IDENTIFICATION

PRODUCT CODE:	MAINDEC-8E-D2AB-D-(D)
PRODUCT TEST:	PDP-8/E TELETYPE AND KL8 ASYNCHRONOUS DATA CONTROL TESTS
DATE:	MAY 14, 1971
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	ED FORTMILLER

1. ABSTRACT

THIS PROGRAM CONSISTS OF A PACKAGE OF TEST PROGRAMS FOR TESTING THE KL8 LOGIC (EIA OR CURRENT) AND A TELETYPE. ONLY ONE TELETYPE MAY BE TESTED AT A TIME. THE TELETYPE TO BE TESTED CAN BE A KRS33, ASR33, KSR35, ASR35, OR KSR37.

THE TEST PROGRAMS ARE:

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

2. REQUIREMENTS

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 SR:
      0110 FOR 110 BAUD, OR
      0150 FOR 150 BAUD, OR
      0300 FOR 300 BAUD, OR
      0600 FOR 600 BAUD, OR
      1200 FOR 1200 BAUD.
   3. PRESS DEPOSIT.

D. REFER TO INDIVIDUAL PROGRAM USE PROCEDURE.

4.2 PRG0 USE PROCEDURE

A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.

B. INSURE THAT TELETYPE IS ON-LINE IF ON THE KL8 BEING TESTED.

C. INSURE THAT THERE IS PAPER IN TELEPRINTER.

D. LOAD ADDRESS 0200.

E. SET SR TO 0000.

F. PRESS CLEAR AND CONTINUE.

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

PRG0 SR OPTIONS:

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

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

4.3 PRG1 USE PROCEDURE

A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.

B. CONNECT EIA OUTPUT TO EIA INPUT, ON THE 40 PIN SIDE CONNECTOR, CONNECT-
PIN E TO PIN M
PIN F TO PIN J

C. LOAD ADDRESS 0200.

D. SET SR TO 0001.

E. PRESS CLEAR AND CONTINUE.

(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=0200. PRESS CONTINUE.

PRG3 SR OPTIONS:

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

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

4.6 PRG4 USE PROCEDURE

A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.

B. INSURE TELETYPE IS ON LINE.

C. LOAD ADDRESS 0200.

D. SET SR TO 0004.

(4,6 CONT'D)

E. PRESS CLEAR AND CONTINUE.

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

PRG4 SR OPTIONS:

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

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

4.7 PRG5 USE PROCEDURE

A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.

B. TURN ON TELETYPE PUNCH.

C. WITH TELETYPE OFF-LINE, PUNCH A SECTION OF BLANK LEADER ABOUT 6 INCHES LONG. RETURN TO ON-LINE POSITION.

D. LOAD LEADER IN READER, LEAVING VERY LITTLE SLACK BETWEEN PUNCH AND READER.

E. TURN ON READER.

F. LOAD ADDRESS 0200.

G. SET SR TO 0005.

H. PRESS CLEAR AND CONTINUE.

I. PROGRAM BEGINS EXECUTION. SET SR5 TO A 1 IF YOU WISH TO STOP ON ERROR. SR5 SET TO A 0 WILL CAUSE PROGRAM TO HALT AT END OF DATA BLOCK IF ERRORS OCCURRED. THE AC WILL CONTAIN THE ERROR COUNT.

J. THE PROGRAM RUNS CONTINUOUSLY, UNTIL STOPPED BY USER.

4.8 PRG6 USE PROCEDURE

A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE. REFER TO SECTION 4.1.

B. INSURE TELETYPE IS ON-LINE.

C. MAKE SURE THAT THE TELETYPE "PROCEED" LIGHT IS ON, IF TESTING A KSR37 KEYBOARD.

D. LOAD ADDRESS 0200.

E. SET SR TO 0006.

F. PRESS CLEAR AND CONTINUE.

G. PROGRAM TITLE IS TYPED, AND PROGRAM HALTS AT LOC 0234 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0000. 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 - 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.

4.9 PRG7 USE PROCEDURE

A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE. REFER TO SECTION 4.1.

B. TURN ON TELETYPE PUNCH.

C. THWITH 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. OCCURRS 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 1524 — AN ILLEGAL BAUD RATE WAS SELECTED. RESELECT THE BAUD RATE AND RESTART PROGRAM.

LOC 2103 — PRG0, PRG1, AND PRG2 UNEXPECTED INTERRUPT ERROR HALT. A DEVICE OTHER THAN THE ONE BEING TESTED WAS CAUSED AN INTERRUPT. THE AC CONTAINS THE IOT CODE THAT DETECTED THE INTERRUPT (EG, 6031 FOR SYSTEM TELETYPE KEYBOARD). PRESS CONTINUE, THE PROGRAM WILL ATTEMPT TO CLEAR THE UNDESIRABLE FLAG. IF SUCCESSFUL, THIS HALT WILL NOT REOCCUR.

LOC 2237 — PRG0, ROUTINE 0, ERROR HALT A. SPF INSTRUCTION FAILED TO SET PRINTER FLAG OR TSF INSTRUCTION FAILED TO SKIP ON PRINTER FLAG SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPF AND THEN TSF CONTINUOUSLY, MANUAL RESTART

LOC 2244 — PRG0, ROUTINE 0, ERROR HALT B. CAF INSTRUCTION FAILED TO CLEAR PRINTER FLAG OR TSF INSTRUCTION SKIPPED ON NO PRINTER FLAG. PRESSING CONTINUE ENTERS SCOPE LOOP THAT SETS PRINTER FLAG WITH SPF, AND THEN CAF AND TSF ARE ISSUED. MANUAL RESTART

LOC 2253 — PRG0, ROUTINE 0, ERROR HALT C. CAF INSTRUCTION FAILED TO CLEAR AC AND/OR LINK. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES CAF WITH AC AND LINK SET. MANUAL RESTART.

LOC 2262 — PRG0, ROUTINE 0, ERROR HALT E. TCF INSTRUCTION FAILED TO CLEAR PRINTER FLAG. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TCF WITH THE PRINTER FLAG SET. MANUAL RESTART.

LOC 2315 — PRG0, ROUTINE 1, ERROR HALT B. WITH THE PRINTER FLAG SET AND THE INTERRUPT ENABLED, NO INTERRUPT OCCURED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT TURNS ON INTERRUPT CONTINUOUSLY. MANUAL RESTART.

LOC 2415 — PRG0, ROUTINE 2, ERROR HALT A. KIE INSTRUCTION FAILED TO DISABLE THE TELETYPE INTERRUPT ENABLE FLIP-FLOP. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KIE CONTINUOUSLY WITH AC 11=0. MANUAL RESTART.

LOC 2427 — PRG0, ROUTINE 2, ERROR HALT B. SPI INSTRUCTION SKIPPED WITH FLAG SET AND TELETYPE INTERRUPT ENABLE FLIP-FLOP DISABLED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPI WITH PRINTER FLAG SET AND TTY INTERRUPT DISABLED MANUAL RESTART.

(6,1 CONT'D)

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

LOC 2442 PRGØ, ROUTINE 2, ERROR HALT D, TSF INSTRUCTION FAILED TO ENABLE TELETYPE IN INPUT FLIP-FLOP. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TSF CONTINUOUSLY WITH ACSSTB. MANUAL RESTART.

LOC 2451 PRGØ, ROUTINE 2, ERROR HALT E, SRQ INSTRUCTION FAILED TO SKIP WITH PRINTER FLAG SET AND TTY INTERRUPT ENABLE FLIP-FLOP ENABLED, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRQ CONTINUOUSLY WITH PRINTER FLAG SET AND INTERRUPT ENABLED, MANUAL RESTART.

LOC 2460 PRGØ, ROUTINE 2, ERROR HALT F, SRQ INSTRUCTION FAILED TO SKIP WITH PRINTER FLAG SET AND TTY INTERRUPT ENABLE FLIP-FLOP SET, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRQ CONTINUOUSLY WITH PRINTER FLAG SET AND TTY INTERRUPT ENABLE FLIP-FLOP ENABLED, MANUAL RESTART.

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

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

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

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

(6,1 CONT'D)

LOC 2607	PRG0, ROUTINE 6, ERROR HALT 4. PRINTER FLAG SET PRIOR TO 9 BIT TIMES, (EG, 110 BAUD: 9X9.09 MSEC = 81.81 MSEC AT WHICH TIME THE FLAG MUST BE SET, NOT PRIOR TO THIS TIME). EITHER THE PDP-8/E TIMING IS TOO SLOW OR THE TTY CLOCK TOO FAST, IS THE SLOW CYCLE JUMPER REMOVED FROM THE PROCESSOR TIMING MODULE AND IS THE CORRECT BAUD RATE SELECTED IN LOC 223). PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY. MANUAL RESTART.
LOC 2614	PRG0, ROUTINE 6, ERROR HALT 5. PRINTER FLAG NOT SET AFTER 9.09 BIT TIMES. (EG, 110 BAUD 9.09X9.09 MSEC = 82.7 MSEC AT WHICH TIME THE FLAG MUST BE SET, NO LATER.) PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY. MANUAL RESTART.
LOC 2655	PRG0, ROUTINE 6, ERROR HALT 6. WHEN ISSUING BACK TO BACK TLS'S, FLAG SETTING PRIOR TO 11 BIT TIMES FOR 150 BAUD OR 10 BIT TIMES FOR MORE THEN 150 BAUD. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY. MANUAL RESTART.
LOC 2662	PRG0, ROUTINE 6, ERROR HALT 7. 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 2665	PRG0, ROUTINE 6, ERROR HALT 8. WITH LINK, ION, AND INT BUS EQUAL TO ZERO, AC DID NOT EQUAL ZERO AFTER ISSUING GTF. NO SCOPE LOOP. MANUAL RESTART.
LOC 2671	PRG0, ROUTINE 6, ERROR HALT 9. GTF INSTRUCTION CLEARED THE LINK. NO SCOPE LOOP. MANUAL RESTART.
LOC 2675	PRG0, ROUTINE 6, ERROR HALT A. GTF INSTRUCTION FAILED TO BRING LINK INTO AC 0. NO SCOPE LOOP. MANUAL RESTART.
LOC 2706	PRG0, ROUTINE 6, ERROR HALT B. GTF INSTRUCTION FAILED TO BRING INT BUS INTO AC 2. NO SCOPE LOOP. MANUAL RESTART.
LOC 2720	PRG0, ROUTINE 6, ERROR HALT C. GTF INSTRUCTION CLEARED ION. NO SCOPE LOOP. MANUAL RESTART.
LOC 2725	PRG0, ROUTINE 6, ERROR HALT D. GTF INSTRUCTION FAILED TO BRING ION INTO AC 4. NO SCOPE LOOP. MANUAL RESTART.
LOC 2744	PRG0, ROUTINE 7, ERROR HALT A. RTF INSTRUCTION FAILED TO RESET LINK WITH AC 2=0. NO SCOPE LOOP. MANUAL RESTART.

(6.1 CONT'D)

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

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

LOC 3020 — 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 3050 — PRG1, ROUTINE 2, ERROR HALT A. SAME AS PRG1, ROUTINE 1, ERROR HALT A.

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

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

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

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

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

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

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

(6,1 CONT'D)

LOC 3257	PRG1, ROUTINE 5, ERROR HALT D, SRC INSTRUCTION SKIPPED WITH NO RECEIVER FLAG SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRC 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 3318	PRG1, ROUTINE 6, ERROR HALT A. RECEIVER FLAG NOT SETTING AT THE END OF 12 BIT TIMES FOR A NON 20MA BAUD DEVICE OR 11 BIT TIMES FOR A 110 BAUD DEVICE. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS 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" KBRQ 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 KBRQ 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 3, 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 3700 — 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 TELE-TYPE BUFFER CONTINUOUSLY. MANUAL RESTART.

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

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

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

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

(6.1 CONT'D)

LOC 4305	PRG2, ROUTINE 12, ERROR HALT 2, 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 1, 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 1, READ ERROR, BAD CHARACTER IN AC. PRESS CONTINUE.
LOC 4432	PRG3, ROUTINE 2, ERROR HALT B, FOLLOW UP HALT, EXPECTED CHARACTER IN AC. PRESSING CONTINUE RESUMES TEST.
LOC 5415	PRG6, ROUTINE 0, KSF COMMAND FAILED TO SKIP ON KEYBOARD FLAG. PRESS CONTINUE TO ENTER SCOPE LOOP THAT SKIPS ON FLAG CONTINUOUSLY.
LOC 5707	PRG10, READ ERROR HALT A, BAD CHARACTER IN AC. PRESS CONTINUE. HALT OCCURS IF SR5=1.
LOC 5712	PRG10, READ ERROR HALT B, FOLLOW UP HALT TO PRG10 READ ERROR HALT A. EXPECTED CHARACTER IS DISPLAYED IN AC. TO PROCEED, PRESS CONTINUE.
LOC 5717	PRG10, ERROR COUNT HALT. HALT OCCURS WHENEVER SR0 IS SET TO A 1. THE AC THEN CONTAINS THE ACCUMULATED ERROR COUNT, IF ANY. TO PROCEED, PRESS CONTINUE.

7. MISCELLANEOUS

7.1 EXECUTION TIME (MINUTES:SECONDS)

	110 CURRENT	110 EIA	150 EIA	300 EIA	600 EIA	1200 EIA
PRG0:	1:31	1:31	1:03	0:32	0:21	0:9
PRG1:	N/A	4:30	3:30	1:45	1:00	0:5[illegible]
PRG2:	2:47	N/A	N/A	N/A	N/A	N/A
PRG3:	10:00	N/A	N/A	N/A	N/A	N/A
PRG4:	20:00	N/A	N/A	N/A	N/A	N/A
PRG5:	CONTINUOUS	N/A	N/A	N/A	N/A	N/A
PRG6:	USER DEP.	N/A	N/A	N/A	N/A	N/A
PRG7:	40:00	N/A	N/A	N/A	N/A	N/A
PRG10:	CONTINUOUS	N/A	N/A	N/A	N/A	N/A
PRG11:	USER DEP.	N/A	N/A	N/A	N/A	N/A
PRG12:	CONTINUOUS	N/A	N/A	N/A	N/A	N/A

7.2 TEST TAPES

MAINDEC-00-D2CS-PT BINARY COUNT PATTERN TEST TAPE IS PROVIDED WITH THIS PROGRAM. FOR CONVENIENCE OF USE, A TAPE LOOP SHOULD BE MADE, MAKING SURE THAT THE PATTERN IS MATCHED AT THE SPLICE POINT.

7.3 TEST EQUIPMENT

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

6. PROGRAM DESCRIPTION

6.1 PRG0 - BASIC OUTPUT LOGIC TESTS

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

RTN0: CHECKS THE ABILITY OF:
SPF TO SET PRINTER FLAG,
TSF TO SKIP ON PRINTER FLAG SET,
CAF TO CLEAR PRINTER FLAG, AC, AND LINK,
TOF TO CLEAR PRINTER FLAG,
TSF TO NOT SKIP ON PRINTER FLAG 2,
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,
SRB TO NOT SKIP WITH NO TTY INTERRUPT REQUEST,
KIE TO ENABLE TTY INTERRUPT ENABLE FLIP-FLOP,
SPI TO SKIP ON A TTY INTERRUPT REQUEST,
SRB 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.

8.2 PRG1 - BASIC EIA INPUT AND OUTPUT LOGIC TESTS

NOTE: ON THE 40 SIN SIDE CONNECTOR: PIN E MUST BE CONNECTED TO PIN M, PIN F MUST BE CONNECTED TO PIN J.

RTN0: CHECKS THAT KCC WILL CLEAR THE AC. TEST IS DONE 100 TIMES.

RTN1: TLS IS USED TO SEND DATA AND KSF CHECKS TO SEE IF THE RECEIVER FLAG SET UPON COMPLETION OF RECEIVING THE DATA. TEST IS DONE 100 TIMES.

RTN2: TEST OF KSF TO SKIP ON RECEIVER FLAG CONSISTENTLY. TEST IS DONE 4000 TIMES.

RTN3: TEST OF KSF TO NOT SKIP ON NO RECEIVER FLAG. TEST IS DONE 300 TIMES.

RTN4: CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT AND THAT THE READER FLAG WILL INTERRUPT. TEST IS DONE 1000 TIMES.

RTN5: CHECKS THE ABILITY OF:

SRQ TO SKIP ON A READER INTERRUPT
SPI TO SKIP ON A READER INTERRUPT
CAF TO CLEAR KBRD/READER FLAG,
SRQ TO NOT SKIP ON NO READER FLAG
SPI TO NOT SKIP ON NO READER FLAG
TEST IS DONE 100 TIMES.

RTN6: CHECKS THAT THE READER FLAG SETS NO LATER THAN THE REQUIRED TIME FOR IT TO SET.

110 BAUD = 100 MSEC.
150 BAUD = 66.7 MSEC.
300 BAUD = 33.3 MSEC.
600 BAUD = 16.7 MSEC.
1200 BAUD = 8.33 MSEC.
TEST IS DONE 100 TIMES.

RTN7: CHECKS DATA HANDLING CAPABILITIES BY SENDING A NUMBER FOLLOWED BY ITS COMPLEMENT. TEST IS DONE 512 TIMES.

RT10: CHECKS DATA HANDLING CAPABILITIES BY SENDING RANDOM NUMBERS. TEST IS DONE 512 TIMES.

RTN11: CHECKS THAT KRS CAN "INCLUSIVE OR" READER BUFFER WITH AC. TEST IS DONE 500 TIMES.

RTN12: CHECKS THAT KRB WILL "JAM TRANSFER" RECEIVER BUFFER TO AC, AND THAT KRB WILL CLEAR READER FLAG. TEST IS DONE 500 TIMES.

8.3 PRG2 - BASIC INPUT LOGIC TESTS

THIS PROGRAM CONTAINS 11 ROUTINES NUMBERED FROM 3 TO 12 (OCTAL).

RTN03: CHECKS THAT KCC COMMAND IS ABLE TO CLEAR THE AC. TEST IS DONE 1000 TIMES.

RTN11: ISSUES KCC, WAITS 200MS AND CHECKS THAT FLAG IS SET. A FAILURE TO SKIP INDICATES THAT THE FLAG IS NOT SET, OR THAT KSF COMMAND FAILED TO SKIP.

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

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

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

RTN51: TIMING TEST.

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

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

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

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

RTN121: CHECKS THAT KRB CAN CLEAR THE READER FLAG AND THAT KRB CAN SET THE FLAG. ALSO KRB IS CHECKED FOR READING DATA. TEST IS DONE 256 TIMES.

8.4 PRG3 - READER TEST

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM Ø TO 2.

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

RTN1: READS 2000 CHARACTERS FO 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 46 ROUTINES NUMBERED FROM Ø TO 56 (OCTAL).

RTNØ: 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 ==== FOLLOWED BY CHARACTERS I=,

RTN2: SPACE TEST. THE TEST PRINTS / IN ALTERNATE POSITIONS OF THE LINE. AFTER A DOUBLE CARRIAGE RETURN IT SCANES 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 61 SLASHES HAVE BEEN PRINTED. THE RESULT SHOULD APPEAR TO BE A LEFT SLANTED LINE FROM POSITION 1 TO 61. VERTICAL SPACING VARIATIONS SHOULD BE APPARENT IF ADJUSTMENT IS REQUIRED.

(8,5 CONT'D)

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

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

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

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

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

THE ASR33 WORST CASE PATTERN USED IS 'LEFT ARROW W/W LEFT ARROW.

(8.5 CONT'D)

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

THE ASY35 WORST CASE PATTERN USED IS (?%?(

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 G, CAPITAL A, SWING DASH, CAPITAL J, LOWER CASE O.

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. READING A RUBOUT ENDS THE TEST.

8.8 PRG7 - COMBINED READER, PRINT, PUNCH TEST

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

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

(6.8 CONT'D)

```
        RTN0:   PUNCH/PRINT AND READ CHECK BLOCK OF ABC
        RTN1:   PUNCH/PRINT AND READ CHECK BLOCK OF DEF
        RTN2:   PUNCH/PRINT AND READ CHECK BLOCK OF GHI
        RTN3:   PUNCH/PRINT AND READ CHECK BLOCK OF JKL
        RTN4:   PUNCH/PRINT AND READ CHECK BLOCK OF MNO
        RTN5:   PUNCH/PRINT AND READ CHECK BLOCK OF PQR
        RTN6:   PUNCH/PRINT AND READ CHECK BLOCK OF STU
        RTN7:   PUNCH/PRINT AND READ CHECK BLOCK OF VWX
        RTN10:  PUNCH/PRINT AND READ CHECK BLOCK OF YZ0
        RTN11:  PUNCH/PRINT AND READ CHECK BLOCK OF 123
        RTN12:  PUNCH/PRINT AND READ CHECK BLOCK OF 456
        RTN13:  PUNCH/PRINT AND READ CHECK BLOCK OF 789
        RTN14:  PUNCH/PRINT AND READ CHECK BLOCK OF +-*
        RTN15:  PUNCH/PRINT AND READ CHECK BLOCK OF /=(
        RTN16:  PUNCH/PRINT AND READ CHECK BLOCK OF )$.
        RTN17:  PUNCH/PRINT AND READ CHECK BLOCK OF ,='
        RTN20:  PUNCH/PRINT AND READ CHECK BLOCK OF :#@
        RTN21:  PUNCH/PRINT AND READ CHECK BLOCK OF '="
        RTN22:  PUNCH/PRINT AND READ CHECK BLOCK OF ¢.[
        RTN23:  PUNCH/PRINT AND READ CHECK BLOCK OF <(+
        RTN24:  PUNCH/PRINT AND READ CHECK BLOCK OF !$*
        RTN25:  PUNCH/PRINT AND READ CHECK BLOCK OF );¬
        RTN26:  PUNCH/PRINT AND READ CHECK BLOCK OF -/,
        RTN27:  PUNCH/PRINT AND READ CHECK BLOCK OF |%_
        RTN30:  PUNCH/PRINT AND READ CHECK BLOCK OF >?"
        RTN31:  PUNCH/PRINT AND READ CHECK BLOCK OF ALL PRINTABLE CHARACTERS
        RTN32:  PUNCH/PRINT AND READ CHECK BLOCK OF 1403 PRINTER
                WORST CASE PATTERN (+W/)
        RTN77:  PUNCH/PRINT AND READ CHECK BLOCK OF 1403 PRINTER
                WORST CASE PATTERN, ( CYC)
        RTN99:  PUNCH/PRINT AND READ CHECK BLOCKS OF SPACE,
                RUBOUT (DATA:  ALL 1'S, ALL 1'S, ALL 0'S).
```

6.9 PRG7 - READER EXERCISER, BINARY COUNT PATTERN

THE PROGRAM READS AND CHECKS A BINARY COUNT PATTERN TEST TAPE, WITH PROGRAM RUNNING SETTING SWR TO A 1 CAUSES PROGRAM TO HALT AND DISPLAY THE ACCUMULATED ERROR COUNT IN AC, SR2 SET TO A 1 GIVES FULL SPEED READING, SR3 SET TO A 0 CAUSES STALLS BETWEEN CHARACTERS. SR4 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.

6.10 PRG10 - PRINTER EXERCISER

THIS PROGRAM CONTINUOUSLY TYPES LINES OF ANY 2 CHARACTERS KEYED BY USER. ON PROGRAM REQUEST THE USER KEYS IN THE 2 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.

6.11 PRG11 - TAPE GENERATOR - BINARY COUNT PATTERN

PUNCHES BINARY COUNT PATTERN TEST TAPE.

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

                /COPYRIGHT 1971, DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS. 01754
                /
                /PRG0=BASIC OUTPUT CONTROL LOGIC TEST
                /PRG1=BASIC OUTPUT AND INPUT LOGIC TEST (LOOP AROUND)
                /PRG2=BASIC INPUT CONTROL LOGIC TEST - (USES READER)
                /PRG3=READER TEST
                /PRG4=PRINTER TEST
                /PRG5=PUNCH TEST
                /PRG6=KEYBOARD TEST
                /PRG7=COMBINED TEST
                /PRG10=READER EXERCISER, BINARY COUNT PATTERN,
                /PRG11=PRINTER EXERCISER,
                /PRG12=TAPE GENERATOR, BINARY COUNT PATTERN,
                /
                /
                /*****************************************************************
                /BIT TIME TABLE)
                /0110 BAUD       11 BITS @ 9.09 MSEC = 100 MSEC
                /0150 BAUD       10 BITS @ 6.67 MSEC = 66.7 MSEC
                /0300 BAUD       10 BITS @ 3.33 MSEC = 33.33 MSEC
                /0600 BAUD       10 BITS @ 1.67 MSEC = 16.67 MSEC
                /1200 BAUD       10 BITS @  .833 MSEC = 8.33 MSEC
                /*****************************************************************
                /
6001    ION=6001                        /TURN INTRRUPT ON.
6002    IOF=6002                        /TURN INTERRUPT OFF.
6003    SRQ=6003                        /SKIP IF INTERRUPT REQUEST.
6004    GTF=6004                        /GET INTERRUPT FLAGS
6005    RTF=6005                        /RESTORE INTERRUPT FLAGS AND TURN INTERRUPT ON
6007    CAF=6007                        /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT
6030    KCR=6030                        /CLEAR KBRD FLAG BUT DO NOT SET ROR RUN
6031    KSF=6031                        /SKIP IF KEYBOARD/READER FLAG = 1.
6032    KCC=6032                        /CLEAR AC AND KBRD/READER FLAG, SET READER RUN.
6034    KRS=6034                        /READ KEYBOARD/READER BUFFER STATIC
6035    KIE=6035                        /ENABLE TTY INTERRUPT WHEN AC11 EQUALS 1
6036    KRB=6036                        /CLEAR AC, READ KEYBOARD BUFFER, CLEAR
                                        /KEYBOARD FLAGS.
6040    SPF=6040                        /SET PRINTER FLAG
6041    TSF=6041                        /SKIP IF TELEPRINTER/PUNCH FLAG = 1.
6042    TCF=6042                        /CLEAR TELEPRINTER/PUNCH FLAG.
6044    TPC=6044                        /LOAD TELEPRINTER/PUNCH BUFFER
                                        /SELECT AND PRINT.
6045    SPI=6045                        /SKIP IF TTY INTERRUPT
6046    TLS=6046                        /LOAD TELEPRINTER/PUNCH BUFFER,
                                        /SELECT AND PRINT AND CLEAR
                                        /TELEPRINTER/PUNCH FLAG.


7002    BSW=7002                        /SWAP BYTES IN AC.
7421    MQL=7421                        /LOAD MQ FROM AC THEN CLEAR AC.
7621    CAM=7621                        /CLEAR AC AND MQ.
7701    ACL=7701                        /LOAD MQ INTO AC.

0000    OPEN=0                          /PROGRAM MODIFABLE.
```

```
                4577    SETLOC=JMS I [STCTR
                4576    DELAY=JMS I [DLYMS
                4575    CRLF=JMS I [CRALF
                4574    MOVE=JMS I [MOVVE
                4573    TYPE=JMS I [TYPSTG
                6117    MTON=6117                       /DC02, MULTIPLE TTY ON.
                6127    MTRS=6127                       /DC02, MULTIPLE TTY READ STATUS.
                6115    MINT=6115                       /DC02, MULTIPLE TTY INTERRUPT CONTROL.
                4572    UKSF=JMS I [XKSF
                4571    UKCC=JMS I [XKCC
                4570    UKRS=JMS I [XKRS
                4567    UKRB=JMS I [XKRB
                4566    UTSF=JMS I [XTSF
                4565    UTCF=JMS I [XTCF
                4564    UTPC=JMS I [XTPC
                4563    UTLS=JMS I [XTLS
                4562    UKCR=JMS I [XKCR
                4561    UKIE=JMS I [XKIE
                4560    USPF=JMS I [XSPF
                4557    USPI=JMS I [XSPI
                4556    STALL=JMS I [STAL
                4555    CKSR37=JMS I [CK37
                4554    CKSR33=JMS I [CK33
                4553    CKSR35=JMS I [CK35
                6577    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    RRPP=0304

                0000    *0
          0000  0000            0000
          0001  5001            JMP 1
          0002  0002            2
          0003  0003            3
                0005    *5
          0005  5402            JMP I 2
          0006  0000            0
                0016    *16
          0016  0000            OPEN            /AUTO INDEX.
                0020    *20
          0020  0000    TTYTYP, OPEN
          0021  0304    TTYIOT, RRPP            /CONSTANT TO DETERMINE IOT CODE
                                                /PRESET FOR 23 READER AND 24 PUNCH.
                                                /TO CHANGE IOT CODE SET THIS LOCATION
                                                /TO: "RRPPP"  WHERE RR IS FOR
                                                /THE READER AND PP IS FOR THE PUNCH.
          0022  0110    BAUDRT, 110             /CONSTANT TO DETERMINE DELAY
                                                /PRESET FOR     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.
                                        /**THE ABOVE ARE THE ONLY LEGAL BAUD RATES**

0023  0000    START,  OPEN              /USER PROGRAM START.
0024  0000    DELAYM, OPEN
0025  0263    CHAIN,  CHAINN            /CHAIN RTN ENTRY.
0026  1363    KFLAG,  KFLAG
0027  0474    CLCNT,  CLCNT
0030  2012    S100,   S100I
0031  2000    S4000,  S4000I
0032  2005    S200,   S200I
0033  2126    TLCALL, TLCALI
0034  2134    TLC37,  TLC37I
0035  2144    PBF,    PBFI
0036  0000    PRGNUM, OPEN
0037  2200    PRGTAB, PRG0
0040  3000            PRG1
0041  3503            PRG2
0042  4307            PRG3
0043  4434            PRG4
0044  5274            PRG5
0045  5340            PRG6
0046  5465            PRG7
0047  5651            PRG10
0050  5722            PRG11
0051  5764            PRG12
0052  0000    TEMP,   OPEN              /WORK
0053  0000    TEMP1,  OPEN              /LOCATIONS
0054  0000    CURTST, OPEN              /FOR CURRENT TEST ADDRESS
0055  0000    RTNNO,  OPEN              /FOR CURRENT TEST NUMBER
0056  0000    NXTST,  OPEN              /FOR NEXT TEST ADDRESS
0057  0000    MSCTR,  OPEN              /MILLISECONDS COUNTER
0060  0000    MILCTR, OPEN
0061  0000    MIL1,   OPEN              /7372 FOR  110 BAUD.
                                        /7522 FOR  150 BAUD.
                                        /7652 FOR  300 BAUD.
                                        /7726 FOR  600 BAUD.
                                        /7754 FOR 1200 BAUD.
0062  0000    CTRA,   OPEN              /COUNTER A.
0063  0000    CTRB,   OPEN              /COUNTER B.
0064  0000    STLID,  OPEN
0065  0530    SYNC,   SYNK              /ENTRY TO SYNC TAPE RTN.
0066  2436    INPATT, IBIN              /ENTRY TO INITIATE PATTERN
0067  2444    GETPT,  GTBIN             /ENTRY TO GET PATTERN CHAR.
0070  2513    CHECK,  CHCK
0071  0000    PFLAG,  0
0072  1271    UOUT,   OUT
0073  1615    UTPLN3, TYPLN3
0074  2112    UPUNCH, PUNCH
0075  0600    UMOVE,  MOVVE
```

```
0076  0000    RBUSY,  0
0077  0000    AC,     0
0100  0000    LINK,   0
0101  0000    CLKCNT, 0
0102  0000    DELAYS, 0
0103  0000    ERRCR,  0
0104  0000    UTEMP,  0
0105  0000    UTEMP1, 0
0106  0000    UTEMP2, 0
0107  0215    CR,     215             /CARRIAGE RETURN
0110  0212    LF,     212             /LINE FEED
0111  0377    CLYMSK, 377
0112  0000    MTS6A,  OPEN


                /CONTROL ROUTINE
        0200    *200
0200  7615    START,  SKP CLA
0201  7402            HLT             /INCORRECT PROGRAM NUMBER
0202  7621            CAM             /CLEAR AC AND MQ.
0203  4777            JMS SETRND      /SET UP RANDOM NUMBERS
0204  4776            JMS STBAUD      /SET UP LOC WHERE FOR SELECTED BAUD RATE.
0205  7664    BONET,  LAS             /READ SR
0206  0157            AND C17         /PROGRAM MASK = 17
0207  1131            TAD C-25        /-PROGRAM LIMIT + -25
0210  7540            SMA SZA         /VALID PROGRAM NUMBER?
0211  5201            JMP STARTP1     /NO.
0212  7664            LAS             /YES, READ SR.
0213  0157            AND C17
0214  3232            DCA PRGNUM      /SAVE PROGRAM NUMBER.
0215  1232            TAD PRGNUM      /DEVELOP PROGRAM START
0216  1156            TAD CPRSTAB     /ADDRESS AND STORE IT
0217  3233            DCA TEMP        /PRGADR.
0220  1432            TAD I TEMP
0221  3235            DCA PRGADR
0222  4775            JMS DVCSEL      /PERFORM IOT SELECTION
0223  7664    SLOOP2, LAS             /SELECT DCD2 UNIT
0224  0147            AND F77#9
0225  6117            MTON
0226  7201            CLA IAC
0227  6115            MINT            /ENABLE DCD2 INTERRUPT
0230  4475            JMS I UMOVE     /INITIALIZE
0231  0005            5               /INT&CNTR*.
0232  2001            1               /AREA.
0233  7776            -2
0234  5635            JMP I .+1
0235  0000    PRGADR, OPEN
0236  7602    SRSET,  HLT CLA
0237  7200    GETRDY, CLA
0240  1023            TAD KSTART      /SET ADDRESS OF LST ROUTINE
0241  3056            DCA NXTST       /STORE AT NXTST
0242  4302            JMS FORWD
0243  7624            LAS             /READ SR
0244  7004            RAL
0245  7500            SMA             /ROUTINE SE   T? (SR1)
```

```
0246  5454            JMP I CURTST    /NO,  START WITH 1ST RTN
0247  7604            LAS             /YES
0250  3146            AND C77         /SF 6-11 ENABLE MASK.
0251  7041            CIA
0252  1055            TAD RTNNO
0253  7650            SNA CLA         /IS IT THIS RTN?
0254  5454            JMP I CURTST    /YES,  GO DO IT
0255  1056            TAD NXTST       /NO
0256  7001            IAC             /IS THIS LAST TRN?
0257  7640            SZA CLA         /NO
0260  5242            JMP GETRDY+3
0261  7402    INCRTN, HLT             /YES,  INCORRECT ROUTINE NO.
0262  5237            JMP GETRDY

0263  6317    CHAINN, JMS SHALT       /HALT? (SR0)
0264  7604            LAS             /READ SR
0265  7006            RTL
0266  7630            SZL CLA         /SELECT ROUTINE? (SR1)
0267  5237            JMP GETRDY      /YES
0270  1056            TAD NXTST
0271  7001            IAC
0272  7640            SZA CLA         /LAST ROUTINE?
0273  5242            JMP GETRDY+3    /NO.
0274  7604            LAS
0275  7006            RTL
0276  7710            SPA CLA         /LOOP PROGRAM? (SR2)
0277  5237            JMP GETRDY      /YES
0300  7402    PRGEND, HLT             /END OF PROGRAM HALT
0301  5263            JMP CHAINN

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

0317  0000    SHALT,  0
0320  7604            LAS             /READ SR
0321  7700            SMA CLA         /HALT? (SR0)
0322  5717            JMP I SHALT
0323  1055            TAD RTNNO
0324  7402            HLT             /UNCONDITIONAL HALT (SR0 = 1)
0325  5717            JMP I SHALT     /EXIT.

0326  0000    STCTR,  0
0327  7200            CLA
0330  1726            TAD I STCTR     /GET CTR ADDR
```

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0331  3852            DCA TEMP          /AND SAVE AT TEMP
0332  2326            ISZ STCTR
0333  1726            TAD I STCTR       /GET COUNT AND
0334  3452            DCA I TEMP        /STORE PER C(TEMP)
0335  2326            ISZ STCTR
0336  5726            JMP I STCTR       /EXIT

0337  0000  DLYMS,    0
0340  7300            CLA CLL
0341  1024            TAD DELAYM        /GET MS COUNT
0342  3057            DCA MSCTR         /STORE IN MSCTR
0343  1061            TAD MIL1          /GET CONSTANT
0344  3060            DCA MILCTR        /STORE IN MILCTR
0345  2060            ISZ MILCTR        /DELAY FINISHED?
0346  5345            JMP .-1
0347  2057            ISZ MSCTR         /DONE DELAYING
0350  5343            JMP .-5
0351  5737            JMP I DLYMS       /EXIT
0352  0000  CK33,     OPEN              /SUB TO CHECK FOR 33 TTY
0353  7200            CLA
0354  1030            TAD TTYTYP        /GET TTY TYPE
0355  7430            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  1030            TAD TTYTYP        /GET TTY TYPE
0363  7630            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  1030            TAD TTYTYP        /GET TTY TYPE,
0371  7630            SNA CLA           /37?
0372  2366            ISZ CK37          /YES,
0373  5766            JMP I CK37
0375  0000
0376  0504
0377  1742
      2400            PAGE


      2400            PAGE
0400  0000  RGNA,     OPEN              /RANDOM NUMBER SUB A,
0401  7302            CLA CLL
0402  1215            TAD RP1A
0403  7006            RTL
0404  1216            TAD RP2A
0405  3215            DCA RP1A
0406  1215            TAD RP1A
0407  7006            RTL
0410  1216            TAD RP2A
1411  7026            RTL
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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,     OPDN              /RANDOM NUMBER SUB B.
0420  7300            CLA CLL
0421  1234            TAD RP1B
0422  7020            RTL
0423  1235            TAD RP2B
0424  3234            DCA RP1B
0425  1234            TAD RP1B
0426  7020            RTL
0427  1235            TAD RP2B
0430  7000            RTL
0431  3235            DCA RP2B
0432  1234            TAD RP1B
0433  5617            JMP I RGNB        /EXIT RGNB SUB
0434  1233  RP1B,     1233
0435  7622  RP2B,     7622

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

                      /SUBROUTINE TO PROVIDE NEXT BINARY COUNT PATTERN CHARACTER (IN AC)
0444  0000  GTBIN,    0
0445  7200            CLA
0446  1242            TAD PT0           /GET PT0
0447  3243            DCA PT1           /STORE AT PT1
0450  1243            TAD PT1           /GET PT1
0451  7001            IAC               /INCREMENT ACCUMULATOR
0452  0345            AND C377          /LIMIT TO 8 BITS
0453  3242            DCA PT0           /STORE AT PT0
0454  1243            TAD PT1           /GET PT1
0455  5644            JMP I GTBIN       /EXIT

                      /SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT.  (NOT MORE THAN 77(8))
0456  0000  CHRCNT,   0
0457  4203            JMS RGNA          /GO GENERATE RANDOM NUMBER
0460  0146            AND C77           /REMOVE HIGH ORDER 6 BITS
0461  7450            SNA
0462  5257            JMP CHRCNT+1
0463  7041            CIA               /2'S COMPLEMENT IT
0464  3273            DCA SCNT
0465  1656            TAD I CHRCNT
0466  3252            DCA TEMP
0467  1273            TAD SCNT
0470  3452            DCA I TEMP        /STORE AT SPECIFIED ADDRESS
0471  2256            ISZ CHRCNT        /SET UP EXIT
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        0472  5656              JMP I CHRCNT    /EXIT
        0473  0000      GCNT,   OPEN

                        /SUBROUTINE TO GENERATE RANDOM DELAY COUNT (NOT MORE THAN 3777(8)).
        0474  0000      DLCNT,  0
        0475  4200              JMS RGNA        /GO GENERATE RANDOM NUMBER
        0476  0111              AND DLYMSK      /MASK OUT UNDESIRED BITS.
        0477  7450              SNA             /ZERO?
        0500  5275              JMP DLCNT+1     /YES, GET ANOTHER NUMBER
        0501  7041              CIA             /2'S COMPLEMENT IT
        0502  3024              DCA DELAYM
        0503  5674              JMP I DLCNT     /EXIT

                        /SUBROUTINE TO ASSIST IN SETTING UP MIL1 FOR DELAYS.
        0504  0000      STBAUD, OPEN
        0505  4777'             JMS SETBAU      /GO TO SETBAU
        0506  7632              -150            / 150 BAUD.
        0507  7500              -300            / 300 BAUD.
        0510  7200              -600            / 600 BAUD.
        0511  6600              -1200           /1200 BAUD.
        0512  7672              -110            / 110 BAUD.

                        /SUBROUTINE TO COMPARE C(AC) TO CONTENTS STORED AT CALL+1
        0513  0000      CHCK,   0
        0514  3327              DCA WCHK        /STORE AC AT WCHK
        0515  1713              TAD I CHCK      /GET COMPARE DATA
        0516  7041              CIA             /2'S COMPLEMENT IT
        0517  1327              TAD WCHK        /ADD C(WCHK)
        0520  2313              ISZ CHCK        /SET UP FOR UNEQUAL EXIT
        0521  7640              SZA 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 AND FLAG
        0535  4572              UKSF            /READY?
        0536  5335              JMP .-1         /NO, TEST AGAIN
        0537  4570              UKRS            /YES, READ
        0540  1144              TAD (-377
        0541  7640              SZA CLA         /377?
        0542  7410              SKP
        0543  5730              JMP I SYNK      /YES,  EXIT
        0544  2350              ISZ CTSK        /BUMP CHAR CTR +1
        0545  5334              JMP SYNKA       /GO READ AGAIN
        0546  7402              HLT             /256 CHARS READ.  CAN'T SYNC
        0547  5331              JMP SYNK+1      /GO TO SRST
```

```
        0550  0000      CTSK,   0               /CHAR COUNTER
        0551  0000      STAL,   OPEN
        0552  7200              CLA
        0553  1064              TAD STLIC
        0554  7700              SMA CLA         /STALL?
        0555  5751              JMP I STAL      /NO, EXIT
        0556  4276              JMS DLCNY       /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  0230              CARLF
        0571  2361              ISZ CRCTR
        0572  5367              JMP .-3
        0573  5762              JMP I CRALF
        0577  1513
              0600              PAGE


              0600              PAGE
                        /SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS
        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
        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
```

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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 DATA
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  0166          AND E77           /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  TYPAT,  JMS PRINT         /NO, PRINT IT,
0655  5643          JMP I TSC2        /RETURN,
0656  2316          ISZ FLAG          /SET "SPECIAL" FLAG,
0657  5643          JMP I TSC2        /EXIT
0660  3316  TYPSP,  DCA FLAG          /CLEAR FLAG,
0661  1315          TAD TEMR          /TEST FOR 0,
0662  7450          SNA               /0?
0663  5643          JMP I TSC2        /IGNORE IT,
0664  1377          TAD (-77
0665  7650          SNA CLA           /77?
0666  5626          JMP I TYPSTG      /YES, EXIT CODE,
0667  1315          TAD TEMR
0670  5254          JMP TYPAT

0671  0000  PRINT,  OPEN
0672  1376          TAD (-45
0673  7640          SZA CLA           /IS IT 45?
0674  5300          JMP .+4           /NO,
0675  1107          TAD CR            /YES, PRINT CR
0676  4474          JMS I UPUNCH
0677  5671          JMP I PRINT
0700  1315          TAD TEMR
0701  1375          TAD (-43
0702  7640          SZA CLA           /IS IT 43?
0703  5306          JMP .+3           /NO,
0704  1110          TAD LF            /YES, TYPE LF
0705  5276          JMP PRINT+5
0706  1315          TAD TEMR
0707  1374          TAD (-40
0710  7510          SPA
0711  1143          TAD C100
0712  1142          TAD C240
0713  5276          JMP PRINT+5
0714  0000  TEMQ,   OPEN
0715  0000  TEMR,   OPEN
0716  0000  FLAG,   OPEN
```

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

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

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

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

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

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

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

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

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

0765  0000    XSPI,   OPEN            /SUB TO ISSUE SPI,
0766  6045            SPI             /
0767  5765            JMP I XSPI      /NO SKIP
0770  2365            ISZ XSPI
0771  5765            JMP I XSPI      /EXIT

0774  7740
0775  7735
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```
0776  7733
0777  7701
      1000            PAGE



      1000      PAGE
1000  0000      STBF,   OPEN              /SUB TO SET UP BUFFER AREA.
1001  4574              MOVE              /CRLF TO BLOCKA.
1002  0107              CR
1003  6577              BLOCKA
1004  7776              -2
1005  4555              CKSR37            /KSR37?
1006  3220              JMP ST33          /NO.
1007  4574              MOVE              /CRLF TO BLKBB
1010  0107              CR
1011  6722              BLKBB
1012  7776              -2
1013  4574              MOVE              /CRLF TO BLKCC.
1014  0107              CR
1015  7034              BLKCC
1016  7776              -2
1017  5600              JMP I STBF        /EXIT STBF

1020  4574      ST33,   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+3.
1033  1631              TAD I FBF3
1034  3237              DCA .+3
1035  2231              ISZ FBF3
1036  4574              MOVE
1037  0000              OPEN
1040  6601              BLOCK1
1041  7775              -3
1042  4555              CKSR37            /37?
1043  5255              JMP FBF33         /NO.
1044  4574              MOVE              /YES.
1045  6601              BLOCK1
1046  6604              BLOCK1+3
1047  7662              -116
1050  4574              MOVE
1051  6601              BLOCK1
1052  6724              BLK2
1053  7657              -121
1054  5631              JMP I FBF3        /EXIT FBF3.
1055  4574      FBF33,  MOVE
```

```
1056  6601            BLOCK1
1057  6604            BLOCK1+3
1060  7673            -125
1061  4574            MOVE
1062  6601            BLOCK1
1063  6713            BLOCK2
1064  7670            -110
1065  5631            JMP I FBF3      /EXIT FBF3.

1066  0000  FBALL,     OPEN            /FILL BUFFER WITH ALL CHARACTERS
1067  4555            CKSR37          /KSR37?
1070  5302            JMP FBA33       /NO.
1071  4574            MOVE            /YES.
1072  6107            A
1073  6601            BLOCK1
1074  7657            -121
1075  4574            MOVE
1076  6601            BLOCK1
1077  6724            BLK2
1100  7657            -121
1101  5666            JMP I FBALL     /EXIT FBALL.
1102  4574  FBA33,     MOVE
1103  6107            A
1104  6601            BLOCK1
1105  7701            -77
1106  4574            MOVE
1107  6107            A
1110  6700            BLOCK1+77
1111  7767            -11
1112  4574            MOVE
1113  6601            BLOCK1
1114  6713            BLOCK2
1115  7670            -110
1116  5666            JMP I FBALL     /EXIT FBALL

1117  0000  FW336,     0
1120  4574            MOVE            /MOVE 6 CHARACTERS ARS33 PRINTER
1121  6065            A33WP6          /WORST CASE PATTERN TO
1122  6601            BLOCK1          /BLOCK1
1123  7772            -6
1124  4574            MOVE            /FILL BLOCKS WITH PATTERN
1125  6601            BLOCK1
1126  6607            BLOCK1+6
1127  7676            -102
1130  4574            MOVE
1131  6601            BLOCK1
1132  6713            BLOCK2
1133  7670            -110
1134  5717            JMP I FW336     /EXIT

1135  0000  FW356,     0
1136  4574            MOVE            /MOVE 6 CHARACTER 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 (SR37 PRINTER
1154  4574            MOVE            /WORST CASE PATTERN TO BLOCK1.
1155  6101            A37WP6
1156  6601            BLOCK1
1157  7772            -6
1160  4574            MOVE            /FILL BUFFER WITH PATTERN
1161  6601            BLOCK1
1162  6607            BLOCK1+6
1163  7665            -113
1164  5753            JMP I FW376     /EXIT

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

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

      1200            PAGE



      1200            PAGE
                /PUNCH 70 (CODE 376) CHARACTERS SUBROUTINE
1200  0000  PL7LR,    0
1201  4577            SETLOC          /SET P70CTR TO -70
1202  1211            P70CTR
1203  7672            -106
1204  1377            TAD (376        /GET 376 CODE
1205  4474            JMS I UPUNCH    /GO PUNCH IT
1206  2211            ISZ P70CTR      /ALL CHARACTERS PUNCHED?
1207  5204            JMP .-3         /NO, REPEAT.
1210  5600            JMP I PL7LR     /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  4345          JMS RRDY        /WAIT FOR READER NOT BUSY
1223  7240          CLA CMA         /READER NOT BUSY,
1224  3076          DCA RBUSY       /SET READER BUSY INDICATOR
1225  4577          SETLOC          /SET READER INTERRUPT
1226  1267          VCTR            /SERVICE RETURN ADDRESS,
1227  1233          RSSERV
1230  6001          ION             /ENABLE INTERRUPT
1231  5616          JMP I RSYNC     /EXIT
1232  0000  RSCTR,  0

1233  6036  RSSERV, KRB            /READ
1234  1144          TAD [-377       /ADD MINUS RUBOUT
1235  7640          SZA CLA         /IS IT A RUBOUT?
1236  5245          JMP .+7         /NO,
1237  3076          DCA RBUSY       /YES, CLEAR READER BUSY,
1240  7300          CLA CLL
1241  1100          TAD LINK
1242  7004          RAL             /RESTORE LINK
1243  1077          TAD AC          /RESTORE AC
1244  5466          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  2101            BLKCNT
1305  1341            PCTR
1306  7777            -1
1307  5677            JMP I PSTUP     /EXIT

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

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

1324  0000  PBLKR,    0               /PUNCH DATA BLOCK RANDOM STALLS.
1325  4277            JMS PSTUP       /GO DO SET UP
1326  4776'           JMS RGNB        /GET A RANDOM NUMBER
1327  7411            AND OLYMSK      /REMOVE EXCESS BITS
1330  7406            SNA             /ERO?
1331  5326            JMP .-3         /YES, GET ANOTHER NUMBER
1332  7041            CIA             /NO, 2'S COMPLEMENT IT.
1333  3034            DCA DELAYR      /PUT NUMBER IN DEL. CT
1334  4576            DELAY           /DELAY.
1335  4310            JMS PDCR        /GO PUNCH CHARACTER
1336  2341            ISZ PCTR        /ALL CHARS PUNCHED?
1337  5326            JMP PBLKR+2     /NO, REPEAT
1340  5724            JMP I PBLKR     /YES, EXIT.
1341  0000  PCTR,     0
1342  0000  PADDR,    0

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

1351  0000  RSTUP,    0
1352  4343            JMS RRDY        /WAIT FOR RDR NOT BUSY
1353  2076            ISZ RBUSY       /SET RBUSY INDICATOR
1354  4577            SETLOC          /SET DATA ADDR
1355  1416            RADDR
1356  6577            BLOCKA
1357  4574            MOVE            /SET DATA BLOCK LENGTH
1360  2101            BLKCNT
1361  1417            RBCTR
1362  7777            -1
1363  3775'           DCA ERRCTR      /CLEAR ERRO.  JUNTER
```

```
          1364  5751            JMP I RSTUP     /EXIT.

                        /ROUTINE TO SET KEYBOARD FLAG.

          1365  0000    KFLAG,  OPEN
          1366  6571            UKCC
          1367  6572            UKSF
          1370  5367            JMP .-1
          1371  5765            JMP I KFLAG     /EXIT WITH KEYBOARD FLAG SET.

          1375  5721
          1376  0417
          1377  2379
                1400            PAGE



                1400            PAGE
          1400  0000    RDBLK,  0               /READ DATA BLOCK, FULL SPEED
          1401  4777'           JMS RSTUP       /GO DO SETUP
          1402  6577            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  6577            SETLOC          /SET READER SERVICE
          1412  1267            VCTR            /ADDRESS.
          1413  1430            RDRSRV
          1414  6001            ION             /ENABLE INT.
          1415  5607            JMP I RDBLKR    /EXIT
          1416  0000    RADDR,  0
          1417  0000    RSCTR,  0

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

          1440  3103    ERROR,  DCA ERRCR       /STORE BAD CHARACTER
```

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1441  2775'           ISZ ERRCTR      /INCREMENT ERROR COUNTER
1442  5245            JMP .+3
1443  7240            CLA CMA         /OFLOW, 7777 TO AC
1444  3775'           DCA ERRCTR      /RESTORE TO 7777.
1445  7604            LAS             /READ SR
1446  0143            AND C100
1447  7650            SNA CLA         /HALT ON ERROR?(SR5)
1450  5254            JMP RUDONE      /NO.
1451  1135            TAD ERRCR       /YES, GET BAD CHARACTER
1452  7402            HLT             /ERROR HALT, BAD CHAR IN AC
1453  7200            CLA
1454  1235            TAD SB
1455  7402            HLT             /GOOD CHAR IN AC
1456  2217   RUDONE,  ISZ RSCTR       /ALL DONE?
1457  5472            JMP I OOUT      /NO, TO MAINLINE
1460  7200            CLA             /YES,
1461  1775'           TAD ERRCTR      /GET C(ERRCTR)
1462  7650            SNA CLA         /ANY ERRORS?
1463  5266            JMP .+3         /NO.
1464  1775'           TAD ERRCTR      /YES,
1465  7402            HLT             /NUMBER OF ERRORS IN AC.
1466  7300            CLA CLL
1467  3076            DCA RBUSY       /CLEAR RBUSY INDICATOR
1470  1100            TAD LINK
1471  7004            RAL             /RESTORE LINK
1472  1077            TAD AC          /TO MAINLINE
1473  5400            JMP I 0

1474  0000   DLMSR,   0
1475  7300            CLA CLL
1476  1102            TAD DELAYS      /GET AND STORE MSEC
1477  3311            DCA RCTRA       /DELAY COUNT
1500  5701            JMP I .+1
1501  1502            .+1
1502  1041            TAD MILI        /GET AND STORE
1503  3312            DCA RCTRB       /1MS CONSTANT
1504  2312            ISZ RCTRB       /DELAYED 1 MS?
1505  5304            JMP .-1         /NO.
1506  2311            ISZ RCTRA       /YES, DONE DELAYING?
1507  5300            JMP .-7         /NO.
1510  5674            JMP I DLMSR     /YES, EXIT
1511  0000   RCTRA,   0
1512  0000   RCTRB,   0

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

1513  0000   SETBAU,  OPEN            /
1514  1374            TAD (-5         /7773
1515  3052            DCA TEMP        /STORE IT IN TEMP.
1516  1022            TAD BAUDRT      /GET DEPOSITED BAUD RATE.
1517  1713            TAD I SETBAU    /GET A RATE FROM THE TABLE.
1520  7650            SNA CLA         /ARE THEY EQUAL?
1521  5327            JMP LOBAUD      /YES, GO SET LOC MILI FOR THAT BAUD RATE.
1522  2052            ISZ TEMP        /NO, +1 TO TEMP
1523  7610            SKP CLA         /SKIP
```

```
1524  7402            HLT             /ILLEGAL BAUD RATE, RESET EAE OPT AND RESTART
                                      /PROGRAM AT 2220.
1525  2313            ISZ SETBAU      /#1 TO SETBAU IN ORDER TO PULL NEXT BAUD RATE
                                      /FROM THE TABLE OF BAUD RATES.
1526  5316            JMP SETBAU-3    /SEE IF NEXT BAUD RATE IS THE END,
1527  1373    LOBAUD, TAD I 7400      /LOW BAUD CONSTANT FOR THE DELAY
1530  3361            DCA MILI        /STORE IT.
1531  2362            ISZ TEMP        /#0 TO TEMP. WAS THIS THE BAUD RATE?
1532  7610            SKP CLA         /SKIP
1533  5772'           JMP SCRET       /YES, EXIT WITH AC=0,
1534  1161            TAD I 7404      /HIGH BAUD CONSTANT FOR THE DELAY,
1535  3361            DCA MILI        /STORE IT,
1536  2362            ISZ TEMP        /WAS THIS THE ISOLATED RATE?
1537  7610            SKP CLA         /NO,
1540  5772'           JMP SCRET       /YES,  EXIT WITH MILI SET AND AC=0
1541  7240            CLA CMA         /AC = -1
1542  1361            TAD MILI        /GET BACK MILI.
1543  7104            CLL RAL         /MULTIPLY BY 2
1544  5535            JMP .-7         /SEE IF NEXT BAUD RATE IS THE ONE,

                /PUNCH TEST NORMAL TEST SEQUENCE ROUTINE
1545  0000    NTST,   0
1546  7200            CLA             /CLEAR RBUSY
1547  3376            DCA RBUSY
1550  1745            TAD I NTST      /SELECT PUNCH MODE
1551  3354            DCA NTSTA
1552  4771'           JMS PLTLR       /PUNCH LEADER
1553  4770'           JMS PSYNC       /PUNCH SYNC CHARACTER
1554  0000    NTSTA,  0
1555  4767'           JMS RSYNC       /SYNC READER
1556  4200            JMS RDBLK       /READ DATA BLOCK
1557  4771'           JMS PLTLR       /PUNCH TRAILER
1560  4766'           JMS RRDY        /WAIT FOR RDR NOT BUSY
1561  5425            JMP I CHAIN     /CHAIN

1562  5555    RM33A,  TEXT    '----I8?'
1563  5555
1564  1100
1565  7700


1566  1343
1567  1216
1570  1212
1571  1200
1572  0205
1573  7372
1574  7773
1575  5721
1576  2400
1577  1351
      1600            PAGE
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                1600            PAGE
                        /COMBINED TEST NORMAL TEST SEQUENCE
1600    0000    CNTST,  0
1601    7200            CLA             /CLEAR RBUSY
1602    3076            DCA RBUSY
1603    4777'           JMS PLYLR       /PUNCH LEADER
1604    4776'           JMS PSYNC       /PUNCH SYNC CHARACTER
1605    4775'           JMS PBLK        /PUNCH DATA BLOCK (NO STALLS)
1606    4774'           JMS RSYNC       /SYNC READER
1607    4773'           JMS RDBLKR      /READ DATA BLOCK (STALLS)
1610    4772'           JMS PBLKR       /PUNCH DATA BLOCK (STALLS)
1611    4771'           JMS RDBLK       /READ DATA BLOCK (NO STALLS)
1612    4777'           JMS PLYLR       /PUNCH TRAILER
1613    4770'           JMS RRDY        /WAIT FOR READER NOT BUSY
1614    5435            JMP I CHAIN     /CHAIN

                        /TYPE LINE OF 3 CHARACTERS (NO DELAY)
1615    0000    TYPLN3, 0
1616    7200            CLA
1617    3010            DCA STLID       /CLEAR STLID
1620    1615            TAD I TYPLN3    /SET AND STORE
1621    3234            DCA .+3         /ADDRESS OF DATA
1622    2215            ISZ TYPLN3
1623    6747'           JMS FBF3        /GO FILL BUFFER WITH 3 CHARACTERS
1624    0000            0
1625    4227            JMS TYPLN       /GO TYPE LINE
1626    5615            JMP I TYPLN3    /EXIT

                        /TYPE LINE OF ASCII PRINTABLE CHARACTERS
1627    0006    TYPLN,  6
1630    4555            CKSR37          /KSR37?
1631    1140            TAD K15         /NO,
1632    1157            TAD K-133       /YES,
1633    3247            DCA TCTR        /=6, OR =55
1634    4377            SETLOC          /SET FETCH TO ADDRESS
1635    1646            FETCH           /OF BLOCKA,
1636    0577            BLOCKA
1637    4556    TYPCA,  STALL
1640    1646            TAD I FETCH     /YES, SET CHARACTER
1641    4474            JMS I UPUNCH    /GO PRINT CHARACTER
1642    2246            ISZ FETCH       /SET UP FOR NEXT CHARACTER
1643    2247            ISZ TCTR        /DONE?
1644    5237            JMP TYPCA       /NO, REPEAT
1645    5627            JMP I TYPLN     /YES, EXIT,
1646    0000    FETCH,  0
1647    0000    TCTR,   0

1650    0000    ASCCN,  0
1651    1650            TAD I ASCCA
1652    3306            DCA WASC
1653    2250            ISZ ASCCN
1654    1650            TAD I ASCCN
1655    3307            DCA SASC
1656    2250            ISZ ASCCN
1657    1366            TAD (7700
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```
1660  0706          AND I WASC
1661  7112          CTR CLL
1662  7012          RTR
1663  7012          RTR
1664  4273          JMP CNV
1665  2307          ISZ SASC
1666  1364          TAD (7700
1667  7040          CMA
1670  0725          AND I WASC
1671  4273          JMS CNV
1672  5650          JMP I ASCCN
1673  0000  CNV,     0
1674  3310          DCA ASCT
1675  1310          TAD ASCT
1676  7006          RTL
1677  7004          RAL
1700  0365          AND (707
1701  1310          TAD ASCT
1702  0365          AND (707
1703  1364          TAD (6060
1704  3707          DCA I SASC
1705  5673          JMP I CNV
1706  0000  WASC,    0
1707  0000  SASC,    0
1710  0000  ASCT,    0

1711  0000  SINPT,   OPEN                    /SUB TO INITIALIZE SGET SUB.
1712  7200          CLA
1713  3316          DCA SPT0                /ZERO SPT0
1714  3320          DCA SPIND               /ZERO SPIND
1715  5711          JMP I SINPT             /EXIT
1716  0000  SPT0,    OPEN
1717  0000  SPT1,    OPEN
1720  0000  SPIND,   OPEN
1721  0000  SGET,    OPEN                    /"SPECIAL" BINARY COUNT
1722  7320          CLA STL                 /PATTERN SUBROUTINE.
1723  2320          ISZ SPIND
1724  7340          CLA CMA CLL
1725  3320          DCA SPIND
1726  1316          TAD SPT0
1727  7420          SNL
1730  5333          JMP .+3
1731  7041          CIA
1732  7410          SKP
1733  7040          CMA
1734  3316          DCA SPT0
1735  1145          TAD C377
1736  0316          AND SPT0
1737  3317          DCA SPT1
1740  1317          TAD SPT1
1741  5721          JMP I SGET              /EXIT SGET SUB.

              /SUBROUTINE TO INITIALIZE RANDOM NUMBER GENERATORS.

1742  0000  SETRND, OPEN
```

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

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

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

2000  0000    S4000I, OPEN
2001  4577            SETLOC          /SET COUNT OF
2002  2062            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  2024            DELAYM          /-200 DECIMAL
2010  7470            -310            /IN DELAYM,
2011  5605            JMP I S200I     /EXIT WITH AC=0,


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

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

```
2016  6612            JMP I 61021     /EXIT, AC=0,


                /ROUTINE TO DETERMINE DEVICE CAUSING UNEXPECTED INTERRUPT.
2017  0000    INTSND, OPEN
2020  7200            CLA
2021  6031    INTKSF, KSF                     /KEYBOARD/READER?
2022  7410            SKP                     /NO,
2023  4276            JMS     HLTD            /YES, HALT AND DISPLAY IOT
2024  6041    INTTSF, TSF                     /TTY PRINTER/PUNCH?
2025  7410            SKP                     /NO,
2026  4276            JMS     HLTD            /YES, HALT AND DISPLAY IOT
2027  6011            RSF                     /M.S. READER?
2030  7410            SKP                     /NO,
2031  4276            JMS     HLTD            /HALT AND DISPLAY IOT
2032  6021            PSF                     /M.S. PUNCH?
2033  7410            SKP                     /NO,
2034  4276            JMS     HLTD            /HALT AND DISPLAY IOT
2035  6401            6401                    /PT05/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 DISPLEY IOT
2057  6461            6461                    /PT05/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 DR DSKP IN?
2066  7410            SKP                     /NO,
2067  4276            JMS     HLTD            /HALT AND DISPLAY IOT
2070  6121            6121                    /PT00/LT00 UNIT 5 DR DSKP OUT?
2071  5275            JMP     .+4             /NO,
2072  4276            JMS     HLTD            /HALT AND DISPLAY IOT
2073  7777            7777                    /DON'T KNOW WHAT DEVICE
2074  7777            7777                    /CAUSED THE INTERRUPT.
2075  4276            JMS     HLTD            /HALT AND DISPLAY ALL 0'S.
2076  0000    HLTD,   OPEN
2077  1276            TAD     HLTD
2100  1311            TAD     M3
2101  3276            DCA     HLTD
```

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

2112  0000    PUNCH,   OPEN
2113  2071             ISZ PFLAG       /SET PFLAG.
2114  6046    OUT0,    TLS             /PUNCH/PRINT.
2115  7200             CLA
2116  1071             TAD PFLAG       /GET C(PLFAG).
2117  7650             SNA CLA         /FLAG RESET?
2120  5323             JMP OUT2        /YES
2121  6041    OUT1,    TSF             /NO, FLAG UP?
2122  5321             JMP .-1         /NO.
2123  6042    OUT2,    TCF             /YES, CLEAR PRINTER FLAG.
2124  3071             DCA PFLAG       /CLEAR PFLAG.
2125  5712             JMP I PUNCH     /EXIT, AC=0.


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

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

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

2134  0000    TLC37I, OPEN                   /GET FIRST LETTER TO BE TYPED
2135  1734             TAD I TLC37I
2136  3342             DCA .+4               /SAVE IT.
2137  4535             CKSR37                /IS IT A "37"?
2140  5425             JMP I CHAIN           /NO, CHAIN
2141  4473             JMS I UTPLNS          /YES, GO TYPE LETTER + NEXT 2
2142  0000             OPEN                  /FIRST LETTER TO BE TYPED.
2143  5425             JMP I CHAIN           /CHAIN

              /CONTROL ROUTINE TO FILL A BUFFER WITH CHARACTERS.

2144  0000    FBF1,    OPEN                  /GET DATA
2145  7300             CLA CLL
2146  1744             TAD I FBF1
2147  3351             DCA .+2               /SAVE IT
2150  4777'            JMS FBF3              /GO FILL A BUFFER-
2151  0000             OPEN                  /WITH THIS +NEXT 2 CHAR
2152  4776'            JMS CNTST             /GO TO COMBINED TEST SEQUENCE

              /ROUTINE TO CONTROL TYPING A LINE A.  OUT STALLS
```

```
                /AND THEN ONE WITH STALLS,

2153  0000      WOSWS,  OPEN
2154  3064              DCA STLIO               /ZERO STALL INDICATOR,
2155  4775'             JMS TYPLN               /TYPE LINE WITHOUT STALLS
2156  7240              CLA CMA                 /7777
2157  3064              DCA STLIO               /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 POSITION
2165  6300              TBMRK
2166  4573              TYPE
2167  6306              TBMRK1
2170  2062              ISZ CTRA
2171  5366              JMP .-3
2172  5762              JMP I MTABP     /EXIT,


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2177  1031
      2200              PAGE


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

2200  4577      PRG0,   SETLOC                  /SET KSTART TO INITIAL
2201  0023              KSTART                  /ROUTINE ADDRESS.
2202  2205              P0TS0
2203  5604              JMP I   .+1             /GO START TEST
2204  2236              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 DELAYM TO DELAY TWICE
```

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                                /10 BIT TIMES FOR AN NON 332
                                /BAUD DEVICE AND TWICE AS BIT
                                /TIMES FOR AN 110 BAUD DEVICE.
                                /SEE 811 TIME TABLE AT BEGINNING
                                /OF PROGRAM.

2210  4438                      JMS I 5100                /SET UP TO DO TEST 128 TIMES.
2211  4566      P0TS0A,         USPF                      /SET PRINTER FLAG
2212  6566                      UTSF                      /FLAG SET?
2213  5237                      JMP     P0E0A             /NO,  SKP BY TSF FAILED
2214  7360      P0TS0B,         CLA CMA CLL CML           /AC AND LINK = 1
2215  6607                      CAF                       /YES,  NOW CLEAR IT.
2216  4576                      DELAY                     /GO DELAY
2217  6466                      UTSF                      /FLAG SET?
2220  7410                      SKP                       /NO,  CONTINUE TEST
2221  5244                      JMP     P0E0B             /YES,  CAF OR TSF FAILED
2222  7435      P1TS0C,         SNL                       /LINK SET?
2223  7440                      SZA                       /NO,  NO ACTI
2224  5232                      JMP     P0E0C             /YES,  CAF FAILED TO CLEAR AC AND/OR LINK
2225  4566      P0TS0D,         USPF                      /SET PRINTER FLAG
2226  6566                      UTSF                      /PRINTER FLAG SET?
2227  5237                      JMP     P0E0A             /NO,  TSF OR TSF FAILED
2230  6606      P0TS0E,         UTSC                      /YES,  CLEAR PRINTER FLAG
2231  6566                      UTSF                      /PRINTER FLAG SET?
2232  7040                      SPA CLA                   /YES, OK,
2233  5235                      JMP     P0E0E             /YES,  TSF FAILED TO CLEAR PRINTER FLAG.
2234  4562                      ISZ     CTR1              /DONE TEST 128 TIMES?
2235  5211                      JMP     P0TS0A            /NO,  REPEAT TEST
2236  5425                      JMP I   CHAIN             /YES,  CHAIN NOW

                        /SPACE WLTS FOR P0TS0.

2237  7402      P0E0A,  HLT                               /SPF FAILED TO SET PRINTER FLAG
                                                        /OR TSF FAILED TO SKIP.
                        /SCOPE LOOP,  P0E0A CONTINUE TO ENTER.
2240  4566              USPF                              /SET PRINTER FLAG
2241  6566              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  4566              USPF                              /SET PRINTER FLAG
2246  6607              CAF                               /CLEAR FLAGS
2247  4576              DELAY                             /DELAY
2250  6566              UTSF                              /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                   /LI    NO AC SET
2255  6607              CAF                               /CLR
```

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2256  7420            SNL                     /LINK SET?
2257  7440            SZA                     /AC CLEAR
2260  5254            JMP     P0E0C+1         /0C OR LINK SET,  REPEAT
2261  5254            JMP     P0E0C+1         /REPEAT.

2262  7402  P0E0E,    HLT                     /TSF FAILED TO CLEAR PRINTER FLAG
                                              /OR TSF SKIPPED.
              /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
2263  6560            USPF                    /SET PRINTER FLAG
2264  6566            UTCF                    /CLEAR PRINTER FLAG
2265  6562            UTSF                    /FLAG SET?
2266  5263            JMP     P0E0E+1         /NO,  REPEAT,
2267  5263            JMP     P0E0E+1         /YES,  REPEAT,



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

2270  0001  P0TS1,  1
2271  2327            P0TS2
2272  4577            SETLOC                  /SET INTERRUPT TO P0E1A,
2273  0002            2                       /TO P0E1A,
2274  2304            P0E1A
2275  6007  P0TS1A,  CAF                     /ATTEMPT TO CLEAR ALL FLAGS
2276  6560            USPF                    /SET PRINTER FLAG
2277  6565            UTCF                    /CLEAR PRINTER FLAG
2300  6001            ION                     /ENABLE INTERRUPT
2301  7000            NOP                     /
2302  6002            IOF                     /DISABLE INTERRUPT
2303  5306            JMP     .+3
2304  4777' P0E1A,    JMS     I INTEN         /UNEXPECTED INTERRUPT
2305  5275            JMP     P0TS1A          /TRY AGAIN
2306  4431            JMS I S4000             /SET UP TO DO TEST 4000 TIMES.
2307  4577            SETLOC                  /SET INTERRUPT RETURN
2310  0002            2                       /TO P0TS1C
2311  2324            P0TS1C
2312  6560            USPF                    /SET PRINTER FLAG
2313  6001  P0TS1B,  ION                     /ENABLE INTERRUPT
2314  7000            NOP                     /NO INTERRUPT
2315  7402  P0E1B,    HLT                     /PRINTER FLAG FAILED TO INTERRUPT
                                              /OR INTERRUPT MALFUNCTION
2316  4577            SETLOC                  /SET INTERRUPT RETURN
2317  0002            2                       / TO P0TS1C-1
2320  2323            P0TS1C-1
2321  6001            ION                     /ENABLE INTERRUPT (SCOPE LOOP)
2322  7000            NOP                     /INTERRUPT
2323  5321            JMP     .-2
2324  2062  P0TS1C,  ISZ     CTRA            /DONE 4000 TIMES?
2325  5313            JMP     P0TS1B          /NO,  REPEAT TEST,
2326  5425            JMP I   CHAIN           /YES,  CHAIN
```

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

2327  0002   P0TS2,  2
2330  2534           P0TS2
2331  4431           JMS I S4000          /SET UP TO DO TEST 4000 TIMES.
2332  4577   P0TS2A, SETLOC               /SET INTERRUPT RETURN
2333  0002           2                    /TO P0E2A
2334  2465           P0E2A
2335  6007           CAF                  /CLEAR EVERYTHING AND ENABLE TTY ENABLE F.F.
2336  4561           UKIE                 /DISABLE INTERRUPT ENABLE FF
2337  4560           USPF                 /SET PRINTER FLAG.
2340  6001           ION                  /TURN INTERRUPT ON.
2341  7000           NOP                  /
2342  4557   P0TS2B, USPI                 /SKIP IF TTY INTERRUPT REQUEST
2343  7610           SKP      CLA         /
2344  5776'          JMP      P0E2B       /USPI SKIPPED
2345  6003   P0TS2C, SRQ                  /SKIP IF INTERRUPT REQUEST
2346  7610           SKP      CLA         /
2347  5775'          JMP      P0E2C       /SRQ SKIPPED
2350  4577   P0TS2D, SETLOC               /SET INTERRUPT RETURN
2351  0002           2                    /TO P0TS2E,
2352  2400           P0TS2E
2353  4560           USPF                 /SET PRINTER FLAG
2354  7201           CLA IAC              /AC11 = 1.
2355  4561           UKIE                 /ENABLE TTY INTERRUPT ENABLE F.F.
2356  6001           ION                  /TURN INTERRUPT ON.
2357  7000           NOP                  /INTERRUPT AT END OF THIS INSTRUCTION
2360  5774'          JMP      P0E2D       /KIE FAILED TO ENABLE TTY INTERRUPT F.F.

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2377  2017
      2400           PAGE

2400  4557   P0TS2E, USPI                 /TTY INTERRUPT REQUEST?
2401  5256           JMP      P0E2E       /NO,  SPI FAILED TO SKIP.
2402  6003   P0TS2F, SRQ                  /IS THERE AN INTERRUPT REQUEST?
2403  5265           JMP      P0E2F       /NO   SRQ FAILED TO SKIP.
2404  7300   P0TS2G, CLA CLL              /AC = LINK = 0
2405  4561           UKIE                 /DISABLE TTY INTERRUPT ENABLE F.F.
2406  6007           CAF                  /CLEAR EVERYTHING AND ENABLE TTY INTERRUPT F.F.
2407  4560           USPF                 /SET PRINTER FLAG.
2410  4557           USPI                 /SKIP IF INTERRUPT REQUEST
2411  5274           JMP      P0E2G       /CAF FAILED TO ENABLE TTY INTERRUPT ENABLE F.F.
2412  2062           ISZ      CTRA        /DONE 4000 TIMES?
2413  5777'          JMP      P0TS2A      /NO   REPEAT TEST.
2414  5425           JMP I    CHAIN       /OK  .
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                    /ERROR HLT'S FOR TEST2.

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 P.E2A+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

2427  7402    P0E2B,  HLT     CLA               /SPI SKIP IF TTY 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 INTERRUPT REQUEST.
2433  5230              JMP     P0E2B+1         /REPEAT.
2434  5230              JMP     P0E2B+1         /REPEAT.

2435  7402    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.
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2464  5257            JMP     P3E2E+1         /REPEAT.


2465  7402  P3E2F,    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                    /CLR PRINTER FLAG
2471  6053            SRQ                     /SKIP IF INTERRUPT REQUEST
2472  5266            JMP     P3E2F+1         /REPEAT
2473  5266            JMP     P3E2F+1         /REPEAT.


2474  7402  P3E30,    HLT                     /SAF FAILED TO ENABLE TTY INTERRUPT
                                              /ENABLES FLIP FLOP.
                      /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
2475  7300            CLA CLL                 /CLEAR
2476  4561            UKIE                    /DISABLE TTY,
2477  6067            SAF                     /ENABLE TTY INTERRUPT ENABLE F.F.
2500  4560            USPF                    /SET PRINTER FLAG
2501  4557            USPI                    /TTY INTERRUPT REQUEST?
2502  5275            JMP     P3E30+4         /NO,  REPEAT.
2503  5275            JMP     P3E30+4         /YES,  REPEAT.


                      /TEST 3 CHECKS THE ABILITY OF
                      /PPC TO SET THE PRINTER FLAG,
                      /UTLS TO CLEAR PRINTER FLAG,
                      /UTLS TO SET PRINTER FLAG;
2504  5600  P3TS3,    3
2505  5544            P3TS4
2506  4430            JMS I 5160              /SET UP TO DO TEST 100 TIMES.
2507  4462            JMS I 5206              /SET DELAYS 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.
2510  4563  P3TS3A,  UTCF                    /CLEAR PRINTER FLAG
2511  4564            UTPC                    /PRINT
2512  4576            DELAY                   /DELAY TWICE MAX TIME
2513  4565            UTSF                    /FLAG SET.  IT SHOULD BE.
2514  5357            JMP P3E3A               /FLAG NOT SET.
2515  4563  P3TS3B,  UTCF                    /CLEAR + SET PRINTER FLAG.
2516  4565            UTSF                    /FLAG SET?
2517  7510            SKP CLA                 /NO,  OK
2520  5334            JMP     P3E3B           /YES
2521  4576  P3TS3C,  DELAY                   /DELAY TWICE BAUD RATE.
2522  4566            UTST                    /FLAG SET?
2523  5346            JMP     P3E31           /NO
2524  2062            ISZ     CTRA            /YES,  DONE 100 TIMES
2525  5310            JMP     P3TS3A          /NO,  DO TEST AGAIN
2526  5425            JMP I   CHAIN           /EXIT


2527  7602  P3E3A,    HLT CLA                 /TPC  FAILED TO SET PRINTER FLAG.
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                    /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
2530  4565          UTCF                    /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            /FLAG FAILED TO CLEAR PRINTER FLAG.
                    /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
2535  4560          UCPF                    /SET PRINTER FLAG
2536  4563          UTLS                    /CLEAR PRINTER FLAG AT TPB,
2537  5335          JMP     .-2

2540  7602    P0E3C, HLT     CLA            /FLAG FAILED TO SET PRINTER FLAG.
                    /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
2541  4563          UTLS                    /PRINT
2542  4576          DELAY                   /DELAY TO 10 CPS 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 4 TIMES,
2547  4577    P0TS4A, SETLOC                  /SET DELAYM
2550  0024          DELAYM                  /TO -84 (DEC)
2551  7657          -121
2552  1022          TAD BAUDRT              /GET BAUD RATE,
2553  1136          TAD C-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 C-130               /NO, CHANGE DELAYM TO -86 (DEC),
2557  3024          DCA DELAYM              /DELAYM NOW SET TO -86 DECIMAL,
2560  4563          UTLS                    /PRINT
2561  4576          DELAY                   /DELAY A LITTLE LESS THAN 9 MILL TIMES
2562  4566          UTSF                    /FLAG SET?
2563  7410          SKP                     /NO,  OK
2564  5776'         JMP     P0E4A           /YES,
2565  4577    P0TS4B, SETLOC                  /SET DELAYM
2566  0024          DELAYM                  /TO -7 (DEC)
2567  7771          -7                      /
2570  4576          DELAY                   /DELAY SO WE'RE PAST THE 9,5 BIT  TIME POINT
2571  4566          UTSF                    /FLAG SET?
2572  5775'         JMP     P0E4B           /NO
2573  5774'         JMP     P0TS4C          /CROSS PAGE

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2575  2614
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2577  2332
      2600          PAGE

2600  4577    P0TS4C, SETLOC
2601  0024          DELAYM
2602  7761          -17
2603  4576          DELAY                   /DELAY SO WE'RE PAST THE END,
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2004  2062            ISZ     CTRA            /DONE 10* TIMES?
2005  5777'           JMP     P0TS4A          /NO,  DO TEST AGAIN
2006  5425            JMP I   CHAIN           /CHAIN


2007  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.
2010  4563              UTLS                  /START PRINTER
2011  4566              UTSF                  /FLAG SET
2012  5211              JMP     .+6           /NO,  CHECK AGAIN
2013  5210              JMP     .+3           /REPEAT

2014  7602    P0E4B,  HLT     CLA             /FLAG NOT SETTING IN REQUIRED TIME.
                /SCOPE LOOP.  PRESS CONTINUE TO ENTER.
2015  5210              JMP     P0E4A+1       /GO TO SCOPE LOOP.


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

2016  0005    P0TS5,  5
2017  2054            P0TO
2020  4430            JMS I   S100
2021  6563            UTLS
2022  4566            UTSF
2023  5222            JMP .+1               /FLAG SET?
2024  4577    P0TS5A, SETLOC                /SET DELAYM TO
2025  0024            DELAYM                /-24 DECIMAL.
2026  7038            -142                  /
2027  6563            UTLS                  /PRINT
2030  4570            DELAY                 /DELAY
2031  4566            UTSF                  /FLAG SET?
2032  7410            SKP CLA               /NO, OK.
2033  5250            JMP P0ES4             /YES, ERROR.
2034  4577    P0TS5B, SETLOC                /SET DELAYM TO
2035  0024            DELAYM                /-24 DECIMAL.
2036  7774            -4                    /
2037  4576            DELAY                 /DELAY
2040  4566            UTSF                  /FLAG NOW SET?
2041  5252            JMP P0ES5             /NO, ERROR.
2042  4576            DELAY
2043  4576            DELAY
2044  4576            DELAY
2045  2062            ISZ CTRA              /TEST DONE?
2046  5221            JMP P0TS5A+3          /NO, REPEAT.
2047  5425            JMP I CHAIN           /YES, CHAIN.

2050  7402    P0E5A,  HLT                   /FLAG SETTING TO SOON.
                /SCOPE LOOP.  PRESS CONTINUE TO ENTER.
2051  5210            JMP P0E4A+1

2052  7402    P0E5B,  HLT                   /FLAG NOT S     NG SOON ENOUG-
                /SCOPE LOOP.  PRESS CONTINUE TO ENT
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2653  5251            JMP P0E5A+1



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

2654  0006  P0T6,    6
2655  6732            P0T7
2656  6431            JMS I P0T7      /SET UP TO DO TEST 4000 TIMES.
2657  6007  P0T6A,   CAF              /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT.
2660  7040            CMA
2661  6004            GTF             /GET INTERRUPT FLAGS.
2662  0331            AND K5200       /MASK.
2663  7440            SZA
2664  7402  P0E6A,   HLT             /GTF FAILED.
2665  7360  P0T6B,   CLA CMA CLL CML /SET LINK AND AC.
2666  6004            GTF             /GET INTERRUPT FLAGS.  (AC SHOULD EQUAL 4800).
2667  0331            AND K5200       /MASK.
2670  7420            SNL
2671  7402  P0E6B,   HLT             /GTF CLEARED LINK.
2672  7104  P0T6C,   CLL RAL         /(AC SHOULD EQUAL 0040.  LINK SHOULD EQUAL 1).
2673  7430            SZL
2674  7440            SZA
2675  7402  P0E6C,   HLT             /GTF DID NOT GET LINK.
2676  6007  P0T6D,   CAF             /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT.
2677  4560            USPF            /SET PRINTER FLAG.
2700  6004            GTF             /GET INTERRUPT FLAGS.
2701  0331            AND K5200       /MASK.
2702  7006            RTL             /PUT INTERRUPT BUS = (AC SHOULD EQUAL 1002)
2703  7004            RAL             /PFLAG INTO LINK, (AC SHOULD EQUAL ZERO).
2704  7430            SZL             /IS LINK 1?
2705  7440            SZA             /IS AC ZERO?
2706  7402  P0E6D,   HLT             /GTF FAILED TO GET INTERRUPT BUS.
2707  4577  P0T6E,   SETLOC          /SET INTERRUPT RETURN LOCATION
2710  2002            2               /TO P0T6F.
2711  2721            P0T6F
2712  6007            CAF             /CLEAR ALL FLAGS.
2713  6001            ION             /TURN INTERRUPT ON
2714  6004            GTF             /GET INTERRUPT FLAGS.
2715  0331            AND K5200
2716  4560            USPF            /SET PRINTER FLAG.
2717  7000            NOP             /(INTERRUPT).
2720  7402  P0E6E,   HLT             /GTF CLEARED ION.
2721  7102  P0T6F,   CLL BSW         /PUT ION = (AC SHOULD EQUAL 0272).
2722  7012            RTR             /FLAG INTO LINK, (AC SHOULD EQUAL 2727).
2723  7430            SZL             /LINK 1?
2724  7440            SZA             /AC ZERO?
2725  7402  P0E6F,   HLT             /GTF FAILED TO GET ION.
2726  2062            ISZ CTRA        /TEST DONE?
2727  5257            JMP P0T6A       /NO.  REPEAT.
2730  5425            JMP I CHAIN
2731  5200  K5200,   5200
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                        /TEST OF RTF, TEST IS DONE
                        /4000 TIMES.

2732  0007      P8T7,   7
2733  7777              7777
2734  4431              JMS I $4000       /SET UP TO DO TEST 4000 TIMES.
2735  4577              SETLOC            /SET INTERRUPT BEGIN
2736  0002              2                 /TO P8T7C+3,
2737  2754              P8T7C+3
2740  7320      P8T7A,  CLA CLL CML       /AC EQUALS ZERO, LINK EQUALS 1.
2741  6005              RTF               /RESTORE FLAGS,
2742  7420              SNL               /LINK SET?
2743  7442              SEA               /AC ZERO?
2744  7402      P8E7A,  HLT               /RTF FAILED TO RESTORE LINK.
2745  7330      P8T7B,  CLA CLL CML RAR   /AC EQUALS 4000
2746  6005              RTF               /RESTORE FLAGS,  (LINK).
2747  7420              SNL               /LINK RESTORED?
2750  7402      P8E7B,  HLT               /RTF FAILED TO RESTORE LINK.
2751  6134      P8T7C,  DSPF              /SET PRINTER FLAG.
2752  7000              NOP               /(INTERRUPT).
2753  7402      P8E7C,  HLT               /RTF DID NOT SET ION.
2754  2052              ISZ CTRA          /TEST DONE?
2755  5340              JMP P8T7A         /NO, REPEAT.
2756  5423              JMP .   CHAIN


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

3000  4577      PR01,   SETLOC
3001  0023              KSTART
3002  3005              P1TS0
3003  5604              JMP I   .+1
3004  0236              SRSET

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

3005  0000      P1TS0,  0
3006  3010              P1TS1
3007  4777'             JMS     P2TSEA

                        /ISSUE TLS AND WHEN KCC,  WAIT TWICE     OR 11 BIT TIMES
                        /(SEE TABLE AT BEGINNING OF PROGRAM,  OR FLAG TO SET.
```

```
                        /SKIP ON FLAG.  FAILURE TO SKIP INDICATES THE THE
                        /FLAG IS NOT SET, OR KSF FAILURE.  TEST IS DONE 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 DELAYH TO DELAY TWICE
                                                /12 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 [illegible] FLAG.
        3015  4563              UTLS            /SEND.
        3016  4576              DELAY           /DELAY TWICE 12 OR 11 BIT TIMES.
        3017  4572              UKSF            /FLAG SET?
        3020  5225              JMP     P1E1A   /NO.
        3021  2062              ISZ     CTR1    /YES, TEST DONE 100 [illegible]
        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 FAIL[illegible]
                        /SCOPE LOOP.  PRESS CONTINUE TO ENTER.
        3026  4571              UKCC
        3027  4563              UTLS
        3030  4576              DELAY           /DELAY TWICE 12 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 12 OR 11 BIT TIMES
                        /(SEE TABLE AT BEGINNING OF PROGRAM) FOR FLAG TO SET.
                        /SKIP ON FLAG 4000 TIMES TO VERIFY CONSISTENT SKIPPING.

        3034  0002      P1TS2,  2
        3035  3066              P1TS3
        3036  4432              JMS I S200      /SET DELAYH TO DELAY TWICE
                                                /12 BIT TIMES FOR AN NON 110
                                                /BAUD DEVICE AND TWICE 11 BIT
                                                /TIMES FOR AN 110 BAUD DEVICE.
                                                /SEE BIT TIME TABLE AT BEGINNING
                                                /OF PROGRAM.

        3037  4431              JMS I S4000     /SET UP TO DO TEST 4000 TIMES.
        3040  4571      P1TS2A, UKCC            /CLEAR AC AND KBRD FLAG.
        3041  4563              UTLS            /SEND.
        3042  4576              DELAY           /DELAY TWICE 12 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.
```

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3050  2062            ISZ CTRA          /YES, DONE 4000 TIMES?
3051  5246            JMP     P1T520    /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    P1E29,  HLT CLA           /KSF FAILED TO SKIP.
              /SCOPE LOOP, PRESS CONTIUE TO ENTER.
3063  4572            UKSF
3064  5265            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    P1T53,  3
3067  3126            P1T54
3070  4577            SETLOC                 /SET COUNT OF
3071  0062            CTRA                   /-500 (DEC)
3072  7014            -764                   /IN CTRA.
3073  4432            JMS I 5200             /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.
3074  4571    P1T53A, 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.
3100  5313            JMP P1E34              /NO.
3101  4571            UKCC                   /CLEAR AND AND KBRD FLAG.
3102  4563            UTLS                   /YES  SEND DATA.
3103  4572            UKSF                   /FLAG SET
3104  5306            JMP .+2                /NO, OK
3105  5322            JMP P1E35              /YES.
3106  4566            UTSF                   /PRINTER FLAG SET?
3107  5306            JMP .-1                /NO, WAIT TO CONTINUE TEST.
3110  2062            ISZ CTRA               /DONE 500 TIMES?
3111  5274            JMP .-15               /NO REPEAT TEST
3112  5425            JMP I CHAIN            /CHAIN.

3113  7602    P1E34,  HLT CLA                /FLAG NOT SE  .R KSF FAILED.
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```
                    /SCOPE LOOP.  PRESS CONTINUE TO ENTER.
3114  4563          P1E3A,  UTLS              /SEND
3115  4571                  UKCC              /CLEAR AC AND KBRD FLAG
3116  4576                  DELAY
3117  4572                  JASR
3120  5314                  JMP .-4
3121  5320                  JMP .+1

3122  7402          P1E3B,  HLT CLA           /ASR SKIPPED ON NO FLAG.
                    /SCOPE LOOP, PRESS CONTINUE TO ENTER.
3123  4563                  UTLS
3124  4426                  JMS I KBFLAG
3125  5323                  JMP P1E3B+1

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

3126  3334          P1TS4,  4
3127  3220                  P1TS5
3130  4577                  SETLOC            /SET INTERRUPT RETURN
3131  0002                  2                 /TO P1E4A
3132  3143                  P1E4A             /
3133  4563          P1TS4A, UTLS              /SEND
3134  4426                  JMS I KBFLAG
3135  4565                  UTCF              /CLEAR PRINTER FLAG,
3136  4571                  UKCC              /CLEAR READER FLAG
3137  6001                  ION               /TURN INTERRUPT ON.
3140  7000                  NOP               /
3141  6002                  IOF               /TURN INTERRUPT OFF,
3142  5345                  JMP .+3           /SKIP OVER,
3143  4776'         P1E4A,  JMS INTFNC        /UNEXPECTED INTERRUPT,
3144  5333                  JMP P1TS4A        /TRY AGAIN,
3145  4577                  SETLOC            /SET COUNT OF
3146  0062                  CTRA              /-1000 (DEC)
3147  6030                  -1750             /IN CTRA,
3150  4577                  SETLOC            /SET INTERRUPT RETURN
3151  0002                  2
3152  3167                  P1TS4C
3153  4563          P1TS4B, UTLS              /SEND
3154  4426                  JMS I KBFLAG
3155  4565                  UTCF              /CLEAR PRINTER FLAG,
3156  6001                  ION               /INTERRUPT ON,
3157  7000                  NOP               /SHOULD INTERRUPT
3160  7402                  HLT               /READER FLAG FAILED TO INTERRUPT OR
                                              /INTERRUPT SYSTEM MALFUNCTION.
3161  4577                  SETLOC            /SET INTERRUPT RETURN
3162  0002                  2
3163  3166                  P1TS4C-1
                    /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
3164  6001                  ION
3165  7000                  NOP
3166  5364                  JMP .-2

3167  2062          P1TS4C, ISZ CTRA          /DONE 1000 TIMES YET?
3170  5353                  JMP P1TS4B        /NO, REPEAT
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3171  6007            CAF             /EXIT
3172  5425            JMP I CHAIN     /EXIT.

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

3200  3000        P1TS5,  5
3201  3271                P1TS6
3202  4430                JMS I $100          /SET UP TO DO TEST 100 TIMES.
3203  6007                CAF                 /CLEAR AND ENABLE INTERRUPT ENABLE FF
3204  4565        P1TS5A, UTLS                /SEND
3205  4436                JMS I KBFLAG
3206  6566                UTCF                /CLEAR PRINTER FLAG.
3207  6003                SRQ                 /INTERRUPT REQUEST?
3210  5230                JMP P1E5A           /NO.
3211  4567        P1TS5B, USPI                /YES, TTY INTERRUPT REQUEST?
3212  5235                JMP P1E5B           /NO.
3213  6007        P1TS5C, CAF                 /YES, CLEAR FLAG.
3214  6772                UKSF                /FLAG SET?
3215  7610                SKP CLA             /NO, OK
3216  5242                JMP P1E5C           /FLAG SET FOR SOME REASON.
3217  6003        P1TS5D, SRQ                 /INTERRUPT REQUEST?
3220  7610                SKP CLA             /NO, OK
3221  5257                JMP P1E5D           /
3222  4567        P1TS5E, USPI                /TTY INTERRUPT REQUEST PRESENT?
3223  7610                SKP CLA             /NO, OK
3224  5264                JMP P1E5E           /
3225  2062                ISZ CTR4            /TEST DONE 100 TIMES?
3226  5204                JMP P1TS5A          /NO, REPEAT.
3227  5425                JMP I CHAIN         /CHAIN.

3230  7402        P1E5A,  HLT CLA             /SRQ FAILED TO SKIP ON KBRD. FLAG.
                  /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
3231  4250                JMS P1E5
3232  6003                SRQ
3233  5231                JMP .-2
3234  5233                JMP .-1


3235  7402        P1E5B,  HLT CLA             /SP: FAILED TO SKIP ON KBRD FLAG.
                  /SCOPE LOOP, PRESS CONTINUE TO ENTER.
3236  4250                JMS P1E5
3237  4567                USPI
3240  5236                JMP .-2
3241  5242                JMP .+1
```

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

3250  0000    P1E5,   OPEN             /ROUTINE TO SET KBRD FLAG.
3251  7201            CLA IAC
3252  4561            UKIE
3253  4563            UTLS
3254  4425            JMS I KBFLAG
3255  4566            UTCF
3256  5650            JMP I P1E5       /EXIT

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

3264  7602    P1E5E,  HLT CLA          /OP1 SKIPPED WITH NO FLAG.
                /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
3265  6007            CAF
3266  4557            USPI
3267  5265            JMP P1E5E+1
3270  5265            JMP P1E5E+1


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

3271  0006    P1TS6,  6
3272  3314            P1TS7
3273  4430            JMS I S100       /SET UP TO DO TEST 100 TIMES.
3274  4577            SETLOC           /SET DELAYM
3275  0024            DELAYM           /TO -133 DECIMAL
3276  7631            M147             /
3277  4563    P1TS6A, UTLS             /SEND
3300  4571            UKCC             /RECEIVE
3301  4576            DELAY            /DELAY 10-11 BIT TIMES
3302  4565            UTCF             /CLEAR TELEPRINTER FLAG
3303  4572            UKSF             /KBRD FLAG SET?
3304  5310            JMP P1E6A        /FLAG NOT SET
3305  2042            ISZ CTRA         /DONE 100 TIMES YET?
3306  5277            JMP P1TS6A
3307  5425            JMP I CHAIN      /CHAIN,


3310  7602    P1E6A,  HLT CLA          /FLAG NOT SETTING IN REQUIRED TIME.
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```
                        /SCOPE LOOP.  PRESS CONTINUE TO ENTER.
3311  4563                      DTLS
3312  4426                      JMS I KBFLAG
3313  5311                      JMP P1E6A+1

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

3314  0007      P1T57,  7
3315  3325              P1T10
3316  4577              SETLOC              /SET COUNT OF
3317  0062              CTRA                /-312 (DEC)
3320  7000              -1000               /IN CTRA,
3321  4777'             JMS SINPT           /INITIALIZE SPECIAL PIN COUNT.
3322  4776'     P1T57A, JMS SGET            /GET A NUMBER
3323  4337              JMS TRDATA          /TRANSFER DATA AND CHECK.
3324  5322              JMP P1T57A          /REPEAT

                        /TEST OF KEYBOARD AND PUNCH BUFFERS USING RANDOM DATA.

3325  0010      P1T10,  10
3326  3400              P1T11
3327  4577              SETLOC              /SET COUNT OF
3330  0062              CTRA                /-312 (DEC)
3331  7000              -1000               /IN CTRA,
3332  4775'             JMS SETRNG          /INITIALIZE RANDOM NUMBER GENERATOR,
3333  4774'     P1T10A, JMS RGNB            /GET A RANDOM NUMBER,
3334  0143              AND (377            /MASK,
3335  4337              JMS TRDATA          /TRANSFER DATA AND CHECK.
3336  5333              JMP P1T10A          /REPEAT

                        /SUB-ROUTINE USED BY P1T57 AND P1T10

3337  0000      TRDATA, OPEN
3340  3346              DCA HOLD1
3341  1346              TAD HOLD1
3342  7421              MQL                 /STORE GOOD DATA IN MQ,
3343  7701              ACL                 /RELOAD AC WITH ONE GOOD
3344  6355              JMS SNDREC          /TRANSMIT AND RECEIVE
3345  4470              JMS I CHECK         /DID I RECEIVE WHAT I SENT?
3346  0000      HOLD1,  OPEN                /WHAT I SENT,
3347  5366              JMP P1E71B          /RECEIVED NOT SAME AS SENT.
3350  2062              ISZ CTRA            /DONE?
3351  5737              JMP I TRDATA        /NO,
3352  5425              JMP I CHAIN         /YES, CHAIN,

                        /ROUTINE TO SEND AND RECEIVE DATA.

3353  0000      SNDREC, OPEN
3354  4565              DTCF
3355  4564              DTPC
3356  4571              DKCC
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3357  4572          UKSF
3360  5357          JMP .-1
3361  7200          CLA             /JUST IN CASE
3362  4570          UKRS
3363  4566          UTSF
3364  5363          JMP .-1
3365  5753          JMP I SNDREC    /EXIT WITH RECEIVED DATA IN AC.


              /COMMON HLT FOR P1TS7 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  4393          JMS SNDREC
3371  5367          JMP P1E710+1    /STAY IN LOOP.

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              /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  2011    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 RGNS        /GET A RANDOM NUMBER
3407  7421          MQL             /STORE IT IN MQ
3410  7701          ACL             /RELOAD AC
3411  4563          UTLS            /
3412  4566          UTSF            /FLAG SET YET?
3413  5212          JMP .-1         /NO, WAIT.
3414  7240          CLA CMA         /7777 TO AC
3415  4570          UKRS            /READ KBRD BUFFER.
3416  7040          CMA             /AC SHOULD NOW EQUAL 0
3417  7440          SZA             /DOES IT = 0?
3420  5224          JMP P1E11A      /NO.
3421  2062          ISZ CTRA        /DONE 500 TIMES YET?
3422  5205          JMP P1T11A      /NO, REPEAT
3423  5425          JMP I CHAIN     /YES CHAIN.
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3424  7402    P1E11A, HLT             /KRS FAILED TO "OR" KBPD 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 -133 DEC.
3442  7631            M147
3443  6007    P1T12A, CAF             /CLEAR THE WORLD.
3444  1134            TAD C252        /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 C252        /ADD SENT DATA TO AC
3454  7440            SZA             /WERE THEY EQUAL?
3455  5264            JMP P1E12A      /NO
3456  4572    P1T12B, UKSF            /FLAG CLEAR?
3457  7610            SKP CLA         /YES
3460  5274            JMP P1E12B      /NO,
3461  2062            ISZ CTRA        /DONE TEST YET?
3462  5243            JMP P1T12A      /NO, REPEAT
3463  5425            JMP I CHAIN     /YES, CHAIN.

3464  7402    P1E12A, HLT             /KRB FAILED TO JAM READER BUFFER TO AC.
                /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
3465  6007            CAF             /CLEAR THE WORLD.
3466  1134            TAD C252
3467  4563            UTLS
3470  4566            UTSF
3471  5270            JMP .-1
3472  4567            UKRB
3473  5265            JMP P1E12A+1

3474  7402    P1E12B, HLT             /KRB FAILED TO CLEAR READER FLAG.
                /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
3475  6007            CAF
3476  4563            UTLS
3477  4566            UTSF
3500  5277            JMP .-1
3501  4567            UKRB
3502  5275            JMP P1E12B+1
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                        /PROGRAM 2, KSR 33/35 TELETYPE BASIC INPUT TESTS.
                        /PROGRAM CHECKS INPUT FLAG'S, KEYBOARD, AND READER TIMING

3523  4577      PRG2,   SETLOC          /SET KSTART TO INITIAL
3524  3023              KSTART          /ROUTINE ADDRESS.
3525  3510              P2TS0
3526  7707              JMP I .+1       /GO START TEST
3527  6238              SRSET

                        /ISSUE KCC WITH AC=7777.  AC SHOULD BE ZERO,
                        /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 5400B     /SET UP TO DO TEST 1000 TIMES.
3515  7240              CLA CMA         /SET AC TO 7777
3516  6571              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  6571              UKCC            /CLEAR AC AND FLAG
3527  5325              JMP .-2         /RPEAT

                        /ISSUE KCC, WAIT TWICE 10-11 BIT TIMES FOR FLAG TO SET,
                        /SKIP ON FLAG,  FAILURE TO SKIP INDICATES
                        /THAT FLAG IS NOT SET, OR KSF FAILURE.
                        /TEST IS DONE 100 TIMES.
3530  0001      P2TS1,  1
3531  3545              P2TS2
3532  4432              JMS I 5200      /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 5100      /SET UP TO DO TEST 100 TIMES.
3534  6571      P2TS1B, UKCC            /CLEAR AC AND FLAG
3535  4576              DELAY           /GO DELAY
3536  6572              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
```

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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 5240      /SET DELAYM TO DELAY TWICE
                                      /10 BIT TIMES FOR AN NON 110
                                      /BAUD DEVICE AND TWICE 11 BIT
                                      /TIMES FOR AN 110 BAUD DEVICE.
                                      /SEE BIT TIME TABLE AT BEGINNING
                                      /OF PROGRAM.

3550  4434            JMS I 54000     /SET UP TO DO TEST 4000 TIMES.
3551  6571  P2TS2A,   KCC             /CLEAR AC AND FLAG
3552  4376            DELAY           /DO DELAY
3553  6572            KSF             /SKIP ON FLAG = 1
3554  5342            JMP P2E2A       /DID NOT SKIP, GO TO E2A
3555  6572            KSF             /SKIP ON FLAG = 1
3556  5344            JMP P2E2B       /DID NOT SKIP, GO TO E2B
3557  2002            ISZ CTRA        /ALL DONE?
3560  5350            JMP .-8         /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  6572            KSF             /SKIP ON FLAG = 1
3566  5365            JMP .+1         /REPEAT
3567  5365            JMP .+2         /REPEAT

3577  0417
      3600            PAGE



                      /ISSUE KCC,  WAIT TWICE 10-11 BIT TIMES  FOR FLAG TO SET,
                      /VERIFY THAT FLAG IS SET,  RESET FLAG (KCC) AND
                      /SKIP ON FLAG 500 TIMES TO VERIFY THAT NO
                      /SKIP OCCURS WITH FLAG = 0.
3600  0003  P2TS3,    3
3601  3600            P2TS4
3602  4432            JMS I 5200      /SET DELAYM TO DELAY TWICE
                                      /10 BIT TIMES FOR AN NON 110
                                      /BAUD DEVICE AND TWICE 11 BIT
                                      /TIMES FOR AN 110 BAUD DEVICE.
                                      /SEE BIT TIME TABLE AT BEGINNING
                                      /OF PROGRAM.

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

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3605  7014                ~766            /CTRA
3606  4571      P2TS3A,   UKCC            /CLEAR FLAG
3607  4575                DELAY           /GO DELAY
3610  4572                UKSF            /READY?
3611  5231                JMP P2E3A       /NO,  ERROR
3612  4571                UKCC            /YES,  RESET FLAG
3613  4572                UKSF            /READY?
3614  5216                JMP .+2         /NO,  OK
3615  5223                JMP P2E3B       /YES,  ERROR
3616  2002                ISZ CTRA        /ALL DONE TESTING?
3617  5213                JMP .-4         /NO,  REPEAT
3620  5425                JMP I [-MAIN    /YES,  CHAIN
3621  7402      P2E3A,    HLT             /TSTG ERR HALT      FLAG
                                          /NOT SET OR DV  FAILURE
3622  5206                JMP P2TS3A      /TRY AGAIN
3623  7402      P2E3B,    HLT             /TSTG ERR HALT 2    FLAG
                                          /FAILED TO RESET, OR ERR
                                          /SKIPPED ERRONEOUSLY.

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


                /THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT.
                /AND THEN CHECKS THAT THE READER FLAG IS CAPABLE OF INTERRUPTING.
3630  0004      P2TS4,    4
3631  3671                P2TS5
3632  4577                SETLOC          /SET INTERRUPT RETURN
3633  0002                2               /TO P2E4A.
3634  3644                P2E4A
3635  4565      P2TS4A,   UTCF            /CLEAR PUNCH/PRINTER FLAG
3636  4426                JMS I KBFLAG
3637  4571                UKCC            /CLEAR READER FLAG
3640  6001                ION             /ENABLE INTERRUPT
3641  7000                NOP
3642  6002                IOF             /TURN OFF INTERRUPT
3643  5246                JMP .+3
3644  4777'     P2E4A,    JMS INTFNO      /UNEXPECTED INTERRUPT
3645  5235                JMP P2TS4A      /TRY AGAIN
3646  4431                JMS I S4000     /SET UP TO DO TEST 4000 TIMES.
3647  4577                SETLOC          /SET INTERRUPT RETURN
3650  0002                2               /TO P2TS4C.
3651  3666                P2TS4C
3652  4571                UKCC
3653  4572                UKSF            /WAIT FOR READER FLAG
3654  5253                JMP .-1         /TO SET
3655  6001      P2TS4B,   ION             /ENABLE INTERRUPT
3656  7000                NOP
3657  7402      P2E4B,    HLT             /READER FLAG FAILED TO INTERRUPT,
                                          /OR INTERRUPT SYSTEM MALFUNCTION
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  5259            JMP P2TS4B              /NO,REPEAT
3670  5425            JMP I CHAIN


                /READER TIMING TEST, CHECKS THAT READER FLAG IS =1 NO
                /LATER THAN 100 MILLISECONDS AFTER KCC INSTRUCTION IS ISSUED.
                /
3671  5005    P2TS5,  5
3672  3711            P2TS6
3673  4577            SETLOC                  /SET DELAYM
3674  0026            DELAYM                  /TO -133
3675  7001            M147
3676  4409            JMS I $100              /SET UP TO DO TEST 150 TIMES.
3677  6571    P2TS5A, LKCC                    /START READER, CLEAR PC FLAG
3700  4576            DELAY                   /GO DELAY 133 MILLISECS
3701  6572            LKSF
3702  5306            JMP P2E5
3703  2062            ISZ CTRA
3704  5277            JMP P2TS5A
3705  5425            JMP I CHAIN
3706  7402    P2E5,   HLT                     /TSTS ERR HALT, FLAG NOT=1
                                                /100 MSECS AFTER KCC INSTRUCTION.
3707  4426            JMS I KBFLAG
3710  5325            JMP .-3                 /YES, REPEAT.


                /READ 256 DIFFERENT CHARACTERS, EACH CHARACTER IS READ 1000 TIMES
                /TO VERIFY CONSISTENCY OF READING FROM TTI.
                /
3711  0000    P2TS6,  6
3712  3762            P2TS7
3713  4577            SETLOC                  /SET COUNT OF
3714  2062            CTRA                    /-256(DEC)
3715  7400            -400                    /IN CTRA
3716  4426    P2TS6A, JMS I KBFLAG
3717  6575            LKRS                    /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            LKRS                    /READ CHARACTER.
3726  7421            MQL                     /STORE IN MQ
3727  7701            ACL                     /GET IT BAC     TO THE AC.
3730  7041            CIA                     /2'S COMPLE     F IT
```

```
3731  1112            TAD WT56A       /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 CTR3        /READ CHAR [illegible] TIMES?
3742  5334            JMP P2TS6C      /NO, GO BACK [illegible] AGAIN.
3743  2062            ISZ CTR4        /YES, SEND [illegible], CHARS?
3744  5310            JMP P2TS6A      /NO.
3745  5425            JMP I CHAIN     /YES, CHAIN

3746  7701    P2E6A,  ACL             /MQ TO AC.
3747  7402            HLT             /TST6 ERR HALT A, AC DISPLAYS
                                      /INCORRECTLY READ CHAR. DEPRESS
                                      /KEY CONTINUE
3750  7200            CLA
3751  1112            TAD WT56A
3752  7402    P2E6B,  HLT             /TST6 ERR HALT B, AC DISPLAYS
                                      /WHAT THE CORRECT CHAR SHOULD
                                      /BE.
3753  7200            CLA
3754  4570            UKRS            /READ CHARACTER
3755  5353            JMP .-2         /LOOP BACK

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



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

3762  0007    P2TS7,  7
3763  4030            P2T10
3764  4430            JMS I S100      /SET UP TO DO TEST 100 TIMES.
3765  4432            JMS I S200      /SET DELAYM TO DELAY TWICE
                                      /12 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

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```
4000  4426    P2TS7A, JMS I KBFLAG
4001  7240            CLA CMA             /AC=7777,
4002  6562            JKCR                /CLEAR READER FLAG,
4003  7340            CMA                 /AC SHOULD EQUAL ZERO NOW,
4004  7440            SZA                 /RESULT ??
4005  5215            JMP P2E7A           /NO, ERROR, GO TO P2E7A,
4006  4576    P2TS7B, DELAY               /GO DELAY 200 MILLISECS,
4007  6572            JKSF                /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  6562            JKCR                /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  6562            JKCR                /CLEAR READER RUN,
4024  4576            DELAY               /GO DELAY 200 MILLISECS
4025  6572            JKSF
4026  5222            JMP P2E7B+1         /REPEAT,
4027  5222            JMP P2E7B+1         /REPEAT,

                /ISSUE KCC, WAIT FOR FLAG TO SET,  ISSUE KIE, WAIT
                /AC1200 THEN TURN THE INTERRUPT ON,  AN INTERRUPT AT THIS TIME
                /INDICATES A KIE FAILURE,  WITH THE FLAG STILL SET ISSUE
                /SKP AND SPI,  A SKIP BY EITHER INDICATES A FAILURE,
                /ISSUE KIE WITH AC1200 AND THE INTERRUPT ON,  NO INTERRUPT
                /INDICATES A KIE FAILURE,  ISSUE SKP AND THEN SPI,  FAILURE OF
                /EITHER TO SKIP INDICATES A FAILURE,  THIS TEST IS DONE 4000 TIMES,

4030  0010    P2T10,  10
4031  4133            P2Y11
4032  4451            JMS I [4000         /SET UP TO DO TEST 4097 TIMES
4033  4426            JMS I KBFLAG
4034  4577    P2T10A, SETLOC              /SET INTERRUPT RETURN LOCATION
4035  0002            2                   /TO P2E10A,
4036  4073            P2E10A
4037  6572            JKSF
4040  5233            JMP P2T10A+1
4041  7200            CLA                 /AC=0
4042  6561            JKIE                /DISABLE TTY INTERRUPT
4043  6001            ION                 /TURN INTERRUPT ON
4044  7000            NOP
4045  6002    P2T10B, IOF                 /TURN INTERRUPT OFF,
4046  6003            SKP                 /SKIP IF INTERRUPT REQUEST,
4047  7410            SKP
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4850  5307            JMP P2E10B      /ERROR, SRQ FAILED, GO TO P2E10B.
4851  4557  P2T10C,  USPI              /SKIP IF TTY INTERRUPT.
4852  7410            SKP
4853  5315            JMP P2E10C      /ERROR,  SPI FAILED, GO TO P2E10C.
4854  4577  P2T10D,  SETLOC           /SET INTERRUPT RETURN LOCATION
4855  0002            2               /TO P2T10E
4856  4864            P2T10E
4857  7201            CLA IAC         /AC11=1
4860  4561            UKIE            /ENABLE TTY INTERRUPT.
4861  6001            ION             /TURN INTERRUPT ON.
4862  7000            NOP             /(SHOULD INTERRUPT).
4863  5323            JMP P2E10D      /ERROR, GO TO P2E10D.
4864  4003  P2T10E,  SRQ               /SKIP IF INTERRUPT REQUEST.
4865  5305            JMP P2E10E      /ERROR, GO TO P2E10E.
4866  4557  P2T10F,  USPI              /SKIP IF TTY INTERRUPT.
4867  5304            JMP P2E10F      /ERROR,  GO TO P2E10F.
4870  7002            ISZ C7RA        /DONE?
4871  5234            JMP P2T10A      /NO, REPEAT.
4872  5425            JMP I CHAIN


4873  7402  P2E10A, HLT               /KIE FAILED TO DISABLE
      /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
4874  4572            UKSF            /IS READER FLAG SET?
4875  4777'           JMS INTFND      /NO,  UNEXPECTED INTERRUPT.
4876  4577            SETLOC          /SET INTERRUPT RETURN LOCATION
4877  0002            2               /TO P2E10A+1.
4100  4874            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=2), REQUEST.  (SHOULD NOT SKIP)
4113  5310            JMP P2E10B+1    /REPEAT
4114  5310            JMP P2E10B+1    /REPEAT

4115  7602  P2E10C, HLT CLA           /SPI SKIPPED WITH TTY DISABLED.
      /SCOPE LOOP,  PRESS CONTINUE TO ENTER.
4116  4426            JMS I KBFLAG
4117  4561            UKIE            /DISABLE TTY INTERRUPT, (AC11=2).
4120  4357            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
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4125  0002            2                       /TO P2E12D+4,
4126  4127            P2E12D+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 P2E12D+4            /REPEAT.


4135  7402    P2E12E, 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 P2E12E+1            /REPEAT,
4143  5336            JMP P2E12E+1            /REPEAT.


4144  7402    P2E12F, 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 P2E12F+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 5100              /SET UP TO DO TEST 100 TIMES.
4156  4432            JMS I 5200              /SET DELAYS TO DELAY TWICE
                                              /10 BIT TIMES FOR AN 110
                                              /BAUD DEVICE AND TWICE 11 BIT
                                              /TIMES FOR AN 110 BAUD DEVICE.
                                              /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                    /SKIP FLAG 0    UP?
4170  7610            SKP CLA
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4171  5775'           JMP P2E11B      /YES, ERROR, GO TO P2E11B.
4172  5774'           JMP P2T14C      /CROSS PAGE

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4200  4426  P2T11C, JMS I KBFLAG
4201  4557            USPI            /SKIP IF TTY INTERRUPT REQUEST.
4202  5224            JMP P2E11C      /NO SKIP, GO TO P2E11C.


4203  2062            ISZ CTRA        /TEST DONE?
4204  5777'           JMP P2T14A      /NO, REPEAT.
4205  5426            JMP I CHAIN

4206  7402  P2E11A, HLT              /CAF FAILED TO CLEAR - NO LINK.
            /SCOPE LOOP, PRESS CONTINUE TO ENTER.
4207  7300            CLA CMA CLL CML /(SCOPE LOOP).
4210  6007            CAF             /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY.
4211  7420            SNL
4212  7440            SZA
4213  5207            JMP P2E11A+1    /REPEAT.
4214  5207            JMP P2E11A+1    /REPEAT.

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


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


            /TEST OF KRB INSTRUCTION.

4233  0012  P2T12,  12
4234  7777            7777
4235  4577            SETLOC          /SET COUNT OF
4236  0062            CTRA            /-256 DECIMAL
4237  7400            -400            /IN CTRA
4240  4577            SETLOC          /SET DELAYM
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```
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  1149    P2T12A, TAD (377
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  5300            JMP P2E12B      /NO, ERROR.
4260  1112    P2T12C, TAD WTS6A       /GET GOOD,
4261  7404            MQL             /MQ CONTAINS GOOD DATA
4262  7784            AQS             /RELOAD AC WITH GOOD FROM MQ.
4263  7002            IAC             /ADD ONE TO IT.
4264  3112            DCA WTS6A       /SAVE IT
4265  1142            TAD WTS6A       /GET IT BACK.
4266  0149            AND (377        /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  5303            JMP P2E12C      /NO, ERROR
4273  2062            ISZ C1RA        /DONE?
4274  5247            JMP P2T12A      /NO, REPEAT.
4275  5425            JMP I CHAIN     /YES, CHAIN.

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

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

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



                /PROGRAM 3, ASR33/35 TELETYPE READER TEST, CHECKS ABILITY OF READER
                /TO CORRECTLY READ AT FULL SPEED AND WITH RANDOM STALLS.
4307  4577    PRG3,   SETLOC          /SET KSTART TO INITIAL
4310  0023            KSTART          /ROUTINE ADDRESS.
4311  4314            P3TS0
4312  5713            JMP I .+1       /GO START
4313  0236            SRSET
```

```
                    /READ 4095 CHARACTERS, AT FULL SPEED, MATCHING EACH CHARACTER
                    /READ AGAINST COUNT PATTERN
                    /
4314  3000  P3TS2,  3
4315  4344          P3TS1
4316  4465          JMS I SYNC        /GO SYNC TAPE
4317  4577          SETLOC            /SET COUNT OF
4320  0062          CTRA              /-4095(DEC) IN
4321  7001          -7777             /CTRA
4322  4571          UKCC              /START READER
4323  4466          JMS I .+3         /GO INITIALIZE PATTERN
4324  4467  P3TS2A, JMS I GETPT       /GET PATTERN CHARACTER
4325  3332          DCA SB0           /STORE AT SB0
4326  4572          UKSF              /READY?
4327  5326          JMP .-1           /NO,  TEST AGAIN
4330  4567          UKRB              /YES,  READ CHARACTER
4331  4470          JMS I CHECK       /GO CHECK FOR CORRECT MATCH
4332  0000  SB0,    0                 /CORRECT CHAR HERE
4333  5337          JMP P3E0          /ERROR,  GO TO P3E0
4334  2062  P3T0B,  ISZ CTRA          /OK,  ALL DONE?
4335  5324          JMP P3TS2A        /NO,  REPEAT
4336  5425          JMP I CHAIN       /YES,  CHAIN
4337  7402  P3E0,   HLT               /P3T10 ERR HALT,  AC CONTAINS
                                      /CHAR THAT DID NOT MATCH
                                      /AGAINST PATTERN,  EXPRESS
                                      /KEY CONTINUE
4340  7200          CLA
4341  1332          TAD SB0           /GET CORRECT CHARACTER
4342  7402          HLT               /AC CONTAINS THE EXPECTED CHARACTER
4343  5334          JMP P3T0B


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

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

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

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

4375  5366              JMP P3T1B

4377  4157
      4400              PAGE


                        /READ WITH RANDOM STALL BETWEEN RANDOM CHARACTER GROUPS
                        /100 GROUPS READ.
                        /
4400  0002  P3TS2,      2
4401  7777              -777
4402  4455              JMS I SYNC        /GO SYNC TAPE
4403  4436              JMS I S100        /SET UP TO GO TEST 100 TIMES.
4404  4571              UKSO              /START READER
4405  4660              JMS I INPATT      /INITIALIZE PATTERN
4406  4427  P3TS2A,     JMS I RLUNTI      /SET RANDOM DELAY
4407  4777              JMS CHRGNT        /SET RANDOM CHARACTER
4410  0003              CTRB              /COUNT IN CTRB
4411  4257  P3TS2B,     JMS I GETPAT      /SET PATTERN CHARACTER
4412  3242              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  4547              UKRB              /READ CHARACTER
4417  4476              JMS I CHECK       /CHECK FOR CORRECT MATCH
4420  0000  SB2,        2                 /AGAINST SB2 CONTENTS
4421  4227              JMP P3E2          /ERROR,  GO TO P3E2
4422  2063              ISZ CTRB          /OK,  ALL CHARS FOR GROUP DONE?
4423  5211              JMP P3TS2B        /NO
4424  2062  P3T2B,     ISZ CTRA          /YES   ALL GROUPS DONE?
4425  5206              JMP P3TS2A        /NO
4426  5623              JMP I CHAIN       /YES,  CHAIN


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

4430  7200              CLA
4431  1242              TAD SB2           /GET CORRECT CHARACTER
4432  7402              HLT               /AC CONTAINS THE EXPTECTED CHARACTER
4433  5224              JMP P3T2B
```

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                    /PROGRAM 4.

4434  4776'   PRG4,   JMS STBF          /SET UP BUFFER AREA
4435  4577             SET_DO           /SET KSTART TO INITIAL
4436  0023             KSTART           /ROUTINE ADDRESS
4437  4443             P4TS0
4440  5641             JMP I .+1        /DO START PROGRAM
4441  2236             SRSET
                    /CARRIAGE RETURN TEST
4442  0000   P4TS0,   0
4443  4475             P4TS1
4444  4565             CKSR37           /KSR37?
4445  1140             TAD I11          /NO,
4446  1375             TAD (-128        /YES
4447  7421             MQL              /STORE IN MQ.
4450  4573             TYPE             /PRINT TEST TITLE
4451  6327             CRTST
4452  1133             TAD (334         /GET "^M" CODE
4453  4474             JMS I UPUNCH     /PRINT IT
4454  7701             ACL              /NO TO AC.
4455  3104             DCA UTEMP
4456  2104   CRTSTA,   ISZ UTEMP        /ALL DONE?
4457  7410             SKP              /NO
4460  5425             JMP I CHAIN      /YES, CHAIN
4461  1104   CRTSTB,   TAD UTEMP
4462  3105             DCA UTEMP1       /UTEMP TO UTEMP1
4463  1142             TAD (240         /GET "SPACE" CODE
4464  4474             JMS I UPUNCH     /PRINT IT
4465  2105             ISZ UTEMP1       /SPACED NO. OF TIMES IN UTEMP1?
4466  5263             JMP .-3          /NO, DO SPACE AGAIN
4467  1107             TAD CR           /YES, GET "CR" CODE.
4470  4474             JMS I UPUNCH     /PRINT IT.
4471  4474             JMS I UPUNCH     /DUMMY CYCLE.
4472  1132             TAD (257         /GET "/" CODE
4473  4474             JMS I UPUNCH     /PRINT IT
4474  5256             JMP CRTSTA       /GO TO CRTSTA


                    /RIGHT MARGIN TEST
4475  0001   P4TS1,   1
4476  4525             P4TS2
4477  7200             CLA
4500  1131             TAD (-16
4501  7421             MQL
4502  1130             TAD (RM33B
4503  3323             DCA RMB
4504  4565             CKSR37           /KSR37?
4505  5312             JMP .+5          /NO.
4506  1127             TAD (-17         /YES,
4507  7421             MQL
4510  1126             TAD (RM37A
4511  3323             DCA RMB
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4512  4573                TYPE                /PRINT TEST TITLE
4513  6337                RMTST
4514  7701                ACL
4515  3104                DCA UTEMP
4516  4573    RMTSTA,     TYPE                /PRINT ---- !
4517  1562                RM33A
4520  2104                ISZ UTEMP           /DONE TIMES?
4521  5316                JMP RMTSTA          /NO, GO DO IT AGAIN
4522  4573                TYPE                /YES, PRINT -(-
4523  0000    RM8,        OPEN
4524  5425                JMP I CHAIN         /CHAIN


                          /SPACE TEST
4525  0002    PATS2,      2
4526  4600                PATS3
4527  4573                TYPE                /PRINT TEST TITLE
4530  5354                SPTST
4531  4525                CKSR37              /KSR37?
4532  1125                TAD C3              /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, GO DO IT AGAIN.
4541  4525                CKSR37              /KSR37?
4542  1123                TAD C4              /NO
4543  1122                TAD C-36            /YES
4544  3104                DCA UTEMP           /-36 TO UTEMP
4545  1376                TAD C-1             /GET -2
4546  3105    SPTSTB,     DCA UTEMP1          /ADD TO UTEMP1
4547  1105                TAD UTEMP1          /UTEMP1
4550  3106                DCA UTEMP2          /TO UTEMP2
4551  1127                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 C255            /GET "/" CODE
4561  4474                JMS I UPUNCH        /PRINT IT
4562  2104                ISZ UTEMP           /DONE 36 TIMES?
4563  7410                SKP                 /NO,
4564  5425                JMP I CHAIN         /YES, CHAIN
4565  7344                CLA CLL CMA RAL     /-2 TO AC
4566  1105                TAD UTEMP1          /ADD C(UTEMP1)
4567  5346                JMP SPTSTB          /GO TO SPTSTB

4574  7777
4575  7656
4576  1000
4577  3456
      4600                PAGE
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```
                        /LINE FEED TEST
4600  0003      P4TS3,  3
4601  5122              P4TS4?
4602  7260              CLA CMA           /SET STALL
4603  3884              DCA STLIO         /INDICATOR
4604  4573              TYPE              /PRINT TEST TITLE
4605  4346              .PTST
4606  4555              CKSR37            /KSR37?
4607  1140              TAD C11           /NO,
4610  1377              TAD (-11          /YES,

4611  3400              DCA UTEMP
4612  1353      .PTSTA, TAD C334          /GET TAB CODE
4613  4474              JMS I UPLNCH      /PRINT IT
4614  1110              TAD LF            /GET LF CODE
4615  4474              JMS I UPLNCH      /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 .PTSTA

                        /TYPE LINE OF CHARACTERS ABC
4623  0004      P4TS4,  4
4624  4631              P4TS5
4625  4573              TYPE              /PRINT TITLE
4626  6370              CHRTST
4627  4433              JMS I TLCALL      /PRINT LINE
4630  6101              A

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

                        /TYPE LINE OF CHARACTERS GHI
4635  0006      P4TS6,  6
4636  4641              P4TS7
4637  4433              JMS I TLCALL
4640  6115              G
                        /TYPE LINE OF CHARACTERS JKL
4641  0007      P4TS7,  7
4642  4645              P4TS10
4643  4433              JMS I TLCALL
4644  6120              J
                        /TYPE LINE OF CHARACTERS MNO
4645  0010      P4TS10, 10
4646  4651              P4TS11
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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  4721            P4TS17
4677  4433            JMS I TLCALL
4700  6148            FOUR
                    /TYPE LINE OF CHARACTERS 789
4701  0017      P4TS17, 17
4702  4705            P4TS20
4703  4433            JMS I TLCALL
4704  6150            SEVEN
                    /TYPE LINE OF CHARACTERS !"#
4705  0020      P4TS20, 20
4706  4711            P4TS21
4707  4433            JMS I TLCALL
4710  6153            C241
                    /TYPE LINE OF CHARACTERS $%&
4711  0021      P4TS21, 21
4712  4715            P4TS22
4713  4433            JMS I TLCALL
4714  6156            C244
                    /TYPE LINE OF CHARACTERS '()
4715  0022      P4TS22, 22
4716  4721            P4TS23
4717  4433            JMS I TLCALL
4720  6161            C247
                    /TYPE LINE OF CHARACTERS *+,
4721  0023      P4TS23, 23
4722  4725            P4TS24
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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
4762  5000            P4TS34
4763  4434            JMS I TLC37
4764  6214            SG

4777  7657
      5000            PAGE


                /TYPE LINE OF SMALL J, K, AND L
5000  0034      P4TS34, 34
5001  5004            P4TS35
5002  4434            JMS I TLC37
5003  6217            SJ
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                        /TYPE LINE OF SMALL M, N, AND O
5004  0035      P4TS35, 35
5005  5010              P4TS36
5006  4434              JMS I TLC37
5007  6222              SM
                        /TYPE LINE OF SMALL P, Q, AND R
5010  0036      P4TS36, 36
5011  5014              P4TS37
5012  4434              JMS I TLC37
5013  6225              SP
                        /TYPE LINE OF SMALL S, T, AND U
5014  0037      P4TS37, 37
5015  5020              P4TS40
5016  4434              JMS I TLC37
5017  6230              SS
                        /TYPE LINE OF SMALL V, W, AND X
5020  0040      P4TS40, 40
5021  5024              P4TS41
5022  4434              JMS I TLC37
5023  6233              SV
                        /TYPE LINE OF SMALL Y, AND Z, AND CODE 340 CHARACTER.
5024  0041      P4TS41, 41
5025  5030              P4TS42
5026  4434              JMS I TLC37
5027  6236              SY
                        /TYPE LINE OF CHARACTERS WHOSE CODE IS 373, 374, 375, 376.
5030  0042      P4TS42, 42
5031  5047              P4TS43
5032  4535              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  6625              BLOCK1+4
5043  7663              -113.
5044  3064              DCA STLID
5045  4777'             JMS TYPLN
5046  5425              JMP I CHAIN

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

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

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

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


                /KSR37, KSR35, OR ASR35 TAB TEST
5122  2047    P4TS47, 47
5123  5231            P4TS50
5124  4555            CKSR37          /KSR37?
5125  5346            JMP TBTB        /NO,
5126  4573            TYPE            /YES, TYPE TITLE
5127  6267            TBTST
5130  1121            TAD [-11        /-9 TO CTRA
5131  4771'           JMS M*ABP       /GO TO SUB TO MARK TAB POSITIONS,
5132  1370            TAD (-12        /SET TAB COUNT
5133  3340            DCA TBCNT       /TO -12
5134  1367    TBTA,   TAD (-7         /YES, -7 TO CTRA
5135  3062            DCA CTRA
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5136  3381            DCA SPCNT       /2 TO SPACE COUNT
5137  4766'           JMS TABP        /GO TAB AND PRINT SLASH 9 TIMES.
5140  0000  TBCNT,    OPEN            /TAB COUNT.
5141  2062            ISZ CTRA        /DONE?
5142  7410            SKP             /NO.
5143  5425            JMP I CHAIN     /YES, CHAIN
5144  2361            ISZ SPCNT       /INCREMENT SPACE COUNT
5145  5337            JMP TBTA+3      /REPEAT
5146  4553  TBTB,     CKSR35          /KSR, ASR35?
5147  5423            JMP I CHAIN     /NO, BYPASS TEST
5150  4573            TYPE            /YES, TYPE TITLE
5151  6267            TBTST
5152  1367            TAD (-7         /-7 TO CTRA
5153  4771'           JMS MTABP       /GO TO SUB TO MARK TAB POSITIONS.
5154  4575            TYPC            /YES.
5155  6301            TBMRK+1
5156  1121            TAD C-11        /SET TAB COUNT
5157  3340            DCA TBCNT       /TO -9
5160  5334            JMP TBTA
5161  0000  SPCNT,    OPEN
5162  0000  SPCTR,    OPEN

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


5200  0000  TABCTR,   OPEN
5201  0000  TABP,     OPEN
5202  1601            TAD I TABP      /SET TABCTR
5203  3200            DCA TABCTR
5204  2201            ISZ TABP
5205  4575            CRLF            /CRLF ONCE
5206  7777            -1
5207  1777'  SPAC,    TAD SPCNT       /GET SPACE COUNT
5210  7450            SNA             /0?
5211  5220            JMP TABPA       /YES, DON'T SPACE
5212  7041            CIA             /NO, NEGATE COUNT
5213  3776'           DCA SPCTR
5214  1142            TAD C240        /SPACE
5215  4474            JMS I UPUNCH
5216  2776'           ISZ SPCTR       /DONE SPACING?
5217  5214            JMP .-3         /NO, SPACE AGAIN
5220  1140  TABPA,    TAD C11         /GET TAB CODE
5221  4474            JMS I UPUNCH    /OUTPUT TO TELEPRINTER
5222  4474            JMS I UPUNCH    /DUMMY CYC
5223  4474            JMS I UPUNCH    /DUMMY CYC.
```

```
5224  1132            TAD C257        /GET "/" CODE
5225  4474            JMS I UPLNCH    /AND TYPE IT
5226  2200            ISZ TABCTR      /DONE?
5227  5267            JMP SPAC        /NO, REPEAT
5230  5631            JMP I TABP      /YES, EXIT



                /KSR37 BACKSPACE TEST
5231  3350    PAT550, 50
5232  4623            PAT54
5233  4555            BKSR37          /KSR-37?
5234  5625            JMP I BKL .     /NO
5235  4575            TYPE            /YES, TYPE T...
5236  6203            BKSPT
5237  1124            TAD [-51        /-41 TO CTRA
5240  3352            DCA CTRA
5241  4573            TYPE            /TYPE ALTERNATE L S
5242  6574            BKSU
5243  2252            ISZ CTRA        /DONE?
5244  5241            JMP .-3         /NO,
5245  1375            TAD [-67        /-39 TO CTRA
5246  3352            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  2252            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
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            JKCC
```

```
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 FOUR 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              JKSF
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  0230              SRSET

5360  1324
5361  1343
5362  1400
5363  1216
5364  1316
5365  1212
5366  1200
5367  1721
5370  1711
5371  7000
5372  6577
5373  0210
5374  6164
5375  7731
5376  5162
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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  2000       PKT0,    0
5401  5401                PKT1
5402  4431                JMS I 54000
5403  4571                UKCC              /CLEAR AC AND FLAG
5404  4573                TYPE
5405  5443                XREDY
5406  4572                UKSF              /READY?
5407  5206                JMP .-1           /WAIT
5410  4572                UKSF              /READY, SKIP ON FLAG
5411  5215                JMP FAL0          /NO SKIP, ERROR
5412  2540                ISZ [illegible]   /ALL DONE?
5413  5212                JMP .-3           /NO, REPEAT
5414  5425                JMP I CHAIN       /YES, CHAIN

5415  7402       FAL0,    HLT [illegible]   /KSF FAILURE
5416  4572                UKSF              /SCOPE LOOP
5417  5220                JMP .+2           /SKIPS ON FLAG
5420  5216                JMP .-2           /CONTINUOUSLY

                 /ECHO TEST CHARACTER RECEIVED FROM KEYBOARD IS TYPED. THE
                 /CHARACTER TYPED SHOULD BE CH CHARACTER KEYED, RUBOUT CHANGES
                 /ECHO ROUTINE.
5421  0001       PKT1,    1
5422  5445                PKT2
5423  4571                UKCC              /CLEAR AC AND FLAG
5424  4573                TYPE
5425  5496                X4502
5426  4572       PKT1A,   UKSF              /READY?
5427  5226                JMP .-1           /WAIT
5430  4567                UKRB              /READ CHARACTER
5431  4563                UTLS              /PRINT IT
5432  4564                UYSF              /PRINTER READY?
5433  5232                JMP .-1           /NO, WAIT
5434  1144                TAD [-577         
5435  7440                SZA               /IS IT RUBOUT?
5436  5226                JMP PKT1A         /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       PKT2,    2
5441  7777                7777
5442  4571                UKCC              /CLEAR AC AND FLAG
5443  4573                TYPE              /PRINT TITLE AND
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5444  6521            KMSG4            /INSTRUCTION
5445  4573            TYPE
5446  6462            KMSG3A
5447  4572  P6T3A,    UKSF             /FLAG UP
5450  5247            JMP .-1          /NO, WAIT
5451  4567            UKRS             /YES, READ KEYBOARD
5452  3112            DCA WTSAV        /STORE CHARACTER
5453  4777'           JMS ASCOC        /CONVERT CHARACTER
5454  0112            WTSAV            /TO PRINTABLE OCTAL
5455  0541            OCTECV
5456  4573            TYPE             /PRINT CHARACTER
5457  6537            KMSG5
5460  1112            TAD WTSAV
5461  1144            TAD C-777
5462  7640            SZA CLA          /WAS IT A RETURN
5463  5247            JMP P6T3A        /NO
5464  5425            JMP I CHKSA      /YES, CHECK

                /PROGRAM 7, COMBINED READER, PRINTER, PUNCH TEST
5465  4577  PRG7,     SETLOC           /SET INTERRUPT SERVICE
5466  0002            2                /ADDRESS TO INTSVC
5467  1234            INTSVC
5470  4577            SETLOC           /SET DATA BLOCK LENGTH
5471  0101            BLKCNT           /TO -150
5472  7552            -226
5473  4426            JMS I KBFLAG
5474  4776'           JMS STBF         /SET UP BUFFER AREA
5475  4577            SETLOC           /SET KSTART TO INITIAL
5476  0023            KSTART           /ROUTINE ADDRESS
5477  5502            P7T0
5500  5701            JMP I .+1        /START PROGRAM
5501  0236            SRSET

5502  0000  P7T0,     0
5503  5506            P7T1
5504  4435            JMS I FBF        /DATA: ABC
5505  6107            A
5506  0001  P7T1,     1
5507  5512            P7T2
5510  4435            JMS I FBF        /DATA: DEF
5511  6112            D
5512  0002  P7T2,     2
5513  5516            P7T3
5514  4435            JMS I FBF        /DATA: GHI
5515  6115            G
5516  0003  P7T3,     3
5517  5522            P7T4
5520  4435            JMS I FBF        /DATA: JKL
5521  6120            J
5522  0004  P7T4,     4
5523  5526            P7T5
5524  4435            JMS I FBF        /DATA: MNO
5525  6123            M
5526  0005  P7T5,     5
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5527  5532              P7T6
5530  4435              JMS I P8F       /DATA: PDR
5531  6126              6
5532  0006    P7T6,     6
5533  5536              P7T7
5534  4435              JMS I P8F       /DATA: ?7?
5535  6131              1
5536  0007    P7T7,     7
5537  5542              P7T10
5540  4435              JMS I P8F       /DATA: VMX
5541  6134              V
5542  0010    P7T10,    10
5543  5546              P7T11
5544  4435              JMS I P8F       /DATA: ?10
5545  6137              Y
5546  0011    P7T11,    11
5547  5552              P7T12
5550  4435              JMS I P8F       /DATA: 220
5551  6142              ONE
5552  0012    P7T12,    12
5553  5556              P7T13
5554  4435              JMS I P8F       /DATA: 456
5555  6145              FOUR
5556  0013    P7T13,    13
5557  5562              P7T14
5560  4435              JMS I P8F       /DATA: 789
5561  6150              SEVEN
5562  0014    P7T14,    14
5563  5566              P7T15
5564  4435              JMS I P8F       /DATA: (*#
5565  6153              C241
5566  0015    P7T15,    15
5567  5572              P7T16
5570  4435              JMS I P8F       /DATA: &%@
5571  6156              C244
5572  0016    P7T16,    16
5573  5600              P7T17
5574  4435              JMS I P8F       /DATA: '()
5575  6161              C247

5576  1000
5577  1650
      5600              PAGE

5600  0017    P7T17,    17
5601  5604              P7T20
5602  4435              JMS I P8F       /DATA: #*,
5603  6164              C252
5604  0020    P7T20,    20
5605  5610              P7T21
5606  4435              JMS I P8F       /DATA: -,/
5607  6167              C255

5610  0021    P7T21,    21
5611  5614              P7T22
```

```
5612  4435          JMS I FBF       /DATA: !"<
5613  6172          C272
5614  0022  P7T22,  22
5615  5620          P7T23
5616  4435          JMS I FBF       /DATA: =>?
5617  6175          C275
5620  0023  P7T23,  23
5621  5624          P7T24
5622  4435          JMS I FBF       /DATA: @[\
5623  6200          C200
5624  0024  P7T24,  24
5625  5630          P7T25
5626  4435          JMS I FBF       /DATA: ]↑ AND ←EFT ARROW
5627  6203          C335
5630  0025  P7T25,  25
5631  5634          P7T26
5632  4777'         JMS FBALL       /DATA: ALL PRINTABLE ASCII
5633  4776'         JMS CNTST


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

                /PROGRAM 10.  READS COUNT PATTERN.

5651  4465  PRG10,  JMS I SYNC     /SYNC TAPE
5652  3321          DCA ERRCTR      /CLEAR ERROR COUNTER
5653  4466          JMS I INPATT    /INITIALIZE PATTERN.
5654  4571          UKCC            /START READER
5655  7604  SRT2A,  LAS             /READ SR
5656  0120          AND [400
5657  7650          SNA CLA         /STALL? (SR3=0)
5660  7040          CMA             /YES
5661  3064          DCA SYLIO       /NO

5662  4467  SRT2B,  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  7430          SZL             /ERROR, NO MATCH, GO INC. ERR[illegible]
5675  5313          JMP HLTTST      /OK
5676  2321  ERRCNT, ISZ ERRCTR      /INCREMENT ERROR COUNTER
5677  5302          JMP [illegible]
5700  7240          CLA CMA         /[illegible] RESET TO 7777,
5701  3321          DCA ERRCTR
5702  7604          LAS             /READ SR.
5703  0143          AND [illegible]
5704  7650          SNA CLA         /[illegible] ERR[illegible] (SR6)
5705  5313          JMP HLTTST      /NO.
5706  1103          TAD ERRCT       /YES, [illegible]
5707  7402          HLT
5710  7200          CLA
5711  1273          TAD SBSP        /GET GOOD CHAR[illegible]
5712  7402          HLT
5713  7604  HLTTST, LAS             /READ SR
5714  7700          SMA CLA         /HALT? (SR0)
5715  5255          JMP SRT0A       /NO.
5716  1321          TAD ERRCTR      /GET ERROR COUNT
5717  7402          HLT             /HALT, ERROR COUNT [illegible]
5720  5255          JMP SRT0A
5721  0000  ERRCTR, 0               /ERROR COUNTER

            /PROGRAM 11, PRINTER EXERCISER, TYPES LINES OF ANY [illegible] ARACTERS
            /WITH STALLS, OR FULL SPEED, KEYBOARD CONTROLLED.

5722  4772' PRG11,  JMS SYBF
5723  4573          TYPE
5724  6546          P11MG1
5725  1371  PRG11A, TAD (BLOCK1-1
5726  3016          DCA 16
5727  4573          TYPE
5730  6562          P11MG2
5731  4353          JMS GKBCR
5732  3416          DCA I 16
5733  4353          JMS GKBCR
5734  3416          DCA I 16
5735  4353          JMS GKBCR
5736  3416          DCA I 16
5737  4353          JMS GKBCR
5740  1144          TAD [-377
5741  7640          SZA CLA                 /STALL?
5742  7240          CLA CMA                 /YES,
5743  3064          DCA ST_IC               /NO,
5744  4773'         JMS P3F3                /SET UP LINE
5745  6601          BLOCK1
5746  4770'         JMS TYPLN               /TYPE LINE OF CHARACTERS
5747  7604          LAS                     /READ SR,
5750  7700          SMA CLA                 /CHANGE DATA? (SR0=1)
5751  5346          JMP .-3                 /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          JKRB                    /READ CHARACTER.
5757  7421          MSL                     /STORE CHARACTER.
5760  7701          ACL                     /GET IT BACK.
5761  4474          JMS I LPUNCH            /ECHO IT.
5762  7701          ACL                     /GET CHARACTER AGAIN.
5763  5735          JMP I [4205R            /EXIT

              /PROGRAM 12, PUNCHES BINARY COUNT PATTERN.

5764  4466  PPG12,  JMS I INPATT    /INITIALIZE BINARY COUNT PATTERN.
5765  4467          JMS I GETPT     /GET BINARY COUNT CHARACTER.
5766  4474          JMS I LPUNCH    /PUNCH CHARACTER
5767  5365          JMP .-2         /REPEAT.

5770  1637
5771  6000
5772  1000
5773  1031
5774  1135
5775  1137
5776  1600
5777  1000
      0000          PAGE

0000  0000  DVCSEL, OPEN                  /DEVICE CODE SELECT ROUTINE.
0001  1147          TAD I [INTAB          /GET START ADDR OF INPUT IOT TABLE,
0002  3052          DCA TEMP              /AND SAVE IT TEMP.
0003  1051          TAD TTYIOT            /OBTAIN NEW INPUT IOT AND
0004  7022          PTR                   /STORE AT UTEMP.
0005  7240          RAR
0006  3116          AND [0770
0007  3124          DCA UTEMP
0010  4222          JMS DVCOM             /PERFORM INPUT IOT SELECTION.
0011  1115          TAD [OUTTAB           /GET START ADDR OF OUTPUT IOT TABLE.
0012  3052          DCA TEMP              /AND OBTAIN NEW OUTPUT IOT AND
0013  1051          TAD TTYIOT            /STORE AT UTEMP
0014  7006          RTL
0015  7004          RAL
0016  0116          AND [0770
0017  3124          DCA UTEMP
0020  4222          JMS DVCOM             /PERFORM OUTPUT IOT SELECTION.
0021  5600          JMP I DVCSEL          /EXIT DVCSEL.
0022  0000  DVCOM,  OPEN                  /COMMON SUB TO SELECT IOT'S.
0023  1452          TAD I TEMP
0024  7450          SNA                   /0?
0025  5622          JMP I DVCOM           /YES, EXIT
0026  3105          DCA UTEMP1
0027  1525          TAD I UTEMP1
0030  0114          AND [7007             /REMOVE OLD DEVICE CODE.
0031  1104          TAD UTEMP             /INSERT NEW DEVICE CODE.
0032  3505          DCA I UTEMP1          /PUT BACK NEW IOT CODE.
0033  2052          ISZ TEMP              /SET ? FOR NEXT IOT CODE.
0034  5223          JMP DVCOM+1
```

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6Ø35  272Ø      INTAB,  XKSF+1
6Ø36  2725              XKCC+1
6Ø37  2731              XKRS+1
6Ø4Ø  2735              XKRB+1
6Ø41  2756              XKCR+1
6Ø42  2742              XKIE+1
6Ø43  2Ø21              INTKSF
6Ø44  1237              ASSERV
6Ø45  1264              INKSF
6Ø46  1435              INØ
6Ø47  ØØØØ              Ø
6Ø5Ø  2761      OUTTAB, XTSF+1
6Ø51  2746              XTCF+1
6Ø52  1172              XTPC+1
6Ø53  2752              XTLS+1
6Ø54  1146              XSPF+1
6Ø55  276Ø              XSPI+1
6Ø56  1261              INTCF
6Ø57  1257              INTSF
6Ø6Ø  2Ø24              INTTSF
6Ø61  2114              OUTØ
6Ø62  2121              OUT1
6Ø63  2123              OUT2
6Ø64  ØØØØ              Ø
6Ø65  Ø247      A33WP6, Ø247            /"'"
6Ø66  Ø337              Ø337            /LEFT ARROW
6Ø67  Ø327              Ø327            /"W"
6Ø7Ø  Ø257              Ø257            /"/"
6Ø71  Ø327              Ø327            /"W"
6Ø72  Ø337              Ø337            /LEFT ARROW
6Ø73  Ø247      A35WP6, Ø247            /"'"
6Ø74  Ø333              Ø333            /"["
6Ø75  Ø277              Ø277            /"?"
6Ø76  Ø3Ø3              Ø3Ø3            /"C"
6Ø77  Ø277              Ø277            /"?"
61ØØ  Ø333              Ø333            /"["
61Ø1  Ø316      A37WP6, Ø316            /BIG N
61Ø2  Ø361              Ø361            /SMALL Q
61Ø3  Ø3Ø1              Ø3Ø1            /BIG A
61Ø4  Ø376              Ø376            /SWUNG DASH
61Ø5  Ø3Ø1              Ø3Ø1            /BIG A
61Ø6  Ø361              Ø361            /SMALL Q

61Ø7  Ø3Ø1      A,      3Ø1
611Ø  Ø3Ø2              3Ø2
6111  Ø3Ø3              3Ø3
6112  Ø3Ø4      D,      3Ø4
6113  Ø3Ø5              3Ø5
6114  Ø3Ø6              3Ø6
6115  Ø3Ø7      G,      3Ø7
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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  0320  C320,     320
6201  0333            333
6202  0334            334
6203  0335  C335,     335
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6204  0336                336
6205  0337                337
6206  2341     SA,        341
6207  0342                342
6210  2343                343
6211  2344     SC,        344
6212  2345                345
6213  2346                346
6214  2347     SG,        347
6215  2350                350
6216  2351                351
6217  2352     SJ,        352
6220  2353                353
6221  2354                354
6222  2355     SP,        355
6223  2356                356
6224  2357                357
6225  2360     SR,        360
6226  2361                361
6227  2362                362
6230  2363     SS,        363
6231  2364                364
6232  2365                365
6233  2366     SV,        366
6234  2367                367
6235  2370                370
6236  2371     SY,        371
6237  2372                372
6240  2340                340
6241  2373     2373,      373
6242  2374                374
6243  2375                375
6244  2376                376
6245  2377     2377,      377
6246  0000                000
6247  4377                377

6250  4543     CARLF,     TEXT    '%##?'
6251  0077
6252  0000
6253  4543     BKSPT,     TEXT    '%##BACKSPACE TEST%##?'
6254  4302
6255  2103
6256  1323
6257  2001
6260  2305
6261  4024
6262  2523
6263  2445
6264  4343
6265  0077
6266  0000
6267  4543     TBTST,     TEXT    '%##TAB TEST%##?'
6270  4324
6271  2102
```

```
6272  4024
6273  0523
6274  2445
6275  4343
6276  0077
6277  2000
6300  4040    TBMRK,  TEXT    '         /87'
6301  4040
6302  4040
6303  4040
6304  5700
6305  7700
6306  4040    TBMRK1, TEXT    '         /8?'
6307  4040
6310  4040
6311  4037
6312  0077
6313  0000
6314  5511    RM33B,  TEXT    '-!-3?'
6315  5500
6316  7700
6317  5555    RM37A,  TEXT    '-----!-387'
6320  5555
6321  1155
6322  1100
6323  7700
6324  3440    SPTSTC, TEXT    '\ 8?'
6325  0077
6326  0000
6327  4343    CRTST,  TEXT    '%%#CR TEST%###?'
6330  4303
6331  2240
6332  2405
6333  2324
6334  4543
6335  4300
6336  7700
6337  4543    RMTST,  TEXT    '%##RIGHT MARGIN TEST%###?'
6340  4322
6341  1107
6342  1024
6343  4015
6344  2122
6345  2711
6346  1640
6347  2425
6350  2324
6351  4543
6352  4320
6353  7700
6354  4543    SPTST,  TEXT    '%##SPACE TEST%##8?'
6355  4323
6356  2001
6357  0305
6360  4024
```

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

```
6450  1303
6451  3145
6452  4300
6453  7700
6454  4543     KMSG3,  TEXT    '%%ECHO TEST'
6455  0503
6456  1017
6457  4024
6460  0523
6461  2400
6462  4543     KMSG3A, TEXT    '%%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    '%%RUBOUT ENDS ROUTINE.%%%@?'
6504  2225
6505  0217
6506  2524
6507  4005
6510  1604
6511  2340
6512  2217
6513  2526
6514  1116
6515  0556
6516  4543
6517  4300
6520  7700
6521  4543     KMSG4,  TEXT    '%%%OCTAL EQUIVALENT TEST@?'
6522  4317
6523  0324
6524  2114
6525  4005
6526  2125
6527  1126
6530  0114
6531  0516
6532  2440
6533  2425
6534  2324
6535  0077
6536  2000
```

```
6537  4543     XMSG6,  TEXT    '%#'
6540  2300
6541  4340     OCTEQV, TEXT    '   '%#@?'
6542  4240
6543  4543
6544  0077
6545  2000
6546  4343     P11MG1, TEXT    '%#PDP-8/E EXERCISER%%#@?'
6547  2022
6550  1110
6551  2405
6552  2240
6553  0530
6554  0522
6555  0311
6556  2305
6557  2245
6560  4300
6561  7700
6562  4543     P11MG2, TEXT    '%#TYPE IN DATA :@?'
6563  2431
6564  2005
6565  4011
6566  1640
6567  0401
6570  2401
6571  4072
6572  0077
6573  0000
6574  2540     BKSU,   TEXT    'U @?'
6575  0077
6576  0000
6577  0000     END,    0               /BEG OF 100 WORD BUFFER

                       $

0114  7007
0115  6050
0116  0770
0117  6035
0120  0400
0121  7767
0122  7730
0123  0004
0124  7727
0125  0005
0126  6317
0127  7761
0130  6314
0131  7762
0132  7257
0133  0334
0134  0252
0135  7650
0136  7670
0137  7653
```

```
0140  0011
0141  7754
0142  0240
0143  0130
0144  7481
0145  0377
0146  0077
0147  7760
0150  0037
0151  7766
0152  0017
0153  0300
0154  0352
0155  0366
0156  0351
0157  0765
0160  1165
0161  0781
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  0537
0177  0526
```

```
0000  11111110  10000010  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11101111  11111111  11111111  11111111  11111111  11111111  11111111

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111110  00000000  00000001

3000  11111111  11111111  11111111  11111111  11111111  11111110  01111111  11111111
3100  11111111  11111111  11111111  11111111  11111111  11111101  10111111  11111111

3200  11111111  11111111  11111111  11111111  11111111  11111011  11011111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11110111  11101111  11111111

3400  11111111  11111111  11111111  11111111  11111111  11101111  11110111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11011111  11111011  11111111

3600  11111111  11111111  11111111  11111111  11111111  10111111  11111101  11111111
3700  11111111  11111111  11111111  11111111  11111111  01111111  11111110  11111111
```

```
4000  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
4100  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

4200  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
4300  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

4400  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
4500  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

4600  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
4700  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

5000  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
5100  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

5200  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
5300  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

5400  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
5500  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

5600  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
5700  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

6000  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
6100  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

6200  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
6300  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

6400  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111
6500  111111111  111111111  111111111  111111111  111111111  111111111  111111111  111111111

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700
```

```
A          6107
A33WP6     6065
A35WP6     6073
A37WP6     6101
AC         0077
ACL        7701
ASCON      1650
ASCT       1710
BAUDRT     0022
BCRET      2205
BKSCTR     5262
BKSPC      0263
BKSPT      6253
BKSW       6574
BLK2       6724
BLKBB      6722
BLKCC      7034
BLKCNT     0101
BLOCK1     6601
BLOCK2     6713
BLOCKA     6577
BLOCKB     6711
BLOCKC     7023
BSW        7002
C241       6153
C244       6156
C247       6161
C252       6164
C255       6167
C272       6172
C275       6175
C300       6200
C335       6203
C373       6241
C377       6245
CAF        6007
CAM        7621
CARLF      6250
CHAIN      0025
CHAINN     0263
CHCK       0513
CHECK      0070
CHRCNT     0456
CHRTST     6376
CK33       0352
CK35       0360
CK37       0366
CKSR33     4554
CKSR35     4553
CKSR37     4555
CNTST      1630
CNV        1673
CR         0107
CRALF      0562
CRCTR      0561
CRLF       4575
CRTST      6327
CRTSTA     4456
CRTSTB     4461
CTRA       0062
CTRB       0063
CTSK       0550
CURTST     0054
D          6112
DBLK       7577
DELAY      4576
DELAYM     0024
DELAYS     0102
DLCNT      0474
DLCNT1     0027
DLMSR      1474
DLYMS      0337
DLYMSK     0111
DVCOM      6022
DVCSEL     6000
END        6577
ERRCNT     5676
ERRCR      0103
ERRCTR     5721
ERROR      1440
FADDR      0023
FBA33      1102
FBALL      1066
FBF        0035
FBF3       1031
FBF33      1055
FBFI       2144
FETCH      1646
FLAG       0716
FORWD      0302
FOUR       6145
FW336      1117
FW356      1135
FW376      1153
G          6115
GETPT      0067
GETRDY     0237
GKBCR      5753
GTBIN      0444
GTF        6004
HLTD       2076
HLTTST     5713
HOLD1      3346
IBIN       0436
IN2        1433
INCRTN     0261
INKSF      1264
INPATT     7066
INTAB      6035
INTCF      1261
INTEND     2017
INTKSF     2021
INTSF      1257
INTSVC     1254
INTTSF     2024
IOF        6002
ION        6001
J          6122
K5203      2731
KBFLAG     0026
KCC        6032
KCR        6030
KFLAG      1365
KIE        6035
KMSG1      6432
KMSG2      6443
KMSG3      6454
KMSG3A     6462
KMSG4      6521
KMSG5      6537
KRB        6036
KRS        6034
KSF        6031
KSTART     2023
LDBAUD     1527
LF         0110
LPTST      6366
LPTSTA     4612
LINK       0100
M          6123
M147       7631
M3         2111
MCTR       0625
MIL1       2061
MILCTR     2060
MINT       6115
MOVE       4574
MOVEA      0613
MOVVE      0600
MQL        7421
MSCTR      2057
MTABP      2162
MTON       6117
MTRS       6127
NTST       1545
NTSTA      1554
NXTST      0256
OCTEQV     6541
ONE        6142
OPEN       0027
OUT        1271
OUT2       2114
OUT1       2121
OUT2       2123
OUTTAB     6052
P          6126
P0E2A      2237
P0E3B      2244
P0E2C      2253
P0E2E      2262
P2E1A      2324
P0E1B      2315
P0E2A      2415
P0E2B      2427
P0E2C      2435
P0E2D      2443
P0E2E      2456
P0E2F      2465
P0E2G      2474
P0E3A      2527
P0E3B      2534
P0E3C      2542
P0E4A      2607
P0E4B      2614
P0E5A      2650
P0E5B      2652
P0E6A      2664
P0E6B      2671
P2E6C      2675
P0E6D      2726
P0E6E      2723
P0E6F      2725
P0E7A      2744
P0E7B      2752
P0E7C      2763
P0T6       2654
P0T6A      2657
P0T6B      2665
P0T6C      2672
P0T6D      2676
P0T6E      2727
P0T6F      2721
P0T7       2732
P0T7A      2742
P0T7B      2745
P0T7C      2751
P0TSJ      2225
P0TSJA     2211
```

PØTSØB	2214	P1T12B	3456	P2T1ØC	4Ø51	P4TS1Ø	4645
PØTSØC	2222	P1TSØ	3ØØ5	P2T1ØD	4Ø54	P4TS11	4651
PØTSØD	2225	P1TS1	3Ø12	P2T1ØE	4Ø64	P4TS12	4655
PØTSØE	223Ø	P1TS1A	3214	P2T1ØF	4Ø66	P4TS13	4661
PØTS1	227Ø	P1TS2	3Ø34	P2T11	4153	P4TS14	4665
PØTS1A	2275	P1TS2A	3Ø4Ø	P2T11A	4157	P4TS15	4671
PØTS1B	2313	P1TS2B	3Ø46	P2T11B	4166	P4TS16	4675
PØTS1C	2324	P1TS3	3Ø66	P2T11C	42ØØ	P4TS17	47Ø1
PØTS2	2327	P1TS3A	3Ø74	P2T12	4233	P4TS2	4525
PØTS2A	2332	P1TS4	3126	P2T12A	4247	P4TS2Ø	47Ø5
PØTS2B	2342	P1TS4A	3133	P2T12B	4255	P4TS21	4711
PØTS2C	2345	P1TS4B	3153	P2T12C	4267	P4TS22	4715
PØTS2D	235Ø	P1TS4C	3167	P2TSØ	351Ø	P4TS23	4721
PØTS2E	24ØØ	P1TS5	32ØØ	P2TSØA	3513	P4TS24	4725
PØTS2F	24Ø2	P1TS5A	32Ø4	P2TS1	353Ø	P4TS25	4731
PØTS2G	24Ø4	P1TS5B	3211	P2TS1A	3533	P4TS26	4735
PØTS3	25Ø4	P1TS5C	3213	P2TS1B	3534	P4TS27	4741
PØTS3A	251Ø	P1TS5D	3217	P2TS2	3545	P4TS3	45Ø2
PØTS3B	2515	P1TS5E	3222	P2TS2A	3551	P4TS3Ø	4745
PØTS3C	2521	P1TS6	3271	P2TS3	36ØØ	P4TS31	4751
PØTS4	2544	P1TS6A	3277	P2TS3A	36Ø6	P4TS32	4755
PØTS4A	2547	P1TS7	3314	P2TS4	363Ø	P4TS33	4761
PØTS4B	2565	P1TS7A	3322	P2TS4A	3635	P4TS34	5ØØ2
PØTS4C	26ØØ	P2EØ	3524	P2TS4B	3655	P4TS35	5ØØ4
PØTS5	2616	P2E1	3543	P2TS4C	3666	P4TS36	5Ø1Ø
PØTS5A	2624	P2E1ØA	4Ø73	P2TS5	3671	P4TS37	5Ø14
PØTS5B	2634	P2E1ØB	41Ø7	P2TS5A	3677	P4TS4	4623
P11MG1	6546	P2E1ØC	4115	P2TS6	3711	P4TS4Ø	5Ø2Ø
P11MG2	6562	P2E1ØD	4123	P2TS6A	3716	P4TS41	5Ø24
P1E11A	3424	P2E1ØE	4135	P2TS6B	3724	P4TS42	5Ø3Ø
P1E12A	3464	P2E1ØF	4144	P2TS6C	3734	P4TS43	5Ø47
P1E12B	3474	P2E11A	42Ø6	P2TS7	37Ø2	P4TS44	5Ø54
P1E1A	3Ø25	P2E11B	4215	P2TS7A	4ØØ2	P4TS45	5Ø72
P1E2A	3Ø53	P2E11C	4224	P2TS7B	4ØØ6	P4TS46	51Ø6
P1E2B	3Ø62	P2E12A	4276	P3EØ	4337	P4TS47	5122
P1E3A	3113	P2E12B	43Ø3	P3E1	4371	P4TS5	4631
P1E3B	3122	P2E12C	43Ø5	P3E2	4427	P4TS5Ø	5Ø31
P1E4A	3143	P2E2A	3562	P3T2B	4334	P4TS6	4635
P1E5	325Ø	P2E2B	3564	P3T1B	4366	P4TS7	4641
P1E5A	323Ø	P2E3A	3621	P3T2C	4424	P6EØ	5415
P1E5B	3235	P2E3B	3623	P3TSØ	4314	P6TØ	5417
P1E5C	3242	P2E4A	3644	P3TSØA	4324	P6T1	5421
P1E5D	3257	P2E4B	3657	P3TS1	4344	P6T1A	5426
P1E5E	3264	P2E5	37Ø6	P3TS1A	4354	P6T2	544Ø
P1E6A	331Ø	P2E6A	3746	P3TS2	44ØØ	P6T2A	5447
P1E71Ø	3366	P2E6B	3752	P3TS2A	44Ø6	P7ØCTR	1Ø11
P1T1Ø	3325	P2E6C	3756	P3TS2B	4411	P7TØ	55Ø2
P1T1ØA	3333	P2E7A	4Ø15	P4T44A	5Ø66	P7T1	5526
P1T11	34ØØ	P2E7B	4Ø21	P4T45A	51Ø2	P7T1Ø	5542
P1T11A	34Ø5	P2T1Ø	4Ø3Ø	P4T46A	5116	P7T11	5546
P1T12	3435	P2T1ØA	4Ø34	P4TSØ	4442	P7T12	5552
P1T12A	3443	P2T1ØB	4Ø45	P4TS1	4475	P7T13	5556

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P7T14   5562        RCTRA   1511        SLOOP2  3223        TLCALI  2126
P7T15   5566        RCTRB   1512        SM      6222        TLCALL  2033
P7T16   5572        RDBLK   1402        SNDREC  3353        TLS     6245
P7T17   5600        RDBLKR  1407        SP      6225        TPC     6244
P7T2    5512        RDRSRV  1423        SPAC    5207        TRDATA  3337
P7T20   5604        RDSRV   1432        SPCNT   5161        TSC1    2654
P7T21   5610        RGNA    0400        SPCTR   5162        TSC2    2643
P7T22   5614        RGNB    0417        SPF     6040        TSF     6241
P7T23   5620        RM33A   1562        SPI     6045        TTYIOT  2021
P7T24   5624        RM33B   6314        SPIND   1720        TTYTYP  2022
P7T25   5630        RM37A   6317        SPT0    1716        TYPAT   2654
P7T26   5634        RMB     4523        SPT1    1717        TYPE    4573
P7T27   5640        RMTST   6337        SPTST   6354        TYPEA   1637
P7T3    5516        RMTSTA  4516        SPTSTA  4535        TYPLN   1627
P7T30   5644        RP1A    0415        SPTSTB  4546        TYPLN3  1615
P7T4    5522        RP1B    0434        SPTSTC  6324        TYPSP   0667
P7T5    5526        RP2A    0416        SRQ     6003        TYPSTG  2626
P7T6    5532        RP2B    0435        SRSET   0236        UKCC    4571
P7T7    5536        RRDY    1343        SRT0A   5655        UKCR    4562
PADDR   1342        RRPP    0304        SRT0B   5662        UKIE    4561
PBLK    1316        RSCTR   1232        SS      6230        UKRB    4567
PBLKR   1324        RSSERV  1233        ST33B   1020        UKRS    4570
PCTR    1341        RSTUP   1351        STAL    0551        UKSF    4572
PDCR    1310        RSYNC   1216        STALL   4556        UMOVE   0075
PFLAG   0071        RTF     6005        START   0200        UOUT    0072
PLTLR   1200        RTNNO   0055        STBAUD  0504        UPUNCH  0074
PRG0    2200        RUDONE  1456        STBF    1000        USPF    4563
PRG1    3000        S       6131        STCTR   2326        USPI    4557
PRG10   5651        S100    0030        STLID   0064        UTCF    4565
PRG11   5722        S100I   2012        SV      6233        UTEMP   2104
PRG11A  5725        S200    0032        SY      6236        UTEMP1  2105
PRG12   5764        S200I   2005        SYNC    0065        UTEMP2  2106
PRG2    3503        S4000   0031        SYNK    0530        UTLS    4563
PRG3    4307        S4000I  2000        SYNKA   0534        UTPC    4564
PRG4    4434        SA      6206        TABCTR  5200        UTPLN3  2073
PRG5    5274        SASC    1707        TABP    5201        UTSF    4566
PRG5A   5317        SB      1435        TABPA   5222        V       6134
PRG6    5340        SB0     4332        TADDR   0624        VCTR    1267
PRG7    5465        SB1     4364        TBCNT   5142        WASC    1706
PRGADR  7235        SB2     4420        TBMRK   6300        WCHK    0527
PRGEND  3300        SBSP    5673        TBMRK1  6306        WCPTST  6412
PRGNUM  0036        SCNT    2473        TBTA    5134        WDSWS   2153
PRGTAB  0037        SD      6211        TBTB    5146        WTS6A   2112
PRINT   0671        SETBAU  1513        TBTST   6267        XKCC    2724
PSTUP   1277        SETLOC  4577        TCF     6042        XKCR    2755
PSYNC   1212        SETRND  1742        TCTR    1647        XKIE    2761
PT0     0442        SEVEN   6152        TEMP    0052        XKRB    2734
PT1     0443        SG      6214        TEMP1   0053        XKRS    2730
PUNCH   2112        SGET    1721        TEMQ    2714        XKSF    2717
RADDR   1416        SHALT   2317        TEMR    2715        XSPF    1165
RSCTR   1417        SINPT   1711        TLC37   2234        XSPI    2765
RBUSY   2076        SJ      6217        TLC371  2134        XTCF    2745
```

```
XTLS    2751
XTPC    1171
XTSF    0740
Y       6137


ERRORS DETECTED: 0

LINKS GENERATED: 109

RUN-TIME:  34 SECONDS

3K CORE USED
```