

IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-DIKLB-A-D
PRODUCT NAME:	KL8-JA TELETYPE TEST
DATE CREATED:	OCTOBER 8, 1973
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	BRUCE HANSEN

COPYRIGHT (C) 1973, DIGITAL EQUIPMENT CORPORATION

THE MATERIAL IN THIS DOCUMENT IS FOR INFORMATION PURPOSES ONLY AND IS SUBJECT TO CHANGE WITHOUT NOTICE. DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY FOR THE USE OF SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY IT. DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY FOR ANY ERRORS WHICH MAY APPEAR IN THE DOCUMENT.

1. ABSTRACT
2. REQUIREMENTS
 - 2.1 EQUIPMENT
 - 2.2 STORAGE
 - 2.3 PRELIMINARY PROGRAMS
3. LOADING PROCEDURE
 - 3.1 METHOD
4. TEST PROCEDURE
 - 4.1 DEVICE CODE SELECTION
 - 4.2 PRG0 TEST PROCEDURE
 - 4.3 PRG1 TEST PROCEDURE
 - 4.4 PRG2 TEST PROCEDURE
 - 4.5 PRG3 TEST PROCEDURE
 - 4.6 PRG4 TEST PROCEDURE
 - 4.7 PRG5 TEST PROCEDURE
 - 4.8 PRG6 TEST PROCEDURE
 - 4.9 PRG7 TEST PROCEDURE
5. PROGRAM AND/OR OPERATOR ACTION
 - 5.1 NORMAL HALTS
6. ERRORS
 - 6.1 ERROR HALTS AND DESCRIPTION,
7. MISCELLANEOUS
 - 7.1 EXECUTION TIME
 - 7.2 TEST TAPES
8. PROGRAM DESCRIPTION
 - 8.1 PRG0-READER TEST
 - 8.2 PRG1-PRINTER TEST
 - 8.3 PRG2-PUNCH TEST
 - 8.4 PRG3-KEYBOARD TEST
 - 8.5 PRG4-COMBINED READER,PRINT,PUNCH TEST
 - 8.6 PRG5-READER EXERCISER,BINARY COUNT PATTERN
 - 8.7 PRG6-PRINTER EXERCISER
 - 8.8 PRG7-TAPE GENERATOR,BINARY COUNT PATTERN

1. ABSTRACT

THIS PROGRAM CONSISTS OF A PACKAGE OF TEST PROGRAMS FOR TESTING THE TELETYPE, ONLY ONE TELETYPE MAY BE TESTED AT A TIME; THE TELETYPES THAT CAN BE TESTED ARE LT33-CC, LT33-DD, LT33-CC, LT33-CD, LT35-CC, LT35-CD, OR KSR37.

THE TEST PROGRAMS ARE:

PRG0=READER TEST
PRG1=PRINTER TEST
PRG2=PUNCH TEST
PRG3=KEYBOARD TEST
PRG4=COMBINED TEST
PRG5=READER EXERCISER, BINARY COUNT PATTERN
PRG6=PRINTER EXERCISER
PRG7=BINARY COUNT TAPE GENERATOR

2. REQUIREMENTS

2.1 EQUIPMENT

A. PDP-8/E FAMILY PROCESSOR WITH AT LEAST 4K OF MEMORY OR A PDP-8, 8I OR 8L WITH 4K OF MEMORY AND A DM8E=BN OR A DM8E=P BUS CONVERTER,
B. LT33'S, LT35-CC, LT35-CD OR KSR37 TO TEST A 110 BAUD CURRENT OPTION,
C. KL8-JA(M8655) TERMINAL CNTRL/DATA INTERFACE.

2.2 STORAGE

LOCATIONS 0000 THROUGH 5400 ARE USED.

2.3 PRELIMINARY PROGRAMS

THE SYSTEM MUST BE CAPABLE OF RUNNING ALL BASIC PROCESSOR DIAGNOSTICS AND THE KL8-JA LOOP BACK TEST, MAINDEV=00-DIKLA.

3. LOADING PROCEDURE

3.1 METHOD

THE PROGRAM IS LOADED USING THE STANDARD BINARY LOADER TECHNIQUE AND THE PROGRAM MUST RESIDE IN FIELD 0.

4. TEST 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)
- 2, DEVICE CODES ASSIGNED,

TO PROVIDE THIS INFORMATION, PROCEED AS FOLLOWS:

A, SET LOCATION 0020 TO:

- 1, 0000 FOR LT33'S TELETYPE
- 2, 0001 FOR LT35-CC OR LT35-CD 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, REFER TO INDIVIDUAL PROGRAM TEST PROCEDURE.

4.2

PRG0 TEST 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 0000,
- G. PRESS CLEAR AND CONTINUE,
- H. PROGRAM HALTS AT LOCATION 0227 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 A0,
SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR0 THROUGH
SR11,
SR2=1 LOOP PROGRAM,
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED:

- I. PROGRAM IS EXECUTED AND HALTS AT LOCATION 0274 PROGRAM END
HALT, IF NO "LOOP" OPTIONS ARE SET, AND IF NO ERRORS OCCUR.

4.3

PRG1 TEST 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 0001,

(4.3 CONT'D)

- E. PRESS CLEAR AND CONTINUE;
- F. PROGRAM HALTS AT LOCATION 0227 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 SR0 = SR11.
SR2=1 LOOP PROGRAM,
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED;
- G. PROGRAM IS EXECUTED AND HALTS AT LOCATION 0211; PROGRAM END HALT IF NO "LOOP" OPTIONS ARE SET, AND IF NO ERRORS OCCUR.

4.4 PRG2 TEST 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 0002.
 - 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.

PRG3 TEST 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 0003.
- F. PRESS CLEAR AND CONTINUE.
- G. PROGRAM TITLE IS TYPED, AND PROGRAM HALTS AT LOC 0427 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0000. PRESS CONTINUE.

PRG3 SR OPTIONS:

SR0=1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AQ.
SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN PR0 = 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 0271.

NOTE

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

PRG4 TEST PROCEDURE

- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
- B. TURN ON TELETYPE PUNCH.
- C. WITH TELETYPE OFF-LINE, PUNCH A SECTION OF BLANK LEADER ABOUT 6 INCHES LONG. RETURN TELETYPE TO ON-LINE POSITION.
- D. LOAD LEADER IN READER, LEAVING VERY LITTLE SLACK BETWEEN PUNCH AND READER.
- E. TURN ON READER.
- F. LOAD ADDRESS 0200.
- G. SET SR TO 0004.
- H. PRESS CLEAR AND CONTINUE.
- I. PROGRAM HALTS AT LOC 0227 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR0=10, TO HALT ON ERROR, PRESS "CONTINUE", DO NOT PRESS "CLEAR".

PRG4 SR OPTIONS:

SR0=1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC.
 SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR0 THROUGH SR11.
 SR2=1 LOOP PROGRAM.
 SR5=1 HALT ON ERROR, BAD CHARACTER IN AC.
 SR9=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 0271 UNLESS PREVENTED FROM ENDING, BY SR OPTIONS, OR IF ERRORS OCCUR.

4.7

PRG5 TEST 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 0005.
- 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.

4.8

PRG6 TEST PROCEDURE

- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE; REFER TO SECTION 4.1.
- B. MAKE SURE THAT TELETYPE IS ON-LINE, AND IF K2R37, THAT KEYBOARD "PROCEED" LIGHT IS ON.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0006.
- 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 YOU 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.

(4,8 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.

4.9 PRG7 TEST 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 0007,
- 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 0227 SR SET HALT, OCCURS TO PERMIT SETTING OF DESIRED OPTIONS. PRESS CONTINUE AFTER SETTING DESIRED OPTIONS, (PRG0,PRG1,PRG2,PRG4),
- LOC 0271 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,PRG4),
- LOC 0315 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,PRG3,PRG4),

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION

ALL OTHER ERROR HALTS WHICH ARE NOT DESCRIBED BELOW, REFER TO THE LISTING FOR EXPLANATION.

LOC 2130	PRG0, ROUTINE 0, ERROR HALT A, READ ERROR, BAD CHARACTER IN AC. PRESS CONTINUE.
LOC 2133	PRG0, ROUTINE 0, ERROR HALT B, FOLLOW UP HALT, EXPECTED CHARACTER IN AC, PRESSING CONTINUE RESUMES TEST.
LOC 2162	PRG0, ROUTINE 1, ERROR HALT A, READ ERROR, BAD CHARACTER IN AC. PRESS CONTINUE.
LOC 2165	PRG0, ROUTINE 1, ERROR HALT B, FOLLOW UP HALT, EXPECTED CHARACTER IN AC, PRESSING CONTINUE RESUMES TEST.
LOC 2227	PRG0, ROUTINE 2, ERROR HALT A, READ ERROR, BAD CHARACTER IN AC. PRESS CONTINUE.
LOC 2232	PRG0, ROUTINE 2, ERROR HALT B, FOLLOW UP HALT, EXPECTED CHARACTER IN AC, PRESSING CONTINUE RESUMES TEST.
LOC 3215	PRG3, ROUTINE 0, KSF COMMAND FAILED TO SKIP ON KEYBOARD FLAG, PRESS CONTINUE TO ENTER SCOPE LOOP THAT SKIPS ON FLAG CONTINUOUSLY.
LOC 3507	PRG5, READ ERROR HALT A, BAD CHARACTER IN AC. PRESS CONTINUE, HALT OCCURS IF SR0=1.
LOC 3512	PRG5, READ ERROR HALT B, FOLLOW UP HALT TO PRG5 READ ERROR HALT A, EXPECTED CHARACTER IS DISPLAYED IN AC, TO PROCEED, PRESS CONTINUE.
LOC 3517	PRG5, 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)

NOTE: THE TIMES LISTED BELOW ARE ONLY APPROXIMATE, THE EXECUTION TIMES MAY VARY FROM PROCESSOR TO PROCESSOR AND FROM ONE TYPE OF MEMORY TO ANOTHER TYPE OF MEMORY.

PRG0: 18:00

PRG1: 20:00

PRG2: CONTINUOUS

PRG3: USER DEP.

PRG4: 40:00

PRG5: CONTINUOUS

PRG6: USER DEP.

PRG7: CONTINUOUS

7.2 TEST TAPES

IF A BINARY COUNT TEST TAPE IS NOT AVAILABLE ON SITE, USE PRG7 TO GENERATE A BINARY COUNT TEST TAPE, FOR CONVENIENCE OF USE, A TAPE LOOP SHOULD BE MADE, MAKING SURE THAT THE PATTERN IS MATCHED AT THE SPLICE POINT.

8. PROGRAM DESCRIPTION

8.1 PRG0 = READER TEST

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 0 TO 2.

RTA0: READS 4095 CHARACTERS OF BINARY COUNT PATTERN, FULL SPEED.

RTA1: READS 2000 CHARACTERS OF BINARY COUNT PATTERN WITH RANDOM STALLS BETWEEN CHARACTERS.

RTA2: READS 100 RANDOM LENGTH CHARACTER BLOCKS; FIXED STALL BETWEEN CHARACTERS IN A BLOCK. THE STALL CHANGES FOR EACH BLOCK AND IS DETERMINED AT RANDOM.

8.2 PRG1 = PRINTER TEST

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

RTA0: 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.

RTA1: RIGHT MARGIN TEST. THIS TEST SHOWS WHEN THE RIGHT MARGIN IS NOT CORRECTLY ADJUSTED. THE TEST PRINTS 16 GROUPS OF ---I FOLLOWED BY CHARACTER I.

RTA2: SPACE TEST. THE TEST PRINTS / IN ALTERNATE POSITIONS OF THE LINE. AFTER A DOUBLE CARRIAGE RETURN IT SCAPES TO THE BLANK POSITIONS AND PRINTS A LEFT SLANT SLASH. A DOUBLE CARRIAGE RETURN IS ISSUED AFTER PRINTING EACH LEFT SLANT SLASH.

RTA3: LINE FEED TEST. THE TEST PRINTS A LEFT SLANT SLASH FOLLOWED BY A LINE FEED. FOLLOWED BY A RANDOM DELAY UNTIL 72 SLASHES HAVE BEEN PRINTED. THE RESULT SHOULD APPEAR TO BE A LEFT SLANTED LINE FROM POSITION 1 TO 72. VERTICAL SPACING VARIATIONS SHOULD BE APPARENT IF ADJUSTMENT IS REQUIRED.

NOTE: KSR37 WILL PRINT 81 SLASHES. THE RESULT SHOULD APPEAR TO BE A LEFT SLANTED LINE FROM POSITION 1 TO 81.

(8,2 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: @C\
RTN30: J+ 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 LT33 PRINTER WORST CASE PATTERN,
ALTERNATE LINES ARE TYPED WITH RANDOM STALLS BETWEEN
CHARACTERS, ROUTINE RUNS ONLY IF A LT33 IS PRESENT.

THE LT33 WORST CASE PATTERN USED IS 'LEFT ARROW W/W
LEFT ARROW.

(8,2 CONT'D)

RTM45: TYPES 12 LINES OF LT35 PRINTER WORST CASE PATTERN,
ALTERNATE LINES ARE TYPED WITH RANDOM STALLS BETWEEN
CHARACTERS, ROUTINE RUNS ONLY IF LT35-CV OR LI35-CD IS
PRESENT,

THE LI35 WORST CASE PATTERN USED IS !?C?C

RTM46: TYPES 12 LINES OF KSR37 PRINTER WORST CASE PATTERN,
ALTERNATE LINES ARE TYPED WITH RANDOM STALLS BETWEEN
CHARACTERS, ROUTINE RUNS ONLY IF KSR37 IS PRESENT,

THE KSR 37 WORST CASE PATTERN USED IS:

CAPITAL N, LOWER CASE Q, CAPITAL A, SWINY DASH,
CAPITAL A, LOWER CASE Q,

RTM47: TAB TEST, EXECUTED FOR 37 OR 35 TELETYPE ONLY, THE
TEST IS RUN AFTER ROUTINE 3.

RTM50: BACKSPACE TEST, EXECUTED FOR KSR37 TELETYPE ONLY,
THIS TEST IS RUN AFTER ROUTINE 47,

8.3

PRG2 - 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)

8.4 PRG3 = KEYBOARD TEST

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 0 TO 2.

RTA0: CHECKS THAT KSF COMMAND SKIPS WHEN FLAG=1. TEST IS DONE 1000 TIMES.

RTA1: ECHO TEST. ANY CHARACTERS READ FROM KEYBOARD ARE TYPED. CORRECT OPERATION VERIFICATION IS DONE VISUALLY BY USER. READING A RUBOUT CHARACTER ENDS THE TEST.

RTA2: OCTAL EQUIVALENCE TEST. THE OCTAL EQUIVALENT OF ANY CHARACTERS KEYED IS TYPED. READING A RUBOUT ENDS THE TEST.

8.5 PRG4 = COMBINED READER, PRINT, PUNCH TEST

THIS PROGRAM CONTAINS 25 ROUTINES NUMBERED FROM 0 TO 34 (OCTAL). ALL ROUTINES USE THE FOLLOWING TEST SEQUENCE:

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

(8,5 CONT'D)

RTN01 PUNCH/PRINT AND READ CHECK BLOCK OF ABC
RTN11 PUNCH/PRINT AND READ CHECK BLOCK OF DEF
RTN21 PUNCH/PRINT AND READ CHECK BLOCK OF GHI
RTN31 PUNCH/PRINT AND READ CHECK BLOCK OF JKL
RTN41 PUNCH/PRINT AND READ CHECK BLOCK OF MNO
RTN51 PUNCH/PRINT AND READ CHECK BLOCK OF PQR
RTN61 PUNCH/PRINT AND READ CHECK BLOCK OF STU
RTN71 PUNCH/PRINT AND READ CHECK BLOCK OF VWX
RTN101 PUNCH/PRINT AND READ CHECK BLOCK OF YZ0
RTN111 PUNCH/PRINT AND READ CHECK BLOCK OF 123
RTN121 PUNCH/PRINT AND READ CHECK BLOCK OF 456
RTN131 PUNCH/PRINT AND READ CHECK BLOCK OF 789
RTN141 PUNCH/PRINT AND READ CHECK BLOCK OF 11#
RTN151 PUNCH/PRINT AND READ CHECK BLOCK OF 5X&
RTN161 PUNCH/PRINT AND READ CHECK BLOCK OF '()
RTN171 PUNCH/PRINT AND READ CHECK BLOCK OF **,
RTN201 PUNCH/PRINT AND READ CHECK BLOCK OF -,/
RTN211 PUNCH/PRINT AND READ CHECK BLOCK OF !|<
RTN221 PUNCH/PRINT AND READ CHECK BLOCK OF =>?
RTN231 PUNCH/PRINT AND READ CHECK BLOCK OF @C\
RTN241 PUNCH/PRINT AND READ CHECK BLOCK OF J+*
RTN251 PUNCH/PRINT AND READ CHECK BLOCK OF ALL PRINTABLE CHARACTERS
RTN261 PUNCH/PRINT AND READ CHECK BLOCK OF LT33 PRINTER
WORST CASE PATTERN (+w/)
RTN271 PUNCH/PRINT AND READ CHECK BLOCK OF LT35 PRINTER
WORST CASE PATTERN, ([?C)
RTN301 PUNCH/PRINT AND READ CHECK BLOCKS OF SPACE,
RUBOUT (DATA! ALL 1'S, ALL 1'S, ALL 0'S)?,

8.6 PRG5 = READER EXERCISER, BINARY COUNT PATTERN

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

8.7 PRG6 = PRINTER EXERCISER

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

8.8 PRG7 = TAPE GENERATOR = BINARY COUNT PATTERN

PUNCHES BINARY COUNT PATTERN TEST TAPE.

/KLB-JA TELETYPE TEST, MAINDEC-08-DIKLB-A=L
/COPYRIGHT 1973 DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS, 01754
/PROGRAMMER: BRUCE HANSEN
/PRG0-READER TEST
/PRG1-PRINTER TEST
/PRG2-PUNCH TEST
/PRG3-KEYBOARD TEST
/PRG4-COMBINED TEST
/PRG5-READER EXERCISER, BINARY COUNT PATTERN,
/PRG6-PRINTER EXERCISER,
/PRG7-TAPE GENERATOR, BINARY COUNT PATTERN,
/

.....
/0110 BAUD 11 BITS @ 9.09 MSEC @ 100 MSEC
.....

6001 ION=6001 /TURN INTERRUPT ON,
6002 IOF=6002 /TURN INTERRUPT OFF.
6030 KCR=6030 /CLEAR KBRD FLAG BUT DO NOT SET RDR RUN
6031 KSF=6031 /SKIP IF KEYBOARD/READER FLAG = 1.
6032 KCC=6032 /CLEAR AC AND KBRD/READER FLAG, SET READER RUN,
6034 KRS=6034 /READ KEYBOARD/READER BUFFER STATIC
6035 KIE=6035 /ENABLE TTY INTERRUPT WHEN AC11 EQUALS 1
6036 KRB=6036 /CLEAR AC, READ KEYBOARD BUFFER, CLEAR
 /KEYBOARD FLAGS,
 /SET PRINTER FLAG
6040 SPF=6040 /SKIP IF TELEPRINTER/PUNCH FLAG = 1.
6041 TSP=6041 /CLEAR TELEPRINTER/PUNCH FLAG,
6042 TCF=6042 /LOAD TELEPRINTER/PUNCH BUFFER
6044 TPC=6044 /SELEC1 AND PRINT,
 /SKIP IF TTY INTERRUPT
6045 SPI=6045 /LOAD TELEPRINTER/PUNCH BUFFER,
6046 TLS=6046 /SELEC1 AND PRINT AND CLEAR
 /TELEPRINTER/PUNCH FLAG.

7200 CLA=7200
7402 HLT=7402
7604 LAS=7604

0000 OPEN=0 /PROGRAM MODIFYBLE,
4577 BSW=JMS I [SIMBSW
4576 SETLOC=JMS I [ESTCTR
4575 DELAY=JMS I [DLYMS
4574 CRLF=JMS I [CRLF
4573 MOVE=JMS I [MOVVE
4572 TYPE=JMS I [TYPSTG
4571 UKSF=JMS I [XKSF
4570 UKCC=JMS I [XKCC
4567 UKRS=JMS I [XKRS
4566 UKRB=JMS I [XKRB
4565 SUKRB=JMS I [SXKRB

4564 UTSF=JMS I [XTSF
4563 UTCF=JMS I [XTCF
4562 UTPC=JMS I [XTPC
4561 UTLS=JMS I [XTLS
4560 UKCR=JMS I [XKCR
4557 UKIE=JMS I [XKIE
4556 USPF=JMS I [XSPF
4555 USPI=JMS I [XSPI
4554 STALL=JMS I [STAL
4553 CKSR37=JMS I [CK37
4552 CKSR33=JMS I [CK33
4551 CKSR35=JMS I [CK35
4376 BLOCKA=END
4400 BLOCK1=BLOCKA+2
4510 BLOCKB=BLOCKA+12
4521 BLKBB=BLOCKA+123
4512 BLOCK2=BLOCKA+114
4523 BLK2=BLOCKA+125
4622 BLOCKC=BLOCKA+224
4633 BLKCC=BLOCKA+235
5376 DBLK=BLOCKA+1000
7631 M147=-147 /-147 DECIMAL,
0304 RRPP=0304

0000 *0
0000 0000
0001 5001 JMP 1
0002 0002 2
0003 0003 3
0005 *5
0005 5402 JMP I 2
0006 0000 0
0016 *16
0016 0000 OPEN /AUTO INVE,
0020 *20
0020 0000 TTYTYP, OPEN /TYPE OF TELETYPE
0021 0304 TTYIOT, RRPP /CONSTANT TO DETERMINE IOT CODE
 /PRESET FOR 03 READER AND 04 PUNCH,
 /TO CHANGE IOT CODE SET THIS LOCATION
 /TO: "RRPP" WHERE RR IS FOR
 /THE READER AND PP IS FOR THE PUNCH,
 /USER PROGRAM START,
0022 0000 KSTART, OPEN
0023 0000 DELAYM, OPEN
0024 0254 CHAIN, CHAINN /CHAIN RIN ENTRY,
0025 1365 KFLAG, KFLAG
0026 0474 DLCONT1, DLCONT
0027 2012 S100, S1001
0030 2000 S4000, S40001
0031 2005 S200, S2001
0032 2033 TLCALL, TLCALI
0033 2041 TLC37, TLC37I
0034 2051 FBF, FBF1
0035 0000 PRGNUM, OPEN
0036 2100 PRGTAB, PRG0
0037 2234 PRG1

```

0040 3074 PRG2
0041 3140 PRG3
0042 3265 PRG4
0043 3451 PRG5
0044 3522 PRG6
0045 3564 PRG7
0046 0000 TEMP, OPEN /WORK
0047 0000 TEMP1, OPEN /LOCATIONS
0050 0000 CURTST, OPEN /FOR CURRENT TEST ADDRESS
0051 0000 RTNNO, OPEN /FOR CURRENT TEST NUMBER
0052 0000 NXTST, OPEN /FOR NEXT TEST ADDRESS
0053 0000 MSCTR, OPEN /MILLISECONDS COUNTER
0054 0000 MILCTR, OPEN
0055 7372 MIL1, 7372 /7372 FOR 110 BAUD,
0056 0000 CTRA, OPEN /COUNTER A,
0057 0000 CTRB, OPEN /COUNTER B,
0060 0000 STLD, OPEN
0061 0521 SYNC, SYNK /ENTRY TO SYNC TAPE RTN,
0062 0436 INPATT, IBIN /ENTRY TO INITIATE PATTERN,
0063 0444 GETPT, GTBIN /ENTRY TO GET PATTERN CHAR,
0064 0504 CHECK, CHCK
0065 0000 PFLAG, 0
0066 1271 UGUT, OUT
0067 1615 UTPLN3, TYPLN3
0070 2017 UPUNCH, PUNCH
0071 0600 UMOVE, MOVVE
0072 0000 RBUSY, 0
0073 0000 AC, 0
0074 0000 LINK, 0
0075 0000 BLKCNT, 0
0076 0000 DELAYS, 0
0077 0000 ERRCR, 0
0100 0000 UTEMP, 0
0101 0000 UTEMP1, 0
0102 0000 UTEMP2, 0
0103 0215 CR, 215 /CARRIAGE RETURN
0104 0212 LF, 212 /LINE FEED
0105 0277 DLYMSK, 277
0106 0000 WTS6A, OPEN
0107 0000 TEMP0, OPEN

```

```

/CONTROL ROUTINE
*200
0200 7610 START, SKP CLA
0201 7402 HLT
0202 4777 JMS SETRND /INCORRECT PROGRAM NUMBER
0203 7604 BDRET, LAS /SET UP RANGE NUMBERS
0204 0150 AND C7 /READ SR
0205 1147 TAD C=7 /PROGRAM MASK = 7
0206 7540 SMA SEA /PROGRAM LIMIT = 7
0207 5201 JMP START+1 /VALID PROGRAM NUMBER?
0210 7604 LAS /NO,
0211 0150 AND C7 /YES, READ SR,
0212 3035 DCA PRGNUM /SAVE PROGRAM NUMBER,

```

```

0213 1035 TAD PRGNUM /DEVELOP PROGRAM START
0214 1146 TAD C=PRGTAB /ADDRESS AND STORE AT
0215 3046 DCA TEMP /PRGADR,
0216 1446 TAD I TEMP
0217 3226 DCA PRGADR
0220 4776 JMS DVCSEL /PERFORM I/O SELECTION
0221 4471 JMS I UMOVE /INITIALIZE
0222 0005 5 /INTERRUPT
0223 0001 1 /AREA,
0224 7776 =2
0225 5626 JMP I ,+1
0226 0000 PRGADR, OPEN
0227 7602 SRSET, HLT CLA
0230 7200 GETRDY, CLA
0231 1022 TAD KSTART /SET ADDRESS OF 1ST ROUTINE
0232 3052 DCA NXTST /STORE ADDRESS
0233 4273 JMS FORND
0234 7604 LAS /READ SR
0235 7004 RAL
0236 7700 SMA CLA /ROUTINE SELECT (SR1)
0237 5450 JMP I CURTST /NO, START WITH 1ST RTN
0240 7604 LAS /YES
0241 0145 AND C77 /SR 0-11 ENABLE MASK,
0242 7041 CIA
0243 1051 TAD RTNNO
0244 7650 SNA CLA /IS IT THIS RTN?
0245 5450 JMP I CURTST /YES, GO TO I
0246 1052 TAD NXTST /NO
0247 7001 IAC /IS THIS LAST RTN?
0250 7640 SEA CLA /NO
0251 5233 JMP GETRDY+3
0252 7402 INCRN, HLT /YES, INCORRECT ROUTINE NO.
0253 5230 JMP GETRDY
0254 4310 CHAINN, JMS SHALT /HALT? (END)
0255 7604 LAS /READ SR
0256 7006 RTL
0257 7630 SEL CLA /SELECT ROUTINE? (SR1)
0260 5230 JMP GETRDY /YES
0261 1052 TAD NXTST
0262 7001 IAC
0263 7640 SEA CLA /LAST ROUTINE?
0264 5233 JMP GETRDY+3 /NO,
0265 7604 LAS
0266 7006 RTL
0267 7710 SPA CLA /LOOP PROGRAM? (SR2)
0270 5230 JMP GETRDY /YES
0271 7402 PRGEND, HLT /END OF PROGRAM HALT
0272 5254 JMP CHAINN
0273 0000 FORND, 0
0274 7300 CLA CLL
0275 1452 TAD I NXTST /GET NEXT MIN NO
0276 3051 DCA RTNNO /STORE ADDRESS
0277 2052 ISE NXTST

```

```

0300 1052 TAD NXTST /SET CURRENT
0301 3046 DCA TEMP /RTN NUMBER
0302 2052 ISE NXTST
0303 1052 TAD NXTST /SET CURRENT
0304 3050 DCA CURTST /RTN ADDR
0305 1446 TAD I TEMP /SET NEXT
0306 3052 DCA NXTST /RTN ADDR
0307 5673 JMP I FORWD /EXIT

0310 0000 SHALT, 0
0311 7604 LAS /READ SR
0312 7700 SNA CLA /HALT? (SR0)
0313 5710 JMP I SHALT
0314 1051 TAD RTNNO
0315 7402 HLT /UNCONDITIONAL HALT (SR0 = 1)
0316 5710 JMP I SHALT /EXIT

0317 0000 STCTR, 0
0320 7200 CLA
0321 1747 TAD I STCTR /GET CTR ADDR
0322 3046 DCA TEMP /AND SAVE AI TEMP
0323 2347 ISE STCTR
0324 1747 TAD I STCTR /GET COUNT AND
0325 3446 DCA I TEMP /STORE PER CTEMP
0326 2347 ISE STCTR
0327 5717 JMP I STCTR /EXIT

0330 0000 DLYMS, 0
0331 7300 CLA CLL
0332 1053 TAD DELAYM /GET MS COUNT
0333 3053 DCA MSCTR /STORE IN MSCTR
0334 1055 TAD MIL1 /GET CONSTANT
0335 3054 DCA MILCTR /STORE IN MILCTR
0336 2054 ISE MILCTR /DELAY FINISHED?
0337 5336 JMP #1
0340 2053 ISE MSCTR /DONE DELAYING
0341 5334 JMP #5
0342 5730 JMP I DLYMS /EXIT
0343 0000 CK33, OPEN /SUB TO CHECK FOR 33 TTY
0344 7200 CLA
0345 1020 TAD TTYTYP /GET TTY TYPE
0346 7650 SNA CLA /33?
0347 2343 ISE CK33 /YES,
0350 5743 JMP I CK33

0351 0000 CK35, OPEN /SUB TO CHECK FOR 35 TTY
0352 7240 CLA CMA
0353 1020 TAD TTYTYP /GET TTY TYPE
0354 7650 SNA CLA /35?
0355 2351 ISE CK35 /YES,
0356 5751 JMP I CK35

0357 0000 CK37, OPEN /SUB TO CHECK FOR 37 TTY
0360 7344 CLA CLL CMA RAL /-2
0361 1020 TAD TTYTYP /GET TTY TYPE,

```

```

0362 7650 SNA CLA /37?
0363 2357 ISE CK37 /YES,
0364 5757 JMP I CK37

PAGE

0400 0400 RGNA, PAGE /RANDOM NUMBER SUB A,
0401 0000 OPEN
0401 7300 CLA CLL
0402 1215 TAD RP1A
0403 7006 RTL
0404 1216 TAD RP2A
0405 3215 DCA RP1A
0406 1215 TAD RP1A
0407 7006 RTL
0410 1216 TAD RP2A
0411 7006 RTL
0412 3216 DCA RP2A
0413 1215 TAD RP1A
0414 5600 JMP I RGNA /EXIT RGNA SUB,
0415 1233 RP1A, 1233
0416 7622 RP2A, 7622

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

/SUBROUTINE TO INITIALIZE BINARY COUNT PATTERN
IBIN, 0
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)
GTBIN, 0
0444 0000 GTBIN, 0
0445 7200 CLA
0446 1242 TAD PT0 /GET PT0
0447 3243 DCA PT1 /STORE AI PT1
0450 1243 TAD PT1 /GET PT1

```

```

0451 7001      IAC          /INCREMENT ACCUMULATOR
0452 0144      AND C377     /LIMIT TO 8 BITS
0453 3242      DCA PT0     /STORE AT P10
0454 1243      TAD PT1     /GET P11
0455 5644      JMP I GTBIN  /EXIT

/SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT, (NOT MORE THAN 77(8))
0456 0000      CHRCNT, 0
0457 4200      JMS RGNA     /GO GENERATE RANDOM NUMBER
0460 0145      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 3046      DCA TEMP
0467 1273      TAD SCNT
0470 3446      DCA I TEMP   /STORE AT SPECIFIED ADDRESS
0471 2256      ISZ CHRCNT  /SET UP EXIT
0472 5656      JMP I CHRCNT /EXIT
0473 0000      SCNT, OPEN

/SUBROUTINE TO GENERATE RANDOM DELAY COUNT (NOT MORE THAN 3777(8)),
0474 0000      DLCNT, 0
0475 4200      JMS RGNA     /GO GENERATE RANDOM NUMBER
0476 0105      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 3023      DCA DELAYM
0503 5674      JMP I DLCNT   /EXIT

/SUBROUTINE TO COMPARE C(AG) TO VALUES STORED AT CALL+1
0504 0000      CHCK, 0
0505 3320      DCA WCHK     /STORE AT WCHK
0506 1704      TAD I CHCK   /GET COMPARE DATA
0507 7041      CIA          /2'S COMPLEMENT IT
0510 1320      TAD WCHK     /ADD C(WCHK)
0511 2304      ISZ CHCK     /SET UP FOR UNEQUAL EXIT
0512 7640      SEA CLA     /EQUAL (AG = 0)?
0513 5316      JMP +3       /NO
0514 2304      ISZ CHCK     /YES, SET UP FOR EQUAL EXIT
0515 5704      JMP I CHCK   /EQUAL EXIT
0516 1320      TAD WCHK     /RESTORE AG
0517 5704      JMP I CHCK   /UNEQUAL EXIT
0520 0000      WCHK, 0

/SYNC ON TAPE SUBROUTINE
0521 0000      SYNK, 0
0522 4576      SETLOC     /SET COUNT OF
0523 0541      CTSK       /-256 (050) IN
0524 7400      =400       /CTSK
0525 4570      SYNKA, UKCC /CLEAR ALL END FLAG
0526 4571      UKSF       /READY?
0527 5326      JMP ,#1     /NO, TEST AGAIN
    
```

```

0530 4567      UKRS       /YES, READ
0531 1143      TAD C=377
0532 7640      SZA CLA     /377?
0533 7410      SKP
0534 5721      JMP I SYNK   /YES, EXIT
0535 2341      ISZ CTSK    /BUMP CHAR CTR +1
0536 5325      JMP SYNKA   /GO READ AGAIN
0537 7402      HLT        /256 CHARS READ, CAN'T SYNC
0540 5322      JMP SYNK+1   /GO TO SSSI

0541 0000      CTSK, 0     /CHAR COUNTEN
0542 0000      STAL, OPEN
0543 7200      CLA
0544 1040      TAD STLID
0545 7700      SMA CLA     /STALL?
0546 5742      JMP I STAL   /NO, EXIT
0547 4274      JMS DL CNT  /YES SET STALL COUNT
0550 4575      DELAY      /STALL
0551 5742      JMP I STAL   /EXIT
0552 0000      CRCTR, OPEN

0553 0000      CRALF, OPEN
0554 7200      CLA
0555 1753      TAD I CRALF
0556 3352      DCA CRCTR
0557 2353      ISZ CRALF
0558 4572      TYPE
0559 4047      CARLF
0562 2352      ISZ CRCTR
0563 5360      JMP +3
0564 5753      JMP I CRALF
0565 0600      PAGE

0600          PAGE
/SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS
0600 0000      MOVVE, 0
0601 7200      CLA
0602 1620      TAD I MOVVE  /GET "FROM ADDR" AND
0603 3223      DCA FADDR   /STORE AT FADDR
0604 2200      ISZ MOVVE
0605 1620      TAD I MOVVE  /GET "TO ADDR" AND
0606 3224      DCA TADDR   /STORE AT TADDR
0607 2200      ISZ MOVVE
0610 1620      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 5000      JMP I MOVVE  /YES, EXIT
    
```

4

```

0623 0000 FADDR, 0
0624 0000 TADDR, 0
0625 0000 MCTR, 0

/TYPE CHARACTER STRING SUBROUTINE
TYPSTG, 0
0626 0000 CLA
0627 7200 TAD I TYPSTG /GET AND SIGN
0630 1626 DCA TEMQ /INITIAL ADDRESS
0631 3314 DCA FLAG /CLEAR FLAG
0632 3316 ISZ TYPSTG /SET UP EXIT
0633 2226 TSC1, TAD I TEMQ /PICK UP DATA
0634 1714 BSW
0635 4577 JMS TSC2 /GO TYPE 1ST CHARACTER
0636 4243 TAD I TEMQ /PICK UP DATA
0637 1714 JMS TSC2 /GO TYPE 2ND CHARACTER
0640 4243 ISZ TEMQ /EVEN STRING ADDRESS
0641 2314 JMP TSC1 /GO BACK FOR MORE
0642 5234 TSC2, 0
0643 0000 AND C77 /MASK OFF 6 BITS
0644 0145 DCA TEMR /SAVE CHARACTER
0645 3315 TAD FLAG /TEST "SPECIAL" FLAG
0646 1316 SZA CLA
0647 7640 JMP TYPSP /SET TYPE SPECIAL
0650 5260 TAD TEMR /NO, REGULAR CHARACTER
0651 1315 SNA /ZERO?
0652 7450 JMP ,+3 /YES, SET FLAG
0653 5256 TYPAT, JMS PRINT /NO, PRINT IT
0654 4271 JMP I TSC2 /RETURN
0655 5643 ISZ FLAG /SET "SPECIAL" FLAG
0656 2316 JMP I TSC2 /EXIT
0657 5643 TYPSP, DCA FLAG /CLEAR FLAG
0660 3316 TAD TEMR /TEST FOR 0
0661 1315 SNA /0?
0662 7450 JMP I TSC2 /IGNORE IT
0663 5643 TAD (=77
0664 1377 SNA CLA /??
0665 7650 JMP I TYPSTG /YES, EXIT CODE
0666 5626 TAD TEMR
0667 1315 JMP TYPAT
0670 5254

PRINT, OPEN
0671 0000 TAD (=45
0672 1376 SZA CLA /IS IT 42?
0673 7640 JMP ,+4 /NO
0674 5300 TAD CR /YES, PRINT CR
0675 1103 JMS I UPUNCH
0676 4470 JMP I PRINT
0677 5671 TAD TEMR
0700 1315 TAD (=43
0701 1375 SZA CLA /IS IT 42?
0702 7640 JMP ,+3 /NO
0703 5306 TAD LF /YES, TYPE LF
0704 1104 JMP PRINT+5
0705 5276 TAD TEMR
0706 1315

```

```

0707 1374 TAD (=40
0710 7510 SPA
0711 1142 TAD C100
0712 1141 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 ISF
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 ICF
0746 6042 TCF
0747 5745 JMP I XTCF /EXIT
0750 7402 HLT /TCF SKIPPED

0751 0000 XTLS, OPEN /SUB TO ISSUE ILS
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

```

5

```

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

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

```

1000 1000 PAGE
1000 0000 STBF, OPEN /SUB TO SET UP BUFFER AREA,
1001 4573 MOVE /CNLF TO BLCKA,
1002 0103 CR
1003 4376 BLOCKA
1004 7776 =2
1005 4553 CKSR37 /KSR377
1006 5220 JMP ST33B /NO,
1007 4573 MOVE /CNLF TO BLKBB
1010 0103 CR
1011 4521 BLKBB
1012 7776 =2
1013 4573 MOVE /CNLF TO BLKCC,
1014 0103 CR
1015 4633 BLKCC
1016 7776 =2
1017 5600 JMP I STBF /EXIT STBF
    
```

```

1020 4573 ST33B, MOVE /CNLF TO BLCKKB,
1021 0103 CR
1022 4510 BLOCKB
1023 7776 =2
1024 4573 MOVE /CNLF TO BLCKKV,
1025 0103 CR
1026 4622 BLOCKC
1027 7776 =2
1030 5600 JMP I STBF /EXIT STBF,
    
```

```

1031 0000 FBF3, OPEN /SUB TO FILL CHAR BUFFER WITH
1032 7200 CLA /3 CHARACTERS SPECIFIED AT CALL+1.
1033 1631 TAD I FBF3
1034 3237 DCA ,*3
1035 2231 ISZ FBF3
1036 4573 MOVE
1037 0000 OPEN
1040 4400 BLOCK1
1041 7775 =3
1042 4533 CKSR37 /37?
1043 5255 JMP FBF33 /NO,
1044 4573 MOVE /YES,
    
```

```

1045 4400 BLOCK1
1046 4403 BLOCK1+3
1047 7662 =116
1050 4573 MOVE
1051 4400 BLOCK1
1052 4523 BLK2
1053 7657 =121
1054 5631 JMP I FBF3 /EXIT FBF3,
1055 4573 FBF33, MOVE
1056 4400 BLOCK1
1057 4403 BLOCK1+3
1060 7673 =105
1061 4573 MOVE
1062 4400 BLOCK1
1063 4512 BLOCK2
1064 7670 =110
1065 5631 JMP I FBF3 /EXIT FBF3,
    
```

```

1066 0000 FBALL, OPEN /FILL BUFFER WITH ALL CHARACTERS
1067 4553 CKSR37 /KSR377
1070 5302 JMP FBA33 /NO,
1071 4573 MOVE /YES,
1072 3706 A
1073 4400 BLOCK1
1074 7657 =121
1075 4573 MOVE
1076 4400 BLOCK1
1077 4523 BLK2
1100 7657 =121
1101 5666 JMP I FBALL /EXIT FBALL,
    
```

```

1102 4573 FBA33, MOVE
1103 3706 A
1104 4400 BLOCK1
1105 7701 =77
1106 4573 MOVE
1107 3706 A
1110 4477 BLOCK1+77
1111 7767 =11
1112 4573 MOVE
1113 4400 BLOCK1
1114 4512 BLOCK2
1115 7670 =110
1116 5666 JMP I FBALL /EXIT FBALL
    
```

```

1117 0000 FW336, 0
1120 4573 MOVE /MOVE 6 CHARACTERS LT33 PRINTER
1121 3664 A33WP3 /WORST CASE PATTERN TO
1122 4400 BLOCK1 /BLOCK1
1123 7772 =6
1124 4573 MOVE /FILL BLOCKS WITH PATTERN
1125 4400 BLOCK1
1126 4406 BLOCK1+6
1127 7676 =102
1130 4573 MOVE
1131 4400 BLOCK1
    
```



```

1132 4512      BLOCK2
1133 7670      =110
1134 5717      JMP I FW336   /EXIT

1135 0000      FW356, 0
1136 4573      MOVE          /MOVE 6 CHARACTER LT35 PRINTER
1137 3672      A35WP3    /WORST CASE PATTERN TO BLOCK1
1140 4400      BLOCK1
1141 7772      =6
1142 4573      MOVE          /FILL BUFFER WITH PATTERN
1143 4400      BLOCK1
1144 4406      BLOCK1+6
1145 7676      =102
1146 4573      MOVE
1147 4400      BLOCK1
1150 4512      BLOCK2
1151 7670      =110
1152 5755      JMP I FW356   /EXIT

1153 0000      FW376, OPEN    /MOVE 6 CHARACTER KSR37 PRINTER
1154 4573      MOVE          /WORST CASE PATTERN TO BLOCK1,
1155 3700      A37WP3
1156 4400      BLOCK1
1157 7772      =6
1160 4573      MOVE          /FILL BUFFER WITH PATTERN
1161 4400      BLOCK1
1162 4406      BLOCK1+6
1163 7645      =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 IPC
1172 6044      TPC
1173 5771      JMP I XTPC   /EXIT
1174 7402      HLT          /TPC SKIPPED.

1200          PAGE

```

```

1200          PAGE
/PUNCH 70 (CODE 376) CHARACTERS SUBROUTINE
PLTLR, 0
1200 0000      SETLOC      /SET P40CTR TO -70
1201 4576      P40CTR
1202 1211      =-106
1203 7672      TAD (376    /GET 376 CODE
1204 1377      JMS I UPUNCH /GO PUNCH IT
1205 4470      ISZ P40CTR   /ALL CHARACTER PUNCHED?
1206 2241      JMP ,=3     /NO, REPEAT
1207 5204      JMP I PLTLR /YES, EXIT
1210 5600

```

```

1211 0000      P40CTR, 0
/PUNCH SYNC CHARACTER SUBROUTINE (MUBOUT)
PSYNC, 0
1212 0000      CLA CMA     /SET AC TO 777/
1213 7240      JMS I UPUNCH /PUNCH A MUBOUT
1214 4470      JMP I PSYNC  /EXIT.
1215 5612

/SYNC READER SUBROUTINE
RSYNC, 0
1216 0000      SETLOC      /SET RSCIR TO *145
1217 4576      RSCTR
1220 1232      =221
1221 7597      JMS RRDY    /WAIT FOR READER NOT BUSY
1222 4343      CLA CMA     /READER NOT BUSY,
1223 7240      DCA RBUSY   /SET READER BUSY INDICATOR
1224 3072      SETLOC      /SET READER INTERRUPT
1225 4576      VCTR       /SERVICE RETURN ADDRESS,
1226 1267      RSSERV
1227 1233      ION        /ENABLE INTERRUPT
1230 6001      JMP I RSYNC /EXIT
1231 5616      RSCTR, 0
1232 0000

RSSERV, KRB
1233 6036      TAD [ =377  /READ
1234 1143      SZA CLA     /ADD MINUS MUBOUT
1235 7640      JMP ,+7     /IS IT A MUBOUT?
1236 5245      DCA RBUSY   /NO,
1237 3072      CLA CLL     /YES, CLEAR READER BUSY,
1240 7300      TAD LINK
1241 1074      RAL        /RESTORE LINK
1242 7004      TAD AC      /RESTORE AC
1243 1073      JMP I 0     /RETURN
1244 5400      ISZ RSCTR   /145 CHARACTER READ?
1245 2232      JMP I UOUT  /NO,
1246 5466      HLT CLA     /YES, NO SYNC,
1247 7602      SETLOC      /SET RSCIR TO *145
1250 4576      RSCTR
1251 1232      =221
1252 7557      JMP I UOUT  /RETURN
1253 5466

1254 3073      INTSVC, DCA AC /SAVE AC
1255 7010      RAR
1256 3074      DCA LINK    /SAVE LINK
1257 6041      INTSF, TSP   /PUNCH/PRINTERT
1260 5244      JMP ,+4     /NO,
1261 6042      INTCF, TCF   /YES, CLEAR FLAG,
1262 3065      DCA PFLAG   /CLEAR FLAG
1263 5271      JMP OUT     /RETURN
1264 6031      INKSF, KSF   /READER/MUBOUT?
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 1074 TAD LINK
1273 7004 RAL /RESTORE LINK
1274 1073 TAD AC /RESTORE AC
1275 6001 ION /ENABLE INTERRUPT
1276 5400 JMP I 0 /RETURN

1277 0000 PSTUP, 0 /PUNCH SETUP
1300 4576 SETLOC /SET DATA ADDR
1301 1342 PADDR
1302 4376 BLOCKA
1303 4573 MOVE /SET BLOCK LENGTH
1304 0075 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 4470 JMS I UPUNCH /GO PUNCH/PRINI 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 5710 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 0105 AND DLYMSK /REMOVE EXCESS BITS
1330 7450 SNA /ZERO?
1331 5326 JMP ,=5 /YES, GET ANOTHER NUMBER
1332 7041 CIA /NO, 2'S COMPLEMENT IT,
1333 3023 DCA DELAY /PUT NUMBER IN DELAY
1334 4575 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 1072 TAD RBUSY /FETCH RBUSY;
1346 7640 SZA CLA /READER BUSY?
1347 5349 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 2072 ISZ RBUSY /SET RBUSY INDICATOR
1354 4576 SETLOC /SET DATA ADDR
1355 1416 RADDR
1356 4376 BLOCKA
1357 4573 MOVE /SET DATA BLOCK LENGTH
1360 0075 BLKCNT
1361 1417 RBCTR
1362 7777 =1
1363 3775 DCA ERRCTR /CLEAR ERROR COUNTER
1364 5751 JMP I RSTUP /EXIT,

/Routine TO SET KEYBOARD FLAG.

1365 0000 KFLAG, OPEN
1366 4570 UKCC
1367 4571 UKSF
1370 5367 JMP ,=1
1371 5769 JMP I KFLAG /EXIT WITH KEYBOARD FLAG SET.

1375 3521
1376 0417
1377 0376
1400 PAGE

1400 1400 PAGE
1401 0000 RDBLK, 0 /READ DATA BLOCK, FULL SPEED
1402 4777 JMS RSTUP /GO DO SETUP
1403 4576 SETLOC /SET READER SERVICE
1404 1267 VCTR /ADDRESS;
1405 1430 RDRSRV
1406 6001 ION /ENABLE INT;
1407 5600 JMP I RDBLK

1407 0000 RDBLKR, 0 /READ DATA BLOCK, RANDOM STALLS
1410 4777 JMS RSTUP /GO DO SETUP;
1411 4576 SETLOC /SET READER SERVICE
1412 1267 VCTR /ADDRESS;
1413 1420 RDRSRV
1414 6001 ION /ENABLE INT;
1415 5607 JMP I RDBLKR /EXIT

1416 0000 RADDR, 0
1417 0000 RBCTR, 0

/READER SERVICE ROUTINES
1420 7200 RDRSRV, CLA
1421 4776 JMS RGNB /GET A RANDOM NUMBER
1422 0105 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 3076 DCA DELAYS /STORE RANDOM NUMBER IN DELAYS;
1427 4274 JMS DLMR /STALL,
1430 1616 RDRSRV, TAD I RADDR /GET EXPECTED CHARACTER

```

```

1431 3235 DCA SB /STORE A1 SB
1432 2216 ISZ RADDR /UPDATE RADDR
1433 6036 IN0, KRB /READ CHARACTER
1434 4464 JMS I CHECK /GO CHECK I:
1435 0000 SB, 0
1436 5240 JMP ERROR /ERROR
1437 5256 JMP RUDONE /GOOD,

1440 3077 ERROR, DCA ERRCR /STORE BAD CHARACTER
1441 2775' ISZ ERRCTR /INCREMENT ERROR COUNTER
1442 5245 JMP ,*3
1443 7240 CLA CMA /OFLOW, /??? TH AC
1444 3775' DCA ERRCTR /RESTORE TO /???,
1445 7604 LAS /READ SR
1446 0142 AND [100
1447 7650 SNA CLA /HALT ON ERROR(SRS)
1450 5256 JMP RUDONE /NO,
1451 1077 TAD ERRCR /YES, GET BAD CHARACTER
1452 7402 HLT /ERROR HALT, BAD CHAR IN AC
1453 7200 CLA TAD SB
1454 1235 HLT /GOOD CHAR IN AC
1455 7402 HLT /ALL DONE?
1456 2217 RUDONE, ISZ RBCTR /NO, TO MAINLINE
1457 5466 JMP I UOUT /NO, TO MAINLINE
1460 7200 CLA /YES,
1461 1775' TAD ERRCTR /GET (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 3072 DCA RBUSY /CLEAR RBUSY INDICATOR
1470 1074 TAD LINK
1471 7004 RAL /RESTORE LINK
1472 1073 TAD AC /TO MAINLINE
1473 5400 JMP I 0

1474 0000 DLMSR, 0
1475 7300 CLA CLL
1476 1076 TAD DELAYS /GET AND STORE MSEC
1477 3311 DCA RCTRA /DELAY COUNT
1500 5701 JMP I ,*1
1501 1502 ,*1
1502 1055 TAD M1L1 /GET AND STORE
1503 3312 DCA RCTRB /IMS CONSTANT
1504 2312 ISZ RCTRB /DELAYED I M9?
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

```

/ROUTINE TO SIMULATE A BYTE SWAP

```

1513 0000 SIMBSW, 0
1514 3327 DCA TEMP2
1515 7012 RTR
1516 7012 RTR
1517 7012 RTR
1520 1327 TAD TEMP2
1521 0330 AND L7700
1522 1327 TAD TEMP2
1523 7006 RTL
1524 7006 RTL
1525 7006 RTL
1526 5713 JMP I SIMBSW

1527 0000 TEMP2, OPEN
1530 7700 L7700, 7700

/PUNCH TEST NORMAL TEST SEQUENCE ROUTINE
1531 0000 NTST, 0
1532 7200 CLA /CLEAR RBUSY
1533 3072 DCA RBUSY
1534 1731 TAD I NTST /SELECT PUNCH MODE
1535 3340 DCA NTSTA
1536 4774' JMS PLTLR /PUNCH LEADER
1537 4773' JMS PSYNG /PUNCH SYNC CHARACTER
1540 0000 NTSTA, 0
1541 4772' JMS RSYNG /SYNC READER
1542 4200 JMS RDBLK /READ DATA BLOCK
1543 4774' JMS PLTLR /PUNCH TRAILER
1544 4771' JMS RRDY /WAIT FOR MCR NOT BUSY
1545 5424 JMP I CHAIN /CHAIN

1546 0000 SXKRB, 0
1547 6036 KRB
1550 0370 AND (177
1551 1367 TAD (200
1552 5746 JMP I SXKRB

1553 5555 RH33A, TEXT '---I0?'
1554 5555
1555 1100
1556 7700

```

```

1567 0200
1570 0177
1571 1343
1572 1216
1573 1212
1574 1200
1575 3521
1576 0400
1577 1351
1600

```

```

1600      PAGE
1600 0000 /COMBINED TEST NORMAL TEST SEQUENCE
1601 7200 CNTST, 0
1602 3072 CLA /CLEAR RPU5Y
1603 4777' JMS PLTLR /PUNCH LEADER
1604 4776' JMS PSYNC /PUNCH SYNC CHARACTER
1605 4775' JMS PBLK /PUNCH DATA BLOCK (NO STALLS)
1606 4774' JMS RSYNC /SYNC READER
1607 4773' JMS RDBLKR /READ DATA BLOCK (STALLS)
1610 4772' JMS PBLKR /PUNCH DATA BLOCK (STALLS)
1611 4771' JMS RDBLK /READ DATA BLOCK (NO STALLS)
1612 4777' JMS PLTLR /PUNCH TRAILER
1613 4770' JMS RRDY /WAIT FOR HEADER NOT BUSY
1614 5424 JMP I CHAIN /CHAIN

/TYPE LINE OF 3 CHARACTERS (NO DELAY)
1615 0000 TYPLN3, 0
1616 7200 CLA /CLEAR SILID
1617 3060 DCA STLID /CLEAR SILID
1620 1615 TAD I TYPLN3 /SET AND STORE
1621 3224 DCA ,+3 /ADDRESS OF DATA
1622 2215 ISZ TYPLN3
1623 4767' JMS FBF3 /GO FILL BUFFER WITH 3 CHARACTERS
1624 0000 0
1625 4227 JMS TYPLN /GO TYPE LINE
1626 5615 JMP I TYPLN3 /EXIT

/TYPE LINE OF ASCII PRINTABLE CHARACTERS
1627 0000 TYPLN, 0
1630 4593 CKSR37 /KSR37
1631 1140 TAD E11 /NO.
1632 1137 TAD E=125 /YES.
1633 3247 DCA TCTR /-76, OR =85
1634 4576 SETLOC /SET FETCH ID ADDRESS
1635 1646 FETCH /OF BLOCKA,
1636 4376 BLOCKA
1637 4594 TYPEA, STALL
1640 1646 TAD I FETCH /YES, SET CHARACTER
1641 4470 JMS I UPUNCH /GO PRINT CHARACTER
1642 2246 ISZ FETCH /SET UP FOR NEXT CHARACTER
1643 2247 ISZ TCTR /DONE?
1644 5237 JMP TYPEA /NO, REPEAT
1645 5627 JMP I TYPLN /YES, EXIT
1646 0000 FETCH, 0
1647 0000 TCTR, 0

1650 0000 ASCCN, 0
1651 1650 TAD I ASCCN
1652 3305 DCA WASC
1653 2250 ISZ ASCCN
1654 1650 TAD I ASCCN
1655 3306 DCA SASC
    
```

```

1656 2250 ISZ ASCCN
1657 1366 TAD (7700)
1660 0705 AND I WASC
1661 7100 CLL
1662 4577 BSW
1663 4272 JMS CNV
1664 2306 ISZ SASC
1665 1366 TAD (7700)
1666 7040 CMA
1667 0705 AND I WASC
1670 4272 JMS CNV
1671 5650 JMP I ASCCN
1672 0000 CNV, 0
1673 3307 DCA ASCT
1674 1307 TAD ASCT
1675 7006 RTL
1676 7004 RAL
1677 0365 AND (707)
1700 1307 TAD ASCT
1701 0365 AND (707)
1702 1364 TAD (6060)
1703 3706 DCA I SASC
1704 5672 JMP I CNV
1705 0000 WASC, 0
1706 0000 SASC, 0
1707 0000 ASCT, 0

1710 0000 SINPT, OPEN /SUB TO INITIALIZE SGET SUB.
1711 7200 CLA /ZERO SPT0
1712 3315 DCA SPT0 /ZERO SPIND
1713 3317 DCA SPIND /ZERO SPIND
1714 5710 JMP I SINPT /EXIT
1715 0000 SPT0, OPEN
1716 0000 SPT1, OPEN
1717 0000 SPIND, OPEN
1720 0000 SGET, OPEN /"SPECIAL" BINARY COUNT
1721 7320 CLA STL /PATTERN SUBROUTINE.
1722 2317 ISZ SPIND
1723 7340 CLA CMA CLL
1724 3317 DCA SPIND
1725 1315 TAD SPT0
1726 7420 SNL
1727 5332 JMP ,+3
1730 7041 CIA
1731 7410 SKP
1732 7040 CMA
1733 3315 DCA SPT0
1734 1144 TAD E377
1735 0315 AND SPT0
1736 3316 DCA SPT1
1737 1316 TAD SPT1
1740 5720 JMP I SGET /EXIT SGET SUB,

/SUBROUTINE TO INITIALIZE RANDOM NUMBER GENERATORS,
    
```

```

1741 0000 SETRND, OPEN
1742 1363 TAD (1233
1743 3762' DCA RP1A
1744 1363 TAD (1233
1745 3761' DCA RP1B
1746 1360 TAD (7622
1747 3757' DCA RP2A
1750 1360 TAD (7622
1751 3756' DCA RP2B
1752 5741 JMP I SETRND /EXIT, A=00

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 -7040 (=4000 DECIMAL).

```

2000 0000 S4000I, OPEN
2001 4576 SETLOC /SET COUNT OF
2002 0056 CTRA /-4000 DECIMAL
2003 0140 =7640 /IN CTRA
2004 5600 JMP I S4000I /EXIT, A=00

```

/ROUTINE TO SET DELAYM TO -310, (=400 DECIMAL).

```

2005 0000 S200I, OPEN
2006 4576 SETLOC /SET COUNT OF
2007 0023 DELAYM /-200 DECIMAL
2010 7470 =310 /IN DELAYM
2011 5605 JMP I S200I /EXIT WITH A=00

```

/ROUTINE TO SET CTRA EQUAL TO -124 (=100 DECIMAL).

```

2012 0000 S100I, OPEN
2013 4576 SETLOC /SET COUNT OF
2014 0056 CTRA /-100 DECIMAL

```

```

2015 7634 -144 /IN CTRA
2016 5612 JMP I S100I /EXIT, A=00

```

```

2017 0000 PUNCH, OPEN
2020 2065 ISZ PFLAG /SET PFLAG
2021 6046 OUT0, TLS /PUNCH/PUNCH
2022 7200 CLA /SET C(PFLAG)
2023 1065 TAD PFLAG /FLAG RESET
2024 7650 SNA CLA /YES
2025 5230 JMP OUT2 /NO, FLAG UP?
2026 6041 OUT1, TSF /NO
2027 5223 JMP ,=4 /YES, CLEAR PRINTER FLAG
2030 6042 OUT2, TCF /CLEAR PFLAG
2031 3065 DCA PFLAG /EXIT, A=00
2032 5617 JMP I PUNCH

```

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

```

2033 0000 TLCALI, OPEN
2034 1633 TAD I TLCALI /GET FIRST LETTER TO BE TYPED
2035 3237 DCA ,+2 /SAVE IT
2036 4467 JMS I UTPLN3 /GO TYPE SAVED LETTER * NEXT 2
2037 0000 OPEN /FIRST LETTER TO BE TYPED
2040 5424 JMP I CHAIN /CHAIN

```

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

```

2041 0000 TLC37I, OPEN /GET FIRST LETTER TO BE TYPED
2042 1641 TAD I TLC37I /SAVE IT
2043 3247 DCA ,+4 /IS IT A "37"?
2044 4553 CKSR37 /NO, CHAIN
2045 5424 JMP I CHAIN /YES, GO TYPE LETTER * NEXT 2
2046 4467 JMS I UTPLN3 /FIRST LETTER TO BE TYPED
2047 0000 OPEN /CHAIN
2050 5424 JMP I CHAIN

```

/CONTROL ROUTINE TO FILL A BUFFER WITH CHARACTERS.

```

2051 0000 FBFI, OPEN /GET DATA
2052 7300 CLA CLL
2053 1451 TAD I FBFI /SAVE IT
2054 3256 DCA ,+2 /GO FILL A BUFFER-
2055 4777' JMS FBFI3 /WITH THIS *NEXT 2 CHAR
2056 0000 OPEN /GO TO COMBINED TEST SEQUENCE
2057 4776' JMS CNTST

```

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

```

2060 0000 WOSHS, OPEN
2061 3060 DCA STLID /ZERO STALL INDICATOR,

```

```

2062 4775' JMS TYPLN /TYPE LINE WITHOUT STALLS
2063 7240 CLA CMA /7777
2064 3060 DCA STLD /SET SMALL INDICATOR
2065 4775' JMS TYPLN /TYPE LINE WITH STALLS
2066 5660 JMP I WOSMS /EXIT,

```

/SUBROUTINE TO MARK TAB POSITIONS,

```

2067 0000 MTABP, OPEN
2070 3056 DCA CTRA
2071 4572 TYPE /MARK TAB POSITIONS
2072 4077 TBMRK
2073 4572 TYPE
2074 4105 TBMRK1
2075 2056 ISZ CTRA
2076 5273 JMP ,#3
2077 5667 JMP I MTABP /EXIT,

```

/PROGRAM 0, LT33/35 TELETYPE READER TEST, CHECKS ABILITY OF READER
/TO CORRECTLY READ AT FULL SPEED AND WITH RANDOM STALLS.

```

2100 4576 PRG0, SETLOC /SET KSTART TO INITIAL
2101 0022 KSTART /ROUTINE ADDRESS,
2102 2105 POTS0
2103 5704 JMP I ,+1 /GO START TEST
2104 0227 SRSET

/READ 4095 CHARACTERS, AT FULL SPEED, MATCHING EACH CHARACTER
/READ AGAINST COUNT PATTERN
/
2105 0000 POTS0, 0
2106 2135 POTS1
2107 4461 JMS I SYNC /GO SYNC TAPE
2110 4576 SETLOC /SET COUNT OF
2111 0056 CTRA /-4095(DEC) IN
2112 0001 -7777 /CTRA
2113 4570 UKCC /START READER
2114 4462 JMS I INPATT /GO INITIALIZE PATTERN
2115 4463 POTS0A, JMS I GETPT /GET PATIEMN CHARACTER
2116 3323 DCA SB0 /STORE A1 SB0
2117 4571 UKSF /READY?
2120 5317 JMP ,#1 /NO, TEST AGAIN
2121 4566 UKRB /YES, READ CHARACTER
2122 4464 JMS I CHECK /GO CHECK FOR CORRECT MATCH
2123 0000 SB0, 0 /CORRECT CHAR HERE
2124 5330 JMP P0E0 /ERROR, GO TO P0E0
2125 2056 P0T0B, ISZ CTRA /OK, ALL DONE!
2126 5315 JMP P0TS0A /NO, REPEAT
2127 5424 JMP I CHAIN /YES, CHAIN
2130 7402 P0E0, HLT /TST1 ERR HALT: AC CONTAINS
/CHAR THAT DID NOT MATCH
/AGAINST PATTERN, DEPRESS
/KEY CONTINUE

2131 7200 CLA

```

```

2132 1323 TAD SB0 /GET CORRECT CHARACTER
2133 7402 HLT /AC CONTAINS THE EXPECTED CHARACTER
2134 5325 JMP P0T0B

```

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

```

2135 0001 POTS1, 1
2136 2200 POTS2
2137 4461 JMS I SYNC /TO SYNC TAPE
2140 4576 SETLOC /SET COUNT OF
2141 0056 CTRA /-2000(DEC) IN
2142 4060 -3720 /CTRA
2143 4570 UKCC /START READER
2144 4462 JMS I INPATT /INITIALIZE PATTERN
2145 4463 POTS1A, JMS I GETPT /GET PATIEMN CHARACTER
2146 3359 DCA SB1 /STORE A1 SB1
2147 4426 JMS I DLCONT1 /GENERATE RANDOM DELAY
2150 4575 DELAY /DELAY
2151 4571 UKSF /READY?
2152 5351 JMP ,#1 /NO, TEST AGAIN
2153 4566 UKRB /YES, READ CHARACTER
2154 4464 JMS I CHECK /GO CHECK FOR CORRECT MATCH

2155 0000 SB1, 0 /CORRECT CHAR HERE
2156 5362 JMP P0E1 /ERROR, GO TO P0E1
2157 2056 P0T1B, ISZ CTRA /OK, ALL DONE!
2160 5345 JMP POTS1A /NO,
2161 5424 JMP I CHAIN /YES, CHAIN
2162 7402 P0E1, HLT /TST1 ERR HALT: AC CONTAINS
/CHARACTER THAT DID NOT MATCH
/AGAINST PATTERN, DEPRESS
/KEY CONTINUE

2163 7200 CLA
2164 1355 TAD SB1 /GET CORRECT CHARACTER
2165 7402 HLT /AC CONTAINS THE EXPECTED
/CHARACTER

2166 5357 JMP P0T1B

2175 1627
2176 1600
2177 1031 PAGE
2200

```

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

```

2200 0002 POTS2, 2
2201 7777
2202 4461 JMS I SYNC /GO SYNC TAPE

```

```

2203 4427      JMS I S100      /SET UP IO DO TEST 100 TIMES,
2204 4570      UKCC          /START READER
2205 4462      JMS I INPATT    /INITIALISE PATTERN
2206 4426      P0TS2A, JMS I DLCONT1 /SET RANDOM DELAY
2207 4777      JMS CHRCNT     /SET RANDOM CHARACTER
2210 0057      CTRB          /COUNT IN CTRB
2211 4463      P0TS2B, JMS I GETPT    /GET PATTERN CHARACTER
2212 3220      DCA SB2      /AND STORE AT SB2
2213 4575      DELAY        /GO DELAY NO OF
2214 4571      UKSF          /READY?
2215 5214      JMP ,=1        /NO, TEST AGAIN
2216 4566      UKRB          /READ CHARACTER
2217 4444      JMS I CHECK    /CHECK FOR CORRECT MATCH
2220 0000      SB2, 0          /AGAINST SB2 CONTENTS
2221 5227      JMP P0E2      /ERROR, GO TO P0E2
2222 2057      ISZ CTRB     /OK, ALL CHARS FOR GROUP DONE?
2223 5211      JMP P0TS2B    /NO
2224 2056      P0T2C, ISZ CTRA /YES, ALL GROUPS DONE?
2225 5206      JMP P0TS2A    /NO
2226 5424      JMP I CHAIN     /YES, CHAIN

2227 7402      P0E2, HLT      /TST2 ERROR MATH, AC CONTAINS CHAR THAT
                          /DID NOT MATCH AGAINST PATTERN, DEPRESS KEY
                          /CONTINUE

2230 7200      CLA          /GET CORRECT CHARACTER
2231 1220      TAD SB2      /AC CONTAINS THE EXPECTED CHARACTER
2232 7402      HLT
2233 5224      JMP P0T2C

```

/PROGRAM 1,

```

2234 4776      PRG1, JMS STBF    /SET UP BUFFER AREA
2235 4576      SETLOC      /SET KSTART TO INITIAL
2236 0022      KSTART     /ROUTINE ADDRESS
2237 2242      P1TS0
2240 5641      JMP I ,+1      /GO START PROGRAM
2241 0227      SRSET

/CARRIAGE RETURN TEST
2242 0000      P1TS0, 0
2243 2275      P1TS1
2244 4533      CKSR37      /KSR37?
2245 1140      TAD C11      /NO,
2246 1375      TAD C=122    /YES
2247 3107      DCA TEMP0    /SAVE THE NUMBER
2250 4572      TYPE        /PRINT TEST TITLE
2251 4126      CRTST
2252 1136      TAD C334     /GET "\N" CODE
2253 4470      JMS I UPUNCH  /PRINT IT
2254 1107      TAD TEMP0    /GET THE NUMBER
2255 3100      DCA UTEMP
2256 2100      CRTSTA, ISZ UTEMP /ALL DONE?
2257 7410      SKP          /NO

```

```

2260 5424      JMP I CHAIN     /YES, CHAIN
2261 1100      CRTSTB, TAD UTEMP
2262 3101      DCA UTEMP1   /UTEMP TO UTEMP1
2263 1141      TAD C240     /GET "SPACE" CODE
2264 4470      JMS I UPUNCH  /PRINT IT
2265 2101      ISZ UTEMP1   /SPACED NO, OF TIMES IN UTEMP1?
2266 5263      JMP ,=3      /NO, SO SPACE AGAIN
2267 1103      TAD CR       /YES, GET "CR" CODE,
2270 4470      JMS I UPUNCH  /PRINT IT,
2271 4470      JMS I UPUNCH  /DUMMY CYCLE,
2272 1135      TAD C257     /SET "/" CODE
2273 4470      JMS I UPUNCH  /PRINT IT
2274 5256      JMP CRTSTA   /GO TO CRTSTA

```

/RIGHT MARGIN TEST

```

2275 0001      P1TS1, 1
2276 2325      P1TS2
2277 7200      CLA
2300 1134      TAD C=16
2301 3107      DCA TEMP0
2302 1133      TAD CRM33B
2303 3323      DCA RMB
2304 4533      CKSR37      /KSR37?
2305 5312      JMP ,=5      /NO,
2306 1132      TAD C=17    /YES,
2307 3107      DCA TEMP0
2310 1131      TAD CRM37A
2311 3323      DCA RMB
2312 4572      TYPE        /PRINT TEST TITLE
2313 4136      RMTST
2314 1107      TAD TEMP0
2315 3100      DCA UTEMP
2316 4572      RMTSTA, TYPE /PRINT --- I
2317 1553      RM33A
2320 2100      ISZ UTEMP    /DONE TIMES?
2321 5316      JMP RMTSTA   /NO, SO DO IT AGAIN
2322 4572      TYPE        /YES, PRINT "A"
2323 0000      RMB, OPEN
2324 5424      JMP I CHAIN  /CHAIN

```

/SPACE TEST

```

2325 0002      P1TS2, 2
2326 2400      P1TS3
2327 4572      TYPE        /PRINT TEST TITLE
2330 4153      SPTST
2331 4533      CKSR37      /KSR37?
2332 1130      TAD C5       /NO
2333 1127      TAD C=51    /YES
2334 3100      DCA UTEMP    /=36 TO UTEMP
2335 4572      SPTSTA, TYPE /PRINT \ SPACE
2336 4123      SPTSTC
2337 2100      ISZ UTEMP    /DONE 36 TIMES?

```

```

2340 5335      JMP SPTSTA      /NO, SO UD II AGAIN,
2341 4553      CKSR37      /KSR37?
2342 1126      TAD [4         /NO
2343 1125      TAD [50        /YES
2344 3100      DCA UTEMP      /-36 TO UTEMP
2345 1374      TAD (=1        /GET -1
2346 3101      SPTSTB, DCA UTEMP1 /AC TO UTEMP1
2347 1101      TAD UTEMP1     /UTEMP1
2350 3102      DCA UTEMP2     /TO UTEMP2
2351 1103      TAD CR         /GET "CR" CODE
2352 4470      JMS I UPUNCH   /PRINT II
2353 4470      JMS I UPUNCH   /DUMMY CYCLE
2354 1141      TAD [240      /GET "SPACER CODE
2355 4470      JMS I UPUNCH   /PRINT II
2356 2102      ISZ UTEMP2   /DONE SPACING?
2357 5354      JMP ,=3        /NO,
2360 1135      TAD [257      /GET "/" CODE
2361 4470      JMS I UPUNCH   /PRINT II
2362 2100      ISZ UTEMP     /DONE 36 TIMES?
2363 7410      SKP          /NO,
2364 5424      JMP I CHAIN    /YES, CHAIN
2365 7344      CLA CLL CMA RAL /-2 TO AL
2366 1101      TAD UTEMP1     /ADD C(UTEMP1)
2367 5346      JMP SPTSTB     /GO TO SPTSTB

2374 7777
2375 7656
2376 1000
2377 0456
2400          PAGE
    
```

```

/LINE FEED TEST
2400 0003      P1TS3, 3
2401 2722      P1TS47
2402 7240      CLA CMA         /SET STALL
2403 3060      DCA STLID    /INDICATVH
2404 4572      TYPE         /PRINT TEST TITLE
2405 4145      LFTST
2406 4553      CKSR37      /KSR37?
2407 1140      TAD [11     /NO,
2410 1377      TAD (=121    /YES,
                DCA UTEMP
2411 3100      LFTSTA, TAD [334 /GET "N" CODE
2412 1136      JMS I UPUNCH /PRINT II
2413 4470      TAD LF       /GET "LF" CODE
2414 1104      JMS I UPUNCH /PRINT II
2415 4470      ISZ UTEMP    /DONE?
2416 2100      SKP          /NO,
2417 7410      JMP I CHAIN    /YES, CHAIN
2420 5424      STALL
2421 4554      JMP LFTSTA   /GO TO LFTSTA
2422 5212
    
```

```

/TYPE LINE OF CHARACTERS ABC
2423 0004      P1TS4, 4
2424 2431      P1TS5
2425 4592      TYPE         /PRINT TITLE
2426 4175      GHRTST
2427 4432      JMS I TLCALL /PRINT LINE
2430 3706      A

/TYPE LINE OF CHARACTERS DEF
2431 0005      P1TS5, 5
2432 2435      P1TS6
2433 4432      JMS I TLCALL
2434 3711      D

/TYPE LINE OF CHARACTERS GHI
2435 0006      P1TS6, 6
2436 2441      P1TS7
2437 4432      JMS I TLCALL
2440 3714      G

/TYPE LINE OF CHARACTERS JKL
2441 0007      P1TS7, 7
2442 2445      P1TS10
2443 4432      JMS I TLCALL
2444 3717      J

/TYPE LINE OF CHARACTERS MNO
2445 0010      P1TS10, 10
2446 2451      P1TS11
2447 4432      JMS I TLCALL
2450 3722      H

/TYPE LINE OF CHARACTERS POR
2451 0011      P1TS11, 11
2452 2455      P1TS12
2453 4432      JMS I TLCALL
2454 3725      P

/TYPE LINE OF CHARACTERS STU
2455 0012      P1TS12, 12
2456 2461      P1TS13
2457 4432      JMS I TLCALL
2460 3730      S

/TYPE LINE OF CHARACTERS VMX
2461 0013      P1TS13, 13
2462 2465      P1TS14
2463 4432      JMS I TLCALL
2464 3733      V

/TYPE LINE OF CHARACTERS YZ0
2465 0014      P1TS14, 14
2466 2471      P1TS15
2467 4432      JMS I TLCALL
2470 3736      Y

/TYPE LINE OF CHARACTERS 123
2471 0015      P1TS15, 15
2472 2475      P1TS16
    
```


2473 4432 JMS I TLCALL
 2474 3741 ONE
 /TYPE LINE OF CHARACTERS 496
 PITS16, 16
 2475 0016 PITS17
 2476 2501 JMS I TLCALL
 2477 4432 FOUR
 2500 3744 /TYPE LINE OF CHARACTERS 789
 PITS17, 17
 2501 0017 PITS20
 2502 2505 JMS I TLCALL
 2503 4432 SEVEN
 2504 3747 /TYPE LINE OF CHARACTERS I"#
 PITS20, 20
 2505 0020 PITS21
 2506 2511 JMS I TLCALL
 2507 4432 C241
 2510 3752 /TYPE LINE OF CHARACTERS 3%8
 PITS21, 21
 2511 0021 PITS22
 2512 2515 JMS I TLCALL
 2513 4432 C244
 2514 3755 /TYPE LINE OF CHARACTERS !()
 PITS22, 22
 2515 0022 PITS23
 2516 2521 JMS I TLCALL
 2517 4432 C247
 2520 3760 /TYPE LINE OF CHARACTERS **,
 PITS23, 23
 2521 0023 PITS24
 2522 2525 JMS I TLCALL
 2523 4432 C252
 2524 3763 /TYPE LINE OF CHARACTERS -!(
 PITS24, 24
 2525 0024 PITS25
 2526 2531 JMS I TLCALL
 2527 4432 C255
 2530 3766 /TYPE LINE OF CHARACTERS !|<
 PITS25, 25
 2531 0025 PITS26
 2532 2535 JMS I TLCALL
 2533 4432 C272
 2534 3771 /TYPE LINE OF CHARACTERS =>?
 PITS26, 26
 2535 0026 PITS27
 2536 2541 JMS I TLCALL
 2537 4432 C275
 2540 3774 /TYPE LINE OF CHARACTERS @ \\
 PITS27, 27
 2541 0027 PITS30
 2542 2545 JMS I TLCALL
 2543 4432 C300
 2544 3777 /TYPE LINE OF CHARACTERS]: AND HEEI AMROW
 PITS30, 30
 2545 0030 PITS31
 2546 2551

2547 4432 JMS I TLCALL
 2550 4002 C335
 /TYPE LINE OF SMALL A, B, AND C
 PITS31, 31
 2551 0031 PITS32
 2552 2555 JMS I TLC37
 2553 4433 SA
 2554 4005 /TYPE LINE OF SMALL D, E, AND F
 PITS32, 32
 2555 0032 PITS33
 2556 2561 JMS I TLC37
 2557 4433 SD
 2560 4010
 /TYPE LINE OF SMALL G, H, AND I
 PITS33, 33
 2561 0033 PITS34
 2562 2600 JMS I TLC37
 2563 4433 SG
 2564 4013
 2577 7657 PAGE
 2600 2600
 /TYPE LINE OF SMALL J, K, AND L
 PITS34, 34
 2600 0034 PITS35
 2601 2604 JMS I TLC37
 2602 4433 SJ
 2603 4016
 /TYPE LINE OF SMALL M, N, AND O
 PITS35, 35
 2604 0035 PITS36
 2605 2610 JMS I TLC37
 2606 4433 SM
 2607 4021 /TYPE LINE OF SMALL P, Q, AND R
 PITS36, 36
 2610 0036 PITS37
 2611 2614 JMS I TLC37
 2612 4433 SP
 2613 4024 /TYPE LINE OF SMALL S, T, AND U
 PITS37, 37
 2614 0037 PITS40
 2615 2620 JMS I TLC37
 2616 4433 SS
 2617 4027 /TYPE LINE OF SMALL V, W, AND X
 PITS40, 40
 2620 0040 PITS41
 2621 2624 JMS I TLC37
 2622 4433 SV
 2623 4032 /TYPE LINE OF SMALL Y, AND Z, ANY CODE 340 CHARACTER,
 PITS41, 41
 2624 0041

```

2625 2630 P1TS42
2626 4433 JMS I TLC37
2627 4035 SY
/TYPE LINE OF CHARACTERS WHOSE CODE IS 373, 374, 375, 376.
2630 0042 P1TS42, 42
2631 2647 P1TS43
2632 4553 CKSR37 /KSR37?
2633 5424 JMP I CHAIN /NO, BYPASS TEST
2634 4573 MOVE
2635 4040 C373
2636 4400 BLOCK1
2637 7774 =4
2640 4573 MOVE
2641 4400 BLOCK1
2642 4404 BLOCK1+4
2643 7663 =115
2644 3060 DCA STLD
2645 4777' JMS TYPLN
2646 5424 JMP I CHAIN

/TYPE 2 LINES OF ALL CHARACTERS, 1ST LINE NO DELAY, 2ND LINE WITH STALLS,
2647 0043 P1TS43, 43
2650 2654 P1TS44
2651 4776' JMS FBALL /FILL BUFFER WITH ALL CHARS.
2652 4775' JMS WOSWS
2653 5424 JMP I CHAIN /CHAIN

/TYPE 12 LINES OF LT33 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS,
2654 0044 P1TS44, 44
2655 2672 P1TS45
2656 4572 TYPE /PRINT TITLE
2657 4211 WCPTST
2660 4552 CKSR33 /33?
2661 5424 JMP I CHAIN /NO
2662 4774' JMS FW336 /PATTERN TO BUFFER
2663 4576 SETLOC /-6 TO CIRA
2664 0056 CTRA
2665 7772 =6
2666 4775' P1T44A, JMS WOSWS
2667 2056 ISZ CTRA
2670 5266 JMP P1T44A /NO, REPEAT
2671 5424 JMP I CHAIN /YES, CHAIN

/TYPE 12 LINES OF ASR35 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS,
2672 0045 P1TS45, 45
2673 2706 P1TS46
2674 4551 CKSR35 /35?
2675 5424 JMP I CHAIN /NO
2676 4773' JMS FW356 /PATTERN TO BUFFER
2677 4576 SETLOC /-6 TO CIRA
2680 0056 CTRA
2681 7772 =6
2682 4775' P1T45A, JMS WOSWS
2683 2056 ISZ CTRA /ALL LINES TYPED?
2684 5302 JMP P1T45A /NO, REPEAT

```

```

2705 5424 JMP I CHAIN /YES, CHAIN

/TYPE 12 LINES OF KSR37 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS,
2706 0046 P1TS46, 46
2707 7777 7777
2710 4553 CKSR37 /37?
2711 5424 JMP I CHAIN /NO, BYPASS TEST
2712 4772' JMS FW376 /YES, PATTERN TO BUFFER
2713 4576 SETLOC /-6 TO CIRA
2714 0056 CTRA
2715 7772 =6
2716 4775' P1T46A, JMS WOSWS
2717 2056 ISZ CTRA /ALL LINES TYPED?
2720 5316 JMP P1T46A /NO, REPEAT
2721 5424 JMP I CHAIN /YES, CHAIN

/KSR37, LT35=CC, OR LT35=CD TAB TEST
2722 0047 P1TS47, 47
2723 3031 P1TS50
2724 4553 CKSR37 /KSR37?
2725 5346 JMP TBTB /NO
2726 4572 TYPE /YES, TYPE TITLE
2727 4066 TBTST
2730 1124 TAD [ =11 /-9 TO CIRA
2731 4771' JMS MTABP /GO TO SUB TO MARK TAB POSITIONS,
2732 1370 TAD [ =12 /SET TAB COUNT
2733 3340 DCA TBCNT /TO =10
2734 1367 TBTB, TAD [ =7 /YES, =7 TO CTRA
2735 3056 DCA CTRA
2736 3361 DCA SPCNT /0 TO SPACE COUNT
2737 4766' JMS TABP /GO TAB AND PRINT SLASH 9 TIMES.
2740 0000 TBCNT, OPEN /TAB COUNT
2741 2056 ISZ CTRA /DONE?
2742 7410 SKP /NO
2743 5424 JMP I CHAIN /YES, CHAIN
2744 2361 ISZ SPCNT /INCREMENT SPACE COUNT
2745 5337 JMP TBTB+3 /REPEAT
2746 4551 TBTB, CKSR35 /LT35=CC, LT35=CD?
2747 5424 JMP I CHAIN /NO, BYPASS TEST
2750 4572 TYPE /YES, TYPE TITLE
2751 4066 TBTST
2752 1367 TAD [ =7 /-7 TO CIRA
2753 4771' JMS MTABP /GO TO SUB TO MARK TAB POSITIONS,
2754 4572 TYPE /YES
2755 4100 TBMHK+1
2756 1124 TAD [ =11 /SET TAB COUNT
2757 3340 DCA TBCNT /TO =9
2760 5334 JMP TBTB
2761 0000 SPCNT, OPEN
2762 0000 SPCTR, OPEN

2766 3001
2767 7771
2770 7766

```

2771 2067
 2772 1153
 2773 1135
 2774 1117
 2775 2060
 2776 1066
 2777 1627
 3000

PAGE

```

3000 0000 TABCTR, OPEN
3001 0000 TABP, OPEN
3002 1621 TAD I TABP /SET TABLIN
3003 3200 DCA TABCTR
3004 2201 ISZ TABP
3005 4574 CRLF /CRLF ONVE
3006 7777 =1
3007 1777' SPAC, TAD SPCNT /GET SPACE COUNT
3010 7450 SNA /0?
3011 5220 JMP TABPA /YES, DON'T SPACE
3012 7041 CIA /NO, NEGATE COUNT
3013 3776' DCA SPCTR
3014 1141 TAD [240 /SPACE
3015 4470 JMS I UPUNCH
3016 2776' ISZ SPCTR /DONE SPACING?
3017 5214 JMP ,=3 /NO, SPACE AGAIN
3020 1140 TABPA, TAD [11 /GET TAB CODE
3021 4470 JMS I UPUNCH /OUTPUT TO TELEPRINTER
3022 4470 JMS I UPUNCH /DUMMY CTRLE
3023 4470 JMS I UPUNCH /DUMMY CTRLE
3024 1135 TAD [257 /GET "/" CODE
3025 4470 JMS I UPUNCH /AND TYPE II
3026 2200 ISZ TABCTR /DONE?
3027 5207 JMP SPAC /NO, REPEAT
3030 5601 JMP I TABP /YES, EXIT
    
```

/KSR37 BACKSPACE TEST.

```

3031 0050 P1TS50, 50
3032 2423 P1TS4
3033 4553 CKSR37 /KSR37
3034 5424 JMP I CHAIN /NO
3035 4572 TYPE /YES, TYPE IIIVE
3036 4052 BKSPPT
3037 1127 TAD [=-51 /=-51 TO WIMA
3040 3056 DCA CTRA
3041 4572 TYPE /TYPE ALIENMATE UIS.
3042 4373 BKSPU
3043 2056 ISZ CTRA /DONE?
3044 5241 JMP ,=3 /NO,
3045 1375 TAD [=-47 /=-39 TO WIMA
3046 3056 DCA CTRA
3047 4263 JMS BKSPC /BACKSPACE INIIVE
3050 7776 =2
    
```

```

3051 1774' TAD C252 /TYPE "="
3052 4470 JMS I UPUNCH
3053 4263 JMS BKSPC /BACKSPACE INRIICE
3054 7775 =3
3055 1774' TAD C252 /TYPE "="
3056 4470 JMS I UPUNCH
3057 2056 ISZ CTRA /DONE 39 TIMES?
3060 5253 JMP ,=5 /NO,
3061 5424 JMP I CHAIN /YES, CHAIN
3062 0000 BKSCTR, OPEN
3063 0000 BKSPC, OPEN
3064 1663 TAD I BKSPC /GET BACKSPACE COUNT
3065 3262 DCA BKSCTR /AND STORE AT BKSCTR
3066 2263 ISZ BKSPC /SET UP EXIT
3067 1373 TAD [210 /GET BACKSPACE CODE
3070 4470 JMS I UPUNCH /OUTPUT TO TELEPRINTER
3071 2262 ISZ BKSCTR /DONE BACKSPACING?
3072 5267 JMP ,=3 /NO, REPEAT
3073 5663 JMP I BKSPC /YES, EXIT
    
```

/PROGRAM 2, PUNCH TEST

```

3074 4576 PRG2, SETLOC /SET INTERRUPT SERVICE ADDRESS
3075 0002 2 /TO INTSVG
3076 1254 INTSVG
3077 4576 SETLOC /SET DATA BLOCK
3100 0075 BLKCNT /LENGTH 10
3101 7000 =1000 /-512
3102 4570 UKCC
3103 1372 TAD [BLOCKA /SET UP ADDRESS TO
3104 3100 DCA UTEMP /STORE DATA,
3105 1371 TAD [=-1000 /-512 TO CTRA
3106 3056 DCA CTRA
3107 4770' JMS SINPT /INITIALIZE SPECIAL COUNT PATTERN
3110 4767' JMS SGET /GET CHARACTER
3111 3500 DCA I UTEMP /STORE II
3112 2100 ISZ UTEMP /INCREMENT POINTER,
3113 2056 ISZ CTRA /DONE 512 CHARACTERS?
3114 5310 JMP ,=4 /NO, REPEAT
3115 4571 UKSF
3116 5315 JMP ,=1
3117 7200 PRG2A, CLA /YES, CLEAN READY BUSY
3120 3072 DCA RBUSY
3121 4766' JMS PLTLR /PUNCH LEADER
3122 4765' JMS PSYNC /PUNCH SYNC CHARACTER
3123 4764' JMS PBLK /PUNCH DATA BLOCK FULL SPEED.
3124 4766' JMS PLTLR /PUNCH TRAILER
3125 4763' JMS RSYNC /SYNC READER
3126 4762' JMS RDBLK /READ DATA BLOCK
3127 4761' JMS RRDY /WAIT FOR READER NOT BUSY
3130 4766' JMS PLTLR /PUNCH LEADER
3131 4765' JMS PSYNC /PUNCH SYNC CHARACTER
3132 4760' JMS PBLKR /PUNCH DATA BLOCK (WITH STALLS).
3133 4766' JMS PLTLR /PUNCH TRAILER
    
```

```

3134 4763' JMS RSYNC /SYNC READER
3135 4762' JMS RDBLK /READ DATA BLOCK
3136 4761' JMS RRDY /WAIT FOR READER NOT BUSY
3137 5317 JMP PRG2A /REPEAT.
    
```

```

/PROGRAM 3, KEYBOARD TEST
PRG3, SETLOC /SET KSTART TO INITIAL
      KSTART /ROUTINE ADDRESS
      P3T0
      TYPE /PRINT
      KMSG1
      JMP I ,*1
      SRSET
    
```

```

3140 4576
3141 0022
3142 3200
3143 4572
3144 4231
3145 5746
3146 0227

3160 1324
3161 1343
3162 1400
3163 1216
3164 1316
3165 1212
3166 1200
3167 1720
3170 1710
3171 7000
3172 4376
3173 0210
3174 3763
3175 7731
3176 2762
3177 2761
3200
    
```

PAGE

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

```

3200 0000 P3T0, 0
3201 3221 P3T1
3202 4430 JMS I 54000
3203 4570 UKCC /CLEAR AC AND FLAG
3204 4572 TYPE
3205 4242 KMSG2
3206 4571 UKSF /READY?
3207 5206 JMP ,=1 /WAIT
3210 4571 UKSF /READY, SKIP ON FLAG
3211 5215 JMP P3E0 /NO SKIP, ERROR
3212 2056 ISR CTRA /ALL DONE?
3213 5210 JMP ,=3 /NO, REPEAT
3214 5424 JMP I CHAIN /YES, CHAIN

3215 7602 P3E0, HLT CLA /KSF FAILURE
3216 4571 UKSF /SCOPE LOOP
3217 5216 JMP ,=1 /SKIPS ON FLAG
3220 5216 JMP ,=2 /CONTINUOUSLY
    
```

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

```

3221 0001 P3T1, 1
3222 3240 P3T2
3223 4570 UKCC /CLEAR AC AND FLAG
3224 4572 TYPE
3225 4253 KMSG3
3226 4571 P3T1A, UKSF /READY?
3227 5226 JMP ,=1 /WAIT
3230 4565 SUKRB /READ CHARACTER
3231 4561 UTLS /PRINT IT
3232 4564 UTSF /PRINTER READY?
3233 5232 JMP ,=1 /NO, WAIT
3234 1143 TAD [=377
3235 7440 SZA /IS IT RUBOUT?
3236 5226 JMP P3T1A /NO
3237 5424 JMP I CHAIN /YES, CHAIN
    
```

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

```

3240 0002 P3T2, 2
3241 7777 7777
3242 4570 UKCC /CLEAR AC AND FLAG
3243 4572 TYPE /PRINT TITLE AND
3244 4320 KMSG4 /INSTRUCTION
3245 4572 TYPE
3246 4261 KMSG3A
3247 4571 P3T2A, UKSF /FLAG ?
3250 5247 JMP ,=1 /NO, WAIT
3251 4565 SUKRB /YES, READ KEYBOARD
3252 3106 DCA WTS6A /STORE CHARACTER
3253 4777' JMS ASCCN /CONVERT CHARACTER
3254 0106 WTS6A /TO PRINTABLE OCTAL.
3255 4340 OCTEQV
3256 4572 TYPE /PRINT CHARACTER
3257 4336 KMSG5
3260 1106 TAD WTS6A
3261 1143 TAD [=377
3262 7640 SZA CLA /WAS IT A RUBOUT?
3263 5247 JMP P3T2A /NO,
3264 5424 JMP I CHAIN /YES, CHAIN
    
```

```

/PROGRAM 4, COMBINED READER, PRINTER, PUNCH TEST,
PRG4, SETLOC /SET INTERRUPT SERVICE
      2 /ADDRESS TO INISVC
      INTSVC
      SETLOC /SET DATA BLOCK LENGTH
      BLKCNT /TD -150
    
```

```

3272 7552      +226
3273 4425      JMS I KBFLAG
3274 4776'     JMS STBF
3275 4576      SETLOC        /SET UP BUFFER AREA
3276 0022      KSTART      /SET KSTART TO INITIAL
3277 3302      P4T0        /ROUTINE ADDRESS
3300 5701      JMP I ,+1    /START PROGRAM
3301 0227      SRSET

3302 0000      P4T0, 0
3303 3306      P4T1
3304 4434      JMS I FBF    /DATAI ABC
3305 3706      A
3306 0001      P4T1, 1
3307 3312      P4T2
3310 4434      JMS I FBF    /DATAI DEF
3311 3711      D
3312 0002      P4T2, 2
3313 3316      P4T3
3314 4434      JMS I FBF    /DATAI GHI
3315 3714      G
3316 0003      P4T3, 3
3317 3322      P4T4
3320 4434      JMS I FBF    /DATAI JKL
3321 3717      J
3322 0004      P4T4, 4
3323 3326      P4T5
3324 4434      JMS I FBF    /DATAI MNO
3325 3722      M
3326 0005      P4T5, 5
3327 3332      P4T6
3330 4434      JMS I FBF    /DATAI PQR
3331 3725      P
3332 0006      P4T6, 6
3333 3336      P4T7
3334 4434      JMS I FBF    /DATAI SIU
3335 3730      S
3336 0007      P4T7, 7
3337 3342      P4T10
3340 4434      JMS I FBF    /DATAI VWX
3341 3733      V
3342 0010      P4T10, 10
3343 3346      P4T11
3344 4434      JMS I FBF    /DATAI YZ0
3345 3736      Y
3346 0011      P4T11, 11
3347 3352      P4T12
3350 4434      JMS I FBF    /DATAI 143
3351 3741      ONE
3352 0012      P4T12, 12
3353 3356      P4T13
3354 4434      JMS I FBF    /DATAI 420
3355 3744      FOUR
3356 0013      P4T13, 13
3357 3362      P4T14

```

```

3360 4434      JMS I FBF    /DATAI 799
3361 3747      SEVEN
3362 0014      P4T14, 14
3363 3366      P4T15
3364 4434      JMS I FBF    /DATAI 118
3365 3752      C241
3366 0015      P4T15, 15
3367 3372      P4T16
3370 4434      JMS I FBF    /DATAI 526
3371 3755      C244
3372 0016      P4T16, 16
3373 3400      P4T17
3374 4434      JMS I FBF    /DATAI 111
3375 3760      C247

3376 1000
3377 1650      PAGE
3400 0017      P4T17, 17
3401 3404      P4T20
3402 4434      JMS I FBF    /DATAI **,
3403 3763      C292
3404 0020      P4T20, 20
3405 3410      P4T21
3406 4434      JMS I FBF    /DATAI -1/
3407 3766      C255

3410 0021      P4T21, 21
3411 3414      P4T22
3412 4434      JMS I FBF    /DATAI 115
3413 3771      C272
3414 0022      P4T22, 22
3415 3420      P4T23
3416 4434      JMS I FBF    /DATAI 227
3417 3774      C275
3420 0023      P4T23, 23
3421 3424      P4T24
3422 4434      JMS I FBF    /DATAI 01\
3423 3777      C300
3424 0024      P4T24, 24
3425 3430      P4T25
3426 4434      JMS I FBF    /DATAI 3: AND LEFT ARROW
3427 4002      C335
3430 0025      P4T25, 25
3431 3434      P4T26
3432 4777'     JMS FBALL    /DATAI ALL PRINTABLE ASCII
3433 4776'     JMS CNTST

3434 0026      P4T26, 26
3435 3440      P4T27
3436 4775'     JMS FW336    /DATAI L153 PRINTER WORST CASE
3437 4776'     JMS CNTST    /PATTERN

```

```

3440 0027 P4T27, 27
3441 3444 P4T30
3442 4774 JMS FB356 /DATA1 L132 PRINTER WORST CASE
3443 4776 JMS CNTST /PATTERN
3444 0030 P4T30, 30
3445 7777 7777
3446 4773 JMS FBFB3 /DATA1 I'S AND O'S
3447 4044 CS77
3450 4776 JMS CNTST
    
```

/PROGRAM 5, READS COUNT PATTERN:

```

3451 4461 PRG5, JMS I SYNC /SYNC TAP
3452 3321 DCA ERRCR /CLEAR ERROR COUNTER
3453 4462 JMS I INPATT /INITIALIZE PATTERN,
3454 4970 UKCC /START READER
3455 7004 SRT0A, LAS /READ SR
3456 0123 AND [400
3457 7090 SMA CLA /STALL? ISN3?0!
3460 7040 CMA /YES
3461 3060 DCA STLID /NO

3462 4463 SRT0B, JMS I GETPT /GET PATIENM CHAR,
3463 3273 DCA SBSP /STORE AI SBSP
3464 4594 STALL /STALL
3465 4571 UKSF /READY?
3466 5265 JMP ,=1 /TEST AGAIN
3467 4566 UKRB /READ, CLEAR AI AND FLAG,
3470 3077 DCA ERRCR
3471 1077 TAD ERRCR
3472 4464 JMS I CHECK /GO CHECK CHARACTER WORD,
3473 0000 SBSP, 0 /
3474 7410 SKP /ERROR, NO MATCH, GO INC, ERRCNT
3475 5313 JMP HLTST /OK,
3476 2321 ERRCNT, ISE ERRCR /INCREMENT ERROR COUNTER
3477 5302 JMP ,=3
3500 7240 CLA CMA /OFLOW, RESET IO 7777,
3501 3321 DCA ERRCR
3502 7604 LAS /READ SR
3503 0142 AND [100
3504 7650 SMA CLA /HALT ON ERROR! (SR5)
3505 5313 JMP HLTST /NO
3506 1077 TAD ERRCR /YES, GET BAD CHAR,
3507 7402 HLT
3510 7200 CLA /GET GOOD CHARACTER
3511 1273 TAD SBSP
3512 7402 HLT
3513 7604 HLTST, LAS /READ SR
3514 7700 SMA CLA /HALT? (SR0)
3515 5255 JMP SRT0A /NO
3516 1321 TAD ERRCR /GET ERROR COUNT
3517 7402 HLT /HALT, ERROR COUNT IN AC
3520 5255 JMP SRT0A
3521 0000 ERRCR, 0 /ERROR COUNTER
    
```

/PROGRAM 6, PRINTER EXERCISER, TYPES LINES OF ANY 3 CHARACTERS /WITH STALLS, OR FULL SPEED, KEYBOARD CONTROLLED.

```

3522 4792 PRG6, JMS STBF
3523 4592 TYPE
3524 4345 P11MG1
3525 1371 PRG6A, TAD (BLOCK1-1
3526 3016 DCA 16
3527 4592 TYPE
3528 4361 P11MG2
3531 4353 JMS GKBCR
3532 3416 DCA I 16
3533 4353 JMS GKBCR
3534 3416 DCA I 16
3535 4353 JMS GKBCR
3536 3416 DCA I 16
3537 4353 JMS GKBCR
3540 1143 TAD [377
3541 7640 SZA CLA /STALL?
3542 7240 CLA CMA /YES
3543 3060 DCA STLID /NO
3544 4793 JMS FBFB3 /SET UP LINE,
3545 4400 BLOCK1
3546 4790 JMS TYPLN /TYPE LINE OF CHARACTERS
3547 7604 LAS /READ SR
3550 7700 SMA CLA /CHANGE DATA? (SR0=1)
3551 5346 JMP ,=3 /NO
3552 5325 JMP PRG6A /YES
3553 0000 GKBCR, OPEN /SUB TO GET KEYBOARD CHARACTER,
3554 4571 UKSF /WAIT FOR FLAG,
3555 5354 JMP ,=1
3556 4565 SUKRB /READ CHARACTER,
3557 3107 DCA TEMP0 /STORE CHARACTER,
3560 1107 TAD TEMP0 /GET IT BACK,
3561 4470 JMS I UPUNCH /ECHO IT,
3562 1107 TAD TEMP0 /GET CHARACTER AGAIN,
3563 5753 JMP I GKBCR /EXIT
    
```

/PROGRAM 7, PUNCHES BINARY COUNT PATTERN.

```

3564 4462 PRG7, JMS I INPATT /INITIALIZE BINARY COUNT PATTERN
3565 4463 JMS I GETPT /GET BINARY COUNT CHARACTER,
3566 4470 JMS I UPUNCH /PUNCH CHARACTER
3567 5365 JMP ,=2 /REPEAT,

3570 1627
3571 4377
3572 1000
3573 1031
3574 1135
3575 1117
3576 1000
3577 1066
3600
    
```

```

3600 0000 DVCSEL, OPEN /DEVICE CODE SELECT ROUTINE,
3601 1422 TAD CINTAB /GET START ADDR OF INPUT IOT TABLE,
3602 3046 DCA TEMP /AND SAVE AT TEMP,
3603 1021 TAD TTYIOT /OBTAIN NEW INPUT IOT AND
3604 7012 RTR /STORE AT UTEMP,
3605 7012 RAR
3606 0121 AND C0770
3607 3100 DCA UTEMP
3608 4222 JMS DVCOM /PERFORM INPUT IOT SELECTION,
3609 4222 TAD COUTTAB /GET START ADDR OF OUTPUT IOT TABLE,
3610 1120 DCA TEMP /AND OBTAIN NEW OUTPUT IOT AND
3611 3046 TAD TTYIOT /OBTAIN NEW OUTPUT IOT AND
3612 1021 RTL /STORE AT UTEMP,
3613 7006 RAL
3614 7004 AND C0770
3615 0121 DCA UTEMP
3616 3100 JMS DVCOM /PERFORM OUTPUT IOT SELECTION,
3617 4222 JMP I DVCSEL /EXIT DVCSEL,
3618 5600 DVCOM, OPEN /COMMON SUB TO SELECT IOT'S,
3619 0000 TAD I TEMP /07
3620 1446 SNA /YLS, EXIT
3621 7490 JMP I DVCOM
3622 5622 DCA UTEMP1
3623 3101 TAD I UTEMP1
3624 1501 AND C7807 /REMOVE OLD DEVICE CODE,
3625 0117 TAD UTEMP /INSERT NEW DEVICE CODE,
3626 1100 DCA I UTEMP1 /PUT BACK NEW IOT CODE,
3627 3501 ISZ TEMP /SET UP FOR NEXT IOT CODE,
3628 2046 JMP DVCOM+1
3629 5223

```

```

3635 0720 INTAB, XKSF+1
3636 0725 XKCC+1
3637 0731 XKRS+1
3638 0735 XKR8+1
3639 1547 SXKR8+1
3640 0756 XKCR+1
3641 0762 XKE+1
3642 1233 RSSERV
3643 1264 INKSF
3644 1433 IN0
3645 0000 0
3646 0741 OUTTAB, XTGF+1
3647 0746 XTCF+1
3648 1172 XTFC+1
3649 0752 XTLS+1
3650 1166 XSPF+1
3651 0766 XSP1+1
3652 1261 INTCF
3653 1257 INTSF
3654 2021 OUT0

```

```

3661 2026 OUT1
3662 2030 OUT2
3663 0000 0
3664 0247 A33WPS, /"H
3665 0337 0337 /LEFT ARROW
3666 0327 0327 /"H
3667 0257 0257 /"H
3668 0327 0327 /"H
3669 0337 0337 /LEFT ARROW
3670 0247 A35WPS, /"H
3671 0333 0333 /"E
3672 0277 0277 /"H
3673 0303 0303 /"C
3674 0277 0277 /"H
3675 0333 0333 /"E
3676 0316 A37WPS, /BIG N
3677 0361 0361 /SMALL Q
3678 0301 0301 /BIG A
3679 0376 0376 /SWUNG DASH
3680 0301 0301 /BIG A
3681 0361 0361 /SMALL Q
3682 0301 A, 301
3683 0302 302
3684 0303 303
3685 0304 D, 304
3686 0305 305
3687 0306 306
3688 0307 G, 307
3689 0310 310
3690 0311 311
3691 0312 J, 312
3692 0313 313
3693 0314 314
3694 0315 M, 315
3695 0316 316
3696 0317 317
3697 0320 P, 320
3698 0321 321
3699 0322 322
3700 0323 S, 323
3701 0324 324
3702 0325 325
3703 0326 V, 326
3704 0327 327
3705 0330 330
3706 0331 Y, 331
3707 0332 332
3708 0260 260
3709 0261 ONE, 261
3710 0262 262
3711 0263 263
3712 0264 FOUR, 264
3713 0265 265
3714 0266 266

```

3747	0267	SEVEN,	267
3750	0270		270
3751	0271		271
3752	0241	C241,	241
3753	0242		242
3754	0243		243
3755	0244	C244,	244
3756	0245		245
3757	0246		246
3760	0247	C247,	247
3761	0250		250
3762	0251		251
3763	0252	C252,	252
3764	0253		253
3765	0254		254
3766	0255	C255,	255
3767	0256		256
3770	0257		257
3771	0272	C272,	272
3772	0273		273
3773	0274		274
3774	0275	C275,	275
3775	0276		276
3776	0277		277
3777	0300	C300,	300
4000	0333		333
4001	0334		334
4002	0335	C335,	335
4003	0336		336
4004	0337		337
4005	0341	SA,	341
4006	0342		342
4007	0343		343
4010	0344	SD,	344
4011	0345		345
4012	0346		346
4013	0347	SG,	347
4014	0350		350
4015	0351		351
4016	0352	SJ,	352
4017	0353		353
4020	0354		354
4021	0355	SH,	355
4022	0356		356
4023	0357		357
4024	0360	SP,	360
4025	0361		361
4026	0362		362
4027	0363	SS,	363
4030	0364		364
4031	0365		365
4032	0366	SV,	366
4033	0367		367
4034	0370		370

4035	0371	SY,	371
4036	0372		372
4037	0340		340
4040	0373	C373,	373
4041	0374		374
4042	0375		375
4043	0376		376
4044	0377	C377,	377
4045	0000		000
4046	0377		377
4047	4543	CARLF, TEXT	'X#0?'
4050	0077		
4051	0000		
4052	4543	BKSPT, TEXT	'X#BACKSPACE TEST###?'
4053	4302		
4054	0103		
4055	1323		
4056	2001		
4057	0305		
4060	4024		
4061	0523		
4062	2445		
4063	4343		
4064	0077		
4065	0000		
4066	4543	TBTST, TEXT	'X#TAB TEST###?'
4067	4324		
4070	0102		
4071	4024		
4072	0523		
4073	2445		
4074	4343		
4075	0077		
4076	0000		
4077	4040	TBMRK, TEXT	' /0?'
4100	4040		
4101	4040		
4102	4040		
4103	5700		
4104	7700		
4105	4040	TBMRK1, TEXT	' /0?'
4106	4040		
4107	4040		
4110	4057		
4111	0077		
4112	0000		
4113	5511	RMS3B, TEXT	'-1-0?'
4114	5500		
4115	7700		
4116	5555	RMS37A, TEXT	'-1-1-10?'
4117	5555		
4120	1155		
4121	1100		
4122	7700		

4123 3440 SPTST, TEXT '\ @?'

4124 0077
4125 0000
4126 4543 CRTST, TEXT 'X##CR TESTX##?'

4127 4303
4130 2240
4131 2405
4132 2324
4133 4543
4134 4300
4135 7700
4136 4543 RMTST, TEXT 'X##RIGHT MARGIN TESTX##?'

4137 4322
4140 1107
4141 1024
4142 4015
4143 0122
4144 0711
4145 1640
4146 2405
4147 2324
4150 4543
4151 4300
4152 7700
4153 4543 SPTST, TEXT 'X##SPACE TESTX##?'

4154 4323
4155 2001
4156 0305
4157 4024
4160 0923
4161 2445
4162 4343
4163 0077
4164 0000
4165 4543 LFTST, TEXT 'X##LF TESTX##?'

4166 4314
4167 0640
4170 2405
4171 2324
4172 4543
4173 4300
4174 7700
4175 4543 CRTST, TEXT 'X##CHARACTER TESTX##?'

4176 4303
4177 1001
4200 2201
4201 0324
4202 0522
4203 4024
4204 0523
4205 2423
4206 4543
4207 4300
4210 7700
4211 4543 NCPST, TEXT 'X##WORST CASE PATTERN TESTX##?'

4212 4327
4213 1722
4214 2324
4215 4003
4216 0123
4217 0540
4220 2001
4221 2424
4222 0522
4223 1640
4224 2405
4225 2324
4226 4543
4227 4300
4230 7700
4231 4543 KMSG1, TEXT 'X##KYBD TESTX##?'

4232 4313
4233 3102
4234 0440
4235 2405
4236 2324
4237 4543
4240 0077
4241 0000
4242 4543 KMSG2, TEXT 'X##PRESS A KEYX##?'

4243 2022
4244 0523
4245 2340
4246 0140
4247 1305
4250 3145
4251 4300
4252 7700
4253 4543 KMSG3, TEXT 'X##ECHO TEST'

4254 0503
4255 1017
4256 4024
4257 0523
4260 2400
4261 4543 KMSG3A, TEXT 'X##CHARACTER KEYED WILL BE TYPED.'

4262 0310
4263 0122
4264 0103
4265 2405
4266 2240
4267 1305
4270 3105
4271 0440
4272 2711
4273 1414
4274 4002
4275 0540
4276 2431
4277 2005
4300 0456

4301 0000
4302 4543 TEXT '#RUBOUT ENDS ROUTINE,###?'
4303 2225
4304 0217
4305 2524
4306 4005
4307 1604
4310 2340
4311 2217
4312 2524
4313 1116
4314 0596
4315 4543
4316 4300
4317 7700
4320 4543 KMSG4, TEXT '###OCTAL EQUIVALENT TEST?'
4321 4317
4322 0324
4323 0114
4324 4005
4325 2125
4326 1126
4327 0114
4330 0516
4331 2440
4332 2405
4333 2324
4334 0077
4335 0000
4336 4543 KMSG5, TEXT '#'
4337 0000
4340 4040 OCTEQV, TEXT ' ##?'
4341 4040
4342 4543
4343 0077
4344 0000
4345 4543 P11MG1, TEXT '#PRINTER EXERCISE###?'
4346 2022
4347 1116
4350 2405
4351 2240
4352 0530
4353 0522
4354 0311
4355 2305
4356 2245
4357 4300
4360 7700
4361 4543 P11MG2, TEXT '#TYPE IN DATA !??'
4362 2431
4363 2005
4364 4011
4365 1640
4366 0401
4367 2401

4370 4072
4371 0077
4372 0000
4373 2540 BKSU, TEXT 'U ??'
4374 0077
4375 0000
4376 0000 END, 0 /BEG OF 1000 WORD BUFFER

S
0117 7007
0120 3650
0121 0770
0122 3635
0123 0400
0124 7767
0125 7730
0126 0004
0127 7727
0130 0005
0131 4116
0132 7761
0133 4115
0134 7762
0135 0257
0136 0334
0137 7693
0140 0011
0141 0240
0142 0100
0143 7401
0144 0377
0145 0077
0146 0036
0147 7771
0150 0007
0151 0351
0152 0343
0153 0357
0154 0542
0155 0765
0156 1165
0157 0761
0160 0755
0161 0751
0162 1471
0163 0749
0164 0740
0165 1546
0166 0734
0167 0730
0170 0724
0171 0717
0172 0626
0173 0600
0174 0553

24

2175 0330
2176 0317
2177 1513

0000	11111111	00000010	11111111	11111111	11111111	11111111	11111111	11111111
0100	11111111	00000001	11111111	11111111	11111111	11111111	11111111	11111111
0200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0300	11111111	11111111	11111111	11111111	11111111	11111111	11110000	00000011
0400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0500	11111111	11111111	11111111	11111111	11111111	11111111	11110000	00000000
0600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11001111
1000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11110000
1200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11000111
1400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1500	11111111	11111111	11111111	11111111	11111111	11111111	00000001	11111111
1600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1700	11111111	11111111	11111111	11111111	11111111	11110001	11111111	11111111
2000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2100	11111111	11111111	11111111	11111111	11111111	11111111	11111110	00000111
2200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	00001111
2400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2500	11111111	11111111	11111111	11111111	11111111	11111111	11110000	00000001
2600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2700	11111111	11111111	11111111	11111111	11111111	11111111	11100011	11111111
3000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3100	11111111	11111111	11111111	11111111	11111110	00000000	11111111	11111111
3200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111

```

4000 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
4100 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111

4200 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
4300 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111110

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700
    
```

A	3706	CRLF	4574	INTCF	1261	P0T00	2125
A33WP3	3664	CRTST	4126	INTSF	1257	P0T10	2187
A35WP3	3672	CRTSTA	2256	INTSVQ	1254	P0T2C	2224
A37WP3	3700	CRTSTB	2261	LOP	6002	P0TS0	2105
AC	0073	CTRA	0056	LUN	6001	P0TS0A	2115
ASCCN	1690	CTRB	0057	J	3717	P0TS1	2135
ASCT	1707	CTSK	0541	ABFLAG	0025	P0TS1A	2145
BDMET	0203	CURTST	0050	KCC	6032	P0TS2	2200
BKSCTR	3062	D	3711	KCR	6030	P0TS2A	2206
BKSPC	3063	DBLK	5376	KFLAG	1365	P0TS2B	2211
BKSPPT	4052	DELAY	4575	KLE	6035	P11MG1	4345
BKSU	4373	DELYM	0023	KMSG1	4231	P11MG2	4361
BLK2	4523	DELAYS	0076	KMSG2	4242	P1T44A	2666
BLKBB	4521	DLCNT	0474	KMSG3	4253	P1T45A	2702
BLKCC	4633	DLCNT1	0026	KMSG3A	4261	P1T46A	2716
BLKCNT	0075	DLMSR	1474	KMSG4	4320	P1TS0	2242
BLCCK1	4400	DLYMS	0330	KMSG5	4336	P1TS1	2275
BLCCK2	4512	DLYMSK	0105	KRB	6036	P1TS10	2445
BLCCKA	4376	DVCOM	3622	KRB	6034	P1TS11	2451
BLCCKB	4510	DVCGEL	3600	KSF	6031	P1TS12	2455
BLCCKC	4622	END	4376	KSIAMT	0022	P1TS13	2461
BSH	4577	ERRCNT	3476	L7780	1530	P1TS14	2465
C241	3752	ERRCR	0077	LAS	7604	P1TS15	2471
C244	3755	ERRCTR	3921	LF	0104	P1TS16	2475
C247	3760	ERROR	1440	LFTBI	4165	P1TS17	2501
C252	3763	FADDR	0023	LFTBIA	2412	P1TS2	2325
C255	3766	FBA33	1102	LINK	0074	P1TS20	2505
C272	3771	FBALL	1066	M	3722	P1TS21	2511
C275	3774	FBF	0034	M147	7631	P1TS22	2515
C300	3777	FBF3	1031	PCIN	0625	P1TS23	2521
C335	4002	FBF33	1055	PILA	0055	P1TS24	2525
C373	4040	FBFI	2051	PILGTR	0054	P1TS25	2531
C377	4044	FETCH	1646	MOVE	4573	P1TS26	2535
CARLF	4047	FLAG	0716	MOVEA	0613	P1TS27	2541
CHAIN	0024	FORWD	0273	MOVVE	0600	P1TS3	2400
CHAINN	0254	FOUR	3744	MSCIN	0053	P1TS30	2545
CHCK	0504	FW336	1117	MTABR	2067	P1TS31	2551
CHECK	0064	FW356	1135	NTBI	1531	P1TS32	2555
CHRCNT	0456	FW376	1153	NTSTA	1540	P1TS33	2561
CHRTST	4175	G	3714	NATST	0052	P1TS34	2600
CK33	0343	GETPT	0063	QUOTEQV	4340	P1TS35	2604
CK35	0351	GETRDY	0230	UNE	3741	P1TS36	2610
CK37	0357	GKBCR	3553	UPEN	0000	P1TS37	2614
CKSR33	4552	GTBIN	0444	OUT	1271	P1TS4	2423
CKSR35	4551	HLT	7402	OUTW	2021	P1TS40	2620
CKSR37	4553	HLTST	3513	OUT1	2026	P1TS41	2624
CLA	7200	IBIN	0436	OUT2	2030	P1TS42	2630
CNTST	1600	IN0	1433	OUTTAB	3650	P1TS43	2647
CNV	1672	INCRTN	0252	F	3725	P1TS44	2654
CR	0103	INKSF	1264	FWEW	2130	P1TS45	2672
CRALF	0553	INPATT	0062	FOL1	2162	P1TS46	2706
CRCTR	0552	INTAB	3635	FBE2	2227	P1TS47	2722

P17S5	2431	PR07	3564	2220	TBTA	2734
P17S50	3031	PRGADR	0226	2220	TBTB	2746
P17S6	2439	PRGEND	0271	3473	TBTST	4066
P17S7	2441	PRGNUM	0035	0473	TCF	6042
P3E0	3219	PRGTAB	0036	4010	TCFR	1647
P3T0	3200	PRINT	0071	4576	TEMP	0046
P3Y1	3221	PSYUP	1277	1741	TEMP0	0107
P3Y1A	3226	PSYNC	1212	3747	TEMP1	0047
P3Y2	3240	PT0	0442	4013	TEMP2	1527
P3Y2A	3247	PT1	0443	1720	TEMP3	0714
P40CTR	1211	PUNCH	2017	0310	TEMQ	0715
P4T0	3302	RADDR	1416	1513	TL037	0033
P4T1	3306	RBCTR	1417	1710	TL037I	2041
P4T10	3342	RBUSY	0072	4016	TL0CALL	2033
P4T11	3346	RCTRA	1511	4021	TL0CALL	0032
P4T12	3352	RCTRB	1512	3007	TL0	6044
P4T13	3356	RDBLK	1400	2761	TL0	6044
P4T14	3362	RDBLKR	1407	2762	TSC1	0634
P4T15	3366	RDRSRV	1420	6040	TSC2	0643
P4T16	3372	RDSRV	1430	6045	TSC	0041
P4T17	3400	RGNA	0400	1717	TSP	0021
P4T2	3312	RGNB	0417	1715	TTYIOT	0020
P4T20	3404	RM33A	1553	1716	TYPAT	0054
P4T21	3410	RM33B	4143	4193	TYPE	4572
P4T22	3414	RM37A	4146	2335	TYPEA	1637
P4T23	3420	RMB	2323	2346	TYPLN	1927
P4T24	3424	RMYST	4136	4123	TYPLN3	1615
P4T25	3430	RMYSTA	2316	0227	TYPSP	0060
P4T26	3434	RP1A	0415	3455	TYPSTG	0026
P4T27	3440	RP1B	0434	3462	UKCC	4570
P4T3	3316	RP2A	0416	4027	UKCR	4560
P4T30	3444	RP2B	0435	1020	UKIE	4587
P4T4	3322	RRDY	1343	0542	UKRB	4566
P4T5	3326	RRPP	0304	4554	UKRS	4567
P4T6	3332	RSCTR	1232	0200	UKSF	4571
P4T7	3336	RSSERV	1233	1000	UMQVE	0071
PADDR	1342	RSYUP	1351	0317	UDUT	0066
PBLK	1316	RSYNC	1216	0060	UPUNCH	0070
PBLKR	1324	RTNNO	0051	4565	USPF	4536
PCTR	1341	RUDONE	1456	4032	USPI	4555
PDCR	1310	S	3730	1346	UTCF	4563
PFLAG	0065	S100	0027	4039	UTEMP	0100
PLTLR	1200	S100I	2012	0061	UTEMP1	0101
PR00	2100	S200	0031	0521	UTEMP2	0102
PR01	2234	S200I	2005	0525	UTLS	4561
PR02	3074	S4000	0030	3000	UTPC	4562
PR02A	3117	S4000I	2000	3001	UTPLN3	0067
PR03	3140	SA	4005	3020	UTSF	4564
PR04	3265	SASC	1706	0024	V	3733
PR05	3491	SB	1435	1001	VCTR	1297
PR06	3522	SB0	2123	4077	WASC	1705
PR06A	3525	SB1	2155	4105	WONK	0520

WCPTST	4211
WQSW5	2060
WIS6A	0106
XKCC	0704
XKCR	0705
XKIE	0761
XKRB	0734
XKRS	0730
XKSF	0717
XSPF	1165
XSPI	0765
XTCF	0745
XTLS	0751
XTPC	1171
XTSF	0740
Y	3736

ERRORS DETECTED: 0
 LINKS GENERATED: 82
 RUN-TIME: 12 SECONDS
 3K CORE USED

