IDENTIFICATION

Product Code:	MAINDEC-08-D2Q D-D
Product Name:	Family of 8 ASR33/35 Teletype Tests, Part 2
Date Created:	June 4, 1968
Maintainer:	Diagnostics Group

1. ABSTRACT

The Family-of-8 ASR33/35 Teletype Tests, Part 2 is the second part of a 2 part package used to test the ASR33 or ASR35 Teletype when attached to a Family-of-8 system.

Part 2 contains nine selectable programs numbered from 0 to 10 (octal). The programs are selected by means of Switch Register (SR).

The available programs are:

PRG0	Printer Test
PRG1	Punch Test
PRG2	Keyboard Test
PRG3	Combined Reader, Printer, Punch Test
PRG4	Printer Exerciser. Prints lines of characters stored in LOC 0021 and 0022. No stalls.
PRG5	Same as PRG4, but stalls between characters.
PRG6	Punch Exerciser. Punches and read checks data blocks of data stored in LOC 0021 and 0022. No stalls.
PRG7	Same as PRG6, but random stalls between characters punched.
PRG10	Punch Exerciser. Punches and read checks blocks of Binary Count pattern. Random stalls between characters punched.

2. REQUIREMENTS

2.1 Equipment

a. Standard PDP-8/S, PDP-8, or PDP-8/I with

b. ASR33 or ASR35 Teletype.

2.2 Storage

Locations 0000 through 5173 are used.

2.3 Preliminary Programs

Family-of-8 ASR33/35 Teletype Tests, Part 1. PRG0, PRG1, and PRG2 must have been run successfully.

3. LOADING PROCEDURES

3.1 Method

The Binary Loader is used to load the program.

4. STARTING PROCEDURES (PRG0)

4.1 Control Switch Settings (PRG0)

SR0	Halt at end of routine. Routine number in AC.
SR1	Select routine whose number is set in SR6 through SR11.
SR2	Loop program.
SR6 through SR11	Routine number to be selected.

4.2 Starting Addresses (PRG0)

This program starts at LOC 0200.

4.3 Program and/or Operator Action (PRG0)

a. Insure Teletype is on-line.

b. Turn off Teletype reader and punch.

c. Load address 0200.

d. Set SR to 0000.

e. Press START.

f. Program halts at LOC 0232 to permit setting of options.

g. Select desired options, if any, in SR. For normal run SR should be 0000. Press CONTINUE.

h. Program is executed and halts at program end halt at LOC 0274, unless prevented from ending, by SR options.

NOTE

The resulting printouts during execution of PRG0 must be verified visually by user to determine correct teleprinter operation. Refer to Section 9. Program description.

4.A STARTING PROCEDURES (PRG1)

4.1A Control Switch Settings (PRG1)

SR0	Halt at end of routine. Routine number in AC.
SR1	Select routine whose number is set in SR6 through SR11.
SR2	Loop Program.
SR5=1	Halt on error. Bad character in AC.
SR5=0	Halt at end of data block. Error count in AC.
SR6 through SR11	Routine number to be selected.

4.2A Starting Addresses (PRG1)

This program starts at LOC 0200.

4.3A Program and/or Operator Action (PRG1)

a. Trun on Teletype punch.

b. With Teletype off-line, punch a section of blank leader about 6 in. long. Return Teletype to on-line position.

c. Load leader on reader, leaving very little slack between punch and reader.

d. Turn on reader.

e. Load address 0200.

f. Set SR to 0001.

g. Press START.

h. Program halts at LOC 0232 to permit setting of options.

i. Set desired options, if any, in SR. For normal run, set SR to 0000. Press CONTINUE.

j. Program is executed and halts at program end halt at LOC 0274, unless prevented from ending by SR options, or if errors occur.

4.B STARTING PROCEDURES (PRG2)

4.1B Control Switch Settings (PRG2)

SR0	Halt at end of routine. Routine number in AC.
SR1	Select routine whose number is set in SR6 through SR11.
SR2	Loop Program.
SR6 through SR11	Routine number to be selected.

4.2B Starting Addresses (PRG2)

This program starts at LOC 0200.

4.3B Program and/or Operator Action (PRG2)

a. Insure Teletype is on-line.

b. Turn off Teletype reader and punch.

c. Load address 0200.

d. Set SR to 0002.

e. Press START.

f. Program title is printed and program halts at LOC 0232 to permit setting of options.

g. Set desired options, if any, in SR. For normal run, set SR to 0000. Press CONTINUE.

h. Follow program instructions.

i. When last routine is completed, and provided that no SR options prevent it, the program stops at program end halt at LOC 0274.

NOTE

Correct operation of the keyboard is determined by user, by checking that the printed characters match with the characters keyed.

4.C STARTING PROCEDURES (PRG3)

4.1C Control Switch Settings (PRG3)

SR0	Halt at end of routine. Routine number in AC.
SR1	Select routine whose number is set in SR6 through SR11.
SR2	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.

4.2C Starting Addresses (PRG3)

This program starts at LOC 0200.

4.3C Program and/or Operator Action (PRG3)

a. Turn on Teletype punch.

b. With Teletype off-line, punch a section of blank leader about 6 in. long. Return Teletype to on-line position.

c. Load leader on reader, leaving very little slack between punch and reader.

d. Turn on reader.

e. Load address 0200.

f. Set SR to 0003.

g. Press START.

h. Program halts at LOC 0232 to permit setting of options.

i. Set desired options, if any, in SR. For normal run, set SR to 0000. Press CONTINUE.

j. Program is executed and halts at program end halt at LOC 0274, unless prevented from ending, by SR options, or if errors occur.

4.D STARTING PROCEDURES (PRG4 and PRG5)

4.1D Control Switch Settings (PRG4 and PRG5)

None

4.2D Starting Addresses (PRG4 and PRG5)

Both programs are started at LOC 0200.

4.3D Program and/or Operator Action (PRG4 and PRG5)

a. Insure Teletype is on-line.

b. Turn off Teletype reader and punch.

c. Deposit in LOC 0021 and 0022 the 8-bit codes for characters to be printed.

d. For PRG5, deposit in LOC 0023, the desired stall count in 2's complement form. A count of -1 gives a 1 ms stall, etc.

e. Load address 0200.

f. Set SR to 0004, or 0005.

g. Press START.

h. The program runs continuously, printing lines with characters stored in LOC 0021 and 0021.

4.E STARTING PROCEDURES (PRG6, PRG7, and PRG10)

4.1E Control Switch Settings (PRG6, PRG7, and PRG10)

SR5=1 Halt on error. Bad character in AC.

SR5=0 Halt at end of data block if errors occurred. Error count in AC.

4.2E Starting Addresses (PRG6, PRG7, and PRG10)

These programs start at LOC 0200.

4.3E Program and/or Operator Action (PRG6, PRG7, and PRG10)

a. Turn on Teletype punch.

b. With Teletype off-line, punch a section of blank leader about 6 in. long. Return Teletype to on-line position.

c. Load leader on reader, leaving very little slack between punch and reader.

d. Turn on reader.

e. For PRG6 and PRG7, deposit in LOC 0021 and 0022 the 8-bit codes for characters to be punched.

f. Load address 0200.

g. Set SR to 0006, 0007, or 0010.

h. Press START.

i. The program runs continuously, unless errors occur.

5. OPERATING PROCEDURE

5.1 Program and/or Operator Action

5.1.1 Normal Halts

LOC 0232	SR SET halt. Occurs to permit setting of desired options. Press CONTINUE. (PRG0, PRG1, PRG2, PRG3).
LOC 0274	Program end halt. Occurs if no "loop program" option is set. Set desired options and press CONTINUE. If no options are set, this halt reoccurs. (PRG0, PRG1, PRG2, PRG3).
LOC 0320	Routine end halt. Occurs at end of routine if SR0 = 1. To proceed, press CONTINUE. (PRG0, PRG1, PRG2, PRG3).

6. ERRORS

6.1 Error Halts and Description

LOC 0177	Incorrect program number selected. Set SR to correct program number and press CONTINUE. (All programs).
LOC 0255	Nonexistent routine selected. Set correct routine number in SR6 through SR11 and press CONTINUE. (PRG0, PRG1, PRG2, PRG3).
LOC 1137	Sync error halt. Sync reader subroutine has not found sync character within 145 characters. Position tape in reader so that sync character (rubout) is within 145 characters from read station, and press CONTINUE. (PRG1, PRG3, PRG6, PRG7 and PRG10).
LOC 1160	Unexpected Interrupt. A non-Teletype device has caused interrupt. Turn off device, and press CONTINUE. (PRG1, PRG3, PRG6, PRG7, and PRG10).
LOC 1343	Read Check error A. Bad character in AC. Press CONTINUE. (SR5 must be on).
LOC 1346	Read check error B. Follow up halt. Correct character in AC. To proceed, press CONTINUE. (PRG1, PRG3, PRG6, PRG7, PRG10).
LOC 1356	Block errors halt. Number of errors in AC. To proceed press CONTINUE. (SR5 must be off). (PRG1, PRG3, PRG6, PRG7, PRG10).

7. RESTRICTIONS

7.1 Starting Restrictions

All programs must be started at LOC 0200.

7.2 Operating Restrictions

PRG0 and PRG1 must precede execution of PRG3. PRG0 must precede execution of PRG2.

8. MISCELLANEOUS

8.1 Execution Time

PRG0 execution time: 15 minutes

PRG1 execution time: 19 minutes

PRG2 execution time: User dependent

PRG3 execution time: 37 minutes

PRG4 through PRG10 are continuous running programs.

9. PROGRAM DESCRIPTIONS

The Family-of-8 ASR33/35 Teletype Tests Part 2, consists of 9 programs numbered from 0 to 10 (octal).

9.1 PRG0 -- Printer Test

This program contains 31 routines numbered from 0 to 36 (octal).

RTN0 Carriage return test. Checks ability of carriage return to print position 1 from all other print positions. No printing should occur in any print position other than position 1.

RTN1 Right margin test. This test shows when the right margin is not correctly adjusted. The test prints 14 groups of ---- I followed by characters - I -. A correctly adjusted margin will give the following printout:

```
----I----I----I----I----I----I----I----I----I----I----I----I----I----I----I-
```

The I's are printed to facilitate counting print positions.

RTN2 Space Test. The test prints / in alternate positions of the line. After a double carriage return it scapes to the blank positions and prints a left slant slash. A double carriage return is issued after printing each left slant slash.

RTN3 Line Feed Test. The test prints a left slant slash followed by a line feed, followed by a 250 ms 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.

RTN4 Types line of characters ABC.

RTN5 Types line of characters DEF.

RTN6	Types line of characters	GHI.
RTN7	Types line of characters	JKL.
RTN10	Types line of characters	MNO.
RTN11	Types line of characters	PQR.
RTN12	Types line of characters	STU.
RTN13	Types line of characters	VWX.
RTN14	Types line of characters	YZO.
RTN15	Types line of characters	123
RTN16	Types line of characters	456
RTN17	Types line of characters	789
RTN20	Types line of characters	!"#
RTN21	Types line of characters	$%&
RTN22	Types line of characters	'( )
RTN23	Types line of characters	*+ ,
RTN24	Types line of characters	-./
RTN25	Types line of characters	: ; <
RTN26	Types line of characters	= > ?
RTN27	Types line of characters	@ [\
RTN30	Types line of characters	[↑ ←
RTN31	Types line of all characters	.
RTN32	Types line of all characters. Fixed delay between characters in a line. Delay is determined at random.	
RTN33	Types six lines of ASR33 WORST CASE PATTERN.	
RTN34	Types six lines of ASR33 WORST CASE PATTERN. Fixed delay between characters in a line. Delay is determined at random.	
	The ASR33 WORST CASE PATTERN consists of characters ▲ ← W/W←	
RTN35	Types six lines of ASR35 WORST CASE PATTERN.	
RTN36	Types six lines of ASR35 WORST CASE PATTERN. Fixed delay between character in a line. Delay is determined at random.	
	The ASR35 WORST CASE PATTERN consists of characters ♣ [? C ? [	

9.2 PRG1 - Punch Test

This program contains 15 routines numbered from 0 to 16 (octal). The test sequence used by the routines is:

a. Set up data block
b. Punch leader
c. Punch sync character (Rubout)
d. Punch data block
e. Sync the reader
f. Read data block
g. Punch trailer
h. Wait for reader to complete reading of data block before going to next routine.

RTN0	Punch and read check block of all 0s.
RTN1	Punch and read check block of channel 1.
RTN2	Punch and read check block of channel 2.
RTN3	Punch and read check block of channel 3.
RTN4	Punch and read check block of channel 4.
RTN5	Punch and read check block of channel 5.
RTN6	Punch and read check block of channel 6.
RTN7	Punch and read check block of channel 7.
RTN10	Punch and read check block of channel 8.
RTN11	Punch and read check block of sliding 1 pattern.
RTN12	Punch and read check block of sliding 0 pattern.
RTN13	Punch and read check block of 1s and 0s pattern.
RTN14	Same as RTN13, but random delay between characters punched.
RTN15	Punch and read check block of binary count pattern.
RTN16	Same as RTN15, but random delay between characters punched.

9.3 PRG2 - 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.

9.4 PRG3 - Combined Reader, Printer, Punch Test

This program contains 27 routines numbered from 0 to 32 (octal). All routines use the following test sequence:

a. Fill core block with data to be punched/printed.
b. Punch leader.
c. Punch sync character.
d. Punch data block (no delay between characters).
e. Sync the reader.
f. Read/Check data block (Random delay between characters).
g. Punch data block (Random delay between characters).
h. Read data block (no delay between characters).
i. Punch trailer.
j. Wait for reader to complete reading data block.
k. End of test sequence.

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 all printable characters.
RTN26	Punch/Print and read check block of ASR33 Printer worst case pattern (◢ ← W/)
RTN27	Punch/Print and read check block of ASR33 Printer worst case pattern with interspersed blanks.
RTN30	Punch/Print and read check block of ASR35 Printer worst case pattern. (▼[?C)
RTN31	Punch/Print and read check block of ASR35 Printer worst case pattern with interspersed blanks.
RTN32	Punch/Print and read check blocks of space, rubout (1s and 0s).

9.5 PRG4 - Printer Exerciser

Prints lines with data stored in LOC 0021 and 0022, no stalls.

9.6 PRG5 - Printer Exerciser

Prints lines with data stored in LOC 0021 and 0022. Fixed delay between characters. Delay is determined at random.

9.7 PRG6, PRG7, and PRG10 Punch Exerciser

PRG6 punches and read checks data blocks with data stored in LOC 0021 and 0022. No stalls.

PRG7 is the same as PRG6, but random stalls between characters punched.

PRG10 punches and read checks blocks of Binary Count pattern. Random stalls between characters.

The three exercisers use the following sequence:

a. Set up data block
b. Punch leader
c. Punch sync character (rubout)
d. Punch data block
e. Sync the reader
f. Read data block
g. Punch data block
h. Back to step f.

```
/FAMILY-DEC ASR33/35 TELETYPE TESTS - PART 2
/
/PRG0-PRINTER TEST
/PRG1-PUNCH TEST
/PRG2-KEYBOARD TEST
/PRG3-COMBINED READER, PRINTER, PUNCH TEST.
/PRG4-PRINTER EXERCISER.  PRINTS LINES OF CHARACTERS STORED IN LOC 0021 AND 0022.
/                  NO STALLS.
/PRG5-PRINTER EXERCISER.  PRINTS LINES OF CHARACTERS STORED IN LOC 0021 AND 0022. STALLS
/                  BETWEEN CHARACTERS.
/PRG6-PUNCH EXERCISER. PUNCHES AND READ CHECKS DATA BLOCKS OF DATA STORED IN LOC 0021
/                  AND 0022.  NO STALLS
/PRG7- SAME AS PRG6, BUT RANDOM STALLS BETWEEN CHARACTERS PUNCHED.
/PRG10-PUNCH EXERCISER. PUNCHES AND READ CHECKS BLOCKS OF BINARY COUNT PATTERN,
/                  RANDOM STALLS
/
/STARTING ADDRESS:0200
/
/SR OPTIONS
/
/SR0-HALT AT END OF ROUTINE. ROUTINE NUMBER IN AC.
/SR1=SELECT ROUTINE WHERE NUMBER IS SET IN SR6 TO 11.
/SR2-LOOP PROGRAM
/SR3=1=HALT ON ERROR. BAD CHARACTER IN AC.
/SR3=0= HALT AT END OF DATA BLOCK. ERROR COUNT IN AC
/SR6 TO SR11 = ROUTINE NUMBER TO BE SELECTED.
```

```
                        /ASR33/35 TELETYPE TESTS - PART 2
     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
     0020               *20
0020 0000               KSTART, 0
0021 0000               PTEMP,  0
0022 0000               PTEMP1, 0
0023 0000               DELAYM, 0
0024 0000               DELAYS, 0
0025 0000               PRGNUM, 0
0026 0017               PRGMSK, 17
0027 7770               PRGLIM, -10
0030 0161               PSW,    PRGTAB
0031 0000               CPID,   0
0032 7444               KP8,    -334
0033 7764               KP8S,   -14
0034 0000               RTNNO,  0
0035 0000               CURTST, 0
0036 0000               NXTST,  0
0037 0077               TSTMSK, 77
0040 0000               MSCTR,  0
0041 0000               MILCTR, 0
0042 0000               MIL1,   0
0043 0535               DLY1MS, DLYMS
0044 0257               CHAIN,  CHAINN
0045 0515               SHLT,   SHALT
0046 0522               SETCTR, STCTR
0047 0400               RANDNO, RANGEN
0050 0444               XTYPST, TYPSTG
0051 1246               URRDY,  RRDY
0052 0550               DLYCNT, DLCNT
0053 0560               UCRLF,  CRLF
0054 0526               UPUNCH, PUNCH
0055 0542               UMOVE,  MOVVE
0056 1530               UTYPE,  TYPE
0057 0621               USTBF,  STBF
0060 1516               UTPLNS, TYPLNS
0061 0637               UFBF3,  FBF3
0062 0661               UFBALL, FBALL
0063 0677               UFBTMP, FBTMP
0064 0710               UFW334, FW334
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0065  0733          UFW336, FW336
0066  0751          UFW335, FW335
0067  1000          UFW354, FW354
0070  1016          UFW356, FW356
0071  1034          UFW355, FW355
0072  1067          UPLTLR, PLTLR
0073  1102          UPSYNC, PSYNC
0074  1106          URSYNC, RSYNC
0075  1400          UDLMSK, DLMSK
0076  1417          UDCNTP, DLCNTP
0077  1161          UOUT,   OUT
0100  1217          UPBLK,  PBLK
0101  1225          UPBLKR, PBLKR
0102  1270          URDBLK, RDBLK
0103  1277          URBLKR, RDBLKR
0104  1443          UNTST,  NTST
0105  1500          UCNTST, CNTST
0106  1600          UASCON, ASCON
0107  1461          USTST,  STST
0110  1052          CHECK,  CHCK
0111  0600          INPATI, INITPT
0112  0607          GETPT,  GETPTT
0113  0000          TEMP,   0
0114  0000          TEMP1,  0
0115  0000          TEMPU,  0
0116  0000          UTEMP,  0
0117  0000          UTEMP1, 0
0120  0000          UTEMP2, 0
0121  0000          CTRA,   0
0122  0000          CTRB,   0
0123  0100          SRDMSK, 100
0124  0000          ERRCR,  0
0125  0000          ERRCTR, 0
0126  0277          DLYMSK, 277
0127  0000          PFLAG,  0
0130  0000          BLKCNT, 0
0131  0215          CR,     215
0132  0212          LF,     212
0133  7401          MREOUT, -377
0134  0000          RBUSY,  0
0135  0000          LINK,   0
0136  0000          AC,     0
0137  0240          SPACE,  240
0140  0257          C257,   257
0141  0334          C334,   334
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```
0142  7777          M1,     -1
0143  7776          M2,     -2
0144  7762          M16,    -16
0145  7734          M44,    -44
0146  7670          M110,   -110
0147  7667          M111,   -111

0150  0000          TEMQ,   0
0151  0000          TEMR,   0
0152  0000          FLAG,   0
0153  0077          K77,    77
0154  7740          M40,    -40
0155  0100          C100,   100
0156  0240          C240,   240
0157  7500          SKIPMA, SMA
0160  7510          SKIPPA, SPA
0161  2400          PRGTAB, PRG0
0162  3060                  PRG1
0163  3440                  PRG2
0164  3537                  PRG3
0165  4076                  PRG4
0166  4104                  PRG5
0167  4111                  PRG6
0170  4131                  PRG7
0171  4151                  PRG10
      4446          SETLOC=JMS I SETCTR
      4455          MOVE=JMS I UMOVE
      4443          DELAY=JMS I DLY1MS
```

```
      0177                *177
0177  7402                      HLT             /INCORRECT PROGRAM NUMBER HALT.
0200  7604          START,      LAS             /READ SR
0201  0026                      AND PRGMSK
0202  1027                      TAD PRGLIM
0203  7540                      SMA SZA /VALID PROGRAM NUMBER?
0204  5177                      JMP 177         /NO, GO TO LOC 177
0205  7604                      LAS             /READ SR
0206  0026                      AND PRGMSK
0207  3025                      DCA PRGNUM      /SAVE PROGRAM NUMBER
0210  1025                      TAD PRGNUM      /DEVELOP PROGRAM
0211  1030                      TAD PSW         /START ADDRESS AND
0212  3113                      DCA TEMP
0213  1513                      TAD I TEMP
0214  3231                      DCA PRGADR
0215  7350          ID,         CLA CLL CMA RAR /DETERMINE CPU ID,
0216  7710                      SPA CLA         /IS IT PDP8/8I?
0217  5222                      JMP .+3         /NO, IT IS A PDP8/S,
0220  1032                      TAD KP8         /YES, IT IS PDP8/8I
0221  7410                      SKP
0222  1033                      TAD KP8S
0223  3042                      DCA MIL1        /SET DELAY CONSTANT
0224  4455                      JMS I UMOVE
0225  0005                      5
0226  0001                      1
0227  7776                      -2
0230  5631                      JMP I .+1       /GO TO SELECTED PROGRAM.
0231  0000          PRGADR,     0
0232  7602          SRSET,      HLT CLA
0233  7200          GETRDY,     CLA
0234  1020                      TAD KSTART              /GET ADDRESS OF 1ST ROUTINE
0235  3036                      DCA NXTST       /STORE AT NXTST
0236  4276                      JMS FORWD
0237  7604                      LAS             /READ SR
0240  7004                      RAL
0241  7500                      SMA             /ROUTINE SELECT?
0242  5435                      JMP I CURTST    /NO, START WITH CURRENT ROUTINE.
0243  7604                      LAS             /YES, READ SR
0244  0037                      AND TSTMSK      /GET ROUTINE NUMBER,
0245  7041                      CIA             /2'S COMPLEMENT IT,
0246  1034                      TAD RTNNO       /ADD CURRENT ROUTINE NUMBER.
0247  7650                      SNA CLA         /IS IT THIS ROUTINE?
0250  5435                      JMP I CURTST    /YES, GO DO IT,
0251  1036                      TAD NXTST       /NO. IS THIS THE LAST ROUTINE?
0252  7001                      IAC
0253  7640                      SZA CLA
0254  5236                      JMP GETRDY+3    /NO,
0255  7402          INCRTN,     HLT             /YES, INCORRECT ROUTINE NUMBER
0256  5233                      JMP GETRDY
```

```
0257  4313          CHAINN, JMS SHALT       /HALT? (SR0) GO CHECK.
0260  7604                  LAS             /READ SR
0261  7006                  RTL
0262  7630                  SZL CLA         /ROUTINE SELECT?(SR1)
0263  5233                  JMP GETRDY      /YES,
0264  1036                  TAD NXTST
0265  7001                  IAC
0266  7640                  SZA CLA         /LAST ROUTINE?
0267  5236                  JMP GETRDY+3    /NO, SET UP TO DO NEXT ROUTINE
0270  7604                  LAS
0271  7006                  RTL
0272  7710                  SPA CLA         /LOOP PROGRAM? (SR2)
0273  5233                  JMP GETRDY      /YES, GO REPEAT PROGRAM.
0274  7402          PRGEND, HLT             /PROGRAM END HALT
0275  5257                  JMP CHAINN      /GO CHECK FOR OPTIONS AGAIN.
0276  0000          FORWD,  0
0277  7300                  CLA CLL
0300  1436                  TAD I NXTST     /GET AND STORE NEXT ROUTINE
0301  3034                  DCA RTNNO       /NUMBER,
0302  2036                  ISZ NXTST
0303  1036                  TAD NXTST       /SET CURRENT
0304  3113                  DCA TEMP        /ROUTINE NUMBER
0305  2036                  ISZ NXTST
0306  1036                  TAD NXTST       /SET CURRENT
0307  3035                  DCA CURTST      /ROUTINE ADDRESS.
0310  1513                  TAD I TEMP      /SET NEXT
0311  3036                  DCA NXTST       /ROUTINE ADDRESS.
0312  5676                  JMP I FORWD     /EXIT.
0313  0000          SHALT,  0
0314  7604                  LAS             /READ SR.
0315  7700                  SMA CLA         /HALT? (SR0)
0316  5713                  JMP I SHALT     /NO, EXIT
0317  1034                  TAD RTNNO       /GET CURRENT RTN NUMBER
0320  7402                  HLT             /UNCONDITIONAL HALT.
0321  5713                  JMP I SHALT     /EXIT.
```

```
0322  0000          STCTR,  0
0323  7200                  CLA
0324  1722                  TAD I STCTR     /GET CTR ADDRESS
0325  3113                  DCA TEMP        /STORE AT TEMP.
0326  2322                  ISZ STCTR
0327  1722                  TAD I STCTR     /GET COUNT AND STORE
0330  3513                  DCA I TEMP      /PER C(TEMP)
0331  2322                  ISZ STCTR
0332  5722                  JMP I STCTR     /EXIT.
0333  0000          DLYMS,  0
0334  7300                  CLA CLL
0335  1023                  TAD  DELAYM     /GET MILLISECOND COUNT
0336  3040                  DCA MSCTR       /STORE AT MSCTR
0337  5740                  JMP I .+1
0340  0341                  .+1
0341  1042                  TAD MIL1        /GET 1MS CONSTANT
0342  3041                  DCA MILCTR      /STORE IN MILCTR
0343  2041                  ISZ MILCTR      /DELAYED 1 MILLISECOND?
0344  5343                  JMP .-1         /NO.
0345  2040                  ISZ MSCTR       /YES. DONE DELAYING?
0346  5337                  JMP .-7         /NO. GO DELAY ANOTHER MILSEC.
0347  5733                  JMP I DLYMS     /EXIT.
0350  0000          DLCNT,  0
0351  4447                  JMS I RANDNO    /GENERATE RANDOM NUMBER
0352  0126                  AND DLYMSK      /MASK OUT UNDESIRED BITS
0353  7450                  SNA             /RESULT ZERO?
0354  5351                  JMP DLCNT+1     /YES, GET ANOTHER NUMBER
0355  7041                  CMA IAC         /NO, 2'S COMPLEMENT IT
0356  3023                  DCA DELAYM      /STORE AT DELAYM
0357  5750                  JMP I DLCNT     /EXIT
0360  0000          CRLF,   0
0361  7200                  CLA
0362  1760                  TAD I CRLF
0363  3375                  DCA CRCTR
0364  2360                  ISZ CRLF
0365  4450                  JMS I XTYPST
0366  0372                  .+4
0367  2375                  ISZ CRCTR
0370  5365                  JMP .-3
0371  5760                  JMP I CRLF
0372  0015                  0015
0373  0012                  0012
0374  0001                  0001
0375  0000          CRCTR,  0
```

```
      0400          *. 17/+1
                    /RANDOM NUMBER GENERATOR SUBROUTINE
0400  0000  RANGEN, 0
0401  7200          CLA
0402  1242          TAD RANTND
0403  1227          TAD RANDEX
0404  7640          SZA CLA
0405  5215          JMP RANTAD
0406  1231          TAD RANTBL
0407  3227          DCA RANDEX
0410  1230          TAD RANCON
0411  7104          CLL RAL
0412  7430          SZL
0413  7001          IAC
0414  3230          DCA RANCON
0415  1230  RANTAD, TAD RANCON
0416  1627          TAD I RANDEX
0417  3627          DCA I RANDEX
0420  1243          TAD RANSAV
0421  7010          RAR
0422  1627          TAD I RANDEX
0423  2227          ISZ RANDEX
0424  3243          DCA RANSAV
0425  1243          TAD RANSAV
0426  5600          JMP I RANGEN
0427  0442  RANDEX, RANTND
0430  6543  RANCON, 6543
0431  0432  RANTBL, .+1
0432  6543          6543
0433  3210          3210
0434  0765          0765
0435  5432          5432
0436  2107          2107
0437  7654          7654
0440  4321          4321
0441  1076          1076
0442  7536  RANTND, -.
0443  0000  RANSAV, 0
```

```
                        /TYPE CHARACTER STRING SUBROUTINE
0444  0000  TYPSTG, 0
0445  7200          CLA
0446  1644          TAD I TYPSTG    /GET AND STORE
0447  3150          DCA TEMQ        /INITIAL ADDRESS
0450  3152          DCA FLAG        /CLEAR FLAG.
0451  2244          ISZ TYPSTG      /SET UP EXIT
0452  1550  TSC1,   TAD I TEMQ      /PICK UP DATA
0453  7012          RTR
0454  7012          RTR
0455  7012          RTR
0456  4263          JMS TSC2        /GO TYPE 1ST CHARACTER
0457  1550          TAD I TEMQ      /PICK UP DATE
0460  4263          JMS TSC2        /GO TYPE 2ND CHARACTER
0461  2150          ISZ TEMQ        /EVEN STRING ADDRESS
0462  5252          JMP TSC1        /GO BACK FOR MORE
0463  0000  TSC2,   0
0464  0153          AND K77         /MASK OFF 6 BITS
0465  3151          DCA TEMR        /SAVE CHARACTER
0466  1152          TAD FLAG        /TEST "SPECIAL" FLAG,
0467  7640          SZA CLA
0470  5300          JMP TYPSP       /SET TYPE SPECIAL
0471  1151          TAD TEMR        /NO, REGULAR CHARACTER
0472  7450          SNA             /ZERO?
0473  5276          JMP .+3         /YES, SET FLAG.
0474  4317  TYPAT,  JMS PRINT       /NO, PRINT IT.
0475  5663          JMP I TSC2      /RETURN,
0476  2152          ISZ FLAG        /SET "SPECIAL" FLAG,
0477  5663          JMP I TSC2      /EXIT
0500  3152  TYPSP,  DCA FLAG        /CLEAR FLAG.
0501  1151          TAD TEMR        /TEST FOR 0,
0502  7041          CIA
0503  7450          SNA
0504  5274          JMP TYPAT       /0:TYPE "@"
0505  7001          IAC             /TEST FOR 01
0506  7650          SNA CLA
0507  5644          JMP I TYPSTG    /YES, EXIT CODE.
0510  1157          TAD SKIPMA      /ALTER INSTRUCTION
0511  3321          DCA SWITCH      /TO BE "SMA"
0512  1151          TAD TEMR        /TYPE CHAR
0513  4317          JMS PRINT
0514  1160          TAD SKIPPA      /ALTER INSTRUCTION
0515  3321          DCA SWITCH      /TO BE "SPA"
0516  5663          JMP I TSC2      /RETURN
0517  0000  PRINT,  0
0520  1154          TAD M40         /COMPARE WITH 40
0521  7510  SWITCH, SPA             /OR SMA FOR SPECIAL CODES,
0522  1155          TAD C100
0523  1156          TAD C240
0524  4454          JMS I UPUNCH    /GO PRINT CHARACTER
0525  5717          JMP I PRINT     /RETURN
```

```
0526  0000          PUNCH,  0
0527  2127                  ISZ PFLAG       /SET PFLAG
0530  6046                  TLS             /PUNCH/PRINT
0531  7200                  CLA
0532  1127                  TAD PFLAG       /GET C(PFLAG)
0533  7650                  SNA CLA         /FLAG RESET?
0534  5337                  JMP .+3         /YES
0535  6041                  TSF             /NO, FLAG UP?
0536  5332                  JMP .-4         /NO,
0537  6042                  TCF             /YES, CLEAR PRINTER FLAG.
0540  3127                  DCA PFLAG       /CLEAR PFLAG
0541  5726                  JMP I PUNCH     /EXIT,
0542  0000          MOVVE,  0
0543  7200                  CLA
0544  1742                  TAD I MOVVE     /GET AND STORE
0545  3364                  DCA FADDR       /"FROM" ADDRESS
0546  2342                  ISZ MOVVE
0547  1742                  TAD I MOVVE     /GET AND STORE
0550  3365                  DCA TADDR       /"TO" ADDRESS
0551  2342                  ISZ MOVVE
0552  1742                  TAD I MOVVE     /GET AND STORE
0553  3366                  DCA MCTR        /"MOVE" COUNT,
0554  2342                  ISZ MOVVE       /SET UP EXIT,
0555  1764          MOVEA,  TAD I FADDR     /GET "FROM" WORD
0556  3765                  DCA I TADDR     /STORE AT "TO" LOCATION
0557  2364                  ISZ FADDR       /+1 TO FADDR
0560  2365                  ISZ TADDR       /+1 TO TADDR
0561  2366                  ISZ MCTR        /DONE MOVING?
0562  5355                  JMP MOVEA       /NO, REPEAT
0563  5742                  JMP I MOVVE     /YES, EXIT.
0564  0000          FADDR,  0
0565  0000          TADDR,  0
0566  0000          MCTR,   0
```

```
      0600              *, 17/+1
                        /INITIALIZE BINARY PATTERN SUBROUTINE
0600  0000  INITPT, 0
0601  7200              CLA
0602  3204              DCA PT0           /SET PT0=0
0603  5600              JMP I INITPT      /EXIT,
0604  0000  PT0,   0
0605  0000  PT1,   0
0606  0377  PTMSK, 377
                        /SUBROUTINE TO SET AC TO NEXT BINARY PATTERN CHARACTER
0607  0000  GETPTT, 0
0610  7200              CLA
0611  1204              TAD PT0           /GET PT0
0612  3205              DCA PT1           /STORE AT PT1
0613  1205              TAD PT1           /GET PT1
0614  7001              IAC               /+1 TO AC
0615  0206              AND PTMSK         /LIMIT TO 8 BITS
0616  3204              DCA PT0           /STORE AT PT0
0617  1205              TAD PT1           /GET PT1
0620  5607              JMP I GETPTT      /EXIT

                        /SET BUFFER AREA SUBROUTINE
0621  0000  STBF,  0
0622  4455              JMS I UMOVE       /MOVE CRLF TO BLOCKA
0623  0131              CR
0624  4175              BLOCKA
0625  7776              -2
0626  4455              JMS I UMOVE       /MOVE CRLF TO BLOCKB
0627  0131              CR
0630  4307              BLOCKB
0631  7776              -2
0632  4455              JMS I UMOVE       /MOVE CRLF TO BLOCKC
0633  0131              CR
0634  4421              BLOCKC
0635  7776              -2
0636  5621              JMP I STBF        /EXIT,
```

```
0637  0000          FBF3,   0
0640  7200                  CLA             /FILL 144 CHARACTER BUFFER
0641  1637                  TAD I FBF3      /WITH 3 CHARACTERS WHOSE
0642  3245                  DCA .+3         /ADDRESS IS SPECIFIED
0643  2237                  ISZ FBF3        /AT CALL+1
0644  4455                  JMS I UMOVE
0645  0000                  0
0646  4177                  BLOCK1
0647  7775                  -3
0650  4455                  JMS I UMOVE
0651  4177                  BLOCK1
0652  4202                  BLOCK1+3
0653  7673                  -105
0654  4455                  JMS I UMOVE
0655  4177                  BLOCK1
0656  4311                  BLOCK2
0657  7670                  -110
0660  5637                  JMP I FBF3      /EXIT
0661  0000          FBALL,  0
0662  4455                  JMS I UMOVE     /FILL 144 CHARACTER BUFFER
0663  1710                  A               /WITH ALL PRINTABLE ASCII
0664  4177                  BLOCK1          /CHARACTERS,
0665  7701                  -77
0666  4455                  JMS I UMOVE
0667  1710                  A
0670  4276                  BLOCK1+77
0671  7767                  -11
0672  4455                  JMS I UMOVE
0673  4177                  BLOCK1
0674  4311                  BLOCK2
0675  7670                  -110
0676  5661                  JMP I FBALL     /EXIT

0677  0000          FBTMP,  0
0700  4455                  JMS I UMOVE     /FILL 144 CHARACTER BUFFER
0701  0021                  PTEMP           /WITH DATA IN PTEMP
0702  4177                  BLOCK1          /AND PTEMP1,
0703  7776                  -2
0704  4455                  JMS I UMOVE
0705  4177                  BLOCK1
0706  4201                  BLOCK1+2
0707  7672                  -106
0710  4455                  JMS I UMOVE
0711  4177                  BLOCK1
0712  4311                  BLOCK2
0713  7670                  -110
0714  5677                  JMP I FBTMP     /EXIT,
```

```
0715  0000  FW334,  0
0716  4455          JMS I UMOVE     /MOVE 4 CHARACTER ASR33 PRINTER
0717  1644          ASSWP4          /WORST CASE PATTERN TO
0720  4177          BLOCK1          /BLOCK1
0721  7774          -4
0722  4455          JMS I UMOVE     /FILL BLOCK1 WITH PATTERN
0723  4177          BLOCK1
0724  4203          BLOCK1+4
0725  7674          -104
0726  4455          JMS I UMOVE     /FILL BLOCK2 WITH PATTERN
0727  4177          BLOCK1
0730  4311          BLOCK2
0731  7670          -110
0732  5715          JMP I FW334     /EXIT
0733  0000  FW336,  0
0734  4455          JMS I UMOVE     /MOVE 6 CHARACTER ARS33 PRINTER
0735  1650          ASSWP6          /WORST CASE PATTERN TO
0736  4177          BLOCK1          /BLOCK1
0737  7772          -6
0740  4455          JMS I UMOVE     /FILL BLOCKS WITH PATTERN
0741  4177          BLOCK1
0742  4205          BLOCK1+6
0743  7676          -102
0744  4455          MOVE            /FILL BLOCK2 WITH PATTERN.
0745  4177          BLOCK1
0746  4311          BLOCK2
0747  7670          -110
0750  5733          JMP I FW336     /EXIT

0751  0000  FW338,  0
0752  4455          JMS I UMOVE     /MOVE 8 CHARACTER ASR33 PRINTER
0753  1656          ASSWP8                  /WORST CASE PATTERN WITH
0754  4177          BLOCK1          /INTERSPERSED BLANKS TO BLOCK1.
0755  7770          -10
0756  4455          JMS I UMOVE     /FILL BLOCK1 WITH PATTERN
0757  4177          BLOCK1
0760  4207          BLOCK1+10
0761  7700          -100
0762  4455          JMS I UMOVE     /FILL BLOCK2 WITH PATTERN
0763  4177          BLOCK1
0764  4311          BLOCK2
0765  7670          -110
0766  5751          JMP I FW338     /EXIT
```

```
      1000              *, 17/+1
1000  0000  FW354,  0
1001  4455            JMS I UMOVE     /MOVE 4 CHARACTER ASR35 PRINTER
1002  1666            ASCWP4          /WORST CASE PATTERN TO BLOCK1.
1003  4177            BLOCK1
1004  7774            -4
1005  4455            JMS I UMOVE     /FILL BLOCK1 WITH PATTERN
1006  4177            BLOCK1
1007  4203            BLOCK1+4
1010  7674            -104
1011  4455            JMS I UMOVE     /FILL BLOCK2 WITH PATTERN
1012  4177            BLOCK1
1013  4311            BLOCK2
1014  7670            -110
1015  5600            JMP I FW354     /EXIT
1016  0000  FW356,  0
1017  4455            JMS I UMOVE     /MOVE 6 CHARACTER ASR35 PRINTER
1020  1672            ASCWP6          /WORST CASE PATTERN TO BLOCK1
1021  4177            BLOCK1
1022  7772            -6
1023  4455            JMS I UMOVE     /FILL BLOCK1 WITH PATTERN
1024  4177            BLOCK1
1025  4205            BLOCK1+6
1026  7676            -102
1027  4455            JMS I UMOVE     /FILL BLOCK2 WITH PATTERN
1030  4177            BLOCK1
1031  4311            BLOCK2
1032  7670            -110
1033  5616            JMP I FW356     /EXIT
1034  0000  FW35S,  0
1035  4455            JMS I UMOVE     /MOVE 8 CHARACTER ASR35 PRINTER
1036  1700            ASCWPS          /WORST CASE PATTERN TO BLOCK1
1037  4177            BLOCK1
1040  7770            -10
1041  4455            JMS I UMOVE     /FILL BLOCK1 WITH PATTERN
1042  4177            BLOCK1
1043  4207            BLOCK1+10
1044  7700            -100
1045  4455            JMS I UMOVE     /FILL BLOCK2 WITH PATTERN
1046  4177            BLOCK1
1047  4311            BLOCK2
1050  7670            -110
1051  5634            JMP I FW35S     /EXIT
```

```
1052  0000  /SUBROUTINE TO COMPARE C(AC) TO C(CALL+1)
1053  3266  CHCK,   0
1054  1652          DCA WCHK          /STORE AC AT WCHK
1055  7041          TAD I CHCK        /SET COMPARE DATA
1056  1266          CIA               /2'S COMPLEMENT IT
1057  2252          TAD WCHK          /ADD C(WCHK)
1060  7640          ISZ CHCK          /SET UP FOR UNEQUAL EXIT
1061  5264          SZA CLA           /EQUAL?
1062  2252          JMP .+3           /NO,
1063  5652          ISZ CHCK          /YES, SET UP FOR EQUAL EXIT,
1064  1266          JMP I CHCK        /EQUAL EXIT
1065  5652          TAD WCHK          /RESTORE AC
1066  0000          JMP I CHCK        /UNEQUAL EXIT,
                    WCHK,   0

                    /PUNCH 70 (CODE 376) CHARACTERS SUBROUTINE
1067  0000          PLTLR,  0
1070  4446          JMS I SETCTR      /SET P70CTR TO -70
1071  1100          P70CTR
1072  7672          -106
1073  1301          TAD LDCDE               /GET 376 CODE
1074  4454          JMS I UPUNCH      /GO PUNCH IT
1075  2300          ISZ P70CTR        /ALL CHARACTERS PUNCHED?
1076  5273          JMP .-3           /NO, REPEAT,
1077  5667          JMP I PLTLR       /YES, EXIT,
1100  0000          P70CTR, 0
1101  0376          LDCDE,  376
                    /PUNCH SYNC CHARACTER SUBROUTINE (RUBOUT)
1102  0000          PSYNC,  0
1103  7240          CLA CMA           /SET AC TO 7777
1104  4454          JMS I UPUNCH      /PUNCH A RUBOUT
1105  5702          JMP I PSYNC       /EXIT.
                    /SYNC READER SUBROUTINE
1106  0000          RSYNC,  0
1107  4446          JMS I SETCTR      /SET RSCTR TO -145
1110  1122          RSCTR
1111  7557          -221
1112  4451          JMS I URRDY       /WAIT FOR READER NOT BUSY
1113  7240          CLA CMA           /READER NOT BUSY,
1114  3134          DCA RBUSY         /SET READER BUSY INDICATOR
1115  4446          JMS I SETCTR      /SET READER INTERRUPT
1116  1157          VCTR              /SERVICE RETURN ADDRESS,
1117  1125          RSSERV
1120  6001          ION               /ENABLE INTERRUPT
1121  5706          JMP I RSYNC       /EXIT
1122  0000          RSCTR,  0
```

```
1123  6036          RSSERV, KRB             /READ
1124  1133                  TAD MRBOUT      /ADD MINUS RUBOUT
1125  7640                  SZA CLA         /IS IT A RUBOUT?
1126  5335                  JMP .+7 /NO,
1127  3134                  DCA RBUSY       /YES, CLEAR READER BUSY,
1130  7300                  CLA CLL
1131  1135                  TAD LINK
1132  7004                  RAL             /RESTORE LINK
1133  1136                  TAD AC          /RESTORE AC
1134  5400                  JMP I 0         /RETURN
1135  2322                  ISZ RSCTR       /145 CHARACTER READ?
1136  5477                  JMP I UOUT      /NO,
1137  7602                  HLT CLA         /YES, NO SYNC,
1140  4446                  JMS I SETCTR    /SET RSCTR TO -145
1141  1122                  RSCTR
1142  7557                  -221
1143  5477                  JMP I UOUT      /RETURN

1144  3136          INTSVC, DCA AC          /SAVE AC
1145  7010                  RAR
1146  3135                  DCA LINK        /SAVE LINK
1147  6041                  TSF             /PUNCH/PRINTER?
1150  5354                  JMP .+4         /NO,
1151  6042                  TCF             /YES, CLEAR FLAG,
1152  3127                  DCA PFLAG       /CLEAR PFLAG
1153  5361                  JMP OUT         /RETURN
1154  6031                  KSF             /READER/KYBD?
1155  5360                  JMP .+3         /NO ERROR,
1156  5757                  JMP I .+1       /GO SERVICE READER
1157  0000          VCTR,   0
1160  7402                  HLT             /UNEXPECTED INTERRUPT
1161  7300          OUT,    CLA CLL
1162  1135                  TAD LINK
1163  7004                  RAL             /RESTORE LINK
1164  1136                  TAD AC          /RESTORE AC,
1165  6001                  ION             /ENABLE INTERRUPT
1166  5400                  JMP I 0         /RETURN
```

```
      1200                    *, 17/+1
1200  0000    PSTUP,  0               /PUNCH SETUP
1201  4446            SETLOC          /SET DATA ADDR
1202  1245            PADDR
1203  4175            BLOCKA
1204  4455            MOVE            /SET BLOCK LENGTH
1205  0130            BLKCNT
1206  1244            PCTR
1207  7777            -1
1210  5600            JMP I PSTUP     /EXIT
                      /
1211  0000    PDCR,   0               /PUNCH  DATA CHAR SUB,
1212  7200            CLA
1213  1645            TAD I PADDR     /GET DATA
1214  2245            ISZ PADDR               /UPDATE PADDR,
1215  4454            JMS I UPUNCH    /GO PUNCH/PRINT DATA
1216  5611            JMP I PDCR      /EXIT
                      /
1217  0000    PBLK,   0               /PUNCH DATA BLOCK FULL SPEED
1220  4200            JMS PSTUP
1221  4211            JMS PDCR        /GO PUNCH CHARACTER
1222  2244            ISZ PCTR                /ALL CHARS PUNCHED?
1223  5221            JMP .-2         /NO, REPEAT
1224  5617            JMP I PBLK      /YES, EXIT
                      /
1225  0000    PBLKR,  0               /PUNCH DATA BLOCK RANDOM STALLS,
1226  4200            JMS PSTUP               /GO DO SET UP
1227  4476            JMS I UDCNTP            /FILL DELAY BLOCK
1230  4446            SETLOC          /UBLK ADDRESS TO DAP
1231  1243            DAP
1232  4575            UBLK
1233  1643            TAD I DAP               /GET DELAY WORD
1234  3023            DCA DELAYM      /TO DELAYM
1235  2243            ISZ DAP         /UPDATE DAP,
1236  4443            DELAY           /DELAY,
1237  4211            JMS PDCR                /GO PUNCH CHARACTER
1240  2244            ISZ PCTR                /ALL CHARS PUNCHED?
1241  5233            JMP .-6                 /NO, REPEAT
1242  5625            JMP I PBLKR     /YES, EXIT,
1243  0000    DAP,    0
1244  0000    PCTR,   0
1245  0000    PADDR,  0
```

```
1246  0000          RRDY,   0               /WAIT FOR RDR NOT BUSY SUB.
1247  7200                  CLA
1250  1134                  TAD RBUSY               /FETCH RBUSY.
1251  7640                  SZA CLA         /READER BUSY?
1252  5250                  JMP .-2         /YES, TRY AGAIN
1253  5646                  JMP I RRDY      /NO,EXIT
1254  0000          RSTUP,  0
1255  4246                  JMS RRDY                /WAIT FOR RDR NOT BUSY
1256  2134                  ISZ RBUSY               /SET RBUSY INDICATOR
1257  4446                  SETLOC                  /SET DATA ADDR
1260  1312                  RADDR
1261  4175                  BLOCKA
1262  4455                  MOVE            /SET DATA BLOCK LENGTH
1263  0130                  BLKCNT
1264  1313                  RBCTR
1265  7771                  -1
1266  3125                  DCA ERRCTR      /CLEAR ERROR COUNTER
1267  5654                  JMP I RSTUP     /EXIT.
1270  0000          RDBLK,  0               /READ DATA BLOCK, FULL SPEED
1271  4254                  JMS RSTUP               /GO DO SETUP
1272  4446                  SETLOC                  /SET READER SERVICE
1273  1157                  VCTR            /ADDRESS.
1274  1321                  RDSRV
1275  6001                  ION             /ENABLE INT.
1276  5670                  JMP I RDBLK
1277  0000          RDBLKR, 0               /READ DATA BLOCK,RANDOM STALLS
1300  4254                  JMS RSTUP               /GO DO SETUP.
1301  4446                  SETLOC                  /SET READER SERVICE
1302  1157                  VCTR            /ADDRESS.
1303  1314                  RDRSRV
1304  4446                  SETLOC          /SET DELAY BLOCK ADDRESS.
1305  1311                  DAR
1306  4175                  DBLK
1307  6001                  ION             /ENABLE INT.
1310  5671                  JMP I RDBLKR    /EXIT
1311  0000          DAR,    0
1312  0000          RADDR,  0
1313  0000          RBCTR,  0
                    /READER SERVICE ROUTINES
1314  7200          RDRSRV, CLA
1315  1711                  TAD I DAR               /MOVE DELAY WORD TO
1316  3024                  DCA DELAYS      /DELAYS.
1317  2311                  ISZ DAR         /UPDATE DAR
1320  4475                  JMS I DDLMSR    /STALL.
1321  1712          RDSRV,  TAD I RADDR     /GET EXPECTED CHARACTER
1322  3326                  DCA SB          /STORE AT SB
1323  2312                  ISZ RADDR               /UPDATE RADDR
1324  6036                  KRB             /READ CHARACTER
1325  4510                  JMS I CHECK     /GO CHECK IT.
1326  0000          SB,     0
1327  5331                  JMP ERROR               /ERROR
1330  5347                  JMP RDDONE      /GOOD.
```

```
1331  3124  ERROR,  DCA ERRCR           /STORE BAD CHARACTER
1332  2125          ISZ ERRCTR      /INCREMENT ERROR COUNTER
1333  5336          JMP .+3
1334  7240          CLA CMA         /OFLOW, 7777 TO AC
1335  3125          DCA ERRCTR      /RESTORE TO 7777,
1336  7604          LAS             /READ SR
1337  0123          AND SR5MSK
1340  7650          SNA CLA         /HALT ON ERROR?(SR5)
1341  5347          JMP RDDONE      /NO,
1342  1124          TAD ERRCR               /YES, GET BAD CHARACTER
1343  7402          HLT             /ERROR HALT, BAD CHAR IN AC
1344  7200          CLA
1345  1326          TAD SB
1346  7402          HLT             /GOOD CHAR IN AC
1347  2313  RDDONE, ISZ RBCTR              /ALL DONE?
1350  5477          JMP I DOUT      /NO, TO MAINLINE
1351  7200          CLA             /YES,
1352  1125          TAD ERRCTR      /GET C(ERRCTR)
1353  7650          SNA CLA         /ANY ERRORS?
1354  5357          JMP .+3         /NO,
1355  1125          TAD ERRCTR      /YES,
1356  7402          HLT             /NUMBER OF ERRORS IN AC,
1357  7300          CLA CLL
1360  3134          DCA RBUSY               /CLEAR RBUSY INDICATOR
1361  1133          TAD LINK
1362  7004          RAL             /RESTORE LINK
1363  1136          TAD AC          /TO MAINLINE
1364  5400          JMP I 0
```

```
                        /
      1400              *, 17/+1
1400  0000              DLMSR,  0
1401  7300                      CLA CLL
1402  1024                      TAD DELAYS      /GET AND STORE MSEC
1403  3215                      DCA RCTRA               /DELAY COUNT
1404  5605                      JMP I ,+1
1405  1406                      .+1
1406  1042                      TAD MIL1                /GET AND STORE
1407  3216                      DCA RCTRB               /1MS CONSTANT
1410  2216                      ISZ RCTRB               /DELAYED 1 MS?
1411  5210                      JMP .-1         /NO,
1412  2215                      ISZ RCTRA               /YES, DONE DELAYING?
1413  5204                      JMP .-7         /NO.
1414  5600                      JMP I DLMSR     /YES, EXIT
1415  0000              RCTRA,  0
1416  0000              RCTRB,  0


1417  0000              DLCNTP, 0               /SUB TO FILL DELAY BLOCK
1420  4455                      MOVE            /SET DELAY BLOCK LENGTH
1421  0130                      BLKCNT
1422  1442                      DCTR
1423  7777                      -1
1424  4446                      SETLOC          /DBLK ADDR TO DADDR
1425  1441                      DADDR
1426  4575                      DBLK
1427  4447              GNRND,  JMS I RANDNO            /GET RANDOM NUMBER,
1430  0126                      AND DLYMSK      /REMOVE EXCESS BITS
1431  7450                      SNA             /ZERO?
1432  5227                      JMP GNRND               /YES, GET ANOTHER NUMBER
1433  7041                      CIA             /NO, 2'S COMPLEMENT IT
1434  3641                      DCA I DADDR     /STORE IT IN DELAY BLOCK
1435  2241                      ISZ DADDR               /UPDATA DELAY BLOCK ADDR,
1436  2242                      ISZ DCTR                /BLOCK FULL?
1437  5227                      JMP GNRND               /NO, REPEAT,
1440  5617                      JMP I DLCNTP    /YES, EXIT,
1441  0000              DADDR,  0
1442  0000              DCTR,   0
```

```
                        /PUNCH TEST NORMAL TEST SEQUENCE ROUTINE
1443  0000              NTST,   0
1444  4446                      SETLOC                    /CLEAR RBUSY
1445  0134                      RBUSY
1446  0000                      0
1447  1643                      TAD I NTST        /SELECT PUNCH MODE
1450  3253                      DCA NTSTA
1451  4472                      JMS I UPLTLR      /PUNCH LEADER
1452  4473                      JMS I UPSYNC      /PUNCH SYNC CHARACTER
1453  0000              NTSTA,  0
1454  4474                      JMS I URSYNC      /SYNC READER
1455  4502                      JMS I URDBLK      /READ DATA BLOCK
1456  4472                      JMS I UPLTLR      /PUNCH TRAILER
1457  4451                      JMS I URRDY       /WAIT FOR RDR NOT BUSY
1460  5444                      JMP I CHAIN       /CHAIN
                        /PUNCH TESTS SPECIAL TEST SEQUENCE ROUTINE,
1461  0000              STST,   0
1462  4446                      SETLOC            /CLEAR RBUSY
1463  0134                      RBUSY
1464  0000                      0
1465  1661                      TAD I STST        /SELECT PUNCH MODE
1466  3273                      DCA STSTA
1467  1273                      TAD STSTA
1470  3276                      DCA STSTC
1471  4472                      JMS I UPLTLR      /PUNCH LEADER
1472  4473                      JMS I UPSYNC      /PUNCH SYNC CHARACTER
1473  0000              STSTA,  0                 /PUNCH DATA BLOCK
1474  4474                      JMS I URSYNC      /SYNC READER
1475  4502              STSTB,  JMS I URDBLK      /READ DATA BLOCK
1476  0000              STSTC,  0                 /PUNCH DATA BLOCK
1477  5275                      JMP STSTB                 /GO READ AGAIN
                        /COMBINED TEST NORMAL TEST SEQUENCE
1500  0000              CNTST,  0
1501  4446                      SETLOC                    /CLEAR RBUSY
1502  0134                      RBUSY
1503  0000                      0
1504  4472                      JMS I UPLTLR      /PUNCH LEADER
1505  4473                      JMS I UPSYNC      /PUNCH SYNC CHARACTER
1506  4500                      JMS I UPBLK       /PUNCH DATA BLOCK (NO STALLS)
1507  4474                      JMS I URSYNC      /SYNC READER
1510  4503                      JMS I URBLKR      /READ DATA BLOCK (STALLS)
1511  4501                      JMS I UPBLKR      /PUNCH DATA BLOCK (STALLS)
1512  4502                      JMS I URDBLK      /READ DATA BLOCK (NO STALLS)
1513  4472                      JMS I UPLTLR      /PUNCH TRAILER
1514  4451                      JMS I URRDY       /WAIT FOR READER NOT BUSY
1515  5444                      JMP I CHAIN       /CHAIN
```

```
                        /TYPE LINE OF 3 CHARACTERS (NO DELAY)
1516  0000              TYPLN3, 0
1517  7200                      CLA
1520  3023                      DCA DELAYM        /CLEAR DELAYM
1521  1716                      TAD I TYPLN3      /SET AND STORE
1522  3325                      DCA .+3           /ADDRESS OF DATA
1523  2316                      ISZ TYPLN3
1524  4461                      JMS I UFBF3       /GO FILL BUFFER WITH 3 CHARACTERS
1525  0000                      0
1526  4456                      JMS I UTYPE       /GO TYPE LINE
1527  5716                      JMP I TYPLN3      /EXIT
                        /TYPE LINE OF ASCII PRINTABLE CHARACTERS
1530  0000              TYPE,   0
1531  4446                      JMS I SETCTR      /SET TCTR TO =76
1532  1551                      TCTR
1533  7664                      -114
1534  4446                      JMS I SETCTR      /SET FETCH TO ADDRESS
1535  1550                      FETCH             /OF BLOCKA,
1536  4175                      BLOCKA
1537  1023              TYPEA,  TAD DELAYM        /GET C(DELAYM)
1540  7640                      SZA CLA           /0?
1541  4443                      JMS I DLY1MS      /NO, SO DELAY,
1542  1750                      TAD I FETCH       /YES, SET CHARACTER
1543  4454                      JMS I UPUNCH      /GO PRINT CHARACTER
1544  2350                      ISZ FETCH         /SET UP FOR NEXT CHARACTER
1545  2351                      ISZ TCTR          /DONE?
1546  5337                      JMP TYPEA         /NO, REPEAT
1547  5730                      JMP I TYPE        /YES, EXIT,
1550  0000              FETCH,  0
1551  0000              TCTR,   0
```

```
      1600
1600  0000  ASCCN,  0
1601  1600           TAD I ASCCN
1602  3236           DCA WASC
1603  2200           ISZ ASCCN
1604  1600           TAD I ASCCN
1605  3237           DCA SASC
1606  2200           ISZ ASCCN
1607  1241           TAD K7700
1610  0636           AND I WASC
1611  7112           RTR CLL
1612  7012           RTR
1613  7012           RTR
1614  4223           JMS CNV
1615  2237           ISZ SASC
1616  1241           TAD K7700
1617  7040           CMA
1620  0636           AND I WASC
1621  4223           JMS CNV
1622  5600           JMP I ASCCN
1623  0000  CNV,     0
1624  3240           DCA ASCT
1625  1240           TAD ASCT
1626  7006           RTL
1627  7004           RAL
1630  0242           AND K0707
1631  1240           TAD ASCT
1632  0242           AND K0707
1633  1243           TAD K6060
1634  3637           DCA I SASC
1635  5623           JMP I CNV
1636  0000  WASC,    0
1637  0000  SASC,    0
1640  0000  ASCT,    0
1641  7700  K7700,   7700
1642  0707  K0707,   0707
1643  6060  K6060,   6060
```

```
1644  0247              A33WP4, 0247          /"'"
1645  0337                      0337          /LEFT ARROW
1646  0327                      0327          /"W"
1647  0257                      0257          /"/"
1650  0247              A33WP6, 0247          /"'"
1651  0337                      0337          /LEFT ARROW
1652  0327                      0327          /"W"
1653  0257                      0257          /"/"
1654  0327                      0327          /"W"
1655  0337                      0337          /LEFT ARROW
1656  0247              A33WP5, 0247          /"'"
1657  0240                      0240          /SPACE
1660  0337                      0337          /LEFT ARROW
1661  0240                      0240          /SPACE
1662  0327                      0327          /"W"
1663  0240                      0240          /SPACE
1664  0257                      0257          /"/"
1665  0240                      0240          /SPACE
1666  0247              A35WP4, 0247          /'
1667  0333                      0333          /"["
1670  0277                      0277          /"?"
1671  0303                      0303          /"C"
1672  0247              A35WP6, 0247          /"'"
1673  0333                      0333          /"["
1674  0277                      0277          /"?"
1675  0303                      0303          /"C"
1676  0277                      0277          /"?"
1677  0333                      0333          /"["
1700  0247              A35WP5, 0247          /"'"
1701  0240                      0240          /SPACE
1702  0333                      0333          /"["
1703  0240                      0240          /SPACE
1704  0277                      0277          /"?"
1705  0240                      0240          /SPACE
1706  0303                      0303          /"C"
1707  0240                      0240          /SPACE

1710  0301              A,      301
1711  0302                      302
1712  0303                      303
1713  0304              D,      304
1714  0305                      305
1715  0306                      306
1716  0307              G,      307
1717  0310                      310
1720  0311                      311
1721  0312              J,      312
1722  0313                      313
1723  0314                      314
1724  0315              M,      315
1725  0316                      316
1726  0317                      317
```

```
1727  0320                P,      320
1730  0321                        321
1731  0322                        322
1732  0323                S,      323
1733  0324                        324
1734  0325                        325
1735  0326                V,      326
1736  0327                        327
1737  0330                        330
1740  0331                Y,      331
1741  0332                        332
1742  0260                        260
1743  0261                ONE,    261
1744  0262                        262
1745  0263                        263
1746  0264                FOUR,   264
1747  0265                        265
1750  0266                        266

1751  0267                SEVEN,  267
1752  0270                        270
1753  0271                        271
1754  0241                C241,   241
1755  0242                        242
1756  0243                        243
1757  0244                C244,   244
1760  0245                        245
1761  0246                        246
1762  0247                C247,   247
1763  0250                        250
1764  0251                        251
1765  0252                C252,   252
1766  0253                        253
1767  0254                        254
1770  0255                C255,   255
1771  0256                        256
1772  0257                        257
1773  0272                C272,   272
1774  0273                        273
1775  0274                        274
1776  0275                C275,   275
1777  0276                        276
2000  0277                        277
2001  0300                C300,   300
2002  0333                        333
2003  0334                        334
2004  0335                C335,   335
2005  0336                        336
2006  0337                        337
```

```
2007  0001              SLID1,  0001          /SLIDING 1 PATTERN
2010  0002                      0002
2011  0004                      0004
2012  0010                      0010
2013  0020                      0020
2014  0040                      0040
2015  0100                      0100
2016  0200                      0200
2017  0100                      0100
2020  0040                      0040
2021  0020                      0020
2022  0010                      0010
2023  0004                      0004
2024  0002                      0002
2025  0376              SLID0,  0376          /SLIDING 0 PATTERN
2026  0375                      0375
2027  0373                      0373
2030  0367                      0367
2031  0357                      0357
2032  0337                      0337
2033  0277                      0277
2034  0177                      0177
2035  0277                      0277
2036  0337                      0337
2037  0357                      0357
2040  0367                      0367
2041  0373                      0373
2042  0375                      0375

2043  4003              CRTST,  4003          /SPC,C
2044  2240                      2240          /R,SPC
2045  2405                      2405          /T,E
2046  2324                      2324          /S,T
2047  0001                      0001          /END CODE
2050  4022              RMTST,  4022          /SPC,R
2051  1107                      1107          /I,G
2052  1024                      1024          /H,T
2053  4015                      4015          /SPC,M
2054  0122                      0122          /A,R
2055  0711                      0711          /G,I
2056  1640                      1640          /N,SPC
2057  2405                      2405          /T, E
2060  2324                      2324          /S,T
2061  0001                      0001          /END CODE
```

```
2062  4023          SPTST,  4023          /SPC,S
2063  2001                  2001          /P,A
2064  0305                  0305          /C,E
2065  4024                  4024          /SPC,T
2066  0523                  0523          /E,S
2067  2400                  2400          /T
2070  0100                  0100          /END CODE
2071  4014          LFTST,  4014          /SPC,L
2072  0640                  0640          /F,SPC
2073  2405                  2405          /T,E
2074  2324                  2324          /S,T
2075  0001                  0001          /END CODE
2076  4003          CHRTST, 4003          /SPC,C
2077  1001                  1001          /H,A
2100  2201                  2201          /R,A
2101  0324                  0324          /C,T
2102  0522                  0522          /E,R
2103  4024                  4024          /SPC,T
2104  0523                  0523          /E,S
2105  2423                  2423          /T,S
2106  0001                  0001          /END CODE
2107  4027          WCPTST, 4027          /SPC,W
2110  1722                  1722          /O,R
2111  2324                  2324          /O,R
2112  4003                  4003          /SPC,C
2113  0123                  0123          /A,S
2114  0540                  0540          /E,SPC
2115  2001                  2001          /P,A
2116  2424                  2424          /T,T
2117  0522                  0522          /E,R
2120  1640                  1640          /N,SPC
2121  2405                  2405          /T,E
2122  2324                  2324          /S,T
2123  0015                  0015          /CR
2124  0012                  0012          /LF
2125  0001                  0001          /END CODE
```

```
2126  0015              KMSG1,  0015          /CR
2127  0012                      0012          /LF
2130  4001                      4001                /SP,A
2131  2322                      2322                /S,R
2132  6363                      6363                /3,3
2133  5763                      5703                /1,3
2134  6540                      6540                /5,SP
2135  1331                      1331                /K,Y
2136  0204                      0204                /B,D
2137  4024                      4024                /SP,T
2140  0523                      0523                /E,S
2141  2400                      2400                /T
2142  1500                      1500                /CR
2143  1200                      1200                /LF
2144  0100                      0100                /END CODE
                        /
                        /KMSG2, TYPE: PRESS A KEY
2145  0015              KMSG2,  0015                /CR
2146  0012                      0012                /LF
2147  4020                      4020                /SP,P
2150  2205                      2205                /R,E
2151  2323                      2323                /S,S
2152  4001                      4001                /SP,A
2153  4013                      4013                /SP,K
2154  0531                      0531                /E,Y
2155  5600                      5600                /,
2156  1500                      1500                /CR
2157  1200                      1200                /LF
2160  0100                      0100                /END CODE
```

```
2161  0015                KMSG3,  0015            /CR
2162  0012                        0012            /LF
2163  4005                        4005            /SP,E
2164  0510                        0510            /C,H
2165  1740                        1740            /0,SP
2166  2405                        2405            /T,E
2167  2524                        2524            /S,T
2170  0015                KMSG3A, 0015            /CR
2171  0012                        0012            /LF
2172  4003                        4003            /SP,C
2173  1001                        1001            /H,A
2174  2201                        2201            /R,A
2175  0524                        0524            /C,T
2176  0522                        0522            /E,R
2177  2340                        2340            /S,P
2200  1305                        1305            /K,E
2201  3105                        3105            /Y,E
2202  0440                        0440            /D,SP
2203  2711                        2711            /W,I
2204  1414                        1414            /L,L
2205  4002                        4002            /SP,B
2206  0540                        0540            /E,SP
2207  2431                        2431            /T,Y
2210  2005                        2005            /P,E
2211  0456                        0456            /D,.
2212  0015                        0015            /CR
2213  0012                        0012            /LF
2214  4022                        4022            /SP,R
2215  2502                        2502            /U,B
2216  1725                        1725            /0,U
2217  2440                        2440            /T,SP
2220  0516                        0516            /E,N
2221  0423                        0423            /D,S
2222  4022                        4022            /SP,R
2223  1725                        1725            /0,U
2224  2411                        2411            /T,I
2225  1605                        1605            /N,E
2226  5600                        5000            /.
2227  1500                        1500            /CR
2230  1200                        1200            /LF
2231  1500                        1500            /CR
2232  1200                        1200            /LF
2233  0100                        0100            /END CODE
```

```
2234  0015              KMSG4,  0015          /CR
2235  0012                      0012          /LF
2236  0015                      0015          /CR
2237  0012                      0012          /LF
2240  4017                      4017          /SP,O
2241  0524                      0524          /C,T
2242  0114                      0114          /A,L
2243  4005                      4005          /SP,E
2244  2125                      2125          /Q,U
2245  1126                      1126          /I,V
2246  0114                      0114          /A,L
2247  0516                      0516          /E,N
2250  2440                      2440          /T,SR
2251  2405                      2405          /T,E
2252  2324                      2324          /S,T
2253  0015                      0015          /CR
2254  0001                      0001          /END CODE

2255  0015              KMSG5,  0015          /CR
2256  0012                      0012          /LF
2257  4040              OCTEQV, 4040
2260  4040                      4040
2261  0001                      0001          /END CODE
```

```
      2400              *, 17/+1
2400  4457    PRG0,     JMS I USTBF       /SET UP BUFFER AREA
2401  4446              JMS I SETCTR      /SET KSTART TO INITIAL
2402  0020              KSTART            /ROUTINE ADDRESS
2403  2406              P0TS0
2404  5605              JMP I .+1         /GO START PROGRAM
2405  0232              SRSET
                        /CARRIAGE RETURN TEST
2406  0000    P0TS0,    0
2407  2441              P0TS1
2410  4453              JMS I UCRLF       /CRLF TWICE
2411  7776              -2
2412  4450              JMS I XTYPST      /PRINT TEST TITLE
2413  2043              CRTST
2414  4453              JMS I UCRLF       /CRLF TWICE
2415  7776              -2
2416  1141              TAD C334          /GET "\" CODE
2417  4454              JMS I UPUNCH      /PRINT IT
2420  1147              TAD M111
2421  3110              DCA UTEMP         /-73 TO UTEMP
2422  2110    CRTSTA,   ISZ UTEMP         /ALL DONE?
2423  7410              SKP               /NO
2424  5444              JMP I CHAIN       /YES, CHAIN
2425  1110    CRTSTB,   TAD UTEMP
2426  3117              DCA UTEMP1        /UTEMP TO UTEMP1
2427  1137              TAD SPACE         /SET "SPACE" CODE
2430  4454              JMS I UPUNCH      /PRINT IT
2431  2117              ISZ UTEMP1        /SPACED NO. OF TIMES IN UTEMP1?
2432  5227              JMP .-3           /NO, SO SPACE AGAIN
2433  1131              TAD CR            /YES, SET "CR" CODE,
2434  4454              JMS I UPUNCH      /PRINT IT,
2435  4454              JMS I UPUNCH      /DUMMY CYCLE,
2436  1140              TAD C257          /SET "/" CODE
2437  4454              JMS I UPUNCH      /PRINT IT
2440  5222              JMP CRTSTA        /GO TO CRTSTA
```

```
                        /RIGHT MARGIN TEST
2441  0001              PØTS1,  1
2442  2473                      PØTS2
2443  4453                      JMS I UCRLF       /CRLF TWICE
2444  7776                      -2
2445  4450                      JMS I XTYPST      /PRINT TEST TITLE
2446  2050                      RMTST
2447  4453                      JMS I UCRLF       /CRLF TWICE
2450  7776                      -2
2451  1144                      TAD M16           /-14 TO UTEMP
2452  3116                      DCA UTEMP
2453  4450              RMTSTA, JMS I XTYPST      /PRINT =-=- I
2454  2456                      .+2
2455  5262                      JMP .+5
2456  5555                      5555
2457  5555                      5555
2460  1100                      1100
2461  0100                      0100
2462  2116                      ISZ UTEMP         /DONE 14 TIMES?
2463  5253                      JMP RMTSTA        /NO, SO DO IT AGAIN
2464  4450                      JMS I XTYPST      /YES, PRINT  =I-
2465  2467                      .+2
2466  5272                      JMP .+4
2467  5511                      5511
2470  5500                      5500
2471  0100                      0100
2472  5444                      JMP I CHAIN       /CHAIN
```

```
                        /SPACE TEST
2473  0002              PØTS2,  2
2474  2541                      PØTS3
2475  4453                      JMS I UCRLF       /CRLF TWICE
2476  7776                      -2
2477  4450                      JMS I XTYPST      /PRINT TEST TITLE
2500  2062                      SPTST
2501  4453                      JMS I UCRLF       /CRLF TWICE
2502  7776                      -2
2503  1145                      TAD M44
2504  3116                      DCA UTEMP         /=36 TO UTEMP
2505  4450              SPTSTA, JMS I XTYPST      /PRINT \, SPACE
2506  2510                      .+2
2507  5312                      JMP .+3
2510  3440                      3440              /"\", SPC
2511  0001                      0001              /END CODE
2512  2116                      ISZ UTEMP         /DONE 36 TIMES?
2513  5305                      JMP SPTSTA        /NO, SO DO IT AGAIN.
2514  1145                      TAD M44
2515  3116                      DCA UTEMP         /-36 TO UTEMP
2516  1142                      TAD M1            /GET =1
2517  3117              SPTSTB, DCA UTEMP1        /AC TO UTEMP1
2520  1117                      TAD UTEMP1        /UTEMP1
2521  3120                      DCA UTEMP2        /TO UTEMP2
2522  1131                      TAD CR            /GET "CR" CODE
2523  4454                      JMS I UPUNCH      /PRINT IT
2524  4454                      JMS I UPUNCH      /DUMMY CYCLE
2525  1137                      TAD SPACE         /GET "SPACE" CODE
2526  4454                      JMS I UPUNCH      /PRINT IT
2527  2120                      ISZ UTEMP2        /DONE SPACING?
2530  5325                      JMP .-3           /NO,
2531  1140                      TAD C257          /GET "/" CODE
2532  4454                      JMS I UPUNCH      /PRINT IT
2533  2116                      ISZ UTEMP         /DONE 36 TIMES?
2534  7410                      SKP               /NO,
2535  5444                      JMP I CHAIN       /YES, CHAIN
2536  1143                      TAD M2            /=2 TO AC
2537  1117                      TAD UTEMP1        /ADD C(UTEMP1)
2540  5317                      JMP SPTSTB        /GO TO SPTSTB
```

```
                        /LINE FEED TEST
2541  0003              P0TS3,  3
2542  2600                      P0TS4
2543  4453                      JMS I UCRLF     /CRLF TWICE
2544  7776                      -2
2545  4450                      JMS I XTYPST    /PRINT TEST TITLE
2546  2071                      LFTST
2547  4453                      JMS I UCRLF     /CRLF TWICE
2550  7776                      -2
2551  1146                      TAD M110
2552  3116                      DCA UTEMP               /=/2 TO UTEMP
2553  1141              LFTSTA, TAD C334                /GET "\" CODE
2554  4454                      JMS I UPUNCH    /PRINT IT
2555  1132                      TAD LF          /GET "LF" CODE
2556  4454                      JMS I UPUNCH    /PRINT IT
2557  2116                      ISZ UTEMP               /DONE?
2560  7410                      SKP             /NO,
2561  5444                      JMP I CHAIN     /YES, CHAIN
2562  4452                      JMS I DLYCNT    /GENERATE RANDOM DELAY COUNT
2563  4443                      JMS I DLY1MS    /GO DELAY,
2564  5353                      JMP LFTSTA      /GO TO LFTSTA
```

```
      2600
2600  0004
2601  2613

2602  4453
2603  7776
2604  4450
2605  2076
2606  4453
2607  7776
2610  4460
2611  1710
2612  5444
2613  0005
2614  2620

2615  4460
2616  1713
2617  5444
2620  0006
2621  2625

2622  4460
2623  1716
2624  5444
2625  0007
2626  2632

2627  4460
2630  1721
2631  5444
2632  0010
2633  2637

2634  4460
2635  1724
2636  5444
2637  0011
2640  2644

2641  4460
2642  1727
2643  5444
2644  0012
2645  2651

2646  4460
2647  1732
2650  5444
```

```
*, 17/+1
PØTS4,  4
        PØTS5
/TYPE LINE OF CHARACTERS ABC
        JMS I UCRLF     /CRLF TWICE
        -2
        JMS I XTYPST    /PRINT TITLE
        CHRTST
        JMS I UCRLF     /CRLF TWICE
        -2
        JMS I UTPLN3    /PRINT LINE
        A
        JMP I CHAIN
PØTS5,  5
        PØTS6
/TYPE LINE OF CHARACTERS DEF
        JMS I UTPLN3
        D
        JMP I CHAIN
PØTS6,  6
        PØTS7
/TYPE LINE OF CHARACTERS GHI
        JMS I UTPLN3
        G
        JMP I CHAIN
PØTS7,  7
        PØTS10
/TYPE LINE OF CHARACTERS JKL
        JMS I UTPLN3
        J
        JMP I CHAIN
PØTS10, 10
        PØTS11
/TYPE LINE OF CHARACTERS MNO
        JMS I UTPLN3
        M
        JMP I CHAIN
PØTS11, 11
        PØTS12
/TYPE LINE OF CHARACTERS PQR
        JMS I UTPLN3
        P
        JMP I CHAIN
PØTS12, 12
        PØTS13
/TYPE LINE OF CHARACTERS STU
        JMS I UTPLN3
        S
        JMP I CHAIN
```

```
2651  0013          PØTS13, 13
2652  2656                  PØTS14
                    /TYPE LINE OF CHARACTERS VWX
2653  4460                  JMS I UTPLN3
2654  1735                  V
2655  5444                  JMP I CHAIN
2656  0014          PØTS14, 14
2657  2663                  PØTS15
                    /TYPE LINE OF CHARACTERS YZØ
2660  4460                  JMS I UTPLN3
2661  1740                  Y
2662  5444                  JMP I CHAIN
2663  0015          PØTS15, 15
2664  2670                  PØTS16
                    /TYPE LINE OF CHARACTERS 123
2665  4460                  JMS I UTPLN3
2666  1743                  ONE
2667  5444                  JMP I CHAIN
2670  0016          PØTS16, 16
2671  2675                  PØTS17
                    /TYPE LINE OF CHARACTERS 456
2672  4460                  JMS I UTPLN3
2673  1746                  FOUR
2674  5444                  JMP I CHAIN
2675  0017          PØTS17, 17
2676  2702                  PØTS20
                    /TYPE LINE OF CHARACTERS 789
2677  4460                  JMS I UTPLN3
2700  1751                  SEVEN
2701  5444                  JMP I CHAIN
2702  0020          PØTS20, 20
2703  2707                  PØTS21
                    /TYPE LINE OF CHARACTERS !"#
2704  4460                  JMS I UTPLN3
2705  1754                  C241
2706  5444                  JMP I CHAIN
2707  0021          PØTS21, 21
2710  2714                  PØTS22
                    /TYPE LINE OF CHARACTERS $%&
2711  4460                  JMS I UTPLN3
2712  1757                  C244
2713  5444                  JMP I CHAIN
2714  0022          PØTS22, 22
2715  2721                  PØTS23
                    /TYPE LINE OF CHARACTERS '()
2716  4460                  JMS I UTPLN3
2717  1762                  C247
2720  5444                  JMP I CHAIN
```

```
2721  0025          P0TS25, 25
2722  2726                  P0TS24
                    /TYPE LINE OF CHARACTERS **,
2723  4460                  JMS I UTPLN3
2724  1765                  C252
2725  5444                  JMP I CHAIN
2726  0024          P0TS24, 24
2727  2733                  P0TS25
                    /TYPE LINE OF CHARACTERS -,(
2730  4460                  JMS I UTPLN3
2731  1770                  C255
2732  5444                  JMP I CHAIN
2733  0025          P0TS25, 25
2734  2740                  P0TS26
                    /TYPE LINE OF CHARACTERS ;;<
2735  4460                  JMS I UTPLN3
2736  1773                  C272
2737  5444                  JMP I CHAIN
2740  0026          P0TS26, 26
2741  2745                  P0TS27
                    /TYPE LINE OF CHARACTERS =>?
2742  4460                  JMS I UTPLN3
2743  1776                  C275
2744  5444                  JMP I CHAIN
2745  0027          P0TS27, 27
2746  2752                  P0TS30
                    /TYPE LINE OF CHARACTERS @ [\
2747  4460                  JMS I UTPLN3
2750  2001                  C300
2751  5444                  JMP I CHAIN
2752  0030          P0TS30, 30
2753  2757                  P0TS31
                    /TYPE LINE OF CHARACTERS ]↑ AND LEFT ARROW
2754  4460                  JMS I UTPLN3
2755  2004                  C335
2756  5444                  JMP I CHAIN
2757  0031          P0TS31, 31
2760  2765                  P0TS32
                    /TYPE LINE OF ALL CHARACTERS
2761  4462                  JMS I UFBALL      /FILL BUFFER WITH ALL CHARS.
2762  3025                  DCA DELAYM        /0 TO DELAYM.
2763  4456                  JMS I UTYPE       /TYPE LINE
2764  5444                  JMP I CHAIN       /CHAIN
2765  0032          P0TS32, 32
2766  3000                  P0TS33
                    /TYPE LINE OF ALL CHARACTERS, FIXED DELAY BETWEEN CHARACTERS
2767  4462                  JMS I UFBALL      /FILL BUFFER WITH ALL CHARS
2770  4452                  JMS I DLYCNT      /GENERATE DELAY COUNT
2771  4456                  JMS I UTYPE       /TYPE LINE
2772  5444                  JMP I CHAIN       /CHAIN
```

```
      3000              *, 17/+1
3000  0033        PØTS33, 33
3001  3017                PØTS34
                  /TYPE 6 LINES OF ASR33 WORST CASE PATTERN, NO DELAY,
3002  4453              JMS I UCRLF     /CRLF TWICE
3003  7776              -2
3004  4450              JMS I XTYPST    /PRINT TITLE
3005  2107              WCPTST
3006  4465              JMS I UFW336    /PATTERN TO BUFFER
3007  3023              DCA DELAYM      /0 TO DELAYM
3010  4446              JMS I SETCTR    /-6 TO CTRA
3011  0121              CTRA
3012  7772              -6
3013  4456              JMS I UTYPE     /TYPE LINE
3014  2121              ISZ CTRA                /ALL LINES TYPED?
3015  5213              JMP .-2         /NO, REPEAT
3016  5444              JMP I CHAIN     /YES, CHAIN,
3017  0034        PØTS34, 34
3020  3032                PØTS35
                  /TYPE 6 LINES OF ASR33 WORST CASE PATTERN, FIXED DELAY BETWEEN CHARACTERS
3021  4465              JMS I UFW336    /PATTERN TO BUFFER
3022  4446              JMS I SETCTR    /-6 TO CTRA
3023  0121              CTRA
3024  7772              -6
3025  4452              JMS I DLYCNT    /GENERATE DELAY COUNT
3026  4456              JMS I UTYPE     /TYPE LINE
3027  2121              ISZ CTRA                /ALL LINES TYPED?
3030  5223              JMP .-3         /NO, REPEAT
3031  5444              JMP I CHAIN     /YES, CHAIN
3032  0035        PØTS35, 35
3033  3043                PØTS36
                  /TYPE 6 LINES OF ASR35 WORST CASE PATTERN, NO DELAY
3034  4470              JMS I UFW356    /PATTERN TO BUFFER
3035  3023              DCA DELAYM      /0 TO DELAYM
3036  4446              JMS I SETCTR    /-6 TO CTRA
3037  0121              CTRA
3040  7772              -6
3041  4456              JMS I UTYPE     /TYPE LINE
3042  2121              ISZ CTRA                /ALL LINES TYPED?
3043  5241              JMP .-2         /NO, REPEAT,
3044  5444              JMP I CHAIN     /YES, CHAIN
3045  0036        PØTS36, 36
3046  7777              /777
                  /TYPE 6 LINES OF ASR35 WORST CASE PATTERN, FIXED DELAY BETWEEN CHARACTERS
3047  4470              JMS I UFW356    /PATTERN TO BUFFER
3050  4446              JMS I SETCTR    /=6 TO CTRA
3051  0121              CTRA
3052  7772              -6
3053  4452              JMS I DLYCNT    /GENERATE DELAY COUNT
3054  4456              JMS I UTYPE     /TYPE LINE
3055  2121              ISZ CTRA                /ALL LINES TYPED?
3056  5253              JMP .-3         /NO, REPEAT
3057  5444              JMP I CHAIN     /YES, CHAIN
```

```
                        /PROGRAM 1, ASR33/35 PUNCH FUNCTION TEST
                        /
3060  4446  PRG1,     JMS I SETCTR     /SET INTERRUPT SERVICE ADDRESS
3061  0002            2                /TO INTSVC
3062  1144            INTSVC
3063  4446            SETLOC           /SET DATA BLOCK
3064  0130            BLKCNT           /LENGTH TO
3065  7400            -400             /-256
3066  4446            JMS I SETCTR     /SET KSTART TO INITIAL
3067  0020            KSTART           /ROUTINE ADDRESS.
3070  3073            P1T0
3071  5672            JMP I .+1        /GO START PROGRAM
3072  0232            SRSET
                      /ROUTINE 0,
                      /PUNCH AND READ CHECK BLOCK OF ALL 0'S
3073  0000  P1T0,     0
3074  3106            P1T1
3075  4446            SETLOC           /0 TO BLOCK A
3076  4175            BLOCKA           /FILL BUFFER
3077  0000            0
3100  4455            MOVE
3101  4175            BLOCKA
3102  4176            BLOCKA+1
3103  7401            -377
3104  4504            JMS I UNTST      /GO TO NORMAL TEST,
3105  4500            JMS I UPBLK      /USE THIS CALL
                      /ROUTINE 1
                      /PUNCH AND READ CHECK BLOCK OF CHANNEL 1 PUNCHES,
3106  0001  P1T1,     1
3107  3121            P1T2
3110  4446            SETLOC           /1 TO BLOCKA
3111  4175            BLOCKA
3112  0001            1
3113  4455            MOVE             /FILL BUFFER
3114  4175            BLOCKA
3115  4176            BLOCKA+1
3116  7401            -377
3117  4504            JMS I UNTST      /GO TO NORMAL TEST
3120  4500            JMS I UPBLK      /USE THIS CALL
                      /ROUTINE 2
                      /PUNCH AND READ CHECK BLOCK OF CHANNEL 2 PUNCHES
3121  0002  P1T2,     2
3122  3200            P1T3
3123  4446            SETLOC           /2 TO BLOCKA
3124  4175            BLOCKA
3125  0002            2
3126  4455            MOVE             /FILL BUFFER
3127  4175            BLOCKA
3130  4176            BLOCKA+1
3131  7401            -377
3132  4504            JMS I UNTST      /GO TO NORMAL TEST
3133  4500            JMS I UPBLK      /USE THIS CALL
```

```
        3200            *, 17/+1
                        /ROUTINE 3
                        /PUNCH AND READ CHECK BLOCK OF CHANNEL 3 PUNCHES
3200    0003    P1T3,   3
3201    3213            P1T4
3202    4446            SETLOC          /4 TO BLOCK A
3203    4175            BLOCKA
3204    0004            4
3205    4455            MOVE            /FILL BUFFER
3206    4175            BLOCKA
3207    4176            BLOCKA+1
3210    7401            -377
3211    4504            JMS I UNTST     /GO TO NORMAL TEST
3212    4500            JMS I UPBLK     /USE THIS CALL
                        /ROUTINE 4
                        /PUNCH AND READ CHECK BLOCK OF CHANNEL 4 PUNCHES
3213    0004    P1T4,   4
3214    3226            P1T5
3215    4446            SETLOC          /10 TO BLOCKA
3216    4175            BLOCKA
3217    0010            10
3220    4455            MOVE            /FILL BUFFER
3221    4175            BLOCKA
3222    4176            BLOCKA+1
3223    7401            -377
3224    4504            JMS I UNTST     /60 TO NORMAL TEST
3225    4500            JMS I UPBLK     /USE THIS CALL
                        /ROUTINE 5
                        /PUNCH AND READ CHECK BLOCK OF CHANNEL 5 PUNCHES
3226    0005    P1T5,   5
3227    3241            P1T6
3230    4446            SETLOC          /10 TO BLOCKA
3231    4175            BLOCKA
3232    0020            20
3233    4455            MOVE            /FILL BUFFER
3234    4175            BLOCKA
3235    4176            BLOCKA+1
3236    7401            -377
3237    4504            JMS I UNTST     /GO TO NORMAL TEST
3240    4500            JMS I UPBLK     /USE THIS CALL
```

```
                        /ROUTINE 6
                        /PUNCH AND READ CHECK BLOCK OF CHANNEL 6 PUNCHES
3241  0006      P1T6,   6
3242  3254              P1T7
3243  4446              SETLOC          /40 TO BLOCKA
3244  4175              BLOCKA
3245  0040              40
3246  4455              MOVE            /FILL BUFFER
3247  4175              BLOCKA
3250  4176              BLOCKA+1
3251  7401              -377
3252  4504              JMS I UNTST     /GO TO NORMAL TEST
3253  4500              JMS I UPBLK     /USE THIS CALL
                        /ROUTINE 7
                        /PUNCH AND READ CHECK BLOCK OF CHANNEL 7 PUNCHES
3254  0007      P1T7,   7
3255  3267              P1T10
3256  4446              SETLOC          /100 TO BLOCK A
3257  4175              BLOCKA
3260  0100              100
3261  4455              MOVE            /FILL BUFFER
3262  4175              BLOCKA
3263  4176              BLOCKA+1
3264  7401              -377
3265  4504              JMS I UNTST     /GO TO NORMAL TEST
3266  4500              JMS I UPBLK     /USE THIS CALL.
                        /ROUTINE 10
                        /PUNCH AND READ CHECK BLOCK OF CHANNEL 8 PUNCHES
3267  0010      P1T10,  10
3270  3302              P1T11
3271  4446              SETLOC          /200 TO BLOCK A
3272  4175              BLOCKA
3273  0200              200
3274  4455              MOVE            /FILL BUFFER
3275  4175              BLOCKA
3276  4176              BLOCKA+1
3277  7401              -377
3300  4504              JMS I UNTST     /GO TO NORMAL TEST
3301  4500              JMS I UPBLK     /USE THIS CALL.
                        /ROUTINE 11
                        /PUNCH AND READ CHECK BLOCK OF SLIDING 1 PATTERN
3302  0011      P1T11,  11
3303  3316              P1T12
3304  4455              MOVE            /FILL BUFFER WITH
3305  2007              SLIDI           /SLIDING 1 PATTERN
3306  4175              BLOCKA
3307  7762              -16
3310  4455              MOVE
3311  4175              BLOCKA
3312  4216              BLOCKA+16
3313  7410              -352
3314  4504              JMS I UNTST     /GO TO NORMAL TEST
3315  4500              JMS I UPBLK     /USE THIS CALL
```

```
                        /ROUTINE 12
                        /PUNCH AND READ CHECK BLOCK OF SLIDING Ø PATTERN.
3316  0012              P1T12,  12
3317  3332                      P1T13
3320  4455                      MOVE              /FILL BUFFER WITH
3321  2025                      SLIDØ             /SLIDING Ø PATTERN
3322  4175                      BLOCKA
3323  7762                      -16
3324  4455                      MOVE
3325  4175                      BLOCKA
3326  4215                      BLOCKA+16
3327  7410                      -362
3330  4504                      JMS I UNTST       /GO TO NORMAL TEST
3331  4500                      JMS I UPBLK       /USE THIS CALL
                        /ROUTINE 13
                        /PUNCH AND READ CHECK BLOCK OF ONES AND ZEROES.
3332  0013              P1T13,  13
3333  3350                      P1T14
3334  4446                      SETLOC            /377 TO BLOCK A
3335  4175                      BLOCKA
3336  0377                      377
3337  4446                      SETLOC            /Ø TO BLOCKA+1
3340  4176                      BLOCKA+1
3341  0000                      Ø
3342  4455                      MOVE              /FILL BUFFER
3343  4175                      BLOCKA
3344  4177                      BLOCKA+2
3345  7402                      -376
3346  4504                      JMS I UNTST       /GO TO NORMAL TEST
3347  4500                      JMS I UPBLK       /USE THIS CALL
                        /ROUTINE 14
                        /PUNCH AND READ CHECK BLOCK OF ONES AND ZEROES, RANDOM
                        /STALLS BETWEEN CHARACTERS PUNCHED.
3350  0014              P1T14,  14
3351  3400                      P1T15
3352  4446                      SETLOC            /377 TO BLOCKA
3353  4175                      BLOCKA
3354  0377                      377
3355  4446                      SETLOC            /Ø TO BLOCKA+1
3356  4176                      BLOCKA+1
3357  0000                      Ø
3360  4455                      MOVE              /FILL BUFFER
3361  4175                      BLOCKA
3362  4177                      BLOCKA+2
3363  7402                      -376
3364  4504                      JMS I UNTST       /GO TO NORMAL TEST
3365  4501                      JMS I UPBLKR      /USE THIS CALL
```

```
        3400            *. 17/+1
                        /ROUTINE 15
                        /PUNCH AND READ CHECK BLOCK OF BINARY COUNT PATTERN
3400    0015    P1T15,  15
3401    3426            P1T16
3402    4446            SETLOC          /BLOCK A ADDR TO TEMPU
3403    0115            TEMPU
3404    4175            BLOCKA
3405    4446            SETLOC          /-256 TO CTRA
3406    0121            CTRA
3407    7400            -400
3410    4511            JMS I INPATT    /INITIALIZE B. PATTERN
3411    4512    P1T15A, JMS I GETPT     /FILL BUFFER WITH
3412    3515            DCA I TEMPU     /BINARY COUNT PATTERN
3413    2115            ISZ TEMPU
3414    2121            ISZ CTRA
3415    5211            JMP P1T15A
3416    4504            JMS I UNTST     /GO TO NORMAL TEST
3417    4500            JMS I UPBLK     /USE THIS CALL.
                        /ROUTINE 16
                        /PUNCH AND READ CHECK BLOCK OF BINARY COUNT PATTERN
                        /RANDOM STALLS BETWEEN CHARACTERS PUNCHED.
3420    0016    P1T16,  16
3421    7777            /777
3422    4446            SETLOC          /BLOCK A ADDR TO TEMPU
3423    0115            TEMPU
3424    4175            BLOCKA
3425    4446            SETLOC          /-256 TO CTRA
3426    0121            CTRA
3427    7400            -400
3430    4511            JMS I INPATT    /INITIALIZE B. PATTERN
3431    4512    P1T16A, JMS I GETPT     /FILL BUFFER WITH
3432    3515            DCA I TEMPU     /BINARY COUNT PATTERN
3433    2115            ISZ TEMPU
3434    2121            ISZ CTRA
3435    5231            JMP P1T16A
3436    4504            JMS I UNTST     /GO TO NORMAL TEST
3437    4501            JMS I UPBLKR    /USE THIS CALL
```

```
                        /PROGRAM 2, KEYBOARD TEST
3440  4446              PRG2,   SETLOC          /SET KSTART TO INITIAL
3441  0020                      KSTART          /ROUTINE ADDRESS
3442  3447                      P2T0
3443  4450                      JMS I XTYPST    /PRINT
3444  2126                      KMSG1
3445  5646                      JMP I .+1
3446  0232                      SRSET
                        /ROUTINE 0
                        /CLEAR AC AND FLAG (KCC), WAIT FOR FLAG TO SET, WITH FLAG SET, SKIP
                        /ON FLAG 1000 TIMES, KSF SHOULD SKIP EVERY TIME.
3447  0000              P2T0,   0
3450  3472                      P2T1
3451  4446                      SETLOC          /-1000 TO CTRA
3452  0121                      CTRA
3453  6030                      -1750
3454  6032                      KCC             /CLEAR AC AND FLAG
3455  4450                      JMS I XTYPST
3456  2145                      KMSG2
3457  6031                      KSF             /READY?
3460  5257                      JMP .-1         /WAIT
3461  6031                      KSF             /READY, SKIP ON FLAG
3462  5266                      JMP P2E0                /NO SKIP, ERROR
3463  2121                      ISZ CTRA                /ALL DONE?
3464  5261                      JMP .-3         /NO, REPEAT
3465  5444                      JMP I CHAIN     /YES, CHAIN
3466  7602              P2E0,   HLT CLA         /KSF FAILURE
3467  6031                      KSF             /SCOPE LOOP
3470  5267                      JMP .-1         /SKIPS ON FLAG
3471  5267                      JMP .-2         /CONTINUOUSLY
                        /ROUTINE 1,
                        /ECHO TEST CHARACTER RECEIVED FROM KEYBOARD IS TYPED, THE
                        /CHARACTER TYPED SHOULD MATCH CHARACTER KEYED, RUBOUT CHARCTER
                        /ENDS ROUTINE.
3472  0001              P2T1,   1
3473  3511                      P2T2
3474  6032                      KCC             /CLEAR AC AND FLAG
3475  4450                      JMS I XTYPST
3476  2161                      KMSG3
3477  6031              P2T1A,  KSF             /READY?
3500  5277                      JMP .-1         /WAIT
3501  6036                      KRB             /READ CHARACTER
3502  6046                      TLS             /PRINT IT
3503  6041                      TSF             /PRINTER READY?
3504  5303                      JMP .-1         /NO, WAIT
3505  1133                      TAD MRBOUT
3506  7440                      SZA             /IS IT RUBOUT?
3507  5277                      JMP P2T1A               /NO
3510  5444                      JMP I CHAIN             /YES, CHAIN
```

```
                        /ROUTINE 2,
                        /OCTAL EQUIVALENT TEST, THE OCTAL EQUIVALENT OF ANY
                        /CHARACTER KEYED IS PRINTED, RUBOUT ENDS ROUTINE.
3511  0002      P2T2,   2
3512  7777              7777
3513  6032              KCC               /CLEAR AC AND FLAG
3514  4450              JMS I XTYPST      /PRINT TITLE AND
3515  2234              KMSG4             /INSTRUCTION
3516  4450              JMS I XTYPST
3517  2170              KMSG3A
3520  6031      P2T2A,  KSF               /FLAG 1?
3521  5320              JMP .-1           /NO, WAIT
3522  6036              KRB               /YES, READ KEYBOARD
3523  3336              DCA P2T2W         /STORE CHARACTER
3524  4506              JMS I UASCCN      /CONVERT CHARACTER
3525  3336              P2T2W             /TO PRINTABLE OCTAL,
3526  2257              OCTEQV
3527  4450              JMS I XTYPST      /PRINT CHARACTER
3530  2255              KMSG5
3531  1336              TAD P2T2W
3532  1133              TAD MRBOUT
3533  7640              SZA CLA           /WAS IT A RUBOUT?
3534  5320              JMP P2T2A         /NO,
3535  5444              JMP I CHAIN       /YES, CHAIN
3536  0000      P2T2W,  0
```

```
                        /PROGRAM 3, COMBINED READER, PRINTER, PUNCH TEST.
3537  4446              PRG3,   SETLOC          /SET INTERRUPT SERVICE
3540  0002                      2               /ADDRESS TO INTSVC
3541  1144                      INTSVC
3542  4446                      SETLOC          /SET DATA BLOCK LENGTH
3543  0130                      BLKCNT          /TO =150
3544  7552                      -226
3545  4457                      JMS I USTBF     /SET UP BUFFER AREA
3546  4446                      SETLOC          /SET KSTART TO INITIAL
3547  0020                      KSTART          /ROUTINE ADDRESS
3550  3553                      P3T0
3551  5752                      JMP I .+1               /START PROGRAM
3552  0232                      SRSET
3553  0000              P3T0,   0
3554  3560                      P3T1
3555  4461                      JMS I UFBF3     /DATA: ABC
3556  1710                      A
3557  4505                      JMS I UCNTST
3560  0001              P3T1,   1
3561  3565                      P3T2
3562  4461                      JMS I UFBF3     /DATA: DEF
3563  1713                      D
3564  4505                      JMS I UCNTST
3565  0002              P3T2,   2
3566  3572                      P3T3
3567  4461                      JMS I UFBF3     /DATA: GHI
3570  1716                      G
3571  4505                      JMS I UCNTST
3572  0003              P3T3,   3
3573  3577                      P3T4
3574  4461                      JMS I UFBF3     /DATA: JKL
3575  1721                      J
3576  4505                      JMS I UCNTST
3577  0004              P3T4,   4
3600  3604                      P3T5
3601  4461                      JMS I UFBF3     /DATA: MNO
3602  1724                      M
3603  4505                      JMS I UCNTST
3604  0005              P3T5,   5
3605  3611                      P3T6
3606  4461                      JMS I UFBF3     /DATA: PQR
3607  1727                      P
3610  4505                      JMS I UCNTST
3611  0006              P3T6,   6
3612  3616                      P3T7
3613  4461                      JMS I UFBF3     /DATA: STU
3614  1730                      S
3615  4505                      JMS I UCNTST
```

```
3616  0007              P3T7,   /
3617  3623                      P3T10
3620  4461                      JMS I UFBF3     /DATA: VWX
3621  1735                      V
3622  4505                      JMS I UCNTST
3623  0010              P3T10,  10
3624  3630                      P3T11
3625  4461                      JMS I UFBF3     /DATA: YZ0
3626  1740                      Y
3627  4505                      JMS I UCNTST
3630  0011              P3T11,  11
3631  3635                      P3T12
3632  4461                      JMS I UFBF3     /DATA: 123
3633  1743                      ONE
3634  4505                      JMS I UCNTST
3635  0012              P3T12,  12
3636  3642                      P3T13
3637  4461                      JMS I UFBF3     /DATA: 456
3640  1746                      FOUR
3641  4505                      JMS I UCNTST
3642  0013              P3T13,  13
3643  3647                      P3T14
3644  4461                      JMS I UFBF3     /DATA: 789
3645  1751                      SEVEN
3646  4505                      JMS I UCNTST
3647  0014              P3T14,  14
3650  3654                      P3T15
3651  4461                      JMS I UFBF3     /DATA: !"#
3652  1754                      C241
3653  4505                      JMS I UCNTST
3654  0015              P3T15,  15
3655  3661                      P3T16
3656  4461                      JMS I UFBF3     /DATA: $%&
3657  1757                      C244
3660  4505                      JMS I UCNTST
3661  0016              P3T16,  16
3662  3666                      P3T17
3663  4461                      JMS I UFBF3     /DATA: '()
3664  1762                      C247
3665  4505                      JMS I UCNTST
3666  0017              P3T17,  17
3667  4000                      P3T20
3670  4461                      JMS I UFBF3     /DATA: *+,
3671  1765                      C252
3672  4505                      JMS I UCNTST
```

```
      4000              *, 17/+1
4000  0020    P3T20,    20
4001  4005              P3T21
4002  4461              JMS I UFBF3     /DATA: =,/
4003  1770              C255
4004  4505              JMS I UCNTST

4005  0021    P3T21,    21
4006  4012              P3T22
4007  4461              JMS I UFBF3     /DATA: ;;<
4010  1773              C272
4011  4505              JMS I UCNTST
4012  0022    P3T22,    22
4013  4017              P3T23
4014  4461              JMS I UFBF3     /DATA: =>?
4015  1776              C275
4016  4505              JMS I UCNTST
4017  0023    P3T23,    23
4020  4024              P3T24
4021  4461              JMS I UFBF3     /DATA: @L\
4022  2001              C300
4023  4505              JMS I UCNTST
4024  0024    P3T24,    24
4025  4031              P3T25
4026  4461              JMS I UFBF3     /DATA: ]↑ AND LEFT ARROW
4027  2004              C335
4030  4505              JMS I UCNTST
4031  0025    P3T25,    25
4032  4035              P3T26
4033  4462              JMS I UFBALL    /DATA: ALL PRINTABLE ASCII
4034  4505              JMS I UCNTST
4035  0026    P3T26,    26
4036  4041              P3T27
4037  4464              JMS I UFW334    /DATA: ASR33 PRINTER WORST CASE
4040  4505              JMS I UCNTST    /PATTERN
4041  0027    P3T27,    27
4042  4045              P3T30
4043  4466              JMS I UFW33S    /DATA; ASR33 PRINTER WORST CASE
4044  4505              JMS I UCNTST    /PATTERN WITH INTERSPERSED BLANKS
4045  0030    P3T30,    30
4046  4051              P3T31
4047  4467              JMS I UFW354    /DATA: ASR35 PRINTER WORST CASE
4050  4505              JMS I UCNTST    /PATTERN
4051  0031    P3T31,    31
4052  4055              P3T32
4053  4471              JMS I UFW35S    /DATA: ASR33 PRINTER WORST CASE
4054  4505              JMS I UCNTST    /PATTERN WITH INTERSPERSED BLANKS
```

```
4055  0032          P3T32,  32
4056  7777                  7777
4057  4446                  SETLOC          /DATA: ONE'S AND ZEROES
4060  4177                  BLOCK1
4061  0377                  377
4062  4446                  SETLOC
4063  4200                  BLOCK1+1
4064  0000                  0
4065  4455                  MOVE
4066  4177                  BLOCK1
4067  4201                  BLOCK1+2
4070  7672                  -106
4071  4455                  MOVE
4072  4177                  BLOCK1
4073  4311                  BLOCK2
4074  7670                  -110
4075  4505                  JMS I UCNTST
                    /
                    /PROGRAM 4, PRINT LINES WITH DATA IN PTEMP AND PTEMP1, NO DELAY,
4076  7200          PRG4,   CLA
4077  3023                  DCA DELAYM      /0 TO DELAYM
4100  4457                  JMS I USTBF
4101  4463                  JMS I UFBTMP    /FILL BUFFER WITH DATA
4102  4456                  JMS I UTYPE     /TYPE LINE
4103  5302                  JMP .-1         /REPEAT
                    /
                    /PROGRAM 5, PRINT LINES WITH DATA IN PTEMP AND PTEMP1, FIXED RANDOM DELAY
4104  4463          PRG5,   JMS I UFBTMP    /FILL BUFFER WITH DATA,
4105  4457                  JMS I USTBF
4106  4452                  JMS I DLYCNT    /GENERATE DELAY COUNT,
4107  4456                  JMS I UTYPE     /TYPE LINE
4110  5306                  JMP .+2         /REPEAT
                    /PROGRAM 6, PUNCH AND READ CHECK DATA BLOCKS
                    /WITH DATA IN PTEMP AND PTEMP1, NO DELAY
4111  4446          PRG6,   SETLOC          /SET INTERRUPT SERVICE
4112  0002                  2               /ADDRESS TO INTSVC
4113  1144                  INTSVC
4114  4446                  SETLOC          /SET BLOCK LENGTH TO
4115  0130                  BLKCNT          /-256
4116  7400                  -400
4117  4455                  MOVE            /FILL BUFFER WITH DATA
4120  0021                  PTEMP           /IN PTEMP AND PTEMP1
4121  4175                  BLOCKA
4122  7776                  -2
4123  4455                  MOVE
4124  4175                  BLOCKA
4125  4177                  BLOCKA+2
4126  7402                  -376
4127  4507                  JMS I USTST     /GO TO SPECIAL TEST SEQUENCE
4130  4500                  JMS I UPBLK     /CLSE THIS CALL.
```

```
                        /PROGRAM 7, PUNCH AND READ CHECK DATA BLOCKS WITH DATA
                        /IN PTEMP AND PTEMP1, RANDOM STALLS BETWEEN CHARS PUNCHED
4131  4446      PRG7,   SETLOC          /SET INTERRUPT SERVICE
4132  0002              2               /ADDRESS TO INTSVC
4133  1144              INTSVC
4134  4446              SETLOC          /SET BLOCK LENGTH TO
4135  0130              BLKCNT          /-256
4136  7400              -400
4137  4455              MOVE            /FILL BUFFER WITH DATA IN
4140  0021              PTEMP           /PTEMP AND PTEMP1
4141  4175              BLOCKA
4142  7776              -2
4143  4455              MOVE
4144  4175              BLOCKA
4145  4177              BLOCKA+2
4146  7402              -376
4147  4507              JMS I USTST     /GO TO SPECIAL TEST SEQUENCE
4150  4501              JMS I UPBLKR    /USE THIS CALL,

                        /PROGRAM 10, PUNCH AND READ CHECK BLOCKS OF BINARY
                        /COUNT PATTERN, RANDOM STALLS BETWEEN CHARACTERS PUNCHED
4151  4446      PRG10,  SETLOC          /SET INTERRUPT SERVICE
4152  0002              2               /ADDRESS TO INTSVC
4153  1144              INTSVC
4154  4446              SETLOC          /SET BLOCK LENGTH TO
4155  0130              BLKCNT          /-256
4156  7400              -400
4157  4446              SETLOC
4160  0115              TEMPU
4161  4175              BLOCKA
4162  4446              SETLOC
4163  0121              CTRA
4164  7400              -400
4165  4511              JMS I INPATT    /FILL BUFFER WITH BINARY
4166  4512      PRG10A, JMS I GETPT     /COUNT PATTERN
4167  3515              DCA I TEMPU
4170  2115              ISZ TEMPU
4171  2121              ISZ CTRA
4172  5366              JMP PRG10A
4173  4507              JMS I USTST     /GO TO SPECIAL TEST SEQUENCE
4174  4501              JMS I UPBLKR    /USE THIS CALL
```

```
                        /
4175  0215              BLOCKA, 215             /CR
4176  0212                      212             /LF

4177  0000              BLOCK1, 0

      4307              *BLOCK1+110
4307  0215              BLOCKB, 215             /CR
4310  0212                      212             /LF

4311  0000              BLOCK2, 0

      4421              *BLOCK2+110
4421  0215              BLOCKC, 215             /CR
4422  0212                      212             /LF

      4575              *BLOCKA+400
4575  0000              DBLK,   0

      5175              *DBLK+400

                        $
```

THERE ARE NO ERRORS