

IDENTIFICATION

Product Code: MAINDEC-08-D2PE-D
Product Name: Family-of-8 ASR 33/35
Teletype Tests Part 1
Date Created: February 21, 1969
Maintainer: Diagnostic Group

1. ABSTRACT

The Family-of-8 ASR33/35 Teletype Tests Part 1 is the first part of a two part package used to test the ASR33, ASR33TY, or ASR35 Teletype when attached to a Family-of-8 system.

Part 1 contains nine selectable programs numbered from 0 to 10 (octal). The programs are selected by means of the switch register (SR).

The programs available are:

PRG0	Basic Input Logic Tests
PRG1	Basic Output Logic Tests
PRG2	Reader Test
PRG3	Test Tape Generator. Punches tape with characters stored in locations 0021 and 0022.
PRG4	Test Tape Generator. Punches Binary Count Pattern test tape.
PRG5	Reader Exerciser. Reads Binary Count pattern tape in random length blocks, and with fixed stalls between characters. The stall is determined at random.
PRG6	Reader Exerciser. Reads Binary Count pattern tape. Fixed stall between characters. Stall count is taken from LOC 0023.
PRG7	Reader Exerciser. Reads tape punched with any 2 test characters. Random length blocks and fixed stall between characters. The stall is determined at random.
PRG10	Reader Exerciser. Reads tape punched with any 2 test characters. Fixed stall between characters. Stall count taken from LOC 0023.
PRG11	ASR33TY Automatic Reader option test. Checks for correct response to READER ON, and READER OFF commands.
PRG12	ASR33TY Automatic Punch option test. Checks for correct response to PUNCH ON and PUNCH OFF commands

2. REQUIREMENTS

2.1 Equipment

Standard PDP-8/S, PDP-8 or PDP-8/I with ASR33, ASR33TY, or ASR35 Teletype.

NOTE

Programs PRG0 through PRG10 are not written specifically for the ASR33TY Teletype. Whenever these programs are run, be sure to lock the punch and reader in their ON position. In the case of the reader, use a heavy rubber band to keep the reader switch in the ON position.

2.2 Storage

Locations 0000 through 2341 are used.

3. LOADING PROCEDURE

3.1 Method

The Binary Loader is used to load the program.

4. STARTING PROCEDURE (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. Load binary count pattern test tape in reader.
- c. Turn on reader.
- d. Load address 0200.
- e. Set SR to 0000.
- f. Press START.
- g. Program halts at LOC 0232 to permit setting of options.
- h. Select desired options, if any, in SR. For normal run SR should be 0000. Press

CONTINUE.

i. Program is executed and halts at LOC 0274, program end halt, if no loop options are selected and if no errors occur.

5. OPERATING PROCEDURE (PRG0)

5.1 Program and/or Operator Action (PRG0)

5.1.1 Normal Halts (PRG0)

LOC 0232	SR SET halt. Occurs to permit setting of desired options.
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.
LOC 0320	Routine end halt. Occurs at end of routine if SR0 = 1. To proceed, press CONTINUE.

6. ERRORS (PRG0)

6.1 Error Halts and Description (PRG0)

LOC 0177	Incorrect program number selected. Set SR to 0000 and press CONTINUE.
LOC 0255	Nonexistent routine selected. Set correct routine number in SR6 through SR11 and press CONTINUE.
LOC 1221	PRG0, routine 0 error halt. KCC instruction failed to clear the AC. Pressing CONTINUE enters scope loop that sets AC to all 1s, issues KCC to clear AC, and repeats. Manual restart.
LOC 1244	PRG0, routine 1 error halt. 200 ms after KRB instruction the flag is not set, or KSF instruction failed to skip on flag = 1. Pressing CONTINUE repeats the test.
LOC 1267	PRG0, routine 2 error halt A. Same as PRG0, routine 1 error halt.
LOC 1271	PRG0, routine 2 error halt B. KSF instruction failed to skip with flag = 1. Pressing CONTINUE enters scope loop that skips on flag continuously. Manual Restart.
LOC 1320	PRG0, routine 3 error halt A. Same as PRG0, routine 1 error halt.
LOC 1322	PRG0, routine 3 error halt B. KCC failed to reset, or KSF instruction skipped with flag = 0. Pressing CONTINUE enters scope loop that clears the flag and skips on flag continuously. Manual restart.
LOC 1345	PRG0, routine 4, error halt A. Unexpected interrupt. Turn off any device that may be causing an interrupt (other than the Teletype). Pressing CONTINUE repeats the test.
LOC 1362	PRG0, routine 4, error halt B. With reader flag = 1 and interrupt enabled, no interrupt occurred. Pressing CONTINUE enters scope loop that turns on interrupt continuously. Manual restart.
LOC 1417	PRG0, routine 5, error halt. Timing error. Flag not -1 110 ms after KRB command. Pressing CONTINUE enters scope loop that reads tape continuously to aid in timing adjustment. Manual restart.

LOC 1457	PRG0, routine 6, error halt A. Reread error. A reread of the Teletype buffer did not match with the original read. New character is displayed in AC. Press CONTINUE.
LOC 1462	PRG0, routine 6, error halt B. Follow up halt to PRG0, routine 6, error halt A. The "old" character is displayed in AC. Pressing CONTINUE enters scope loop that reads the teletype buffer continuously. Manual restart.

4A. 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.
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. Insure Teletype is on-line.
- b. Insure reader is off.
- c. Insure that there is paper in teleprinter.
- d. Load address 0200.
- e. Set SR to 0001.
- f. Press START.
- g. Program halts at LOC 0232 to permit setting of options.
- h. Select desired options, if any, in SR. For normal run SR should be 0000. Press CONTINUE.
- i. Program is executed and halts at LOC 0274, program end halt, if no loop options are selected and if no errors occur.

5.A OPERATING PROCEDURE (PRG1)

5.1A Program and/or Operator Action (PRG1)

5.1.1A Normal Halts (PRG1)

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

6.A ERRORS (PRG1)

6.1A Error Halts and Description (PRG1)

LOC 0177	Incorrect program number selected. Set SR to 0001 and press CONTINUE.
LOC 0255	Nonexistent routine selected. Set correct routine number in SR6 through SR11 and press CONTINUE.
LOC 1627	PRG1, routine 0, error halt A. 200 ms after TLS command the flag is not 1, or TSF command failed to skip. Pressing CONTINUE repeats the test.
LOC 1631	PRG1, routine 0, error halt B. With flag = 1, TSF command failed to skip. Pressing CONTINUE enters scope loop that skips on flag continuously. Manual restart.
LOC 1651	PRG1, routine 1 error halt. TCF command failed to clear flag, or TSF command skipped with flag = 0. Pressing CONTINUE enters scope loop that clears the flag and then skips on flag continuously. Manual restart.
LOC 1676	PRG1, routine 2 error halt. TCF command failed to clear flag. Pressing CONTINUE enters scope loop that issues TCF command continuously. Manual restart.
LOC 1717	PRG1, routine 3, error halt A. Unexpected interrupt. Turn off any device that may be causing an interrupt. (The teletype reader must be off). Press CONTINUE to repeat test.
LOC 1734	PRG1, routine 3, error halt B. With flag = 1, and interrupt enabled, no interrupt occurred. Pressing CONTINUE enters scope loop that turns on interrupt continuously. Manual restart.
LOC 1765	PRG1, routine 4 error halt. Timing error. Flag not 1 110 ms after TLS command. Pressing CONTINUE enters scope loop that runs the printer/punch continuously, to aid in timing adjustment. Manual restart.

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. Load binary count pattern test tape in reader.
- c. Turn on reader.
- d. Load address 0200.
- e. Set SR to 0002.
- f. Press START
- g. Program halts at LOC 0232 to permit setting of options.
- h. Set desired options, if any, in SR. For normal run, SR should be 0000. Press CONTINUE.
- i. Program is executed and halts at LOC 0274, program end halt, if no loop options are set, and if no errors occur.

5.B OPERATING PROCEDURE (PRG2)

5.1B Program and/or Operator Action (PRG2)

5.1.1B Normal Halts (PRG2)

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

6.B ERRORS (PRG2)

6.1B Error Halts and Description (PRG2)

LOC 0177	Incorrect program number selected. Set SR to 0002 and press CONTINUE.
LOC 0255	Nonexistent routine selected. Set correct routine number in SR6 through SR11 and press CONTINUE.
LOC 0564	Unable to sync. Sync subroutine has not found an all 1's character within 256 characters. Press CONTINUE to retry.
LOC 2030	PRG2, routine 0, error halt A. Read error. Bad character in AC. Press CONTINUE.
LOC 2033	PRG2, routine 0, error halt B. Follow up halt. Expected character in AC. Pressing CONTINUE resumes test.
LOC 2062	PRG2, routine 1, error halt A. Read error. Bad character in AC. Press CONTINUE.
LOC 2065	PRG2, routine 1, error halt B. Follow up halt. Expected character in AC. Pressing CONTINUE resumes test.
LOC 2120	PRG2, routine 2, error halt A. Read error. Bad character in AC. Press CONTINUE.
LOC 2123	PRG2, routine 2, error halt B. Follow up halt. Expected character AC. Pressing CONTINUE resumes test.

4.C STARTING PROCEDURES (PRG3)

4.1.C Control Switch Settings (PRG3)

None

4.2C Starting Addresses (PRG3)

This program starts at LOC 0200.

4.3C Program and/or Operator Action (PRG3)

- a. Insure Teletype is on-line.
- b. Turn off teletype reader.
- c. Load blank tape in punch.
- d. Turn on punch.
- e. Deposit in LOC 0021 and 0022 (8), the 8-bit code for characters to be punched.
- f. Load address 0200.
- g. Set SR to 0003.

- h. Press START.
- i. Program punches tape until stopped by user.

5.C OPERATING PROCEDURE (PRG3)

5.1C Program and/or Operator Action (PRG3)

5.1.1C Normal Halts (PRG3)

None

6.C ERRORS (PRG3)

6.1C Error Halts and Description (PRG3)

LOC 0177 Incorrect program number selected. Set SR to 0003 and press
CONTINUE.

4.D STARTING PROCEDURES (PRG4)

4.1D Control Switch Settings (PRG4)

None

4.2D Starting Addresses (PRG4)

This program starts at LOC 0200.

4.3D Program and/or Operator Action (PRG4)

- a. Insure Teletype is on-line.
- b. Turn off teletype reader.
- c. Load blank tape in punch.
- d. Turn on punch.
- e. Load address 0200.
- f. Set SR to 0004.
- g. Press START.
- h. Program punches binary count pattern test tape until stopped user.

5.D OPERATING PROCEDURE (PRG4)

5.1D Program and/or Operator Action (PRG4)

5.1.1D Normal Halts (PRG4)

None.

6.D ERRORS (PRG4)

6.1D Error Halts and Description (PRG4)

LOC 0177 Incorrect program number selected. Set SR to 0004 and press CONTINUE.

4.E STARTING PROCEDURES (PRG5)

4.1E Control Switch Settings (PRG5)

SR0 Halt. Program halts with accumulated error count in AC.
SR5 Halt on error. Program halts if read-error occurs.

4.2E Starting Addresses (PRG5)

This program starts at LOC 0200.

4.3E Program and/or Operator Action (PRG5)

- a. Insure Teletype is on-line.
- b. Load binary count pattern test tape in reader.
- c. Turn on reader.
- d. Load address 0200.
- e. Set SR to 0005.
- f. Press START.
- g. Program runs continuously until stopped, unless a read error occurs with SR5 = 1, or SR0 is set to 1.

5.E OPERATING PROCEDURE (PRG5)

5.1E Program and/or Operator Action (PRG5)

5.1.1E Normal Halts

LOC 1115 Halt. Accumulated errors in AC. Occurs if SR0 = 1. Press CONTINUE to proceed.

6.E ERRORS (PRG5)

6.1E Error Halts and Description (PRG5)

LOC 0177 Incorrect program number selected. Set SR to 0005 and press CONTINUE.

LOC 1110 Read error halt. Occurs if SR5 = 1. Press CONTINUE to proceed.

4.F STARTING PROCEDURES (PRG6)

4.1F Control Switch Settings (PRG6)

SR0 Halt. Program halts with accumulated error count in AC.

SR5 Halt on error. Program halts if read error occurs.

4.2F Starting Addresses (PRG6)

This program starts at LOC 0200.

4.3F Program and/or Operator Action (PRG6)

- a. Insure Teletype is on-line.
- b. Load binary count pattern test tape in reader.
- c. Turn on reader.
- d. Deposit in LOC 0023 the desired stall count in 2's complement form. A count of -1 gives a 1ms stall, etc.
- e. Load address 0200.
- f. Set SR to 0006.
- g. Press START.
- h. Program runs continuously until stopped, unless a read error occurs with SR5 = 1, or SR0 is set to 1.

5.F OPERATING PROCEDURE (PRG6)

5.1F Program and/or Operator Action (PRG6)

5.1.1F Normal Halts (PRG6)

LOC 1115 Halt. Accumulated errors in AC. Occurs if SR0 = 1. Press CONTINUE to proceed.

6.F ERRORS (PRG6)

6.1F Error Halts and Description (PRG6)

LOC 0177 Incorrect program number selected. Set SR to 0006 and press CONTINUE.

LOC 1110 Read error halt. Occurs if SR5 = 1. Press CONTINUE to proceed.

4.G STARTING PROCEDURES (PRG7)

4.1G Control Switch Settings (PRG7)

SR0 Halt. Program halts with accumulated error count in AC.

SR5 Halt on error. Program halts if read error occurs.

4.2G Starting Addresses (PRG7)

This program starts at LOC 0200.

4.3G Program and/or Operator Action (PRG7)

- a. Insure Teletype is on-line.
- b. Load reader with 2-character test tape.
- c. Turn on reader.
- d. Deposit in location 0021 and 0022 the 8-bit codes for the character punched in the test tape.
- e. Load address 0200.
- f. Set SR to 0007.
- g. Press START
- h. Program runs continuously until stopped, unless a read error occurs with SR5 = 1, or SR0 is set to 1.

5.G OPERATING PROCEDURE (PRG7)

5.1G Program and/or Operator Action (PRG7)

5.1.1G Normal Halts (PRG7)

LOC 1115 Halt. Accumulated errors in AC. Occurs if SR0 = 1. Press CONTINUE to proceed.

6.G ERRORS (PRG7)

6.1G Error Halts and Description (PRG7)

LOC 0177 Incorrect program number selected. Set SR to 0007 and press CONTINUE.

LOC 1110 Read error halt. Occurs if SR5=1. Press CONTINUE to proceed.

LOC 1137 Align error halt. Insure that correct tape is used, and check Step 4.3Gd.

4.H STARTING PROCEDURES (PRG 10)

4.1H Control Switch Settings (PRG 10)

SR0 Halt. Program halts with accumulated error count in AC.

SR5 Halt on error. Program halts if read error occurs.

4.2H Starting Addresses (PRG 10)

This program starts at LOC 0200.

4.3H Program and/or Operator Action (PRG 10)

- a. Insure Teletype is on-line.
- b. Load reader with 2-character test tape.
- c. Turn on reader
- d. 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 0010.

- g. Press START.
- h. Program runs continuously until stopped, unless a read error occurs with $SR5 = 1$, or $SR0$ is set to 1.

5.H OPERATING PROCEDURE (PRG10)

5.1H Normal Halts (PRG 10)

LOC 1115 Halt. Accumulated errors in AC. Occurs if $SR0 = 1$. Press CONTINUE to proceed.

6.H ERRORS (PRG 10)

6.1H Error Halts and Description (PRG 10)

LOC 0177 Incorrect program number selected. Set SR to 0007 and press CONTINUE.

LOC 1110 Read error halt. Occurs if $SR5 = 1$. Press CONTINUE to proceed.

LOC 1137 Align error halt. Insure that correct tape is used, and check Step 4.3Hd.

4.I STARTING PROCEDURES (PRG 11)

4.II Control Switch Settings (PRG 11)

None

4.2I Starting Addresses (PRG 11)

This program starts at LOC 0200.

4.3I Program and/or Operator Action (PRG 11)

- a. Insure that Teletype is on-line.
- b. Load reader with any test tape loop .
- c. Turn on reader by pushing the momentary contact switch to the START position.
- d. Make sure that teletype punch is not locked on.
- e. Load Address 0200.
- f. Set SR to 0011.
- g. Press START
- h. Program runs continuously until stopped, unless an error halt occurs.

5.I OPERATING PROCEDURE (PRG 11)

5.II Normal Halts (PRG 11)

None

6.I ERRORS (PRG 11)

6.II Error halts and Description (PRG 11)

LOC 2212

Reader flag not set after approximately 110 ms after KCC command issued after READER ON command. Probably the READER ON command failed to turn on the reader. Press CONTINUE to proceed.

LOC 2227

Reader flag was set after approximately 110 ms after KCC command issued after READER OFF command. Probably the READER OFF command failed to turn off the reader. Press CONTINUE to proceed.

4.J STARTING PROCEDURES (PRG 12)

4.1J Control Switch Settings (PRG 12)

None

4.2J Starting Addresses (PRG 12)

This program starts at LOC 0200.

4.3J Program and/or Operator Action (PRG 12)

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

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

c. Turn on reader by pushing the momentary contact switch to the START position.

d. Make sure that teletype punch is not locked on.

e. Load address 0200.

f. Set SR to 0012.

g. Press START

h. Program runs continuously until stopped, unless an error halt occurs.

5.J OPERATING PROCEDURE (PRG 12)

5.1J Normal Halts (PRG 12)

None

6.J ERRORS (PRG 12)

6.1J Error halts and Description (PRG 12)

LOC 2337	Reader failed to read a rubout. Reader failed to read correctly if character on tape is a rubout. If tape character is a rubout, the PUNCH FEED OFF command failed to stop the punch from feeding. Check for other similar failures. To be correct, the punched tape should contain all rubouts. Press CONTINUE to proceed.
----------	---

6.2J Other Errors (PRG 12)

Failure of the PUNCH FEED ON command will eventually be detected by the tightening of the slack between the reader and punch. The longer the program is run the better the chances are of detecting the problem, if present.

7. RESTRICTIONS

7.1 Starting Restrictions

All programs must be started at LOC 0200.

7.2 Operating Restrictions

PRG0 and PRG1 must be run prior to executing any other programs. Problems detected during execution of PRG0 and PRG1 should be corrected as they occur.

PRG11 must precede PRG12 execution.

8. MISCELLANEOUS

8.1 Execution Time

PRG0 execution time: 1 minute

PRG1 execution time: 20 seconds

PRG2 execution time: 18 minutes

PRG3 through PRG12 are continuous run programs.

8.2 Test Tapes

MAINDEC-08-D2G3-PT Binary Count Pattern test tape is provided with this program. For convenience in use, the tape should be spliced into a loop, making sure that the pattern is matched at the splice point.

9. PROGRAM DESCRIPTION

The Family-of-8 ASR33/35 Teletype Tests, Part 1, consists of 11 programs numbered from 0 to 12 (octal).

9.1 PRG0 - Basic Input Logic Tests

This program contains 7 routines numbered from 0 to 6 (octal).

RTN0 Checks that KCC command is able to clear the AC. Test is done 1000 times.

RTN1 Issues KCC, waits 200 ms and checks for flag = 1. A failure to skip on flag indicates that flag is not 1, or KSF command failure to skip.

RTN2	Checks ability of KSF command to skip with flag = 1. Done 1000 times.
RTN3	Checks that KSF command does not skip with flag = 0. Done 500 times.
RTN4	Checks that no other device can cause an interrupt, and then checks that the reader is capable of interrupting.
RTN5	Timing Test.
RTN6	Reads a character from tape and saves it. It then rereads the TTI statically 1000 times to check for consistent reading from TTI. 256 characters are read in this manner.

9.2 PRG1 - Basic Output Logic Tests

This program contains five routines numbered from 0 to 4.

RTN0	Issues TLS, waits 200 ms, and checks for flag = 1. A failure to skip indicates that flag is not 1, or KSF command failed. If this part is satisfied the routine skips on flag = 1, 1000 times. Failure to skip indicates TSF failure.
RTN1	Checks that TSF command does not skip with flag = 0. Done 1000 times.
RTN2	Checks that TCF command clears flag. Done 100 times.
RTN3	Checks that no other device can cause an interrupt, and then checks that the printer/punch is able to interrupt.
RTN4	Timing Test.

9.3 PRG2 - Reader Test

This program contains three routines numbered from 0 to 2.

RTN0	Reads 4095 characters of binary count pattern, at full speed.
RTN1	Reads 2000 characters of binary count patterns with random stalls between characters.
RTN2	Reads 100 random-length character blocks. Fixed stall between characters in a block. Stall is changed for each block and is determined at random.

9.4 PRG3 - Test Tape Generator

This program punches test tape with characters whose code is stored in LOC 0021 and 0022.

9.5 PRG4 - Test Tape Generator

Punches binary count pattern test tape.

9.6 PRG5 – Reader Exerciser

This program reads binary count pattern test tape, in random length blocks, and with fixed stalls between characters. Stall is determined at random.

9.7 PRG6 – Reader Exerciser

Reads binary count pattern test tape. Fixed stall between characters. Stall count is taken from LOC 0023.

9.8 PRG7 – Reader Exerciser

Reads test tape punched with any two test characters, random length blocks, and fixed stall between characters. Stall is determined at random.

9.9 PRG10 – Reader Exerciser

Reads test tape punched with any two test characters. Fixed stall between characters. Stall count taken from LOC 0023.

9.10 PRG11 – ASR33TY Automatic Reader Option Test

Checks for correct response to READER ON, and READER OFF commands by checking for correct state of reader flag 110 ms after issuing KCC command which is preceded by one of the reader control commands.

The coder control commands used are:

READER ON – 221

READER OFF – 223

9.11 PRG12 – ASR33TY Automatic Punch Option Test

Checks for correct operation of PUNCH FEED ON and PUNCH FEED OFF commands by punching rubouts with the punch feed on, and all 0's characters with the punch feed off. The resulting tape should contain all rubouts. The tape is verified by running it through the reader at the same time.

The punch control commands used are:

PUNCH FEED ON – 222

PUNCH FEED OFF – 224

```
/FAMILY OF ASR33/35 TELETYPE TESTS - PART 1
/
/COPYRIGHT 1969, DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS.
/
/PRG0-BASIC INPUT CONTROL LOGIC TEST - (USES READER)
/PRG1-BASIC OUTPUT CONTROL LOGIC TEST - (USES PRINTER)
/PRG2-READER TEST
/PRG3-TEST TAPE GENERATOR, PUNCHES CONTENTS OF LOC 0021 AND 0022
/PRG4-TEST TAPE GENERATOR, PUNCHES BINARY COUNT PATTERN TEST TAPE
/PRG5-READER EXERCISER, READS BINARY COUNT PATTERN TEST TAPE IN RANDOM
/    LENGTH BLOCKS, STALLS WITH FIXED DELAY BETWEEN CHARACTERS. STALL
/    IS DIFFERENT FOR EACH BLOCK,
/PRG6-READER EXERCISER READS BINARY COUNT PATTERN, FIXED STALL BETWEEN CHARACTERS.
/PRG7-READER EXERCISER, READS TAPE PUNCHED BY PRG3, TEST DATA MUST BE STORED
/    IN LOC 0021 AND 0022, RANDOM LENGTH BLOCKS, FIXED STALL BETWEEN
/    CHARACTERS, STALL DIFFERENT FOR EACH BLOCK
/PRG10-SAME AS PRG7, BUT FIXED STALL BETWEEN CHARACTERS (NO RANDOM LENGTH BLOCKS)
/PRG11-ASR33TY AUTOMATIC READER OPTION TEST
/PRG12-ASR33TY AUTOMATIC PUNCH OPTION TEST
/
/SR OPTIONS
/
/SR0-HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC
/SR1-SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 TO SR11
/SR2-LOOP PROGRAM
/SR5-HALT ON ERROR
/SR6-SR11-ROUTINE NUMBER TO BE SELECTED,
```

/FAMILY-OF-8 ASR33/35 TELETYPE TESTS-PART 1
*0

0000 0000 0000
0001 5001 JMP 1
0002 0002 2
0003 0003 3
0005 0005 *5
0005 5402 JMP I 2
0006 0000 0

0020 0000 *20
0021 0000 KSTART, 0
0022 0000 PTEMP, 0
0023 0000 PTEMP1, 0
0024 0257 DELAYN, 0
0025 0313 CHAIN, CHAINN
0026 0322 SHLT, SHALT
0027 0333 SETCTR, STCTR
0030 0345 DLY1SC, DLYSC
0031 0232 DLY1MS, DLYMS
0032 0400 SRST, SRSET
0033 0017 RANDNO, RANGEN
0034 7766 PRGMSK, 17
0035 0000 PRGLIM, -12
0036 0037 PRGNUM, 0
0037 1200 PSW, PRGTAB
0040 1600 PRGTAB, PRG0
0041 2000 PRG1
0042 1000 PRG2
0043 1006 PRG3
0044 1013 PRG4
0045 1031 PRG5
0046 1042 PRG6
0047 1060 PRG7
0050 2200 PRG10
0051 2244 PRG11
PRG12

/USER PROGRAM START,

/CHAIN RTN ENTRY.
/HALT TEST ENTRY
/SET COUNTER ENTRY
/DELAY SECONDS ENTRY
/DELAY MILLISECS ENTRY

PAL12 V133

21-FEB-69

18:16 PAGE 3

0052	0000	TEMP, 0	/WORK
0053	0000	TEMP1, 0	/LOCATIONS
0054	0077	TSIMSK, 77	/SR 6-11 ENABLE MASK
0055	0100	SRPMASK, 100	/SR5 MASK
0056	0000	CPI0, 0	/IDENTIFIES CPU
0057	0000	CURTST, 0	/FOR CURRENT TEST ADDRESS
0060	0000	RTNNO, 0	/FOR CURRENT TEST NUMBER
0061	0000	NXTST, 0	/FOR NEXT TEST ADDRESS
0062	0000	SCCTR, 0	/SECONDS COUNTER
0063	0000	MSCTR, 0	/MILLISECONDS COUNTER
0064	0000	MILCTR, 0	
0065	0000	MIL1, 0	/FOR 1 MSEC CONSTANT
0066	7444	KPB, -334	/PDP8 1 MSEC CONSTANT
0067	7764	KPBS, -14	/PDP8S 1 MSEC CONSTANT
0070	0000	TEMO, 0	/CONSTANTS
0071	0000	TEMR, 0	/FOR
0072	0000	FLAG, 0	/TYPE
0073	0077	K77, 77	/CHARACTER
0074	7740	M40, -40	/STRING
0075	0100	C100, 100	/SUBROUTINE
0076	0240	C240, 240	
0077	7500	SKIPMA, SMA	
0100	7510	SKIPPA, SPA	
0101	0000	CTRA, 0	/COUNTER A,
0102	0000	CTRB, 0	/COUNTER B,
0103	0000	SCNT, 0	
0104	7634	K100, -144	
0105	2000	K2000, 2000	
		/	
0106	0546	SYNCR, SYNCR	/ENTRY TO SYNC TAPE RTN,
0107	0444	INPAT, INIPT	/ENTRY TO INITIATE PATTERN
0110	0453	GEIPT, GEIPT	/ENTRY TO GET PATTERN CHAR,
0111	0531	CHECK, CHCK	
0112	0502	CRCNT, CHRCNT	
0113	0520	DLYCNT, DLCCNT	
0114	0000	PFLAG, 0	
0115	0465	UPUNCH, PUNCH	
0116	0600	UMOVE, MOVE	
0117	7401	MRROUT, -377	

```

/CONTROL ROUTINE
* 177
0177 0177
0200 7402 HLT /INCORRECT PROGRAM NUMBER
0201 7604 START, LAS
0202 0033 AND PRGMSK
0203 1034 TAD PRGLIM
0204 7540 SMA SZA
0205 5177 JMP 177
0206 7604 LAS
0207 0033 AND PRGMSK
0210 3035 DCA PRGNUM
0211 1035 TAD PRGNUM
0212 1036 TAD PSW
0213 3052 DCA TEMP
0214 1452 TAD I TEMP
0215 3231 DCA PRGADR
0216 7350 ID, CLA CLL CMA RAR
0217 7710 SPA CLA
0220 5222 JMP ,+3
0221 1066 TAD KP8
0222 7410 SKP
0223 1067 TAD KP8S
0224 3065 DCA MIL1
0225 4516 JMS I UMOVE /INITIALIZE
0226 0005 5 /INTERRUPT,
0227 0001 1 /AREA,
0228 7776 -2
0230 5631 JMP I ,+1
0231 0000 PRGADR, 0
0232 7602 SRSET, HLT CLA

0233 7200 GETRDY, CLA
0234 1020 TAD KSTART /SET ADDRESS OF 1ST ROUTINE
0235 3061 DCA NXTST /STORE AT NXTST
0236 4276 JMS FORWD
0237 7604 LAS /READ SR
0240 7004 RAL
0241 7500 SMA /ROUTINE SELECT?
0242 5457 JMP I CURTST /NO, START WITH 1ST RTN
0243 7604 LAS /YES
0244 0054 AND TSTMSK
0245 7041 CIA
0246 1060 TAD RTNNO
0247 7650 SNA CLA /IS IT THIS RTN?
0250 5457 JMP I CURTST /YES, GO DO IT
0251 1061 TAD NXTST /NO
0252 7001 IAC /IS THIS LAST TRN?
0253 7640 SZA CLA /NO
0254 5236 JMP GETRDY+3
0255 7402 INCRTN, HLT /YES, INCORRECT ROUTINE NO.
0256 5233 JMP GETRDY

```


0257	4313	CHAINN, JMS SHALT	/HALT? (SR0)
0258	7604	LAS	/READ SR
0259	7206	RIL	
0260	7630	SZL CLA	/SELECT ROUTINE? (SR1)
0261	5233	JMP GETRUY	/YES
0264	1061	TAD NXTST	
0265	7001	IAC	
0266	7640	SZ4 CLA	/LAST ROUTINE?
0267	5236	JMP GETRUY+3	/NO,
0270	7604	LAS	
0271	7006	RTL	
0272	7710	SPA CLA	/LOOP PROGRAM? (SR2)
0273	5233	JMP GETRUY	/YES
0274	7402	PRGEND, HLT	/END OF PROGRAM HALT
0275	5257	JMP CHAINN	
0276	0000	FORWD, 0	
0277	7300	CLA CLL	
0300	1461	TAD I NXTST	/GET NEXT RTN NO
0301	3060	DCA RTNNO	/STORE AT RTNNO
0302	2061	ISZ NXTST	
0303	1061	TAD NXTST	/SET CURRENT
0304	3052	DCA TEMP	/RTN NUMBER
0305	2061	ISZ NXTST	
0306	1061	TAD NXTST	/SET CURRENT
0307	3057	DCA CURTST	/RTN ADDR,
0310	1452	TAD I TEMP	/SET NEXT
0311	3061	DCA NXTST	/RTN ADDR,
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	
0317	1060	TAD RTNNO	
0320	7402	HLT	/UNCONDITIONAL HALT (SR0 = 1)
0321	5713	JMP I SHALT	/EXIT,S/-10L
0322	0000	STCTR, 0	
0323	7200	CLA	
0324	1722	TAD I STCTR	/GET CTR ADDR
0325	3052	DCA TEMP	/AND SAVE AT TEMP
0326	2322	ISZ STCTR	
0327	1722	TAD I STCTR	/GET COUNT AND
0330	3452	DCA I TEMP	/STORE PER C(TEMP)
0331	2322	ISZ STCTR	
0332	5722	JMP I STCTR	/EXIT
0333	0000	DLYSC, 0	
0334	7300	CLA CLL	
0335	1733	TAD I DLYSC	/GET SECONDS COUNT
0336	3062	DCA SCCTR	/STORE AT SCCTR
0337	4345	JMS DLYMS	/GO DELAY
0340	6030	=1750	/1 SECOND (1000 MSEC),
0341	2062	ISZ SCCTR	/DONE DELAYING?
0342	5337	JMP ,=3	
0343	2333	ISZ DLYSC	/YES
0344	5733	JMP I DLYSC	/EXIT
0345	0000	DLYMS, 0	
0346	7300	CLA CLL	
0347	1023	TAD DELAYM	/GET MS COUNT
0350	3063	DCA MSCTR	/STORE IN MSCTR
0351	1065	TAD MIL1	/GET 1 MS CONSTANT
0352	3064	DCA MILCTR	/STORE IN MILCTR
0353	2064	ISZ MILCTR	/DELAYED 1 MSEC?
0354	5353	JMP ,=1	
0355	2063	ISZ MSCTR	/DONE DELAYING?
0356	5351	JMP ,=5	
0357	5745	JMP I DLYMS	/EXIT

```

      0400      *.177+1
              /RANDOM NUMBER GENERATOR SUBROUTINE
              RANGEN, 0
              CLA
0401 0000      TAD RANTND
0402 7200      TAD RANDEX
0403 1242      SZA CLA
0404 1227      JMP RANTAD
0405 7640      TAD RANTBL
0406 5215      DCA RANDEX
0407 1231      TAD RANCON
0408 3227      CLL RAL
0409 1230      SZL
0410 7104      IAC
0411 7430      DCA RANCON
0412 7001      RANTAD, TAD RANCON
0413 3230      TAD I RANDEX
0414 1230      DCA I RANDEX
0415 1627      TAD RANSAV
0416 3627      RAR
0417 1243      TAD I RANDEX
0418 7010      ISZ RANDEX
0419 1627      DCA RANSAV
0420 3243      TAD RANSAV
0421 1243      JMP I RANGEN
0422 5600      RANDEX, RANTND
0423 0442      RANCON, 6543
0424 6543      RANTBL, ,+1
0425 0432      6543
0426 6543      3210
0427 3210      0765
0428 0765      5432
0429 5432      2107
0430 2107      7654
0431 7654      4321
0432 4321      1076
0433 1076      RANTND, -,
0434 7336      RANSAV, 0
0435 0000

```

```

/SUBROUTINE TO INITIALIZE BINARY COUNT PATTERN
0444 0000 INITPT, 0
0445 7200 CLA /SET PT0 = 0
0446 3250 DCA PT0
0447 5644 JMP I INITPT /EXIT
0450 0000 PT0, 0
0451 0000 PT1, 0
0452 0377 PTMSK, 377

/SUBROUTINE TO PROVIDE NEXT BINARY COUNT PATTERN CHARACTER (IN AC)
0453 0000 GETPTT, 0
0454 7200 CLA
0455 1250 TAD PT0 /GET PT0
0456 3251 DCA PT1 /STORE AT PT1
0457 1251 TAD PT1 /GET PT1
0460 7001 IAC /INCREMENT ACCUMULATOR
0461 0252 AND PTMSK /LIMIT TO 8 BITS
0462 3250 DCA PT0 /STORE AT PT0
0463 1251 TAD PT1 /GET PT1
0464 5653 JMP I GETPTT /EXIT

/PUNCH/PRINT ONE CHARACTER SUBROUTINE (CHAR IN AC).
0465 0000 PUNCH, 0
0466 2114 ISZ PFLAG /SET PFLAG
0467 6046 TLS /PUNCH PRINT
0470 7200 CLA
0471 1114 TAD PFLAG
0472 7640 SZA CLA /FLAG RESET?
0473 7410 SKP /NO
0474 5277 JMP ,+3 /YES,
0475 6041 TSF /DONE PRINTING
0476 5271 JMP ,+5 /NO,
0477 6042 TCF /YES, RESET PUNCH/PRINTER FLAG
0500 3114 DCA PFLAG /RESET PFLAG,
0501 5665 JMP I PUNCH /EXIT,

/SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT, (NOT MORE THAN 77(8))
0502 0000 CHRCNT, 0
0503 4432 JMS I RANDNO /GO GENERATE RANDOM NUMBER
0504 0317 AND CRMSK /REMOVE HIGH ORDER 6 BITS
0505 7450 SVA
0506 5303 JMP CHRCNT+1
0507 7041 CIA /2'S COMPLEMENT IT
0510 3103 DCA SCNT
0511 1702 TAD I CHRCNT
0512 3052 DCA TEMP
0513 1103 TAD SCNT
0514 3452 DCA I TEMP /STORE AT SPECIFIED ADDRESS
0515 2302 ISZ CHRCNT /SET UP EXIT
0516 5702 JMP I CHRCNT /EXIT
0517 0077 CRMSK, 77

```

/SUBROUTINE TO GENERATE RANDOM DELAY COUNT (NOT MORE THAN 3777(8)).

```

/
DLCNT,
0520 0000      JMS I RANDNO      /GO GENERATE RANDOM NUMBER
0521 4432      AND DLYMSK        /MASK OUT UNDESIRED BITS.
0522 0330      SNA              /ZERO?
0523 7450      JMP DLCNT+1      /YES, GET ANOTHER NUMBER
0524 5321      CIA              /2'S COMPLEMENT IT
0525 7041      DCA DELAYM
0526 3023      JMP I DLCNT      /EXIT
0527 5720
0530 0277      DLYMSK, 277

```

/SUBROUTINE TO COMPARE C(AC) TO CONTENTS STORED AT CALL+1

```

/
CHK, 0
0531 0000      DCA WCHK          /STORE AC AT WCHK
0532 3345      TAD I CHK        /GET COMPARE DATA
0533 1731      CIA              /2'S COMPLEMENT IT
0534 7041      TAD WCHK         /ADD C(WCHK)
0535 1345      ISZ CHK          /SET UP FOR UNEQUAL EXIT
0536 2331      SZA CLA          /EQUAL (AC = 0)
0537 7640      JMP ,+3          /NO
0540 5343      ISZ CHK          /YES, SET UP FOR EQUAL EXIT
0541 2331      JMP I CHK        /EQUAL EXIT
0542 5731      TAD WCHK        /RESTORE AC
0543 1345      JMP I CHK        /UNEQUAL EXIT
0544 5731
0545 0000      WCHK, 0

```

/SYNC ON TAPE SUBROUTINE

```

/
SYNK, 0
0546 0000      JMS I SETCTR      /SET COUNT OF
0547 4426      CTSK              /-256 (DEC) IN
0550 0566      =400             /CTSK
0551 7400      SYNKA, KCC        /CLEAR AC AND FLAG
0552 6032      KSF              /READY?
0553 6031      JMP ,=1          /NO, TEST AGAIN
0554 5353      KRS              /YES, READ
0555 6034      TAD MRBOUT
0556 1117      SZA CLA          /377?
0557 7640      SKP
0560 7410      JMP I SYNK       /YES, EXIT
0561 5746

0562 2366      ISZ CTSK         /BUMP CHAR CTR +1
0563 5352      JAF SYNKA        /GO READ AGAIN
0564 7402      HLT              /256 CHARS READ, CAN'T SYNC
0565 5347      JMP SYNK+1       /GO TO SRST
0566 0000      CTSK, 0         /CHAR COUNTER

```

```

0600      * 177+1
          /SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS
0600      MOVE, 0
0601      CLA
0602      TAD I MOVE      /GET "FROM ADDR" AND
0603      DCA FADDR      /STORE AT FADDR
0604      ISZ MOVE
0605      TAD I MOVE      /GET "TO ADDR" AND
0606      DCA TADDR      /STORE AT TADDR,
0607      ISZ MOVE
0610      TAD I MOVE      /GET "MOVE COUNT" AND
0611      DCA MCTR        /STORE AT MCTR,
0612      ISZ MOVE        /SET UP FOR EXIT.
0613      MOVEA, CLA
0614      TAD I FADDR      /GET "FROM" WORD
0615      DCA I TADDR      /STORE AT "TO" LOCATION
0616      ISZ FADDR        /+1 TO "FROM" ADDR
0617      ISZ TADDR        /+1 TO "TO" ADDR
0620      ISZ MCTR        /ALL WORDS MOVED?
0621      JMP MOVEA        /NO, GO MOVE AGAIN
0622      JMP I MOVE      /YES, EXIT
0623      FADDR, 0
0624      TADDR, 0
0625      MCTR, 0

```

```

1000      *, 177+1
          /PROGRAM NUMBER 3, PUNCHES TEST TAPE WITH 2 CHARACTERS
          /SPECIFIED IN SYMBOLIC LOCATIONS PTEMP, AND PTEMP1.
1000 7200 PRG3,  CLA
1001 1021      TAD PTEMP      /GET C(PTEMP)
1002 4515      JMS I UPUNCH   /PUNCH C(PTEMP)
1003 1022      TAD PTEMP1     /GET C(PTEMP1)
1004 4515      JMS I UPUNCH   /PUNCH C(PTEMP1)
1005 5200      JMP PRG3       /REPEAT,
/
/PROGRAM NUMBER 4, PUNCHES TEST TAPE WITH BINARY COUNT PATTERN.
1006 7200 PRG4,  CLA
1007 4507      JMS I INPATT    /INITIALIZE BINARY COUNT PATTERN
1010 4510      JMS I GETPT     /GET BINARY COUNT CHARACTER.
1011 4515      JMS I UPUNCH    /PUNCH CHARACTER
1012 5210      JMP ,=2         /REPEAT,
/
/PROGRAM 5=READS COUNT PATTERN-RANDOM NUMBERED GROUPS,
/      FIXED RANDOM DELAY BETWEEN CHARACTERS IN A GROUP.
1013 4506 PRG5,  JMS I SYNC     /SYNC TAPE
1014 3317      DCA ERRCTR      /CLEAR ERROR COUNTER
1015 4507      JMS I INPATT    /INITIALIZE PATTERN.
1016 6032      KCC             /START READER
1017 4513      SRT0A, JMS I DLYCNT /GENERATE DELAY COUNT
1020 4512      JMS I CRCNT     /GO GENERATE AND STORE
1021 0101      CTRA           /RANDOM CHAR, COUNT
1022 4510      SRT0B, JMS I GETPT /GET PATTERN CHAR.
1023 3276      DCA SBSP       /STORE AT SBSP.
1024 4430      JMS I DLY1MS    /GO DELAY
1025 4271      JMS READCK      /GO READ AND CHECK CHAR.
1026 2101      ISZ CTRA       /GROUP DONE?
1027 5222      JMP SRT0B      /NO,
1030 5217      JMP SRT0A      /YES, START AGAIN
/
/PROGRAM 6=READS COUNT PATTERN=FIXED DELAY BETWEEN CHARACTERS
1031 4506 PRG6,  JMS I SYNC     /SYNC TAPE
1032 3317      DCA ERRCTR      /CLEAR ERROR COUNTER
1033 4507      JMS I INPATT    /INITIALIZE PATTERN
1034 6032      KCC             /START READER
1035 4510      SRT1A, JMS I GETPT /GET PATTERN CHAR.
1036 3276      DCA SBSP       /STORE AT SBSP
1037 4430      JMS I DLY1MS    /GO DELAY
1040 4271      JMS READCK      /GO READ AND CHECK CHAR.
1041 5235      JMP SRT1A      /REPEAT

```

```

/PROGRAM 7 - READS CHARS FROM TAPE AND MATCHES AGAINST CHARS
/ IN TEMP AND TEMP1, RANDOM DELAY BETWEEN CHARS,
PRG7,  CLA
      DCA ERRCTR      /CLEAR ERROR COUNTER
      JMS ALIGN       /
      KCC              /START READER
SRT2A, JMS I DLYCNT    /GENERATE DELAY COUNT
      JMS I CRCNT      /GO GENERATE AND STORE
      CTRA             /RANDOM CHAR COUNT
SRT2B, JMS GIVE        /GET CHARACTER
      DCA SBSP         /STORE AT SBSP
      JMS I DLY1MS     /GO DELAY
      JMS READCK       /GO READ AND CHECK CHAR
      ISZ CTRA         /GROUP DONE?
      JMP SRT2B        /NO,
      JMP SRT2A        /YES START AGAIN

```

```

/PROGRAM 10 - SAME AS SRT2, BUT FIXED DELAY BETWEEN
/ CHARS, DELAY IS SPECIFIED IN LOC - DELAYM,
PRG10, CLA
      DCA ERRCTR      /CLEAR ERROR COUNTER,
      JMS ALIGN       /
      KCC              /START READER
SRT3A, JMS GIVE        /SET CHARACTER,
      DCA SBSP         /STORE AT SBSP
      JMS I DLY1MS     /GO DELAY
      JMS READCK       /GO READ AND CHECK CHAR,
      JMP SRT3A        /REPEAT,
/
READCK, 0
      KSF              /READY?
      JMP ,+1          /TEST AGAIN,
      KRB              /READ CLEAR AC AND FLAG,
      JMS I CHECK      /GO CHECK CHARACTER WORD,
      SBSP, 0          /
      JMP ERRCNT       /ERROR, NO MATCH, GO INC, ERRCNT
      JMP HLTST
ERRCNT, ISZ ERRCTR     /INCREMENT ERROR COUNTER
      JMP ,+3
      CLA CMA          /OFLOW, RESET TO 7777,
      DCA ERRCTR
      LAS              /READ SR,
      AND SR5MSK
      SZA CLA          /HALT ON ERROR?
      HLT              /YES,
      HLTST, LAS       /READ SR
      SMA CLA          /HALT?
      JMP I READCK     /NO EXIT
      TAD ERRCTR       /GET ERROR COUNT
      HLT              /HALT, ERROR COUNT IN AC
      JMP I READCK     /EXIT,
ERRCTR, 0              /ERROR COUNTER

```



```

/
1120 0000 ALIGN, 0
1121 7200 CLA
1122 6031 KSF
1123 5322 JMP , -1 /READY?
1124 6034 KRS /TEST AGAIN,
1125 7041 CIA /READ CHARACTER,
1126 3347 DCA ATEMP /2'S COMPLEMENT IT,
1127 1347 TAD ATEMP /STORE AT A TEMP,
1130 1021 TAD PTEMP
1131 7650 SNA CLA /IS IT CHAR IN PTEMP?
1132 5341 JMP AL1 /YES,
1133 1347 TAD ATEMP /NO,
1134 1022 TAD PTEMP1
1135 7650 SNA CLA /IS IT CHAR IN PTEMP1?
1136 5344 JMP AL2 /YES,
1137 7402 HLT /NO, ERROR,
1140 5321 JMP ALIGN+1 /REPEAT,
1141 7040 AL1, CMA
1142 3346 DCA IND /SET IND TO -1
1143 5720 JMP I ALIGN
1144 3346 AL2, DCA IND /SET IND TO 0,
1145 5720 JMP I ALIGN
1146 0000 IND, 0
1147 0000 ATEMP, 0
1150 0000 GIVE, 0
1151 7200 CLA
1152 2346 ISZ IND /IS IND = -1?
1153 5357 JMP , +4 /NO,
1154 3346 DCA IND /YES,
1155 1022 TAD PTEMP1 /GET CHAR FROM TEMP1
1156 5750 JMP I GIVE /EXIT,
1157 7040 CMA
1160 3346 DCA IND /SET IND TO -1,
1161 1021 TAD PTEMP /GET CHAR FROM TEMP,
1162 5750 JMP I GIVE /EXIT,
/

```

```

1200      *, 1/7+1
          /PROGRAM 0, ASR 33/35 TELETYPE BASIC INPUT TESTS.
          /PROGRAM CHECKS INPUT IOT'S, INTERRUPT, AND READER TIMING
1200 4426 PRG0, JMS I SETCTR /SET KSTART TO INITIAL
1201 0020      KSTART /ROUTINE ADDRESS.
1202 1205      P0TS0
1203 5604      JMP I ,+1 /GO START TEST
1204 0232      SRSET

/
1205 0000 P0TS0, 0
1206 1225      P0TS1
          /ISSUE KCC WITH AC=7777, AC SHOULD GO TO 0,
          /AC NOT 0 INDICATES KCC FAILURE, TEST IS DONE 1000 TIMES.
1207 4426 JMS I SETCTR /SET COUNT OF
1210 0101 CTRA /-1000 (DEC) IN
1211 6030 -1750 /CTRA
1212 7240 CLA CMA /SET AC TO 7777
1213 6032 KCC /CLEAR AC AND FLAG
1214 7440 SZA /IS AC = 0?
1215 5221 JMP P0E0 /NO ERROR, GO TO P0E0
1216 2101 ISZ CTRA /DONE?
1217 5212 JMP ,=5 /NO, REPEAT
1220 5424 JMP I CHAIN /CHAIN
1221 7402 P0E0, HLT /TST0 ERR HALT, KCC DID
          /NOT RESULT IN AC = 0
1222 7240 CLA CMA /SET A TO 7777
1223 6032 KCC /CLEAR AC AND FLAG
1224 5222 JMP ,=2 /REPEAT
1225 0001 P0TS1, 1
1226 1246 P0TS2

          /ISSUE KCC, WAIT 200 MSEC FOR FLAG TO SET,
          /SKIP ON FLAG, FAILURE TO SKIP INDICATES
          /THAT FLAG IS NOT SET, OR KSF FAILURE,
          /TEST IS DONE 100 TIMES,
1227 4426 JMS I SETCTR /SET DELAYM
1230 0023 DELAYM /TO -200
1231 7470 -310
1232 4426 P0TS1A, JMS I SETCTR /GO SET COUNT OF
1233 0101 CTRA /-100 (DEC) IN
1234 7634 -144 /CTRA
1235 6032 P0TS1B, KCC /CLEAR AC AND FLAG
1236 4430 JMS I DLY1MS /GO DELAY
1237 6031 KSF /SKIP ON FLAG = 1
1240 5244 JMP P0E1 /ERROR, GO TO E1
1241 2101 ISZ CTRA /ALL DONE?
1242 5235 JMP P0TS1B /NO, REPEAT
1243 5424 JMP I CHAIN /CHAIN
1244 7402 P0E1, HLT /TST1 ERROR HALT, FLAG IS NOT
          /SET, OR KSF FAILED
1245 5232 JMP P0TS1A /RESTARTING TEST,

```

```

1246 0002 P0IS2, 2
1247 1275 P0TS3
/ISSUE KCC, WAIT 200 MSEC FOR FLAG TO BE SET,
/SKIP ON FLAG 1000 TIMES TO VERIFY CONSISTENT SKIPPING,
/
1250 4426 JMS I SETCTR /SET DELAYM
1251 0023 DELAYM /TO -200
1252 7470 -310
1253 4426 JMS I SETCTR /GO SET COUNT OF 1000
1254 0101 CTRA /((DEC) IN
1255 6030 -1750 /CTRA
1256 6032 P0TS2A, KCC /CLEAR AC AND FLAG
1257 4430 JMS I DLY1MS /GO DELAY
1260 6031 KSF /SKIP ON FLAG = 1
1261 5267 JMP P0E2A /DID NOT SKIP, GO TO E2A
1262 6031 KSF /SKIP ON FLAG = 1
1263 5271 JMP P0E2B /DID NOT SKIP, GO TO E2B
1264 2101 ISZ CTRA /ALL DONE?
1265 5262 JMP ,=3 /NO, REPEAT
1266 5424 JMP I CHAIN /CHAIN
1267 7402 P0E2A, HLT /TST2 ERROR HALT, FLAG
/NOT SET OR KSF FAILURE,
1270 5256 JM P0TS2A
1271 7402 P0E2B, HLT /TST2 ERR HALT B,
/KSF FAILURE
1272 6031 KSF /SKIP ON FLAG = 1
1273 5272 JMP ,=1 /REPEAT
1274 5272 JMP ,=2 /REPEAT

```

```

1275 0003 P0TS3, 3
1276 1327 P0TS4
/
/ISSUE KCC, WAIT 200 MSECs FOR FLAG TO SET,
/VERIFY THAT FLAG IS SET, RESET FLAG (KCC) AND
/SKIP ON FLAG 500 TIMES TO VERIFY THAT NO
/SKIP OCCURS WITH FLAG = 0,
/
1277 4426 JMS I SETCTR /SET DELATM
1300 0023 DELAYM /TO -200,
1301 7470 -310
1302 4426 JMS I SETCTR /SET COUNT OF
1303 0101 CTRA /-500 (DEC) IN
1304 7014 -764 /CTRA
1305 6032 P0TS3A, KCC /CLEAR FLAG
1306 4430 JMS I DLY1MS /GO DELAY
1307 6031 KSF /READY?
1310 5320 JMP P0E3A /NO, ERROR
1311 6032 KCC /YES, RESET FLAG
1312 6031 KSF /READY?
1313 5315 JMP ,+2 /NO, OK
1314 5322 JMP P0E3B /YES, ERROR
1315 2101 ISZ CTRA /ALL DONE TESTING?
1316 5312 JMP ,+4 /NO, REPEAT
1317 5424 JMP I CHAIN /YES, CHAIN
1320 7402 P0E3A, HLT /TST3 ERR HALT A, FLAG
/NOT SET OR KSF FAILURE
1321 5305 JMP P0TS3A /TRY AGAIN
1322 7402 P0E3B, HLT /TST3 ERR HALT B, FLAG
/FAILED TO RESET, OR KSF
/SKIPPED ERRONEOUSLY,

/TURN OFF READER BEFORE ENTERING
/SCOPE LOOP,
1323 6032 KCC /CLEAR FLAG AND AC
1324 6031 KSF /SKIP ON FLAG = 1
1325 5323 JMP ,+2 /REPEAT
1326 5323 JMP ,+3 /REPEAT

```

```

1327 0004 P0TS4, 4
1330 1400 P0TS5
/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,
/AND THEN CHECKS THAT THE READER FLAG IS CAPABLE OF INTERRUPTING,
1331 4426 JMS I SETCTR /SET INTERRUPT RETURN
1332 0002 2 /TO P0E4A,
1333 1345 P0E4A
1334 6042 P0TS4A, TCF /CLEAR PUNCH/PRINTER FLAG
1335 6032 KCC /CLEAR READER FLAG AFTER
1336 6031 KSF /IT COMES UP
1337 5336 JMP , -1
1340 6032 KCC /CLEAR READER FLAG
1341 6001 ION /ENABLE INTERRUPT
1342 7000 NOP
1343 6002 IOF /TURN OFF INTERRUPT
1344 5347 JMP , +3
1345 7402 P0E4A, HLT /UNEXPECTED INTERRUPT
1346 5334 JMP P0TS4A /TRY AGAIN
1347 4426 JMS I SETCTR /SET CTRA TO
1350 0101 CTRA /-1000
1351 6030 -1750
1352 4426 JMS I SETCTR /SET INTERRUPT RETURN
1353 0002 2 /TO P0TS4C,
1354 1371 P0TS4C
1355 6032 KCC
1356 6031 KSF /WAIT FOR READER FLAG
1357 5356 JMP , -1 /TO SET
1360 6001 P0TS4B, ION /ENABLE INTERRUPT
1361 7000 NOP
1362 7402 P0E4B, HLT /READER FLAG FAILED TO INTERRUPT,
/OR INTERRUPT SYSTEM MALFUNCTION
1363 4426 JMS I SETCTR /SET INTERRUPT RETURN
1364 0002 2 /TO P0TS4C-1,
1365 1370 P0TS4C-1
/SCOPE LOOP
1366 6001 ION
1367 7000 NOP
1370 5366 JMP , -2
/
1371 2101 P0TS4C, ISZ CTRA /DONE?
1372 5360 JMP P0TS4B /NO, REPEAT
1373 5424 JMP I CHAIN

```

```

1400 1400      *, 177.1
1400 0005      POTS5, 5
1401 1424      POTS6
/READER TIMING TEST, CHECKS THAT READER FLAG IS #1 NO
/LATER THAN 110 MILLISECONDS AFTER KCC INSTRUCTION IS ISSUED.
/
1402 4426      JMS I SETCTR      /SET DELAYM
1403 0023      DELAYM           /TO=110
1404 7622      =156
1405 4426      JMS I SETCTR      /SET COUNT OF
1406 0101      CTRA             /-100 (DEC) IN
1407 7634      =144             /CTRA
1410 6032      POTS5A, KCC       /START READER, CLEAR PC FLAG
1411 4430      JMS I DLY1MS      /GO DELAY 110 MILLISECS
1412 6031      KSF
1413 5217      JMP P0E5
1414 2101      ISZ CTRA
1415 5210      JMP POTS5A
1416 5424      JMP I CHAIN
1417 7402      P0E5, HLT         /TST5 ERR HALT, FLAG NOT=1
                                  /110 MSECS AFTER KCC INSTRUCTION.
1420 6032      KCC              /START READER, CLEAR FLAG, AC,
1421 6031      KSF              /FLAG=1?
1422 5221      JMP ,=1          /NO, TEST AGAIN
1423 5220      JMP ,=3          /YES, REPEAT,

```

```

1424 0006 POTS6, 6
1425 7777 7777
/READ 256 DIFFERENT CHARACTERS, EACH CHARACTER IS READ 1000 TIMES
/TO VERIFY CONSISTENCY OF READING FROM ITI,
/

1426 4426 JMS I SETCTR /SET COUNT OF
1427 0101 CTRA /-256(DEC)
1430 7400 -400 /IN CTRA
1431 6032 POTS6A, KCC /CLEAR AC, FLAG, START RDR
1432 6031 KSF /READY?
1433 5232 JMP , -1 /NO, TEST AGAIN,
1434 6034 KRS /READ CHARACTER,
1435 3266 DCA WTS6A /SAVE AT WTS6A,
1436 4426 JMS I SETCTR /SET COUNT OF
1437 0102 CTRB /CTR
1440 6030 -1750 /-1000 (DEC) IN
1441 7200 POTS6B, CLA
1442 6034 KRS /READ CHARACTER,
1443 3267 DCA WTS6B /SAVE AT WTS6B
1444 1267 TAD WTS6B /GET IT BACK,
1445 7041 CIA /2'S COMPLEMENT IT
1446 1266 TAD WTS6A /ADD EXPECTED CHAR,
1447 7640 SEA CLA /RESULT 0?
1450 5256 JMP POTS6A /NO, ERROR, GO TO E6A,
1451 2102 ISZ CTRB /READ CHAR 1000 TIMES?
1452 5241 JMP POTS6B /NO, GO READ IT AGAIN,
1453 2101 ISZ CTRA /YES, READ 256 DIFF, CHARS?
1454 5231 JMP POTS6A /NO,
1455 5424 JMP I CHAIN /YES, CHAIN
1456 1267 POTS6A, TAD WTS6B
1457 7402 HLT /TST6 ERR HALT A, AC DISPLAYS
/ /INCORRECTLY READ CHAR, DEPRESS
/ /KEY CONTINUE

1460 7200 CLA
1461 1266 TAD WTS6A
1462 7402 POTS6B, HLT /TST6 ERR HALT B, AC DISPLAYS
/ /WHAT THE CORRECT CHAR SHOULD
/ /BE,

1463 7200 CLA
1464 6034 KRS /READ CHARACTER
1465 5263 JMP , -2 /L
1466 0000 WTS6A, 0
1467 0000 WTS6B, 0

```

```

1600      * : 177*1
          /PROGRAM 1, ASR33/35 TELETYPE BASIC OUTPUT TESTS,
          /PROGRAM CHECKS OUTPUT IOT,S, INTERRUPT, AND TIMING,
1600 4426 PRG1, JMS I SETCTR /SET KSTART TO INITIAL
1601 0020 KSTART /ROUTINE ADDRESS.
1602 1605 P1TS0
1603 5604 JMP I ,+1 /GO START TEST
1604 0232 SRSET

/
1605 0000 P1TS0, 0
1606 1635 P1TS1
          /1. TLS AND WAIT 200 MSEC'S FOR FLAG TO SET, SKIP ON FLAG=1 (TSF),
          /TSF SHOULD SKIP, OR ERROR HALT P1E0A OCCURS, FLAG NOT SET, OR TSF FAILURE,
          /2. WITH FLAG=1, SKIP ON FLAG 1000 TIMES TO TEST FOR CONSISTENT SKIPPING,
          /FAILURE TO SKIP CAUSES ERROR HALT P1E0B,
1607 4426 JMS I SETCTR /-200 TO DELAYM
1610 0023 DELAYM
1611 7470 =310
1612 4426 JMS I SETCTR /-1000 TO CTRA
1613 0101 CTRA
1614 6030 =1750
1615 7200 P1TS0A, CLA /CLEAR AC
1616 6046 TLS /START PRINTER/PUNCH
1617 4430 JMS I DLY1MS /DELAY 200 MSEC'S,
1620 6041 TSF /FLAG=1?
1621 5227 JMP P1E0A /NO, ERROR
1622 6041 P1TS0B, TSF /FLAG=1?
1623 5231 JMP P1E0B /ERROR, FAILED TO SKIP,
1624 2101 ISZ CTRA /DONE?
1625 5222 JMP P1TS0B /NO, REPEAT,
1626 5424 JMP I CHAIN /YES, CHAIN
1627 7602 P1E0A, HLT CLA /ERR HALT A, FLAG NOT=1 AFTER
1630 5215 JMP P1TS0A /200 MSEC'S, OR TSF FAILURE
1631 7602 P1E0B, HLT CLA /ERR HALT B, TSF FAILED TO SKIP
1632 6041 TSF /SCOPE LOOP, SKIPS ON
1633 5232 JMP ,-1 /FLAG CONTINUOUSLY,
1634 5232 JMP ,-2

```



```

1635 0001 P1TS1, 1
1636 1656 P1TS2
/ISSUE TCF TO CLEAR FLAG, SKIP ON FLAG 1000 TIMES TO VERIFY THAT NO
/SKIP OCCURS WITH FLAG=0
1637 4426 JMS I SETCTR /-1000 TO CTRA
1640 0101 CTRA
1641 6030 -1750
1642 6042 TCF /CLEAR FLAG
1643 6041 P1TS1A, TSF
1644 7410 SKP
1645 5251 JMP P1E1
1646 2101 ISZ CTRA
1647 5243 JMP P1TS1A
1650 5424 JMP I CHAIN
1651 7602 P1E1, HLT CLA /ERR HALT, AFTER CLEAR FLAG (TCF),
/TSF INSTRUCTION SKIPPED,
/SCOPE LOOP, CLEARS FLAG,
/ADN THEN SKIPS ON FLAG
/CONTINUOUSLY,
1652 6042 TCF
1653 6041 TSF
1654 5253 JMP ,-1
1655 5253 JMP ,-2
/
1656 0002 P1TS2, 2
1657 1701 P1TS3
/ISSUE TCF, WAIT FOR FLAG TO SET, CLEAR FLAG (TCF), SKIP ON FLAG=1, NO SKIP
/SHOULD OCCUR, IF SKIP OCCURS, TCF INSTRUCTION (CLEAR FLAG), FAILED,
1660 4426 JMS I SETCTR /-100 TO CTRA
1661 0101 CTRA
1662 7634 -144
1663 7200 P1TS2A, CLA
1664 6046 TLS
1665 6041 TSF
1666 5265 JMP ,-1
1667 6042 TCF
1670 6041 TSF
1671 7410 SKP
1672 5276 JMP P1E2
1673 2101 ISZ CTRA
1674 5263 JMP P1TS2A
1675 5424 JMP I CHAIN
1676 7602 P1E2, HLT CLA /ERR HALT, TCF FAILED TO RESET
/FLAG,
/SCOPE LOOP, CLEARS FLAG
/CONTINUOUSLY,
1677 6042 TCF
1700 5277 JMP ,-1

```

```

1701 0003 P1TS3, 3
1702 1746 P1TS4
/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,
/AND THEN CHECKS THAT THE PUNCH/PRINTER FLAG CAN CAUSE AN INTERRUPT,
1703 4426 JMS I SETCTR /SET INTERRUPT RETURN TO
1704 0002 2 /P1E3A
1705 1717 P1E3A
1706 6032 P1TS3A, KCC /CLEAR READER FLAG IF UP,
1707 6046 TLS
1710 6041 TSF
1711 5310 JMP ,=1
1712 6042 TCF /CLEAR PUNCH/PRINTER FLAG
1713 6001 ION /ENABLE INTERRUPTS,
1714 7000 NOP
1715 6002 IOF /DISABLE INTERRUPTS
1716 5321 JMP ,+3
1717 7402 P1E3A, HLT /UNEXPECTED INTERRUPT,
1720 5306 JMP P1TS3A /TRY AGAIN,
1721 4426 JMS I SETCTR /-1000 TO CTRA,
1722 0101 CTRA
1723 6030 =1750
1724 4426 JMS I SETCTR /SET INTERRUPT RETURN
1725 0002 2 /TO P1TS3C
1726 1743 P1TS3C
1727 6046 TLS /START PUNCH/PRINTER
1730 6041 TSF /FLAG UP?
1731 5330 JMP ,=1 /NO, TEST AGAIN
1732 6001 P1TS3B, ION /YES, ENABLE INTERRUPT
1733 7000 NOP
1734 7402 P1E3B, HLT /PRINTER FLAG FAILED TO INTERRUPT
/OR INTERRUPT MALFUNCTION,
1735 4426 JMS I SETCTR /SET INTERRUPT RETURN
1736 0002 2 /TO P1TS3C-1
1737 1742 P1TS3C-1
1740 6001 ION /SCOPE LOOP,
1741 7000 NOP
1742 5340 JMP ,=2
1743 2101 P1TS3C, ISZ CTRA /DONE?
1744 5332 JMP P1TS3B /NO, REPEAT
1745 5424 JMP I CHAIN /YES, CHAIN

```

1746	0004	P1TS4, 4	
1747	7777	7777	
		/PUNCH/PRINTER TIMING TEST, CHECKS THAT FLAG IS=1 NO LATER THAN	
		/110 MILLISECONDS AFTER TLS INSTRUCTION	
1750	4426	JMS I SETCTR	/~110 TO DELAYM
1751	0023	DELAYM	
1752	7622	=156	
1753	4426	JMS I SETCTR	/~100 TO CTRA
1754	0101	CTRA	
1755	7634	=144	
1756	6046	P1TS4A, TLS	/START PUNCH/PRINTER
1757	4430	JMS I DLY1MS	/GO DELAY 110 MSECS,
1760	6041	TSF	/FLAG=1?
1761	5365	JMP P1E4	/NO, ERROR,
1762	2101	ISZ CTRA	/YES, DONE?
1763	5356	JMP P1TS4A	/NO, REPEAT,
1764	5424	JMP I CHAIN	/YES, CHAIN
1765	7602	P1E4, HLT CLA	/ERR HALT, FLAG NOT 1 110 MSECS
			/AFTER TLS INSTRUCTION,
1766	6046	TLS	/SCOPE LOOP, START PRINTER
1767	6041	TSF	/FLAG=1?
1770	5367	JMP ,=1	/NO, CHECK AGAIN
1771	5366	JMP ,=3	/YES REPEAT,

```

2000      *. 177*1
          /PROGRAM 2, ASR33/35 TELETYPE READER TEST, CHECKS ABILITY OF READER
          /TO CORRECTLY READ AT FULL SPEED AND WITH RANDOM STALLS,
2000 4426 PRG2, JMS I SETCTR /SET KSTART TO INITIAL
2001 0020      KSTART /ROUTINE ADDRESS,
2002 2005      P2TS0
2003 5604      JMP I ,+1 /GO START TEST
2004 0232      SRSET
          /
2005 0000      P2TS0, 0
2006 2035      P2TS1 /NEXT RTN ADDR,
          /READ 4095 CHARACTERS, AT FULL SPEED, MATCHING EACH CHARACTER
          /READ AGAINST COUNT PATTERN
          /
2007 4506      JMS I SYNC /GO SYNC TAPE
2010 4426      JMS I SETCTR /SET COUNT OF
2011 0101      CTRA /-4095(DEC) IN
2012 0001      -7777 /CTRA
2013 6032      KCC /START READER
2014 4507      JMS I INPATT /GO INITIALIZE PATTERN
2015 4510 P2TS0A, JMS I GETPT /GET PATTERN CHARACTER
2016 3223      DCA SB0 /STORE AT SB0
2017 6031      KSF /READY?
2020 5217      JMP ,~1 /NO, TEST AGAIN
2021 6036      KRB /YES, READ CHARACTER
2022 4511      JMS I CHECK /GO CHECK FOR CORRECT MATCH
2023 0000      SB0, 0 /CORRECT CHAR HERE
2024 5230      JMP P2E0 /ERROR, GO TO P2E0
2025 2101      P2T0B, ISZ CTRA /OK, ALL DONE?
2026 5215      JMP P2TS0A /NO, REPEAT
2027 5424      JMP I CHAIN /YES, CHAIN
2030 7402      P2E0, HLT /TST10 ERR HALT, AC CONTAINS
          /CHAR THAT DID NOT MATCH
          /AGAINST PATTERN, EPRESS
          /KEY CONTINUE
2031 7200      CLA
2032 1223      TAD SB0 /GET CORRECT CHARACTER
2033 7402      HLT /AC CONTAINS THE EXPECTED CHARACTER
2034 5225      JMP P2T0B

```

```

2035 2001 P2TS1, 1
2036 2067 P2TS2
/READ 2000 CHARACTERS WITH RANDOM DELAY BETWEEN CHARACTERS.
/MATCH EACH CHARACTER READ AGAINST COUNT PATTERN
/

2037 4506 JMS I SYNC /TO SYNC TAPE
2040 4426 JMS I SETCTR /SET COUNT OF
2041 0101 CTRA /-2000 (DEC) IN
2042 4060 -3720 /CTRA
2043 6032 KCC /START READER
2044 4507 JMS I INPATT /INITIALIZE PATTERN
2045 4510 P2TS1A, JMS I GETPT /GET PATTERN CHARACTER
2046 3255 DCA SB1 /STORE AT SB1
2047 4513 JMS I DLYCNT /GENERATE RANDOM DELAY
2050 4430 JMS I DLY1MS /DELAY
2051 6031 KSF /READY?
2052 5251 JMP ,=1 /NO, TEST AGAIN
2053 6036 KRB /YES, READ CHARACTER
2054 4511 JMS I CHECK /GO CHECK FOR CORRECT MATCH

2055 0000 SB1, 0 /CORRECT CHAR HERE
2056 5262 JMP P2E1 /ERROR, GO TO P2E1
2057 2101 P2T1B, ISZ CTRA /OK, ALL DONE?
2060 5245 JMP P2TS1A /NO,
2061 5424 JMP I CHAIN /YES, CHAIN
2062 7402 P2E1, HLT /TST1 ERR HALT, AC CONTAINS
/CHARACTER THAT DID NOT MATCH
/AGAINST PATTERN, DEPRESS
/KEYCONTINUE

2063 7200 CLA
2064 1255 TAD SB1 /GET CORRECT CHARACTER
2065 7402 HLT /AC CONTAINS THE EXPECTED
/CHARACTER

2066 5257 JMP P2T1B

```

```

2067 0002 P2IS2, 2
2070 7777 7777
/READ WITH RANDOM STALL BETWEEN RANDOM CHARACTER GROUPS
/100 GROUPS READ,
/
2071 4506 JMS I SYNC /GO SYNC TAPE
2072 4426 JMS I SETCTR /SET COUNT OF
2073 0101 CTRA /-100 (DEC) IN
2074 7634 -144 /CTRA
2075 6032 KCC /START READER
2076 4507 JMS I INPATT /INITIALIZE PATTERN
2077 4513 P2TS2A, JMS I DLYCNT /SET RANDOM DELAY
2100 4512 JMS I CRCNT /SET RANDOM CHARACTER
2101 0102 CTRB /COUNT IN CTRB
2102 4510 P2TS2B, JMS I GETPT /GET PATTERN CHARACTER
2103 3311 DCA SB2 /AND STORE AT SB2
2104 4430 JMS I DLY1MS /GO DELAY NO OF
2105 6031 KSF /READY?
2106 5305 JMP , -1 /NO TEST AGAIN
2107 6036 KRB /READ CHARACTER
2110 4511 JMS I CHECK /CHECK FOR CORRECT MATCH
2111 0000 SB2, 0 /AGAINST SB2 CONTENTS
2112 5320 JMP P2E2 /ERROR, GO TO P2E2
2113 2102 ISZ CTRB /OK, ALL CHARS FOR GROUP DONE?
2114 5302 JMP P2TS2B /NO
2115 2101 P2T2C, ISZ CTRA /YES, ALL GROUPS DONE?
2116 5277 JMP P2TS2A /NO
2117 5424 JMP I CHAIN /YES, CHAIN
2120 7402 P2E2, HLT /TST2 ERROR HALT, AC CONTAINS CHAR THAT
/ /DID NOT MATCH AGAINST PATTERN, DEPRESS KEY
/ /CONTINUE

2121 7200 CLA
2122 1311 TAD SB2 /GET CORRECT CHARACTER
2123 7402 HLT /AC CONTAINS THE EXPECTED CHARACTER
2124 5315 JMP P2T2C
/

```

/PRG12, ASR33TY AUTOMTIC PUNCH OPTION TEST
 /CHECKS OPERATION OF AUTOMATIC PUNCH BY PUNCHING RUBOUTS WITH
 /PCHON, AND ALL 0'S CHARACTERS WITH PCHOF, THE TAPE RESULTING
 /SHOULD HAVE ALL RUBOUTS, AS THE TAPE SHOULD NOT ADVANCE
 /WHEN PUNCHING WITH PCHOFF, THE READER IS USED TO CHECK THE
 /TAPE, REPEATED FAILURE OF THE PUNCH FEED TO TURN ON WILL
 /EVENTUALLY BE INDICATED BY TIGHTENING OF SLACK BETWEEN
 /READER AND PUNCH,
 /

2244	1242	PRG12,	TAD K7650	/GET (SNA CLA) CODE AND
2245	3326		DCA TTOUTA	/SET AT TTOUTA.
2246	4273		JMS CRPIN	/INITIALIZE DELAY AND CHAR COUNT.
2247	1236		TAD PCHOFF	/TURN OFF PUNCH FEED
2250	4311		JMS TTOUT	
2251	1233		TAD RDRON	/TURN ON READER,
2252	4311		JMS TTOUT	
2253	4311		JMS TTOUT	/PUNCH ALL 0'S CHAR,
2254	2102		ISZ CTRB	/DONE FOR N 0 CHARS?
2255	5253		JMP ,=2	/NO, REPEAT,
2256	1241		TAD K0377	/YES, PUNCH A RUBOUT
2257	4311		JMS TTOUT	
2260	1101		TAD CTRA	/RELOAD CHAR COUNT
2261	3102		DCA CTRB	/INTO CTRB
2262	1235		TAD PCHON	/SET SPFLAG
2263	3237		DCA SPFLAG	
2264	1235		TAD PCHON	/TURN ON PUNCH FEED,
2265	4311		JMS TTOUT	
2266	1241		TAD K0377	/PUNCH A RUBOUT
2267	4311		JMS TTOUT	
2270	2102		ISZ CTRB	/DONE FOR N RUBOUTS?
2271	5266		JMP ,=3	/NO, REPEAT,
2272	5246		JMP PRG12+2	/YES, START OVER.

		/SUB TO	INITIALIZE DELAY CAUSED AND SET CHAR COUNT
2273	0000	CRPIN,	0
2274	4426		JMS I SETCTR /-110 TO DELAYM
2275	0023		DELAYM
2276	7622		=156
2277	4432		JMS I RANDNO /GET RANDOM NUMBER
2300	0240		AND K0007
2301	7450		SNA
2302	5277		JMP ,=3 /NO,
2303	7041		CIA
2304	3101		DCA CTRA /SET IN CTRA
2305	1101		TAD CTRA /AND CTRB
2306	3102		DCA CTRB
2307	3237		DCA SPFLAG /CLEAR SPFLAG
2310	5673		JMP I CRPIN /EXIT

2200

PAGE

/PRG11, ASR33TY AUTOMATIC READER OPTION TEST,
 /CHECKS THAT READER FLAG RESPONDS TO KCC AFTER "READER ON" COMMAND,
 /AND THAT FLAG DOES NOT RESPOND TO KCC AFTER "READER OFF" COMMAND,
 /A TEST IS DONE BETWEEN 1 AND 7 CHARACTERS AFTER EACH READER CONTROL
 /COMMAND, TEST IS CONTINUOUS RUNNING, FAILURES ARE INDICATED BY HALTS,
 /

2200	3237	PRG11, DCA SPFLAG	/CLEAR SPFLAG,
2201	1236	TAD PCHOFF	/TURN OFF PUNCH FEED
2202	4311	JMS TTOUT	
2203	4273	JMS CRPIN	/INITIALIZE DELAY AND CHAR COUNT,
2204	1233	TAD RDRON	/TURN ON READER
2205	4311	JMS TTOUT	
2206	4430	JMS I DLY1MS	/WAIT AN ADDITIONAL 110 MSECS,
2207	6032	KCC	/ISSUE READER START,
2210	4430	JMS I DLY1MS	/DELAY 110 MSECS.
2211	6031	KSF	/FLAG UP?
2212	7602	HLT CLA	/NO, ERROR, FLAG SHOULD BE UP
2213	2102	ISZ CTRB	/DONE FOR N CHARACTER?
2214	5207	JMP ,=5	/NO, REPEAT,
2215	1101	TAD CTRA	/YES, RELOAD CHAR COUNT
2216	3102	DCA CTRB	/INTO CTRB,
2217	1234	TAD RDROFF	/TURN OFF READER
2220	4311	JMS TTOUT	
2221	6032	KCC	/CLEAR READER FLAG,
2222	4430	JMS I DLY1MS	/DELAY 110 MSECS
2223	6032	KCC	/ISSUE READER START
2224	4430	JMS I DLY1MS	/WAIT 110 MSECS,
2225	6031	KSF	/FLAG UP?
2226	7410	SKP	/NO, OK,
2227	7602	HLT CLA	/YES, HALT, FLAG SHOULD BE DOWN
2230	2102	ISZ CTRB	/DONE N TIMES
2231	5223	JMP ,=6	/NO, REPEAT
2232	5203	JMP PRG11+3	/YES, START OVER,
/			
2233	0221	RDRON, 221	
2234	0223	RDROFF, 223	
2235	0222	PCHON, 222	
2236	0224	PCHOFF, 224	
2237	0000	SPFLAG, 0	
2240	0007	K0007, 7	
2241	0377	K0377, 377	
2242	7650	K7650, 7650	
2243	7610	K7610, 7610	

/SUB TO OUTPUT DATA TO TELEPRINTER/PUNCH. IF SPFLAG
/IS SET, READ A CHARACTER FROM TAPE READER AND CHECK
/THAT IT IS A RUBOUT,

2311	0000	TTOUT, 0	
2312	6046	TLS	/OUTPUT CHAR,
2313	6041	TSF	/DONE?
2314	5313	JMP ,=1	/NO, WAIT
2315	6042	TCF	/YES, CLEAR FLAG,
2316	7200	CLA	
2317	1237	TAD SPFLAG	
2320	7650	SNA CLA	/PUNCH ON?
2321	5711	JMP I TTOUT	/NO, EXIT,
2322	6032	KCC	/YES, START READER,
2323	6031	KSF	/FLAG UP?
2324	5323	JMP ,=1	/NO, WAIT
2325	6034	KRS	/YES, READ CHAR
2326	7650	TTOUTA, SNA CLA	/OR (SKP CLA)
2327	5711	JMP I TTOUT	/CHAR IS 0, EXIT,
2330	1243	TAD K7610	/GET (SKP CLA) AND
2331	3326	DCA TTOUTA	/SET AT TTOUTA,
2332	6034	KRS	/REREAD CHAR,
2333	1117	TAD MRBOUT	/TAD (=377
2334	7650	SNA CLA	/WAS IT A RUBOUT?
2335	5711	JMP I TTOUT	/YES, OK,
2336	6034	KRS	/NO, ERROR, REREAD CHAR,
2337	7402	HLT	/DISPLAY CHAR,
2340	7200	CLA	
2341	5711	JMP I TTOUT	/EXIT,

\$ PAL10 V133 21-FEB-69 18:16 PAGE 30

\$

AL1	1141	M40	0074	P1TS3A	1706	RANTND	0442
AL2	1144	MCTR	0625	P1TS3B	1732	RDRUFF	2234
ALIGN	1120	MIL1	0065	P1TS3C	1743	RDRON	2233
ATEMP	1147	MILCTR	0064	P1TS4	1746	READCK	1071
C100	0075	MOVE	0600	P1TS4A	1756	RTNNO	0060
C240	0076	MOVEA	0613	P2E0	2030	SB0	2023
CHAIN	0024	MRROUT	0117	P2E1	2062	SB1	2055
CHAINN	0257	MSCTR	0063	P2E2	2120	SB2	2111
CHCK	0531	NXTST	0061	P2T0B	2025	SBSB	1076
CHECK	0111	P0E0	1221	P2T1B	2057	SCCTR	0062
CHRCNT	0502	P0E1	1244	P2T2C	2115	SCNT	0103
CPID	0056	P0E2A	1267	P2TS0	2005	SETCTR	0026
CRCNT	0112	P0E2B	1271	P2TS0A	2015	SHALT	0313
CRMSK	0517	P0F3A	1320	P2TS1	2035	SHLT	0025
CRPIN	2273	P0E3B	1322	P2TS1A	2045	SKIPMA	0077
CTRA	0101	P0E4A	1345	P2TS2	2067	SKIPPA	0100
CTRB	0102	P0E4B	1362	P2TS2A	2077	SPFLAG	2237
CTSK	0566	P0E5	1417	P2TS2B	2102	SR5MSK	0055
CURTST	0057	P0E6A	1456	PCHOFF	2236	SRSET	0232
DELAYM	0023	P0E6B	1462	PCHON	2235	SRST	0031
DLCNT	0520	P0TS0	1205	PFLAG	0114	SRT0A	1017
DLY1MS	0030	P0TS1	1225	PRG0	1200	SRT0B	1022
DLY1SC	0027	P0TS1A	1232	PRG1	1600	SRT1A	1035
DLYCNT	0113	P0TS1B	1235	PRG10	1060	SRT2A	1046
DLYMS	0345	P0TS2	1246	PRG11	2200	SRT2B	1051
DLYMSK	0530	P0TS2A	1256	PRG12	2244	SRT3A	1064
DLYSC	0333	P0TS3	1275	PRG2	2000	START	0200
ERRCNT	1101	P0TS3A	1305	PRG3	1000	STCTR	0322
ERRCTR	1117	P0TS4	1327	PRG4	1006	SYNC	0106
FADDR	0623	P0TS4A	1334	PRG5	1013	SYNK	0546
FLAG	0072	P0TS4B	1360	PRG6	1031	SYNKA	0552
FORWD	0276	P0TS4C	1371	PRG7	1042	TADDR	0624
GETPT	0110	P0TS5	1400	PRGADR	0231	TEMP	0052
GETPTT	0453	P0TS5A	1410	PRGEND	0274	TEMP1	0053
GETRDY	0233	P0TS6	1424	PRGLIM	0034	TEMQ	0070
GIVE	1150	P0TS6A	1431	PRGMSK	0033	TEMR	0071
HLTTST	1111	P0TS6B	1441	PRGNUM	0035	TSTMSK	0094
ID	0215	P1E0A	1627	PRGTAB	0037	TTOUT	2311
INCRN	0255	P1E0B	1631	PSW	0036	TTOUTA	2326
IND	1146	P1E1	1651	PT0	0450	UMOVE	0110
INITPT	0444	P1E2	1676	PT1	0451	UPUNCH	0119
INPAT	0107	P1E3A	1717	PTEMP	0021	WCHK	0549
K0007	2240	P1E3B	1734	PTEMP1	0022	WTS6A	1466
K0377	2241	P1E4	1765	PTMSK	0452	WTS6B	1467
K100	0104	P1TS0	1605	PUNCH	0465		
K2000	0105	P1TS0A	1615	RANCON	0430		
K7610	2243	P1TS0B	1622	RANDEX	0427		
K7650	2242	P1TS1	1635	RANDNO	0032		
K77	0073	P1TS1A	1643	RANGEN	0400		
KPB	0066	P1TS2	1656	RANSAV	0443		
KPBS	0067	P1TS2A	1663	RANTAD	0415		
KSTART	0020	P1TS3	1701	RANTBL	0431		

\$ PAL10 V133 21-FEB-69 18:16 PAGE 30-2

ERRORS DETECTED: 0

RUN-TIME: 26 SECONDS

5K CORE USED