

IDENTIFICATION

PRODUCT CODE: MAINDEC-15-D2CC-D (D)
PRODUCT NAME: PDP-15 HIGH SPEED READER TEST
DATE REV. OCTOBER 16, 1978
MAINTAINER: DIAGNOSTIC GROUP
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1. ABSTRACT

The PDP-15 High Speed Reader Test verifies the operational status of the reader by performing tests on the reader's control logic and mechanics. The control logic tests include error halts with provisions for looping on any failing test. The mechanical tests provide TTY print-outs in case of error. A test tape is provided for use with the mechanical test. This should be used in lieu of a tape loop, since a loop will not provide proper test operation.

The control logic tests should be run first, and then the mechanical tests (total of 3) must each be manually started by the operator.

2. REQUIREMENTS

Equipment

A standard PDP-15 equipped with a high speed reader.

Storage

The program requires approximately 3250 (octal) locations in field 0.

3. LOADING PROCEDURE

- a. Set the ADDRESS switches to 17700; the BANK MODE switch on a 1.
- b. Press I/O RESET, and then READ-IN.
- c. The program is not self-starting at the completion of loading.

4. STARTING PROCEDURE

Test Tape Generator - 200
Timing Loop for Setup - 250
Control Logic Tests - 300
Out of Tape Test - 1401
Data and IOT tests - 2100
Variable Reader Speed Test - 2400
Read Randomly and Stall Randomly - 2500

The Control Logic Test contains a series of individual tests which are automatically executed by the program. The individual starting addresses may be found after the Table of Error halts appearing in section 6.1.

5. OPERATING PROCEDURE

A test tape is supplied with the program. If a new test tape is desired, a subroutine is included which will punch the necessary patterns. To punch one of the two patterns necessary, use the procedure below. If a new test tape is not needed go on to section 5.1.

a. Set the ADDRESS switches to 200.

b. Set the AC switches to indicate the pattern desired.

ACS 0 on a 1 = Punch alternate frames of all 1's and 0's.

ACS 1 on a 1 = Punch a binary count.

ACS 2 on a 1 = Punch all 1's.

c. Press I/O RESET, and then START. The pattern will be punched until PROGRAM STOP is pressed.

If a tape loop is to be made, the pattern must be continued at the splice.

Reader Setup Routine

The use of this routine is intended for Field Service and Production only. Its purpose is to provide a variable delay timing loop to expedite the setup of the reader timing.

A tape with a punched pattern of alternate frames of all 1's and 0's is usually used for the setup procedure. However, the routine will allow any pattern to be used. The Test Tape Generator will punch the required pattern.

a. Set the ADDRESS switches to 250.

b. Place the tape in the reader.

c. Set the ACS to 600000. This will give a stall (delay) of approximately 250 milliseconds.

d. Press RESET and then START.

The routine reads 16 frames and then stalls; another 16 frames and another stall, etc. The stall time may be varied while the program is running.

Program Operating Procedure

5.1 Control Logic Tests

The test tape supplied contains the necessary test patterns for all control logic tests. The pattern used is an all ones pattern. This pattern is duplicated three times on the test tape even though only one pattern is used. Blank tape separates each pattern. One pass of the control logic tests requires approximately one foot of test tape.

Any errors encountered will cause a program halt. The nature of the error is determined by the address of the halt. The program will not execute the next test until the error is corrected. The halts are tagged, and may be identified from the table of error halts appearing at the end of this document.

- a. Place the test tape in the reader with the punched pattern over the reader's photo cells.
- b. Set the ADDRESS switches to 300, and all ACS equal to 000000.
- c. If an API option is installed, place ACS 6 on a 1.
- d. Press I/O RESET, and then START.

The program will respond with a carriage return and line feed on the KSR-33 teleprinter, and begin Test 1.

- e. Assuming no errors the program will halt with C(PC) = 1401.

The reader No Tape Test is performed next.

- f. Remove the test tape from the reader.
- g. Set the ADDRESS switches to 1401.
- h. Press I/O RESET, and then START.

Assuming no error halts, the program will halt with C(PC) = 1434.

- i. Place the test tape in the reader and press continue.

Assuming no error halts, the program will halt with C(PC) = 1444

- j. Turn the Reader "OFF LINE" to test for setting the "NO-TAPE" flag.
- k. Press CONTINUE

The data and mechanical tests are performed next.

There are three data/mechanical tests. Each test must be manually started by the operator. All three tests use the same tests tape pattern which is a binary count.

When placing the test tape in the reader, place the punched pattern over the reader's photo cells. This is necessary to enable the program to synchronize properly. When starting any of the three tests sections the program will read the test tape until it finds one frame of all 0's. The program then enters the test sequence.

If an all 0's character cannot be found, the message "CANNOT SYNC" is printed, followed by a halt with C(PC) = 2017 (tagged PRHLT4). Press CONTINUE to try again. Inability to sync may be a result of the lack of an all 0's character, or possibly the reader buffer will not clear.

5.2 Basic Data Checks

This test requires a fan-folded test tape with a punched binary count pattern

- a. Place the test tape in the reader with the punched pattern over the reader's photo cells.
- b. Set the ACS to 000000.
- c. Set the ADDRESS switches to 2100.
- d. Press the I/O RESET, and then START.

The data check test is divided into four parts. A test is first made using RSA and RRB, followed by RSA and RCF. Selecting the reader in binary mode is then done by using RSB and RRB, followed by RSB and RCF. The four parts are designated as A, B, C and D respectively.

Assuming no errors, the program will halt with the PC = 2243. If the test proves error-free go on to paragraph 5.3.

Error Identification

If an error occurs a print-out takes place giving in order, the subtest, what the data being read was expected to be, and the data read from the reader buffer.

The print-out will appear as:

A	GOOD	XXX	BAD	XXX
B	GOOD	XXX	BAD	XXX
C	GOOD	XXXXXX	BAD	XXXXXX
D	GOOD	XXXXXX	BAD	XXXXXX

ACS 0 may be placed up to halt the program when an error occurs. The C (PC) will equal 2125 when halting during Part A, 2161 during part B, and 3012 when halting during Part C or D. Press CONTINUE to read the next frame in sequence.

The Variable Reader Speed Test should be next performed.

5.3 Variable Reader Speed Test

This test requires a fan-fold test tape, with a punched binary count pattern. The reader is selected using the RSA IOT only.

AC switches 2 through 17 control the speed of the reader; the slowest reader speed is obtained with all ACS up, and normal speed with all ACS down. ACS 0 and 1 have no effect on the reading speed.

- a. Place the test tape in the reader with the punched pattern over the reader's photo cells.
- b. Set the ADDRESS switches to 2400.

- c. Press I/O RESET, and then START.

If no errors are indicated, go on to paragraph 5.4.

Error Identification

If an error occurs, a print-out will give in order, what the data read was expected to be, and the data read from the reader buffer. The print-out will appear as:

GOOD XXX BAD XXX

ACS 0 will provide a halt on error when in the up position. The halt will occur with the PC = 2435. Pressing CONTINUE will cause the next frame in sequence to be read.

5.4 Random Read and Stall

This test requires a fan-fold test tape with a punched binary count pattern.

The Random Read and Stall routine reads a random number of frames with a fixed stall time between each frame. After reading the random number of frames the routine reads a random number of frames at full speed. The routine reads a maximum of 14 frames with a stall between each frame, and a maximum of 512 frames at full speed.

ACS Functions for Section 5

<u>ACS</u>	<u>FUNCTION</u>
0	Stop on error (1) Don't stop (0)
1	'Scope mode (1). Ignore errors.

- a. Place the test tape in the reader with the punched pattern over the reader's photo cells. Set the ADDRESS switches to 2500.
- b. Press I/O RESET, and then START.
The test will run until stopped by the operator.

Error Identification

A print-out occurs for each detected error. The format is as shown below:

GOOD XXX BAD XXX

The type of error which will occur most frequently with this test will be when the test tape gets out of sync with the program. The bad data will be + 1 count or more of the good data.

After each print-out the program continues on in sequence.

Sub-Routine Abstracts

When starting from address 300, the program performs control logic tests 1 through 7 using the reader IOT RSA. At the completion of test 7, tests 2 through 7 are repeated using reader IOT RSB.

Test 1 - Illegal Instruction

An illegal instruction of 700110 is executed. If an RRB or RCF instruction is executed, the contents of the AC will be changed and an error halt occurs with C(PC) = 316. No tape movement should be observed during this test.

Test 2 - Test for Reader Flag Cleared

An RSF IOT is executed. If the program was started properly by pressing I/O RESET and then START, the flag should be cleared at this point. An error halt with C(PC) = 325 occurs if the flag is set. If this occurs, it maybe the result of I/O power clear not clearing the flag, or the result of tape movement during test 1. Place ACS 1 up, and press CONTINUE to enter scope mode.

Test 3 - Set the Reader Flag and Test for Illegal RSF

Either an RSA or RSB IOT is used to select the reader. The program then stalls for 100 MSEC., after which an illegal conditional skip is attempted using 700110. If the skip occurs, an error halt occurs with C(PC) = 361. If no skip occurs, the reader flag is next tested. An RSF IOT is executed, and if no skip occurs, an error halt with C(PC) = 355, or 356 depending in which mode the reader was selected. Placing ACS1 up and pressing CONTINUE after any error halt, will place the program in scope mode.

Test 4 - Clear the Reader Flag with RRB and RCF

The reader flag is first set with an RSA or RSB IOT and then immediately cleared by executing an RRB. If the test is successful, the flag is again set and then cleared by executing an RCF IOT. If RRB does not clear the flag, an error halt occurs with C(PC) = 423 (RSA), or 424 (RSB). If RCF does not clear the flag, a halt occurs with C(PC) = 430 (RSA) or 431 (RSB). Place ACS1 up, and press CONTINUE to enter scope mode.

Test 5 - Clear the Reader Flag with RSA or RSB

The reader flag is first set using either the RSA or RSB IOT. The reader is again selected and the flag tested for being cleared using the IOT RSF. The flag should be cleared immediately after an RSA or RSB IOT. If not, an error halt occurs with C(PC) = 515 (RSA), or 516 (RSB). Place ACS1 up, and press CONTINUE to enter scope mode.

Test 6 - Interrupt Test

An I/O Power Clear (CAF) is first executed, followed by a 210 MSEC stall. No interrupt should occur at this point. If an interrupt occurs, the I/O status word is tested to determine the device which caused the interrupt. If the reader caused the interrupt, an error halt occurs with C(PC) = 636. A spurious interrupt will cause a halt with C(PC) = 640. The AC will contain the I/O status word at each halt.

If the above test is successful, an attempted program interrupt using either the RSA or RSB IOT is then performed. The reader is selected, and a stall of 100 MSEC is done, waiting for a program interrupt. If no interrupt occurs, a halt with C(PC) = 625 (RSA), or 626 (RSB) occurs. Place ACS1 up and press CONTINUE to enter scope mode.

Test 7 - Reader API Test

Test 7 is performed only if ACS 6 is on a 1 to indicate that an API option is installed. The routine assumes the readers' API channel address to be 50, and API priority level 2.

The first test performed makes certain a reader API break does not occur when the reader flag is 0. An error halt occurs with the PC = 1021 in the event of an API break.

The reader flag is then set by the program, and an API break is attempted. No API break results in an error halt with the PC = 1047. If an API break occurs, the API status word is read and tested for level 2 active. If level 2 is not active, an error halt occurs with the PC = 1056. ACS 1 on a 1 will enable a scope loop for any of the above errors.

Test 8 - Reader No-Tape Test

Test 8 tests the response of the reader logic under no tape conditions. The test tape is first removed from the reader, and the test is started from location 1401. A test is first made to determine whether the no tape indicator has been set by the absence of tape in the reader. If true, the reader flag is then tested to make sure it had been set as a result of the no tape flag. If both tests are successful, the program halts at location 1423, at which point the tape is replaced in the reader.

The TAPE FEED button is then pressed and released. Pressing CONTINUE will cause the program to check for the no tape indicator being reset by TAPE FEED. If all three of the above tests are successful a halt occurs at location 1430.

ERRORS

Error Halts and Descriptions

Error halts and descriptions are given in the tables below for the control Logic Tests.

'Scope mode' may be entered for any single test by placing ACS1 up, and pressing CONTINUE after the error halt. 'Scope mode may also be entered by restarting the desired test. Restarting addresses are given in the tables immediately following each error halt table.

Table of Error Halts for Control Logic Tests

<u>C(PC)</u>	<u>TAG</u>	<u>TEST#</u>	<u>IDENTIFICATION</u>
316	E01	1	700110 changed contents of the AC.
325	E02	2	Reader flag on illegally
355	EA03	3	Flag wasn't set using RSA
356	EB03	3	Flag wasn't set using RSB If no tape movement: If tape moved:
361	E04	3	Skip occurred using 700110 after an RSA or RSB
423	EA05	4	Flag wasn't cleared using RSA & RRB
424	EB05	4	Flag wasn't cleared using RSB & RRB
430	EA06	4	Flag wasn't cleared using RSA & RCF
431	EB06	4	Flag wasn't cleared using RSB & RCF
515	EA11	5	Flag wasn't cleared using RSA
516	EB11	5	Flag wasn't cleared using RSB

The AC = the data read from the reader buffer after each of the halts EB12 through EA15.

625	EA16	6	No interrupt occurred using RSA - waited 70 MS.
626	EB16	6	No interrupt occurred using RSB - waited 70 MS.
636	E16B	6	Reader caused interrupt when not selected
640	E16C	6	Spurious interrupt
652	E16D	6	Interrupt not from reader AC = I/O status word.
1021	E17	7	An API break occurred with the reader flag cleared.
1047	E18	7	No API break from the reader with the reader flag set.
1056	E19	7	An API break occurred, but priority level 2 is not active. Maybe another device caused the break, or the reader is on the wrong API level.
1401	NOTAPE	8	End of tests 2-7. Set the ADDRESS switches to 14Q1, and press I/O RESET, and then START to begin test 8.
1412	EA20	8	NO TAPE flag not set.
1421	EA20B	8	Reader flag won't set with the NO-TAPE flag set.
1427	EA20C	8	Reader flag won't clear with the NO-TAPE flag set.
1434	PHLT3	8	Replace tape in the reader and Press Continue.
1442	ERR20D	8	NO-TAPE flag didn't clear.
1444	OFFLINE	8	TURN Reader "off".
1452	ERR20E	8	No-Tape didn't set when the reader was turned off-line
1454	PHLT3A	8	End of the NO-TAPE test

Table of Restarting Addresses to Initiate 'Scope Mode

'Scope mode should normally be initiated by placing ACS1 up, and pressing CONTINUE after an error halt. In the event that 'scope mode must be entered by restarting any one test, the starting addresses for tests 1 through 7 are listed in the table below. Tests 3 through 7 use the IOT instructions RSA, RSB, RRB, and RCF, and the starting address for any one test will vary according to which IOT is to be tested. Place ACS1 up before restarting.

Test #	'Scope IOT	Operator Action	Restart at Address
1	Illegal IOT	Press I/O RESET, and then START	300
2	RSF	Press I/O RESET, and then START	321
3	RSA	Deposit 700104 into location 333.	331
	RSB	Deposit 700144 into location 333.	331
4	RSA and RRB	Deposit 700104 into location 333.	400
	RSA and RCF	Deposit 700104 into location 333, and 700102 into location 406.	402
	RSB and RRB	Deposit 700144 into location 333.	400
	RSB and RCF	Deposit 700144 into location 333, and 700102 into location 406	402
5	RSA	Deposit 700104 into location 333.	500
	RSB	Deposit 700144 into location 333.	500
6		Deposit 700104 or 700144 into location 333, to test illegal interrupt; SA =	600
6		To test no interrupt, deposit 700104 or 700144 into location 333. SA =	612

7. RESTRICTIONS

None

8. MISCELLANEOUS

When looping on tests 2-7 the loop time is approximately 5 seconds.

The Basic Data Check tests will take approximately 5 seconds.

The Variable Reader Speed and Random Read tests each run until stopped by the operator with PROGRAM STOP.

Applications

Loop on Tests 2-7 of Section 1

A loop on tests 2-7 may be performed using either the RSA or RSB IOT's. If a test tape loop is to be used make sure the pattern is continued at the splice.

If looping on tests 2-7 using the RSB IOT, make sure channel 8 is continuously punched, and continued at the splice.

To loop on tests 2-7 using RSA, place the test tape in the reader.

1. Set the ADDRESS switches to 317.
2. Place ACS 4 up.
3. Press I/O RESET, and then START.

To loop on tests 2-7 using RSB, place the test tape in the reader.

1. Set the ADDRESS switches to 1074
2. Place ACS 4 up.
3. Press I/O RESET, and then START.

Basic Data Check Applications

'Scope mode for part A, B, C or D of Section 3 may be entered by following the steps below:

- A. Place ACS 1 up, and press CONTINUE if a halt on error occurred, or
- B. Press PROGRAM STOP.
- C. Place ACS 1 up.
- D. Set the ADDRESS switches to:
 - a. 2100 for part A (RSA and RRB)
 - b. 2133 for part B (RSA and RCF)
 - c. 2167 for part C (RSB and RRB)
 - d. 2215 for part D (RSB and RCF)
- E. Press I/O RESET, and then START.

9. PROGRAM DESCRIPTION

Tests 1 through 8 are provided to find catastrophic type failures. The basic functions of the reader logic are first tested, and then as many timing tests as possible are performed. If these tests run the remaining problems will be in the individual data paths.

A provision for looping on tests 2 through 7 is provided.

The Basic Data Check tests are provided to insure that the reader is capable of correctly reading data from tape. All reader IOT's are used during the test.

The Variable Speed and Random Read tests are designed to test the reader's mechanical adjustments by varying the motor speed, and rate of reader selection. The Binary Count portion of the test tape supplied provides the most stringent test. A test tape loop will not provide a satisfactory test, and should be used only during 'scope mode.

10. LISTING

.TITLE HSR19
/PDP-15 HIGH SPEED READER DIAGNOSTIC - TAPE 1
/
.ABS
/
/COPYRIGHT OCT, 20, 1970, DIGITAL EQUIPMENT CORP.,
/MAYNARD, MASS,
/
/INTERRUPT ROUTINE

00000
00000 000000
00001 600001
00002 777777
00003 777777
00004 777777
00005 777777

.LOC 0
0
JMP 1 /INTERRUPT ON ILLEGALLY
LAW -1
LAW -1
LAW -1
LAW -1
.EJECT

```

/TAPE LOOP GENERATOR
00200      ,LOC 200
00200 750004 BGN1  LAS      /TEST SWITCH REGISTER
00201 740010      RAL
00202 741400      SZL
00203 600231      JMP ALT10  /PUNCH 1'S AND 0'S
00204 740010      RAL
00205 741400      SZL
00206 600221      JMP PBNCNT  /PUNCH BINARY COUNT
00207 740010      RAL
00210 741400      SZL
00211 600264      JMP PSWREG  /PUNCH ALL 1'S
00212 600200      JMP BGN1
00213 600200      JMP BGN1

/
/TAPE PUNCH ROUTINE
/
00214 000000 PNCHA  0
00215 700204      PSA
00216 700201      PSF
00217 600216      JMP ,=1
00220 620214      JMP* PNCHA

/
/BINARY COUNT
/
00221 202027 PBNCNT LAC ONE
00222 100214      JMS PNCHA
00223 740001      CMA
00224 100214      JMS      PNCHA
00225 740001      CMA
00226 342027      TAD ONE
00227 100214      JMS PNCHA
00230 600223      JMP PBNCNT*2

/
/PUNCH ALTERNATE 1'S AND 0'S
/
00231 750001 ALT10  CLAICMA
00232 100214      JMS PNCHA
00233 740001      CMA
00234 600232      JMP ,=2

/
00250      ,LOC 250
00252 777760 SETUP  LAW =20
00251 043030      DAC WORK
00252 750004      LAS      /AC=600000 = ABOUT 200 MS STALL
00253 043031      DAC WORK1
00254 700104      RSA
00255 700101      RSF
00256 600255      JMP ,=1
00257 443030      ISZ WORK  /FRAME COUNTER
00262 600254      JMP ,=4
00261 443031      ISZ WORK1 /STALL
00262 600261      JMP ,=1
00263 600250      JMP SETUP
      .FJECT

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/PUNCH ALL ONES
/
00264 777777 PSWREG LAW -1
00265 100214 JMS PNCHA
00266 000215 JMP PNCHA+1

/HIGH SPEED PAPER TAPE READER DIAGNOSTIC
/
/PART 1. INSTRUCTION AND CONTROL TESTING
/
00300 .LOC 300
/TEST 1. ILLEGAL INSTRUCTION
/
00300 102551 TST1 JMS CRLF
00301 140013 DZM 13
00302 750001 CLAICMA
00303 700110 700110 /NO IOT BITS, INSTRUCTION
00304 740200 SZA /BIT 14 SHOULD CLEAR AC
00305 600314 JMP RBERR
00306 103002 JMS SCOPE /CHECK FOR SCOPE MODE
00307 600311 JMP ,+2
00310 600301 JMP TST1+1
00311 440013 ISZ 13
00312 600302 JMP TST1+2
00313 600317 JMP TST2-2
00314 103002 RBERR JMS SCOPE /ERROR, INFORMATION DELIVERED
00315 740040 E01 HLT /ILLEGALLY
00316 600301 JMP TST1+1

/
/TEST 2. TEST FOR FLAG OFF
/
00317 203015 LAC CKRSA
00320 040333 DAC RSAB
00321 700101 TST2 RSP /FLAG SHMULD BE OFF
00322 600326 JMP OK /SUCCESSFUL TEST
00323 103002 JMS SCOPE /CHECK FOR SCOPE MODE
/FAILURE PATH
00324 740040 E02 HLT /FLAG IS ON ILLEGALLY
00325 600321 JMP TST2
00326 103002 OK JMS SCOPE /CHECK FOR SCOPE MODE
00327 600331 JMP TST3 /SUCCESS PATH
00330 600321 JMP TST2
.EJECT

```

```

/
/TEST 3, ILLEGAL RSF TEST AND
/SET FLAG WITH RSA AND RSB
/SKIP ONRSF
/
00331 777763 TST3 LAW P15
00332 040013 DAC 13
/
00333 000000 RSAB 0
00334 102767 JMS STAL70
00335 700110 700110
00336 741000 SKP
00337 600357 JMP SKPERR
00340 700101 RSF /FLAG SHOULD BE SET
00341 600347 JMP ER3
00342 440013 ISZ 13
00343 600333 JMP RSAB
00344 103002 JMS SCOPE /SUCCESS PATH
00345 600400 JMP TST4
00346 600333 JMP TST3+2
00347 103002 ER3 JMS SCOPE /ERROR PATH
00350 741000 SKP
00351 600333 JMP TST3+2
00352 200333 LAC RSAB
00353 543015 SAD CKRSA
00354 740040 EA03 HLT /FLAG NOT SETTING AFTER RSA
00355 740040 EB03 HLT /FLAG NOT SETTING AFTER RSB
00356 600331 JMP TST3
00357 103002 SKPERR JMS SCOPE
00360 740040 E04 HLT /ILLEGAL RSA OR RSB
00361 600333 JMP RSAB
,EJECT

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```

/TEST 4, RESET FLAG WITH RRB AND RCF
00400      ,LOC 400
/
00400      203020  TST4   LAC CKRRB
00401      040406  DAC ,+5
00402      400333  XCT RSAB
00403      700101  RSF
00404      600403  JMP ,=1
00405      750000  CLA
00406      000000  @ /RRB OR RCF
00407      043021  DAC STOR1
00410      700101  RSF /CHECK RESET OF FLAG
00411      600432  JMP OK4
00412      103002  JMS SCOPE /ERROR PATH, FLAG STILL ON
00413      741000  SKP
00414      600402  JMP TST4+2
00415      203027  LAC FLAG
00416      740200  SEA /CHECK FOR RRB OR RCF
00417      600425  JMP ,+6 /RCF
00420      200333  LAC RSAB /CHECK FOR RSA OR RSB
00421      543015  SAD CKRSA
00422      740040  EA05  HLT /ERROR, FLAG STILL SET
/ AFTER RRB WITH RSA
00423      740040  EB05  HLT /FLAG STILL SET AFTER
/ RRB WITH RSB
00424      600402  JMP TST4+2
00425      200333  LAC RSAB
00426      543015  SAD CKRSA
00427      740040  EA06  HLT /ERROR, FLAG STILL SET
/ AFTER RCF WITH RSA
00430      740040  EB06  HLT /FLAG STILL SET AFTER
/ RCF WITH RSB
00431      600402  JMP TST4+2
00432      103002  OK4  JMS SCOPE /SUCCESS PATH
00433      741000  SKP
00434      600402  JMP TST4+2
00435      203027  LAC FLAG
00436      740200  SBA /CHECK FOR RRB OR RCF
00437      600000  JMP TST5
00440      443027  ISZ FLAG /SET FLAG
00441      203017  LAC CKRCF
00442      600401  JMP TST4+1
, EJECT

```

```

/
/TEST 5, RESET FLAG WITH RSA OR RSB
/
00500          .LOC 500
/
00500 143027  TST5  DEM FLAG
00501 400333          XCT RSAB          /RESET FLAG
00502 700101          RSP
00503 600502          JMP ,=1
00504 400333          XCT RSAB          /RESET FLAG
00505 700101          RSP
00506 600517          JMP OK5A
00507 103002          JMS SCOPE          /ERROR, FLAG STILL ON
00510 741000          SKP
00511 600500          JMP TST5
00512 200333          LAC RSAB
00513 543015          SAD CKRSA
00514 740040          EA11 HLT          /DID NOT CLEAR WITH RSA
00515 740040          EB11 HLT          /DID NOT CLEAR WITH RSB
00516 600500          JMP TST5
00517 103002          OK5A JMS SCOPE
00520 741000          SKP
00521 600501          JMP TST5+1
00522 700101          RSP          /WAIT FOR FLAG
00523 600522          JMP ,=1
00524 600600          JMP TST6
          .EJECT

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```

/TEST 5. INTERRUPT TEST
/
00000      .LOC 600
00000      203063  TST6  LAC JMP5
00001      040001      DAC 1
00002      703302      CAP
00003      700042      ION
00004      102767      JMS STAL70      /WAIT FOR ILLEGAL INT
00005      102767      JMS STAL70
00006      102767      JMS STAL70
00007      103002      JMS SCOPE      /OK, CHECK FOR SCOPE MODE
00010      741000      SKP
00011      600602      JMP TST6+2      /SCOPE
00012      203065  TSRINT LAC JMP6
00013      040001      DAC 1
00014      700042      ION
00015      400333      XCT RSAB
00016      102767      JMS STAL70      /WAIT FOR INT
00017      103002      JMS SCOPE      /ERROR, NO INT
00020      741000      SKP
00021      600612      JMP TSRINT      /SCOPE
00022      203015      LAC CKRSA
00023      540333      SAD RSAB
00024      740040      EA16  HLT      /NO INT USING RSA
00025      740040      EB16  HLT      /NO INT USING RSA
00026      600612      JMP TSRINT
      .EJECT

```

```

/INTERRUPT SERVICE ROUTINE
00627 103002 ILINT JMS SCOPE /CHECK FOR SCOPE MODE
00630 741000 SKP
00631 600602 JMP TST6+2 /SCOPE
00632 700314 IORS /READ I/O STATUS
00633 503160 AND (200000
00634 740200 SZA /SEE IF READER FLAG SET
00635 740040 E16B HLT /READER FLAG SET
00636 700314 IORS
00637 740040 E16C HLT /SPURIOUS INT, AC=I/O STATUS
00640 600602 JMP TST6+2
00641 103002 TSRFLG JMS SCOPE /RETURN FROM INT
00642 741000 SKP
00643 600612 JMP TSRINT /SCOPE
00644 700314 IORS /I/O STATUS
00645 503161 AND (177777
00646 741200 SNA /MAKE SURE READER CAUSED INT.
00647 600653 JMP OK7 /SUCCESS PATH
00650 700314 IORS
00651 740040 E16D HLT /SPURIOUS INT, AC=I/O STATUS
00652 600612 JMP TSRINT
00653 200650 OK7 LAC E16D=1
00654 040001 DAC 1
00655 700002 IOP
00656 601000 JMP TST7
.EJECT

```


/
/RETURN HERE FROM CHANNEL ADDRESS 50

01050	705512	RDR	705512	/READ PRIORITY LEVELS
01051	503167		AND (20000	/MASK LEVEL 2 BIT
01052	740200		SEA	/SHOULDN'T BE 0
01053	601057		JMP OK8A	/SUCCESS PATH
01054	103002		JMS SCOPE	/CHECK FOR LOOP
01055	740040	E19	HLT	/ERROR, READER CAUSED
01056	601033		JMP LOP8A	/API BREAK O.K., BUT LEVEL /2 ACTIVE IS NOT SET.

01057	703302	/	OK8A	CAF
01060	103002			JMS SCOPE
01061	741000			SKP
01062	601033			JMP LOP8A
				/CHECK FOR LOOP
				/NO LOOP
				/LOOP

01063	750004	/		LAS
01064	503167			AND (20000
01065	740200			SEA
01066	601076			JMP RSBLP+2
01067	203016			LAC CKRSB
01070	540333			SAD RSAB
01071	601400			JMP NOTAPE
01072	703302			CAF
01073	600320			JMP TST2-1
				/NEXT TEST
				/DO RSB TEST

01074	203016	/	RSBLP	LAC CKRSB
01075	040333			DAC RSAB
01076	703302			CAF
01077	600321			JMP TST2

/
.EJECT

```

/TEST 8, NO TAPE TEST
,LOC 1400
01400
01400 740040 /NOTAPE HLT /REMOVE TAPE FROM READER
01401 700104 RSA /SELECT READER
01402 761000 LAW 1000
01403 102767 JMS STAL70
01404 700314 IORS
01405 503170 AND (1000
01406 740200 SZA /'NO-TAPE' SHOULD BE SET
01407 601413 JMP OKFLG
01410 103002 JMS SCOPE
01411 740040 EA20 HLT /ERROR, 'NO-TAPE' NOT SET.
01412 601401 JMP NOTAPE+1
01413 700314 OKFLG IORS
01414 740010 RAL
01415 741100 SPA /READER FLAG SHOULD BE SET
01416 601422 JMP TSTRRB
01417 103002 JMS SCOPE
01420 740040 EA20B HLT /ERROR, READER FLAG DIDN'T SET
01421 601401 JMP NOTAPE+1 /WITH 'NO-TAPE' SET
01422 700112 TSTRRB RRB /CLEAR READER FLAG WITH 'RRB'
01423 700101 RSF /DID THE FLAG CLEAR?
01424 601430 JMP RESETA /YES
01425 103002 JMS SCOPE /NO
01426 740040 EA20C HLT /READER FLAG WON'T CLEAR WITH "NO-TAPE" SET.
01427 601422 JMP TSTRRB
01430 700104 RESETA RSA /RESET FLAG
01431 761000 LAW 1000
01432 102767 JMS STAL70
01433 740040 PRHLT3 HLT /REPLACE TAPE IN THE READER
01434 700314 IORS
01435 503170 AND (1000 /MASK 'NO-TAPE' FLAG.
01436 741200 SNA
01437 601443 JMP OFFLINE /OK, FLAG CLEARED
01440 103002 JMS SCOPE
01441 740040 ERR20D HLT /ERROR, 'NO-TAPE' FLAG DIDN'T CLEAR
01442 601434 JMP PRHLT3+1
01443 740040 OFFLINE HLT /TURN READER 'OFF'
01444 700314 IORS
01445 503170 AND (1000
01446 740200 SZA /DID NO-TAPE SET?
01447 601453 JMP PHLT3A /YES, END OF TEST
01450 103002 JMS SCOPE
01451 740040 ERR20E HLT /ERROR, 'NO-TAPE' DIDN'T SET
01452 601444 JMP OFFLINE+1 /WITH READER 'OFF'
01453 740040 PHLT3A HLT /OK, END OF 'NO-TAPE' TEST
,EJECT

```

```

/
/
/RANDOM NUMBER GENERATOR
GENRAN 0
01454 000000 LAC RANDEX
01455 201502 SAD (RANTBL*10
01456 543171 SKP
01457 741000 JMP RANTAD=1
01460 601470 LAC (RANTBL
01461 203172 DAC RANDEX
01462 041502 LAC RANCON
01463 201501 CLLIRAL
01464 744010 SEL
01465 741400 TAD ONE
01466 342027 DAC RANCON
01467 041501 LAC* RANDEX
01470 221502 RANTAD TAD RANCON
01471 341501 DAC* RANDEX
01472 061502 LAC RANSAV
01473 201514 RAR
01474 740020 TAD* RANDEX
01475 361502 DAC RANSAV
01476 041514 ISZ RANDEX
01477 441502 JMP* GENRAN
01500 621454

/
RANCON 123456
RANDEX RANTBL*10
RANTBL 654321
01501 123456 361416
01502 001513 055363
01503 654321 546060
01504 361416 243035
01505 055363 762572
01506 546060 453237
01507 243035 150214
01510 762572 0
01511 453237 RANSAV 0
01512 150214 .EJECT
01513 000000
01514 000000

```

```

/TAPE LOOP SYNC ROUTINE
      .LOC 2000
/
SYNC      2
02000    000000    LAC (-3001
02001    203173    DAC DELAY
02002    042026    RSA
02003    700104    /CHECK FOR SYNC CHAR,
02004    700101    RSF
02005    602004    JMP ,=1
02006    700112    RRB
02007    741200    SNA
02010    602020    JMP INSYNC
02011    442026    ISZ DELAY
02012    602003    JMP SYNC+3
02013    203061    LAC PRINT3    /TIMED OUT
02014    040011    DAC 11
02015    102562    JMS MSG1
02016    740040    PRHLT4 HLT
02017    602001    JMP SYNC+1
02020    777679    INSYNC LAW -103
02021    043022    DAC STOR2    /BINARY COUNT RSB
02022    143023    DEM STOR2A  /ALPHA
02023    777776    LAW =2
02024    043025    DAC STOR4
02025    622000    JMP* SYNC
02026    000000    DELAY 0
02027    000001    ONE 1
02030    000377    TH77 377
      .EJECT

```

/PDP-9 HIGH SPEED READER DIAGNOSTIC - TAPE 2

/

/DATA CHECK ROUTINE FOR RSA, RSB AND RCF

/RSA AND RRB

02100

.LOC 2100

02100 102000

/

RSACK JMS SYNC

02101 760301

LAW 301

02102 043067

DAC INF1+1

02103 202244

LAC BLOCK

02104 043024

DAC STOR3

02105 203041

LAC PRINT1

02106 040011

DAC 11

02107 700104

RSA

02110 700101

RSF

02111 602110

JMP .-1

02112 700112

RRB

/READ A WORD

02113 043021

DAC STOR1

02114 543023

SAD STOR2A

/COMPARE

02115 602125

JMP OKRSA

02116 103002

JMS SCOPE

02117 741000

SKP

02120 602123

JMP .+3

02121 102605

JMS SETUP1

/ERROR

02122 102562

JMS MSG1

02123 103010

JMS ERHLT

02124 740040

HLT

02125 102246

OKRSA

JMS CKTAPE

02126 443024

ISZ STOR3

/CHECK FOR END OF BLOCK

02127 602105

JMP RSACK+5

02130 103002

JMS SCOPE

/CHECK FOR SCOPE MODE

02131 602133

JMP RSARCF

02132 602100

JMP RSACK

/SCOPE MODE

.EJECT

		/RSA AND RCF	
02133	102000	RSARCF	JMS SYNC
02134	760302		LAW 302
02135	043067		DAC INF1+1
02136	202244		LAC BLOCK
02137	043024		DAC STOR3
02140	203041		LAC PRINT1
02141	040011		DAC 11
02142	700104		RSA
02143	700101		RSP
02144	602143		JMP ,=1
02145	790000		CLA
02146	700102		RCF
			/READ CHAR,
02147	043021		DAC STOR1
02150	543023		SAD STOR2A
			/COMPARE
02151	602161		JMP OKRCF
02152	103002		JMS SCOPE
02153	741000		SKP
02154	602157		JMP ,+3
02155	102605		JMS SETUP1
			/ERROR
02156	102562		JMS MSG1
02157	103010		JMS ERHLT
02160	740040		HLT
02161	102246	OKRCF	JMS CKTAPE
02162	443024		ISZ STOR3
			/CHECK FOR END OF BLOCKS
02163	602140		JMP RSARCF+5
02164	103002		JMS SCOPE
02165	602167		JMP RSBCK
02166	602133		JMP RSARCF
			.EJECT

```

/RSB AND RRB
/
02167 102000 RSBCK JMS SYNC
02170 760303 LAW 303
02171 043067 DAC INF1+1
02172 202245 LAC BLOCKA
02173 043024 DAC STOR3
02174 700144 RSB
02175 700101 RSF
02176 602175 JMP ,=-1
02177 700112 RRB /READ CHAR,
02200 043021 DAC STOR1 /COMPARE
02201 543022 SAD STOR2
02202 602207 JMP ,+5
02203 103002 JMS SCOPE
02204 741000 SKP
02205 741000 SKP
02206 102654 JMS SETUP3
02207 102246 JMS CKTAPE
02210 443024 ISZ STOR3
02211 602174 JMP RSBCK+5
02212 103002 JMS SCOPE /CHECK FOR SCOPE MODE
02213 602215 JMP RSBRCF
02214 602167 JMP RSBCK
/
/RCF AND RSB
/
02215 102000 RSBRCF JMS SYNC
02216 760304 LAW 304
02217 043067 DAC INF1+1
02220 202245 LAC BLOCKA
02221 043024 DAC STOR3
02222 700144 RSB /SELECT
02223 700101 RSF
02224 602223 JMP ,=-1
02225 750000 CLA
02226 700102 RCF /READ
02227 043021 DAC STOR1
02230 543022 SAD STOR2 /COMPARE
02231 602236 JMP ,+5
02232 103002 JMS SCOPE
02233 741000 SKP
02234 741000 SKP
02235 102654 JMS SETUP3
02236 102246 JMS CKTAPE
02237 443024 ISZ STOR3
02240 602222 JMP RSBRCF+5
02241 103002 JMS SCOPE /CHECK FOR SCOPE MODE
.EJECT

```

22242	740040	PRHLT5	HLT	/END OF DATA TESTS
22243	602215		JMP RSBRCF	
22244	777401	BLOCK	777401	
22245	777753	BLOCKA	777753	
		/		
		/		
02246	000000	CKTAPE	0	
02247	203022		LAC STOR2	/COMPLEMENT BINARY
02250	343174		TAD (747475	
02251	043022		DAC STOR2	
02252	203023		LAC STOR2A	/COMPLEMENT ALPHA
02253	740001		CMA	
02254	502030		AND TH77	
02255	043023		DAC STOR2A	
02256	443025		ISZ STOR4	/BUMP COUNT IF 0
02257	622246		JMP* CKTAPE	
02260	203023		LAC STOR2A	/ALPHA MODE
02261	342027		TAD ONE	
02262	502030		AND TH77	
02263	043023		DAC STOR2A	
02264	777776		LAW =2	
02265	043025		DAC STOR4	
02266	622246		JMP* CKTAPE	
			,EJECT	

```

/
/VARIABLE READER SPEED CONTROL4 ACS 2=17 SET SPEED
/
02400      .LOC 2400
/
02400      102000  VARSPD JMS SYNC
02401      143023      DEM STOR2A
02402      750004      LAS           /LOAD ACS
02403      503161      AND (177777
02404      740001      CMA
02405      042545      DAC STLSTR
02406      442545      ISZ STLSTR   /DELAY
02407      602406      JMP  ,=-1
02410      700104      RSA           /READ
02411      700101      RSF
02412      602411      JMP  ,=-1
02413      700112      RRB
02414      543023      SAD STOR2A   /COMPARE
02415      602431      JMP VAREND
02416      043021      DAC STOR1
02417      103002      JMS SCOPE   /CHECK FOR SCOPE MODE
02420      741000      SKP
02421      602431      JMP VAREND
02422      102605      JMS SETUP1
02423      203041      LAC PRINT1
02424      342027      TAD ONE
02425      040011      DAC 11
02426      102562      JMS MSG1
02427      103010      JMS ERHLT   /CHECK FOR HALT ON ERROR
02430      740040      HLT
02431      102246      VAREND JMS CKTAPE
02432      602402      JMP VARSPD+2
                        .EJECT

```

```

02500      /RANDOM READ AND STALL
           .LOC 2500
02500      /
02500      HSKP   JMS SYNC
02501      102000 JMS GENRAN
02501      101454 AND (17      /MAX. OF 17 FRAMES PER BLOCK
02502      503175 CMA
02503      740001 DAC LOOP
02504      042546 JMS READ      /READ ONE FRAME
02505      102512 ISE LOOP      /DONE IF SKIP
02506      442546 JMP ,+2
02507      602505 CAF      /FIRE THE STOP DELAY
02510      703302 JMP HSKP+1
02511      602501 .EJECT

```

```

/READ AND COMPARE LOOP
02512 000000 READ ?
02513 700104 RSA /READER IN ALPHA
02514 700101 RSF
02515 602514 JMP ,=-1
02516 700112 RRB /READ A CHAR.
02517 043021 DAC STOR1
02520 543023 SAD STOR2A /COMPARE
02521 602534 JMP TAPECK
02522 103002 JMS SCOPE
02523 741000 SKP
02524 602534 JMP TAPECK /INHIBIT PRINT
02525 102605 JMS SETUP1 /BAD
02526 203041 LAC PRINT1
02527 342027 TAD ONE
02530 040011 DAC 11
02531 102562 JMS MSG1
02532 103010 JMS ERHLT
02533 740040 HLT
02534 102246 TAPECK JMS CKTAPE
02535 622512 JMP* READ /CHECK FOR END OF BLOCK

/
/CONSTANTS AND VARIABLES
02536 777736 CON7 =42
02537 000020 CON8 20
02540 000040 CON9 40
02541 000777 LNLIM 777
02542 777657 M120 =121
02543 777776 M1 =2
02544 777747 M30 =31
02545 000000 STLSTR 0
02546 000000 LOOP 0
02547 000000 LOOPA 0
02550 000260 N260 260

/
02551 000000 CRLF 0
02552 760215 LAW 215
02553 700406 TLS
02554 700401 TSF
02555 602554 JMP ,=-1
02556 542560 SAD ,+2
02557 622551 JMP* CRLF
02560 760212 LAW 212
02561 602553 JMP CRLF+2
.EJECT

```

/TTY PRINT ROUTINES

02562	000000	MSG1	0
02563	220011		LAC* 11
02564	700400		TL5
02565	343064		TAD END
02566	740200		SEA
02567	741000		SKP
02570	602574		JMP CRWAIT
02571	700401		TSF
02572	602571		JMP ,=1
02573	602563		JMP MSG1+1
02574	777761	CRWAIT	LAW =17
02575	043031		DAC WORK1
02576	770000		LAW =10000
02577	043030		DAC WORK
02600	443030		ISE WORK
02601	602600		JMP ,=1
02602	443031		ISE WORK1
02603	602576		JMP CRWAIT+2
02604	622562		JMP* MSG1

/SETUP1

02605	000000	SETUP1	0
02606	203021		LAC STOR1
02607	503056		AND MSK3
02610	102637		JMS ROTAT6
02611	043107		DAC BAD1
02612	203021		LAC STOR1
02613	503055		AND MSK2
02614	102646		JMS ROTAT3
02615	043110		DAC BAD1+1
02616	203021		LAC STOR1
02617	503054		AND MSK1
02620	342550		TAD N260
02621	043111		DAC BAD1+2
02622	203023		LAC STOR2A
02623	503056		AND MSK3
02624	102637		JMS ROTAT6
02625	043076		DAC GOOD1
02626	203023		LAC STOR2A
02627	503055		AND MSK2
02630	102646		JMS ROTAT3
02631	043077		DAC GOOD1+1
02632	203023		LAC STOR2A
02633	503054		AND MSK1
02634	342550		TAD N260
02635	043100		DAC GOOD1+2
02636	622609		JMP* SETUP1
			,EJECT

/BAD DATA

02637	000000	ROTAT6	0
02640	742020	RTR	RTR RTR RTR
02641	742020		
02642	742020		
02643	342550	TAD	N260
02644	744000	CLL	
02645	622637	JMP*	ROTAT6
/			
02646	000000	ROTAT3	0
02647	742020	RTR	
02650	740020	RAR	
02651	342550	TAD	N260
02652	744000	CLL	
02653	622646	JMP*	ROTAT3
/			
/			
02654	000000	SETUP3	0
02655	203067	LAC	INF1+1
02656	700406	TLS	
02657	700401	TSP	
02660	602657	JMP	,=1
02661	203047	LAC	PRINT4
02662	040011	DAC	11
02663	203022	LAC	STOR2
02664	043023	DAC	STOR2A
02665	102667	JMS	,+2
02666	602701	JMP	TYPE1
02667	000000	TYPE2	0
02670	777773	LAW	=5
02671	043040	DAC	CNTA
02672	220011	LAC*	11
02673	700406	TLS	
02674	700401	TSP	
02675	602674	JMP	,=1
02676	443040	ISZ	CNTA
02677	602672	JMP	,=5
02700	622667	JMP*	TYPE2
02701	777772	TYPE1	LAW =6
02702	042766	DAC	AWAY
02703	203176	LAC	(700000
02704	503022	AND	STOR2
02705	744000	CLL	
02706	742010	RTL	
02707	742010	RTL	
02710	342550	TAD	N260
02711	042765	DAC	TRBLES
02712	203022	LAC	STOR2
02713	742010	RTL	
02714	740010	RAL	
02715	043022	DAC	STOR2
02716	102720	JMS	TYPE3

02720	000000	TYPE3	0
02721	202769		LAC TRBLES
02722	700406		TLS
02723	700401		TSF
02724	602723		JMP ,=1
02725	442766		ISE AWAY
02726	622720	TYPE4	JMP TYPE3
02727	777772		LAW =6
02730	042766		DAC AWAY
02731	102667		JMS TYPE2
02732	203176		LAC (700000
02733	503021		AND STOR1
02734	744000		CLL
02735	742010		RTL
02736	742010		RTL
02737	342550		TAD N260
02740	042769		DAC TRBLES
02741	203021		LAC STOR1
02742	742010		RTL
02743	740010		RAL
02744	043021		DAC STOR1
02745	102747		JMS TYPE5
02746	602732		JMP TYPE4+3
02747	000000	TYPE5	0
02750	202769		LAC TRBLES
02751	700406		TLS
02752	700401		TSF
02753	602752		JMP ,=1
02754	442766		ISE AWAY
02755	622747		JMP TYPE5
02756	102551		JMS CRLF
02757	203023		LAC STOR2A
02760	043022		DAC STOR2
02761	102767		JMS STAL70
02762	103010		JMS ERHLT
02763	740040		HLT
02764	622654		JMP SETUP3
02765	000000	TRBLES	0
02766	000000	AWAY	0
			.EJECT

02767	000000	STAL70	0	/70 MS STALL
02770	203001		LAC M6	
02771	043030		DAC WORK	
02772	770000		LAW =10000	
02773	043031		DAC WORK1	
02774	443031		ISZ WORK1	
02775	602774		JMP . =1	
02776	443030		ISZ WORK	
02777	602772		JMP STAL70+3	
03000	622767		JMP* STAL70	
03001	777771	M6	=7	
		/		
03002	000000	SCOPE	0	
03003	750004		LAS	/CHECK FOR SCOPE MODE
03004	742010		RTL	
03005	741400		SZL	
03006	443002		ISZ SCOPE	/YES, SCOPE MODE
03007	623002		JMP* SCOPE	
		/		
03010	000000	ERHLT	0	/CHECK FOR HALT ON ERROR
03011	750004		LAS	
03012	740100		SMA	
03013	443010		ISZ ERHLT	/NO HALT
03014	623010		JMP* ERHLT	
			.EJECT	

/CONSTANTS, VARIABLES ETC.

03015	700104	CKRSA	700104	/RSA IOT
03016	700144	CKRSB	700144	/RSB IOT
03017	700102	CKRCF	700102	/RCF IOT
03020	700112	CKRRB	700112	/RRB IOT
/				
03021	000000	STOR1	0	/THESE NEXT 6 FOR
03022	000000	STOR2	0	/DATA WORD STORAGE
03023	000000	STOR2A	0	
03024	000000	STOR3	0	
03025	000000	STOR4	0	
03026	000000	STOR5	0	
03027	000000	FLAG	0	/RSA, RSB FLAG
03030	000000	WORK	0	/THESE 3USED
03031	000000	WORK1	0	/IN TIMING LOOPS
03032	000000	WORK2	0	
/				
03033	776027	CON1	-1731	/THESE FOUR USED
03034	776544	CON3	-1234	/IN TIMING LOOPS
03035	771623	CON5	-6155	
03036	003777	CON6	3777	
/				
03037	000000	COUNTA	0	
03040	000000	CNTA	0	
03041	003066	PRINT1	INF1	
03042	000000	BLSTOR	0	/BLOCK LENGTH
03043	000000	CHACNT	0	/CHARACTER COUNTER
03044	000000	CNTEN	0	/COUNT OF TEN
03045	000000	STORLM	0	/ERROR COUNT
03046	000000	LASTAL	0	/LAST STALL TIME
03047	003132	PRINT4	INF4	
/				
03050	760301	A	760301	/TTY CHAR. A
03051	760302	B	760302	/DITTO B
03052	760303	C	760303	/DITTO C
03053	760304	D	760304	/DITTO D
03054	000007	MSK1	7	
03055	000070	MSK2	70	
03056	000300	MSK3	300	
03057	000700	MSK4	700	
03060	007000	MSK5	7000	
03061	003114	PRINT3	INF3	
03062	003149	PRINT5	INF5	
03063	600627	JMP5	JMP ILINT	
03064	777563	END	777563	
03065	600641	JMP6	JMP YSRFLG	
			.EJECT	

/TTY PRINT ROUTINES

03066	000000	INF1	0	
03067	000000		2	/A,B,C, OR D
03070	000240		240	/SPACE
03071	000307		307	/G
03072	000317		317	/O
03073	000317		317	/O
03074	000304		304	/D
03075	000240		240	/SPACE
03076	000330	GOOD1	330	/X
03077	000330		330	/X
03100	000330		330	/X
03101	000240		240	/SPACE
03102	000240		240	/SPACE
03103	000302		302	/B
03104	000301		301	/A
03105	000304		304	/D
03106	000240		240	/SPACE
03107	000330	BAD1	330	/X
03110	000330		330	/X
03111	000330		330	/X
03112	000212		212	/LF
03113	000215		215	/CR
		/		
03114	000000	INF3	0	
03115	000303		303	/C
03116	000301		301	/A
03117	000316		316	/N
03120	000316		316	/N
03121	000317		317	/O
03122	000324		324	/T
03123	000240		240	/SPACE
03124	000323		323	/S
03125	000331		331	/Y
03126	000316		316	/N
03127	000303		303	/C
03130	000212		212	/LF
03131	000215		215	/CR

.EJECT

03132	000000	INF4	0	
03133	000307		307	/G
03134	000317		317	/O
03135	000317		317	/O
03136	000304		304	/D
03137	000240		240	/SPACE
03140	000240		240	/SPACE
03141	000302		302	/B
03142	000301		301	/A
03143	000304		304	/D
03144	000240		240	/SPACE

03145	000000	INF5	0	
03146	000000		0	/X
03147	000000		0	/X
03150	000000		0	/X
03151	000257		257	/SLASH
03152	000323		323	/S
03153	000305		305	/E
03154	000303		303	/C
03155	000240		240	/SPACE
03156	000312		212	/LF
03157	000215		215	/CR

03160	000000		.END	
03161	200000	*L		
03161	177777	*L		
03162	004000	*L		
03163	001017	*L		
03164	000037	*L		
03165	740040	*L		
03166	001000	*L		
03167	020000	*L		
03170	001000	*L		
03171	001013	*L		
03172	001003	*L		
03173	774777	*L		
03174	747475	*L		
03175	000017	*L		
03176	700000	*L		

SIZE=03177

NO ERROR LINES