

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.

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

The reader No Tape Test is performed next.

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

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

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

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

- i. Turn the Reader "OFF LINE" to test for setting the "NO-TAPE" flag.
- j. 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 10T 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 RSP. 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 1401, 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 ACSI 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 ACSI 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 HSR15  
/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  
      JMP 1          /INTERRUPT ON ILLEGALLY  
      LAW -1  
      LAW -1  
      LAW -1  
      LAW -1  
      .EJECT
```

```

/TAPE LOOP GENERATOR
00200      ,LOC 200
00202      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      RSP
00256      600255      JMP ,=1
00257      443030      ISZ WORK      /FRAME COUNTER
00260      600254      JMP ,=4
00261      443031      ISZ WORK1  /STALL
00262      600261      JMP ,=1
00263      600250      JMP SETUP
          .EJECT

```

```

/PUNCH ALL ONES
/
00264 777777 PSWREG LAW -1
00265 100214 JMS PNCHA
00266 000219 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 DCM 13
00302 750001 CLAICMA
00303 700110 700110 /NO IOT BITS, INSTRUCTION
00304 740200 SEA /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 RSF /FLAG SHHULD 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 -15
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

```

```

/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      RSP
00404      600403      JMP ,=1
00405      750000      CLA
00406      000000      0
00407      043021      DAC STOR1
00410      700101      RSP
00411      600432      JMP OK4
00412      103002      JMS SCOPE
00413      741000      SKP
00414      600402      JMP TST4+2
00415      203027      LAC FLAG
00416      740200      SZA
00417      600425      JMP ,+6
00420      200333      LAC RSAB
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      JMS SCOPE
00433      741000      SKP
00434      600402      JMP TST4+2
00435      203027      LAC FLAG
00436      740200      SZA
00437      600500      JMP TST5
00440      443027      ISZ FLAG
00441      203017      LAC OKRCF
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

```

```

/TEST 6. INTERRUPT TEST
/
00000          .LOC 600
/
00600 203063   TST6   LAC JMP5
00601 040001   DAC 1
00602 703302   CAF
00603 700042   ION
00604 102767   JMS STAL70   /WAIT FOR ILLEGAL INT
00605 102767   JMS STAL70
00606 102767   JMS STAL70
00607 103002   JMS SCOPE   /OK, CHECK FOR SCOPE MODE
00610 741000   SKP
00611 600602   JMP TST6+2   /SCOPE
00612 203065   TSRINT LAC JMP6
00613 040001   DAC 1
00614 700042   ION
00615 400333   XCT RSAB
00616 102767   JMS STAL70   /WAIT FOR INT
00617 103002   JMS SCOPE   /ERROR, NO INT
00620 741000   SKP
00621 600612   JMP TSRINT   /SCOPE
00622 203015   LAC CKRSA
00623 540333   SAD RSAB
00624 740040   EA16 HLT       /NO INT USING RSA
00625 740040   EB16 HLT       /NO INT USING RSA
00626 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 OKBA /SUCCESS PATH
01054 103002 JMS SCOPE /CHECK FOR LOOP
01055 740040 E19 HLT /ERROR, READER CAUSED
01056 601033 JMP LOPBA /API BREAK O.K., BUT LEVEL
/2 ACTIVE IS NOT SET.

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

/
01063 750004 LAS
01064 503167 AND (20000
01065 740200 SEA /CHECK TO LOOP TESTS 2-6
01066 601076 JMP RSBLP+2 /LOOP
01067 203016 LAC CKRSB
01070 540333 SAC RSAB
01071 601400 JMP NOTAPE /NEXT TEST
01072 703302 CAF
01073 600320 JMP TST2-1 /DO RSB TEST

/
01074 203016 RSBLP LAC CKRSB /RSB IOT
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
01502 001513
01503 654321
01504 361416
01505 055363
01506 546060
01507 243035
01510 762572
01511 453237
01512 150214
01513 000000
01514 000000 RANSAV 0
,EJECT

```

```

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

ISE 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 RSF
02144 602143 JMP ,=1
02145 750000 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	
02201	543022	SAD	STOR2	/COMPARE
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
02401      143023
02402      750004
02403      503161
02404      740001
02405      042545
02406      442545
02407      602406
02410      700104
02411      700101
02412      602411
02413      700112
02414      543023
02415      602431
02416      043021
02417      103002
02420      741000
02421      602431
02422      102605
02423      203041
02424      342027
02425      040011
02426      102562
02427      103010
02430      740040
02431      102246
02432      602402

VARSPD    JMS SYNC
           DEM STOR2A
           LAS           /LOAD ACS
           AND (177777
           CMA
           DAC STLSTR
           ISZ STLSTR    /DELAY
           JMP ,=-1
           RSA           /READ
           RSP
           JMP ,=-1
           RRB
           SAD STOR2A    /COMPARE
           JMP VAREND
           DAC STOR1
           JMS SCOPE     /CHECK FOR SCOPE MODE
           SKP
           JMP VAREND
           JMS SETUP1
           LAC PRINT1
           TAD ONE
           DAC 11
           JMS MSG1
           JMS ERHLT     /CHECK FOR HALT ON ERROR
           HLT
VAREND    JMS CKTAPE
           JMP VARSPD+2
           .EJECT

```

```
02500      /RANDOM READ AND STALL
           .LOC 2500
/
02500      HSKP   JMS SYNC
02501      102000 JMS GENRAN
02502      101454 AND 17      /MAX, OF 17 FRAMES PER BLOCK
02503      503175 CMA
02504      740001 DAC LOOP
02505      042546 JMS READ      /READ ONE FRAME
02506      102512 ISZ LOOP      /DONE IF SKIP
02507      442546 JMP 1-2
02508      602505 CAF          /FIRE THE STOP DELAY
02509      703302 JMP HSKP+1
02510      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 LNGLIM 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		ISZ 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

HSR15

02637	000000	ROTAT6	0
02640	742020		RTRJ RTRJ 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		TL5
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		TL5
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

19MSR

MSR15

02720	000000	TYPE3	0
02721	202769		LAC TRBLES
02722	700406		TL3
02723	700401		TSP
02724	602723		JMP ,=1
02725	442766		ISE AWAY
02726	622720		JMP TYPE3
02727	777772	TYPE4	LAW =6
02730	042766		DAC AWAY
02731	102667		JMS TYPE2
02732	203176		LAC (700000
02733	903021		AND STOR1
02734	744000		CLL
02735	742010		RTL
02736	742010		RTL
02737	342590		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		TL3
02752	700401		TSP
02753	602752		JMP ,=1
02754	442766		ISE AWAY
02755	622747		JMP TYPE5
02756	102591		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 -1751 /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 600027 JMP5 JMP ILINT
03064 777563 END 777563
03065 600041 JMP6 JMP TSRFLG
.EJECT

```

```

/TTY PRINT ROUTINES
INP1 0
      2 /A,B,C, OR D
      240 /SPACE
      307 /G
      317 /O
      317 /O
      304 /D
      240 /SPACE
GOOD1 330 /X
      330 /X
      330 /X
      240 /SPACE
      240 /SPACE
      302 /B
      301 /A
      304 /D
      240 /SPACE
BAD1 330 /X
      330 /X
      330 /X
      212 /LF
      215 /CR

/
INFS 0
      303 /C
      301 /A
      316 /N
      316 /N
      317 /O
      324 /T
      240 /SPACE
      323 /S
      331 /Y
      316 /N
      303 /C
      212 /LF
      215 /CR
      .EJECT

```

PAGE 27 15HBR HBR15

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	000212		212	/LF
03157	000215		215	/CR

.END

03160	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