PDP-15

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-15-D9AA-D
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PDP-15 DIAGNOSTIC USERS GUIDE

This manual provides the basic diagnostic operating procedures for the PDP-15 and most of the common peripherals. Refer to the individual diagnostic write ups and listing if more detailed information is needed.

TABLE OF CONTENTS

	92	✓	TCØ2 Basic Exerciser (Part 2)
	95	✓	TCØ2 Dectape Random Exerciser
	98		Power Fail Test
	100		RF15 Disk Data
	103		RF15 Diskless
	112		RF15 Multi Disk
	115		CRØ3 B GDI Card Reader Test

PDP-15 INSTRUCTION TEST (PART 1 and 1A)

ABSTRACT

Instruction Test (Part 1) tests all operate group instructions and the following memory reference instructions : LAC, AND, and XOR. Part 1 A tests the TAD, ADD, and SAD instructions. There is a separate binary tape for each part.

Part 1 must run in its antiraty before attempting to run Part 1A.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 00200.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.
2. Set ACS = 000000 (ACS 0 = 1 will suppress bell for Test 1).
3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The bell rings with each successful cycle of the test.

ERROR IDENTIFICATION

Error halts indicate each failing test.

PDP-15 INSTRUCTION TEST, PART 2

ABSTRACT

Instruction Test (Part 2) tests the following memory reference instructions: DZM, DAC, ISZ, JMP, JMS and XCT. The instruction DBR is tested, and in addition, AUTO-INCREMENT, INDIRECT, REAL TIME CLOCK and PROGRAM INTERRUPT are tested.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 00200.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.
2. Set AC switch 17 to a 1 if the REAL TIME CLOCK is to be tested.
3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The TTY bell rings with each successful cycle of the test.

ERROR IDENTIFICATION

Error halts indicate each failing test.

PDP-15 ISZ TEST

ABSTRACT

The ISZ Test checks the operation of the ISZ instruction. Various checks are made, including from 777777 to 000000 on all memory locations and ISZ of random numbers stored in random memory locations.

All Basic Instruction Tests should be run successfully before attempting to operate this program.

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 00200.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.

2. Set ACS = 000000 (normal operation).

3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The teleprinter bell rings after the test has been successfully completed.

ERROR IDENTIFICATION

Unless AC switch 0 is a 1, errors will be printed on the teletype. The following is an example of the error print-out used by the ISZ Test:

ISZ ADD

NUMBER AT ORIGINAL BAD ISZ AT

001234 765435 765434 005763

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1 0	Halt on error. Don't halt on error.
1	1 0	Don't print on errors. Print errors.
2	1 0	Ring bell on error. Ring bell after N passes.
3	1 0	Loop on current conditions. Don't loop on current conditions.
4	1 0	Loop on current test. Don't loop on current test.
5	1 0	Save initial error conditions of random ISZ. Don't save initial error conditions of random ISZ.
6	1 0	Vary location of ISZ instruction. Don't vary location of ISZ instruction.
7	1 0	Vary location of number incremented. Don't vary location of number incremented
8	1 0	Vary number incremented. Don't vary number incremented.

(Switches 6,7,8 operate in conjunction with 5; 3 supercedes 4)

The following starting/restarting procedures should be observed:

1. To put the program in the scope mode, the ACCUMULATOR SWITCHES should be set to 270000, (don't halt, don't print, bell after N passes, loop on current number (location), loop on current test, save error conditions).

2. To start program initially so that upper memory may be checked, start at location 00200.

3. To start program initially so that lower memory may be checked without checking upper memory, start at location 00244.

4. To restart program to check upper memory after program has moved, restart at 07652.

5. To restart program to check lower memory after program has moved, restart at 07000.

6. To restart program to check random ISZ's after program has moved, restart at 07052.

PDP-15 MEMORY ADDRESS TEST

ABSTRACT

The Memory Address Test checks the memory system to ensure that all memory locations (not occupied by the program) in a given 4K memory stack can be uniquely addressed. Checks are also made to ensure that only one memory location is written into whenever memory is addressed, and that cores of different locations are not shorted together.

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 07200.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 07200.

2. Set ACS = 002000 (to repeat test set ACS=000000).

3. Press I/O RESET, than START.

SUCCESSFUL OPERATION INDICATION

The program runs for approximately six minutes and halts at location 07451 unless ACS = 000000.

ERROR IDENTIFICATION

Unless ACS 1 is a 1, errors will be printed on the teletype in the following format:

ADDRESS	GOOD	BAD
001234	001234	001230

A HALT at location 07503 is the only error halt in the program.

FIELD SERVICE INFORMATION

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1 0	Halt on error. Don't halt on error.
1	1 0	Don't print errors. Print errors.
2	1 0	Ring bell on error. Ring bell after N passes.
3	1	Loop on current number (address or complement).
4	1	Loop on current location.
5	1	Loop on current test.
6	1	Skip 1's in 0's test (Test 4).
7	1	Halt after completing all tests.

FIELD SERVICE INFORMATION

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1 0	Halt on error. Don't halt on error.
1	1 0	Don't print errors. Print errors.
2	1 0	Ring bell on error. Ring bell after N passes.
3	1 0	Loop on current location. Don't loop on current location.
4	1 0	Repeat whole test (all locations). Don't repeat whole test.

PDP-15 JMP-SELF : TEST

ABSTRACT

The JMP-self test checks to insure taht the JMP instruction is executed correctly. The computer is held in a JMP to current location for a definite time interval. When the time period has lapped the JMP instruction is moved elsewhere and the check is repeated.

All Basic Instruction Tests should be run successfully before attempting to operate this program.

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 07500.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 07500.

2. Set ACS = 000000 (normal operation).

3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The teleprinter bell rings after each segment of the test is completed. The entire test takes approximately 10 minutes.

ERROR IDENTIFICATION

Unless AC switch 1 is a 1 errors will be printed on the teletype. The following is an example of the error print-out used by the JMP-self Test:

```
JMP TEST
JMP AT CAL FROM
001234  001230
```

PDP-15 JMP Y - INTERRUPT TEST

ABSTRACT

The JMP Y Interrupt Test determines if the PDP-15 will complete a JMP Y (where Y is some standard value) instruction before it goes into program interrupt.

All Basic Instruction Tests should be run successfully before attempting to operate this program.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 07400.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 07400.
2. Set ACS = 000000 (normal operation).
3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The teleprinter bell rings after each successful 100 (octal cycles of the test.)

ERROR IDENTIFICATION

Unless AC switch 1 is a 1, errors will be printed on the teletype. The following is an example of the error print-out used by the JMP Y Interrupt Test:

```
ION-JMP Y
JMP AT          "Y"          C(O)          C(Y)

001234          007654       001235        740040
```

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1	Halt on error.
	0	Don't halt on error.
1	1	Don't print errors.
	0	Print errors.
2	1	Ring bell on error.
	0	Ring bell after N passes.
3	1	Loop on current Y.
	0	Don't loop on current Y.
4	1	Loop on current location.
	0	Don't loop on current location.

PDP-15 JMS Y-INTERRUPT TEST

ABSTRACT

The JMS Y Interrupt Test determines if the PDP-15 will complete a JMS Y (where Y is some standard value) instruction before it goes into program interrupt.

All Basic Instruction Tests should be run successfully before attempting to operate this program.

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 07400.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 07400.

2. Set ACS = 000000 (normal operation).

3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The teleprinter bell rings after each successful 100 (octal cycles of the test.

ERROR IDENTIFICATION

Unless AC switch 1 is a 1, errors will be printed on the teletype. The following is an example of the error print-out used by the JMS Y Interrupt Test:

```
ION - JMS Y
JMS AT              "Y"          C(O)          C(Y)

001234              007654       001235        740040
```

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1 0	Halt on error. Don't halt on error.
1	1 0	Don't print errors. Print errors.
2	1 0	Ring bell on error. Ring bell after N passes.
3	1 0	Loop on current Y. Don't loop on current Y.
4	1 0	Loop on current location. Don't loop on current location.

PDP-15 BASIC MEMORY CHECKERBOARD

(LOW AND HIGH VERSIONS)

ABSTRACT

The PDP-15 Basic Memory Checkerboard tests 3D core memories for failure on half-selected lines under worst case noise conditions. Its use is intended for 4K systems.

LOADING PROCEDURE

Loading procedures for both the high and low versions are identical. Both versions must be run in order to complete the test.

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 177ØØ.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. For Low End Program, set ADDRESS switches to ØØ2ØØ.
   For High End Program, set ADDRESS switches to Ø74ØØ.
2. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The programs run continously. Execution time for either the high or low version is approximately 20 seconds.

ERROR IDENTIFICATION

Errors are indicated by program halts.

PDP-15 EXTENDED MEMORY TEST

ABSTRACT

The PDP-15 Extended Memory Test checks for correct operation of key instructions, the interrupt system, the API (automatic priority interrupt) system, and the auto-index feature.

The test operates on 8K to 32K core memory configurations. All programs required to insure correct operation of the basic processor must have been run successfully before use of this program.

LOADING PROCEDURE

1. Place object tape in reader.

2. Set BANK MODE switch on a 1.

3. Set ADDRESS switches to 17700.

4. Press I/O RESET and then READ-IN.

5. The program will load and halt with one of these AC settings:

   AC=777777 loaded correctly.

   AC=000000 checksum error. Repeat the loading procedure.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.

2. Press I/O RESET and then START.

3. The program prints the following and halts:

   "PDP-15 EXTENDED MEMORY TEST"

4. Set ACS3-5 to the number of additional extended memory pages (4K/page). E.g., for 16K memory, set ACS3-5=3_8.

5. Press CONTINUE.
   If the following is printed, return to step 4:

   "ACS3-5 INCORRECTLY SET, OR SYSTEM DOES NOT HAVE AT LEAST 8K OF CORE"

6. Program runs continuously until stopped by the operator (by setting ACSØ=1) or an error halt occurs. A single ring of the teletype bell indicates completion of each program pass.

NORMAL HALTS

Location 00577 - for routine-end-halt option or halt after instruction typeout. Recover by pressing CONTINUE (after reply to instruction, if required).

ERROR IDENTIFICATION

Location 00602 - after an error typeout, the program halts at this common location. There are two forms of error print-outs:

"ERROR LOC XXXXXX AC = YYYYYY TEST 000ZZZ"

occurs when a test routine detects a predictable error for which it is testing;

"CALERR LOC XXXXXX AC = YYYYYY TEST 000ZZZ

is printed when a failure occurs during a test routine which causes the system to "CAL OUT".

FIELD SERVICE INFORMATION

The following AC switch options may be set at any time:

AC0 = 1 Halt at end of routine.

AC1 = 1 Loop on routine.

AC2 = 1 Scope loop (set only if AC1 option also used).

PDP-15 EXTENDED MEMORY CHECKERBOARD

ABSTRACT

The PDP-15 Extended Memory Checkerboard test verifies the operational status of core memory be testing for core failure on half-selected lines under worst case noise conditions.

The program tests any memory configuration of from 8K to 32K words in 4K segments, automatically relocating itself in order to test all memory fields from each field.

LOADING PROCEDURE

Normally load the program into memory field 0 as follows:

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 177ØØ.

4. Press I/O RESET and then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to ØØ2ØØ.

2. Press I/O RESET and then START.

PROGRAM/OPERATOR ACTION

Note: TTY indicates program typeout; OP indicates operator response.

Setting Test Limits

TTY: "TEST LIMITS"

OP: Format "X, Y "
where X=first 4K field to be tested
Y=last 4K field to be tested
)=Carriage return.

The memory fields are numbered 0 thru 7 for 4K thru 32K respectively. If a typing error is made, press RUBOUT.

Remember that the program checks all of core designated by the test limits except the portion occupied by the Program at that time. If the user attempts to test only the field in which the program resides, "PROGRAM IS IN FIELD X" is printed and the test limits must be changed.

Examples:

TTY: TEST LIMITS
OP: 3,6)
This indicates fields 3,4,5,6 will be tested.

TTY: TEST LIMITS
OP: 2,2↵
Field 2 only is to be tested.

ACS Set-up

TTY: "SETUP ACS"

OP: Set ACS=ØØØØØØ.
Press any keyboard key except RUBOUT.

SUCCESSFUL OPERATION INDICATION

The following is printed each time program relocation has been completed:

"PROGRAM IS IN FIELD X"

If the tests are successfully run from all fields designated by the operator (no error indicators typed), the test is considered successful. Note also use of this print-out as an error message while setting the Test Limits.

FIELD SERVICE INFORMATION

Restarting Procedure

Start from 200 to reinitialize the program.
Start from 215 to retain current operation parameters.

ACS SETTINGS

Any ACS listed may be set while the program is running though operation may not be initiated immediately since most are sensed only after all tests have been performed.

ERROR IDENTIFICATION

Any of the following messages indicates an error condition exists:

"TEST OCTAL ADR GOOD BAD PAT CONTROL WORD"

"PROGRAM RELOCATION ERROR"

"ERROR IN SELECTED FIELD"

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1	Program halt. Press CONTINUE to recover.
1	1	Delete error print-out and halt on error. Press CONTINUE to recover.
2	1	Ring bell on error.
3 - 6	1	Specify tests 1 thru 4 respectively.
9	1	Inhibit program relocation.
11	1	Inhibit "PROGRAM IS IN FIELD" print-out.
12	1	For forced program relocation.
13	1	Set up 'scope loop via Keyboard input.
14	1	Inhibit error printouts for one or more bit positions.

PDP-15 EXTENDED MEMORY ADDRESS TEST

ABSTRACT

The PDP-15 Extended Memory Address Test checks all of core memory not occupied by the program to insure that each location can be uniquely addressed. This is done thru a series of four tests. The test patterns are chosen so as to detect word and bit errors as well as shorted wires within any bank.

The program relocates automatically from field to field, testing all of core memory specified from each field. The program tests any memory configuration from 8K to 32K.

LOADING PROCEDURE

1. Place tape in reader.

2. Set ADDRESS switches to 17700.

3. Press I/O RESET and then READ-IN.

OPERATING PROCEDURE

1. Set the ADDRESS switches to ØØ2ØØ.

2. Press I/O RESET and then START.

PROGRAM/OPERATOR ACTION

Note: TTY indicates program typeout; OP indicates operator response.

Setting Test Limits

TTY: "TEST LIMITS"

OP: Format "X, Y)"
where X = first 4K field to be tested
Y = last 4K field to be tested
) = carriage return

The memory fields are numbered 0 thru 7 for 4K thru 32K respectively.
If a typing error is made, press RUBOUT.
Remember that the program checks all of core designated by the test limits except the portion occupied by the program. If the user attempts to test only the field in which the program resides, "PROGRAM IS IN FIELD X" is printed and the test limits must be changed.

Examples:

TTY: TEST LIMITS

OP: 3, 6 ↵
Indicates fields 3, 4, 5, 6 to be tested.

TTY: TEST LIMITS
OP: 2,2
Field 2 only is to be tested.

ACS SETUP

TTY: "SETUP ACS"

OP: Set ACS=000000.
Press any keyboard key (except RUBOUT).

SUCCESSFUL OPERATION INDICATION

The following is printed each time program relocation has been completed: "PROGRAM IS IN FIELD X". If the tests are successfully run from all fields designated by the operator (no error indicators typed), the test is considered successful. (Note also use of this printout as an error message while setting the Test Limits).

ERROR IDENTIFICATION

Any of the following messages indicates an error condition exists:

"TEST OCTAL ADR GOOD BAD PAT CONTROL WORD"

"PROGRAM RELOCATION ERROR"

"ERROR IN SELECTED FIELD"

FIELD SERVICE INFORMATION

Restarting Procedure

Start from 200 to reinitialize the program.
Start from 221 to retain current operating parameters.

ACS Settings

Any ACS listed may be set while the program is running though operations may not be initiated immediately since most are sensed only after all tests have been performed.

AC SWITCH	STATE	DESCRIPTION
0	1	Program halt. Press CONTINUE to recover.
1	1	Delete error print-out and halt on error. Press CONTINUE to recover
2	1	Ring bell on error.
3-6	1	Specify tests 1 thru 4 respectively
9	1	Inhibit program relocation.
11	1	Inhibit "PROGRAM IS IN FIELD" print-out.
12	1	For forced program relocation.
13	1	Request keyboard input.

HARDWARE INDEX REGISTER TEST

ABSTRACT

The Hardware Index Register Test checks for proper operation of the hardware index register, the limit register, and their associated intructions. The program is relocated to each memory field to test all other fields in relation to each.

The basic control processor tests and extended memory tests must have run successfully before this test is attempted.

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch on 1.

3. Set ADDRESS switches to 177ØØ.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set BANK MODE switch to 1.

2. Set ADDRESS switches to ØØ2ØØ.

3. Set AC switches to Ø for normal operation, except ACS 3-5 which are set to the number of additional 4K fields of core available, i.e.

   4K = ØØØ

   8K = ØØ1

   .
   .
   .

   32K = 111

4. Press I/O RESET, then START.

5. If the BANK MODE switch is operational, the program will halt with all ones in the AC. Otherwise, an error message will be typed.

6. Set BANK MODE switch to Ø.

7. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

After the last test is completed, END will be typed. Any errors present would have caused error typeouts to be printed previous to this.

Approximate execution time for one pass is

(23 + 3N) seconds, where N=number of 4K memory fields to be tested.

FIELD SERVICE INFORMATION

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	Ø 1	Suppress halts Halt at end of current test
1	Ø 1	Print error messages Suppress error print-out
2	Ø 1	Loop on error Proceed on error
3,4,5	XXX	Number of additional 4K fields of core available.
11	Ø 1	Type END when one pass complete. Suppress END message typeout.

ERROR IDENTIFICATION

Error typeouts accur in the following formats:

ERXXXXXX PASS=XXXXXX AC=XXXXXX L=X XR=XXXXXX LR=XXXXXX

CAL ADR = XXXXXX TST ADR = XXXXXX AC=XXXXXX

PDP-15 4K BASIC EXERCISER

ABSTRACT

The 4K Basic Exerciser is designed to exercise the CP and I/O control logic with no more than 4K of core memory. The exerciser uses the program interrupt facility while running the basic I/O devices. Tests are also performed on all memory reference and operate instructions.

All memory and CP MAINDEC diagnostics applying to the PDP-15 being used should be run before attempting to run this program.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 0700.
4. Set ACS = 000000.
5. Press I/O RESET, then READ-IN.

OPERATING PROCEDURES

Operator Action Without High Speed Reader/Punch

1. Set ADDRESS switches to 00200.
2. Set ACS 9 = 1 (indicates no high speed reader/punch).
3. If no real time clock installed set ACS 5 = 1.
4. Press I/O RESET, the READ-IN.
5. The program will run continuously until manually stopped by the operator or until there is an error halt.

Operator Action With High Speed Reader/Punch

1. Set ADDRESS switches to 00200.
2. If no real time clock installed set ACS5 = 1.
3. Press I/O RESET, then START.

4. Approximately 3 1/2 feet of leader will be punched. It is blank except for one from which has all channels punched.

5. Place the punched frame directly over the high speed reader drive sprocket, and arrange the tape between the reader and punch for minimum binding.

6. Press CONTINUE.

7. The program will run continuously until manually stopped by the operator, or until there is an error halt.

SUCCESSFUL OPERATION INDICATION

Execution time is approximately 2 minutes. At this time the teleprinter bell rings.

If ACS 1 is a 1 (inhibit all I/O devices and the PI) the message "COMPLETE" will be printed after 5 complete passes of the program.

ERROR IDENTIFICATION

Errors are indicated by error halts.

Error print-outs are as follows:

R NO TAPE - NO TAPE IN READER

P NO TAPE - NO TAPE IN PUNCH

Incorrect operation of the real time clock will appear as clock interrupts less than two seconds apart or greater than nine seconds apart, or as no clock interrupts at all.

ERROR RECOVERY

Press CONTINUE one or more times to receive further error halts or to continue testing.

FIELD SERVICE INFORMATION

Restarting Procedure

1. Set ADDRESS switches to 00032.

2. Set appropriate AC switches. (See Control Switch Settings)

3. Press I/O RESET, then START.

4. The program may also be restarted from location 00200 if a new leader is desired.

Control Switch Settings

The program must be stopped by the operator in order to make effective changes to the AC switch settings. Use the Restart Procedure to continue.

AC SWITCH	STATE	DESCRIPTION
0	1	Run only the I/O device(s). Program interrupt will be enabled.
1	1	Inhibit the I/O device(s). Program interrupt is disabled and the real time clock is on. The complete instruction set will be performed.
2	1	Loop continuously on "add random pairs" test. The I/O devices and program interrupt are enabled unless otherwise indicated.
5	1	Inhibit clock. Unless otherwise specified program action is normal except the clock should always be off.
6	1*	Inhibit reader and teletype. The punch will run continuously. Tape must be in the reader.
7	1*	Inhibit punch and teletype. The reader will run continuously. Any loop or fan-fold tape may be used.
8	1*	Inhibit punch. The program will read and print 52 character, Any loop or fan-fold tape may be used.
9	1 0	No high speed reader/punch installed. High speed reader/punch option is installed.

* Applies only if the high speed reader/punch option is installed.

PDP-15 8K BASIC EXERCISER

7. The program will run continuously until manually stopped by the operator, or until then is an error halt.

SUCCESSFUL OPERATION INDICATION

Execution time is approximately 2 minutes for each 4K field tested. At this time the teleprinter bell rings.

If ACS 1 is a 1 (inhibit all I/O devices and the PI) the message "COMPLETE" will be printed after 5 complete passes. A pass is defined as testing one 4K field. If ACS 4 is a 1 (inhibit program relocation) "COMPLETE" is printed after 10 passes of the program.

ERROR IDENTIFICATION

Errors are indicated by error halts.

Error print-outs are as follows:

R NO TAPE - NO TAPE IN READER

P NO TAPE - NO TAPE IN PUNCH.

Incorrect operation of the real time clock will appear as clock interrupts less than two seconds apart or greater than nine seconds apart, or as no clock interrupts at all.

ERROR RECOVERY

Press CONTINUE one or more times to receive further error halts or to continue testing.

FIELD SERVICE INFORMATION

1. Set ADDRESS switches to 00032 (10032 if program was relocated).

2. Set appropriate AC switches (See Control Switch Settings).

3. Press I/O RESET, then START.

4. The program may also be restarted from location 00200 or 10200 if a new leader is desired.

ABSTRACT

The 8K Basic Exerciser is designed to exercise the CP, core memory, and models 33 or 35 teleprinters with the program interrupt facility enabled. The program also tests the real time clock, high speed reader, and high speed punch.

All MAINDEC diagnostics which apply to the PDP-15 configuration being used should be run before attempting to run this program.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 17700.
4. Set ACS to 000000.
5. Press I/O RESET, then READ-IN.

OPERATING PROCEDURES

Operator Action Without High Speed Reader and Punch

1. Set ADDRESS switches to 00200.
2. Set ACS 9 = 1 (indicates no high speed reader or punch).
3. If no real time clock installed set ACS 5 = 1
4. Press I/O RESET, then START.
5. The program will run continuously until manually stopped by the operator or until there is an error halt.

Operator Action With High Speed Reader and Punch

1. Set ADDRESS swtiches to 00200.
2. If no real time clock installed set ACS 5 = 1.
3. Press I/O RESET, then START.
4. Approximately 3 1/2 feet of leader will be punched. It is blank except for one frame which has all channels punched.
5. Place the punched frame directly over the high speed reader drive sprocket, and arrange tape between the reader and punch for minimum finding.
6. Press CONTINUE.

Control Switch Settings

The program must be stopped by the operator in order to make effective changes to the AC switch settings. Use the Restart Procedure to continue.

AC SWITCH	STATE	DESCRIPTION
0	1	Run only the I/O device(s). Program interrupt will be enabled.
1	1	Inhibit the I/O device(s). Program interrupt is disabled and the real time clock is on. The complete instruction set will be performed.
2	1	Loop continuously on "add random pairs" test. The I/O devices and program interrupt are enabled unless otherwise indicated.
4	1	Inhibit program relocation.
5	1	Inhibit clock. Unless otherwise specified program action is normal except the clock should always be off.
6	1*	Inhibit reader and teletype. The punch will run continuously. Tape must be in reader.
7	1*	Inhibit punch and teletype. The reader will run continuously. Any loop or fan-fold tape may be used.
8	1*	Inhibit punch. The program will read and print 52 characters. Any loop or fan-fold tape may be used.
9	1 0	No high speed reader/punch installed. High speed reader/punch option is installed

* Applies only if the high speed reader/punch option is installed.

PDP-15 HOT MEMORY TEST

ABSTRACT

The Hot Memory Test checks the resistance of cores to being switched from 1-to the 0-state during or after a rise in temperatur

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 17700.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.
2. Set ACS's 6, 7, and 8 to the octal number of additional 4K extended memory fields.
3. Press I/O RESET, then START.
4. A halt will occur at 01006 in case step 2 had not been executed.
5. Press CONTINUE.

SUCCESSFUL OPERATION INDICATION

The execution time is approximately 1 minute for each 4K field tested. The computer will halt at 01006.

ERROR IDENTIFICATION

All errors are printed on the teletype and are succeeded by error halts. The print-out is as follows:

HOT MEMORY TEST

CONTENTS	LOCATION
605077	
600077	24077

Control Switch Settings

AC SWITCH(ES)	STATE	DESCRIPTION
0	0 1	Don't repeat current cycle. Repeat current cycle.
1	0 1	Halt after error print-out. Don't halt after error print-out.
2	0 1	Print error data. Don't print error data.
3,4,5	0 to 7	Start testing in the 4K field specified by the octal value (0 to 7)
6,7,8	0 to 7	Octal number (0 to 7) of additional 4K extended memory fields.
16	0 1	Halt at end of program. Repeat entire program
17	0 1	Go on to next field. Repeat test on current field.

PDP-15 MEMORY ADDRESS TIMING TEST

ABSTRACT

The Memory Address Timing Test tests the action of long carry chains under the extremely tight timing conditions that occur at the far end of extended memory. At least 8K of memory is required to operate the program.

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 17700.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.

2. Set ACS's 15, 16, and 17 to the octal number of additional 4K extended memory fields.

3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The program runs without intervention until the operator stops it manually. Execution time is less than one second.

ERROR IDENTIFICATION

At the occurrence of the first error, an error message will be printed and the program will halt. The following are examples of error print-outs:

1. NOT ENOUGH MEMORY

2. EXTENDED MEMORY ISZ TEST

   LOCATION CONTENTS

   01234 000010

3. SKIP FAILED

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	0	Normal Mode. Do not repeat cycles.
	1	Scope Mode. Repeat current test cycle
1	0	Halt on error after print-out.
	1	Do not halt on error.
2	0	Print error data.
	1	Do not print error data.

PDP-15 BASIC MEMORY PARITY TEST

(LOW and HIGH VERSIONS)

ABSTRACT

The PDP-15 Basic Memory Parity Tests are designed to test the memory parity control logic, and the memory parity bit plane. The LOW version resides in the lower portion of the memory field, and tests the control logic plus worst case memory checkerboard patterns on all of memory above the program (locations 01100 through 07777). The HIGH version resides in the upper portion of the memory field, and tests the parity bit plane using worst case checkerboard patterns. The HIGH version does not test the parity control logic.

LOADING PROCEDURE

Loading procedures for both the low and high versions are identical. Both versions must be run in order to complete the test.

1. Place tape in reader.

2. Set BANK MODE switch to a 1.

3. Set ADDRESS switches to 17700.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. For Low End program, set ADDRESS switches to 002000, and ACS 6 to 1 if API is installed. All other ACS should be 0.

2. Press I/O RESET, then START.

The following print-out on the TTY occurs after starting from address 200:

```
PRESS CONTINUE AFTER POSITIONING ERROR SWITCH:
UP
```

The Parity Error switch is located in the parity control logic rack. When it is "down", any parity error will cause a processor halt. When it is "up" the parity error flag will set, but no CP halt will occur.

3. Press CONT as instructed. The program will sequentially perform tests T1 through T5, and then print "DOWN".

4. Place the Parity Error switch "down", and then press CONTINUE.

5. A CP halt should occur (due to a parity error) with the PC = 440 in test T6.

6. Set the ADDRESS switches to 440.

7. Place the Parity Error switch "up".

8. Press RESET, then START.

9. The program will now proceed to T7. Test T7 is repeated twice, and then the program recycles starting with T1. Test T6 will be skipped during each recycle.

HIGH VERSION OPERATING PROCEDURE

1. Set ADDRESS switches to 07400.

2. Place all ACS on a 0.

3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The programs run continuously. Execution time for either the low or high version is approximately 20 seconds.

ERROR INDICATION

Errors are indicated by program halts.

FIELD SERVICE INFORMATION

A read/write loop is included in both programs to enable the operator to loop on one or more memory addresses. The loop is tagged SCOPE on either listing. Do the following steps to run the loop:

1. Set the ADDRESS switches to the address of tag SCOPE, indicated on the listing and in the symbol table at the rear of the listing.

2. Place the lowest address of the block to be looped in the AC switches.

3. Press RESET, and then START.

4. A halt will occur immediately. Set the AC switches to the highest address of the block (the lowest and highest may be equal).

5. Press CONTINUE.

PDP-15 EXTENDED MEMORY PARITY CHECKERBOARD

ABSTRACT

The PDP-15 Extended Memory Parity Checkerboard test verifies the operational status of core memory be testing for core failure on half-selected lines under worst case noise conditions.

The program tests any memory condiguration of from 8K to 32K words in 4K segments, automatically relocating itself in order to test all memory fields from each field.

LOADING PROCEDURE

Normally load the program into memory field 0 as follows:

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 177ØØ.

4. Press I/O RESET and then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to ØØ2ØØ.

2. Press I/O RESET and then START.

PROGRAM/OPERATOR ACTION

Note: TTY indicates program typeout; OP indicates operator response.

Setting Test Limits

TTY: "TEST LIMITS"

OP: Format "X, Y"
where X= first 4K field to be tested
Y= last 4K field to be tested
= carriage return
The memory fields are numbered 0 thru 7 for 4K thru 32K respectively.
If a typing error is made, press RUBOUT.

Remember that the program checks all of core designated by the test limits except the portion occupied by the Program at that time. If the user attempts to test only the field in which the program resides, "PROGRAM IS IN FIELD X" is printed and the test limits must be changed.

Examples:

TTY; TEST LIMITS
OP: 3,6 indicates fields 3, 4, 5, 6 will be tested.

TTY: TEST LIMITS
OP: 2, 2
Field 2 only is to be tested.

ACS Set-up

TTY: "SETUP ACS"

OP: Set ACS=ØØØØØØ.
Press any keyboard key except RUBOUT

SUCCESSFUL OPERATION INDICATION

The following is printed each time program relocation has been completed:

"PROGRAM IS IN FIELD X"

If the tests are successfully run from all fields designated by the operator (no error indicators typed), the test is considered successful. Note also use of this print-out as an error message while setting the Test Limits.

FIELD SERVICE INFORMATION

Restarting Procedure

Start from 200 to reinitialize the program.
Start from 215 to retain current operation parameters.

ACS SETTINGS

Any ACS listed may be set while the program is running though operation may not be initiated immediately since most are sensed only after all tests have been performed.

ERROR IDENTIFICATION

Any of the following messages indicates an error condition exists:

"TEST OCTAL ADR GOOD BAD PAT CONTROL WORD"

"PROGRAM RELOCATION ERROR"

"ERROR IN SELECTED FIELD"

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1	Program halt. Press CONTINUE to recover.
1	1	Delete error print-out and halt on error. Press CONTINUE to recover.
2	1	Ring bell on error.
3-6	1	Specify tests 1 thru 4 respectively.
9	1	Inhibit program relocation.
11	1	Inhibit "PROGRAM IS IN FIELD" print-out.
12	1	For forced program relocation.
13	1	Set up 'scope loop via Keyboard input.
14	1	Inhibit error printous for one or more bit positions.

PDP-15 EXTENDED ARITHMETIC ELEMENT

(PART 1 OF 2)

ABSTRACT

The EAE Test (part 1 of 2) verifies the operation of all EAE operations except multiplies and divides. The test is separated into three logical sections as follows:

SET-UP TEST

SC AND BASIC SHIFT TEST

RANDOM DATA AND NORMALIZE TEST

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 17700.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.
2. Set ACS 6 = 1
3. Press I/O RESET, then START.
4. The processor halts at 00201 with MQ=777777.
5. Set ADDRESS switches to 00202.
6. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

At the completion of 1 pass through, each of the sections a character is typed on the teleprinter as follows:

Set-up Test	/
SC and Basic Shift Test	.
Random Data and Normalize Test	*

ERROR IDENTIFICATION

Hardware malfunctions detected by the program will result in an error typeout on the teleprinter and a processor halt.

FIELD SERVICE INFORMATION

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1	Delete error typeouts. Do not halt on errors.
1	1	Halt after each EAE test section. Press CONTINUE to proceed.
2	1	Repeat last EAE test section.
3	1	Halt after each EAE sequence.
4	1	Repeat last EAE sequence.
5	1	Cycle all three test sections.
6	1	Cycle all three test sections and signal via teletype when each is complete.
7	1	Delete error halts.
0 and 7	1	Ring bell on error. Error typeouts and halts are deleted.

STARTING PROCEDURE (for each test section)

SET-UP TEST

1. Use the Operating Procedure, but set ACS=000000.

SC AND BASIC SHIFT TEST

1. Set ADDRESS switches to 02200.
2. Set ACS = 000000.
3. Press I/O RESET, then START.

RANDOM DATA AND NORMALIZE TEST

1. Set ADDRESS switches to 05000.
2. Set ACS = 000000.
3. Press I/O RESET, then START.

PDP-15 EXTENDED ARITHMETIC ELEMENT

(PART 2 OF 2)

ABSTRACT

The EAE Test (part 2 of 2) verifies the operation of the EAE multiply and divide instructions. The test is separated into two logical sections as follows:

Fixed Number Test

Random Number Test

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 17700.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.

2. Set ACS = 014000.

3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

At the completion of 1 pass the message "OK" is printed on the teleprinter.

ERROR IDENTIFICATION

Hardware malfunctions detected by the program will result in an error halt for section 1 and an error typeout for section 2 followed by a processor halt.

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1	Delete error typeout, but ring bell on error.
1	1	Halt after each EAE test section. Press CONTINUE to proceed.
2	1	Repeat last EAE test section.
3	1	Halt after each EAE sequence.
4	1	Repeat last EAE sequence.
5	1	Cycle both test sections continuously.
6	1	Print "OK" after each pass when ACS 5=1.

PDP-15 I/O TEST (API)

ABSTRACT

The I/O TEST (API) checks the operation of the Automatic Priority Interrupt system to ensure that all hardware and software levels of priority interrupt operate properly, that timing specifications are met, and that the API system operates correctly with the rest of the computer.

LOADING PROCEDURE

1. Place tape in reader.

2. Set BANK MODE switch to 1.

3. Set ADDRESS switches to 00200.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.

2. Set ACS = 040000 (normal operation).

3. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The program will run continuously. The execution time for the complete test is less than one second; however, if it is allowed to run for 15 minutes, the operator may feel secure that the basic operation of the API System is sound.

ERROR IDENTIFICATION

Any error encountered by the program will cause the computer to halt. If no errors are encountered and ACS 3 is 0, the computer will halt at locaton 003661.

FIELD SERVICE INFORMATION

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1	Loop on smallest repeatable segment
	0	Don't loop.
1	1	Loop on next largest repeatable segment
	0	Don't loop.
2	1	Loop on current test.
	0	Don't loop.
3	1	Repeat tests.
	0	Don't repeat tests.

PDP-15 I/O BUS TESTER PROGRAMS (IO15-1, IO15-2 AND IO15-2A)

ABSTRACT

This ABSTRACT covers programs IO15-1, IO15-2 and IO15-2A. The PDP-15 I/O Bus Tester Programs are used with the I/O Bus Tester unit, a unit which simulates external DCH (data channel) devices, and five API (automatic priority interrupt) devices on four API levels. All address, data and signal lines between the tester and the PDP-15 are tested first, and then tests are performed on the I/O Control and CP.

The Tester runs on a PDP-15 with from 4K to 32K of core memory. All CP MAINDECS for the PDP-15 configuration being used must have been run successfully before attempting to run the I/O Bus Tester programs. IO15-1 must be run error-free before IO15-2/2A.

LOADING PROCEDURE

*Note: IO15-2A is part of IO15-2 tape.

1. Place tape in reader.

2. Set BANK MODE switch to a 1.

3. Set ADDRESS switches: for 4K PDP-15, to 07700

   for greater than 4K PDP-15, to 17700.

4. Press I/O RESET, and then READ-IN.

5. The programs halt at the end of loading.

STARTING PROCEDURE

1. Set ADDRESS switches to 00200 (for both IO15-1 and IO15-2/2A.

2. Press I/O RESET and then START.

OPERATING PROCEDURE

Both programs will print a series of questions which are to be answered via keyboard input.

For IO15-1:

1. Q. "DO YOU HAVE A REAL TIME CLOCK?"
   A. Type Y for yes,
   or N for no;
   then press carriage return key.

2. Q. "HOW MANY K OF MEMORY?"
   A. Type 4, 8, 12, 16, 20, 24, 28 or 32;
   then press carriage return key.

3. IO15-1 runs until an error is detected or until stopped by the operator. One complete pass is indicated by the printed message OK.

For IO15-2/2A:

1. Q. "DO YOU HAVE A REAL TIME CLOCK?"
   A. Type Y for yes,
   or N for no;
   then press carriage return key.

2. Q. "DO YOU HAVE AN API?"
   A. Type Y for yes,
   or N for no;
   then press carriage return key.

3. Q. "HOW MANY K OF MEMORY?"
   A. Type 4, 8, 12, 16, 20, 24, 28 or 32;
   then press carriage return key.

4. Successful running of IO15-2 is indicated by a ring of the teleprinter BELL. The program then prints

   IO15-2A

   and waits for an input command.

5. Press the letter E on the keyboard, enabling all devices and starting execution.

6. IO15-2A runs continuously, printing END after 32 (decimal) passes, and reinitializing itself for another 32 passes.

7. Commands for controlling IO15-2A are included later for Field Service use.

8. Program interrupt and teletype keyboard are always enabled. Press any key; the letter should be echoed back by the program. Do this repeatedly to ensure that program interrupts are honored. Typing too fast will result in incorrect characters echoed back, since a character is being sent while the program is attempting to print.

ERROR HALTS

Error identification is by program halt. With two exceptions, when an error halt occurs, the AC will hold 760XXX, where XXX is the halt number.

FIELD SERVICE INFORMATION

Looping IO15-2

IO15-2A may be inhibited and IO15-2 continuously looped by setting ACSØ=1 and restarting from location 201. In this case one pass is indicated by one ring of the teletype bell.

Controlling 1015-2A

Each command is a single letter typed on the keyboard. The program types > to indicate it is waiting for a command. The commands available are:

E - execute 1015-2A.
↑C (CTRL C Keys) - terminates the testing.
The program prints > and awaits further commands.
A - used to assign any combination of devices for testing.
R - requests a print-out of the devices currently being used by the program.

With the exception of ↑C, the commands are recognized only when the program is waiting for command input, i.e. only after the > character has been printed.

PDP-15 ASR 33/35 TELETYPE TEST, PART 1

ABSTRACT

The PDP-15 ASR33/35 Teletype Test, Part 1, is the first of a two part test package used to test the ASR 33 or ASR35 teletype when attached to a PDP-15. Part 1 contains seven selectable programs used to test the input and output logic and the teletype reader.

All programs necessary to insure correct operation of the basic processor should be run successfully before attempting these tests.

Program Ø and Program 1 of this test must be run successfully before executing any of the other programs.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 177ØØ.
4. Press I/O RESET and then READ IN.
5. The program will load and halt with
   AC=777777 if it loaded correctly.
   AC=ØØØØØØ if a checksum error occured. Repeat the loading procedure.

OPERATING PROCEDURES

For Program Ø - Basic Input Logic Test

1. Place teletype on-line.
2. Place binary count pattern test tape in reader.
3. Turn on reader.
4. Set console register display switch to AC.
5. Set ADDRESS switches to 2ØØ.
6. Set AC to Ø.
7. Press I/O RESET, and then START.
8. Program halts at location 233 for AC switch options.
9. Press CONTINUE.
10. If no errors, program halts at ØØ275.

For Program 1 - Basic Output Logic Test

1. Place teletype on-line
2. Turn reader off.
3. Set console register display switch to AC.
4. Set ADDRESS switches to ØØ2ØØ.
5. Set AC switches to ØØØØØ1.
6. Press I/O RESET and then START.
7. Program halts at location 233 for setting AC switch options.
8. Press CONTINUE.
9. If no errors, program halts at ØØ275.

For Program 2 - Reader Test

1. Place teletype on-line.
2. Place binary count pattern test tape in reader.
3. Turn on reader.
4. Set console register display switch to AC.
5. Set ADDRESS switches to ØØ2ØØ.
6. Set AC switches to ØØØØØ2.
7. Press I/O RESET and then START.
8. Program halts at location 233 for setting AC switch options.
9. Press CONTINUE.
10. If no errors, program halts at ØØ275.

Program 3 - Test Tape Generator-for Field Service use only

For Program 4 - Test Tape Generator (Punches binary count pattern test tape)

1. Place teletype on-line.
2. Turn off teletype reader.
3. Place blank tape in punch and turn punch on.
4. Set ADDRESS switches to 2ØØ.
5. Set AC switches to ØØØØØ4.
6. Press I/O RESET, then START.
7. Program punches binary count test tape continuously until stopped by the user.

For Program 5 - Reader Exerciser (Binary count pattern)

1. Place teletype on-line.
2. Place binary count pattern test tape in reader.
3. Turn reader on.
4. Set console register display switch to AC.
5. Set ADDRESS switches to ØØ2ØØ.
6. Set AC switches to ØØØØØ5.
7. Press I/O RESET and then START.
8. Program runs continuously unless AC switch options cause a halt. Refer to AC Switch Settings table.

Program 6 - Reader Exerciser - for Field Service use only.

ERROR IDENTIFICATION

Errors are indicated by program halts at locations other than the normal halts listed below.

NORMAL PROGRAM OPERATION

Normal halts can occur at the following locations:

loc ØØ233
loc ØØ275
loc ØØ32Ø
loc ØØ652

Normal execution times are

Program Ø	1 min 15 sec (max)
Program 1	30 sec (max)
Program 2	20 min (max)
Program 3-6	run continuously

FIELD SERVICE INFORMATION

Test Tape Generator (Punches contents of loc ØØØ21 and ØØØ22)

1. Teletype on-line and in full duplex mode.
2. Turn off teletype reader.
3. Place blank tape in punch; turn punch on.
4. Deposit in locations ØØ21 and ØØ22 (octal) the 8 bit code for characters to be punched.
5. Set ADDRESS switches to 200.
6. Set AC switches to ØØØØØ3.
7. Press I/O RESET, then START.
8. Program punches test tape continuously until stopped by the user.

Reader Exerciser

1. Place teletype on-line.
2. Place 2 character test tape in reader and turn reader on.
3. Deposit in location ØØ21 and ØØ22 (octal) the 8-bit codes. for the characters punched in the test tape.
4. Set console register display switch to AC.
5. Set ADDRESS switches to ØØ2ØØ.
6. Set AC switches to ØØØØØ6.
7. Press I/O RESET and then START.
8. Program runs continuously unless AC switch options cause a halt. Refer to AC Switch Settings Table.

AC Switch Settings

ACS	PROGRAM Ø	PROGRAM 1	PROGRAM 2	PROGRAM 5	PROGRAM 6
ACSØ=1	Halts program at location ØØ32Ø, end of routine	Halts program at location ØØ32Ø, end of routine	Halts program at location ØØ32Ø, end of routine	Halts program at location ØØ652	Halts program at location ØØ652
ACS1=1	Select routine whose number is in ACS12 ACS17	Select routine whose number is in ACS12 ACS17	Select routine whose number is in ACS12 ACS17	_____	_____
ACS2=1	Loop program	Loop program	Loop program	_____	_____
ACS3=1	_____	_____	_____	Halt on error	Halt on error
ACS4=1	_____	_____	_____	Program reads tape with random duration stalls	Program reads tape with random duration stalls.
ACS5=1	_____	_____	_____	Program locks on current stall.	Program locks on current stall
ACS12-ACS17	Number of routine to be selected	Number of routine to be selected	Number of routine to be selected	_____	_____

PDP - 15 ASR 33/35 TELETYPE TEST, PART 2

ABSTRACT

The PDP-15 ASR 33/35 Teletype Test, Part 2, is the second of a two part test package used to test the ASR 33 or ASR 35 teletype when attached to a PDP-15. Part 2 contains seven selectable programs used to test the teleprinter, punch, keyboard, and the printer, punch and reader in combination.

All programs necessary to insure correct operation of the basic processor should be run successfully before attempting these tests.

"PDP-15 ASR 33/35 Teletype Test, Part 1", programs Ø, 1, and 2 must have been run successfully.

Programs Ø and 1 of Part 2 must be run successfully before execution of Program 3. Program Ø must precede execution of Program 2.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 177ØØ.
4. Press I/O RESET and then READ IN.
5. The program will load and halt with
   AC = 777777 if it loaded correctly.
   AC = ØØØØØØ if a checksum error occured.

OPERATING PROCEDURES

For Program Ø - Printer Test

1. Teletype on-line.
2. Teletype reader and punch off.
3. Set console register display switch to AC
4. Set ADDRESS switches to ØØ2ØØ.
5. Set AC switches to ØØØØØØ.
6. Press I/O RESET and then START.
7. Program halts at loc ØØ233 for setting AC switch options. Normal operation ACS = ØØØØØØ.
8. Press CONTINUE.
9. Program halts at ØØ275.
10. User must verify teleprinter operation. The print out is described in the complete test document.

For Program 1 - Punch Test

1. Teletype punch on.
2. With teletype off-line, punch 6 inches of blank leader and return teletype to on-line.
3. Place blank leader in reader, leaving very little slack between punch and reader.
4. Turn on reader.
5. Set console register display switch to AC.
6. Set ADDRESS switches to ØØ2ØØ.
7. Set AC switches to ØØØØØ1.
8. Press I/O RESET, and then START.
9. Program halt at ØØ233 for setting of ACS options. Normal operation, AC=Ø4ØØØØ (for halt-on-error).
10. Press CONTINUE.
11. If no errors, program halts at ØØ275.

For Program 2 - Keyboard Test

1. Teletype on-line.
2. Turn off teletype reader and punch.
3. Set console register display switch to AC.
4. Set ADDRESS switches to ØØ2ØØ.
5. Set AC switches to ØØØØØ2.
6. Press I/O RESET, then START.
7. Program title is printed and program halts at ØØ233 for setting ACS options. Normally, ACS = ØØØØØØ.
8. Press CONTINUE.
9. Follow teleprinter instructions.
10. When last routine is completed, program stops at ØØ275.

For Program 3 - Combined Reader, Printer, Punch Test

1. Turn on teletype punch.
2. With teletype off-line, punch 6 inches of blank leader. Return teletype to on-line.
3. Place blank leader in reader, leaving little slack between reader and punch.
4. Turn reader on.
5. Set console register display switch to AC.
6. Set ADDRESS switches to ØØ2ØØ.
7. Set AC switches to ØØØØØ3.
8. Press I/O RESET, then START.
9. Program halts at ØØ233 for setting ACS options. Normally ACS = Ø4ØØØØ (halt-on-error).
10. Press CONTINUE.
11. If no errors, program halts at loc ØØ275.

For Program 4 - Printer Exerciser

1. Teletype on-line.
2. Turn off teletype reader and punch.
3. Deposit in loc ØØØ21 and ØØØ22 the 8 bit codes for characters to be printed.
4. Set console register display switch to AC.
5. Set ADDRESS switches to ØØ2ØØ.
6. Set AC switches to ØØØØØ4.
7. Press I/O RESET, then START.
8. The program runs continuously printing lines of the stored characters until stopped by the user.

For Program 5 - Punch Exerciser - for Field Service use only.

For Program 6 - Punch Exerciser (Binary count pattern)

1. Turn on teletype punch.
2. With teletype off-line, punch 6 inches of blank leader. Return teletype to on-line.
3. Place blank leader in reader, leaving little slack between reader and punch.
4. Turn on reader.
5. Set console register display switch to ØØØØØ6.
6. Set ADDRESS switches to ØØ2ØØ.
7. Set AC switches to ØØØØØ6.
8. Press I/O RESET and then START.
9. Program runs continuously until stopped by user unless errors occur.

ERROR IDENTIFICATION

Errors are indicated by error halts at locations other than those listed as normal halts below.

NORMAL PROGRAM OPERATION

Normal halts occur at
loc ØØ233
loc ØØ275
loc ØØ32Ø

Normal execution times are

Program Ø : 16 min. (max)
Program 1 : 20 min. (max)
Program 2 : User dependent
Program 3 : 40 min. (max)
Program 4 : thru 6 : run continuously

FIELD SERVICE INFORMATION

Punch Exerciser:

1. Turn on teletype punch.
2. With teletype off-line, punch 6 inches of blank leader. Return teletype to on-line.
3. Place blank leader in reader, leaving little slack between reader and punch.
4. Turn on reader.
5. Deposit in loc ØØØ21 and ØØØ22 the 8 bit codes for characters to be punched.
6. Set console register display switch to AC.
7. Set ADDRESS switches to ØØ2ØØ.
8. Set AC switches to ØØØØØ5.
9. Press I/O RESET, then START.
10. Program runs continuously until stopped by user, unless error occurs.

AC Switch Settings

	Program 0	Program 1	Program 2	Program 3	Program 4	Programs 5 and 6
ACSØ=1	Halts program at ØØ32Ø, end of routine	Halts program at ØØ32Ø, end of routine	Halts program at ØØ32Ø end of routine	Halts program at ØØ32Ø end of routine	For stalling between characters. (ACSØ=Ø for full speed operation	For stalling between characters (ACSØ=Ø for full speed operation
ACS1=1	Select routine whose number is in ACS12-ACS 17	Select routine whose number is in ACS12-ACS17	Select routine whose number is in ACS12-ACS17	Select routine whose number is in ACS12-ACS17	———	———
ACS2=1	Loop program	Loop Program	Loop program	Loop program	———	
ACS3=1	———	Halt-on-error (ACS3=Ø for halt end of data block if errors)	———	Halt-on-error (ACS3=Ø for halt at end of data block if errors)	———	Halt-on-error (ACS3=Ø for halt at end of data block if errors)
ACS12-ACS17	Number of routine to be selected	Number of routine to be selected	Number of routine to be selected	Number of routine to be selected	———	———

PDP-15 High Speed Reader Test

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 tests. The mechanical tests provide TTY print-outs in case of error. A test tape is provided for use with the mechanical tests.

LOADING PROCEDURE

1. Place tape in reader.

2. Place BANK MODE switch on a 1.

3. Set ADDRESS switches to 177ØØ.

4. Press I/O RESET, adn then READ-IN.

STARTING PROCEDURE

The program is not self-starting. The procedure to be followed for each program is shown in the section"Operating Procedure" below.

OPERATING PROCEDURE

A fan-fold test tape is supplied containing the necessary test patterns for all tests. At the beginning of each test the tape must be forwarded to the correct test pattern with the beginning of the punched pattern over the reader's photo cells. The tape is divided into four segments as follows:

1. All ones pattern

2. All ones pattern

3. All ones pattern

4. Binary count pattern

Each segment is preceded by a blank leader.

Control Logic Tests

1. Place test tape in reader with the all ones pattern over the reader's photo cells.

2. Set ADDRESS switches to ØØ3ØØ, and all ACS to Ø.
   If the PDP-15 has an API option, set ACS6 to a 1.

3. Press I/O RESET, and then START.
   The program responds with a carriage return and line feed on the KSR-33 teleprinter, and begins Test 1.
   Assuming no error halts, the program halts with C(MO) = 14Ø1.

4. Remove test tape from reader.

5. Set ADDRESS switches to Ø14Ø1.

6. Press I/O RESET, and then START.
   Assuming no error halts, the program will halt with C(MO) =1423

7. Place test tape in reader.

8. Press and release the TAPE FEED button.

9. Press CONTINUE.
   Assuming no error halts, the program will halt with C(MO) = 143Ø

Basic Data Checks

1. Place the test tape in reader with the punched binary pattern over the reader's photo cells.

2. Set the ACS to ØØØØØØ.

3. Set ADDRESS switches to Ø21ØØ.

4. Press I/O RESET, and then START.
   Assuming no errors, the program will halt with C(MO) = 2243.

Random Read and Stall

1. Place the test tape in the reader with the punched binary count pattern over the reader's photo cells.

2. Set ADDRESS switches to Ø25ØØ.

3. Press I/O RESET, then START.
   The test will run until stopped by the operator.

PDP-15 HIGH SPEED PUNCH TEST

ABSTRACT

The PDP-15 High Speed Puch Test is designed to test and verify the operational status of the puch control logic and the mechanical functions of the punch. The program is divided into three parts, the first consisting of six tests on the punch control logic, part two is a series of nine tests on the punch itself, and part three is a read verification check on the punched tape.

OPERATING PROCEDURE

All devices other than the reader, teletype, and punch must be turned "OFF" to avoid unwanted interrupts.

Loading:

1. Place binary tape in reader.

2. Set all ACS to 0.

3. Set ADDRESS switches to 17700.

4. Press I/O RESET, and then READ-IN.

5. After loading is completed, remove tape from reader.

Control Logic Tests:

1. Set ADDRESS switches to ØØ2ØØ.

2. Press I/O RESET, and then START

3. If no errors, program will halt with MO = 523.

4. Remove tape from punch.

5. Press CONTINUE

6. If no errors, program will halt with MO = 547

7. Place tape in punch

Data Check Tests:

1. Press Continue to preform the data check tests.

2. Approximatley 1 1/2 feet of leader will be punched.
   It is blank except for one frame of all 1's. This is the MARK character

3. After punching the leader, the program will punch each test pattern in sequence, punching Pattern 9 until the operator stops it with PROGRAM STOP. This test runs for approximatley 5 minutes.

4. When test 9 has finished, blank leader is punched and the program will halt with the MO = 2425.

READ VERIFICATION:

1. Place the punched tape in the reader.

2. Press continue and if no errors the program will halt with the MO = 4427.

3. Press continue to restart the data checks.

ERROR IDENTIFICATION

Control Logic Test

Any test error is indicated by an error halt at a location other than the normal halts mentioned in the operating procedure. If CONTINUE is pressed to recover the program will loop back to the start of that segment of the test which had failed.

DATA CHECK TEST

The only error detected via the data check tests is a "NO TAPE" condition.

No tape conditions are printed out as:
"NO TAPE IN PUNCH"
The AC switches have no control over this typeout.

READ VERIFICATION

Any data error encountered will cause an error printout in the following format:

TST. NØ.	GOOD	BAD
N	XXX	XX

Pressing continue will resume verification check.

FIELD SERVICE INFORMATION

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	Ø	Halt after error printout (with MO = 2752). Press CONTINUE to recover
0	1	Continue after each error printout.
1	1	Run scope mode
2	Ø	Loop on current tests
2	1	Repeat the current read check
4-17		May be used to vary rate of punching with all tests except 5, 6 and 8.

PDP-15 TC02 DECTAPE BASIC EXERCISER

(PART 1 OF 2)

ABSTRACT

The TC02 Basic Exerciser (Part 1 of 2) is a series of nine test programs that may be used to gain a high degree of confidence in the data handling ability of a TC02 DECtape control and any configuration of 1 to 8 TU55 DECtape transports.

Each routine will operate on any drive or any configuration of 1 to 8 drives.

The Scope Loops will oerate on any drive, but only use the lowest drive or DRive 8 if it is selected.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 17700.
4. Press I/O RESET, then READ-IN.

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1	Drive 8 enabled.
1	1	Drive 1 enabled.
2	1	Drive 2 enabled.
3	1	Drive 3 enabled.
4	1	Drive 4 enabled.
5	1	Drive 5 enabled.
6	1	Drive 6 enabled.
7	1	Drive 7 enabled.
12	0	API not enabled.
	1	API enabled.
13	0	PDP-9 format tapes
	1	PDP-7 format tapes.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.
2. Set appropriate AC switches.
3. Put DECtape drive "ON LINE" "WRITE ENABLED".
4. Place DECtape on the drive.
5. Press I/O RESET, then START.
6. The processor halts at address 240.
7. Set ACS = 000000 (normal operation).
8. Press CONTINUE.

SUCCESSFUL OPERATION INDICATION

The program runs continuously unless manually stopped by operator.

ERROR IDENTIFICATION

If a hardware malfunction is detected by the program, an error message is typed on the teletype. Each error message includes drive number, operation, direction, mode, error status, block being operated on, and correct and incorrect data, if applicable.

FIELD SERVICE INFORMATION

By setting the correct ACS the operator may test any one of the 9 procedures.

AC SWITCHES	STATE	DESCRIPTION
14 to 17	0	0 Move Scope Loop
	1	1 Search Scope Loop
	2	2 Read Scope Loop
	3	3 Write Scope Loop
	4	4 Search Find All Blocks
	5	5 Write/Read Data Test
	6	6 Parity Test
	7	7 Basic Search
	10	10 Start Stop Turn Around

PDP-15 TC02 DECTAPE BASIC EXERCISER

(PART 2 of 2)

ABSTRACT

The TC02 Basic Exerciser (Part 2 of 2) is a series of test programs that may be used to gain a high degreee of confidence in the data handling ability of a TC02 DECtape control and any configuration of 1 to 8 TU55 DECtape transport.

The tests are divided into two classes:

TC02 Instruction Test

TC02 API Test

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 17700.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURES

Instruction Test

1. Set ADDRESS switches to 00200.
2. Set AC switches to 001001.
3. Put DRIVE 8 "ON LINE" "WRITE ENABLED."
4. Place DECtape on the drive.
5. Press I/O RESET, then START.
6. The program tests and verifies all control functions that do not require tape motion and HALTS at address 00522.
7. Press CONTINUE.
8. The program will verify the functional operations of the TC02 control, typeout END on the teleprinter, and HLT at address 01567.

API Test

1. Set ADDRESS switches to 00200.
2. Set AC switches to 000442.
3. Place DRIVE 8 "ON LINE" "WRITE ENABLED".
4. Place DECtape on the drive.
5. Press I/O RESET, then START.
6. At the completion of the test "API END" will be printed on the teleprinter and the processor will halt.

ERROR IDENTIFICATION

The TC02 Basic Exerciser has no error printouts; however, a HALT condition without printing END or API END indicates an error. Press CONTINUE one or more times to proceed.

PDP-15 TC02 DECTAPE RANDOM EXERCISER

ABSTRACT

In the TC02 Random Exerciser DECtape functions are exercised by the random determination of function, direction, transport number, number of blocks, and data pattern generation. Search, Read Data, and Write Data are exercised in both Normal and Continuous modes. Read all and move are also exercised. Small instruction test programs are executed by the central processor to test the proper execution of the Data Break facility.

At least one PDP-9 Format DECtape is needed for the exercise.

The TC02 Basic Exerciser (Part 1 and 2) must be run successfully before attempting the Random Exerciser.

LOADING PROCEDURE

1. Place tape in reader.

2. Set ADDRESS switches to 17700.

3. Set BANK MODE switch to 1.

4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00100.

2. Put each TU55 to be tested "ON LINE" "WRITE ENABLED" and a standard PDP-9 DECtape on each.

3. Set ACS 0 thru 9 to 0, ACS 10 to 1 to exercise transport 8, and ACS 11 thru 17=1 to exercise Transports 1 thru 7 respectively.

4. Press I/O RESET, then START.

SUCCESSFUL OPERATION INDICATION

The program runs without intervention until the operator stops it manually.

ERROR INDENTIFICATION

1. If no transports are selected, the computer will halt at location 00107. The error print-out will read:

   NO TRANSPORT SELECTED

   Set the correct ACS and press CONTINUE.

2. Processor test errors cause error halts which are non-recoverable. The program must be restarted at location 00100.

3. All other errors are listed on the teleprinter.

FIELD SERVICE INFORMATION

Control Switch Settings

AC SWITCH	STATE	DESCRIPTION
0	1 0	Halt on error. Don't halt on error.
1	1 0	Don't print errors. Print errors.
2	1 0	Print only 4 data errors. Print all data errors.
3	1 0	Hit end zone twice for 0000 or 1077. Hit end zone one for 0000 or 1077.
10	1	Exercise Transport 8
11	1	Exercise Transport 1
12	1	Exercise Transport 2
13	1	Exercise Transport 3
14	1	Exercise Transport 4
15	1	Exercise Transport 5
16	1	Exercise Transport 6
17	1	Exercise Transport 7

PDP-15 POWER FAIL TEST

ABSTRACT

The PDP-15 Power Fail Option Test verifies the ability to enable the program to proceed from the exact point at which a power failure interrupt occurred. It also tests the ability of the power fail option to cause an API break.

All basic processor, memory, and address tests must have run successfully before attempting to run this test.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 17700.
4. Press I/O RESET, then READ-IN.

OPERATING PROCEDURE

1. Set ADDRESS switches to 00200.
2. Set ACS 6 = 1 if API option is installed.
3. Set ACS's 3, 4, and 5 to the octal number of addition 4K extended memory fields.
4. Press I/O RESET, then START.
5. Turn console lock switch to locked position. This switch is located on the power supply.
6. Press STOP. The program should not halt. If it does the console lock is not operating correctly.
7. Turn main power switch to the OFF position. (Located on the power supply).
8. Turn main power switch to the ON position.
9. The program should resume the address test where it left off and any error will result in an error halt.

RF15 DISK DATA

ABSTRACT

The RF15 Disk Data Test is a series of addresses and data reliability routines which verify that the disk control (RF15) and disk (RS15) are operating correctly. This test used in conjunction with the RF15 Diskless and RF15 Multi-disk assures the user of an error free system.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 177ØØ.
4. Press I/O RESET, then READ-IN.

STARTING PROCEDURE

Note: For optional multiple disk controls and non-standard IOT assignments, the user may, upon initialization, change the disk codes by entering the teletype conversation mode. Refer to the main document.

1. Set WRITE LOCKOUT switches on disk control unit to "WRITE ENABLED."
2. Set ADDRESS switches to ØØ2ØØ.
3. Set AC switches to Ø for normal operation, except ACS3=1 for PI enabled.
4. Press I/O RESET, then START.
5. X-FER RATE (LO, MED, HI) is typed and the program continues.

ERROR INDENTIFICATION

The following are error printouts used by the program:

```
PC: XXXXXX        DAT1 XXXXXX      DAT2  XXXXXX    DAT3 XXXXXX

TIME OUT.         XXXXXX

DKX               TKNO:XXXXXX      WORD: XXXXXX    ABAD:XXXXXX
                  DATW:XXXXXX              STAT:XXXXXX

RDX               DKX              TKNO:XXXXXX     WORD:XXXXXX
                  ABAD:XXXXXX              STAT:XXXXXX

RDX               DKX              TKNO:XXXXXX     WORD:XXXXXX
                  ABAD:XXXXXX      DATW:XXXXXX     DATR:XXXXXX
```

SUCCESSFUL OPERATION INDICATION

PASS COMPLETE is printed on a complete pass of the system.

Program execution time is 45 minutes per disk.

AC SWITCH SETTINGS

AC SWITCH	STATE	DESCRIPTION
0	0 1	Operate worst case disk zero Enter program conversation mode.
1	0 1	Cycle through tests. Loop on test routine.
2	0 1	Cycle through routines. Loop on failing address in address test.
3	0 1	Enable API Enable PI
4	0 1	Execute next pass. Halt on completion flag
5	0 1	Report message Delete typeouts
6	0 1	Continue after error message Halt on error.
7	0 1	Report each error. Count errors; report on request
8	0 1	Compare data buffers. Delete data comparison.
9	0 1	Execute address test 6 Delete address test 6
10	0 1	Select track under program control Select track from ACS11-17. (one of 177_8 tracks)

RF15 DISKLESS

ABSTRACT

The RF15 DISKLESS program is an incremental test of the RF15 disk logic and the RSØ9 computer interface. This program does not test the disk.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 177ØØ.
4. Press I/O RESET, then READ IN.

STARTING PROCEDURE

Separate starting procedures for each of the tests included in the RF15 DISKLESS program are found in the Operating Procedure below.

OPERATING PROCEDURE

The operating procedures are divided into three tables, with similar tests grouped together. Each table is preceded by a list of conditions which are assumed to be met before running each individual test in the table. The tests should be run in the order in which they appear in the table, and the tables in the order in which they occur. The procedure for each test is read from left to right across the table following the test name.

For each of the tests in TABLE 1, the following conditions are assumed before following the test procedure:

1. Enable times one transfer mode (high).
2. Detach all "real disks" (remove timing track cables).
3. Attach device RF15T.
4. Disable write lockout switch.
5. Select disk zero, all others non-existent.
6. Connect light card <u>if</u> tracks are to be visually tested.

TABLE 1

Test Name	Miscellaneous Instructions	AC Switch Settings	Set ADDRESS Switches	Press I/O RESET, then START	Successful Completion Indication	Error Indications
I/O RESET	_____	All to Ø	ØØ2ØØ	✓	Printout "RF15DL I/O RESET TEST"	Errors printed
PART 1	_____	All to Ø	ØØ2Ø1	✓	Printout "RF15DL PART 1"	Errors printed
DOFL	Select disk 7 only	All to Ø	ØØ2Ø2	✓	Printout "RF15DL DOFL"	Errors printed
VOT 1	Select disk Ø only	All to Ø	ØØ2Ø3	✓	Printout "RF15DL VOT1"	Errors printed and visual observation
VOT 1.1	Select all disks except disk Ø	All to Ø	ØØ2Ø4	✓	Printout "RF15DL VOT 1.1"	Errors printed and visual observation
VOT 1.2	Select disk Ø only	All to Ø	ØØ2Ø5	✓	Printout "RF15DL VOT 1.2	Errors printed and visual observation
WRLKOT	Enable write lockout switch	All to Ø	ØØ2Ø6	✓	Printout "R 15DL WRLKOT"	Errors printed
DCHTE	Remove the M1Ø4 necessary for DCH transfers	All to Ø	ØØ2Ø7	✓	Printout "RF15DL DCHTE"	Errors printed

TABLE 1 continued

Test Name	Miscellaneous Instructions	AC Switch Settings	Set ADDRESS Switches	Press I/O RESET, then START	Successful Completion Indication	Error Indications
TEST X2	Enable times two transfer mode	All to Ø	ØØ21Ø	✓	Printout "RF15DL TESTX2"	Errors printed
TEST X4	Enable times four transfer mode	All to Ø	ØØ211	✓	Printout "RF15DL TESTX4"	Errors printed

For each test in TABLE 2, the following conditions are assumed before following the test procedure:

1. Remove the RF15T.
2. Attach the RSØ9 head simulator and all interface cables.
3. Disable all write lockout switches.
4. Select disk zero, all others non-existent.

TABLE 2

Test Name	Miscellaneous Instructions	AC Switch Settings	Set ADDRESS Switches	Press I/O RESET, then START	Successful Completion Indication	Error Indications
PART 2	_____	Set AC switches 15-17 for the desired test	ØØ212	✓	Printout "RF15DL PART 2"	Errors printed
WRLKOS	Enable all write lockout switches	All to Ø	ØØ213	✓	Printout "RF15DL WRLKOS"	Errors printed

The tests in TABLE 3 are manual intervention tests. Visual observation is extremely essential to each test since errors are not checked.

TABLE 3

Test Name	Miscellaneous Instructions	AC Switch Settings	Set ADDRESS Switches	Press I/O RESET, then START	Successful Completion Indication	Error Indications
MI1	To be run if VOT 1 or VOT 1.1 fails	AC switches 15-17 regulate disk address selection	ØØ214	✓	———	Visual observation only
MI2	To be run if VOT 1.2 fails	AC switches Ø-6 regulate track address selection	ØØ215	✓	———	Visual observation only
MI3	To be run if the light card testing fails (Test 15 of Part 1) This test may not be executed with the RSØ9 interfaced. Refer to Table 1 conditions	AC switches Ø-17 regulate address selections	ØØ216	✓	———	Visual observation only

AC Switch Settings

AC Switch	State	Description
Ø	1	Inhibit error message print-out.
1	1	Inhibit halt on error.
2	1	Inhibit automatic scope loop.
3	1	Loop on test indicated by ACS 13-17 (Part 1) or ACS 15-17 (Part 2)
4	1	Inhibit explanatory messages.
5	1	Halt current test execution.
6	1	Test API.
7	1	Inhibit bell ring on error.
8	1	Inhibit printing of error header.
9	1	Inhibit incremental addressing
13-17		For "Part 1" test only. Program will sequence through the 19 tests of Part 1, commencing with test Ø or the test indicated by AC switches 13-17.
15-17		For "Part 2" test only. Program will sequence through the tests of Part 2, commencing with test Ø, or the test indicated by AC switches 15-17.

RF15 MULTI DISK

ABSTRACT

RF15 Multi Disk is a high speed confidence test that operates in two modes. The first mode (SAVE MODE) restores the disk to its original state after exercising it with random data. The second mode (RANDOM MODE) destroys the data on the disk.

LOADING PROCEDURE

1. Set ADDRESS switches to 177ØØ.
2. Set BANK MODE switch to a 1.
3. Press I/O RESET, then READ IN.

STARTING PROCEDURE

Note: For optional multiple disk controls and non-standard IOT assignments, the user may, upon initialization, change the disk codes by entering the teletype conversation mode. Refer to the main document.
Normal starting procedure is:
1. Set ADDRESS switches to ØØ2ØØ.
2. Set AC switches to Ø. Set ACS1=Ø for SAVE MODE or ACS1=1 for RANDOM MODE.
3. Press I/O RESET, then START.

OPERATOR ACTION

After starting, the program will type

LAST AVAILABLE MEMORY LOCATION OCTAL?

to which the user must reply in the form XXXXXX ↵
where XXXXXX is, for example, ØØ7777 for a 4K system
or 377777 for a 131 system,
and ↵ is a carriage return.
The program will next print X EXISTENT DISK (S) where X is the number of disks connected to the system (no operator action is required).

ERROR IDENTIFICATION

One error halt exists at location ØØ463, indicating no disk on system or disks not selected sequentially from Ø.

Error messages are:

DKX TKAD: XXX WRDA: XXXXXX ABAP:XXXXXX STAREG:XXXXXX

DKX TKAD: XXX WRDA: XXXXXX ABAP:XXXXXX GDDAT:XXXXXX

BDDAT:XXXXXX

XXXXXX TIME OUT

SUCCESSFUL OPERATION INDICATION

At the end of $1Ø_8$ passes of the disk system,
PASS COMPLETE is printed.

FIELD SERVICE INFORMATION

AC Switch Setting

AC Switch	State	Description
Ø	Ø	Exercise next disk buffer area.
	1	Halt on completion flag while in SAVE MODE.
1	Ø	Operate in SAVE MODE
	1	Operate in RANDOM MODE
2	Ø	Report all error messages
	1	Delete all data and status error reports

CRØ3B GDI CARD READER TEST

ABSTRACT

This program is a two part test of the operation of the CRØ3B (General Design Inc., 200 CPM) card reader. The first part tests for correct operation of the IOT instructions, status register, data buffer bits and error flags. The second part tests for proper operation under actual data handling conditions including program interrupt and automatic priority interrupt operation.

CRØ3 Binary Card Deck (MAINDEC - 89 - D2A2 -C) is required for this test.

LOADING PROCEDURE

1. Place tape in reader.
2. Set BANK MODE switch to 1.
3. Set ADDRESS switches to 177ØØ.
4. Press I/O RESET, then READ IN.

STARTING PROCEDURE

Starting procedures for the two tests are included in the operating procedures below.

OPERATING PROCEDURE

Perform both tests in the following order.
IOT, Buffer, and Flag Test

1. Turn on card reader.
2. Place one or more cards in input hopper.
3. Press motor start, then press read start on card reader. All red lights should be off; any on are an error condition.
4. Set ADDRESS switches to ØØ2ØØ.
5. Press I/O RESET, then START.
6. If program runs properly, program halts with MA=ØØ4Ø5 and all ones in the AC. No card should have been selected during this test.
7. If normal halt occurs, remove all cards from the input hopper. This will cause hopper empty light.
8. Press CONTINUE.
9. Completion of test signaled by "END" typed out on the teletype.

Data Reliability Test

1. The IOT, Buffer, and Flag Test above must work properly before attempting this test.
2. Place CRØ3B test card deck in input hopper. Test deck must be complete and in the proper sequence. The deck consists of 80 binary coded cards. Card number one is a representation of the data stored in the program. Each subsequent card contains the same information except that it is shifted one column in relation to the preceding card.
3. Turn on reader.
4. Press motor start, then read start on card reader. All red lights should be off.
5. Set ADDRESS switches to ØØ2Ø1.
6. Set AC=ØØØØØØ for normal operation.
7. Press I/O RESET, then START.
8. The program will ring bell and print "*" when finished with the 80 card test deck.

ERROR IDENTIFICATION

Errors are indicated by error halts, and, in some cases, by error typeouts.

IOT, Buffer, and Flag Tests - all errors indicated by LAW XXXX (76XXXX) in the AC.

Data Reliability Test - nondata transfer errors result in a halt with LAW XXXX (76XXXX) in the AC. Data transfer errors result in error message typeout in the following format:

CD -XX CL - XX G - XXXX B - XXXXX

SUCCESSFUL PROGRAM OPERATION

Successful completion of the test sequences are indicated as shown in the operating procedure.

FIELD SERVICE INFORMATION

Control switch settings for Data Reliability Test only:

AC Switch	State	Description
0	1	Suppress data error typeout.
1	1	Inhibit halt on data error.
2	1	Inhibit halt at end of current test deck.
3	1	Select API test.
4-17	00000-37777	Select delay time between cards where ØØØØØ=minimum delay and 37777=maximum delay.