

EK-RRD50-UG-002

RRD50

Digital Disc Drive

User's Guide

**Prepared by Educational Services
of
Digital Equipment Corporation**

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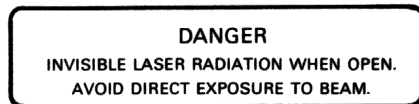
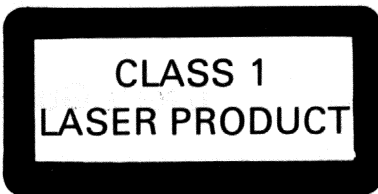
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WARNING

The BC18R-06 I/O cable supplied with the subsystem is a shielded cable and must be used to connect the subsystem. No other cables are allowed. If any other cables are used, the subsystem will not meet FCC requirements for a Class B computing device.

CAUTION

Use of controls and adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. Compliance of the FCC Class B technical requirements is dependent on the use of interconnecting cables specified in the user/installation manuals. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following methods:

- re-orient the receiving antenna
- relocate the computer or peripheral with respect to the receiver
- move the computer or peripheral away from the receiver
- plug the computer or peripheral into a different outlet so that they are on different branch circuits than the receiver.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the booklet *How to Identify and Resolve Radio/TV Interference Problems*, prepared by the Federal Communications Commission helpful. This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402, Stock No. 004-000-00345-4.

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CONTENTS

CHAPTER 1 INTRODUCTION

Scope	3
Subsystem Components	3
Environmental/Space Requirements	5
Related Documentation	5
RRD50 Digital Disk Drive Specifications	5
Digital Repair Service	7
On Site Service	7
Basic Service	7
DECservice	7
Carry-In Service	7
DECmailer	7
Per Call Service	8

CHAPTER 2 UNPACKING AND INSPECTION

CHAPTER 3 INSTALLING

Overview	13
Setup	14
Voltage Selecting	16
Unit Number	19
Connections	23

CHAPTER 4 OPERATING

Controls and Indicators	27
Normal Operation	27
Inserting and Running a Disc	31
Everyday Use of the RRD50	31
Stopping and Removing a Disc	34

CHAPTER 5 TESTING

Introduction	35
Power-Up Self-Tests	35
Running Tests on a MicroVAX	36
Equipment	36
Help	38
Tests	39
Commands	40
Configure/Select/Configure	40
Set/Show	40
Start	44
Sample Test Setup and Results	44
Sample Error Readout on Failed Tests	45
What to do When a Test Fails	45

CHAPTER 6 MAINTENANCE AND PROBLEMS

Introduction	47
Maintenance	47
Cleaning the Exterior	47
Cleaning the Objective Lens	48
Cleaning a Disc	49
Solving Problems	49

INDEX

FIGURES

1-1	RRD50 Subsystem	4
2-1	Carton Contents	11
3-1	Parts Location: Bottom of Disc Drive	15
3-2	Parts Location: Rear of Disc Drive	16
3-3	Voltage Selector	17
3-4	Setting the Voltage Selector	18
3-5	Three Types of Switches	21
3-6	Unit Number Labeling	22
3-7	Drive Unit Cabling	24
3-8	Connecting the Power Cord	25
4-1	Front Panel Controls and Indicators	28
4-2	Opening the Disc Door	32
4-3	Inserting a Disc	33
6-1	The Objective Lens	48
6-2	Cleaning a Disc	50

TABLES

1-1	Related Documentation	5
3-1	Unit Number Setting	20
4-1	Controls and Indicators	29
5-1	Verify (Customer) Mode Functional Tests	39
5-2	Service Mode Tests	39
5-3	Diagnostic Monitor: Set/Show Commands	41
6-1	Solving Simple Problems	51

HOW TO USE THIS BOOK

This guide is for the user and operator of the RRD50 Digital Disc Subsystem. Chapters are arranged by function so you can refer to a specific chapter for information on the function you want to perform.

Chapter 1 – Introduction – Gives overview information about the subsystem as well as environmental and space requirements. This chapter also gives Digital's related documentation, RRD50 drive specifications, and Digital's repair services.

Chapter 2 – Unpacking and Inspecting – Details materials needed to install and operate the subsystem. This chapter also tells where to order new packing material, if necessary.

Chapter 3 – Installing – Gives instructions (overview and step-by-step) on how to configure and install the RRD50 disc drive into a host computer system.

Chapter 4 – Operating – Lists the controls and indicators on the disc drive and their functions in normal subsystem operation. Chapter 4 shows how to load, run, and remove a disc from the disc drive.

Chapter 5 – Testing – Shows how to run operator tests on the subsystem.

Chapter 6 – Maintenance and Problems – Gives cleaning and maintenance instructions to keep the disc drive in good working order. Chapter 6 also includes a list of simple problems and possible corrective actions to take before calling Digital Field Service.

An index is provided for easy access to particular instructions and procedures in this book.

INTRODUCTION **1**

SCOPE

This guide is for the user and operator of the RRD50 Digital Disc Drive (also known as the CD Reader). The disc drive is the main component in the RRD50 Digital Disc Subsystem.

The RRD50 Digital Disc subsystem is a read-only storage device that reads data stored on 4.7 inch "optical" discs. Optical storage is a major breakthrough in storage technology. One optical disc stores 600 megabytes (about 600 million characters) of data. If you took all the data on just one optical disc and put it on RX50 floppy diskettes, you would need 1600 diskettes.

In optical storage devices, data (which is stored on the disc) is read off the disc by a laser system. A laser is a concentrated beam of light. In the RRD50, the laser (contained in the RRD50 disc drive) shines light on the disc. The intensity of the light reflected back (to the laser from the disc) determines the data on the disc. The concentrated beam of light from the laser is so fine that it is possible to store massive amounts of data on a single disc.

SUBSYSTEM COMPONENTS

Two major components make up the RRD50 Subsystem: the RRD50 disc drive and a single printed circuit board controller module. The disc drive is connected to the controller via the BC18R-6 I/O cable. The controller module plugs into the host computer system bus. The controller provides an interface between the computer's central processor and the disc drive. In some configurations, an additional internal cable connects the controller to the rear of the computer system. Refer to Figure 1-1.

2 INTRODUCTION

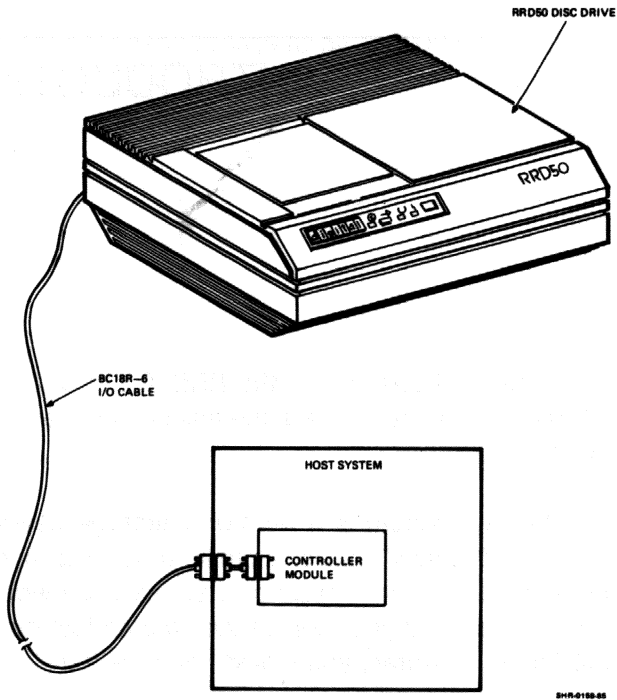


Figure 1-1 RRD50 Subsystem

ENVIRONMENTAL/SPACE REQUIREMENTS

The RRD50 subsystem can operate in a computer room, business office, or light industrial environment. A good rule of thumb concerning the operating environment is to follow the environmental requirements of the host computer system.

The RRD50 is a tabletop unit. Make sure there is space near the computer system for the disc drive. Never place the disc drive in direct sunlight or near a heat source. The rear of the disc drive must be clear for ventilation and to access the power switch. The top of the disc drive must also be clear for ventilation and so the disc door can open and close freely.

RELATED DOCUMENTATION

Table 1-1 lists Digital's related documentation on the RRD50 Digital Disc Subsystem.

Table 1-1 Related Documentation

Title	Part Number
RRD50 Digital Disc Drive Technical Description	EK-RRD50-TD
RRD50 Q-Bus Controller Installation Guide	EK-M7552-IN
RRD50 Q-Bus Controller Technical Manual	EK-M7552-TM

RRD50 DIGITAL DISC DRIVE SPECIFICATIONS

Physical Specifications

Height	0.115 m	(4.53 in)
Width	0.32 m	(12.6 in)
Depth	0.264 m	(10.4 in)
Weight	5.2 kg	(11.48 lb)

4 INTRODUCTION

Electrical Specifications

RRD50-A2 100/120 Volts	50 Hz \pm 3Hz 60 Hz \pm 3 Hz
RRD50-A3 220/240 Volts	50 Hz \pm 3Hz 60 Hz \pm 3 Hz

Performance Specifications

Drive Capacity	600 Megabyte (Maximum per disc)
----------------	---------------------------------

Average Transfer Rate	176.4 Kbytes/second
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Access Times

Average	Less than 2 seconds
Worst Case	Less than 6 seconds

Average Latency	180 msec at inner track 400 msec at outer track
-----------------	--

Maximum Load Time	15 sec
-------------------	--------

Error Rates

Soft	Not greater than 1 in 10^9
------	------------------------------

Hard	Not greater than 1 in 10^{13}
------	---------------------------------

DIGITAL REPAIR SERVICE

Digital Field Service offers a range of flexible service plans.

ON SITE SERVICE offers the convenience of service at your site and insurance against unplanned repair bills. For a small monthly fee you receive personal service from our Service Specialists. Within a few hours the specialist is dispatched to your site with equipment and parts to give you fast and dependable maintenance.

BASIC SERVICE offers full coverage from 8 a.m. to 5 p.m., Monday through Friday. Options are available to extend your coverage to 12-, 16-, or 24-hour days, and to Saturdays, Sundays, and holidays.

DECservice offers a premium on-site service that guarantees extra-fast response and nonstop remedial maintenance. We don't leave until the problem is solved, which makes this service contract ideal for those who need uninterrupted operations.

Under Basic Service and DECservice all parts, materials, and labor are covered in full.

CARRY-IN SERVICE offers fast, personalized response, and the ability to plan your maintenance costs for a smaller monthly fee than On-Site Service. When you bring your unit to one of 160 Digital Servicenters worldwide, factory-trained personnel repair your unit within two days (usually 24 hours). This service is available on selected terminals and systems. Contact your local Digital Field Service Office to see if this service is available for your unit.

Digital Servicenters are open during normal business hours, Monday through Friday.

DECmailer offers expert repair at a per use charge. This service is for users who have the technical resources to troubleshoot, identify, and isolate the module causing the problem. Mail the faulty module to our Customer Returns Center where the module is repaired and mailed back to you within five days.

PER CALL SERVICE offers a maintenance program on a noncontractual, time-and-materials-cost basis. This service is available with either On-Site or Carry-In service. It is appropriate for customers who have the expertise to perform first-line maintenance, but may occasionally need in-depth support from Field Service.

Per Call Service is also offered as a supplementary program for Basic Service customers who need maintenance beyond their contracted coverage hours. There is no materials charge in this case.

On-Site Per Call Service is provided on a best effort basis, with a normal response time of two to three days. It is available 24 hours a day, seven days a week.

Carry-In-Per Call Service is available during normal business hours, with a two to three day turnaround.

For more information on these Digital service plans, prices, and special rates for volume customers, call one of the following numbers for the location of the Digital Field Service office nearest you.

Digital International Field Service Information Numbers

U.S.A.	1-(800)-554-3333	Denmark	430-1005
Canada	(800)-267-5251	Spain	91-7334370
United Kingdom	(0256)-57122	Finland	90-423332
Belgium	(02)-242-6790	Holland	(01820)-34144
West Germany	(089)-9591-6644	Switzerland	01-8299111
Italy	(02)-617-5381/2	Sweden	08-987350
Japan	(03)-989-7161	Norway	2-256422
France	1-6873152		

UNPACKING AND INSPECTING **2**

Before unpacking and inspecting your package, your controller should have already been installed into your computer system. If the controller has not been installed, do one of the following.

1. Refer to the controller installation guide that came in the same package as this manual, or
2. Contact your Digital Service Representative.

If the controller has been installed already, you are ready to install the disc drive. You should have the following items (from the package that this manual came in).

- 1 Set of labels
- 1 Power cord
- 1 Screwdriver

If you have these items, you are ready to unpack your package. Make sure to save all packing material. If the drive ever has to be returned, the original packing material must be used! More packing material can be purchased through:

Accessories and Supplies Group
Digital Equipment Corporation
P.O. Box CS2008
Nashua, N.H. 03061
USA

8 UNPACKING AND INSPECTING

Unpack and inspect your package. Your package should have the following items (see Figure 2-1).

- 1 RRD50 Disc Drive
- 1 6-foot BC18R-6 I/O cable
- 1 Test disc

Make sure all these items are in your package. Inspect the items and make sure there is no visible damage. If something is damaged or missing, STOP! Contact your Digital Service Representative. If all items check out, you are ready to start the installation.

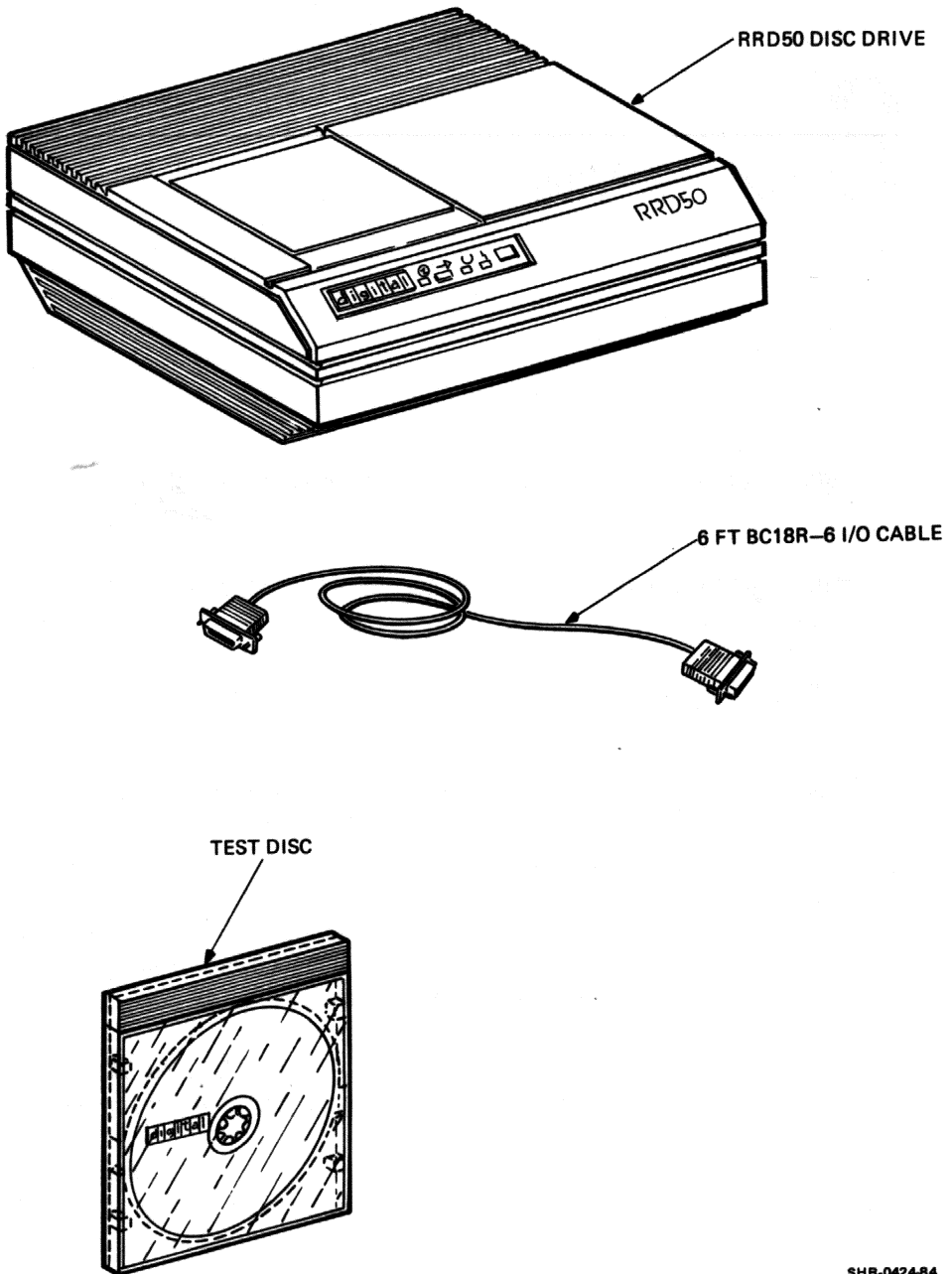


Figure 2-1 Carton Contents

INSTALLING 3

OVERVIEW

Make sure the following procedures have been done before starting the installation.

1. All system users have been instructed to log off the host system until further notice.
2. The host computer system has been shut down using appropriate shut-down procedures.
3. The host system power cord has been disconnected from its wall outlet.

The following procedures are covered in this chapter.

SETUP

Locating the ID label

Removing the shipping screws and power label

VOLTAGE SELECTING

Checking and, if necessary, setting the voltage selector

UNIT NUMBER

Determining the unit number the RRD50 drive will have in the host system

Assigning the RRD50 drive the unit number

Putting the unit number label on the RRD50 drive

CONNECTIONS

Connecting the RRD50 drive to the host computer

Connecting the power cord

SETUP

Turn the drive over to access the bottom of the unit. Make sure the drive is not resting on the rear panel. Locate the ID label (Figure 3-1). Make note of the disc drive's model number and serial number located on the ID label.

Find the two shipping screws on the bottom of the disc drive (Figure 3-1). These screws must be removed for the disc drive to function properly. Leaving these screws in results in random errors in subsystem operation. Remove these two screws and save them.

WARNING: *Make sure you save the shipping screws. If the disc drive ever has to be moved or shipped, these screws must be reinstalled.*

Find the power label on the rear of the disc drive (Figure 3-1). This label indicates the voltage your disc drive has been preset to. The next section shows how to verify and, if necessary, change the setting of the voltage selector. Tear the power label off. This completes the setup portion of the installation.

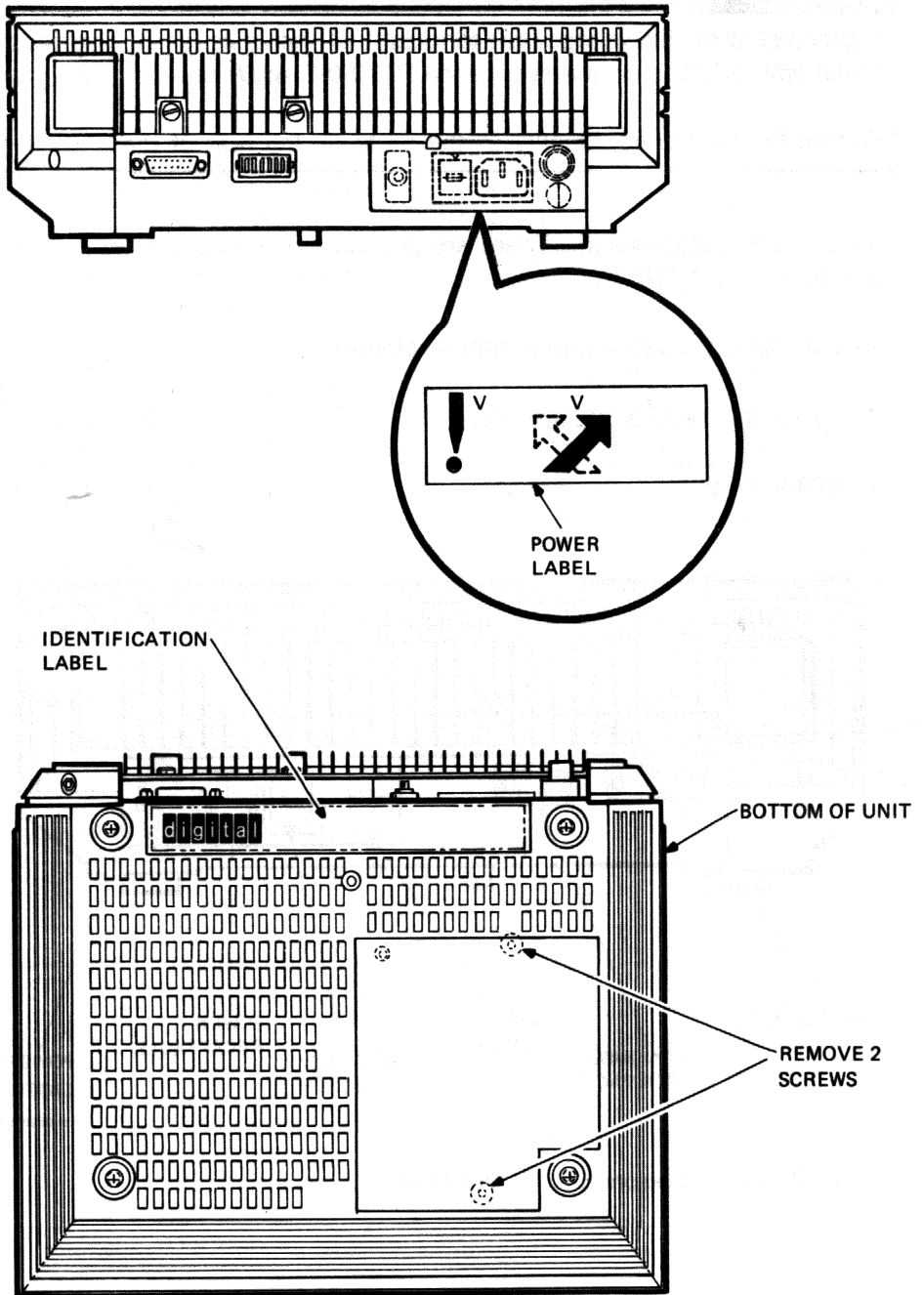


Figure 3-1 Parts Location: Bottom of Disc Drive

VOLTAGE SELECTING

To proceed with the voltage selecting part of the installation, you must be familiar with all parts on the rear of the RRD50 Disc Drive.

Examine the disc drive. Identify all the parts on the rear of the drive (Figure 3-2).

Locate the voltage selector. There are two variations of the voltage selector: 100/120 V, or 220/240 V.

The selector is preset to one of these voltages.

1. 120 V for the 100/120 selector
2. 220 V for the 220/240 selector

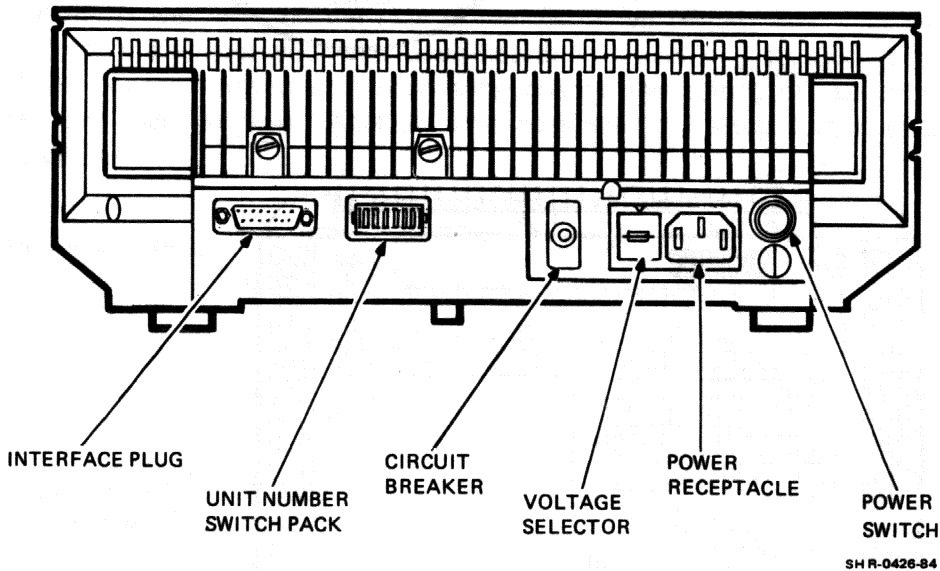
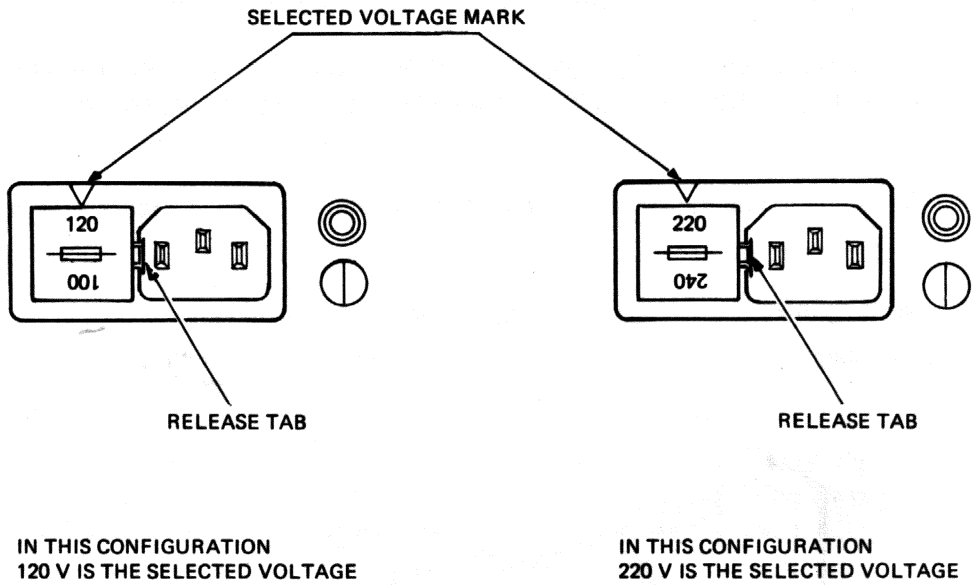


Figure 3-2 Parts Location: Rear of Disc Drive

The drive is set to the voltage that lines up with the "selected voltage" mark above the selector (Figure 3-3). Verify that the selected voltage is correct for your power requirements.



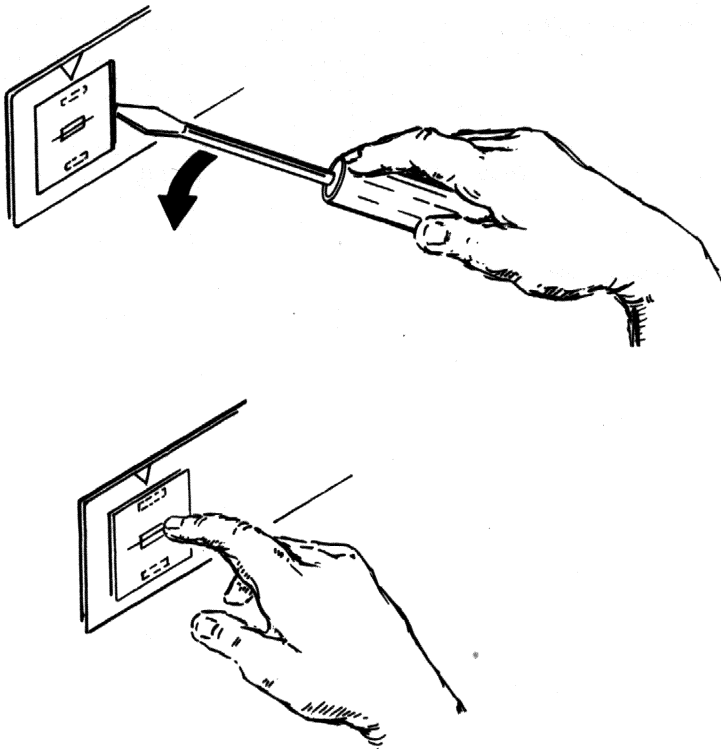
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Figure 3-3 Voltage Selector

If the proper voltage for your power requirements is already selected on your voltage selector, go to the next section: Unit Number. If the voltage selected is incorrect, proceed as follows.

1. Slip a flathead screwdriver into the release tab and turn so the voltage selector comes out (Figure 3-4).
2. Take the selector all the way out of the drive. Orient the selector so the proper voltage is facing the "selected voltage mark" when reinserting the selector.
3. Push the voltage selector back into place until it snaps in securely (Figure 3-4).

This completes the voltage selecting part of the installation.



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Figure 3-4 Setting the Voltage Selector

UNIT NUMBER

The host computer system (or computer network) finds a peripheral device (such as the RRD50) via a unit number. The RRD50 can have any unit number from 0 to 253. The unit number is set during installation, but can be changed at any time. Two different devices cannot have the same unit number. Two devices with the same unit number causes a fault.

Determine the unit number your RRD50 will have in the host system. Find the unit number switch pack on the rear panel of the RRD50 (see Figure 3-2). You must set the unit number switch pack to that number.

Table 3-1 shows the switch pack settings for the first 17 assignable unit numbers (unit number 0 – 16). The unit number is set in base 2 (binary). If you need help, refer to your system documentation.

Figure 3-5 shows the three different types of switch packs. Set the switches on the switch pack according to Table 3-1.

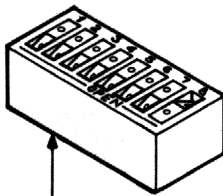
NOTE: Use a ballpoint pen or similar pointed instrument to set up the switch pack. Never use a pencil. The graphite used in lead pencils can damage the switch pack.

Table 3-1 Unit Number Setting

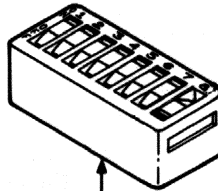
Switch Pack Legend: 0 = Off = Open
1 = On = Closed

Looking at the rear of the disc drive, the rightmost switch is the least significant bit (LSB). The leftmost switch is the most significant bit (MSB).

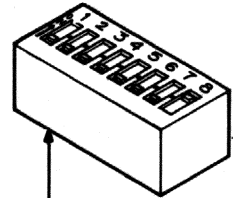
Unit Number	Switch Number							
	1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	1	0
3	0	0	0	0	0	0	1	1
4	0	0	0	0	0	1	0	0
5	0	0	0	0	0	1	0	1
6	0	0	0	0	0	1	1	0
7	0	0	0	0	0	1	1	1
8	0	0	0	0	1	0	0	0
9	0	0	0	0	1	0	0	1
10	0	0	0	0	1	0	1	0
11	0	0	0	0	1	0	1	1
12	0	0	0	0	1	1	0	0
13	0	0	0	0	1	1	0	1
14	0	0	0	0	1	1	1	0
15	0	0	0	0	1	1	1	1
16	0	0	0	1	0	0	0	0



ROCKER:



MODIFIED ROCKER:



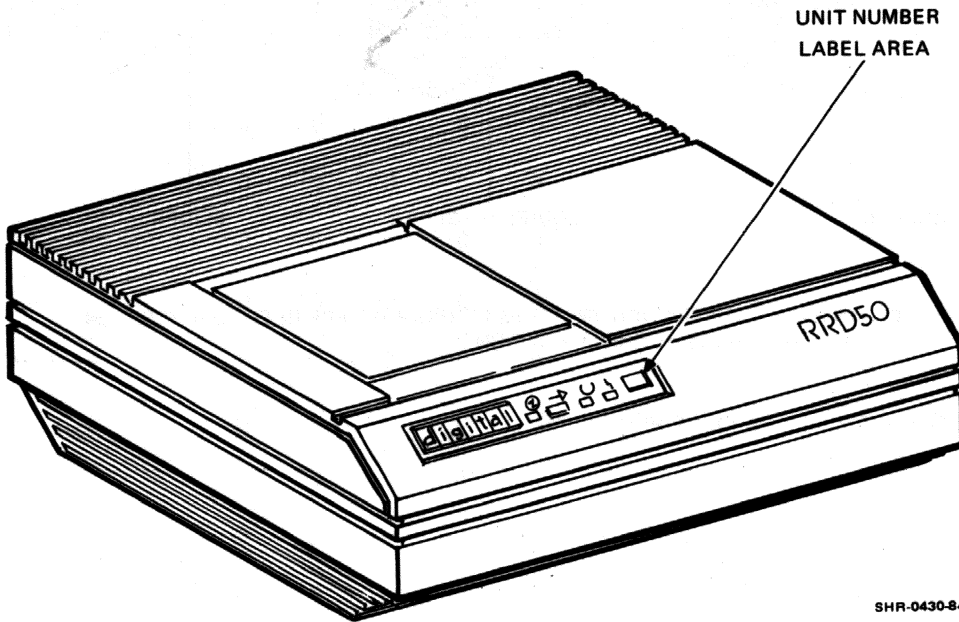
SLIDER:

NOTE: IN EACH ILLUSTRATION, SWITCHES 1 THROUGH 7 ARE IN THE OFF POSITION AND SWITCH 8 IS IN THE ON POSITION.

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Figure 3-5 Three Types of Switches

After you have assigned a unit number, you must label the disc drive with that number. Get the package of labels that came with this manual. Find the number that corresponds to the unit number you have just assigned the drive. Use Figure 3-6 to find the recessed area on the front panel that is reserved for the unit number label. Label the disc drive with that number. Once the disc drive is labeled, the unit number portion of the installation is complete.



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Figure 3-6 Unit Number Labeling

CONNECTIONS

Put the disc drive near the computer system. Get the 6-foot BC18R-6 I/O cable. Notice that the cable has a male connector on one end and a female connector on the other end.

NOTE: Make sure that the host system's power is off and the rear cover is removed.

1. Connect and secure the male connector to the RRD50 bulkhead connector on the rear of the computer system (Figure 3-7). If this RRD50 is the first RRD50 to be connected to the computer, use the top connector on the bulkhead (marked A).
2. Install and secure the female connector into the RRD50 disc drive (Figure 3-7).

Before connecting the power cord to the RRD50 disc drive, get a feel for the power switch. The power switch is on the rear of the RRD50 disc drive (refer to Figure 3-8). Push the switch so it goes in and holds. This "in" position is the POWER ON position. Now, push it again so the switch comes out and holds. This "out" position is the POWER OFF position. Leave the switch in the off position when connecting the power cord. When you have a feel for the power switch, proceed as follows.

1. Connect the female end of the power cord to the power cord receptacle on the rear of the disc drive. Use Figure 3-8 to find the drive's power receptacle. Make sure it seats in securely.
2. Connect the male end of the power cord to a wall outlet.

At this point, the installation is complete. The next step is to perform tests (diagnostics) on the subsystem. Before doing the tests, however, refer to the Controls and Indicators section of Chapter 4. This section will familiarize you with the operating controls of the disc drive. When you are comfortable with the controls and indicators, perform the tests defined in Chapter 5 of this manual: Testing. These tests verify that the subsystem is fully operational.

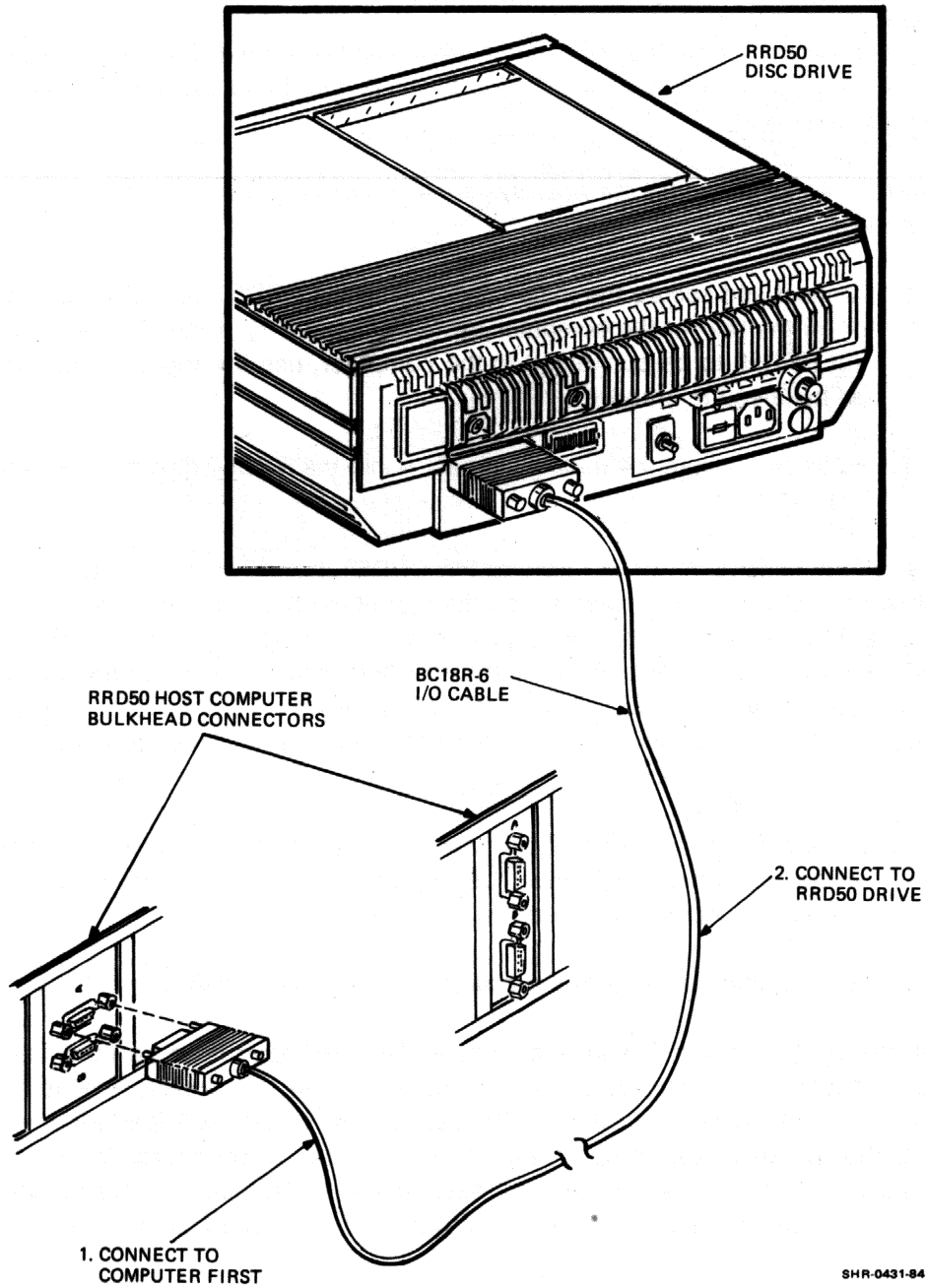


Figure 3-7 Drive Unit Cabling

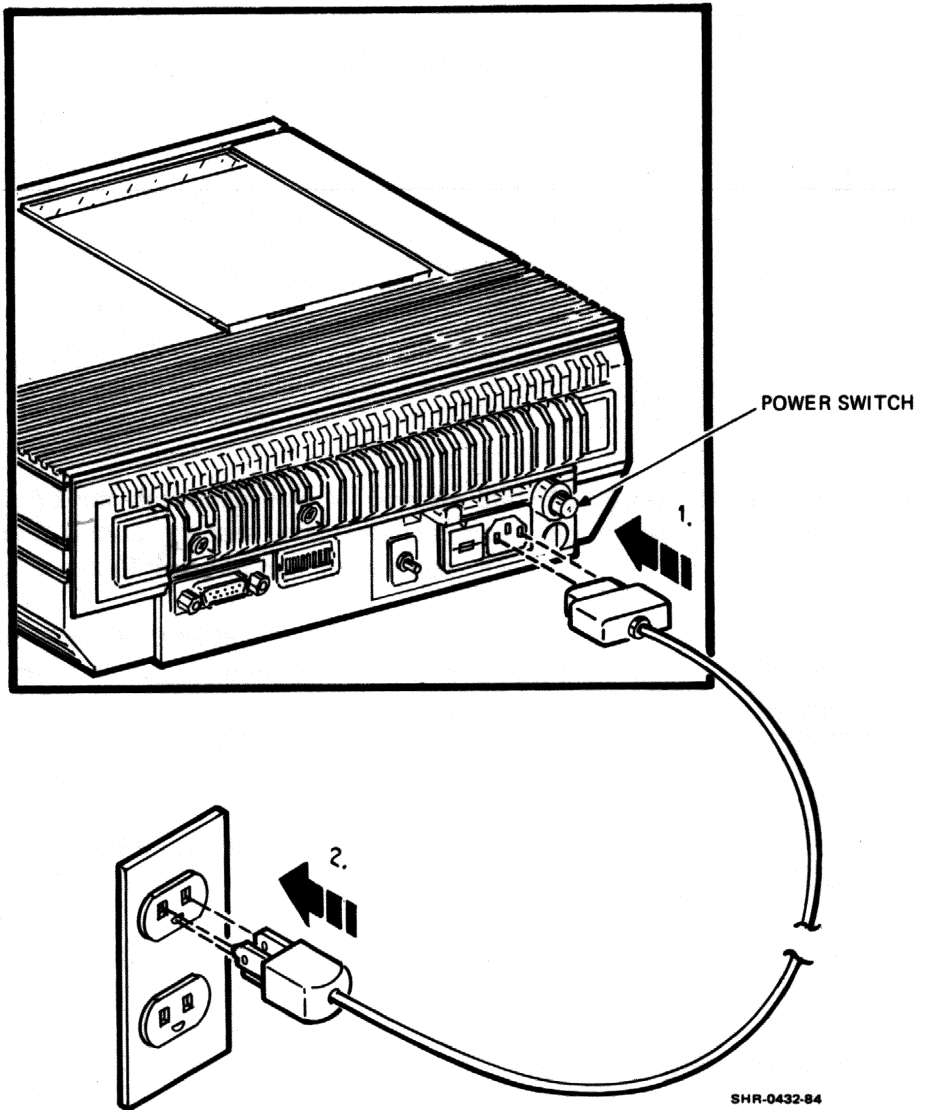


Figure 3-8 Connecting the Power Cord

OPERATING 4

This chapter describes how to operate the RRD50 Disc Drive. Familiarize yourself with all controls, indicators, and operating procedures outlined in this chapter before trying to operate the subsystem.

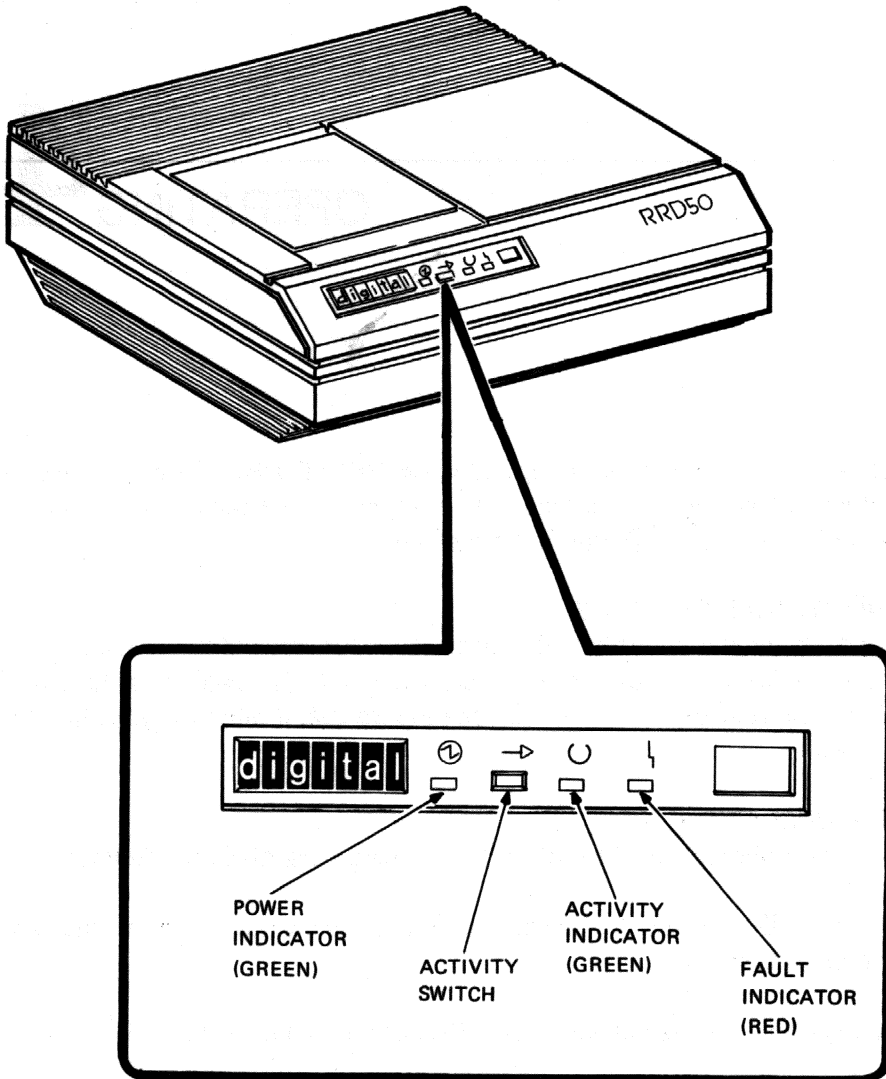
CONTROLS AND INDICATORS

Figure 4-1 shows the controls and indicators on the front of the RRD50 Drive. Table 4-1 defines what they are used for. Table 4-1 also describes the circuit breaker on the rear of the disc drive. Use Figure 3-2, if necessary, to find the circuit breaker.

NORMAL OPERATION

There are two general rules to follow when using data discs (CDROMs).

1. Never write on discs. If you want to label a disc, write on the plastic case the disc comes in.
2. Always hold the disc by the edges. Do not touch the data area of the disc.



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Figure 4-1 Front Panel Controls and Indicators

Table 4-1 Controls and Indicators





Control/ Indicator	Symbol	Function
Power indicator (Green)		When lit, indicates that all dc voltages are present.
Activity switch		<p>Pressing this switch spins the motor up to speed and the laser turns on.</p> <p>If a disc has not been installed or has been installed incorrectly, pressing this switch causes the unit to fault (Fault indicator on).</p> <p>Pressing this switch with the motor already spun up causes the motor to spin down (after about two seconds) and the laser to shut off.</p>
Activity indicator (Green)		<p>When lit, indicates that motor is spun up to speed and the laser is on.</p> <p>When blinking, indicates that data is being transferred.</p>

Table 4-1 Controls and Indicators (Cont)

Control/ Indicator	Symbol	Function
Fault indicator (Red)		<p>During power up, this indicator lights indicating that 5 volts is present. It stays on for about one second while the ROM, RAM, and microprocessor are checked. When the check is successful, the indicator turns off.</p> <p>During normal operation, the indicator may blink on and off at random. This random activity is not a problem. The blinking indicates that a fault occurred and was corrected internally. If the indicator lights solid, this means the player has a serious fault requiring manual intervention.</p>
Circuit breaker (on rear of unit)		<p>Protects subsystem from over-voltage and over-current conditions. When conditions appear, the circuit breaker pops out about 1/8 inch. To reset, push breaker back in.</p>

INSERTING AND RUNNING A DISC

To insert and run a disc, proceed as follows.

1. Open the disc door on the top of the disc drive. Push down on the front of the disc door and let go (Figure 4-2). The door opens slowly.
2. Notice that on the disc, there is a label side and a shiny side. Insert the disc (holding it by the edges) into the drive with the label side up (shiny side down) and close the door (Figure 4-3).
3. Press the Activity switch on the front panel. The disc starts to spin. The activity indicator lights (green) when the motor is spun up to speed and the laser is on.

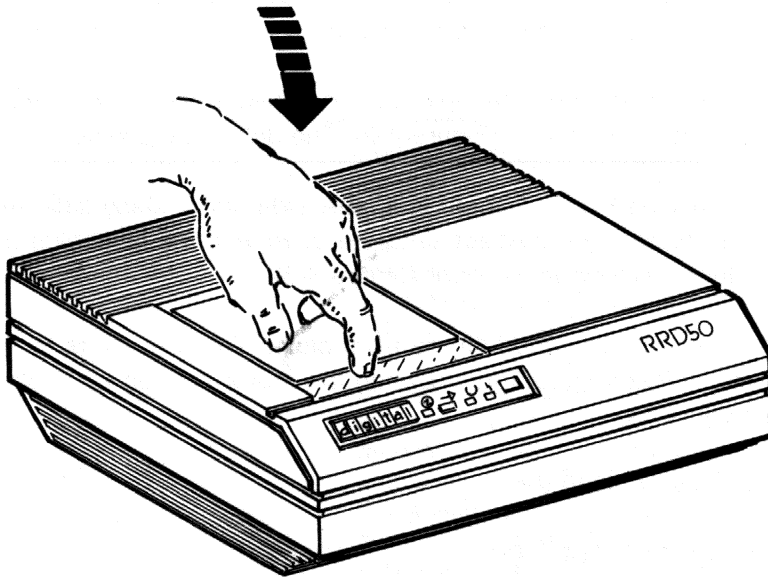
The disc is now ready to use.

EVERYDAY USE OF THE RRD50

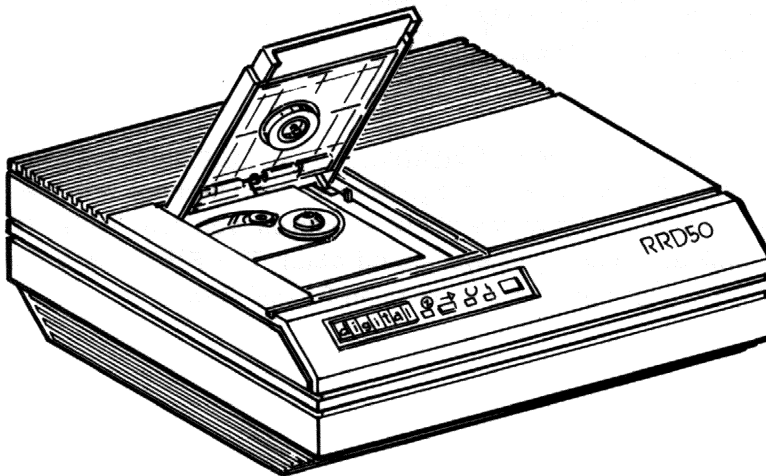
The RRD50 subsystem is a mass storage device in your host computer system. Other storage devices include:

- Diskettes (floppy disks)
- Non-removable hard disks
- Removable hard disks
- Tape drives.

Loading and accessing the RRD50 from your host computer system is basically the same as with any other storage device. The difference with the RRD50 is that it is "read-only". On all the above examples, you can "write" (store your data) as well as "read" (retrieve stored data). The RRD50 is a "read-only" device. You cannot put your data onto an RRD50 disc.



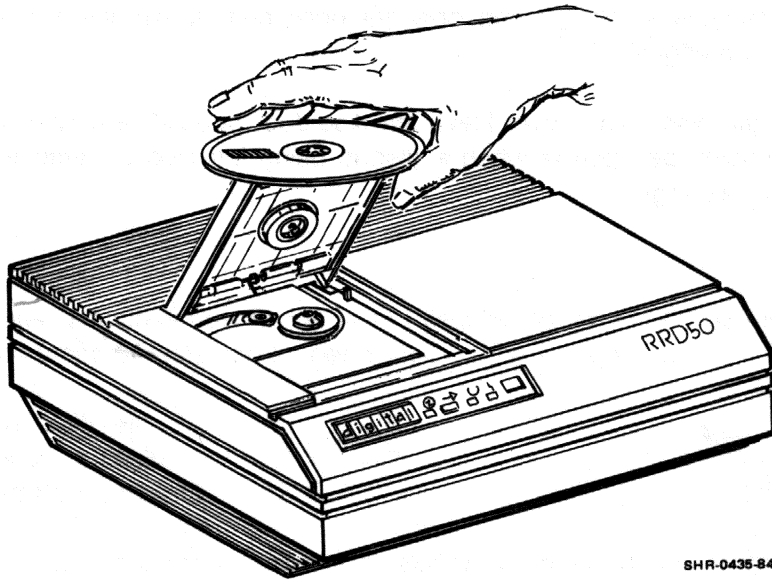
1. PRESS DOWN



2. DOOR OPENS

SHR-0434-84

Figure 4-2 Opening the Disc Door



SHR-0435-84

Figure 4-3 Inserting a Disc

STOPPING AND REMOVING A DISC

To stop and remove a disc in use inside the unit, proceed as follows.

1. Press the **ACTIVITY** switch on the front panel. The disc stops spinning and the activity indicator goes out.
2. When the disc stops spinning, open the door, and remove the disc (holding by the edges).
3. Close the disc door. Never leave the disc door open. The only time the door should be open is when a disc is being inserted or removed (or during cleaning).

TESTING 5

INTRODUCTION

This chapter describes how to run tests (diagnostics) on the RRD50 subsystem. Three types of tests can be performed on the subsystem.

- Drive Self-Tests
- Customer Tests
- Field Service Tests

Drive Self-Tests are tests that the RRD50 drive runs whenever power is applied (power switch turned on).

Customer and Field Service Tests both require operator intervention.

POWER-UP SELF-TESTS

These tests automatically run when power is applied to the disc drive. The disc drive does not have to be connected to the host computer for these tests. All that is needed is for the drive to be plugged into a wall outlet.

When the power switch is pressed, the drive checks for all the necessary internal voltages. When all voltages are present, the green power indicator on the front panel lights. This voltage check takes only a fraction of a second so it seems that the light goes on immediately when the power switch is pressed.

The drive also checks the RAM, ROM, and microprocessor upon power up. While this test runs, the fault indicator on the front panel lights (red). When the check is successful, the fault indicator goes out. This typically takes between one and two seconds.

To perform the power-up self-tests, proceed as follows.

1. Plug the RRD50 power cord into a wall outlet.
2. Observe the power and fault indicators on the disc drive front panel while applying power to the RRD50 drive. To apply power, push in the POWER switch (refer to Figure 3-2, if necessary, to find the power switch).

Make sure that:

- a. Power indicator on the RRD50 goes on (green), and
- b. Fault indicator goes on (red) for one to two seconds, then shuts off.

If these two conditions are met, your RRD50 has passed the power-up self-tests and you are ready to proceed with the next level of testing. If either or both of these conditions cannot be met, there is a problem. Refer to Chapter 6, Table 6-1 Solving Problems. Find the problems that apply here and follow the correction procedures. If the problem still exists after performing the correction procedures, call your Digital Service Representative.

RUNNING TESTS ON A MICROVAX

Equipment

To run RRD50 tests on the MicroVAX, you need the MicroVAX Diagnostic Monitor (MDM) Diagnostic Kit ZNA01-C3. Get the floppy that contains the RRD50 diagnostics from the kit.

You also must insert the test disc into the drive before you begin testing. Some of the tests need the test disc to run (for example, the DRIVE FORCED ERRORS TEST).

Running diagnostics for the RRD50 is essentially the same as running any other diagnostics.

CAUTION: *Before loading the MDM floppy, make sure the host HALT SWITCH IS NOT ON, Fixed Disk 0 IS WRITE PROTECTED, and Removable Disk Drive 1 IS READY.*

Load the diagnostic monitor to Removable Disk 1.

The following appears on the screen.

MicroVAX Maintenance System -- MDM Version X.XX

CONFIDENTIAL DIAGNOSTIC SOFTWARE
PROPERTY OF
DIGITAL EQUIPMENT CORPORATION

Use Authorized Only Pursuant to a Valid Right-to-use
License

Copyright © 1985
Digital Equipment Corporation

Current date and time is: XX-XXX-XXXX XX:XX:XX.XX

Press the RETURN key to continue,
OR enter the new date and time, then press the RETURN key.

[DD-MMM-YYY HH:MM]

Enter the date and time here (if necessary) and press RETURN. The screen then gives the date and time that you just put in and displays the MicroVAX diagnostic monitor Main Menu.

MAIN MENU

- 1 -- Test the system
- 2 -- Show system configuration and devices
- 3 -- Display the System Utilities menu
- 4 -- Display the service menu
- 5 -- Exit MicroVAX Maintenance System

Type the number, then press the RETURN key >

Type in 4 here and the service menu will be displayed. Select option 4: ENTER SYSTEM COMMANDS and press RETURN. Some warnings and instructions will be listed on the screen. Just press the RETURN key to enter the MicroVAX Diagnostic Monitor (MDM). Type 0 to return to the Main Menu.

The MDM >> prompt signifies that you are in the MicroVAX Diagnostic Monitor.

HELP

The Help function gives a brief outline of all testing commands. Just type HELP at the MDM >> prompt and the following appears on the screen:

Current Commands Are:

CONFIGURE	- Configure System
SELECT Diag Name	- Select Diagnostic to Run
SET DETAILED MESSAGE ON	- Display Detailed Messages
DETAILED MESSAGE OFF	- Do NOT Display Detailed Error Messages
MODE VERIFY	- Set Verify Mode Tests
SERVICE	- Set Service Mode Tests
PROGRESS OFF	- Print no progress messages
PROGRESS BRIEF	- Controller progress messages
PROGRESS FULL	- Controller and test progress messages
SECTION FUNCTIONAL	- Set Functional Test Section
UTILITY	- Set Utility Test Section
EXERCISER	- Set Exerciser Test Section
TEST ALL	- Run All Tests
Number	- Run Only Test Number xxxxx
PASSES Number	- Run test for xxx Passes
START	- Start Selected Tests Running
START ALL	- Start All Tests Running
SHOW CONFIGURATION	- Show configuration information
SHOW DEFAULT	- Show defaults

Tests

Tables 5-1 and 5-2 list all the tests that can be run in each mode and the time each test takes to run (duration).

Table 5-1 Verify (Customer) Mode Functional Tests

Test Number	Test Name	Test Duration (in Seconds)
1	Register Existence Test	< 1
2	Level 1 Power Up Microdiagnostics	< 1
3	Initialization Steps 1 - 3	< 2
4	Diagnostic Wrap Mode Test	< 2
5	Vector and Br Level Test	< 2
6	Purge and Poll Test	< 2
7	Small Ring Buffer Initialization Test	< 5
8	Large Ring Buffer Initialization Test	< 5
9	Get Dust Status Test	< 5
10	Server Functionality Verification	< 5
11	RRD50 Drive Microdiagnostic Test	< 5 per tested drive
12	RRD50 Drive Spinup/Spindown Test	15 per tested drive
13	RRD50 Drive Data Transfer Rate Test	30 per tested drive
14	RRD50 Drive Access Time Test	25 per tested drive
15	RRD50 Drive Basic Read Data Test	10 per tested drive
16	RRD50 Drive Worse Case Read Data Test	30 per tested drive
17	RRD50 Drive Forced Errors Test	30 per tested drive

Table 5-2 Service Mode Tests

Test Number	Test Name	Test Duration
1 - 17	Same as verify tests	
18	Basic Seek and Read Data Tests	45 s per tested drive
19	Data Transfer Rate Test	20 min per tested drive
20	Seek Position Test	20 min per tested drive
21	Short Data Reliability Test	10 min per tested drive
22	Extended Data Reliability Test	2 hrs per tested drive
23	Spinup/Down Data Reliability Test	30 min per tested drive
24	Autospin Down Test	20 min per tested drive

COMMANDS

The specific commands to run tests (some or all) are as follows.

- Configure - Sets up the system for its specific configuration.
- Select - To choose a group of diagnostics on the MDM floppy.
- Set - To set up parameters for testing.
- Start - To run the selected tests.

Configure/Select/Configure

The first steps in running diagnostics are the Configure and Select commands. Type Configure at the MDM >> prompt and press the RETURN key. When the configure is done, another MDM >> prompt appears. At that prompt, type SELECT RRD50A. This selects the group of RRD50 diagnostics from the floppy. This also says that only one controller is to be tested. If you have two RRD50 controllers on the system and you want to test both controllers, type SELECT RRD50A,RRD50B.

NOTE: Do not confuse controllers with drives. If you have two RRD50 drives on one controller, you still type SELECT RRD50A.

When the RRD50 diagnostics are selected, the screen shows the MicroVAX Diagnostic Monitor prompt: MDM >>.

Now type CONFIGURE again to clear all the diagnostics.

The next step is to SET the parameters for testing.

SET/SHOW

The Set and Show commands set up and display the testing mode and the specific tests to run. The Set command has many qualifiers that you can use. Table 5-3 lists the various Set and Show commands. The commands are listed by groups in the first column. Each group has a default parameter. The default is what is set if no specific Set command is given. Table 5-3 also lists what to type in (to set a specific testing parameter) and what each command does.

Table 5-3 Diagnostic Monitor: Set/Show Commands

Command Group (and Default)	What to Type In	What the Command Does
MESSAGE (MESSAGE OFF)	SET DETAILED MESSAGE OFF	This command gives a brief message if a test fails (in either mode).
	SET DETAILED MESSAGE ON	This command causes a detailed error report to display on the screen in the event that a test fails. The error report is for use by Field Service and should not be run by customers.
PROGRESS (PROGRESS OFF)	SET PROGRESS OFF	This command does NOT give a progress report on the screen.
	SET PROGRESS BRIEF	This command gives a screen message for successful completion of a test (full number of passes). For example, if you run test number 5 ten times, the screen displays a message after the tenth pass of the test.
	SET PROGRESS FULL	This command gives a screen message for each run ("pass") of each test (regardless of whether the test passes or fails). If a test fails, a detailed error report is given.

Table 5-3 Diagnostic Monitor: Set/Show Commands (Cont)

Command Group (and Default)	What to Type In	What the Command Does
MODE (VERIFY MODE)	SET MODE VERIFY	This command selects verify mode (Customer tests 1 – 17. See Table 5-1 for test names). These tests take two to three minutes (per drive) to run.
	SET MODE SERVICE	This command selects Service mode (Tests 1 – 24, for use by Field Service. See Table 5-2 for test names). These tests take three to four hours (per drive) to run.
SECTION (FUNCTIONAL)	SET SECTION FUNCTIONAL	This command selects the functional tests (Verify mode runs Tests 1 – 17; Service mode runs Tests 1 – 24).
	SET SECTION UTILITY	This section has two different tests that can be set. Utility Test 1 enables the RRD50 firmware error logs. Utility Test 2 is for updating the serial RAM in the event that a new revision level of the controller is installed.

Table 5-3 Diagnostic Monitor: Set/Show Commands (Cont)

Command Group (and Default)	What to Type In	What the Command Does
	SET SECTION EXERCISER	This command selects only the basic read data test (Functional Test 18). The exerciser is used at the same time as other devices on the system. (For example: If you have a TK50 tape drive in your system, the exerciser can run an RRD50 basic read test while also running a TK50 basic read/write test).
NUMBER (TEST ALL)	SET TEST ALL	This command runs all tests in the mode and section selected. (Example: Verify mode runs tests 1 - 17; Service mode runs tests 1 - 24).
	SET TEST number	This command runs a specific test or a specific series of tests. (Examples: SET TEST 2: runs test 2 SET TEST 2-4: runs tests 2, 3, and 4. SET TEST 2,4-6,8: runs tests 2, 4, 5, 6, and 8).

Table 5-3 Diagnostic Monitor: Set/Show Commands (Cont)

Command Group (and Default)	What to Type In	What the Command Does
TIMES TO RUN (1 pass)	SET PASSES number	This command runs tests the number of times specified in this command: Example: the command SET PASSES 10 runs each test that is Set to run 10 times).
STATUS	SHOW CONFIGURATION	This command shows the number of RRD50 controllers being tested.
	SHOW DEFAULT	This command shows the current selected testing parameters.

START

After the testing parameters are set up and the system is configured, type in START at the MDM >> prompt to run the selected tests.

SAMPLE TEST SETUP AND RESULTS

The following is an example of what the screen looks like running customer tests. Note that the shaded areas are what you key in. Comments are included in parentheses.

```
MDM >> CONFIGURE (Configures system)
MDM >> SELECT RRD50A (Selects the RRD50 diagnostics
from MDM; one controller is
being tested)
MDM >> CONFIGURE (Clears the settings of the
RRD50 MDM)
MDM >> SET MODE VERIFY (Sets mode to VERIFY)
MDM >> SET PROGRESS FULL (Screen will display progress
report)
MDM >> SET SECTION FUNCTIONAL (Sets FUNCTIONAL tests)
```

```

MDM >> SET TEST 1,3           (Run tests 1 and 3)
MDM >> SET PASSES 2           (Run each test 2 times)
MDM >> START                   (Begin)
MDM >>
MDM >> RRD50A started by MDM
RRD50A DSL Pass Number 1      Test number 1
RRD50A DSL Pass Number 2      Test number 1
RRD50A DSL Pass Number 1      Test number 3
RRD50A DSL Pass Number 2      Test number 3
MDM >>

```

SAMPLE ERROR READOUT ON FAILED TESTS

If a test fails, an error message displays.

EXAMPLE: During customer mode testing (with Detailed Message Off), the RRD50 Drive Microdiagnostics Test (Test 11) failed. The following appears on the screen.

```

RRD50A -- Error Number 1103
RRD50 DRIVE FAILED MICRODIAGNOSTIC TEST
RRD50 CABLE/DRIVE A

```

When Set Detailed Message On is set, a detailed error report displays if a test fails. This error report is for specially trained technicians and field engineers. If there are two disc drives on one controller, this report also defines which one of the two drives on that controller failed. The report identifies the two drives by port number. Port A is the drive attached to the A connector on the connector panel. Port B is the drive attached to the B connector on the connector panel.

WHAT TO DO WHEN A TEST FAILS

When a test fails, always try again. If the test fails twice, contact your Digital Service representative. Your service representative will instruct you on what to do.

Remember that you cannot replace the controller or any of its associated cables on Q-Bus host systems. You may void your service contract by opening up your host system. If you have questions on your contract limitations, call your Digital Service Representative or call 1-800-DIGITAL.

MAINTENANCE AND PROBLEMS **6**

INTRODUCTION

This chapter gives maintenance instructions for the disc drive and data discs. This chapter also lists simple problems that might occur and how to solve them.

The following subjects are addressed in this chapter.

- How to clean the outside of the drive
- How to clean the objective lens inside the disc door
- How to clean a data disc
- How to detect and correct problems

MAINTENANCE

The RRD50 disc drive needs very little maintenance. Disc drive maintenance consists of keeping the unit clean and cleaning the laser's objective lens if there is visible dirt on the lens. The only maintenance required by the operator is to keep the discs free from fingerprints and dirt.

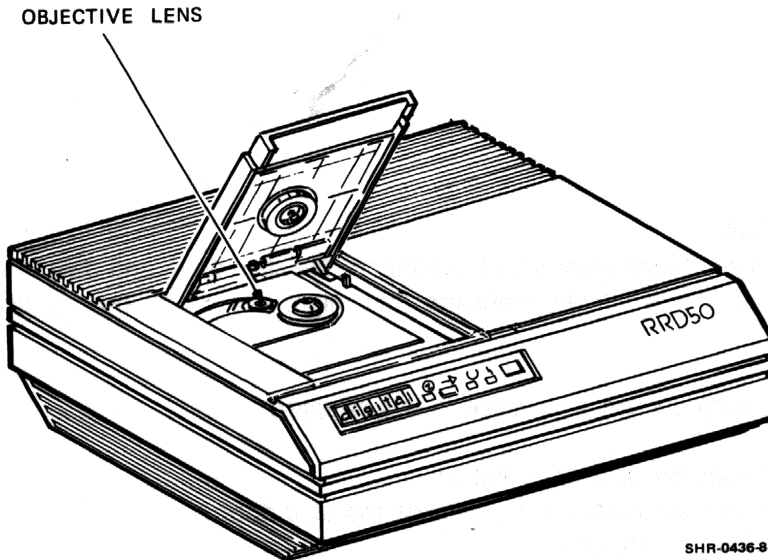
CLEANING THE EXTERIOR

***WARNING:** Always make sure the power is OFF on the RRD50 before cleaning.*

To clean the exterior of the drive, get a clean, lint-free, non-abrasive cloth. Dampen it with water and wipe the drive with it. **DO NOT SOAK THE CLOTH.**

CLEANING THE OBJECTIVE LENS

The objective lens is the part of the laser system that is visible when the disc door is open and no disc is inserted (see Figure 6-1). The only time that you should clean the objective lens is when there is visible dirt or particular buildup on the lens.



SHR-0436-94

Figure 6-1 The Objective Lens

To clean the objective lens, proceed as follows.

1. If there is a disc in the drive, remove it (holding the disc by the edges). Leave the disc door open.
2. Shut off the power on the drive.
3. With a non-abrasive dry cloth, wipe the lens to remove any dirt that may have built up.
4. Wait 10 seconds before proceeding.
5. Close the disc door.

CLEANING A DISC

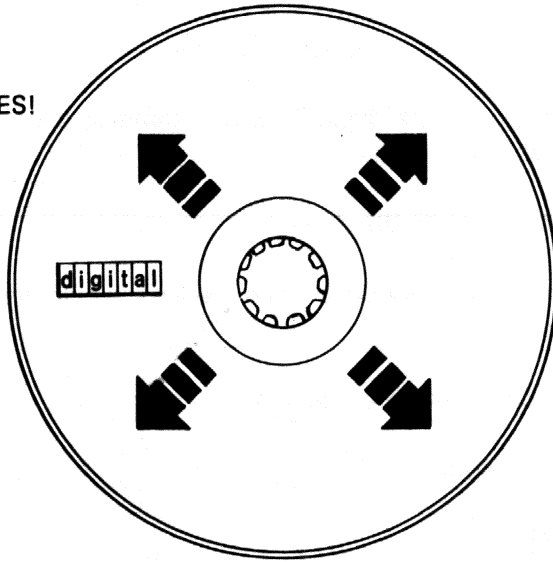
Always handle discs by the edges. Fingerprints, dust, and dirt can block the passage of the laser light beam to the data on the discs. If you need to clean a disc, proceed as follows.

1. Use a non-abrasive dry cloth to wipe the disc.
2. Wipe the disc from the center out toward the edges (see Figure 6-2).
Never wipe the disc in a circular motion.

SOLVING PROBLEMS

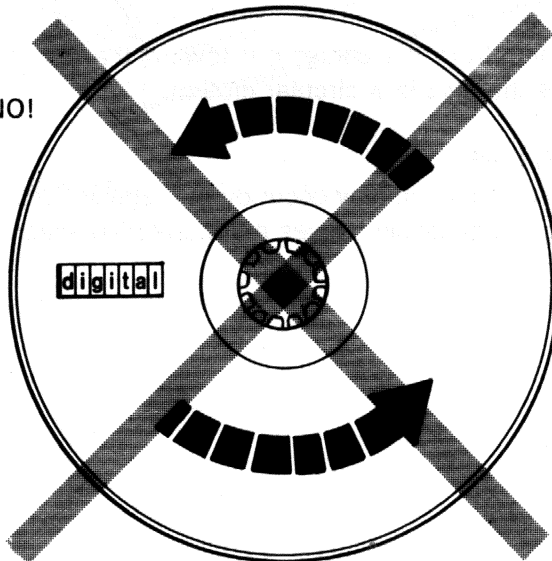
Table 6-1 lists problems that may occur during regular RRD50 subsystem use. Table 6-1 also gives probable causes and corrective action to take to try and solve the problem.

YES!



WIPE THE DISC FROM THE CENTER OUT TOWARD THE EDGE

NO!



NEVER WIPE THE DISC WITH A CIRCULAR MOTION

SHR-0437-84

Figure 6-2 Cleaning a Disc

Table 6-1 Solving Simple Problems

Problem	Probable Cause	Corrective Action
Power light does not go on when power switch is pressed.	Unit is not plugged in completely.	Shut power off. Check both ends of power cord. Make sure that it is securely plugged in on both ends.
	Power indicator is burned out.	Shut power off. Observe fault indicator while pressing power switch. If fault light goes on for a second, then turns off, the power light is burned out.
	A serious over-voltage or over-current condition exists in the drive.	Check circuit breaker, If it has popped out (tripped), shut power off, reset breaker by pushing it in. Power up again. If breaker trips again, there is a serious power problem. Call your Digital service representative.
Fault indicator stays on during power up.	Improper installation.	Verify all installation procedures.
	Power-up self-tests have failed.	Shut off power and try again. Call your Digital service representative.
Fault indicator is on after pressing Activity switch.	No disc is inserted or disc is inserted incorrectly.	Insert disc properly. Call your Digital service representative.

INDEX

A

- Activity indicator 4-2, -3
- Activity switch 4-2, -3

C

- Cabling 3-9, -10
- Carton contents 2-1, -2
- Circuit breaker 3-4, 4-3
- Cleaning the objective lens 6-1, -2
- Cleaning a disc 6-2, -3
- Cleaning the exterior 6-1
- Connecting the power cord 3-11
- Connections 3-9
- Controller 1-1, -2
- Controls and indicators 4-1, -2

D

- Diagnostic monitor: set/show commands 5-8
- Disc cleaning 6-2

E

- Electrical specifications 1-3
- Environmental/space requirements 1-1
- Everyday use of the RRD50 4-6

F

- Fault indicator 4-2, -3
- Front panel 4-1

H

- HELP menu: testing 5-4

I

- I/O cable 1-1, -2, 2-1, 3-9, 3-10
- ID label 3-3
- Inserting a disc 4-4
- Installation overview 3-1
- Installation setup 3-2
- Installation, warranty, and service information 1-4, -5

M

Maintenance 6-1
MicroVAX testing 5-2, -3

N

Normal operation 4-4

O

Objective lens 6-1, -2

P

Packing material 2-1
Parts location: bottom of disc drive 3-3
Parts location: rear of disc drive 3-4
Physical specifications 1-3
Power cord 3-11
Power indicator 4-2, -3
Power switch 3-11
Power-up self-tests 5-1
Problem solving 6-4

R

RRD50 subsystem 1-1, -2
Related documentation 1-3
Removing a disc 4-6
Running tests on a MicroVAX 5-2, -3
Running a disc 4-4

S

Scope 1-1
Service mode tests 5-5
Shipping screws 3-2
Solving problems 6-4
Specifications 1-3
Stopping a disc 4-6
Subsystem components 1-1
Switches 3-8

T

Testing 5-1 – 5-10
Testing: HELP menu 5-4
Tests 5-4, -5
Types of switches 3-8

U

Unit number 3-6 – 3-10
Unpacking and inspection 2-1

V

Verify mode functional tests 5-5
Voltage selector 3-4 – 3-6