

# OptiPac 2652SD User's Manual

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Revision A

© Copyright 2000

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HP 1000 and RTE are trademarks of Hewlett Packard Corp.

## Important FCC Information

This peripheral device generates and uses radio frequency energy and if it is not installed and used properly, that is, in strict accordance with this manual, it may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class-A 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 when operated in a commercial environment. However, there is no guarantee that interference will not occur in a particular installation. Operation of this equipment in a residential area is likely to cause interference and is up to the user, at his own expense, to take whatever measures may be required to correct the interference. You can test to see whether this equipment does cause interference with radio or television reception by turning the disk drive off and on. If it is causing interference, try to correct the problem by one or more of the following measures:

- Be sure you're using shielded interconnect cables.
- Reorient the receiving antenna.
- Relocate the drive with respect to the receiver.
- Move the receiver away from the disk drive, or vice versa.
- Plug the computer into a different outlet so that the computer and receiver are on different circuits.

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

## Warning:

To prevent fire or shock hazard, do not expose the unit to rain or moisture. To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

The OptiPac product is classified as a CLASS 1 LASER PRODUCT.

A CLASS 1 LASER PRODUCT label is located on the top cover of the internal drive mechanism.



## Printing History

If the Revision level of the manual does not change from one printing to the next, this indicates that the newer printing is a maintenance upgrade, i.e. typographic errors, page references, etc.

New revision levels of the manual indicate a new rewrite of the manual. This may include new installation instructions for a particular operating system, or a new ROM version of the OptiPac subsystem. You can determine the ROM version of your OptiPac by using the front panel LCD controls. See chapter 4 for details.

Date = Date this manual was printed  
Rev = Revision level of this manual

<b>Date</b>	<b>Rev</b>	<b>Changes to manual</b>
Apr 2000	A	First printing

## **Warranty Statement**

OptiPac products sold in the U.S.A. and Canada carry a standard one year warranty against defects in materials and workmanship.\* During the warranty period, Bering will, at its option, repair or replace equipment which proves to be defective.

OptiPac cartridge media is warranted against defects for one year from the date of purchase. If the media becomes defective, Bering will replace it upon receipt of the defective media from the customer.

All repairs will be performed at the factory. Any other arrangement, such as on-site service, will be at your expense. Before any product is returned for repair, a Return Materials Authorization number (RMA#) must first be obtained from a Customer Service representative.

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The selection and use of media, supplies, and consumables is the customer's responsibility. Bering reserves the right to exclude from the warranty any damage caused by misuse of the product, unauthorized modification, shipping damage, non-Bering-approved media, interface, software, or cleaning supplies.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. BERING SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES, DIRECTLY OR INDIRECTLY RELATED TO THE USE OR PERFORMANCE OF BERING PRODUCTS.

For products sold outside the U.S.A. and Canada, contact your local Bering distributor, representative, or dealer for warranty terms.

## Configuration Settings

Use this table to record the configuration settings of your Bering OptiPac Magneto-optical disk drive subsystem.

Model \_\_\_\_\_

Serial Number \_\_\_\_\_

Time Zone \_\_\_\_\_

Unit number \_\_\_\_\_

Format Switch             on                     off

Protect rings             on                     off

Protect ring H00         on                     off

12/24 hour clock         12                     24

## Table of Contents

1	<i>INTRODUCTION</i> . . . . .	1
	Features . . . . .	1
	Compatibility . . . . .	2
	Regenerating the Operating System . . . . .	2
	Magneto-Optical Technology . . . . .	2
	Conventions in this Manual . . . . .	3
	Unpacking . . . . .	4
2	<i>INSTALLING THE OPTIPAC</i> . . . . .	5
	Quick-Start Procedure . . . . .	5
	Connecting the OptiPac Drive . . . . .	6
	Daisy Chaining Multiple OptiPacs . . . . .	7
3	<i>OPERATING THE DISK DRIVE &amp; CARTRIDGE</i> . . . . .	9
	2652SD Controls . . . . .	9
	Loading a Cartridge . . . . .	10
	New Cartridges . . . . .	10
	Unloading a Cartridge . . . . .	11
	Manual Cartridge Removal . . . . .	11
	Write-Protecting a Cartridge . . . . .	12
4	<i>OPTIPAC SYSTEM FUNCTIONS</i> . . . . .	13
	System Menu . . . . .	14
	Main Menu . . . . .	15
	Change Ring . . . . .	15
	Unload Cartridge . . . . .	16
	Configurations . . . . .	16
	Utilities . . . . .	16
	Display Time and Messages . . . . .	16
	Configurations Submenu . . . . .	17
	Change Unit # . . . . .	17
	Change Format Switch . . . . .	17
	Change Protect Rings . . . . .	18
	Change Protect Ring H00 . . . . .	18
	Use 12 / 24 Hour Clock . . . . .	18
	Set Time . . . . .	19
	Set Date . . . . .	19
	Utilities Submenu . . . . .	21
	Ring Utilities Submenu . . . . .	22
	Change Ring . . . . .	22
	Change Label . . . . .	22
	Copy Ring . . . . .	23
	Backup Rings . . . . .	23
	Restore Rings . . . . .	24
	Erase Ring . . . . .	25
	Erase Rings . . . . .	26

	Fixed Disk Utilities Submenu . . . . .	27
	Show DISK Information . . . . .	27
	Spin Down / Up Disk . . . . .	27
	Verify Disk . . . . .	28
	Format Disk . . . . .	28
	Erase Disk . . . . .	29
	Cartridge Utilities Submenu . . . . .	30
	Show Cartridge Information . . . . .	30
	Unload Cartridge . . . . .	30
	Verify Cartridge . . . . .	31
	Format Cartridge . . . . .	31
	Erase Cartridge . . . . .	32
	Tests Submenu . . . . .	33
	Test LCD Display . . . . .	33
5	<i>CARING FOR THE DISK DRIVE &amp; CARTRIDGE</i> . . . . .	35
	General Safeguards . . . . .	35
	Cartridge Care . . . . .	36
	Preventive Maintenance . . . . .	36
6	<i>TROUBLESHOOTING &amp; SERVICE</i> . . . . .	37
	Before You Do Anything Else . . . . .	37
	Error Codes and LCD Messages . . . . .	37
	Fuse Replacement . . . . .	37
	If You're Still Having Problems . . . . .	38
A	<i>SPECIFICATIONS</i> . . . . .	39
	5.2GB Cartridge Disk Drive . . . . .	39
	1.3GB Fixed Disk . . . . .	41
	General . . . . .	42
B	<i>RACK MOUNT</i> . . . . .	43
	Installation . . . . .	43
	<i>INDEX</i> . . . . .	45



## INTRODUCTION

Congratulations on purchasing what we think is the finest removable cartridge system on the market. Bering OptiPac drives are built for years of reliable service. We're sure you'll agree as you begin to work with your drive.

### Features

The Bering OptiPac 2652SD subsystem is a 5.2GB Magneto-Optical removable cartridge disk drive with a 1.3GB fixed disk compatible with Hewlett-Packard 1000E, M, or F computers running RTE-IVB and RTE-VI. In this manual we refer to the Bering OptiPac disk drive as *OptiPac* and all HP systems as *computer*, unless otherwise indicated.

**Note:** The Bering OptiPac 2652SD magneto-optical cartridge drive supports 1.3GB and 2.6GB cartridges. However, 1.3GB cartridges are read-only. These cartridges are available through Bering Technology's sales department.

Serving a wide range of storage needs, the OptiPac comes in the following configuration with HP7906M emulation. This provides a plug and play solution to the aging inventory of HP7906M disk drives.

- 2652SD - a 5.2GB Magneto-Optical cartridge drive with a 1.3GB fixed disk

The OptiPac 2652SD subsystem uses a 5.25-inch removable cartridge which can store 2.6GB (1.3GB/side) of data. This means:

- Each cartridge contains multiple rings, so physical removal is not required to change to another ring. Each ring emulates a 10MB HP 7906M cartridge.
- Your storage capacity is limited only by the number of cartridges you use.
- Your data is portable and secure. Just remove the cartridge from the drive and take it with you, or store it in a safe place.
- Your data cartridge is protected in a durable lexan case.
- Your OptiPac can be used to back up the data on fixed disks.
- The OptiPac 2652SD can be chained with other 2652SD's on the SCSI chain by changing the each OptiPac to a unique unit number with the front panel controls.

The OptiPac provides fast, reliable storage that's always on hand. No software or hardware modifications are required. The OptiPac supports the AMIGO HP disk command sets.

The fixed disk and each cartridge is split into multiple 10.1 MB Rings, which emulate a 10MB cartridge in the HP 7906M. The fixed disk has 128 (H00–H127) rings and each removable cartridge has up to 128 (0–127) rings, depending on the cartridge capacity and sector size.

Selecting a ring from the front panel of the OptiPac is equivalent to changing the cartridge in the 7906M. The first ring on the fixed disk (H00) emulates the fixed disk in the 7906M, and is not accessible from the front panel controls.

The rings on the fixed disk will all have an identification label on the LCD display beginning with “H.” Each ring on the removable cartridge is just a number. So ring 23 on the hard drive will be displayed as “H23,” while ring 23 on the cartridge will be displayed as “23.”

## Compatibility

The OptiPac 2652SD drive can read from, but not write to, 1.3GB MO cartridges. It can read and write to 2.6GB cartridges.

### Note:

5.2GB cartridges are not compatible with the OptiPac and should not be used.

The 1.3GB cartridges have a capacity of 650 MB/side and the 2.6GB cartridges have a capacity of 1.3GB/side. The cartridge must be ejected and flipped over to access the other side.

## Regenerating the Operating System

Your HP operating system does not require regeneration if the 2000MX MAC controller board replaces an HP 13037 MAC controller in the same slot where the HP MAC controller was removed from.

If the 2000MX is inserted into any other slot, the operating system will have to be regenerated.

## Magneto-Optical Technology

All of the Bering OptiPac disk drives are based on magnetic and optical technology. Like hard disks, a Magneto-Optical drive writes data to the cartridge using a strong magnet that changes the magnetic fields at specific locations from 1's to 0's and vice versa. But because of the polycarbonate surface of the cartridge, the magnet is not powerful enough to change the polarity of a bit by itself. This is where the optical part of the write process comes in. In order for the magnet to change the polarity of a bit, the area must be heated to a high temperature by a focused, fine-point laser.

Because of the polycarbonate substrate on the cartridge, data stored on Magneto-optical cartridges is highly secure for a long period of time. The estimated storage life of data stored on this media is greater than twenty years. Also the magnetic head does not “float” next to the surface such as fixed disks. This means it is virtually impossible for the head to crash.

## Conventions in this Manual

We'll use the following conventions to make the information in this manual more clear and predictable:

- **Keys** on the keyboard are indicated by capital letters enclosed in square brackets, e.g., [ENTER], regardless of whether the characters on your keys are actually capitalized. On the other hand, **buttons** on the OptiPac are indicated by underlined capital letters alone followed by the word *button*, e.g., ENTER button.
- A font like **this** indicates text you should see on the LCD. The bold font will otherwise follow the conventions herein.
- Italics in any type face, *like this*, have a limited number of possible meanings:

Words as words, letters as letters, or numerals as numerals, e.g., “the word *enter* can be confused with the key on your keyboard, therefore we will use *type* in its place.”

Titles of books, booklets, or disks, e.g., *Bering OptiPac 2652SD User's Manual*

Symbolic of variable words, characters, or numerals. That is, something must be in the variable's place, but the exact contents vary with different situations and cannot be specified without knowing a particular situation. *Variable* is not synonymous with *optional*. Frequently the letter(s) *n* (for numerals), or *x* (for words or characters) are used to hold the place of the variable, e.g., “the program will respond that there are *n* widgets.”

## Unpacking

Carefully unpack your OptiPac near the spot where you want to set it up, noting the packing method as you go. Save the packing materials, they'll come in handy if you ever want to ship the unit.

Besides this manual, you'll find:

- the OptiPac
- a removable data cartridge
- a SCSI terminator
- a SCSI cable (with 2652P or 2652S bundle)
- a power cable
- a warranty card

If any item is missing, please call your dealer or call Bering Customer Service at (408) 364-6500.

## INSTALLING THE OPTIPAC

This chapter describes the installation procedure for the OptiPac and is divided into two sections. The “Quick-Start Procedure” section enables experienced users to begin operation right away. The “Connecting the OptiPac Drive” section helps new users connect the disk drive before going on to the next chapter for additional operating instructions.

### Quick-Start Procedure

This section describes the quick-start procedure to set up the OptiPac for use on a HP 1000 system. Most of the parameters are already set at the factory. There may be some adjustments necessary before the OptiPac can operate in your particular environment. Refer to your operating system manuals for information.

These instructions assume you are replacing an HP 13037 MAC controller with the Bering 2000SP controller.

1. Turn off your computer.
2. Remove the HP 13037 MAC (Multiple Access Controller) interface board and module from the HP 1000.
3. Plug the Bering 2000SP MAC Disk Interface into the HP 1000 where the 13037 MAC interface board was removed from.
4. Attach the SCSI cable to the Bering MAC Disk Interface installed in the computer and the other end to either SCSI connector on the back panel of the OptiPac drive.
5. Install the SCSI terminator on the remaining SCSI connector on the back of the OptiPac.
6. Turn on the OptiPac and wait for the self-test to end.

When the test ends without incident, the time and date should be displayed on the front panel LCD and the clock should be running.

7. Load a cartridge.
8. Format the cartridge from the Removable Utilities menu. This step is not necessary if the cartridge was previously formatted.
9. Turn on your computer.
10. Begin using the OptiPac.

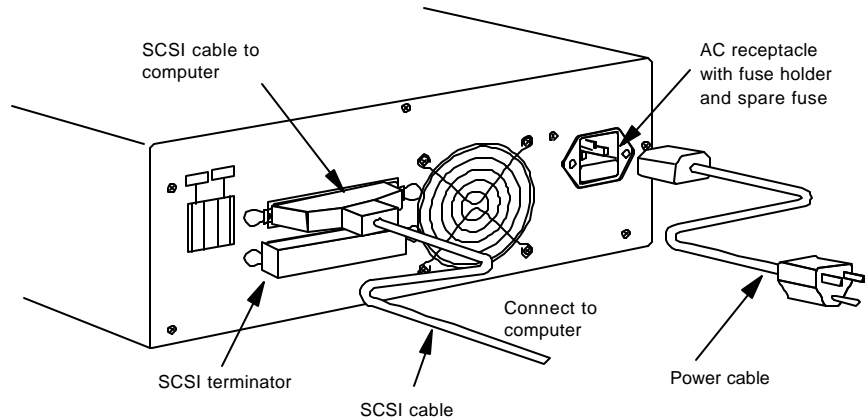
## Connecting the OptiPac Drive

For specific installation and configuration instructions for your computer, refer to your RTE Manager's Manual.

These instructions are for connecting an OptiPac 2652SD model to the Bering 2000SP MAC Disk Interface installed in the HP 1000 or to another 2652SD.

### ▲ CAUTION:

*Turn off your computer and unplug the power cord from the wall outlet. Disconnect any other cables attached to the back panel of your computer that may be in your way.*



*Figure 2-1: Connecting the OptiPac*

1. Turn off your computer and the OptiPac drive.
2. Connect the SCSI cable into either SCSI connector on the back panel of the OptiPac.
3. Attach a SCSI terminator to the other SCSI connector on the back panel of the OptiPac.
4. Plug the other end of the SCSI cable into the MX2000 card in the HP1000. See the *2000MX/SP User's Manual* for instructions on installing the 2000SP PCB into the computer.
5. Connect the power cable to the back of the OptiPac. Make sure there is at least one inch of space around the back and two inches around the sides of the drive.
6. Plug the OptiPac and the computer into grounded electrical outlets or a surge protector. The OptiPac should be on the same circuit as your computer.

### ▲ CAUTION:

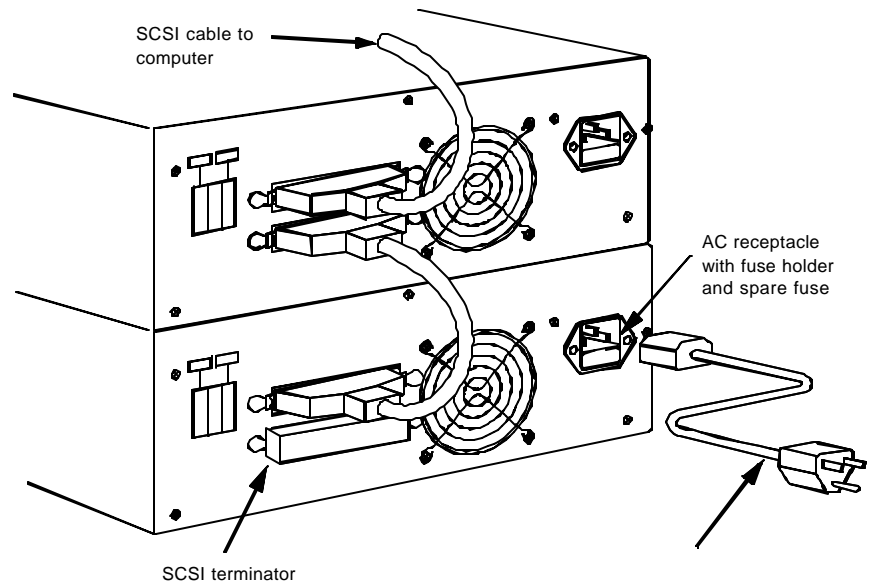
*Make sure that other equipment or appliances which might generate electrical noise or a power surge are on separate circuits.*

7. Turn on the OptiPac, the computer, and any other peripherals.

## Daisy Chaining Multiple OptiPacs

Multiple OptiPac 2652SDs can be chained together on the SCSI chain from the SCSI card in the computer. Each OptiPac can be set to a separate unit number.

1. Set the Unit number of each OptiPac or peripheral on the SCSI chain to a unique unit ID number. The OptiPacs are set in the Configurations submenu of the LCD controls.
2. Attach the MAC SCSI cable from the 2000SP MAC SCSI board to any of the OptiPacs on the SCSI chain.
3. Attach a standard SCSI cable from the second connector on the back of the OptiPac to the next OptiPac in the SCSI chain.
4. Install any other OptiPacs onto the SCSI chain.
5. Install the active terminator onto the open SCSI connector on the back of the last OptiPac on the chain.



*Figure 2-2: Chaining multiple OptiPacs*





## OPERATING THE DISK DRIVE & CARTRIDGE

### 2652SD Controls

Figure 3-1 illustrates all controls and indicators required for operating the OptiPac 2652SD.

1. Press the **POWER** button on the front panel of the OptiPac.

The LCD will display a self-test message and the disk drive model number. This operation should take less than a minute. If a cartridge is loaded, a read test will be performed. After the self-test is successfully completed, the time, date and current ring will be displayed on the LCD.

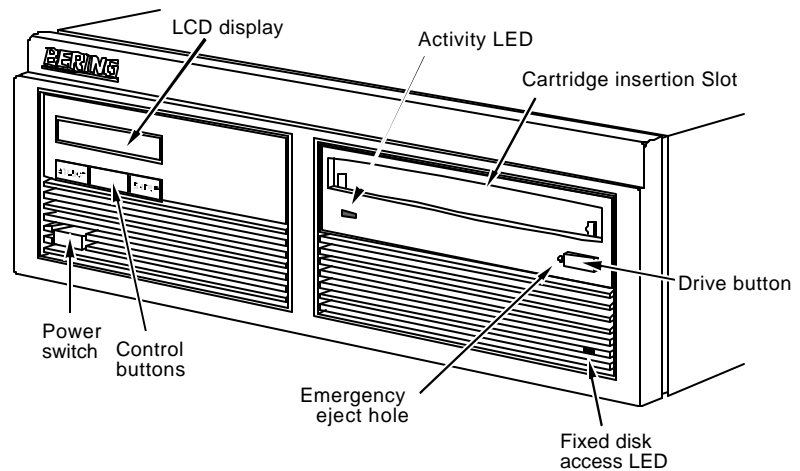


Figure 3-1: OptiPac 2652SD front panel

#### Activity Indicator

The activity LED lights amber when a cartridge is loaded or unloaded, during the power-up self-test sequence, and when the drive is being accessed. It also is amber for approximately two seconds when the cartridge is being ejected. At all other times while a cartridge is inserted in the drive, the Activity indicator will remain green.

#### Drive Button

The drive button is always locked out. The cartridge will not eject when this button is depressed because the OptiPac controller has issued a lock command to the cartridge drive. The cartridge must be ejected using the **Unload cartridge** function in the LCD main menu.

#### Emergency Eject Hole

In an emergency, such as a power outage, the cartridge can be manually ejected by inserting a tool into this opening. Read the complete instructions in the section titled "Manual Cartridge Removal."

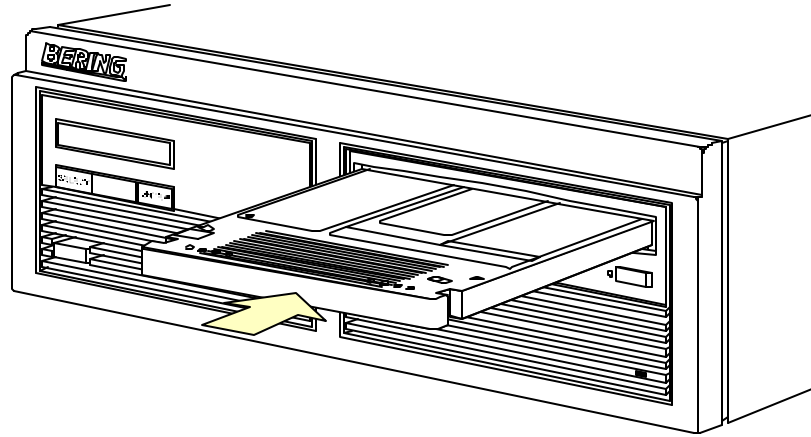
#### Fixed Disk Access Indicator

The fixed disk access indicator is on the lower right side of the front bezel. Whenever the fixed disk is accessed the LED will flash on.

## Loading a Cartridge

Loading a data cartridge is very easy. There is an A and B side on the 5.25 inch cartridges. The reverse side is accessed by ejecting the cartridge and inverting it prior to inserting it in the drive.

1. Make sure the OptiPac is turned on before you load a cartridge.
2. Remove the cartridge from the plastic storage case.



*Figure 3-2: Loading a cartridge in the 2652SD*

3. Insert the cartridge into the drive with either the A or B side up, the write-protect switch toward you and the metal shutter facing the drive.

As you do so, the drive will pull the cartridge inside and seat it in the drive slot. The drive motor will then spin the cartridge up to speed in about five seconds as the Activity LED on the front panel flashes amber. Once the drive reaches the proper speed, the Activity LED will turn green.

### ▲ CAUTION:

*Never move or transport the OptiPac with a cartridge in the drive, operating or not.*

## New Cartridges

The first time a cartridge is used it must be formatted from the Removable Disk Utilities menu. Using an unformatted cartridge can cause loss of data. You should indicate the date on the label when a cartridge is formatted. Remember to format both sides of the new cartridge.

## Unloading a Cartridge

When you're finished using your OptiPac be sure to eject and store the cartridge properly before shutting down your computer.

### ▲ CAUTION:

*Eject the cartridge before you turn off the OptiPac—otherwise the media is vulnerable to contamination which may damage the cartridge or the data on it.*

The OptiPac must be turned on before you can unload a cartridge.

1. With the time and date function displayed on the LCD, push the **SELECT** button on the front panel.

The **Unload cartridge** function will be displayed.

2. Press the **ENTER** button to execute the command.

The cartridge will pop out part way.

3. Remove the cartridge carefully and place it in the protective plastic storage case immediately.

### Note:

The cartridge must be pulled completely out of the drive before it is inserted again. If a cartridge is forced back into the drive without pulling it out damage to the drive may occur.

Remember to label and date the cartridge for future reference. Do not mark on labels with a graphite pencil. The graphite dust may contaminate the disk surface. Refer to Chapter 6, "Caring For The Disk Drive & Cartridge," for further information on cartridge care.

## Manual Cartridge Removal

If you can't get the cartridge to eject using any other method or if there has been a power failure use the following as a last resort. **Use this procedure only when absolutely necessary.**

Use a small round screwdriver or bent paper clip to manually eject the cartridge.

1. Disconnect the power to the drive.
2. Insert the eject tool into the small round hole in the front panel of the drive to eject the cartridge.

The cartridge will then pop out of the drive slot.

### ▲ CAUTION:

*Do not reach into the drive to get the cartridge. Wait until the cartridge is ejected through the front of the drive before removing it. Premature removal of the cartridge could damage the drive.*

## Write-Protecting a Cartridge

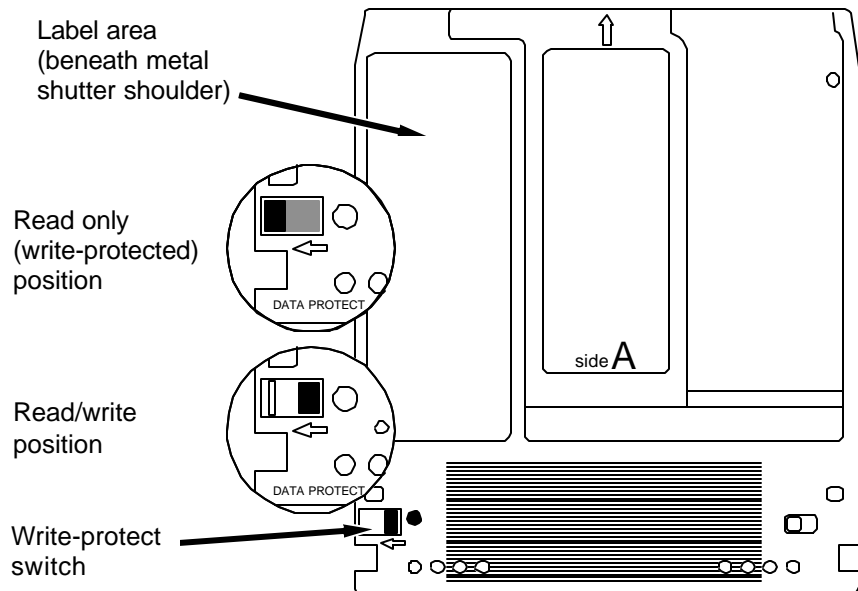
You may want to write-protect one or both sides of a cartridge after removing it from your OptiPac. Write-protection prevents accidental erasure or overwriting data on the removable cartridge.

The write-protect switch for the side which is facing up is the plastic slide switch in the lower left corner of the cartridge.

1. To write-protect a side of the cartridge, slide the appropriate tab toward the left edge as shown in Figure 3-3.

When you can see through the circular hole to the right of the tab, data cannot be written to that side of the cartridge and existing data cannot be erased from that side by ordinary means.

2. To disable write-protection, slide the tab toward the center of the cartridge so the hole is closed.



*Figure 3-3: Cartridge write-protect switch*

**Note:** The appearance of cartridges varies between manufacturers, but the location of the write protect switch should always be the same.

This chapter describes the OptiPac configuration and operating procedures. The OptiPac 2652SD features a push-button operation for performing configuration and operating procedures. This procedure is based on a hierarchical structure of system functions displayed on the disk drive's LCD. All procedures can be performed using the two front panel push-button controls: **SELECT** and **ENTER**.

These instructions should be used in conjunction with your specific HP computer's configuration procedure.

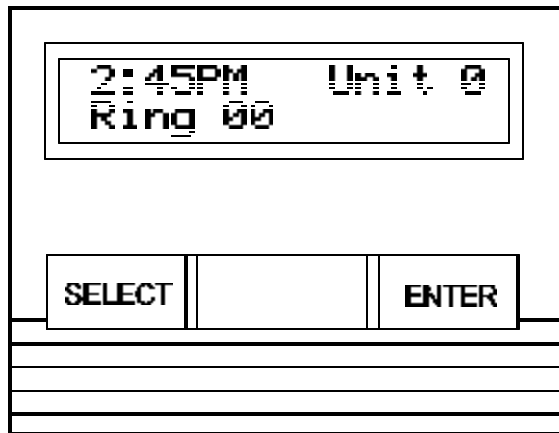


Figure 4-1: Front panel LCD and push-button controls

All system operations are performed by first selecting a function and then entering it for execution. The **SELECT** button enables you to scroll through all the available system functions and select desired choices. The **ENTER** button enables you to execute the chosen function.

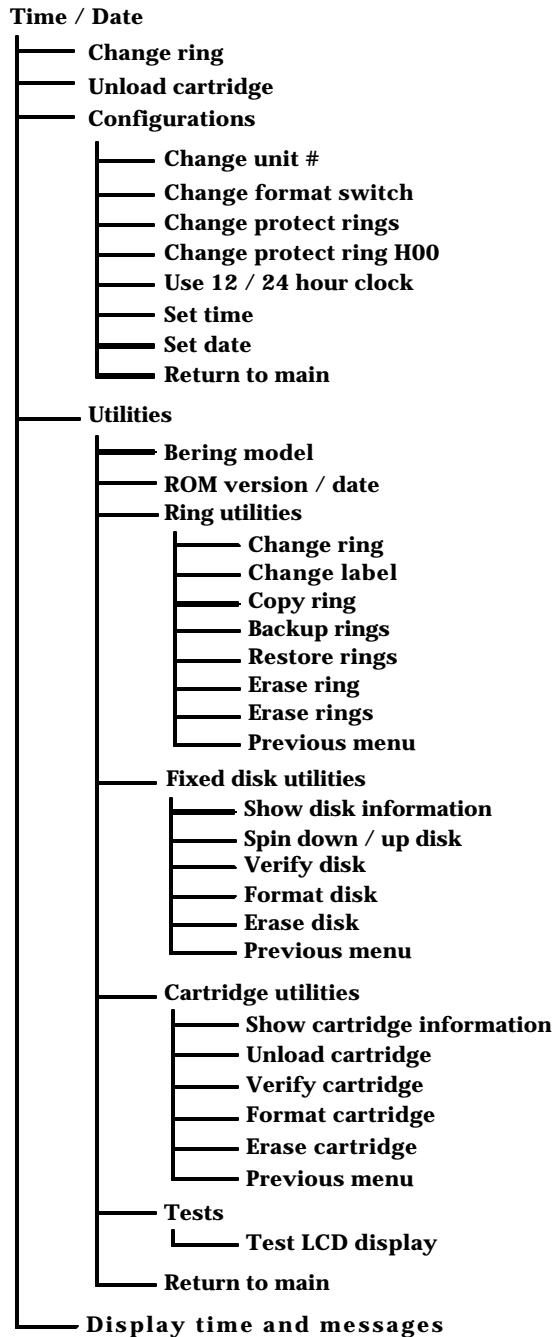
- To select a system function, press the **SELECT** button until the desired function appears on the LCD.
- To execute the chosen function or display its options, press the **ENTER** button.
- If you want to abort the current operation, press the **SELECT** and **ENTER** buttons simultaneously.

The abort function is allowed only during certain operations.

- To scroll or step backward in a menu, press and hold the **SELECT** button first and then the **ENTER** button.

## System Menu

This section contains a menu structure of the commands which can be accessed from the front panel LCD display and controls.



## Main Menu

The default display on the front panel LCD is the time/date. When the **SELECT** button is pressed, the first choice of the Main menu will be displayed. You can scroll the Main menu by repeatedly pressing the **SELECT** button. To execute the selected function or to enter the sub-menu, press the **ENTER** button. The time display will look appear similar to the following display when the system is first powered on and when the unit is on-line:

```
4:15:12PM  Unit 0  
Ring 04  LABEL
```

If a ring has a label, it will be displayed after the ring number. All ring numbers on the hard drive begin with the letter H (H04), while all rings on the removable cartridge have just a numeral (04).

### Note:

Attempting to perform any function on a new and/or unformatted cartridge will cause the following message to display:

```
Media not  
initialized!
```

The cartridge must be formatted from the Removable Utilities menu before it can be used. Remember, you must format both sides of a cartridge.

The following options are available from the Main menu of the OptiPac:

```
Change ring  
Unload cartridge  
Configurations  
Utilities  
Display time and messages
```

## Change Ring

This function allows you to change the current ring. When you return to the main menu the current ring will be displayed. Rings that begin with 'H' indicate a ring on the hard disk. Ring H00 emulates the hard disk in a 7906M and cannot be accessed from the front panel LCD controls. All other rings emulate removable disks.

1. Press the **SELECT** button until the **Change ring** function is displayed on the Main menu.
2. Press **ENTER** to select this option.
3. Use the **SELECT** button to scroll through the ring selections until you see the desired ring, then press the **ENTER** button.

**Unload Cartridge**

Use this function to unload the cartridge from the removable drive.

1. Use the **SELECT** button to choose the function you want to initiate from the Main menu:

**Unload cartridge**

2. Press the **ENTER** button.

A request is sent to the host system for permission to remove the cartridge. If the system grants the request or if there is no response for one second, the cartridge will be ejected. This is required for some operating systems and also prevents accidental ejection during cartridge use.

If the cartridge is in use by the operating system, the following message will appear.

**Cartridge in use  
UNLOAD IT! (NO)**

3. Press the **SELECT** button to select **Yes**, if need be; when **Yes** is selected, press the **ENTER** button to eject the cartridge.

**Configurations**

This function changes the format switch, write protects rings, selects the 24 hour clock format, and sets the date and time. See the “Configurations Submenu” section for detailed information.

**Utilities**

This function shows cartridge/disk information; verifies, and formats the cartridge; formats the fixed disk; erases cartridge data; and performs ring functions. Refer to the “Utilities Submenu” section for detailed information.

**Display Time and Messages**

This function exits the Main menu and displays the current date, time, the current ring, and ring label.



## Configurations Submenu

This function changes the format switch, write protects rings, and sets the date and time.

1. Press the **ENTER** button when the **Configurations** function is displayed on the Main menu.

The Configurations submenu will offer these functions:

**Change Unit #**  
**Change format switch**  
**Change protect rings**  
**Change protect ring H00**  
**Use 24 / 12 hour clock**  
**Set time**  
**Set date**

2. Press the **SELECT** button to scroll through the functions.

To return to the Main menu, press the **ENTER** button when you see **Return to main**.

## Change Unit #

This function changes the unit number of the OptiPac to a unique number when chaining multiple peripherals, such as other 2652SD's, to the SCSI chain. Each peripheral should have a unique number to avoid SCSI conflicts on the SCSI chain.

1. With the **Change Unit #** function displayed, press the **ENTER** button to choose this function.

The following message will appear:

**Unit # = 0**

2. Press the **SELECT** button to toggle scroll through the selections (0-6), then press the **ENTER** button to choose the desired value.

The OptiPac will reset to the new unit address number.

## Change Format Switch

This emulates the format switch on the front panel of an HP 7906M disk drive. Setting the switch to on enables formatting of the current ring from the computer.

To change the setting of the format switch between on and off follow these instructions:

1. Press the **ENTER** button when the Configurations function is displayed on the Main menu.
2. Use the **SELECT** button to scroll through the selections until you see **Change format switch**.
3. Press the **ENTER** button to select this option.

The LCD display will now show the following message:

**Change format  
switch (on)**

4. Press the **ENTER** button to select this option or the **SELECT** button to scroll between off and on and then press **ENTER** at the desired setting.

### Change Protect Rings

This function write protects the current ring displayed on the front panel from being written to by the computer system. If this is *on* and you change rings, the new ring and only the new ring will be write protected until protect rings is turned off.

#### ▲ CAUTION:

*The front panel LCD controls can still write to the rings. Functions such as Erase Ring and Copy Ring can overwrite the current ring even if Protect Rings is on.*

1. With the **Change protect rings** function displayed, press the **ENTER** button to choose this function.

The following message will appear:

**Protect rings  
off / on**

2. Press the **SELECT** button to toggle between On and Off , then press the **ENTER** button to choose the desired option.

The OptiPac will reset to the new value.

### Change Protect Ring H00

This function write protects ring H00 from being written to by the computer system. If this is *on*, ring H00 will be write protected until protect ring H00 is turned off.

#### ▲ CAUTION:

*The front panel LCD controls can still write to the ring. Functions such as Erase Disk can overwrite ring H00 even if Protect Ring H00 is on.*

1. With the **Change protect ring H00** function displayed, press the **ENTER** button to choose this function.

The following message will appear:

**Protect ring H00  
off / on**

2. Press the **SELECT** button to toggle between On and Off , then press the **ENTER** button to choose the desired option.

The OptiPac will reset to the new value.

### Use 12 / 24 Hour Clock

This function changes the clock display on the front panel LCD from a 12 hour clock to a 24 hour clock or vice versa.

1. Press the **ENTER** button until the **Use 12 / 24 hour clock** function is displayed on the Configurations menu.
2. Press **ENTER** to select this option.
3. Use the **ENTER** button to toggle between **12** and **24**. Then press the **SELECT** button to return to the menu.

## Set Time

This function allows you to change the time.

1. With the **Set time** function displayed, press the **ENTER** button.

You'll see:

**Set time**  
**3:15:27 PM**

The actual time displayed will vary. The hour field will be blinking.

2. Press the **SELECT** button to increment the hour.

Holding the **SELECT** button will cause the hour to increment (through twelve hours) continuously. If you continue to hold down the **SELECT** button, incrementing will speed up.

To decrement the hour, press and hold the **SELECT** button, and then press the **ENTER** button. Again, decrementing will be continuous and speeds up if you hold the buttons down.

3. When the correct hour is displayed, press the **ENTER** button.
4. **SELECT** and **ENTER** the correct minute setting just as you did the hour.
5. **SELECT** and **ENTER** the correct setting for seconds.
6. **SELECT** and **ENTER** the correct AM/PM setting.

You will now be returned to the **Set time** option.

## Set Date

This function allows you to change the date.

1. With the **Set date** function displayed, press the **ENTER** button.

You'll see:

**Set date**  
**Wed Feb 12, 1992**

The actual date displayed will vary. The day field will be blinking.

2. Press the **SELECT** button to increment the day.

Holding the **SELECT** button will cause the day to increment (through the days of the week) continuously. If you continue to hold down the **SELECT** button, incrementing will speed up.

To decrement the day, press and hold the **SELECT** button, and then press the **ENTER** button. Again, decrementing will be continuous and speeds up if you hold the buttons down.

3. When the correct day is displayed, press the **ENTER** button. The month field will start to blink.
4. **SELECT** and **ENTER** the correct month setting just as you did the day.
5. **SELECT** and **ENTER** the correct date setting.
6. **SELECT** and **ENTER** the correct year setting.

After you have made this setting, you'll be returned to the **Set date** option.

## Utilities Submenu

This function shows cartridge information; verifies, and formats the cartridge; copies and erases cartridge data; and formats and verifies the fixed disk:

- **MODEL NUMBER**—Displays the model number of the OptiPac.
- **F/W VERSION**—Displays the firmware version number and release date.
- **RING UTILITIES**—Changes rings; changes ring labels, copies rings, erases rings, backs up rings and restores rings. Refer to the “Ring Utilities Submenu” section for detailed information.
- **FIXED DISK UTILITIES**—Shows disk information; verifies, erases, and formats the disk. Refer to the “Fixed Disk Utilities Submenu” section for detailed information.
- **CARTRIDGE UTILITIES**—Shows cartridge information; unloads, verifies, erases, and formats the cartridge. Refer to the “Removable Disk Utilities Submenu” section for detailed information.
- **TESTS**—Tests the LCD. Refer to the “Test Submenu” section for detailed information.

To access and exit these utilities ...

1. Press the **ENTER** button when the **Utilities** function is displayed on the Main menu.

The Utilities submenu appears and displays the following functions:

Model number  
F/W version  
Ring utilities  
Fixed disk utilities  
Cartridge utilities  
Tests  
Return to main

2. Press the **SELECT** button to scroll through the information or functions.
3. When you see **Return to main**, press the **ENTER** button to return to the Main menu.

**Ring Utilities  
Submenu**

This function changes rings, labels rings, copies rings, backs up and restores groups of rings, and erases rings.

1. Press the **ENTER** button when the **Ring utilities** function is displayed on the Utilities submenu.

The Ring utilities submenu then appears displaying these functions:

Change ring  
Change label  
Copy ring  
Backup rings  
Restore rings  
Erase ring  
Erase rings  
Previous menu

2. Press the **SELECT** button to scroll through the information or functions.
3. You can return to the **Utilities** menu by pressing the **ENTER** button when you see Previous menu.

**Change Ring**

This function allows you to change the current ring. When you return to the main menu the current ring will be displayed. Rings that begin with 'H' indicate a ring on the hard disk. Ring H00 emulates the hard disk in a 7906M and cannot be accessed from the front panel LCD controls. All other rings emulate removable disks.

1. Press the **SELECT** button until the **Change ring** function is displayed.
2. Press **ENTER** to select this option.
3. Use the **SELECT** button to scroll through the ring selections until you see the desired ring, then press the **ENTER** button.

**Change Label**

This function allows you to change the label of the current ring. The main menu will display the current ring label. The label can be up to seven characters in length.

1. Press the **ENTER** button when the Ring Utilities function is displayed on the Utilities submenu.
2. Use the **SELECT** button to scroll through the selections until you see **Change label**.
3. Press the **ENTER** button to select this option.

The current label will display.

4. Press the **SELECT** button to scroll through the characters (A-Z, 0-9, ! # \$ % & \* . / : space) for the desired digit. A space is represented by an underscore character. To scroll backwards, press and hold the **SELECT**

button and press the **ENTER** button. The display will decrement the digits.

5. Press the **ENTER** button to select a letter and go to the next digit.

### **Copy Ring**

This function allows you to copy any ring to any other ring. The label of the source ring will also be copied to the target ring.

1. Press the **SELECT** button until the **Copy ring** function is displayed on the Ring utilities menu.
2. Press **ENTER** to select this option.
3. Use the **SELECT** button to scroll through the copy from ring selections until you see the desired source ring, then press the **ENTER** button.
4. Use the **SELECT** button to scroll through the copy to ring selections until you see the desired target ring, then press the **ENTER** button.

You will see a display similar to this:

```
H02 Label to  
03 Label No
```

5. Press the **SELECT** button to change **No** to **Yes** and press the **ENTER** button to start the copy process.

### **Backup Rings**

This function allows you to backup a group of rings from one location to another. The destination can be from one drive to the other or from one area of a drive to another area of the same drive. This function begins by asking for the beginning, ring, of the group to be backed up, then asks for the first ring, where the group of rings is to be backed up to, and then asks for the number of rings to be backed up.

The default values backup the highest numbered rings on the fixed disk equivalent to the number of rings on the cartridge (128 on the cartridge), so rings H000 through H127 will be backed up.

1. Press the **SELECT** button until the **Backup rings** function is displayed on the Ring utilities menu.
2. Press **ENTER** to select this option

You will see the following display:

```
From ring  
H000
```

3. Press the **SELECT** button to scroll through all of the rings and press **ENTER** when the desired beginning or first source ring is displayed.

If you have a 2.6GB cartridge inserted, you will see a display similar to the following:

To ring  
000

- Use the **SELECT** button to scroll through the rings and press **ENTER** when the desired beginning or first target ring is displayed.

You will see a display similar to the following:

Number of rings  
= 128

- Press the **SELECT** button to change the number of rings to be backed up. Leave the value at 128 to backup the entire hard drive to the cartridge drive. Press **ENTER** when the desired value is displayed.

You will see a display similar to the following:

H000 to 000  
128 rings No

- Press the **SELECT** button to toggle between **Yes** and **No** on the display and press **ENTER** when the correct selection is displayed.

If you selected No, the backup will abort. If you selected Yes, the selected number of rings will be backed up from the source rings to the target rings.

## Restore Rings

This function allows you to restore a group of rings from one location to another. The destination can be from one drive to the other or from one area of a drive to another area of the same drive. This function begins by asking for the beginning, or first ring, of the group to be restored, then asks for the beginning, or first ring, where the group of rings is to be restored to, and then asks for the number of rings to be restored.

The default values will restore all rings on the cartridge(128) to the last 128 rings of fixed disk.

- Press the **SELECT** button until the **Restore rings** function is displayed on the Ring utilities menu.
- Press **ENTER** to select this option

You will see the following display:

From ring  
000

- Press the **SELECT** button to scroll through all of the rings and press **ENTER** when the desired beginning or first source ring is displayed.

You will see a display similar to the following:



To ring  
H000

4. Use the **SELECT** button to scroll through the rings and press **ENTER** when the desired beginning or first target ring is displayed.

You will see a display similar to the following:

Number of rings  
= 128

5. Press the **SELECT** button to change the number of rings to be backed up. Leave the value at 128 to restore the entire cartridge to the hard drive. Press **ENTER** when the desired value is displayed.

You will see a display similar to the following:

000 to H000  
128 rings No

6. Press the **SELECT** button to toggle between **Yes** and **No** on the display and press **ENTER** when the correct selection is displayed.

If you selected No, the restore will abort. If you selected Yes, the selected number of rings will be restored from the source rings to the target rings.

## Erase Ring

This function will erase the currently selected ring by performing a security wipe delete. This wiping of data is done by filling the sectors with hexadecimal characters in sequential passes. The characters are written in the following sequence: 00, FF, 55, AA, 00. This method prevents any traces of data from being read, even with sophisticated techniques.

1. Press the **SELECT** button until the **Erase ring** function is displayed on the Ring utilities menu.
2. Press **ENTER** to select this option. The following will display:

ERASE 1 ring  
031 No

3. Press the **SELECT** button to toggle between **Yes** and **No** and press the **ENTER** button when your selection is displayed. No will abort the erase; Yes will continue. The following will display when Yes is selected:

Security erase  
No

4. Press the **SELECT** button to toggle between **Yes** and **No** and press the **ENTER** button when your desired selection is displayed. Yes will perform five erase cycles with five patterns; No will perform one erase pass.

After confirming your selection the erase function will begin.

```
Erasing ring 5
pattern 1 of 5 <>
```

When the erase function is complete, the label of the erased ring will be blank.

## Erase Rings

This function is identical to the Erase ring function, except it will erase a sequential range of rings. You will be asked for a beginning ring and the number of rings to be erased.

1. Press the **SELECT** button until the **Erase rings** function is displayed on the Ring utilities menu.
2. Press **ENTER** to select this option.
3. Use the **SELECT** button to scroll through the erase from ring selections until you see the desired beginning ring, then press the **ENTER** button.
4. Use the **SELECT** button to scroll through the number of rings selections until you see the desired number of rings to be erased, then press the **ENTER** button. The value will default to the number of rings between the current ring and the end of the drive you are currently on.

### ▲ CAUTION:

*Remember to count the first ring as one of the rings to be erased. So, to erase rings 1 through 3 will be a total of three rings—not two.*

```
ERASE 34 rings
(30) label  No
```

5. Press the **SELECT** button to toggle between **Yes** and **No** and press the **ENTER** button when your selection is displayed. No will abort the erase; Yes will continue. The following will display when Yes is selected:

```
Security erase
No
```

6. Press the **SELECT** button to toggle between **Yes** and **No** and press the **ENTER** button when your desired selection is displayed. Yes will perform five erase cycles with five patterns on each ring; No will perform one erase pass on each ring.

After confirming your selection the erase function will begin. The progress of the **Erase rings** function will be displayed:

```
Erasing ring 5
pattern 1 of 5 <>
```

### **Fixed Disk Utilities Submenu**

This function shows disk information; verifies, and formats the fixed disk, and spins the disk down or up.

1. Press the **ENTER** button when the **Fixed disk utilities** function is displayed on the Utilities submenu.

The Fixed disk utilities submenu then appears displaying the following functions:

**Show DISK information**  
**Spin down/up disk**  
**Verify disk**  
**Format disk**  
**Erase disk**  
**Previous menu**

2. Press the **SELECT** button to scroll through the information or functions.
3. You can return to the **Utilities** menu by pressing the **ENTER** button when you see Previous menu.

### **Show DISK Information**

This function displays information similar to the following list about the fixed disk.

Number of rings  
Ring capacity  
Ring size (cylinders)  
Ring cylinder size (tracks)  
Ring track size in sectors  
Total sectors in ring  
Total capacity of drive (kbytes)  
Interleave  
Sector size  
Date disk last formatted\*  
Date disk last written\*  
Date disk last accessed\*

\* only if disk is formatted.

1. Press the **SELECT** button to scroll through each field.

### **Spin Down / Up Disk**

This function will spin the fixed disk drive down or up. Using this function will help prevent wear on a drive which is constantly powered on.

1. Press the **ENTER** button to execute this function.

If the drive is already spun down, you will see the following message:

**Spin up  
disk**

2. Press the **ENTER** button to spin the drive up.

The drive will spin up at the first sign of activity on the SCSI bus, or when the LCD front panel controls access the drive.

**▲ CAUTION:**

*If the computer system attempts to access the OptiPac while it is spun down, the drive will automatically spin up, but the computer system may time-out before the drive is ready, causing a system error.*

**Verify Disk**

This function scans every sector on the fixed disk for defects. If a bad sector is found, this function will terminate with the LCD showing the error.

1. Press the **ENTER** button to start.

As the verification progresses, the record address is updated. The following message will appear:

```
Verify DISK
block n
```

2. To abort the function at any time, press and hold both the **SELECT** and **ENTER** buttons simultaneously until the following message appears:

```
Abort received.
wait ...
```

3. Release the buttons.

The function will abort at the appropriate time and you'll see:

```
User abort
```

4. Press the **SELECT** button to exit.

When the verify is complete, the following message will appear:

```
DISK verified
```

5. Press the **SELECT** button to return to the Fixed disk utilities submenu.

**Format Disk**

This function is used to format the fixed disk if the **FORMAT** utility is not available in your host system.

**▲ CAUTION:**

*The Format Disk function will erase all data on the fixed disk.*

1. Press the **ENTER** button when the **Format disk** function is displayed on the Fixed disk utilities submenu.

The Format disk submenu then appears displaying the following message:

```
Erase entire
media? NO
```

2. Press the **SELECT** button to toggle between **YES** and **NO**.
3. Select **YES** and press the **ENTER** button to continue.

The following message will appear:

```

1 vols      512 bps
continue?   No
    
```

If you choose **No** the **FORMAT** will abort and you'll be returned to the Removable disk utilities menu.

4. Use the **SELECT** button to select **Yes** and press the **ENTER** button to start the format process.

The following message will appear:

```

Formatting
DISK
    
```

Formatting will take up to 1 hour. After the format a verify pass will occur. When the process is complete, the following message will appear:

```

DISK
formatted
    
```

5. Press the **SELECT** button to return to the Fixed disk utilities submenu.

## Erase Disk

This function will erase the entire fixed disk by performing a security wipe delete. This wiping of data is done by filling the sectors with hexadecimal characters in sequential passes. The characters are written in the following sequence: 00, FF, 55, AA, 00. This method prevents any traces of data from being read, even with sophisticated techniques.

### ▲ CAUTION:

*The erased fixed disk will be unreadable and must be formatted again to be usable.*

1. Press the **ENTER** button when the **Erase disk** function is displayed on the fixed disk utilities submenu.

The Erase disk submenu will appear and ask:

```

Erase entire
media? NO
    
```

2. Use the **SELECT** button to select **YES** and press the **ENTER** button to continue.

Upon successful completion, the following message will appear:

```

DISK erased
    
```

3. Press the **SELECT** button to return to the **Fixed disk utilities** submenu.

**Cartridge Utilities  
Submenu**

This function shows cartridge information; locks and unlocks, verifies, and formats the cartridge.

1. Press the **ENTER** button when the **Cartridge utilities** function is displayed on the Utilities submenu.

The Cartridge utilities submenu then appears displaying the following functions:

Show Cartridge information  
Unload cartridge  
Verify cartridge  
Format cartridge  
Erase cartridge  
Previous menu

2. Press the **SELECT** button to scroll through the information or functions.
3. You can return to the **Utilities** menu by pressing the **ENTER** button when you see Previous menu.

**Show Cartridge  
Information**

This function displays information similar to the following list about the cartridge.

Number of rings  
Ring capacity  
Ring size (cylinders)  
Ring cylinder size (tracks)  
Ring track size in sectors  
Sectors in ring  
Total capacity of drive (kbytes)  
Interleave  
Sector size  
Date cartridge last formatted\*  
Date cartridge last written\*  
Date cartridge last accessed\*

\* Not displayed for unformatted cartridges.

1. Press the **ENTER** button to scroll through each field.

**Unload Cartridge**

This is the same as **Unload cartridge** in the Main menu.

## Verify Cartridge

This function scans every sector on the cartridge for defects. If a bad sector is found, this function will terminate with the LCD showing the error.

1. Press the **ENTER** button to start.

As the verification progresses, the record address is updated. The following message will appear:

```
Verify CARTRIDGE  
block n
```

2. To abort the function at any time, press and hold both the **SELECT** and **ENTER** buttons simultaneously until the following message appears:

```
Abort received.  
wait ...
```

3. Release the buttons.

The function will abort at the appropriate time and you'll see:

```
User abort
```

4. Press the **ENTER** button to exit.

When the verify is complete, the following message will appear:

```
CARTRIDGE  
verified
```

5. Press the **SELECT** button to return to the Removable disk utilities submenu.

## Format Cartridge

All new cartridges should be formatted with this utility before using on the computer system. This function is used to format the cartridge if the FORMAT utility is not available in your host system.

1. Press the **ENTER** button when the **Format cartridge** function is displayed on the Removable disk utilities submenu.

The Format cartridge submenu then appears displaying the following message:

```
Erase entire  
media? NO
```

2. Press the **SELECT** button to toggle between **YES** and **NO**.
3. Select **YES** and press the **ENTER** button to continue.

The following message will appear showing the number of volumes (**vol**s) and the sector size (**bps** = bytes per sector):

1 vol 1024 bps  
continue? NO

4. Use the **SELECT** button to select **YES** and press the **ENTER** button to start the format process.

The following message will appear:

Formatting  
CARTRIDGE

Formatting will take up to 1 hour. After the format, a verify pass will occur. When the process is complete, the following message will appear:

CARTRIDGE  
formatted

5. Press the **SELECT** button to return to the Removable disk utilities submenu.

## Erase Cartridge

This function will erase the entire cartridge by performing a security wipe delete. This wiping of data is done by filling the sectors with hexadecimal characters in sequential passes. The characters are written in the following sequence: 00, FF, 55, AA, 00. This method prevents any traces of data from being read, even with sophisticated techniques.

### ▲ CAUTION:

*The erased cartridge will be unreadable and must be formatted again to be usable.*

1. Press the **ENTER** button when the **Erase cartridge** function is displayed on the Removable disk utilities submenu.

The Erase cartridge submenu will appear and ask:

Erase entire  
media? NO

2. Use the **SELECT** button to select **YES** and press the **ENTER** button to continue.

Upon successful completion, the following message will appear:

CARTRIDGE  
erased

3. Press the **SELECT** button to return to the **Removable disk utilities** submenu.



## Tests Submenu

This function tests the LCD.

1. Press the **ENTER** button when the **Tests** function is displayed on the Utilities submenu.

The Tests submenu will appear displaying the following function:

### **Test LCD display**

2. Press the **SELECT** button to scroll through the information or functions.
3. To return to the Utilities menu, press the **ENTER** button when you see **Previous menu**.

## Test LCD Display

This function is used to make sure the LCD is working properly.

1. Press the **ENTER** button to start the test.

All of the segments on the LCD will be turned on. If there are any missing segments (except the last character with an \*), call the Bering Service Department for assistance.

2. Press the **ENTER** button again to exit.



## CARING FOR THE DISK DRIVE & CARTRIDGE

This chapter describes how to care for your OptiPac and cartridges. It is divided into two sections. The “General Safeguards” section tells you what to look out for. The “Cartridge Care” section explains how to handle removable cartridges. The “Preventive Maintenance” section will explain user maintenance procedures. As long as you protect your OptiPac from hazards, it will provide you with years of service.

### General Safeguards

To protect the OptiPac:

- To avoid overheating, place it where the air can circulate around it. Be particularly careful to avoid blocking the cooling vent at the rear of the unit.
- Make sure it is plugged into a grounded (three-hole) electrical outlet. Verify that the outlet actually is grounded — that the third prong really is connected to a ground. The OptiPac should be on the same circuit as your computer.
- Make sure that other equipment or appliances which might generate electrical noise or a power surge (such as electric typewriters or heaters) are on separate circuits.
- Do not expose your OptiPac to extreme heat or cold. Prolonged exposure to excessive heat, direct sunlight, or freezing conditions will harm the drive.
- Keep it away from moisture, dirt, and contaminants such as spilled liquids, steam, or excessive dust. Do not smoke near the OptiPac.
- Do not apply cleaners or lubricants to any part of the drive.
- Never bump the OptiPac when it's running.
- Always set the OptiPac upright on a flat surface.

#### ▲ CAUTION:

*Never transport the OptiPac with a cartridge in the drive. This could damage the media.*

You don't need to worry about leaving the OptiPac on for a long time — it doesn't use much power. It's normal for the drive to feel warm (but not hot) after it's been running for a while.

If the OptiPac does get hot, make sure the fan is running properly, the vent at the rear is not blocked, and that the unit is placed where air can circulate around it.

## Cartridge Care

Removable cartridges are highly reliable and have a very long service life if you care for them properly.

- Store them properly. Remove the cartridge from the drive when you are not using it and store it in its protective case in a cool, dry, safe location.
- Do not leave the cartridge in the OptiPac after it is powered down. This leaves the cartridge shutter open and makes the recording media itself vulnerable to dust.
- Do not turn the computer off to remove the cartridge. This will not eject the cartridge. If the power is turned off, wait at least 60 seconds before removing the cartridge. See “Unloading a Cartridge” in Chapter 3 for more details.
- Keep your cartridges clean and dry and out of harm's way. Protect cartridges from dirt, spills, and smoke. Avoid handling the shutter edge of the cartridge since oil and dirt from your hands may be transferred to the disk media or to the inside of the drive.
- Do not open the cartridge access shutter. Minute particles such as smoke, pollen, or dust can contaminate the disk surface.
- Do not disassemble the cartridge.
- Use them at the correct temperature. Avoid using cartridges at temperatures above 104° F (40° C) or below 41° F(5° C). To avoid permanently damaging data, the drive, cartridge, and room should all be about the same temperature within the above operating range when you insert the cartridge into the drive.
- Do not move the drive with a cartridge loaded.
- Do not drop the cartridge. Sudden jolts may damage the media and/or cause the loss of data.
- Label each side of the cartridge clearly and make sure the label is securely attached before loading the cartridge. Do not mark on labels with a graphite pencil. The graphite dust from the pencil may contaminate the disk surface.
- Do not use defective or questionable cartridges on another drive. You may spread the problem.

## Preventive Maintenance

Bering subsystems will provide extended and reliable service as long as the drives are properly maintained. The Bering OptiPac subsystems require no preventive maintenance. If you have any questions concerning the proper preventive maintenance procedures please contact Bering Customer Support.

## TROUBLESHOOTING & SERVICE

This chapter describes basic trouble-shooting procedures. It is divided into four sections: “Before You Do Anything Else,” “Error Codes and LCD Messages,” “Fuse Replacement,” and “If You’re Still Having Problems.”

### Before You Do Anything Else

Often, problems you’re having can be resolved by verifying that:

- The power cord is securely connected to the OptiPac and a wall outlet.
- The power is switched on, and the AC fuse in the back of the drive is not blown.
- None of the pins on the cable connectors are loose, broken, or shorted.
- All cables are installed correctly.
- At least one side of the cartridge has been properly formatted.
- Each peripheral connected to your computer has a unique address.

### Error Codes and LCD Messages

Occasionally, after installing an OptiPac, the system will display a disk initialization error code upon start up. It is sometimes possible to solve the problem by following the LCD instructions. Sometimes the LCD will display an error code in the form of a number. This error code indicates a problem that may be associated with another hardware device other than the OptiPac. If this occurs, shut down your system and restart it again. If the problem still occurs, contact Bering Technical Support at (408) 364-6500.

### Fuse Replacement

If the drive fails to power on the AC fuse may be blown. The fuse is located in the AC input jack.

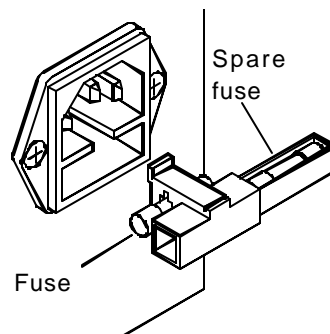


Figure 6-1: Replacing the AC fuse

**If You're Still Having Problems**

If you are able to start up from another drive but not the OptiPac, or from a cartridge and not the hard drive, the system files on the OptiPac hard drive may be damaged.

**START-UP PROBLEMS**

If you're unable to start up from an OptiPac, try starting up the computer with a different drive if available. If you're still unable to start up, the problem is with the computer rather than the OptiPac. Refer to the troubleshooting section in your computer manual for more information.

**WHEN ALL ELSE FAILS...**

If you still have problems after following the procedures in this chapter, call Bering Technical Support at (408) 364-6500. When you call be ready to tell the service representative:

- The model number and serial number of the OptiPac, the firmware version of the OptiPac, the type of computer you're using, the operating system, and the software version.
- Any error messages that have appeared.
- A description of the problem(s) and the steps you've taken to correct it.

Bering Customer Service can be reached by several methods. The mailing/shipping address and phone numbers are:

Bering Technology, inc.  
Customer Service/Technical Support  
1717 Dell Avenue  
Campbell, CA 95008

(408) 364-6500  
FAX: (408) 374-8309  
EMail: help@bering.com

**▲ CAUTION:**

*Never remove the cover of the OptiPac box. This voids the warranty.*

## SPECIFICATIONS

### 5.2GB Cartridge Disk Drive

#### 2.6GB MO Cartridge

The specifications listed in the table are for a single side of a 2.6GB cartridge. The cartridge must be flipped over to use the opposite side. See the following page for 1.3 cartridge specifications. The 2.6GB, 1024 bps cartridge is identical in capacity to the hard drive. Using any other cartridge causes the backup function to not backup all 128 rings.

#### PERFORMANCE

Rings	113 per side	512 bps
	128 per side	1024 bps
Ring capacity	10.1	MB
Rotation speed	3,600	rpm
Average latency	8.3	ms
Minimum seek time	2	ms
Average seek time	25	ms
Maximum seek time	45	0ms
MTBF	100,000	Power on Hours

#### ENVIRONMENTAL (operational)

Temperature	5° to 40°	C
	41° to 104°	F
Temperature gradient	10°	C/hour
Relative humidity	10 to 90	% non-condensing
Vibration	5 to 350 Hz	PSD: 0.014 m <sup>2</sup> /s <sup>3</sup>
	350 to 500 Hz	-6 dB/Oct
	500 Hz	PSD: 0.0096 m <sup>2</sup> /s <sup>3</sup>
Shock	30	G, 3 ms half sine
Altitude	-305 ~ 4,572	meters
	-1,000 ~ 15,000	feet

#### (non-operating)

Temperature	-30° to 60°	C
	-22° to 140°	F
Relative Humidity	5 to 90	% non-condensing
Vibration	5 to 100 Hz	PSD: 1.92 m <sup>2</sup> /s <sup>3</sup>
	100 to 137 Hz	-6dB/Oct
	137 to 350 hz	PSD: 1.03 m <sup>2</sup> /s <sup>3</sup>
	350 to 500 Hz	-6 dB/Oct
	500 Hz	PSD: 0.50 m <sup>2</sup> /s <sup>3</sup>
	1	G 0-peak
Shock	89	G 3 ms half sine
Altitude	-305 ~ 12,192	meters
	-1,000 ~ 40,000	feet

**LASER DIODE**

Type	Semiconductor Laser
Wavelength	785nm, Continuous
Output power	30mW (max)
Classification	Class 1 (IEC. 825) GaAIAs

**1.3 GB MO Cartridge**

This table contains the specifications for a single side of a 1.3 GB and a 1.2GB cartridge when inserted in the OptiPac drive. This is based on a cartridge with physical sector size of 512 and 1024 bytes. To use the opposite side of the cartridge it must be ejected, flipped over, and reinserted into the OptiPac.

**Note:** The 1.3GB and 1.2GB cartridges can be read from, but not written to, in the OptiPac 2652SD.

Rings	58 per side	512 bps
	64 per side	1024 bps



## 1.3GB Fixed Disk

<b>PERFORMANCE</b>	Rings	128	
	Ring capacity	10.1	MB
	Rotation speed	4500	rpm
	Average latency	5.5	ms
	Minimum seek time	3	ms
	Average seek time	10	ms
	Maximum seek time	20	ms
	HP-IB burst transfer rate	1	MB/sec
	HP-IB average transfer rate	940	KB/sec
	SCSI average transfer rate	4.1	MB/sec
	SCSI maximum transfer rate	5	MB/sec (asynchronous)
		10	MB/sec (synchronous)
	MTBF	500,000	POH
	<b>ENVIRONMENTAL (operational)</b>	Temperature	0° to 50°
		32° to 122°	F
Temperature gradient		20	°C/hour
		36	°F/hour
Relative humidity		8 to 85	% non-condensing
Vibration		0.5	G, 5 to 500Hz sine
Shock		10	G, 11 ms half sine pulse
Altitude		-60 ~ 3,000	meters
		-200 ~ 10,000	feet
<b>(non-operating)</b>		Temperature	-40° to 65°
		-40° to 149°	F
	Relative Humidity	5 to 95	%
	Vibration	2.0	G, 22 to 400 Hz sine
	Shock	60	G, 11 ms half sine pulse
	Altitude	-60 ~ 12,200	meters
	-200 ~ 40,000	feet	

**General**

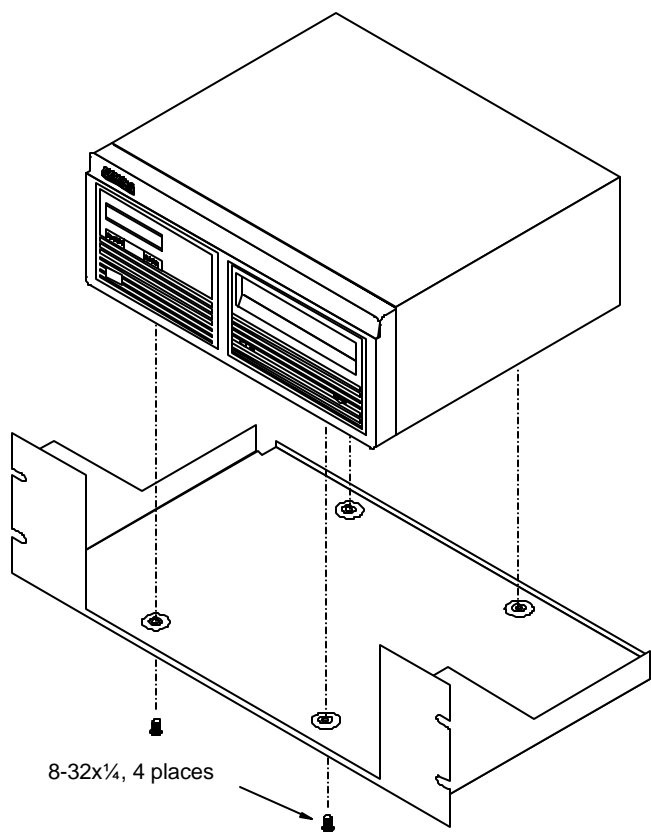
<b>Power Requirements</b>	Line voltage	96 - 240	volts
	Line frequency	47 - 63	Hz
	Current	0.5	Amps
	Fuse	"Slow blow" 1.6A, 250V	
<b>General Dimensions</b>	Interface	SCSI, Common Command Set (CCS)	
	Dimension	5"x 12.8"x 11"	
		12.7 x 32.5 x 27.9 cm	
	Shipping weight	30 lbs. 13.6 Kg	
<b>Accessories</b>	Cartridge, MO, 2.6GB, 1024 bps	ACCS-3050	
	Rack Mount Kit - 19"x5.25" EIA	ACCS-7204	
	Rack Mount Kit - 19"x7" EIA	ACCS-7204HN	

## RACK MOUNT

### Installation

If you purchased the rack mount kit, ACCS-7204 from Bering, these instructions will show the installation procedures. It fits in a standard 19" rack cabinet with 2.25 in. vertically centered mounting holes.

1. Remove the front feet from the Bering drive by removing two screws in each foot. Each foot can be turned around, front to rear, and reinstalled.
2. Mount the Bering drive to the rack mount shelf with four 8-32x1/4 screws inserted from the bottom through the shelf into the bottom of the drive.



*Figure B-1: Attaching the drive to the rack mount assembly*

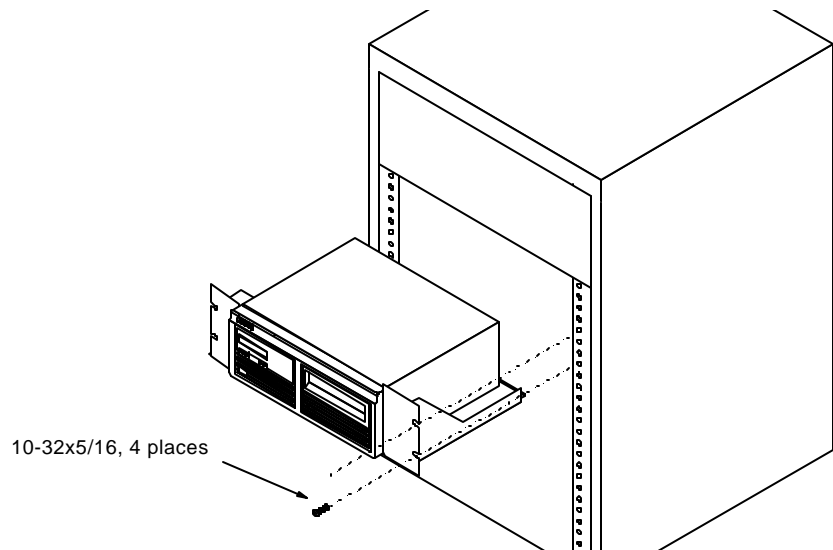
This step may be performed by turning the drive upside down and placing the shelf on the drive while aligning the screw holes.

**▲ CAUTION**

*The following steps require two people to install the unit in a cabinet.*

The rack requires 5.25 inches of vertical clearance. The optional 1.75" x 19.0" panel increases the vertical clearance to 7.0".

3. Insert the shelf with the Bering drive into the cabinet and hold it in place.
4. Insert the four 10-32x3/4 screws from the front through the holes in the cabinet. Screw the 10-32 nuts on the screws from the rear of the cabinet and tighten.
5. If you have the optional 1.75" x 19.0" panel, insert it above the rack mount assembly and attach it to the rack with two 10-32x3/4 screws.



*Figure B-2: Installing the rack mount in the chassis*

# INDEX

## A

Accessories 42  
Activity LED 9

## B

Backup rings 23

## C

Cartridge  
    1.3GB 2  
    2.6GB 2  
    5.2GB 2  
    Care 36  
    Erase 32  
    Format 31  
    Loading 10  
    Manual eject 11  
    New cartridge 10  
    Show information 30  
    Specifications 39  
    Unload 16, 30  
    Unloading 11  
    Verify 31  
    Write protecting 12  
Cartridge utilities submenu 30  
Change format switch 17  
Change label 22  
Change protect ring H00 18  
Change protect rings 18  
Change ring 15, 22  
Change unit # 17  
Clock, 12 / 24 setting 18  
Configurations submenu 17  
Controls 9  
Copy ring 23  
Customer Service 38

## D

Date  
    Setting 19  
Disk  
    Format 28  
    Show information 27  
    Spin down 27  
    Verify 28

Display Time and Messages 16

## E

Emergency cartridge eject 11  
Emergency eject hole 9  
Erase 26  
Erase cartridge 32  
Erase ring 25

## F

FCC iii  
Firmware version 21  
Fixed disk access indicator 9  
Format cartridge 31  
Format disk 28  
Formatting new cartridges 10  
Fuse replacement 37

## L

Label, change 22  
LCD  
    Backup rings 23  
    Cartridge utilities submenu 30  
    Change format switch 17  
    Change label 22  
    Change protect ring H00 18  
    Change protect rings 18  
    Change ring 15, 22  
    Change unit # 17  
    Configurations submenu 17  
    Copy ring 23  
    Erase cartridge 32  
    Erase ring 25  
    F/W version 21  
    Format cartridge 31  
    Format disk 28  
    Model number 21  
    Restore rings 24  
    Set date 19  
    Set time 19  
    Show cartridge information 30  
    Show disk information 27  
    Spin down / up disk 27  
    Test LCD display 33  
    Unload Cartridge 16  
    Unload cartridge 30

- Use 24 hour clock 18
- Utilities submenu 21
- Verify cartridge 31
- Verify disk 28

LCD Menu 14  
LCD messages 37

## M

- Magneto-Optical technology 2
- Main menu 15
- Manual cartridge eject 11
- Media not initialized, message 15
- Menu, system 14
- Model number 21

## N

- New cartridge 10, 15

## O

- Operation 9

## P

- Preventive maintenance 36
- Protect ring H00 18
- Protect rings 18

## R

- Rack mount installation 43
- Regeneration 2
- Ring
  - Backup 23
  - Erase 25
  - Protect 18
  - Restore 24
- ROM version 21

## S

- Set date 19
- Set time 19
- Show cartridge information 30
- Show disk information 27
- Specifications
  - 1.3GB Fixed disk 41
  - 5.2GB cartridge drive 39
  - Cartridges 39
  - General 42
- Spin down / up disk 27

## T

- Table of Contents vii

- Technical Support 38
- Test LCD display 33
- Tests submenu 33
- Time
  - Setting 19

## U

- Unit number 17
- Unload Cartridge 16
- Unload cartridge 30
- Unpacking 4
- Utilities submenu 21

## V

- Verify cartridge 31
- Verify disk 28

## W

- Warranty statement v
- Write protection
  - Cartridge 12
  - Rings 18