



OptiPac 7698N User's Manual

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Revision A

© Copyright 1995

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HP 7906H is a trademark 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. If the new revision is because of a difference in the operating procedures for the system, the ROM version associated with the manual Rev letter will be listed in the ROM Ver column. You can determine the ROM version of your OptiPac by using the front panel LCD controls. See chapter 4 for details.

If you have upgraded your OptiPac to a later version than the last one listed in the following table, you should contact Bering Customer Service to determine the proper revision of the *OptiPac 7698N User's Manual* required for your OptiPac subsystem.

Date = Date this manual was printed
Rev = Revision level of this manual
ROM Ver = Applicable subsystem ROM level

Date	Rev	Rom Ver	Changes to manual
September 1995	A	B.0	
October 1995	A	B.0	Second 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 _____

HP-IB Address _____

Format Switch on off

Table of Contents

1	<i>INTRODUCTION</i>	1
	Features	1
	Compatibility	2
	Magneto-Optical Technology	2
	Conventions in this Manual	3
	Unpacking	4
2	<i>INSTALLING THE DISK DRIVE</i>	5
	Quick-Start Procedure	5
	Connecting the OptiPac Drive	6
3	<i>OPERATING THE DISK DRIVE & CARTRIDGE</i>	7
	7698N Controls	7
	Loading a Cartridge	8
	New Cartridges	8
	Unloading a Cartridge	9
	Manual Cartridge Removal	9
	Write-Protecting a Cartridge	10
4	<i>OPTIPAC SYSTEM FUNCTIONS</i>	11
	System Menu	12
	Main Menu	13
	Change Ring	13
	Unload Cartridge	14
	Configurations	14
	Utilities	14
	Display Time and Messages	14
	Configurations Submenu	15
	Change HP-IB Address	15
	Change Format Switch	15
	Use 12 / 24 Hour Clock	16
	Set Time	16
	Set Date	16
	Utilities Submenu	18
	<i>RING UTILITIES SUBMENU</i>	19
	Change Ring	19
	Label Ring	19
	Copy Ring	20
	Compare Ring	20
	Backup Rings	21
	Restore Rings	21
	Clear Ring	22
	Clear Rings	23
	Erase Ring	23
	Erase Rings	24
	<i>FIXED DISK UTILITIES SUBMENU</i>	25

	Show DISK Information.	25
	Spin Down / Up Disk.	25
	Verify Disk	26
	Format Disk	26
	Erase Disk.	27
	REMOVABLE DISK UTILITIES SUBMENU	29
	Show CARTRIDGE Information	29
	Unload Cartridge	29
	Verify Cartridge	30
	Format Cartridge	30
	Erase Cartridge	31
	TESTS SUBMENU	32
	Test LCD Display	32
	Certify Media	32
	Verify Media	33
	Show Command Trace	34
5	<i>CARING FOR THE DISK DRIVE & CARTRIDGE</i>	35
	General Safeguards.	35
	Cartridge Care.	36
	Preventive Maintenance	36
6	<i>TROUBLESHOOTING & SERVICE</i>	37
	Before You Do Anything Else.	37
	Error Codes and LCD Messages.	37
	If You're Still Having Problems	38
	Fuse Replacement	38
A	<i>SPECIFICATIONS</i>	39
	1.3GB Cartridge Disk	39
	1 GB Fixed Disk.	41
	General.	42
	Power Requirements	42
	General Dimensions.	42
	Environmental	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 7698N subsystem is a multi-function magneto-optical removable cartridge disk drive with a 1GB fixed disk compatible with Hewlett-Packard business, technical, and personal computers, such as the HP1000. (In this manual we refer to the Bering OptiPac disk drive as *OptiPac* and all HP systems as *computer* unless otherwise indicated.)

Serving a wide range of storage needs, the OptiPac series come in the following configurations with HP7906H emulation. This provides a plug and play solution to the aging inventory of HP7906H disk drives.

- 7698N – a 1.3GB Magneto-Optical Cartridge drive with a 1.0GB fixed disk

The OptiPac 7698N subsystem uses a 5.25-inch removable cartridge which can store 1.3GB (650MB/side) of data. This means:

- 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 if your backup software supports that option.
- Each cartridge contains multiple rings, so physical removal is not required to change to another ring. Each ring emulates a 10MB HP 7906H cartridge.
- Security erase functions provide secure erasure of individual rings, groups of rings or entire cartridges.
- Local backup and restore functions provide image backups of any ring or group of rings to any location on the subsystem.
- LCD display provides information on local functions.

The OptiPac provides fast, reliable storage that's always on hand. The installation procedure is almost identical for all models. No software or hardware modifications are required. All OptiPacs support the latest HP disk command sets.

The fixed disk and each cartridge is split into 10.1 MB Rings, which emulate a 10MB cartridge in the HP 7906H. The fixed disk has 99 (H00–H98) rings and each removable cartridge has 64 (00–63) rings. Selecting a ring from the front panel of the OptiPac is equivalent to changing the cartridge in the 7906H. The first ring on the fixed disk (H00) emulates the fixed disk in the 7906H.

The rings on the fixed disk will all have an ID 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.”

▲ DANGER:

Use of the OptiPac other than as prescribed in this manual may result in exposure to hazardous invisible laser radiation if the case is open during operation. Avoid direct exposure to laser radiation. Do not operate the OptiPac while the cover is removed.

Compatibility

The OptiPac 7698N drives can read and write to 650MB MO cartridges as well as the 1.3GB cartridges. The 650MB cartridges have a capacity of 325MB/side. The 1.3GB cartridges have a capacity of 650MB/side. In addition cartridges with 512 bps (bytes per sector) or 1024 bps are fully supported. For capacities and specifications of specific cartridges refer to Appendix A “Specifications.”

**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 monospaced type font, like this, is used to convey text you should see on your screen, e.g., "you'll see: Welcome! on your monitor."
- The same monospaced font in contrast (either bold or regular) to the surrounding text, like this, is used to present the exact characters or keys you are to type or press, e.g., "type UTIL and press [ENTER] to continue." However, these keystrokes will not be typographically differentiated if they are conditional or theoretical. That is, if you have the option of making one of several entries or we are speaking of hypothetical situations, e.g., "If you type Y and press [ENTER] the disk will be reformatted, but if you type N and press [ENTER] you will exit the program."
- A bold font, like this, indicates text you should see on the LCD. The bold font will otherwise follow the conventions herein.
- Commands, program, utility, and file names are capitalized in body text to distinguish them from the rest of the text. However, when in a command line, they will be represented in lower case letters unless upper case (capital) letters are actually required, e.g.:

in body text: "... create a LIF volume using the LIFINIT command."

to be typed: `lifinit /dev/rdisk/B7698`

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
- An HP-IB cable
- 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 DISK DRIVE

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 an 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 Chapter 4 for detailed instructions.

The default parameter settings are as follows:

Time:	Pacific time
Date:	current date
HP-IB address:	0

1. Turn off your computer and connect the OptiPac.
If necessary, refer to the next section in this chapter.
2. Turn on the OptiPac and wait for the self-test to end.
When the test ends without incident, the date and time should be displayed on the front panel LCD along with the current ring.
3. Check the time and date. Adjust the clock if required.
4. Check the **HP-IB address** in the configuration function. Make sure all devices on the HP-IB have a unique address.
5. Load a cartridge.
6. Format the cartridge from the Removable Utilities menu. This step is not necessary if the cartridge was previously formatted.
7. Format the fixed disk from the Fixed Disk Utilities menu.
8. Turn on your computer.
9. Begin using the OptiPac.

Connecting the OptiPac Drive

▲ CAUTION:

These instructions are for connecting an OptiPac 7698N model to an HP-IB based computer with the OptiPac HP-IB connector.

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.

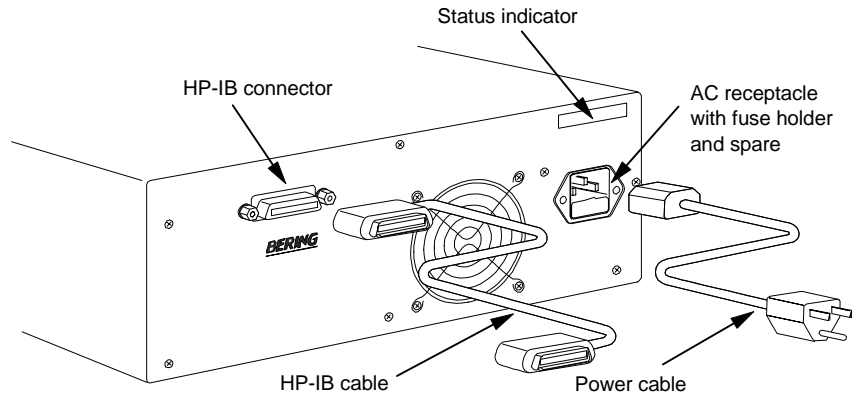


Figure 2-1: Connecting the OptiPac to an HP-IB computer

1. Turn off your computer and the OptiPac drive.
2. Connect one end of the HP-IB cable to the HP-IB connector on the back of the computer and the other end to the HP-IB connector on the back panel of the OptiPac. Tighten the thumb screws by hand.
3. 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.
4. Plug the OptiPac and the computer into three-pronged (grounded) electrical outlets or a surge protector.

Be sure that the outlets actually are grounded — that the third prong really is connected to a ground. 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 (such as electric typewriters or heaters) are on separate circuits.

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

OPERATING THE DISK DRIVE & CARTRIDGE

7698N Controls

Figure 3-1 illustrates all controls and indicators required for operating the OptiPac 7698N.

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 and date will be displayed on the LCD.

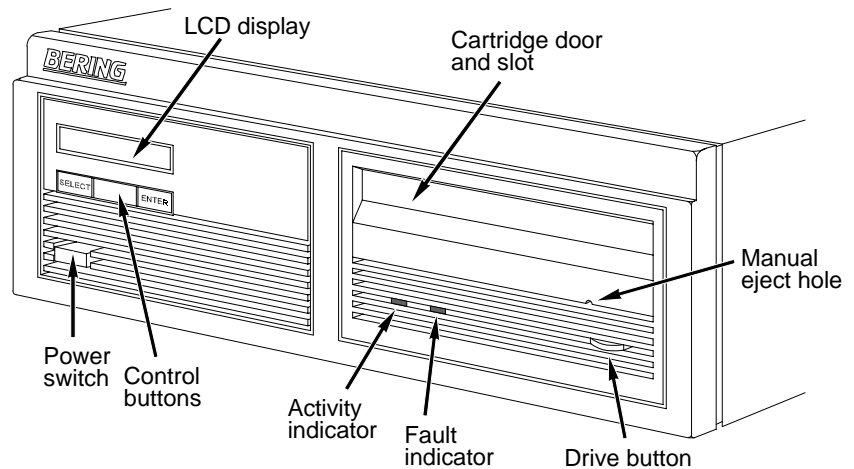


Figure 3-1: OptiPac 7698N front panel

Activity Indicator

The activity LED remains lit when a cartridge is loaded or unloaded, during the power-up self-test sequence, and anytime the drive is being accessed. It also remains lit for approximately two seconds when the cartridge is being ejected.

The activity indicator will slowly flash when no cartridge is in the drive.

Fault Indicator

The fault indicator remains lit whenever a failure condition exists that keeps the drive from operating normally. If the controller card detects a problem the fault light will illuminate through the rear panel of the unit.

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 the SCSI command "Prevent/Allow Medium Removal." The cartridge must be ejected using the **Unload cartridge** function in the LCD main menu. See Chapter 4 for details.

Emergency Eject Hole

In an emergency, such as a power outage, the cartridge can be manually ejected by inserting the eject 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 LCD indicator panel. It is displayed immediately after the time display and before the date display. When ever the fixed disk is accessed a solid block will flash on and off in the LCD indicator.

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.

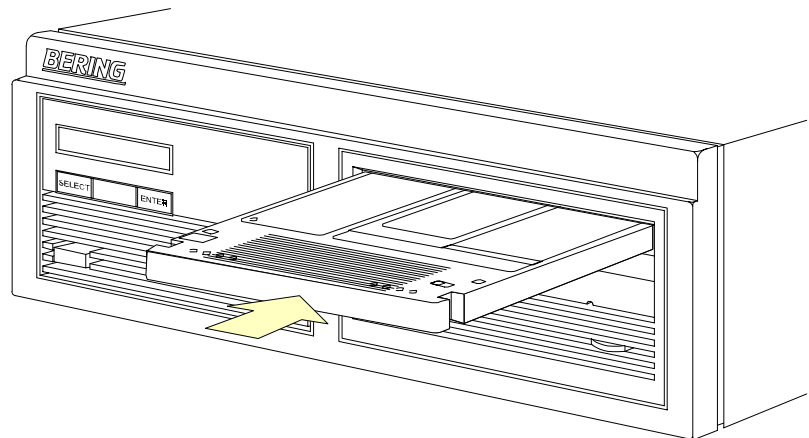


Figure 3-2: Loading a cartridge in the 7698N

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 access light on the front panel flashes. Once the drive reaches the proper speed, the access light will turn off.

▲ 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 it, 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 5, "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 Hewlett-Packard eject tool (p/n 8710-2016) to manually eject the cartridge. If an eject tool is not available a small flat-head screwdriver with the following dimensions may be used:

Length: 50 mm Width: 2.45 mm Thickness: 0.5 mm

1. Disconnect the power to the drive.
2. Insert the eject tool into the small round hole in the front panel of the drive.
3. Turn the eject tool in a clockwise direction (approximately 20 complete rotations) until the cartridge is ejected through the front of the drive.

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.

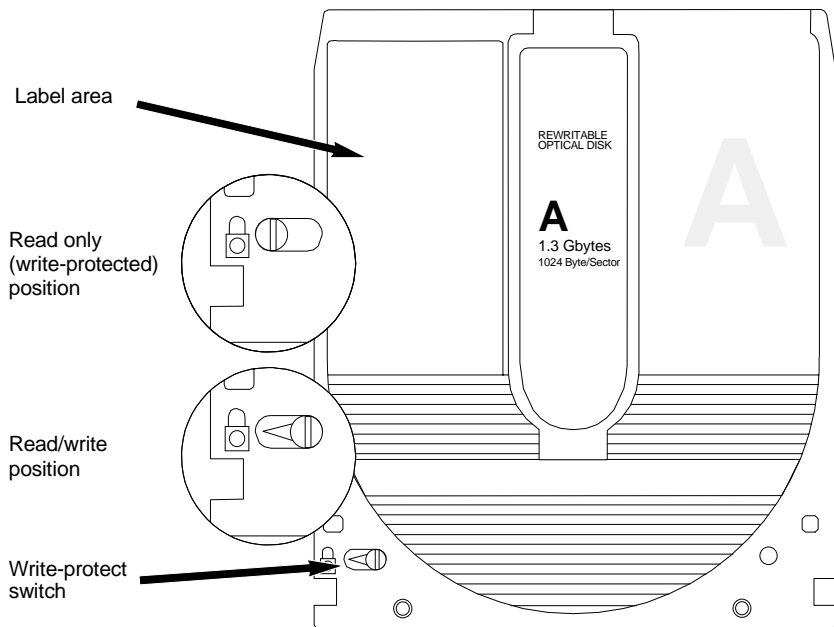


Figure 3-3: Cartridge write-protect switch

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 7698N 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 computer's configuration procedure in your computer's user manual.

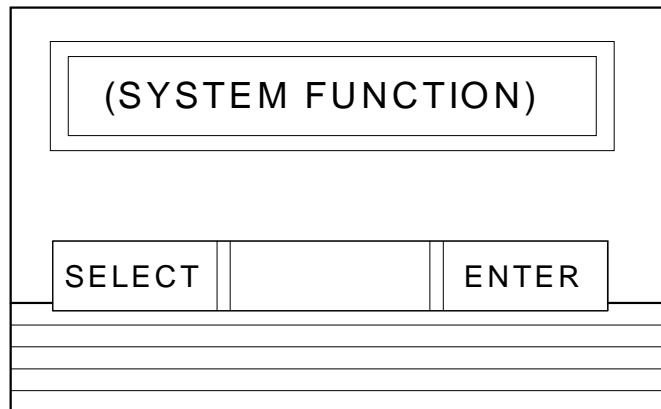


Figure 4-1: Front panel LCD and push-button controls

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.

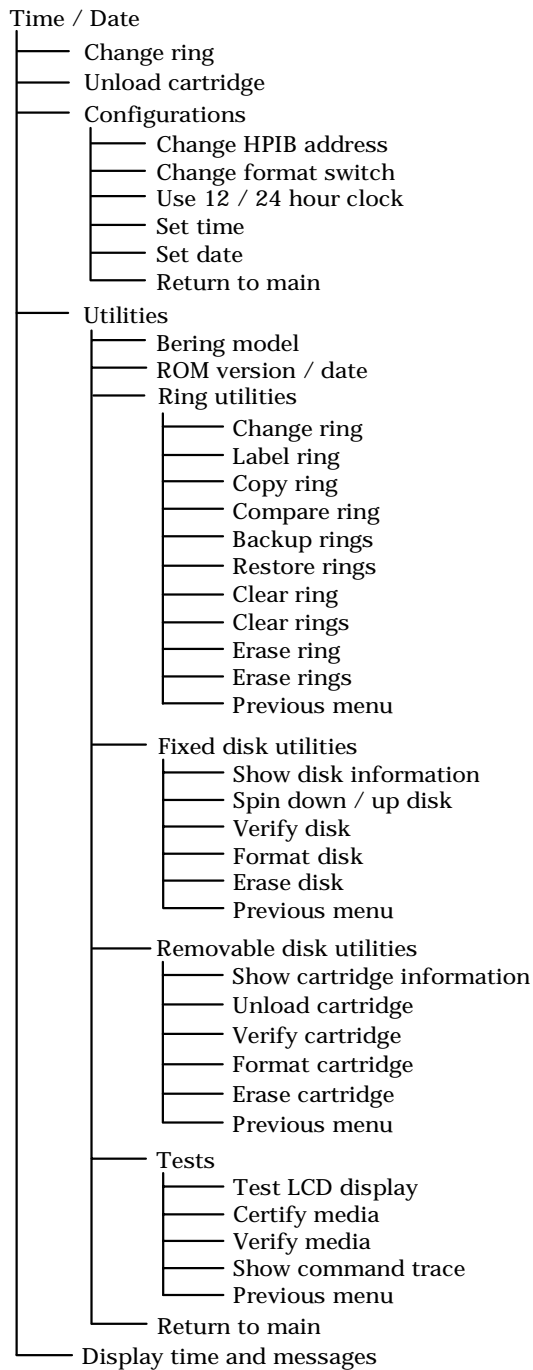
- To select a system function, press the **SELECT** button until the desired function appears on the LCD.
- To execute the chosen function or display its options, press the **ENTER** button.
- If you want to abort the current operation, press the **SELECT** and **ENTER** buttons simultaneously.

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/date 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 ■ H34
LABEL ...

The square after the time is the fixed disk access indicator.

Note:

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

Media not or Cartridge not
initialized! 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:

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 7906H, and is not accessible from the front panel controls, except when copying to or from it. All other rings emulate removable disks.

The fixed disk contains 99 rings, and each side of a 1.3GB 1024 bps cartridge contains 64 rings. A 1.2GB 512 bps cartridge contains 58 rings. Only one side of the cartridge can be accessed at a time.

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.
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 sets the HP-IB address, changes format switch, 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, one side at a time; formats the fixed disk; erases cartridge data; performs ring functions, and performs test functions. Refer to the “Utilities Submenu” section for detailed information.
- Display Time and Messages** This function exits the Main menu and displays the current time, the current ring, and ring label.

Configurations Submenu

This function sets the HP-IB address, changes the format switch, 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 HP-IB address
Change format switch
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 HP-IB Address

This function sets the HP-IB address of the OptiPac. The values range from 0 to 7. When selecting the HP-IB address, make sure each device on the same HP-IB chain has a unique address.

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

The following message will appear:

HP-IB address = 0

2. Press the **SELECT** button to scroll through all the choices, then press the **ENTER** button to select the correct address.

The OptiPac will reset to the new value.

Change Format Switch

This emulates the switch on the front panel of a HP 7906H 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)**

**Use 12 / 24 Hour
Clock**

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.

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 **SELECT** button to toggle between **12** and **24**. Then press the **ENTER** button when the desired option is displayed.

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. Although the current date is not displayed, it is written to the cartridge and fixed disk whenever they are formatted or written to from the front panel controls. This information can be displayed in the Show Disk Information and Show Cartridge Information functions.

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 twelve hours) 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; locks and unlocks, verifies, and formats the cartridge, one side at a time; copies and erases cartridge data; formats and verifies the fixed disk; and performs test functions via these options:

- **MODEL NUMBER** — Displays the model number of the OptiPac.
- **ROM VERSION** — Displays the firmware version number and release date.
- **RING UTILITIES** — Changes rings; labels rings, copies rings, compares rings, backs up and restores rings, and clears 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.
- **REMOVABLE DISK UTILITIES** — Shows cartridge information; unloads, verifies, erases and formats the cartridge, one side at a time. Refer to the “Removable Disk Utilities Submenu” section for detailed information.
- **TESTS** — Tests the LCD, verifies, and certifies media. 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
ROM version
Ring utilities
Fixed disk utilities
Removable disk 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, compares, backs up, and restores groups of rings; and clears 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
Label ring
Copy ring
Compare ring
Backup rings
Restore rings
Clear ring
Clear 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.

Note: Ring H00 can be erased or overwritten with the following functions:
Copy ring, Backup rings, Restore rings, Clear rings, and Erase rings

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 7906H, and is not accessible from the front panel 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.

Label Ring

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 13 characters in length.

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

The current label will display.

3. Press the **SELECT** key to scroll through the characters (A-Z, 0-9, and other miscellaneous characters) for the desired digit. A space is represented by an underscore character.
4. Press the **ENTER** key 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   No
```

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

Compare Ring

This function allows you to compare any ring to any other ring.

1. Press the **SELECT** button until the **Compare 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 "from" ring selections until you see the desired source ring, then press the **ENTER** button.
4. Use the **SELECT** button to scroll through the "to" ring selections until you see the desired ring, then press the **ENTER** button.

You will see a display similar to this:

```
H62 LABEL ...
to 063   No
```

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

A successful compare will display the following message:

```
Compare equal at
1:52:45PM
```

An unsuccessful compare will show the following message:

**Data was not the same
on verify**

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, or first ring, of the group to be backed up, then asks for the beginning, or 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 (64 on the 1.3GB cartridge), so rings H35 through H98 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
H35**

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.

You will see a display similar to the following:

**To ring
00**

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:

**H35 to
00 64 rings NO**

5. 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 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 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 (64) to the last 64 rings of fixed disk.

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

You will see the following display:

```
From ring
00
```

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.

You will see a display similar to the following:

```
To ring
H35
```

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:

```
00          to
H35 64 rings NO
```

5. 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 Yes, the selected number of rings will be restored from the source rings to the target rings.

Clear Ring

This function will clear the current ring by writing 0's over every sector of the ring. This function also clears the label.

1. Press the **SELECT** button until the **Clear ring** function is displayed on the Ring utilities menu and press **ENTER** to select this option.
2. Press the **SELECT** button to toggle between **Yes** and **No** and press the **ENTER** button when your selection is displayed.

After confirming your selection the clear function will begin. A display similar to the following will display.

```
Clearing ring 25
nnnnnnn
```

When the clear function is complete, the label of the cleared ring will be blank.

Clear Rings

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

1. Press the **SELECT** button until the **Clear rings** function is displayed and press **ENTER** to select this option.
2. Use the **SELECT** button to scroll through the clear from ring selections until you see the desired beginning ring, then press the **ENTER** button.
3. Use the **SELECT** button to scroll through the number of rings selections until you see the desired number of rings to be cleared, 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 cleared . So, to clear rings 25 through 30 will be a total of six rings—not five.

You will see a display similar to this:

```
Clear 06 rings
25: LABEL  No
```

4. Press the **SELECT** button to change **No** to **Yes** and press the **ENTER** button to start the erase process.

A display similar to the one in the **Clear ring** function above will display the progress of the Clear rings function and the current pattern.

Erase Ring

This function will erase the current ring by performing a wipe delete. This wiping of data is done by first filling the sectors with the hexadecimal characters 00 then FF, and finally, a random hexadecimal number. Then a verify is performed on the fourth pass. 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.
3. Press the **SELECT** button to toggle between **Yes** and **No** and press the **ENTER** button when your selection is displayed.

A display similar to the following will display.

```
Erasing ring 25
nnnnnnnn
```

The time of completion will be displayed when the erasure is complete.

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.

You will see a display similar to this:

```
From ring  22:
  LABEL
```

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.

The following message will display:

```
Number of rings
= 42
```

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 25 through 30 will be a total of six rings—not five.

You will see a display similar to this:

```
Erase 42 rings
22: LABEL  ..?No
```

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

A display similar to the one in the **Erase ring** function above will display the progress of the **Erase rings** function.

```
Erasing ring 22
  nnnnnn
```


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)
Logical sector size
Physical sector size
Interleave
Date disk last formatted*
Date disk last written*
Date disk last accessed*

* only if disk is formatted.

1. Press the **ENTER** 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 HP-IB 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
record *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 you've exited the function, the following message will appear:

***n* complete**
verifies done

5. Press the **ENTER** 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. The time required is approximately 0.5 hours.

▲ 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:

**Set interleave
to 1**

4. Use the **SELECT** button to select button to scroll through the options (1-10), choose one and press the **ENTER** button to start the format process.

The following message will appear:

**1 vols 256 bps
continue? No**

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

5. 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. When the process is complete, the following message will appear:

**DISK
formatted**

6. Press the **ENTER** button to return to the Fixed disk utilities submenu.

Erase Disk

This function will erase the entire fixed disk by performing a wipe delete. This wiping of data is done by filling the sectors with hexadecimal characters in sequential passes. This wiping of data is done by first filling the sectors with the hexadecimal characters 00 then FF, and finally, a random hexadecimal number. Then a verify is performed on the fourth pass. This method prevents any traces of data from being read, even with sophisticated techniques.

The Erase Disk function takes approximately 1 hour to complete.

▲ 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
04:35:12PM**

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

**REMOVABLE DISK
UTILITIES SUBMENU**

This function shows cartridge information; unloads the cartridge, verifies, formats, and erases the cartridge, one side at a time.

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

The Removable disk 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 one side of the cartridge.

 Total rings
 Ring capacity
 Ring size (cylinders)
 Ring cylinder size (tracks)
 Ring track size in sectors
 Sectors in ring
 Total capacity of drive (kbytes)
 Logical sector size
 Physical sector size
 Interleave
 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 one side of 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
record 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 you've exited the function, the following message will appear:

```
n complete
verifies done
```

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

Format Cartridge

All new cartridges must be formatted with this utility before using on the computer system. This function is used to format one side of 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 (**vols**) and the sector size (**bps** = bytes per sector):

1 vol 256 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. When the process is complete, the following message will appear:

CARTRIDGE
formatted

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

Erase Cartridge

This function will erase the entire side of a cartridge by performing a wipe delete. This wiping of data is done by first filling the sectors with the hexadecimal characters 00 then FF, and finally, a random hexadecimal number. Then a verify is performed on the fourth pass. This method prevents any traces of data from being read, even with sophisticated techniques. Remember, there are two sides on a cartridge.

The Erase Cartridge function takes approximately 1.5 hours to complete.

▲ CAUTION:

The erased side of the 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 **ENTER** button to return to the **Removable disk utilities** submenu.

TESTS SUBMENU

This function shows statistics, tests the LCD, and certifies media.

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

The Tests submenu will appear displaying the following functions:

Test LCD display
Certify media
Verify media
Show command trace

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 dots on the LCD will be turned on. If there are any missing dots (except the last character with an *), call the Bering Technical Support Department for a replacement.

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

Certify Media

This function will first write test patterns on the entire cartridge or fixed disk and then executes the **Verify media** function.

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

The Certify media submenu will appear:

**Erase entire
media? NO**

2. Press the **SELECT** button to select **YES**, then press the **ENTER** button to start this function.

The following message will appear:

**Verify media until
abort? NO**

3. Press the **SELECT** button to toggle between **YES** and **NO**. For multiple verify passes, select **YES** and press the **ENTER** button. Otherwise, select **NO** for a single verify pass and press the **ENTER** button to start.

The record address will advance while the test pattern is written on one side of the cartridge and the following message will appear:

Write CARTRIDGE
record *n*

The verify pass will begin when the test patterns have been written and the following message will appear:

Verify CARTRIDGE
record *n*

If a bad sector is found, this function will terminate with the LCD showing the error.

4. To abort the function at any time, press both the **SELECT** and **ENTER** buttons simultaneously and hold them until you see

Abort received.
wait ...

Unless a bad sector is found, you will have to abort manually if you selected multiple verification passes above.

5. Release the buttons.

The function will abort and the following message will appear:

User abort

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

When you've exited the function, you'll see:

n complete
verifies done

7. Press the **ENTER** button to return to the Tests submenu.

Verify Media

This function is similar to the **Verify cartridge** function in the Removable disk utilities menu, except **Verify media** processes indefinitely unless an error is found. Usually the process must be aborted by the user.

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

The **Verify media** submenu will appear with this message:

Verify media until
abort? No

2. Press the **SELECT** button to toggle between **YES** and **NO**. For multiple verify passes, select **YES** and press the **ENTER** button. Otherwise, select **NO** for a single verify pass and press the **ENTER** button to start.

For subsystems with multiple drives you'll be asked whether you want to:

Test all drives?

No

If you choose **Yes** the verification will begin immediately. If you choose **No**, you will need to select the drive(s) you do want tested:

For models with a fixed disk:

Test fixed disk? No

Test cartridge disk? No

- a. Use the **SELECT** button to choose **Yes** for the drive(s) you want to test and press the **ENTER** button to begin the test procedure.

The record address is updated on the display as the verification progresses. The following message will appear:

**Verify CARTRIDGE
record *n***

Note:

If a bad sector is found, this function will terminate with the LCD showing the error.

The messages will include **DISK** rather than **CARTRIDGE** when you are verifying a fixed disk.

If you chose a single verification pass, you will be prompted when the process is complete, at that time jump to step 3.

If you chose multiple verification passes in step 2, you must stop the process yourself.

- a. To abort the function at any time, press both the **SELECT** and **ENTER** buttons simultaneously and hold them until you see:

**Abort received.
wait ...**

- b. Release the buttons.

The function will abort and you will see **User abort**. It may take some time to stop the process and the display may resume showing the records being verified while it finds a stopping place.

- c. Press the **ENTER** button to exit.

Upon successful completion, you will be notified:

***n* complete
verifies done**

3. Press the **ENTER** button to return to the Tests submenu.

**Show Command
Trace**

This function is for troubleshooting purposes by Technical support personnel. It displays the last sequence of commands sent to the drive.

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:

- Always format both sides of a new cartridge before using. Even if it is labelled as "Formatted," it may not be formatted at the correct sector size. Use the Format Cartridge function in the Removable Disk Utilities menu to format each side of the cartridge.
- 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 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 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.
- Avoid exposure to magnetic fields such as those emitted by magnets, telephones, televisions, speakers, or large electric motors.
- 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 and damage the cartridge.
- 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 head crash 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 questions concerning the proper preventive maintenance procedures please contact Bering Customer Support personnel.

In a dusty environment in which the cartridge is installed at all times, the cartridge may get dust accumulation. Cartridges can be cleaned with an optional cartridge cleaning device. Check with Bering Customer Service for information on cleaning cartridges and availability of cleaning accessories.

This chapter describes basic trouble-shooting procedures. It is divided into three sections: "Before You Do Anything Else," "Error Codes and LCD Messages," and "If You're Still Having Problems."

Before You Do Anything Else

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

- The cartridge has been formatted from the Removable Disk Utilities menu.
- 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.

To check the fuse, use a screwdriver to open the fuse compartment on the back of the OptiPac. If the fuse is blown, replace it with the spare in the compartment, or buy a replacement. The proper replacement is a "slow blow" 1.6 Amp, 250 Volt fuse.

- 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.
- There isn't a floppy disk loaded or an internal hard disk connected when you want to start up from the OptiPac.
- A cartridge is properly loaded in the OptiPac and the drive is up to speed before you start your computer. If you try to start up or otherwise access an OptiPac without a cartridge, the computer may not recognize the drive.
- Each peripheral connected to your computer has a unique HP-IB 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.

If You're Still Having Problems

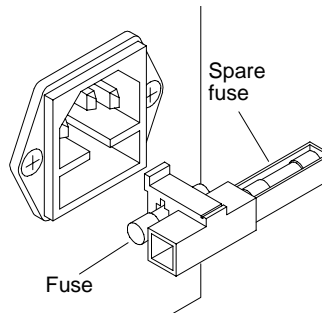
If you are able to start up from the floppy but not the OptiPac, the system files on the OptiPac may be damaged.

START-UP PROBLEMS

If you're unable to start up from an OptiPac, try starting up the computer with a floppy disk. 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.

Fuse Replacement

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



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 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

▲ CAUTION:

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

SPECIFICATIONS

1.3GB Cartridge Disk

1.3GB MO Cartridge

The specifications listed in the table are for a single side of a 1.3GB cartridge. This is based on a cartridge with physical sector size of 1024 bytes. The cartridge must be flipped over to use the opposite side. See the following page for 650MB cartridge specifications.

PERFORMANCE

Rings	64	
Ring capacity	10.1	MB
Rotation speed	2,400	rpm, 1.3GB media
Average latency	12.5	ms, 1.3GB media
Minimum seek time	2	ms
Average seek time	23.5	ms
Maximum seek time	45	ms
MTBF	80,000	Power on Hours (10% write duty cycle)

ENVIRONMENTAL (operational)

Temperature	5° to 40°	C
	41° to 104°	F
Temperature gradient	10°	C/hour
Relative humidity	5 to 90	% non-condensing
Vibration	0.5	G rms
Shock	10	G, 11 ms half sine
Altitude	7,620	meters
	25,000	feet

(non-operating)

Temperature	-40° to 60°	C
	-40° to 140°	F
Relative Humidity	5 to 95	% non-condensing
Vibration	3	G rms random
	1	G 0-peak
Shock	25	G no damage
Altitude	0 ~ 15,300	meters
	0 ~ 50,000	feet

LASER DIODE

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

**1.2GB, 512bps MO
Cartridge**

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

Rings	58	
Ring capacity	10.1	MB
Rotation speed	2,400	rpm
Average latency	12.5	ms

**650MB, 1024bps MO
Cartridge**

This table contains the specifications for a single side of a 650MB cartridge when inserted in the OptiPac drive. This is based on a cartridge with physical sector size of 1024 bytes. To use the opposite side of the cartridge it must be ejected, flipped over, and reinserted into the OptiPac.

Rings	32	
Ring capacity	10.1	MB
Rotation speed	3,600	rpm, 650MB media
Average latency	8.33	ms, 650MB media

The OptiPac MO drive rotation speed increases when a 650MB cartridge is inserted. The lower capacity of the drive accounts for the smaller number of rings.

**650MB, 512bps MO
Cartridge**

The following table contains the specifications for a single side of a 650MB cartridge when inserted in the OptiPac drive. This is based on a cartridge with physical sector size of 512 bytes. To use the opposite side of the cartridge it must be ejected, flipped over, and reinserted into the OptiPac.

Rings	29	
Ring capacity	10.1	MB
Rotation speed	3,600	rpm
Average latency	8.33	ms

1 GB Fixed Disk

PERFORMANCE	Rings	99	
	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
ENVIRONMENTAL (operational)	Temperature	0° to 50°	C
		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
	(non-operating)	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

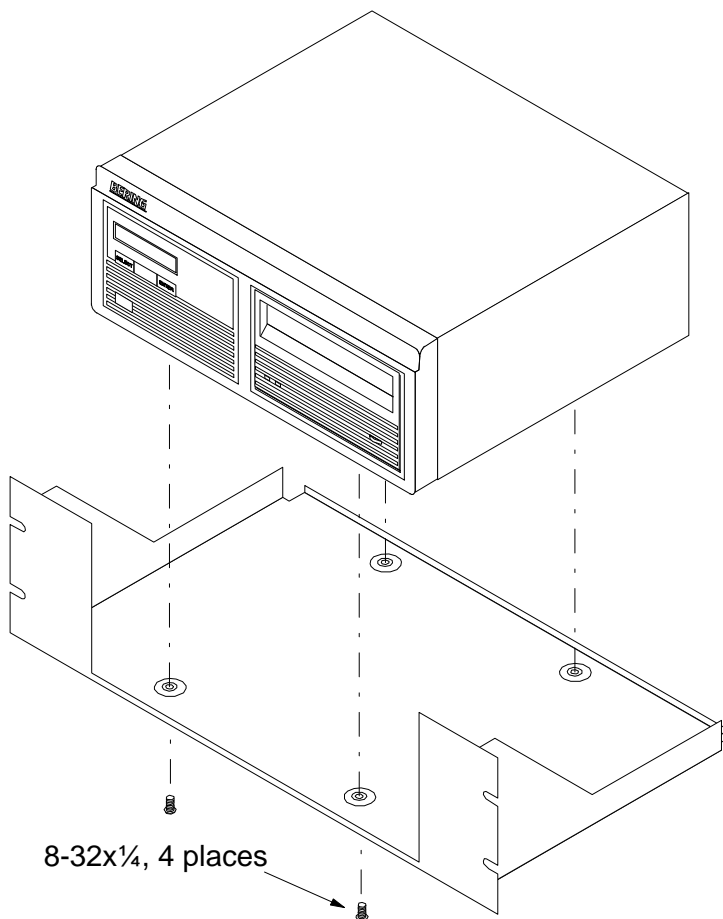
Power Requirements	Line voltage	96 - 240	volts	
	Line frequency	47 - 63	Hz	
	Current	0.5	Amps	
	Fuse	"Slow blow" 1.6A, 250V		
General Dimensions	Interface	HP-IB		
	Dimension	5" x 12.8" x 11" 12.7 x 32.5 x 27.9 cm		
	Shipping weight	20 lbs. 9.1 Kg		
Environmental (operational)	Temperature	5° to 40°	C	
		41° to 104°	F	
	Temperature gradient	10°	C/hour	
	Relative humidity	5 to 90	% non-condensing	
	Vibration	0.5	G rms	
	Shock	10	G, 11 ms half sine	
	Altitude	7,620	meters	
		25,000	feet	
	(non-operating)	Temperature	-40° to 60°	C
			-40° to 140°	F
Relative Humidity		5 to 95	% non-condensing	
Vibration		3	G rms random	
		1	G 0-peak	
Shock		25	G no damage	
Altitude	-60 ~ 15,300	meters		
	-200 ~ 50,000	feet		
Accessories	Cartridge, MO, 1.3GB, 1024bps	ACCS-3036		
	Cartridge, MO, 650MB, 1024bps	ACCS-3024		
	HP-IB Cable 1.0m (3.3 ft.)	ACCS-7110		
	HP-IB Cable 2.0m (6.7 ft.)	ACCS-7115		
	Rack Mount Kit - 19" x 5.25" EIA	ACCS-7204		
	Rack Mount Kit - 19" x 7.00" 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.



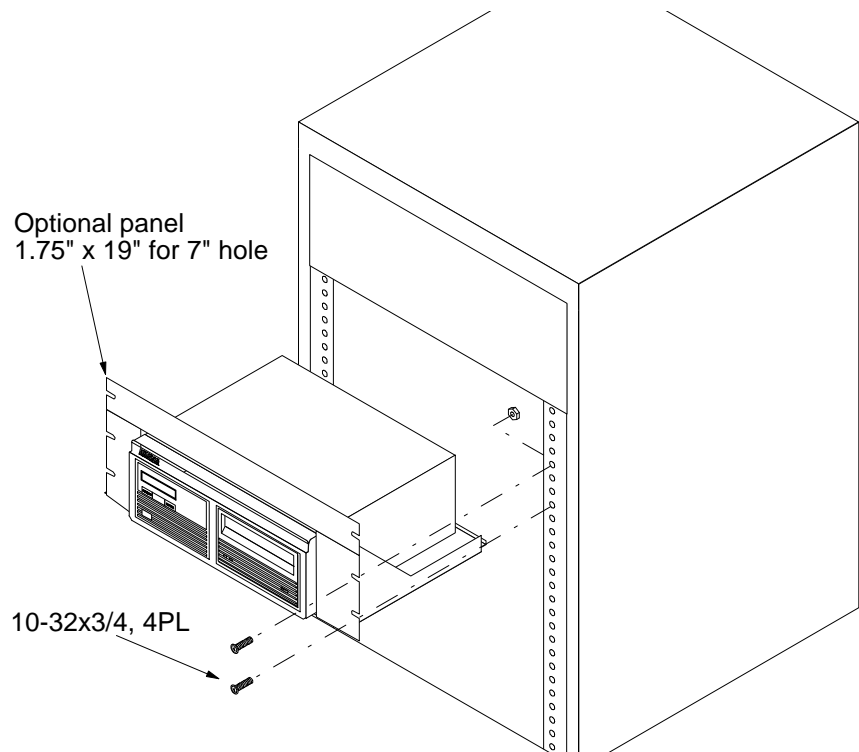
This step may be performed by turning the drive upside down and placing the shelf on the drive while aligning the screw holes.

▲ 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.



INDEX

A

Accessories 42
Activity LED 7

B

Backup rings 21

C

Cartridge
 650MB 2
 Care 36
 Erase 31
 Format 30
 Loading 8
 Manual eject 9
 Show information 29
 Unload 14, 29
 Unloading 9
 Verify 30
 Write protecting 10
Certify media 32
Change format switch 15
Change HP-IB Address 15
Change ring 13, 19
Clear ring 22
Clear rings 23
Clock, 12 / 24 setting 16
Command trace 34
Compare ring 20
Configurations submenu 15
Controls 7
Copy ring 20
Customer Service 38

D

Date
 Setting 16
Disk
 Erase 27
 Format 26
 Show information 25
 Spin down 25
 Verify 26
Display Time and Messages 14

E

Emergency cartridge eject 9
Emergency eject hole 8
Erase 27
Erase cartridge 31
Erase disk 27
Erase ring 23
Erase rings 24

F

Fault LED 7
FCC iii
Fixed disk access indicator 8
Format cartridge 30
Format disk 26
Fuse replacement 38

H

HP-IB
 Address 15

L

Label ring 19
LCD
 Backup rings 21
 Certify media 32
 Change format switch 15
 Change HP-IB Address 15
 Change ring 13, 19
 Clear ring 22
 Clear rings 23
 Compare ring 20
 Configurations submenu 15
 Copy ring 20
 Erase cartridge 31
 Erase disk 27
 Erase ring 23
 Erase rings 24
 Format cartridge 30
 Format disk 26
 Label ring 19
 Model number 18
 Restore rings 21
 ROM version 18
 Set date 16

- Set time 16
- Show cartridge information 29
- Show command trace 34
- Show disk information 25
- Spin down / up disk 25
- Test LCD display 32
- Tests submenu 32
- Unload cartridge 14, 29
- Use 24 hour clock 16
- Utilities submenu 18
- Verify cartridge 30
- Verify disk 26
- Verify media 33
- LCD Menu 12
- LCD messages 37
- LCD, testing 32
- LEDs 7
- M**
- Magneto-Optical technology 2
- Main menu 13
- Manual cartridge eject 9
- Menu, system 12
- Model number 18
- N**
- New cartridges 13
- O**
- Operation 7
- P**
- Preventive maintenance 36
- R**
- Rack mount installation 43
- Removable disk utilities submenu 29
- Ring
 - Backup 21
 - Clear 22, 23
 - Erase 23, 24
 - Restore 21
- ROM version 18
- S**
- Set date 16
- Set time 16
- Show cartridge information 29
- Show command trace 34
- Show disk information 25

- Specifications
 - 1 GB Fixed disk 41
 - 1.3GB cartridge drive 39
 - General 42
- Spin down / up disk 25

- T**
- Table of Contents vii
- Technical Support 38
- Test LCD display 32
- Tests submenu 32
- Time
 - Setting 16

- U**
- Unload cartridge 14, 29
- Unpacking 4
- Utilities submenu 18

- V**
- Verify cartridge 30
- Verify disk 26
- Verify media 33

- W**
- Warranty statement v
- Write protection 10