# OptiPac 7600
# User's Manual

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Revision 1

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## Important Notice

Printed in the United States of America.

The information contained in this document is subject to change without notice. Every reasonable precaution has been taken in the preparation of this manual to insure its accuracy. However, Bering Technology, Inc. assumes no liability resulting from any errors or omissions in this manual, or from the use of the information contained herein, nor does it make a commitment to update the information contained herein.

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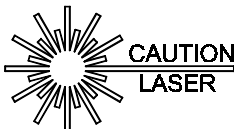
To prevent fire or shock hazard, do not expose the unit to rain or moisture. To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.



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 7600 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 |
|:---:|:---:|:---:|:---|
| April 2001 | A | B.A | Initial release |

## 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.

Customer Service
Bering Technology, Inc.
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EMail help@bering.com

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. Repairs and upgrades carry a limited time warranty. Contact a Bering sales representative or Customer Service Representative for details on the warranty period for replaced parts and upgrades.

**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 _____

| | | |
|---|---|---|
| Option | ❑ Normal | ❑ Fixed disk |
| Drive button | ❑ Enabled | ❑ Disabled |
| Default sector size | ❑ 256 | ❑ 512    ❑ 1024 |
| Emulation | ❑ Enabled | ❑ Disabled |
| Fix disk vol protect | ❑ Enabled | ❑ Disabled |
| CS 80 format | ❑ Enabled | ❑ Disabled |
| Auto spin down/up | ❑ Enabled | ❑ Disabled |

Spin down time/interval _____

Spin up time _____

# Table of Contents

# 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 7600 series subsystem is a magneto-optical removable cartridge disk drive with an optional 2.6 GB fixed disk compatible with Hewlett-Packard technical and business computers, such as the HP1000, using the CS80 command set. In this manual we refer to the Bering OptiPac disk drive as *OptiPac* and all HP systems as *computer* unless otherwise indicated.

The OptiPac 7600 emulates the HP CS80 command set disk drives, making it plug compatible with computer systems supporting the HP-IB interface and CS80 protocol.

These drives support Magneto Optical (MO) technologies.

Serving a wide range of storage needs, the OptiPac series come in the following configuration:

• 7605 – a 5.2 GB Magneto-Optical Cartridge drive
• 7652 – a 5.2 GB Magneto-Optical Cartridge drive with a 2.6GB fixed disk

The OptiPac 7600 series subsystems use a 5.25-inch removable cartridge which can store 5.2 GB (2.6 GB/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 cartridge can be used to back up the data on fixed disks if your backup software supports that option.
• Front panel controls provide off-line copying of data from the fixed disk to the cartridge or from the cartridge to the fixed disk,

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 OptiPac 7600 series support the latest HP CS80 disk command sets.

**▲ 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 7600 drives can read and write to 5.2 GB, 4.8 GB, and 4.1 GB MO cartridges, as well as the 2.6GB/2.3 GB cartridges. The OptiPac 7600 can read, but not write to, 1.3/1.2 GB, and 650/600 MB cartridges.

The 650MB cartridges have a capacity of 325 MB/side; the 1.3 GB cartridges have a capacity of 650 MB/side. The 2.6GB cartridge has a capacity of 1.3 GB/side.

**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/rdsk/B7600`

- 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 7600 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 power cable
- A warranty card

If any item is missing, please call your dealer or call Bering Customer Service at (408) 229-6400.

# 2

# 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:

| | |
|---|---|
| Date/Time: | Pacific time |
| HP-IB address: | 0 |
| Option: | normal |
| Emulation: | disabled |
| Default sector size: | 1024 |
| CS80 format: | enabled |
| Drive button: | disabled |

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 time and date should be displayed on the front panel LCD and the clock should be running.

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

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

▲ **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.*
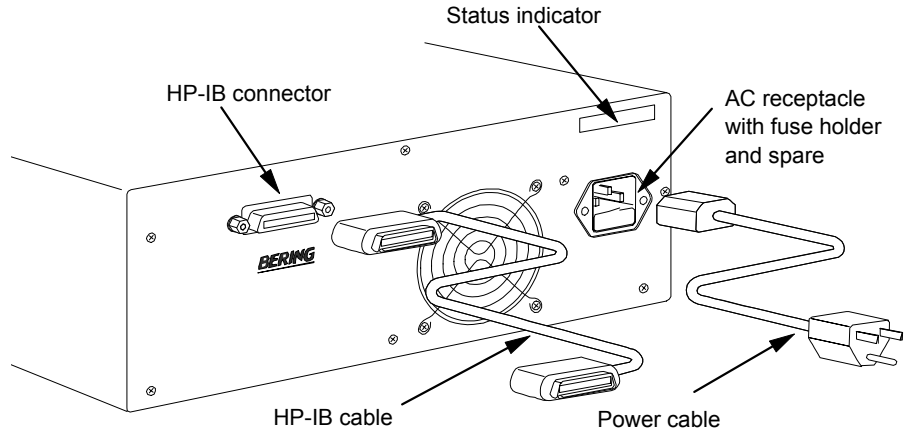


*Figure 2-1: Connecting the OptiPac to an HP-IB computer*

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 a grounded electrical outlet or a surge protector.

   Be sure that the outlets are grounded. 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

**7600 Controls**  Figure 3-1 illustrates all controls and indicators required for operating the OptiPac 7600.

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.
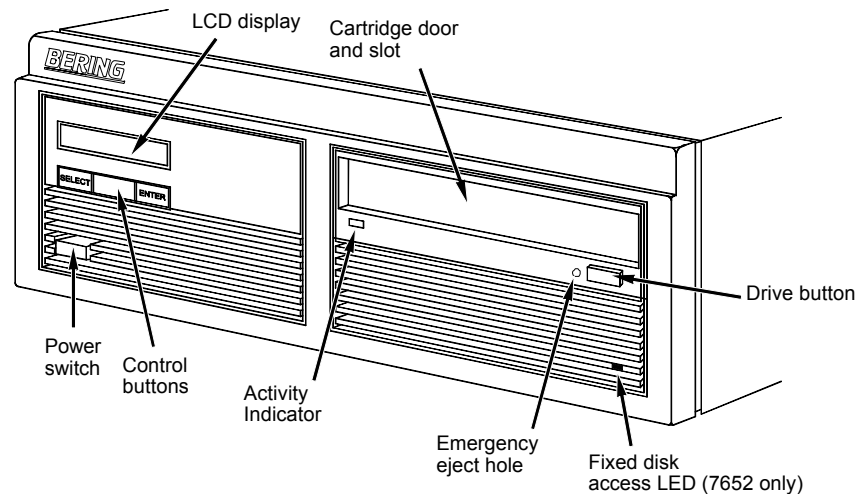


*Figure 3-1: OptiPac 7600 Series front panel*

**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.

**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 an 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 lower right side of the front panel of the model 7652. When ever the fixed disk in the 7652 is accessed the indicator will flash on and off.

**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.
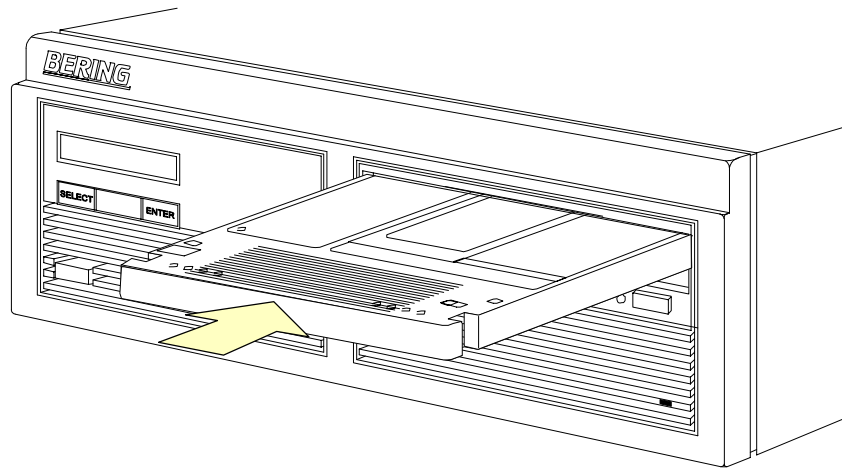


*Figure 3-2: Loading a cartridge in the 7600*

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. Most cartridges are preformatted at the factory and do not require formatting. The LCD will indicate when an unformatted cartridge has been inserted into the drive.

**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 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 screwdriver or large 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 cartridge drive.

3. Press inward 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.
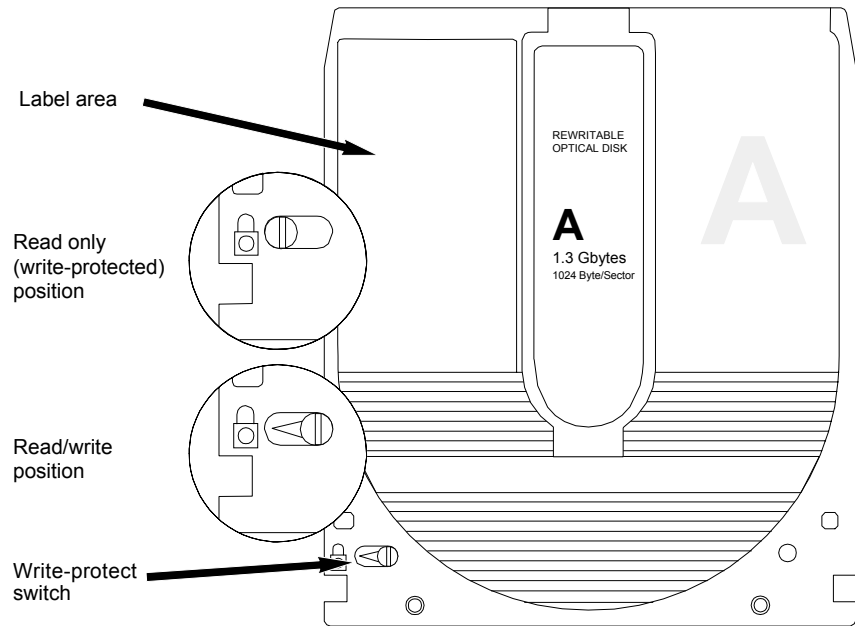


*Figure 3-3: Cartridge write-protect switch*

**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 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 procedures given in Chapter 5, "Configuring Your HP HP-IB System"
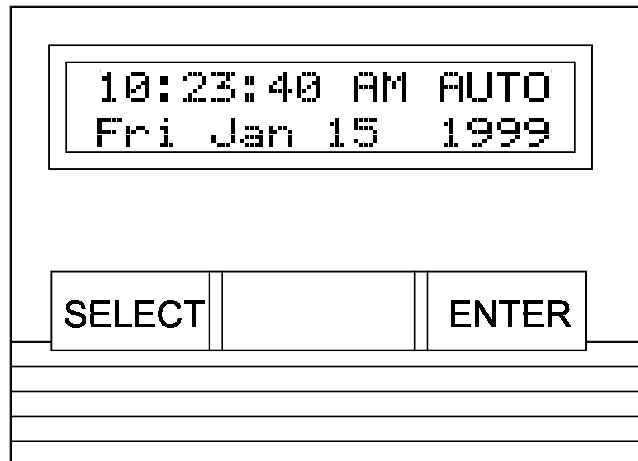


*Figure 4-1: Front panel LCD and push-button controls*

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 Overviews**

This section contains the menu structures of the commands which can be accessed from the front panel LCD display and controls for the OptiPac models.

**7605 Menu Tree**

The command structure for model 7605:

**Time / Date**
- **Unload cartridge (drive button disabled)**
- **Spin down / up disk**
- **Configurations**
  - **Change HPIB address**
  - **Change option**
  - **Change drive button**
  - **Change default sector size**
  - **Change CS80 format**
  - **Set time**
  - **Set date**
  - **Set auto spin up / down disk**
  - **Return to main**
- **Utilities**
  - **Bering model**
  - **ROM version / date**
  - **Removable disk utilities**
    - **Show cartridge information**
    - **Unload or Lock / unlock cartridge**
    - **Verify cartridge**
    - **Format cartridge**
    - **Erase cartridge**
    - **Previous menu**
  - **Tests**
    - **Show statistics**
    - **Test LCD display**
    - **Verify media**
    - **Enable firmware load**
    - **Previous menu**
  - **Return to main**
- **Display time and messages**

**7652 Menu Tree**          The command structure for model 7652:

**Time / Date**
- **Unload cartridge (drive button disabled)**
- **Local backup**
- **Local restore**
- **Spin down / up disk**
- **Configurations**
  - **Change HPIB address**
  - **Change option**
  - **Change drive button**
  - **Change default sector size**
  - **Change emulation**
  - **Change fixed disk volume protect**
  - **Change CS80 format**
  - **Set time**
  - **Set date**
  - **Set auto spin up / down disk**
  - **Return to main**
- **Utilities**
  - **Bering model**
  - **ROM version / date**
  - **Fixed disk utilities**
    - **Show disk information**
    - **Spin down / up disk**
    - **Verify disk**
    - **Format disk**
    - **Erase disk**
    - **Previous menu**
  - **Removable disk utilities**
    - **Show cartridge information**
    - **Unload or Lock / unlock cartridge**
    - **Verify cartridge**
    - **Format cartridge**
    - **Erase cartridge**
    - **Previous menu**
  - **Tests**
    - **Show statistics**
    - **Test LCD display**
    - **Verify media**
    - **Enable firmware load**
    - **Previous menu**
  - **Return to main**
- **Display time and messages**

**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 following options are available from the Main menu:

> Unload cartridge
> Spin down / up disk
> Configurations
> Utilities
> Display time and messages

**Unload Cartridge**  Use this function to unload the cartridge when the drive button is disabled (default setting).

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

    > Unload cartridge

2. Press the **ENTER** button.

    If the drive button is disabled in the Configurations menu, 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 spin down. This is required for some operating systems and also prevents an accidental unload 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 spin down the cartridge.

**Local Backup**  This function is available only on the Bering OptiPacs with fixed disks. Use it to back up the fixed disk in those units. The entire image of the fixed disk is copied onto as many cartridges as are required.

**Note:**  For tutorial purposes the following steps assume that you do not have a cartridge in the drive when you initiate the LOCAL BACKUP function.

1. Select Local Backup from the Main menu and press the **ENTER** button to choose this option.
   You will be asked:

    > Erase entire
    > media? No

2. If your fixed disk is formatted with multiple volumes (see the FORMAT DISK function), you will be asked:

   Backup volume
   all ?

   a. Press the **SELECT** button to scroll through the choices:
      all   =   entire disk
      0     =   volume 1
      1     =   volume 2
      etc.

   b. Press the **ENTER** button to continue when your choice is visible.

3. Press the **SELECT** button to choose Yes and press the **ENTER** button to continue.

   Load cartridge
   1 & continue? Yes

   a. If you change your mind and want to quit the BACKUP process, use the **SELECT** button to choose No and press the **ENTER** button. You'll see:

      User abort

   b. Press the **ENTER** button and you'll be returned to the Time and Date display in the Main menu.

4. Load a cartridge which is not write-protected into the drive, wait for it to spin up, and press the **ENTER** button to continue. You'll see:

   Loading
   CARTRIDGE

   If you inserted a blank, formatted cartridge, the backup will begin immediately. Otherwise, the message you see next will depend on your situation.

   If the cartridge is not formatted or has a different size than the fixed disk you will see:

   Format
   destination? No

   a. Use the **SELECT** button to choose Yes and press the **ENTER** button to continue. You will see:

      Formatting
      CARTRIDGE

   When the cartridge has been formatted the LOCAL BACKUP procedure will automatically begin the backup without your intervention.

5.  If the cartridge already contains a readable backup …
    You will see:

    > Overwrite backup
    > Thu Jan 7, 1999? No

    If that is the cartridge on which you want your backup …

    a.  Use the **SELECT** button to choose Yes and press the **ENTER** button
        to continue.

    You'll see the messages detailed in step 8 if you choose Yes.
    If you want to use a different cartridge …

    a.  Use the **SELECT** button to choose No, if need be, then press the
        **ENTER** button.
        You will see:

        > Unloading
        > CARTRIDGE

    then you'll be prompted to:

    > Remove
    > cartridge!

    b.  Remove the cartridge from the drive, and press the **ENTER** button.
        Now you'll be notified to:

        > Load cartridge
        > 1 & continue? Yes

    c.  Go back to step 4.

6.  If, after you back up onto a cartridge or two, you accidentally insert a
    cartridge which contains part of the current backup, you will be notified:

    > Part of current
    > cartridge set!

    In that case, you'll need to eject the cartridge and replace it with the
    proper one.

    a.  Press the **ENTER** button and you'll see:

        > Unloading
        > CARTRIDGE

    Then you'll be prompted:

    > Remove
    > cartridge!

    b.  Remove the cartridge from the drive and press the **ENTER** button.
        Now you'll be notified to:

> Load cartridge
> 1 and continue? Yes

   c.   Go back to step 4 to resume the backup.

7.  As the backup progresses, the record address of the fixed disk will be updated on the LCD:

> Backup disk …
> record *n*

When the cartridge is full you'll see:

> Remove
> cartridge *n*

8.  Press the drive button and remove the cartridge and label it carefully, including the date and cartridge number, then press the **ENTER** button to continue.
If another cartridge is required, you will be prompted to:

> Load cartridge
> 2 & continue? Yes

9.  Load the next cartridge, wait for it to spin up, and press the **ENTER** button to choose Yes and continue the backup.

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

> Abort received
> Wait …

   b.   Release the buttons.
The function will abort and you'll see:

> User abort

   c.   Press the **Enter** button to exit and return to the Main menu.

Continue in the loop until the backup is complete. You will be notified:

> Backup done at
> 10:30 pm

10. Press the **ENTER** button to exit the LOCAL BACKUP function and return to the Main menu.

**Local Restore**

Use this function to restore the fixed disk in the Bering OptiPac models with fixed disks. The entire image of the disk is restored from the cartridge(s) generated by the LOCAL BACKUP function.

You can restore the backup set in any order.

1.  Load one of the cartridges from the set containing the desired backup image.

2. With the LOCAL RESTORE function displayed, press the **ENTER** button to choose the **RESTORE** function.
   You will see one of the following messages:

   Restore to
   Wed Jan 20, 1999? No

   This message shows the date of the total fixed disk backup on the cartridge you inserted.

   Restore vol *n*
   Wed Jan 20, 1999? No

   This message shows the date of the fixed disk volume backup on the cartridge you inserted.

   If you choose No and press the **ENTER** button you will return to the Main menu.

3. Press the **SELECT** button to choose Yes and press the **ENTER** button to continue.

4. If the fixed disk is not formatted or has a different sector size than the backup image. You will see:

   Format
   destination? No

   a. Use the **SELECT** button to choose Yes and press the **ENTER** button to format the fixed disk.
      You'll be notified:

   Formatting
   DISK

   Formatting the fixed disk will take up to an hour.

   If you choose not to format the fixed disk by selecting No and pressing the **ENTER** button, you will instead see:

   User abort

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

5. If both formats match, the restoration process will begin.

   As a standard restoration progresses the record address of the fixed disk is updated with the following message:

   Restore disk …
   record *n*

   When the data from a cartridge has been restored to the fixed disk, you will see:

Remove
cartridge *n*!

6. Remove the cartridge and press the **ENTER** button to continue.
If another cartridge is required to continue or complete the restoration you will see:

Load cartridge
*n* to continue? Yes

If the restoration is complete you'll see:

Restore done at
10:30 pm

7. If the backup isn't complete, load the next cartridge with the backup set into the OptiPac, make sure that Yes is still selected, and press the **ENTER** button to continue the restoration.
If you want to stop the restoration, choose No and press the **ENTER** button. You'll see:

User abort

a. Press the **ENTER** button and you'll be returned to the Main menu.

8. If the cartridge you inserted in the OptiPac does not belong to the current backup set, you'll be advised:

Not part of
cartridge set!

a. Press the **ENTER** button to unload the cartridge.
b. Go back to step 6.

9. If the data on the cartridge is already restored you will see:

Data already
restored!

a. Press the **ENTER** button to unload the cartridge and go to step 6.

10. Press the **ENTER** button to complete and exit the LOCAL RESTORE process.

**Spin Down Disk**    This function will spin the drive(s) down. Using this function will help prevent wear on a drive which is constantly powered on. There is an Auto spin-down function available in the Configurations menu.

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

The drive(s) will then spin down.

**Spin Up Disk**    This function will spin the drive(s) up. If the drive is already spinning, this function will have no effect.

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

   The drive(s) will then spin up.

**Configurations**  This function sets the HP-IB address, emulation mode, changes the drive button function, default sector size, CS80 format, command mode, and sets the date and time. See the "Configurations Submenu" section for detailed information.

**Utilities**  This function shows cartridge/disk information; locks and unlocks, verifies, and formats the cartridge; 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 date, time, and system messages.

**Configurations Submenu**

This function sets the HP-IB address, changes the emulation, changes the drive button function, 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 option
   > Change drive button
   > Change default sector size
   > Change emulation (fixed disk only)
   > Change fixed disk volume protect (fixed disk only)
   > Change CS80 format
   > Set time
   > Set date
   > Set auto spin down / up time

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

3. 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 Option**

This function selects one of two special options:

**normal** — the drive will report the exact configuration of the cartridge to the host system. For example, configuration is a removable cartridge with 512 bytes/sector.

**fix[ed] disk** — the cartridge drive will report similar configuration information to the host system as in the **normal** mode, except as a fixed disk. This is for systems that can't handle a removable disk. For example, the HP9000 PASCAL and BASIC systems can't boot from a removable cartridge with an HFS directory. By setting the option to Fixed Disk the OS will see the drive as a fixed disk, rather than a removable disk.

1. Press the **ENTER** button to execute this function and you'll see:

   Set option to (normal / fix disk)

2. Press the **SELECT** button to step through the normal and fix disk functions, then press the **ENTER** button to select one.

**Change Drive Button**

This function enables or disables the Eject/Drive button on the cartridge drive(s). The default setting has the Drive button disabled, permitting cartridge removal only by using the Unload cartridge function. This allows the OptiPac to communicate with the host system to request permission for cartridge removal. Enabling this function allows ejection of the cartridge by pressing the eject button on the front of the drive.

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

   The following message will appear:

   disable / enable drive
   button

2. Press the **SELECT** button to toggle between disable and enable.

3. Press the **ENTER** button to select the desired function. The disable function is recommended.

**Change Default Sec[tor] Size**

This function sets the default sector size when the cartridge or fixed disk is formatted by the host computer.

1. With the Change default sec size function displayed, press the **ENTER** button to choose this function.

   You'll see this message:

   Set bytes/sector
   to same / 256 / 512 / 1024

2. Press the **SELECT** button to scroll through the selections:

   | | |
   |---|---|
   | same | =no change |
   | 256 | =256 bytes/sector |
   | 512 | =512 bytes/sector |
   | 1024 | =1024 bytes/sector |

   A sector size of 256 bytes/sector is required for some systems. HP-UX users may use 1024 bytes/sector. See appendix A, or Show Disk / Cartridge Information in the Utilities Submenu for capacities.

3. Press the **ENTER** button to choose the desired value.

**Change Emulation**

This function enables or disables HP disk emulation for the Bering fixed disk. When enabled, the Bering OptiPac fixed disk will emulate a HP fixed disk. The default setting is disabled.

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

    The following message will appear:

    > disable/enable HPxxxxx
    > emulation

2.  Press the **SELECT** button to toggle between disable, and enable.

3.  Press the **ENTER** button to choose the desired setting. The disable function is recommended.

**Change Fix[ed] Disk Volume Protect**

This function is only available on Bering OptiPac subsystems containing fixed disks. This function is used to toggle write-protection on or off for each individual volume on the fixed disk.

1.  With the Change fix[ed] disk volume protect function displayed, press the **ENTER** button to choose this function.

    You'll see the following message:

    > Write protect
    > volume *n*? No

2.  Choose Yes or No and press the **ENTER** button to protect or unprotect each volume on the fixed disk as you step through them one-by-one.

    When you've stepped through each volume on the fixed disk you'll return to the Configurations submenu.

**Change CS80 Format**

Use this function to disable the CS80 FORMAT command when you want to speed up the initialization process or to prevent accidental execution of the FORMAT utility.

**▲ CAUTION:**

*When the FORMAT command is enabled, the INITIALIZE utility or command may overwrite the existing directory with a new one causing the loss of all of your files.*

1.  With the Change CS80 format function displayed, Press the **ENTER** button to initiate this function.

    The following message will appear.

    > Disable/Enable CS80
    > format command

2.  Press the **SELECT** button to toggle between disable and enable.

3.  Press the **ENTER** button to select the desired function.

    We recommend the enable option.

**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 10, 1999

   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.

**Set Auto Spin Down / Up Time**

This function sets a time for the cartridge drive to spin down and then spin up automatically at preset times or intervals. Using this function will help increase the life of the drives. Any disk access activity on the HP-IB bus to the OptiPac from the computer system will cause the drive(s) to spin back up before the preset spin up time. The Auto spin down period should be at a time when no system disk activity will be performed.

The default setting is to spin down the drives after 30 minutes of idle time. The auto spin up portion is disabled by default, meaning the drive(s) will not spin up until you manually spin them up from the front panel controls or the OptiPac is accessed by the computer.

**▲ CAUTION:**    *The spin up time may take several seconds which may cause your computer system to time-out while attempting to access the OptiPac while it is not spinning.*

1.  With the Set auto spin down/up time function displayed, press the **ENTER** button to choose this function.

    The following message will appear:

    > Disable / Enable auto
    > spin down

2.  Press the **SELECT** button to toggle between disable and enable.

3.  Press the **ENTER** button to choose the desired setting.

    If you selected Enable auto spin down, you will see the following message:

    > Spin down base
    > on idle / exact time

4.  Press **SELECT** to toggle between idle and exact then press **ENTER**. Idle means after an amount of time with no activity on the drive; exact means at an exact time of day.

    If you selected idle time, you will see the following display:

    > Spin down after
    > idling 30 min

5.  Press **SELECT** to change the number from 30 to 120 min. You can make the number go down by holding **SELECT** and then pressing **ENTER**. Press **ENTER** when the desired interval is displayed.

If you selected exact time you will see the following display:

> Spin down at
> 10:00 AM

The actual time displayed may be different. The hour field will be blinking.

6. **SELECT** and **ENTER** the spin down hour.

7. **SELECT** and **ENTER** the spin down minute time.

8. **SELECT** and **ENTER** the spin down AM/PM setting.

You will now see the following message:

> Spin up at
> 10:00 AM

9. Follow the same procedure as the spin down time to set the spin up time.

After doing so, you'll be returned to the Disable/Enable auto spin down function.

When you return to the main menu time display, you will see the following:

> 10:23:40 AM AUTO
> Fri Jan 15, 1999

The "AUTO" displayed in the LCD indicates that auto spin up or auto spin down is enabled, or both are enabled.

The auto spin down and spin up will occur at the same time every day until you disable the both the auto spin down and auto spin up functions.

**Utilities Submenu**

This function shows cartridge information; locks and unlocks, verifies, and formats the cartridge; copies cartridge data; 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.
- **FIXED DISK UTILITIES** — Shows disk information, verifies, formats, and erases the disk. Refer to the "Fixed Disk Utilities Submenu" section for detailed information.
- **REMOVABLE DISK UTILITIES** — Shows cartridge information; locks and unlocks, verifies, and formats the cartridge. Refer to the "Removable Disk Utilities Submenu" section for detailed information.
- **TESTS** — Shows statistics, tests the LCD, and verifies 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
   > 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.

**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 the following about the fixed disk:

Number of volumes on disk (if more than 1)
Volume capacity in KB
Volume size in cylinders
Volume cylinder size in tracks
Volume track size in sectors
Volume size in sectors
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. There is an Auto spin-down function available in the Configurations menu.

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 or if you want to partition the disk into multiple volumes. After the disk is formatted into multiple partitions, you must use the HP-IB address, unit number (0) and the volume number (0 to 7) to access each of the partitions.

**▲ 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 bytes/sector
> to same

4. Press the **SELECT** button to scroll through the options (same, 256, 512, 1024), choose one, and press the **ENTER** button for the desired value.

We recommend that you choose 1024 bytes per sector. Refer to Chapter 5 to determine the supported sector size for your system. When you've made your choice, you'll see:

> Set interleave
> to 1

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

   The following message will appear:

   > Set volumes
   > to *n*

**Note:** You must use your system software to initialize each volume created with the LCD controls, even if only one volume was created.

6. Use the **SELECT** button to scroll through the choices for number of volumes (1-8) and press the **ENTER** button to choose the desired value.

   You'll see a display showing the number of volumes (vols) and the sector size (bps - bytes per sector):

   > 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.

7. 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

8. 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 DOD wipe delete. This wiping of data is done by first filling the sectors with the hexadecimal characters FF and 00 three times, then to write the hexadecimal character F6 once. 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 **ENTER** button to return to the Fixed disk utilities submenu.

**REMOVABLE DISK UTILITIES SUBMENU**

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

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 (if drive button disabled)
    > Lock/Unlock cartridge (if drive button enabled)
    > 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 the following about the cartridge:

Number of volumes on cartridge
Volume capacity in KB
Volume size in cylinders
Volume cylinder size in tracks
Volume track size in sectors
Volume size in sectors
Logical sector size
Physical sector size
Date cartridge last formatted*
Date cartridge last written*
Date cartridge last accessed*

\* Not displayed for unformatted cartridges or cartridges formatted to be HP-compatible.

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

**Unload Cartridge**

This function is available only if the Drive button is disabled in the Configurations menu. It is the same as Unload cartridge in the Main menu.

**Lock Cartridge / Unlock Cartridge**

This function is available only if the Drive button is enabled in the Configurations menu. It is used to lock the cartridge in the drive to prevent accidental ejection during cartridge use.

1.  With the Lock cartridge function displayed, press the **ENTER** button to lock the cartridge in the drive.

    The function will change to

> Unlock cartridge?

2. To unlock the cartridge, press the **ENTER** button when the Unlock cartridge function is displayed.

   The function will change to

   > Lock cartridge?

**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
   > 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**

This function is used to format the cartridge if the FORMAT utility is not available in your host system or if you want to partition the cartridge into multiple volumes. After a cartridge is formatted into multiple partitions, you must use the HP-IB address, unit number (0) and the volume number (0 to 7) to access each of the partitions.

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:

   > Set volumes
   > to n

**Note:** You must use your system software to initialize each volume created using the LCD controls, even if only one volume is created.

4. Press the **SELECT** button to scroll through the choices for number of volumes (1-8) and press the **ENTER** button for the desired value.

   The following message will appear showing the number of volumes (vols) and the sector size (bps bytes per sector):

   > 1 vol 1024 bps
   > continue? No

5. 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

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

**Erase Cartridge**

This function will erase the entire cartridge by performing a DOD wipe delete. This wiping of data is done by first filling the sectors with the hexadecimal characters FF and 00 three times, then to write the hexadecimal character F6 once. 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.

    The Erase function will make seven erase passes through the cartridge. This function may be aborted by pressing the **SELECT** and **ENTER** buttons at the same time until Abort received is displayed. 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 verifies 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:

     Show statistics
     Test LCD display
     Verify media
     Enable firmware load

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.

**Show Statistics**      This function displays a list of statistical information.

1.   Press the **ENTER** button and you'll see Cartridge statistics:

2.   Press the **ENTER** button to show each of the following counters:

     Blocks read
     Blocks written
     Read errors
     Write errors
     Seek errors
     Other errors

3.   Press the **ENTER** button after viewing Other errors and you'll see:

     Clear statistic
     counters? No

4.   Press the **SELECT** button to choose Yes and then press the **ENTER** button to exit.

     Since the statistic counters are stored on the cartridge, this information will not be available if that cartridge becomes unreadable, or is not formatted. Normally there are no errors. Any soft errors due to dust particles or electrical noise should be recoverable using error correction code.

**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 Service Department for replacement.

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

**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:

   The record address is updated on the display as the verification progresses. 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.

   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 at the appropriate time 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.

**Enable Firmware Load**

This function allows you to upgrade the firmware on the controller board from a cartridge. The new firmware version will be read from a cartridge and loaded into FLASH memory on the controller board. Full instructions for the upgrade will be included with the upgrade cartridge. Contact Bering Technical Support for more information on this feature.

# CONFIGURING YOUR HP SYSTEM

<div style="text-align: right; font-size: 2em;">5</div>

This chapter describes how to configure different HP-IB- based HP computer systems for the OptiPac drive. It is divided into the following sections: HP 9000 - Series 200-BASIC 3.0/4.0, Series 200/300-BASIC 5.0/6.0/6.2, Series 200/300-PASCAL 3.2, Series 300-HP-UX, Series 800-HP-UX, HP 1000.

Each section describes how to boot the operating system prepare the drive, install the operating system and application software on the cartridge, and how to boot from the OptiPac drive.

It is assumed that a built-in or external flexible disk drive is connected to the computer. Other combinations of disk drives and peripherals may require modifications of the procedures and settings.

If you have a OptiPac configured as HP-IB, the operation and configuration is identical to the models listed in Table 5-1.

**Unit Number**

Unit numbers are used for subsystems with multiple drives. The following table lists those unit numbers for the OptiPac drive with HP-IB enabled.

| Model | Drive | Unit # |
|-------|-------|--------|
| 7605 | Cartridge disk | 0 |
| 7652 | Fixed disk<br>Cartridge disk | 0<br>1 |

*Table 5-1: Drive Unit numbers*

**Note:**

If the cartridge was formatted from the front panel LCD controls, you must still perform an initialization from your system software.

## Series 200 - BASIC 3.0/4.0

The following is a list of hardware and software required or recommended to interface with the Bering OptiPac subsystem.

**SYSTEM REQUIREMENTS**

- The following binary programs are required:
    CS80
    HP-IB

- Disk Interface HP98625A and Dual Channel DMA HP98620B are recommended to utilize the 1 MB/sec transfer rate.
- If the Disk Interface is installed, the binary program, FHP-IB, is also required.

**CONFIGURATION**

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.

HP-IB address:       0-7
Default sector size:   1024

**MASS STORAGE UNIT SPECIFIER**

The Mass Storage Unit Specifier (MSUS) is what the computer uses to identify your disk drive. For example, the MSUS of the OptiPac might appear as follows:

`":CS80,700,1,0"`

**Note:**

The MSUS is composed of four parts, separated by commas:

Device type:               CS80

Device selector:            700

Unit number:1                (default 0)

Volume number:            0 (default 0)

The device type is optional with the BASIC 3.0/4.0 operating system. You may type your MSUS as "`:,700,1,4`", leaving out the device type.

The device selector is the address of your OptiPac. The first digit is the select code of your HP-IB interface. For the internal HP-IB, it is 7. The last two digits are the HP-IB address of the OptiPac as set by the front panel control buttons. The range of addresses is from 00 to 07.

See the table at the beginning of this chapter for the unit number.

**BOOTING YOUR SYSTEM**

The following procedure assumes that Boot ROM 3.0 or later is installed in your computer. Otherwise, boot your system with the floppy drive.

1. Verify that the HP-IB address of your OptiPac is set as desired and that the address is different from other disk drives. If you are booting from an external floppy drive, make the HP-IB address of the floppy drive different from the OptiPac.

2. Turn off your computer.

3. Turn on your disk drives and wait for the self-test to complete.

4. Insert the BASIC 3.0/4.0 system disk in the floppy disk drive.

5. Turn on your computer.

   Your computer will automatically load the operating system and prompt: BASIC READY.

6. Remove the BASIC system disk from the floppy drive.

7. Insert the BASIC 3.0/4.0 Drivers disk into the floppy disk drive.

8. If you are connecting the disk to the built-in HP-IB, type

   `LOAD BIN "HPIB"` and press `[RETURN]`.

9. If you are connecting the disk to the Disk Interface HP98625A, type

   `LOAD BIN "FHPIB"` and press `[RETURN]`.

10. When you see the prompt

    `BASIC HPIB 3.0 or BASIC FHPIB 4.0 `, type

    `LOAD BIN "CS80"` and press `[RETURN]`.

    Now the system is ready to use with BASIC 3.0/4.0.

**DISK INITIALIZATION**

The interleave factor affects the performance of your computer. An interleave of 1 is recommended for the best performance.

1. Initialize the disk, using a command similar to the following:

   `INITIALIZE ":,700,0",1`

   The first four characters represent the MSUS (700,0). The last character represents the interleave (1).

## Series 200/300 - BASIC 5.0/6.0/6.2

### SYSTEM REQUIREMENTS

The following is a list of hardware and software required or recommended for use with the Bering OptiPac subsystem.

- The following binary programs are required :

    CS80
     HP-IB

- Disk Interface HP98625A and Dual Channel DMA HP98620B are recommended for a 1 MB/sec data transfer rate.
- If the Disk Interface is installed, the FHP-IB binary program is required.

    If you want to run BASIC with HP-UX you will need to go through the following procedures before you load BASIC.

1. Type **su** and press **[RETURN]** to log in as a superuser.
2. Type **cd /** and press **[RETURN]** to change to the root directory.
3. Type **chmod 777 /** and press **[RETURN]** to write-enable the root directory.
4. Type **shutdown -h** and press **[RETURN]** to shutdown the system.
5. Wait for the prompt halted, then power down the system.

### CONFIGURATION

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.

> HP-IB address:      0-7
> Default sector size:   1024

### MASS STORAGE UNIT SPECIFIER

The computer uses the Mass Storage Unit Specifier (MSUS) to identify your disk drives. For example, the MSUS of an OptiPac might appear as follows:

`":CS80,700,0,0"`

**Note:** The MSUS is composed of four parts, separated by commas:

Device type: :CS80
Device selector: 700
Unit number:0 (default 0)
Volume number:0 (default 0)

The device type is optional with the BASIC operating system. You may type your MSUS as "**:,700,1,4**" leaving out the device type.

The device selector is the address of your OptiPac. The first digit is the select code of your HP-IB interface. For the internal HP-IB it is usually 7. The last two digits are the HP-IB address of the OptiPac set by the front panel control buttons. The range of addresses is from 00 to 07.

For the Disk Interface card, which is normally select code 14, the MSUS will be :CS80,1400,0.

Before you can install your new OptiPac drive, you will need to load your BASIC operating system into memory from the system disks. After loading BASIC, the operating system can be installed on your OptiPac.

**BOOTING YOUR SYSTEM**

If you will be sharing your disk with other operating systems such as HP-UX or PASCAL, you should usually install the other operating system before installing BASIC. Refer to "*Installing, Using, and Maintaining the BASIC System*" in your HP manual.

**LOADING BASIC**

The following procedure is to load BASIC into memory. For further information refer to the section in your BASIC manual.

**Note:**

You also need to follow this procedure if your system is ROM-based.

1. Verify that the HP-IB address of your OptiPac is set as desired and that the address is different from other disk drives (i.e., HP9121 micro-floppy drive).

2. Turn off the computer.

3. Turn on the disk drives and wait for the self-test to complete.

4. Insert the BASIC system disk (disk 1) into a floppy drive.

5. Turn on the computer and hold down the `[SPACE BAR]`.

   All the bootable operating systems will be listed in the upper right hand corner of the screen, e.g.

   ```
   :HP7605,700,0,0
   1B - SYSTEM_B40
   2B - SYSTEM_B50
   ```

6. Choose a system to load by typing the letters to the left of the system. For instance, type `2B` to load BASIC.

7. Follow the instructions on the screen.

   You will be instructed to load disk 2, BASIC Language Extension and Drivers.

8. BASIC is ready when the following message appears at the bottom of your monitor:

   ```
   The BASIC system is now loaded for your use.
   ```

**DISK INITIALIZATION**

Follow this procedure to format the OptiPac disk.

1. Insert the HFS Utilities disk into the default floppy drive.

2. Type `LOAD "DISC_UTIL"` and press `[RETURN]` to load the Utility.

   This may take a minute or so to complete.

3. Now run the program by pressing `[RETURN]`.

4. Next press the **[CONTINUE]** soft key to start.

   The screen will display a menu from which you can select a function by using the soft keys.

5. Use the **[NEXT]** and **[PREVIOUS]** soft keys to select the `Format a disk` function from your display and press the **[SELECT]** soft key.

   The display should now list a choice of drives from which to select the one to format.

   For example:

   ```
   =>          OptiPac Flexible :,700,0
               9122 Flexible :,701,0
   ```

6. Use the **[NEXT]** and **[PREVIOUS]** soft keys to select the OptiPac disk you want formatted and press the **[SELECT]** soft key.

   The screen will display the directory format choices:

   ```
   LIF directory format
   HFS directory format
   ```

7. Choose the directory format and press **[SELECT]**.

   If you are not sure which format you prefer, refer to your HP BASIC manual. In general, use the HFS format for hard disks.

   If the disk is already formatted, the following prompt will appear:

   ```
   Do you wish to proceed?
   ```

8. Type **yes** to continue.

   The format procedure will take from 20 minutes to 1 hour. When the format procedure is complete, `Done` will appear at the bottom of the screen.

**BOOTING FROM THE DISK**

After the cartridge is formatted, you'll need to install the system and binaries to boot directly from the OptiPac. The next procedure is necessary for booting directly from your OptiPac.

**Note:**

If you are already using HP-UX you need to be sure the root is write-enabled. Refer to the HP-UX manual for information about running BASIC and HP-UX together.

1. If the HFS utility is no longer in memory, insert the HFS Utilities disk into the floppy drive, type

   **`LOAD DISC_UTIL`**, press **`[RETURN]`**, and then press **`[RUN]`**.

   If it is already loaded into main memory, press the **`[Main Menu]`** soft key.

2. Insert disk 2, BASIC Language Extensions and Drivers, into the disk drive.

3. Select `Store the system and binaries from product discs` from the Main menu.

4. Select the OptiPac as the destination device and select the source drive from which you want to copy the system and binary files.

   The source will be the floppy drive which contains the BASIC Language Extensions and Drivers disk.

5. Press **`[CONTINUE]`** to start storing.

6. Now you should be able to boot from the OptiPac by turning off your computer and turning it back on again, or by executing one of the following commands:

   ```
   SYSBOOT [RETURN]
     or
   SYSBOOT SYSB50:,700 [RETURN]
   ```

   Be sure to press the **`[SPACE BAR]`** if you have multiple systems. You should see that the SYSB50 is in the file directory.

   For example:

   ```
   lost + found
   WORKSTATIONS
   SYSB50
   ```

## Series 200/300 - PASCAL 3.2

PASCAL 3.2 supports two different file formats: LIF and HFS. If HFS is desired, follow the procedures in this section. If LIF is desired, follow the procedures in the PASCAL manual.

### SYSTEM REQUIREMENTS

The following is a list of hardware and software required or recommended to interface with the Bering OptiPac subsystem.

- The CS80 driver is required. Make sure it is included in the INITLIB module.
- The HFS_DAM driver is needed to support HFS format. Make sure it is loaded into INITLIB.
- Disk Interface HP98625A and Dual Channel DMA HP98620B are recommended for a 1 MB/sec data transfer rate.
- If the Disk Interface is installed, the DISC_INTF driver is required in the INITLIB module.

### CONFIGURATION

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.

HP-IB address:  0-7
Default sector size:  1024

### BOOTING YOUR SYSTEM

1. Verify that the HP-IB address of your OptiPac is set as desired and that the address is different from other disk drives.

2. Turn off your computer.

3. Turn on your disk drive and wait for the self-test to complete.

4. Insert the Pascal BOOT: disk in the floppy disk drive.

5. Turn on your computer.

   Your computer will automatically load the operating system and prompt,

   ```
   PLEASE PUT SYSVOL IN UNIT #3 AND PRESS THE X KEY.
   ```

6. Remove the BOOT: disk, insert the SYSVOL: disk in the floppy drive, and type **X** to continue.

7. When the screen displays NEW SYSTEM DATE? type the date and press **[ENTER]**.

8. When the screen displays NEW SYSTEM CLOCK TIME? type the time and press **[ENTER]**.

   Now your screen will display the command line to indicate that it is ready for a command.

   ```
   Command: Compiler Editor Filer Initialize Librarian
   Run eXecute Version?
   ```

**INITLIB
CONFIGURATION**

To include the DISC_INTF and the HFS_DAM into INITLIB, the Librarian must be used.

1. Insert the ACCESS: disk into the floppy drive and type **L** to load the Librarian.

2. Make sure the BOOT: disk is online, type **I** to select the input file, and then type **BOOT:INITLIB**.

   Make sure the period (.) is typed.

3. Type **O** to select the output file, then type

   **BOOT:NEWLIB.**

   Now you should see the first module in the INITLIB listed:

   `M input Module: KERNEL`

4. Type **T** to copy the module listed and the next module will be shown, e.g., `SYSDEUS`.

5. Repeat step 4 to copy modules until `HP-IB` appears on the screen.

6. Type **I** to change the input file to `ACCESS:DISC_INTF`, then type **T** to transfer the DISC_INTF module.

7. Type **I** to return to the original INITLIB.

8. When you see `BOOT:INITLIB`, press the **[SPACE BAR]** to skip the modules that are already transferred until you see `HP-IB` at the input module line.

9. Continue typing **T** to transfer modules until you see `LIF_DAM`.

10. Remove the ACCESS: disk from the floppy drive and load the HFS: disk, type **I** to change the input file to HFS:HFS_DAM and then type **T** to transfer the HFS_DAM module to NEWLIB.

11. Type **I** and get the original INITLIB again (BOOT:INITLIB).

12. Press the **[SPACE BAR]** to skip the modules until `LIF_DAM` is shown, then continue typing **T** to copy the rest of the modules.

13. Type **K** to keep the new NEWLIB, then type **Q** to exit.

14. Now type **F** to enter the FILER and change the file names.

15. Type **C** to change a file name.

16. When `Change what file?` appears, type **BOOT:INITLIB**.

17. When `Change to what?` appears, type **OLDLIB**.

18. Then repeat the Change command to change `BOOT:NEWLIB.` to **INITLIB.**

    Type the period (.) too.

19. Reboot the system to use the new INITLIB.

**LOGICAL UNITS**

During the boot process, the TABLE utility in the operating system finds all of the available disk drives and assigns one or more logical unit numbers to each unit. Since the OptiPac disk is larger than 10MB, it will partition the disk into multiple volumes of 1MB each and assign a unit number to each volume starting with #11. Only one unit will be configured after the disk is initialized with the HFS directory format.

**DISK INITIALIZATION**

Use the following steps to initialize the OptiPac disk.

1. Insert the HFS: disk into the floppy disk drive and type **X** for execute.

2. When the screen displays `Execute What File?` type **HFS:MKHFS** and press **[ENTER]**.

   The screen will display `Volume ID?`

3. To initialize the cartridge, type **#11**.

   The screen will display:

   ```
   WARNING: the initialization will also destroy:
    #12 <no dir>
    #13 <no dir>
    …
   ```

   This indicates the number of logical units assigned to the disk drive.

4. Remove the HFS: disk from the floppy drive.

5. When the screen displays `Change or examine default parameter? (Y/N)`, type **N**.

6. When the screen displays `Are you SURE you want to overwrite the disk (Y/N)`, type **Y**.

7. If the screen displays `Interleave factor? (default to 1)`, type **1** and press **[ENTER]**.

8. Reboot PASCAL so that the new HFS volume is configured into the system correctly and use the FILER Vols command to list the volumes.

   It should list `hfs11:`.

**BOOTING FROM THE DISK**

After the OptiPac is initialized, you can copy all system files onto it.

Use the following steps to copy all of the files on any floppy disk.

1. Insert the ACCESS: disk into the floppy disk drive.

2. When the command line, `Command: Compiler Editor Filer ...` appears, type **F** for FILER.

3. When the FILER line, `Filer:Change Get ...` , appears remove the ACCESS: disk and insert the BOOT: disk in the floppy disk drive.

4. Make a new directory on the OptiPac disk by typing **M**.

5. When `Make file or directory (F/D)?` appears on the screen, type **D**.

6. When `Make what directory ?` appears, type **hfs11:WORKSTATIONS** and type **Y** in response to the warning.

7. Repeat steps 4 through 6 to make another directory, but type **hfs11:WORKSTATIONS/SYSTEM** in response to the request for a directory name.

8. When the directories have been created, type **F** for FILECOPY.

9. When the screen asks `Filecopy what file?` type **#3:=** and press **[ENTER]**.

   This tells the FILECOPY utility to copy all files from the floppy disk.

10. When the screen queries `Filecopy to what?` type **hfs11:WORKSTATIONS/SYSTEM/$** and press **[ENTER]**.

    This tells the FILECOPY utility to copy all of the files to the volume 11 SYSTEM directory using the same file names. When the copying is complete, the FILER line, Filer: Change Get ... again appears on the screen.

11. Use the FILECOPY command again to copy the system file from `#3:SYSTEM_P` to **hfs11:SYSTEM_P** .

12. Load the HFS: disk into the floppy drive and type **Q** to exit the FILER, and then type **X** to execute the OSINSTALL utility.

13. When the `OSINSTALL: Check Install...` command line appears, type **I** to install.

14. When `Volume: file to install...` appears, type the name of the system file: **hfs11:SYSTEM_P** .

15. Type **Q** to quit.

    The command line again appears on the screen. Now you should be able to boot from the OptiPac by pressing **[RESET]**, or turning your computer off and back on.

## Series 300 - HP-UX

**SYSTEM REQUIREMENTS**

The Bering OptiPac is supported by HP-UX version 5.0 or later. The following is a list of hardware and software required or recommended for use with the Bering OptiPac drive.

- HP 98620B dual channel DMA card for a 1MB/sec data transfer rate.
- HP 98625A Disk Interface, high speed HP-IB.

**CONFIGURATION**

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.

HP-IB address:       0-7
Default sector size:   1024

**INSTALLING HP-UX**

The following is a summary of the procedure to install HP-UX on your OptiPac. For details, refer to the HP-UX manual.

1. Turn on the source and destination drives.

   The source device is either a floppy disk drive or a cartridge tape drive. The destination device is the OptiPac.

2. Write-enable the media containing the HP-UX software and insert it into the drive.

3. Turn on the computer and system console to boot HP-UX.

4. When prompted, type **Y** to choose the main installation interface.

   The HP-UX INSTALLATION UTILITY - MAIN MENU will appear on the screen showing the source and destination devices.

5. If the destination device doesn't indicate the address of the OptiPac, press the **[NEXT]** or **[PREVIOUS]** key to select the Change DESTINATION device function and press **[SELECT]**. Then type the correct address of the OptiPac as prompted.

**Note:** The major number of the OptiPac disk is 0.

6. Select CONTINUE installation process to proceed.

7. Select the correct swap sizes.

8. When the Install menu appears on the screen, select the BEGIN installation function.

9. When you see Do you want to mediainit your disk?, type **Y** to format your OptiPac.

   Although the disk may be pre-formatted, it is a good idea to re-format the disk to detect any media defects encountered during shipping.

**Note:** The formatting will take from 20 minutes to 1 hour.

10. Finally, follow the instructions on the screen to load file sets or partitions onto the OptiPac.

**ADDING THE OPTIPAC TO YOUR HP-UX SYSTEM**

The following procedure describes how to add the OptiPac to your existing HP-UX system. This assumes that the OptiPac is an add-on storage device on a system with HP-UX already loaded and that there is another hard disk.

**DEVICE FILES**

The first step for installing your OptiPac drive is to create two device files: a block special file and a character special file. To do this, use the MKNOD command with the following items:

- File name: In a directory, a character device starts with r, whereas a block device does not. For example:

  /dev/dsk/OptiPac(block)
  /dev/rdsk/OptiPac(character)

- Major numbers: for the OptiPac, the major number will be 0 for block devices and 4 for the character device files.

- Minor numbers: the address-dependent minor number is the same for both block and character entries. Each minor number consists of a select code (set on the interface card), an HP-IB address (set on OptiPac), a unit number, and a volume number (set at 0). For example:

```
mknod /dev/dsk/megapac b 0 0x0e0100
                                  └── unit 0
                                  └── HP-IB address 1
                                  └── select code 14
                                  └── major number
                                  └── block device
```

```
mknod /dev/rdsk/megapac c 4 0x0e0100
                                  └── major number
                                  └── character device
```

**INITIALIZING YOUR OPTIPAC**

The following initialization procedure prepares your OptiPac for use by setting up a directory, checking the media for defects, and assigning an interleave factor.

1. Be sure you have created a character device file for your OptiPac.

2. Begin the initialization process by typing the MEDIAINIT command using the character special device files, similar to the following:

```
mediainit /dev/rdsk/optipac
```

Now you are ready to create a file system on the disk.

**LIF VOLUME**

If you plan to use your OptiPac to transfer files between other operating systems such as BASIC or PASCAL, you need to create a LIF volume using the LIFINIT command, as follows:

```
lifinit /dev/rdsk/optipac0
```

**CREATING A NEW FILE SYSTEM**

Use the following command to create a new file system for each drive of the OptiPac.

```
/etc/mkfs -L device_file size nsect ntrack 8192 1024
16 10 60 2048
```

where:  *device_file* = character device file
*size* = volume size in sectors
*nsect* = volume track size in sectors
*ntrack* = volume cylinder size in tracks

You can find the values in the Show Disk Information menu or listed as logical values in the specifications section of this manual.

**▲ CAUTION:**

*If you use the values listed in the Specifications appendix, you should confirm the values by doing the Show Disk Information option, and comparing the logical values. If they are different, use the values obtained from the front panel LCD. Make sure the logical sector size is 1024.*

**CREATING A NEW
FILE SYSTEM USING
NEWFS**

NEWFS may be used to create a new file system.

1. To use NEWFS, you must edit the disk information file,
   /etc/disktab , to include an entry for the OptiPac, as follows:

```
optipac :\
:n MB swap:ns#nsect:nt#ntrack:nc#ncyl:\
:s0#size:b0#blksize:f0#fragsize:\
:se#1024:rm#3600:
```

where:  $n$       = the size of the swap area
                      in multiples of 2 MB
        $nsect$   = sectors per track (see show disk
                      information for logical sectors/track)
        $ntrack$  = tracks per cylinder (see show disk
                      information for logical cylinder size )
        $ncyl$    = cylinders per drive (see show disk
                      information for logical cylinders)
        $size$    = nsect times ntrack times ncyl

2. Then create the file system by typing
   **newfs device_file disk_type**

You must be in super-user root.

where:  *device_file*  = character device file for the OptiPac
        *disk_type*    = name for the OptiPac created in
                          the etc/disktab

For example:

**/etc/newfs /dev/rdsk/optipac optipac**

## Series 800 HP-UX 7.0

The Bering OptiPac is supported by HP-UX version 7.0. The following is a list of hardware and software required for use with the Bering OptiPac drive.

**SYSTEM REQUIREMENTS**

- HP-IB interface configured for high-speed mode.

**CONFIGURATION**

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.)

> HP-IB address:      0-7
> Default sector size:   1024

**Note:**

If you are installing the HP-UX system on the OptiPac disk, you mest set the emulation to enabled. Refer to  "Change Emulation" in Chapter 4.

**ADDING THE OPTIPAC TO YOUR HP-UX SYSTEM**

The following procedure describes how to add the OptiPac to your existing HP-UX system. This assumes that the OptiPac is an add-on storage device on a system with HP-UX already loaded.

**KERNEL CONFIGURATION**

The HP-UX kernel may have to be modified to add a disk to your system. The procedure for modifying HP-UX is summarized below. The use of the HP-UX System Administration Manager (SAM) can be used for this procedure.

1. Check and, if necessary, modify the file etc/conf/gen/S800 so that it contains the desired I/O configuration for the OptiPac.

   Sometimes the kernel will already be configured for additional disk drives. In that case no kernel configuration is needed. For example, the following I/O configuration may be in the S800 file.

```
hpib0          address 0  {
               disc0 lu 0 address 0;
               disc0 lu 1 address 1;
               disc0 lu 2 address 2;
               disc0 lu 3 address 3;
}
```

   Where lu 0 can be your system disk. Then you can pick lu 1 for your OptiPac and no configuration is required.

2. Run the **UXGEN** utility to regen the HP-UX kernel from the new S800 file.

3. Reboot the system.

**USING SAM TO ADD THE OPTIPAC**

1. Invoke the System Administration Manager by typing

   `/usr/bin/sam`

   You will see the SAM main menu.

2. Choose the `Peripheral Devices` option.

   You will see the Peripheral Devices menu.

3. Choose the `Add a Hard Disk Drive` option under the Disks section.

   You will see the menu for Add a Hard Disk Drive. Check and modify the entries as follows:

   Disk drive model:HP7963B
   Card slot:   check with on-line help
   Interface type:HP-IB
   Address:    HP-IB address
   Midbus address:check with on-line help

4. Choose the field
   `Create a new file system? (y or n)`

   and type **Y**.

   You will see the following options in a message box

   ```
   Initialize media? (y or n) n
   Number of sections (1-7) 1
   Long file names (y or n) y
   ```

5. Modify the fields and press the `[DONE]` soft key to continue.

   Type **Y** to answer the Initialize media? question.

   Now you should see a table with entries for each section.

6. Type the directory name for each section, select the usage (`hfs, swap, or ignore`), and select the mount and protection options.

7. Press the `[PERFORM TASK]` soft key to continue.

   SAM then performs the necessary tasks to automatically configure the OptiPac into your system as a HP disk.

**ADDING THE OPTIPAC TO THE HP-UX SYSTEM MANUALLY**

Use the following procedures to add the OptiPac to your existing HP-UX system. These steps assume the OptiPac is being added to an HP-UX system already loaded on another drive. You should also follow the Kernel Configuration section to ensure that a LU number is configured in the /etc/conf/gen/S800 file.

**DEVICE FILE**

Use /etc/mknod to create two device files: a block and a character special file. See the HP-UX System Administration TASK Manual and Configuring HP-UX for Peripherals for more detailed instructions.

For the cartridge disk:

```
/etc/mknod /dev/dsk/optipac b 0 0x00nn02
/etc/mknod /dev/rdsk/optipac c 4 0x00nn02
```

nn = LU number in /etc/conf/gen/S800

**INITIALIZING THE OPTIPAC**

Create a special file with the Transparent Mode option and use the MEDIAINIT command to format the media.

For the cartridge disk in the OptiPac:

```
/etc/mknod /dev/rdsk/optipac c 4 0x80nn02
```

Then use one of the following commands to format the disk:

```
mediainit /dev/rdsk/optipac
or
mediainit /dev/rdsk/optipac_F c
```

nn = LU number

**CREATING A NEW FILE SYSTEM**

Use the following command to create a new file system for the cartridge disk in the OptiPac.

```
/etc/mkfs -l device_file size nsect ntrack 8192 1024
16 10 60 2048
```

Where: *device_file* = character device file
*size* = volume size in sectors
*nsect* = volume track size in sectors
*ntrack* = volume cylinder size in tracks

These values can be found in Appendix A, "Specifications"of this manual.

▲ **CAUTION:**  *If you use the values listed in the Specifications appendix, you should confirm the values by doing the Show Disk Information option, and comparing the logical values. If they are different, use the values obtained from the front panel LCD. Make sure the logical sector size is 1024.*

| | |
|---|---|
| **Series 800 HP-UX 8.0/9.0** | The Bering OptiPac is supported by HP-UX version 8.0/9.0. The following is a list of hardware and software required for use with the Bering OptiPac drive. |

**SYSTEM REQUIREMENTS**

- HP-IB interface configured for high-speed mode.
- Device driver disc1.

**CONFIGURATION**

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.

> HP-IB address:        0-7
> Default sector size:   1024

**Note:** If you are installing the HP-UX system on the Bering cartridge disk, you mest set the emulation to enabled. Refer to "Change Emulation" in Chapter 4.

**ADDING THE OPTIPAC TO YOUR HP-UX SYSTEM**

The following procedure describes how to add the OptiPac to your existing HP-UX system. This assumes that the OptiPac is an add-on storage device on a system with HP-UX already loaded.

**KERNEL CONFIGURATION**

Use SAM, the System Administration Manager tool, available in release 8.0 to configure the appropriate driver into the kernel. The drive must be connected and powered on.

1. Type **SAM** to run the program.

2. Select Kernel Configuration from the main menu.

3. In the Kernel Configuration menu, select View/Modify I/O Configuration.

4. In the View/Modify I/O Configuration menu select Disk Drivers...

   You will see a menu similar to the following:

   ```
           Disk Drivers

   Select the disk drivers to add or remove from the
   configuration and press "Perform Task".

           Driver                    In Configuration?
                                        (y or n)
    HP-FL Fiberlink (disc2) . . . . . . . . . n
    HP-IB disk driver (disc1) . . . . . . . y
    SCSI (disc3)  . . . . . . . . . . . . . n
    SCSI CD-ROM autochanger (autox0). . . . n
   ```

5. If the HP-IB driver (disc1) indicates n, change it to **y**. Otherwise, exit from this menu.

6. As you exit from SAM, you will be instructed to regenerate the kernel to preserve the changes you have made (only if you actually made changes). You should at this point regenerate the kernel.

**CREATING DEVICE SPECIAL FILES**

You should now check the device files for your system. Do this by using the ioscan -f command to get more detailed information about your hardware. This command will display binding information, the LU number associated with each of your devices, the hardware status and driver status for each device.

1. Type **ioscan -f** at the system prompt.

   You will see a display similar to the following:

   ```
   Class        LU   H/W Path   Driver
   ==============================================
   Tape_drive   1    4.0.3      cio_ca0.hpib0.tape1
   disk         4    4.0.1      cio_ca0.hpib0.disc1
   ```

   In addition the H/W and S/W status will be listed.

**Note:**   The LU listed in the table is the reference for each device. The disk line shows a drive attached to the HP-IB interface with a HP-IB address set to one. (the last digit in the H/W path: 4.0.1).

2. Set the HP-IB address of the OptiPac to a number which is not on the list of disk drives, ( i.e., 3).

3. Connect the OptiPac. to the system if it is not already connected and power it on.

4. Run **ioscan -f** again.

   The list of devices should now show the OptiPac with the HP-IB address you assigned to it.

5. Create the device special files for the OptiPac by typing the two following commands:

   ```
   cd /dev
   insf
   ```

6. Run **ioscan -f** again to determine the LU number assigned to the OptiPac.

   The LU number is the number you should use to access the OptiPac

**INITIALIZING THE OPTIPAC**

Use the MEDIAINIT command to format the media.

Use the following command to format the disk:

**mediainit /dev/diag/dsk/c*nn*d0**

***nn*** = LU number

**CREATING A NEW
FILE SYSTEM**

Use the following command to create a new file system for the  disk in the OptiPac.

```
/etc/mkfs -l device_file size nsect ntrack 8192 1024
16 10 60 2048
```

Where:  *device_file* =  character device file (/dev/rdsk/cnnd0s2)
          *size* =  volume size in sectors
          *nsect* =  volume track size in sectors
          *ntrack* =  volume cylinder size in tracks

These values can be found in Appendix A, "Specifications," of this manual.

**▲ CAUTION:**

*If you use the values listed in the Specifications appendix, you should confirm the values by doing the Show Disk Information option, and comparing the logical values. If they are different, use the values obtained from the front panel LCD. Make sure the logical sector size is 1024.*

## HP 1000 A

**CONFIGURATION**

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.

HP-IB address: 0-7
Default sector size: 256

**SYSTEM REQUIREMENTS**

Device Driver: DD.33
Interface Card: HP-IB Interface Card
Interface Driver: ID.37

**SYSTEM RELOCATION PHASE**

The following modules of code must be relocated during this phase:
%DD.33 (Disk device driver)
%ID.37 (HP-IB interface driver)

**TABLE GENERATION PHASE**

The Interface Table (IFT) for drive ID.37 must be constructed in this phase. Use the following command:

```
IFT,%ID.37,SC:sc
```

where:sc = the octal select code of the interface card

A Device Table (DVT) must be constructed for each logical unit (LU) on the disk in this phase. Use the following command:

```
DVT,dir/%DD*33,M7935:0,LU:lu,TO:1000,-
DP:1: address :0-
DP:3: sb2 :sb1 :sb0,
DP:6: tracks :bpt:0
```

where: *dir* = directory containing RTE-A relocatables
*lu* = logical unit
*address* = HP-IB address of the OptiPac
*sb2,sb1,sb0* = 3-word starting block address of that lu
*tracks* = number of RTE tracks in that lu
*bpt* = number of blocks in each RTE track (48)

The total number of available blocks for the drive can be calculated as follows:

blocks = $\dfrac{\textit{Logical cylinders * Logical cylinder size * Track size * Sector size}}{256}$

where Logical cylinders, Logical cylinder size, Track size, and Sector size can be found from the Show Disk Information on the front panel LCD display. Make sure the *Track size* entry corresponds to the *Sector size* of your drive.

Now you can calculate the total number of available RTE tracks:

Total RTE tracks = *Blocks / bpt*

where bpt can be the same as the Track size, the RTE default of 48, or

any desire value. Now you can divide the disk with Total RTE tracks into multiple Lu's. Each Lu may have a different number of tracks. For the first Lu, the values for sb2, sb1, and sb0 are 0. For the subsequent LU's, these values can be calculated as follows:

Tracks used = *tracks in Lu0 + tracks in Lu1 …*
Offset = *Tracks used * bpt*
sb2 = *Offset / (65536*65536)*
sb1 = *(Offset - sb2 * 65536*65536) / 65536*
sb0 = *(Offset - sb2 * 65536 * 65536 - sb1 * 65536)*

**LIST ENTRIES**

All devices with multiple LUs using the same controller must have their LU numbers placed into a node list. Use the following command:

```
NODE,    lu of subdivision 0, -
         lu of subdivision 1, -
         lu of subdivision 2, -
         lu of subdivision 3, -…
```

**MEMORY ALLOCATION PHASE DISK LIST ALLOCATION**

The maximum number of disks to be mounted on the system at one time must be described at this time. Add the total number of DVTs constructed for each disk to the number passed to the generator.

**FORMATTING THE OPTIPAC**

Before the OptiPac disk is put on line, it is a good idea to go through the format procedure. This will allow any defective tracks to be spared. Use the FORMC utility supplied by HP and enter a command similar to the following.

```
RU,FORMC,,FO,disk lu, 1
```

where:  *FO*         =   the format option
        *disk lu*    =   the logical unit of the cartridge
        *1*          =   interleave factor

Follow the instructions in the software installation manual to load the program. Detailed instructions for FORMC can be found in the *Hewlett-Packard RTE-A Utilities Manual*.

## HP 1000 M/E/F

**CONFIGURATION**

Use the OptiPac controls to set the configuration options according to the following settings. Refer to Chapter 4 for detailed instructions.

HP-IB address:      0-7
Default sector size:    256

**SYSTEM REQUIREMENTS**

Device Driver:      DVM33
Interface Card:      12821A HP-IB Interface Card

Disks managed by DVM33 (CS80 disks) and disks managed by DVA32 (ICD disks) cannot be on the same 12821A HP-IB card.

If an additional 12821A is used, the DVN33 and $TN33 should be used for the CS80 disks or the DVP32 and $TC32 should be used for the ICD disks.

**SUBCHANNEL CONFIGURATION**

OptiPac disk subsystems are compatible with HP Command Set 80 (CS80) disk drives. Therefore, in general the system generation instructions for the CS80 disk can be applied to OptiPac disk drives. Use the following assignments.

```
available blocks = available tracks * bpt
```

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.
- 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 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.

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) 229-6400.

**Fuse Replacement**

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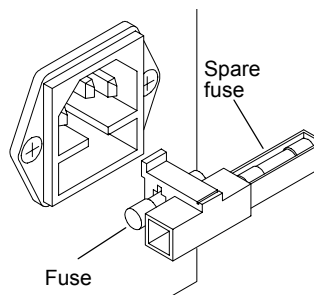


*Figure 7-1: Replacing the AC fuse*

## 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.

**WHEN ALL ELSE FAILS...**

If you still have problems after following the procedures in this chapter, call Bering Technical Support at (408) 229-6400. 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.
- Any recent changes to your system, such as new software installed, software upgrades, new hardware, even a new brands of cartridge.

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

Bering Technology, Inc.
Customer Service/Technical Support
2827 Aiello Drive
San Jose, CA 95111

(408) 229-6400
Fax: (408) 229-6401
EMail: help@bering.com

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

# A

## SPECIFICATIONS

### 5.2 GB Cartridge Drive

**5.2 GB MO Cartridge**

The specifications listed in the table are for a single side of a 5.2 GB 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 2.6 GB cartridge specifications.

| | | | | |
|---|---|---|---|---|
| Formatted capacity | 2,399.0 | 2,399.0 | 2,399.0 | MB |
| Logical sector size | 256 | 512 | 1,024 | bytes |
| Logical track size | 136 | 68 | 34 | sectors |
| Logical heads | 36 | 36 | 36 | tracks (heads) |
| Logical cylinders | 1,914 | 1,914 | 1,194 | cylinders |
| Logical drive size | 9,370,944 | 4,685,472 | 2,342,736 | sectors |

**PERFORMANCE**

| | | |
|---|---|---|
| Rotation speed | 3,600 | rpm |
| Average latency | 9.1 | ms |
| Access time | 25 | ms |
| Maximum seek time | 45 | ms |
| 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 | 0.5 | G rms |
| Shock | 30 | G, 3 ms half sine |
| Altitude | -305 to 4,572 | meters |
| | -1,000 to 15,000 | feet |

**(non-operating)**

| | | |
|---|---|---|
| Temperature | -30° to 60° | C |
| | -22° to 140° | F |
| Relative Humidity | 5 to 90 | % non-condensing |
| Vibration | 3 | G rms random |
| | 1 | G 0-peak |
| Shock | 89 | G, 3 ms half sine no damage |
| Altitude | -305 to 12,192 | meters |
| | -1,000 to 40,000 | feet |

**LASER DIODE**

| Type | Semiconductor Laser |
| --- | --- |
| Wavelength | 685nm, Continuous |
| Output power | 30mW (max) |
| Classification | Class 1 (IEC. 825) GaAllnP |

**2.6 GB MO Cartridge**

The specifications listed in the table are for a single side of a 2.6 GB 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.

| Formatted capacity | 1,302.2 | 1,302.2 | 1,302.2 | MB |
| --- | --- | --- | --- | --- |
| Logical sector size | 256 | 512 | 1,024 | bytes |
| Logical track size | 68 | 34 | 34 | sectors |
| Logical heads | 72 | 72 | 36 | tracks (heads) |
| Logical cylinders | 1,039 | 1,039 | 1,039 | cylinders |
| Logical drive size | 5,086,944 | 2,543,472 | 1,271,736 | sectors |

## 2.6 GB Fixed Disk

| Formatted capacity | 2,604.52 | 2,604.52 | 2,604.52 | MB |
|---|---|---|---|---|
| Logical sector size | 256 | 512 | 1,024 | bytes |
| Logical track size | 136 | 68 | 68 | sectors |
| Logical heads | 72 | 72 | 36 | tracks (heads) |
| Logical cylinders | 1,039 | 1,039 | 1,039 | cylinders |
| Logical drive size | 10,173,888 | 5,086,944 | 2,543,472 | sectors |

**PERFORMANCE**

| | | |
|---|---|---|
| Rotation speed | 5400 | 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° | C |
| | -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, CS80 command set |
| | Dimension | 5"x 12.8"x 11" |
| | | 12.7 x 32.5 x 27.9 cm |
| | Shipping weight | 30 lbs. |
| | | 13.6 Kg |

| | | |
|---|---|---|
| **Accessories** | Cartridge, MO, 5.2 GB, 1024bps | ACCS-3067 |
| | Cartridge, MO, 2.6 GB, 1024bps | ACCS-3065 |
| | HP-IB Cable 1.0m (3.3 ft.) | ACCS-7110 |
| | HP-IB Cable 2.0m (6.7 ft.) | ACCS-7115 |
| | Rack Mount Kit - 19" EIA | ACCS-7204 |

# 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.

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 (4) 8-32x¼ screws inserted from the bottom through the shelf into the bottom of the drive.

8-32x¼, 4 places
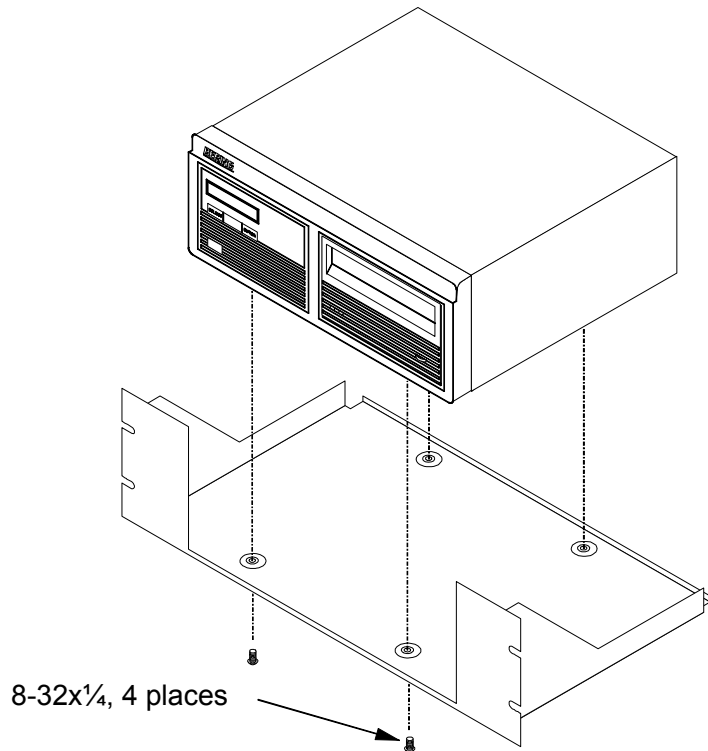
*Figure B-1: Hatching the unit to the rack mount*

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.

3. Insert the shelf with the Bering drive into the cabinet and hold it in place.

4. Insert the four (4) 10-32x5/16 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.



10-32x5/16, 4 places
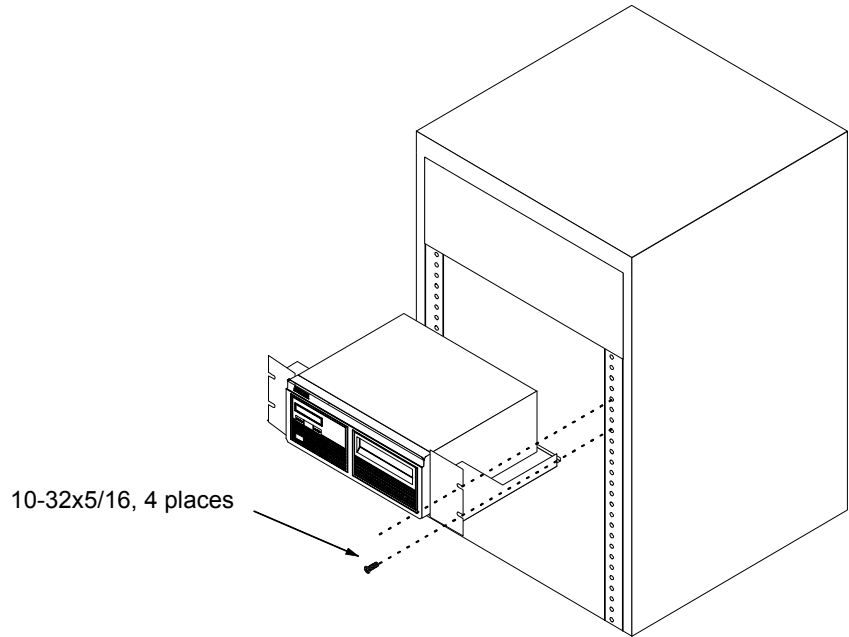
*Figure B-2: Installing the rack mount in a chassis*

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