MultiPac 8500
User's Manual

Manual No. 11-18501-01
Revision A

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Important Notice

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 Class A Information

This peripheral device generates and uses radio frequency energy, and if it is not installed and used properly, that is, in 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 in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. Operation of this equipment in a residential area may cause interference and is up to you, at your 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 MultiPac off and on while the receivers are on to see whether interference stops when the drive is off. If the drive 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 MultiPac, 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 Office, Washington, D.C., 20402.

Printing History

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 MultiPac 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 MultiPac by using the front panel LCD controls. See chapter 4 for details.

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.

If you have upgraded your MultiPac 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 *MultiPac 8500 User's Manual* required for your MultiPac subsystem.

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

Date	Rev	ROM Ver	Changes to manual
May 1999	A	B.A	First printing

Warranty Statement

Bering 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.

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

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

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*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 MultiPac cartridge 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

1

INTRODUCTION

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

Bering MultiPac series drives are compatible with HP computer systems with HP-IB interfaces. In this manual we refer to the Bering MultiPac subsystem as *MultiPac* and all HP systems as *computer* unless otherwise indicated.

The Bering MultiPac Series is a subsystem consisting of a removable cartridge drive in combination with either an optional second removable cartridge drive or an optional fixed disk to meet the mass storage requirements of any operating system.

Bering Technology, Inc. offers the following MultiPac models:

- Model 8501 — a single 2.0GB 3.5 in. removable cartridge disk drive
- Model 8502 — a dual 2.0GB 3.5 in. removable cartridge disk drive
- Model 8522 — a 2.0GB 3.5 in. removable cartridge disk drive with a 2.0GB fixed disk
- Model 8542 — a 2.0GB 3.5 in. removable cartridge disk drive with a 4.0GB fixed disk

The MultiPac subsystems provide fast, reliable storage that's always available. The installation procedure is almost identical for all models. No software or hardware modifications are required. All MultiPac drives support the latest HP disk command sets. The MultiPac 8500 series supports and emulates the CS80 command set.

The removability feature of the MultiPac 8500 series drive offers the following benefits:

- Large on-line capacity—The MultiPac provides large on-line storage capacity. The 2.0GB capacity cartridge easily meets routine systems storage requirements in a wide range of computer applications.
- Unlimited storage—The use of multiple cartridges provides unlimited capacity for off-line storage of data. The MultiPac 8500 provides infinite storage capacity in increments of 2.0GB.
- Data transportability—The MultiPac 8500 allows individual users who maintain large, private data bases to share system resources. It permits ease of transferring data between systems or platforms.

- Data security—In security-sensitive environments data may be locked away, eliminating the inconvenience of securing the computer system or removing the entire disk drive.
- Data organization—The MultiPac 8500 allows similar types of data in projects to be maintained on individual cartridges.
- Fast backup and retrieval of archival data—The MultiPac 8500 utilizes the fast transfer rates of random access time of the disk drive to backup and retrieve archival data in a timely manner.
- The MultiPac 8500 provides transparent defect management with track and sector sparing.

Conventions in this Manual

We'll use the following conventions to make the information more precise:

- **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 MultiPac are indicated by underlined capital letters alone followed by the word *button*, e.g. POWER 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 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, 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 font will otherwise follow the conventions herein.
- Commands, program, utility, and file names are capitalized 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 text: "... use the TYPE command to read text files."

  to be typed:
  type a:readme

- Italics in any type face, *like this*, have a limited number of possible meanings:

  Titles of books, booklets, or disks, e.g., *MultiPac 8500 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 answer that there are *n* widgets." Note however, that a capital *N* is used for clarity when you are to type the letter *n* usually to signify *No* even though you don't actually have to capitalize the letter when you type it.

Unpacking

Carefully unpack your MultiPac near the location 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 transport the unit.

Besides this manual, the carton contains:

- The MultiPac drive subsystem
- A removable cartridge (2 cartridges with 8502)
- A power cable
- A warranty card

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

2

INSTALLING THE MULTIPAC DRIVE

This chapter describes the installation procedure for the MultiPac Series drives.

Quick-Start Procedure

This section describes the quick-start procedure to set up the MultiPac 8500 series. Most of the configuration is already set at the factory. There may be some adjustments necessary before the MultiPac can operate in your particular environment. (Refer to Chapter 5 for detailed instructions).

The default configuration settings are as follows:

Date/time	current date/Pacific time
HP-IB address:	0
Option	normal
Drive button	enabled
Default sector size:	1024
Emulation:	disabled
CS80 Format:	enabled
Auto spin down:	enabled, after 30 minutes idle time
Auto spin up	disabled

1. Turn off your computer and connect the MultiPac drive.
2. Turn on the MultiPac drive.
3. Check the HP-IB address using the LCD front panel controls. Make sure all devices on the HP-IB chain have a unique address.

   The HP-IB address is set within the Configurations menu using the front panel control buttons. When selecting the HP-IB address, make sure each device on the same HP-IB chain has a unique address.

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

   The following message will appear:

   HP-IB address = 0

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

   The MultiPac will reset to the new value.

6. Insert a cartridge in the removable drive(s).
7. Turn on your computer.
8. Initialize the MultiPac with your operating system format utilities.

Connecting the MultiPac Drives

For specific installation and configuration instructions for your HP-IB based computer, refer to Chapter 5 of this manual.

These instructions are for connecting the MultiPac to an HP-IB based computer with the MultiPac 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.*

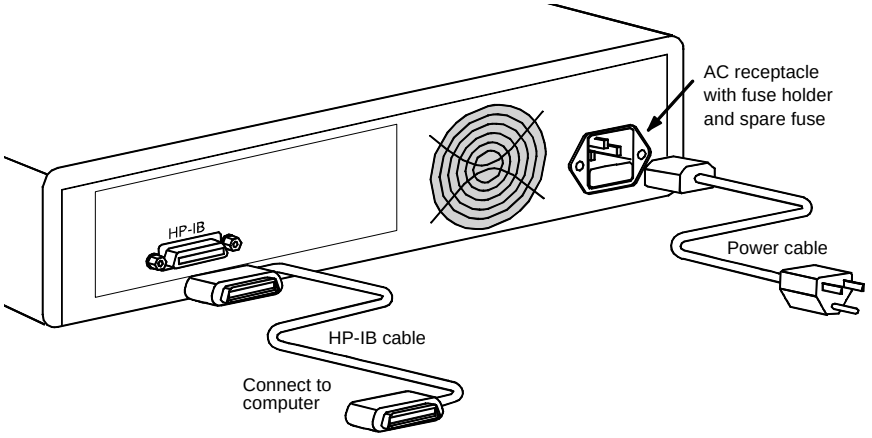


Figure 2-1: Connecting the MultiPac to an HP-IB based system

1. 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 connector on the back panel of the MultiPac. Tighten the thumb screws by hand.
2. Connect the power cable to the back of the MultiPac. Make sure there is at least two inches of space around the back and one inch around the sides of the drive.
3. Plug the MultiPac and the computer into grounded electrical outlets.

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

4. Turn on the MultiPac.
5. Check the HP-IB address using the LCD front panel controls. Make sure all devices on the HP-IB chain have a unique address.

   The HP-IB address is set within the Configurations menu using the front panel control buttons. When selecting the HP-IB address, make sure each device on the same HP-IB chain has a unique address.

6. Power on any other peripherals and the computer.

3

OPERATING THE MULTIPAC DRIVE

This chapter describes the operating procedures for the MultiPac series drives. It is divided into four sections: “Power Up,” “Jaz Controls,” “Loading a Cartridge,” and “Ejecting a Cartridge.”

Power Up

Figure 3-1 illustrates all controls and indicators required for operating the MultiPac.

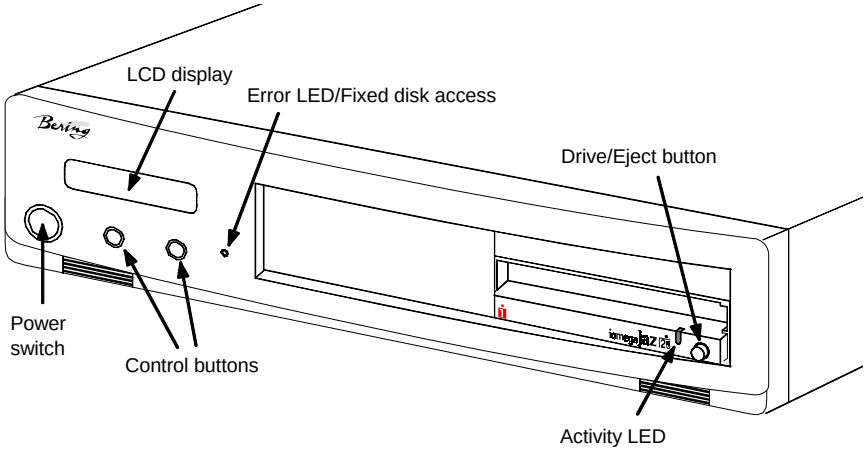


Figure 3-1: MultiPac 8501/8522/8542 front panel

1. Press the **POWER** switch on the front panel of the MultiPac.

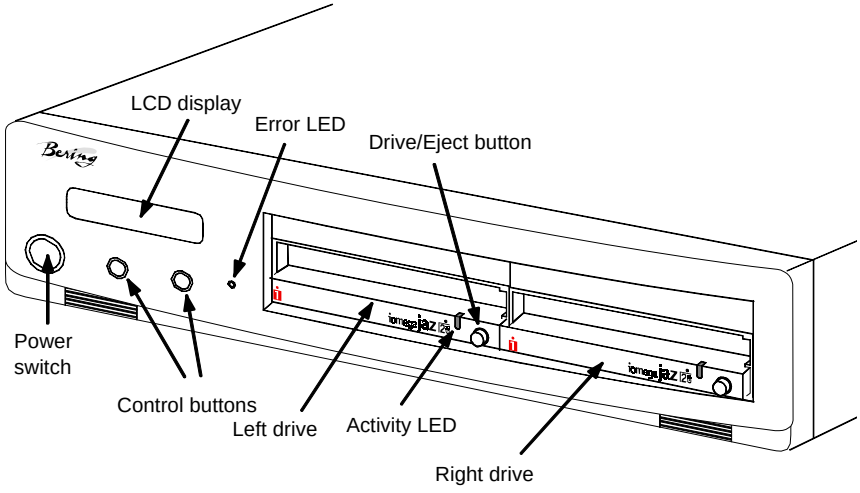


Figure 3-2: MultiPac 8502C front panel

LCD Display

When the MultiPac has completed its power on sequence the date and time till be displayed on the LCD.

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

The AUTO displayed at the top of the display indicates that the Auto Spin Down function is enabled. The drive(s) will spin down after 30 minutes of inactivity. While a drive is spun down any activity on the HP-IB interface from the host computer will cause the drive to spin up.

You may wish to disable the Auto Spin Down function if your operating system cannot tolerate the 10 second (approximate) time period it takes to spin the drive up. See Chapter 4 for details on enabling and disabling the Auto Spin Down and Auto Spin Up functions.

Error LED

The Error LED turns red and stays illuminated when a system error is detected. This LED is also used as a fixed disk access LED. It flashes green when the fixed disk in the model 8522 is accessed.

Jaz Controls

The Jaz drive controls are simple.

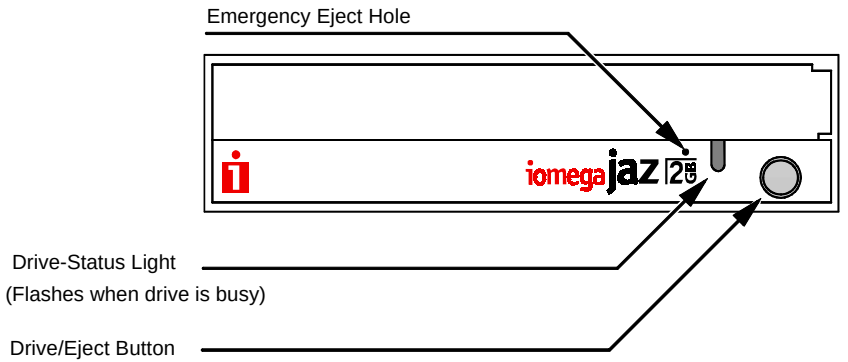


Figure 3-3: Jaz controls

Loading a Cartridge

Loading a data cartridge is very much like loading a diskette.

1. Make sure the MultiPac is turned on before you load a cartridge.
2. Remove the cartridge from its plastic, book-like storage case.

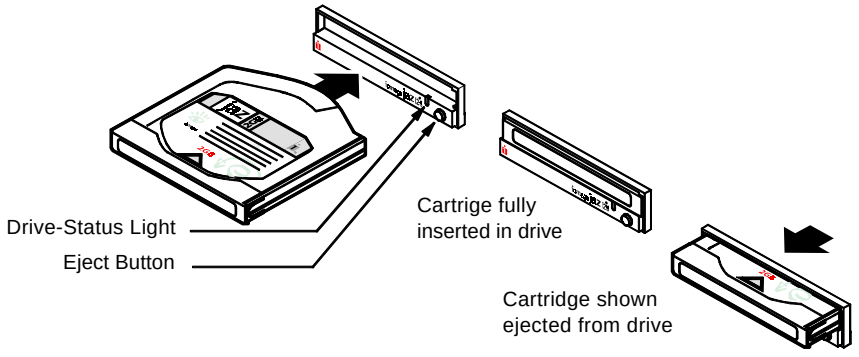


Figure 3-4: Inserting a cartridge into the Jaz drive

3. Insert the cartridge into the drive slot with the label side up and the rounded side pointing toward the cartridge insertion slot and push the cartridge straight in, keeping it parallel with the top and bottom of the drive.
4. Slide the cartridge all the way into the drive.

   The activity LED on the front of the removable drive will flash amber as the drive spins up and you will hear a click. After a brief test, the LED will extinguish when the drive is ready. Thereafter, the status LED will flash whenever the removable disk is accessed.

▲ CAUTION: *Never move or transport the MultiPac with a cartridge in the drive. This may damage the cartridge and cause read/write head damage.*

Compatibility

The MultiPac subsytems read, write, and format Jaz 1.0GB and 2.0GB cartridges. Performance is degraded while using 1.0GB cartridges.

Ejecting a Cartridge

It is important to remove the cartridge before you turn off the MultiPac. If you leave the cartridge in the drive, the shutter remains open and the recording media itself is vulnerable to dust. If the MultiPac is turned off prior to cartridge removal, the automatic disk spin-down operation does not occur and the cartridge disk will spin freely for up to 45 seconds. Attempting to remove the cartridge during this time may damage the media.

The MultiPac must be turned on before you can unload a cartridge. If the Drive button is enabled, proceed directly to step 3.

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

   The Unload cartridge function(s) will be displayed. For the 8502 dual-drive system two options will be available:

Unload left cartridge
Unload right cartridge

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

   The cartridge will spin down and eject from the drive.

Note: NEVER eject a cartridge while the file system is mounted on your operating system.

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

   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 7, "Caring for The Disk Drive & Cartridge," for further information on cartridge care.

Ejecting a Cartridge Without Power

While the MultiPac is not powered on, you can manually eject a cartridge.

▲ CAUTION: *Never manually eject a cartridge while the power is on. This can damage the drive and invalidate the warranty.*

1. Wait for 45 seconds or more after the power is off.
2. Insert a paper clip into the emergency reject hole on the front of the drive.
3. Gently push the paper clip into the hole until the cartridge pops out.
4. Return the cartridge to its protective case for storage or transport.

Write-Protection

The 2.0GB Jaz cartridge cannot be physically write protected.

4

MULTIPAC SYSTEM FUNCTIONS

This chapter describes the MultiPac configuration and operating procedures. The MultiPac 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 System”

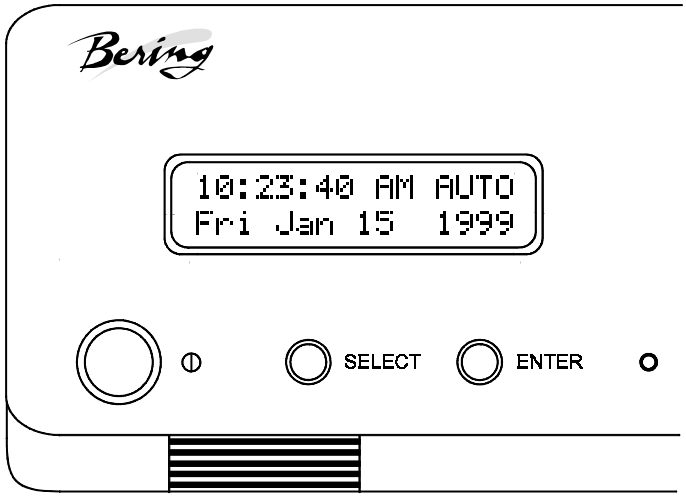


Figure 4-1: Front panel LCD and push-button controls

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 MultiPac models.

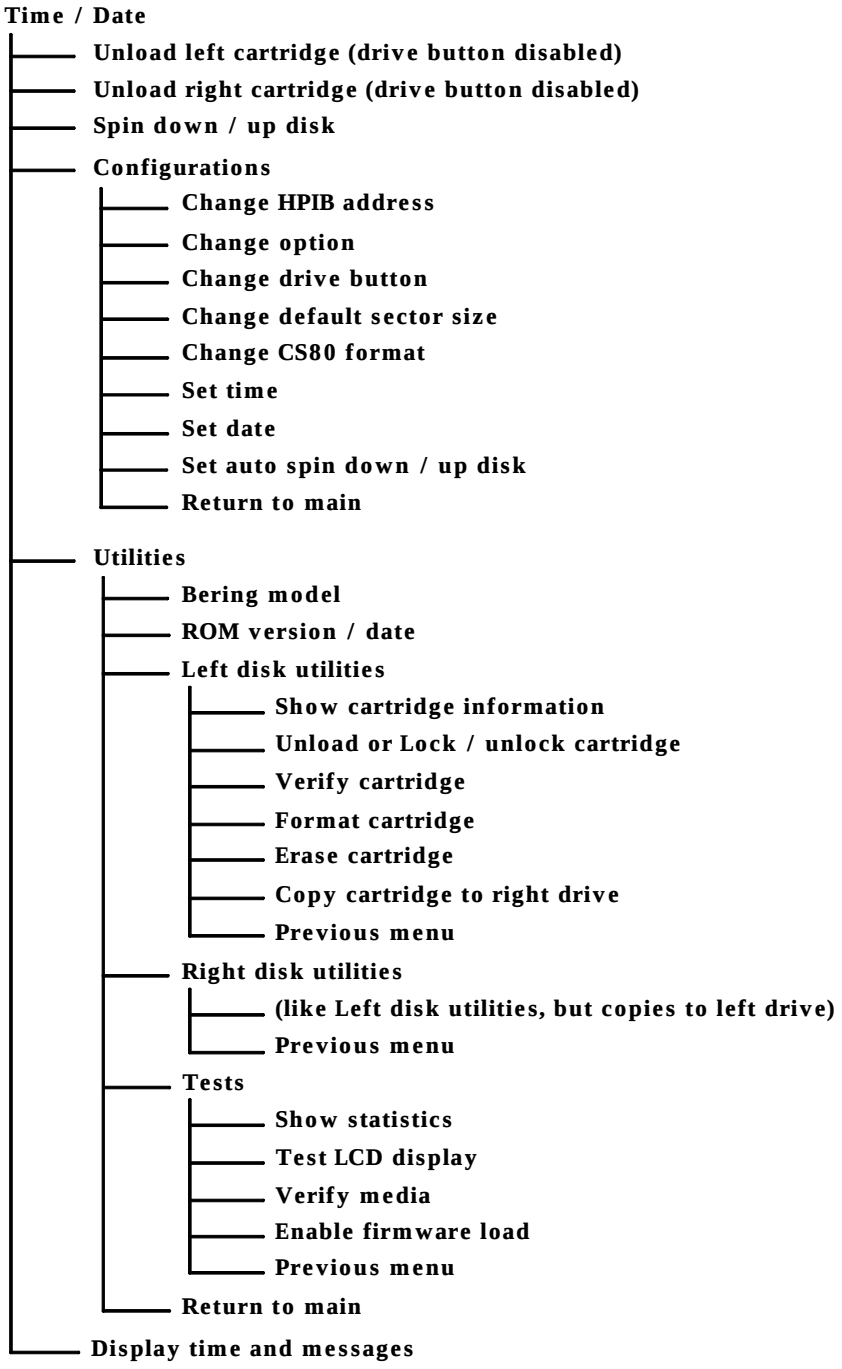
8501 Menu Tree

The command structure for model 8501:

- **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**

8502 Menu Tree

The command structure for model 8502:



8522 Menu Tree

The command structure for the model 8522:

- **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

These options are available from the Main menu of the MultiPac 8502 dual-drive subsystem.

Unload left cartridge
Unload right 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

   For the 8502:
   Unload left cartridge
   or
   Unload right 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 MultiPacs 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 MultiPac 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 MultiPac, 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 MultiPac 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 MultiPac. 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac.
- **ROM VERSION** — Displays the firmware version number and release date.
- **FIXED DISK UTILITIES** — Shows disk information; verifies, and formats the disk. Refer to the "Fixed Disk Utilities Submenu" section for detailed information.
- **REMOVABLE DISK UTILITIES** — Shows cartridge information; locks and unlocks, verifies, formats, and copies 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 MultiPac 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
   Copy cartridge to right/left drive (8502)
   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.

Copy Cartridge

This function is available only for the 8502. Use the Copy Cartridge function to copy an image of one cartridge to another.

1. Load the source and destination cartridges into the drives.
2. Choose the Copy to right cartridge or Copy to left cartridge command from the Left Cartridge Utilities, or Right Cartridge Utilities menu and press the **ENTER** button to start the command.

   This warning message will appear:

   Erase
   entire media? No

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

   If the destination cartridge is unformatted or has a different format than the source (e.g., different sector size) the following message will appear:

   Format destination?
   No

   a. If you decide not to start the process, choose No and press the **ENTER** button to quit.

   If you do not see the above format query, you'll automatically pick up the process with the paragraph at the top of step 5a.

4. Use the **SELECT** button to choose Yes and press the **ENTER** button to begin the process.

   Formatting cartridge

   will appear and formatting will take about 30 minutes. Once the destination cartridge has been formatted, the data from the source will automatically be copied.

As the copy progresses, the record address will be updated on the display:

Copy CARTRIDGE
record n

a. To stop the COPY process 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.

When the COPY process is complete

Unloading CARTRIDGE

will flash on the LCD momentarily and then you'll be asked to

Remove cartridge 1!

5. Remove the cartridge by pushing the drive button.

You will see

Copy done at
10:30 am

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

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:

   For the model 8502:

   ```
   Test left cartridge? No
   Test right cartridge? No
   ```

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

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

   ```
   Verify CARTRIDGE
   record n
   ```

   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.

5

CONFIGURING YOUR HP SYSTEM

This chapter describes how to configure different HP-IB- based HP computer systems for the MultiPac drive. It is divided into the following sections: 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 MultiPac 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.

Unit Number

Unit numbers are used for subsystems with multiple drives. The following table lists those unit numbers for the MultiPac drive.

Model	Drive	Unit #
8501	Cartridge disk	0
8502	Left drive Right drive	0 1
8522/8542	Fixed disk Cartridge disk	0 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 200/300 - 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac. 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 MultiPac 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 MultiPac 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 MultiPac.

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 MultiPac 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.

   ```
   :HP8500,700,0,0
   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 MultiPac 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:

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

6. Use the **[NEXT]** and **[PREVIOUS]** soft keys to select the MultiPac 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 MultiPac. The next procedure is necessary for booting directly from your MultiPac.

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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac 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 MultiPac by pressing **[RESET]**, or turning your computer off and back on.

Series 300 - HP-UX

SYSTEM REQUIREMENTS

The Bering MultiPac 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 MultiPac 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 MultiPac 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 MultiPac. 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 MultiPac.

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 MultiPac, press the **[NEXT]** or **[PREVIOUS]** key to select the Change DESTINATION device function and press **[SELECT]**. Then type the correct address of the MultiPac as prompted.

Note: The major number of the MultiPac 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 MultiPac.

   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 MultiPac.

ADDING THE MULTIPAC TO YOUR HP-UX SYSTEM

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

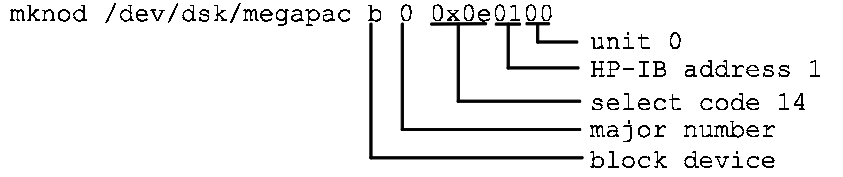
DEVICE FILES

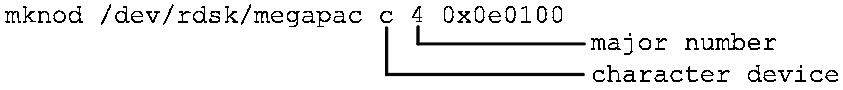
The first step for installing your MultiPac drive is to create two device files: a block special file and a character special file. To do this, use the MKNOD command with the following items:

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

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

- Major numbers: for the MultiPac, 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 MultiPac), a unit number, and a volume number (set at 0). For example:





INITIALIZING YOUR MULTIPAC

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

   `mediainit /dev/rdsk/multipac`

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

LIF VOLUME

If you plan to use your MultiPac 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/multipac0`

CREATING A NEW FILE SYSTEM

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

`/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 MultiPac, as follows:

```
multipac :\
: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 MultiPac
	disk_type	=	name for the MultiPac created in the etc/disktab

For example:

/etc/newfs /dev/rdsk/multipac multipac

Series 800 HP-UX 8.0/9.0

The Bering MultiPac 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 MultiPac drive.

SYSTEM REQUIREMENTS

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

CONFIGURATION

Use the MultiPac 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 MULTIPAC TO YOUR HP-UX SYSTEM

The following procedure describes how to add the MultiPac to your existing HP-UX system. This assumes that the MultiPac 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 MultiPac to a number which is not on the list of disk drives, (i.e., 3).
3. Connect the MultiPac. 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 MultiPac with the HP-IB address you assigned to it.

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

```
cd /dev
insf
```

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

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

INITIALIZING THE MULTIPAC

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 MultiPac.

```
/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 Multipac 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 MultiPac
	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:

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

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 MULTIPAC

Before the MultiPac 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 MultiPac 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

MultiPac 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 MultiPac disk drives. Use the following assignments.

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

6

CARING FOR THE DISK DRIVE

This chapter describes how to care for your MultiPac disk drive. It is divided into two sections. The “General Safeguards” section tells you what to look out for. The “Cartridge Care” section describes ways to care for your cartridges. As long as you protect your MultiPac from hazards, it will provide you with years of service.

General Safeguards

You can preclude many problems by taking preventive measures.

- Avoid overheating by placing the MultiPac where adequate airflow can circulate around it. Be particularly careful to avoid blocking the cooling vent at the rear of the unit.
- Make sure it is plugged into a grounded electrical outlet. Verify that the outlet is actually grounded. The MultiPac 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 you MultiPac 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 MultiPac.
- Avoid exposure to magnetic fields such as those emitted by magnets, speakers, or telephone equipment.
- Avoid bumping the MultiPac while it is running.
- Always set the MultiPac upright on a flat surface.
- Do not transport the MultiPac with a cartridge in the drive.
- Use the spin-down and auto spin-down functions if the drive will not be accessed for long periods of time. This will save wear and tear on the drive spindle and promote a much longer life for the drive.

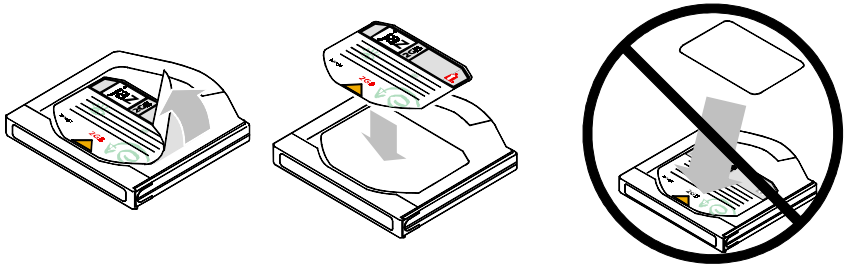
  You don't need to worry about leaving the MultiPac on for a long time it doesn't use much power. It's normal for the drive to feel warm (but not hot) after it's been running for a while.

  If the MultiPac 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 plenty of 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 MultiPac after it is powered down. This leaves the cartridge shutter open and makes the recording media itself vulnerable to dust. Also, the heads are not placed on a safe landing zone if you leave the cartridge in the drive. The media or the heads could easily be damaged in this risky situation.
- Keep your cartridges clean and dry and out of harm's way. Protect cartridges fro dirt, spills, and smoke. Avoid opening the shutter of the cartridge since dust and dirt can be transferred to the disk media or to the inside of the drive.
- Use them at correct temperatures. Avoid using the cartridges at extreme temperatures above 90° F (32° C) or below 60° F (16° C). To avoid permanently damaging data, the drive, cartridge, and room should all be about the same temperature when you insert the cartridge into the drive.
- Do not expose cartridges to magnetic fields, moisture, or prolonged direct sunlight.
- Do not move the drive with a cartridge loaded.
- Do not drop the cartridge.
- Label 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 may contaminate the disk surface).
- Never apply more than one label to a cartridge.
- Apply a label only to the recessed area on the cartridge.



- Do not open the access door. Minute contaminants such as smoke particles, pollen, or dust can cause errors or damage.

▲ CAUTION: *Do not use defective or questionable cartridges on another MultiPac drive. You may spread the problem.*

7

TROUBLESHOOTING & SERVICE

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

Before You Do Anything Else

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

- The power cord is securely connected to the MultiPac 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.
- 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 MultiPac, 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 MultiPac. If this occurs, shut down your system and restart it again. If the problem still occurs, contact Bering Technical Support at (408) 364-6500.

The Drive is Clicking

When a Jaz cartridge is inserted into the drive, the heads will click to acquire the media. This is normal. However, if a disk is inserted into the Jaz drive and the heads continue to click several times or do not stop clicking, this is not normal.

Drives or cartridges that are physically damaged will constantly click. The constant clicking sound is the drive head extending out as far as it will go and not finding anything to read or when the heads cannot acquire the media. If the drive continues to click constantly, this may indicate a problem with the drive or media. Possible causes are a broken drive head, the media is torn or was erased by a bulk eraser. The clicking sound is a physical problem with the Jaz drive or cartridge. If the drive clicks because the media is damaged, there is a possibility it will damage the microscopic head.

What do I do if my drive constantly clicks?

If possible, try one more disk. Use a disk that does not contain valuable data, the second disk may become unusable. If the problem continues

with another disk contact Bering Technical Support for return information.

If only one cartridge constantly clicks, discontinue use of that cartridge.

The Cartridge Will Not Eject

Make sure you are using the "Unload Cartridge" function using the control buttons on the front panel of the MultiPac. By default, the eject button on the front of the Jaz drive is disabled.

If you are still unable to eject the disk out of your drive, power off the MultiPac. Next, locate the emergency eject access hole which is located on the front of the drive. See "Ejecting a Cartridge Without Power" on page 10.

What do I do next?

Try inserting and ejecting more than one cartridge. If other cartridges will not eject, your cartridge drive may not be functioning properly. If only one cartridge will not eject properly, that one cartridge may be defective.

The Amber Light Slowly Flashes

If the amber light on the drive slowly flashes during read and write operations, try using a different cartridge. If the problem persists, recycle the power on the MultiPac and reboot the operating system. If the problem persists after the above procedure, the drive may be defective.

Fuse Replacement

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

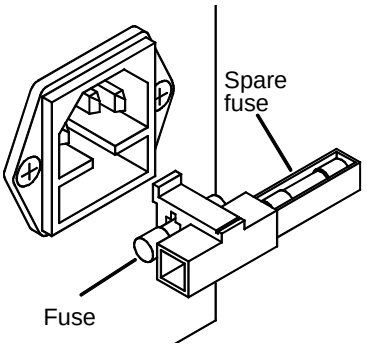


Figure 7-1: Replacing the AC fuse

If You're Still Having Problems

If you are able to start up from another drive, but not the MultiPac, the system files on the MultiPac may be damaged.

START-UP PROBLEMS

If you're unable to start up from an MultiPac, 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 MultiPac. Refer to the troubleshooting section in your computer manual for more information.

WHEN ALL ELSE FAILS...

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

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

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

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

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

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

SPECIFICATIONS

A

Jaz 2.0GB Cartridge Disk

Formatted capacity	2,003.8	2,003.8	2,003.8	MB
Logical sector size	256	512	1,024	bytes
Logical track size	192	96	48	sectors
Logical size	32	32	32	tracks (heads)
Logical cylinders	1,274	1,274	1,274	cylinders
Logical drive size	7,827,456	3,913,728	1,956,864	sectors

PERFORMANCE

Rotation speed	5,394	rpm
Average seek time	10	ms, read
	12	ms, write
HP-IB Burst transfer rate	1	MB/sec
HP-IB Average transfer rate	940	KB/sec
MTBF	100,000	Power On Hours
Data reliability	<1 nonrecoverable error	in 10^{12} bits read

ENVIRONMENTAL (operational)

Temperature	10° to 46°	C
Relative humidity	10 to 80	% non-condensing
Vibration	5 to 10	Hz, 0.03 in. peak-to-peak
	10 to 300	Hz, 0.5 G's p-p
	300 to 500	Hz, 0.2G's p-p
Shock	3	G, 11 ms half sine pulse
Altitude	0 to 10,000	feet
	0 to 3,048	meters

(non-operating)

Temperature	-40° to 60°	C
Relative Humidity	10 to 90	% non-condensing
Vibration	2 to 10	0.4" in. p-p
	10 to 500	Hz, 4 G's p-p
Shock (cartridge removed)	80	G's at 11 ms
Altitude	-1,000 to 40,000	feet
	-305 to 12,192	meters

Jaz 1.0GB Cartridge

The following table can be used to configure your operating system for use with the Jaz 1.0GB cartridge. The Jaz drive is optimized for 2.0GB cartridges, so performance will be reduced when using 1.0GB cartridges.

Formatted capacity	1,069.5	1,069.5	1,069.5	MB
Logical sector size	256	512	1,024	bytes
Logical track size	96	48	24	sectors
Logical size	32	32	32	tracks (heads)
Logical cylinders	1,360	1,360	1,360	cylinders
Logical drive size	4,177,920	2,088,960	1,044,480	sectors

2.0 GB Fixed Disk

Used in 8522

Formatted capacity	2,003.8	2,003.8	2,003.8	MB
Logical sector size	256	512	1,024	bytes
Logical track size	192	96	48	sectors
Logical size	32	32	32	tracks (heads)
Logical cylinders	1274	1274	1274	cylinders
Logical drive size	7,827,456	3,913,728	1,956,864	sectors

PERFORMANCE	Rotation speed	5400	rpm
	Average latency	5.6	ms
	Minimum seek time	2	ms
	Average seek time	12.5	ms
	Maximum seek time	22	ms
	HP-IB Burst transfer rate	1	MB/sec
	HP-IB Average transfer rate	940	KB/sec
	MTBF	300,000	Power On Hours
ENVIRONMENTAL (operational)	Temperature	5° to 55°	C
		41° to 131°	F
	Temperature gradient	15°	C/hour
		59°	F/hour
	Relative humidity	20 to 80	% non-condensing
	Vibration	1	G, 5 to 250Hz
	Shock	10	G, 10 ms max
	Altitude	0 ~ 3,000	meters
		0 ~ 10,000	feet
(non-operating)	Temperature	-40° to 70°	C
		-40° to 158°	F
	Relative Humidity	5 to 90	%
	Vibration	2	G, 5 to 250 Hz
	Shock	75	G, 10 ms max
	Altitude	0 ~ 12,000	meters
		0 ~ 40,000	feet

4.0 GB Fixed Disk

Used in 8542

Formatted capacity	4,007.7	4,007.7	4,007.7	MB
Logical sector size	256	512	1,024	bytes
Logical track size	192	96	48	sectors
Logical size	32	32	32	tracks (heads)
Logical cylinders	2,548	2,548	2,548	cylinders
Logical drive size	15,654,912	7,827,456	3,913,728	sectors

PERFORMANCE

Rotation speed	5400	rpm
Average latency	5.6	ms
Minimum seek time	2	ms
Average seek time	12.5	ms
Maximum seek time	22	ms
HP-IB Burst transfer rate	1	MB/sec
HP-IB Average transfer rate	940	KB/sec
MTBF	300,000	Power On Hours

ENVIRONMENTAL (operational)

Temperature	5° to 55°	C
	41° to 131°	F
Temperature gradient	15°	C/hour
	59°	F/hour
Relative humidity	20 to 80	% non-condensing
Vibration	1	G, 5 to 250Hz
Shock	10	G, 10 ms max
Altitude	0 ~ 3,000	meters
	0 ~ 10,000	feet

(non-operating)

Temperature	-40° to 70°	C
	-40° to 158°	F
Relative Humidity	5 to 90	%
Vibration	2	G, 5 to 250 Hz
Shock	75	G, 10 ms max
Altitude	0 ~ 12,000	meters
	0 ~ 40,000	feet

General

Power Requirements

Line voltage	100-200	volts
Line frequency	47-63	Hz
Current	0.5	Amp
Fuse	“Slow blow,” 1.6A, 250V	

Dimensions

Interface	HP-IB, CS80
Dimension	3" x 12.8" x 14" 8.25 x 32.5 x 35.5 cm
Shipping weight	25 lbs. 11.3 Kg

Accessories

Cartridge Jaz, 2.0GB	ACCS-3061
Cartridge Jaz, 2.0GB, 3 pack	ACCs-3063
HP-IB Cable 1.0m (3.3 ft.)	ACCS-7110
HP-IB Cable 2.0m (6.7 ft.)	ACCS-7115
Rack Mount Kit - 19"	ACCS-7206

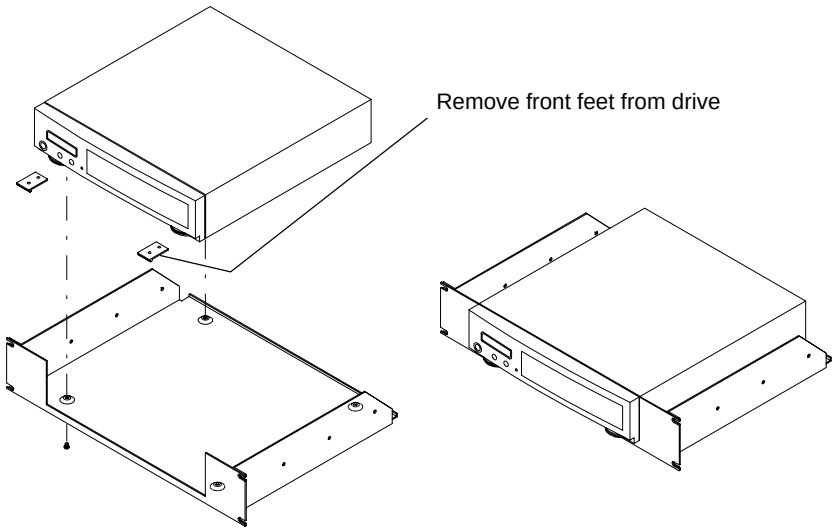
RACK MOUNT

B

Installation

If you purchased the rack mount kit, ACCS-7206 from Bering, these instructions will show the installation procedures. It fits in a standard 19” rack cabinet. The front is a 3.5 in. panel with the holes on 3 in. centers. The holes on the sides of the rack are 3.625 centers for installation of a standard C300S-22 slide rail. The following instructions are for installing the drive into a rack without slide rails.

1. Remove the front feet from the Bering drive by removing two screws in each foot.
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.

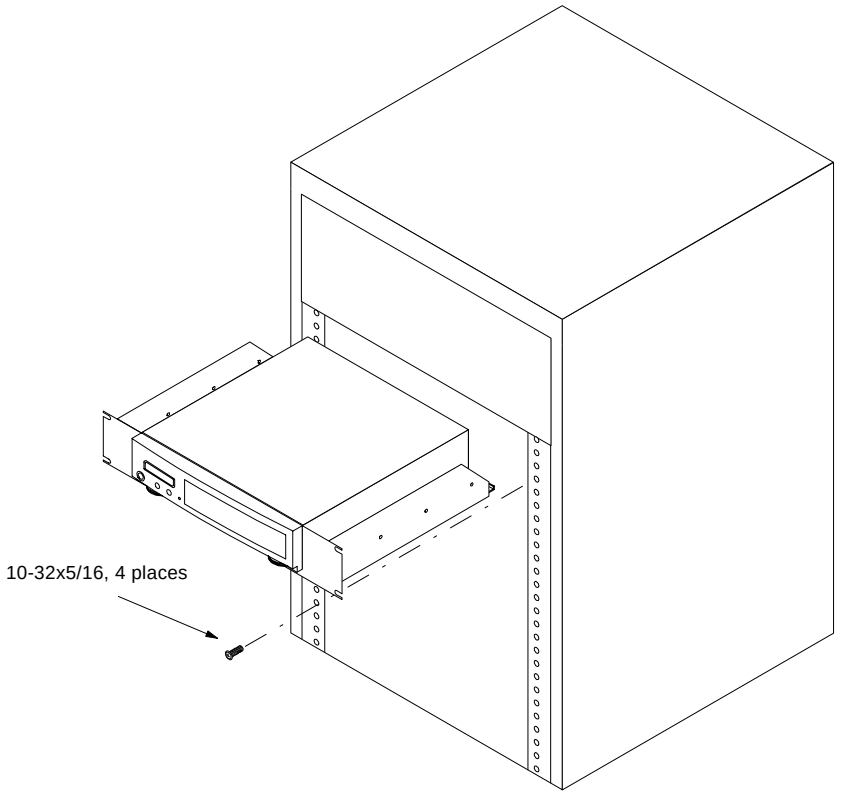


This step may be performed by turning the drive upside down and placing the shelf on the drive while aligning the screw holes.

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

The shelf requires 3.5 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 panel and tighten.



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