



EconoPac 7300 User's Manual

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Revision A

Copyright 1999

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Important FCC Information

This peripheral device generates and uses radio frequency energy, and if it is not installed and used properly, that is, in 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 EconoPac 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 EconoPac, 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 EconoPac subsystem which affects functionality. You can determine the ROM version of your EconoPac by using the front panel LCD controls. See chapter 4 for details.

If you have upgraded your EconoPac and the LCD functions no longer match those described in this manual, you should contact Bering Customer Service to determine the proper revision of the *EconoPac 7300 User's Manual* required for your EconoPac subsystem.

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

Date	Rev	Changes to manual
May 1999	A	First Printing

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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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*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 EconoPac disk drive subsystem.

Model: _____ S/N: _____

Time Zone _____

HP-IB Address _____

Default Sector Size 256 512
 1024

Emulation (HPxxx) Enabled Disabled

Fixed disk volume protect Yes No

CS 80 format Enabled Disabled

Auto Spin down/up Enabled Disabled

Spin down time _____

Spin up time _____

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INTRODUCTION

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

Bering EconoPac 7300 series drives are compatible with HP computer systems with an HP-IB interface. In this manual we refer to the Bering EconoPac subsystem as *EconoPac* and all HP systems as *computer* unless otherwise indicated.

The Bering EconoPac 7000 Series is a subsystem consisting of a fixed disk drive with fixed disk capacities ranging from 200 MegaBytes to 2.1 GigaBytes to meet the mass storage requirements of any operating system. They have a 2.0 MB floppy disk drive.

Bering Technology offers the following EconoPac models:

- Model 7320 — a 200MB fixed disk drive with a 2.0MB floppy drive
- Model 7350 — a 500 MB fixed disk drive with a 2.0 MB floppy drive
- Model 7310 — a 1 GB fixed disk drive with a 2.0 MB floppy drive
- Model 7321 — a 2.1 GB fixed disk drive with a 2.0 MB floppy drive

The EconoPac 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 EconoPac drives support the latest HP disk CS80 command set.

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

Titles of books, booklets, or disks, e.g., *EconoPac 7300 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 EconoPac 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 EconoPac drive
- A floppy diskette
- A power cable
- A warranty card

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

INSTALLING THE ECONOPAC DRIVE

This chapter describes the installation procedure for the EconoPac and is divided into three sections. The “Quick-Start Procedure” section enables experienced users to begin operation right away. The “Connecting the EconoPac 7300 Drives” section helps new users connect the disk drive to HP-IB based systems before going on to the next chapter for additional operating instructions.

Quick-Start Procedure

This section describes the quick-start procedure to set up the EconoPac 7300. Most of the parameters are already set at the factory. There may be some adjustments necessary before the EconoPac can operate in your particular environment. Refer to Chapter 5 for detailed instructions.

The default parameter settings are as follows:

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

1. Turn off your computer and connect the EconoPac.
If necessary, refer to the next section in this chapter.
2. Turn on the EconoPac and wait for the self-test to end.
When the test ends without incident, the time and date should be displayed on the front panel LCD and the clock should be running.
3. Check the time and date. Adjust the clock if required.
4. Check the HP-IB address in the configuration function. Make sure all devices on the HP-IB have a unique address.
5. Turn on your computer.
6. Initialize the disk and begin using the EconoPac.

▲ CAUTION:

Make sure that other equipment or appliances which might generate electrical noise or a power surge (such as electric typewriters or heaters) are on separate circuits.

Connecting the EconoPac 7300 Drives

For specific installation and configuration instructions for your computer, refer to the Chapter 5, “Configuring your HP System.”

These instructions are for connecting an EconoPac 7300 to an HP-IB based computer.

▲ 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.

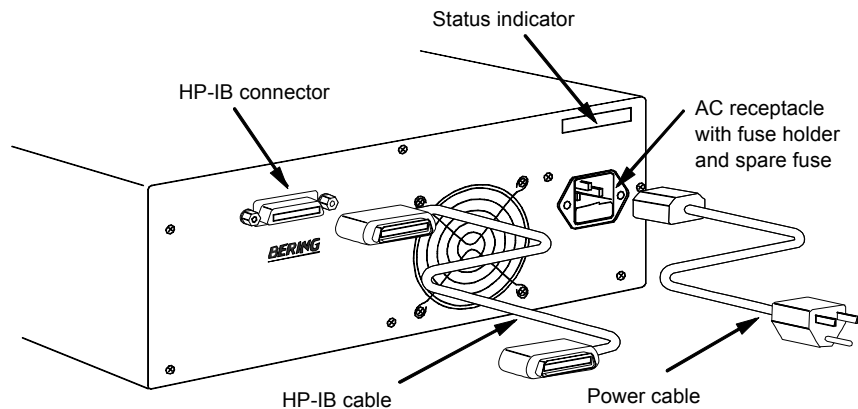


Figure 2-1: Connecting EconoPac 7300 to an HP-IB computer

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

Be sure that the outlets actually are grounded — that the third prong really is connected to a ground. The EconoPac should be on the same circuit as your computer.

▲ CAUTION:

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

4. Turn on the EconoPac, the computer, and any other peripherals.

OPERATING THE DISK DRIVE

This chapter describes the operating procedures for the EconoPac series drives. It is divided into four sections: “Power Up,” “Loading a Diskette,” “Ejecting a Diskette,” and “Write-Protecting a Diskette.”

Power Up

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

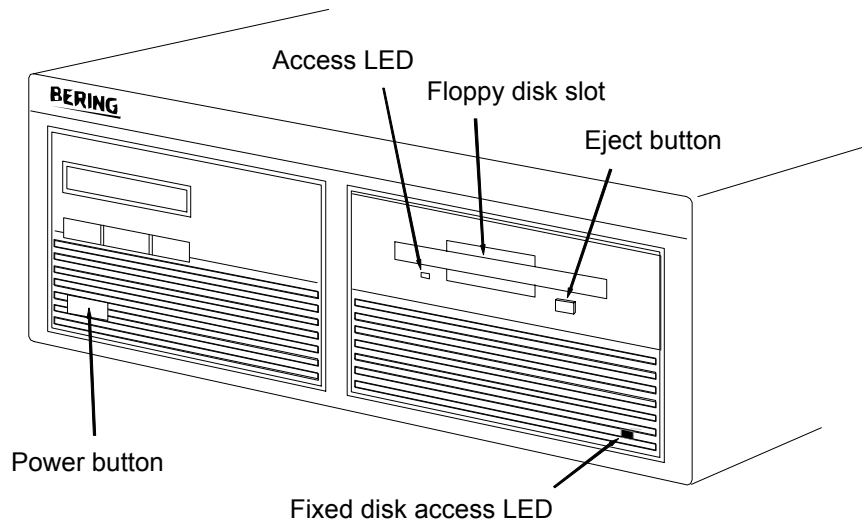


Figure 3-1: EconoPac 7300 Front Panel

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

The EconoPac will begin its power up self-test procedures. The EconoPac has a red access LED in the lower right corner of the front panel. This LED will flash during start up to indicate a self-test operation for the fixed drive and then go out. It will also flash whenever the fixed disk drive is accessed. This operation should take less than a minute.

Loading a Diskette

Insert and remove floppy diskettes just as you would on a PC.

1. Hold the labeled edge of the disk between thumb and forefinger - the label up, the metal shutter facing the drive slot, and the angled corner of the disk on your right.
2. Insert the diskette into the drive slot with the label side up and the write-protect switch toward you and push the diskette straight in, keeping it parallel with the top and bottom of the drive, until it seats with a click.

Ejecting a Diskette

It is important to remove the diskette before you turn off the EconoPac. If you leave the diskette in the drive, the shutter remains open and the recording media itself is vulnerable to dust and contamination.

1. To eject a diskette, depress the eject button until the diskette pops out.

Remember to **label and date** the diskette for future reference.

Write-Protecting a Diskette

You may want to write-protect the floppy diskette after removing it from the floppy drive. Write-protection prevents accidentally erasing data on the diskette. The write-protection switch is located on the front left edge of the diskette.

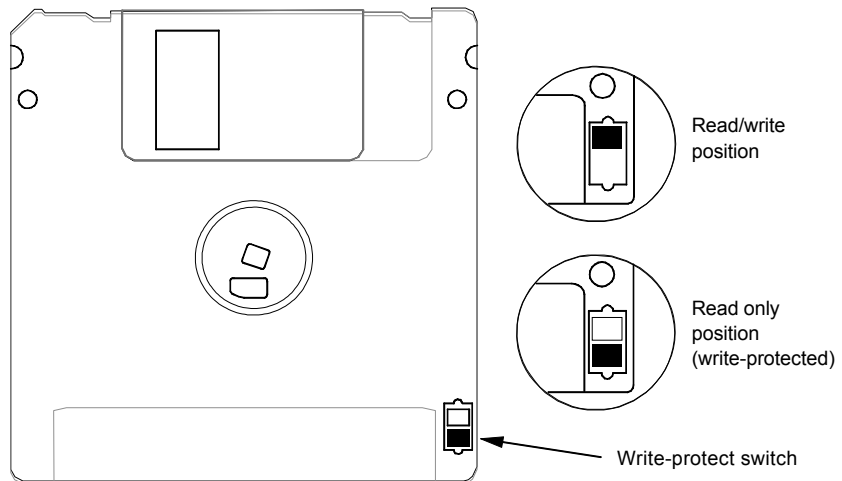


Figure 3-2: Write-protecting a diskette

1. To write-protect the floppy diskette, slide the tab away from the metal shutter until the tab snaps into place.

A fingernail or the tip of a pen may prove useful in moving the tab. When you can see through the rectangle this opens in the diskette, data cannot be written to the cartridge and existing data cannot be erased by any ordinary means.

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

These instructions should be used in conjunction with your specific HP computer's configuration procedure given in Chapter 5, "Configuring Your HP System."

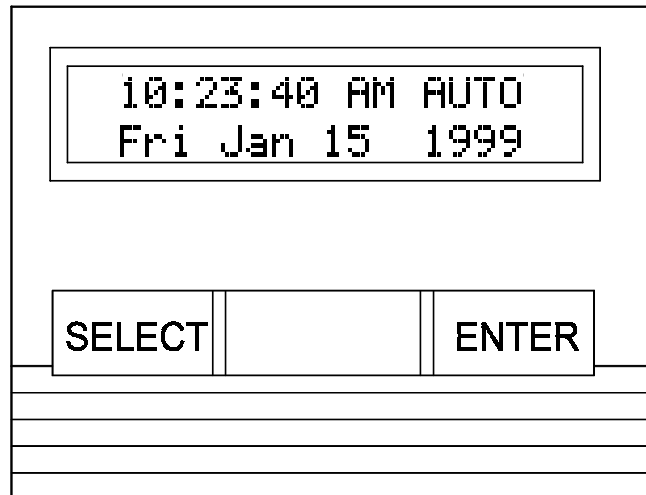


Figure 4-1: Front panel LCD and push-button controls

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.

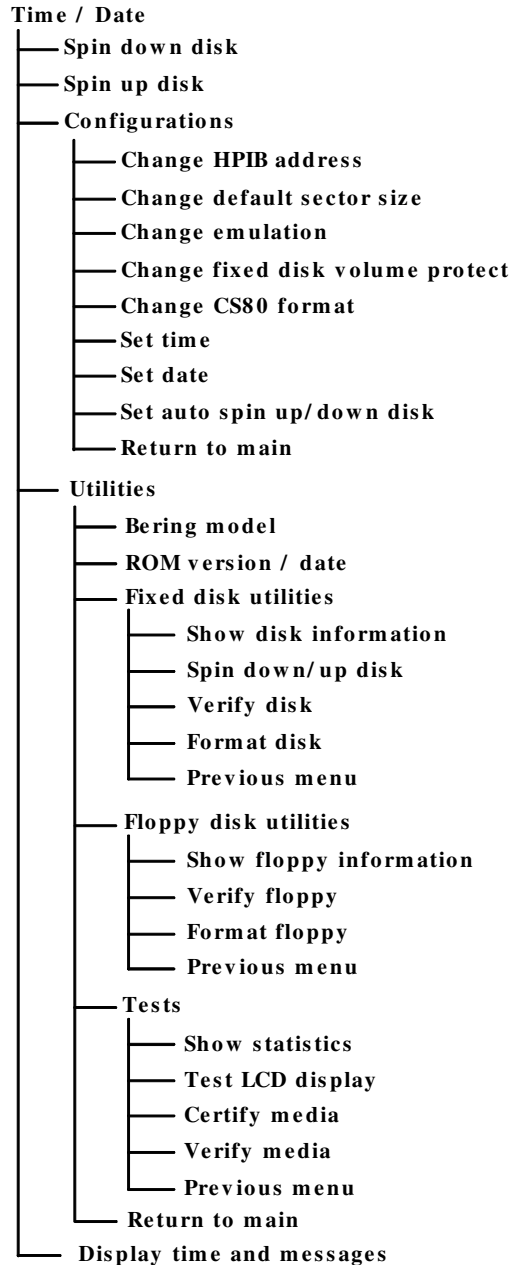
- To scroll or step backward in a menu, press and hold the **SELECT** button first and then the **ENTER** button.

**System
Overviews**

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

EconoPac Menu Tree

The LCD display command structure for the 7300 models:



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:

Spin down disk
Spin up disk
Configurations
Utilities
Display time and messages

Spin Down Disk

This function will spin the fixed disk drive 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 will then spin down.

Spin Up Disk

This function will spin the fixed disk drive 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 will then spin up.

▲ CAUTION:

If the computer system attempts to access the EconoPac 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.

Configurations

This function sets the HP-IB address, emulation mode, default sector size, CS80 format, command mode, sets automatic spin down and up, and sets the date and time. (See the “Configurations Submenu” section for detailed information.)

Utilities

This function shows disk/floppy information; verifies, and formats the fixed disk, formats the floppy disk; erases data; 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 default sector size
Change emulation
Change fixed disk volume protect
Change CS80 format
Set time
Set date
Set auto spin down/up disk

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 EconoPac. The values range from 0 to 7. When selecting the HP-IB address, make sure each device on the same HP-IB 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 EconoPac will reset to the new value.

**Change Default
Sec[tor] Size**

This function sets the default physical sector size when the 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 900, and HP-UX users may use 1024 bytes/sector. See appendix A, or Show Disk 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 EconoPac 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

▲ CAUTION:

Setting this option to Enable will cause the operating system of your computer to see the Bering fixed disk as an HP disk which is close, but not identical, in size to the Bering disk. The emulation will be a smaller capacity drive. For example, the Bering 500MB fixed disk set to HP emulation mode will appear as an HP 300MB fixed disk.

Change Fix[ed] Disk Volume Protect

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 disabled, 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.

The minute field will start to blink.

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.

After you have made this setting, you'll 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
Fri Jan 15, 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.

When the correct day is displayed, press the **ENTER** button.

The month field will start to blink.

3. **SELECT** and **ENTER** the correct month setting just as you did the day.
4. **SELECT** and **ENTER** the correct date setting.
5. **SELECT** and **ENTER** the correct year setting.

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

Set Auto Spin Down/ Up Time

This function sets a time for the disk drive to spin down and then spin up automatically at preset times. Using this function will help increase the life of the fixed disk drive. Any disk access activity on the HP-IB bus to the EconoPac from the computer system will cause the drive 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.

▲ CAUTION:

The spin up time may take several seconds which may cause your computer system to time-out while attempting to access the EconoPac 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 at
10:00 AM**

The hour field will be blinking.

4. **SELECT** and **ENTER** the spin down hour.
5. **SELECT** and **ENTER** the spin down minute time.
6. **SELECT** and **ENTER** the spin down AM/ PM setting.

You will now see the following message

**Spin up at
10:00 AM**

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

**10:23:40 AM AUTO
Fri Jul 15, 1999**

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, one side at a time; copies and erases cartridge data; and performs test functions via these options:

- **Model Number** — Displays the model number of the EconoPac.
- **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.
- **Floppy Disk Utilities** — Shows diskette information; verifies, and formats the diskette. Refer to the “Floppy Disk Utilities Submenu” section for detailed information.
- **Tests** — Shows statistics, tests the LCD, and certifies media. (See 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 then appears and displays the following functions:

Model number
ROM version
Fixed disk utilities
Floppy 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 cartridge information; locks and unlocks, verifies, and formats the cartridge, one side at a time; and erases cartridge data.

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
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 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 Main 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 EconoPac 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**

- 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 ...**

- Release the buttons.

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

User abort

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

When you've exited the function, the following message will appear:

**n complete
verifies done**

- 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.*

- 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**

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

The following message will appear:

**Set bytes/sector
to same**

- 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 or Chapter 6 to determine the supported sector size for your system. When you've made your choice, you'll see:

**Set interleave
to 1**

- 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**

- 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.

- 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**

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

**Floppy Disk
Utilities Submenu****Show Floppy
Information**

This group of functions shows floppy disk information; verifies and formats the diskette.

This function displays the following information about the floppy disk:

Floppy capacity in bytes
High/Low density
Single/Double sided
Sector size
Interleave
IBM format (if formatted in DOS format)
Write-protected (if protection is on)

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

Verify Floppy

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

1. With the **Verify floppy** function displayed, press the **ENTER** button to start. You'll see:

**Verifying
FLOPPY**

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

**Verifying
Cyl *n* Head *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 take a while to stop and the following message will appear:

**FLOPPY
verified**

4. Press the **ENTER** button to exit.
5. Press the **ENTER** button to return to the **Floppy disk utilities** submenu.

Format Floppy

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

▲ CAUTION:

The Format Floppy function will erase all data on the floppy diskette.

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

The following message appears:

**Erase entire
media? No**

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

The following message will appear:

**Set bytes/sector
to same**

- Use the **SELECT** button to scroll through the options (same, 256, 512, 1024, IBM), choose one, and press the **ENTER** button.

We recommend that you choose 256 bytes per sector. When you've made your choice, you'll see:

```
Set interleave
to 1
```

- Use the **SELECT** button to scroll through the options (1-10), choose one, and press the **ENTER** button and you'll see:

```
256 bps
Interleave 1
```

- Press the **ENTER** button again and you'll see:

```
OK to format?
No
```

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

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

The following message will appear:

```
Formatting
FLOPPY
```

and then

```
Formatting
Cyl n Head n
```

When the process is complete, you'll see:

```
FLOPPY
formatted
```

- Press the **ENTER** button to return to the Floppy disk utilities submenu.

Tests Submenu

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

- 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
Certify media
Verify media
```

3. Press the **SELECT** button to scroll through the information or functions.
4. 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 **Disk 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 disk, this information will not be available if the disk is formatted to be HP-compatible and 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.

Certify Media

This function will first write test patterns on the entire disk and then executes the **Repeat verify** function.

▲ CAUTION:

The Certify Media function will erase all data on the disk.

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

The **Certify media** submenu will appear:

- Erase entire
- media? NO

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

The following message will appear:

```
Verify media
until abort? NO
```

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

The record address will advance while the test pattern is written on the disk and the following message will appear:

```
Write DISK
record n
```

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

```
Verify DISK
record n
```

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

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

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

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

5. Release the buttons.

The function will abort and the following message will appear:

```
User abort
```

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

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

```
n complete
verifies done
```

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

Verify Media

This function is similar to the **Certify media** function in the Fixed disk utilities menu, except **Verify media** does not write test patterns. Usually the process must be aborted by the user.

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

The Repeat verify 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.

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

```
Verify DISK  
record n
```

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

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

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

You will have to abort manually if you selected multiple verification passes above.

4. Release the buttons.

The function will abort at the appropriate time and you will see **User abort**.

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

Upon successful completion, you will be notified:

```
n complete  
verifies done
```

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

CONFIGURING YOUR HP SYSTEM

This chapter describes how to configure different types of HP computer systems for the EconoPac drive. It is divided into the following sections: Formatting a Floppy, Series 800-HP-UX, HP 3000 MPE-V and HP 900 XL/ix. Refer to the section which applies to your computer. The EconoPac may be compatible with other HP operating systems. Please refer to the operating system user manuals for details, or call Bering Technical Support.

Each section describes how to boot the operating system from a floppy diskette, prepare the fixed disk, install the operating system and application software on the cartridge, and how to boot from the EconoPac 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 HP-IB subsystems with multiple drives. The following table lists those unit numbers for the EconoPac drive.

Model	Drive	Unit #
7300	Fixed disk	0
	Floppy disk	1

Table 5-1: Drive Unit numbers

Formatting a Floppy Disk

You must choose a formatting option and interleave factor when you format (initialize) a floppy disk. See the following tables for explanations of the various choices. The default setting is 0.

▲ CAUTION:

Single-sided disks must not be form atted as double-sided. Form at options 2 and 16 (512-byte) don't work with BASIC or Pascal.

Media	Frmt Optn	Bytes/ Sector	Sctrs/ Track	Tracks/ Surface	Srfcs/ Disk	Total Sectors	Capacity (bytes)
0.5 MB	4	256	16	66	1	1,056	270,336
1 MB	0	256	16	77	2	2,464	630,784
	1*	256	16	77	2	2,464	630,784
	2	512	9	77	2	1,386	709,632
	3	1,024	5	77	2	770	788,480
	4	256	16	66	1	1,056	270,336
2 MB	16	512	9	88	2	1,440	737,280
	0	256	32	77	2	4,928	1,261,568
	1**	256	32	77	2	4,928	1,261,568
	2	512	18	77	2	2,772	1,419,264
	3	1,024	10	77	2	1,540	1,576,960
4**	256	32	77	2	4,928	1,261,568	
	16	512	18	80	2	2,880	1,474,560
*Same as Option 0 (default) when using 1 MB media							
**Same as Option 0 (default) when using 2MB media.							

Table 5-2: Floppy disk formating options

Frmt Optn	0.5 MB Media	1 MB Media	2 MB Media
0	Don't use	Normal usage	Normal usage
1	Don't use	Normal usage	Normal usage
2	Don't use	512-byte sectors	512-byte sectors
3	Don't use	1024 -byte sectors	1024-byte sectors
4	Compatible with HP single sided disk drives	Compatible with HP single sided disk drives	Defaults to Format Option 0
16	Don't use	IBM compatible	IBM compatible

Table 5-3: Formating options and media usage

Series 200/ 300 - BASIC 5.0/ 6.0

SYSTEM REQUIREMENTS

The following is a list of hardware and software required or recommended for use with the Bering EconoPac 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 5.0 with HP-UX you will need to go through the following procedures before you load BASIC 5.0.
 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 EconoPac 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 EconoPac 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 5.0 operating system. You may type your MSUS as `" : , 700 , 1 , 4"` leaving out the device type.

The device selector is the address of your EconoPac. 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 EconoPac 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.

For the EconoPac fixed disk, the unit number is always 0. Before you can install your new EconoPac drive, you will need to load your BASIC 5.0 operating system into memory from the system disks. After loading BASIC, the operating system can be installed on your EconoPac.

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 5.0. Refer to *“Installing, Using, and Maintaining the BASIC 5.0 System”* in your HP manual.

LOADING BASIC 5.0

The following procedure is to load BASIC 5.0 into memory. For further information refer to the section in your BASIC 5.0 manual.

Note:

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

1. Verify that the HP-IB address of your EconoPac 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.

```
:HP7000,700,0,0
 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 5.0.
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 EconoPac 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:

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

6. Use the **[NEXT]** and **[PREVIOUS]** soft keys to select the EconoPac 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 5.0 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 fixed disk is formatted, you'll need to install the system and binaries to boot directly from the EconoPac. The next procedure is necessary for booting directly from your EconoPac.

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 5.0 and HP-UX together.

1. If the HFSutility is no longer in memory, insert the HFSUtilities 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 EconoPac 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 econopac 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 EconoPac 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 EconoPac 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 EconoPac 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 **I** 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 EconoPac 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 EconoPac 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 one side of 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 EconoPac disk 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 econopac 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 FILECOPYY.
9. When the screen asks **Filecopy what file?** type **#3:=** and press **[ENTER]**.

This tells the FILECOPYY 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 FILECOPYY 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 FILECOPYY 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 EconoPac by pressing **[RESET]**, or turning your computer off and back on.

HP 1000 A

CONFIGURATION

Use the EconoPac 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 EconoPac
sb2,sb1,sb0 = 3-word starting block address of that lu
tracks = number of RTE tracks in that lu
bpt = number of blocks in each RTE track (48)

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

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

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 = $\text{Blocks} / \text{bpt}$

where *bpt* can be the same as the Track size, the RTE default of 48, or any desired 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:

$$\begin{aligned} \text{Tracks used} &= \text{tracks in Lu0} + \text{tracks in Lu1} \dots \\ \text{Offset} &= \text{Tracks used} * \text{bpt} \\ \text{sb2} &= \text{Offset} / 65536 \\ \text{sb1} &= (\text{Offset} - \text{sb2} * 65536) / 65536 \\ \text{sb0} &= (\text{Offset} - \text{sb2} * 65536 * 65536 - \text{sb1} * 65536) \end{aligned}$$

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 ECONOPAC

Before the EconoPac 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
l = 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 EconoPac 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

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

available blocks = available tracks * bpt

**Series 800 HP-UX
8.0/ 9.0/ 10.0**

The Bering EconoPac is supported by HP-UX version 8.0, 9.0 and 10.0. The 2.1GB and higher models are only supported on HP-UX 9.04 and later. The following is a list of hardware and software required for use with the Bering EconoPac drive.

**SYSTEM
REQUIREMENTS**

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

CONFIGURATION

Use the EconoPac 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 fixed disk, you must set the emulation to enabled. Refer to "Change Emulation" in Chapter 4.

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

The following procedure describes how to add the EconoPac to your existing HP-UX system. This assumes that the EconoPac is an add-on storage.

**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.

- 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.

- 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).

- Set the HP-IB address of the EconoPac to a number which is not on the list of disk drives, (i.e., 3).
- Connect the EconoPac to the system if it is not already connected and power it on.
- Run `ioscan -f` again.

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

- Create the device special files for the EconoPac by typing the two following commands:

```
cd /dev
insf
```

- Run `ioscan-f` again to determine the LU number assigned to the EconoPac.

The LU number is the number you should use to access the EconoPac.

INITIALIZING THE ECONOPAC

Use the `MEDIAINIT` command to format the media.

Use the following command to format the disk:

```
mediainit /dev/diag/dsk/cnn0
```

nn = LU number

**CREATING A NEW
FILE SYSTEM**

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

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

Where: *device_file* = character device file (/dev/rdisk/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.

**FLOPPY
INITIALIZATION**

For the floppy disk drive in 73xx EconoPac models:

```
lifinit -n LIFVOL /dev/dsk/cnnd1s2
(makes lif volume called LIFVOL on LU nn)
```

```
lifcp /etc/passwd /dev/rdisk/cnnd1s2
(copies /etc/passwd file to lif floppy)
```

```
lifls -l /dev/diag/rdisk/cnnd1s2
(long list the directory of the floppy)
```

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

CARING FOR THE DISK DRIVE

This chapter describes how to care for your EconoPac disk drive. It is divided into two sections. The “General Safeguards” section tells you what to look out for. The “Diskette Care” section explains how to handle Diskettes. As long as you protect your EconoPac 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 EconoPac 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 EconoPac 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 EconoPac 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 EconoPac.
- Avoid exposure to magnetic fields such as those emitted by magnets, speakers, or telephone equipment.
- Avoid bumping the EconoPac while it is running.
- Always set the EconoPac upright on a flat surface.
- Do not transport the EconoPac with a diskette 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 EconoPac 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 EconoPac 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.

Diskette Care

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

- Store them properly. Remove the diskette from the drive when you are not using it and store it in a cool, dry, safe location.
- Do not leave the diskette in the drive after it is powered down. This leaves the diskette shutter open and makes the recording media vulnerable to dust and humidity.
- Keep your diskettes clean and dry and out of harm's way. Protect diskettes from dirt, spills, and smoke. Never attempt to open the shutter of the diskette since oil and dirt from your hands may be transferred to the media or to the inside of the drive.
- Use diskettes at correct temperatures - between 40°F (5°C) and 113°F (40°C). If a diskette is exposed to temperatures outside the operating limits, it should be stabilized to room temperature for a minimum of two hours before use.
- Do not expose the diskette to moisture, or prolonged direct sunlight.
- Do not move the drive while a diskette is loaded.
- Label the diskette clearly and ensure that the label is securely attached before loading the diskette. Do not mark on labels with a graphite pencil. The graphite dust may contaminate the media surface.

TROUBLESHOOTING & SERVICE

This chapter describes basic trouble-shooting procedures. It is divided into three sections: “Before You Do Anything Else,” “Maintenance,” and “Technical Support.”

Before You Do Anything Else

Often, problems with disk drives can be resolved by using the following check list.

- Is the power cord securely connected to the EconoPac and to a wall outlet?
- Is the power switched on and the AC fuse in the back of the drive intact?
To check the fuse, use a screwdriver to open the fuse compartment on the back of the EconoPac. If the fuse is blown, replace it with the spare fuse in the compartment, or purchase a replacement of the same size and type (“slow blow,” 1.6A, 250V).
- Are any of the pins on the cable connectors loose, broken, or shorted?
- Has the drive or floppy been properly formatted?
- Are all cables installed correctly?
- Is a floppy properly loaded in the EconoPac and was the drive up to speed and on-line before you started your computer?
If you attempt to start up or otherwise access a floppy without a diskette, the computer may not recognize the drive.
- Does each device connected to the HP-IB chain have a unique address?

Maintenance

There are no user serviceable parts in the EconoPac. The outside case of the EconoPac may be cleaned periodically with a damp cloth and a mild detergent.

The floppy disk drive should be cleaned periodically with a standard 3.5 inch diskette cleaning kit, available from most computer supply companies.

▲ CAUTION:

Never remove the cover of the EconoPac. This voids the warranty.

Fuse Replacement

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

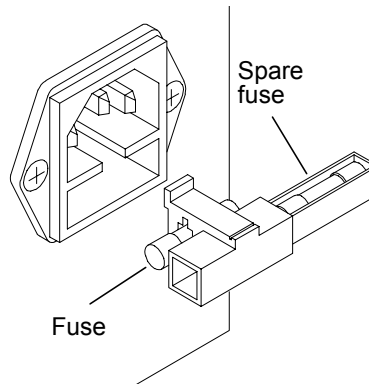


Figure 7-1: Replacing the AC fuse

Technical Support

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

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

(408) 364-6500
FAX (408) 374-8309

Prior to calling for Technical Support, please have the following information available:

- The model number and serial number of the EconoPac.
- The type of computer you're using, the operating system, the software version, and any other programs or utilities being affected.
- An exact description of the problem, including any error messages received from the operating system or application.
- The steps you have taken to correct the problem.



SPECIFICATIONS

200 MB Fixed Disk

Used in 7320

Formatted capacity	200.6	200.6	205.1	MB
Logical sector size	256	512	1,024	bytes
Logical track size	90	45	23	sectors
Logical size	28	28	28	tracks (heads)
Logical cylinders	311	311	311	cylinders
Logical drive size	783,720	391,860	200,284	sectors

PERFORMANCE

Rotation speed	4,306	rpm
Average latency	7	ms
Minimum seek time	4	ms
Average seek time	16	ms
Maximum seek time	30	ms
HP-IB burst transfer rate	1	MB/sec
HP-IB average transfer rate	940	KB/sec
MTBF	250,000	Power on Hours (POH)

ENVIRONMENTAL (operational)

Temperature	5° to 50° 41° to 122°	C F
Temperature gradient	20 68	°C/hour °F/hour
Relative humidity	8 to 80	%non-condensing
Vibration	1	G, 5 to 500Hz sine
Shock	6	G, 20 ms half sine pulse
Altitude	-300 ~ 3,100 -1,000 ~ 10,000	meters feet

(non-operating)

Temperature	-40° to 65° -40° to 149°	C F
Relative Humidity	5 to 95	%
Vibration	2	G, 5 to 500 Hz sine
Shock	70	G, 0.5 ms half sine pulse
Altitude	-300 ~ 12,000 -1,000 ~ 40,000	meters feet

**500 MB Fixed
Disk**

Used in: 7350

Formatted capacity	459.0	509.6	509.6	MB
Logical sector size	256	512	1,024	bytes
Logical track size	87	48	24	sectors
Logical size	64	64	64	tracks(heads)
Logical cylinders	322	324	324	cylinders
Logical drive size	1,792,896	995,328	497,664	sectors

PERFORMANCE

Rotation speed	4500	rpm
Average latency	6.6	ms
Minimum seek time	3.7	ms
Average seek time	12	ms
Maximum seek time	25	ms
HP-IB burst transfer rate	1	MB/sec
HP-IB average transfer rate	940	KB/sec
MTBF	250,000	POH

**ENVIRONMENTAL
(operational)**

Temperature	5° to 50°	C
	41° to 122°	F
Temperature gradient	20	°C/hour
	36	°F/hour
Relative humidity	8 to 80	% non-condensing
Vibration	0.5	G, 22 to 250Hz sine
Shock	10	G, 11 ms half sine pulse
Altitude	-60 ~ 3,000	meters
	-200 ~ 10,000	feet

(non-operating)

Temperature	-40° to 65°	C
	-40° to 149°	F
Relative Humidity	5 to 95	%
Vibration	2.0	G, 22 to 400 Hz sine
Shock	60	G, 11 ms half sine pulse
Altitude	-60 ~ 12,000	meters
	-200 ~ 40,000	feet

1 GB Fixed Disk

Used in 7310

Formatted capacity	1,003.9	1,003.9	1,003.9	MB
Logical sector size	256	512	1,024	bytes
Logical track size	148	74	37	sectors
Logical size	32	32	32	tracks(heads)
Logical cylinders	828	828	828	cylinders
Logical drive size	3,921,408	1,960,704	980,352	sectors

PERFORMANCE

Rotation speed	4500	rpm
Average latency	5.5	ms
Minimum seek time	3	ms
Average seek time	10	ms
Maximum seek time	20	ms
HP-IB burst transfer rate	1	MB/ sec
HP-IB average transfer rate	940	KB/ sec
MTBF	250,000	Power On Hours (POH)

ENVIRONMENTAL (operational)

Temperature	0° to 45°	C
	32° to 113°	F
Temperature gradient	20°	C/ hour
	36°	F/ hour
Relative humidity	8 to 85	% non-condensing
Vibration	0.5	G, 5 to 500Hz sine
Shock	10	G, 11 ms half sine pulse
Altitude	-60 ~ 3,000	meters
	-200 ~ 10,000	feet

(non-operating)

Temperature	-40° to 65°	C
	-40° to 149°	F
Relative Humidity	5 to 95	%
Vibration	2.0	G, 22 to 400 Hz sine
Shock	60	G, 11 ms half sine pulse
Altitude	-60 ~ 12,200	meters
	-200 ~ 40,000	feet

**2.1 GB Fixed
Disk**

Used in 7321

Formatted capacity	2,107.6	2,107.6	2,107.6	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	1,340	1,340	1,340	cylinders
Logical drive size	8,232,960	3,993,200	2,058,240	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	POH

**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

Floppy Disk

PERFORMANCE	Formatted capacity	1.42	MB
	Physical heads	2	
	Rotation speed	300	rpm
	Average latency	100	ms
	Minimum seek time	18	ms
	Average seek time	94	ms
	Burst transfer rate	1	MB/ sec
	Average transfer rate	32	KB/ sec
	Motor start time	500	ms
ENVIRONMENTAL (operational)	Temperature	5° to 40°	C
		50° to 104°	F
	Relative humidity	8 to 80	% non-condensing
	Vibration	0.5	G, 10 to 500 Hz sine
	Shock	5	G, 11 ms half sine pulse
ENVIRONMENTAL (non-operational)	Temperature	-40° to 60°	C
		40° to 140°	F
	Relative humidity	5 to 90	%
	Vibration	2	G, 10 to 500 Hz sine
	Shock	70	G, 11 ms half sine pulse

General**Power Requirements**

Line voltage	90–240	volts
Line frequency	47-63	Hz
Current	0.5	Amp
Fuse	“Slow blow,” 1.6A, 250V	

General Dimensions

Interface	HP-IB, CS80
Dimension	5" x 12.8" x 11" 12.7 x 32.5 x 27.9 cm
Shipping weight	30 lbs. 13.6 Kg

Accessories

HP-IB Cable 1.0m (3.3 ft.)	ACCS-7110
HP-IB Cable 2.0m (6.7 ft.)	ACCS-7115
Rack Mount Kit - 19" EIA	ACCS-7204

RACK MOUNT

Installation

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

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

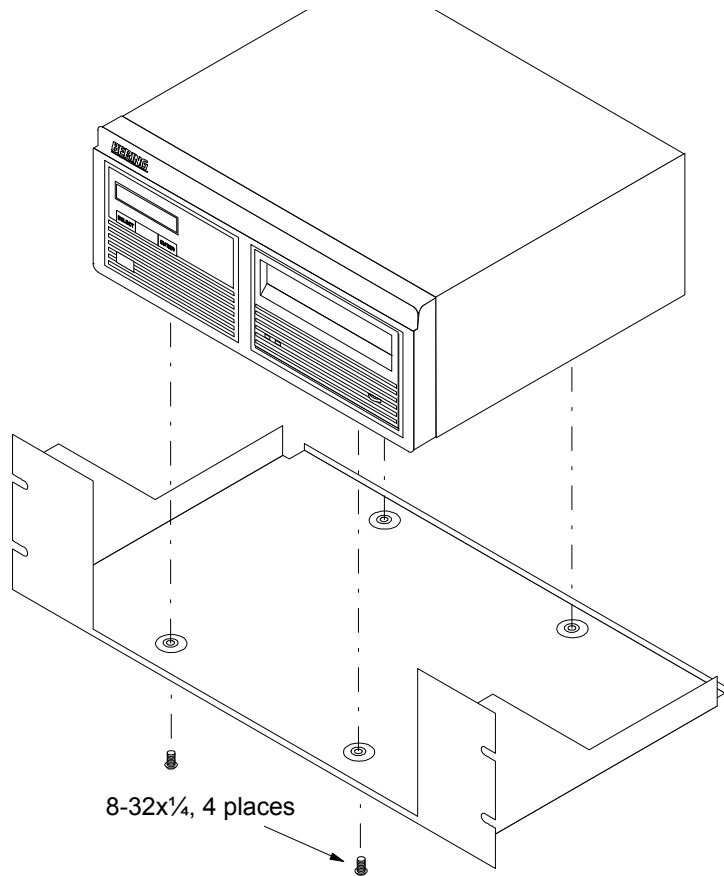


Figure B-1: Attaching the unit to the rack mount

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

▲ CAUTION

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

The rack requires 5.25 inches of vertical clearance.

3. Insert the shelf with the Bering drive into the cabinet and hold it in place.
4. Insert the four (4) 10-32x5/16 screws from the front through the holes in the cabinet. Screw the 10-32 nuts on the screws from the rear of the cabinet and tighten.

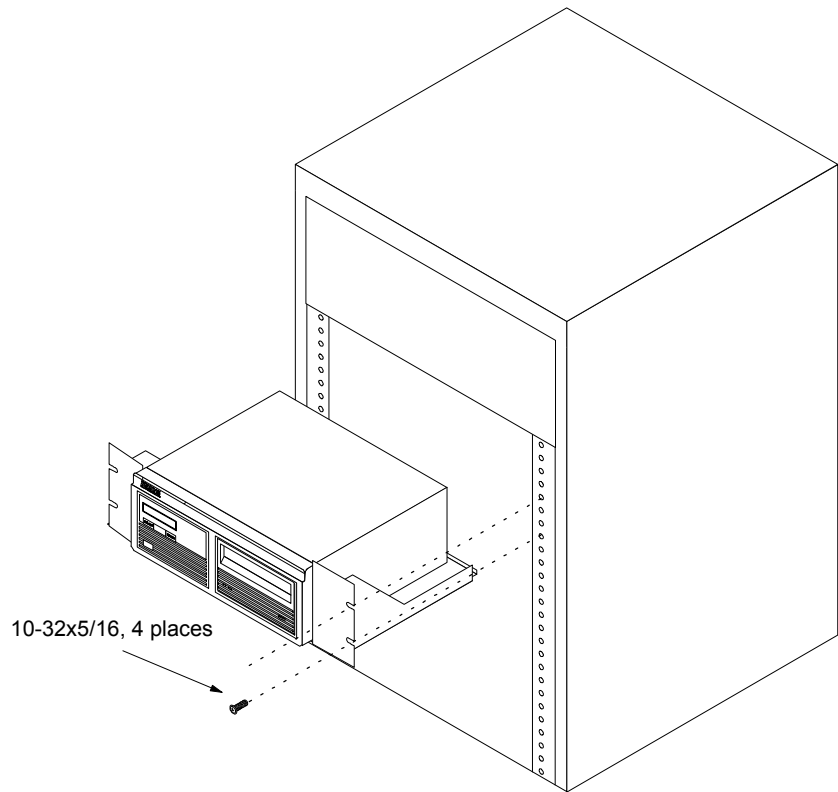


Figure B-2: Installing the rack mount

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