Echo 8400 Series
User's Manual

Manual No. 11-11001-01, Rev B

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Note:

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

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Important FCC Information

This peripheral device generates and uses radio frequency energy and if it is not installed and used properly, that is, in strict accordance with this manual, it may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class-A computing device in accordance with the specifications in subpart J of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. However, there is no guarantee that interference will not occur in a particular installation. Operation of this equipment in a residential area is likely to cause interference and is up to the user, at his own expense, to take whatever measures may be required to correct the interference. You can test to see whether this equipment does cause interference with radio or television reception by turning the disk drive off and on. If it is causing interference, try to correct the problem by one or more of the following measures:

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

If necessary, consult your dealer or an experienced radio/television technician for additional suggestions. You may also find a booklet prepared by the Federal Communications Commission helpful. It is entitled *How to Identify and Resolve Radio-TV Interference Problems.* Request Stock No. 004-000-00345-4, from the U.S. Government Printing 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 Echo 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 Echo 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 Echo 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 *Echo 8400 Series User's Manual* required for your Echo 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
November 1994	A	A.00	First printing
February 1995	B	A.00	Added rack mount instructions

Warranty Statement

Echo 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.

Echo cartridge tape media is warranted against defects for ninety (90) days from the date of purchase. If the media becomes defective, Bering will replace it upon receipt of the defective media from the customer.

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

Customer Service
Bering Technology, Inc.
1357 Dell Ave.
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Customer Service: (408) 364-6500
FAX: (408) 374-8309

Bering telephone support for installation problems is available for ninety (90) days from the date of purchase. After ninety days an extended service contract is required. Contact Bering sales department for information on extended service contracts.

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

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

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

Configuration Settings

Use this table to record the configuration settings of your Bering Echo 8400 cartridge tape subsystem.

Model _____

Part Number _____

Serial Number _____

ROM Version _____

Time Zone _____

Interface	❑ HP-IB	❑ SCSI
HP-IB Address _____		
SCSI ID	Left _____	Right _____
Termination	❑ Enabled	❑ Disabled
Termination power	❑ Enabled	❑ Disabled
Emulation	❑ DDS ❑ 7974 ❑ CS80 tape	❑ 7980 ❑ 7970
Tape size limit	❑ Enabled	❑ Disabled
Compression	❑ Enabled	❑ Disabled
Dual tape mode	❑ Mirror ❑ Sequential	❑ Split
Auto eject	❑ Enabled	❑ Disabled
Auto on-line	❑ Enabled	❑ Disabled

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1

INTRODUCTION

Congratulations on purchasing what we think is the finest tape backup system available. Bering drives are built for years of reliable service. We hope you'll agree as you continue to use your drive.

The Bering Echo tape subsystem is compatible with Hewlett-Packard business, and technical computers, such as the HP3000, HP1000, and HP9000 Series 200/300/700/800. In this manual we refer to the Bering Echo subsystem as *Echo* and all HP systems as *computer*.

This is the list of all Echo models:

- 8401HS — a 4mm DDS-1 (up to 2 GB) tape subsystem
- 8411HS — a 4mm DDS-1 data compression (up to 8 GB) tape subsystem
- 8421HS — a 4mm DDS-2 data compression (up to 16GB) tape subsystem
- 8422HS — a dual 4mm DDS-2 data compression (up to 32GB) tape subsystem.

  The 8422HS model contains two DDS-2 tape drives which can be set to do different types of backups:

- Mirror backup—the backup writes the same information to both drives at the same time, essentially creating two identical backups.
- Sequential backup—the backup writes to the first tape drive until End-of-Tape is detected and then continues to write to the second tape.
- Split backup—the backup writes to both drives, a block to the left drive and then a block to the right drive. This is the fastest mode.

  These models support FAST SEARCH capabilities.

The Echo HS models contain an HP-IB interface and a SCSI interface. Only one of the interfaces can be used at a time. The interface can be selected from the front panel LCD controls. Many of the controls are disabled while the SCSI interface is enabled. The only LCD menu items available with the SCSI interface enabled are:

- Use HPIB interface
- Set SCSI address
- Set SCSI termination
- Set time
- Set date
- Test LCD display

The Echo HS models are DDS (Digital Data Storage) format drives. These drives use the HP/Sony standard DDS recording format. These drives also use the DDS recording format extended to support data compression (DDS-DC).

The installation procedure is almost identical for all models. No software or hardware modifications are required. All Echo models support the latest HP tape command sets. These models support the SCSI Common Command Set (CCS).

Data Compression

The Echo models can store up to 8GB of data on a 90m tape in the DDS-1 models or 16GB on a 120m tape in the DDS-2 models. These higher capacities can be obtained with the use of data compression. A 2 to 4 fold increase in capacity over standard DAT can be obtained with maximum compression.

The data compression algorithm used is the advanced DCLZ (Data Compression Lempel Ziv) method. Because the data compression is resident in the tape drive and the drive compresses data in real time, the host is free to manage other processes. This algorithm can achieve a compression factor of two for files such as object code and a compression factor of four or more for text and data bases.

The data compression can be disabled or enabled from the Echo front panel LCD controls. This allows backward compatibility with the Echo 4420, 8401, and Echo 4425 models as well as other brands of DDS/DAT drives which do not support data compression.

DDS-2 Format and Compatibility

The 8421 and 8422 models support the DDS-2 format. The DDS-2 format is an extension of the DDS-1 and DDS-DC format. The DDS-2 format allows compressed data to be stored in a way that maintains the full functionality of the DDS-1 format, and ensures backward compatibility with existing DDS drives. The Echo supports the mixing of compressed and uncompressed data. This means that a tape can be labeled with uncompressed data and read in any DDS tape drive.

The DDS-2 format uses the same error correction techniques as the DDS-1 format. These incorporate the error correction techniques used in DAT drives with additional techniques specifically designed to provide the integrity of data necessary for computer use.

Media Recognition System

The DDS logo was designed to indicate that a cartridge contained data-grade quality tape. Although non-DDS cartridges may appear to work satisfactorily in the drive, their inferior specification threatens the integrity of your data. The Media Recognition System provides the drive with the ability to detect DDS cartridges.

DDS Media Recognition system tapes have a series of stripes on the transparent leader tape at the beginning of the tape. The 8421HS and 8422HS models can detect these, and are configured to treat any tape without stripes as write-protected. In other words, the drive will only be allowed to read tapes which are not DDS Media Recognition System, not write to them. You can recognize DDS Media Recognition system tapes by the logo shown below.

Tapes with the old DDS logo are not inferior, they simply do not have the stripes on the leader tape, so the drive cannot recognize them as being DDS quality. All DDS tapes cartridges produced from early 1993 should have the Media Recognition System stripes.

Conventions in this Manual

We'll use the following conventions to make the information in this manual easier to understand:

- 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 Echo are indicated by underlined capital letters alone followed by the word button, e.g., **ENTER** button.
- A monospaced font, `like this`, will convey text you should see on your screen, e.g., you'll see: `Welcome!` on your monitor.'
- The same monospaced font in contrast (either bold or regular) to the surrounding text, **`like this`**, will present the exact characters or keys you are to type or press, e.g., -type **`UTIL`** and press **`[ENTER]`** to continue. However, these keystrokes will not be typographically differentiated if they are conditional or theoretical. That is, if you have the option of making one of several entries or we are speaking of hypothetical situations, e.g., -If you type **Y** and press **[ENTER]** the disk will be reformatted, but if you type **N** and press **[ENTER]** you will exit the program.
- We will place entries you are to type which are longer than one word on a separate line in the monospaced font detailed above.
- 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 in body text to distinguish them from the rest of the text. However, when in a command line, they will be represented in lower case letters unless upper case (capital) letters are actually required, e.g.,
  in body text: -... create a LIF volume using the LIFINIT command

  `to be typed:` **`lifinit /dev/rdsk/Echo`**
- 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., *Echo 8400 Series 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. Frequently the letter(s) *n* (for numerals), or *x* (for words or characters) are used to hold the place of the variable, e.g., the program will respond that there are *n* widgets. 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

This section describes the unpacking procedure. Carefully unpack your Echo 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 Echo subsystem
- A tape cartridge (two cartridges for 8422HS)
- A power cable
- A cleaning cartridge
- An HP-IB 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 TAPE DRIVE

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

Quick-Start Procedure

This section describes the quick-start procedure to set up the Echo on a HP-IB based computer. Most of the parameters are already set at the factory, but there may be some adjustments necessary before the Echo can operate in your environment. Refer to Chapter 5 for detailed instructions for installing the drive on your HP-IB computer and Chapter 6 for systems with a SCSI interface.

The default parameter settings are as follows:

Time:	Pacific time
Date:	current date
Interface	HP-IB
HP-IB address:	0
Emulation:	HP DDS
Dual Tape Mode	Sequential (8422HS only)
Auto eject:	disabled
Auto online:	enabled
Compression:	enabled

1. Turn off your computer and connect the Echo.

   If necessary, refer to the next section in this chapter.

2. Turn on the Echo and wait for the self-test to end.

   When ready for use, the LCD will display the time and date.

3. Verify that the time and date are correct.
4. Use the **SELECT** and **ENTER** buttons to choose the Configurations function

   a. Check the HP-IB address and change it if necessary.
      Make sure all devices on the HP-IB have a unique address.

5. Return to the main menu and load a cartridge.
6. Turn on your computer.

Connecting the 8400HS

For specific installation and configuration instructions for your SCSI based computer, refer to Chapter 6, *Configuring Your HP SCSI System.*

...To a HP-IB Based Computer

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

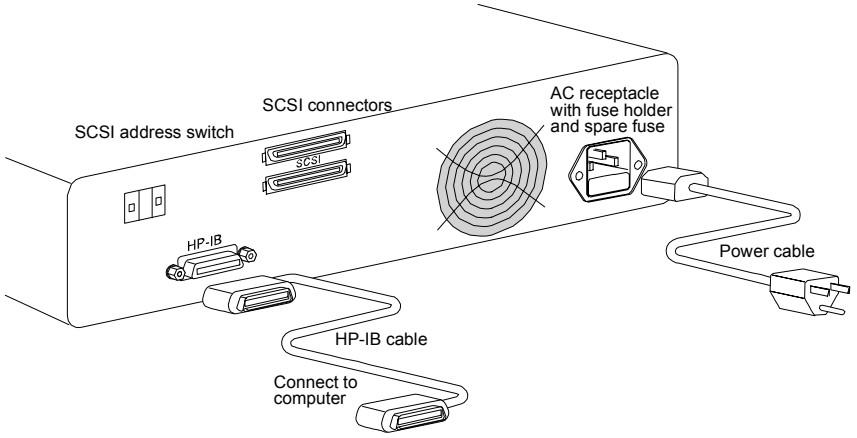


Figure 2-1: Connecting the Echo to a HP-IB computer

1. Turn off your computer.
2. Connect one end of the HP-IB cable to the HP-IB connector on the back of the computer and the other end to the HP-IB connector on the back panel of the drive. Tighten the thumb screws by hand.
3. Connect the power cable to the back of the Echo. Make sure there is at least one inch of space around the back and two inches around the sides of the drive.
4. Plug the Echo and the computer into three-pronged (grounded) electrical outlets.

   Be sure that the outlets actually are grounded. The Echo should be on the same circuit as your computer.

   Set the SCSI address on the back panel of the Echo to 0. If this is an 8422HS model set the left address to 0 and the right address to 1.
5. Turn on the Echo, the computer, and any other peripherals.

...To a SCSI Based Computer

These instructions are for connecting an Echo model to a SCSI based computer with the Echo SCSI 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.*

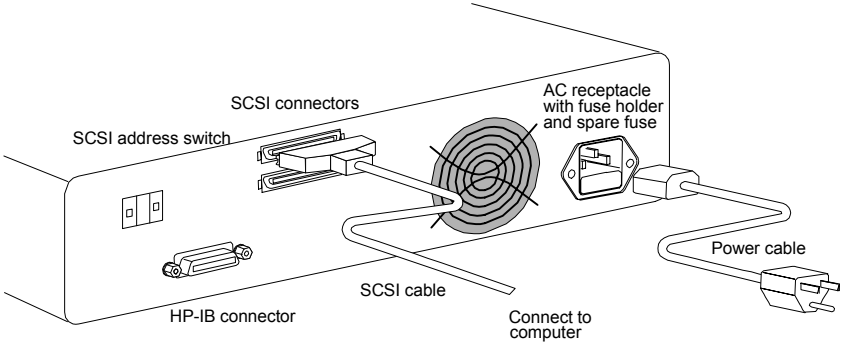


Figure 2-2: Connecting the Echo to a SCSI computer

1. Turn off your computer.
2. Connect the SCSI high density cable from the computer to the top SCSI connector on the back panel of the Echo. If the Echo in the middle of the SCSI chain connect a cable from the bottom connector of the Echo to the next drive in the SCSI chain. Remember to terminate the last device in the chain.

   The bottom SCSI connector is terminated when the Echo is the last drive in the SCSI chain. The termination is enabled from the Echo's front panel LCD controls. The instructions for enabling the SCSI port and termination can be found on the following page.
3. Connect the power cable to the back of the Echo.
4. Make sure there is at least one inch of space around the back and two inches around the sides of the drive.
5. Plug the Echo into three-pronged (grounded) electrical outlets.

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

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

6. Turn on the Echo.

Enabling the SCSI Ports

To enable the SCSI ports on the Echo model, follow these instructions:

▲ CAUTION: *Changing to and from the SCSI Interface while the Echo is attached to and mounted on your computer may cause data corruption. Always disconnect the drive from your computer prior to changing the interface.*

1. Disconnect the Echo from your computer system.
2. Press the **SELECT** button on the front of the Echo until the Configurations function is displayed.
3. Press the **ENTER** button when the Configurations function is displayed on the Main menu.
4. The Use SCSI interface function will now be displayed.

   If Use HP-IB interface is displayed, the SCSI interface is already enabled.

▲ CAUTION: *Connecting the SCSI ports of the Echo to a SCSI interface in your computer without proper termination of the SCSI chain could damage the Echo or your computer.*

5. Push the **ENTER** button to enable the SCSI interface.

   You will be asked to confirm your selection by pressing the **SELECT** key until Yes is display, then press the **ENTER** key to confirm it.

   You will be returned to the time and date display:

   ```
   3:04:55  SCSI
   Fri May 15, 1992
   ```

6. Set the SCSI address on the back panel for each drive in the Echo.

Note: The drive should be set to a value which will not conflict with other devices on the SCSI chain. Each device should have a unique address. Values of 0 through 6 are generally used. If your computer has an internal hard disk, it will normally use SCSI address 0. The SCSI controller in your computer will normally use SCSI address 7.

7. Set the SCSI termination by going to the Configurations menu and selecting Terminator disable / enable. If this is the last drive in the SCSI chain, enable termination, otherwise disable it.
8. Connect the Echo to your computer and restart the computer to install the Echo on the new operating system.

   For more information on enabling the HP-IB or SCSI port on the Echo models, refer to Chapter 4 of this manual.

▲ CAUTION: *When you select the SCSI interface, the HP-IB interface is disabled. Most of the LCD functions will also be disabled, except setting the time and date, viewing the ROM version and model, enabling the HP-IB interface, and changing SCSI termination.*

3 OPERATING THE TAPE DRIVE & CARTRIDGE

This chapter describes the operating procedure of the Echo and cartridges. It is divided into four sections: “Power Up”, “Loading a Cartridge”, “Unloading a Cartridge”, and “Write-Protecting a Cartridge”.

Power Up the Echo

Figure 3-1 illustrates all controls and indicators required for operating the Echo DDS tape drives.

1. Make sure the Echo is plugged in and properly connected, then press the **POWER** button on the front panel of the Echo.

   The LCD will display a self-test message. The LEDs on the Echo tape drive will stay lit during start up to indicate a self-test operation and then go out. This operation may take several minutes. After the self-test is successfully completed, the Echo model number, then the time and date will be displayed on the LCD.

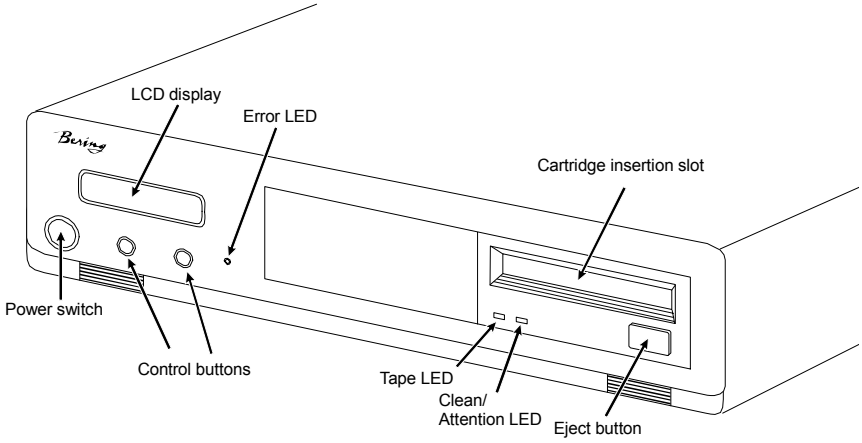


Figure 3-1: Echo 8400 front panel

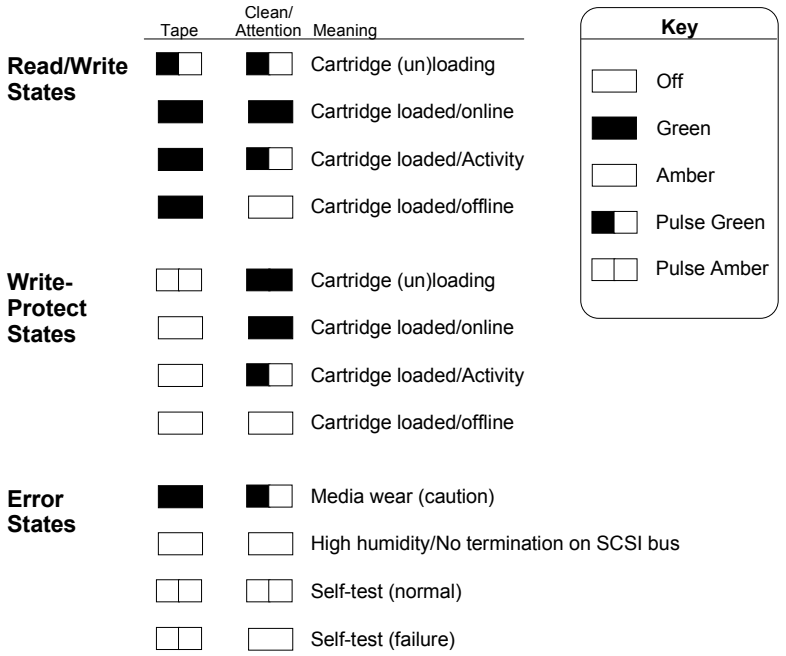
The 8422HS model will have two drives installed, one on the left and one on the right.

The Error LED illuminates when an error is detected by the controller circuitry. This red LED may flash or remain on constantly. Some types of tape errors will not cause the Error LED to light. Some errors are indicated by a message on the LCD or by flashing LEDs on the individual tape bezels. Other errors may appear on the computer operating system monitor.

Front Panel LEDs, 8401 / 8411

The front panel of each 4mm tape drive has two bi-color LEDs. Green is used to indicate normal operation, and amber is used to imply warning conditions. Pulsing shows activity between the drive and the SCSI bus. If the Tape LED (left) shows steady amber, this indicated that the cartridge is write-protected. If the Clean/Attention LED (right) shows steady amber, this indicates a fault condition.

The following table lists all the possibilities.



Caution Error State

If an excessive number of read-after-write errors are detected during normal operation, a Caution (media wear) Signal is displayed.

This condition could be caused by dirty heads, so the heads should be cleaned and the operation tried again. If the Caution signal reappears, assume the tape is nearing the end of its useful life; copy the data on the cartridge onto a new one and discard the old cartridge. The Caution Signal is cleared by unloading the cartridge.

Head Cleaning

The tape heads should be cleaned after every 25 hours of use. Cleaning the heads should also be performed when a Caution Signal display appears on the front panel. Refer to Chapter 7 for head cleaning instructions.

High Humidity

If the drive detects high humidity, all commands are aborted and rejected until the drive detects that the humidity is at an acceptable level.

Front Panel LEDs, 8421 / 8422

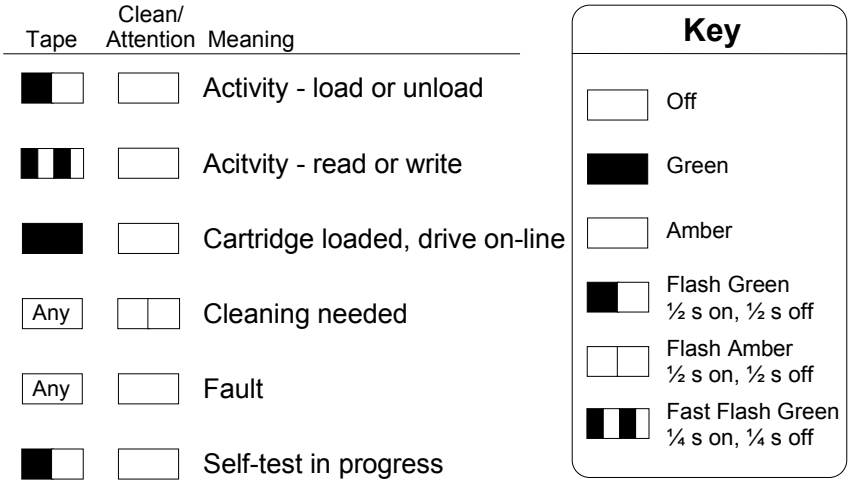
The front panel of each 4mm tape drive has two LEDs. Green is used to indicate normal operation, and amber is used to imply warning conditions. Pulsing shows activity between the drive and the SCSI bus. If the Tape LED (left) uses green to show tape activity as follows:

- Slow flashing green while the tape is being loaded or unloaded
- Steady green when the tape is loaded
- Fast flashing green when read or write operations occur

The Clean/Attention LED (right) uses amber to show the following condition:

- Slow flashing amber to indicate that the heads need cleaning, or the cartridge is near the end of its useful life
- Steady amber to indicate a hard fault

The following table lists all the possibilities.



Caution Error State

If an excessive number of read-after-write errors are detected during normal operation, the Clean/Attention light flashes amber.

This condition could be caused by dirty heads, so the heads should be cleaned and the operation tried again. If the Cleaning Needed signal reappears, assume the tape is nearing the end of its useful life; copy the data on the cartridge onto a new one and discard the old cartridge. The Cleaning Needed signal is cleared by loading a cleaning cartridge.

Loading a 4mm Cartridge

Loading a data cartridge is very much like loading a cassette in your tape player.

▲ CAUTION:

Only DDS (Digital Data Storage) tapes with the DDS logo should be used in the Echo 8400 Series drives. The use of DAT (Digital Audio Tape) tape will endanger the integrity of your data. Bering Technology reserves the right to exclude from the warranty any damage caused by use of non-approved media, such as DAT tape.

The 8401HS and 8411HS models can read and write to DDS-1 tapes; while the 8421HS and 8422HS models can read and write to both DDS-1 and DDS-2 tapes.

1. Make sure the Echo is turned on before you load a cartridge
2. Insert the DDS cartridge into the drive slot with the arrowhead pointing toward the slot and the write-protect switch toward you. Push the cartridge straight in, keeping it parallel with the top and bottom of the drive.

   The drive will complete the loading process, threading the tape and performing a load sequence. The tape will be examined and the read/write circuits will be tested. This procedure should take approximately 25 seconds. When the load sequence is complete the green LED will light to tell you the drive is ready.

Unloading a Cartridge

It is important to remove the cartridge before you turn off the Echo. If you leave the cartridge in the drive, the shutter remains open and the recording media itself is vulnerable to dust. The media or the heads could easily be damaged and cause the loss of valuable data.

Note: You can not unload a cartridge when the Echo is turned off.

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

   The Go on-/off-line function will be displayed.

2. Push the **SELECT** button again.

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

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

   The drive will rewind the tape, open the door, and eject the cartridge.

4. 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 tape surface. Refer to Chapter 7, “Caring For The Tape Drive & Cartridge,” for further information on cartridge care.

Write-Protecting a 4mm Cartridge

You may want to write-protect the cartridge after removing it from your Echo. Write-protection prevents accidentally erasing or overwriting data on the cartridge tape. The write-protection switch is located at the front of the cartridge.

1. To write-protect a cartridge, use a fingernail or a non-magnetized small screwdriver to slide the switch sideways toward the center of the cartridge.

   When the hole on the edge of the cartridge is open, data cannot be written to the cartridge and existing data cannot be changed or erased by the Echo.

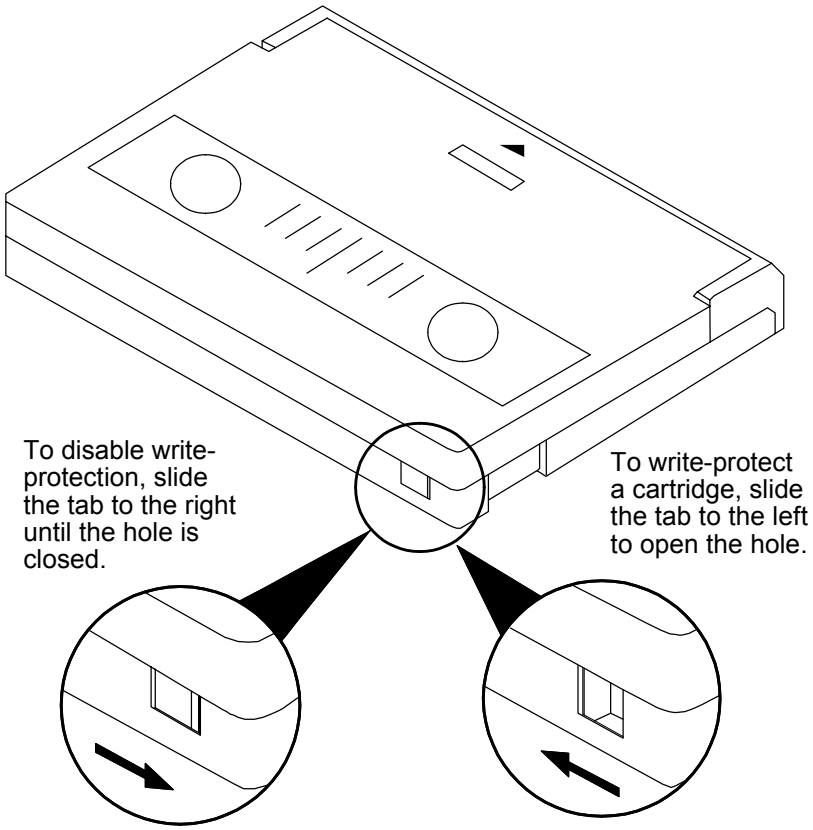


Figure 3-2: The 4mm cartridge write-protect switch

1. To disable write-protection, slide the switch toward the closest edge of the cartridge.

   When the hole in the cartridge is closed, data can be written to the cartridge and existing data can be changed or erased by the Echo.

4

ECHO SYSTEM FUNCTIONS

This chapter describes the Echo configuration and operating procedures. The Echo features a push-button operation for performing configuration and operating procedures. They are based on a hierarchical structure of system functions displayed on the tape drive's LCD. All 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 HP-IB System.”

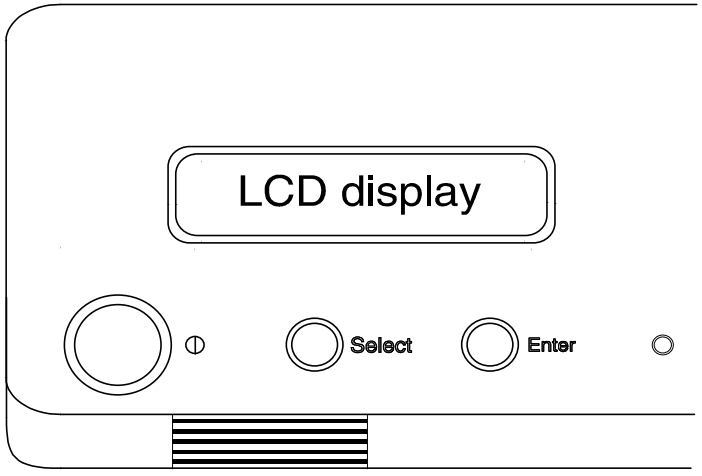


Figure 4-1: Front panel LCD and push-button controls

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

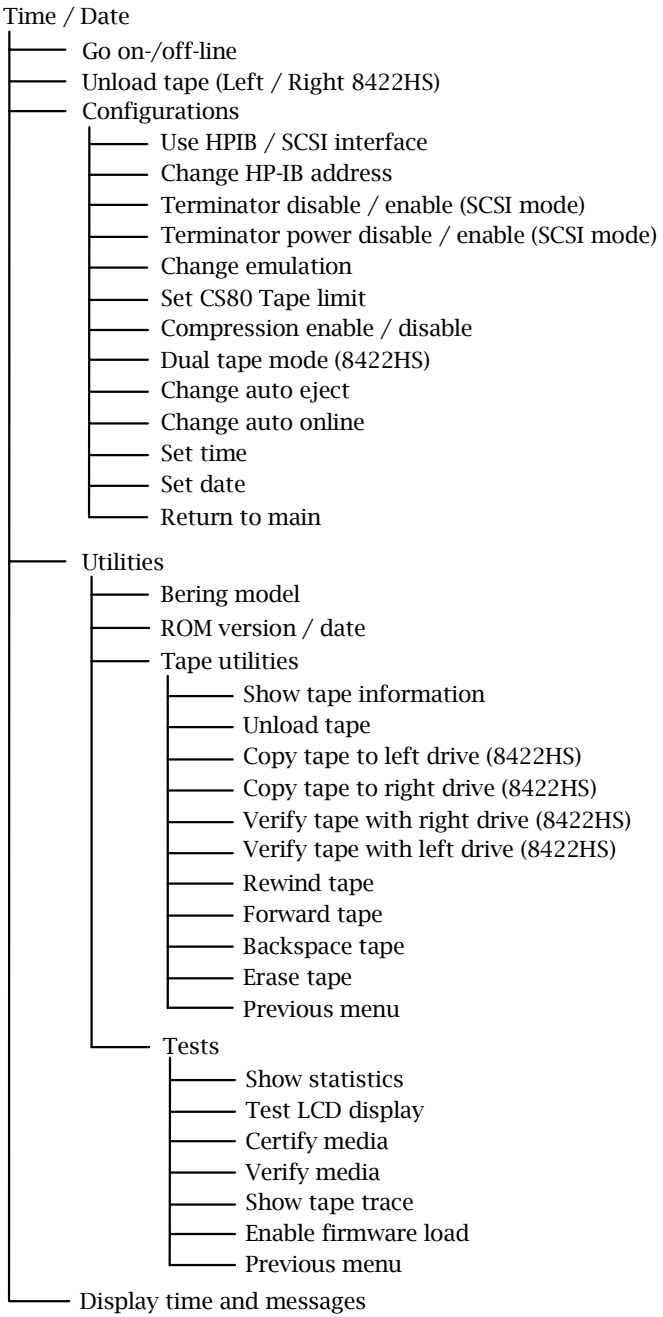
- To select a system function, press the **SELECT** button until the desired function appears on the LCD.
- To execute the chosen function or display its options, press the **ENTER** button.
- To cancel the current operation, press the **SELECT** and **ENTER** buttons simultaneously.

  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.

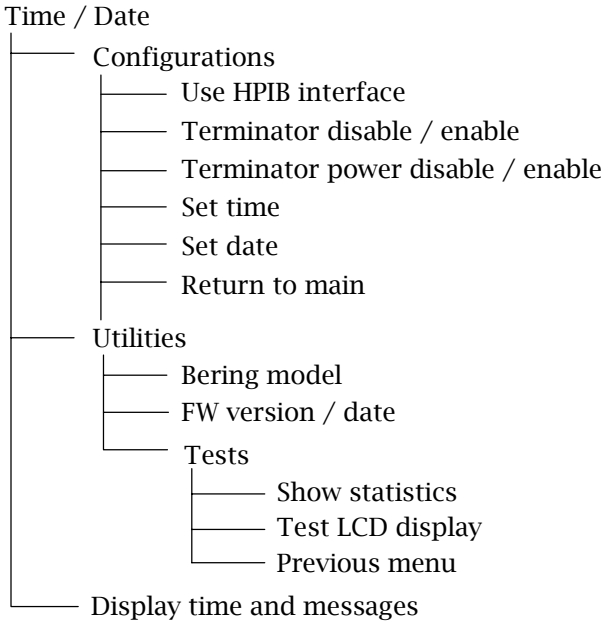
Echo Menu Tree

The menu tree below should help you orient yourself within the command structure for the Echo.



Echo SCSI Mode Menu Tree

The menu tree below should help you orient yourself within the command structure while the Echo has the SCSI port enabled.



Power-on LCD Display

When you power on the Echo, The default display on the front panel LCD is the time/date and on-line/off-line status. The following message will appear:

```
10:34:58AM 10/14
ON-LINE
```

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 through 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:

```
Go on-/off-line
Unload tape (Unload left/right tape)
Configurations
Utilities
Display time and messages
```

Go On-/Off-line

Use this function to go on-line and off-line.

1. Use the **SELECT** button to choose the Go on-/off-line function from the Main menu:

   Pressing the **SELECT** button will toggle between Go on-line and Go off-line.

2. Press the **ENTER** button.

Unload Left/Right Tape

Use this function to unload the left or right cartridge.

1. Use the **SELECT** button to choose the Unload tape function from the Main menu:
2. Press the **ENTER** button.

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

   If the cartridge is in use by the operating system, you'll see:

   ```
   Tape in use
   UNLOAD IT! No
   ```

   a. Press the **SELECT** button to choose Yes, if need be; when Yes is selected, press the **ENTER** button to initiate this action.
   See “Unloading a Cartridge” in Chapter 3 for more details.

Configurations	Functions in this submenu set the HP-IB address, emulation mode, change the SCSI termination, and set the date and time. See the "Configurations Submenu" section for detailed information.
Utilities	This function shows cartridge tape information, verifies, copies, moves, and erases the tape, and performs test functions. Refer to the "Utilities Submenu" section for detailed information.
Display Time And Messages	This function exits the Main menu and displays the current time, date, and system messages.

Configurations Submenu

These functions set the HP-IB address, change emulations and auto eject and on-line functions, set the date and time, and set auto backup time.

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

   The submenu will offer these functions in sequential order:

   Use HP-IB/SCSI interface
   Change HP-IB address
   Terminator disable / enable (only while SCSI is enabled)
   Terminator power disable / enable (only while SCSI is enabled)
   Change emulation
   Tape size limit (CS80 tape emulation)
   Compression enable / disable (8411, 8421, 8422)
   Dual tape mode (8422HS only)
   Change auto eject
   Change auto online
   Set time
   Set date
   Return to main

2. Press the **SELECT** button to scroll through the functions.
3. To return to the time and date display on the Main menu, press the **ENTER** button when you see:

   Return to main

Use HP-IB/SCSI Interface

This function toggles the SCSI interface on or off in the Echo. When the SCSI interface is enabled, most other LCD functions are disabled.

Note: The dual mode functions—mirror, sequential, and split—in the 8422HS will not be available while the SCSI interface is enabled. The computer will see two separate drives attached to the SCSI chain.

▲ CAUTION: *Changing to and from the SCSI Interface while the Echo is attached to and mounted on your computer may cause data corruption. Always disconnect the drive from your computer prior to changing the interface.*

1. With the Use SCSI interface function displayed, press the **ENTER** button to choose this function.

   The display will ask for confirmation. Use the **SELECT** key to toggle between Yes and No and press **ENTER** when the desired message is displayed.

   The display will return to the time and date display:

```
3:04:55  SCSI
Fri May 15, 1992
```

If the SCSI is already enabled, you will see the following message:

```
Use HP-IB
interface
```

2. Press the **ENTER** button to enable the HP-IB interface.

   The display will ask for confirmation. Use the **SELECT** key to toggle between Yes and No and press **ENTER** when the desired message is displayed.

Change HP-IB Address

This function sets the HP-IB address of the Echo; it is only available while the HP-IB interface is enabled. 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. With the Change HP-IB address function displayed, press the **ENTER** button to choose this function.

   The following message will appear:

   ```
   HP-IB address = n
   ```

2. Press the **SELECT** button to scroll through the choices, then press the **ENTER** button to choose an address.

   The Echo will reset to the new value.

Terminator Disable / Enable

This function enables or disables the active termination of the bottom SCSI connector on the back panel of the Echo. If the Echo is the last drive on the SCSI chain, the terminator should be enabled. If it is not the last drive on the SCSI chain the termination should be disabled. while the terminator is enabled the SCSI cable should be plugged only into the top SCSI connector.

1. With the Terminator enable / disable function displayed, press the **ENTER** button to choose this function.

   The following message will appear:

   ```
   disable
   Terminator
   ```

2. Press the **SELECT** button to toggle between enable and disable, then press the **ENTER** button to choose a termination option.

   The Echo will reset to the new value.

Terminator Power Disable / Enable

The Echo provides termination power (TERMPWR) to the SCSI bus. If any device on the SCSI bus requires external termination power no other device on the SCSI bus provides TERMPWR, this feature should be enabled. Bering recommends that termination power always be enabled.

1. With the Terminator power disable / enable function displayed, press the **ENTER** button to choose this function.

   The following message will appear:

   ```
   disable
   Terminator power
   ```

2. Press the **SELECT** button to toggle between enable and disable, then press the **ENTER** button to choose a terminator power option.

   The Echo will reset to the new value.

Change Emulation

This feature is only available while in HP-IB mode. This function selects one of six special emulations of standard Hewlett Packard tape drives:

HP DDS — the Echo will report to the host computer as an HP C1511A DDS drive. this is used for HP3000 and HP-UX computers.

HP 7980 — the Echo will report to the host computer as a HP 7980 streaming tape. This is used for HP3000, HP 1000 and HP-UX computers.

HP 7974 — the Echo will report to the host computer as a HP 7974 streaming tape. This is used for HP3000, HP 1000 and HP-UX computers which do not support the HP7980 tape drive.

HP 7970 — the Echo will report to the host computer as a HP 7970 streaming tape. This is used for HP3000 and HP-UX computers which do not support HP7974 or HP7980 tape drives.

CS80 tape — the Echo will report to the host computer as a CS80 tape drive such as 9144. This is used for the computers which do not support streaming tapes such as HP9000 BASIC, PASCAL, and SRM.

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

   The following message will appear:

   ```
   Set emulation to
   (HP DDS/HP 7980/HP 7974/HP 7970/CS80 tape)
   ```

2. Press the **SELECT** button to step through the choices, then press the **ENTER** button to choose an emulation

Tape Size Limit

This function is available only when CS80 tape emulation is enabled. It limits the tape capacity to approximately 900MB. This is required for use on SRM systems.

1. With the Tape size limit function displayed, press the **ENTER** button to choose this function.

   The following message will appear:

   Tape size limit
   enable / disable

2. Press the **SELECT** button to toggle between enable and disable.
3. Press the **ENTER** button to choose the desired setting.

Compression Enable / Disable

This function is for the 8411, 8421, and 8422 only. The default setting — enabled — stores up to 8GB of data on a 90 meter 4mm cartridge. Use this function to disable data compression — stores up to 2GB on a 90 meter 4mm cartridge — for compatibility with the 4420XL/4425XL and other DDS/DAT models. This feature is only available while in HP-IB mode. If you have SCSI enabled the drives that support compression are defaulted to SCSI.

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

   The following message will appear:

   Compression
   enable / disable

2. Press the **SELECT** button to toggle between enable and disable.
3. Press the **ENTER** button to choose the desired setting.

Dual Tape Mode

This function is for the 8422HS only. This function sets the mode for writing and reading information to and from the dual tapes. This feature is only available while in HP-IB mode.

Mirror —the Echo will write identical data to both drives at the same time.

Split — the Echo will write data to both drives simultaneously. One block of data to the left drive then the next block of data to the right drive. This is the fastest mode for writing data.

Sequential — the data will be written to the left tape until the end-of-tape is reached, then data will be written to the right tape.

1. With the Dual tape mode function displayed, press the **ENTER** button to choose this function.

The following message will appear:

Dual tape mode
(Mirror, Split, Sequential)

2. Press the **SELECT** button to toggle through the options (Mirror, Split, Sequential)
3. Press the **ENTER** button to choose the desired setting.

Change Auto Eject

This function enables or disables automatic cartridge ejection after the host computer places the Echo in the off-line mode. This feature is only available while in HP-IB mode.

Note: When the Echo is off-line, the LCD display message: OFF-LINE.

1. With the Change Auto-eject function displayed, press the **ENTER** button to choose this function.

   The following message will appear:

   disable/enable
   Auto eject

2. Press the **SELECT** button to toggle between disable and enable.
3. Press the **ENTER** button to choose the desired setting.

Change Auto Online

Use this function to determine whether the Echo automatically goes on-line after a cartridge is loaded. This feature is only available while in HP-IB mode.

1. With the Change Auto-online function displayed, press the **ENTER** button to choose this function.

   The following message will appear:

   disable/enable
   Auto online

2. Press the **SELECT** button to toggle between disable and enable.
3. Press the **ENTER** button to choose the desired setting.

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.
   To decrement the hour, press and hold the **SELECT** button, and then press the **ENTER** button.

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.

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 May 15, 1992
   ```

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

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

   Holding the **SELECT** button will cause the day to increment (through twelve hours) continuously.

   To decrement the day, press and hold the **SELECT** button, and then press the **ENTER** button.

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.

Utilities Submenu

This function provides utilities for the tape drive and performs test functions via the following options:

- **MODEL NUMBER** — Displays the Echo model number.
- **ROM VERSION** — Displays the firmware version number and release date.
- **TAPE UTILITIES** — Shows tape information; unloads, moves, copies, and erases the tape. Refer to the "Tape Utilities Submenu" section for detailed information.
- **TESTS** — Shows statistics, tests the LCD, and certifies media. Refer to the "Tests Submenu" section for detailed information.

To access and exit these utilities ...

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

   The Utilities submenu will appear displaying these options:

   Bering model number
   ROM version, date
   Tape utilities (8422HS has left / right tape 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.

Tape Utilities Submenu

These functions show tape information; move, and erase the tape. The 8422HS model has a Left tape utilities menu and a Right tape utilities menu.

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

   The Tape utilities submenu then appears displaying the following functions:

   Show tape information
   Unload tape
   Rewind tape
   Copy tape to right/left drive (8422HS only)
   Verify tape with right/left drive (8422HS only)
   Forward tape
   Backspace tape
   Erase tape
   Previous menu

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

3. You can return to the Utilities menu by pressing the **ENTER** button when you see Previous menu.

Show Tape Information

This function displays the following information about the tape cartridge:

Tape capacity
Data compression enabled / disabled
Data on tape compressed / not compressed

Note: There will be considerable tape movement and several messages will appear on the LCD while the Echo takes time to read the tape upon initiation of this procedure.

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

   After displaying the information for the tape as a whole, this function will step through similar information for each volume which has been backed up on the tape.

Unload Tape

This function will eject the tape cartridge from the Echo. It is the same as Unload tape in the Main menu.

Rewind Tape

This function rewinds the tape to the beginning of the tape.

Copy tape to Left/ Right drive

This function is only available on the 8422HS. This function copies the tape in the selected drive to the other drive.

The source and target tapes must be inserted into the drives prior to running this function. If copying to the right drive the source tape must be in the left drive and the target tape in the right drive. If copying to the left drive the source tape must be in the right drive and the target tape must be in the left drive.

1. Write protect the source tape cartridge.
2. With the Copy tape to right/left drive function displayed, press the **ENTER** button.

Verify tape with Right/Left drive

This function is only available on the 8422HS. This function compares the tape in the selected drive to the other drive.

The two tapes to be compared must be inserted in the drives prior to running this function.

1. With the Verify tape with right/left drive function displayed, press the **ENTER** button.

Forward Tape

This function moves the tape forward to the next file mark. It can be used to position the tape to the desired backup session.

1. With the Forward tape function displayed, press the **ENTER** button to move the tape forward to next file mark.

   The LCD will note the number of the backup file to which it is moving.

Backspace Tape

This function moves the tape backward to the previous file mark. It can be used to position the tape to the desired backup session.

1. With the Backspace tape function displayed, press the **ENTER** button to move the tape backward to the previous file mark.

   The LCD will note the number of the backup file to which it is moving.

Erase Tape

This function erases the entire tape.

1. With the Erase tape function displayed, press the **ENTER** button to start erase.

   You'll see:

   ```
   Erasing TAPE
   ```

   The erase process can take up to 2 hours. At completion, you'll be notified with the following message:

   ```
   TAPE erased
   ```

Tests Submenu

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

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

   The Tests submenu will appear sequentially offering the following options:

   ```
   Show statistics
   Test LCD display
   Certify media
   Verify media
   Show tape trace
   Enable firmware load
   ```

2. Press the **SELECT** button to scroll through the options.
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. The options and LCD messages vary, depending on the Echo model you have.

1. With the Show statistics function displayed, press the **ENTER** button and you'll see a message like the following:

Tape cartridge
statistics:

2. Press the **ENTER** button once for each message to step through the following counters:

Blocks read	Total written
Blocks written	Total read errors
Read errors	Total write errors
Write errors	Total seek errors
Seek errors	Total errors
Other errors	Load cycles
Total read	Clear statistics counter Y/N

3. Press the **SELECT** button to choose Yes or No and then press the **ENTER** button to exit.

Test LCD Display

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

1. With the Test LCD display function displayed, press the **ENTER** button to start the test.

   All of the dots on the LCD will be turned on. The last character block will alternate between dots and an asterisk (*). If there are any missing dots (except the last character with an *), call the Bering Technical Support Department for repair information.

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

Certify Media

This function will first write test patterns on the entire tape cartridge and then test the media until you stop the process. CERTIFY MEDIA will not test external storage devices.

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 choose Yes, then press the **ENTER** button to choose 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 tape and the following message will appear:

Write TAPE
record *n*

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

Verify TAPE
record *n*

Note: If a bad block 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 4.

If you chose multiple verification passes you must stop the process yourself unless a bad sector is found.

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 after awhile and the following message will appear:

   User abort

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

   You will see:

   n complete
   verifies done

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

Verify Media

This function reads the tape until either blank tape or an error is found or you abort. If a bad block is found, this function will terminate with the LCD showing the error.

To start the process ...

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

To abort this function ...

1. Press both the **SELECT** and **ENTER** buttons simultaneously and hold them until you see:

   Abort received.
   wait ...

2. Release the buttons.

   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. When the verification stops, you will see:

   User abort

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

   Upon successful completion, you will be notified:

   End of tape
   data

4. When the process concludes or you stop it, press the **SELECT** button to step through the following information.

   n file marks
   n records
   n bytes

   You will be returned to the Tests menu after you see the number of bytes.

Show Tape Trace

This function displays a list of hexadecimal commands sent to the drive. This function is for Bering Technical Support troubleshooting purposes and has no effect on the operation of the Echo.

1. With the Show tape trace function displayed, press the **ENTER** button and you'll see a message similar to the following:

   255:08FF,FF
   FF,FF,FF Yes

2. Press the **SELECT** button to change Yes to No and Press the **ENTER** button twice to leave this function.

Enable Firmware Load

This function allows you to upgrade the firmware on the controller board from a tape cartridge. Full instructions for the upgrade will be included with the upgrade tape. Contact Bering technical support for more information on this feature.

5

CONFIGURING YOUR HP-IB HP SYSTEM

This chapter describes how to configure different types of HP computer systems for the Echo to operate as on-line backup device. It is divided into the following sections: HP 9000 Series 300-HP-UX, Series 800-HP-UX, HP 3000 MPE-V, and HP3000 Series 900 MPE-XL. Refer to the section which applies to your computer.

Each section describes how to configure the Echo and the operating system, and procedures for backup and restore.

It is assumed that the operating system is already installed on a disk drive and the reader knows how to use the operating system.

Note: The density is always 1600 bpi for HP DDS emulation.

See your HP manuals for instructions on selecting the bpi options.

SCSI Configuration

If you are using the SCSI interface, you should refer to Chapter 6 “Configuring Your SCSI HP System” in this manual to determine the configuration for your operating system.

Series 300 - HP-UX

SYSTEM REQUIREMENTS

The Bering Echo is supported by HP-UX version 5.0 or later. The following is a list of recommended hardware for use with the Echo.

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

CONFIGURATION

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

	HP-UX 5.0	≥HP-UX 7.0
HP-IB address:	0-7	0-7
Emulation	7974	HP DDS

ADDING THE ECHO TO YOUR HP-UX SYSTEM

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

DEVICE FILES

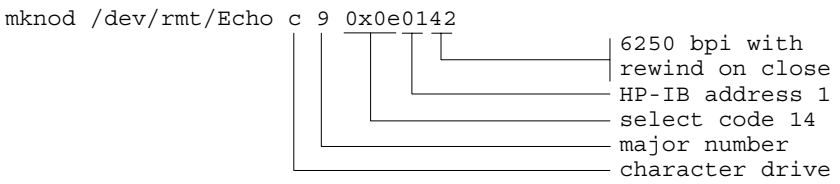
The first step for installing your Echo drive is to create a character special file. To do this, use the MKNOD command (refer to HP-UX System Administrator Manual for details) with the following items:

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

  `/dev/rmt/Echo`

- Major numbers: for the Echo, the major number will be 9 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 Echo) and the characteristics of the tape drive, e.g.

  For HP DDS or HP7974 emulation:



  For HP7980 emulation:

```
mknod /dev/rmt/echo c 9 0x0e0182
```

BACKUP

Follow the steps below to backup your system.

1. Load a tape into the Echo. Make sure the cartridge is not write-protected.
2. Review and edit the Backup script, replacing the following lines

   ```
   cpio -ocx |
   tcio -o $dest
   ```

   with

   `cpio -ocBx $dest`
3. For a full backup, type

   `/etc/backup -archive`

   For an incremental backup type

   `/etc/backup`

   You'll get a message similar to:

   ```
   backing up to /dev/update.src
   enter new device name to change the backup destination.
   ```

   A time out results if you don't type a response within one minute.
4. Type the device name for the Echo, such as

   `/dev/rmt/echo`
5. When the backup has finished, remove the cartridge, label it with the date and the type of backup, then store it in a secure place.

RESTORE

Follow this procedure to restore data to your disk.

1. Load the backup tape into the Echo. Make sure the cartridge is write-protected.
2. Change the directory to the correct parent directory.
3. Type the following command to restore files:

   `cpio -iBcdmux [pattern] < device`

   where: *pattern* is an optional parameter used to specify which files to recover. If you wish to restore all the files on the tape, do not specify a pattern.

   device is the special file for the Echo.

Series 800 HP-UX 8.0

The Bering Echo is supported by HP-UX version 8.0. The following is a list of hardware and software required for use with the Echo.

- HP-IB interface configured for high-speed mode.
- Device driver **tape1**.

CONFIGURATION

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

HP-IB address: 0-7
Emulation: HP DDS

ADDING ECHO TO HP-UX 8.0 USING SAM

To configure the appropriate driver into the kernel, use SAM, the System Administration Manager tool available in release 8.0 and higher. You must be logged in as root, or be a superuser to use SAM.

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

   The main screen will be similar to the following:

```
SAM            System Administration Manager

Highlight an item and then press "Return" or "Select
Item".

   Users ->
   Groups ->
   Auditing and Security (Trusted System) ->

   File systems ->
   Peripheral Devices ->
    Backup and Recovery ->

   Networks/Communications ->
   Cluster Configuration ->
   Kernel Configuration ->

    Task Customization...
    Other Utilities ->

   How to Use SAM
```

2. Select `Peripheral Devices`.
3. In the "Peripheral Devices" menu, select `Tape Drives`.
4. In the "Tape Drive" menu, select `Add Tape Drive`.

   The screen will display a message similar to the following:

```
Scanning the System's Hardware
```

   All tape drives connected to the system will be displayed.

5. Select the Echo drive.

The Echo can be determined by the bus address listed on the screen. This is the same as the HP-IB address you set the Echo to.

6. Press the **Done** button to return to the tape drive menu.
7. Now select the `View Tape Drives` button to see the drive again.
8. Press the `Dev File Info` button to see the associated special files that were generated by the Tape Drive installation.

   Make note of the device special files. These are the device special files you need to reference whenever you access the Echo.
9. The correct driver is now installed.

CHECKING THE CONFIGURATION

If you need to know how the drivers are configured, you can use **ioscan -f** 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 you should use whenever you access the tape drive.

At this point you should restart your HP-UX system to fully implement the changes you just made.

BACKUP

To backup your file system to the Echo, you will use the following command (refer to the *HP-UX System Administration Tasks Manual* for details): This is a test of fonts

`fbackup -f` *`device -level`* `-u -g` *`graphfile -I ifile`*

where	*-f device*	specifies the device file for the tape.
	-level	backup level where 0 is for specifying full backup and values of 1-9 specify incremental backup levels.
	-u	updates the /usr/adm/fbackupfiles/dates to contain the level, date and time, and the graph file of the backup.
	-g *graphfile*	a graphfile (text) file contains a list of files to be included or excluded from the backup.

-I *ifile* creates a list of the files being backed up in *ifile*.

1. Load a cartridge tape in the Echo. Make sure the cartridge is not write-protected.
2. Edit the GRAPHFILE to include the files you want, or don't want, to backup.

   For example:

   ```
   i /usr
   e /tmp
   ```

   specifies to backup /usr but not /tmp. Or

   ```
   i /
   e /tmp
   ```

   will backup the entire file system except the files in /tmp.
3. Invoke the FBACKUP utility.

   For a full backup you will use a command similar to the following:

   ```
   fbackup -u0f /dev/rmt/1h \
      -g /usr/adm/fbackupfiles/graph \
      -I /usr/adm/fbackupfiles/full303.90
   ```

   For an incremental backup you will use a command similar to the following:

   ```
   fbackup -u1f /dev/rmt/1h \
      -g /usr/adm/fbackupfiles/graph \
      -I /usr/adm/fbackupfiles/inc303.90
   ```
4. When the backup has finished, remove the cartridge, label it with the date and the type of backup, and store it in a secure place.

RESTORE

To restore your file system from the Echo, use the following command (refer to your HP-UX System Administration Tasks Manual for details):

```
frecover -f device -r -x -g graphfile -I ifile
```

where
- -f *device* specifies the device file for the tape.
- -g *graphfile* a graphfile (text) file contains a list of files to be included or excluded from the recovery.
- -r recovers all files on the tape.
- -x recovers the directories specified in the -g option, in addition to their subtree structure.
- -I *ifile* creates a list of the files recovered in *ifile*.

1. Load the fbackup cartridge tape in the Echo. Make sure the cartridge is write protected.
2. Review or edit the GRAPHFILE to include the files you want, or don't want, to recover.

   For example:

   ```
   i /usr
   e /tmp
   ```

   specifies to recover /usr but not /tmp. Or

   ```
   i /
   e /tmp
   ```

   will restore the entire file system except the files in /tmp.
3. Invoke the FRECOVER utility.

   To restore the entire file system on the tape, you may use a command similar to the following:

   ```
   frecover -rf /dev/rmt/1h
   ```

   To recover parts of the file system, you should use a command similar to the following:

   ```
   fbackup -xf /dev/rmt/1h \
      -g /usr/adm/fbackupfiles/graph
   ```

HP-UX TAPE COMMANDS

The three commands CPIO, TAR, and MT are the most commonly used for accessing tape drives. The following examples show general usage of the commands.

CPIO

The CPIO command is generally used for archiving file systems and files. A common use is with a filter using the FIND command.

find directory -print | **cpio -ocv /dev/rmt/1h**
(writing to tape)

cpio -icdx < /dev/rmt/1h *filelist*
(restoring from tape)

TAR

The TAR command is used to archive a directory.

tar cvf /dev/rmt/1h *directory* (writing to tape)

cd directory (change directory before restoring from tape)

tar xvf /dev/rmt/1h *directory* (restores a directory from the archive)

MT

This command is commonly used for positioning the tape, but can also be used to eject the cassette under software control and to write tape marks.

mt rew (rewind the tape to LBOT)

mt fsf (forward space to next filemark)

mt fsf 4 (forward space 4 filemarks)

mt -t /dev/rmt/1h off (eject the cassette)

For more information, refer to your *HP-UX Reference Manual.*

HP 3000 - MPE-V

SYSTEM REQUIREMENTS

The HP MPE-V operating system is required to interface with the Echo.

CONFIGURATION

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

HP-IB address: *0-7*
Emulation: HP DDS

ECHO INSTALLATION

1. Cold start your system from tape, or cool start it from a disk. Type **Y** when you see `ANY CHANGES?`
2. When you see `I/O CONFIGURATION CHANGES?`, type **Y** to start adding the Echo to your system.
3. When you're asked `LIST I/O DEVICES?` type **Y** to list all of the devices currently configured in your system.

   Note all of the logical devices listed under the LOG DEV column. You will need to select an LDEV for your Echo in the next step.
4. Skip all of the questions by pressing **[RETURN]** until you are asked `LOGICAL DEVICE #?`
5. Specify the LDEV for the Echo.

   You can select a new one or an existing one to be replaced by the Echo.
6. When you are prompted for a `DEVICE NAME?` type **HP7980**.
7. When you see `DRT? 32`, verify the number. Correct the number if it is different or missing.

   The DRT number for the Echo is equal to the HP-IB channel number multiplied by 8 plus the HP-IB address of the Echo.

   If you have multiple IMB, the DRT number is equal to the IMB number multiplied by 128 plus the HP-IB channel number (GIC) multiplied by 8 plus the HP-IB address of the Echo.
8. When you're asked `Unit? 0`, verify that the number is 0. Correct the number if it is different or missing.
9. Go through the remaining steps and verify that the defaults are specified as listed below. If not, type the correct setting.

	HP Emulation	HP DDS Emulation
SOFTWARE CHANNEL	0	0
TYPE?	24	24
SUB TYPE?	5	6
RECORD WIDTH?	128	128
OUTPUT DEVICE?	0	0
ACCEPT JOB/SESSION?	NO	NO
ACCEPT DATA?	NO	NO
INTERACTIVE?	NO	NO
DUPLICATIVE?	NO	NO
INITIALLY SPOOLED?	NO	NO
AUTO REPLY?	NO	NO
DRIVER NAME?	HIOTAPE3	HIOTAPE4

The following prompt will appear:

```
DEVICE CLASS? TAPE
```

DISC is the default class.

10. If you want to define a new class to differentiate the Echo from other tape drives, type: **ECHO**.
11. Continue the configuration and boot process and wait until MPE is ready.

BACKUP YOUR SYSTEM

To backup your entire system onto a cartridge tape:

1. Use commands similar to the following:

```
FILE T; DEV=ECHO
FULLBACKUP
```

2. If the Echo is configured without auto-reply, a request will be issued at the system console and may look like this:

```
?16:15/#525/pin/ldev FOR "T" on ECHO (NUM)?
```

In that case a standard reply command, like the following, must be typed:

```
=reply pin, ldev
```

RESTORE FILES

To restore files from the cartridge tape:

1. Use commands similar to the following:

```
FILE T; DEV=ECHO
RESTORE *t;fileset
```

Use @.@.@ as the *fileset* to restore all the files. Refer to the *HP MPE V COMMANDS* manual for details.

2. If the Echo is configured without auto-reply, a request will be issued at the system console and may look like this:

?16:15/#525/*pin*/*ldev* FOR "T" on *ECHO* (NUM)?

In that case a standard reply command, like the following, must be typed:

=reply *pin, ldev*

COLD LOAD FROM ECHO

The system backup on the Echo cartridge can be used to cold load your system. Use your standard cold load procedure with the LDEV of the Echo.

HP 3000 SERIES 900 MPE-XL, *iX*

SYSTEM REQUIREMENTS

The Bering Echo tape drives are supported by MPE-XL version 2.0 and later. The Echo drive can be installed, along with other tape drives or printers, on the second available HP-IB card.

CONFIGURATION

Use the Echo drive controls to set the configuration options according to the following settings. See Chapter 4 for details.

HP-IB address: 0-7
Emulation: HP DDS

Note: Do not connect the Echo to the system until completion of the sysgen process (after step 9 below).

ADDING THE ECHO TO YOUR MPE-XL SYSTEM

This section tells how to add the Echo to your existing MPE-XL system.

1. At the `ISL>` prompt, start the MPE-XL system with the NORECOVERY option by typing:

   `start norecovery`

2. When the system boots up, run sysgen by typing **`:sysgen`**.
3. At the `sysgen>` prompt, type **`io`**.
4. At the `io>` prompt, type **`ld`**.

   A sample configuration for the HP3000/S925 follows (your configuration may vary).

```
LDEV        PATH        DEVICE ID
1           4.1.0       HP7937H
2           4.1.1       HP7937H
3           4.1.2       HP7937H
6           4.5.1       HP2566A
7           4.5.0       HP7980A
10          4.5.7       HP7980A
19          4.5.5       HP2680A
20          4.2.0       HP2392A
28          4.5.6       HP2688A

LDEV  OUTDEV  DEVTYPE  JAID  RxS  RSIZE  CLASS  CLASS  CLASS
 1      0        DISC                128   DISC  SPOOL
etc.
```

5. Type **`ad`** and the appropriate parameters to add the Echo.

   For example,

   **`io>ad `*`8`*` path=`*`4.5.2`*` id=`*`HPC1511A`*

   Where *8* = Logical device number (LDEV),
   4 = Channel Input Output Interface Bus

5	=	Slot number of the HP-IB card
2	=	HP-IB address of the ECHO
HPC1511A	=	Emulation configured in Echo

6. Type **ho** to keep the newly configured device, then type **e** to exit the io submenu.
7. At the `sysgen>` prompt, type **k** to store the new configuration.
8. At this point, physically connect the ECHO to the MPE-XL system.

   See Chapter 2 for drive installation instructions.
9. Type **=shutdown** to reboot the MPE-XL system so the new configuration will take effect.

BACKUP FILES

Back up all files with the DIRECTORY option, e.g.:

```
:store @.@.@;*t;directory;show
```

Then validate the backup by using VSTORE:

```
:vstore *t;@.@.@;show
```

See the MPE-XL Commands manual for more details.

RESTORE FILES

To restore files from the cartridge tape, type the following commands:

```
:file t;dev=8
:restore *t;@.@.@;create;keep;show
```

CREATE A SYSTEM LOAD TAPE

The following procedure is a brief description of creating a System Load Tape and full backup of the directory and files for your MPE-XL system. Refer to the *HP3000 MPE-iX System Administrator's Manual* for more details.

1. You must be in sysgen to create a System Load Tape. If need be, type **:sysgen**.
2. At the `sysgen>` prompt, type **ta** to create a System Load Tape.

   If the ECHO is configured without auto-reply, a request will be issued at the system console and may look like this:

   ```
   :16:15/#S1/14/Vol (unlabeled) mounted on LDEV #8
   ```
3. Respond with a standard reply command, such as:

   ```
   =reply 14,y
   ```

   The system will take several minutes to build the load tape.

COLD LOAD FROM ECHO

Use the following procedure to execute a cold load from the Echo.

1. Bring the system down by pressing **[CONTROL]** - **[A]** and typing **shutdown** at the resultant = prompt.

2. Reboot the system, either by pressing **[CONTROL]-[B]** from the console or by pressing the `reset switch` on the system panel.

   The following message will appear.

   ```
   Autoboot from primary path enabled
   To override, press any key within 10 seconds.
   ```

3. Press any key and you will see:

   ```
   Boot from primary boot path (Y or N)?>
   ```

4. Type **N** to disable booting from the primary path and you'll be asked:

   ```
   Boot from alternate boot path (Y or N)?>
   ```

5. Now type **N** to avoid booting from the alternate boot path, and you'll be asked to:

   ```
   Enter boot path, command, or ?>
   ```

6. Type the appropriate numerals to define the boot path, e.g., 4.5.2.

7. At the `ISL>` prompt, type **install**.

   See the System Administrator's manuals for more details.

6

CONFIGURING YOUR SCSI HP SYSTEM

This chapter describes how to configure the HP 9000, Series 800 HP-UX version 8.0 and Series 700 HP-UX 9.0 for the Echo 8400HS drives to operate as an on-line device.

We assume that the operating system is already installed on a disk drive and that you know how to use the operating system.

HP-UX 8.0 Series 800 Echo

The Bering DDS Echo tape subsystems are supported by HP-UX version 8.0 on the HP 9000 Series 800.

To configure the appropriate driver into the kernel, use SAM, the System Administration Manager tool available in release 8.0. You must be logged in as root, or be a superuser to use SAM.

1. With the Echo connected to the computer and powered on, invoke SAM by typing **`SAM`** at the system prompt.

   The main screen will be similar to the following:

```
SAM           System Administration Manager

Highlight an item and then press "Return" or "Select
Item".

   Users ->
   Groups ->
   Auditing and Security (Trusted System) ->

   File systems ->
   Peripheral Devices ->
    Backup and Recovery ->

   Networks/Communications ->
   Cluster Configuration ->
   Kernel Configuration ->

    Task Customization...
    Other Utilities ->

   How to Use SAM
```

2. Select `Peripheral Devices`.
3. In the peripheral Devices menu, select `Tape Drives`.
4. In the Tape Drive menu, select `Add Tape Drive`.

   The screen will display a message similar to the following:

```
Scanning the System's Hardware
```

All tape drives connected to the system will be displayed.

5. Select the Echo drive.

   The Echo can be determined by the bus address listed on the screen. This is the same as the SCSI address you set the Echo to.

6. Press the **Done** button to return to the tape drive menu.
7. Now select the `View Tape Drives` button to see the drive again.
8. Press the `Dev File Info` button to see the associated special files that were generated by the Tape Drive installation.

   Make note of the device special files. These are the device special files you need to reference whenever you access the Echo.

   The correct driver is now installed.

CHECKING THE CONFIGURATION

If you need to know how the drivers are configured, you can use `ioscan -f` 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.scsi0.tape1
disk          4   4.0.1       cio_ca0.scsi0.disc1
```

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

Note: The LU listed in the table is the reference you should use whenever you access the tape drive.

At this point you should restart your HP-UX system to fully implement the changes you just made.

HP-UX Tape Commands

The three commands CPIO, TAR, and MT are the most commonly used for accessing tape drives. We also show examples of FBACKUP and FRECOVER tape commands. The following examples show general usage of the commands.

CPIO

The CPIO command is generally used for archiving file systems and files. A common use is with a filter using the FIND command.

```
find directory -print | cpio -ocv /dev/rmt/echo
(writing to tape)
```

```
cpio -icdx < /dev/rmt/echo filelist
(restoring from tape)
```

TAR

The TAR command is used to archive a directory.

```
tar cvf /dev/rmt/echo directory
(writing to tape)

cd directory
(change directory before restoring from tape)

tar xvf /dev/rmt/echo directory
(restores a directory from the archive)
```

MT

This command is commonly used for positioning the tape, but can also be used to eject the cassette under software control and to write tape marks.

```
mt rew    (rewind the tape to LBOT)

mt fsf    (forward space to next filemark)

mt fsf 4  (forward space 4 filemarks)

mt -t /dev/rmt/echo off   (eject the cassette)
```

FBACKUP

To backup your file system to the Echo, you will use the following command (refer to the *HP-UX System Administration Tasks Manual* for details):

fbackup -f *device* -*level* -u -g *graphfile* -I *ifile*

where	-f *device*	specifies the device file for the tape.
	-level	backup level where 0 is for specifying full backup and values of 1-9 specify incremental backup levels.
	-u	updates the /usr/adm/fbackupfiles/dates to contain the level, date and time, and the graph file of the backup.
	-g *graphf*	a graphfile (text) file contains a list of files to be included or excluded from the backup.
	-I *ifile*	creates a list of the files being backed up in *ifile*.

1. Load a cartridge tape in the Echo. Make sure the cartridge is not write-protected.
2. Edit the GRAPHFILE to include the files you want, or don't want, to backup.

For example:

```
i /usr
e /tmp
```

specifies to backup /usr but not /tmp. Or

```
i /
e /tmp
```

will backup the entire file system except the files in /tmp.

3. Invoke the FBACKUP utility.

   For a full backup you will use a command similar to the following:

```
fbackup -u0f /dev/rmt/1h \
   -g /usr/adm/fbackupfiles/graph \
   -I /usr/adm/fbackupfiles/full303.90
```

   For an incremental backup you will use a command similar to the following:

```
fbackup -u1f /dev/rmt/1h \
   -g /usr/adm/fbackupfiles/graph \
   -I /usr/adm/fbackupfiles/inc303.90
```

4. When the backup has finished, remove the cartridge, label it with the date and the type of backup, and store it in a secure place.

FRECOVER

To restore your file system from the Echo, use the following command (refer to your HP-UX System Administration Tasks Manual for details):

frecover -f *device* -r -x -g *graphfile* -I *ifile*

where	-f *device*	specifies the device file for the tape.
	-g *graphf*	a graphfile (text) file contains a list of files to be included or excluded from the recovery.
	-r	recovers all files on the tape.
	-x	recovers the directories specified in the -g option, in addition to their subtree structure.
	-I *ifile*	creates a list of the files recovered in *ifile*.

1. Load the fbackup cartridge tape in the Echo. Make sure the cartridge is write protected.
2. Review or edit the GRAPHFILE to include the files you want, or don't want, to recover.

   For example:

```
i /usr
e /tmp
```

specifies to recover /usr but not /tmp. Or

```
i /
e /tmp
```

will restore the entire file system except the files in /tmp.

3. Invoke the FRECOVER utility.

   To restore the entire file system on the tape, you may use a command similar to the following:

   ```
   frecover -rf /dev/rmt/1h
   ```

   To recover parts of the file system, you should use a command similar to the following:

   ```
   fbackup -xf /dev/rmt/1h \
      -g /usr/adm/fbackupfiles/graph
   ```

   For more information, refer to your *HP-UX Reference Manual.*

HP-UX 9.0 Series 700

The Bering Echo 8400 Series cartridge tape subsystems are supported by HP-UX version 9.0 on the HP 9000 Series 700.

To configure the appropriate driver into the kernel, use SAM, the System Administration Manager tool available in release 9.0. You must be logged in as root, or be a superuser to use SAM.

1. With the Echo connected to the computer and powered on, invoke SAM by typing **`SAM`** at the system prompt.

   The main SAM screen will display with a menu of selections.

2. Select `Kernel Configuration`.
3. Then select `Drivers` from the menu list.
4. Scroll down the list until you see "`scsitape`."

   If the current state is out, highlight "scsitape" and then select "Add Driver to Kernel.

   If the current status is "in," back out to the main menu, then proceed to step 9.

5. When the "Pending State" column changes to in, select "`Create a New Kernel`" from the menu.
6. Restart the computer.
7. Login as root or superuser.
8. Run SAM again from the system console.
9. Select `Peripheral Devices`.
10. In the peripheral Devices menu, select `Tape Drives`. The Echo should be listed as a SCSI tape drive.
11. Select `Create Device Files`.

    The system will generate 16 device files in the /dev/rmt directory.

12. Select `Display Device Files` from the menu.

    Make note of the device special files. These are the device special files you need to reference whenever you access the Echo.

    The correct drivers and device files are now installed.

Device Files

SAM generates 16 device files in the /dev/rmt directory for the Echo. The following list displays the files and their meanings.

This is the list of files generated by SAM with the Echo set to Buss Address (SCSI Address) of 3. If the address was set to 5, the file name of the first entry would be c201d5c and the minor number would be 0x20150c.

File Name	Minor Number	Description
c201d3c	0x20130c	AT&T style, auto rewind, compressed
c201d3cb	0x20130e	Berkeley style, auto rewind, compressed
c201d3cn	0x20130d	AT&T style, no rewind, compressed
c201d3cnb	0x20130f	Berkeley style, no rewind, compressed
c201d3h	0x201308	AT&T style, auto rewind, high density
c201d3hb	0x20130a	Berkeley style, auto rewind, high density
c201d3hn	0x201309	AT&T style, no rewind, high density
c201d3hnb	0x20130b	Berkeley style, no rewind, high density
c201d3l	0x201300	AT&T style, auto rewind, low density
c201d3lb	0x201302	Berkeley style, auto rewind, low density
c201d3ln	0x201301	AT&T style, no rewind, low density
c201d3lnb	0x201303	Berkeley, no rewind, low density
c201d3m	0x201304	AT&T style, auto rewind, medium density
c201d3mb	0x201306	Berkeley style, auto rewind, medium density
c201d3mn	0x201305	AT&T style, no rewind, medium density
c201d3mnb	0x201307	Berkeley style, no rewind, medium density

Manual Device File Generation

You may generate the device files manually using the mknod command. For instance to generate the last device file in the above list, use the following command:

```
mknod /dev/rmt/c201d3mnb c 54 0x201307
```

In the above example, the c after the file name is the filetype (character) and 54 is the major number. These values should always be used in the mknod command for tape drives.

HP-UX Tape Commands

The three commands CPIO, TAR, and MT are the most commonly used for accessing tape drives. We also show examples of FBACKUP and FRECOVER tape commands. The following examples show general usage of the commands.

CPIO

The CPIO command is generally used for archiving file systems and files. A common use is with a filter using the FIND command.

```
find directory -print | cpio -ocv /dev/rmt/c201d3c
(writing to tape)
```

```
cpio -icdx < /dev/rmt/c201d3c filelist
(restoring from tape)
```

TAR

The TAR command is used to archive a directory.

```
tar cvf /dev/rmt/c201d3c directory
(writing to tape)
```

```
cd directory
(change directory before restoring from tape)
```

```
tar xvf /dev/rmt/c201d3c directory
(restores a directory from the archive)
```

MT

This command is commonly used for positioning the tape, but can also be used to eject the cassette under software control and to write tape marks.

```
mt rew    (rewind the tape to LBOT)
```

```
mt fsf    (forward space to next filemark)
```

```
mt fsf 4  (forward space 4 filemarks)
```

```
mt -t /dev/rmt/c201d3c off   (eject the cassette)
```

FBACKUP

To backup your file system to the Echo, you will use the following command (refer to the *HP-UX System Administration Tasks Manual* for details):

```
fbackup -f device -level -u -g graphfile -I ifile
```

where	-f *device*	specifies the device file for the tape.
	-level	backup level where 0 is for specifying full backup and values of 1-9 specify incremental backup levels.
	-u	updates the /usr/adm/fbackupfiles/dates to contain the level, date and time, and the graph file of the backup.
	-g *graphf*	a graphfile (text) file contains a list of files to be included or excluded from the backup.
	-I *ifile*	creates a list of the files being backed up in *ifile*.

1. Load a cartridge tape in the Echo. Make sure the cartridge is not write-protected.
2. Edit the GRAPHFILE to include the files you want, or don't want, to backup.

   For example:

   ```
   i /usr
   e /tmp
   ```

   specifies to backup /usr but not /tmp. Or

   ```
   i /
   e /tmp
   ```

   will backup the entire file system except the files in /tmp.

3. Invoke the FBACKUP utility.

   For a full backup you will use a command similar to the following:

   ```
   fbackup -u0f /dev/rmt/c201d3c \
      -g /usr/adm/fbackupfiles/graph \
      -I /usr/adm/fbackupfiles/full303.90
   ```

   For an incremental backup you will use a command similar to the following:

   ```
   fbackup -u1f /dev/rmt/c201d3c \
      -g /usr/adm/fbackupfiles/graph \
      -I /usr/adm/fbackupfiles/inc303.90
   ```

4. When the backup has finished, remove the cartridge, label it with the date and the type of backup, and store it in a secure place.

FRECOVER

To restore your file system from the Echo, use the following command (refer to your HP-UX System Administration Tasks Manual for details):

frecover -f *device* -r -x -g *graphfile* -I *ifile*

where	-f *device*	specifies the device file for the tape.
	-g *graphf*	a graphfile (text) file contains a list of files to be included or excluded from the recovery.
	-r	recovers all files on the tape.
	-x	recovers the directories specified in the -g option, in addition to their subtree structure.
	-I *ifile*	creates a list of the files recovered in *ifile*.

1. Load the fbackup cartridge tape in the Echo. Make sure the cartridge is write protected.
2. Review or edit the GRAPHFILE to include the files you want, or don't want, to recover.

   For example:

   ```
   i /usr
   e /tmp
   ```

   specifies to recover /usr but not /tmp. Or

   ```
   i /
   e /tmp
   ```

   will restore the entire file system except the files in /tmp.
3. Invoke the FRECOVER utility.

   To restore the entire file system on the tape, you may use a command similar to the following:

   ```
   frecover -rf /dev/rmt/c201d3c
   ```

   To recover parts of the file system, you should use a command similar to the following:

   ```
   fbackup -xf /dev/rmt/c201d3c \
      -g /usr/adm/fbackupfiles/graph
   ```

   For more information, refer to your *HP-UX Reference Manual.*

HP 3000 SERIES 900 MPE-XL, iX

The Bering Echo HS tape drives are supported by MPE-XL version 2.0 and later. The Echo drive can be installed, along with other tape drives or printers, on the SCSI card.

SYSTEM REQUIREMENTS

MPE-XL systems with an add-in SCSI card such as the CIO system, currently do not support booting from tape drives attached to the CIO SCSI card.

CONFIGURATION

Use the Echo drive controls to set the configuration options according to the following settings. See Chapter 4 for details.

SCSI interface: Enabled
SCSI address: 0-6

Note: Do not connect the Echo to the system until completion of the sysgen process (after step 9 below).

ADDING THE ECHO TO YOUR MPE-XL SYSTEM

This section tells how to add the Echo to your existing MPE-XL system.

1. At the `ISL>` prompt, start the MPE-XL system with the NORECOVERY option by typing:

   `start norecovery`

2. When the system boots up, run sysgen by typing **`:sysgen`**.
3. At the `sysgen>` prompt, type **`io`**.
4. At the `io>` prompt, type **`ld`**.

   A sample configuration for the HP3000/S917 follows (your configuration may vary).

```
LDEV      PATH         DEVICE ID
1         4.1.0        HP7937H
2         4.1.1        HP7937H
3         4.1.2        HP7937H
6         4.5.1        HP2566A
7         4.5.0        HP7980A
10        4.5.7        HP7980A
19        4.5.5        HPC1504A
20        4.2.0        HP2392A
28        4.5.6        HP2688A

LDEV  OUTDEV  DEVTYPE  JAID  RxS  RSIZE  CLASS  CLASS  CLASS
 1      0       DISC               128   DISC  SPOOL
etc.
```

5. Type **`ad`** and the appropriate parameters to add the Echo.

   For example,

   `io>ad 8 path=4.5.2 id=HPC1504A`

Where

8	=	Logical device number (LDEV),
4	=	SCSI Interface Bus
5	=	Slot number of the SCSI card
2	=	SCSI address of the ECHO
HPC1504A	=	Emulation configured in Echo

6. Type **ho** to keep the newly configured device, then type **e** to exit the io submenu.
7. At the sysgen> prompt, type **k** to store the new configuration.
8. At this point, physically connect the ECHO to the MPE-XL system.

   See Chapter 2 for drive installation instructions.
9. Type **=shutdown** to reboot the MPE-XL system so the new configuration will take effect.

BACKUP FILES

Back up all files with the DIRECTORY option, e.g.:

```
:store @.@.@;*t;directory;show
```

Then validate the backup by using VSTORE:

```
:vstore *t;@.@.@;show
```

See the MPE-XL Commands manual for more details.

RESTORE FILES

To restore files from the cartridge tape, type the following commands:

```
:file t;dev=8
:restore *t;@.@.@;create;keep;show
```

CREATE A SYSTEM LOAD TAPE

The following procedure is a brief description of creating a System Load Tape and full backup of the directory and files for your MPE-XL system. Refer to the *HP3000 MPE-XL System Administrator's Manual* for more details.

1. You must be in sysgen to create a System Load Tape. If need be, type **:sysgen**.
2. At the sysgen> prompt, type **ta** to create a System Load Tape.

   If the ECHO is configured without auto-reply, a request will be issued at the system console and may look like this:

   ```
   :16:15/#S1/14/Vol (unlabeled) mounted on LDEV #8
   ```
3. Respond with a standard reply command, such as:

   ```
   =reply 14,y
   ```

   The system will take several minutes to build the load tape.

Note: MPE-XL systems with an add-in SCSI card i.e. CIO systems, do not support booting from tape drives attached to this SCSI card.

BOOT FROM ECHO

Use the following procedure to execute a boot from the Echo.

1. Bring the system down by pressing **[CONTROL]-[A]** and typing **shutdown** at the resultant **=** prompt.
2. Reboot the system, either by pressing **[CONTROL]-[B]** from the console or by pressing the `reset switch` on the system panel.

   The following message will appear.

   ```
   Autoboot from primary path enabled
   To override, press any key within 10 seconds.
   ```

3. Press any key and you will see:

   ```
   Boot from primary boot path (Y or N)?>
   ```

4. Type **N** to disable booting from the primary path and you'll be asked:

   ```
   Boot from alternate boot path (Y or N)?>
   ```

5. Now type **N** to avoid booting from the alternate boot path, and you'll be asked to:

   ```
   Enter boot path, command, or ?>
   ```

6. Type the appropriate numerals to define the boot path, e.g., 4.5.2.
7. At the `ISL>` prompt, type **install**.

See the System Administrator's manuals for more details.

7

CARING FOR THE TAPE DRIVE & CARTRIDGE

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

General Safeguards

To protect the Echo:

- To avoid overheating, place it where the air can circulate around it. Be particularly careful to avoid blocking the cooling vent at the rear of the unit.
- Make sure it is plugged into a grounded (three-hole) electrical outlet. Verify that the outlet actually is grounded - that the third prong really is connected to a ground. The Echo should be on the same circuit as your computer.
- Make sure that other equipment or appliances which might generate electrical noise or a power surge (such as electric typewriters or heaters) are on separate circuits.
- Do not expose your Echo 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 Echo.
- Use the Bering cleaning kit to clean the drive heads after every 50 hours (about one month) of use.
- Avoid exposure to magnetic fields such as those emitted by magnets, telephones, televisions, speakers, or large electric motors.
- Never bump the Echo when it's running.
- Always set the Echo upright on a flat surface.
- Use Bering-approved media. Standard DAT (Digital Audio Tape) may have excessive defects resulting in unreliable data storage. Only Bering-approved DDS (Digital Data Storage) tapes should be used in the Echo drives.

▲ CAUTION: *Never transport the Echo with a cartridge in the drive. This could damage the media and the read/write heads.*

You don't need to worry about leaving the Echo 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 Echo does get hot, make sure the fan is running properly, the vent at the rear is not blocked, and that the unit is placed where air can circulate around it.

Cartridge Care

Cartridge tapes 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 Echo after it is powered down. This leaves the cartridge shutter open and makes the recording media itself vulnerable to dust.
- Keep your cartridges clean and dry and out of harm's way. Protect cartridges from dirt, spills, and smoke. Avoid handling the shutter edge of the cartridge since oil and dirt from your hands may be transferred to the media or to the inside of the drive.
- Use them at the correct temperature. Avoid using cartridges at 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 (between 60˚F and 90˚F) when you insert the cartridge into the drive.
- Do not expose cartridges to magnetic fields (e.g., telephones, televisions, speakers, large electric motors, or magnets), moisture, or prolonged direct sunlight.
- Do not move the drive with a cartridge loaded.
- 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 tape surface.)

Head Cleaning

After 25 hours of tape transport, or if the front panel caution LED indicator is displayed, clean the tape heads with the head cleaning kit provided with your Bering tape drive. Follow these steps:

1. Insert the DDS cleaning cassette into the tape slot of the Bering Echo drive with the unit powered on.

   The drive will load the cassette and clean the heads automatically. When the cleaning cycle is complete, the drive will eject the cleaning cassette.

2. Note the date on the cleaning cassette label.

   After 25 cleaning cycles the cassette should be discarded.

Note: The Bering DDS drives monitor the number of read-after-write or third level correctable errors. If the number is excessive the heads may need cleaning or the cassette in use may be nearing the end of its useful life. This is indicated by the drive flashing a caution signal (alternate green and amber sequence of LEDs) on the front panel. See Chapter three for LED indications.

If you get such a media warning, clean the heads first. If this doesn't solve the problem, replace the cassette.

8

IF YOU HAVE PROBLEMS

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

Before You Do Anything Else

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

- The power cord is securely connected to the Echo and a wall outlet.
- The power is switched on, and the AC fuse in the back of the drive is not blown.

  To check the fuse, use a screwdriver to open the fuse compartment on the back of the Echo. If the fuse is blown, replace it with the spare in the compartment, or buy a replacement. The proper replacement is a slow blow 1.6 Amp, 250 Volt fuse.
- None of the pins on the cable connectors are loose, broken, bent, or shorted.
- All cables are installed correctly.
- Each Echo connected to your computer has a unique HP-IB or SCSI address.
- If you are experiencing data errors, clean the head and try again.

Error Codes and LCD Messages

Occasionally, after installing an Echo, the system will display a tape initialization error code upon startup. It is sometimes possible to solve the problem by following the instructions on the LCD. 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 Echo. If this occurs, shut down your system and restart it. If the problem still occurs, contact Bering Technical Support at (408) 364-6500.

If You're Still Having Problems

Start-up Problems

If you're unable to start up your system with the Echo connected, make sure the Echo is powered up. Your system may not be able to access your disk drive with the Echo turned off. Wait until the time and date display appears on the LCD, then try to start up your system again.

If you're still unable to start, try starting up the computer with the Echo disconnected. If you're still unable to start up, the problem is with the computer rather than the Echo. Refer to the troubleshooting section in your computer manual for more information.

If you are able to start without the Echo, the configuration (i.e. HP-IB address or SCSI address) of the Echo may be incorrect.

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 Echo, the firmware version, and the type of computer you're using.
- The backup or restore software, and the version level of the software.
- Any error messages that have appeared.
- A description of the problem(s) and the steps you've taken to correct them.

Bering Technical support can be reached by the following:

Bering Technology, Inc
Technical Support
1357 Dell Avenue
Campbell, CA 95008-6629

Technical Support: (408) 364-6500
FAX: (408) 374-8309

▲ CAUTION: *Never remove the cover of the Echo enclosure. This voids the warranty.*

SPECIFICATIONS

A

8401HS

PERFORMANCE	Storage capacity	2.0 GB
	Max. sustained transfer rate	183 KB/sec
	SCSI burst transfer rate	1.58 MB/sec (asynchronous) 5MB/sec (synchronous)
	Recording density	61 M bits/in^2
	Error rate	1 in 10^{15} bits read
	MTBF	50,000 POH, 12% duty
ENVIRONMENTAL (operational)	Temperature	5 to 40 ˚C 41 to 104 ˚F
	Temperature gradient	10 ˚C/hour
	Relative humidity	20 - 80%
	Vibration	0.3G rms, 5 to 500Hz
	Shock	5G peak, 3 ms 2G peak, 11 ms
	Altitude	0 ~ 4,600 Meters 0 ~ 15,000 Feet
ENVIRONMENTAL (non-operational)	Temperature	-40 to 70 ˚C -40 to 158 ˚F
	Relative Humidity	5 - 95%
	Vibration	0.75 G rms, 5 to 500 Hz
	Shock	90G peak, 3 ms 30G peak, 26 ms
	Altitude	0 ~ 15,200 Meters 0 ~ 50,000 Feet

8411HS

PERFORMANCE	Storage capacity	8.0 GB (compressed 4:1) 2.0 GB (native mode)
	Max. sustained transfer rate	183 KB/sec
	SCSI burst transfer rate	1.58 MB/sec (asynchronous) 5MB/sec (synchronous)
	Recording density	61 M bits/in^2
	Error rate	1 in 10^{15} bits read
	MTBF	50,000 POH, 12% duty
ENVIRONMENTAL (operational)	Temperature	5 to 40 ˚C 41 to 104 ˚F
	Temperature gradient	10 ˚C/hour
	Relative humidity	20 - 80%
	Vibration	0.3G rms, 5 to 500Hz
	Shock	5G peak, 3 ms 2G peak, 11 ms
	Altitude	0 ~ 4,600 Meters 0 ~ 15,000 Feet
ENVIRONMENTAL (non-operational)	Temperature	-40 to 70 ˚C -40 to 158 ˚F
	Relative Humidity	5 - 95%
	Vibration	0.75 G rms, 5 to 500 Hz
	Shock	90G peak, 3 ms 30G peak, 26 ms
	Altitude	0 ~ 15,200 Meters 0 ~ 50,000 Feet

8421HS

PERFORMANCE	Storage capacity	16.0 GB (compressed 4:1) 4.0 GB (native mode)
	Max. sustained transfer rate	510 KB/sec (native)
	Max sustained transfer rate	1.0 MB/sec (compressed)
	SCSI burst transfer rate	1.58 MB/sec (asynchronous) 5MB/sec (synchronous)
	Recording density	61 M bits/in^2
	Error rate	1 in 10^{15} bits read
	MTBF	200,000 POH, 12% duty
ENVIRONMENTAL (operational)	Temperature	5 to 40 ˚C 41 to 104 ˚F
	Temperature gradient	10 ˚C/hour
	Relative humidity	20 - 80%
	Vibration	0.3G rms, 5 to 500Hz
	Shock	5G peak, 3 ms 2G peak, 11 ms
	Altitude	0 ~ 4,600 Meters 0 ~ 15,000 Feet
ENVIRONMENTAL (non-operational)	Temperature	-40 to 70 ˚C -40 to 158 ˚F
	Relative Humidity	5 - 95%
	Vibration	0.75 G rms, 5 to 500 Hz
	Shock	90G peak, 3 ms 30G peak, 26 ms
	Altitude	0 ~ 15,200 Meters 0 ~ 50,000 Feet

8422HS

PERFORMANCE	Storage capacity	32.0 GB (compressed 4:1) 8.0 GB (native mode)
	Max. sustained transfer rate	510 KB/sec (native)
	Max sustained transfer rate	1.0 MB/sec (compressed)
	SCSI burst transfer rate	1.58 MB/sec (asynchronous) 5MB/sec (synchronous)
	Recording density	61 M bits/in^2
	Error rate	1 in 10^{15} bits read
	MTBF	200,000 POH, 12% duty
ENVIRONMENTAL (operational)	Temperature	5 to 40 ˚C 41 to 104 ˚F
	Temperature gradient	10 ˚C/hour
	Relative humidity	20 - 80%
	Vibration	0.3G rms, 5 to 500Hz
	Shock	5G peak, 3 ms 2G peak, 11 ms
	Altitude	0 ~ 4,600 Meters 0 ~ 15,000 Feet
ENVIRONMENTAL (non-operational)	Temperature	-40 to 70 ˚C -40 to 158 ˚F
	Relative Humidity	5 - 95%
	Vibration	0.75 G rms, 5 to 500 Hz
	Shock	90G peak, 3 ms 30G peak, 26 ms
	Altitude	0 ~ 15,200 Meters 0 ~ 50,000 Feet

General

Power Requirements	Line voltage	100-240 volts
	Line frequency	47-63Hz
	Current	0.5 AMP
Physical	Interface	HP-IB, CS80 or SCSI CCS (Common Command Set)
	Dimension	3.25" x 12.8" x 14" 8.25 x 32.5 x 35.5 cm
	Shipping weight	25 lbs. 11.3 Kg
Accessories	Cartridge DDS, 90m	ACCS-3028
	Cartridge DDS-2, 120m	ACCS-3038
	Head cleaning kit, 4mm	ACCS-3512
	HP-IB Cable 1.0m (3.3 ft.)	ACCS-7110
	HP-IB Cable 2.0m (6.7 ft.)	ACCS-7115
	Cable, SCSI, 1.5m (5.0 ft.) 50 pin Hi Density to 50 pin Centronics	ACCS-7120
	Rack mount kit - 19" EIA	ACCS-7206

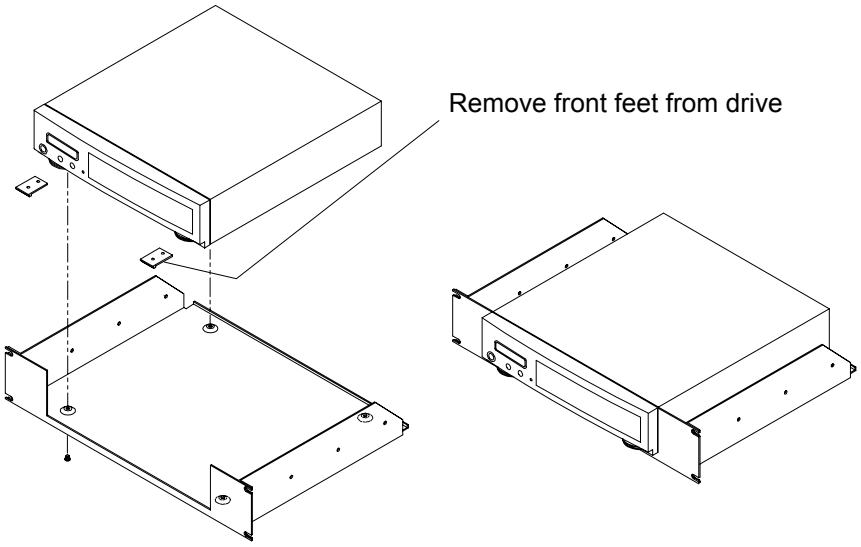
RACK MOUNT

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 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 cabinet and tighten.

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