



Exabyte 10h 8mm Library

Installation and Operation

Copyright

Copyright 1995, 1997 by Exabyte Corporation. All rights reserved. This item and the information contained herein are the property of Exabyte Corporation. No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the express written permission of Exabyte Corporation, 1685 38th Street, Boulder, Colorado 80301.

Disclaimer

Exabyte Corporation makes no representation or warranties with respect to the contents of this document and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Further, Exabyte Corporation reserves the right to revise this publication without obligation of Exabyte Corporation to notify any person or organization of such revision or changes.

Trademark Notices

Exabyte, EXAPAK, EXB, LANCourier, FileSECURE, and NetSECURE are registered trademarks of Exabyte Corporation. Eagle, Eliant, EXA, EXAFacts, EXAsoft, EXATAPE, Nest, and SCIMON are trademarks of Exabyte Corporation. All other brand and product names are trademarks or registered trademarks of their respective companies.

Revision History

Revision	Date	Description
000	February 1995	Initial release
001	May 1995	Updated for distribution kits and reorganized
002	February 1997	Updated for the Eliant 820

Exabyte Corporation
1685 38th Street
Boulder, Colorado USA 80301
(303) 442-4333

310376-002

Product Warranty Caution

The Exabyte® 10h 8mm Library (EXB-10h) is warranted to be free from defects in materials, parts, and workmanship and will conform to the current product specification upon delivery. For the specific details of your warranty, refer to the warranty card included with the library. If no warranty card was included, refer to your sales contract (or contact the company from which the library was purchased).

The warranty for the library shall not apply when:

- The library is repaired by anyone other than the Manufacturer's personnel or approved agent; or is repaired by anyone (including an approved agent) in a manner that is contrary to the maintenance or installation instructions supplied by the Manufacturer.
- The library is damaged or fails because of physical abuse, mishandling, accident, negligence, alteration, misapplication, faulty installation, or failure to follow operating instructions.
- The Manufacturer's serial number tag is removed.
- The library is damaged because of improper packaging on return.

CAUTION

Returning the library in unauthorized packaging may damage the unit and void the warranty. See Chapter 8 for packing instructions.

If problems with the library occur, contact your maintenance organization; do not void the product warranty by allowing untrained or unauthorized personnel to attempt repairs.

Standards

The library meets the following safety and regulatory agency standards:

- UL Standard 478, 4th Edition, Electronic Data Processing Units and Systems
- CSA Standard C22.2 No.950-95, Safety of Information Technology Equipment
- IEC 950/EN60950/DIN VDE 0805/5.90, Safety of Information Technology Equipment including Electrical Business Equipment
- CISPR Publication 22 (1985), Class B (Eliant 820 differential, Class A)

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables are required for this device to comply with FCC Rules. **Use shielded cables when connecting this device to others.**

According to FCC regulations, changes or modifications to this equipment that are not expressly approved by Exabyte could void the user's authority to operate the equipment.

Canadian D.O.C. Notice

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Contents

Welcome	vii
About the Exabyte 10h	viii
About this manual	xi
1 Installation	1
Preparing for installation	1
Installing the library	3
2 Configuration and setup	11
Installing data cartridges	11
Using the operator panel	18
Configuring the library	24
Installing the software application	31
Checking the setup	34
Where to go from here	35
3 General operation	37
General guidelines for operation	37
Opening the door during operation	39
Changing the control mode	41
Moving the CHM	47
Operating the tape drive	49
Cleaning the tape drive	53
Caring for cartridges	55
Resetting the library	56
4 Tape drive replacement	59
Preparing the library	59
Removing and installing the tape drive	61
5 Maintenance	81
Using touch-up paint on the housing	82
Cleaning the library	82
Replacing the fuse	83
Calibrating the CHM	85

6	Advanced operation	89
	About elements	89
	Viewing SCSI information	91
	Viewing operating statistics and status	98
	Performing diagnostics	103
7	Troubleshooting	109
	Problems with installation	110
	Problems with tape drive operation	112
	Problems with library operation	113
8	Shipping the library	115
	Returning the library for service	115
	Packing the library	116
	Appendix A: Specifications	121
	General specifications	121
	Operating environment	121
	Physical characteristics	122
	SCSI cable specifications	122
	Power	123
	SCSI terminator specifications	123
	Power cord requirements	124
	Appendix B: SCSI configuration	125
	SCSI components	125
	Configuring the library on the SCSI bus	126
	Appendix C: Error and status codes	129
	Error alert and status screens	130
	List of error and status codes	131
	Getting Help	145
	Glossary	147
	Index	151

Welcome

Thank you for selecting the Exabyte® 10h 8mm Library (*EXB-10h* or *library*). You have chosen an easily integrated solution for your backup and restore needs.

The library provides automated data storage, archival, backup, and retrieval for a wide range of systems, from PC networks to mainframes. Reducing the need for manual intervention, the library's robotic handler automatically loads and unloads 8mm data cartridges from the enclosed Exabyte 8mm half-high tape drive. When operating with an Eliant™ 820 or an EXB-8505XL tape drive and assuming an average data compression ratio of 2:1, the library can store up to 140 gigabytes of information on ten 160m XL cartridges.

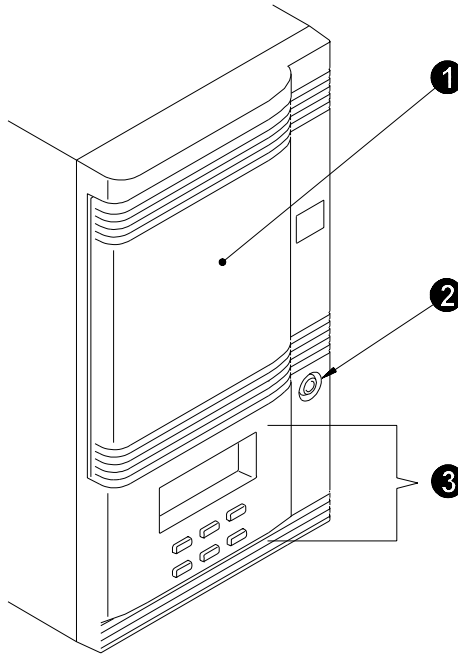
The library can operate as a random-access ("changer") device with application software packages that control libraries, or it can operate as a sequential-access ("stacker") device with software packages that control tape drives.

The library and the enclosed tape drive both include Small Computer System Interface (SCSI) controllers and use independent sets of SCSI-2 commands.

For detailed library specifications, see Appendix A.

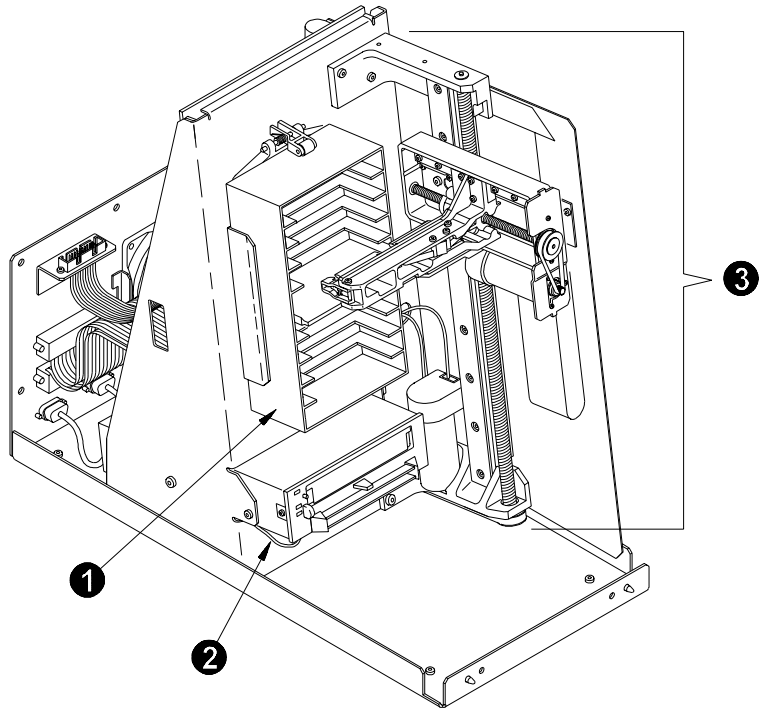
About the Exabyte 10h

Front panel components



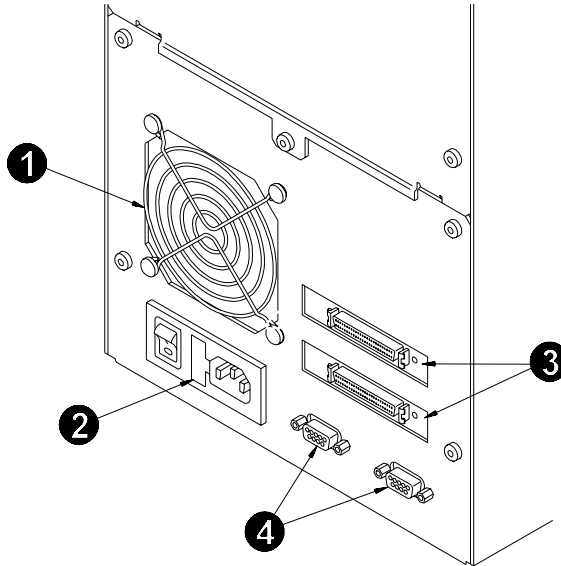
- ❶ **Door** The front door features a scratch-resistant window that allows you to see the cartridges, tape drive, and motions of the robotic arm.
- ❷ **Door lock** The door lock allows you to lock the front door for data security.
- ❸ **Operator panel.** The operator panel, which includes a liquid crystal display (LCD) and keypad, allows you to view the operational status of the library, access a menu of operations, and view status messages or hardware error messages.

Internal components



- ❶ **Data cartridge magazine** The data cartridge magazine holds up to ten EXATAPE™ 8mm data cartridges. You can also place an Exabyte Premium 8mm cleaning cartridge in this magazine.
- ❷ **Tape drive** The library includes one Exabyte 8mm half-high tape drive.
- ❸ **CHM** The cartridge handling mechanism (CHM) is the robotic arm that moves vertically and horizontally to load and unload cartridges from the magazine and tape drive. The gripper is the part of the CHM that grips the cartridge.

Back panel components



- ❶ **Cooling fan** The cooling fan reduces the operating temperatures of the CHM and tape drive.
- ❷ **Power entry module** The power entry module includes the power switch, the AC power connector, and the fuse drawer.
- ❸ **SCSI connectors** Two external SCSI connectors can accommodate two SCSI cables for daisy-chained configurations or one cable and an external terminator when the library is the terminating device for the SCSI bus.
- ❹ **CHS Monitor and CTS Monitor ports** Two 9-pin connectors enable an authorized service technician to perform diagnostics. The CHS Monitor (outermost) port is for library diagnostics; the CTS Monitor (innermost) port is for tape drive diagnostics.

About this manual

Use this manual for installing, operating, maintaining, and troubleshooting basic problems with the library. Use the *Exabyte 10h Quick Reference* at the back of this manual as a pull-out reference to the operator panel and error codes.

Who should use this manual

This manual is intended for system integrators and administrators who plan to install and operate the library.

For more information

For more information about . . .	Refer to . . .
Supplies and accessories available from Exabyte	"Getting Help" in the back of this manual
Exabyte Technical Support	
Detailed EXB-10h specifications	<i>Exabyte 10h 8mm Library Product Specification (310377)</i>
Detailed tape drive specifications	The product specification for your tape drive

Conventions used in this manual

This manual uses the following conventions:

Note: Notes provide additional information or suggestions about the topic or procedure being discussed.

ENTER Boxed characters such as **ENTER** indicate keys on the operator panel.

➤ **Important** Important notices help you successfully complete a procedure or avoid additional steps in a procedure.

CAUTION

Information in *CAUTION* boxes explains how to avoid damaging the equipment or data recorded on tape.

WARNING!

Boxed text under “WARNING!” provides information you must know to avoid personal injury.

1 Installation

This chapter provides information for the following tasks:

- Preparing for installation
- Installing the library

Preparing for installation

To prepare for installation, follow the steps in this section. You can use the table below as a checklist.

✓	Step	Procedure
	1	Unpack the library and save the materials.
	2	Check the library accessories.
	3	Prepare the host computer system.
	4	Prepare the library.

Step 1 – Unpack library and save the materials

Complete the unpacking procedure printed on the box. Save all the original packing materials in case you need to reship the library. For information about shipping the library, see Chapter 8.

Step 2 – Check the library accessories

The accessory box contains a list of library accessories. Verify that the contents in the box match the items on the list. If you need additional items, see “Getting Help” on page 145.

Step 3 – Prepare the host computer system

- Install a SCSI adapter card in the host computer (if one is not already installed).
- Select a software application. Make sure the application is compatible with an Exabyte EXB-10h, EXB-10e, or EXB-10i 8mm Library. For more information about the software's compatibility with the library, see “Installing the software application” beginning on page 31.

Step 4 – Prepare the library

- Ensure that the environment is free of conditions that could cause electrostatic discharge (ESD). If possible, use an antistatic mat and grounded static protection wristband during installation. If a mat and wristband are not available, touch a known grounded surface, such as the computer's metal chassis, to discharge static electricity from your body.
- Determine the position of the library on the SCSI bus, the SCSI IDs of all devices on the bus, and the length of required cable. For detailed information about installing the library on the SCSI bus, refer to Appendix B.
- Locate a level surface near a readily accessible outlet. You can use a carpenter's level to determine if the library is level.
- Remove the protective film from the library door.

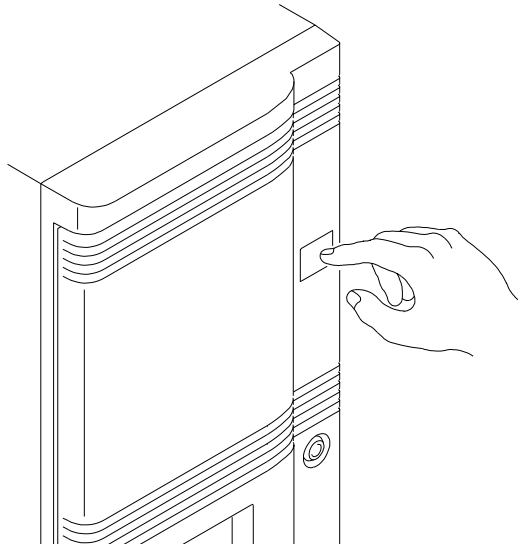
Installing the library

This section describes how to install the library. You can use the table below as a checklist.

✓	Step	Procedure
	1	Unlock and open the door.
	2	Move the CHM and remove packing foam.
	3	Close and lock the door.
	4	Install the tape drive, if necessary.
	5	Connect the library to the SCSI bus.
	6	Connect the power cord.
	7	Power on the library.

Step 1 – Unlock and open the door

Using one of the keys provided in the accessory box, unlock the library door. Open the door by pressing the square at the right.



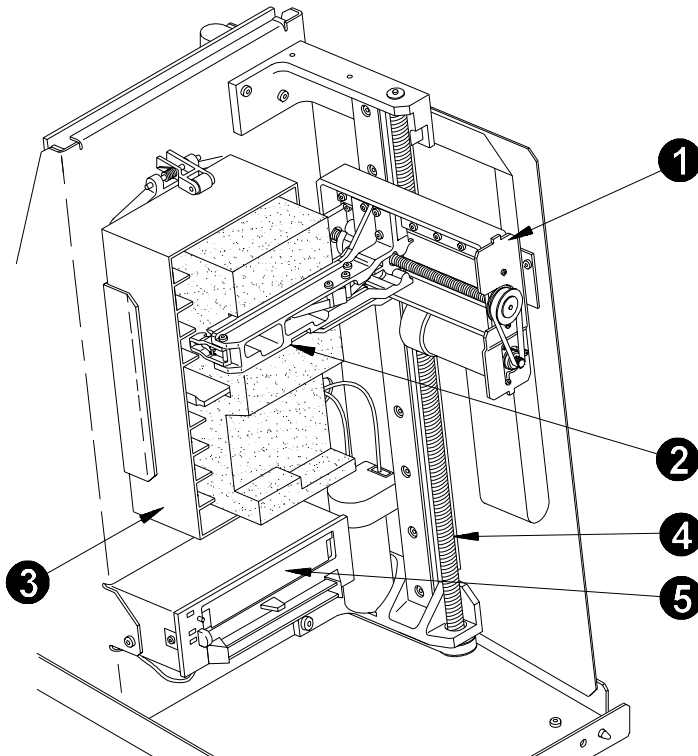
Step 2 – Move CHM and remove packing foam

When the library is shipped, the CHM base (❶ in the figure below) and gripper ❷ are secured in packing foam in the magazine ❸ above the tape drive ❺.

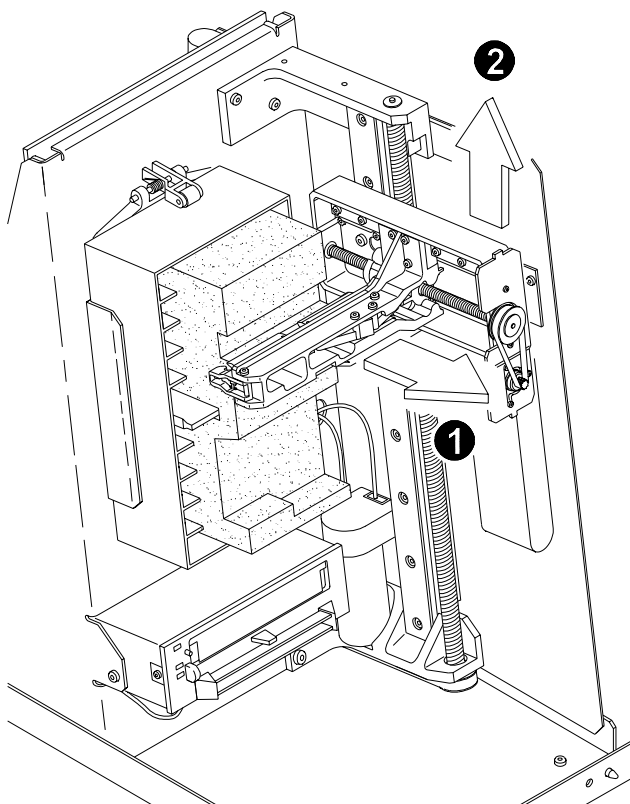
Follow these instructions to move the CHM up along the lead screw ❹ and remove the packing foam.

CAUTION

Do not touch the spring underneath the gripper and do not pull on the CHM base (❶).



1. Grasp the gripper near the CHM base and pull firmly to slide it back, toward you (arrow **1** in the figure below).
2. If desired, move the CHM base to the top (arrow **2**) until it no longer blocks the magazine. To do this, use your fingers to turn the vertical lead screw.
3. Remove the foam packing piece and save it with the other library packing materials.



Step 3 – Close and lock the door

Close the library door and press the square on the right to latch it. If desired, lock the door and store the key in a safe location.

Step 4 – Install the tape drive, if necessary

Note: If a tape drive is already installed in the library, go to step 5.

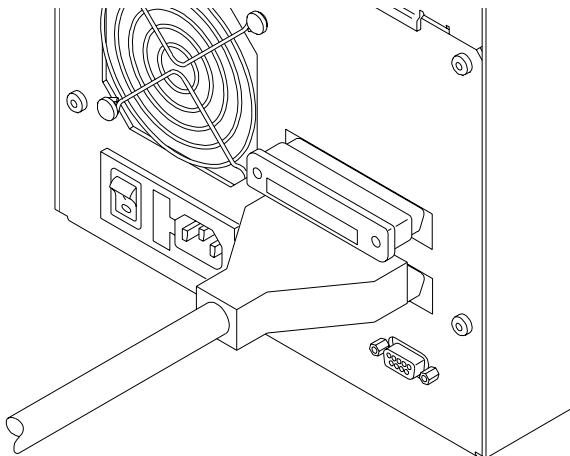
If you purchased the library without a tape drive, you must install your own Exabyte 8mm half-high tape drive, as described in Chapter 4. Continue with the steps in that chapter to connect the library to the SCSI bus, power on the library, and test the tape drive installation. When you have finished with those instructions, skip the rest of this chapter and go to Chapter 2.

Step 5 – Connect the library to the SCSI bus

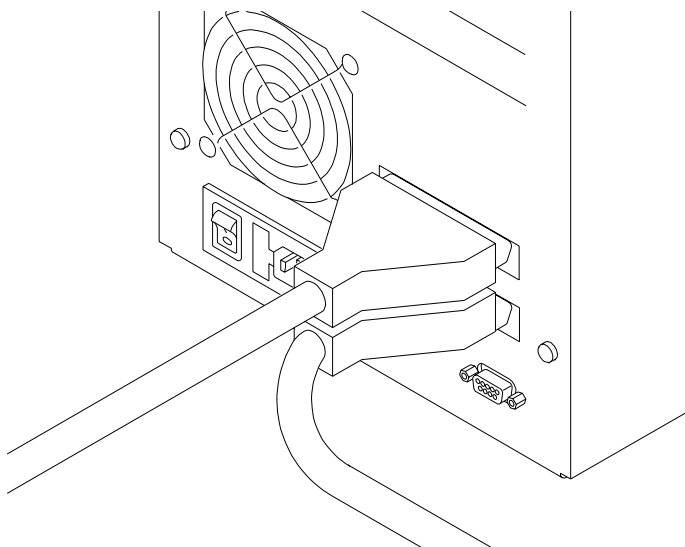
Note: If you are unfamiliar with installing devices on a SCSI bus, see Appendix B.

1. Make certain the host computer and any peripheral devices are turned off. If another SCSI device previously terminated the SCSI bus and will no longer be at the physical end of the bus, remove the terminator from that device.
2. If you have not already done so, connect the SCSI cable to the host computer (or to the next device in the daisy-chain).
3. Plug the other end of the SCSI cable into one of the SCSI connectors on the back of the library.

4. If the library is the last device on the SCSI bus, plug a terminator into the other connector.



If the library is not the last device on the SCSI bus, plug another SCSI cable into the other library connector.



Step 6 – Connect the power cord

WARNING!

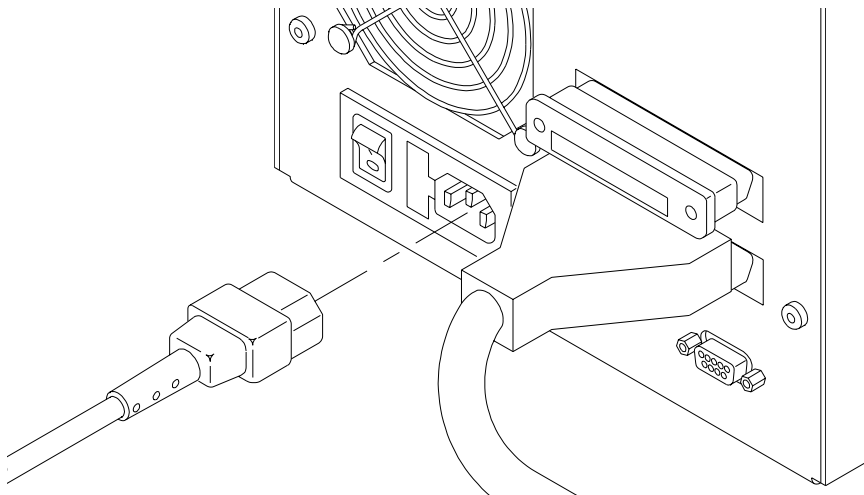
The library's primary disconnect device is the power cord plug. For this reason, install the library near an outlet that is readily accessible.

VORSICHT!

Die Hauptnetztrennfunktion wird durch den Netzstecker übernommen. Aus diesem Grund schließen Sie bitte das EXB-10h an eine leicht zugängliche Steckdose an.

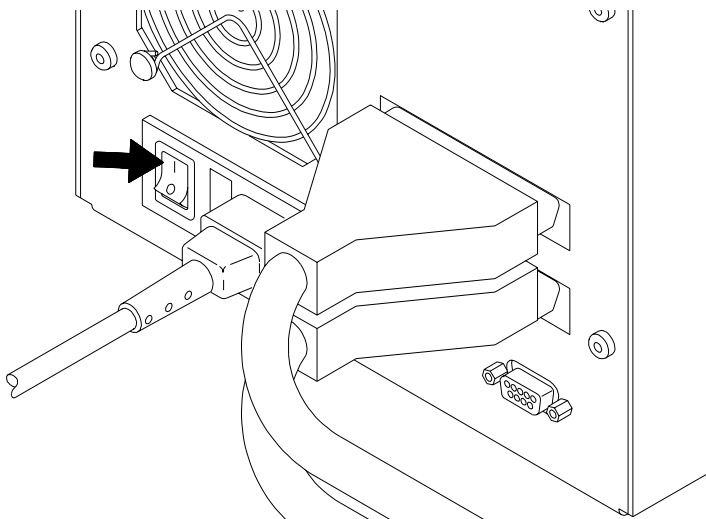
1. Make sure that the power switch on the back of the library is off (the **0** is pressed).
2. Connect the female end of the power cord to the power connector. To prevent possible power loss, make sure that the power cord is fully connected.
3. Plug the male end of the power cord into the power source.

Note: The library has autoranging voltage selection, so you do not need to change the voltage setting.



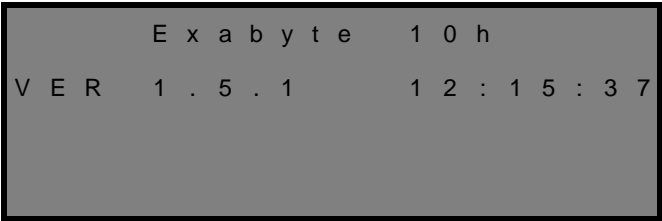
Step 7 – Power on the library

1. Turn on the host computer system and any other devices.
2. Push the power switch to the on position (the **I** is pressed).



Wait while the library performs its power-on sequence. During this time, the following activities occur:

- The cooling fan begins to rotate.
- The LCD illuminates and displays the Main Screen:



- The tape drive performs its power-on self-test.
- The library performs its power-on self-test.

When the power-on sequence is finished, the CHM moves to the top.

If problems occur . . .

Problem	Corrective action
The library does not power on as described	Check the following: <ul style="list-style-type: none">✓ Is the power cord inserted correctly?✓ Is the library door closed?✓ Is the host computer turned on?✓ Is the SCSI bus terminated?✓ If the library is terminated, is the host computer providing term power?
An error code is displayed on the LCD	See Appendix C for information about the error code.
Other problems	See “Problems with installation” on page 110.

If you cannot solve the problem yourself, see “Getting Help” on page 145.

2 Configuration and setup

This chapter provides information for the following tasks:

- Installing data cartridges
- Using the operator panel
- Configuring the library
- Installing the software application
- Checking the library setup

Installing data cartridges

This section describes how to select the appropriate data cartridges for the tape drive and how to install these cartridges.

Selecting data cartridges

Exabyte strongly recommends that you use EXATAPE™ data-grade media with all Exabyte tape drives. Unlike media available from other manufacturers, EXATAPE 8mm Data Cartridges are formulated specifically for use in a data storage environment and offer reliability, extended durability, and long-term archivability. In addition, exclusive use of EXATAPE media with Exabyte 8mm tape drives has been shown to prolong head and tape life.

8mm data cartridges require no formatting before use, although your software application may need to initialize them.

CAUTION

Never use video-grade tape for data storage. Video-grade tape can be less accurate than data-grade tape and is more abrasive to tape drive recording heads.

If you need to order additional data cartridges, see “Getting Help” on page 145.

Compatibility of cartridges and tape drives

EXATAPE™ 8mm Metal Particle (MP) Data Cartridges are available in lengths of 15m, 54m, 112m, and 160m XL.

Exabyte XL tape drives and the Eliant 820 use the Recognition System to identify 160m XL tapes. The Recognition System is a “stripe” on the tape leader that identifies the tape to the tape drive. Make sure you purchase data cartridges equipped with the following Recognition System logo on the label:

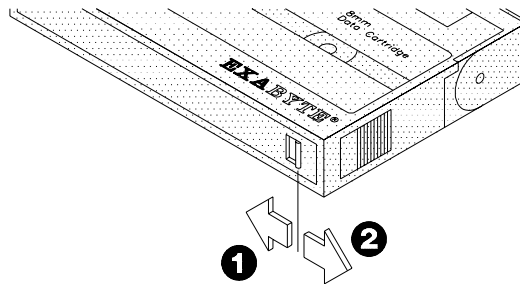


Note: The EXB-8205 and EXB-8505 8mm tape drives do not support 160m XL data cartridges and will automatically eject them.

➤ **Important** You cannot use EXATAPE Advanced Metal Evaporated (AME) 8mm data cartridges in the Exabyte 10h library.

Setting the write-protect switch

Before installing a data cartridge in the library, make sure that the write-protect switch is set correctly for the desired operation. You can use a ball-point pen or similar instrument to set the switch.



- ➊ Write protect (red tab fully visible)
- ➋ Write enable (red tab not fully visible)

Installing cartridges

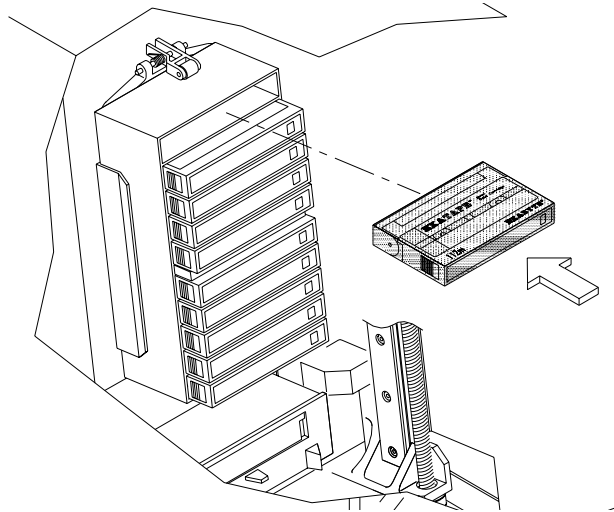
You can install cartridges in the library when the magazine is still mounted in the library or when the magazine is removed from the library. This section describes both procedures.

➤ **Important** Your software application may require that a cleaning cartridge be installed in a specific slot or not installed at all. Check the documentation provided with your software.

Magazine mounted in library

1. Make certain the CHM is not blocking the magazine, then open the library door. If you need to move the CHM manually, see page 47.
2. To insert a cartridge, hold it so that the write-protect switch is to the right, then insert it into the empty slot.

Note: Very little force is needed to install a cartridge into the magazine. If the cartridge does not snap into place easily, check its orientation.

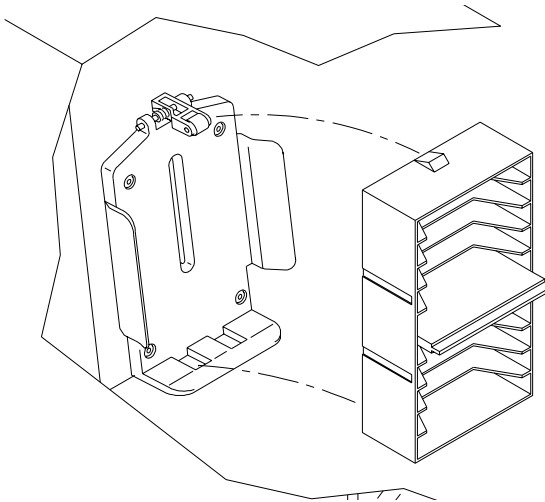


3. Close the library door and press the square at the right to latch the door.

Magazine removed from library

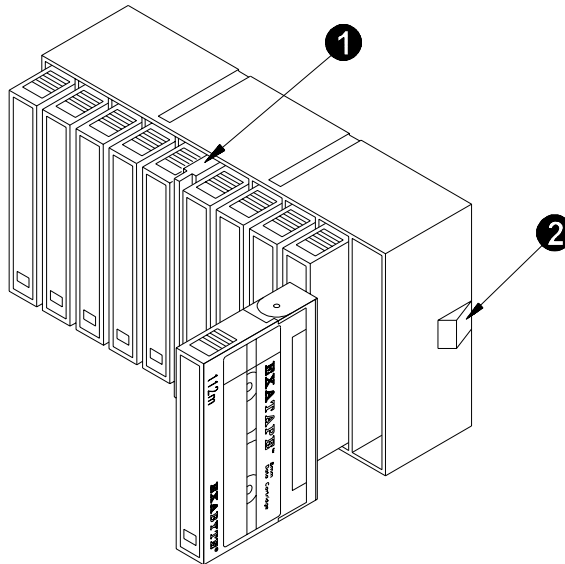
This section describes how to remove the magazine to install cartridges.

1. Make certain the CHM is not blocking the magazine, then open the library door. If you need to move the CHM manually, see page 47.
2. Pull the magazine out first from the top, and then the bottom.



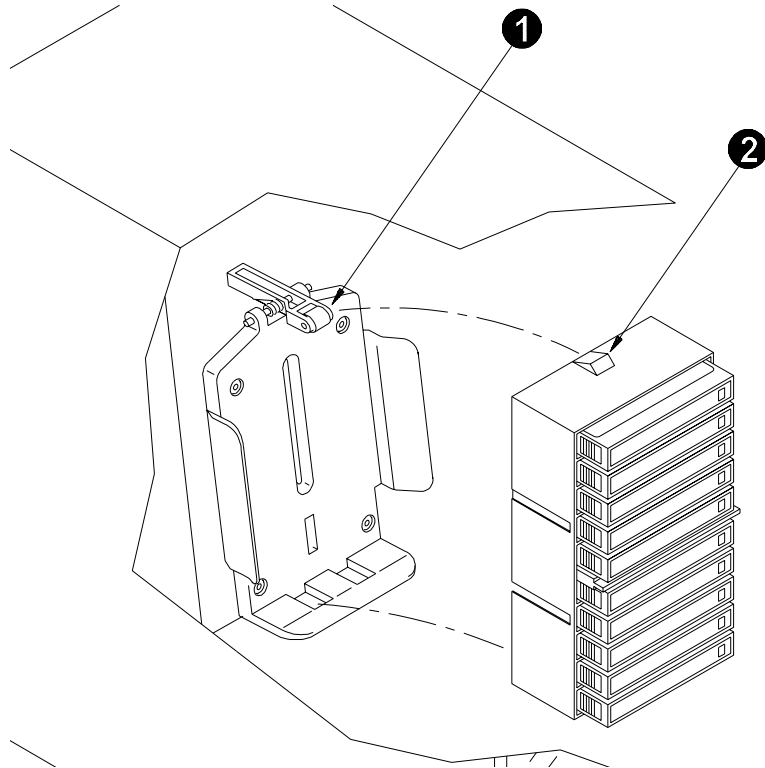
3. Using the mounting guide ❷ on the magazine for orientation, position each cartridge with the write-protect switch down and insert the cartridge into the slot.

Note: As described below, very little force is needed to install a cartridge. If it does not snap into place easily or if it protrudes further than the center rib ❶, check the orientation of the cartridge.



➤ **Important** Use only *cartridge magazines* designed for Exabyte 8mm libraries that contain a half-high tape drive (such as the EXB-10h and EXB-210). Do not use *data cartridge holders* designed for full-high tape drive libraries. Data cartridge holders do not fit in the EXB-10h.

4. Position the magazine so that the roller **1** on the mounting plate and the mounting guide **2** on the magazine are aligned. Clip the magazine onto the bottom, then press on the top.



Using the operator panel

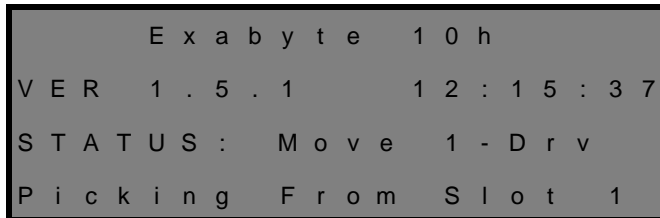
The library includes a four-line LCD and keypad, called the *operator panel*, which allows you to control library operations.

Note: The operator panel allows you to control CHM operations only, not tape drive operations. The tape drive operates independently of the library.

Main Screen

The Main Screen appears when you apply power to the library. The first and second lines identify the product and display the current time. The third and fourth lines provide status messages about current operations.

An example of the Main Screen with a status message is shown below.








```
      E x a b y t e   1 0 h
V E R   1 . 5 . 1           1 2 : 1 5 : 3 7
S T A T U S :   M o v e   1 - D r v
P i c k i n g   F r o m   S l o t   1
```

Note: The exact wording of the Main Screen may be different on your display.

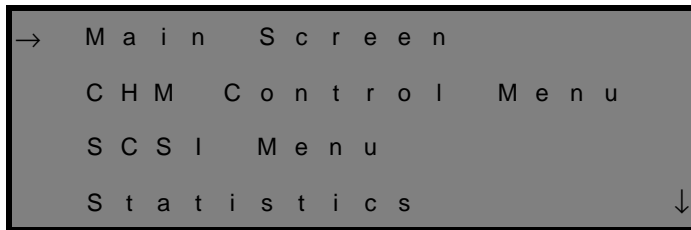
Operator keys

Use the keys on the operator panel to perform the following actions:

	Scrolls up or down through menus. or Increases or decreases values in screens.
	Displays the Main Menu.
	Returns to the previous screen.
	Selects the item next to the arrow when a menu is displayed. or Displays the Error Status screen when a library hardware error occurs (see Appendix C for more information).
	Displays the Reset screen, which allows you to reset the library.

Main Menu

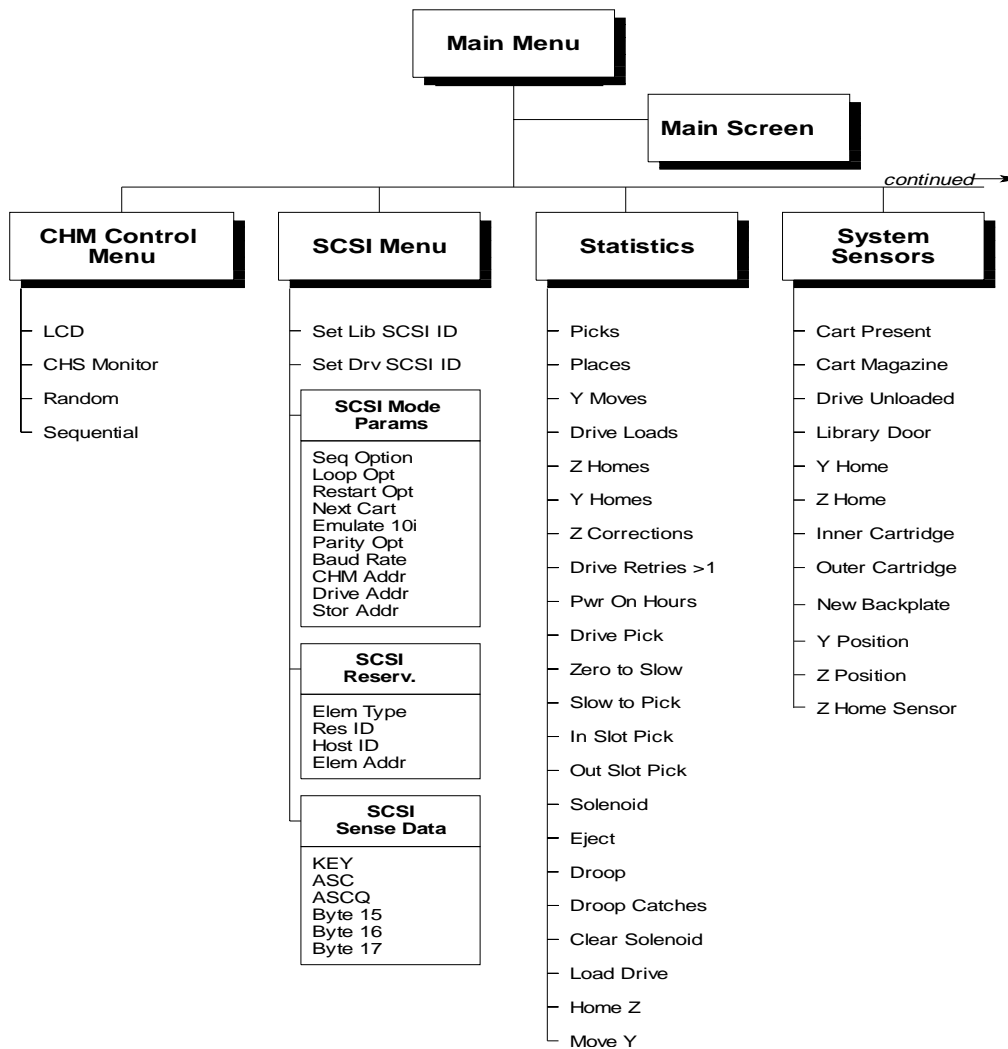
Use the Main Menu to access all LCD options and functions. To access the Main Menu, press **MENU** or **ESC** from the Main Screen.

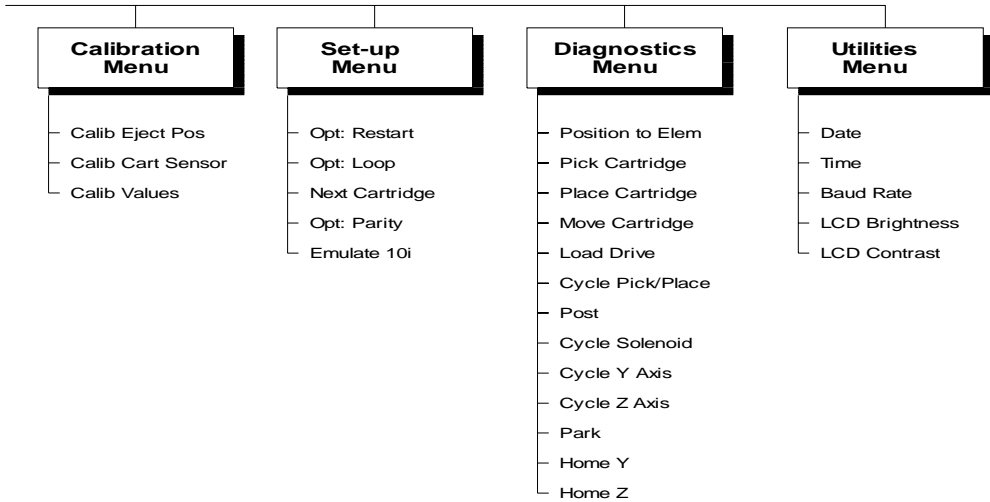


The selections on the Main Menu are described below.

Menu selection	Description
Main Screen	Returns to the Main Screen.
CHM Control Menu	Accesses options for specifying how CHM motion is controlled.
SCSI Menu	Accesses options for viewing or setting SCSI IDs and viewing SCSI information for the library.
Statistics	Accesses options for viewing current information about library operations.
System Sensors	Accesses options for viewing the status of the library's internal mechanical sensors.
Calibration Menu	Accesses options for calibrating the positions of the library's cartridge sensor and the solenoid used for ejecting cartridges from the CHM.
Set-up Menu	Accesses options for specifying various parameters that affect library operation.
Diagnostics Menu	Accesses options for performing diagnostic tests.
Utilities Menu	Accesses options for specifying the library's internal date and time and the LCD appearance.

The menu structure is shown below and on the next page.





Configuring the library

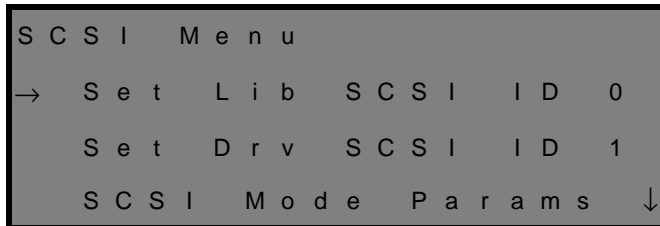
The table below describes how the library’s configuration options are set at the factory. Use this table to determine if you need to change any options.

Option	Description	Factory setting	Reason to change
Lib SCSI ID	Determines the library’s SCSI ID.	0	If there is another device on the SCSI bus that uses ID 0.
Drv SCSI ID	Determines the tape drive’s SCSI ID.	1	If there is another device on the SCSI bus that uses ID 1.
Parity option	Determines whether the library performs parity checking on information coming across the SCSI bus.	On	If the SCSI adapter card does not support parity checking.
Date and time	Sets the library’s internal clock.	Current date and time	If you need to adjust the date or time.
Brightness and contrast	Determines the LCD appearance.	Maximum	If you want to adjust the LCD’s brightness and contrast.

If you need to change any of the configuration options, follow the appropriate instructions on the following pages.

Changing the SCSI IDs

To view the current SCSI ID settings for the library and tape drive, display the Main Menu by pressing **[MENU]** from the Main Screen, then select SCSI Menu.

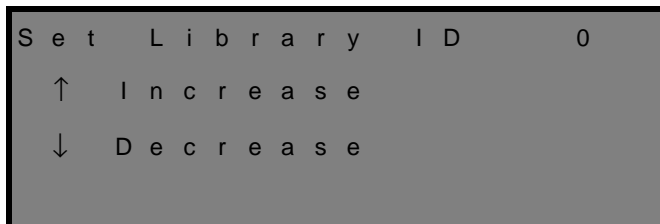


The SCSI Menu displays the current settings. In the example above, the library (Lib) is set to 0. The tape drive (Drv) is set to 1. If the current settings are correct for your situation, press **[ESC]** to return to the Main Menu.

Note: Some software applications require specific SCSI IDs. Before setting the library SCSI IDs, read the manual provided with the software.

To change the SCSI ID for the library:

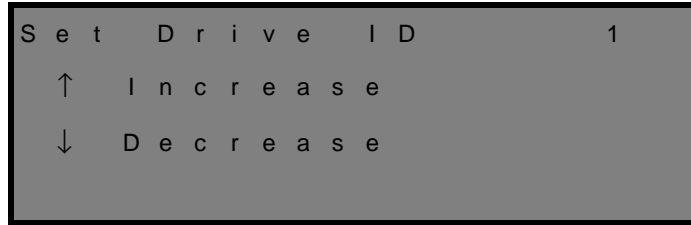
1. Make sure the arrow points to Set Lib SCSI ID. Press **[ENTER]**.







2. Press **[↑]** to increase the SCSI ID or **[↓]** to decrease the SCSI ID. When the desired ID appears, press **[ENTER]**.

To change the SCSI ID for the tape drive:

1. From the SCSI Menu, select Set Drv SCSI ID.



Note: The library and the tape drive must have different SCSI IDs. If you attempt to set them to the same value, the LCD displays an error message.

2. Press  to increase the SCSI ID or  to decrease the SCSI ID. When the desired ID appears, press . The LCD displays a message reminding you to power the tape drive off and back on.
3. Press  to exit from the message screen.
4. For the tape drive SCSI ID change to take effect, turn the library off and then on again.

Note: If your software application is active, you may also need to turn the host computer off and then on so the application can rescuing the bus for the new SCSI IDs. Refer to the documentation for the application.

Setting parity checking

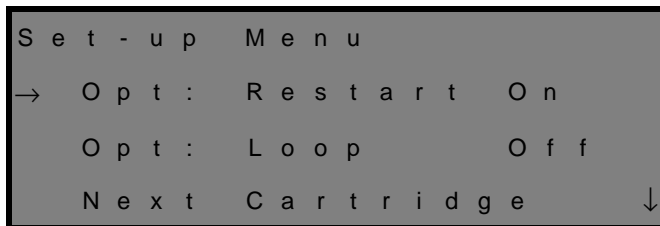
The SCSI Parity option allows you to enable parity checking for the library (if the SCSI adapter card connected to the bus supports it). When this option is enabled, the library checks all data coming across the SCSI bus for parity. The setting remains in effect across power cycles.

Note: Parity checking for the library can also be enabled by the software application using the SCSI command, MODE SELECT. Refer to the *EXB-10h and EXB-10e 8mm Libraries SCSI Reference* for more information.

Parity checking for tape drives is set separately using the MODE SELECT command or EEPROM options.

To change parity checking:

1. From the Main Menu, select Set-up Menu.



2. Scroll through the options until the screen arrow points to Opt: Parity.
3. Change the setting of Opt: Parity by pressing **ENTER**. This toggles the option on and off.
4. Press **MENU** to return to the Main Menu.

Setting the date and time

This section describes how to verify the library's internal date and time settings, and how to change the settings if necessary. The date appears in diagnostic listings. The time is shown on the library's Main Screen and also appears in diagnostics listings.

To view the date and time, select Utilities Menu from the Main Menu.

```
U t i l i t i e s   M e n u
→  D a t e   F R I   0 5 - 2 0 - 9 5
    T i m e       1 0 : 2 7 : 5 4
    B a u d   R a t e       9 6 0 0   ↓
```




The Utilities Menu displays the current date and time settings. If these settings are correct, press **ESC** to return to the Main Menu.

To change the date:


1. Make certain the screen arrow points to Date and press **ENTER**.

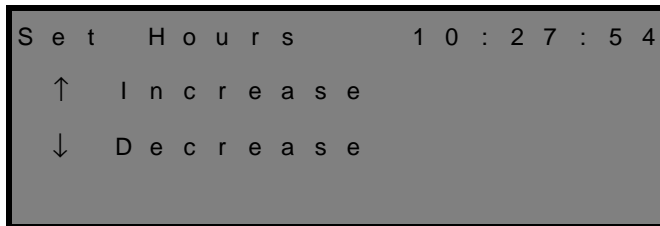
```
S e t   D a y   o f   W e e k :   F R I
  ↑   I n c r e a s e
  ↓   D e c r e a s e
```

The Date option consists of four screens. The screen above is the first that appears and is followed by screens that allow you to set the month, day, and year.




2. To increase the value, press ; to decrease it, press . To accept a change and go to the next screen, press .

To set the time:

1. Display the Utilities Menu as described on the previous page.
2. Scroll down to Time, and press .



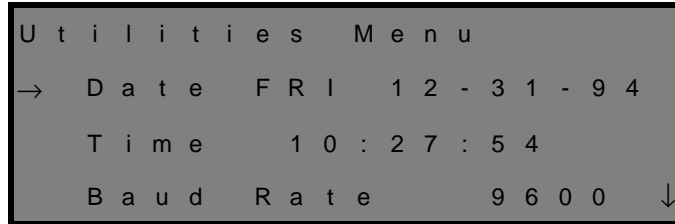
The Time option consists three screens. The screen above is the first that appears and is followed by screens that allow you to set the minutes and seconds.

3. To increase the value, press ; to decrease it, press . To accept a change and go to the next screen, press .

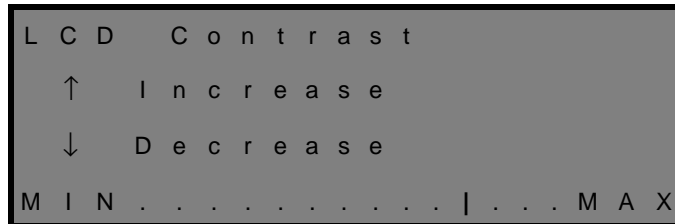
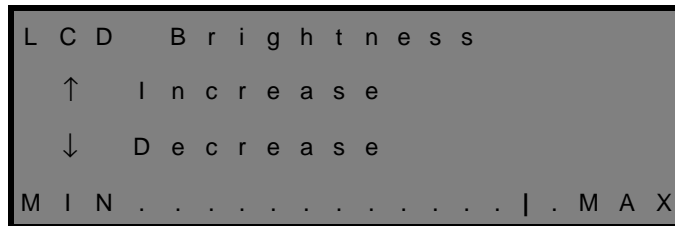
Adjusting brightness and contrast of the LCD

The LCD Brightness and LCD Contrast options allow you to adjust the appearance of the lettering on the LCD. To adjust the brightness and contrast:

1. From the Main Menu, select Utilities Menu.



2. Scroll down to either LCD Brightness or LCD Contrast. Press **ENTER**.



3. To increase the value, press **↑**; to decrease it, press **↓**. To accept a change and go to the Main Menu, press **ENTER**.

Installing the software application

After you install and configure the library, install the software application on the host computer. Make sure the SCSI host bus adapter card installed in the computer and the application software are compatible with the library.

Refer to this section for general software compatibility information. More detailed information is available from Exabyte's internet site at www.exabyte.com, or from EXAFacts™, Exabyte's fax-on-demand service.

If the application is already installed, you may need to reconfigure it for the library.

Application requirements

Most applications need to know the following library information:

- **SCSI IDs of the library and tape drive.** Some applications require you to enter the IDs; others can determine the IDs by querying all devices on the SCSI bus. The library uses two IDs: one for the library and one for the tape drive.

To verify the current SCSI ID settings, display the SCSI Menu as described on page 25.

- **Cartridge inventory.** Most applications need to identify the cartridges in the magazine. During this process, the application instructs the CHM to place each cartridge in the tape drive so the application can identify the tape.

For more information about your application's requirements, read the documentation provided with the software.

If the application does not support an EXB-10h

The EXB-10h will operate with software applications that support an Exabyte EXB-10e, EXB-10i, or 8mm half-high tape drive, as follows:

Applications for the EXB-10e

The EXB-10h has the same operating features as the EXB-10e and is designed to operate with the same software application packages.

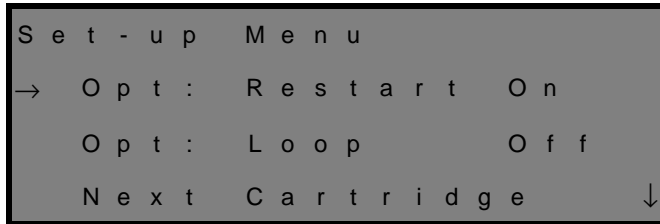
➤ **Important** Your software application may identify the EXB-10h as an “EXB-10e.” Since the EXB-10h is designed to operate with applications developed for the EXB-10e, the different name will not matter for library operations.

Applications for the EXB-10i

If your software application does not support an EXB-10h or EXB-10e, but does support an Exabyte EXB-10i, you can turn on the Emulate EXB-10i option so your software and library can communicate. EXB-10i and EXB-10h operations are virtually the same, except that the EXB-10h has an LCD interface (which does not matter to your software).

To turn on the Emulate EXB-10i option:

1. From the Main Menu, select Set-up Menu.



2. Scroll down until the screen arrow points to Emulate EXB-10i.
3. Change the setting by pressing **ENTER**. This toggles the option on and off.
4. Press **MENU** to return to the Main Menu.

Applications for the tape drive

If the software does not support the EXB-10h, EXB-10e, or EXB-10i libraries, but does support an Exabyte 8mm half-high tape drive, you can run the library in sequential mode (see page 41).

Checking the setup

After installing the library and software application, check the setup by performing some exercises on the library. While these exercises are not required, it is a good idea to verify that your software and hardware are communicating properly before you begin operations.

To check the setup:

- Use the options on the Diagnostics Menu to exercise the hardware, as described on page 104. This determines whether the library hardware components are operating properly.
- Instruct the software application to load some cartridges into the tape drive. This determines whether the software and library are functioning properly.
- Back up several megabytes of data and perform a comparison check on the backed up data. This determines whether the software and tape drive are functioning properly.

If problems occur . . .

Problem	Corrective action
The library does not power on as described	Check the following: <ul style="list-style-type: none"> ✓ Is the power cord inserted correctly? ✓ Is the library door closed? ✓ Is the host computer turned on? ✓ Is the SCSI bus terminated? ✓ If the library is terminated, is the host computer providing term power?
An error code is displayed on the LCD	See Appendix C for information about the error code.
Other problems	See “Problems with installation” on page 110.

If you cannot solve the problem yourself, see “Getting Help” on page 145.

Where to go from here

Before you begin library operations, check the following:

- ✓ The magazine and cartridges are installed. If the magazine is not in place, the LCD displays “No Magazine.”
- ✓ The tape drive does not contain a cartridge.
- ✓ The CHM does not contain a cartridge.

- ✓ The library door is closed. If the door is not closed, the LCD displays “Door Open.”
- ✓ The library is in the proper control mode. The standard operating mode is random mode. If you plan to use sequential mode, refer to “Using sequential mode options” beginning on page 44.

3 General operation

This chapter describes how to operate the library, including:

- General guidelines for operation
- Opening the library door during operation
- Changing the control mode
- Moving the CHM
- Operating the tape drive
- Cleaning the tape drive
- Caring for cartridges
- Resetting the library

General guidelines for operation

Once the library and software application are successfully installed and configured, you can automatically perform backup and restore operations using the software application. You do not need to intervene in the cartridge processing unless you want to replace cartridges. Most applications will inform you when it is time to replace cartridges.

While the library is operating, follow these guidelines:

- **Do not open the library door** while the CHM is performing a move operation. Wait for the CHM to complete its task.

Also be aware that most software applications can detect whether the door has been opened and may assume that you have disturbed the cartridge processing order. After the door has been opened and then closed, these applications may perform a time-consuming cartridge inventory process.

Even if the library is not operating, you should keep the door closed to protect its internal components from dust.

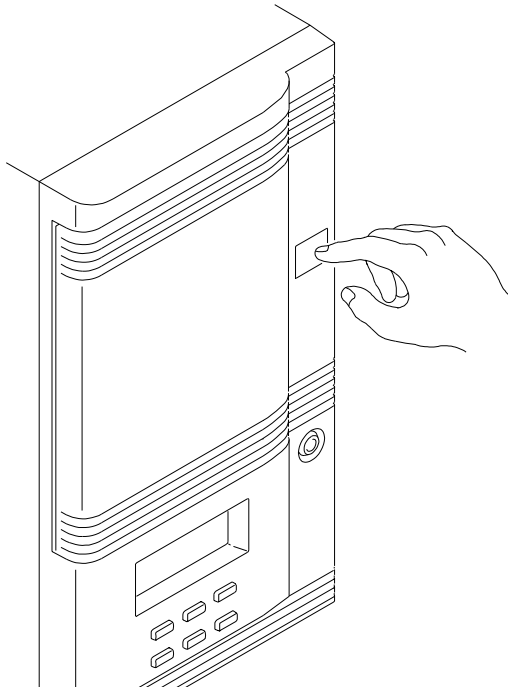
- **If your application keeps a detailed inventory of cartridges, do not remove or install cartridges** unless your application instructs you to do so. Replacing cartridges at random may confuse the processing order and your application may hang.
- **Do not switch control modes** or other options unless absolutely necessary (see page 41 for more information about control modes). Your software application may expect the library to operate with specific settings.
- **Use only the recommended types of cartridges**, as described on page 11.
- **Follow recommended tape drive cleaning procedures** as described on page 53.

Opening the door during operation

➤ **Important** Do not open the door while the CHM is performing a pick-and-place operation. Wait for the CHM to complete the move.

After the door has been opened and then closed, the software application may perform a time-consuming cartridge inventory process.

1. If necessary, unlock the front door.
2. Press the square at the right of the door to release the door latch. This temporarily stops library operations.



What happens when you open the door

- The library's internal motors turn off.
- If the Main Screen is currently displayed, the following status message appears:

Door Open

- If the library is in random mode, the library returns Check Condition status to the host.
- The software application may display an error message indicating that the door has been opened and that the cartridge inventory may have been changed.

Resuming operation

To resume operation, close the door and press the square at the right to latch it. If desired, lock the door.

After the door is closed:

- If the library is in sequential mode and the restart option is off, the CHM waits one second and then resumes processing where it left off. If the restart option is on, the CHM resumes processing with cartridge 1.
- If the library is in random mode, the host computer must process the Check Condition status before operation can resume.
- The software application may perform a cartridge inventory process.

Changing the control mode

The control mode determines which interface controls CHM motion: either the application, the library firmware, the LCD, or a diagnostic program.

Note: The library is set to random mode at the factory. Because most software applications for libraries expect the library to be in random mode, you should keep this setting, unless you want the CHM to be controlled differently.

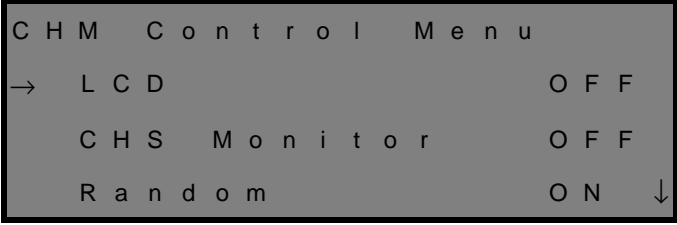
Mode	Description	Purpose
Random	An application on the host computer controls CHM motion using SCSI (Small Computer System Interface) commands.	To allow a host computer and library software application to control CHM operations.
Sequential	The library's internal firmware instructs the CHM to process cartridges sequentially from the bottom to the top of the magazine. Before changing the control mode to sequential, read "Processing cartridges in sequential mode" beginning on page 43.	To operate the library as a sequential "stacker" device with a software application that does not support libraries.
CHS Monitor	A diagnostic program controls CHM motion through the CHS Monitor port.	To allow authorized service technicians to perform diagnostic tests on the library.
LCD*	The operator panel (the keypad and LCD) controls CHM motion.	To perform diagnostics that test individual CHM motions and to calibrate the position of the CHM.

* You do not need to set the library to LCD mode to use most of the features available from the LCD. LCD mode is required only when you want to control the motions of the CHM using the LCD.

➤ **Important** The software application can control CHM movement only when the library is set to random mode.

To change the control mode:

1. Make certain the library is in the ready state (there is no hardware error, the door is closed, and so on).
2. From the Main Menu, select CHM Control Menu.



```
CHM Control Menu
→ LCD OFF
CHS Monitor OFF
Random ON ↓
```

Note: Before changing the control mode to sequential, read “Processing cartridges in sequential mode” beginning on page 43.

3. Scroll through the options until the screen arrow points to the mode you want. Press **ENTER**.

A status message indicates when the control mode change is complete. If the library is currently performing a move operation, it completes the move, then displays the status message.

4. Press **MENU** to return to the Main Menu.

Processing cartridges in sequential mode

➤ **Important** Before the library can begin sequential processing, the tape drive must be unloaded and the CHM must be empty. If not, the library displays an error.

After you set the library to sequential mode, the library performs the following actions:

1. Picks the cartridge from the bottommost slot in the magazine. (If the CHM encounters an empty slot, it moves up to the next cartridge in the magazine.)
2. Places the cartridge in the tape drive and waits for the software application to eject the cartridge.
3. Retrieves the cartridge from the tape drive.
4. Returns the cartridge to its original slot in the magazine.
5. Repeats the process with the next cartridge up in the magazine.

After all the cartridges in the magazine have been processed, the CHM either cycles back to the bottommost cartridge and continues processing, or it stops and waits for operator intervention. The CHM's actions depend on how the loop option is set (see page 44 for information about the sequential mode options).

Using sequential mode options

The following table describes sequential mode options.

Option	Description	Factory setting
Restart	The restart option determines where the library restarts operation when the door is opened and closed, when the power is turned off and back on, or when the library is reset. When restart is on, the library restarts operation at the bottommost cartridge. When restart is off, the library resumes operation from where it left off.	On
Loop	The loop option determines the library's actions after it has finished processing the last (topmost) cartridge in the magazine. When loop is on, the library loops back to the bottommost cartridge and starts processing all the cartridges again. When loop is off, the library stops processing cartridges.	Off
Next Cartridge	The next cartridge option allows you to interrupt sequential processing and select the next cartridge for the library to process. The library resumes sequential operations starting with the cartridge you select.	N/A

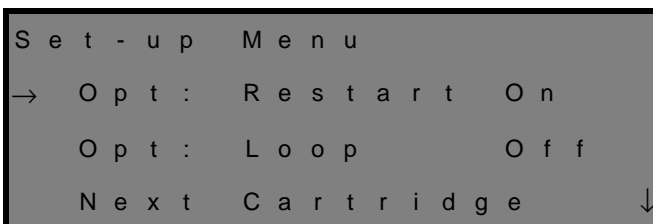
Setting the restart option

CAUTION

If you open and close the library door when the restart option is on, the library restarts operation at the bottommost cartridge. To prevent unauthorized users from opening and closing the door and potentially causing the library to overwrite data, keep the library door locked when the restart option is on.

To change the restart setting:

1. If you are turning on the restart option, make certain the tape drive and the CHM are empty. If not, the library may display an error.
2. From the Main Menu, select Set-up Menu.



```
S e t - u p   M e n u
→  O p t :   R e s t a r t   O n
    O p t :   L o o p           O f f
    N e x t   C a r t r i d g e   ↓
```

3. Make certain the screen arrow points to Opt: Restart.
4. Change the setting by pressing **ENTER**. This toggles the option on and off.
5. Press **ESC** to return to the Main Menu.

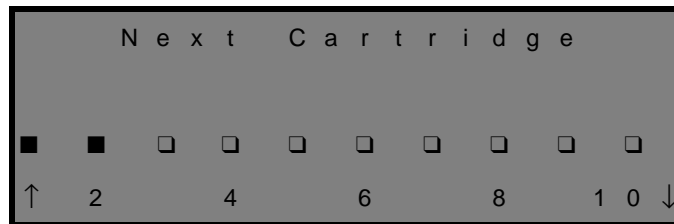
Setting the loop option

To change the loop option setting:

1. From the Main Menu, select Set-up Menu.
2. Scroll down until the screen arrow points to Opt: Loop.
3. Change the setting by pressing **ENTER**. This toggles the option on and off.
4. Press **ESC** to return to the Main Menu.

Specifying the next cartridge to be processed

1. From the Main Menu, select Set-up Menu.
2. Scroll down until the screen arrow points to Next Cartridge and press **ENTER**. (If the CHM is in the middle of a cycle, it finishes the move, then displays the screen below.)



In the Next Cartridge screen, solid squares indicate cartridges that have already been processed. Hollow squares indicate cartridges not yet processed. A blinking square indicates the next cartridge to be processed. Cartridges are numbered 1 through 10, where 1 is the bottommost cartridge.

3. Press the arrow keys to move the blinking square (↑ moves the square to the right; ↓ moves the square to the left). When the square corresponding to the cartridge you want is blinking, press **ENTER**. The Set-up Menu reappears.

The library resumes operation as follows:

- When the tape drive ejects the cartridge, the library picks it and places it in the magazine.
- The CHM moves to the cartridge you specified, picks it from the magazine, and places it in the tape drive.
- The library resumes processing cartridges sequentially, continuing from the cartridge you selected.

Moving the CHM

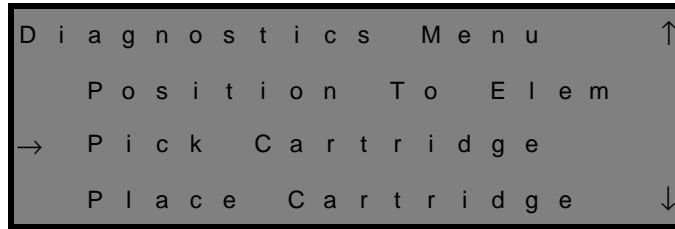
When the library is powered on, you can move the CHM by using the functions available through the Diagnostics Menu. When the library is powered off, you can move the CHM manually, as described on the next page.

Using the Diagnostics Menu (power on)

When the library is powered on, you can move the CHM as follows:

1. Change the control mode to LCD mode (see page 41).

2. Select Diagnostics Menu from the Main Menu.



3. From the Diagnostics Menu, select either:

- Park to move the CHM to the bottom
- Home Y to move the CHM to the top
- Home Z to move the gripper away from the magazine

For more information about moving the CHM to specific positions, see page 104.

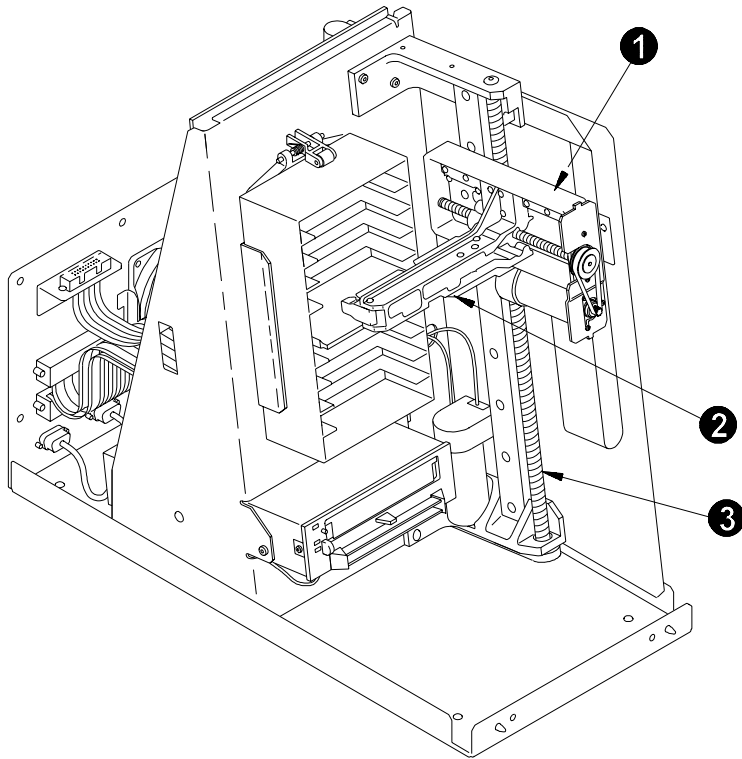
Manually moving the CHM (power off)

CAUTION

Do not touch the spring underneath the gripper and do not pull on the CHM base (❶ in the next figure).

When the library is powered off, you can move the CHM as follows:

- To move the gripper in and out, use your fingers to grasp the gripper ❷ and gently pull it out or push it in.
- To move the CHM base up and down, use your fingers to turn the vertical lead screw ❸.



Operating the tape drive

The tape drive is controlled by the software application across the SCSI bus. You cannot control the tape drive from the operator panel; however, you can perform diagnostics on it using the CTS (*cartridge tape subsystem* or tape drive) Monitor port and a tape drive Monitor utility. Contact your service provider for more information.

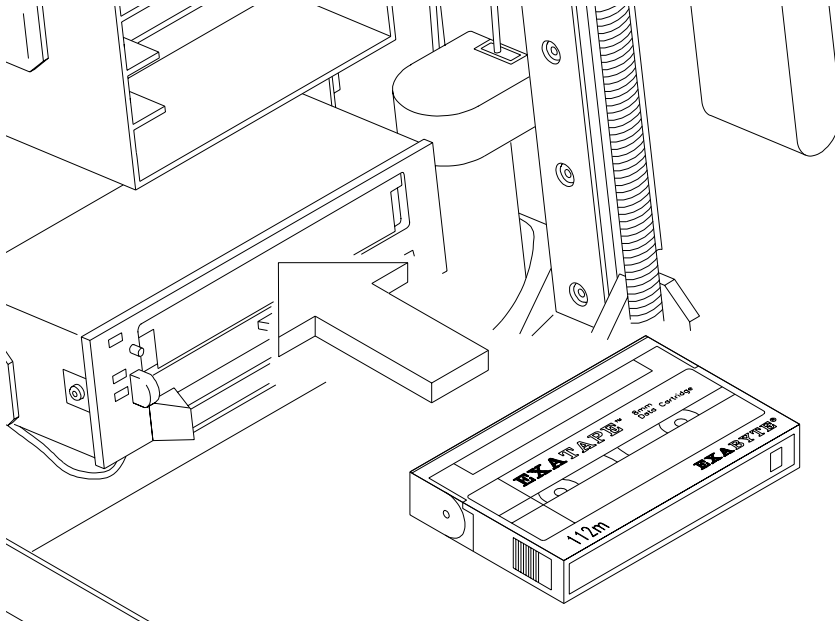
Note: After performing tape drive diagnostics through the CTS Monitor port, you must reset the tape drive by turning the library off and then back on again.

Manually loading and unloading cartridges

During normal library operation, you do not need to load or unload cartridges manually. However, you may want to load and unload cartridges in the following circumstances:

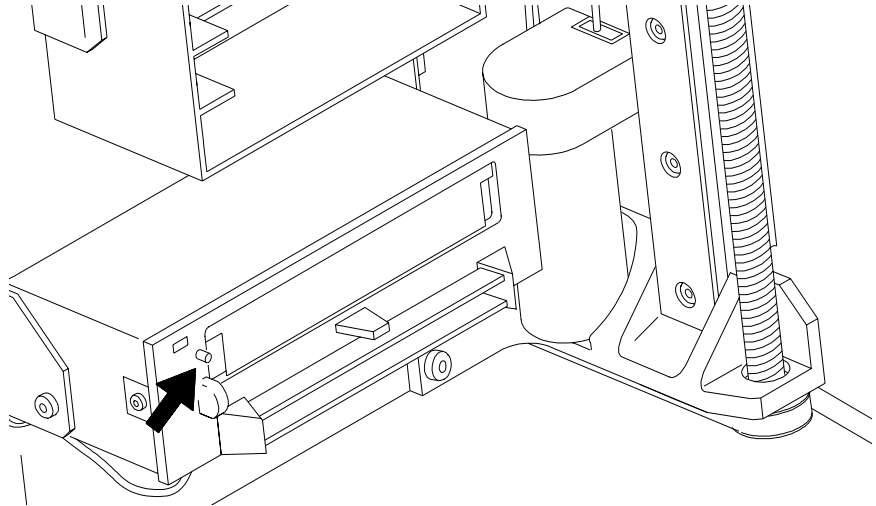
- To insert a cleaning cartridge
- To correct a problem that requires intervention

To load a cartridge, gently push it into the tape drive until the load mechanism pulls in the cartridge.



To unload a cartridge from the tape drive, press the unload button (indicated by the arrow in the following figure). The tape drive completes the current operation and ejects the cartridge.

Note: Your application may have disabled the unload button. Refer to your software documentation.



Reading the tape drive LEDs

Exabyte 8mm half-high tape drives use three light emitting diodes (LEDs) to indicate operating states. The following table describes general LED conditions.

Note: Although you may see other LED activity (random flashing, steady on, and so on), the indications listed in the table provide basic information for monitoring your tape drive.

LED Activity	Description
All LEDs on	Power-on self-test.
Top LED flashing	Error condition or cleaning needed. If the top LED is flashing and the bottom LED is off, the tape drive may have a hardware error. If both the top and bottom LEDs are flashing, the tape drive needs cleaning.
Middle LED flashing	SCSI bus activity. If the middle LED is flashing, the tape drive is using the SCSI bus. On the XL tape drives, if the middle LED is green, the data is not compressed. If the middle LED is amber, the data is compressed. Note: The middle LED is always green on the Eliant 820 tape drive.
Bottom LED flashing	Tape motion or cleaning needed. If the bottom LED is flashing and the top LED is off, tape motion is occurring. If both the top and bottom LEDs are flashing, the tape drive needs cleaning.
Bottom LED on	Tape loaded and ready.

Cleaning the tape drive

The only routine maintenance required by the tape drive is regular cleaning of the drive's heads and tape path. When cleaning the tape drive, you must use an Exabyte Premium 8mm Cleaning Cartridge or a cleaning cartridge approved by Exabyte for your tape drive model. To order cleaning cartridges, see "Getting Help" on page 145.

CAUTION

Using a cleaning method other than the Exabyte Premium 8mm Cleaning Cartridge or a cleaning cartridge approved by Exabyte for your tape drive model may void the warranty for the tape drive and can lead to premature tape drive head wear.

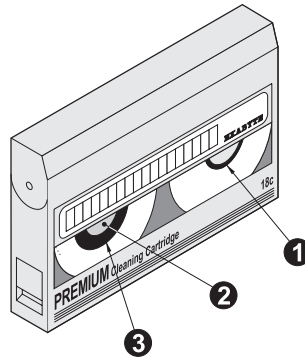
Note: The Eliant 820 and XL tape drives do not support the cleaning cartridge designed for Exabyte Mammoth tape drives.

Determining when to clean the tape drive

Many software applications will notify you when it is time to clean the tape drive. However, if your software does not notify you automatically, you should clean the drive as soon as possible after you see the top and bottom LEDs flashing.

Using the cleaning cartridge

1. If there is a cartridge in the tape drive, wait for the application to eject the cartridge and for the CHM to replace the cartridge in its slot.
2. Make sure the CHM is not blocking the tape drive, then open the library door. If you need to move the CHM, see page 47.
3. Check the cleaning cartridge to see if there is sufficient cleaning material (❸ in the following figure) remaining on the supply reel ❷. If most or all of the cleaning material has been transferred to the take-up reel ❶, discard the cleaning cartridge and use a new one. **Do not rewind the cartridge and attempt to use it again.**



4. Insert the cleaning cartridge in the tape drive. The tape drive performs the cleaning cycle automatically. When the cleaning cycle is complete, the tape drive ejects the cleaning cartridge.

Note: If there are no more cleaning cycles remaining for the cleaning cartridge, the tape drive ejects it without completing the cleaning cycle and the top and bottom LEDs remain lit.

5. Remove the cleaning cartridge. If sufficient cleaning material remains on the supply reel, store the cartridge for future use.

Caring for cartridges

To maximize the shelf life of your tapes and ensure data integrity, follow these guidelines when storing cartridges:

- **Label the cartridges.** Place a label or other reference information adjacent to the write-protect switch on the cartridges. On the label, you may want to include the cartridge number (log number), date of backup, and the format of the tape (for example, “8500c”).
- **Store cartridges in a suitable environment.** Follow the specifications for storage temperature and other environmental requirements, as described on the cartridge packaging. Do not allow the temperature and humidity in the storage environment to fluctuate dramatically.
- **Keep the storage location as free of airborne particulates as possible.** To eliminate obvious sources of particulates, do not permit anyone to smoke, eat, or drink near the storage area, and do not store cartridges near a copier or printer that may emit toner and paper dust.
- **Store cartridges as soon as possible** after you remove them from the library. Immediate storage helps avoid many of the conditions that can damage tapes, such as temperature and humidity fluctuation, and excessive handling.
- **Store cartridges with the write-protect switch in the protected position.** See page 13.
- **If possible, use a magazine and its cover to store cartridges.** With the cover in place, cartridges are protected from dust and other airborne contaminants. In addition, you can stack the magazines to make the most efficient use of storage space.

Resetting the library

As described in this section, you can reset the library manually or the library might be reset automatically through the SCSI bus.

CAUTION

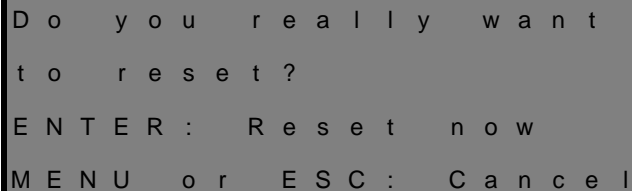
Before manually resetting the library, make certain the library and tape drive are not communicating on the SCSI bus. Resetting the library or tape drive may disrupt communications on the SCSI bus.

Unless necessary for mechanical reasons, do not turn the library off while there are cartridges in the tape drive or gripper.

Manual resets

If the library has encountered an error and is still not operating after you tried the corrective action for the error, you may need to manually reset the library, as described below.

Reset key Press **RESET** on the operator panel. The following message appears on the LCD:



D o y o u r e a l l y w a n t
t o r e s e t ?
E N T E R : R e s e t n o w
M E N U o r E S C : C a n c e l

Press **ENTER** to continue with the reset (or press **ESC** to cancel). After the library is reset, the Main Screen appears.

Power-on reset Turn the library's power switch to the off position (0), then back on. The library and tape drive perform their power-on self-tests, then the Main Screen appears on the LCD.

Host-driven resets

The library and tape drive can be reset by the host under the conditions described below.

SCSI bus reset A reset (RST) pulse on the SCSI bus occurring for a minimum of 25 μ sec causes the library and tape drive to be reset. A SCSI bus reset immediately clears all devices on the bus, resets their associated equipment, and terminates all pending I/O processes.

Bus device reset message A Bus Device Reset (0Ch) message from the host to a device (the library or a tape drive) causes the device to be reset. A device reset clears the device from the bus, causes all commands sent to be cleared, and terminates all pending I/O processes. A Bus Device Reset message received by the library does not reset the tape drive; a Bus Device Reset message received by the tape drive does not reset the library.

Notes

4 Tape drive replacement

This chapter describes how to replace the tape drive or install it for the first time.

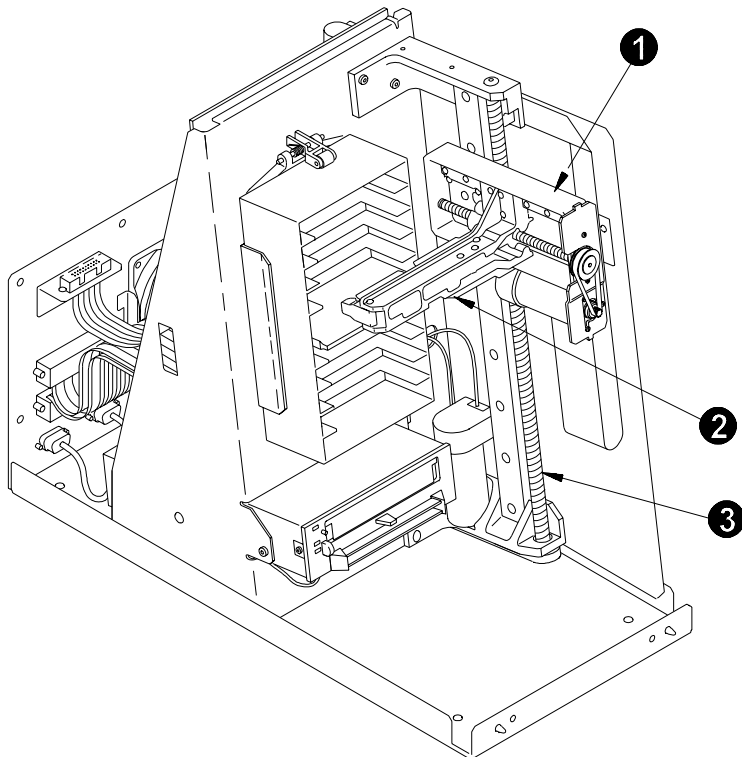
➤ **Important** If you replace another model of tape drive with an Eliant 820, you need to perform a hardware upgrade. Contact Exabyte to obtain a field upgrade kit.

Preparing the library

Before replacing or installing the tape drive, prepare the library as follows:

1. Obtain the following tools:
 - Torque limiting screwdriver with T-10, T-15, and T-20 TORX® driver bits
 - Flat-nose wiring pliers
 - # 0 Phillips bit

2. Turn the library off, disconnect the power cord, and disconnect the SCSI cables.
3. Ensure that the work area is as free from ESD as possible:
 - Place a static protection mat on the work surface. Use a 1-megohm resistor to ground the mat.
 - Wear a static protection wrist band that is connected to the static protection mat or to other suitable ESD grounding.
4. Make certain the CHM base ❶ is located above the tape drive. To move the CHM base up when the library is powered off, use your fingers to turn the vertical lead screw ❸. Be careful not to touch the spring underneath the gripper ❷.



Removing and installing the tape drive

Use the table below as a checklist for replacing or installing the tape drive.

✓	Step	Procedure
	1	Remove the library cover.
	2	Remove the tape drive. (Skip this step if you are installing a tape drive for the first time.)
	3	Prepare the new tape drive. (Skip this step if you are re-installing the same tape drive.)
	4	Install the tape drive.
	5	Replace the library cover.
	6	Connect the cables and power on the library.
	7	Test the tape drive installation.

WARNING!

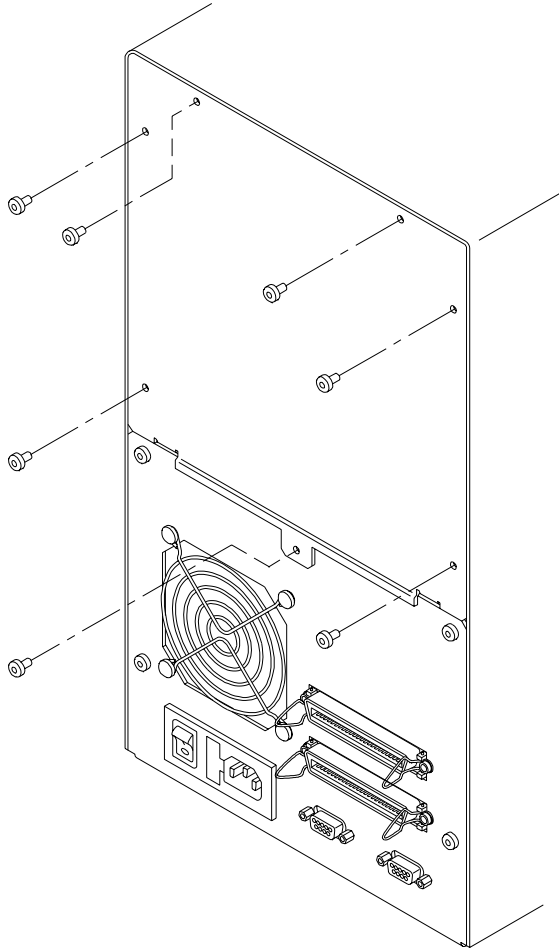
Before performing any of the following steps, be sure that the power switch is in the off position and the power cord is disconnected from the library.

VORSICHT!

Bevor Sie einen der folgenden Schritte ausführen, stellen Sie bitte sicher, daß der Netzschalter ausgeschaltet und das Netzkabel vom EXB-10h getrennt ist.

Step 1 – Remove the library cover

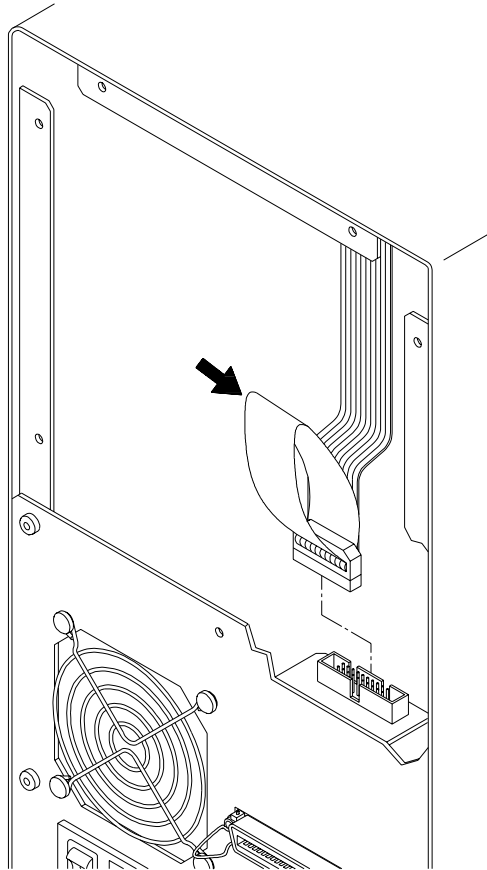
1. Using a T-20 TORX driver bit, remove the seven screws from the upper back panel. Grasp the panel and set it aside.



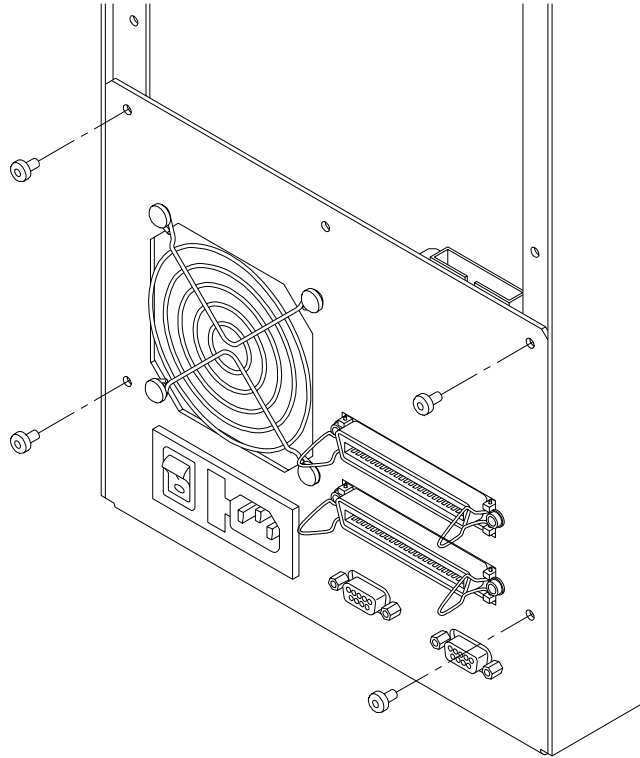
2. Insert your fingers in the looped portion of the ribbon cable and pull up to disconnect it.

CAUTION

You must disconnect this cable to avoid damaging it when you remove the cover assembly.



3. Using a T-20 bit, remove the four screws that hold the cover assembly to the lower back panel.

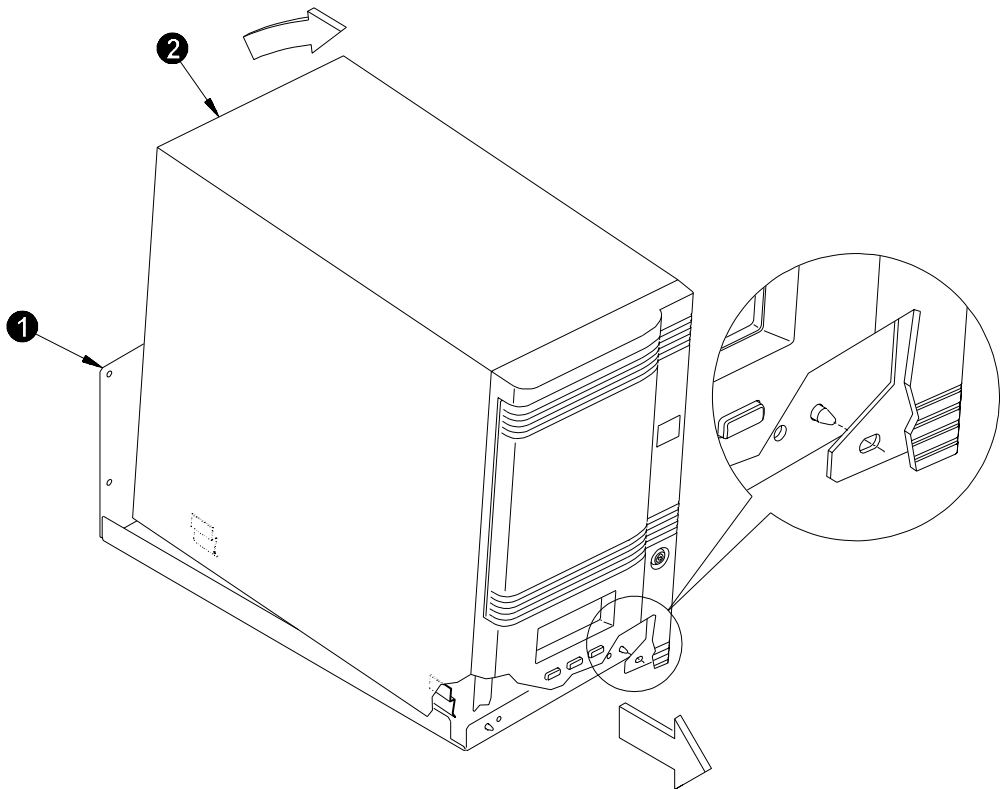


CAUTION

Removing the cover exposes the CHM and printed circuit boards (cards). To avoid damaging the library, do not touch the CHM or cards.

4. Remove the cover as follows:

- a.** Use one hand to hold down the lower rear panel **1**.
- b.** Grasp the top of the cover at the rear **2** and pull up sharply until the cover comes off the chassis.
- c.** Pull the cover forward (away from the rear panel) to disengage the clips and alignment pins.

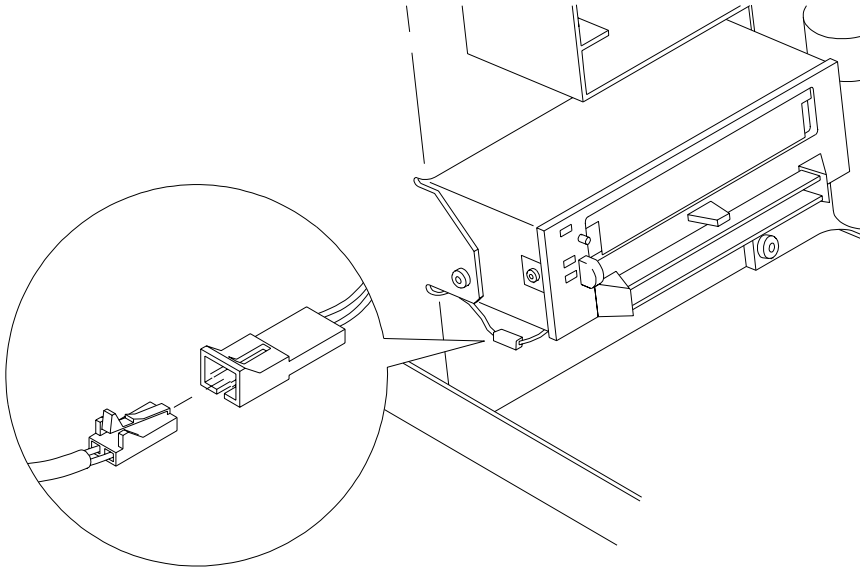


Step 2 – Remove the tape drive

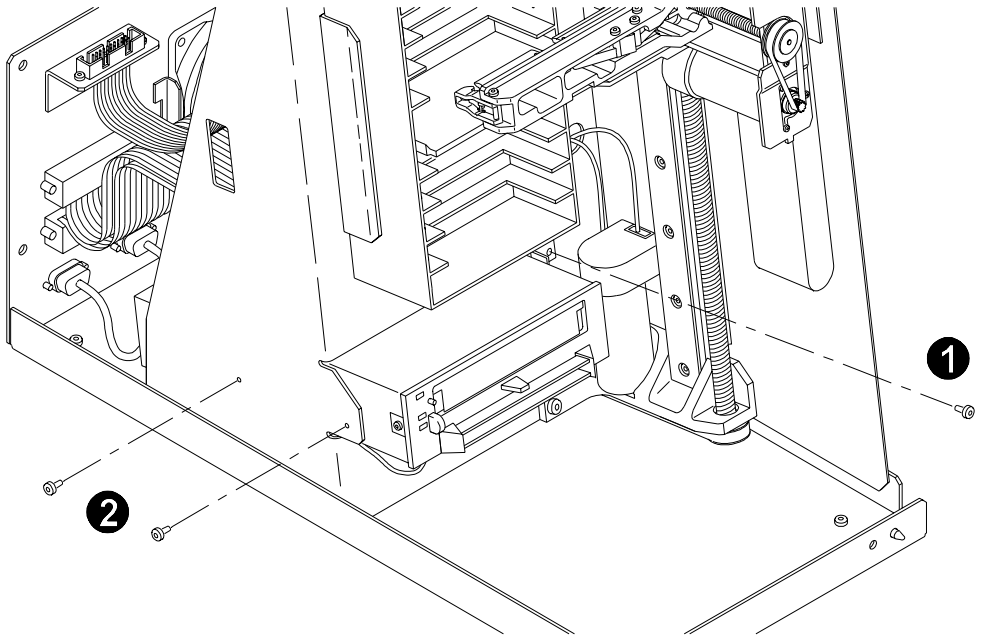
Note: If you are installing a tape drive in the library for the first time, skip this step.

To remove the tape drive:

1. If you have an Exabyte XL tape drive, disconnect the drive sensor cable.



2. Using a T-15 bit, remove the single mounting screw on the right side of the tape drive ❶. Using a T-10 bit, remove the two mounting screws on the left side ❷.



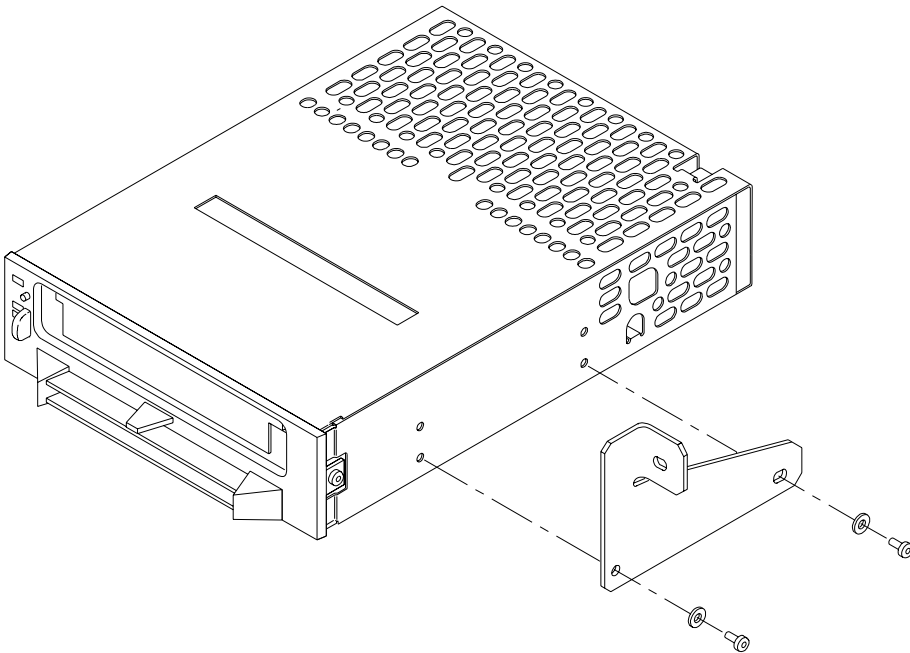
3. Slide the tape drive forward a few inches (approximately 5 cm) so you can reach the cables and connectors on the back of the tape drive.

4. Disconnect all the cables from the tape drive.
5. From the front of the library, slide the tape drive out of the enclosure.

CAUTION

When removing the tape drive, be careful not to disturb the cables attached to the CHM.

6. Use a T-10 bit to remove the two screws holding the metal mounting bracket to the tape drive.

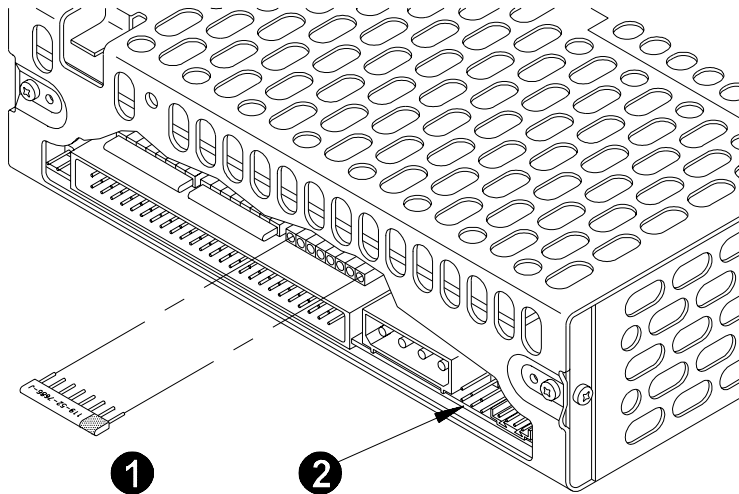


Step 3 – Prepare the tape drive

If you are replacing an old tape drive with a new tape drive or if you are installing a tape drive in the library for the first time, follow these instructions to prepare the tape drive.

Removing terminators and jumpers

1. If you are installing a tape drive that includes resistor terminators (R-packs), use flat-nose wiring pliers to remove the three R-packs ❶ from the back.
2. Remove any jumpers ❷ from the SCSI ID jumper block.



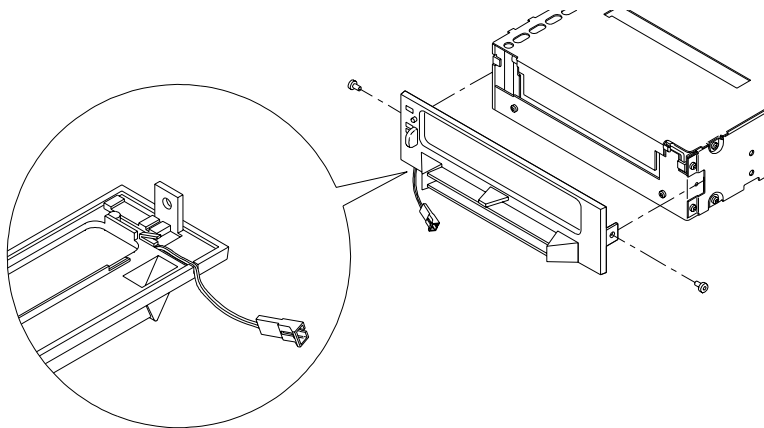
Attaching a faceplate

To operate in the Exabyte 10h, the tape drive must be equipped with a special faceplate. (The correct faceplate for your tape drive is included in the accessory box if you ordered a library without a tape drive.) Follow these steps to attach the new faceplate.

Note: Do not re-use an old faceplate on a new tape drive. Refer to “Getting Help” on page 145 to order a new one.

1. Remove the old faceplate from the tape drive by using a # 0 Phillips screwdriver to remove the screws on each side. Discard the old faceplate.
2. If you are installing an Exabyte XL tape drive, thread the two wires on the drive sensor cable through the groove on the back of the new faceplate (shown below). Make sure the wires lie side-by-side and are not twisted.

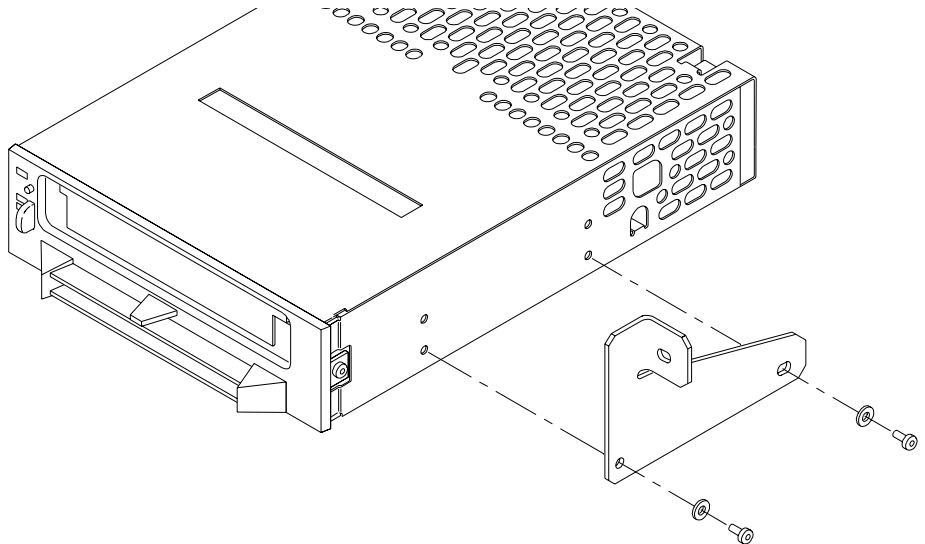
➤ **Important** If the cable wires do not lie flat in the groove, the drive sensor cable may not function.



3. Mount the faceplate over the tape drive and use a # 0 Phillips screwdriver to replace the screws on each side. Tighten the screws to 1.9 inch-pounds (2.19 kg-cm) of torque.

Installing the mounting bracket

1. Place the mounting bracket on the right side of the new tape drive. Insert the two # 3 metric screws in the lower two holes.



2. While using your thumb to apply pressure on the bracket towards the back of the tape drive, use a T-10 bit to tighten the screws to 4.0 inch-pounds (4.6 kg-cm) of torque.

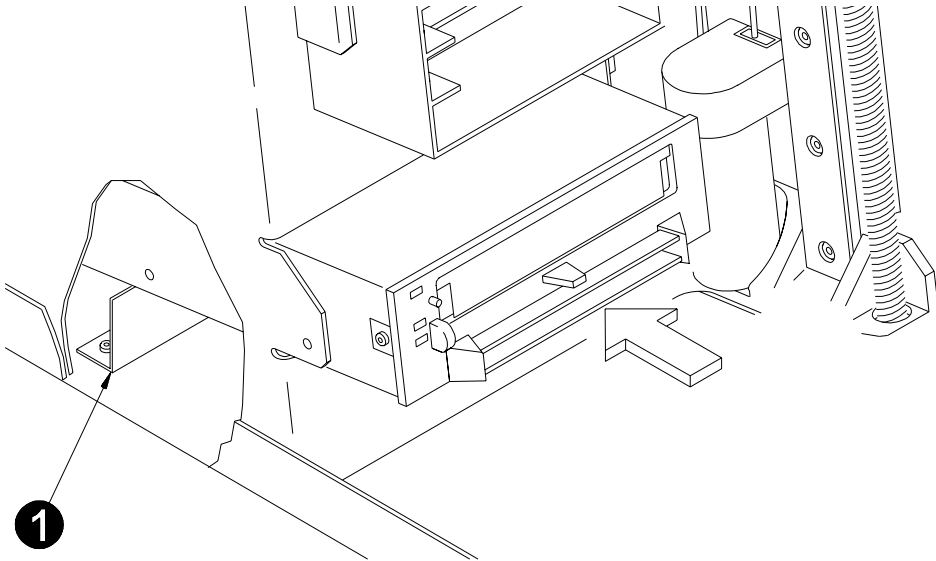
Step 4 – Install the tape drive

CAUTION

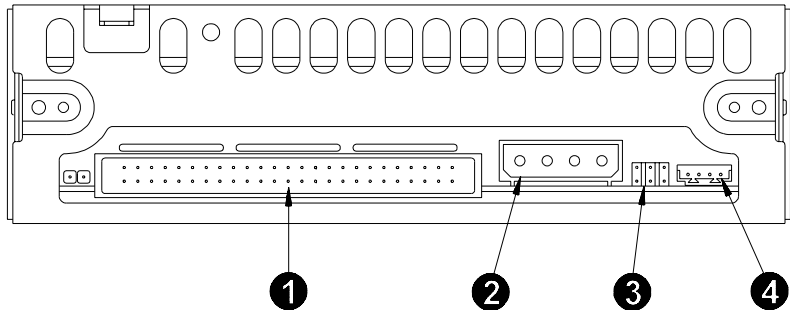
Before installing the tape drive, make certain the CHM cables and the drive sensor cable are out of the way.

To install the tape drive:

1. Insert the tape drive into the library enclosure, making certain to raise the rear of the tape drive slightly so that it clears the baffle ❶ on the lower frame.

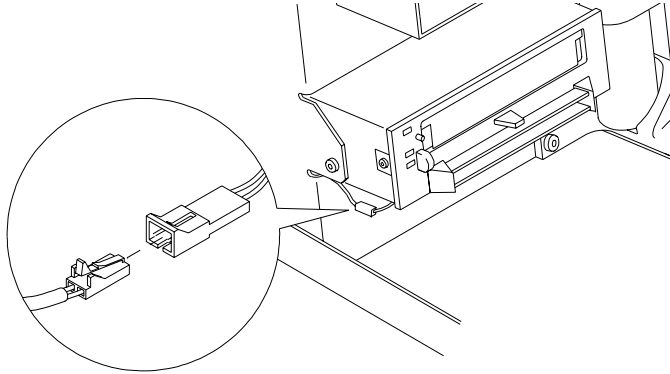


2. Follow these instructions to connect cables to an Exabyte XL tape drive.

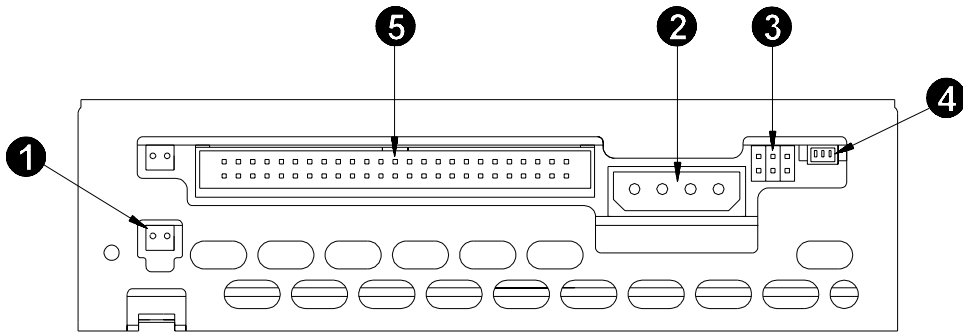


- a. Connect the SCSI cable to connector ❶.
- b. Connect the power cable to connector ❷.
- c. Connect the six-pin SCSI ID cable to the SCSI ID jumper block ❸. Ensure that pin 1 of the six-pin connector (indicated by a white mark on the top of the connector) is connected to pin 1 of the SCSI ID jumper block.
- d. Connect the Monitor cable to the Monitor port ❹. The Monitor cable assembly has a 3-pin connector for tape drives with 3-pin connectors and a 4-pin connector for tape drives with 4-pin connectors. Use the appropriate connector for your tape drive.

- e. Connect the drive sensor cable at the front of the tape drive.

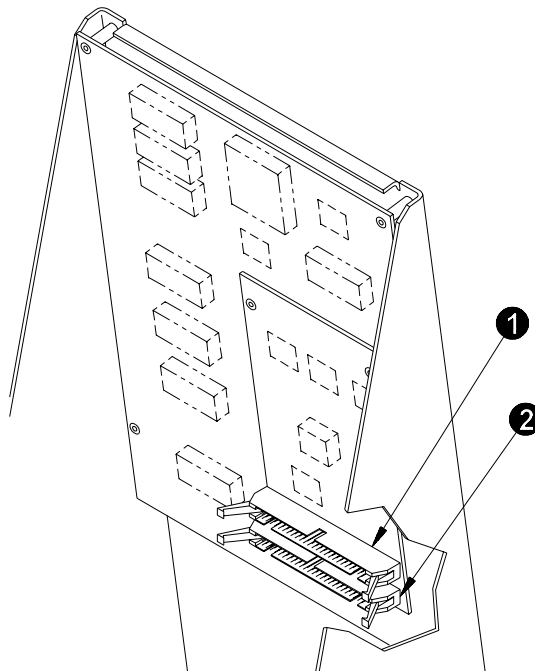


Follow these instructions to connect cables to an Eliant 820 tape drive.



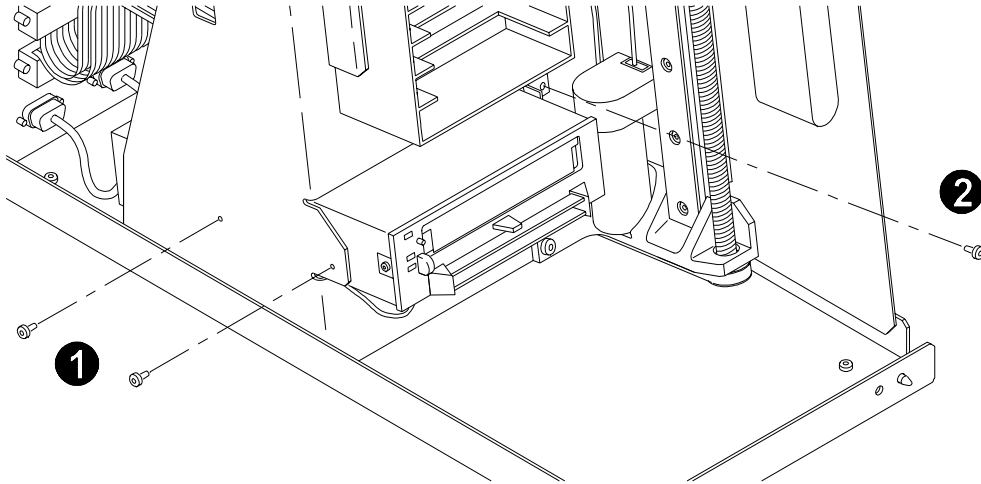
- a. Connect the drive sensor cable to connector ❶.
- b. Connect the power cable to connector ❷.
- c. Connect the six-pin SCSI ID cable to the SCSI ID jumper block ❸. Ensure that pin 1 of the six-pin connector (indicated by a white mark on the top of the connector) is connected to pin 1 of the SCSI ID jumper block.

- d. Connect the Monitor cable to the Monitor port ④. The Monitor cable assembly may include a 3-pin connector and a 4-pin connector. Use the 3-pin connector for the Eliant 820 tape drive.
 - e. Connect the SCSI cable to the SCSI connector ⑤.
3. Make certain the library is set correctly for single-ended or differential configurations. For a differential tape drive, the library's internal SCSI cable should be connected to the Diff connector ① on the controller card. For a single-ended tape drive, this cable should be connected to the Sing connector ②.



4. Mount the tape drive as follows:

- a.** Align the mounting holes in the tape drive with the three holes in the library.



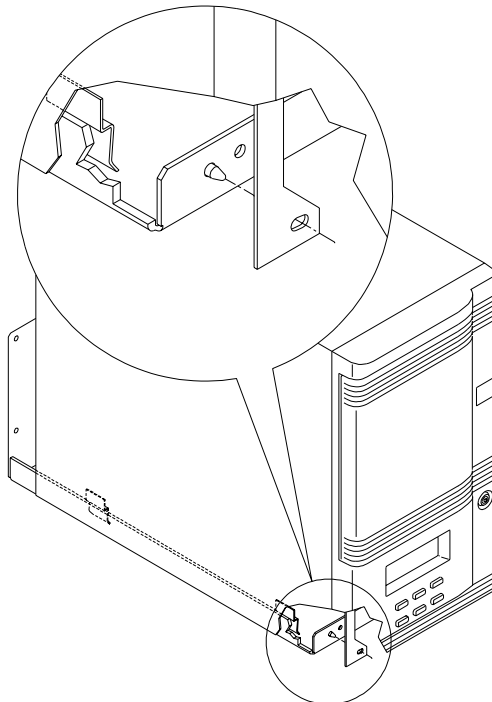
- b.** Use a T-10 bit to insert the two # 3 metric screws on the left side of the tape drive ❶, but do not tighten them yet.
- c.** Use a T-15 bit to insert the # 6-32 screw into the right side of the tape drive ❷, but do not tighten it yet.
- d.** While using one hand to gently push the tape drive toward the back of the library, tighten the two screws on the left side to 4.0 inch-pounds (4.6 kg-cm) of torque. Tighten the screw on the right to 8.0 inch-pounds (9.2 kg-cm) of torque.

Step 5 – Replace the library cover

CAUTION

Make sure none of the cables are caught between the frame and the cover. Do not connect the power cord or turn on the library unless the cover is properly installed.

1. Lower the cover until it rests on the frame. Make sure the two pins are aligned with the two holes in the cover and the side edges of the chassis are inserted in the clips inside the cover.
2. Push against the front of the cover to snap it into place.



3. Using a T-20 bit, replace the four screws in the lower back panel (see the figure on page 64). Tighten the screws to 8.0 inch-pounds (9.2 kg-cm) of torque.
4. Connect the ribbon cable to the connector on the lower back panel (see the figure on page 63).
5. Position the upper back panel on the top and use a T-20 bit to replace the seven screws (see the figure on page 62). Tighten the screws to 8.0 inch-pounds (9.2 kg-cm) of torque.

Step 6 – Connect cables and apply power

Note: If you are installing the tape drive for the first time and you need more information about connecting the cables and powering on the library, see pages 6 through 10.

1. Connect the SCSI cables (or SCSI cable and terminator) to the back of the library.
2. Connect the power cord. To prevent possible power loss, make sure the power cord is fully connected.
3. Push the power switch to the on position (**I** is pressed). If the library fails to power on, see the table on page 10.

Note: The new tape drive automatically assumes the SCSI ID of the old tape drive.

Step 7 – Check the tape drive installation

If desired, check the tape drive installation as follows:

1. Change the control mode to LCD (see page 41).
2. Locate a blank cartridge and place it in slot 1 (the bottommost slot of the magazine).
3. Display the Diagnostics Menu, as described on page 104. Use Move Cartridge to instruct the CHM to pick the cartridge from slot 1 (source index 1) and move it to the tape drive (destination index 0), then select Load Drive. This determines whether the tape drive is correctly positioned so that the CHM can load a cartridge.
4. Display the System Sensors screen, as described on page 101. Make certain the Drive Unloaded line displays 0 (cartridge loaded in the tape drive). Open the library door, and press the drive's unload button to eject the cartridge from the tape drive. Make certain the Drive Unload line displays 1 (no cartridge loaded in the tape drive). This determines whether the faceplate is installed correctly and whether the drive sensor is operating.
5. Change the control mode back to the original mode (see page 41).

Notes

5 Maintenance

This chapter describes how to perform some basic maintenance on the library, which includes:

- Using touch-up paint on the housing
- Cleaning the library
- Replacing the fuse
- Calibrating the CHM

If the library needs more detailed maintenance, contact your service provider.

CAUTION

Unless you have a self-maintenance contract with Exabyte, do not attempt to replace any components in the library, other than the tape drive or fuse. If you do so, you will void your warranty.

Using touch-up paint on the housing

A pearl-white paint kit is available for touching up nicks and scratches on the finish. For ordering information, see “Getting Help” on page 145.

Cleaning the library

The library requires a minimal amount of cleaning. You should clean the magazine and installed cartridges approximately every 500 pick-and-place cycles or whenever you notice dust building up. To determine when 500 pick-and-place cycles have gone by, you can use the Statistics screen. To do this, select Statistics from the Main Menu, then look at the number of picks and places on the screen. (One pick + one place = one pick-and-place cycle.)

CAUTION

Do not clean or lubricate the library's internal components.

Cleaning the magazine and cartridges

1. Wait for the CHM to move out of the way of the magazine, then open the library door. If you need to move the CHM, see page 47.
2. Remove the magazine, but do not remove the cartridges.
3. Use a soft cloth or lens-quality tissue to wipe any dust off the top, sides, and bottom of the magazine. Also, wipe any dust from the sides of the cartridges.

4. Replace the magazine.
5. Close the library door.

Cleaning the window

To clean the library window, use the cleaning packets provided with the library. First use the # 1 wet wipe, then use the # 2 dry wipe. (To order additional cleaning packets, see “Getting Help” on page 145.)

CAUTION

To avoid scratching the window, do not use abrasive cleaners, abrasive cleaning implements, harsh chemicals, or solvents.

Replacing the fuse

The library uses a 5×20 mm, 2.0 amp, 250-volt “slow blow” fuse. The fuse is located in the fuse drawer at the back of the library. A spare fuse is provided in the fuse drawer.

CAUTION

When replacing the library fuse, use only the same type and rating of fuse.

To order additional fuses, see “Getting Help” on page 145.

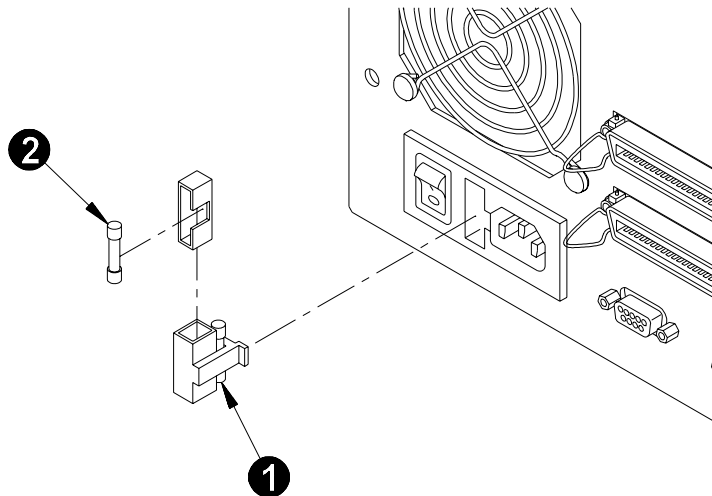
WARNING!

Before performing any of the following steps, be sure that the power switch is in the off position and the power cord is disconnected from the library.

VORSICHT!

Bevor Sie einen der folgenden Schritte ausführen, stellen Sie bitte sicher, daß der Netzschalter ausgeschaltet und das Netzkabel vom EXB-10h getrennt ist.

1. Place a small, flat-blade screwdriver underneath the tab on the fuse drawer and pry out the fuse drawer.
2. Pull the blown fuse ❶ out of the fuse slot.



3. Use the screwdriver to push the spare fuse box out of the fuse drawer. Remove the spare fuse ❷ and place it in the slot.
4. Insert the fuse drawer and push in until it snaps into place.

Calibrating the CHM

This section describes how to perform the cartridge sensor and eject position calibrations. These calibrations are necessary if:

- The CHM has been replaced
- The controller card has been replaced
- The library firmware has been upgraded
- The library displays certain error conditions (see Appendix C)

Calibrating the eject position

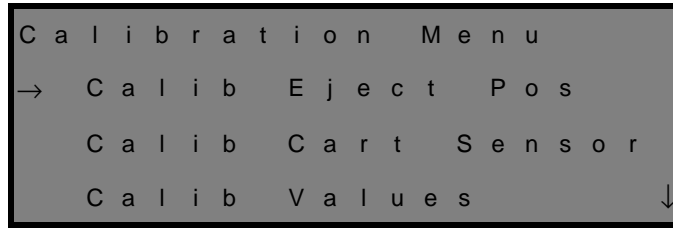
The eject position determines the operation of the solenoid on the CHM. The library uses this solenoid to eject a cartridge from the gripper.

During the eject position calibration, the CHM moves to slot 1 of the magazine, moves toward the magazine, then backs away from the magazine. If an error occurs during the calibration, the library displays an error message. You can access the Error Status display to find out more about the error by pressing **ENTER**.

To calibrate the eject position:

1. Change the control mode to LCD (see page 41).

2. From the Main Menu, select Calibration Menu.



3. Make sure the screen arrow points to Calib Eject Pos. Press **ENTER**. Instructions for calibrating the eject position appear. You can scroll through the instructions by using the arrow keys.

Note: The remaining steps in this section parallel the instructions on the display and provide additional details where necessary.

4. Make sure the magazine is installed.
5. Close the library door.
6. Press **ENTER**. The calibration process starts; status messages are displayed as it progresses. When the calibration is finished, the status message reads Complete.
7. Change the control mode back to the original mode.

Calibrating the cartridge sensor position

The cartridge sensor is located on the CHM and enables the library to determine whether there is a cartridge in the gripper.

During the cartridge sensor calibration, the CHM uses the calibration block to determine the cartridge sensor position. If an error occurs during the calibration, the library displays an error message. You can access the Error Status display to find out more about the error by pressing **ENTER**.

Before you begin this calibration procedure, locate the green calibration block provided with the library. If you also have an EXB-10i, do not attempt to use the EXB-10i's white calibration block.

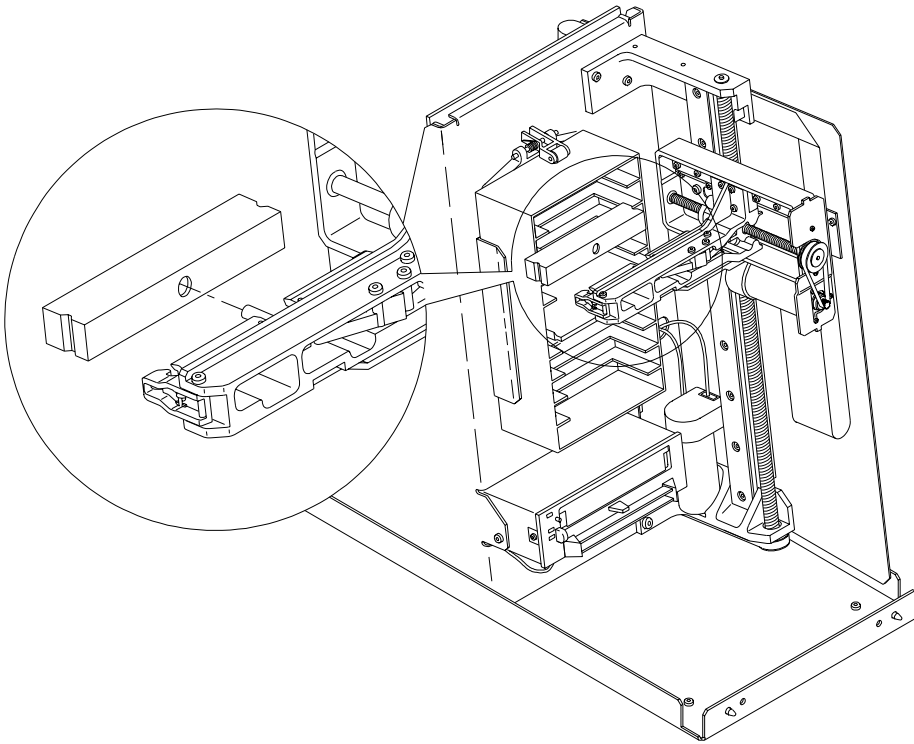
To calibrate the cartridge sensor position:

1. Change the control mode to LCD (see page 41).
2. From the Main Menu, select Calibration Menu.
3. Select Calib Cart Sensor. Instructions for calibrating the cartridge sensor appear. You can scroll through the instructions by using the arrow keys.

Note: The remaining steps in this section parallel the instructions on the display and provide additional details where necessary.

4. Open the library door.

5. Place the calibration block in the gripper. As shown in the figure, make sure that the hole in the green calibration block is facing toward the gripper.



6. Close the library door to begin calibration.
7. When the calibration is finished, you are prompted to remove the calibration block from the gripper. Open the library door, remove the calibration block, and close the door. The LCD indicates that the calibration is complete.
8. Change the control mode back to the original mode.

6 Advanced operation

This chapter describes advanced operations you can perform, such as:

- Viewing SCSI information
- Viewing hardware operating statistics and status
- Performing diagnostics on the library

Many of the tasks described in this chapter may be necessary if you want to troubleshoot library hardware operations.

About elements

Elements are the twelve physical locations in the library that can accept a cartridge, which includes the CHM, the ten slots in the magazine, and the tape drive.

Element indexes

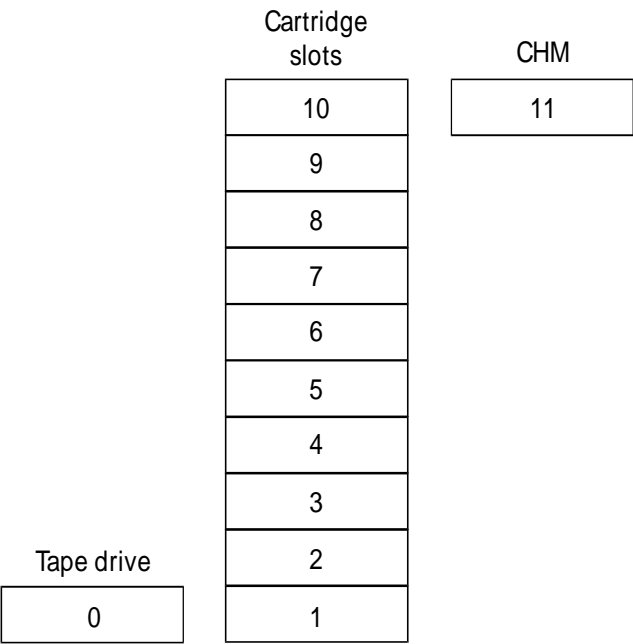
The library identifies each element with an *element index* number. If you perform diagnostics from the LCD, you must use element indexes to move a cartridge between source and destination elements. The *source* is either a magazine slot or the tape drive where the CHM will pick a cartridge. The *destination* is either the slot or the tape drive where the CHM will place the cartridge.

Element addresses

Your software application identifies elements in the library as *element addresses*, which are used in SCSI commands. An element address can be changed by your software application (through the SCSI command, MODE SELECT).

Note: The default element addresses are identical to the element indexes.

The following chart shows the element indexes and the default element addresses assigned for the library.



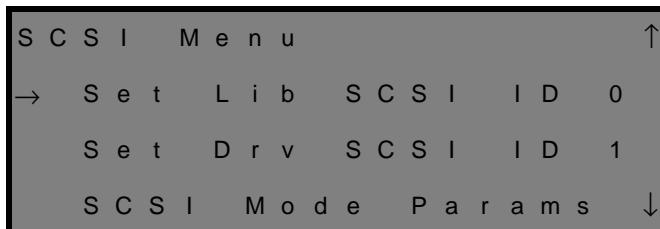
Viewing SCSI information

The library retains the following SCSI information:

- **Mode parameters.** Data the library reports in response to a MODE SENSE command.
- **Reservations.** Information about which elements (CHM, tape drive, and cartridge slots) have been reserved for the host computer's exclusive use by a RESERVE command.
- **Sense data.** Data the library returns in response to a REQUEST SENSE command.

Note: SCSI information is mainly for use by technical support and application developers. If you are an end-user, you may be asked by technical support to display one of these screens and locate information that will help troubleshoot a problem.

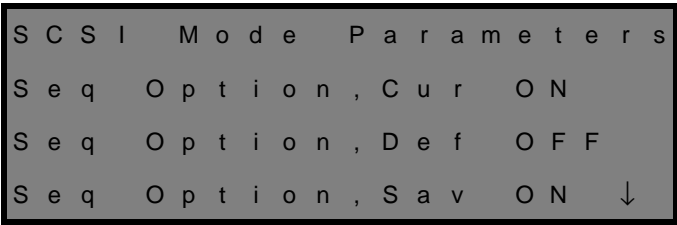
SCSI information is available through the SCSI Menu, shown below. To display this menu, select SCSI Menu from the Main Menu.



SCSI mode parameters

The SCSI Mode Parameters screen displays the settings of various operating mode parameters, which are equivalent to the parameters reported by the library in response to a MODE SENSE command, issued by a SCSI application program. Typically, the values of these parameters are changed by a MODE SELECT command issued by a host. For more information about the MODE SENSE and MODE SELECT commands, refer to the *EXB-10h and EXB-10e 8mm Libraries SCSI Reference*.

To view these parameters, select SCSI Mode Params from the SCSI Menu.



For each parameter, the SCSI Mode Parameters screen provides the current (Cur), default (Def), and saved (Sav) values:

- The *current* value is the value currently active. It is either the power-on default or a temporary value set by the latest MODE SELECT command.
- The *default* value is the original value set at the factory.
- The *saved* value is the value specified as the power-on default by a MODE SELECT command. After a saved value has been specified with a MODE SELECT command, this value takes effect each time you power on the library.

The items on the SCSI Mode Parameters screen are described below.

Item	Description
Seq Option	Sequential mode of operation.
Loop Opt	Loop option used for sequential mode.
Restart Opt	Restart option used for sequential mode.
Next Cart	The next cartridge to process for sequential mode.
Emulate 10i	Emulate 10i option, used to allow the library to emulate an EXB-10i.
Parity Opt	Parity checking of the SCSI bus (random mode only).
Baud Rate	The baud rate used for the CHS Monitor diagnostic port.
CHM Addr*	The element address of the cartridge handling mechanism (CHM).
Drive Addr*	The element address of the tape drive.
Stor Addr*	The starting element address of the cartridge storage locations (slots). This is the address for the bottommost slot in the magazine. The slots are numbered sequentially, bottom to top, from the starting element address.

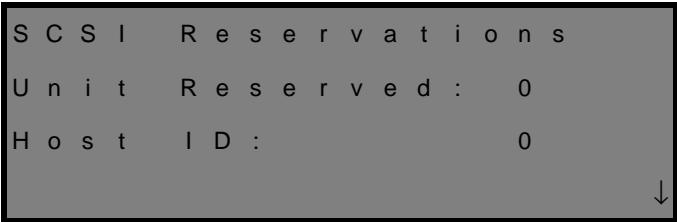
* When set to their default values, the element addresses reported on this screen are the same as element indexes shown on page 90. However, unlike element indexes, which cannot be changed, addresses can be changed with a MODE SELECT command.

SCSI reservations

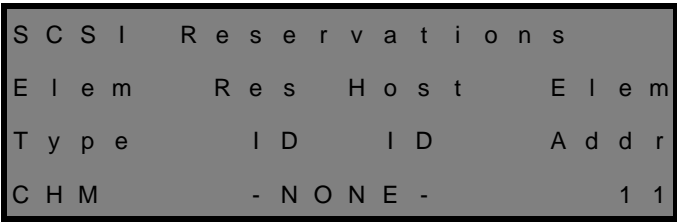
The SCSI Reservations screen indicates if the library elements are reserved for exclusive use by a host computer. Elements are reserved and released through SCSI commands (RESERVE and RELEASE).

You may want to view SCSI reservations if you are operating the library in a multi-host environment and you want to determine which elements are reserved by which host. Multiple hosts can reserve different elements within a single library. For example, Host 1 may reserve cartridge slots 1 through 5 for its exclusive use; while Host 2 may reserve slots 6 through 10.

To view SCSI reservations, select SCSI Reservations from the SCSI Menu. The first screen shows unit reservation information.







To display the Element Reservations screen, press  to scroll past the last item in the Unit Reservation screen.



The information in the SCSI Reservations screens is described below.

Screen	Description
Unit Reservation	The library's reservation status (1 if it is reserved or 0 if it is not) and the host's SCSI ID, if the library is reserved.
Elem Reservations	<p>Elem Type. The category of elements: CHM, tape drive, or cartridge slot. If the element is a cartridge slot, its number is indicated as "Slot <i>n</i>."</p> <p>Res ID. The ID that the element is reserved under. This is a number assigned to the element by a host when the reservation was made. If there is no reservation, the Res ID and Host ID columns display "-NONE-".</p> <p>Host ID. The SCSI ID of the host that currently has the element reserved.</p> <p>Elem Addr. The address of the element. (The Element Reservations screen displays the element addresses currently set by the MODE SELECT command. If no element addresses were set, the default element addresses appear.)</p>

To review other elements, use the keys listed in the table below.

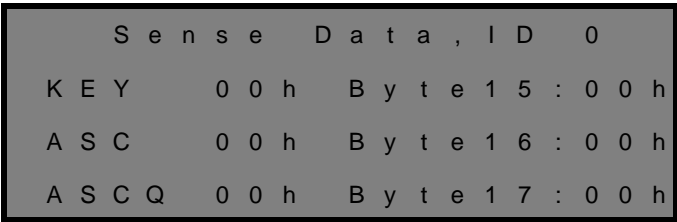
To view an element with a higher address	Press 
To view an element with a lower address	Press 
To return to the SCSI Menu	Press 
To return to the Main Menu	Press 

SCSI sense data

When an error or state condition occurs, the library returns information to the host in response to a REQUEST SENSE command. This information, called *sense data*, is displayed on the SCSI Sense Data screen. Sense data provides information to help you diagnose problems with the library.

For detailed information about SCSI sense data, refer to the *EXB-10h and EXB-10e 8mm Libraries SCSI Reference*.

To view the sense data, select SCSI Sense Data from the SCSI Menu.



The ID at the top of the display is the SCSI ID of the host that the sense data is being held for. (Note that sense data is supplied for inactive IDs as well as active IDs.)

While this screen is displayed, use the keys in the following table:

To view a device with a higher ID:	Press
To view a device with a lower ID:	Press
To return to the SCSI Menu:	Press
To return to the Main Menu:	Press

The table below describes the information in the Sense Data screen.

Item	Description
KEY	<p>This is the sense key returned by the REQUEST SENSE command. The sense keys are:</p> <p>0h–No Sense There is no specific sense key information to report.</p> <p>2h–Not Ready The library cannot be accessed. Operator intervention may be required.</p> <p>4h–Hardware Error The library detected a non-recoverable hardware failure during a self-test or while performing a command.</p> <p>5h–Illegal Request An illegal parameter was sent with a command; or, the library was in the wrong control mode to execute the command.</p> <p>6h–Unit Attention The cartridge inventory may have been violated.</p> <p>Bh–Aborted Command The library aborted the command. The initiator may be able to recover by trying the command again.</p>
ASC	These are the Additional Sense Code and the Additional Sense Code Qualifier. Together, the ASC and ASCQ provide information describing an error condition.
ASCQ	
Byte 15	This is the Sense Key Specific data, which provides additional information about an error condition. This information is valid only for the Illegal Request (5h) sense key.
Byte 16	This is the first byte of the Field Pointer data. It indicates which byte in the command had an error. This information is valid only for the Illegal Request (5h) sense key.
Byte 17	This is the second byte of the Field Pointer data. This information is valid only for the Illegal Request (5h) sense key.

Viewing operating statistics and status

The library retains operating information that describes CHM movement and cartridge placement. You can view this information in one of the following screens:

- **Statistics.** Contains data about the number of picks, places, and moves the CHM performed since first power-on, and data about the number of times the CHM retried to perform specific actions.
- **System sensors.** Contains information about whether the library's mechanical sensors can detect the placement of a cartridge, the position of the CHM, and whether the library door is open.


Note: These statistics are intended for use by trained service technicians to diagnose problems with the library.

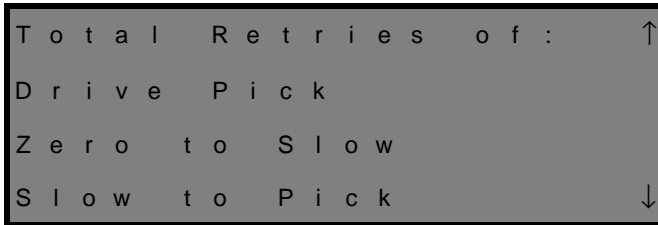
Viewing statistics

The Statistics screen consists of two groups of statistics: one totalled by count, the other totalled by retries.

To view statistics, select Statistics from the Main Menu. The first screen to appear is the Total Count screen:

T o t a l C o u n t o f :		
P i c k s	2 5 9	
P l a c e s	2 5 6	
Y M o v e s	8 3 6	↓

To display the Total Retries screen, press  to scroll past the last item in the Total Count screen.



Total Retries of: ↑
 Drive Pick
 Zero to Slow
 Slow to Pick ↓

The information in the Statistics screen is described below.

Statistics Totalled by Count:	
Picks	The number of times the CHM picked a cartridge from the magazine or tape drive.
Places	The number of times the CHM placed a cartridge in the tape drive or magazine.
Y Moves	The number of <i>vertical moves</i> the CHM performed. A vertical move is an upward or downward movement along the vertical axis.
Drive Loads	The number of times the CHM loaded a cartridge in the tape drive.
Z Homes	The number of times the CHM returned to the home position on the Z axis.
Y Homes	The number of times the CHM returned to the home position on the Y axis.
Z Corrections	The number of times the horizontal home sensor was found outside an area defined during the power-on self-test process. A number here may indicate missing encoder counts or a loose horizontal belt. (This value is reset to zero at power-on.)
Drive Retries	The number of times the CHM retried more than once to pick a cartridge from the tape drive. (This value is reset to zero at power-on.)

Pwr On Hours	The number of hours the library has been in operation since the first power on. This value is retained through power cycles and when new firmware is loaded.
Statistics Totalled by Retries:*	
Drive Pick	The number of times the CHM retried picking a cartridge from the tape drive.
Zero to Slow	The number of times the CHM retried a move from the Zero position to the Slow Down position.
Slow to Pick	The number of times the CHM retried a move from the Slow Down position to the Pick position.
In Slot Pick	The number of times the CHM attempted to pick a cartridge that was not present or not properly seated in the gripper.
Out Slot Pick	The number of times the CHM attempted to pick a cartridge that was not present or not properly seated in the gripper, after the CHM reached the Z Home position.
Solenoid	The number of times the library retried the place procedure because of a weak solenoid. If the library has a weak solenoid, the CHM needs to be replaced.
Eject	The number of times the library retried a move to the eject position during a place procedure.
Droop	The number of times the CHM could not place a cartridge because it was not firmly seated in the CHM. A large number here may indicate the CHM needs to be replaced.
Droop Catches	The number of times a cartridge hit against the magazine slot because the cartridge was not firmly seated in the CHM. A number here may indicate that the CHM needs to be replaced.
Clear Solenoid	The number of times the CHM retried to place a cartridge because of a slow or stuck solenoid. A number here may indicate that the CHM needs to be replaced.

Load Drive	The number of times the CHM retried loading a cartridge in the tape drive. A number here may indicate a problem with the tape drive or CHM.
Home Z	The number of times the CHM retried returning to the home position on the horizontal axis.
Move Y	The number of times the CHM retried a vertical move. A vertical move is either an upward or downward movement along the vertical axis.

* These counters are reset whenever the library is powered off and then back on.

Viewing system sensors

The System Sensors screen enables you to troubleshoot hardware problems by checking the current status of the library’s internal mechanical sensors.

To view system sensors, select System Sensors from the Main Menu.

S y s t e m S e n s o r s :		
C a r t P r e s e n t	0	
C a r t M a g a z i n e	1	
D r i v e U n l o a d e d	1	↓

The information in the System Sensors screen is described below.

Item	Description
Cart Present	0 - No cartridge in gripper (CHM at Z Home position) 1 - Cartridge in gripper (CHM at Z Home position)
Cart Magazine	0 - No magazine installed 1 - Magazine installed 2 - Library has not yet detected magazine
Drive Unloaded	0 - Cartridge loaded in tape drive 1 - Cartridge not loaded in tape drive
Library Door	0 - Library door closed 1 - Library door open
Y Home	0 - CHM not at the topmost vertical position 1 - CHM at the topmost vertical position
Z Home	0 - CHM not at the outermost horizontal position 1 - CHM at the outermost horizontal position
Inner Cartridge	Indicates the status of the inner cartridge sensor (nearest the magazine): 0 - Flag in sensor 1 - No flag in sensor
Outer Cartridge	Indicates the status of the outer cartridge sensor (just to the right of the inner cartridge sensor): 0 - Flag in sensor 1 - No flag in sensor
New Backplate	Indicates whether a new style backplate (or data cartridge magazine mounting plate) is installed: 0 - The old style backplate is installed 1 - The new style backplate is installed
Y Position	Indicates the number of <i>counts</i> (the library's internal unit of measurement) the CHM is away from the vertical home position.

Item	Description
Z Position	Indicates the number of counts the CHM is away from the outermost horizontal position (the position closest to the library door). This number is usually positive.
Z Home Sensor	Indicates the physical position of the Z home sensor on the horizontal axis. This number, which should be between –500 and –1,000, can be used to determine whether the horizontal axis position information is valid.

Performing diagnostics

This section provides the following information:

- An overview of diagnostic tools available for the library
- Instructions for using the Diagnostics Menu
- Instructions for setting the CHS Monitor port's baud rate

Overview of diagnostic tools

You can use the following diagnostic tools to test library operations:

- **LCD Diagnostics.** From the LCD, you can use the library's Diagnostics Menu to test CHM functions. See the instructions beginning on the next page.
- **Diagnostic Firmware.** The library's internal diagnostic firmware helps you determine mechanical problems, gather system statistics for the CHM, upgrade to new library firmware, and print a diagnostic listing. The diagnostic firmware resides in the flash EEPROM and can be displayed on a PC when you connect a cable to the CHS Monitor port (outermost port on the back of the library) and to a port on a PC. For more information, contact your service provider.

- **Tape Drive Monitor.** Exabyte provides Monitor software that you can install on a PC to help you test, configure, and upgrade Exabyte 8mm tape drives. The tape drive, also called a *cartridge tape subsystem* or *CTS*, communicates with the PC across a serial cable from the CTS Monitor port (innermost port on the back of the library) to a serial port on a PC. For more information, contact your service provider.

Note: After performing tape drive diagnostics, reset the tape drive by turning the library off and then back on again.

Using the Diagnostics Menu

The Diagnostics Menu provides basic functions for exercising each component in your library. You can use these functions to test the library hardware after installation.

Before you begin

Before performing diagnostic exercises, follow these steps:

1. Change the control mode to LCD (see page 41).

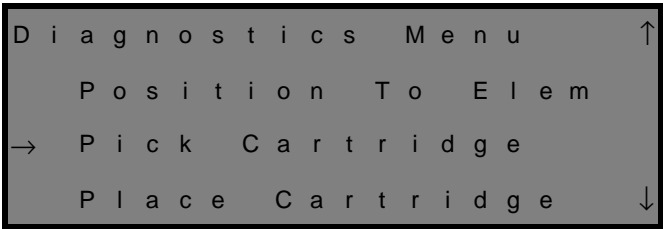
➤ **Important** When the library is in LCD mode, the software application cannot control CHM movement.

2. Make certain you know the element indexes for the components you will exercise (you need to specify source and destination element indexes for many of the diagnostic test). The following table lists element indexes.

Element	Element Index
Tape drive	0
Cartridge slots	1 to 10 (starting from the bottom)
CHM	11

Accessing the Diagnostics Menu

Select Diagnostics Menu from the Main Menu.



Performing diagnostics

The following table describes each of the tests available from the Diagnostics Menu. If you need to specify a source or destination, enter the element index of that element by pressing the arrow keys to increase or decrease the number shown on the display. When the element index you want is displayed, press **Enter** to start the test.

While each test is in progress, the library displays status messages. If an error occurs, the library displays an error message. For more information about the error, access the Error Status display (see page 130).

Item	Description
Position to Elem	Moves the CHM to the tape drive or to one of the cartridge slots. You are asked to specify a destination.
Pick Cartridge	Causes the CHM to pick a specified cartridge. You are asked to indicate the source location of the cartridge.
Place Cartridge	Causes the CHM to place the cartridge it is currently holding at a specified location. You are asked to indicate the destination location for the cartridge.
Move Cartridge	Moves a cartridge from one location to another. You are asked to indicate the source location and the destination location.
Load Drive	Causes the CHM to load a cartridge into the tape drive.
Cycle Pick/Place	Causes the CHM to take a cartridge from a specified slot and replace it in the same slot. You are asked to specify the source slot and the number of pick/place cycles the CHM should perform in increments of 10.
POST	Causes the library to perform its power-on self-test. During the power-on self-test, the library determines its Y-axis and Z-axis home positions, which enables it to accurately calculate the locations of cartridges.
Cycle Solenoid*	Causes the CHM to cycle the solenoid used to eject a cartridge from the CHM. You are asked to specify the number of cycles the CHM should perform in increments of 10.
Cycle Y Axis*	Causes the CHM to move up and down on the Y axis. You are asked to specify the number of cycles the CHM should perform in increments of 10.
Cycle Z Axis*	Causes the CHM to move in and out on the Z axis. You are asked to specify the number of cycles the CHM should perform in increments of 10.

Item	Description
Park	Causes the CHM to move to the park position at the bottom of the library.
Home Y	Causes the CHM to move to the Y home position near the top of the Y axis.
Home Z	Causes the CHM to move to the Z home position away from the magazine.

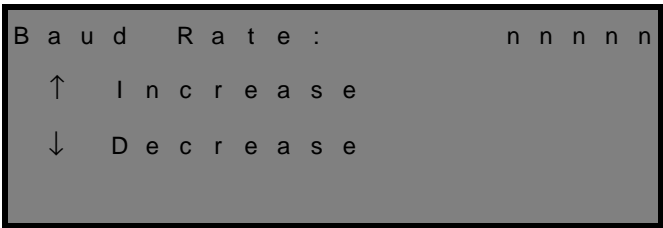
* If you select 0, each of these tests will run for 65,536 cycles or until you reset the library.

➤ **Important** After performing diagnostics, switch back to the original control mode (see page 41).

Setting the CHS Monitor baud rate

If you plan to use the CHS Monitor port, you may need to set the port's baud rate. To do this:

1. Select Utilities from the Main Menu.
2. Select Baud Rate from the Utilities Menu.



3. Using the arrow keys, select one of the available baud rates:

- 300
- 1200
- 2400
- 4800
- 9600
- 19200

7 Troubleshooting

This chapter provides a list of suggestions for solving problems that may occur when you are installing and operating the library and enclosed tape drive. This troubleshooting chapter is divided into the following sections:

- Problems with installation
- Problems with tape drive operation
- Problems with library operation

Note: If an error code is displayed on the LCD, refer to Appendix C.

If you are unable to solve the problem by following the suggestions in this chapter, contact your service provider or refer to “Getting Help” on page 145.

Problems with installation

Most problems during library installation occur because the SCSI bus is not correctly configured, the software application is not correctly configured, or the library is in the wrong control mode. If your library and software application are not communicating after installation, check the following:

- ✓ **SCSI IDs.** Make sure that the SCSI IDs for the tape drive and library are not the same as the ID used by any other SCSI device, including the SCSI adapter card. Refer to page 25 for information about setting the SCSI IDs.
- ✓ **SCSI cabling.** Make sure that all SCSI cables are securely connected at both ends. Also check the length and integrity of your SCSI cabling. For single-ended configurations, the total length of all your SCSI cables (both internal and external) must not exceed 19.7 feet (6.0 meters). For differential configurations, the total length must not exceed 82 feet (25.0 meters) Try replacing suspect cables with ones you know are good.
- ✓ **Termination.** Make sure your bus is properly terminated as described in Appendix B.
- ✓ **Single-ended or differential devices.** Make sure that all devices and on the bus are all single-ended or all differential. Also make sure that other equipment (controller cards, cables, and terminators) are all single-ended or differential.

- ✓ **Compatibility.** Make sure that your tape drive and library are compatible with the SCSI adapter card and software application you plan to use. For general compatibility information, see page 31. More detailed information is available from Exabyte's internet site at www.exabyte.com, or from EXAFacts™, Exabyte's fax-on-demand service. If your software application does not support a library, see page 33.
- ✓ **SCSI adapter card installation.** Make sure that you installed the SCSI adapter card correctly. Refer to the documentation that came with your card for installation and troubleshooting instructions. Pay special attention to steps describing setting various jumpers and switches on the card. Make sure that the card is properly seated.
- ✓ **Software installation.** Make sure that your software application is installed correctly. Refer to the documentation that came with your software. Pay special attention to steps describing configuring the software for use with the library and tape drive.
- ✓ **Control mode.** Make sure that the library is operating in the correct control mode. For most applications that support libraries, the control mode should be set to random. See page 41 for more information.

After checking the items above, reset the SCSI bus by turning off the library and host computer. Power on the host computer first, then power on the library.

Problems with tape drive operation

Most problems with tape drive operation occur with improper cartridge use. If you have been successfully operating the software application and library in the past, but are now experiencing problems reading and writing data, do the following:

- ✓ Check the data cartridges you are using. For best results, use only EXATAPE 8mm metal particle (MP) cartridges. You cannot use advanced metal evaporated (AME) cartridges in the library. See page 11 for more information about selecting data cartridges.
- ✓ Make sure the cartridge is compatible with your tape drive. The EXB-8205 and EXB-8505 are not compatible with XL 8mm data cartridges and will automatically eject them. (The library will post a 45h error after attempting to place the XL cartridge in the tape drive three times.) See page 12 for more information about compatibility of data cartridges and tape drives.
- ✓ If you are writing data, make sure that the cartridge is write enabled (move the write-protect tab toward the edge of the cartridge).
- ✓ Try using a new cartridge. The cartridge may be worn or damaged.
- ✓ Clean the tape drive with an Exabyte Premium 8mm Cleaning Cartridge. Refer to page 53 for instructions.

Problems with library operation

Most problems with library operation occur after you have changed configuration options or performed a maintenance operation. If the library has been successfully operating in the past, but is now experiencing problems, check the following:

- ✓ Make sure the library is operating in the correct control mode. If you are using a software application to control CHM operations, the library must be set to random mode. See page 41 for more information. If you are trying to operate the library in sequential mode, be sure to read “Processing cartridges in sequential mode” beginning on page 43.
- ✓ Make sure the library door is closed and latched. After you close the door, you must press on the square at the right of the door to latch it.
- ✓ Make sure a magazine is installed.
- ✓ Make sure the fuse has not blown. See “Replacing the fuse” beginning on page 83 for instructions about checking and replacing the fuse.
- ✓ Make sure the CHM is not blocked and is moving properly along its axes. You can use the selections in the Diagnostics Menu to determine if the CHM is functioning properly. See page 104.

Notes

8 Shipping the library

This chapter describes procedures for:

- Returning the library for service
- Packing the library

Returning the library for service

If you need to return the library for service, contact your service provider. If your service provider instructs you to return the library directly to Exabyte, contact Exabyte Service at one of the numbers below to obtain a Return Materials Authorization (RMA) number and the shipping address. When you have the RMA number, follow the shipping instructions on the following pages.

	USA	Scotland
Phone:	1-800-EXATAPE (1-800-392-8273) or 1-303-442-4333	(44) 0324-564564
Fax:	1-303-417-7689	(44) 0324-564500
E-mail:	service@exabyte.com	

Packing the library

Required materials

- Original shipping containers
- Original foam packing pieces
- Antistatic bag
- Packing tape
- Completed paperwork and shipping label

CAUTION

To avoid damaging the library and voiding your warranty, be sure to use the original shipping materials (or replacement materials obtained from your vendor) when repacking and shipping the library. Do not use the shipping carton and packing materials to ship items other than or in addition to a library.

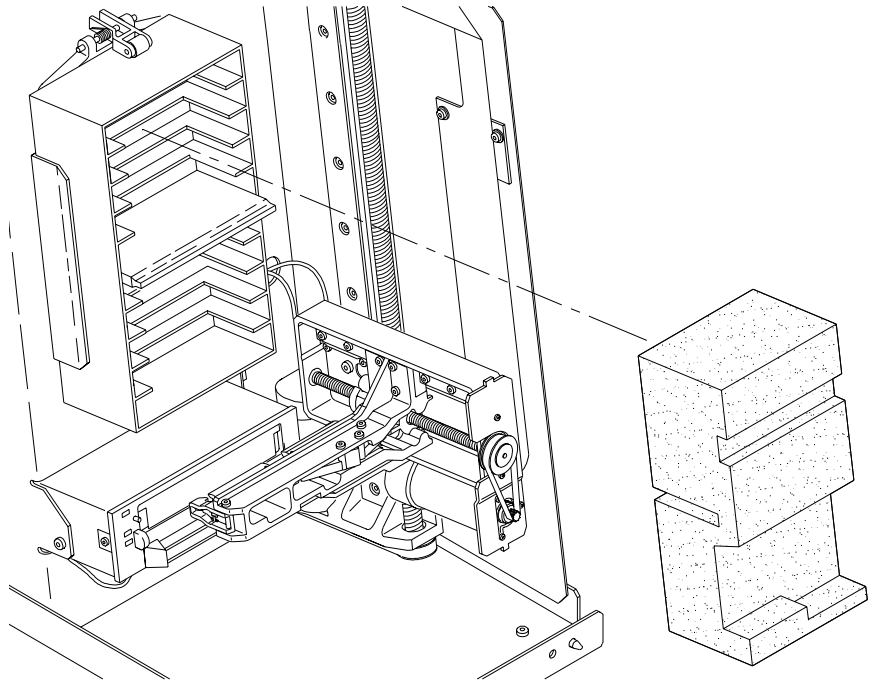
The following table summarizes the weights and dimensions for library shipments.

	Weight*	Dimensions (depth × width × height)
With tape drive	52 lbs. (23.6 kg)	25 × 16 × 26.5 inches (63.5 × 40.6 × 67.3 cm)
Without tape drive	49.4 lbs. (22.4 kg)	

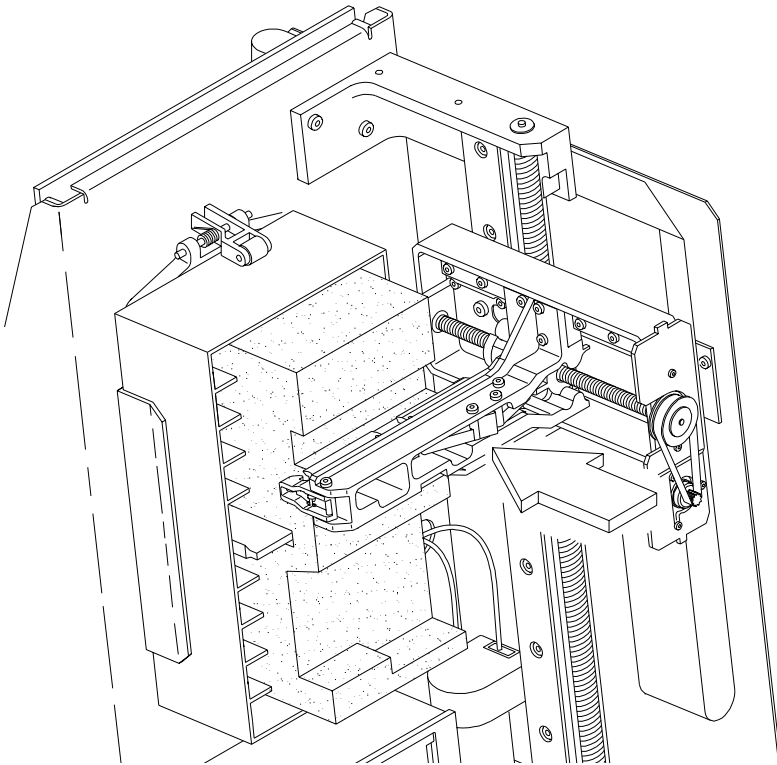
* These weights include the magazine and other library accessories.

Preparing the library for shipping

1. Make sure that there is no cartridge in the gripper, tape drive, or magazine.
2. Move the gripper and insert the foam packing piece as follows:
 - a. Change the control mode to LCD mode (see page 41).
 - b. Select Diagnostics Menu from the Main Menu.
 - c. From the Diagnostics Menu, select Park to move the CHM to the bottom.
 - d. Insert the foam packing piece into the magazine.



- e. Select Position to Element. When the LCD prompts you to specify a destination, use the arrow keys to select 8.
3. Power off the library.
 4. Remove the power cord and SCSI cables (or terminator).
 5. Push the gripper forward until it is secure between the sides of the foam.

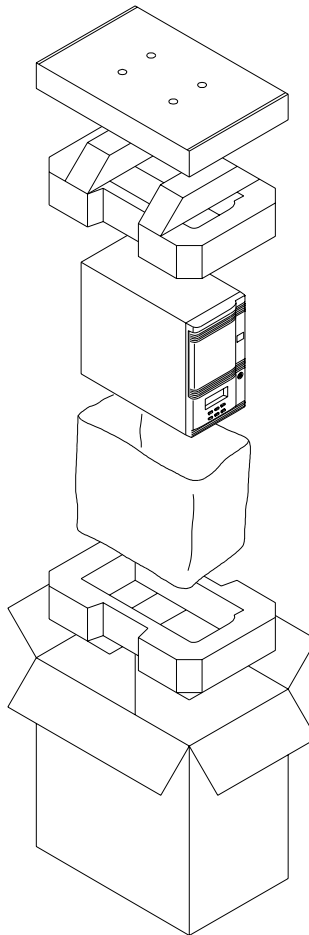


6. Close the library door and tape it shut using a small piece of packing tape.
7. Cover the library with the antistatic bag and tape it closed.

Packing the library

After you prepare the library, pack the library as follows:

1. Place one packing cushion in the bottom of the original shipping carton, with the fitted space for the library facing up.
2. Carefully lift the library into the shipping carton and lower it into the fitted space in the packing cushion. Be sure that the library is correctly seated in the cushion.



3. Place the other packing cushion on top of the library, with the fitted space for the library facing down.
4. Place any accessories you plan to ship in the accessory box. Place the accessory box on top of the top packing cushion, with the holes in the box facing up.

➤ **Important** If you are returning the library for service, do not return the library's accessories (cartridges, cartridge magazines, SCSI cables, terminators, jumpers, power cables, and keys).

5. Ensure that the necessary paperwork is in the library box and tape the box shut.
6. Write the RMA number on the outside of the shipping carton.

➤ **Important** You must obtain an RMA number before returning the library to Exabyte. Packages received without an RMA number clearly marked on the box will be returned unrepared, freight collect.

7. Write your return address on the outside of the shipping carton.
8. Place the shipping label on the box.

A Specifications

General specifications

Capacity^a	Up to 140 gigabytes, on ten 160m XL data cartridges written in compressed format
Interface	SCSI-2, single-ended or differential
Mean cycles between failures (MCBF)^b	200,000 cycles
Maximum sustained data transfer rate^a	2.0 MB per second

^a Assumes an Eliant 820 tape drive, 8500c format and an average compression ratio of 2:1.

^b During one full cycle, the CHM picks a cartridge from a slot, places it in the tape drive, removes it from the tape drive, and replaces it in the slot.

Operating environment

Ambient temperature range	+ 5°C to + 35°C (+ 41°F to + 95°F)
Relative humidity range	20% to 80%, non-condensing
Wet bulb temperature	26°C (79°F) max

Physical characteristics

Size	15.75 in. high × 8.50 in. wide × 19.11 in. long (40.01 × 21.59 × 48.53 cm)
Weight	38.9 pounds (17.6 kilograms) with tape drive

Power

Input voltages	Accepts 120 or 240 VAC at 50 to 60 Hz; automatic input voltage selection
Power consumption	46 watts minimum; 60 watts maximum.

SCSI cable specifications

If you plan to use your own SCSI cable, make certain it meets the specifications listed below.

Cable feature	Requirement
Standard Construction	50 conductors (25 twisted pairs with drain wire and shield)
Primary Conductors	Insulated per UL Style 1589 Gauge: # 28 AWG minimum stranded (7/34) annealed, tinned copper Insulation: Polypropylene (80° C) 0.010 inch nominal
Shielding	80% minimum tinned copper braid over aluminum/mylar foil
Outer Jacket	Insulated per UL Style 2919, Polyvinyl Chloride (80° C)

Cable feature	Requirement
Voltage Rating	30 VAC
Impedance (XL tape drive)	100 Ohms 10% @ 1.5 Mhz
Impedance (Eliant 820)	Single-ended: 88 Ohms \pm 8 Ohms Differential: 130 Ohms \pm 12 Ohms
Grounding	Case-to-case grounding
Connector (XL tape drive)	50-contact Amphenol 57F series male connector
Connector (Eliant 820)	50-contact AMP Amplimite 0.050 male, shielded, SCSI-2 connector
Maximum length	6 meters (19.7 feet) for single-ended configurations; 25 meters (82 feet) for differential configurations

SCSI terminator specifications

If the library is the last device on the SCSI bus, you must attach an external terminator to one of the SCSI connectors. For best results, use one of the terminators shown in the following table.

	Exabyte 10h with Exabyte XL tape drive	Exabyte 10h with Exabyte Eliant 820
Single-ended	Amphenol® 200-1S000-02000-00000	AMP® Amplimite™ 750381-1
	Methode Electronics, Inc. dataMate® DM800-09-0	Methode Electronics, Inc. dataMate DM2000-02-R
Differential	Amphenol 200-2S000-02000-00000	AMP Amplimite 749541-1
	Methode Electronics, Inc. dataMate DM800-08-0	Methode Electronics, Inc. dataMate DM2000-01-0

Power cord requirements

The library includes an appropriate power cord for United States and Canada shipments, and for some international shipments.

United States and Canada

The library is shipped with a seven-foot (2.1 meter), three-conductor AC power cord for 120-volt use in the United States and Canada. If you plan to use a 220-volt AC power cord, make certain it meets the following criteria:

- A molded NEMA 6-15P attachment plug on one end and a molded IEC type CEE-22 female connector on the other end
- An SJT or SVT type, three-conductor, 18 AWG minimum
- Compliance with local electrical code

Outside the United States and Canada

When using the library outside the United States and Canada, make certain the power cord consists of:

- Attachment plug of the proper type, rating, and safety approval for the intended country
- Female connector, IEC type CEE-22, on one end
- Electrical cable, type HD21

B SCSI configuration

This appendix provides an overview of the *Small Computer System Interface (SCSI)* and gives an overview of how to configure the SCSI bus. *SCSI* is a standard specification that allows an application running on a host computer to communicate with peripheral SCSI devices, such as the library and the enclosed tape drive. The library uses SCSI commands to receive instructions from the host and to report its status to the host.

SCSI components

The SCSI system consists of the following components:

- **Initiator.** The host computer system acts as the initiator of commands. It consists of the software application, the operating system, the device driver, and the SCSI adapter card.
- **Bus.** The SCSI cables connected to the adapter card and to the library (as well as other devices on the bus) provide a pathway (or “bus”) for passing commands, data, and messages.

- **Targets.** Both the library and the tape drive are peripheral devices (or targets) that are capable of receiving commands from the host. Up to eight devices can be connected along the SCSI bus (including the host computer), in what is referred to as a *daisy chain*.

Configuring the library on the SCSI bus

This section provides the basic rules and considerations for setting up the library on the SCSI bus.

Single-ended or differential

Every SCSI device attached to the SCSI bus must be of the same type: either *single-ended* or *differential*. On a single-ended SCSI bus, one signal line is used to transmit a bus signal between devices. On a differential bus, two signal lines are used.

If your library is single-ended, then all devices and equipment you install on the SCSI bus must also be single-ended; if your library is differential, all devices must be differential. Other devices and equipment include the tape drive installed in the library, the adapter card installed in your host computer, and all SCSI cables and terminators.

To determine if the library is single-ended or differential, you can remove the upper back panel (as described on page 62) and look at the label on top of the tape drive. The label displays “SLDS” for single-ended configurations or “SLDD” for differential configurations.

SCSI cabling

When connecting the library and other devices on the SCSI bus, follow these guidelines for SCSI cabling:

- ✓ For single-ended configurations, the total length of cabling cannot be longer than 6 meters (19.7 feet) for single-ended devices. For differential configurations, the total length of cabling cannot be longer than 25 meters (82 feet).
- ✓ The library uses 25 inches (63.5 cm) of internal SCSI cable; be sure to include this amount in your cable length calculations. If you have any other external devices (not installed inside your host computer), these devices may have some amount of internal SCSI cabling as well. Remember to include that amount in your calculations.

Termination

The two devices that are physically located at the ends of the SCSI cable must be *terminated* to ensure proper signal transmission. If the library is located at the end of the SCSI bus, plug an external terminator on one of the connectors. (Do not use internal termination.) See page 123 for types of terminators to use.

If another SCSI device previously terminated your SCSI bus and will no longer be at the physical end of the bus, be sure to remove the terminator from that device.

The EXB-10h does not provide term power. If you install a terminator on the back of the library, the host computer must provide the term power.

SCSI IDs

Each device attached to a SCSI bus has a unique SCSI ID that identifies it during communication. SCSI IDs range from 0 to 7 for each bus. The SCSI ID determines which device has priority when more than one device is trying to communicate on the bus. The lower the ID, the lower the priority of the device.

Note: The SCSI ID does not depend on physical location. For example, the last device on a multi-device SCSI bus can have a SCSI ID of 2.

Your library uses two SCSI IDs: one for the library itself and one for the tape drive. This allows the library and tape drive to operate as separate devices, receiving different sets of SCSI commands from the host.

C Error and status codes

This appendix describes the error codes for the library and corrective actions for each error condition.

CAUTION

If you cannot find an obstruction or other obvious cause for the problem, call your service provider. Unless you have a self-maintenance contract, do not attempt to replace any components or you will void your warranty. Library components can be replaced only by approved service providers.

If you reset the library, you may disrupt communication on the SCSI bus. Always make sure there is no SCSI activity on the bus before resetting the library.

For information about SCSI error conditions (sense data), refer to page 96 of this manual or to the *EXB-10h and EXB-10e 8mm Libraries SCSI Reference*. For information about tape drive LED conditions, see page 51.

Error alert and status screens

The library has two ways of providing error information: the Error Alert screen and the Error Status screen.

- **Error Alert screen.** The Error Alert screen appears automatically whenever a serious error occurs. You must correct the error before operation can continue.



```
E r r o r   A l e r t !           D 1 h
U S E R   E R R O R
C A N ' T   R E S T A R T   S E Q
M O D E ,   D R I V E   F U L L
```

- **Error Status screen.** The Error Status screen is available when you need to find out information about a “non-fatal” error, for example, during calibration or diagnostics. Whenever a status message indicates that an error has occurred, you can access the Error Status screen by pressing **ENTER**.

The first line of the Error Alert or Error Status screen provides the error's hexadecimal code. The second line indicates a category of errors. The third and fourth lines provide a brief explanation of the error.

To return to the Main Screen, press **ESC**.

List of error and status codes

The table lists library hardware error conditions in numerical order. The columns in the table indicate the following:

- **Code.** Displays the code's hexadecimal number. This is the number that may appear on the LCD when the code occurs or on a diagnostic listing.
- **Description.** Provides a description of the code.
- **Corrective Action.** Suggests recommended corrective actions.

Code	Description	Corrective action
03h	The CHM is attempting to place a cartridge in a slot, but another cartridge is already present.	Remove one of the conflicting cartridges, then reset the library. (If you removed the cartridge from the CHM, the library considers the place operation complete. If you removed the cartridge from the cartridge slot, the library places the cartridge left in the CHM.)
05h	The library door is open; automatic operation cannot continue.	Close the door by pressing the square at the right of the door to latch it.
06h	A magazine is not installed.	Install a magazine. If a magazine is already installed, contact your service provider.

Code	Description	Corrective action
07h	The library finished processing all cartridges in the magazine.	<p>The library is waiting for operator action. You can restart the pick-and-place cycle in one of these ways:</p> <ul style="list-style-type: none">▪ Replace the magazine. If you replace the magazine, the library resumes operation with cartridge 1.▪ Turn on the loop option.▪ Use the next cartridge option to specify the next cartridge to be processed.
08h	The library finished processing what appears to be an empty magazine.	<p>The library is waiting for operator action. Install a magazine; or if the magazine is empty, install cartridges. The library resumes operation with cartridge 1.</p> <p>If the magazine is not empty, the cartridges have not been processed and the CHM may be malfunctioning. Contact your service provider.</p>
09h	The library cannot execute SCSI motion commands.	Change the control mode to random. If you were performing diagnostics through the CHS Monitor port, make certain you exit the diagnostics program.
0Bh	The CHM attempted to move to the park position or attempted to restart sequential mode, but cannot accomplish this move because there is a cartridge in the CHM.	Remove the cartridge from the CHM and reset the library.

Code	Description	Corrective action
0Ch	The CHM is moving to the home position, which occurs periodically to prevent the CHM from losing position. This status message may also indicate that the library is performing a calibration.	None. The library resumes normal operation when the motion is complete.
0Fh	The firmware load is not complete. or The library firmware may be corrupted.	This message appears when you are loading new firmware through the CHS Monitor port and a host computer. To complete the firmware load, press F on the computer keyboard. If the firmware is corrupted, contact your service provider to receive new firmware.
11h	The CHM cannot pick a cartridge because a cartridge is already in the gripper.	Remove the cartridge from the CHM, then reset the library.
12h	The CHM cannot execute a retry while picking a cartridge from the tape drive.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If you cannot determine the problem, contact your service provider.
13h	The CHM cannot complete the move outward after picking a cartridge, or the CHM cannot move in close enough to the cam on the drive bezel.	
14h	The CHM cannot move inward to pick a cartridge, or the CHM cannot cock the gripper fingers.	

Code	Description	Corrective action
15h	The CHM cannot pick a cartridge from the tape drive, or the CHM cannot move up to the tape drive opening after cocking the gripper fingers.	If you replaced the tape drive, make certain it is mounted correctly (see page 79 for instructions on testing the tape drive installation). If the tape drive is not the problem, contact your service provider.
16h	The CHM cannot pick a cartridge from the tape drive, or the CHM cannot move down to the cam on the drive bezel.	
1Ah	The CHM attempted to pick a cartridge from the source (tape drive or magazine slot), but the cartridge inventory indicates the source is full.	First, make certain a magazine is installed. Next, check to see if there is a cartridge in the source. If there is, make sure that the cartridge is not caught. If the cartridge is not caught, the CHM may not be gripping the cartridge correctly and you should contact your service provider. If there is no cartridge, the CHM automatically moves to the next action in the current pick-and-place cycle.
1Bh	The CHM cannot pick from the tape drive because the cartridge is not ejected.	Press the unload button to eject the cartridge.
1Ch	The CHM cannot properly grip the cartridge and returned the cartridge to its source (tape drive or slot).	Recalibrate the cartridge sensor position by following the instructions on page 87. If calibration does not solve the problem, contact your service provider.

Code	Description	Corrective action
1Dh	The CHM cannot complete a pick operation because the source (tape drive or slot) was empty.	First, make certain a magazine is installed. Next, check to see if there is a cartridge in the source. If there is, make sure that the cartridge is not caught. If the cartridge is not caught, the CHM may not be gripping the cartridge correctly and you should contact your service provider. If the source is empty, place a cartridge in the source or pick from another source.
1Eh	The CHM attempted to pick a cartridge. The library cannot detect a cartridge in the CHM, even though the sensors indicate there is.	Recalibrate the cartridge sensor position by following the instructions on page 87. If calibration does not solve the problem, contact your service provider.
21h	The CHM cannot complete a place operation because a cartridge is not in the gripper.	If there is a cartridge in the CHM, the solenoid or the plunger may be malfunctioning. Contact your service provider.
22h	The CHM cannot move upward to start the place procedure.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
23h	The CHM cannot move toward the slot or tape drive while executing a place procedure.	
24h	The CHM cannot move downward to the tape drive while executing a place procedure.	

Code	Description	Corrective action
25h	The CHM cannot move to a position where it could place a cartridge into the magazine or tape drive.	Check to see if the magazine is installed correctly. If the magazine is not the problem, this error could be caused by a misaligned CHM or an incorrectly mounted tape drive. Contact your service provider.
27h	The CHM cannot execute one of the moves that ejects the cartridge.	This error could be caused by a misaligned solenoid on the CHM. Contact your service provider.
28h	The CHM cannot eject a cartridge.	This error could be caused by a bad solenoid on the CHM. Contact your service provider.
29h	The CHM cannot place a cartridge into the tape drive or a slot.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
2Ah	The CHM cannot place a cartridge in the tape drive or a slot.	This error could be caused by a misaligned solenoid on the CHM. Contact your service provider.
2Bh	The CHM tried to place a cartridge, but another cartridge is already present in the slot or tape drive.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.

Code	Description	Corrective action
2Ch	The CHM tried to place a cartridge in the tape drive, but a cartridge is already loaded.	<p>When this error occurs, the library's pick-and-place cycle has been interrupted. You need to restart the pick-and-place cycle by following these steps:</p> <ol style="list-style-type: none"> 1. Press the unload button to eject the cartridge. 2. Turn on the restart option. 3. Reset the EXB-10. <p>The library resumes the pick-and-place cycle with cartridge 1 and returns the appropriate status to the host.</p>
2Dh	The CHM cannot move towards the magazine to place a cartridge in either slots 1 through 5 or slots 7 through 10.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
30h	The CHM cannot complete a procedure that allows it to define zero on the horizontal axis.	
31h, 32h	The CHM cannot complete a procedure that allows it to define zero on the horizontal axis.	Reset the library. If the error still occurs, contact your service provider. You may need new firmware.
33h, 34h	The CHM cannot complete a procedure that allows it to define zero on the horizontal axis.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
35h	The CHM cannot complete a procedure that allows it to define zero on the vertical axis.	

Code	Description	Corrective action
36h, 37h	The CHM cannot complete a procedure that allows it to define zero on the vertical axis.	Reset the library. If the error still occurs, contact your service provider. You may need new firmware.
38h	The CHM cannot complete a procedure that allows it to define zero on the vertical axis.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
41h	The CHM cannot move to the vertical axis position where it starts pushing the cartridge into the tape drive.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
42h	The CHM cannot move to the horizontal axis position where it starts pushing the cartridge into the tape drive.	
43h	The CHM cannot load the cartridge into the tape drive.	
44h	The CHM cannot move to the horizontal axis zero position after loading the cartridge.	
45h	The tape drive rejected the cartridge after several attempts to load it.	<p>This error could be caused by an incompatible tape drive and cartridge. For example, if you have a non-XL tape drive and are trying to load an XL cartridge, the tape drive will not accept it.</p> <p>This error could also be caused by a servo error in the tape drive firmware. If there is a servo error, the tape drive will not accept a cartridge. To clear a servo error in the tape drive, press the unload button.</p>

Code	Description	Corrective action
4Ah	The CHM cannot load a cartridge in the tape drive after several retries.	Reset the library. If the error still occurs, contact your service provider.
50h	The firmware cannot find a valid physical coordinate that corresponds to the specified logical position. This error may be caused by a malfunction in the library's firmware.	
51h	The CHM cannot move to the horizontal axis zero position before starting the vertical axis move.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
52h	The CHM cannot move to the specified vertical axis physical position.	
58h, 59h	The CHM cannot move to the specified horizontal axis physical position.	
60h	Internal error. This error may indicate that there is a problem with the library's firmware.	Reset the library. If the error still occurs, contact your service provider.

Code	Description	Corrective action
61h	Invalid nonvolatile RAM. This error may indicate that the nonvolatile RAM is bad.	Reset the library. If the error still appears, contact your vendor.
62h	The vertical motor's servo chip cannot be initialized. This error may indicate that the servo control chip is bad.	
63h	The horizontal motor's servo chip cannot be initialized. This error may indicate that the servo control chip is bad.	
64h	A CHM motion took longer than the maximum time allocated for it. When these functions cannot complete in the specified time, the currents to the servo motors are shut off.	Reset the library. If the CHM still moves slowly, contact your service provider.
65h	The SCSI chip failed.	Turn the library off and then on again. If the error still occurs, contact your service provider.
90h	The CHM cannot move to the cartridge sensor calibration position.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. Recalibrate the cartridge sensor position as described on page 87. If the error still occurs, contact your service provider.
91h	The CHM cannot move to a position where it starts polling for the cartridge sensor.	
92h	The CHM cannot find the cartridge sensor.	Make certain the calibration block is correctly placed in the CHM. If you still receive this error, the cartridge sensor is malfunctioning. Contact your service provider.

Code	Description	Corrective action
94h	The CHM cannot complete the cartridge sensor calibration.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. Recalibrate the cartridge sensor position as described on page 87. If the error still occurs, contact your service provider.
95h	The CHM cannot find the cartridge sensor anywhere on the horizontal axis.	Contact your service provider. The cartridge sensor may be malfunctioning.
96h	The calibrated cartridge sensor value is not within the accepted range.	Make certain the calibration block is fully seated. Also check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. Recalibrate the cartridge sensor position as described on page 87. If the error still occurs, contact your service provider.
97h	The CHM cannot move to the horizontal zero position after completing the cartridge sensor calibration.	
98h	Internal error.	Contact your service provider.
9Ch	The library has completed cartridge sensor calibration and is now waiting for you to remove the calibration block.	Remove the calibration block and close the library door.

Code	Description	Corrective action
A0h	The CHM cannot move to the cartridge sensor to determine whether a cartridge exists in the CHM. This error may indicate a malfunction in the horizontal motion assembly.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
A1h	The CHM cannot find the cartridge sensor or the horizontal home sensor while moving on the horizontal axis. This error may indicate a malfunction in the horizontal motion assembly.	
A2h, A3h	The library cannot determine if there is a cartridge in the gripper.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. Also check to make certain the horizontal axis belt on the CHM is intact. If it is worn or broken, you need to replace this belt. Contact your service provider.
B0h	The CHM cannot move to the start position for the eject position calibration.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.
B1h	The CHM cannot execute a move that prepares for the eject position calibration.	
B2h	The solenoid did not eject.	The solenoid is malfunctioning. Contact your service provider.
B3h	The CHM cannot move to the position where it starts to push in the cartridge.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If the error still occurs, contact your service provider.

Code	Description	Corrective action
B4h	There is a cartridge in the CHM.	Remove the cartridge and retry the calibration procedure by resetting the library.
C0h	The CHM is unable to place the cartridge back in the source after a pick failure.	Contact your service provider.
C1h	The CHM is unable to place the cartridge back in the source after a place failure.	
C2h	The CHM is unable to place the cartridge back in the source after a SCSI abort.	
D0h	There are no cartridges in the magazine.	Place cartridges in the magazine.
D1h	The library cannot restart sequential mode because the tape drive contains a cartridge.	Remove the cartridge from the tape drive.
E0h	Error during diagnostics: The CHM cannot move to the tape drive with a cartridge in the CHM.	Remove the cartridge from the CHM.
E1h	Error during diagnostics: The CHM cannot push the cartridge into the drive because of a conflicting cartridge or the drive is empty.	Depending on the problem, perform one of the following actions: <ul style="list-style-type: none"> ▪ Remove the cartridge from the CHM. ▪ Eject the cartridge from the tape drive. ▪ Place a cartridge in the tape drive.

Code	Description	Corrective action
E2h	Error during diagnostics: The CHM cannot cycle the solenoid with a cartridge in the CHM.	Remove the cartridge from the CHM.
E3h	Error during diagnostics: The CHM cannot perform the cycle Y-axis with a cartridge in the CHM.	
E4h	Error during diagnostics: The CHM cannot perform the cycle Z-axis with a cartridge in the CHM.	
E5h	Error during diagnostics: The CHM cannot complete a motion on the Z axis during a diagnostic function.	Check to see if something is blocking the CHM. If there is, remove the obstruction and reset the library. If you cannot determine the problem, contact your service provider.
E6h	Error during diagnostics: The CHM cannot move to the park position with a cartridge in the CHM.	Remove the cartridge from the CHM.
E7h	Error during diagnostics: The CHM cannot pick a cartridge because there is a cartridge in the CHM.	
E8h	Error during diagnostics: The CHM cannot place a cartridge because the gripper is empty.	Instruct the CHM to pick a cartridge first.

Glossary

address	See element address.
AME tape	Advanced Metal Evaporated tape.
bus	The SCSI cable that serves as a link for passing signals between the host computer and targets, such as the library and the tape drive.
byte	A unit of data or storage capacity equal to 1 character or 8 bits.
cartridges 1 through 10	Cartridge slots are numbered consecutively from 1 to 10 in the cartridge magazine. Cartridge 1 is the bottommost slot; cartridge 10 is the topmost slot.
CHM	Cartridge handling mechanism. The robotic assembly that retrieves and replaces cartridges in the cartridge magazine and loads and unloads them from the tape drive. The CHM includes the gripper, motors, belts, and lead screws.
CHS	Cartridge Handling Subsystem. Formal name for the library.
CHS Monitor port	The diagnostic port on the back of the library that can be used to connect the library to one of Exabyte's library Monitor programs.

compression	The process used to increase the capacity of a data cartridge. Compression allows the tape drive to write more data to a segment of tape. For example, when writing in compressed format, the tape drive compresses data by an average of 2:1 before writing it to tape.
control mode	Determines whether the CHM's movement is controlled through a host computer (random mode), the library firmware (sequential mode), the CHS Monitor port (CHS Monitor mode), or the LCD (LCD mode).
CTS	Cartridge Tape Subsystem. Formal name for a tape drive.
CTS Monitor port	The diagnostic port on the back of the library that can be used to connect the tape drive to one of Exabyte's tape drive Monitor programs.
daisy chain	The physical connection of devices on the SCSI bus.
data transfer rate	The rate at which information can be written to tape or read from the tape, expressed in either KB or MB per second.
destination	Either a cartridge magazine slot or the tape drive where the CHM will place the cartridge.
differential	A SCSI configuration using two signal lines to transmit a bus signal between devices.
EEPROM	Electrically erasable programmable read only memory.
element	Either the CHM, a slot in the cartridge magazine, or the tape drive.
element address	The temporary address assigned to each element so the host computer can identify it. The default addresses are 0 (tape drive) 1 through 10 (cartridge slots, from bottom to top) and 11 (CHM). The software application may change these numbers.

element index	The permanent address assigned to each element so the library can identify it. The indexes are 0 (tape drive) 1 through 10 (cartridge slots, from bottom to top) and 11 (CHM). These numbers cannot be changed.
ESD	Electrostatic discharge.
EXB-10h	The Exabyte 10h library.
FCC	Federal Communications Commission.
gigabyte (GB)	Approximately one billion bytes.
gripper	On the CHM, the device that grips, picks, and places the cartridges.
h	Hexadecimal (base 16) numbering system.
home position	For the CHM, the uppermost position of the vertical axis.
host	The computer connected to the SCSI bus that issues commands to the library.
ID	Identification.
index	See element index.
kilobyte (KB)	1,024 bytes.
LCD	Liquid crystal display. For the library, the four-line display that shows the operational status and a menu of operations.
LED	Light emitting diode. For the tape drive, the lights that show drive status.
library	The Exabyte 10h.
megabyte (MB)	Approximately one million bytes.
mm	Millimeter (0.03937 inches).
MP tape	Metal Particle tape.

park	The position of the CHM when it is at the base of the library.
random mode	One of four control modes. In random mode, the library is controlled by SCSI commands through the host computer.
SCSI	Small Computer System Interface. A standard set of commands and messages that allows hosts and peripheral devices, such as the library and the tape drive, to communicate.
SCSI bus	The SCSI cables that serve as a link for passing signals between the host computer and targets, such as the library.
SCSI ID	A unique address (0 to 7) assigned to a SCSI device.
sequential mode	One of four control modes. In sequential mode, the library is controlled by its internal firmware and processes cartridges in a sequential order.
single-ended	A SCSI configuration that uses one signal line to transmit a bus signal between devices.
source	Either a cartridge magazine slot or the tape drive where the CHM will pick a cartridge.
target	A device on the SCSI bus that receives commands from the host computer. The library is a target.
terminator	The terminating plug required if the library is located at the physical end of the SCSI bus.
XL	eXtended Length (160m) data cartridges.
Y or Z axis	The vertical (Y) and horizontal (Z) axes on which the CHM moves.

Index

A

- accessories
 - included in accessory box 2
 - packing 120
 - shipping 120
- adapter card
 - description of 125
 - installing 2
 - problems with installing 111
 - See also* host computer
- addresses
 - See* elements
 - See* SCSI IDs
- agency standards iv
- altitude specification 121–122
- application
 - See* software application
- arrow keys 20
- ASC 97
- ASCQ 97

B

- backup application
 - See* software application
- baud rate, setting for CHS Monitor port 107
- bezel
 - See* faceplate
- bracket for mounting tape drive 71
- brightness setting 24

- bus
 - See* SCSI bus
- buttons
 - See* keypad
 - See* unload button on tape drive

C

- cable
 - See* power cord
 - See* SCSI cable
- calibrating
 - cartridge sensor position 87
 - eject position 85
- calibration block 88
- Calibration Menu 21
- capacity 121
- cartridge handling mechanism
 - See* CHM
- cartridge holder
 - See* cartridge magazine
- cartridge magazine
 - cleaning 82
 - cover for 55
 - location of ix
 - replacing 15
 - using correct type 16
 - using for storage 55
- cartridge sensor position
 - calibration 87
- cartridges
 - caution about replacing 38
 - cleaning cartridges 53
 - compatibility with tape drives 12, 112
 - inventory of 38
 - labeling 55
 - loading and unloading manually 50

cartridges (*continued*)
 loading and unloading through
 diagnostics 106
 maintaining 55
 problems with 112
 replacing 13
 selecting the correct type 11–12
 storing 55
 video-grade 12
 write-protecting and write-
 enabling 13
changer, using library as 41
CHM
 control modes 41
 general description and
 location ix
 moving 4, 47
 problems with 113
 testing functionality 104
 viewing statistics for 99
CHM Control Menu
 description of 21
 using to change control
 mode 42
CHS Monitor mode
 changing to 42
 description and purpose 41
CHS Monitor port
 changing baud rate 107
 current baud rate setting 93
 location of x
cleaning
 cartridge magazine 82
 requirements for library 82
 tape drive 54
 window in door 83
cleaning cartridge 54
cleaning packets 83
components, location of viii–x
compression, LED indication 52

computer
 See host computer
configuration options 24
contrast setting 24, 30
control mode
 caution about changing 38
 changing 42
CTS
 See tape drive
CTS Monitor port x

D

data capacity 121
data cartridges
 See cartridges
date, setting 24, 28
destination element 89, 146
diagnostic ports x
 See also CHS Monitor port
diagnostics
 for tape drives 104
 performing on library 104
 tools available for the
 library 103
Diagnostics Menu
 description of 21
 using to move CHM 47
 using to test components 104
differential configurations 126
dimensions of the library 122
display
 See LCD
door for library
 caution about opening 38, 45
 cleaning 83
 locking 6
 opening 39
 unlocking 3

drive

See tape drive

Drive Sensor cable 66

E

eject position calibration 85

ejecting cartridges 50

elements

 addresses for 90

 current address settings 93

 description of 89, 146

 indexes for 89, 105

 reserved by different hosts 94

 viewing reservation status
 for 95

Eliaint 820

See tape drive

Emulate 10i option 32

Enter key 20

error codes

 displayed for library 130

 displayed for tape drive 52

 sense data for SCSI 97

Esc key 20

ESD protection 2, 60

EXAPAK

See cartridge magazine

EXATAPE 11

See also cartridges

EXB-10e

 appears in software screens 32

 compatibility with

 Exabyte 10h 32

EXB-10i compatibility 32

eXtended-length data cartridges 12

F

faceplate

 replacing on tape drive 71

 testing the sensor on the
 back 79

fan x

FCC notice iv

firmware, upgrading 103

foam, packing 118

front door

See door for library

fuse, replacing 83

G

gripper

 description of ix
 moving 48

H

holder

See cartridge magazine

home position 147

horizontal axis

See Z axis

host computer

 connecting to SCSI bus 6

 installing on SCSI bus 125

 multiple hosts reserving
 elements 94

 powering on 9

 SCSI ID for 95

See also adapter card

humidity specification 121–122

I

IDs
 See SCSI IDs
indexes
 See elements
indicators on tape drive 51
initiator
 See host computer
installing the library
 configuration on the SCSI
 bus 126
 preparations for 1–2
 problems with 10, 35
 procedures for 3–4, 6–9
 testing the setup 34
 troubleshooting problems 110
installing the tape drive 59
interface
 See SCSI
inventory of cartridges 38

J

jumpers, removing from drive 69

K

key lock viii
keypad
 description of viii
 using 20
 See also operator panel
keys for front door 3

L

labels for cartridges 55
LCD
 adjusting brightness and
 contrast 24, 30
 error display 130
 general description viii
 using 18
 using Main Menu 21
LCD mode
 changing to 42
 description and purpose 41
 using for calibration 85, 87
 using to move CHM 47, 117
LEDs on tape drive 51
lights
 See LEDs on tape drive
lock on front door viii
loop option 46
lubrication for library 82

M

magazine
 See cartridge magazine
Main Menu 21–22
Main Screen
 description of 19
 redisplaying from Main
 Menu 21
MCBF (mean cycles between
 failure) 121
media
 See cartridges
Menu key 20
menu structure 22
mode
 See control mode

mode parameters 92
Monitor cable (internal),
 connecting 73, 75
monitor ports
 See diagnostic ports
Monitor software 104
mounting bracket for tape drive 71

N

next cartridge option 46

O

operating environment 121–122
operator panel
 general description viii
 using 18
 See also LCD

P

packaging materials 1, 116
packing the library 119
paint for cover 82
parity option
 current setting for 93
 default setting 24
 turning on or off 27
park position 107, 148
ports
 See diagnostic ports
power cord
 connecting 8
 requirements and
 specifications 124
powering on library 9–10

R

random mode
 caution about changing 38
 changing to 42
 description and purpose 41
regulatory agency standards iv
reservations, SCSI 94
Reset key 20, 56
resetting the library
 caution for 56
 host-driven 57
 manual resets 56
resistor terminators, removing from
 drive 69
restart option 45
RMA number for shipping 115, 120
robot
 See CHM
R-packs, removing from drive 69

S

safety standards iv
screen
 See LCD
SCSI
 general information about 125
 mode parameters 92
 reservations 94
 sense data 96
SCSI bus
 installing library on 6, 126
 physical description 125
 providing power to 9
 resetting 57
SCSI cable
 connecting 6
 internal library cable 127

- SCSI cable (*continued*)
 - length limitations on the SCSI bus 127
 - requirements on the SCSI bus 127
 - specifications 122
 - SCSI IDs
 - changing 25
 - connecting SCSI ID cable to drive 73–74
 - default settings 24
 - description and requirements 128
 - for replacement tape drive 78
 - needed for software application 31
 - removing jumpers from drive 69
 - viewing the ID of the host computer 95
 - SCSI Menu
 - description of 21
 - using for advanced SCSI functions 91
 - sense data 96–97
 - sequential mode
 - caution about changing 38
 - changing to 42
 - description and purpose 41
 - options for 44
 - processing cartridges in 43
 - serial ports
 - See* diagnostic ports
 - Set-up Menu 21
 - shipping the library 115
 - single-ended configurations 126
 - size of the library 122
 - SLDD 126
 - SLDS 126
 - software application
 - compatibility with other Exabyte products 32
 - detecting an open door 38–39
 - installation guidelines 31
 - keeping a cartridge inventory 38
 - supports only a tape drive 33
 - supports only an EXB-10i 32
 - source element 89, 148
 - stacker, using library as 41
 - Statistics Menu
 - description of 21
 - functions of 98
 - storage capacity 121
 - System Sensors Menu
 - description of 21
 - functions of 98
- T**
- tape
 - See* cartridges
 - tape drive
 - cleaning 53–54
 - compatibility of cartridges 12
 - general operation 49
 - installing 6, 59
 - LED status conditions 51
 - loading cartridges manually 50
 - loading cartridges through diagnostics 106
 - performing diagnostics on 104
 - replacing 59
 - testing installation 79
 - troubleshooting problems with 112
 - upgrading firmware 104

temperature
 specification 121–122
ten-pack
 See cartridge magazine
term power 127
terminator for library
 installing 6
 requirements on SCSI bus 127
 type to use 123
terminators for drive, removing 69
time, setting 24, 29
touch-up paint 82
troubleshooting the library 109
turning on library 9

U

unload button on tape drive 51
unpacking the library 1
upgrading the library 59
Utilities Menu 21

V

vertical axis
 See Y axis
voltage specifications 123

W

warranty information iii
weight of the library 122
window in door, cleaning 83
write-protect switch, setting 13

X

XL data cartridges 12
XL tape drive
 compatibility of cartridges 12,
 112
 See also tape drive

Y

Y axis 148

Z

Z axis 106, 148

Notes