

L180 Tape Library

Operator's Guide



STORAGETEK





L180 Tape Library

Operator's Guide

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 Storage Technology Corporation
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 Louisville, CO 80028-2201
 USA

Record the library configuration in the following table.

L180 Library Configuration Information	
Serial Number _____ Model: 180-cell <input type="checkbox"/> 140-cell <input type="checkbox"/> 80-cell <input type="checkbox"/>	
Code Version _____	Library SCSI ID _____
Port 0 Address _____	Number of Drives Installed _____
Drive 0 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 1 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 2 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 3 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 4 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 5 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 6 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 7 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 8 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Drive 9 SCSI ID _____ Model: DLT7000 <input type="checkbox"/> DLT8000 <input type="checkbox"/> 9840 <input type="checkbox"/> Ultrium <input type="checkbox"/> type: _____	On bus <input type="checkbox"/> Off bus <input type="checkbox"/>
Fast Load: Enabled <input type="checkbox"/> Disabled <input type="checkbox"/> Auto Clean: Enabled <input type="checkbox"/> Disabled <input type="checkbox"/>	
Optional DC power supply/optional PDU: Installed <input type="checkbox"/> Not Installed <input type="checkbox"/>	

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Summary of Changes

EC	Date	Edition	Description
111222	Nov. 1999	First	initial release
111426	March 2000	Second	Changes as noted in second edition document.
	Oct. 2000	Third	Throughout: Imported 051000 Garamond template. Updated boilerplate. Changed to new style conventions. Added information about Ultrium drives. Indicated related change in operator panel screens. Added information about Ultrium cartridges. Consolidated information about the rack area.

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Preface

This guide describes how to operate the StorageTek L180 tape library (referred to in this guide as “the L180 library” or simply “the library”). Most of the information pertains to library hardware. For specific drive information or for client-generated software commands and console messages, refer to your drive or software documentation.

This guide is intended primarily for data center operators who operate the tape library. System programmers and computer system administrators might also find the information in this guide useful.

The following sections describe the organization of and conventions in this guide. Subsequent sections describe sources of additional information and list safety information.

■ Organization

This guide has five chapters and one appendix:

- Chapter 1** “General Information” describes the library hardware. This chapter also describes the library’s two operating modes and its Auto Clean feature.
- Chapter 2** “Controls and Indicators” shows the locations of the power switch and operator panel and describes the functions of the buttons, indicators, and display screens.
- Chapter 3** “Configuration” describes how to power on and configure the library and drives through the operator panel.
- Chapter 4** “Library Operation” contains the procedures for operating the library in two modes: automated mode and manual mode. Procedures include monitoring status information, inserting cartridges through the CAP (cartridge access port), cleaning a drive, replacing cleaning cartridges, powering off the library, and manually removing cartridges.
- Chapter 5** “StorageTek Maintenance Support” describes how to contact Customer Support Services for assistance if the library has a hardware or software problem.
- Appendix A** “Cartridge Information” describes how to prepare, inspect, store, clean, and repair cartridges. It also lists criteria that colored cartridges must meet to be used in the tape library.

Glossary The Glossary defines new or special L180 library terms and abbreviations used in this guide.

Index The Index assists in locating information in this guide.

■ Alert Messages

Alert messages call the reader's attention to information that is especially important or that has a unique relationship to the main text or graphic.

Note: A note provides additional information that is of special interest. A note might point out exceptions to rules or procedures. A note usually, but not always, follows the information to which it pertains.

CAUTION:

A caution informs the reader of conditions that might result in damage to hardware, corruption of data, corruption of application software, or long-term health problems in people. A caution always precedes the information to which it pertains.

WARNING:

A warning alerts the reader to conditions that might result in injury or death. A warning always precedes the information to which it pertains.

■ Conventions

Typographical conventions highlight special words, phrases, and actions in this publication.

Item	Example	Description of Convention
Acronyms	CSA	All uppercase
Buttons	MENU	Sans serif font; capitalization follows interface (usually all uppercase)
Commands	Mode Select	Initial cap
Document titles	<i>System Assurance Guide</i>	Italic
Emphasis	<i>not</i> or <i>must</i>	Italic
File names	fsc.txt	Monospace font
Hypertext links	Figure 2-1 on page 2-5	Blue (prints black in hard-copy publications)
Indicators	<i>Open</i>	Italic; capitalization follows interface (usually initial caps)
Jumper names	TERMPWR	All uppercase

Item	Example	Description of Convention
Keyboard keys	<Y> <Enter> or <Ctrl+Alt+Delete>	Sans serif; capitalization follows interface (usually initial caps); enclosed within angle brackets
Menu names	Configuration Menu	Capitalization follows interface; usually title caps
Parameters and variables	Device = <i>xx</i>	Italic
Path names	c:/mydirectory	Monospace font
Port or connector names	SER1	Capitalization follows label on unit; otherwise, all uppercase
Positions for circuit breakers, jumpers, and switches	ON	Default font; capitalization follows interface; otherwise, all uppercase
Screen text (including screen captures, screen messages, and user input)	downloading	Monospace
Switch names	Power	Sans serif; capitalization follows label on unit
URLs	www.storagetek.com	Blue (prints black in hard-copy publications); underlined; split at forward slash or period

■ Additional Information

StorageTek offers several methods for you to obtain additional information. Please use one of these methods when you want to obtain the latest edition of this or any other StorageTek customer publication.

StorageTek's External Web Site

StorageTek's external web site provides marketing, product, event, corporate, and service information. In addition, the external web site serves as an entry point to the Customer Resource Center (CRC) and to the Channel site. The external web site is accessible to anyone with a web browser and an Internet connection.

The URL for the StorageTek external web site is <http://www.storagetek.com>

Customer Resource Center

StorageTek's Customer Resource Center (CRC) is a web site that enables members to resolve technical issues by searching code fixes and technical documentation. CRC membership entitles you to other proactive services, such

as HIPER subscriptions, technical tips, answers to frequently asked questions, and online product support contact information. Customers who have a current warranty or a current maintenance service agreement may apply for membership by clicking on the **Request Password** button on the CRC home page.

The URL for the CRC is <http://www.support.storagetek.com>.

Channels Site

StorageTek's Channels site is a web site that provides information about products, services, customer support, upcoming events, training programs, and sales tools to support StorageTek's channel partners. (This site was formerly known as the Partners Page.) Access to this site, beyond the Channels Login page, is restricted. On the Channels Login page, current partners who do not have access can request a login ID and password and prospective partners can apply to become StorageTek resellers.

The URL for the Channels site is <http://channels.storetek.com>.

Hard-copy Publications

Contact a StorageTek sales or marketing representative to order additional paper copies of this publication or to order other StorageTek customer publications in paper format.

■ Comments and Suggestions

A Reader's Comment Form at the back of this publication lets you communicate suggestions or requests for change. StorageTek encourages and appreciates reader feedback.

Safety

■ Fiber Optic Safety

WARNING:

***Eye hazard.* Never look directly into a fiber-optic cable, a fiber-optic connector, or a laser transceiver module. Hazardous conditions might exist from laser power levels that are capable of causing injury to the eye.**

Be especially careful when using optical instruments with this equipment. Such instruments might increase the likelihood of eye injury.

The laser transceivers in fiber-optic equipment can pose dangers to personal safety. Ensure that anyone who works with this StorageTek equipment understands these dangers and follows safety procedures. Ensure that the optical ports of every laser transceiver module are terminated with an optical connector, a dust plug, or a cover.

Each fiber-optic interface in this StorageTek Fibre Channel equipment contains a laser transceiver that is a Class 1 Laser Product. Each laser transceiver has an output of less than 70 μW and a wavelength of 850 nm. StorageTek's Class 1 Laser Products comply with EN60825-1(+A-11) and with sections 21 CFR 1040.10 and 1040.11 of the Food and Drug Administration (FDA) regulations.

The following translations are for users in Finland and Sweden who wish to identify laser safety and classification:

CLASS 1 LASER
LUOKAN 1 LASERLAITE
KLASSE 1 LASER APPARAT

■ Laser Product Label

In accordance with safety regulations, a label on each StorageTek Fibre Channel product identifies the laser class of the product and the place and date of the manufacturer. The label appears on top of a Fibre Channel tape drive and near the Fibre Channel connectors on a Fibre Channel tape library. A copy of the label is shown here:

CLASS 1 LASER PRODUCT
LASER KLASSE 1
APPAREIL A LASER DE CLASSE 1
COMPLIES WITH 21 CFR 1040.10 AND 1040.11

■ Fiber-Optic Cable Handling

Observe these precautions when you handle fiber-optic cables:

- Do not coil the cable to less than 96 mm (3.75 in.) in diameter.
- Do not bend the cable to less than 12 mm (0.5 in.) in radius. StorageTek recommends that a cable's bend radius be no less than 20 times the diameter of the cable.
- Do not pull on the cables; carefully place them into position.
- Do not grasp the cables with pliers, grippers, or side cutters; do not attach pulling devices to the cables or connectors.
- Keep cables away from sharp edges or sharp protrusions that could cut or wear through the cable; make sure that cutouts in the equipment have protective edging.
- Install the connector's protective cover whenever the connector is not connected.

■ Electrostatic Discharge Damage Prevention

Before you touch any internal components in the library, including drives, you must take precautions against electrostatic discharge (ESD).

CAUTION:

Components are sensitive to static electricity: Even a small electrostatic discharge can damage an electrical component that is inside the library. A damaged component might not fail immediately, but over time, it will become worse and might eventually cause an "intermittent" problem. Be sure that you touch an *unpainted* metal surface of the library before you reach inside the library or touch the drives.

Before you touch any internal components:

1. With your finger, touch an *unpainted* metal surface of the library. In some libraries, you can touch the library's frame. In other libraries, you might have to touch a bolt on the wall or on the door frame.
2. Keep your body movement to a minimum as you touch the drives or the library components.

Antistatic wrist straps that have clip-on ends are commercially available.

■ Rack Safety and Precautions

WARNING:

Possible personal injury:

- **More than one person might be required to install equipment into the library's rack or to remove equipment from the library's rack.**
- **Personnel should take adequate precautions when they are moving a library that contains rack-mounted equipment. The weight of some rack equipment might alter the height of the library's center of gravity. This condition might cause the library to tip during a move.**

CAUTION:

Potential equipment damage: Do not exceed the maximum allowable weight (77.1 kg [170 lb]) and U-height (6U) for equipment in the rack area of this library.

Observe the following safety and handling precautions when you are installing equipment into the library's rack:

- Ensure that the equipment has UL listing (listing by Underwriters' Laboratories), CSA certification (certification by the Canadian Standards Association), and CE compliance (compliance with the European Council's directives and standards).
- Understand that the library does not supply power to the rack area. So ensure that the rack-mounted equipment has an adequate power source.

Note: If you remove power from the library by using the library's power switch, the rack-mounted equipment will remain powered on.

- Follow the manufacturer's guidelines to position, to support, and to fasten the equipment in the rack.
- Locate the equipment so that it does not block or hinder any ventilation openings in the library's rack area. For example, do not block library or drive exhaust areas, the electronic module exhaust area, perforated metal, or other similar ventilation.
- Locate the equipment so that the library's doors adequately clear the equipment when you close them.
- Install the equipment from the bottom of the rack to the top of the rack; StorageTek recommends that you place the heaviest items near the bottom of the rack.
- Ensure that any equipment that you place within the rack is adequately cooled. The library's internal ambient temperature should not exceed the recommended operating temperature. Base cooling considerations upon the power dissipation within the rack space as well as upon the ambient room

conditions that are external to the library. You must provide cooling for moderate power dissipation within the rack space.

- Ensure that the equipment in the rack does not create an overcurrent condition, whether equipment is connected directly to the branch circuit or to a power distribution strip.
- Ensure that the equipment in the rack has reliable earth ground, whether equipment is connected directly to the branch circuit or to a power distribution strip.

Notices

Please read the following compliance and warning statements for this product.

CAUTION:

***Potential equipment damage:* Cables that connect peripherals must be shielded and grounded; refer to cable descriptions in the instruction manuals. Operation of this equipment with cables that are not shielded and not correctly grounded might result in interference to radio and TV reception.**

Changes or modifications to this equipment that are not expressly approved in advance by StorageTek will void the warranty. In addition, changes or modifications to this equipment might cause it to create harmful interference.

■ FCC Compliance Statement

The following compliance statement pertains to Federal Communications Commission Rules 47 CFR 15.105:

Note: This equipment has been tested and found to comply to the limits for Class A digital devices 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 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 or her own expense.

■ CISPR 22 and EN55022 Warning

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

■ Japanese Compliance Statement

The following compliance statement in Japanese pertains to VCCI EMI regulations:

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation: This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

■ Taiwan Warning Label Statement

The following warning label statement pertains to BSMI regulations in Taiwan, R.O.C.:

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策

English translation: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

■ Internal Code License Statement

The following is the Internal Code License Agreement from StorageTek:

NOTICE

INTERNAL CODE LICENSE

PLEASE READ THIS NOTICE CAREFULLY BEFORE INSTALLING AND OPERATING THIS EQUIPMENT. THIS NOTICE IS A LEGAL AGREEMENT BETWEEN YOU (EITHER AN INDIVIDUAL OR ENTITY), THE END USER, AND STORAGE TECHNOLOGY CORPORATION (“STORAGETEK”), THE MANUFACTURER OF THE EQUIPMENT. BY OPENING THE PACKAGE AND ACCEPTING AND USING ANY UNIT OF EQUIPMENT DESCRIBED IN THIS DOCUMENT, YOU AGREE TO BECOME BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE WITH THE TERMS OF THIS AGREEMENT, DO **NOT** OPEN THE PACKAGE AND USE THE EQUIPMENT. IF YOU DO NOT HAVE THE AUTHORITY TO BIND YOUR COMPANY, DO **NOT** OPEN THE PACKAGE AND USE THE EQUIPMENT. IF YOU HAVE ANY QUESTIONS, CONTACT THE AUTHORIZED STORAGETEK DISTRIBUTOR OR RESELLER FROM WHOM YOU ACQUIRED THIS EQUIPMENT. IF THE EQUIPMENT WAS OBTAINED BY YOU DIRECTLY FROM STORAGETEK, CONTACT YOUR STORAGETEK REPRESENTATIVE.

1. **Definitions:** The following terms are defined as followed:
 - a. “Derivative works” are defined as works based upon one or more preexisting works, such as a translation or a musical arrangement, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial revision, annotations, elaboration, or other modifications which, as a whole, represent an original work of authorship, is a Derivative work.
 - b. “Internal Code” is Microcode that (i) is an integral part of Equipment, (ii) is required by such Equipment to perform its data storage and retrieval functions, and (iii) executes below the user interface of such Equipment. Internal code does not include other Microcode or software, including data files, which may reside or execute in or be used by or in connection with such Equipment, including, without limitation, Maintenance Code.
 - c. “Maintenance Code” is defined as Microcode and other software, including data files, which may reside or execute in or be used by or in connection with Equipment, and which detects, records, displays, and/or analyzes malfunctions in the Equipment.
 - d. “Microcode” is defined as a set of instructions (software) that is either imbedded into or is to be loaded into the Equipment and executes below the external user interface of such Equipment. Microcode includes both Internal Code and Maintenance Code, and may be in magnetic or other storage media, integrated circuitry, or other media.
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General Information

1

This chapter describes the hardware components of the StorageTek L180 tape library. For specific information about interfaces, drives, and client software, refer to your software or drive documentation.

The library is the hardware component in an automated tape cartridge system. More specifically, the library is a robotic system that stores, moves, mounts, and dismounts tape cartridges that are used for data read or write operations.

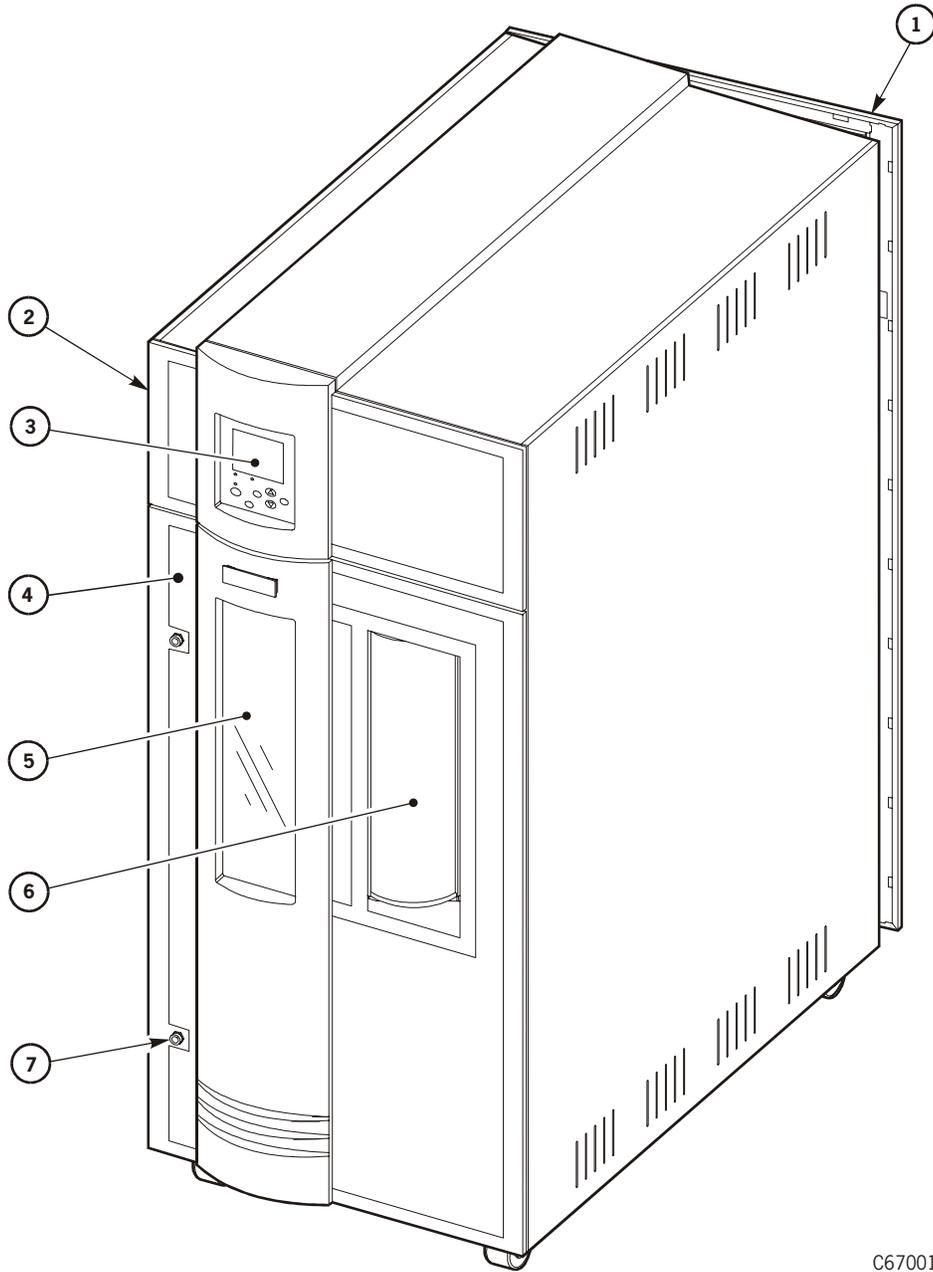
[Figure 1-1 on page 1-2](#) through [Figure 1-4 on page 1-7](#) show the library's major components, which are described in the following pages.

Library Components

For an orientation to the major external components of the library, see [Figure 1-1 on page 1-2](#). The library has four major internal components:

- A robot, which mounts and dismounts cartridges
- Storage cells for 84 to 174 data tape cartridges
- A cartridge access port (CAP) that holds up to 10 tape cartridges in two magazines
- Drives, which perform read/write operations

Figure 1-1. L180 Library Major External Components



C67001

L180 External Components (C67001)

1. Rear door
2. Rack door
3. Operator panel
4. Front door
5. Window

Figure 1-1. L180 Library Major External Components (Continued)

-
6. CAP (shown closed)
 7. Front door latches
-

Robot

The robot moves cartridges between storage cells, between storage cells and tape drives, and between the CAP and storage cells. It consists mainly of the Z column assembly and the hand-camera assembly. [Figure 1-2 on page 1-4](#) shows the robot components.

The Z column assembly contains a Z column and Z carriage. The Z column, which attaches to the floor and ceiling of the library, rotates almost 180 degrees to enable the hand to gain access to all cells in the library.

The hand-camera assembly contains the hand (or “gripper”) and a bar code scanner, referred to as “the camera.” The hand, which is on the Z carriage, grasps and releases cartridges. The Z carriage moves the hand up and down the Z column to storage cells, drives, or the CAP.

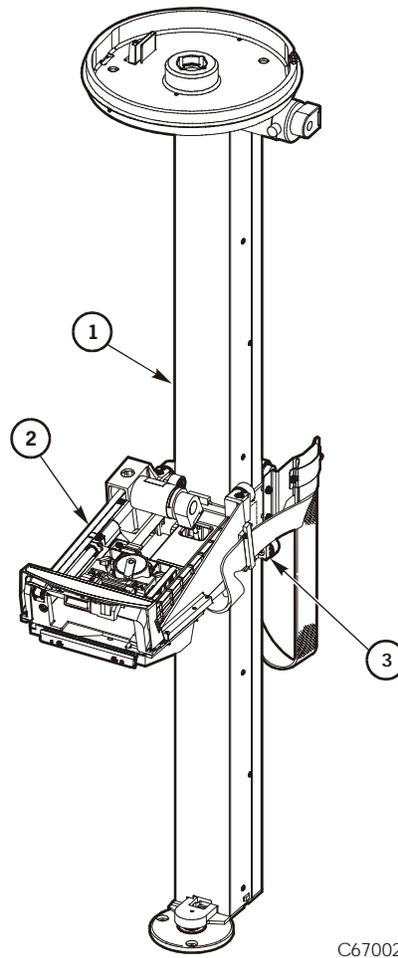
The camera, which is on the hand, is active only during a library audit. An audit occurs when you:

- Power on the library
- Open and close the lower front library door
- Make a request at the customer server console to audit the library

During an audit, the camera reads the location and volume serial number (VOLSER) of each cartridge in the storage cells and reserved cells. Because this information is stored in memory on the logic card (referred to as the “MPC” card), the library does not rely on the camera to locate cartridges during mount and dismount operations.

The storage of audit data has two implications for operation:

- Each time an audit occurs, you must use the system console to request a client (host) update. This procedure adds the library audit information to the client memory.
- If you manually exchange a cartridge from a drive for one in storage, the client memory will continue to apply the VOLSER and location information from the first cartridge to the second cartridge. This might cause an error.

Figure 1-2. Robot Components

Robot Components (C67002)

1. Z column (also called the "Z tube")
2. Hand-camera assembly
3. Z carriage

Storage Cells

The client software locates cartridges by panel, column, row and cell. The library contains storage cells for 84 to 174 data tape cartridges, excluding the CAP cells and reserved cells. The library capacity (total number of cells) was determined at the time the library was ordered or upgraded.

Cell Locations

Data tape cartridges are stored in cell arrays that hold six cartridges. The cell arrays are stacked in columns and the columns are arranged in a semicircle

around the robot. Columns can hold up to 28 cartridges. (The topmost arrays in each column hold only four data cartridges.)

[Figure 1-3 on page 1-6](#) and [Figure 1-4 on page 1-7](#) show cell locations for the L180 library in its various configurations.

Notes: The following statements apply to cell locations:

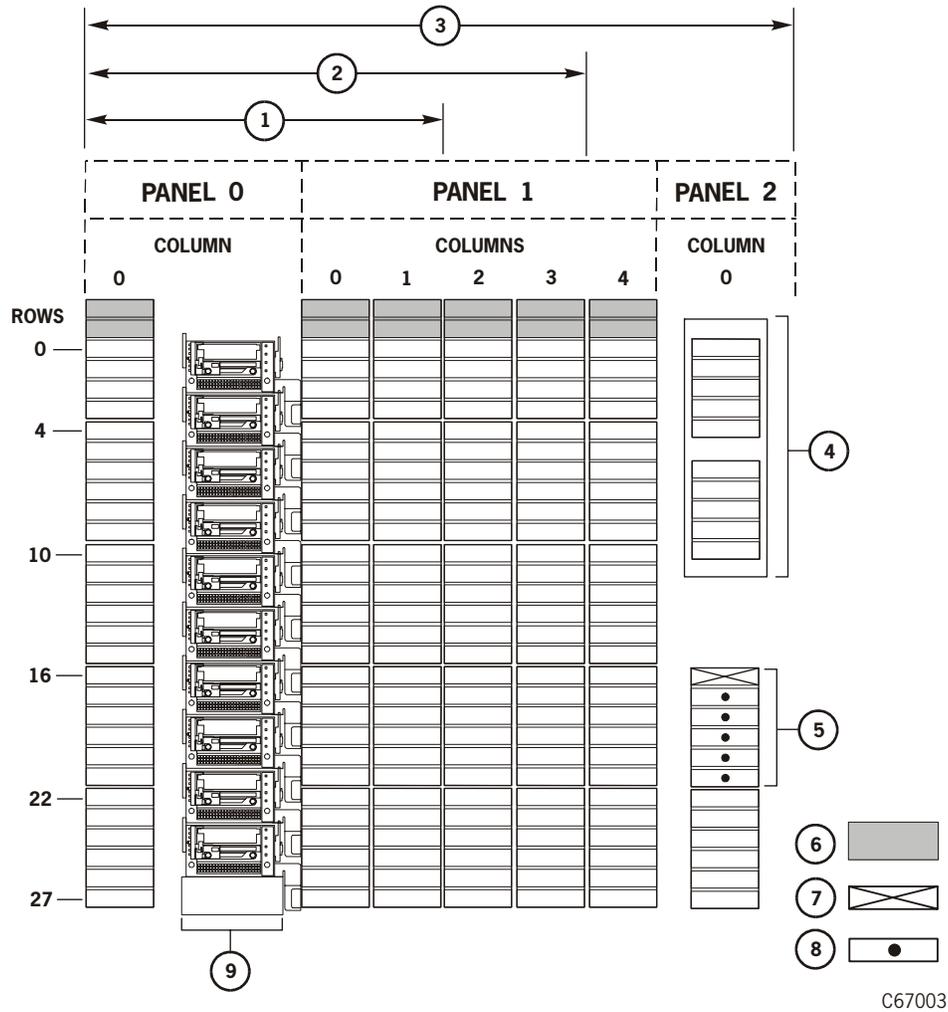
1. The library uses array targets for robotic calibration after you power on or reinitialize the library.
2. You must not place data cartridges in the reserved cells (refer to [“Reserved Cells” on page 1-8](#) for more information). If you do not want to store diagnostic and/or cleaning tapes in these cells, you must leave them empty.
3. The library does not use the drive and CAP locations to store cartridges.
4. The robot uses the swap cell (the top-most cell in the reserved cells) to place a cartridge that is left in the hand when a power failure occurs or to perform a swap operation.

Library Capacity

[Table 1-1](#) lists library storage capacities (also shown in [Figure 1-3 on page 1-6](#)). Although library capacity is automatically configured when you bring the library online, check the operator panel to ensure that the capacity information is accurate. If the information is not accurate, check the location of the theta stops, as shown in [Figure 1-5 on page 1-8](#).

Table 1-1. L180 Library Capacity

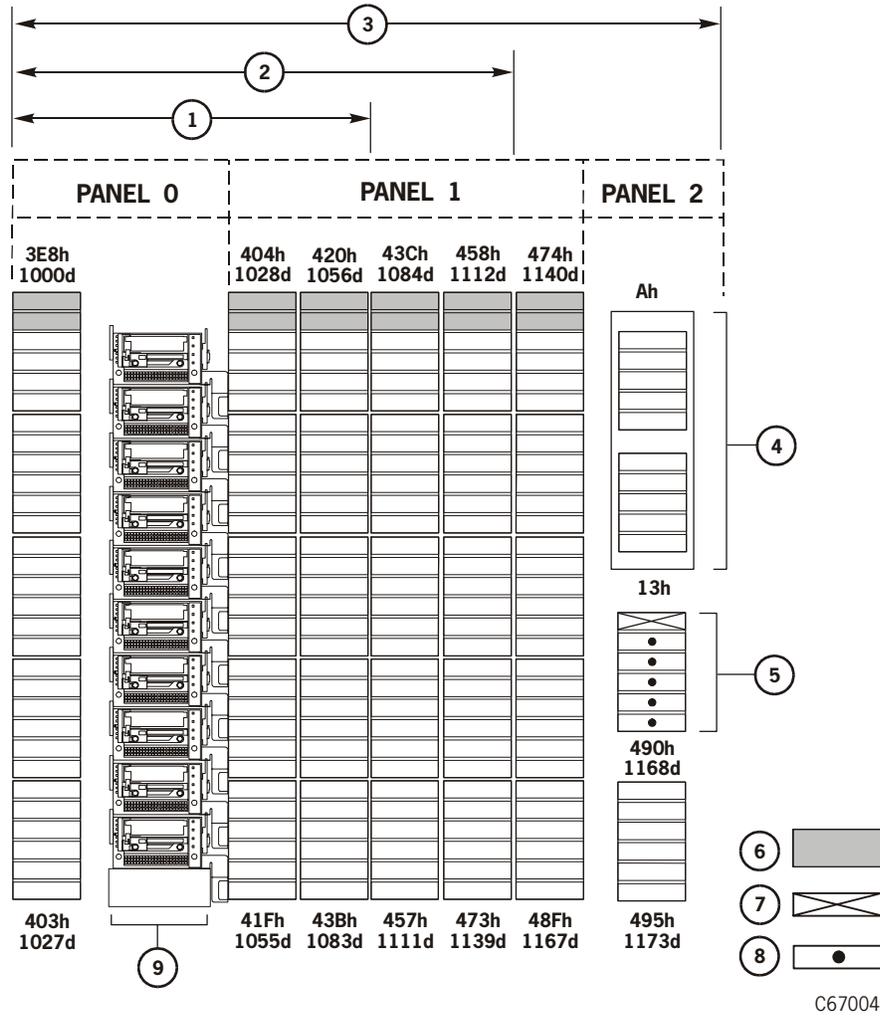
Model Type	Cartridge Capacity	Description
L180-180	174	174 data cartridge slots, 6 reserved cartridge slots, one DC power supply, one AC power distribution unit (PDU)
L180-140	140	140 data cartridge slots, 6 reserved cartridge slots, one DC power supply, one AC PDU
L180-80	84	84 data cartridge slots, 6 reserved cartridge slots, one DC power supply, one AC PDU

Figure 1-3. Locating Cartridges—Panels, Cells, Rows

Locating Cartridges and Components by Panel, Row, and Column (C67003)

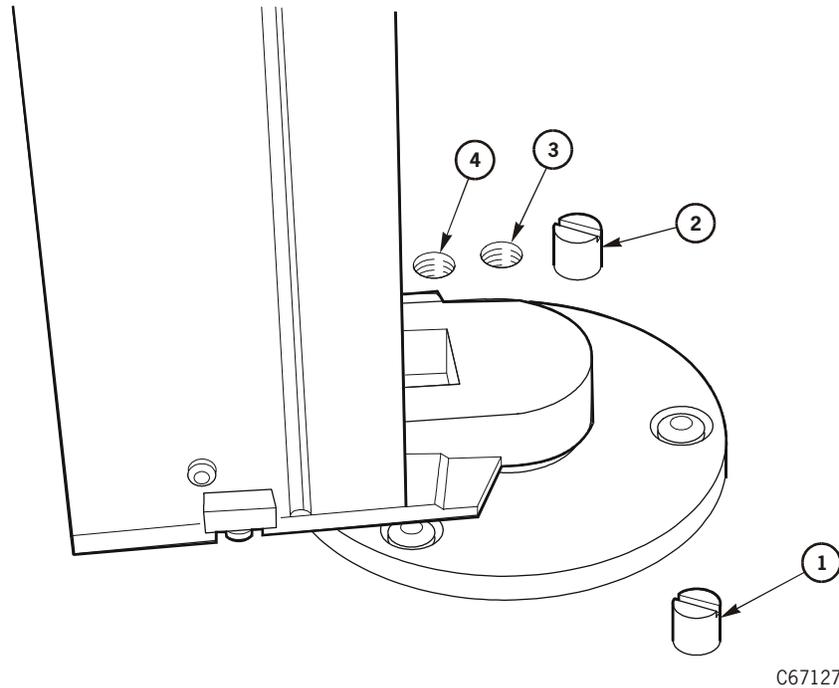
1. 84-cartridge-cell configuration
2. 140-cartridge-cell configuration
3. 174-cartridge-cell configuration
4. Blocked storage cells (no cartridges permitted)
5. Swap cell
6. Cells reserved for cleaning or diagnostic cartridges
7. CAP
8. Reserved cell array
9. Drive column (shown with DLT drives installed)

Figure 1-4. Locating Cartridges—Hexadecimal



Locating Cartridges Components (C67004)

1. 84-cartridge-cell configuration
2. 140-cartridge-cell configuration
3. 174-cartridge-cell configuration
4. Blocked storage cells (no cartridges permitted)
5. Swap cell
6. Cells reserved for cleaning or diagnostic cartridges
7. CAP (addressed as Column 1, Panel 1 in some software)
8. Reserved cell array (addressed as Column 0, Panel 1 in some software)
9. Drive column (addressed as Column 0, Panel 0 in some software)

Figure 1-5. Theta Stops (Floor of Library)

Theta Stop Locations (C67127)

1. Front theta stop: This stop must always be present
2. Theta stop for 174-cartridge configuration
3. Theta stop for 140-cartridge configuration
4. Theta stop for 84-cartridge configuration

Reserved Cells**CAUTION:**

Do not insert data tape cartridges into the reserved cells, or the client software will not find the cartridges.

Figure 1-4 on page 1-7 shows the cells reserved for swapping cartridges and for diagnostic and cleaning cartridges. The top-most cell in the reserved area is the swap cell, which is always available for in-transit cartridges. Do *not* place any cartridges into this cell. You may place any type of cleaning or diagnostic cartridges into the other five cells.

Note: Inserting cleaning cartridges into any of these five cells and resetting the library enables Auto Clean. Your client software must support the Auto Clean feature.

Cartridge Access Port (CAP)

The CAP (shown closed in [Figure 1-1 on page 1-2](#)) lets you add cartridges to or remove cartridges from the library without interrupting normal library operations. The CAP, accessible from the front of the library, holds two cartridge magazines.

A CAP magazine is designed for easy handling. You can add cartridges to the magazine while leaving it in the CAP by simply lifting up and pulling down on the magazine handle and then adding cartridges. Or you can add cartridges to the magazine by lifting it out, inserting the cells, and placing the magazine back into the CAP. A magazine's snap-on cartridge retention cover lets you keep cartridges in place when carrying the magazine. For detailed procedures, refer to [“Inserting Cartridges into the CAP” on page 4-9](#).

You also can use the CAP to export and import cleaning cartridges. Refer to [“Importing Cleaning Cartridges through the CAP” on page 4-13](#) and [“Exporting Cleaning Cartridges to the CAP” on page 4-15](#).

Drives

The library supports five types of tape drives:

- Digital Linear Tape (DLT) 8000
- DLT7000
- 3580 Ultrium (IBM)
- Einstein Ultrium (Hewlett-Packard)
- Viper 200 Ultrium (Seagate)
- 9840

The maximum number of DLT and Ultrium drives supported in an L180 is 10. (The maximum number of DLT drives permissible in your library depends on the type of drive and your site's power configuration.) The maximum number of 9840 drives is six. Mixing drive types is allowed. All drives are in the library's single drive column.

As an operator, you might have to:

- Configure a drive in a library; refer to [“Drive Entries \(SCSI Drives Only\)” in Chapter 3, “Configuration.”](#)
- Check drive status information; refer to [“Monitoring Status Information” in Chapter 4, “Library Operation.”](#)
- Manually mount a cartridge into a drive or dismount a cartridge from a drive; refer to [“Mounting/Dismounting Cartridges Manually” in Chapter 4, “Library Operation.”](#)

Note: During typical operation (or automated mode), the library's robotic hand automatically places a cartridge into the drive or removes a

cartridge from the drive when a command is sent from the client software.

For specific drive information, refer to your drive publications.

■ Library Safety Features

Safety features are incorporated into the library. If the front door to the library is opened, an electronic interlock removes power from the robot.

In the electronics compartment, covers over the logic card, the AC power supply, and the DC power supply prevent you from coming into contact with hazardous voltages and sensitive electronics.

■ Controlling Software

The controlling software (also referred to as “client” or “server” software) requests tape read/write operations and robotic move operations. When the library is in automated mode (refer to the following section, “[Library Operating Modes](#)”), these operations occur without operator intervention. The software determines where the cartridge is located by accessing audit data (sometimes referred to as “the catalog”) uploaded from the library; the software then allocates which drive receives the cartridge. For command descriptions and instructions, refer to your software publications.

■ Library Operating Modes

An operating mode is the manner in which a library and the controlling software interact. A library can operate in either automated mode or manual mode, as described in the following paragraphs.

Automated Mode

Automated mode is the normal operating mode of the library. The controlling software instructs the robot to move cartridges among the storage cells, drives, and CAP without operator intervention. Operator tasks include:

- Monitoring the library operator panel for messages
- Entering a cartridge into the CAP
- Ejecting a cartridge from the CAP
- Replacing a cleaning cartridge
- Cleaning a drive
- Reviewing the FSC log
- Running diagnostic tests
- Powering off the library

Refer to [Chapter 4, “Library Operation,”](#) for the procedures.

Manual Mode

Manual mode occurs when the library is taken offline or loses power. Operator tasks include:

- Opening the library front door
- Moving the robot
- Locating a cartridge
- Removing a cartridge from the hand
- Mounting a cartridge into a drive
- Dismounting a cartridge from a drive
- Returning the library to online status

Refer to [Chapter 4, “Library Operation,”](#) for the procedures.

■ Auto Clean Feature

Drives must be cleaned occasionally to prevent read/write errors. The library supports two methods for cleaning drives: automatic cleaning (or Auto Clean) and manual cleaning. The Auto Clean feature is enabled automatically when the library detects a cleaning cartridge in a reserved cell after you power on the library or open and close the library front door. With Auto Clean enabled, when a drive requires cleaning, the robot retrieves the required cleaning cartridge from the reserved cell area, mounts the cartridge into the drive, and returns the cartridge to the reserved cell after cleaning is complete.

If Auto Clean is not enabled, a CLEAN NEEDED message appears on the operator panel’s display screen when a drive requires cleaning. You must then place the required cleaning cartridge into the CAP and execute the Clean Drive function from the operator panel menus.

Refer to [“Enabling Auto Clean” in Chapter 3, “Configuration,”](#) and [“Cleaning a Drive” on page 4-17](#) for more information and procedures.

■ 6U Rack Area

CAUTION:

Potential damage to library electronics and drives: The two perforated sections in the rear of the rack area provide ventilation for the library processor, power supply, and drives. Do not block these sections.

Potential equipment damage: The total maximum weight of equipment installed in this location must not exceed 77.1 kg (170 lb), and the total height must not exceed 6U.

Potential equipment damage: Ensure that any equipment that you place within the rack is adequately cooled. The library’s internal ambient temperature should not exceed the recommended operating temperature.

Base cooling considerations upon the power dissipation within the rack space as well as upon the ambient room conditions that are external to the library. You must provide cooling for moderate power dissipation within the rack space.

The rack area is not recommended for high power dissipation components such as multiprocessor servers or disk arrays.

You may use the internal 6U rack area, behind the top front door, for additional equipment. Requirements for this area are:

- An understanding of all the information in [“Rack Safety and Precautions” on page xix.](#)
- Placement of equipment well away from the perforated ventilation areas in the rack.
- Routing of power cables through the cutouts in the bottom of the library frame.

■ **Horizon L Series Library Monitor (Optional)**

The Horizon L Series Library Monitor is an optional web-based interface to the library. If your library has the Horizon L Series Library Monitor installed, you can perform these tasks through a workstation or PC that is running a Netscape or Microsoft browser.

- “View” the interior of the library electronically
- Monitor status information
- Perform automated operations
- Run diagnostic tests

(The workstation or PC must be connected to the library’s “Enet” [Ethernet] port.) For information about monitoring, operating, or testing the library through your browser, access the online help files for the Horizon L Series Library Monitor.

This chapter locates and describes the functions of the StorageTek L180 tape library operator panel and the power switch. It also lists tasks the operator can perform through the operator panel. Refer to the drive publications for information about operating the drives.

■ Operator Panel

The operator panel, recessed into the library's rack door, contains buttons, indicators, and a graphic display. [Figure 2-1 on page 2-2](#) shows the panel and describes each item.

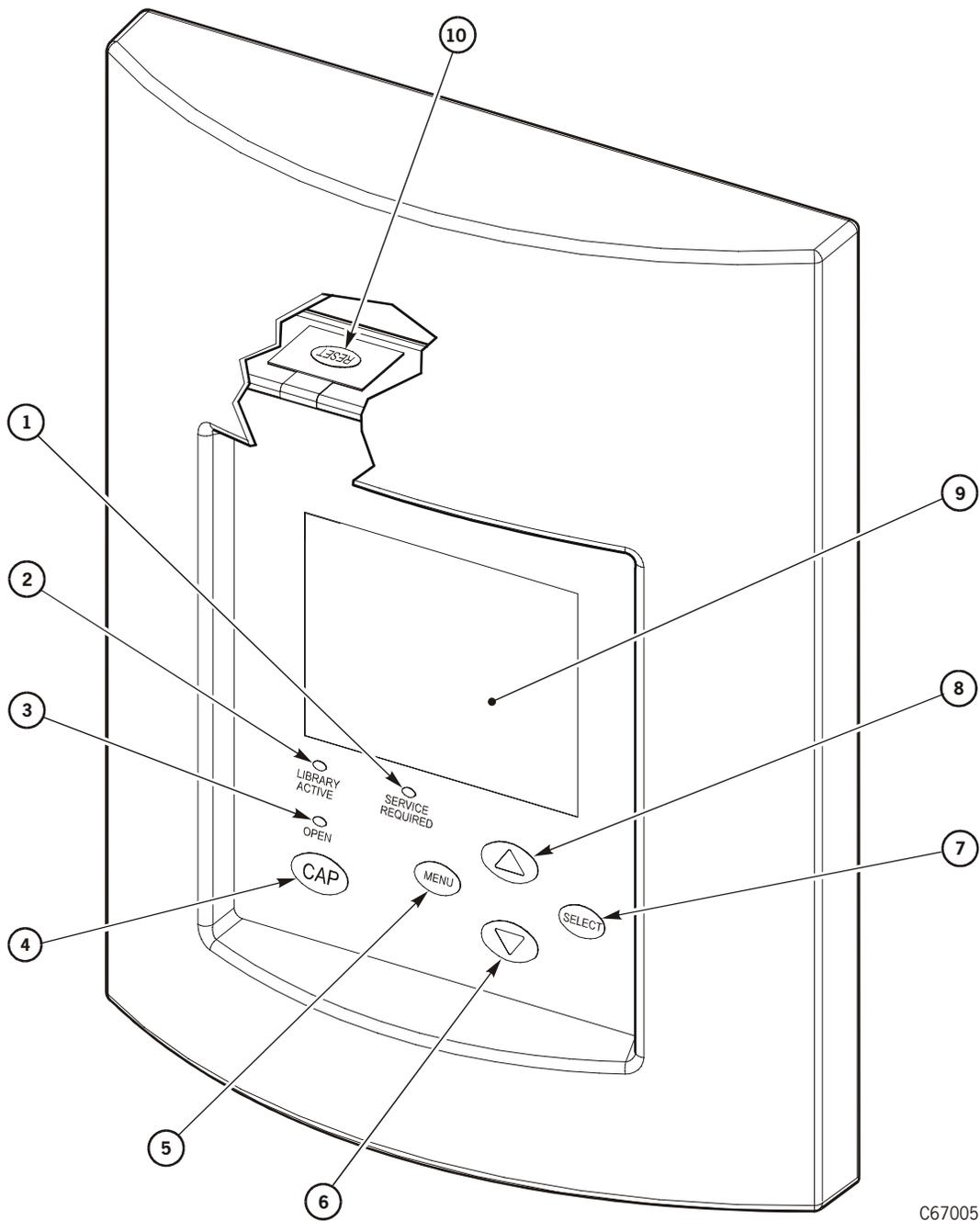
Use this panel to:

- Monitor current information about the library's readiness, CAP, configuration, drives, doors, drive cleaning, hardware and software versions, personality, and events
- Help resolve library problems

If an error occurs, the display shows a fault symptom code (FSC), which you can give to a service representative to help resolve problems. Write down the FSC as soon as it is displayed.

- Set library, network, and drive configurations
- Rotate the CAP
- Replace drive cleaning cartridges and set cleaning cartridge warning count
- Run library and drive tests
- Reset (start an initial program load [IPL] on) the library

For specific task instructions, refer to [Chapter 3, "Configuration"](#) and [Chapter 4, "Library Operation."](#)

Figure 2-1. Operator Panel Display, Controls, and Indicators

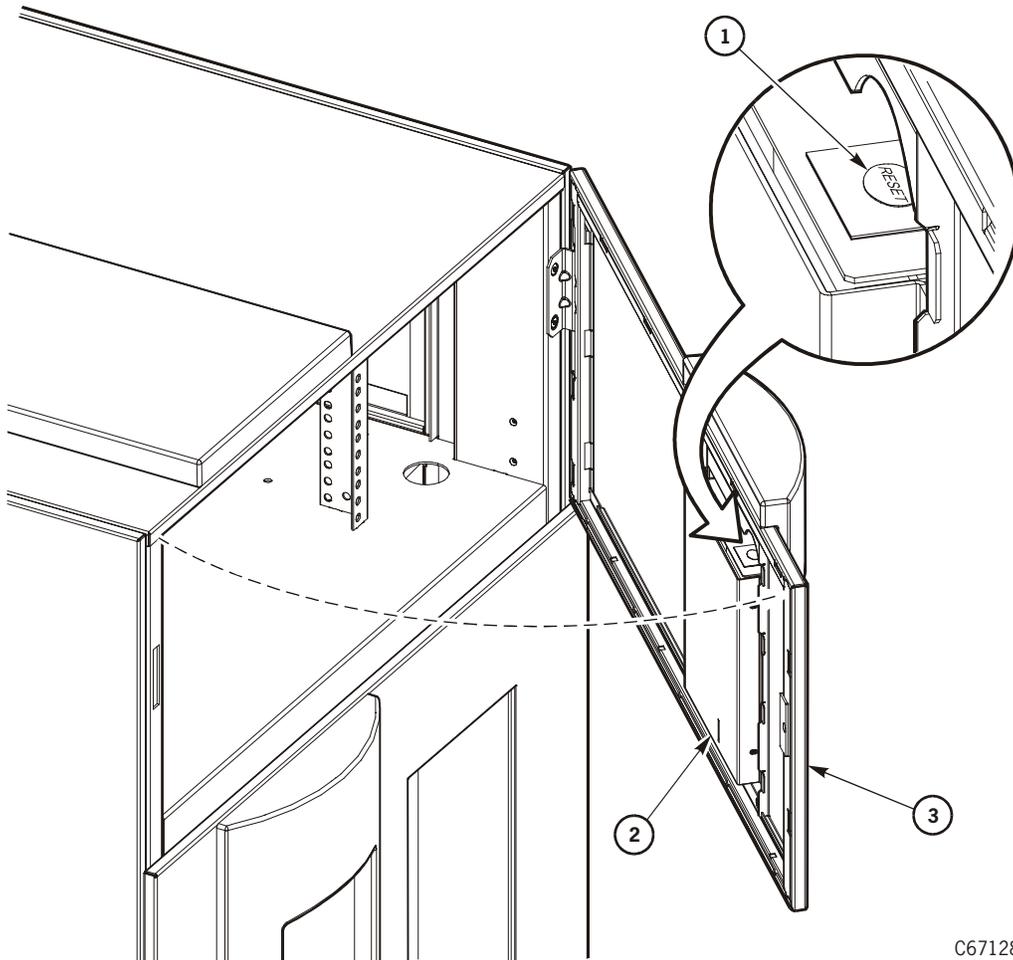
C67005

Operator Panel Components (C67005)

1. *Service Required* indicator is steadily red when human intervention is required.
2. *Library Active* indicator flashes green when the library is operational.
3. *Open* indicator is steadily amber when the CAP is open for you to enter or remove cartridges.
4. CAP button opens and closes the CAP.

Figure 2-1. Operator Panel Display, Controls, and Indicators (Continued)

5. MENU button initially places you into the main menu; subsequently, it returns you to a previously selected screen.
 6. Arrow down button moves the cursor down the display screen; it also decrements a value underscored on the screen.
 7. SELECT button selects an item on a menu; it also saves the currently underscored value and moves the cursor to the next field.
 8. Arrow up button moves the cursor up the display screen; it also increments a value underscored on the screen.
 9. Graphic display screen shows current information and FSCs and allows input from menus.
 10. RESET button resets the library (starts an IPL). To access the RESET button, you must open the rack door (see [Figure 2-2](#)).
-

Figure 2-2. Location of RESET Button

C67128

Location of RESET Button (C67128)

1. RESET button
2. Operator panel
3. Rack door

Indicators

Three indicators on the operator panel provide basic status information: *Library Active*, *Service Required*, *Open*. Refer to [Figure 2-1 on page 2-2](#) for details about these indicators.

Note: When the *Service Required* indicator is on, StorageTek recommends that you contact your service provider.

Buttons

Five buttons appear on the operator panel: CAP, MENU, SELECT, and the up and down arrows. The RESET button is behind the operator panel, inside the rack door (see [Figure 2-2 on page 2-4](#)). The CAP and RESET buttons let you directly manipulate the library; the remaining four buttons let you manipulate the menus and underscored values on the graphic display. See [Figure 2-1 on page 2-2](#) for the location and a description of the five operator panel buttons.

Note: The up arrow, down arrow, MENU, and SELECT buttons manipulate only values that are under operator control. As you scroll down or up a list of selections, the cursor underscores these values. (You cannot manipulate values that do not permit underscoring.)

Display Screens

Screens on the graphic display show current information and allow input. Information accessible on the screens includes:

- Drive status
- CAP and CAP magazine status
- Library status
- Library capacity
- Library personality
- Library features
- Hardware and software versions
- SCSI type (single-ended or differential)
- Cleaning cartridge and Auto Clean status
- DHCP status
- Ethernet ID
- Error and FSC information

Except for the CAP status, DHCP status, and error and FSC information, these values are set through an automatic configuration process that occurs during an IPL.

Other values require your input. These values include:

- Cleaning cartridge warning count
- SCSI drive configuration values:
 - SCSI ID
 - Bus status (on or off bus)
- Network configuration values:
 - Library name
 - IP address
 - Subnet mask
 - Library gateway
- Library configuration information:
 - SCSI ID
 - Fast Load enable/disable

- Date, time
- Display screen brightness and contrast

In addition, you can use the display menus to run diagnostic tests.

The following pages describe the library's primary menus. For instructions on working with specific configuration values, see [“Operator Panel Entry” in Chapter 3, “Configuration.”](#)

Initial Status

The first screen to appear on the operator panel after an IPL is an information-only screen. [Figure 2-3 on page 2-6](#) shows an example of this initial status screen:

STK L180 (Code Ver 2.00)	Library type and firmware version
CAP Closed	Status of the CAP
Library Online	Status of the library
No Remote Users	Number of users logged onto the library through a remote interface product
Column 0	The status of each drive installed in the drive column (the drives are listed by their logical numbers)

(For a list of status messages, see [“Monitoring Status Information” in Chapter 4, “Library Operation.”](#))

Figure 2-3. Example Initial Status Screen

```

STK L180 (CODE VER 2.00.00)
CAP CLOSED

LIBRARY ONLINE
NO REMOTE USERS
  COLUMN 0
00 BUSY
01 BUSY
02 ---
03 LOADING
04 EMPTY
05 EMPTY
06 EMPTY
07 ---
08 ---
09 ---

```

By pushing the MENU button from the status screen, you can see the Main Menu (see [Figure 2-4 on page 2-7](#)).

Figure 2-4. Main Menu

```

MAIN MENU:

FSC LOG
CAP CONTENTS
DRIVE INFO
CLEANING INFO
DIAGNOSTICS
VERSION INFO
CONFIGURATION
  
```

FSC (Fault Symptom Code) Log

Accessible from the Main Menu, the FSC logs menu displays the last 20 events. Each entry includes an FSC, the number of occurrences, and the date and time of the last occurrence. [Figure 2-5](#) shows an example Event Logs menu. For more information, see “[Reviewing FSC Log](#)” in [Chapter 4, “Library Operation.”](#)

Notes: The following statements apply to the event logs screen:

1. Events listed in the log might not be failures. All events are recorded.
2. FSCs are generated for both library errors and drive errors.

Figure 2-5. Example FSC Log

```

3329  03  NONE
03/01/2004  14:46:14
3304  09  NONE
03/01/2004  14:46:14
30BB  02  NONE
03/01/2004  14:44:01
30BA  02  NONE
03/01/2004  14:44:01
30B9  02  NONE
02/28/2004  09:22:23
30B8  02  NONE
02/28/2004  08:27:14
4487  02  NONE
02/27/2004  16:52:33
3329  03  NONE
  
```

CAP Contents

Accessible from the Main Menu, the CAP Contents menu is an information-only screen. It displays either the VOLSER of a cartridge or a status message for each slot in a CAP magazine. See [Figure 2-6](#) for an example CAP Contents screen. For more information, see “CAP Magazine Status” in [Chapter 4](#), “Library Operation.”

Figure 2-6. CAP Status Menu

```
CAP CONTENTS

MAGAZINE 1 CONTENTS
200042
57QF43R
EMPTY
EMPTY
EMPTY
MAGAZINE 2 CONTENTS
EMPTY
EMPTY
EMPTY
EMPTY
EMPTY
```

Drive Information

Accessible from the Main Menu, the Drive Information Menu is an information-only screen that lists manufacturing and status information about the selected drive (see [Figure 2-7 on page 2-9](#)):

Vendor	The manufacturer of the drive
Type	The drive model
Status	The drive's logical number and status (see “Drive Status” in Chapter 4, “Library Operation,” for a list of status messages)
Serial Number	The serial number assigned by the drive's manufacturer
Interface Type	The type of client-to-drive interface (this example shows a SCSI interface, but a drive with Fibre Channel capability would display FIBRE I/F)
Code Version	The firmware version of the drive

See [“Drive Information” in Chapter 4, “Library Operation,”](#) for instructions on how to access this menu.

Figure 2-7. Drive Information Menu

```
DRIVE INFORMATION MENU:
```

```
VENDOR: QUANT
TYPE: DLT7000
STATUS: 00 EMPTY
```

```
SERIAL NUMBER:
XXXXXXXXXX
```

```
INTERFACE TYPE:
SCSI I/F
```

```
CODE VERSION
50
```

Cleaning Information

Accessible from the Main Menu, the Cleaning Info menu provides information about and control of the library's cleaning cartridges. See [Figure 2-8](#) for an example Cleaning Info menu:

Num Clean Cartridges	The total number of cleaning cartridges in the reserved cells within the library
DLT Warn Count	The number of times you want the DLT cleaning cartridge to be used before the library exports it
9840 Warn Count	The number of times you want the 9840 cleaning cartridge to be used before the library exports it
HP LTO Warn Count IBM LTO Warn Count SGT LTO Warn Count	The number of times you want the Ultrium cleaning cartridge to be used before the library exports it.
Export Cartridges	A procedure for moving the cleaning cartridges from the reserved cells to the CAP
Import Cartridges	A procedure for moving cleaning cartridges from the CAP to the reserved cells
Clean Cartridge Info	A path to an information screen that lists all cleaning cartridges in the library

The Cleaning Info menu lets you change the warning count for each type of cleaning cartridge as well as import cleaning cartridges to the library and export them from the library. The menu also lets you check the number of times a cleaning cartridge has been used. (For procedures, see [“Cleaning Cartridge Usage Count”](#) in [Chapter 4](#), [“Library Operation.”](#))

Figure 2-8. Cleaning Information Menu

```

CLEANING INFO

NUM CLEAN CARTRIDGES: 00

DLT WARN COUNT: 000
9840 WARN COUNT: 000
HP LTO WARN COUNT: 000
IBM LTO WARN COUNT: 000
SGT LTO WARN COUNT: 000

EXPORT CARTRIDGES
IMPORT CARTRIDGES

CLEAN CARTIDGE INFO
  
```

Diagnostics

Accessible from the Main Menu, the Main Diagnostics Menu (see [Figure 2-9](#)) lets you perform these functions:

- **Drive-related functions:**
 - **Clean Drive:** Enables you to clean tape drives manually
 - **Mount:** Inserts a test cartridge into a drive
 - **Dismount:** Removes a test cartridge from a drive
 - **Mount-Dismount Loop:** Inserts a test cartridge into and removes it from a drive. (You may designate the number of times the library goes through the loop.)
- **Get-Put Loop:** Gets a test cartridge and puts it in another location. (You may designate the number of times the library goes through the loop.)
- **Demo Mode:** Simulates library operation

For procedures, see [“Running Diagnostics” in Chapter 4, “Library Operation.”](#)

Note: All diagnostic functions except for Clean Drive require the library and associated drive to be offline.

Figure 2-9. Main Diagnostics Menu

MAIN DIAGNOSTICS MENU:

DRIVE DIAGNOSTICS

GET/PUT LOOP

DEMO MODE

Version Information

Accessible from the Main Menu, the Version Info Menu is an information-only screen (see example in [Figure 2-10](#)). It displays the version level of the library's firmware code, the date the code was completed, and the serial number of the logic card (also referred to as "the MPC card").

Figure 2-10. Version Information Menu

```
VERSION INFO MENU:  
  
CODE VERSION:  
  2.00.00  
  
CODE BUILT ON:  
  Feb 12 2000  16:38:19  
  
HARDWARE / VERSION  
  MPC 00000098
```

Main Configuration Menu

Accessible from the Main Menu, the Main Configuration Menu (see [Figure 2-11](#)) routes you to the configuration menus (library, drive, network) and to the panel display controls. It also routes you to screens that let you view the library personality and input a password for a Web interface product.

Figure 2-11. Configuration Menu

```
MAIN CONFIGURATION MENU  
  
LIBRARY CONFIG  
DRIVE CONFIG  
NETWORK CONFIG  
PERSONALITY MODULE  
WEB PASSWORD  
DISPLAY INFO
```

Library Configuration

Accessible from the Main Configuration Menu, the Lib Config Menu displays library capacity information and lets you modify the library's configuration. [Figure 2-12 on page 2-13](#) shows an example library configuration screen.

The screen displays:

Lib SCSI I/F ID (or Lib Fibre I/F ID)	The library's interface identifier
Fast Load	The Fast Load feature status (on or off)
Date	Current date
Time	Current time
Auto Clean	Whether Auto Clean is enabled
User Cells	How many data storage cells the library contains

From this menu, you may access editing menus for setting the library's interface identifier, Fast Load status, date, and time. See ["Library Entries" on page 3-4](#) for procedures and additional information.

Figure 2-12. Library Configuration Menu

```
LIB CONFIG MENU:

LIB SCSI I/F ID: 00
FAST LOAD: OFF
DATE: 03/01/2004
TIME: 23:59

AUTO CLEAN: OFF
USER CELLS: 84
```

Library SCSI Interface Configuration

Accessible from the Lib Config Menu, the Lib SCSI I/F Config Menu lets you view the library's SCSI type (differential or single-ended) and access an edit menu for the library's SCSI ID. [Figure 2-13](#) shows an example of this menu.

Figure 2-13. Library SCSI Interface Configuration Menu

```
LIB SCSI I/F CONFIG MENU:
SCSI TYPE: DIFFERENTIAL
LIB SCSI I/F ID: 00
```

Library Fibre Channel Interface Configuration

Accessible from the Lib Config Menu, the Lib Fibre I/F Config Menu lets you view the library's worldwide ID and Port 0 worldwide ID. It also lets you access an edit menu for the library's Port 0 address. [Figure 2-14](#) shows an example of this menu.

Figure 2-14. Library Fibre Channel Interface Configuration Menu

```
LIB FIBRE I/F CONFIG MENU:
LIBRARY WORLDWIDE ID:
00.00.00.00.00.00.00.00
PORT 0 WORLDWIDE ID:
00.00.00.00.00.00.00.00
PORT 0 CONFIGURATION
```

Drive Configuration

Accessible from the Main Configuration Menu, the drive configuration menu lets you modify portions of each SCSI drive's configuration. [Figure 2-15](#) shows an example screen. For each drive, the menu displays the drive position, drive type, and, if the drive path is SCSI, the drive's SCSI ID and the drive's SCSI bus relationship with the library. If the drive path is Fibre Channel, the menu displays FIBRE I/F after the drive type.

Sub-menus let you change the SCSI ID and indicate whether the drive is on the same SCSI bus as the library. For more information, see [“Drive Entries \(SCSI Drives Only\)” in Chapter 3, “Configuration.”](#)

Notes: These statements apply to this menu:

1. The cursor position is saved on all screens that list the library's drives.
2. The panel displays 16 lines of data per menu. If your library contains more than seven drives, you must use the down arrow button to scroll to drives 08 and 09.

Figure 2-15. Drive Configuration Menu

```
00 DLT7000_ID:01
    ON BUS: OFF
01 9840_FIBRE I/F

02 DLT7000_ID:03
    ON BUS: OFF
03 DLT7000_ID:04
    ON BUS: OFF
04 DLT7000_ID:05
    ON BUS: OFF
05 9840_FIBRE I/F

06 DLT7000_ID:06
    ON BUS: OFF
07 9840_FIBRE I/F
```

Network Configuration

Accessible from the Main Configuration Menu, the Network Config Menu (see [Figure 2-16](#)) lets you modify the library's network configuration and view the library's Ethernet address. For procedures, see "Network Entries" in [Chapter 3, "Configuration."](#)

Figure 2-16. Network Configuration Menu

```
NETWORK CONFIG MENU:  
LIBRARY NAME:  
—  
  
IP ADDRESS:  
  000.000.000.000  
NETWORK GATEWAY:  
  NOT SET  
SUBNET MASK:  
  000.000.000.000  
  
DHCP: DISABLED  
  
ETHERNET ADDRESS:  
00:10:4F:00:05:76
```

Display Information

Accessible from the Main Configuration Menu, the Display Info Menu (see [Figure 2-17](#)) leads to menus that let you adjust the contrast and backlight on the graphic display screen. For a procedure, see "Screen Characteristics" in [Chapter 3, "Configuration."](#)

Figure 2-17. Display Information Menu

```
DISPLAY INFO MENU:  
  
CONTRAST: 09  
  
  DEFAULT = 16  
  
BACKLIGHT: 128  
  
  DEFAULT = 128  
  
RESTORE DEFAULTS  
  
MENU TO EXIT
```

Operations Overview

Table 2-1 lists the tasks that you can perform by using the operator panel. The right column refers you to another page in this manual for more information. The tasks appear in the order you would most likely perform them. Detailed instructions appear in [Chapter 3, “Configuration”](#) and [Chapter 4, “Library Operation.”](#)

Table 2-1. Operations Guide

Task	Page for Operator Panel Instructions
Understand library status messages	page 4-3
Understand drive status messages	page 4-4
Understand CAP status messages	page 4-2
Insert cartridges into the CAP	page 4-9
Check CAP magazine contents	page 4-5
Manage drive cleaning and cleaning cartridges	See list for individual tasks.
• Import cleaning cartridges through the CAP	page 4-13
• Export cleaning cartridges to the CAP	page 4-9
• Check cleaning cartridge usage count	page 4-5
• Check/set cleaning cartridge warning count	page 3-14
• Manually clean a drive	page 4-16
Import data cartridges through the CAP	page 4-9
Export data cartridges to the CAP	page 4-13
Review the FSC log	page 4-18
Review drive information	page 4-4
Run diagnostics	page 4-18
• Run get/put loop	page 4-20
• Operate in demo mode	page 4-20
• Run drive mount diagnostics	page 4-19
Check the library firmware version	page 2-12
Check the library personality information	page 4-7
Set configuration values	page 3-3
• Set library SCSI ID	page 3-4
• Set library Fibre Channel Port 0 address	page 3-5

Table 2-1. Operations Guide (Continued)

Task	Page for Operator Panel Instructions
• Enable/disable Fast Load	page 3-6
• Set date and time	page 3-7
• Set drive SCSI ID and bus status	page 3-8
• Set network configuration	page 3-10
• Set screen characteristics	page 3-13

■ Library Power Switch

The library power switch is a circuit breaker (or two circuit breakers) behind the rear door of the library (to the left of the drive column). [Figure 2-18 on page 2-19](#) shows the power switch location.

The power switch has two configurations:

- A single circuit breaker on the main PDU lets you control power to the library and all ten drive positions.
- An optional second circuit breaker (on the optional PDU) lets you control power to the top five drive positions and ensure power to the library in case the main electrical circuit loses power. (In this configuration, the main PDU powers the bottom five drive positions as well as the library.)

Notes: If your library has two circuit breakers, then:

1. The optional PDU must be connected to a separate electrical circuit.
2. If one PDU loses power, the other PDU remains on to provide power to the library.

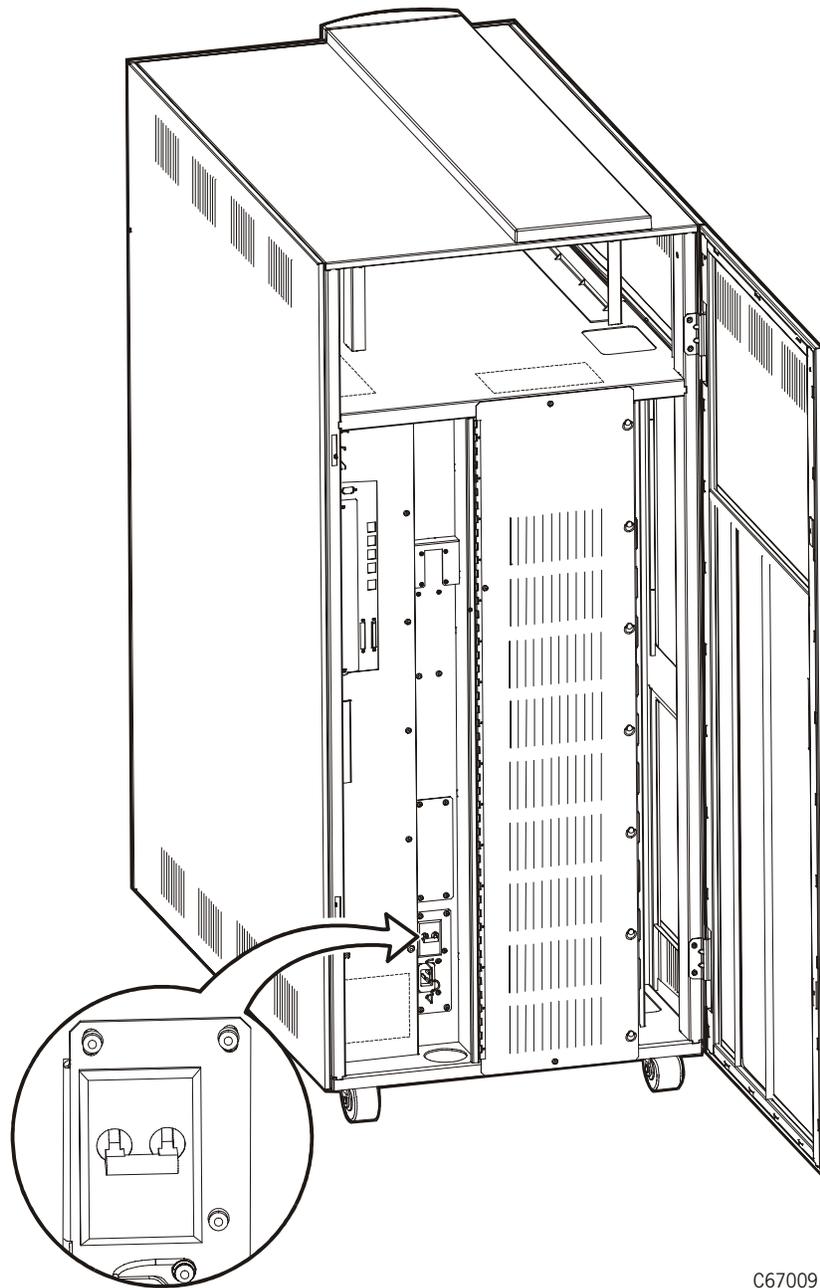
To apply power to the library and drive column:

1. Open the rear door by gently pulling on the finger slot.
2. Lift the power switch (one or two circuit breakers).
3. Close the rear door.

To remove power from the library and drive column:

1. Make sure all jobs are complete.
2. Open the rear door by gently pulling on the finger slot.
3. Push down on the library power switch (one or two circuit breakers).
4. Close the rear door.

Figure 2-18. Library Power Switch Location



C67009

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This chapter describes how to configure the library and drives for operation. Configuration requires you to:

1. Enable Auto Clean (if desired) by installing cleaning cartridges
2. Power on or reset the library
3. Enter required configuration information (and reset the library if necessary)
4. Place the library online (if necessary)
5. Send a client command to load library audit information into client memory

After power-on, the library automatically verifies and loads some configuration values, such as drive locations, Auto Clean status, capacity, and drive types. Before the library is fully operational, however, someone must enter the remaining configuration values. Typically, your service representative will configure your library during installation, during a firmware upgrade, or after drives are added. If you must change the library's configuration, you may enter the values through the operator panel.

Note: You might need to consult with your systems administrator for some information.

■ Enabling Auto Clean

You will need to clean the drives occasionally to prevent read/write errors. Enabling the Auto Clean feature allows the library to initiate drive cleaning without operator intervention. (A drive is cleaned with a special cleaning cartridge.)

To enable Auto Clean, insert valid cleaning cartridges into any of the five cells that are reserved for cleaning and diagnostic cartridges.

Note: To be valid, a cleaning cartridge must have “CLN” somewhere in its VOLSER label. 9840 cleaning cartridges also must have a “U” on their media ID labels. For more information, see [Appendix A, “Cartridge Information.”](#)

For instructions on how to use the CAP to insert cleaning cartridges, see [“Importing Cleaning Cartridges through the CAP” on page 4-13](#). For the location of the reserved cells, see [“Reserved Cells” in Chapter 1, “General Information.”](#)

Note: The Auto Clean feature is automatically enabled if you insert even one cleaning cartridge into the reserved cell area and then power on or reset the library.

To install cleaning cartridges in the reserved cells:

1. Unlock and open the front door (see [“Opening the Library Front Door” in Chapter 4, “Library Operation”](#)).
2. Ensure that the cleaning cartridges are right side up. (The numbers on the VOLSER label should be closest to the top edge and facing outward. For an illustration of the correct orientation, see [Figure 3-1 on page 3-16](#).)

CAUTION:

Potential static electricity damage to electrical components. Take precautions against electrostatic discharge by touching the gray, unpainted metal of the library frame before reaching inside the library or before touching the drives. Avoid touching any electrical component.

Confined space. While reaching inside the library, take care to avoid bumping your head or catching your clothing on protruding edges.

3. Place a cartridge into any of the five designated cells.
4. Close and lock the front door.

Note: You may follow this same procedure to insert diagnostic cartridges into the reserved cells. (Every diagnostic cartridge has “DG” as the first two letters of its VOLSER label.) However, inserting only diagnostic cartridges does not enable Auto Clean.

■ Powering on the Library

Powering on the library supplies power to the library and to the drive column. Powering on also initializes the library and causes an IPL (initial program load) (see [“Initializing and IPLing the Library” on page 3-2](#)).

To power on the library, lift the power switch (one or two circuit breakers) behind the rear door of the library. (See [“Library Power Switch” on page 2-18](#) and [Figure 2-18 on page 2-19](#).)

Note: If the library does not power on, contact your service provider and report the problem.

■ Initializing and IPLing the Library

Powering on the library causes it to initialize components and perform an IPL (initial program load). During initialization, the library prepares the robotics for use and audits any cartridges in the storage and reserved cells. During an IPL,

the library loads the operating code and automatically verifies some configuration values, such as drive locations and drive types.

Reinitializing the Library

You will have to reinitialize the library in the rare instance when a robotic component malfunctions. Before reinitializing the library, perform any necessary manual operation tasks (see [“Operating in Manual Mode” on page 4-21](#)).

To reinitialize the library, make sure that all drives are powered on and perform one of these actions:

- Power off and power on the library (also causes an IPL)
- Open and close the front door

Re-IPLing (Resetting) the Library

You will have to re-IPL (reset) the library when:

- You are directed to do so by your system administrator or a service representative
- You have to change the library configuration (for example, when you have to change the library's SCSI ID)

To re-IPL the library after it is already powered on, make sure that all the drives are powered on and press the **RESET** button on the operator panel.

Entering Configuration Data

After the IPL is complete, the initial status screen will appear on the operator panel. This indicates that you may now complete the configuration process. At this point, you must make choices about your library, drives, and network and enter those choices into the library's memory.

Note: You might need to consult with your systems administrator for some information.

You may enter all configuration data through the operator panel. See [“Operator Panel Entry”](#) for specific instructions. If you have installed the Horizon L Series Library Monitor, you also can enter some configuration data through a workstation or a PC that is running a Netscape or Microsoft browser. For more information, access the online help files for the Horizon L Series Library Monitor.

Operator Panel Entry

Entering configuration data through the operator panel will prepare the library for basic operation. For a detailed description of the operator panel, see [“Operator Panel” in Chapter 2, “Controls and Indicators.”](#)

Library Entries

Four entries complete the configuration choices for the library:

- Library SCSI ID or Fibre Channel Port 0 address
- Drive Fast Load enable/disable
- Date
- Time

Note: The sequence assumes that you will make all entries at one time. Each item is saved as it is changed, except for the library’s SCSI ID or Fibre Channel Port 0 address. To save a revised library SCSI ID or Fibre Channel Port 0 address, you must reset the library by pressing the **RESET** button.

Setting the Library SCSI ID

If the control path for the library is SCSI, you must set a SCSI ID for the library at the operator panel. You set the library SCSI ID from the Lib SCSI I/F Config Menu.

To set this value:

1. From the online status screen, press the **MENU** button. The Main Menu will display.
2. Press the down arrow button until the cursor underscores **CONFIGURATION**.
3. Press the **SELECT** button. The Main Configuration Menu will appear. The cursor will line up with **LIBRARY CONFIG**.
4. Press the **SELECT** button. The Lib Config Menu will appear. The cursor will line up with **LIB SCSI I/F CONFIG**.
5. Press the **SELECT** button. The Lib SCSI I/F Config Menu will appear. (This menu also displays the type of SCSI interface: differential or single-ended.)
6. Press the arrow buttons until the cursor underscores **SCSI ID**.
7. Press the **SELECT** button. The Set Lib SCSI ID Menu will appear.
8. Use the up and down arrow buttons to change the ID.
9. When the ID is correct, press the **SELECT** button to save the changes. You may press the **MENU** button to abort.

10. If the library SCSI ID is the only configuration value you wish to set at this time, press the **RESET** button. If you wish to set other configuration values before you reset the library, continue with the next section.

Notes: These notes explain special circumstances for setting the library's SCSI ID (address):

1. When configuring the library to a Unix workstation, StorageTek recommends that you use a dedicated SCSI client bus adapter:
 - For wide SCSI adapters, you may assign any address from 0 to 14 for the library.
 - For narrow SCSI adapters, the range of addresses is 0 to 6.
2. If you choose to use the embedded system bus on the SPARC station, you should select address 6, 5, 2, or 0 for the library because the remaining targets are reserved for Sun peripherals.
3. For IBM RISC System/6000 machines, available addresses on the embedded system bus are 6, 5, 3, and 2.

Setting the Library Fibre Channel Port 0 Address

If the control path for the library is Fibre Channel, you must set the Library's Fibre Channel Port 0 address. The library Fibre Channel Port 0 address locates the library's Port 0 on the Fibre Channel loop. You set the library Fibre Channel Port 0 address from the Lib Fibre I/F Config Menu.

To set this value:

1. From the online status screen, press the **MENU** button. The Main Menu will display.
2. Press the down arrow button until the cursor underscores **CONFIGURATION**.
3. Press the **SELECT** button. The Main Configuration Menu will appear. The cursor will line up with **LIBRARY CONFIG**.
4. Press the **SELECT** button. The Lib Config Menu will appear. The cursor will line up with **LIB FIBRE I/F CONFIG**.
5. Press the **SELECT** button. The Lib Fibre I/F Config Menu will appear. (This menu also displays the library's worldwide ID (the node ID) and the Port 0 worldwide ID (the port ID). These two IDs are set at the factory and cannot be changed. (Each ID is 64 bits and uses the IEEE registered format.) The cursor will line up with **PORT 0 CONFIGURATION**.
6. Press the **SELECT** button. The Fibre Port 0 Configuration menu will appear.

Note: Consult with your system administrator before selecting the library's Port 0 addressing option.

7. If you want to have your network's software set the library Port 0 address, you must set the hard address option to **DISABLED** by:
 - a. Pressing the arrow buttons until the cursor underscores **AUTO ADDRESS**.
 - b. Pressing the **SELECT** button. The Port Hard Address Edit Menu will appear.
 - c. Using the up and down arrow buttons to select **DISABLED**.
 - d. Pressing the **SELECT** button to save the selected option.

Note: The default for the hard address option is **DISABLED**.
8. If you want to set the library Port 0 address, you must set the **HARD ADDRESS** option to **ENABLED** (see Step 9) and enter a port address by:
 - a. Selecting **ADDRESS** from the Fibre Port 0 Configuration menu. The Port Address menu will appear.
 - b. Using the up and down arrow buttons to select a digit for each field in the three-field address. Permissible addresses are 000 through 125.
 - c. Pressing the **SELECT** button to save the address.
9. If the library Fibre Channel Port 0 address is the only configuration value you wish to set at this time, press the **RESET** button. If you wish to set other configuration values before you reset the library, continue with the next section.

Enabling/Disabling Fast Load

The Fast Load feature adjusts the robot's timing during cartridge load operations:

- With the Fast Load feature *enabled*, the robot will mount a tape into a drive and then immediately perform its next task, not waiting for the tape drive to complete its loading cycle.
- With the Fast Load feature *disabled*, the robot will wait at the drive location until the tape is fully loaded before beginning its next task.

Note: Some client software does not support the Fast Load feature. Consult with your systems administrator before enabling this feature.

You enable/disable the Fast Load feature from the Lib Config Menu (see [Figure 2-12 on page 2-13](#)). To set this value:

1. At the Lib Config Menu, press the arrow button until the cursor underscores **FAST LOAD**.
2. Press the **SELECT** button. An editing screen appears.
3. Use the up and down arrow buttons to select either **ON** or **OFF**.

4. When the screen displays your desired setting, press the **SELECT** button to save the changes. You may press the **MENU** button to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Setting the Date

The library saves the current date and time in non-volatile memory.

You set the date from the Lib Config Menu (see [Figure 2-12 on page 2-13.](#)) To set this value:

1. At the Lib Config Menu, press an arrow button until the cursor underscores **DATE**.
2. Press the **SELECT** button. An editing screen appears.
3. On the editing screen:
 - a. Use the up and down arrow buttons to select a value for each portion (field) of the date.
 - b. Use the **SELECT** button to move right to the next field.
 - c. Use the **MENU** button to move left to the previous field.
4. When the screen displays your desired setting, press the **SELECT** button from the right-most field to save the changes. You may press the **MENU** button from the left-most field to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Setting the Time

The library saves the current date and time in non-volatile memory.

You set the time from the Lib Config Menu (see [Figure 2-12 on page 2-13.](#)) To set this value:

1. At the Lib Config Menu, press the arrow button until the cursor underscores **TIME**.
2. Press the **SELECT** button. An editing screen appears.
3. On the editing screen:

- a. Use the up and down arrows to select a value for each portion (field) of the time.
 - b. Use the **SELECT** button to move right to the next field.
 - c. Use the **MENU** button to move left to the previous field.
4. When the screen displays your desired setting, press the **SELECT** button from the right-most field to save the changes. You may press the **MENU** button from the left-most field to abort.
 5. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Configuring a Personality Module

If you are planning to use the Horizon L Series Library Monitor, your service representative should install its personality module and other components according to the documentation included in the Horizon L Series Library Monitor shipping package. You should consult this documentation for instructions on how to set required configuration data.

Setting the Web Password

If your library has the Horizon L Series Library Monitor installed, you must set a Web password at the operator panel. For instructions on how to set this value, see the documentation that shipped with the Horizon L Series Library Monitor.

Drive Entries (SCSI Drives Only)

Notes: These notes apply to configuring a 9840 drive:

1. For you to be able to configure a 9840 drive's SCSI ID and bus status from the library's operator panel, the drive must have firmware version 1.24 or later. To check the drive's firmware version, select **DRIVE INFO** from the Main Menu.
2. Configuring a 9840 drive might involve more than setting the drive's SCSI ID and bus status. For more information about 9840 drive configuration options and instructions, refer to the *9840 Tape Drive Product Manual*, PN 95741.

Two entries at the library operator panel complete the configuration choices for each SCSI drive installed in the library:

- SCSI ID
- Bus status (on or off bus)

Note: “On bus” means that the drive is on the same SCSI bus as the library. “Off bus” means that the drive is *not* on the same SCSI bus as the library.

You set the drive SCSI IDs and bus status choices from the drive configuration menu (see [Figure 2-15 on page 2-15](#).) You can enter both values for each drive at the same time:

1. At the Main Configuration Menu, press an arrow button until the cursor underscores DRIVE CONFIG.
2. Press the **SELECT** button. The screen will list all installed drives, and the cursor will align with the first drive on the list. The format of the drive information appears in the following example:

```
00 DLT7000 ID: __
      ON BUS: ON
```

The first two digits are the drive’s logical number, that is, the number that the library has assigned the drive. The library sets this number during its automatic configuration sequence (at power-on or reset). It is an internal number *only* and is shown for information only. The uppermost drive within the column is designated as “0,” the next is “1,” and so forth.

Next in the example is the drive type (DLT7000 in this example). To the right of the drive type is the ID or SCSI address. On the next line is the drive’s bus status.

The Einstein Ultrium drive displays as HP LTO. The 3580 Ultrium drive displays as IBM LTO. The Viper 200 Ultrium drive displays as SGT LTO.

Notes: These statements further explain how drive information might appear on the menu:

- If the drive is a Fibre Channel drive, the menu will display FIBRE I/F instead of the SCSI ID.
- If the menu displays INVALID instead of the SCSI ID for a drive, you must set the drive’s SCSI ID to a valid address.

3. Use the arrow buttons to scroll to the drive you wish to change and press the **SELECT** button. The Set Drive SCSI ID Menu will appear.

Note: The operator panel displays only 16 lines per menu. If the library contains more than eight drives, you must use the down arrow button to scroll to drives 08 and 09.

4. Use the up and down arrow buttons to change the ID.
5. When the ID is correct, press **SELECT** to save your changes. A message screen will appear to indicate that the library is saving the new ID. Then the drive configuration menu will reappear.

Notes: These statements explain how the drive configuration might look after it reappears:

- The cursor position is the same as it was in Step 3.
 - The new SCSI ID for a 9840 drive might not appear right away.
6. Press the arrow down button to get to the drive's second line of information (which is the drive's bus status field).
 7. Press the **SELECT** button. The Set Drive SCSI Bus Menu will appear.
 8. Use the up and down arrow buttons to change the bus status to **ON** or **OFF**.
 9. When your choice is highlighted, press the **SELECT** button to save the changes. (You may press the **MENU** button to abort.) The drive configuration screen will reappear.
 10. Continue these steps until all drives are configured.

Note: You cannot set any configuration data for Fibre Channel drives.

11. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Network Entries

Four entries complete the library's network configuration:

- Library name
- IP address
- Network gateway
- Subnet mask

You also can view the library's Ethernet address.

You accomplish these tasks from the Network Config Menu (see [Figure 2-16 on page 2-16](#)).

Note: You might need to consult with your systems administrator for some information.

Viewing the Ethernet Address

Note: The library's Ethernet address is pre-set at the factory. You cannot change it.

To view the Ethernet address:

1. At the Main Configuration Menu, press the arrow down button to line up the cursor with NETWORK CONFIG.
2. Press the **SELECT** button. The Network Config Menu will appear.
3. The library's Ethernet address appears at the bottom of the screen.
4. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Setting the Library Name

The system administrator might assign the library a name. The name is mapped to the IP address but does not affect operation. To set the library name:

1. At the Network Config Menu, press an arrow button until the cursor underscores LIBRARY NAME.
2. Press the **SELECT** button. An editing screen appears.
3. On the editing screen:
 - a. Use the up and down arrow buttons to select a value for each character (field) in the name.
 - b. Use the **SELECT** button to move right to the next field.
 - c. Use the **MENU** button to move left to the previous field.

Note: Do not enter a library name longer than 30 characters.

4. When the screen displays your desired setting, press the **SELECT** button twice to save the changes. You may press the **MENU** button from the left-most field to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Setting the IP Address

The system administrator might assign the library an IP address, which makes the library accessible through a network.

Note: To use the Horizon L Series Library Monitor, you must set the library's IP address at the operator panel.

To set the IP address:

1. At the Network Config Menu, press an arrow button until the cursor underscores IP ADDRESS.
2. Press the **SELECT** button. An editing screen appears.
3. On the editing screen:
 - a. Use the up and down arrow buttons to select a value for each digit (field) in the address.
 - b. Use the **SELECT** button to move right to the next field.
 - c. Use the **MENU** button to move left to the previous field.
4. When the screen displays your desired setting, press the **SELECT** button from the right-most field to save the changes. You may press the **MENU** button from the left-most field to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Setting the Network Gateway Address

Note: Entering the network gateway address is optional. It serves to indicate the gateway connection between subnets, but it is applicable only when such a connection exists and is necessary to library operation. Consult with your systems administrator for additional information.

To set the network gateway address:

1. At the Network Config Menu, press an arrow button until the cursor underscores NETWORK GATEWAY.
2. Press the **SELECT** button. An editing screen appears.
3. On the editing screen:
 - a. Use the up and down arrow buttons to select a value for each digit (field) in the address.
 - b. Use the **SELECT** button to move right to the next field.
 - c. Use the **MENU** button to move left to the previous field.
4. When the screen displays your desired setting, press the **SELECT** button from the right-most field to save the changes. You may press the **MENU** button from the left-most field to abort.

5. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Setting the Subnet Mask Address

The system administrator might assign the library a subnet mask address if one is required. This address makes the library accessible through a subnet on a large network. To set the subnet mask address:

1. At the Network Config Menu, press an arrow button until the cursor underscores **SUBNET MASK**.
2. Press the **SELECT** button. An editing screen appears.
3. On the editing screen:
 - a. Use the up and down arrow buttons to select a value for each digit (field) in the address.
 - b. Use the **SELECT** button to move right to the next field.
 - c. Use the **MENU** button to move left to the previous field.
4. When the screen displays your desired setting, press the **SELECT** button from the right-most field to save the changes. You may press the **MENU** button from the left-most field to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. If you wish to set other configuration values, continue with the next section. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **MENU** button until you exit all menus.

Screen Characteristics

You also can change the operator panel's screen characteristics from the main configuration menu. The screen characteristics are saved in non-volatile memory.

To change the contrast and backlight (or brightness) of the operator panel screens:

1. At the Main Configuration Menu, press an arrow button until the cursor underscores **DISPLAY INFO**.
2. Press the **SELECT** button. The Display Info Menu will appear.
3. Use the arrow buttons to line up with the desired screen characteristic: **CONTRAST** or **BACKLIGHT**. An editing screen will appear.

4. On the editing screen, use the up and down arrow buttons to change the count value.

Note: To reset the screen characteristics to the default values, line up the cursor with `RESTORE DEFAULTS` and press the **SELECT** button.

5. When the value is correct, press the **SELECT** button to save the changes. You may press the **MENU** button to abort.
6. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the **RESET** button. (In this case, if you try to exit the main configuration menu, a message will appear requesting that you reset the library.) If you have not changed the library's SCSI ID, you may exit the configuration menu to do other tasks.

Cleaning Cartridge Warning Count

Cleaning cartridges have a limited life span. After multiple uses, a cleaning cartridge must be replaced and disposed of at your site.

If you have enabled the Auto Clean feature, you can use the operator panel to set the maximum number of times a cleaning cartridge can be used (or the "warning count"). Check your tape drive's product manual for the recommended use and life of the drive's cleaning cartridge.

Note: The Auto Clean feature is automatically enabled if you insert even one cleaning cartridge into the reserved cell area and then power off and power on the library or open and close the library's front door. You set the cleaning cartridge warning count from the Cleaning Info menu (see [Figure 2-8 on page 2-10](#)). To set this value:

1. From the status screen, press the **MENU** button. The Main Menu will appear.
2. Press the arrow button until the cursor underscores `CLEANING INFO`.
3. Press the **SELECT** button. The Cleaning Info menu will appear (see [Figure 2-8 on page 2-10](#)). This menu displays the number of cleaning cartridges in the reserved area.
4. Using an arrow button, line up the cursor with the appropriate drive's warning count.
5. Press the **SELECT** button for your choice. An editing screen will appear.
6. The editing screen displays the current setting for the cartridge warning count. It displays the maximum recommended warning count below the current setting. On this screen, use the up and down arrow buttons to change the count value.
7. When the value is correct, press the **SELECT** button to save the changes. You may press the **MENU** button to abort.

8. When you are finished, press the MENU button twice to return to the library status screen.

Horizon L Series Library Monitor Entries (Optional)

The Horizon L Series Library Monitor is an optional web-based interface to the library. If you ordered this interface for your library, your service representative should install it for you. Before you can use the Horizon L Series Library Monitor to monitor the library or alter the library's configuration, your service representative must enter two values at the operator panel:

- The library's IP address
- The library's web password

For instructions on how best to make these entries, see the documentation included in the Horizon L Series Library Monitor shipping package. For instructions on using the interface to alter the library's configuration or monitor library activity, access the online help files for the Horizon L Series Library Monitor.

■ Inserting Cartridges into the Library

CAUTION:

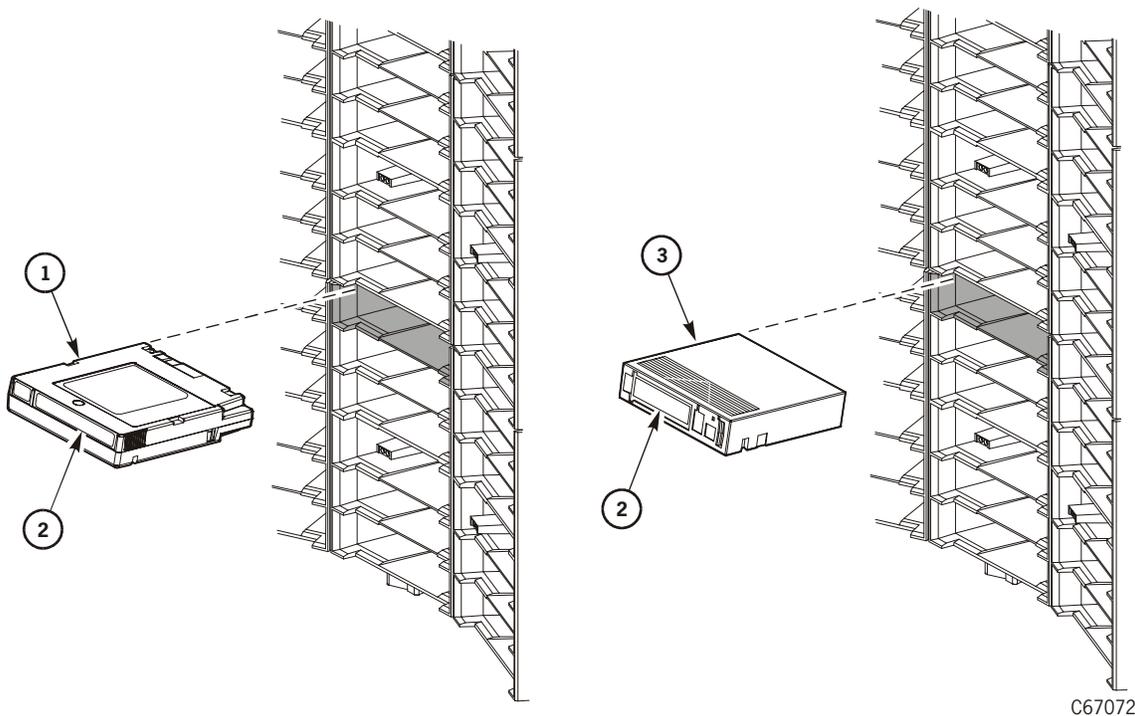
Potential static electricity damage to electrical components: Take precautions against electrostatic discharge by touching the gray, unpainted metal of the library frame before reaching inside the library or before touching the drives. Avoid touching any electrical component.

Confined space: While reaching inside the library, take care to avoid bumping your head or catching your clothing on protruding edges.

When you are ready to place the library into production, you may place data cartridges inside the library. The most efficient way to insert a great quantity of cartridges into the library is to insert them manually into the array cells.

Figure 3-1 and Figure 3-2 on page 3-17 illustrate this method. (You must first unlock and open the library front door.) You also may insert cartridges into array cells by using the CAP. (See “Inserting Cartridges into the CAP” on page 4-9.)

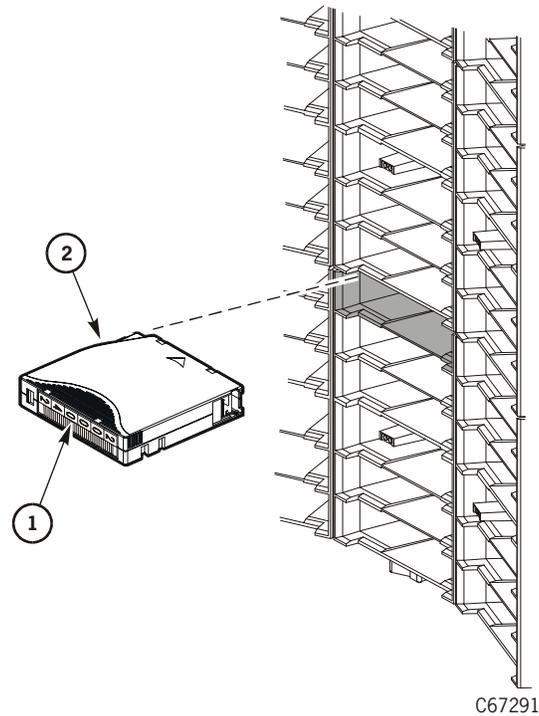
■ **Figure 3-1. Placing DLT and 9840 Cartridges into Array Cells**



Placing Tapes into Array Cells (C67072)

1. 9840 cartridge customer label
2. VOLSER label
3. DLT cartridge customer label

Figure 3-2. Placing Ultrium Cartridges into Array Cells



Placing Ultrium Cartridges into Array Cells (C67291)

1. VOLSER label
2. Ultrium cartridge

Close and lock the front door after you have inserted all the data cartridges into the library. The robot automatically audits the cartridges and their locations within the library.

Note: Do *not* use DATA D3 (helical recording) cartridges or 3480 cartridges in the L180 library.

Placing the Library Online

Before you place the library into production, you must first:

- Enter the system command to place all drives online.
- When all drives are online, enter the command to place the library online.
- Enter the command to upload the library audit data to the client system memory (see the following paragraphs).

■ Sending Library Audit Data to Client

■ During initialization, the library audits the location and VOLSER of all cartridges in the storage and reserve cells. The library performs an audit when:

- You power on the library.
- You open and close the front library door.
- Make a request at the customer server console to audit the library

■ You must follow every audit with a client command that loads the library audit data (the “catalog”) into client memory. For instructions on how to send this command, refer to your software and system publications.

Library Operation

4

This chapter contains the procedures for operating the library in:

- Automated mode
- Manual mode

Note: When the client controls the library, refer to your software publications and enter the command at the server console to perform the desired activity. During some activities, you might have to ask your systems administrator for the required information.

■ Operating in Automated Mode

Automated mode is the normal operating mode of the library. When the library is powered on and ready, monitor your system console and the library operator panel for messages and respond appropriately.

When a library is powered on and ready, you also might need to:

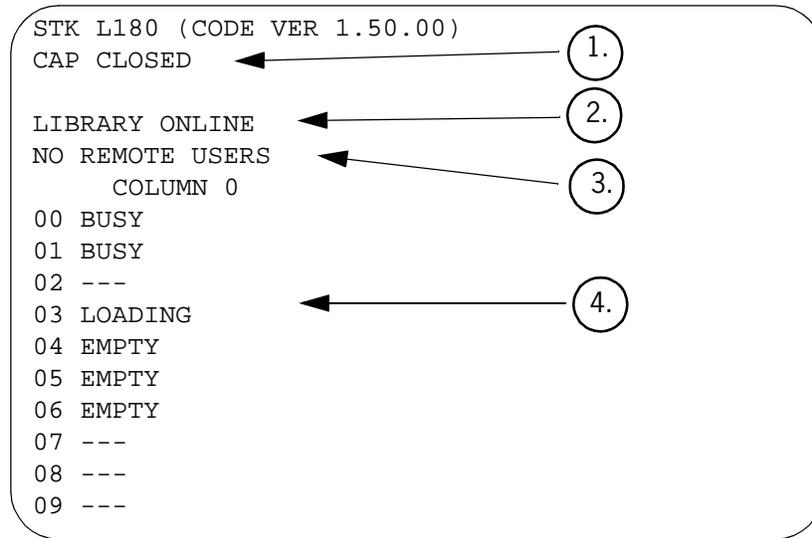
- Export cleaning cartridges
- Import cleaning cartridges
- Enter cartridges into the library through the CAP
- Eject cartridges from the library through the CAP
- Manually clean a drive
- Review the event log
- Run diagnostic tests (the library must be offline)

The following text describes how to perform these activities.

Monitoring Status Information

You can monitor CAP, library, remote user, and drive status information through the initial status screen (see [Figure 4-1 on page 4-2](#)). This screen displays after initialization or a library reset is complete, and it displays when you press the MENU button while you are viewing the Main Menu.

Figure 4-1. Example Initial Status Screen



1. CAP status message
2. Library status message
3. Remote users status message
4. Drives status messages

You also can monitor drive information, CAP magazine status, the cleaning cartridge usage count, and the library’s “personality” information through operator panel menus.

CAP Status

The first line of status information on the initial status screen indicates the condition of the CAP. [Table 4-1](#) explains the status messages that might appear on this line.

Table 4-1. CAP Status Messages

Status Message	Explanation
OPEN	The CAP door is currently open. (The <i>Open</i> indicator also is on.) You may insert cartridges or remove the CAP magazines. But you cannot view the CAP magazine contents through the operator panel menus.
CLOSED	The CAP door is currently closed.
CLOSED (LOCKED)	The CAP door is currently closed and locked. Before you can open the CAP door, you must issue a command from the system console.

Table 4-1. CAP Status Messages (Continued)

Status Message	Explanation
TRANSITION	The CAP door has stalled while attempting to open.
UNKNOWN	The library does not recognize the current state of the CAP door.

Library Status

The following table explains the library status messages that might appear on the initial status screen.

Table 4-2. Library Status Messages

Status Message	Explanation
LIB MAIN DOOR OPEN	The library's front door is open. When you close it, the library will reinitialize.
LIB INIT REQUIRED	The library requires initialization. This message might appear momentarily after you close the library's front door. If the message remains on the screen, open and close the front door. The library then begins its initialization cycle.
LIBRARY NOT READY	The library is not available to perform operator-requested actions. Some status information might be available through the network interfaces.
LIBRARY READY	The library has completed initialization and is ready to perform requested actions.
LIB MAINTENANCE MODE	The library is offline because it is performing diagnostic tests.
INTERVENTION REQUIRED	The library is experiencing a problem. You should note the FSC (if the library has displayed one) and call your service provider.
LIB UNKNOWN STATE	The library does not recognize its current state. You should note the FSC (if the library has displayed one) and call your service provider.

Remote Users Status

Following the library status line is a status line that indicates the number of users who are currently accessing the library remotely (for example, through the Horizon L Series Library Monitor). At the time of publication, no additional status messages were available for this line. The line will always read NO REMOTE USERS.

Drive Status

Table 4-3 summarizes drive status messages that might appear on the initial status screen:

Table 4-3. Drive Status Messages

Status Message	Explanation
INIT REQUIRED	You must initialize this drive.
NOT CONNECTED	This drive is not connected to the library.
UNKNOWN DRIVE	The library does not recognize the type of drive in this location.
NOT COMMUNICATE	This drive is not communicating with the library. (This drive might be powered off.)
NOT FUNCTIONAL	This drive is not operating properly.
EMPTY	No cartridge is loaded in this drive.
CARTRIDGE IN	This drive contains a cartridge, but it is not loaded into the drive.
CLEAN NEEDED	This drive requires cleaning. This message appears only if the drive is “empty.”
CLEAN FAILED	The attempt to clean this drive failed. This message appears only if the drive is “empty.”
LOADING	The drive is loading a cartridge.
REWOUND	The cartridge in this drive has been rewound.
UNLOADING	The drive is unloading a cartridge.
LOADED	A cartridge is loaded in this drive.
REWINDING	The cartridge in this drive is being rewound.
BUSY	This drive is performing a read or write operation.
CLEANING	The drive is being cleaned.

These messages might also appear on the Drive Information Menu and the Drive Diagnostics menu.

Drive Information

To view details about an installed drive, including its serial number and firmware version:

1. Press the **MENU** button to display the Main Menu.
2. If necessary, press an arrow button until the cursor lines up with **DRIVE INFO**.

3. Press the **SELECT** button. A list of all installed drives will appear.
4. Use the arrow buttons until the cursor underscores the desired drive.
5. Press the **SELECT** button. The Drive Information Menu will appear (see [Figure 2-7 on page 2-9](#)). The screen lists the manufacturer, model, status, serial number, interface type, and firmware version of the selected drive. See [Table 4-3 on page 4-4](#) for a list of drive status messages.

CAP Magazine Status

To check the status of a CAP magazine and its contents:

1. Press the **MENU** button to display the Main Menu.
2. If necessary, press an arrow button until the cursor lines up with **CAP CONTENTS**.
3. Press the **SELECT** button. The CAP Contents menu will appear (see [Figure 2-6 on page 2-8](#)). The menu lists **VOLSER** of each cartridge in an installed magazine, or the screen lists a status message. See [Table 4-4](#) for the status messages that appear on this list.

Note: The upper magazine is always **MAGAZINE 1**; the lower magazine is always **MAGAZINE 2**.

Table 4-4. CAP Magazine Slot Status Messages

Status Message	Explanation
EMPTY	This magazine slot does not contain a cartridge.
UNKNOWN	The library has not yet performed an audit to determine the contents of this magazine slot.
UNREADABLE	This magazine slot contains a cartridge, but the camera could not read the cartridge's VOLSER label.

Cleaning Cartridge Usage Count

These procedures assume that you have inserted cleaning cartridges into the reserved cells and have subsequently reinitialized the library. (Taking those two steps enables the Auto Clean function.) You then can check the usage count of cleaning cartridges in the reserved cells or in both the reserved cells and the CAP.

Cartridges in the Reserved Cells

CAUTION:

Take precautions with used cleaning cartridges. If you have placed into the library a cleaning cartridge that has been previously used, the library will indicate a usage count of **0**. You must adjust the cleaning cartridge's warning count to prevent the library from over-extending the cartridge's

use. For information about setting the warning count, see “Cleaning Cartridge Warning Count” on page 3-14.

To check the number of times that the cleaning cartridges have been used since they were inserted into the reserved cells in the library:

1. Press the **MENU** button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores **CLEANING INFORMATION**.
3. Press the **SELECT** button. The panel displays the Cleaning Info menu (see [Figure 2-8 on page 2-10](#)).
4. Press the arrow buttons until the cursor underscores **EXPORT CARTRIDGE**.
5. Press the **SELECT** button. The Export Clean Cartridges screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), **VOLSER**, and usage count.

Note: If the usage count for a cleaning cartridge has exceeded its warning count, the export screen will display **EXPIRED**. You must remove this cartridge from the library. You may highlight that cartridge on this screen by pressing the **SELECT** button. Press the **SELECT** button again to export the cartridge to the CAP.

6. Press the **MENU** button to exit the Export Clean Cartridges screen.

Cartridges in Reserved Cells and CAP

To check the usage count of all cleaning cartridges (those in the reserved cells and those in the CAP):

1. Press the **MENU** button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores **CLEANING INFORMATION**.
3. Press the **SELECT** button. The panel displays the Cleaning Info menu (see [Figure 2-8 on page 2-10](#)).
4. Press the arrow buttons until the cursor underscores **CLEAN CARTRIDGE INFO**.
5. Press the **SELECT** button. The Clean Cartridges screen appears, which lists all installed cleaning cartridges by domain (or drive type), **VOLSER**, and usage count.

Note: If the usage count for a cleaning cartridge has exceeded its warning count, the export screen will display **EXPIRED**. You must remove this cartridge from the library. For instructions on how to export the cartridge to the CAP, see [“Exporting Cleaning Cartridges to the CAP” on page 4-15](#)

6. Press the **MENU** button to exit the Clean Cartridges screen.

Library Personality Information

Viewing library personality information lets you determine who the library's manufacturer is, whether a personality module is present and enabled, and how the library's name and vendor name appear on a SCSI interface.

To view the library's personality information:

1. Press the **MENU** button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores **CONFIGURATION**.
3. Press the **SELECT** button. The panel displays the Main Configuration Menu.
4. Press the arrow buttons until the cursor underscores **PERSONALITY MODULE**.
5. Press the **SELECT** button. The panel displays the Personality Module Info screen.
6. Press the down arrow to view a second screen of information.
7. To exit the Personality Module Info screen, press the **MENU** button.

The following status messages might appear on the Personality Module Info screen:

Table 4-5. Status Messages about the Personality Module

Status Message	Explanation
STATUS :	
PRESENT	A recognizable personality module is attached to the logic card.
NOT PRESENT	No personality module is attached to the logic card.
UNKNOWN	No valid vendor information has been loaded into this library.
TYPE :	
NORMAL	If the STATUS is PRESENT , a personality module containing vendor information is attached to the logic card. If the STATUS is NOT PRESENT , the factory-installed vendor information is in effect.
UPGRADE	You can use the personality module attached to the logic card to install a feature. This type of personality module is an "upgrade module."
USED UPGRADE	The feature on the attached upgrade module has already been installed on a library.

Table 4-5. Status Messages about the Personality Module (Continued)

Status Message	Explanation
WRITE IN PROGRESS	The installation of the information from the personality module has been interrupted. The personality module is no longer valid.
VERSION:	This is the version number for the personality module. If a personality module is not present, this is the version of the vendor information.
LIBRARY VENDOR ID:	This is the identity number for the library vendor.
LIBRARY VENDOR NAME:	This is the name of the library vendor.
LIBRARY PRODUCT NAME:	If TYPE is NORMAL, this is the product name assigned by the library vendor. If TYPE is UPGRADE, this is the name of the product for which the upgrade is valid.
SCSI VENDOR NAME:	This is the library vendor name reported on the SCSI or Fibre Channel interface.
SCSI PRODUCT NAME:	This is the library product name reported on the SCSI or Fibre Channel interface.
HORIZON:	
ENABLED	If the TYPE is NORMAL, this message indicates that the Horizon L Series Library Monitor is enabled. If the TYPE is UPGRADE, this message indicates that this upgrade module contains the information to install and enable the Horizon L Series Library Monitor.
DISABLED	The Horizon L Series Library Monitor is not available.

Inserting Cartridges into the CAP

To unlock the CAP, open it, and place cartridges into it:

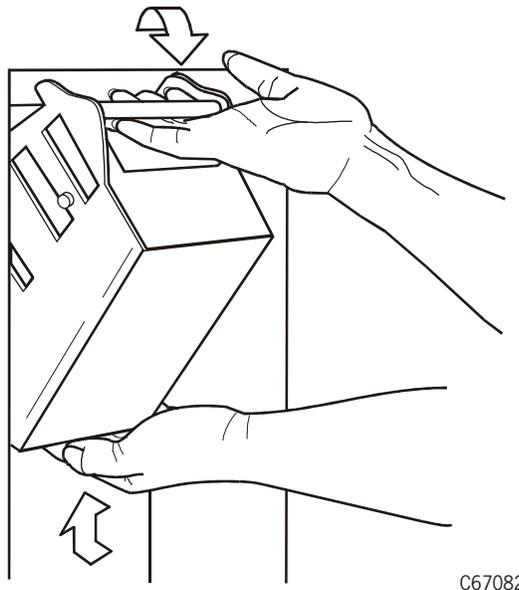
1. Enter the console command to unlock the CAP.
2. Press the CAP button on the operator panel to open the CAP. The *Open* indicator will light.

CAUTION:

Possible halt to operation or damage to components. You must enter the cartridges properly or you might damage the robot or the drive, or cause the library to stop operating. Use only DLT cartridges for the DLT drives. Use only 9840 cartridges for 9840 drives. Do not use 3840-type cartridges or DATA D3 (helical recording) cartridges in the L180 library.

3. Insert cartridges into the magazine. You can do this one of two ways: Pull out and down on the magazine handle, or remove the magazine by lifting it out (see [Figure 4-2](#)).

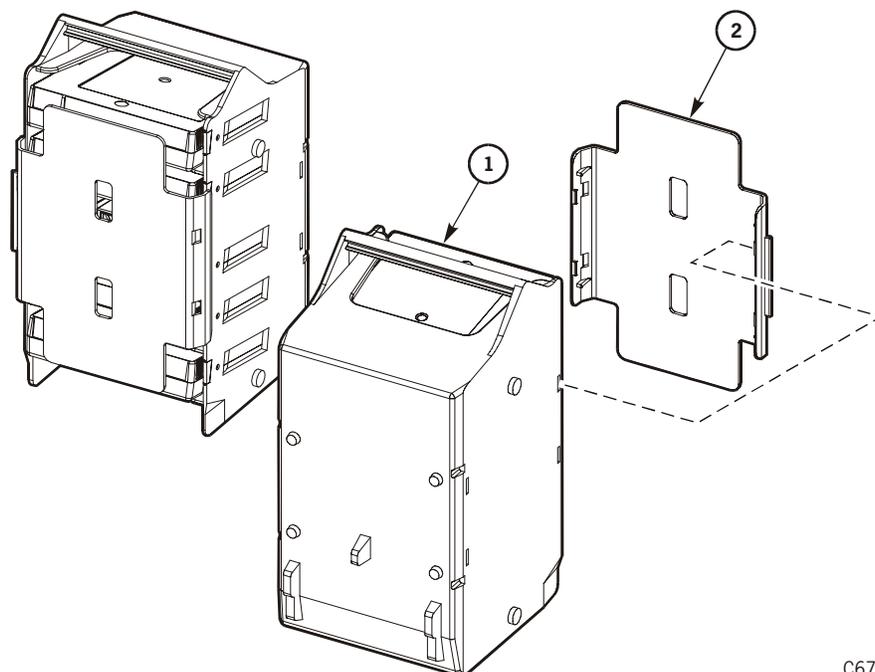
Figure 4-2. Removing the CAP Magazine



C67082

Note: You can use the snap-on retention cartridge cover to keep cartridges in place when carrying the magazine (see [Figure 4-3](#) on page 4-10). Remove the clear cover from the back of the magazine by lifting the side edge. To protect the cartridges, place the slots on one edge of the cover into the grooves on the side of the magazine's top panel and snap the other edge into place.

Figure 4-3. Attaching/Detaching CAP Magazine Cover



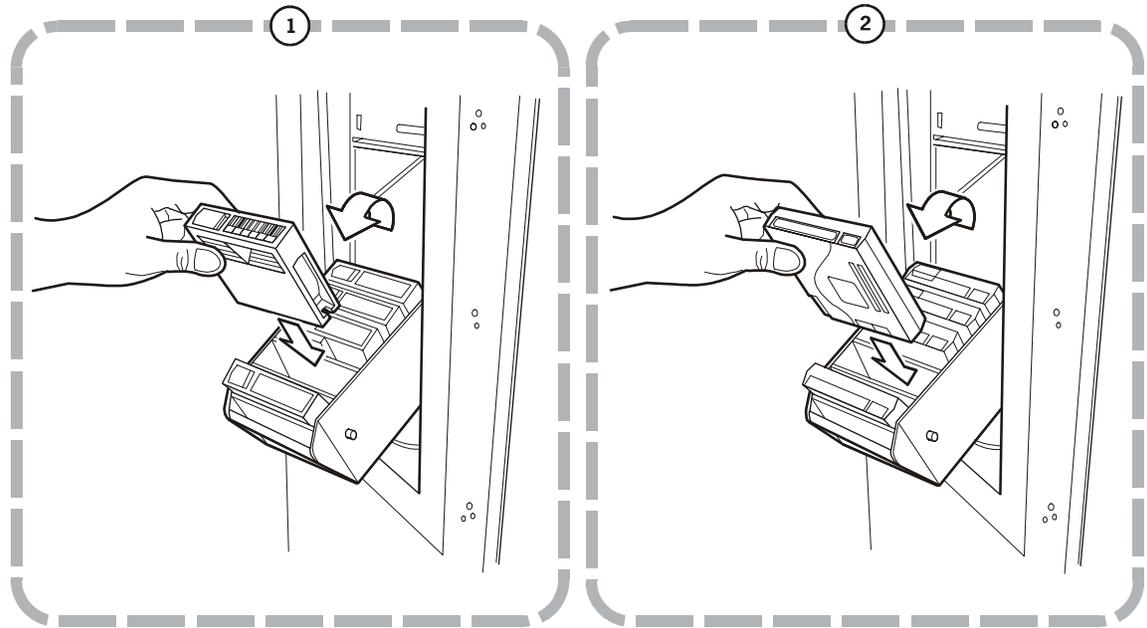
C67227

Attaching/Detaching CAP Magazine Cover (C67227)

1. CAP magazine (in upright position)
2. CAP magazine cover

4. Enter the cartridges into the magazine so that they lie flat, with the VOLSER label facing toward you, the customer label facing down, and the reel facing away from you. (See [Figure 4-4 on page 4-11](#) and [Figure 4-5 on page 4-12](#).)

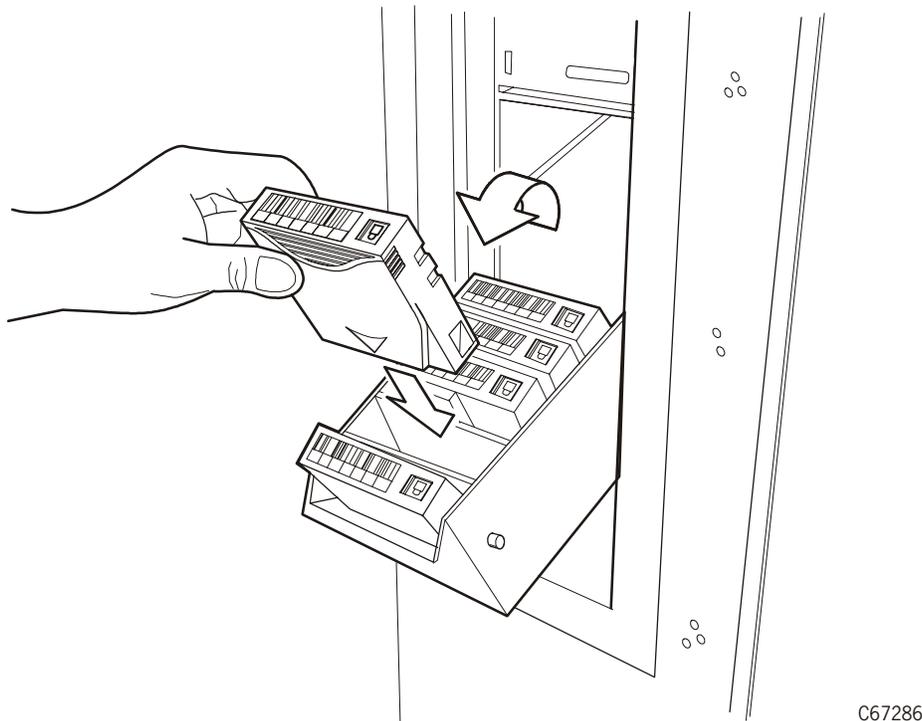
Figure 4-4. Entering DLT and 9840 Cartridges into the CAP Magazine



C67011

Entering Cartridges into the CAP Magazine

1. DLT cartridge
2. 9840 cartridge

Figure 4-5. Entering Ultrium Cartridges into the CAP Magazine

C67286

CAUTION:

Possible damage to the hand assembly. Remove the magazine's retention cover before inserting the magazine into the CAP.

5. Return the magazine to its closed position. (If you have used a retention cover on the magazine, remove the cover before replacing the magazine.)
6. Press the **CAP** button on the operator panel to close the CAP.

Note: StorageTek strongly advises that you do not enter unlabeled cartridges. The client software determines what happens when you enter a cartridge with an unreadable label. Under ordinary conditions, the camera on the hand audits the CAP and recognizes that a cartridge is present, but the hand does not move it. You must remove the cartridge from the CAP.

In this situation, the client software might direct the library to stop operating. Other software might prompt you to type in a label number when no VOLSER is read. Typing in a label number might cause a problem later during an audit because the camera still will not be able to read the unreadable VOLSER on the cartridge.

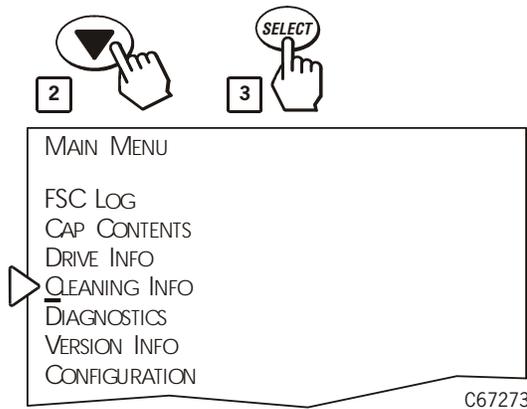
Importing Cleaning Cartridges through the CAP

Follow the procedure for “[Inserting Cartridges into the CAP](#)” on page 4-9. Then follow this procedure to import the cleaning cartridges into the reserved cells in the library.

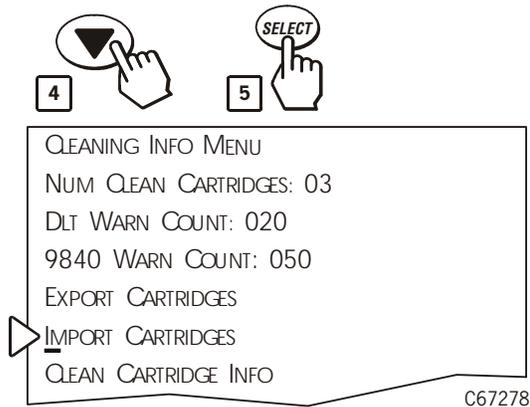


C67272

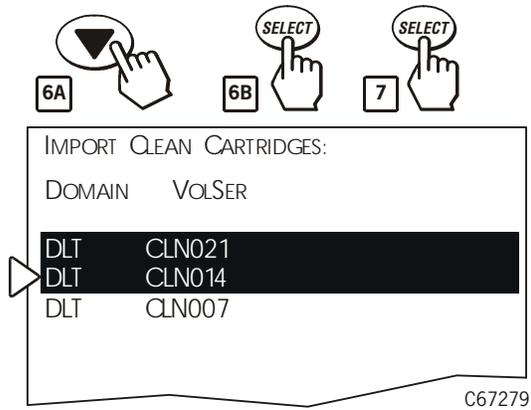
1. Press the **MENU** button to return the display to the Main Menu.



2. Press the arrow buttons until the cursor underscores CLEANING INFO.
3. Press the **SELECT** button. The panel displays the Cleaning Info menu.



4. Press the arrow buttons until the cursor underscores IMPORT CARTRIDGES .
5. Press the **SELECT** button. The Import Clean Cartridges screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type) and VOLSER.



6. Select the cleaning cartridges you want to import by:

- a. Moving the cursor to the desired cartridge entry on the list
- b. Pressing the **SELECT** button. A selected cleaning cartridge is then highlighted (in reverse video)
- c. Repeating Steps a and b until you have selected all the cartridges you want to import

Note: There is no undo available on this menu. If you select a cartridge by mistake, you must exit the menu by pressing the MENU button. Then you must start again at Step 4.

7. Press the **SELECT** button again to initiate the import. The panel will display a message to indicate when the import is complete.

8. Press the **MENU** button to exit the menu.



C67272

Importing Data Cartridges through the CAP

Follow the procedure for [“Inserting Cartridges into the CAP”](#) on page 4-9. Then consult your software documentation for additional information.

Exporting Cleaning Cartridges to the CAP

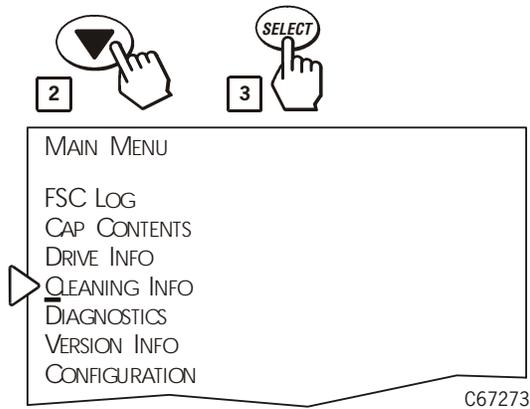
When one or more cleaning cartridges have expired, you can export them from the reserved cells to the CAP with this procedure:

1. Press the **MENU** button to return the display to the Main Menu.



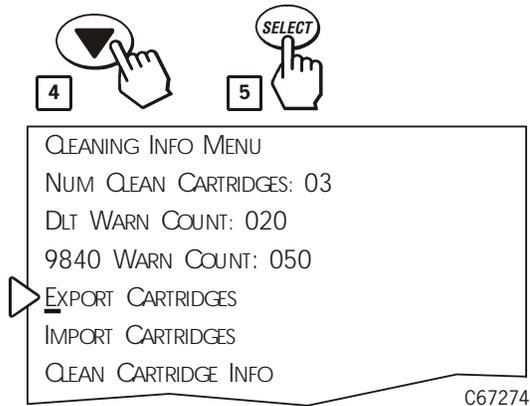
C67272

2. Press the arrow buttons until the cursor underscores **CLEANING INFO**.
3. Press the **SELECT** button. The panel displays the Cleaning Info menu.

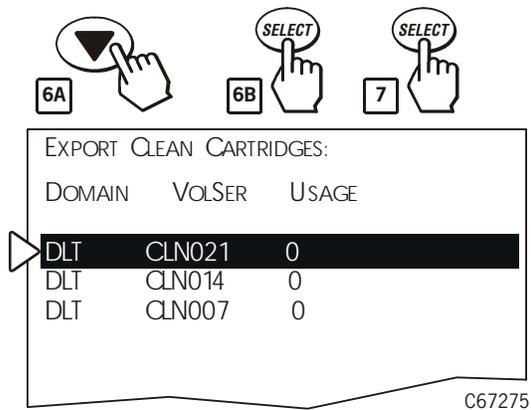


C67273

4. Press the arrow buttons until the cursor underscores **EXPORT CARTRIDGES**.
5. Press the **SELECT** button. The Export Clean Cartridges screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), VOLSER, and usage count.



C67274



6. Select the cleaning cartridges you want to export by:
 - a. Moving the cursor to the desired cartridge entry on the list
 - b. Pressing the **SELECT** button. A selected cleaning cartridge is then highlighted (in reverse video)
 - c. Repeating Steps a and b until you have selected all the cartridges you want to export

Note: There is no undo available on this menu. If you select a cartridge by mistake, you must exit the menu by pressing the MENU button. Then you must start again at Step 4.

7. Press the **SELECT** button again to initiate the export. The panel will display a message to indicate when the export is complete.

8. Press the **MENU** button to exit the menu.



C67272

Exporting Data Cartridges to the CAP

To unlock the CAP, open the CAP, and remove cartridges from it:

1. At the system console, enter the VOLSERS of the cartridges you require. The robot will retrieve the cartridges and insert them into the CAP.
2. Enter the console command to open the CAP. This will unlock the CAP.
3. Press the **CAP** button on the operator panel to open the CAP.
4. Remove or pull down the magazine and remove the cartridges and store them *outside* the library (refer to [“Storing Cartridges” in Appendix A, “Cartridge Information”](#)).
5. Repeat these steps until you have removed all the required cartridges.

Cleaning a Drive

If you have not enabled the Auto Clean function on the library, then the library status screen on the operator panel will display **CLEAN NEEDED** whenever a specific drive requires cleaning. To clean this drive:

1. Import the required cleaning cartridge by using the procedure described in [“Importing Cleaning Cartridges through the CAP” on page 4-13](#).
2. Press the **MENU** button until the Main Menu displays.
3. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
4. Press the **SELECT** button. The panel will display the Main Diagnostics Menu (see [Figure 2-9 on page 2-11](#)).
5. Press the arrow buttons until the cursor underscores **DRIVE DIAGNOSTICS**.
6. Press the **SELECT** button. The screen will display a list of all installed drives.
7. Use the arrow buttons to highlight the desired drive.
8. Press the **SELECT** button. The Diagnostics for Drive menu appears.
9. Press the arrow buttons until the cursor underscores **CLEAN DRIVE**.
10. Press the **SELECT** button. A message screen will appear to tell you that the drive will be cleaned at the next opportunity.
11. When cleaning is complete, the robot will return the cleaning cartridge to a reserved cell.
12. If you want to clean another drive (of the same type), press the **MENU** button to return to the list of drives, and repeat Steps 10 through 14.
13. When drive cleaning is complete, export the cleaning cartridge using the procedure described in [“Exporting Cleaning Cartridges to the CAP” on page 4-15](#).

Note: The Auto Clean feature is automatically enabled if you insert even one cleaning cartridge into the reserved cell area and then reinitialize the library.

Reviewing FSC Log

A service representative or other StorageTek representative might ask you to review the library's FSC log so that you can better analyze library-related problems. The FSC log records significant messages and errors that the library has generated during operation.

To review the FSC log:

1. Press the **MENU** button until the Main Menu displays.
2. If necessary, press the arrow buttons until the cursor underscores **FSC LOG**.
3. Press the **SELECT** button. The panel displays the FSC log screen (see [Figure 2-5 on page 2-7](#)).
4. Use the arrow buttons to scroll through the log.

Here is a sample entry on the event logs screen, followed by an explanation of the entry's elements:

```
3329   03   NONE
03/01/2004   14:46:14
```

- 3329** This four-character code is the FSC.
- 03** This value indicates the number of times this FSC has occurred.
- NONE** This message indicates which, if any, mechanical device was involved.
- 03/01/2004** These digits indicate the date the FSC occurred. The fields from left to right are month, day, and year.
- 14:46:14** These digits indicate the time the FSC occurred. The fields from left to right are hour, minutes, and seconds.

Note: The electronic FSC dictionary, which lists additional information about FSCs and responses to them, is available through your service representative or other StorageTek representative. Contact your service provider for more information.

Running Diagnostics

Diagnostic tests included in the library's firmware let you test the functionality of important library components. You also may place the library in demonstration mode through the diagnostics menus.

CAUTION:
Diagnostic tests should be performed only by trained personnel.

Before performing the diagnostic tests, ensure that the library and drives are offline.

Running Drive Diagnostics

To run a diagnostic test on a drive:

1. Place the library and drives offline.
2. Press the **MENU** button until the Main Menu displays.
3. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
4. Press the **SELECT** button. The panel displays the Main Diagnostics Menu (see [Figure 2-9 on page 2-11](#)).
5. Press the arrow buttons until the cursor underscores **DRIVE DIAGNOSTICS**.
6. Press the **SELECT** button. The screen will display a list of installed drives.
7. Use the arrow buttons to highlight the desired drive.
8. Press the **SELECT** button. The Diags for Drive menu appears.
9. Press the arrow buttons until the cursor underscores the desired test. For a description of the available tests, see [Table 4-6](#).
10. Press the **SELECT** button. If you selected **MOUNT/DISMOUNT LOOP**, an editing screen will appear:
 - a. Use the arrow buttons to enter the desired value. (The up arrow button increases the value; the down arrow button decreases the value.)
 - b. Press the **SELECT** button.
11. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (**ARE YOU SURE?**). Confirm this by pressing the **SELECT** button. You may press the **MENU** button to abort.
12. Wait until the test is complete; the screen will display **TEST COMPLETE** or, if a problem occurred, an FSC code.

Table 4-6. L180 Library Drive Diagnostic Tests

Test	Description
Clean Drive	This function is not a test. It moves a specified cleaning cartridge from a reserved cell to a drive and initiates drive cleaning. When cleaning is complete, it returns the cleaning cartridge to a reserved cell.
Mount	This test mounts a diagnostic tape to the selected drive.
Dismount	This test dismounts a diagnostic tape from the selected drive.
Mount-Dismount	This test mounts and dismounts a diagnostic tape from the selected drive.

Running a Get-Put Loop

During a Get-Put loop, the hand mounts and dismounts a cartridge from a storage cell. This tests the functionality of the hand-camera assembly. To run a Get-Put loop:

1. Place the library offline.
2. Press the **MENU** button until the Main Menu displays.
3. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
4. Press the **SELECT** button. The panel displays the Main Diagnostics Menu (see [Figure 2-9 on page 2-11](#)).
5. Press the arrow buttons until the cursor underscores **GET PUT LOOP**.
6. Press the **SELECT** button. The Get-Put Mode screen will appear.
7. Use the arrow buttons to enter the desired number of loops. The up arrow button increases the value; the down arrow button decreases the value. The maximum number of loops allowed is 20.
8. Press the **SELECT** button.
9. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (**ARE YOU SURE?**). Confirm this by pressing the **SELECT** button. You may press the **MENU** button to abort.
10. Wait until the test is complete; the screen will display **TEST COMPLETE** or, if a problem occurred, an FSC code.

Operating in Demo Mode

CAUTION:

***Potential for error.* Running the library in Demo Mode causes the data cartridges to be rearranged. After Demo Mode is complete, you must reinitialize the library and give the client command to upload library audit data to client memory.**

With the library in Demo Mode (demonstration mode), the hand retrieves a cartridge from a storage cell, rotates around on the Z and theta axes, and places the cartridge back to a different storage cell. This tests the functionality of the robot. To operate in Demo Mode:

1. Place the library and drives offline.
2. Press the **MENU** button until the Main Menu displays.
3. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
4. Press the **SELECT** button. The panel displays the Main Diagnostics Menu (see [Figure 2-9 on page 2-11](#)).

5. Press the arrow buttons until the cursor underscores DEMO MODE .
6. Press the **SELECT** button. The Demo Mode menu appears.
7. Use the arrow buttons to enter the desired number of loops. The up arrow button increases the value by 100; the down arrow button decreases the value by 100. The maximum number of loops allowed is 2,000.
8. Press the **SELECT** button.
9. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (ARE YOU SURE?). Confirm this by pressing the **SELECT** button. You may press the **MENU** button to abort.
10. Wait until the test is complete; the screen will display TEST COMPLETE or, if a problem occurred, an FSC code.
11. Press the **RESET** button to reset the library.

■ Using Horizon L Series Library Monitor

If your library has the Horizon L Series Library Monitor installed, you can monitor status information, perform automated operations, and run diagnostic tests through a workstation or a PC that is running a Netscape or Microsoft browser. For information about monitoring, operating, or testing the library through your browser, access the online help files for the Horizon L Series Library Monitor.

■ Powering off the Library

To power off the library:

1. Enter the command at the server console to take the library and drives offline.
2. Open the rear door by gently pulling on the finger slot.
3. Press down on the power switch (one or two circuit breakers) near the floor of the library (see [Figure 2-18 on page 2-19](#)).
4. Close the rear door.

■ Operating in Manual Mode

The following pages describe operations you can perform when the library is in manual mode. Manual mode occurs when the library is offline (that is, not communicating with the client).

When the library is offline, you might have to:

- Open the front door

- Move the robot
- Locate a cartridge in the storage cells
- Remove a cartridge from the hand
- Mount a cartridge in a drive
- Dismount a cartridge from a drive

Before starting any of these tasks, you must take precautions against electrostatic discharge (ESD).

CAUTION:

***Components are sensitive to static electricity:* Even a small electrostatic discharge can damage an electrical component that is inside the library. A damaged component might not fail immediately, but over time, it will become worse and might eventually cause an “intermittent” problem. Be sure that you touch an *unpainted* metal surface of the library before you reach inside the library or touch the drives.**

Before you touch any internal components:

1. With your finger, touch an *unpainted* metal surface of the library. In some libraries, you can touch the library’s frame. In other libraries, you might have to touch a bolt on the wall or on the door frame.
2. Keep your body movement to a minimum as you touch the drives or the library components.

Antistatic wrist straps that have clip-on ends are commercially available.

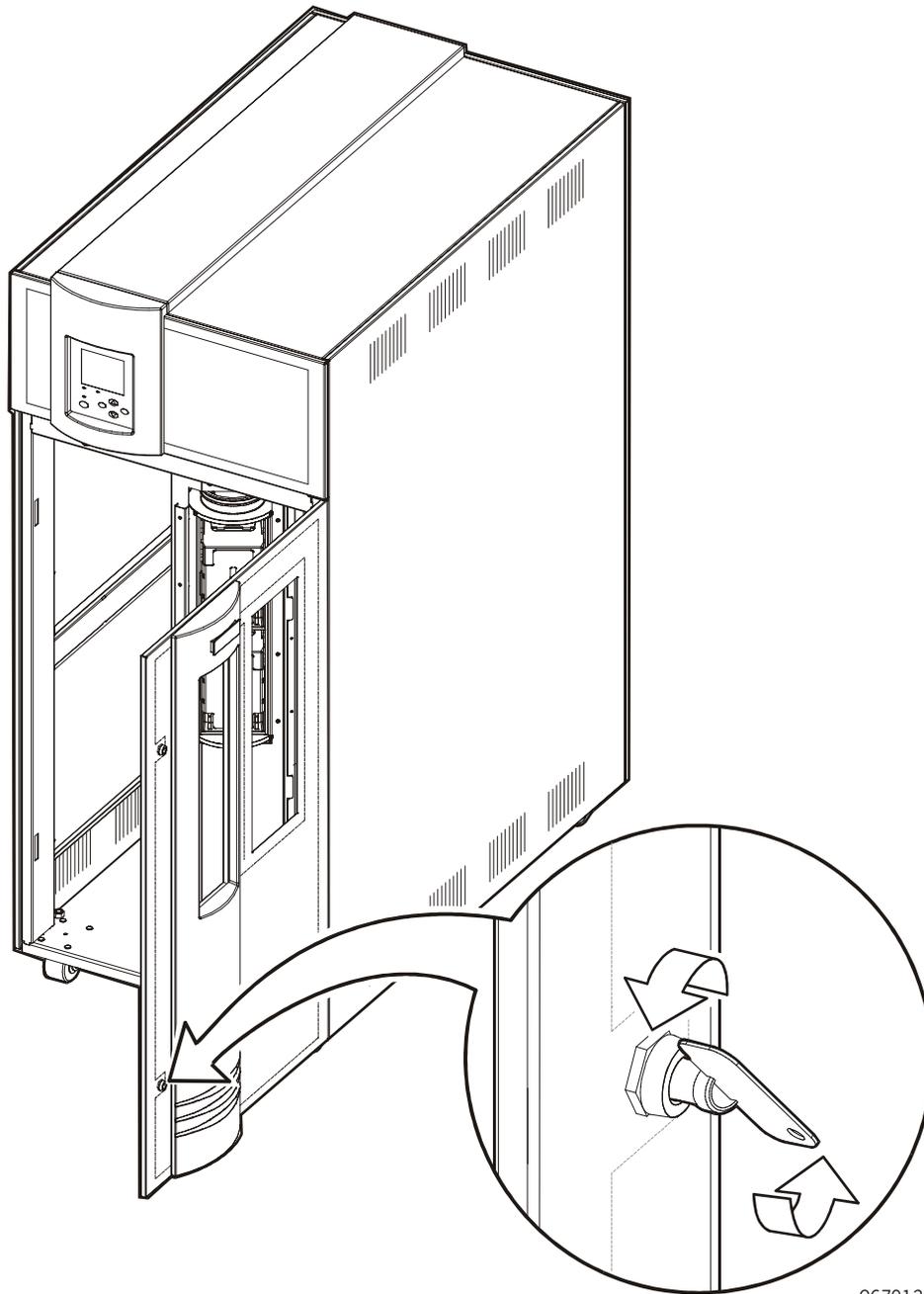
Opening the Library Front Door

CAUTION:

***Confined space.* While reaching inside the library, take care to avoid bumping your head or catching your clothing on protruding edges.**

You must open the front door to perform manual operations. Refer to [Figure 4-6 on page 4-23](#) as you perform this procedure.

1. Make sure all jobs have ended and that the library is offline.
2. Open the library front door by using a latch key to unlock both latches. Turn the key counterclockwise to unlock them; then pull open the door.

Figure 4-6. Opening Front Door

C67013

Moving the Robot

After you open the library door, you might need to move the robot so that you can more easily access cartridges or the drives.

Read and observe the following caution before you attempt to move any portion of the robot.

CAUTION:

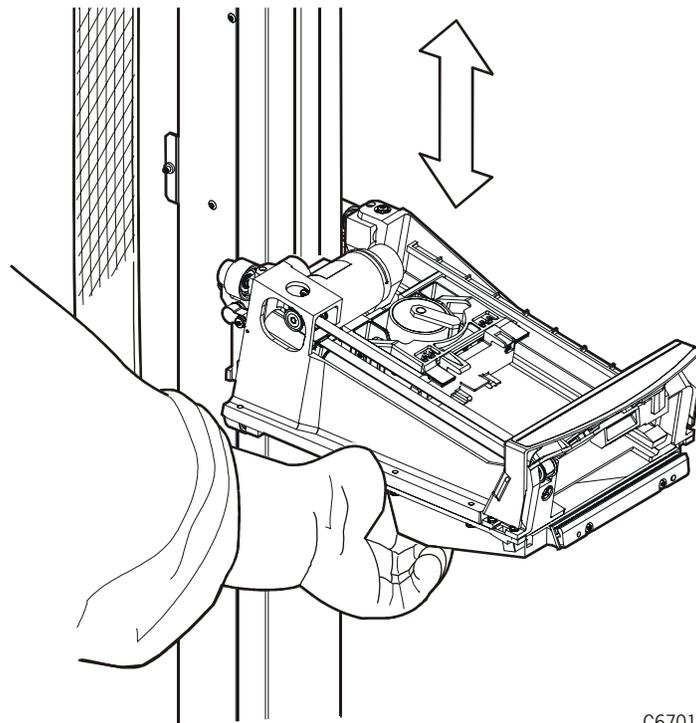
Potential equipment damage: To prevent damaging the hand or Z carriage, make sure the gripper mechanism on the hand is fully retracted before moving any part of the robot. Push the gripper mechanism into the retracted position (see [Figure 4-7](#) for retracted position). If the library goes offline, the reach mechanism might be extended into a storage cell or drive. If you rotate the robot when this condition exists, the hand could be damaged.

Move the Z column and Z carriage only as shown in [Figure 4-7](#) and [Figure 4-8 on page 4-26](#).

Take precaution against potential ESD damage by touching the gray, unpainted metal of the library frame before reaching inside the library or before touching the drives. Do not touch exposed electrical parts when moving any part of the robot.

Raising and Lowering the Hand Assembly

If you need to raise or lower the hand, *slowly and carefully* move it by placing your fingers on the bottom of the hand assembly as shown in [Figure 4-7](#).

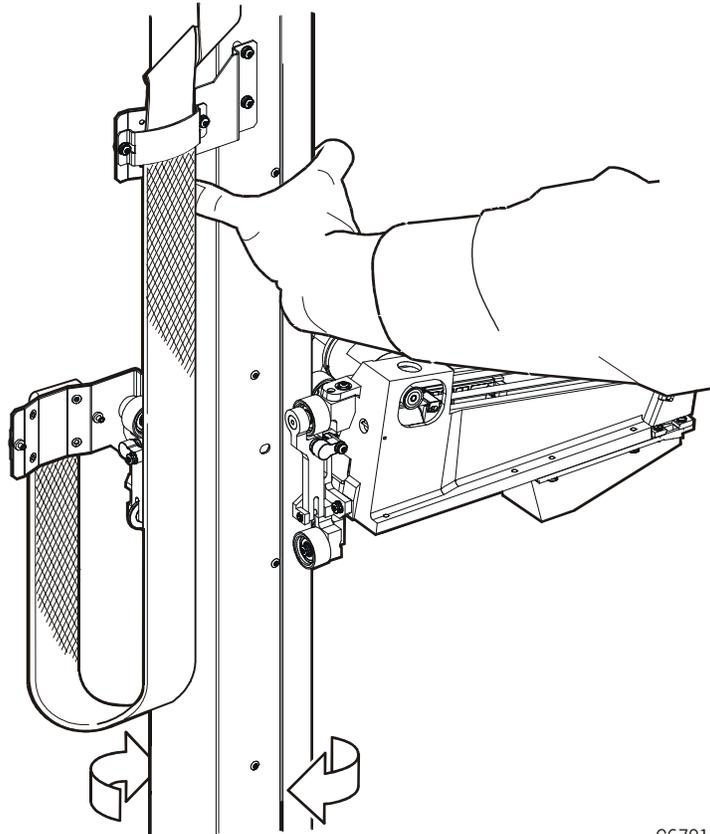
Figure 4-7. Raising and Lowering the Z Carriage

C67014

Rotating the Z Column

If you need to rotate the Z column, grasp it and *carefully* rotate it, as shown in [Figure 4-8](#).

The Z column does not rotate a full 360 degrees. If the column meets resistance and stops before reaching the desired position, it has contacted a stopping mechanism. Do not force it. Rotate the column in the opposite direction.

Figure 4-8. Rotating the Z Column

C67015

Locating a Cartridge in the Storage Cells

Figure 1-3 on page 1-6 and Figure 1-4 on page 1-7 show the locations of the panels, rows, and columns of the cartridge storage cells in the library. The decal at the top of each column also provides location information. To remove a cartridge from a storage cell, slide the cartridge out.

Removing a Cartridge from the Hand

If the library (control path) goes offline or experiences mechanical difficulties, a cartridge might remain in the hand. You can remove it from the hand and manually mount it into a drive for a read/write operation.

CAUTION:

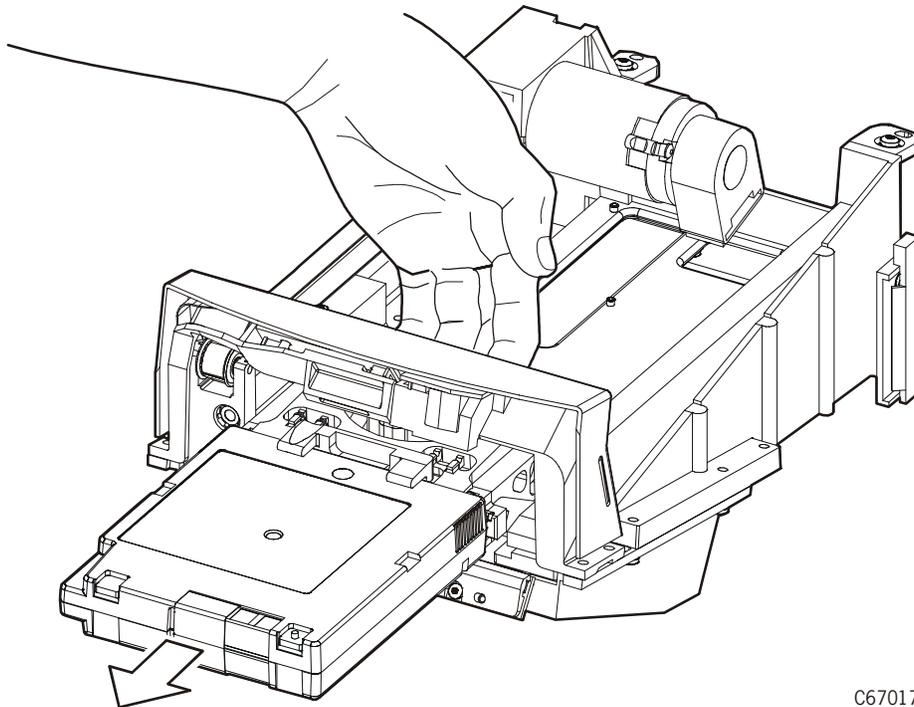
Potential equipment damage: Follow the procedures described in [“Moving the Robot” on page 4-23](#). Failing to do so could damage the hand.

Make sure you do not touch any electronic components on the hand assembly. The components could easily be damaged.

To remove a cartridge from the hand:

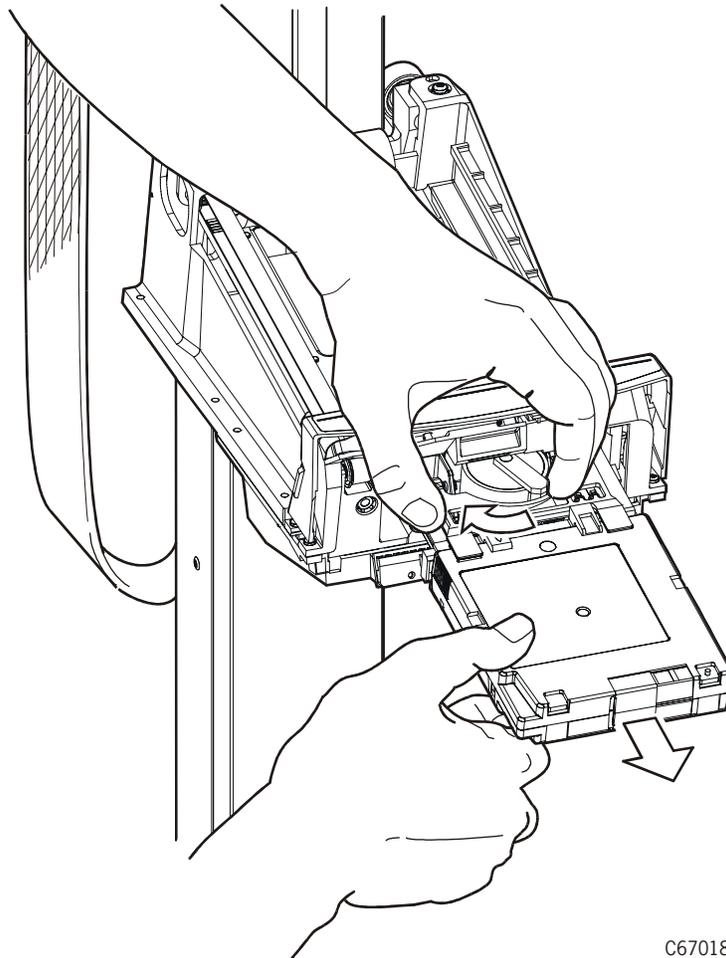
1. Rotate the Z column, move the hand until it is facing the front door.
2. Push on the back of the reach mechanism (as shown in [Figure 4-9](#)) until the gripper is extended to its full position, as shown in [Figure 4-10](#) on [page 4-28](#).

Figure 4-9. Extending the Gripper



C67017

Figure 4-10. Removing a Cartridge from the Hand



C67018

CAUTION:

Heated components: If the robot has been active, the solenoid and switch might be hot to the touch. Wait for the solenoid to cool before touching it.

3. Hold the solenoid on top of the reach mechanism with one hand and grasp the cartridge with the other. Rotate the solenoid switch clockwise until the cartridge is released from the gripper, as shown in [Figure 4-10](#).

CAUTION:

Potential equipment damage: Make sure the gripper mechanism is fully retracted. If it is left extended and you turn the robot, the gripper mechanism will strike a storage cell. If the gripper mechanism is left extended and the hand is facing the library door when it is closed, the door will strike the gripper mechanism.

4. Push the gripper mechanism back into the hand until the mechanism is fully retracted.

Mounting/Dismounting Cartridges Manually

When the library is offline, you can—after taking adequate precautions—mount a cartridge to a drive or dismount a cartridge from a drive. The following pages provide manual mount and dismount procedures for DLT drives and 9840 drives.

Note: If you manually mount any cartridges, you must manually dismount them and store them in the proper cell or remove them from the library.

Mounting a Cartridge to a DLT Drive

CAUTION:

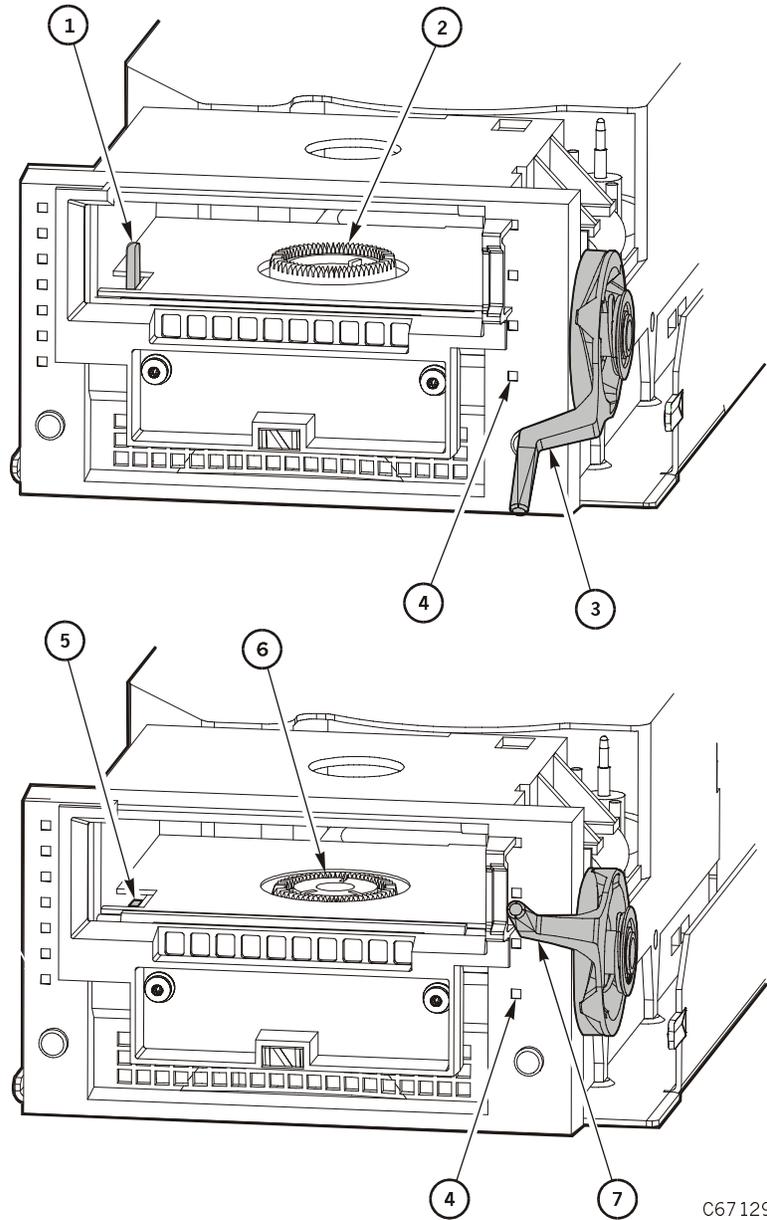
Potential equipment damage: Before you mount a cartridge into the drive, you must make sure power is on, and the *Operate Handle* indicator is steadily lit (not flashing).

To mount a cartridge to a DLT drive:

1. Obtain the cartridge VOLSER, location, and drive number from the server console.
2. Place the drive offline.
3. Open the library front door by using the key to unlock both latches. See [Figure 4-6 on page 4-23](#). Turn the key counterclockwise to unlock the latches; then pull open the door.
4. Locate the cartridge (see [“Locating a Cartridge in the Storage Cells” on page 4-26](#)).
5. Make sure the DLT handle is up and the *Operate Handle* indicator is steadily on.

Note: If the handle is in the down position, wait for the *Operate Handle* indicator to remain on steadily before moving it to the up position (see [Figure 4-11 on page 4-30](#)). If the *Operate Handle* indicator is flashing while the handle is up, move the handle to the down position and wait for the *Operate Handle* indicator to remain on steadily. Then move the handle to the up position.

Figure 4-11. Reviewing DLT Operate Handle and Hub Positions



C67129

Reviewing DLT Operate Handle and Hub Positions (C67129)

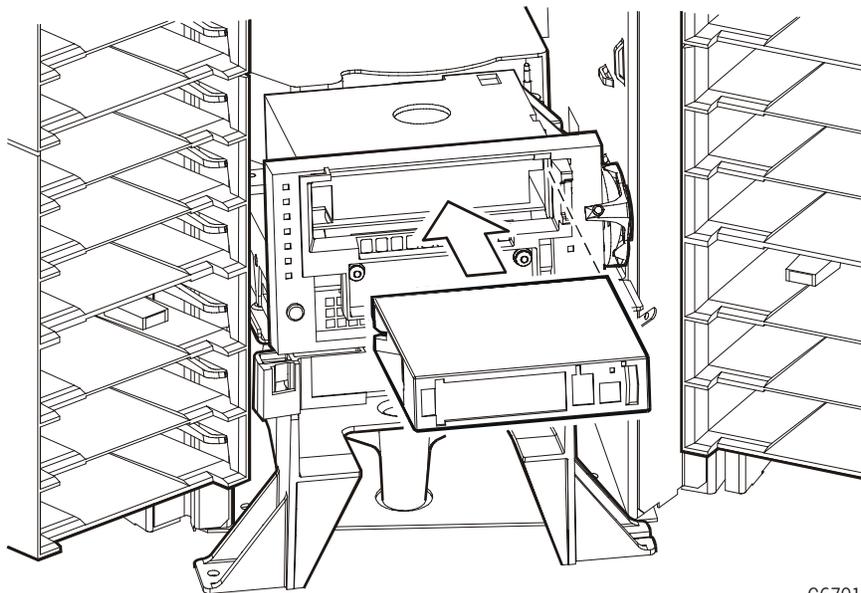
1. Cartridge hook (up)
2. Hub (up)
3. Handle (down)
4. Operate Handle indicator
5. Cartridge hook (down)
6. Hub (down)
7. Handle (up)

CAUTION:

Potential equipment damage. You must insert the cartridge properly or you will damage the drive. Use only DLT cartridges for DLT drives. Do not use DATA D3 (helical recording) cartridges or 3480-type cartridges in the L180 library.

6. Hold the cartridge so that the VOLSER label area is facing you and the write protect switch is on the right side of the cartridge, as shown in [Figure 4-12](#).
7. Insert the cartridge into the drive and push the cartridge into the back of the drive until it is firmly seated. If the drive is a DLT7000, you must hold the cartridge in place for three seconds.
8. Lower the drive handle.
9. Place the drive online.

Figure 4-12. Mounting a Cartridge into the DLT Drive



C67019

Dismounting a Cartridge from a DLT Drive

To dismount a cartridge from a DLT drive:

1. Obtain the drive number from the server console and place the drive offline.
2. Open the library front door by using a latch key to unlock both locks. See [Figure 4-6 on page 4-23](#). Turn the key counterclockwise to unlock the latches; then pull open the door.
3. Locate the desired drive.

4. Press the **Unload** button on the drive.
5. Wait (about 12 seconds) for the *Operate Handle* indicator to remain steadily on.
6. Raise the handle. The cartridge will eject about 12.7 mm (0.5 in.).

CAUTION:

Potential equipment damage: Wait at least three seconds before pulling the cartridge out of the drive. Immediately removing the cartridge may damage the cartridge or drive leaders.

7. Gently pull the cartridge from the drive.
Note: If the cartridge does not come out of the drive, remount the cartridge and return to Step 5.
8. Store the cartridge in an empty cell or outside the library (see [“Storing Cartridges” on page A-17](#)). If you store the cartridge in empty cell, you will have to reinitialize the library (see [“Reinitializing the Library” on page 3-3](#).)
9. Place the drive online.

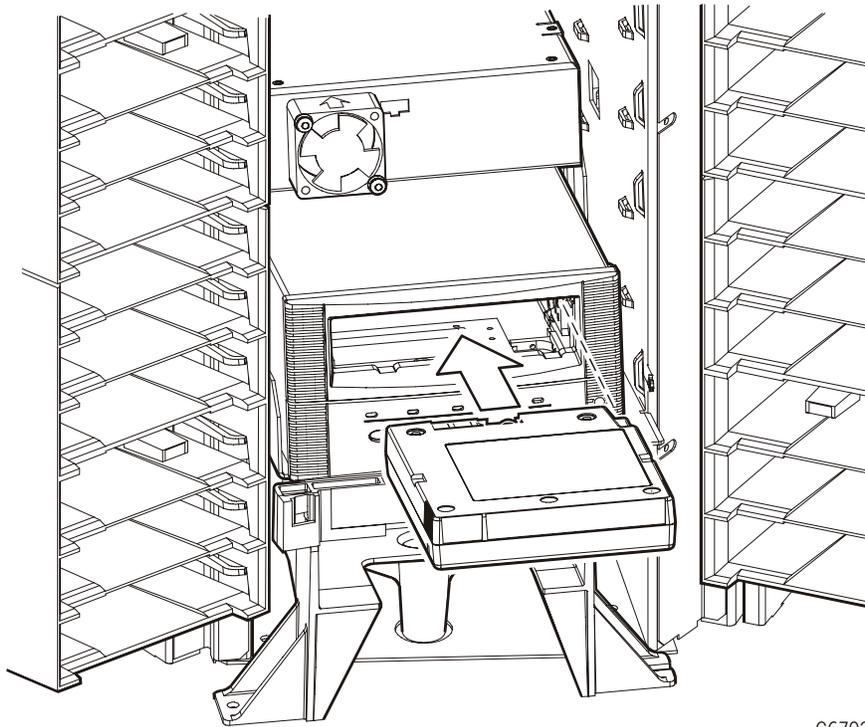
Mounting a Cartridge to a 9840 Drive

CAUTION:

Potential equipment damage. You must insert the cartridge properly or you will damage the drive. Use only 9840 cartridges for 9840 drives. Do not use DATA D3 (helical recording) cartridges or 3480-type cartridges in the L180 library.

To mount a cartridge to a 9840 drive:

1. Obtain the cartridge VOLSER, location, and drive number from the server console and place the drive offline.
2. Open the library front door by using a latch key to unlock both latches. See [Figure 4-6 on page 4-23](#). Turn the key counterclockwise to unlock the latches; then pull open the door.
3. Locate the cartridge (see [“Locating a Cartridge in the Storage Cells” on page 4-26](#)).
4. Insert the cartridge into the 9840 drive using the direction shown in the following figure.

Figure 4-13. Mounting a Cartridge into the 9840 Drive

C67020

5. Wait for one of the following messages to display on the drive's front panel and take the appropriate action, if necessary:
 - The Ready F (File Protected) message displays when a write-protected cartridge loads successfully.
 - The Ready U (File Unprotected) message displays when a cartridge that is not write-protected loads successfully.
 - The NTReady message displays when the tape in the cartridge has lost tension. Follow the instructions outlined in the *9840 Tape Drive System User's Reference Manual*, PN 95739 to correct this condition.
 - The LOADxxxx message displays when the cartridge unsuccessfully loads, where the xxxx is a fault symptom code. Follow the instructions outlined in the *9840 Tape Drive System User's Reference Manual*, PN 95739 to correct this condition.

Dismounting a Cartridge from a 9840 Drive

To dismount a cartridge from a 9840 drive:

1. Make sure that the 9840 drive is not selected by the client.

2. Obtain the drive number from the server console and place the drive offline.
3. Open the library front door by using a latch key to unlock both latches. See [Figure 4-6 on page 4-23](#). (Turn the key counterclockwise to unlock the latches; then pull open the door.)
4. Press the **Unload** switch on the front panel of the drive.

One of the following conditions can occur:

- After the tape rewinds, the cartridge ejects from the 9840 drive. Remove the cartridge from the 9840 drive.
 - The cartridge fails to eject after the tape rewinds. Refer to the *9840 Tape Drive User's Reference Manual*, PN 95739 to correct this condition.
 - If the **Unload** switch is pressed during a write operation, the 9840 drive tries to write the remaining data before the cartridge unloads. If the UnWrxxxx (Unwritten Data) message displays, where xxxx is the fault symptom code, the attempt failed and some data remains unwritten to the tape. For more information about recovering from an Unwritten Data condition, refer to the *9840 Tape Drive User's Reference Manual*, PN 95739.
5. Gently pull the cartridge from the drive.
 6. Store the cartridge in an empty cell or outside the library (refer to “[Storing Cartridges](#)” in [Appendix A](#), “[Cartridge Information](#)”). If you store the cartridge in empty cell, you will have to reinitialize the library (see “[Reinitializing the Library](#)” on [page 3-3](#).)
 7. Place the drive online.

Mounting a Cartridge to an Ultrium Drive

CAUTION:

Potential equipment damage. You must insert the cartridge properly or you will damage the drive. Use only 9840 cartridges for 9840 drives. Use only Ultrium cartridges for Ultrium drives. Use only DLT cartridges for DLT drives. Do not use DATA D3 (helical recording) cartridges or 3480-type cartridges in the L180 library.

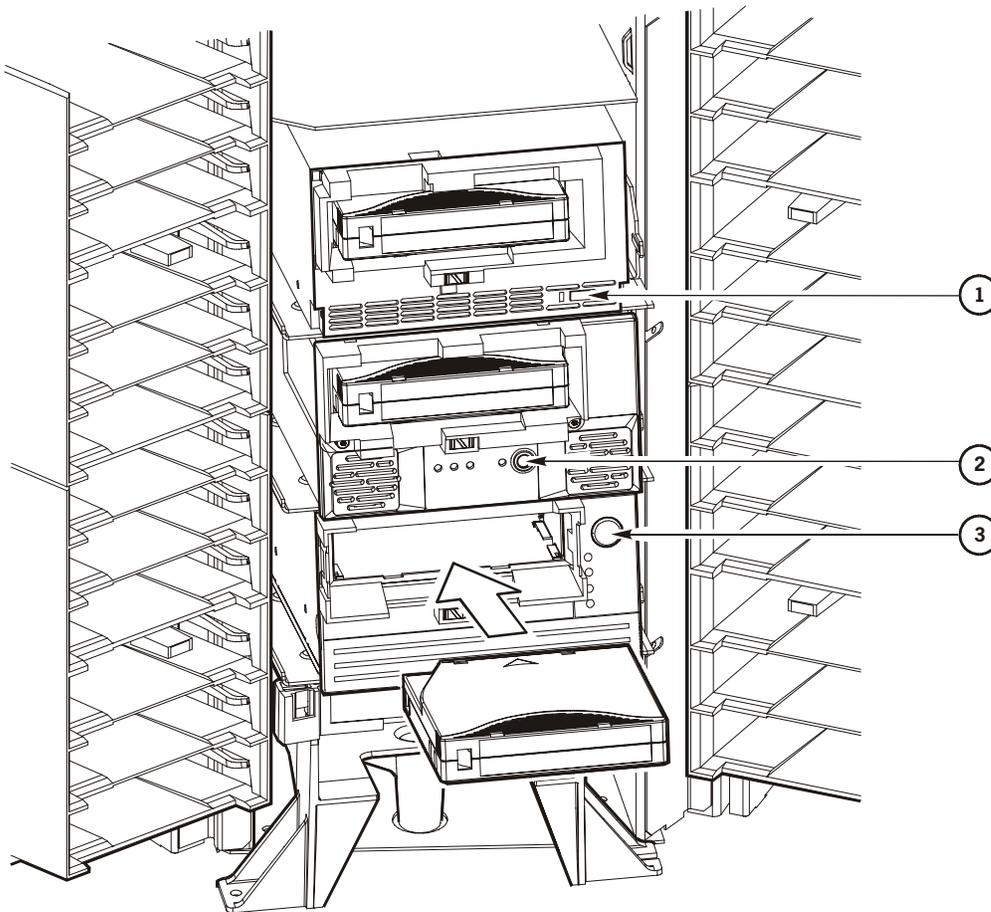
To mount a cartridge to an Ultrium drive:

1. Obtain the cartridge VOLSER, location, and drive number from the server console and place the drive offline.
2. Open the library front door by using a latch key to unlock both latches. See [Figure 4-6 on page 4-23](#). Turn the key counterclockwise to unlock the latches; then pull open the door.

Note: You *must* open the front door before attempting to manually mount a cartridge to an Ultrium drive. A unique communication between the library and the drive prepares the drive for manual operation.

3. Locate the cartridge (see “Locating a Cartridge in the Storage Cells” on page 4-26).
4. Insert the cartridge into the Ultrium drive using the direction shown in the following figure.

Figure 4-14. Mounting a Cartridge into an Ultrium Drive



C67293

Mounting a Cartridge to an Ultrium Drive (C67293)

1. Cartridge dismount button on 3580 Ultrium drive
2. Cartridge dismount button on Viper 200 Ultrium drive
3. Cartridge dismount button on Einstein Ultrium drive

5. Wait for the indicator on the front panel of the drive to stop blinking.
6. Place the drive back online.

Dismounting a Cartridge from an Ultrium Drive

To dismount a cartridge from an Ultrium drive:

1. Make sure that the Ultrium drive is not selected by the client.
2. Obtain the drive number from the server console and place the drive offline.
3. Open the library front door by using a latch key to unlock both latches. See [Figure 4-6 on page 4-23](#). (Turn the key counterclockwise to unlock the latches; then pull open the door.)

Note: You *must* open the front door before attempting to manually dismount a cartridge from an Ultrium drive. A unique communication between the library and the drive prepares the drive for manual operation.

4. Press the button on the front panel of the drive.

Note: Do not hold down the button.

One of the following conditions can occur:

- After the tape rewinds, the cartridge ejects from the Ultrium drive. Remove the cartridge from the Ultrium drive.
 - The cartridge fails to eject after the tape rewinds. Refer to the *3580 IBM Ultrium Setup, Operator, and Service Guide*, IBM PN GA32.0415.00 to correct this condition.
5. Gently pull the cartridge from the drive.
 6. Store the cartridge in an empty cell or outside the library (refer to [“Storing Cartridges” in Appendix A, “Cartridge Information”](#)). If you store the cartridge in empty cell, you will have to reinitialize the library (see [“Reinitializing the Library” on page 3-3](#).)
 7. Place the drive online.

Returning the Library to Online Status

To return the library online for automated operations:

1. Refer to your specific drive publications for instructions on making the drives ready. For a DLT drive, make sure the *Operate Handle* light is on and the handle is up.

Note: If you manually mounted any cartridges, you must manually dismount them and store them in a storage cell or remove them from the library.

2. Make sure that the library is powered on. (If you have powered off the library, power it on by lifting up on the power switch inside the rear door of the library.)

3. Close and lock the library front door. The robot will perform an audit of the cells.
4. Place the library and drives online by entering the appropriate commands at the server operator console.
5. Give the client command to upload the audit data to the client.
6. Refer to your specific software publications for instructions on replacing the cartridges you removed and on inserting the cartridges into the storage cells.



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This chapter describes what to do if problems occur with the library. In some cases, you might be able to correct the problem. In other cases, you must contact your service provider, as described in this chapter.

Refer to [Appendix A, “Cartridge Information”](#) when the problem is caused by a cartridge. Refer to your drive publications when the problem is caused by tape drives.

Most of the time, a fault symptom code (FSC) appears on the library operator panel display. Write down the FSC information, and give the information to your service representative or to the staff at StorageTek Customer Support Services (CSS).

■ Customer Support Services

The Call Center for Customer Support Services (CSS) is available 24 hours a day, seven days a week, to customers with StorageTek maintenance contracts and to StorageTek employees. You can find additional information about the CSS on StorageTek’s external web site at:

<http://www.storagetek.com/StorageTek/css>

■ Customer Initiated Maintenance

Customer Initiated Maintenance begins with a telephone call from you to the StorageTek CSS. You receive immediate attention from qualified StorageTek personnel, who record problem information and respond with the appropriate level of support.

To contact the CSS about a problem:

1. Use the telephone to call the StorageTek Customer Support Services at:

 **1-800-735-2778** (from within the United States)

 **303-673-4056** (from outside the United States)

2. Describe the problem to the call taker. The call taker will ask several questions and will either route your call to or dispatch a service representative.

If you have the following information when placing a service call, the process will be much easier:

Account name	_____
Site location number	_____
Contact name	_____
Telephone number	_____
Equipment model number	_____
Device address	_____
Device serial number (if known)	_____
Urgency of problem	_____
Fault Symptom Code (FSC)	_____
Problem description	_____

■ StorageTek's Worldwide Offices

You may contact any of StorageTek's worldwide offices to discuss complete storage, service, and support solutions for your organization. You can find address and telephone number information on StorageTek's external web site at:

http://www.storagetek.com/StorageTek/about/about_wo.html

(An underscore appears between "about" and "wo" in this URL.)

Cartridge Information

A

This appendix describes how to prepare, inspect, store, clean, and repair tape cartridges. It also lists cartridge specifications.

Note: Do not use 3840-type cartridges or DATA D3 (helical recording) cartridges in the L180 library.

■ DLT Basic Requirements for Cartridges

DLT cartridges must meet specifications defined in *American National Standard Magnetic Tape & Cartridge for Information Interchange, ACS X3B5*.

Cartridges must meet the following requirements:

- Cartridges
 - 101.6 mm x 127 mm x 25.4 mm (4 in. x 5 in. x 1 in.)
 - Integrated thumb wheel
- Media
 - Chromium dioxide
 - 12.7 mm (0.5 in.) wide
 - 165 m (541 ft) long, minimum
 - No beginning of tape/end of tape reflective markers
- Volume serial number (VOLSER) label
 - Valid characters are A–Z, 0–9, # (crosshatch), or trailing blanks. Leading blanks are not allowed.

■ DLT Colored Cartridge Specifications

Colored cartridges are approved only if the measured reflection density is greater than 1.20 for DLT cartridges and 1.50 for 9840 cartridges, as measured by an X-Rite 404G color reflection densitometer. For more information about colored cartridges, contact your StorageTek marketing representative. Measurements are:

Bandwidth	ANSI Status T Wide band (380 to 780 nanometers)
Measuring range	Density (0.00 to 2.50) D
Accuracy	± 0.02 D

Repeatability ± 0.01 D

Aperture diameter 3.4 mm

■ Ultrium Cartridge Information

Cartridges and labels for Ultrium drives are listed below by drive type.

Note: The advantage of the LTO specification is that any LTO Ultrium cartridge can work in any LTO Ultrium tape drive.

■ 3580 Ultrium

Table A-1 lists cartridges available from IBM.

Table A-1. IBM Ultrium Cartridges (No Labels)

IBM Part Number	Description
08L9149	100 GB data cartridge (no label)
08L9153	Cleaning cartridge

Cartridge labels for the 3580 Ultrium drive can be ordered from their authorized suppliers at the addresses or Web sites listed below.

<http://www.ibm.com/storage/storagesmart/lto>

Engineered Data Products Corporation
 2550 West Midway Boulevard
 Broomfield, CO 80020
 U.S.A.

Telephone: 800 4321 EDP

<http://www.edp-usa.com/pdf/labelmi.pdf>

Engineered Data Products Corporation
 43 Redhills Road
 South Woodham Ferrers
 Chelmsford
 Essex CM3 5UL
 England

Telephone: +44 1245 322380

<http://www.edp-usa.com/pdf/labelmi.pdf>

■ Einstein Ultrium

Hewlett-Packard offers cartridge ordering information through its Storage Media web site:

<http://www.hp.com/storagemedia/>

■ Cartridge Preparation

The following pages describe how to prepare a cartridge for use in the library.

Handling a Cartridge

Improper handling of cartridges can result in a loss of data or damage to a library component.

To handle a cartridge correctly:

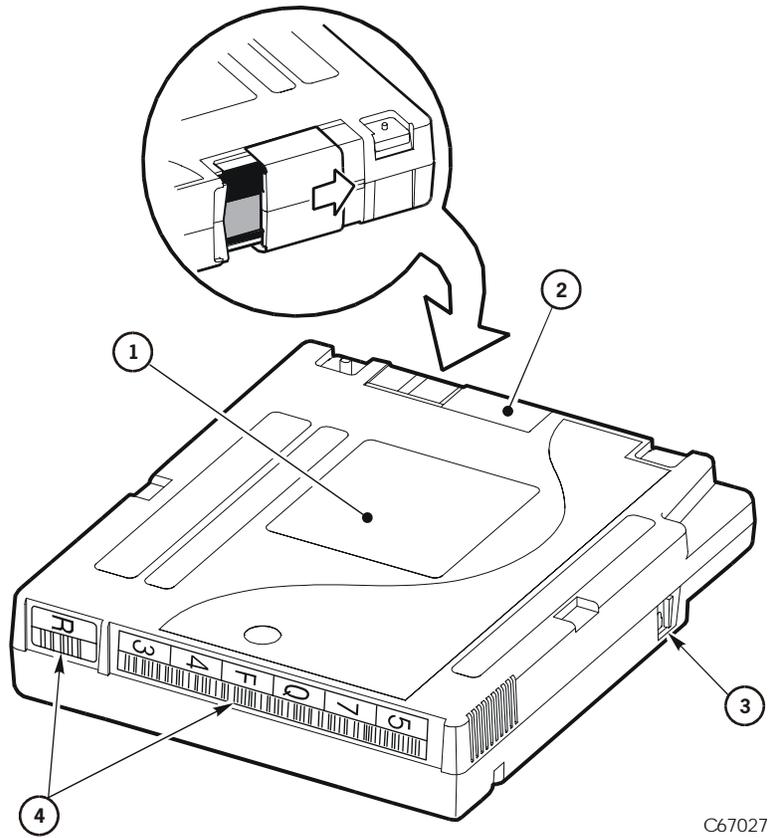
- Make sure the leader block is latched every time you pick up a cartridge.
- Keep cartridges *clean*.
- Inspect a cartridge before each use, and *never* put a damaged cartridge into a drive or library.
- Never release a leader block and pull tape from a cartridge.
- Never open a cartridge.
- Do not handle tape that is outside the cartridge; the tape edge might be damaged.
- Do not expose the tape or cartridge to direct sunlight or moisture.
- Do not expose a recorded cartridge to magnetic fields; this might destroy data on the tape.

Inspecting a Cartridge

A defective or dirty cartridge can damage a drive. Always inspect a cartridge before inserting it into a drive or a library. Refer to [Figure A-3 on page A-5](#), [Figure A-1 on page A-4](#) or [Figure A-2 on page A-5](#). Look for:

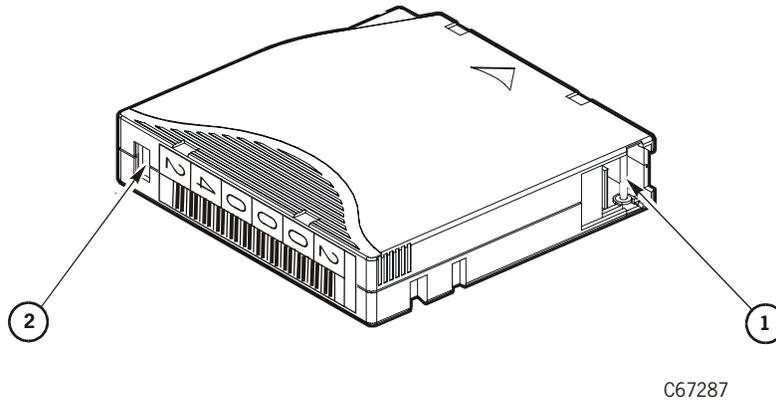
- Cracked or broken cartridge
- Broken leader block
- Broken leader block latch
- Damaged write-protect selector or write-protect switch
- Liquid in the cartridge
- Labels not firmly attached or extending over the cartridge edge
- Any other obvious damage

Figure A-1. Inspecting a 9840 Cartridge

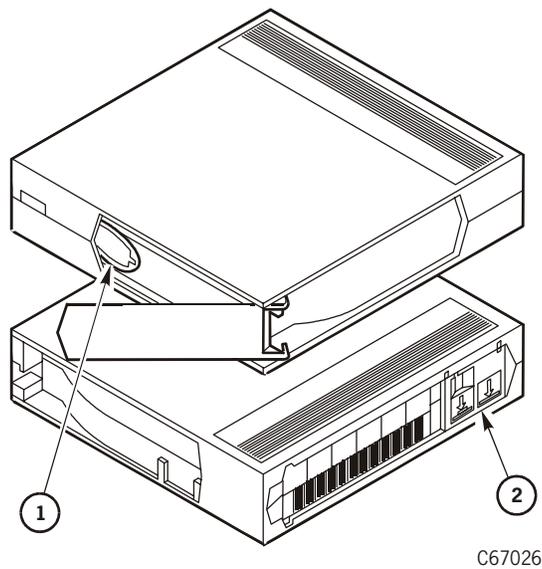


9840 Cartridge Components (C67027)

1. Customer label
 2. Access door
 3. Write-protect switch
 4. Labels
-

Figure A-2. Inspecting an Ultrium Cartridge

1. Access door
2. Write-protect switch (data cartridge = red; cleaning cartridge = gray)

Figure A-3. Inspecting a DLT Cartridge

DLT Cartridge Components (C67026)

1. Tape leader
2. Write-protect switch

■ Cartridge Tapes and Labels

StorageTek's Tape Media Sales organization handles orders for cartridge tapes and labels. To obtain additional information about cartridge tapes and labels, call StorageTek's Tape Media Sales (from within the United States) at 1-800-905-8502, or contact them by fax 1-877-888-0609: from 8 a.m. to 8 p.m. United States Eastern Standard Time Monday through Friday. You also can find tape media information on StorageTek's web site at:

<http://www.storagetek.com/products/tape/services/>

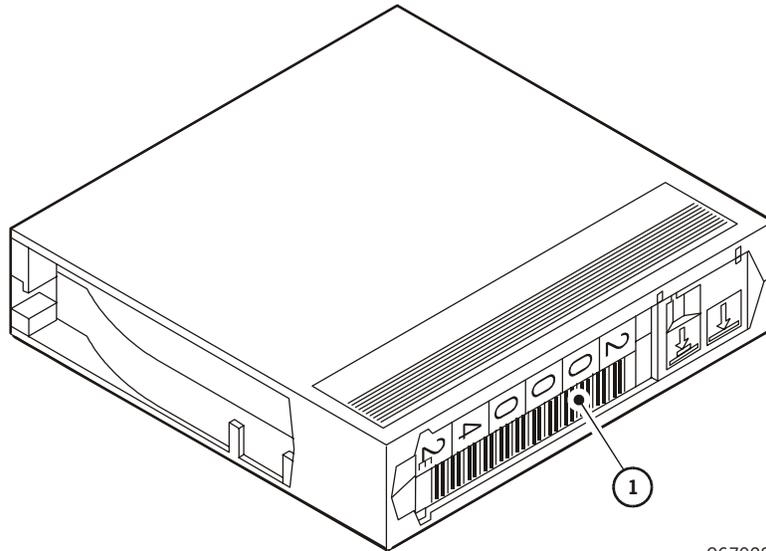
Order cartridge tapes and labels by including the order on the sales entry form, if used; the media portion of the order will be routed to the appropriate department.

Orders for domestic customers, value-added distributors (VADs), and value-added resellers (VARs):

5390 Triangle Parkway, Suite 300
Norcross, GA 30092
Voice: 1-800-905-8502
Media Service Center
Fax: 1-877-888-0609

Orders from distributors, original equipment manufacturers (OEMs), and Canada, Japan, Australia, South Asia, or Mexico subsidiaries:

Orders Management
Fax: 303-673-2640 for distributors or subsidiaries
Fax: 303-673-7654 for OEM
One StorageTek Drive
Louisville, CO 80028-4350
Voice: 303-673-5513

Figure A-4. Applying Cartridge Labels to DLT Cartridges

C67028

DLT Cartridge Label Components (C67028)

1. VOLSER label

Applying Cartridge Labels to DLT Cartridges

Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the VOLSER reflects the media. Cleaning cartridges have CLN in the VOLSER; diagnostic cartridges have DG in the VOLSER.

The kinds of cartridge labels you might need to apply are:

- CompacTape III VOLSER
- CompacTape IIIXT VOLSER
- CompacTape IV VOLSER
- Diagnostic cartridge VOLSER
- Cleaning cartridge VOLSER

Refer to [Figure A-4 on page A-7](#) and perform these steps before inserting the label into the recessed area on the cartridge:

CAUTION:

Make sure the edges of the labels do not curl; curling causes the cartridge to stick in the drive loader and the robot will misread the VOLSER.

1. Make sure the cartridge has been at room temperature for at least 24 hours.
2. Clean the surface where the labels will be placed using a cleaning solution made for this purpose. Refer to [“Cleaning the Cartridge Exterior” on page A-17](#).
3. Locate the label that you require and refer to [Figure A-4 on page A-7](#):
 - Compactape III has a “C” next to the far left number, bar code down.
 - Compactape IIIXT has an “E” next to the far left number, bar code down.
 - Compactape IV has a “D” next to the far left number, bar code down.
 - Diagnostic cartridge has “DG” at the beginning of the VOLSER label.
 - Cleaning cartridge has “CLN” somewhere on the VOLSER label.
4. Hold the cartridge so that the write-protect switch is toward you.
5. Refer to [Figure A-4 on page A-7](#) and slide the label under the slots in the recessed area. If you prefer, peel the backing from the label and then slide it under the slots, pressing it into place.

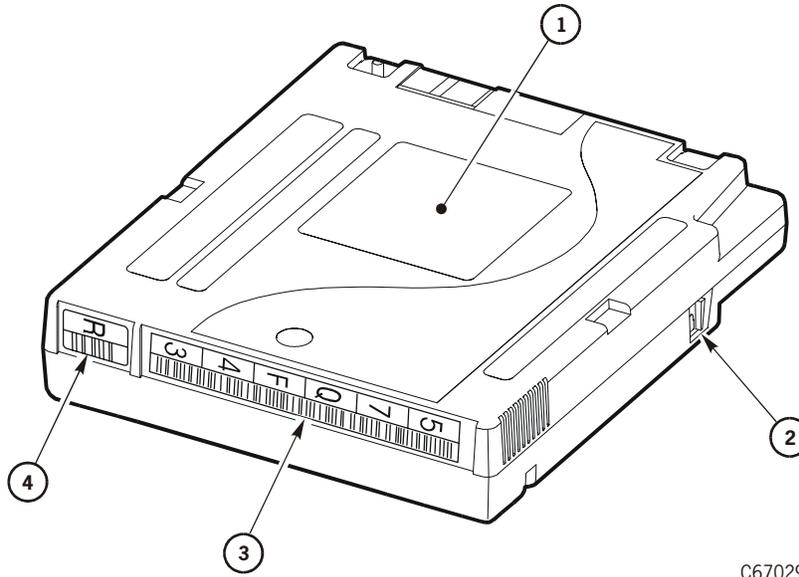
Note: The following statements apply to cartridge labeling:

1. Make sure the labels are not placed elsewhere on the cartridge surface.
2. Use labels that do not leave a residue when removed.
3. Make sure the label contains a VOLSER and media letter.

Applying Cartridge Labels to 9840 Cartridges

Refer to 9840 documentation before applying labels to 9840 cartridges.

Figure A-5. Applying Cartridge Labels to 9840 Cartridges



C67029

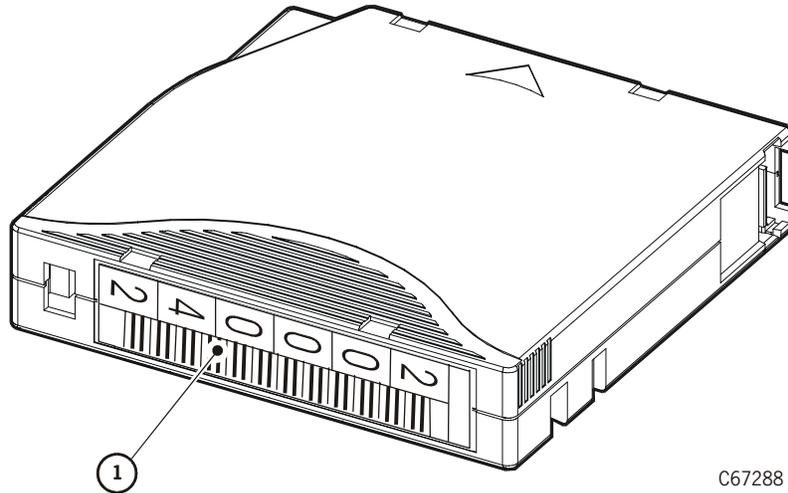
9840 Cartridge Label Components (C65008)

1. Customer label
 2. Write-protect switch
 3. VOLSER label
 4. Media ID label
-

Applying Cartridge Labels to Ultrium Cartridges

Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the VOLSER reflects the media. Cleaning cartridges have CLN in the VOLSER; diagnostic cartridges have DG in the VOLSER.

Figure A-6. Applying Cartridge Labels to Ultrium Cartridges



C67288

Applying Cartridge Labels to Ultrium Cartridges (C67288)

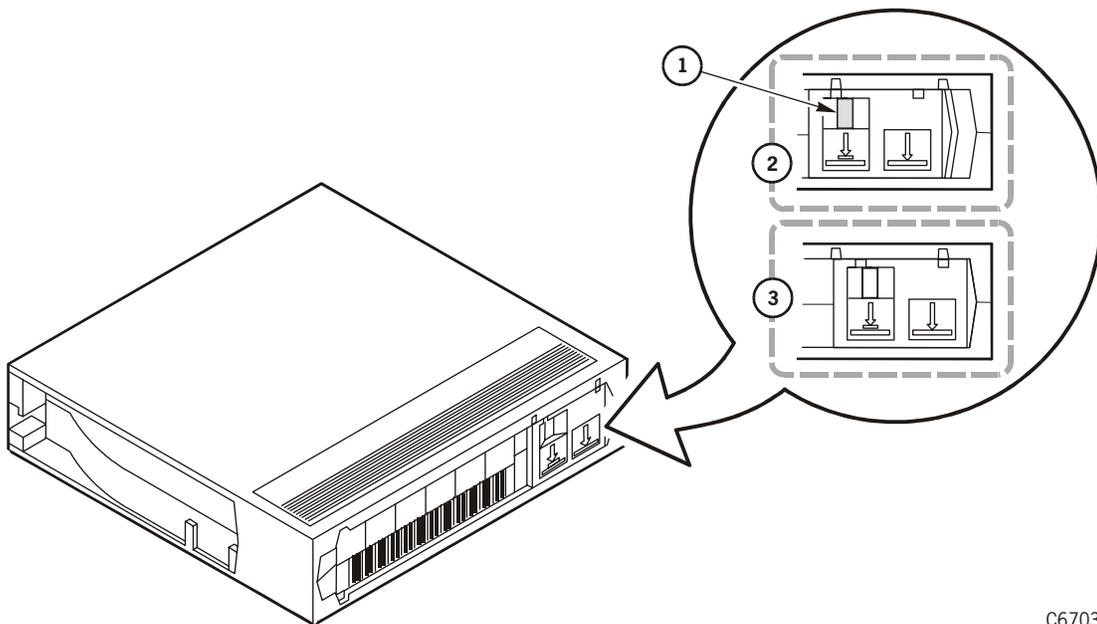
1. VOLSER label
-

Setting the DLT Write-protect Switch

You can set the write-protect switch so the cartridge is *write-enabled*. Slide the switch to the right so the orange indicator is not visible (see [Figure A-7](#)). In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the library.

You can set the write-protect switch so that the cartridge is *read-only* (nothing can be written on the tape). Slide the switch to the left so that the orange indicator is visible (see [Figure A-7](#)). In this position, the drive can only read data from the tape, but cannot write data on it.

Figure A-7. Setting the DLT Write-protect Switch



C67030

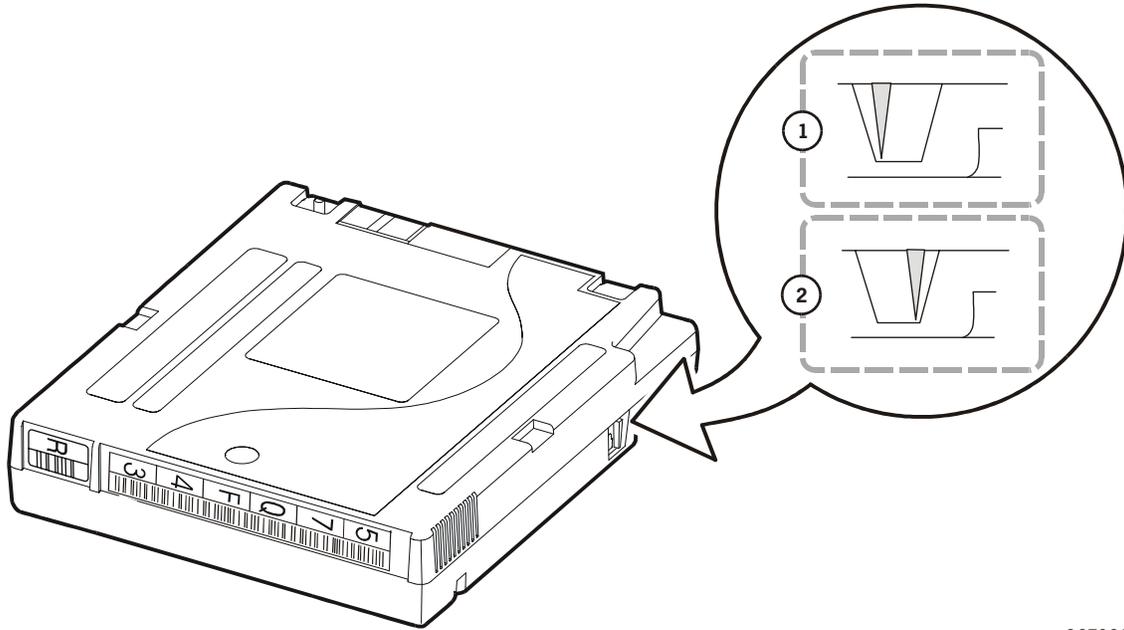
DLT Write-protect Components (C67030)

1. Orange indicator to show that tape is write-protected
2. Write-protect position
3. Write-enabled position

Setting the 9840 Write-protect Switch

Refer to the 9840 drive documentation for instructions on how to set the cartridge's write-protect switch.

Figure A-8. Setting the 9840 Write-protect Switch



C67031

9840 Write-protect Components (C67031)

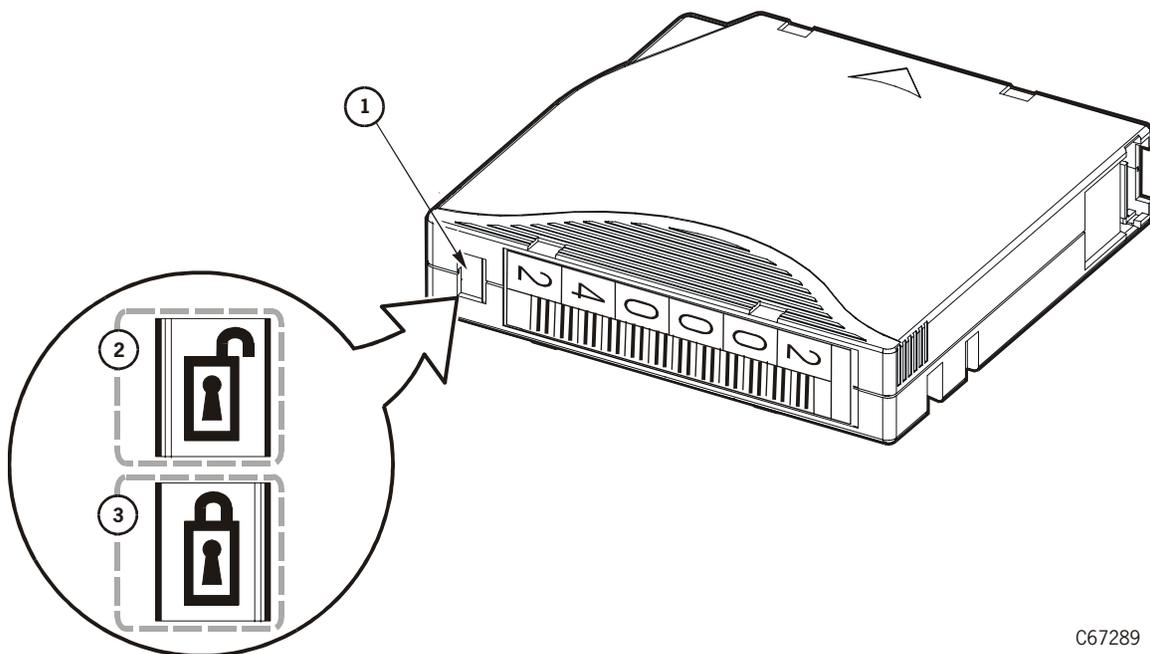
1. Write-enabled position
 2. Write-protect position
-

Setting the Ultrium Write-protect Switch

As shown in [Figure A-9 on page A-13](#), you can set the write-protect switch so that the cartridge is *write-enabled*. Slide the switch to reveal the “open lock” symbol to write-enable the tapes. In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the tape library.

You can set the write-protect switch so that the cartridge is *read-only* (nothing can be written on the tape). Slide the switch to reveal the “closed lock” symbol. In this position, the drive can only read data from the tape; the drive cannot write data to it.

Figure A-9. Setting the Ultrium Write-protect Switch



C67289

Setting the Ultrium Write-protect Switch (C67289)

1. Write-protect switch
2. Write-enabled position
3. Write-protected position

■ Cartridge Maintenance

The following pages list cartridge environmental specifications, describe how to store and clean cartridges, use cleaning cartridges, and repair a detached leader block.

DLT Cartridge Environmental Specifications

Table A-2. DLT Cartridge Environmental Specifications

<i>Operating environment</i>	
Temperature	10° to 40°C (50° to 104°F)
Relative humidity	20% to 80% noncondensing
Wet-bulb temperature	25° C (77°F) maximum
CAUTION:	
<i>Potential damage to cartridges:</i> Tape temperatures above 49°C (120°F) might damage the tapes. If during storage or transportation a cartridge has been exposed to conditions exceeding the above values, before using the cartridge, keep the cartridge within those operating environment specifications for at least as long as the time that the cartridge exceeded the specifications, up to two hours. Make sure the cartridge has no moisture on it.	
<i>Potential damage to cartridges:</i> When storing DLT cartridges, the stray magnetic field at any point on the tape shall not exceed 4000A/m. Make sure the cartridge has no moisture on it.	
<i>Cartridge storage environment</i>	
Temperature	16° to 32°C (61° to 90°F)
Relative humidity	20% to 80% noncondensing
Wet-bulb temperature	26° C (79° F) maximum
<i>Cartridge storage environment for cartridges intended for archiving data for one year or more</i>	
Temperature	18° to 26°C (64° to 79°F)
Relative humidity	40% to 60%

For more information on DLT cartridges, visit the Quantum web site at:

<http://www.Quantum.com>

9840 Cartridge Environmental Specifications

The following specifications refer to the operating and storage environments for 9840 cartridges.

Table A-3. 9840 Cartridge Environmental Specifications

<i>Operating environment</i> ¹ .	
Temperature	15.6° to 32.2°C (60° to 90°F)
Relative humidity	20% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge storage environment (archive)</i>	
Temperature	5° to 25.5°C (41° to 78°F)
Relative humidity	40% to 60%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge storage environment (non-archive)</i>	
Temperature	5° to 32.2°C (41° to 90°F)
Relative humidity	5% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge shipping environment (unrecorded)</i> ² .	
Temperature	-23° to 49°C (-10° to 120°F)
Relative humidity	5% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge shipping environment (recorded)</i> ² .	
Temperature	4° to 40°C (40° to 104°F)
Relative humidity	5% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum

Notes:

¹The conditioning time before use is 24 hours.

²The shipping environment must not exceed the limit of the storage environment, archive or non-archive, for longer than 10 days.

Ultrium Cartridge Environmental Specifications

The following specifications refer to the operating and storage environments for LTO Ultrium cartridges.

Table A-4. LTO Ultrium Cartridge Environmental Specifications

<i>Operating environment</i> ¹ .	
Temperature	10° to 45°C (50° to 113°F)
Relative humidity	20% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge storage environment (archive)</i> ² .	
Temperature	16° to 25°C (61° to 77°F)
Relative humidity	20% to 50%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge storage environment (non-archive)</i>	
Temperature	16° to 32°C (61° to 90°F)
Relative humidity	20% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge shipping environment (unrecorded)</i> ³ .	
Temperature	-23° to 49°C (-10° to 120°F)
Relative humidity	20% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum

Notes:

¹The conditioning time before use is 24 hours.

²Archival storage is one to 10 years.

³The shipping environment must not exceed the limit of the storage environment, archive or non-archive, for longer than 10 days.

Storing Cartridges

When you store a cartridge:

- Leave it in its protective wrapping until you are ready to use it.
- Choose a clean environment that duplicates the conditions of the room in which it is used.
- Make sure it has been in its operating environment for at least 24 hours.

Cleaning the Cartridge Exterior

CAUTION:

Potential damage to cartridges: Do not use certain solvents to remove labels or to clean cartridges because they can damage the cartridges. Do not use acetone, trichloroethane, toluene, xylene, benzene, ketone, methylethyl ketone, methylene chloride, ethyldichloride, esters, ethyl acetate, or similar chemicals.

Wipe all dust, dirt, and moisture from the cartridge with a lint-free cloth.

Use StorageTek Tape Cleaner Wipes, PN 4046289-01, to clean the cartridges. These wipes are saturated with isopropyl alcohol. Do not let any solution touch the tape or get inside the cartridge.

Repairing a Detached Leader Block

When a tape is damaged, use a backup tape. If a leader block is detached, there is no obvious damage to the cartridge or tape, and you have no backup tape, you may repair the leader block using a repair kit provided by your supplier. You can use the tape once to copy the data onto another tape.

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Glossary

This glossary defines abbreviations and new or special terms in this publication.

A

address A character or group of characters that identifies a register, a particular part of storage, or some other data source or destination.

Advanced Interactive Executive (AIX)

The operating software for an IBM RISC System/6000.

audit (1) Tape library audit—the part of the library initialization sequence that catalogs all tape cartridge locations. This data is retained in the logic (MPC) card memory.

(2) client audit—A client request to catalog the tape cartridges of a library by SCSI element or library number, panel, row, column.

Automated Cartridge System Library

Software (ACSL) The software within a Unix-based server that interfaces the server and clients; it also maintains a list of all cartridges within a library.

automated mode A relationship between a library and all attached clients. The library is powered on and ready to receive operator requests. In automated mode, the robot moves cartridges among storage cells, the CAP, and drives. This is the normal operating mode of a library.

B

bus A facility that transfers data between two devices with only one device having control at a time. An interface.

C

camera A system that reads VOLSER labels on cartridges, instead of scanning the labels with a laser. A camera performs faster and more accurately than a laser scanner.

CAP *See* “cartridge access port.”

cartridge The plastic housing around a cartridge tape. A plastic leader block is attached to the tape for automatic threading when loaded in a transport. The spine of the cartridge contains a VOLSER label listing the volume identification number.

cartridge access port (CAP) An assembly allowing an operator to enter or eject cartridges during automated operations.

cartridge tape Magnetic tape enclosed in a plastic housing.

catalog The inventory of all cartridge storage locations in an L180 library. This inventory is by SCSI element or library number, panel, row, column.

cell In the library, a receptacle that stores a single cartridge.

configuration The physical description of a library, listing the panel types, cartridge capacity, type of client connection, and number of tape drives.

Customer Resource Center (CRC)

StorageTek’s Web-based service that provides technical information to customers with StorageTek maintenance contracts. A log-in and password are required.

Customer Support Services (CSS)

StorageTek’s customer services organization. Customers with StorageTek maintenance contracts may contact CSS 24 hours a day, seven days a week.

D

diagnostics Tests, accessible through the library operator panel or the Horizon Library Monitor, that allow a user to evaluate the functionality of certain library components while the library is offline.

differential operation A SCSI bus alternative in which the signal from the SCSI chip passes through a set of differential drivers/receivers. This alternative provides better signal quality with less cross-talk and noise but requires more power to drive the signal. The maximum cable length is 25 m (82 ft.). *See* “single-ended operation.”

drive A device that reads from or writes to a magnetic tape.

drive column Inside the library, a set of hardware shelves with power connections into which drives are installed.

E

Ethernet address A six-byte address that makes a library accessible to a network. (*See* “IP address,” “library name,” “network gateway,” and “subnet mask.”)

event log *See* “FSC log.”

F

fault symptom code (FSC) Error or information code generated by functional or diagnostic software that may directly or indirectly be used to indicate the field replaceable unit (FRU) that is probably causing the error.

Fibre Channel The American National Standards Institute standard that defines an ultra high-speed, content-independent, multilevel data transmission interface that can support multiple protocols simultaneously, support connectivity to millions of devices over fiber-optic physical media, and provides

the best characteristics of both networks and channels.

FSC log A file, accessible through the operator panel, that contains events that occurred during the functional operation of the library.

H

hand-camera assembly The robotic element that includes a motor, a gripper for grasping cartridges, and a camera for reading VOLSER labels and targets.

hard address A device address that is directly input into the firmware by the operator or manufacturer.

Horizon L Series Library Monitor An optional software interface that provides internet browser operation for the library. This feature is enabled by the personality module.

HVD High Voltage Differential SCSI.

I

initial program load (IPL) A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these programs at IPL execution.

initialization A startup-diagnostic routine performed automatically by the library when it is powered on or when the main door is opened and closed. In the L180 library, this routine includes an audit of the cells.

Internet Protocol (IP) address A four-byte value that identifies a library and makes it accessible through a network. (*See* “Ethernet address,” “subnet mask,” and “library name.”)

in-transit cartridges Cartridges that have been moved from their home cell by the robot. The client software must recover these

cartridges to a known location to clear out the software in-transit record.

IP address *See* “Internet Protocol (IP) address.”

IPL *See* “initial program load (IPL).”

L

leader block The mechanism that loads the cartridge tape through the tape path in a drive.

library name An assigned name that maps to the IP address for a library. (*See* “IP address,” “Ethernet address,” and “network gateway,” and “subnet mask.”)

load a cartridge The process by which a drive prepares a cartridge tape for read and write operations.

LTO Linear Tape Open, an open specification for tape storage devices.

LVD Low-Voltage Differential SCSI.

M

manual mode A relationship between an library and all attached clients. Tape libraries operating in manual mode have been placed offline to all client CPUs and require human assistance to perform cartridge operations.

media format Format of data written on the cartridge tape (36-track, compressed, etc.)

mount a cartridge The process by which the library robot retrieves a cartridge from a cell and places it into a drive.

MPC card The main logic card in the library.

N

network gateway A four-byte notation that makes the library accessible to a large network, which consists of two or more subnets, through a gateway connection.

non-volatile (random-access) memory (NVRAM) A section of memory that will retain its information even when power is removed from the equipment.

O

offline Not available for functional use by the client CPU.

online State of being controlled directly by or in direct communication with a computer. Available for functional use.

P

Port 0 address The address by which the library’s first (and currently *only*) port will be identified on a Fibre Channel loop.

R

RESET button This button will start a initial program load to the library.

RISC System/6000 An IBM processor that may be used to connect several IBM AS/400 processors, acting as their server through a network.

robot Electro-mechanical device for locating and moving cartridges.

S

servo Device that uses closed-loop feedback to govern physical positioning.

single-ended operation A SCSI bus alternative in which the signal passes directly between SCSI chips on either end of the cable. *See* “differential operation.”

small computer systems interface (SCSI) A type of data or control interface between the library/ tape drives and client.

StorageTek Storefront StorageTek’s global Web site. The site provides information about

topics such as news bulletins, products, services, integrated solutions, customer support, and upcoming events. The Storefront is accessible to all persons with a web browser.

subnet mask A four-byte notation that resolves routing within a network. (See “IP address,” “Ethernet address,” “library name,” and “network gateway.”)

T

theta motor The motor responsible for the lateral movement of the hand mechanism in the library.

Tri-Optic label An external label attached to the spine of a cartridge that is both human- and machine-readable. *See also* “volume serial (VOLSER) label.”

TTI Tape Transport Interface.

U

Ultrium The single hub implementation of the LTO specification for tape storage devices.

V

VOLSER The volume serial identification of a cartridge tape.

volume A certain portion of data, together with its data carrier, that can be handled conveniently as a unit.

volume serial (VOLSER) label An alphanumeric label used by client software to identify a volume (sometimes used to indicate the contents of a tape).

Y

Y-cable A communications cable that has two connectors at one end and one connector at the other.

Z

Z carriage The portion of the robot on which the hand assembly rests.

Z column The column (or tube) which allows the hand mechanism in the library to move vertically.

Z motor The motor responsible for the vertical movement of the hand assembly in the library.

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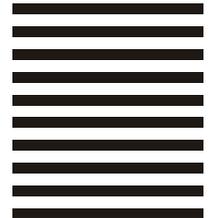
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