

# L180 Tape Library

Installation Manual



**STORAGETEK**





# L180 Tape Library

Installation Manual

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Information Development  
Storage Technology Corporation  
One StorageTek Drive  
Louisville, CO 80028-2201  
USA

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# Summary of Changes

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<b>EC</b>	<b>Date</b>	<b>Edition</b>	<b>Description</b>
111222	Nov. 1999	First Edition	Initial Release
111426	March 2000	Second Edition	Changes as noted in second edition document.
??	Sept. 2000	Third Edition	

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# Preface

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This manual describes how to install an L180 tape library (in this manual called “the L180 library” or “the library”) and its associated drives. This manual is intended primarily for StorageTek solutions delivery engineers (SDEs) or authorized original equipment manufacturing (OEM) engineers.

This preface contains information about:

- How the manual is organized
- What kind of conventions the manual follows, including:
  - Trademarks
  - Notes, warnings, and cautions
  - Typographical conventions
- What related publications are available
- How to find additional information
- How to protect your safety, to handle fiber optic cables, to avoid electrostatic discharge, and to install rack components when working with this library.

## Organization

This manual contains the following information:

- Chapter 1** “General Information” provides an overview of the L180 tape library models and features. It shows the location of major system components. This chapter also lists physical, environmental, and power requirements for the tape library.
- Chapter 2** “Library and Drive Installation” describes the procedures for unpacking and installing the library and drives. This chapter also describes how to connect a laptop device to the SER1 port.
- Chapter 3** “Library Configuration” describes how to configure the library and SCSI drives for operation with the client.
- Chapter 4** “Cables for External Paths” explains how to connect the library and tape drives to the client system.
- Chapter 5** “Library Preparation” provides procedures to prepare and test the library and drives before placing them online.

- Appendix A** “Library Elements and MPC Card” provides diagrams of all wall elements within the library, an illustration of the MPC logic card, and a system diagram.
- Appendix B** “Initialization Sequence” explains the sequence of tasks the library performs during its initialization sequence.
- Glossary** The Glossary defines new or special terms and abbreviations used in this publication.
- Index** The Index assists in locating information in this publication.

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## ■ 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	<a href="#">Figure 2-1 on page 2-5</a>	Blue (prints black in hard-copy publications)
Indicators	<i>Open</i>	Italic; capitalization follows interface (usually initial caps)
Jumper names	TERMPWR	All uppercase
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	<a href="http://www.storagetek.com">www.storagetek.com</a>	Blue (prints black in hard-copy publications); underlined; split at forward slash or period

## ■ Related Publications

You can find additional information in the following publications, some of which are delivered with this product.

<b>L180 Tape Library Documentation</b>	<b>Part Number</b>
<i>L180 Tape Library General Information Manual</i>	MT 4012
<i>L180 Tape Library Illustrated Parts Catalog</i>	95898
<i>L180 Tape Library Hardware Operator's Guide</i>	95895
<i>L180 Tape Library Service Manual</i>	95897
<i>L180 Tape Library System Assurance Guide</i>	MT 5009
<i>L700/L180 Tape Libraries Interface Reference Manual</i>	95869

<b>Tape Drive Documentation</b>	<b>Part Number</b>
<i>9840 Tape Drive Product Manual</i>	95741
<i>9840 Tape Drive Service Reference Manual</i>	95740
<i>9840 Tape Drive User's Reference Manual</i>	95739
<i>9840 Tape Drive Installation Manual</i>	95879
<i>DLT7000 Tape Drive Product Manual</i>	313134501 Quantum part number 81-60000-0x
<i>DLT8000 Tape Drive Product Manual</i>	Quantum part number: 81-60118-02

<b>ACSLs Publications</b>	<b>Part Number</b>
<i>Automated Cartridge System Library Software: System Administrator's Guide</i>	112194201

<b>Other Publications</b>	<b>Part Number</b>
<i>American National Standard Dictionary for Information Processing Systems</i>	ANSI X3/TR-1-82
<i>Code for Information Interchange</i>	ANSI X3.4-1977
<i>L180/L700 Interface Reference Manual</i>	95869 (StorageTek)
<i>Magnetic Tape Labels and File Structure for Information Interchange</i>	ANSI X3.27-1978

<b>Other Publications</b>	<b>Part Number</b>
<i>Recorded Magnetic Tape and Cartridge for Information Interchange</i>	ANSI X3B5/87-009
<i>SCSI-2</i>	ANSI X3T9.2/86-009
<i>SCSI-3 Parallel Interface (SPI)</i>	ANSI X3T9.2/91-010R7
<i>Small Computer System Interface</i>	ISO 9316:1989

## ■ Additional Information

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### 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. (This site encompasses the former Electronic Documentation Center.) 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. StorageTek employees may enter the CRC through Portal.

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, StorageTek employees and

current partners who do not have access can request a login ID and password and prospective partners can apply to become StorageTek resellers.

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## KnowledgeMap

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## Documents on CD

*Documents on CD* (part number 3106600xx) is a compact disc that contains portable document format (PDF) files of StorageTek's tape, library, OPENstorage disk, and StorageNet publications. Contact your local Customer Services Logistics Depot to order this CD and to get onto the distribution list for this CD. The *Documents on CD* is only for StorageTek employees.

## Hard-copy Publications

You may order hard copies of publications listed on the CRC or included on the *Documents on CD*.

Service publications have *numeric* part numbers. To order hard copies of service publications, contact your local Customer Services Logistics Depot.

Marketing publications have *alphanumeric* part numbers. To order hard copies of marketing publications, do one of the following:

- Visit the StorageTek's Portal and select alphabetical listings under "L" or select *Online Forms*. Then search for Literature Distribution. Follow the instructions on the Literature Distribution web page.
- Send an e-mail to Literature Distribution at [DistrL@louisville.stortek.com](mailto:DistrL@louisville.stortek.com).

## 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

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This section covers topics that are *essential* to all customer service activity:

- Safeguarding safety
- Handling fibre optic cables properly
- Preventing electrostatic discharge (ESD) damage to equipment
- Installing equipment in the rack area

Read the following pages and become familiar with these guidelines before beginning any service activity.

## ■ Safety Precautions

### **CAUTION:**

***Potential injury:* On-the-job safety is important; therefore, observe the following safety precautions while you are engaging in any maintenance activity. Failing to follow these precautions could result in serious injury.**

**Remove all conductive jewelry, such as watches and rings, before you service powered-on equipment.**

- Avoid electrical shock. Be careful when you work near power connectors and supplies.
- Power-off the equipment that is being serviced before you remove a field replaceable unit (FRU) or other component. Remember that dangerous voltages could still be present in some areas even though power is off.
- Ground all test equipment and power tools.
- Lift objects properly; read the information in [“Lifting Techniques” \(see below\)](#).
- Do not remove, cut, or relocate any floor tiles indiscriminately. Before you manipulate floor tiles, be sure that you understand the customer’s environment and receive the customer’s approval. Remember, each situation is different.
- Enforce good housekeeping practices in the equipment area to help prevent fire and accidents.

**Note:** Important things to investigate and to be aware of include the use of Halon® gas, under-the-floor smoke detectors, and cables to other equipment installed nearby.

## Lifting Techniques

Lifting, regardless of how much or how little, can create serious back stress. If you follow these guidelines, you can reduce the risk of back injury:

- Do not twist your body to pick up something or to put it down. Twisting puts extreme pressure on your back, especially when you lift or carry objects. Instead of twisting, make the task two separate moves; first lift, and then use your feet to turn your body.
- Plan the lift: first examine the object and then determine how it will be lifted and where it will be placed.
- Choose the appropriate lifting technique. Examine the weight, size, location, frequency, and direction of the lift. Plan to avoid awkward postures, and determine if material-handling aids are needed.
- Place your feet shoulder-width apart, and place one foot a little behind the other. Keep your back straight because even light loads can significantly increase pressure on your spine when you lean forward.
- Whenever you can, grip the load with your whole hand, and use two hands.
- Carry objects at elbow height and close to your body. The farther away you hold an object, the more force it puts on your lower back.
- Lift with your legs instead of your back. Leg muscles are some of the strongest in the body. When you squat and lift with your legs, you can lift more weight safely.
- Alternate lifting tasks with tasks that are less stressful to the same muscles. This technique ensures that your muscles have some recovery time.

## Shoulder, Elbow, Wrist, and Hand Safety

Follow these guidelines to minimize the possibility of injury to your shoulders, elbows, wrists, and hands.

- Work within your safety zone—the area between shoulder level and knuckle level of your lowered hands. You face less chance of injury when you work or lift in this area.
- Keep your elbows bent to keep loads close to your body and to decrease the amount of force necessary to do the job. If you use this posture, you will put less weight and pressure on your shoulder.
- Be sure to keep your wrists straight. Avoid bending, extending, or twisting your wrists for long periods of time.
- Do not use a pinch grip to lift large or heavy loads because the way you lift also can affect the tendons in your hand. When you grasp an object

between your thumb and fingers, you put a lot of tension on hand and wrist tendons. Use both hands—use one for a while, and then use the other—to give them rest.

## ■ 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  $\mu$ W 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.

## ■ Fiber-Optic Cable Installation

Follow these guidelines when you install fiber-optic cables:

### 1. Cable routing:

- **Raised floor:** You may install fiber-optic cables under a raised floor. Route them away from any obstruction, such as existing cables or other equipment.
- **Cable tray or raceway:** Place the cables in position; do not pull them through the cable tray. Route the cables away from sharp corners, ceiling hangers, pipes, and construction activity.
- **Vertical rise length:** Leave the cables on the shipping spool, and lower them from above; do not pull the cables up from below. Use proper cable ties to secure the cable.
- **General:** Do not install fiber-optic cables on top of smoke detectors.

### 2. Cable management:

- Leave at least 4.6 m (15 ft) of cable at each end for future growth.
- Use strain reliefs to prevent the weight of the cable from damaging the connector.
- Review all information in this manual and in any related manuals about

### 3. Connector protection:

- Insert connectors carefully to prevent damage to the connector or fiber.

- Leave the connector's protective cover in place until you are ready to make connections.
- Replace the connector's protective cover when the connector is disconnected.
- Clean the connector before making a connection. Make sure that there are no obstructions and that keyways are aligned.

## ■ Electrostatic Discharge (ESD) Damage Prevention

Anyone who handles ESD-sensitive components must be aware of the damage that ESD can cause to electronic components and must take the proper precautions to prevent it. Also, anyone who performs maintenance on StorageTek equipment must complete an ESD-basics course.

### **CAUTION:**

***Potential damage to equipment: Handle ESD-sensitive components only under ESD-protected conditions. To meet this requirement, always use the Field Service Grounding Kit (PN 4711) and always follow these ESD precautions and procedures when you are servicing StorageTek equipment or handling ESD-sensitive components.***

## ESD Precautions

Always take the following general precautions when you work with ESD-sensitive components:

- Wear ESD protection whenever you install, remove, maintain, or repair StorageTek equipment.
- Keep ESD-sensitive printed-circuit components in their ESD-protective packages until you have taken all ESD-preventive steps and you are ready to install the component.
- Do not allow anyone to touch or handle an unprotected ESD-sensitive component unless that person has taken all ESD precautions.
- Reinstall all equipment covers and close all equipment doors after you have completed the work.
- If the grounding-kit work surface has been exposed to temperatures above 66°C (150°F) or below 4.5°C (40°F), acclimate the work surface to room temperature before you unroll it.
- Immediately place any component that you have removed into an ESD-protective package.
- Keep the grounding-kit work surface clean.

**Note:** To clean the work surface, use a mild detergent and water, and make sure that the surface is completely dry before you use it.

- Periodically check the electrical resistance of the ground cord and the wrist-strap coil cord.

**Note:** The ground cord should measure less than 1.2 M $\Omega$ , and the coil cord should measure between 0.8 and 1.2 M $\Omega$ . Repair or replace the cords if they no longer meet these requirements.

## ESD-Protection Procedure

Remember that each customer environment is different. Address all the customer's concerns before you work on any equipment.

### Prepare the Work Area

1. Before you service the equipment, unfold the grounding-kit work surface completely and place it on a convenient surface.
2. Attach one end of the ground cord to the work surface; secure the snap fastener.

**Note:** You will attach the free end in a later step.

3. Slip on an ESD wrist strap. Make sure that the strap is comfortable and makes contact with the entire circumference of your wrist.
4. Snap one end of the coil cord to the wrist band.

### Access the Equipment

5. Carefully open the doors to the equipment or remove the covers from the equipment. Do not touch any internal components.

**CAUTION:**

**Be sure that you are properly grounded before you touch any internal components.**

6. Attach the free end of the coil cord to the most appropriate place:
  - a. If you are working on components from a small piece of equipment, attach the free end of the coil cord to the grounding-kit work surface. In addition, be sure that you touch an unpainted metal surface on the equipment before you touch an internal component.
  - b. If you are working on components from a large piece of equipment, attach the free end of the coil cord to a grounding jack or to an unpainted metal surface inside the equipment.

## Replace Components

7. Remove the defective component and place it on the work surface.
8. Remove the replacement component from its ESD-protective package, and install the component in the equipment.
9. Place the defective component in the ESD-protective package.

## Clean Up

10. Disconnect the ground cords from the equipment.
11. Reinstall all equipment covers and close all equipment doors.
12. Disconnect the coil cord from your wrist, and, if necessary, disconnect the ground cord from the work surface.
13. Properly store the work surface and the other Field Service Grounding Kit items.

# 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.

## ■ L180 Door Interlock

A safety interlock for the tape library is located behind the front door. When this door is opened, the interlock immediately disables all tape library motors.

# General Information

# 1

---

This chapter describes the L180 library models, features, and components. It also lists library specifications such as weight, size, and power consumption.

## ■ Overview

The L180 library is a fully automated tape cartridge storage and retrieval subsystem. Depending on the model type and feature set, it can store from 84 to 174 data cartridges. These totals do not include cartridges in the cartridge access port (CAP) or cartridges in reserved cells.

Installing the library should take about two hours, plus the time to install each drive. The installation must be performed by qualified service engineers.

**Note:** Some aspects of library installation require two service engineers.

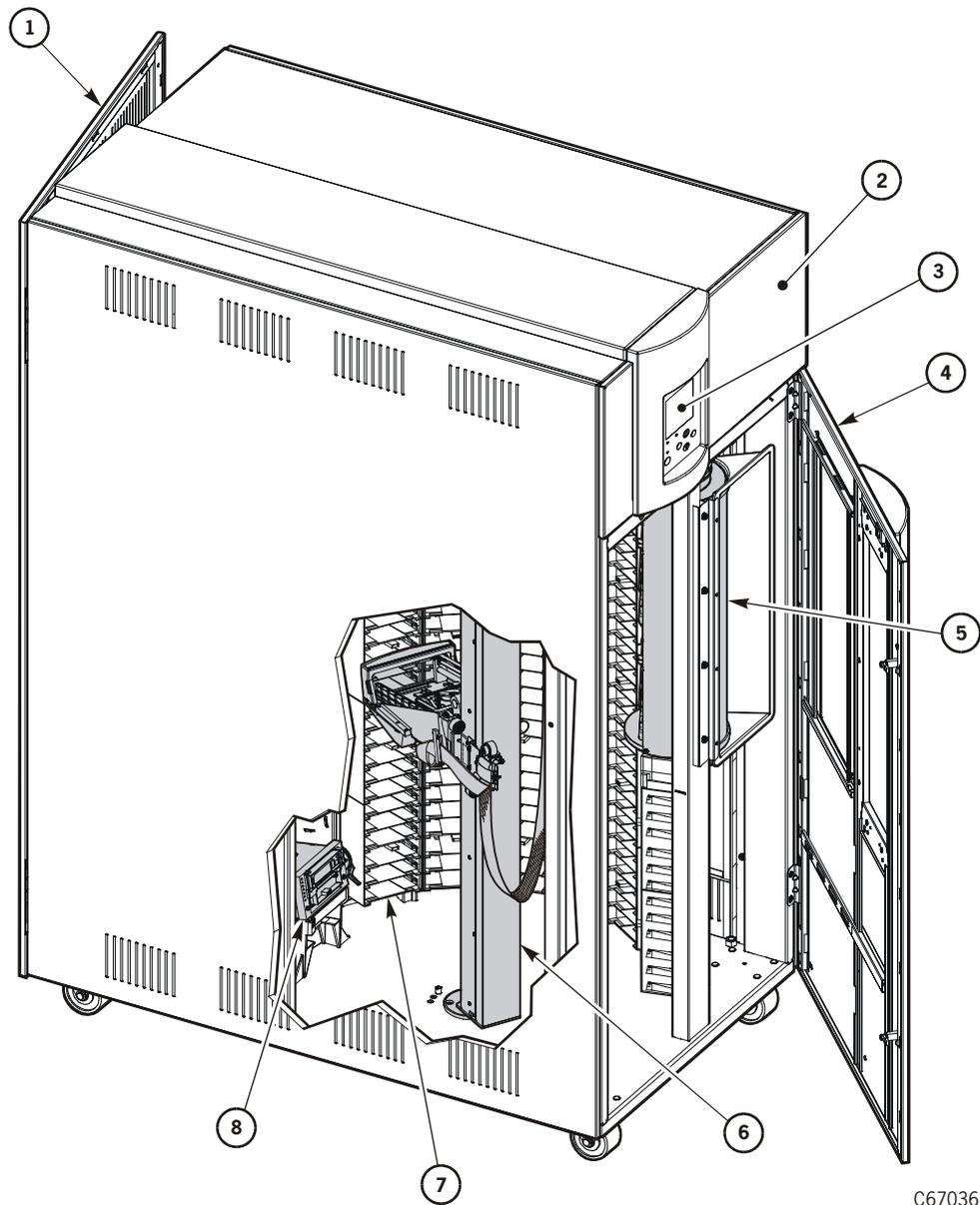
## Major Components

Refer to [Figure 1-1](#) to orient yourself to the major components of the L180 library:

- The robot, which mounts and dismounts cartridges
- Arrays of cells for storing data cartridges
- Drives, which access the data
- A 10-cell CAP for entering cartridges into or ejecting cartridges from the library

The library's front door provides access to the cartridge storage area, robot, and drive front panels. The rack door provides access to 6U of rack space. (6U is the equivalent of six rack units [a total of 0.27 m or 10.5 in.] of 0.48 m [19 in.] storage space for rack-mounted equipment.) A rear door provides access to the drive column and electronic components.

**Figure 1-1. Library Major Components**



C67036

L180 Library Major Components (C67036)

1. Rear door
2. Rack door
3. Operator panel
4. Front door
5. CAP
6. Robotics

**Figure 1-1. Library Major Components (Continued)**

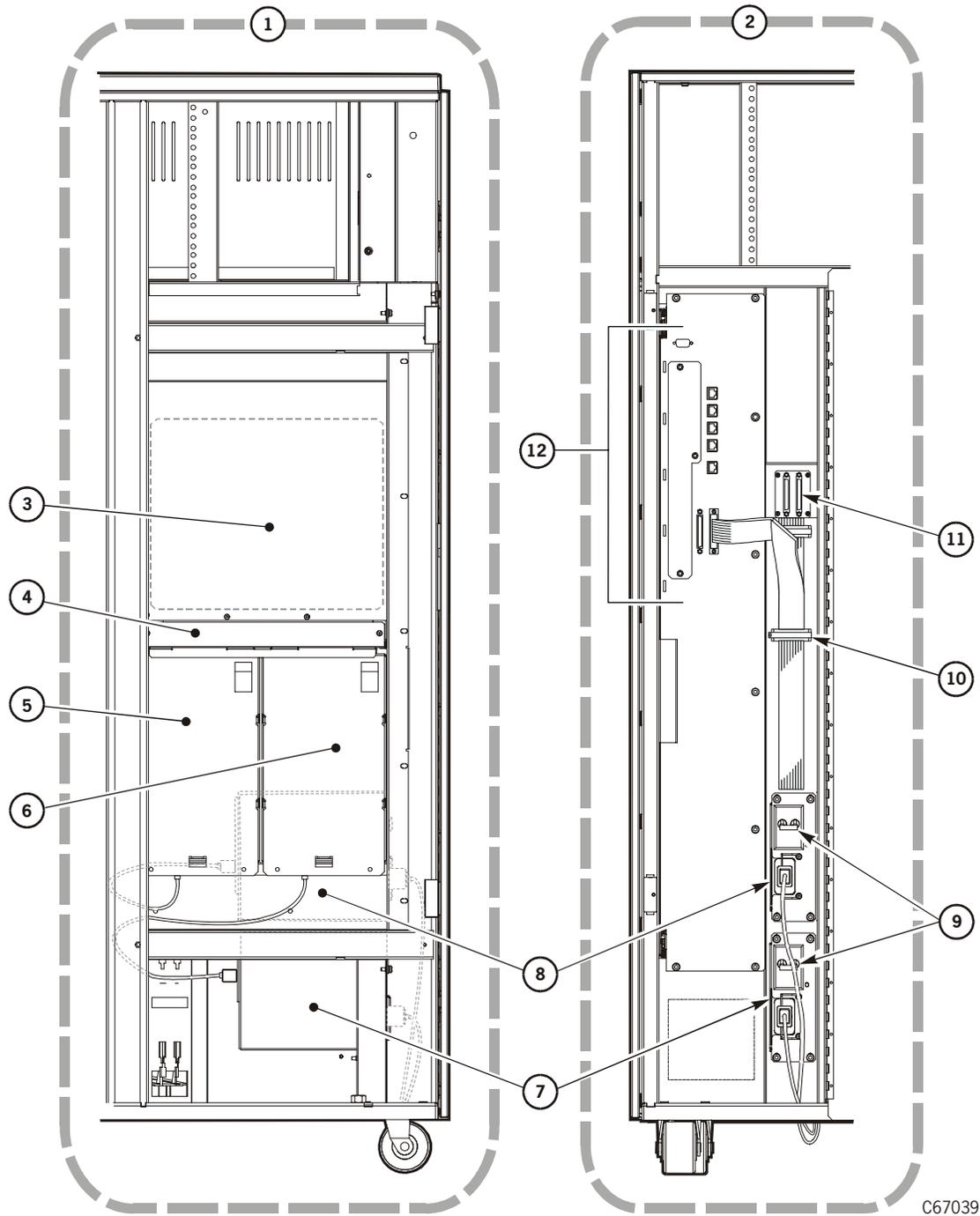
---

- 7. Arrays
  - 8. Drives
- 

**Electronic Components**

The following figures show the electronic components of the library. These components are in the slide-out electronics compartment behind the rear door.

**Figure 1-2. Library Electronic Components**



C67039

Major Library Electronic Components (C67039)

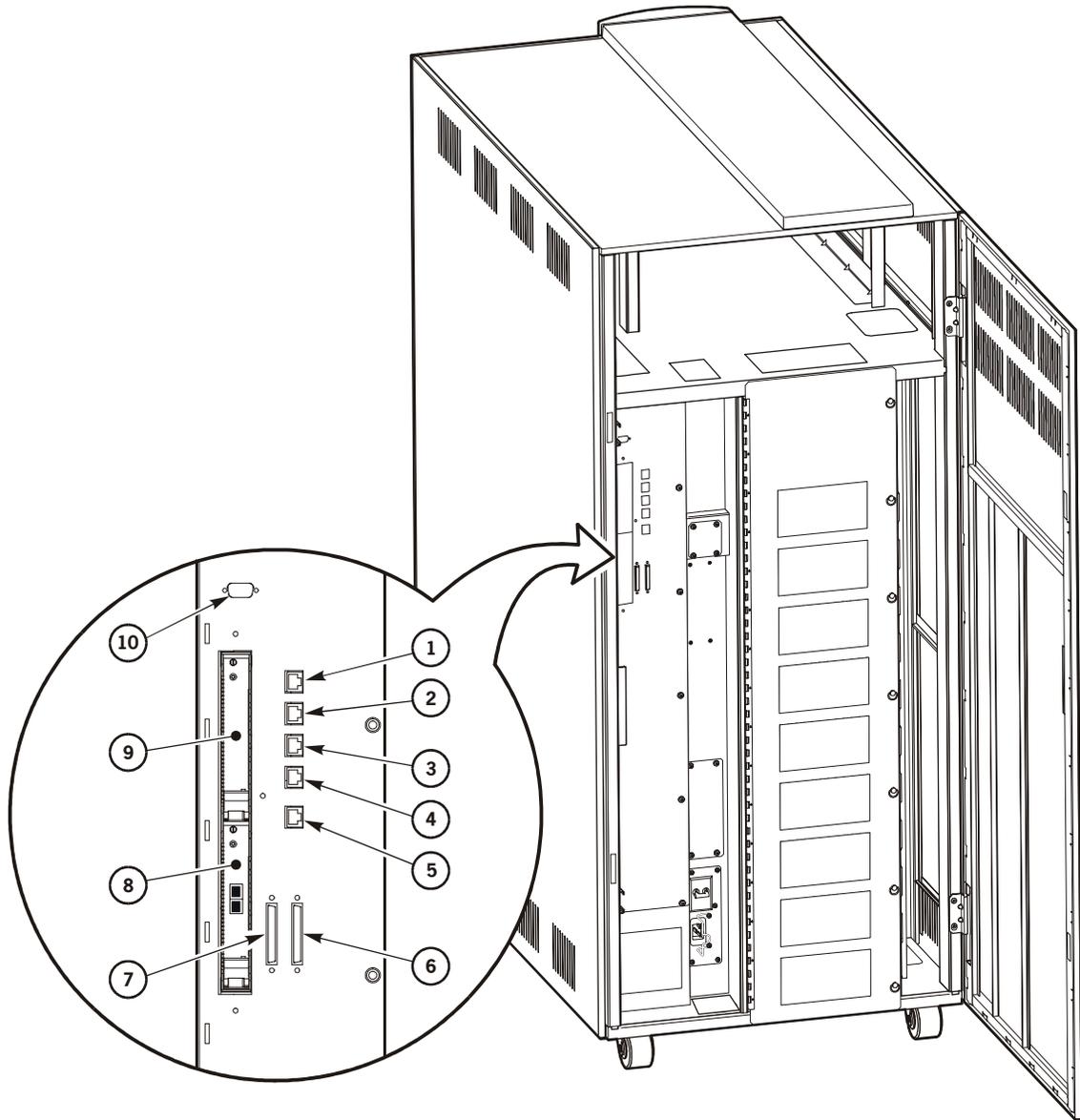
1. View from library side (cut away)
2. View from library rear
3. MPC card (enclosed)

**Figure 1-2. Library Electronic Components (Continued)**

---

4. Fan enclosure
  5. Standard DC power supply
  6. Optional DC power supply
  7. Standard power distribution unit (PDU)
  8. Optional power distribution unit (PDU)
  9. Power switch (circuit breakers)
  10. Cable clamp for library Y-cable
  11. Library-to-client SCSI I/O connectors (on power bulkhead)
  12. Electronics module bulkhead
-

**Figure 1-3. Library Electronics Module Bulkhead**



C67076

Library Electronics Module Bulkhead (C67076)

1. CSE port (firmware download)
2. Test
3. Ser 1 (serial) (diagnostics and service)
4. Ser 2 (serial)
5. Enet (Ethernet/Horizon Library Monitor)
6. SCSI, differential

**Figure 1-3. Library Electronics Module Bulkhead (Continued)**

- 
7. SCSI, single-ended
  8. Slot 0 (Fibre Channel Port 0 connector shown)
  9. Slot 1 (future expansion card)
  10. DB-9 connector for a personality module
- 

**Power System**

The library power system consists of:

- One or two DC power supplies that provide voltage to the library
- One or two AC power distribution units (PDUs)

Refer to [Figure 1-2 on page 1-4](#) for the location of these power system components.

**DC Power Supplies**

If the library has two DC power supplies, one supply powers the library during normal operation. If a fault is detected, the second DC power supply assumes control, and the library posts the error to the FSC log.

**AC Power Distribution Units (PDUs)**

Each PDU:

- Operates within a line voltage of 100 to 127 VAC or 200 to 240 VAC at 50/60 Hz
- Distributes AC voltage to drives and to a library DC power supply
- Is protected from overcurrent by circuit breakers

**Note:** If the library has the second, optional DC power supply, it also must have the optional PDU and a second power cord. See [“Site Power Considerations” on page 1-21](#) to determine if this optional power equipment is necessary for your customer’s installation.

Recall that each PDU in a two-PDU library supplies power to the library robotics and *half* of the drives. So when the library has two PDUs, connect each PDU to a separate, branch AC circuit (see [Figure A-4 on page A-6](#)). If you are installing more than one drive in the library, StorageTek recommends that you place some drives in the upper five slots and some drives in the lower five slots in the drive column. With this configuration and with each PDU connected to a separate circuit, if one PDU loses power, the customer still has some operational drives as well as operational library robotics.

## Robotic Components

The robot contains three major components:

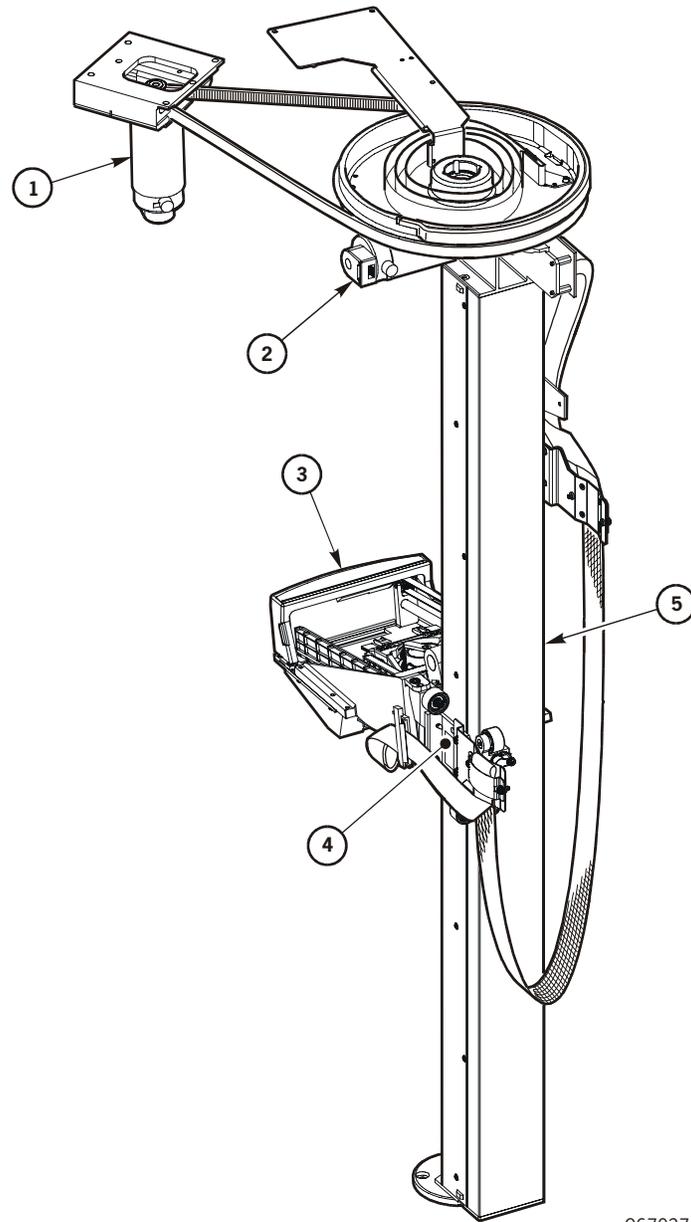
1. Theta motor (controls lateral movement)
2. Z column motor (controls vertical movement)
3. Hand-camera assembly on the Z carriage (controls cartridge movement to and from cells, drives, and CAP)

[Figure 1-4 on page 1-9](#) shows these components. Most of these components are mounted on a tube called the Z column. The hand-camera assembly includes a gripper mechanism. [Figure 1-5 on page 1-10](#) shows details of the hand-camera assembly.

## Robotic Functions

The robot mounts and dismounts cartridges within the library. The library stores cartridges in cell arrays that hold six cartridges per array. The arrays are stacked in columns; the columns are arranged in a semicircle around the robot. Each column holds 28 cartridges. (Each array holds six cartridges but the top two cells in each column are not available.) Refer to [Figure 1-6 on page 1-18](#) for details of this arrangement.

The robot moves cartridges from the storage cells by rotating the theta, moving the hand up and down the Z column, and reaching into a storage cell to grip a cartridge. Commands from the client software activate the robot: the library translates the client command into servo commands to direct the robotic motors.

**Figure 1-4. Robotic Components**

C67037

## Robotic Components (C67037)

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

## Hand-Camera Assembly

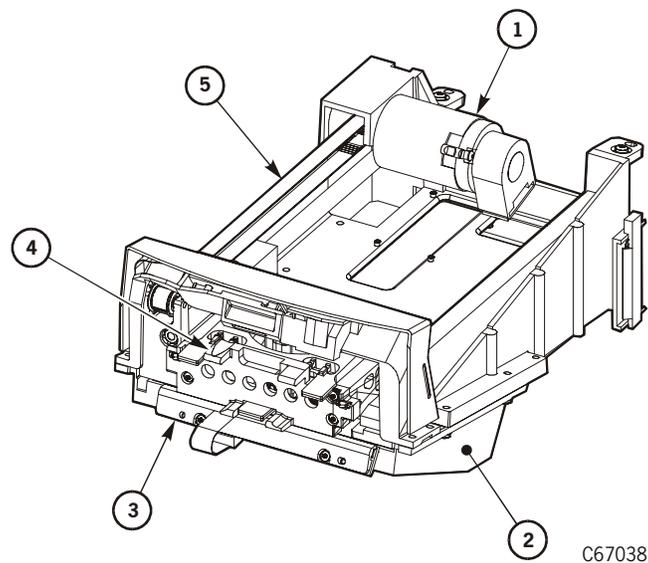
The hand-camera assembly consists of a gripper, a motor-driven drive belt for gripper extension, and a bar code scanner card and camera (enclosed in a case under the hand components).

The camera reads the volume serial numbers (VOLSERs) from the cartridge labels during an audit and as cartridges enter the library through the CAP. During an audit, the library matches each VOLSER with a specific cell location. These locations are stored in memory on the MPC card. Because the library always stores a cartridge in the same location, it does not use the camera during normal robotic operations.

During the library's initialization, the hand checks its extension in the space below the calibration label (at the bottom of the drive column).

**Note:** Cartridges left in drives will not be audited. However, volume information is retained for a cartridge that a library mounted to a drive.

**Figure 1-5. Hand Assembly**



Hand Assembly (C67038)

1. Motor
2. Camera housing
3. LED card
4. Gripper
5. Drive belt

## 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) or 6U.

The internal 6U rack area, behind the top front door, may be used by customers for additional equipment. Ensure that customers understand the safety information in [“Rack Safety and Precautions” on page xxvii](#).

**Note:** Power cable access is provided in the cutout area in the bottom of the compartment. For cable access locations and service area requirements, see [Figure 2-1 on page 2-5](#).

## ■ Interfaces

An L180 library supports these standard interfaces:

- A multi-initiator Small Computer System Interface (SCSI) connection
- A Fibre Channel connection (requires feature code IF01)

In addition, the SCSI connection can be converted to Fibre Channel through a converter network.

Thus users can interface with the L180 library through:

- A direct connection to a SCSI client
- An indirect connection to a SCSI client
- A Fibre Channel connection to a Fibre Channel arbitrated loop
- A 10baseT Ethernet connection that they access through a Web browser with the Horizon Library Monitor (optional)
- The operator panel

An SDE can connect a laptop to the library through the CSE or SER1 port.

## SCSI Client Direct Connections

For client-to-library (direct) SCSI connections, a server connects to the drives and library through a multi-initiator SCSI bus. The library may have a control path that is separate from the data path to/from the drives (the drives are then “off bus”), or the control path may be daisy-chained to the data path (the drives are then “on bus”). The connection from the server to the library and/or drives is a SCSI Type-3, 68-pin cable.

## SCSI Indirect Connections

An indirect connection to the library occurs when the library connects to a client through a network.

An example of an indirect connection would be:

- A library connected to a Unix server
- The server connected to an Ethernet LAN network
- A cable connected between the Ethernet LAN and the client

A SCSI Type-3 68-pin cable connects the server to the library. The server may have its own control-side path or may be daisy-chained to a shared data bus with one or more drives.

**Note:** If the customer is using Automated Cartridge System Library Software (ACSL), its level must be Version 5.3.2 or higher.

## SCSI Cable Considerations

The library and drives support *only* SCSI Type-3 connectors. If you use SCSI Type 1 or 2 cable connectors, you must order a SCSI-1- or SCSI-2-to-SCSI-3 adapter so that components can connect properly.

Refer to [Chapter 4, “Cables for External Paths,”](#) for more information about SCSI cables and SCSI adapters for both *control* and *data* paths.

[Table 1-1 on page 1-12](#) lists additional restrictions for SCSI connections that you should keep in mind.

**Table 1-1. SCSI Cable Restrictions**

Application	Length Restriction
Single-Ended (Library only)	Stub length: 0.1 m (4 in.)
	5 to 10 MHz data transfer rate: 3 m (10 ft)
	1 to 5 MHz data transfer rate: 6 m (20 ft)
Differential	Stub length: 0.2 m (10 in.)
	1 to 10 MHz data transfer rate: 25 m (82 ft)

## Fibre Channel

The L180 supports the following topologies with a single N\_Port (N=Node) attachment:

- Arbitrated loop—private loop
- Arbitrated loop—public loop

The arbitrated loop provides:

- Multiple connections for devices that share a single loop
- Only point-to-point connections between an initiator and target during communications

The library supports both public and private loop configurations (see the following sections).

In a Fibre Channel arbitrated loop, as with the SCSI protocol, devices must arbitrate and win the connection before *bus* communications can begin. After a device is powered on and initialized on the loop, it must arbitrate and win to be able to communicate with other *devices* on the loop.

### Private Arbitrated Loop

If the arbitrated loop is not attached to a Fibre Channel fabric, it is a private loop. A private arbitrated loop can connect up to 126 N-type ports. On this loop:

- Only point-to-point communication is possible between one initiator and one target at any time. (Other links on the loop act as repeaters.)
- Both initiator and target of the communication must reside within the same loop.

While the L180 library supports this Fibre Channel topology, StorageTek does not recommend it. Its best implementation includes a Fibre Channel hub.

### Public Arbitrated Loop

If the Fibre Channel arbitrated loop contains at least one F-type (F=Fabric) port and is attached to a Fibre Channel fabric, it is a public loop. A public loop can contain up to 126 N-type ports and one F-type port. If the fabric connects to another arbitrated loop, then an initiator on one public loop might be able to communicate with a target on another.

## Fibre Channel Cable Considerations

[Table 1-2](#) lists the Fibre Channel cable and connector specifications that the L180 library supports.

**Table 1-2. Fibre Channel Cables and Connectors**

Distance		FC-0 Code	Cable	Type	Connector
Meters	Feet				
2–300	6.5–985	100-M6-SN-I	62.5 $\mu$ m Multimode	780 nm Shortwave laser without OFC	Keyed Duplex SC
2–500	6.5–1640	100-M5-SN-I	50 $\mu$ m Multimode	780 nm Shortwave laser without OFC	Keyed Duplex SC

## Horizon L-Series Library Monitor (Optional)

The Horizon L-Series Library Monitor is an optional Web-based interface to the L180 library. Customers must order the Horizon L-Series Library Monitor separately from the library. For the L180 library, they must order Model HRZN-002 with feature code LS3x.

The Horizon L-Series Library Monitor lets a library's users configure, operate, and monitor the library through a workstation or PC that is running a Netscape or Microsoft browser. The monitor must first be enabled and configured on the library. Installation and configuration instructions appear in the documentation that ships with the Horizon L-Series Library Monitor components.

## Other Interfaces

The library features three additional interfaces:

- An operator panel that communicates library status, configuration, diagnostic sequences, and fault symptom code (FSC) information. The operator panel provides menus for running diagnostic tests and for examining the 20 most recent library events. The FSC information will help you troubleshoot should a component fail.
- A Ser 1 port that communicates the same operator panel information (in the previous paragraph) to a remote laptop device or through a serial modem connection. This interface is through an RJ45 connection. You may run diagnostic tests on the library through this port; however, please note that the library will go offline (that is, stop communicating with the client) without warning once the tests begin. This connection operates at 38400 bps.
- A CSE port that lets you download firmware to the library. This connection currently operates at 38400 bps while running Flash 97.exe.

## ■ Drive Models

Table 1-3 lists supported drives by model number and feature codes.

**Table 1-3. Drive Features**

Drive <sup>1</sup>	Model Number	Interface	Interface Feature Code	Drive Tray Feature Code
DLT7000	9777-001	SCSI Single-ended	2010	TX40
DLT7000	9777-001	SCSI Differential	2012	TX40
DLT8000	9788-001	SCSI Differential	2012	TX40
9840	9840-L01	SCSI Differential	1	TX40
9840	9840-L03	Fibre Channel	1	TX40

**Note:** <sup>1</sup> For 9840 model and feature code information, refer to the *9840 Tape Drive Product Manual*, PN95741

## ■ Drive Combinations

Within the drive column, an L180 library can hold:

- 10 DLT drives (DLT7000 or DLT8000)
- Six 9840 drives and one DLT drive
- A mixture of DLT and 9840 drives

The drive column contains 10 slots. A DLT drive fills one slot, and, generally, two 9840 drives fill three slots. However, you cannot install a 9840 drive in the top-most slot. For additional information, see “[Changing Library SCSI Operating Options](#)” in Chapter 2, “[Library and Drive Installation](#).”

## ■ Library Models

Table 1-4 lists the various models of the L180 tape library.

**Table 1-4. L180 Library Models**

Model Type	Data Cartridge Capacity	Description <sup>1</sup>
L180-180	174	174 data cartridge cells, 6 reserved cartridge slots, one DC power supply, one AC power distribution unit (PDU)
L180-140	140	140 data cartridge cells, 6 reserved cartridge slots, one DC power supply, one AC PDU
L180-80	84	84 data cartridge cells, 6 reserved cartridge slots, one DC power supply, one AC PDU

**Note:** <sup>1</sup> The totals for data cartridge cells do not include cells in the reserved area or in the CAP.

## ■ Standard Library Features

The following features are standard with all L180 libraries:

- An internal 6U (26 cm [10.5 in.] vertical space) standard rack space (48 cm [19 in.] wide) above the front door (customer must supply power).
- 10-cartridge CAP
- Viewing window on the front door
- Space for 10 DLT or six 9840 tape drives and one DLT drive (or a mixture of these drive types)
- A full audit of all tapes within three minutes (once machine initialization is complete)
- Locking access door for media security
- Initialization within five minutes, including audit
- Manual mount capability
- Library firmware load through a solutions delivery engineer's (CSE) port
- Fast/wide, multi-initiator Small Computer System Interface (SCSI)
- Fibre Channel interface
- Support for optional Web-based interface (the Horizon Library Monitor)

## Optional Features

Table 1-5 lists the L180 tape library optional features.

**Table 1-5. Library Optional Features**

Feature Code	Description
RMPS	Redundant main power supply <sup>1</sup> .
IF01	Compact PCI bus expansion and 1 GB Fibre Channel card (MPU)
IF02	1 GB Fibre Channel card only (not available at the time of publication)
None <sup>2</sup> .	Power cable (ordered by part number)
None <sup>3</sup> .	Horizon L-Series Library Monitor (ordered by part number)

**Notes:** <sup>1</sup> If the customer has ordered this feature, it will ship separately from the library. Its packaging will include the optional DC power supply and PDU as well as installation instructions. Also note that a redundant power supply provides power redundancy only for library robotics, *not* a tape drive.

<sup>2</sup> The customer must order a power cable. See [Table 1-8 on page 1-23](#) for specific cable part numbers and connector types.

<sup>3</sup> The optional web interface to the L180 library is Horizon L-Series Library Monitor model HRZN-002 with feature code LS3x.

## Library Performance

The library's exchange rate for mounting tape cartridges is 450 exchanges per hour. An exchange is defined as the average time it takes the robot to:

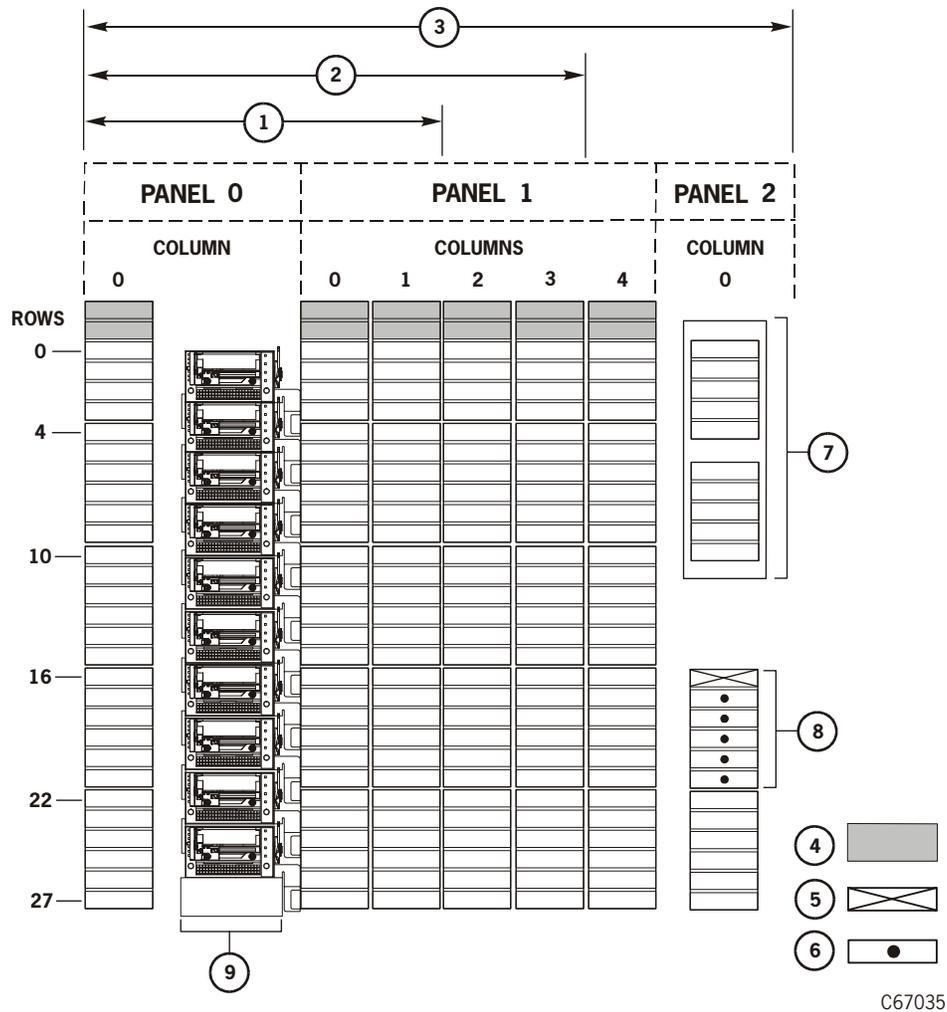
1. Move to a slot and retrieve a cartridge
2. Move to another slot and insert the cartridge
3. Move to a slot and retrieve a cartridge
4. Move to another slot and insert the cartridge

## Library Capacity

[Figure 1-6 on page 1-18](#) shows the size configurations available. Capacity variations depend upon the number of storage cell arrays installed in Panel 1.

The smallest configuration consists of three columns of arrays and one tape drive. For information about theta stops, see [Figure 3-1 on page 3-6](#).

**Figure 1-6. Library Size Configurations**



L180 Library Size Configurations (C67035)

1. L180-80 Model = 84 data storage cells
2. L180-140 Model = 140 data storage cells
3. L180-180 Model = 174 data storage cells
4. Blocked storage cells (no cartridges permitted)
5. Swap cell

**Figure 1-6. Library Size Configurations (Continued)**

- 
6. Cells reserved for cleaning or diagnostic cartridges
  7. CAP
  8. Reserved cell array
  9. Drive column
- 

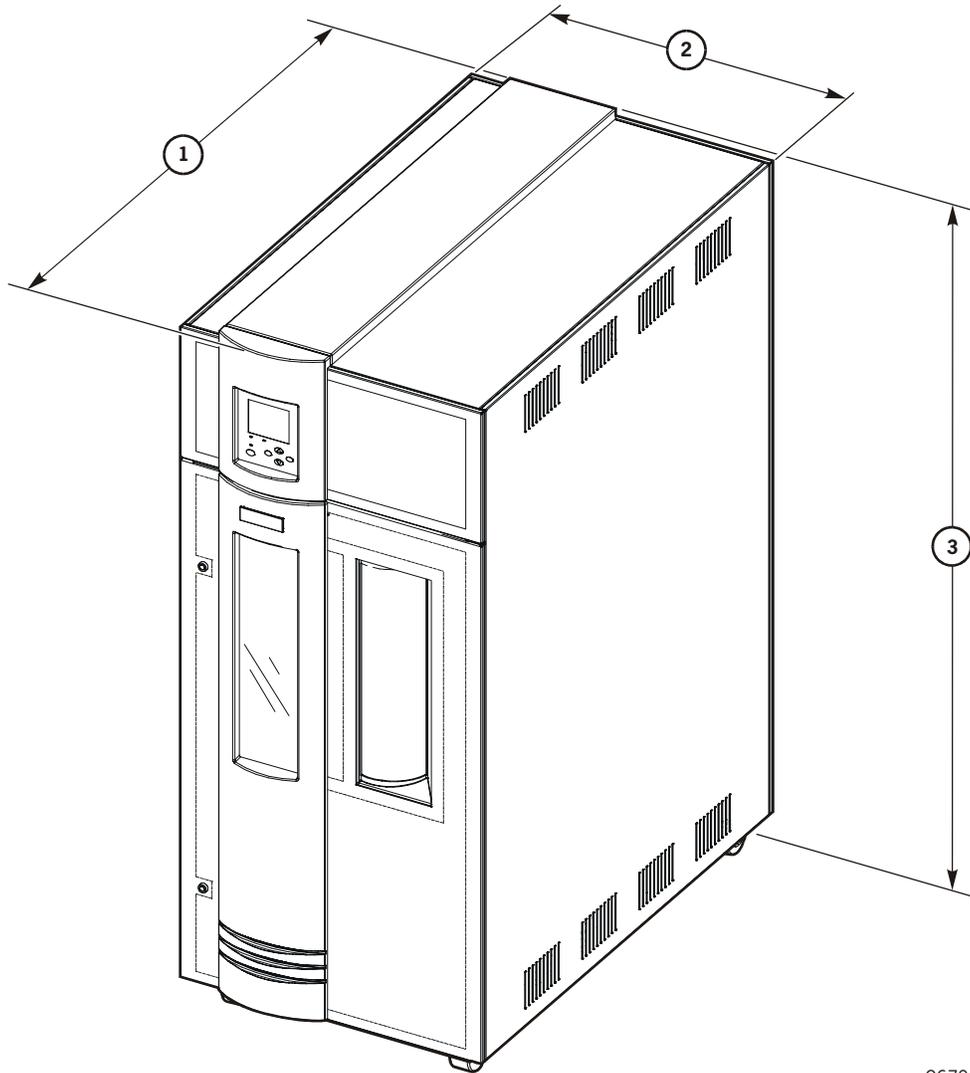
**■ Physical Specifications**

The following pages provide physical specifications for the L180 library.

**Physical Dimensions**

[Figure 1-7](#) shows the library's physical dimensions.

**Figure 1-7. Physical Dimensions**



C67041

Physical Dimensions (C67041)

1. Depth with covers: 1252 mm (49.3 in.)
2. Width with covers: 718 mm (28.3 in.)
3. Height: 1654 mm (65.1 in.)

**Note:** Add 15 cm (6 in.) for top clearance and 10 cm (4 in.) on sides for cooling.

## Weight Variations

Table 1-6 lists the variable specifications for the library. Note that weight varies with the quantity and type of drives installed.

**Table 1-6. L180-180 Library Weight Variations**

L180-180	No Drives	10 DLT Drives	Six 9840 Drives
Weight without cartridges	239.5 kg (528 lb)	292.6 kg (645 lb)	277.9 kg (612 lb)
<b>Note:</b> Each DLT cartridge weighs 223 g (7.85 oz). Each 9840 cartridge weighs 262 g (9.17 oz).			

## Site Power Considerations

In the L180 library, some combinations of input voltage and current, drive type, and plug type limit the number of drives that can be installed. See the following paragraphs for details.

### At 120 to 127 VAC

You may install the maximum number of drives in the L180 library if the power source at the site is 120 to 127 VAC: 10 DLTs (with or without Power Factor Correction [PFC]) or six 9840s and one DLT. You may do so even if the library is connected to a single AC circuit.

**Note:** For drive power redundancy, StorageTek recommends connecting the library to a second AC circuit.

### At 200 to 240 VAC

Table 1-7 on page 1-22 lists the maximum number of tape drives that you may install in the L180 library if it is connected to a single 220 VAC circuit. At 200 to 240 VAC, the maximum configuration of DLT drives with non-PFC supplies requires the library to connect to two AC circuits (see “AC Power Distribution Units (PDUs)” on page 1-7). Please note the differences between the PFC and non-PFC drive configurations.

**Notes:**

1. PFC power supplies are currently not available on DLT drives.
2. You must use a locking plug on the library’s power cord when the library contains a non-PFC DLT drive.

**Table 1-7. Maximum Number of Drives on a Single 220 VAC Circuit**

Factor	220 VAC <sup>1</sup> .			
	Current Capacity	10 or 15A (International)		15 A or 20 A
Phase	Single Phase		Two Phase	
Power Cord Rating	10 or 15A (International)		15 A	
Plug Style	Non-locking	Locking <sup>2</sup> .	Non-locking	Locking <sup>2</sup> .
	Maximum Number of Drives			
9840	6	6	6	6
DLT w/non-PFC	5	10	5	10
DLT w/PFC <sup>3</sup> .	10	10	10	10
<p><b>Notes:</b> 1. Numbers in this table include library robotics requirements. StorageTek recommends that site power be sized to accommodate expansion to the maximum number of tape drives.</p> <p>2. You must use a locking plug on the library's power cord when the library contains a non-PFC DLT drive.</p> <p>3. PFC power supplies have less leakage current and lower peak current demand on the AC input.</p>				

Use this table to determine:

- How many drives may be installed in the library
- Whether the library's power cord requires a locking plug or might require a locking plug in the future.
- Whether the library's configuration requires the optional PDU and a second power cord or might require this equipment in the future
- How many AC circuits the customer must supply for the library

When you have made your determination, see [Table 1-8 on page 1-23](#) to determine whether the customer has the appropriate power cables.

## ■ Power Cable Information

For each library, the customer must order the power cable and supply the correct receptacle. [Table 1-8](#) gives the StorageTek part number for the cable and plug type as determined by:

- Input voltage (first column)
- Country (second column) where the library is to be installed
- Which type of drive is installed in the library (remaining columns)

**Note:** If the library configuration contains a mixture of drive types, the customer must order the part number listed in the far right column.

**Table 1-8. L180 Power Cables—By Part Number**

Input Voltage	Country	If the Library Contains...	
		Only 9840 drives	DLT Drives
100 – 127 VAC 15 A	U.S./Canada	Nema 5–15P 10083634	Nema 5–15P 10083634
	Japan	JIS 8303 10083649	JIS 8303 10083649
200 – 240 VAC 10 or 15 A	Australia	AS 3112 10083650	Locking <sup>1</sup> IEC 60309 10083635
	Europe <sup>2</sup>	CEE 7/7 10083646	Locking IEC 60309 10083635
	Italy	CEI.23 10083651	Locking IEC 60309 10083635
	South Korea	KS 8305 10083656	Locking IEC 60309 10083635
	South Africa	BS 546 or BS 1363 10083655	Locking IEC 60309 10083635

**Notes:** <sup>1</sup> You must use a locking plug on the library's power cable when the library contains a non-PFC DLT drive.

<sup>2</sup> Europe includes Denmark, Germany, Norway, Sweden, Finland, the Netherlands, Belgium, France, and Switzerland.

**Table 1-8. L180 Power Cables—By Part Number (Continued)**

Input Voltage	Country	If the Library Contains...	
		Only 9840 drives	DLT Drives
200 – 240 VAC 10 or 15 A	United Kingdom	BS 1363 10083653	Locking <sup>1</sup> IEC 60309 10083635
	U.S./ Canada	NEMA 6–15 10083644	Locking IEC 60309 410573502 <i>or</i> NEMA L6–15P 10083645

**Note:** <sup>1</sup> You must use a locking plug on the library's power cable when the library contains a non-PFC DLT drive.

## ■ Power Specifications

Table 1-9 lists library power specifications.

**Table 1-9. L180 Library Power Specifications**

Power cable	<p><b>U.S./Canada:</b> 100 to 127 VAC UL/CSA power cable</p> <p><b>International:</b> 200 to 240 VAC HAR power cable</p>
Input voltage range	100 to 127 VAC / 200 to 240 VAC
Input current	<p>Library: 1.0 A at 120 VAC (0.5 A at 240 VAC) DLT7000–DLT8000: Refer to DLT manuals 9840: Refer to 9840 manuals</p>
Power configuration	<p><b>U.S./Canada:</b> Single-phase 100 to 127 VAC, 50/60 Hz, 15 A Service, 3-wire</p> <p><b>International:</b> Single-phase 200 to 240 VAC, 50/60 Hz, 10 A Service, 3-wire</p>
Power consumption	<p>Library only: 120 W DLT7000–DLT8000: Refer to DLT manuals 9840: Refer to 9840 manuals</p>
Maximum heat output	<p>Library only: 410 BTU/hr DLT7000–DLT8000: Refer to DLT manuals 9840: Refer to 9840 manuals</p>

## ■ Environmental Specifications

Table 1-10 lists the environmental consideration for the library.

**Table 1-10. L180 Library Environmental Specifications**

<i>Temperature</i>	
Operating	15° to 32°C (59° to 90°F)
Storage	10° to 40°C (50° to 104°F)
Shipping	-40° to 60°C (-40° to 140°F)
<i>Relative Humidity</i>	
Operating	20% to 80% (noncondensing)
Storage	10% to 95% (noncondensing)
Shipping	10% to 95% (noncondensing)
<i>Wet Bulb Maximum</i>	
Operating	29.2°C (84.5°F)
Storage	35°C (95°F)
Shipping	35°C (95°F)
<i>Altitude</i>	
Operating	0 to 3.05 km (0 to 10,000 ft)
Storage	0 to 3.05 km (0 to 10,000 ft)
Shipping	0 to 15.24 km (0 to 50,000 ft)

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# Library and Drive Installation

## 2

This chapter contains the procedures for preparing the library site, unpacking and positioning the library, removing the shipping hardware, changing two library operating options, installing a DLT drive, connecting the power cable, and connecting laptop equipment. It also contains a checklist with all steps needed to install the library successfully.

## ■ Checking Hardware Installation

The checklist in [Table 2-1](#) summarizes the steps required to install the library. *Remove this page from the book, and make sure all steps are completed in the sequence listed.* When you complete a procedure, check off the item in the table below.

**Table 2-1. Hardware Installation Checklist**

Item	Procedure
<input type="checkbox"/>	<a href="#">“Safety” on page xxi</a>
<input type="checkbox"/>	<a href="#">“Checking Tools” on page 2-3</a>
<input type="checkbox"/>	<a href="#">“Preparing the Library Location (Standard)” on page 2-3</a>
<input type="checkbox"/>	<a href="#">“Removing the Packing Material” on page 2-7</a>
<input type="checkbox"/>	<a href="#">“Removing the Library from the Pallet” on page 2-7</a>
<input type="checkbox"/>	<a href="#">“Removing the Shipping Kit” on page 2-10</a>
<input type="checkbox"/>	<a href="#">“Positioning the Library” on page 2-10</a>
<input type="checkbox"/>	<a href="#">“Securing the Library Position (Standard)” on page 2-10</a>
<input type="checkbox"/>	<a href="#">“Unpacking the Library Interior” on page 2-11</a>
<input type="checkbox"/>	<a href="#">“Installing Optional Power Components” on page 2-16</a>
<input type="checkbox"/>	<a href="#">“Installing Fibre Channel Components” on page 2-16</a>
<input type="checkbox"/>	<a href="#">“Changing Library SCSI Operating Options” on page 2-21</a>
<input type="checkbox"/>	<a href="#">“Installing Drives” on page 2-25</a>
<input type="checkbox"/>	<a href="#">“Connecting Power” on page 2-34</a>
<input type="checkbox"/>	<a href="#">“Entering Configuration Data” on page 3-10</a>
<input type="checkbox"/>	<a href="#">“SCSI Control Connection” on page 4-7</a>

**Table 2-1. Hardware Installation Checklist (Continued)**

<b>Item</b>	<b>Procedure</b>
<input type="checkbox"/>	“SCSI Drive (Data) Connections” on page 4-9
<input type="checkbox"/>	“Fibre Channel Operation” on page 4-14
<input type="checkbox"/>	“Installing Diagnostic and Cleaning Cartridges” on page 5-4
<input type="checkbox"/>	“Powering on the Library” on page 5-8
<input type="checkbox"/>	“Preparing DLT Drives” on page 5-8 and/or “Preparing 9840 Drives” on page 5-12
<input type="checkbox"/>	“Checking the Subsystem” on page 5-12
<input type="checkbox"/>	“Inserting Data Cartridges” on page 5-16
<input type="checkbox"/>	“Placing the Library Online” on page 5-18

## ■ Checking Tools

You need these tools to install the basic library and its associated drives:

- 3/4-inch wrench (STK tool crib PN WR08) or adjustable wrench\* (STK tool crib PN WR11)
- Phillips screwdriver\*
- Torx set\*
- 3/16-inch nut driver\*
- 5/16-inch nut driver\*
- Diagonal cutters or knife\*
- Laptop personal computer
  - RJ-45 cable (PN 4108289xx) from the L180 library's shipping kit
  - RJ-45-DB9 adapter (PN 10410823) from the library's shipping kit
- Key to the library's front door (PN 310293301) from the library's shipping kit

\* These tools are part of the SDE tool kit (StorageTek PN 4019). Note that nut drivers can be built with the included socket set.

**Note:** StorageTek also recommends that you use an ESD grounding kit (StorageTek PN 4711) when working with electrical components inside the library.

## ■ Preparing the Library Location (Standard)

In preparing the library location, be sure to:

- Allow enough space for the library
- Plan the signal cable and power cable routing
- Provide enough space to open all doors

See [Figure 2-1 on page 2-5](#) for spacing requirements and cable access locations.

**Note:** Safety agency standards require that your power receptacle is located within 2.8 m (9.2 ft) of the library. The power receptacle also must be easily accessible.

In sites where the power cable is directly wired to a power source, the facility must have a readily accessible disconnect device incorporated in the fixed wiring.

**Remarque :** Les normes des organismes de sécurité requièrent que votre prise d'alimentation soit située à moins de 2,8 m de la bibliothèque. La prise de courant doit être d'accès aisé.

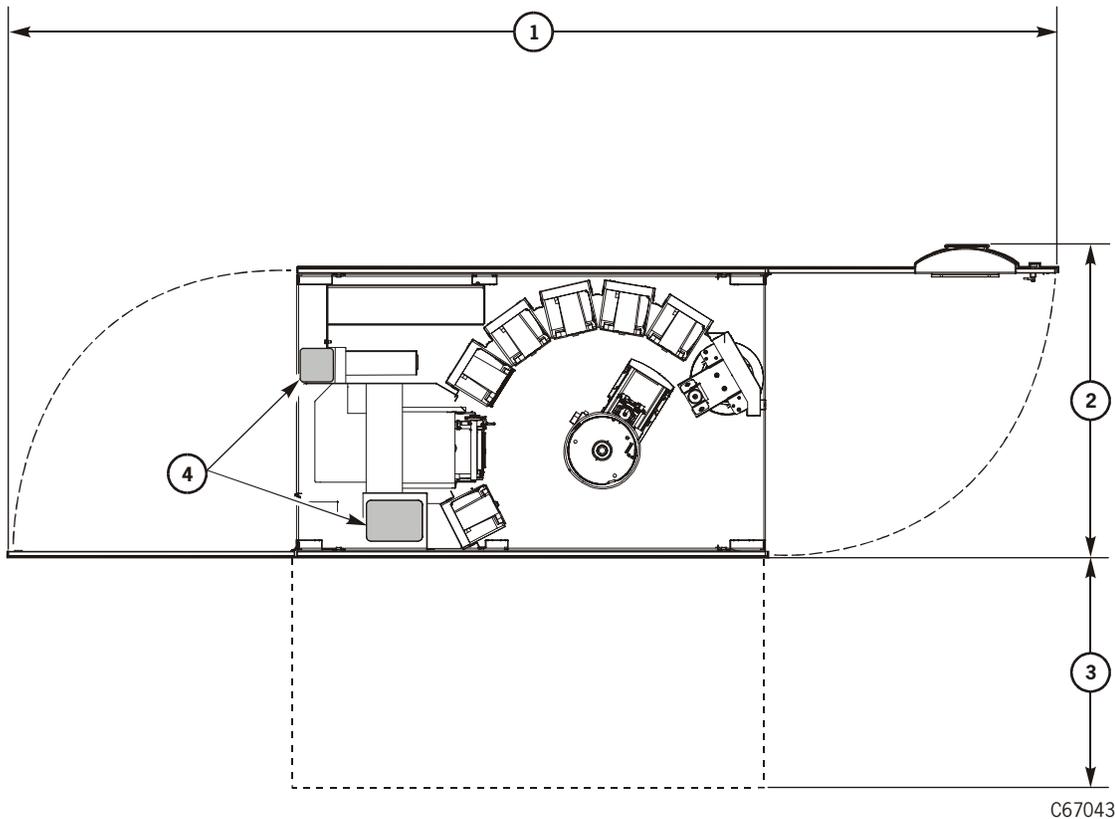
Sur les sites où le câble d'alimentation est directement connecté à une source d'alimentation, un système de déconnexion facile d'accès doit être intégré au câblage fixe.

**Hinweis:** Gemäß den geltenden sicherheitsrechtlichen Vorschriften darf die Netzsteckdose maximal 2,8 m von der Library entfernt sein. Außerdem muß die Steckdose gut zugänglich sein.

Wenn das Netzkabel fest an die Stromquelle angeschlossen ist, muß sich an der Festverdrahtung eine gut zugängliche Unterbrechungseinrichtung befinden.

**Wskazówka:** Przepisy BHP wymagają, aby skrzynka zasilania znajdowała się w odległości 2,8 m od biblioteki. Do skrzynki zasilania musi być łatwy dostęp.

W miejscach, gdzie kabel zasilania jest bezpośrednio podłączony do źródła prądu, w układzie zasilania zamontowanym na stałe musi być wbudowane urządzenie pozwalające na łatwe odłączenie źródła prądu.

**Figure 2-1. Service Area Requirements and Cable Access Locations (Top View)**

Service Area Requirements (View does not include rack area) (C67043)

1. 2.6 m (8.5 ft) (both front and rear doors open)
2. 0.8 m (2.6 ft) (front and rack door open)
3. When positioning the library, consider that a minimum of 1.0 m (3.3 ft) might be necessary for removing the side panel during service calls.

**Note:** These statements apply to side area clearance:

- For normal operation, allow a minimum of 5.1 cm (2 in.) of space on each side for air flow.
  - Side cover removal is not required for service; removal is optional. Service can be performed with front and rear access only.
4. Cable access locations (through the floor of the library) in the rear of the library

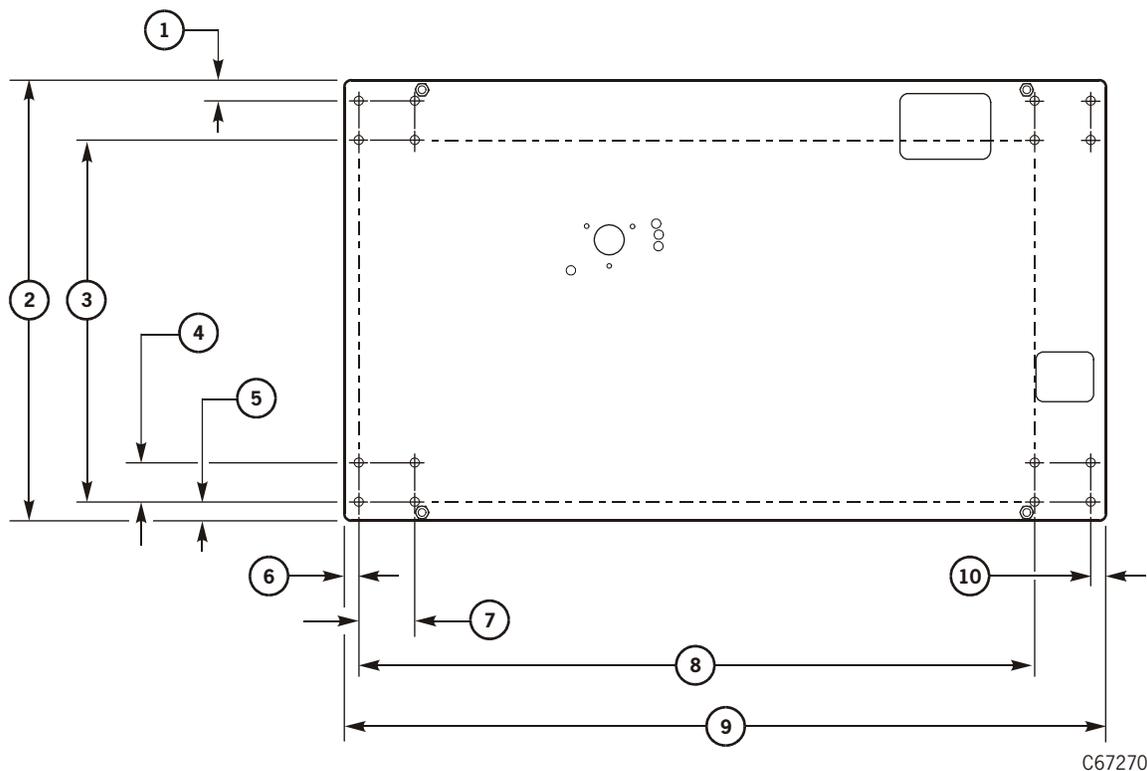
## ■ Preparing the Library Location (Special)

For sites within areas of seismic activity, the customer might wish to fix the library's position permanently for added stability. To meet this requirement, the library must have all four wheel assemblies removed so that the mounting studs for the wheel assembly can be used to fix the library in its permanent position. See [Figure 2-2](#) for the locations of the mounting studs for the wheel assembly.

**Note:** See [Figure 2-1](#) on page 2-5 and note that the library's permanent position must allow for:

- Adequate air intake for cooling
- Adequate space for service
- Cable access to the library

**Figure 2-2. Library Floor—Wheel Stud Locations**



Library Floor—Wheel Stud Locations (C67270)

1. 33.274 mm (1.312 in.)
2. 685.8 mm (27 in.)
3. 558.8 mm (22 in.)
4. 60.325 mm (2.375 in.)
5. 33.35 mm (1.313 in.)
6. 21.92 mm (0.863 in.)

**Figure 2-2. Library Floor—Wheel Stud Locations (Continued)**

- 
- |     |                       |
|-----|-----------------------|
| 7.  | 85.725 mm (3.375 in.) |
| 8.  | 1039.1 mm (40.91 in.) |
| 9.  | 1168.7 mm (46.01 in.) |
| 10. | 21.895 mm (0.862 in.) |
- 

## ■ Unpacking the Library

Unpacking the library involves:

- Removing the packing material and shipping bill
- Removing the library from the shipping pallet
- Positioning the library
- Removing the shipping kit
- Securing the library position
- Unpacking the library interior

### Removing the Packing Material

You will need diagonal cutters or knife to cut the shipping straps.

Refer to [Figure 2-3 on page 2-9](#) while performing these steps:

1. Remove and retain the shipping bill.

**CAUTION:**

***Potential backlash from straps: Be sure that no one is near the shipping straps when you are ready to cut them. The straps are under tension, and they could strike someone when they are cut loose.***

2. While holding the shipping ramp against the library box covers, carefully cut the three wrapping straps on the exterior of the packaging.
3. Remove the ramp and corrugated box covers.
4. Remove the shipping bag (not shown).

### Removing the Library from the Pallet

**Note:** Some shipping agreements require the shipper to remove the library from its shipping pallet. If this is the case, you may skip this section.

**WARNING:**

***Heavy load. At least two people are required to remove the library from its shipping pallet.***

**AVERTISSEMENT :**

**CHARGE LOURDE.** Deux personnes au moins sont requises pour retirer bibliothèque de sa palette de transport.

**VORSICHT:**

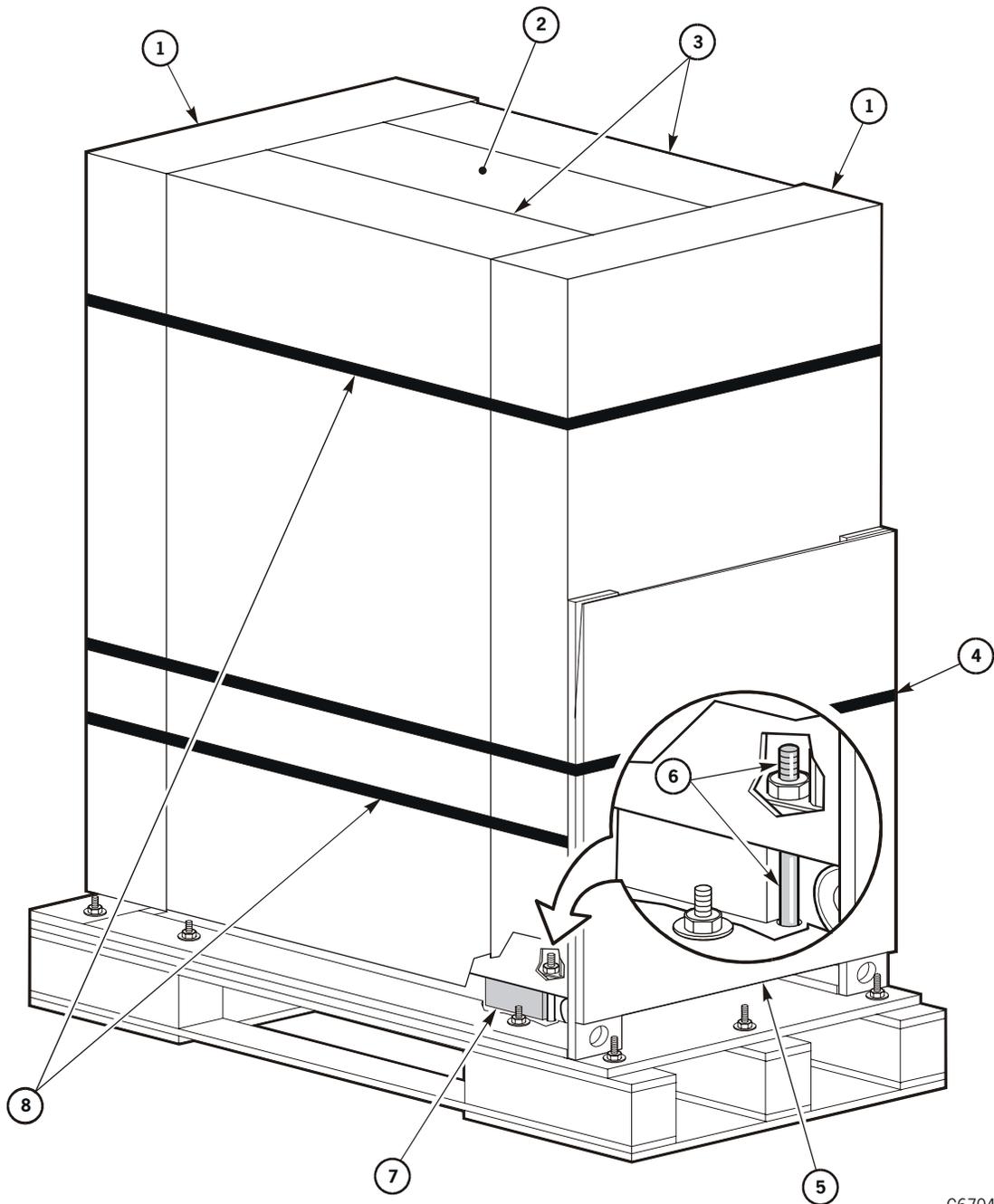
**HOHES GEWICHT.** Um die Library von der Lieferpalette zu heben, benötigen Sie mindestens einen Helfer.

**OSTRZEŻENIE:**

**DUŻA WAGA.** Co najmniej dwie osoby powinny wyjmować bibliotekę z palety wysyłkowej.

If you must remove the library from its pallet:

1. Obtain a 3/4-inch (or adjustable) wrench or socket.
2. Remove the four 3/4-inch bolts that secure the library to the pallet.
3. Tilt and remove the four wood blocks positioned near the wheels.
4. See [Figure 2-3 on page 2-9](#) and position the ramp by aligning the holes of the ramp with the two posts on the pallet.
5. Securely seat the ramp on the ramp posts.
6. With someone on both sides of the library, carefully guide the library down the ramp.
7. Remove the ramp and pallet from your work area. You may re-use or dispose of the shipping materials according to your local policies.

**Figure 2-3. Library Packaging Removal**

C67044

## Library Packaging Removal (C67044)

1. End covers of shipping box
2. Corrugated top of shipping box
3. Side covers of shipping box
4. Ramp strap

**Figure 2-3. Library Packaging Removal (Continued)**

---

5. Ramp
  6. Shipping bolt
  7. Wood block (4x)
  8. Shipping straps
- 

**Positioning the Library**

To position the library:

1. Carefully roll the library to its assigned location.
2. Position the library to allow space for maintenance and operator access. These space requirements are shown in [Figure 2-1 on page 2-5](#).
3. If your installation requires that you have cables routed underneath a raised floor, make sure the floor cutouts are in the correct positions.

**Removing the Shipping Kit**

To remove the library accessories kit:

1. Open the rear door by gently pulling on the finger slot.
2. Remove the shipping kit package from the rear of the library's rack area.
3. Remove the library door key (PN 310293301) and the wheel chocks from the shipping kit.
4. Save the remaining components in the kit for subsequent tasks.

**Securing the Library Position (Standard)**

To secure the library position:

1. Make sure you have the four wheel chocks (PN 4048) from the shipping kit.
2. Position a wheel chock perpendicular to each wheel, and slide the chock in place.
3. Make sure the library does not move from its floor position.

## Securing the Library Position (Special)

For those customers who wish to fix a permanent position for the library:

1. Move the library into position and line up the studs from the wheel-mounting assembly with their position on the floor or platform.
2. Fasten the library to the floor or platform.

## Unpacking the Library Interior

**CAUTION:**

***Potential damage to electronic components. Take precautions against ESD damage by touching gray, unpainted metal such as the library's frame or by using an ESD grounding kit before touching any electronic component.***

To unpack the interior portion of the library:

1. Open the library front door by unlocking the top and bottom latches with the key provided.
2. Take adequate precautions against ESD damage by touching gray, unpainted metal such as the library's frame or by using an ESD grounding kit (StorageTek PN 4711) before touching any electronic component. Review the ESD information in [“Electrostatic Discharge \(ESD\) Damage Prevention” on page xxv](#).
3. Locate and remove the Z-column shipping pin (shown in [Figure 2-4 on page 2-12](#)).

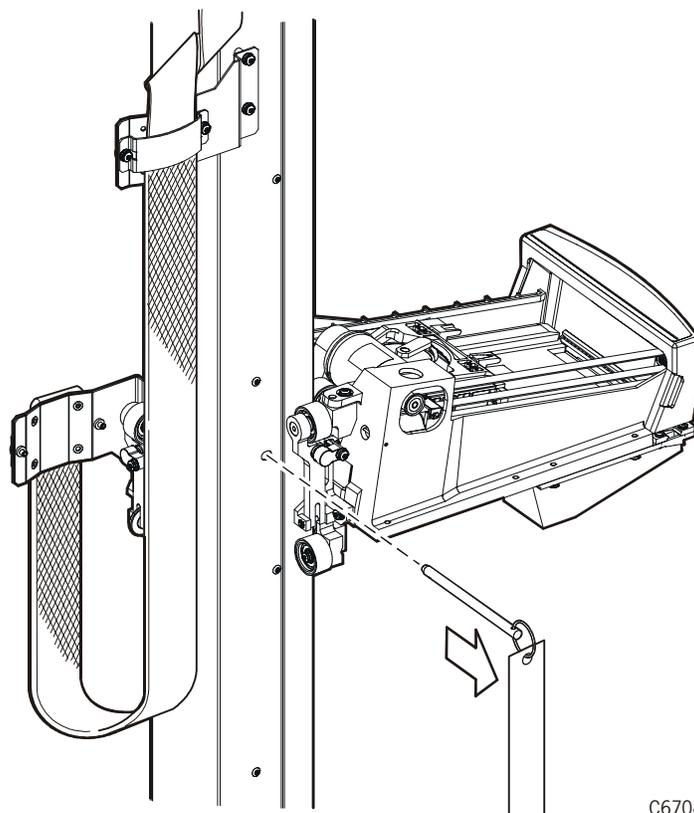
**CAUTION:**

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

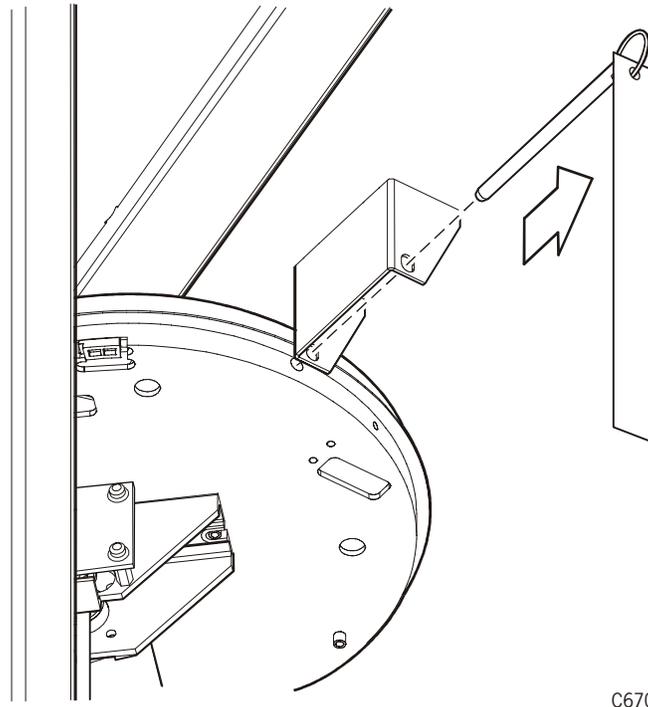
4. Locate and remove the theta shipping pin (shown in [Figure 2-5 on page 2-13](#)).

**Note:** Both shipping pins are marked with red ribbons.

**Figure 2-4. Z Column Shipping Pin**



C67045

**Figure 2-5. Theta Shipping Pin**

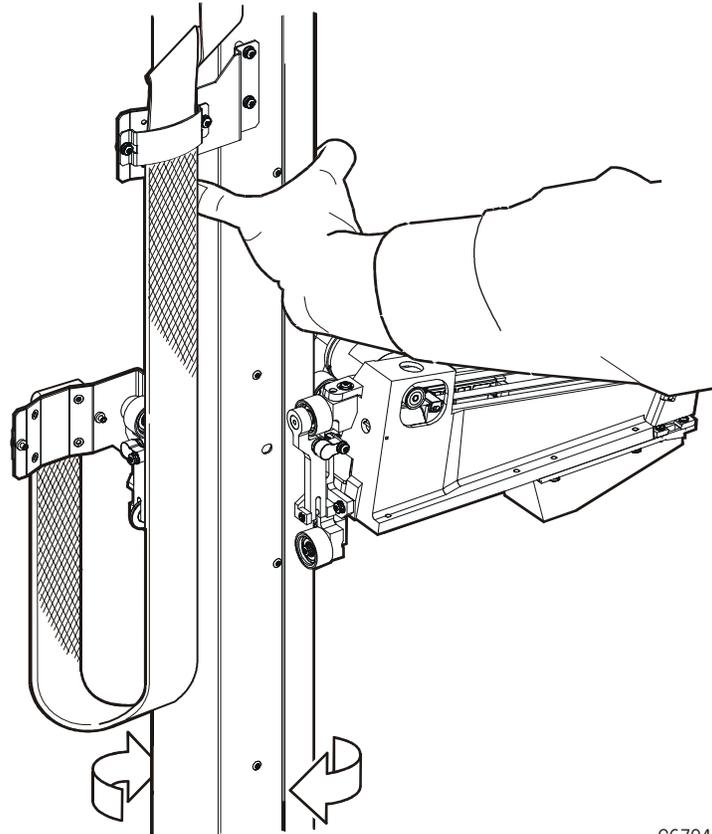
5. Retain the shipping pins. They are required for maintenance procedures to the Z and theta motors. Pins may be stored in holes provided in the rack floor. These holes are located in the front on the right-hand side.

**CAUTION:**

**Potential hand-camera damage. Move the Z column and the Z carriage at the two points shown in the following two figures. Excessive force will damage the hand and its attaching hardware.**

6. Move the Z column to access the hand assembly. See [Figure 2-6](#).

**Figure 2-6. Z Column Rotation**



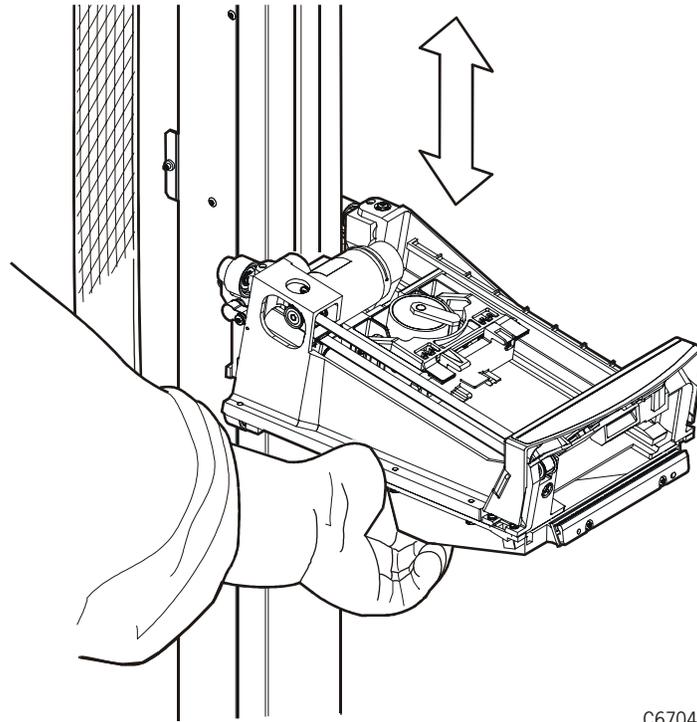
C67047

7. Raise the hand-camera assembly (on the Z carriage) as shown in [Figure 2-7](#) so that you have comfortable access to the hand assembly. Remove and discard the foam packing material from inside the hand assembly.

**Note:** Make sure that the hand is left in the fully retracted position.

8. Close the front door of the library by locking the top and bottom latches with the key provided.

**Figure 2-7. Z Carriage Movement**



C67048

## ■ Installing Optional Power Components

**CAUTION:**

**Do not power on the library until this manual indicates that it is all right to do so.**

The factory ships the two optional power components separately from the library:

- Optional (DC) power supply (feature code RMPS)
- Optional PDU (ships with the optional DC power supply and must be installed also)

To install these components, follow the installation instructions in the shipping packages.

## ■ Installing Fibre Channel Components

Read the following paragraphs for an overview of how to install Fibre Channel components into the library. Be sure that you have read [“Fiber-Optic Cable Handling” on page xxiv](#) and [“Fiber-Optic Cable Installation” on page xxiv](#) before installing Fibre Channel components. See [Table 4-7 on page 4-14](#) for Fibre Channel cable information.

### ■ 9840 Drive Connection

Consult the *9840 Tape Drive Installation Manual*, PN 95879, for directions on installing and configuring 9840 drives.

Before you install 9840 Fibre Channel tape drives in the L180 library, ensure that the library has a perforated drive access door. In February 2000, the perforated drive access door replaced an older drive access door that had vertical louvers. If you determine that the library requires a perforated drive access door, please order FB62296.

**Note:** L180 libraries that require this replacement door have these serial numbers: 0–18, 300–324, 5000–5020.

### ■ Library Connection

**CAUTION:**

**Do *not* connect the client’s (host’s) Fibre Channel cable to the library until after you have configured the library and the drives.**

For Fibre Channel connection to the library (that is, the control path), you must install the compact PCI bus (CPCI) component (MPV card), a 1 GB Fibre

Channel card (MPU card), and the control-path strain relief. Consult the instructions enclosed with these components in the shipping package.

After you have installed all components and configured the library and drives, follow the instructions for “[Fibre Channel Connection \(Library\)](#)” on page 4-14.

## Drive Cable Strain Reliefs

The library shipping kit includes two data-path strain reliefs to help you accommodate fiber-optic cables from the drives. Install these strain reliefs and wrap the fiber-optic cables around them:

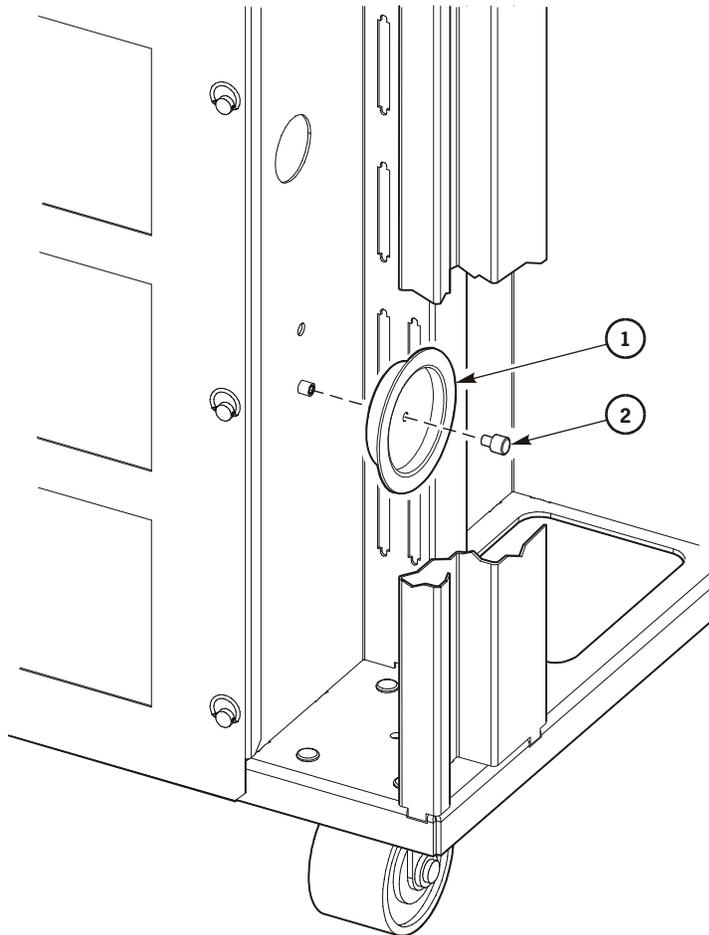
1. Remove the strain relief and its 10-32 thumbscrew from the shipping kit.
2. Align the center hole in the strain relief with one of the screw holes on the side of the drive tower (see [Figure 2-8 on page 2-18](#)).
3. Insert the thumbscrew into the center hole in the strain relief.
4. Tighten the thumbscrew until the strain relief is securely in place.
5. Repeat Steps 1 through 4 for the second strain relief.

**CAUTION:**

**Do *not* connect the client’s (host’s) Fibre Channel cable to the drives until after you have configured the library and the drives.**

6. Wrap data-path fiber optic cables at least 360° clockwise around the strain relief (see [Figure 2-9 on page 2-20](#)).

**Note:** Because the drive tower contains two cable access holes and supports two strain reliefs, you can place half of the fiber-optic data-path cables around each strain relief.

**Figure 2-8. Attaching Fiber-Optic Cable Strain Reliefs**

C67285

### Attaching Fiber-Optic Cable Strain Reliefs (C67285)

1. Strain Relief
2. Thumb screw

## Rack-Mounted Components

### CAUTION:

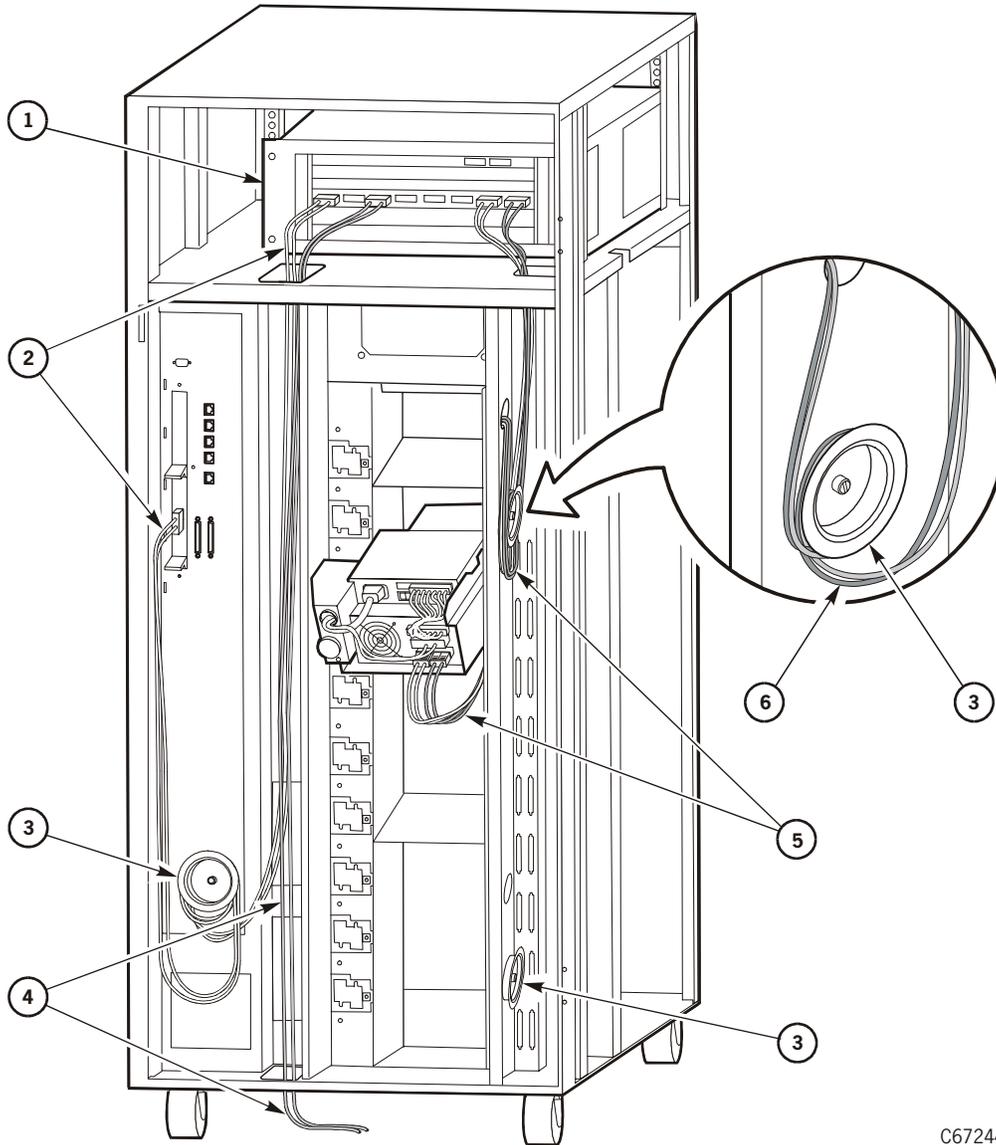
Be sure that you have read and understood the **“Rack Safety and Precautions”** on page xxvii before installing rack components.

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.

To install rack-mounted Fibre Channel components:

1. Ensure that you have read and understood the [“Rack Safety and Precautions” on page xxvii](#).
2. Ensure that the Fibre Channel device (bridge, switch, or hub) faces the *front* of the library to allow proper cable routing to the drives. Cables that exit the fiber device must follow the routing shown in [Figure 2-9 on page 2-20](#).
3. Follow the directions:
  - Enclosed with the Fibre Channel device for rack mounting the component into the 6U rack area
  - Supplied in the *9840 Tape Drive Installation Manual*, PN 95879, for installing the 9840 Fibre Channel drives

**Figure 2-9. Fiber-optic Cable Route**



C67244

L180 Fiber Cable Route from Rack Area to Drive (C67244)

1. Fibre Channel hub
2. Fiber cable route to the library
- 3. Fibre-optic cable strain relief
4. Fiber cable route to the server
5. Fiber cable route to a drive
- 6. Wrap the fiber-optic cable at least 360° clockwise around the strain relief.

## ■ Changing Library SCSI Operating Options

The standard MPC card (without the MPV or MPU card) is factory-configured to:

- Supply terminating power
- Operate on a differential SCSI interface

You may change either or both of these options by following the procedures below.

### Library Terminating Power Option

**CAUTION:**

***Loss of data or degradation of performance: StorageTek recommends that the library be at one end of the SCSI bus and that the devices at both ends of the bus supply terminating power (TERMPWR = ON). This recommendation is especially pertinent if:***

- The library is some distance from the server
- The library contains 9840 drives, and the library is daisy-chained with the drives on the SCSI bus

**Industry standards advise that no more than three devices provide terminating power to the bus.**

The terminating power strap is set to the ON location (library supplying terminating power) at the factory. You may change the strap to the OFF location, which means only the server would supply terminating power.

To change the library terminating power to the OFF position:

1. Open the rear door by gently pulling on the finger slot.
2. Remove the 13 screws (Torx 25) that secure the electronics compartment.
3. Open the cable clamp on the library's Y-cable. This allows the Y-cable to extend as you perform the next step.
4. Grasping the handle, gently slide out the electronics compartment until the slide rail buttons snap in place.

5. Remove the six screws (Torx 15) and cover from the MPC card. (The MPC card position is shown in [Figure 1-2 on page 1-4](#). Four screws are on the front face of the cover, and two screws are on the side.)
6. Refer to [Figure 2-10 on page 2-24](#), and check the location of the terminating power strap at the bottom, right of the MPC card, J18.
7. Pull out the jumper and place it in the OFF position.
8. Replace the cover on the MPC card. Secure it in place with the six screws.
9. Secure the electronics compartment by:
  - a. Pushing in on the slide rail buttons
  - b. Gently sliding the compartment into the library interior
  - c. Replacing the 13 screws
10. Re-clamp the library Y-cable to its original position.

## Library Single-ended Operation

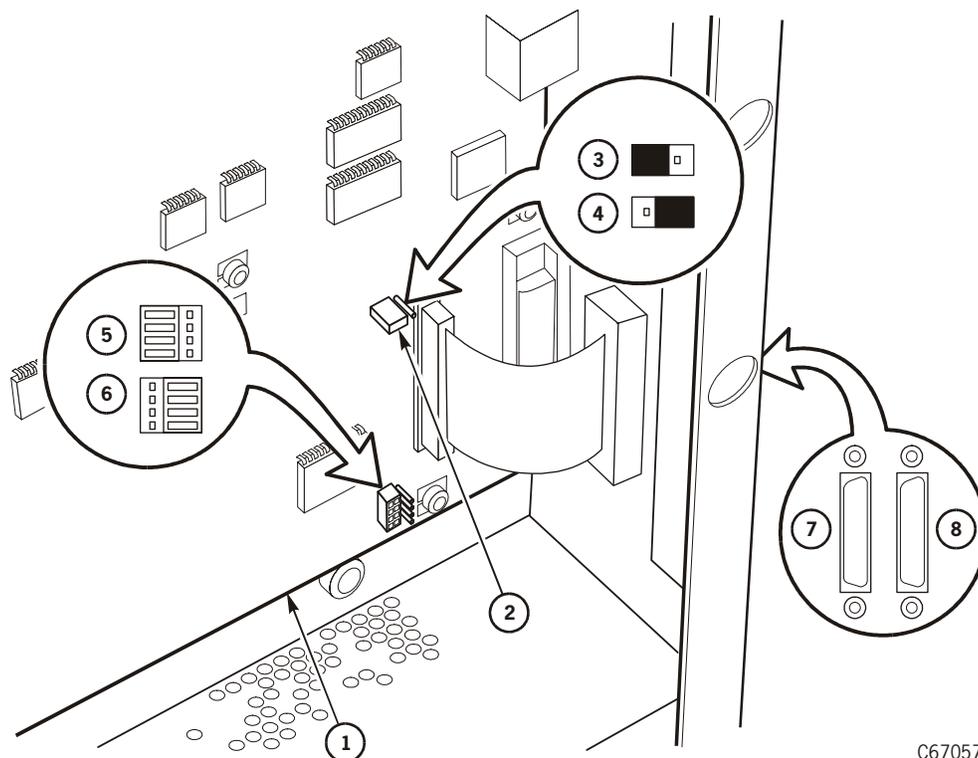
The library is set to differential operation at the factory. You may change the operation to single-ended by changing the jumper (J16) on the MPC card.

To change the library for single-ended operation:

1. Open the rear door by gently pulling on the finger slot.
2. Remove the 13 screws (Torx 25) that secure the electronics compartment.
3. Open the cable clamp on the library's Y-cable. This allows the Y-cable to extend as you perform the next step.
4. Grasping the handle, gently slide out the electronics compartment until it the slide rail buttons snap in place.
5. Remove the six screws (Torx 15) and cover from the MPC card. (The MPC card position is shown in [Figure 1-2 on page 1-4](#). Four screws are on the front face of the cover, and two screws are on the side.)
6. Refer to [Figure 2-10 on page 2-24](#) and check the location of the single-ended or differential jumper at J16.
7. Pull out the jumper and place it in the single-ended position.
8. Replace the cover on the MPC card. Secure it in place with the six screws.
9. Secure the electronics compartment by:
  - a. Pushing in on the slide rail buttons
  - b. Gently sliding the compartment into the library interior
  - c. Replacing the 13 screws

10. Re-clamp the library Y-cable to its original position
11. Refer to the diagram in [Figure 1-3 on page 1-6](#) for the location of the library's SCSI single-ended connector. Move the library Y-cable to the single-ended connector.

**Figure 2-10. Library Terminating Power and Operation Jumpers**



C67057

Terminating Power & Channel Setting Jumpers—L180 (C67057)

1. MPC card
2. Terminating power strap (J18)
3. Terminating power ON position
4. Terminating power OFF position
5. Differential setting (J16)
6. Single-ended setting (J16)
7. Single-ended connector (front)
8. Differential connector (rear)

## ■ Installing Drives

**CAUTION:**

**Potential equipment damage:** Do not power on the library until this manual indicates that it is all right to do so.

**Potential equipment damage:** Do not mix SCSI single-ended drives with SCSI differential drives on the same SCSI bus.

**Potential equipment damage:** Before connecting SCSI drives to a client, ensure that the SCSI terminator on the client is turned on.

Drives are shipped individually. Because of the size differences of the DLT and 9840 drives, you may choose from a variety of ways of installing the drives. Typically, drive installation moves from the bottom slot and up. (Installation instructions begin on [page 2-28](#).)

You may, however, install any drive into any location that it fits, except in the uppermost slot in the drive column, which is reserved for a DLT drive only. (The 9840 drive is too large to fit in this slot.)

**Note:** When a drive is correctly seated in a drive slot, the power and TTI (tape transport interface) connections between the library and drive are complete. You do *not* have to install a separate TTI cable.

**Note:** If you plan to install other drives in the future, you should initially install drives in the top slots and work down since drive numbers are assigned from top-to-bottom (0-x).

If the initial drives are installed from the bottom slots and up, any additional drive installation will cause the entire column of drives to be re-numbered. This will involve extra work from the system viewpoint.

See [Figure 2-11 on page 2-27](#) and [Table 2-2 on page 2-26](#) for the rules for combining drives:

1. The first section in [Figure 2-11](#) shows that the uppermost drive slot in the drive column may only be a DLT drive.
2. The second section depicts the size ratio of the 9840 drives to the DLT drives. In size, two 9840 drives fit in the same space as three DLT drives. This space also accommodates one DLT drive and one 9840 drive.
3. The third section shows this ratio again: three DLT drives fit in the same space as two 9840 drives. This space also accommodates one DLT drive and one 9840 drive.
4. The fourth section depicts a mixture of 9840 and DLT drives.

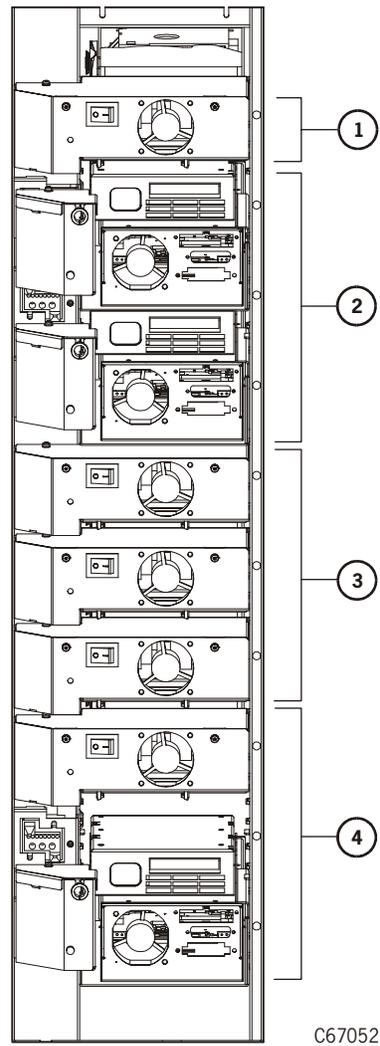
**Table 2-2. Drive Combinations Permitted**

Number of 9840 Drives	Number of DLT Drives <sup>1</sup>
0	10
1	8
2	7
3	5
4	4
5	2
6	1

<sup>1</sup>. With the L180 library, some combinations of input voltage and current, drive type (PFC or non-PFC), and plug type (locking or non-locking) limit the number of DLT drives that can be installed.

Drive positions (“logical” numbers) are automatically assigned by the library during initialization. You must, however, configure each drive’s SCSI IDs and “on bus” or “off bus” status. The configuration procedure is explained in [“Drive Entries \(SCSI Drives Only\)”](#) in Chapter 3, [“Library Configuration.”](#)

**Note:** Due to the size of the 9840 drive, the operator panel will display dashed lines (- - -) between a 9840 drive and another drive; this is due to the empty (not connected) power and tape transport interface (TTI) connector displaced by the physical size of the 9840.

**Figure 2-11. Drive Combination Rules****Drive Installation Rules (C67052)**

1. DLT drive *only* in top-most slot
2. Two 9840 drives (shown), or three DLT drives, or one 9840 and one DLT
3. Three DLT drives (shown), or two 9840 drives, or one 9840 and one DLT
4. Mixed 9840 and DLT drives (shown), or three DLT drives, or two 9840 drives

## Installing DLT Drives

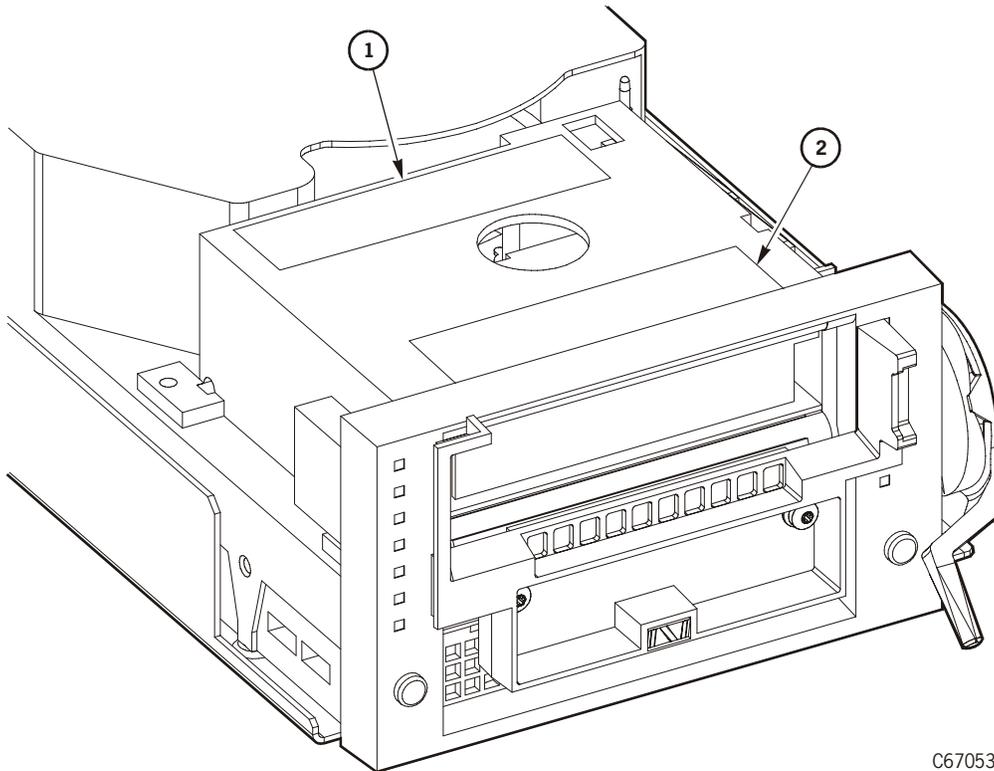
For DLT drives, follow the procedure (beginning on [page 2-28](#)) to unpack and install the drives.

DLT tape drives are shipped with the following, non-selectable configurations:

- DLT7000 (manufacturer's model number)
- DLT8000 (manufacturer's model number)
- Differential operation

Make sure that the labels on the drive match the drive type and operation required. See [Figure 2-12](#) for the locations of the labels.

**Figure 2-12. DLT Model Number Labels**



DLT Model Number and Operation Type Labels (C67053)

1. Manufacturer's model number label
2. Single-ended or differential label (and drive serial number)

To install a DLT drive:

1. Open the rear door by gently pulling on the finger slot.
2. Open the library's drive access door (inside the rear door) by:

- a. Removing the screws at the top and bottom of the door
  - b. Twisting the snap rings (Turn the snap rings clockwise, and gently pull open the door.)
3. Open the drive package.
  4. Remove the packing material.

**Note:** Check with the customer for a maintenance agreement on drives. If the drives are to be returned for repair, have the customer retain one shipping box (with packing material) in case a drive must be sent back to the factory. (Some maintenance agreements allow drive replacement by trained and certified personnel on the customer's staff.)

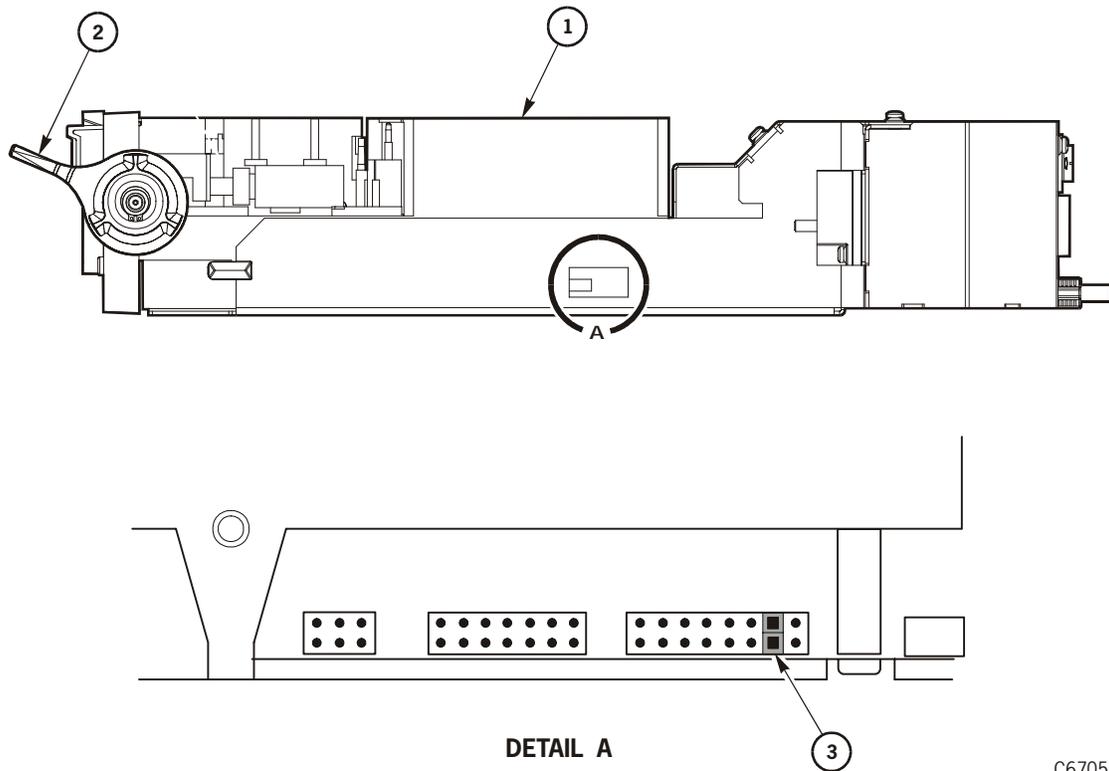
5. Check the side of the DLT drive for the terminating power jumper selection. See [Figure 2-13 on page 2-30](#) for jumper locations.

**CAUTION:**

***Loss of data or degradation of performance: StorageTek recommends that the library be at one end of the SCSI bus and that the devices at both ends of the bus supply terminating power (TERMPWR). Industry standards advise that no more than three devices provide terminating power to the bus.***

Check whether TERMPWR for DLT drives is on or off (enabled or disabled) for each tape drive. If needed, move the jumper to match your requirement.

- TERMPWR ON: Install the jumper on the pins shown in [Figure 2-13 on page 2-30](#).
  - TERMPWR OFF: Remove the jumper on the pins shown in [Figure 2-13](#). You can store the jumper by placing it on one pin only.
6. Carefully place the drive near the rear of the library.
  7. Look inside the drive column area and determine which slot to use for the drive. (See [Figure 2-11 on page 2-27](#) for drive configuration rules.)

**Figure 2-13. DLT Drive Terminating Power Jumper**

C67054

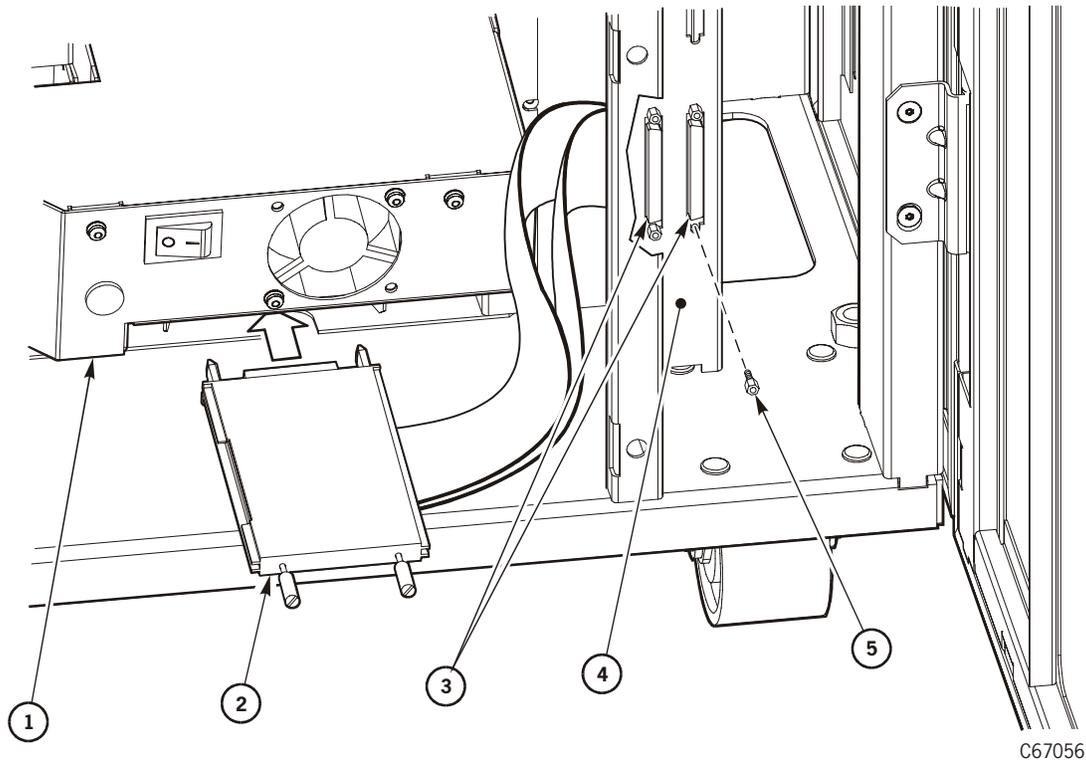
## Terminating Power Jump—DLT Drive (C67054)

1. DLT drive
2. Load latch
3. TERMPWR jumper (enabled)

**CAUTION:**

**Do *not* connect the client's SCSI bus cable to the library or to the drive bulkhead until after you have configured the library and the drives.**

8. Remove the drive's Y-cable and mounting screws from the drive box.
9. Attach the drive's Y-cable to the drive bulkhead by:
  - a. Threading one of the jackscrews into the end of one of the two connectors at the dual end of the cable. Thread the jackscrew all the way in and then back it off by 1/4-turn.
  - b. Referring to [Figure 2-14 on page 2-31](#) as you tilt the channel connector (with the jackscrew end at the bottom) into the slot on the interior of the drive bulkhead, next to the desired drive location.

**Figure 2-14. DLT Drive Cable Connections**

DLT Drive Cable Connections (C67056)

1. DLT Drive
2. SCSI connection at the drive (single end of drive Y-cable)
3. SCSI connection at the drive bulkhead (dual end of drive Y-cable)
4. Exterior of drive bulkhead
5. Jackscrew

**Note:** It is easier to insert the connector if you tilt it away from the interior of the drive bulkhead.

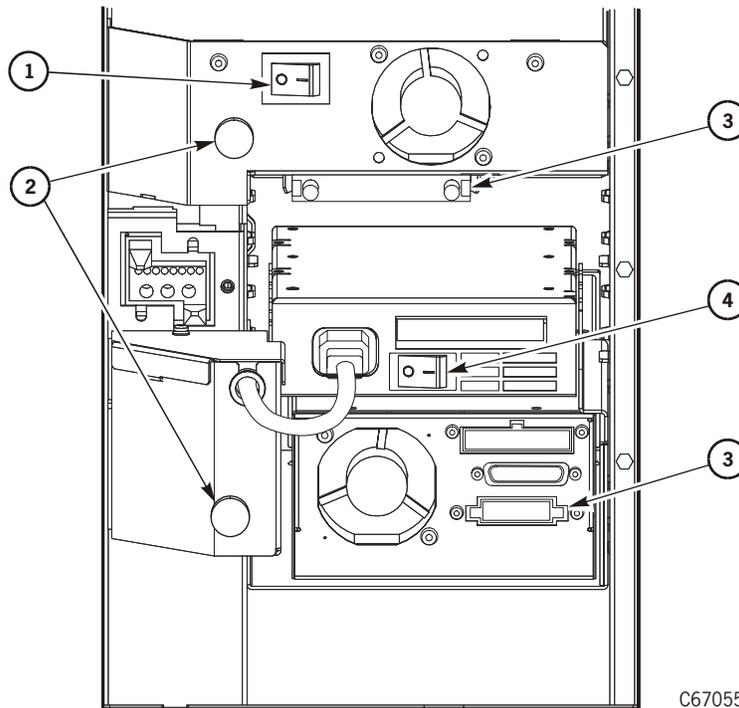
- c. Working from the exterior of the drive bulkhead as you grasp the connector and thread the second jackscrew into the top of the connector.
  - d. Making sure the connector aligns inside its slot and tightening both jackscrews with a 3/16-inch nut driver. Do not overtighten.
  - e. Repeating Steps A through D for the second connector at the dual end of the Y-cable.
10. Remove and discard the drive slot cover. (To remove the cover, pull on the knob.)

11. Following the lifting procedures described in [“Lifting Techniques” on page xxii](#), firmly grasp the drive at the rear with one hand and place the other hand under the drive tray.
12. Carefully guide the drive into its slot. Push it in as far as it will go and firmly seat the drive.

**CAUTION:**

***Potential equipment damage:*** In the following step, do not overtighten the thumbscrew.

13. Refer to [Figure 2-15](#), and turn the thumbscrew clockwise until it is secure.
14. Connect the single end of the Y-cable to the SCSI connector on the rear of the drive.
15. Place the drive’s power switch to the ON (|) position.
16. You may now install other drives. For instructions on how to complete cabling, see [“SCSI Drive \(Data\) Connections” in Chapter 4, “Cables for External Paths.”](#)

**Figure 2-15. Installed Drives—Rear View**

Installed Drives—Rear View (C67055)

1. DLT power switch
2. Thumbscrews
3. Drive's SCSI connector
4. 9840 power switch

## Installing 9840 Drives

### CAUTION:

**Do not connect the client's interface cables to the library or to the drives until after you have configured the library and the drives.**

Refer to the *9840 Tape Drive Installation Manual* (PN 95879) for drive installation instructions. You may obtain the latest version of this manual by following the instructions in [“Additional Information” on page xix](#). For instructions on how to complete cabling, see [“SCSI Drive \(Data\) Connections” in Chapter 4, “Cables for External Paths.”](#) For information about routing fiber-optic cables, see [“Installing Fibre Channel Components” on page 2-16](#).

## ■ Connecting Power

The following pages describe the procedure to connect the library power cable. If your library has the duplicate power supply feature, be sure that each power supply is connected to its own circuit breaker.

**CAUTION:**

**Do not connect the power cable until told to do so in the instructions. Make sure the circuit breakers at the library power supply and for the power outlet are turned off.**

### Routing the Power Cable

To route the power cable, see [Figure 2-16 on page 2-37](#) and:

1. Make sure that the power source is turned off and that the library power switches (or switch) are in the down (OFF) position.
2. Loosen the two screws (Torx 15) that hold the strain relief in place. (See [Figure 2-16 on page 2-37](#).)
3. Insert the female connector through the hole in the library floor. Make sure the power cable is labeled with the customer's circuit breaker number and location.

**Note:** If the installation requires this cable to be under the floor, carefully pull the cable up through the hole in the floor.

4. Insert the power cable connector into the bottom of the AC power distribution unit.
5. Tighten the screws on the strain relief.

**Note:** Safety agency standards require that your power receptacle is located within 2.8 m (9.2 ft) of the library. The power receptacle must also be easily accessible.

In sites where the power cable is directly wired to a power source, the facility must have a readily accessible disconnect device incorporated in the fixed wiring.

**Remarque :** Les normes des organismes de sécurité requièrent que votre prise d courant soit située à moins de 2,8 m de la bibliothèque. La prise de coura doit être d'accès aisé.

Sur les sites où le câble d'alimentation est directement connecté à une sou d'alimentation, un système de déconnexion facile d'accès doit être intégré câblage fixe.

**Hinweis:** Gemäß den geltenden sicherheitsrechtlichen Vorschriften darf die Netzsteckdose maximal 2,8 m von der Library entfernt sein. Außerdem n die Steckdose gut zugänglich sein.

Wenn das Netzkabel fest an die Stromquelle angeschlossen ist, muß sich Festverdrahtung eine gut zugängliche Unterbrechungseinrichtung befinde

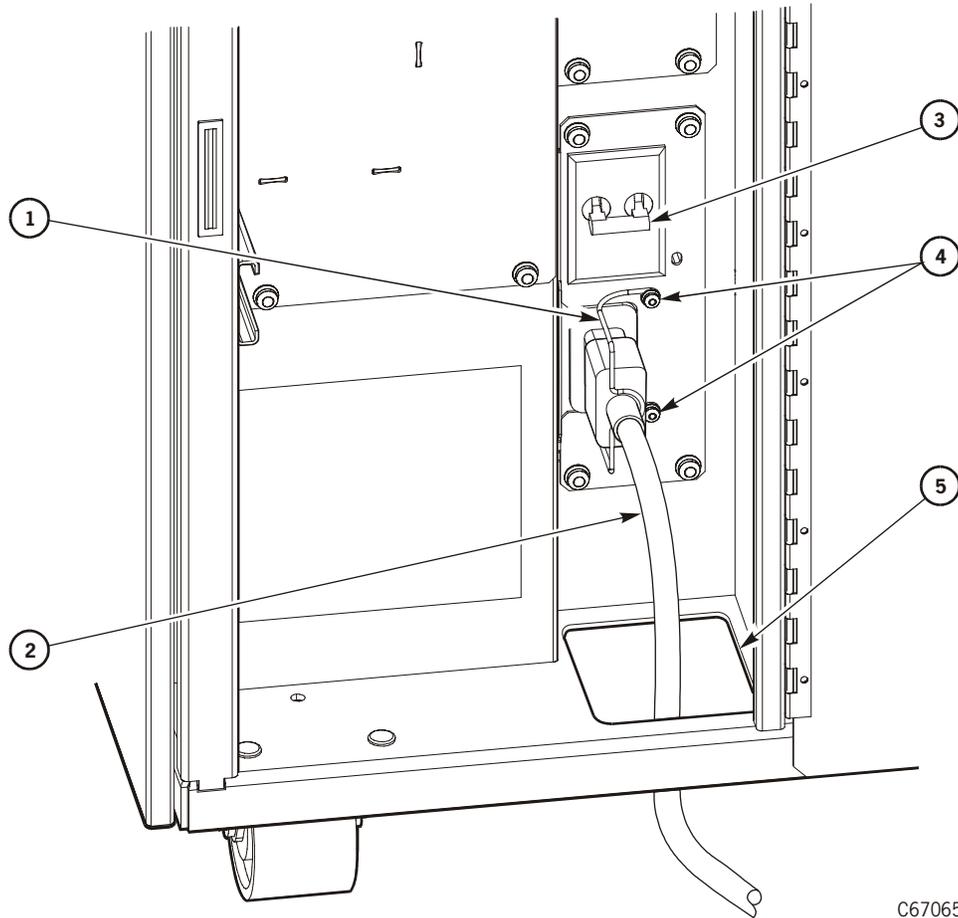
**Wskazówka:** Przepisy BHP wymagają, aby skrzynka zasilania znajdowała się w odległości 2,8 m od biblioteki. Do skrzynki zasilania musi być łatwy dost

W miejscach, gdzie kabel zasilania jest bezpośrednio podłączony do źród prądu, w układzie zasilania zamontowanym na stałe musi być wbudowan urządzenie pozwalające na łatwe odłączenie źródła prądu.

## Supplying Power

To connect the library power cable to its power source:

1. Make sure that the cable is labeled with the library address/location.
2. Connect the male end of the power cable into the wall outlet.
3. Turn the circuit breaker for the wall outlet to ON.
4. Make sure that the power switches for the drives are in the ON (|) position.
5. Close the drive access door by turning the snap rings and reinstalling the top and bottom screws.
6. Lift up the library power switch (so that it is in the ON position). (See [Figure 2-16 on page 2-37.](#))
7. The library will begin its initial program loading of the embedded firmware and start its initialization procedure.
8. Close the rear door of the library.
9. Refer to the next chapter to configure the library and drives.

**Figure 2-16. Library Power Cable**

C67065

## Library Power Cable (C67065)

1. Strain relief
2. Power cable
3. Power switch
4. Strain relief screws (2)
5. Cable access hole

## ■ Connecting a Laptop (for Service Only)

Two types of connections from a laptop device are available for service representatives:

1. Load firmware connection
2. Remote (modem) connection

Both types use RJ45 cables (PN 4108289xx) and require a RJ45–DB9 connector (PN 10410823) at the laptop connection.

For either connection, your laptop computer must be set for RS423 or RS232 serial protocol:

- Eight bits
- No parity bit
- One stop bit

### Load Firmware Connection

To load the library's firmware only, connect the RJ45 cable from the laptop device to the top connector—labeled *CSE*—on the top of the electronics module. The baud rate is 9600.

### Remote (Modem) Connection

To run diagnostic tests from the laptop instead of the operator panel or to extract detailed maintenance information, connect the RJ45 cable from the laptop to the third connector—labeled *Ser 1*—from the top of the electronics module. The baud rate is 38400 bps with Flash 97.exe.

**Note:** The Ser1 port takes the library offline without warning when you begin diagnostic tests from the laptop.

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This chapter describes how to configure the library and its associated drives for operation.

## ■ Loading Firmware Revisions

Library firmware is factory-installed on all new machines. It resides within a Flash PROM chip on the library's MPC card. For new installations, you are provided with a diskette with current firmware. You may also download firmware from the multi-platform support web site at <http://mpss.stortek.com/>.

You must have a personal computer and RJ45 cable (with DB9 adapter [PN 10410823] on the personal computer side) to download the firmware to the library's MPC card.

To download the firmware to the library:

1. Connect the RJ45 serial cable to the CSE port on the electronics module bulkhead.
2. Boot the personal computer to DOS mode.  
**Note:** Do not switch from MSWindows to DOS. The personal computer *must* be booted into DOS mode.
3. Create a directory on the C drive (`mk dir`).
4. Insert the firmware diskette into the personal computer.
5. Change to the directory on the diskette drive (`cd directory name`).
6. Copy the `flash97.exe` program *and* the firmware file `release.prm` to the directory you created on the C drive (`copy flash.exe c:/directory name`, and `copy release.prm c:/directory name`).
7. From the directory on your personal computer, type in:  

```
flash97 release.prm
```
8. When prompted, enter the port number being used on the personal computer (generally Port 1) and press [Enter] (or return).

**CAUTION:**  
***Equipment Damage:*** Do not attempt to do perform any operations on the personal computer or library until the operator panel displays **DOWNLOAD**

**COMPLETE. Damage to the MPC processor card may occur if you do not wait for the process to complete.**

9. After several seconds, the personal computer will display and update the number of bytes being sent. The download takes about five minutes.

10. The library's operator panel will display DOWNLOADING.

11. After the personal computer displays FILE TRANSFER COMPLETED SUCCESSFULLY, the operator panel will display DOWNLOAD COMPLETE. *Wait for this sequence to complete.*

12. To activate the firmware, press the RESET button on the operator panel.

**Note:** The fault symptom code (FSC) dictionary is also contained on this firmware diskette. The file name is `fsc.txt` and, when proper security safeguards are followed, this file may also be copied to a file on your personal computer.

## ■ Choosing Library Configuration Options

Before starting the configuration procedure, read the explanations in this section and in “[Reporting SCSI Drive Information](#)” on page 3-8. Determine your choices, and write your configuration information in the spaces provided in [Table 3-1](#) and in [Table 3-3](#) on page 3-9. You might need to consult with the system administrator for some information.

**Table 3-1. Library/Network Configuration Record**

<i>Configuration Option</i>	<i>Selection</i>
<b>Auto Clean enabled or disabled</b>	
<b>9840 cleaning cartridge warning count</b>	
<b>DLT cleaning cartridge warning count</b>	
<b>Date</b>	
<b>Ethernet address</b>	Not configurable: pre-set at the factory
<b>Fast Load enabled or disabled</b>	
<b>IP address</b>	
<b>Library capacity</b>	Automatically configured during IPL
<b>Library name</b>	
<b>Library SCSI ID</b>	
<b>Library SCSI type</b>	Automatically configured during IPL
<b>Library Worldwide ID</b>	Not configurable: pre-set at the factory
<b>Network gateway address</b>	
<b>Port 0 Address (library)</b>	
<b>Port 0 Worldwide ID (library)</b>	Not configurable: pre-set at the factory
<b>Subnet netmask address</b>	
<b>Time</b>	
<b>Web password</b>	

### Auto Clean Disabled or Enabled

The following information relates to the Auto Clean feature. A user enables Auto Clean by loading at least one cleaning cartridge into the reserved cells and then resetting the library. During the subsequent IPL, the robot will audit the cleaning cartridges and automatically set the “Auto Clean enabled” option for the library.

The two Auto Clean options are defined as follows:

**Auto Clean disabled:** When a drive requires cleaning, you must enter the compatible cleaning cartridge into the CAP, using the Clean Drive function available through the diagnostic menu on the operator's panel. The robot will retrieve the cleaning cartridge, mount it in the drive, and return it to the CAP when cleaning is completed. You must then remove the cleaning cartridge from the CAP and manually keep track of its usage.

**Auto Clean enabled:** When a drive requires cleaning, the robot retrieves and mounts a compatible cleaning cartridge from the reserved cell in the library. (These cell locations are shown in [Figure A-1 on page A-2](#).) When the cleaning is complete, the robot returns the cleaning cartridge to its cell location within the library. The MPC card will keep track of usage and notify the client when the usage has expired.

If customers desire this feature, they must load at least one cleaning cartridge in the reserved cells area of the library and reset the library. (See [“Locating Reserved Cells” in Chapter 5, “Library Preparation”](#))

**Note:** Before enabling the Auto Clean function, make sure that the customer's client software supports the Auto Clean feature.

## Cleaning Cartridge Warning Count

After a predetermined count, a cleaning cartridge must be replaced and disposed of at your site.

If the library has Auto Clean enabled, you must specify the cartridge warning count. This is the number of times that a cleaning cartridge may be used (that is, its “warning count”). The *DLT Tape Drive Product Manual* specifies that a DLT cleaning cartridge may be used a maximum of 20 times. For 9840 cartridges, refer to the *9840 Tape Drive User's Reference Manual*, PN 95739.

## Ethernet Address

The Ethernet address is burned into a programmable read-only memory (PROM) component at the factory. It is automatically displayed when you enter the network configuration menu. It cannot be changed.

## Fast Load Enabled or Disabled

These two Fast Load options are defined as follows:

**Fast Load enabled:** The robot will mount a tape to a drive and then immediately perform its next task, not waiting for the tape drive to complete its loading cycle.

**Fast Load disabled:** The robot will mount a tape to a drive and 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 enabled” option. Check with the customers for their requirements.

## IP (Internet Protocol) Address

The four-byte IP address must be set by the system administrator. The value identifies the library and makes it accessible through a network. An example of an IP address entry is 192.0.0.1.

## Library Capacity

The three storage capacity variations available for the L180 are listed in the following table.

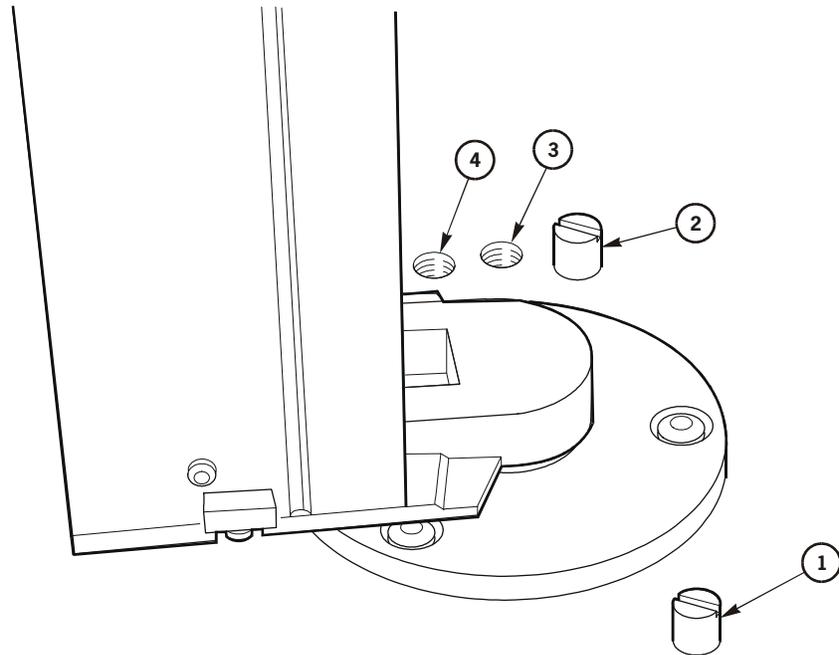
**Note:** The firmware configures the capacity of the library during an IPL.

[Figure 3-1 on page 3-6](#) shows the theta stops and their relationship to library capacity. Make sure that the location of the rear stop matches the capacity of the library.

**Table 3-2. Capacity Variations**

Model Type	Capacity
L180-80	84 data storage cells
L180-140	140 data storage cells
L180-180	174 data storage cells

See [Appendix A, “Library Elements and MPC Card,”](#) for cell (element) locations.

**Figure 3-1. Theta Stops (Floor of Library)**

C67118

#### L180 Tape Library Theta Stops (C67118)

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

## Library Name

The library name is strictly a local convention. It is mapped to the IP address and does not affect operation. The library name must be assigned by the system administrator.

## Library SCSI ID

You must enter a SCSI identifier (ID) for the *library*. (Drive IDs will appear on a different screen.)

### Notes:

1. When configuring the library to a Unix workstation, StorageTek recommends that you use a dedicated SCSI bus adapter:
  - For wide SCSI adapters, you may assign any identifier from 0 to 14 for the library.

- For narrow SCSI adapters, the range of identifiers is 0 to 6.
2. If you choose to use the embedded system bus on the SPARC station, you should select target 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 targets on the embedded system bus are 6, 5, 3, and 2.
  4. If the customer is using Automated Cartridge System Library Software (ACSLs), its level must be Version 5.3.2 or higher.

## Library SCSI Type

The SCSI type is the level of the SCSI interface to the library (SCSI-1, SCSI-2, or SCSI-3). This value is automatically configured during IPL.

## Library Worldwide ID

When a library has a Fibre Channel interface, then the library's worldwide ID identifies the library as a node on the Fibre Channel system. The ID is automatically displayed when you access the "Fibre Channel Interface Configuration Menu." It cannot be changed.

## Network Gateway

A network gateway in a large network allows devices on one subnet to interface with devices on another subnet (see "[Subnet Netmask](#)" on page 3-8). This four-byte address must be specified by the system administrator.

## Port 0 Address

The Fibre Channel interface requires configuration of the library's Port 0 address. You may configure the library for soft or hard addressing of this port.

If you configure the library for hard addressing, you may input the Port 0 address yourself through the library's operator panel or through the library's Horizon L-Series Library Monitor if it is enabled. Allowable addresses are 000d to 125d.

**Note:** Before you input a Port 0 address, you must first set the library's Fibre Channel hard address option to *enabled*.

If you configure the library for soft addressing, you are allowing the network's software to configure the Port 0 address. For this addressing approach, you must set the Fibre Channel hard address option to *disabled*.

**Note:** The default for the hard address option is *disabled*.

## Port 0 Worldwide ID

When a library has a Fibre Channel interface, then the Port 0 worldwide ID identifies the library's Port 0 (that is, the lower MPU card) on the Fibre Channel system. The ID is automatically displayed when you access the "Fibre Channel Interface Configuration Menu." It cannot be changed.

## Subnet Netmask

A subnet separates a single physical network (or intranet) into multiple logical networks for easier routing within the customer's network. The subnet netmask field identifies the library on one of these subnets. This four-byte address must be specified by the system administrator. An example of a subnet mask entry is 255.255.254.0.

## Web password

If you have installed the Horizon L-Series Library Monitor, you must set a Web password at the library operator panel. This password allows a user at a workstation or PC that is networked to the library to communicate with the library through the Horizon L-Series Library Monitor. The Web password may be up to 30 characters.

## Reporting SCSI Drive Information

Before you configure a drive, make note of its SCSI system address and whether it is "on bus" or "off bus." Record this information in [Table 3-3 on page 3-9](#).

**Note:** You might need to consult with the system administrator for drive configuration information.

The first column in the table lists the logical drive number assigned to each drive. The library assigns this number during an IPL. (An IPL occurs when the library is powered on or when the **RESET** button is pressed.) The uppermost drive within the drive column is designated as "0," the next is "1," and so forth. These drive numbers are only for the library-to-drive communication.

### SCSI ID

You must set a SCSI identifier for each drive installed in the library.

### On Bus or Off Bus

This entry indicates whether the drive is on the same cable path (on bus) as the library or on a separate bus (off bus).

**Table 3-3. Drive Configuration Record**

Logical Drive Number	SCSI ID	On / Off Bus
00		
01		
02		
03		
04		
05		
06		
07		
08		
09		

**Note:** Configuring a 9840 SCSI 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 Service Reference Manual*, PN 95740.

## ■ Entering Configuration Data

The following pages describe the operator panel and provide steps for entering configuration information through the operator panel.

*System Degradation:* Make sure that the library and associated drives are offline to the system before you start configuration.

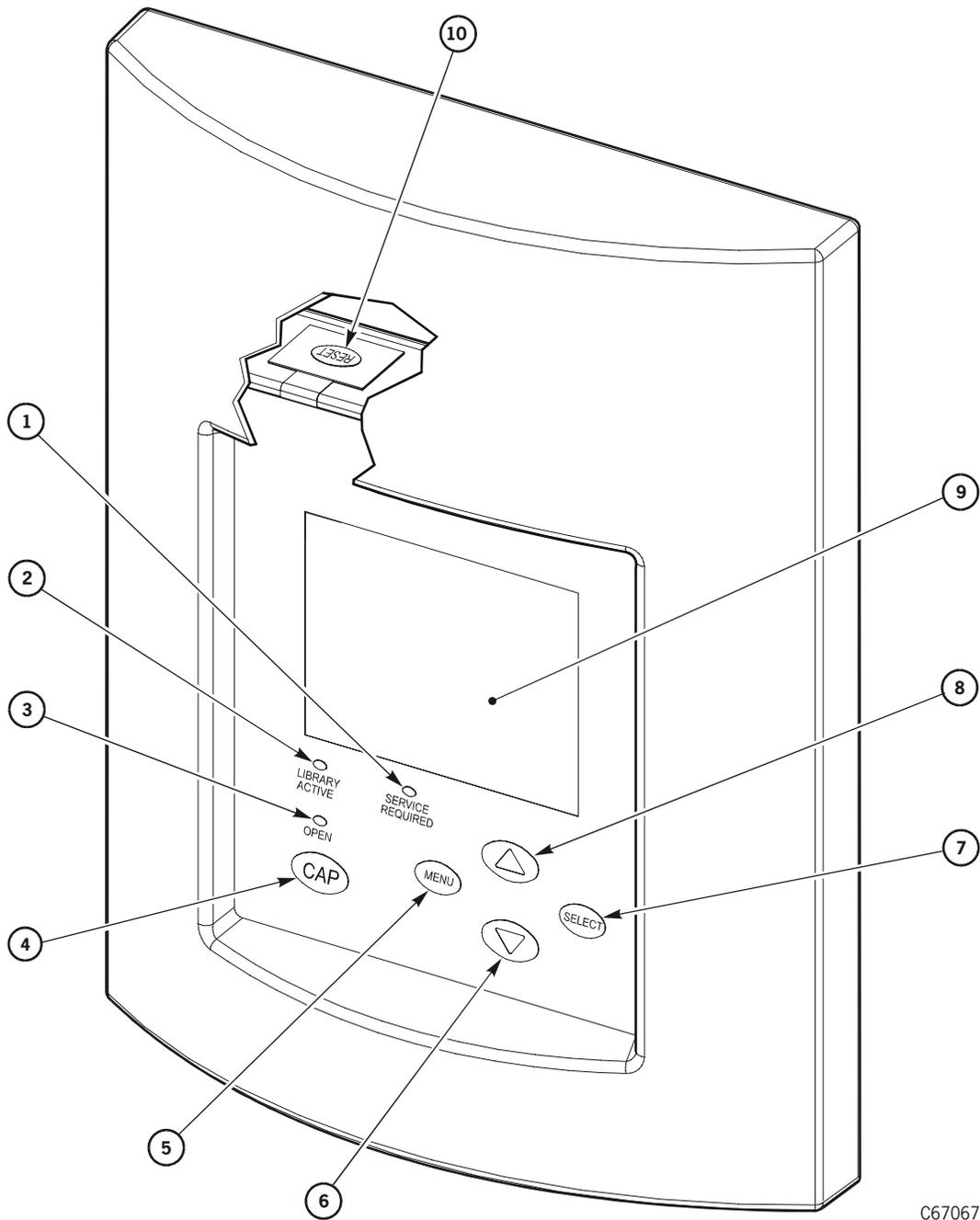
### Recommended Entry Sequence

After you have powered on or reset the library, the library will perform an IPL. When the IPL is complete, the operator panel will display a status screen. Once you see this screen, you can begin entering configuration data through the operator's panel. StorageTek recommends that you enter the following:

- Library configuration information (SCSI ID or Port 0 Address, Fast Load option, date, time)
- Network configuration information
- SCSI drive configuration information (SCSI ID and bus status)
- Screen characteristics (if necessary)
- Cleaning cartridge warning count (if Auto Clean is enabled)

### Operator Panel Buttons

[Figure 3-2 on page 3-11](#) shows the operator panel. Note that some buttons serve dual functions.

**Figure 3-2. Operator Panel**

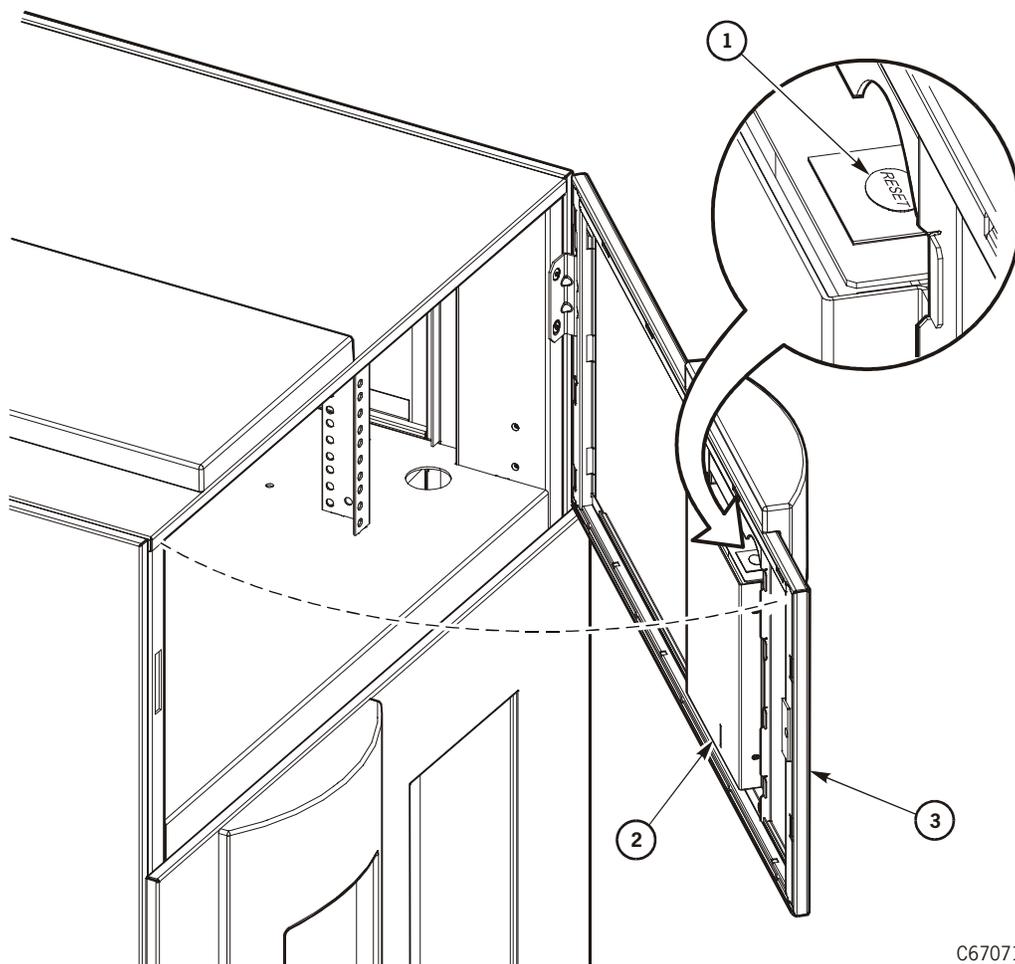
C67067

## Operator Panel (C67067)

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.

**Figure 3-2. Operator Panel (Continued)**

4. CAP button opens and closes the CAP.
5. MENU button initially places you into the Main Menu screen; 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 errors and allows input from menus.
10. RESET button starts an initial program load (IPL). To access this button you must open the rack door (see [Figure 3-3](#)).

**Figure 3-3. Location of RESET Button**

C67071

**Figure 3-3. Location of RESET Button**


---

Location of RESET button (C67071)

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

**Library Entries**

Four entries complete the configuration choices for the library:

- SCSI ID or Port 0 address
- SCSI drive Fast Load enable/disable
- Date
- Time

You make these entries from the library configuration screen.

**Note:** The configuration information in the lower half of the library configuration screen is automatically set when the library performs its IPL. You cannot change this data from the operator panel. This information includes Auto Clean status and User cell total.

Instructions for setting configuration choices appear in the following paragraphs. The sequence assumes that you will make all entries at one time. For each entry, except for the library's SCSI ID or Port 0 address, you save the changes with the final press of the **SELECT** button. To save a revised SCSI ID or Port 0 address, you must reset the library by pressing the **RESET** button; you must reset the library in this way before you can exit the "Main Configuration Menu." (You may choose to wait to press the **RESET** button until after you have entered all library, network, and drive configuration information and have revised the panel's screen characteristics.)

**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:
  - FSC LOG
  - CAP CONTENTS
  - DRIVE INFO
  - CLEANING INFO
  - DIAGNOSTICS
  - VERSION INFO
  - CONFIGURATION

2. Press the down arrow button until the cursor underscores CONFIGURATION.
3. Press the **SELECT** button. The “Main Configuration Menu” will appear:
  - LIBRARY CONFIG
  - DRIVE CONFIG
  - NETWORK CONFIG
  - PERSONALITY MODULE
  - WEB PASSWORD
  - DISPLAY INFO

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.

## 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 addressing option. 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:
  - FSC LOG
  - CAP CONTENTS
  - DRIVE INFO
  - CLEANING INFO
  - DIAGNOSTICS
  - VERSION INFO
  - CONFIGURATION
2. Press the down arrow button until the cursor underscores CONFIGURATION.

3. Press the **SELECT** button. The “Main Configuration Menu” will appear:

- LIBRARY CONFIG
- DRIVE CONFIG
- NETWORK CONFIG
- PERSONALITY MODULE
- WEB PASSWORD
- DISPLAY INFO

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

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

You enable/disable the Fast Load feature from the “Lib Config Menu.” 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.” 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." 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.

## Installing a Personality Module

If the customer ordered the Horizon L-Series Library Monitor, you must install its personality module and other components according to the documentation included in the Horizon L-Series Library Monitor shipping package. Consult this documentation for instructions on how to set required configuration data.

## Setting the Web Password

If you have installed the Horizon L-Series Library Monitor, 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. The Web password may be up to 30 characters.

## Drive Entries (SCSI Drives Only)

**Notes:** These notes apply to configuring a 9840 SCSI 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 library's "Main Menu."

2. Configuring a SCSI 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. 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.

**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 seven 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."

**Note:** You might need to consult with the 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 systems 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

**Note:** For the customer to be able 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 this 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 the 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 systems administrator might assign the library a subnet mask address if one is required. 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

If the customer has enabled the Auto Clean feature, you must use the operator panel to set the maximum number of times a cleaning cartridge can be used (or the "warning count"). The DLT tape drive product manual specifies that you can use a DLT cleaning cartridge a maximum of 20 times. For 9840 cartridges, refer to the *9840 Tape Drive User's Reference Manual* PN 95739.

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

You set the cleaning cartridge warning count from the "Cleaning Info" menu. 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. This menu displays the number of cleaning cartridges in the reserved area.
4. Using an arrow button, line up the cursor with the **DLT WARNING COUNT** or **9840 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)**

■ Before the customer can use the Horizon L-Series Library Monitor to monitor the library or alter the library’s configuration, you 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.

## ■ **Configuration Verification**

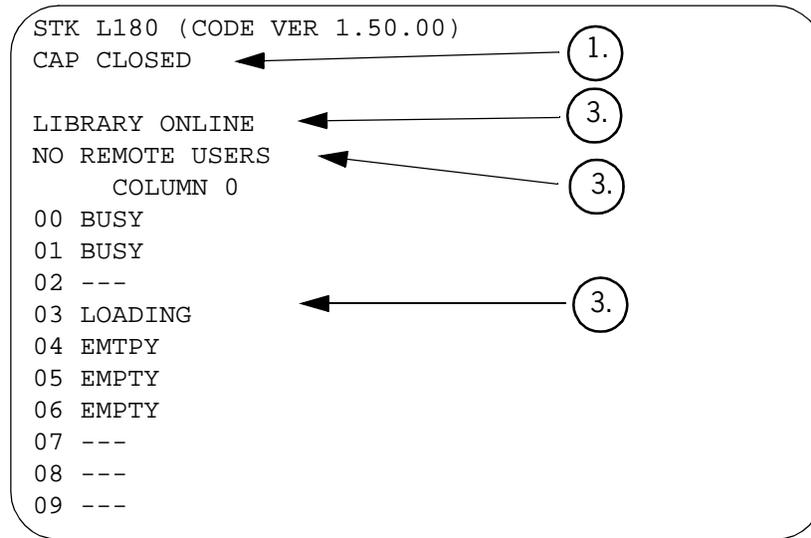
When you have completed all configuration entries, the library will notify you if you made a change that requires you to press the **RESET** button.

If you have reset the library, wait for it to complete its IPL. Then go through the configuration screens to verify that all information is complete. In addition, examine the information in the following section to understand the status messages that might appear on the operator panel.

## ■ Monitoring Status Information

You can monitor CAP, library, remote user, and drive status information through the initial status screen (see [Figure 3-4 on page 3-25](#)). This screen displays after initialization is complete, and it displays when you press the **MENU** button while you are viewing the “Main Menu.”

**Figure 3-4. 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 3-4](#) explains the status messages that might appear on this line.

**Table 3-4. CAP Status Messages**

<b>Status Message</b>	<b>Explanation</b>
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 your network's system console.
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 3-5. Library Status Messages**

<b>Status Message</b>	<b>Explanation</b>
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.

**Table 3-5. Library Status Messages (Continued)**

<b>Status Message</b>	<b>Explanation</b>
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 3-6 summarizes drive status messages that might appear on the initial status screen:

**Table 3-6. Drive Status Messages**

<b>Status Message</b>	<b>Explanation</b>
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.

**Table 3-6. Drive Status Messages (Continued)**

Status Message	Explanation
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.

**Note:** Due to the size of the 9840 drive, the status screen will display dashed lines (- - -) between a 9840 drive and another drive; this is due to the empty (not connected) power and tape transport interface (TTI) connector displaced by the physical size of the 9840. 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. The screen lists the manufacturer, model, status, serial number, interface type, and firmware version of the selected drive. See [Table 3-6 on page 3-27](#) for a list of drive status messages.

## CAP Magazine Status

Other status information is available through the operator panel menus. 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. The menu lists **VOLSER** of each cartridge in an installed magazine, or the screen lists a status message. See [Table 3-7 on page 3-29](#) 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 3-7. 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.

These procedures assume that you have inserted cleaning cartridges into the reserved cells and have subsequently reset 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 3-23.**

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.
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.
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 5-7](#)

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 and whether a personality module is present and enabled.

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 3-8. Status Messages about the Personality Module**

<b>Status Message</b>	<b>Explanation</b>
<b>STATUS :</b>	
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.
<b>TYPE :</b>	
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.
WRITE IN PROGRESS	The installation of the information from the personality module has been interrupted. The personality module is no longer valid.
<b>VERSION:</b>	This is the version number for the personality module. If a personality module is not present, this is the version of the vendor information.
<b>LIBRARY VENDOR ID:</b>	This is the identity number for the library vendor.
<b>LIBRARY VENDOR NAME:</b>	This is the name of the library vendor.
<b>LIBRARY PRODUCT NAME:</b>	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.
<b>SCSI VENDOR NAME:</b>	This is the library vendor name reported on the SCSI or Fibre interface.
<b>SCSI PRODUCT NAME:</b>	This is the library product name reported on the SCSI or Fibre interface.

**Table 3-8. Status Messages about the Personality Module (Continued)**

Status Message	Explanation
<b>HORIZON:</b>	
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.

## ■ Final Steps

After you have configured the library and drives and have verified configuration entries, take these final steps before testing the library:

1. Open the rear door.
2. Power off the library.
3. Connect external cables and/or daisy chain cables as described in [Chapter 4, “Cables for External Paths.”](#)
4. Ensure that all drive power switches are in the ON (|) position.
5. Install diagnostic and cleaning cartridges (see [“Installing Diagnostic and Cleaning Cartridges”](#) in [Chapter 5, “Library Preparation”](#)).
6. Power on the library. An initialization sequence will begin (see [Appendix B, “Initialization Sequence”](#)).
7. Check the drives (see [“Preparing DLT Drives”](#) and [“Preparing 9840 Drives”](#) in [Chapter 5, “Library Preparation”](#))

# Cables for External Paths

## 4

This chapter explains how to connect these cables:

- Library SCSI *control* cables
- Drive SCSI *data* cables, including daisy-chain cables
- Ethernet cable
- Fibre Channel cables

**Note:** If the cables are going under a raised floor, the floor tile under the library must have cutouts to allow routing of these cables.

## ■ SCSI Cable Paths

The customer may choose to separate the control and data paths. The control path transfers client commands for library robotic operations only. The data path transfers data to/from the drives.

The customer may combine both the data and control paths into one, single path. However, urge the customer to consider performance characteristics when determining the number of drives per SCSI path.

## Connector Requirements—General

The library SCSI control and data path cables must be 68-pin high density (HD) connectors at the library. While single-ended cables may be used, their connectors must be adapted to a 68-pin differential configuration at the library connection. Since system cables vary, you may need to adapt a connector to fit the library.

## Daisy-Chain Cables

If the drives will be linked to a common path or if the library will be linked to the drive path, refer to [Table 4-1](#) for the daisy-chain cables.

**Table 4-1. SCSI Daisy-chain Cables**

Length	Description	Part Number
25.4 cm (10 in.)	DLT drive to DLT drive	313109302

**Table 4-1. SCSI Daisy-chain Cables (Continued)**

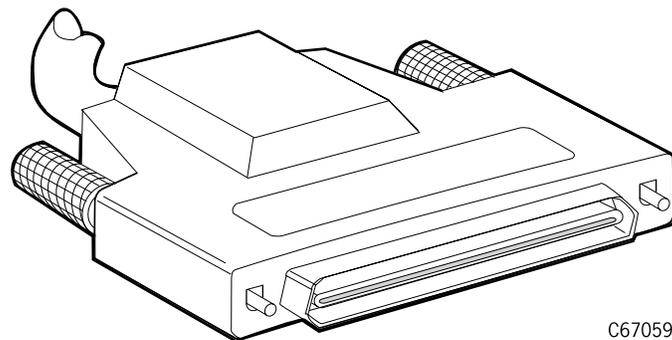
Length	Description	Part Number
46 cm (18 in.)	9840 drive to 9840 drive	310292001
213 cm (84 in.)	Between drive and library	313115701

## ■ SCSI Connectors

Supported SCSI connectors for the library are shown in [Figure 4-1](#) (below) through [Figure 4-5](#) on page 4-6.

### 68-Pin MD to 68-Pin VHDC Cables

For operating systems that support the VHDC (Very High Density Connector) cables at the client channel card, StorageTek offers the following cables ([Table 4-2](#)). The smaller, VHDC connector connects to the client SCSI card.

**Figure 4-1. 68-Pin VHDC Connector****Table 4-2. 68-Pin Mini-D to 68-Pin VHDC Cables**

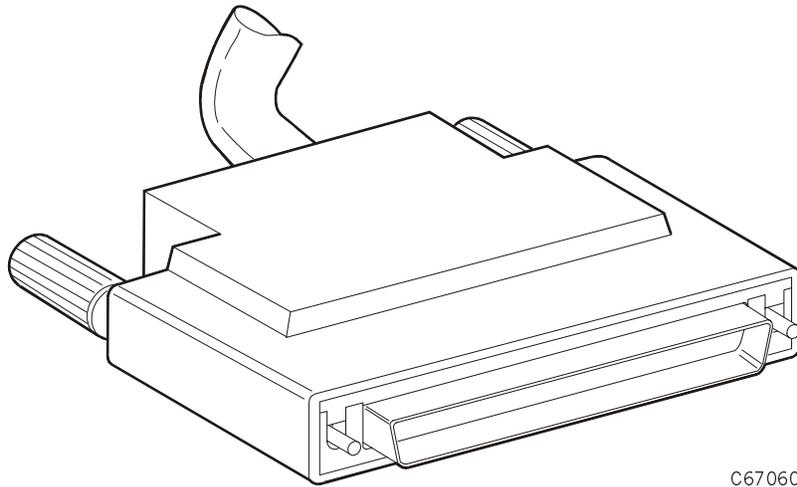
68-Pin HD to 68-Pin VHDC Cable Part Numbers		
Length	Above Floor PN	Plenum PN (see Note)
3 m (9.8 ft)	10083594	Not available
6 m (19.7 ft)	10083595	Not available
12 m (39.4 ft)	10083596	Not available
15 m (49.2 ft)	10083597	Not available
18 m (59.1 ft)	10083598	Not available

**Note:** Plenum rated cables will withstand higher temperatures.

## High-Density 68-Pin Jackscrew Cables

High-density 68-pin high-density jackscrew cables connect at the library and drive bulkhead (see [Figure 4-2](#)). Both ends of the cable feature the 68-pin configuration. See [Table 4-3](#) for a list of part numbers.

**Figure 4-2. High Density 68-Pin Jackscrew Connector**



C67060

**Table 4-3. 68-Pin High Density Jackscrew Cables**

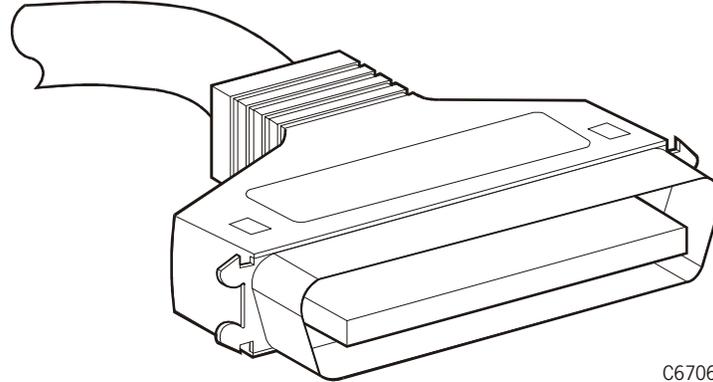
<b>68-Pin High Density Jackscrew Cable Part Numbers</b>		
<b>Length</b>	<b>Above Floor PN</b>	<b>Plenum PN (see Note)</b>
3 m (9.8 ft)	10083309	10083313
6 m (19.7 ft)	10083310	10083314
15 m (49.2 ft)	10083311	10083315
20 m (65.6 ft)	10083312	10083316

**Note:** Plenum rated cables will withstand higher temperatures.

## Centronics 50-Pin Latch to 68-Pin Jackscrew Cables

When connecting to a RISC System/6000, a BULL DPX/20, or other system that uses a Centronics 50-pin spring-latch connector, you must obtain one of the cables listed in [Table 4-4](#).

**Figure 4-3. Centronics 50-Pin Latch Connector**



**Table 4-4. Centronics 50-Pin to 68-Pin Jackscrew Cables**

<b>Centronics 50-Pin to 68-Pin Jackscrew Cable Part Numbers</b>		
<b>Length</b>	<b>Above Floor PN</b>	<b>Plenum PN (see Note)</b>
9 m (29.5 ft)	10083359	10083368
15 m (49 ft)	10083361	10083370
24 m (78.7 ft)	10083364	10083373

**Note:** Plenum rated cables will withstand higher temperatures.

## 68-Pin MD to 68-Pin Mini-Centronics Connector

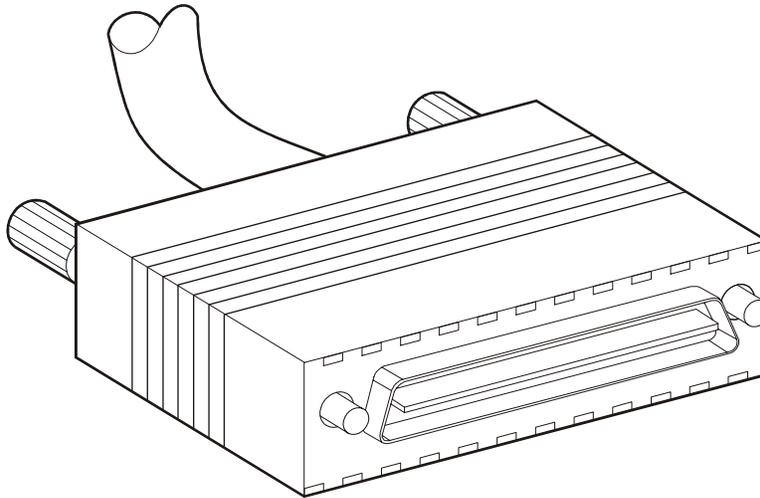
When connecting to a RISC System/6000 or other system that uses a 68-pin mini-Centronics connector, you must use one of these cables:

- Part 10083388, a 12 m (39.4 ft) cable for above-floor installation
- Part 10083397, a 12 m (39.4 ft) cable for plenum installation

See the following figure.

**Figure 4-4. 68-Pin Mini-Centronics Connector**

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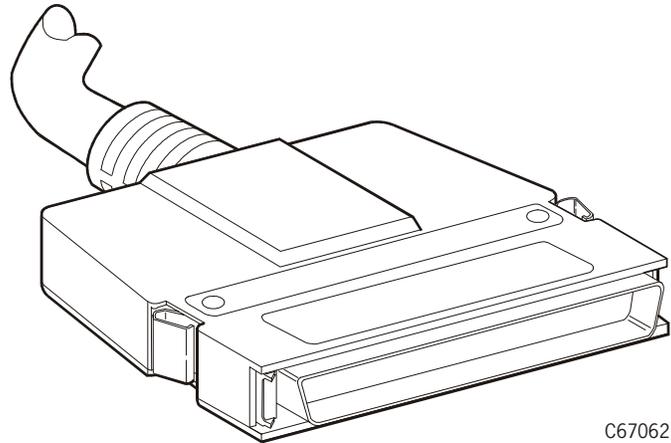
C67280

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## Special SCSI Adapter Cables

The cables in [Table 4-5](#) adapt existing system cables to operate with the library.

**Figure 4-5. 50-Pin to 68-Pin Latch, Block and Rail Connector Adapter**



**Table 4-5. Special SCSI Cable Adapter**

<b>50-Pin to 68-Pin Latch, Block and Rail Connector Part Number</b>		
<b>Cable Length and Description</b>	<b>Cable Usage</b>	<b>Part Number</b>
3 m (10 ft): HD 50-to-68 pin Sun/SPARC latch, block and rail adapter	Used to adapt the 50-pin HD latch, block and rail to fit a 68-pin connection	10083522

## ■ SCSI Control Connection

SCSI control connections depend on length requirements, the position of the server in relation to the library, and the type of interface required (single-ended or differential).

The library control cable from the server connects to the library through one of the two connectors near the power bulkhead (see [Figure 1-2 on page 1-4](#)). A Y-cable from the power bulkhead connects to the MPC card at the electronics module bulkhead. See [Figure 1-3 on page 1-6](#) for the connections at the electronics module bulkhead.

**Note:** If the customer is using Automated Cartridge System Library Software (ACSL), its level must be Version 5.3.2 or higher.

The following paragraph pertains to connections in general. For connection to a Sun SPARC5, refer to [“Server Connection—Sun Server” on page 4-8](#).

### Connection—General

To connect the server SCSI *control* cable:

1. Bring the SCSI 68-pin cable from the server to the connectors near the power bulkhead. (Route the cable up through the cable access hole in the floor at the rear of the library, and pass it over and beyond the power switches.)
2. Connect the SCSI cable to one of the two connectors.
3. If the path *terminates* (recommended), connect a terminator at the other connector on the power bulkhead:
  - PN 10148003 for differential SCSI
  - PN 10148002 for single-ended SCSI
4. If the path *continues* from this point, connect a second cable to the second connector on the bulkhead. Route this cable down and through the hole in the library floor.

## Server Connection—Sun Server

Two types of connections to a Sun server are possible: single-ended SCSI operation and differential SCSI operation (see [Table 4-6](#)). See your server documentation for the locations of these connections.

**Table 4-6. SCSI Connection to Sun Server**

	Single-ended <sup>1</sup>	Differential
<b>Distance Restriction</b>	3.7 m (12 ft) between library and server	Up to 18 m (60 ft) between library and server
<b>Required Host Adapter Cards</b>	None	<ul style="list-style-type: none"> <li>StorageTek PN 112167001 for 8 addresses<sup>2</sup></li> <li>StorageTek PN 309457301 for 16 addresses<sup>2</sup></li> </ul>
<b>Special Cable</b>	3 m (10 ft) high-density, 68-to-50 pin cable, PN 10083522 (fits all standard SPARC and RISC System/6000 single-ended connectors)	None
<b>Connection at Sun Server</b>	50-pin	68-pin
<b>SCSI Paths</b>	Control path only	Can connect control path to data path

**Notes:** <sup>1</sup> A single-ended connection is reserved for library control functions only.

<sup>2</sup> Host adapter cards are required for differential connections when the distance between the library and server exceeds 3.7 m (12 ft)

After you determine the type of operation, connect to the Sun server by following the same procedure described in [“Connection—General”](#) on [page 4-7](#).

## Workstation and Embedded Bus Connection

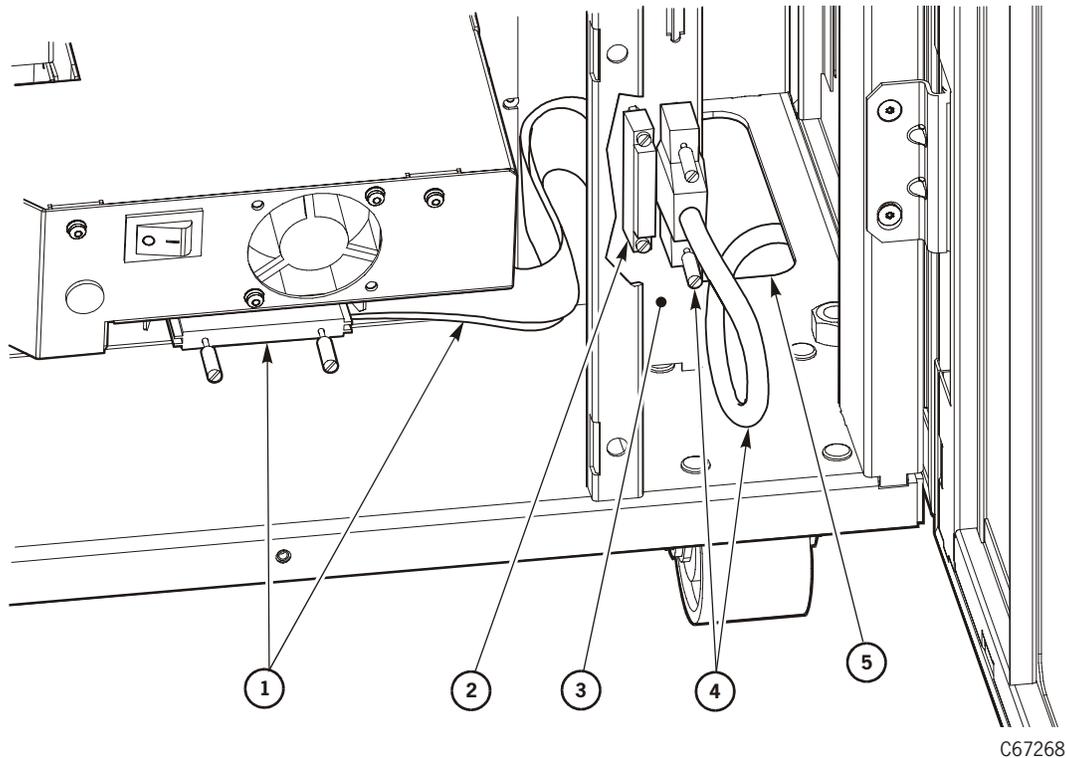
When connecting to a Unix workstation or embedded bus, follow the procedure described in [“Connection—General” on page 4-7](#), but note this information about SCSI addressing:

- When configuring the library to a Unix workstation, StorageTek recommends that you use a dedicated SCSI 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.
- 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, since the remaining targets are reserved for Sun peripherals.
- For IBM RISC System/6000 machines, available addresses on the embedded system bus are 6, 5, 3, and 2.

## ■ SCSI Drive (Data) Connections

For SCSI operation, make sure that you comply with the length restrictions for your channel type.

It is very important to label each drive with its client address. It is also important to label the cables. These labels provide reliable identification for any future maintenance on the drives. [Figure 4-6 on page 4-10](#) shows an example connection of a client cable to the drive bulkhead.

**Figure 4-6. Client Cable Connection at Drive Bulkhead**

C67268

Client Cable Connection at Drive Bulkhead (C67268)

1. Drive SCSI Y-cable
2. Terminator
3. Drive bulkhead
4. SCSI cable (from client)
5. Cable access cutout

**CAUTION:**

**System degradation:** Do not connect SCSI drives to the client until you have configured the drives for operation.

**Direct Connection**

For installations with *direct* SCSI data path configurations:

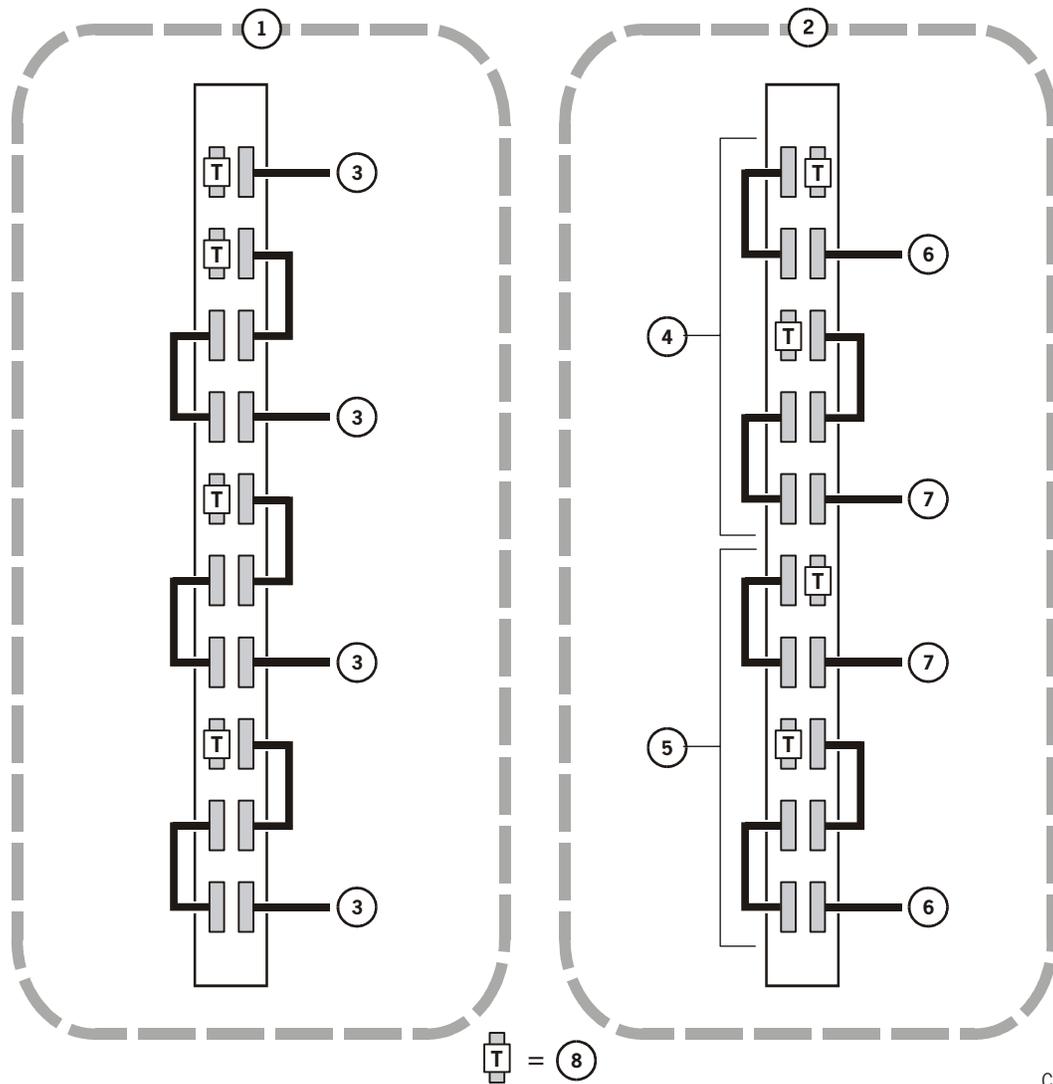
1. Open the rear door by gently pulling on the finger slot.
2. For each drive:

- a. Route the client's data cable up through the cable access hole in the library floor near the drive bulkhead.
- b. Connect the client's data cable to the appropriate connector at the drive bulkhead.
- c. Make sure a terminator is installed on the second drive connector at the drive bulkhead: PN 10148003 (differential).

## Daisy-Chain Connection

For installations with *daisy-chain* SCSI data path configurations:

1. Open the rear door by gently pulling on the finger slot.
2. Route the client's data cable up through the cable access hole in the library floor near the drive bulkhead.
3. At the drive bulkhead, connect the client's data cable to the first connector of the first drive.
4. At the drive bulkhead, install a short SCSI jumper cable—PN 313109302 or PN 310292001—from the second connector of the first drive to the first connector of the next drive in the chain.
5. Continue the chain until you reach the last drive on the chain. See [Figure 4-7 on page 4-12](#) for an example of two daisy-chain configurations.

**Figure 4-7. Example Daisy-Chain Connection of Drives**

C67269

## Example Daisy-Chain Connection of Drives (C67269)

1. Single AC power circuit
2. Dual AC power circuits (requires optional DC power supply and PDU)
3. Cable to client
4. AC power circuit connected to optional PDU
5. AC power circuit connected to standard PDU
6. Cable to first client
7. Cable to second client

**Note:** For best performance, StorageTek recommends including only two or three drives in a chain.

6. Make sure to install a terminator on the last drive connector at the drive bulkhead: PN 10148003 (differential). For daisy chains that involve the drives (data path) only, this is the final step.

For installations with a daisy-chain connection between the control path and the data path (not recommended):

**CAUTION:**

***Loss of data or degradation of performance: StorageTek recommends that the library be at one end of the SCSI bus and that the devices at both ends of the bus supply terminating power (TERMPWR = ON). (For more information about TERMPWR, see “Library Terminating Power Option” on page 2-21.)***

7. Connect a long daisy-chain cable—PN 313115701—between the last drive on the chain and the library:
  - a. Connect one end of the cable to the second connector of the last drive on the chain.
  - b. Route the cable down through the cable access hole on the floor near the drive bulkhead and under the floor of the library.
  - c. Bring the cable up through the cable access hole on the floor near the power bulkhead.
  - d. Connect the cable to one of the two connectors on the power bulkhead.
8. Make sure that you connect a terminator at the other connector on the power bulkhead:
  - PN 10148003 for differential SCSI
  - PN 10148002 for single-ended SCSI

## ■ Ethernet Cable

If your installation requires an Ethernet connection, perform these steps:

1. Make sure that the library power switches are in the down (OFF) position.
2. Route the client's Ethernet cable up through the cable access hole in the library floor near the power bulkhead.
3. Connect the Ethernet cable to the “Enet” connector on the electronics module bulkhead.
4. Close the rear door of the library.

## ■ Fibre Channel Operation

Fibre Channel operation for the library requires:

- The optional MPV logic assembly, also referred to as the compact peripheral component interconnect (CPCI) assembly. This card is attached to the MPC card.
- The optional MPU card, which is inserted into the MPV card. This card contains a Class 1 laser required for fiber-optic operation.
- Fiber-optic cable strain reliefs

## ■ Fibre Channel Cables

Part numbers and descriptions for Fibre Channel (SC connector) cables are listed in [Table 4-7](#).

**Table 4-7. Fiber-Optic Cables: 50  $\mu$ m Multimode, SC-to-SC Connectors**

Description—Plenum rated	Part Number
5 m (16.4 ft)	10800123
20 m (65.6 ft)	10800125
50 m (164 ft)	10800127
100 m (328.1 ft)	10800128
250 m (820.2 ft)	10800129
500 m (1640.4 ft)	10800130

**Note:** Plenum-rated cables can withstand higher temperatures and can be used for both under-floor and riser applications.

## ■ Fibre Channel Connection (Library)

After following the directions outlined in “[Fiber-Optic Cable Installation](#)” on [page xxiv](#):

1. Make sure that the library power switches are in the down (OFF) position.
2. Route the library’s Fibre Channel cable through the cable access hole in the library floor near the power bulkhead (see [Figure 2-9 on page 2-20](#)).
3. If necessary, route this cable up through the floor in the library’s rack to connect to a Fibre Channel hub or other rack-mounted equipment. Then route a cable from this equipment back down through the floor of the library’s rack.

4. Leaving a six-inch service loop, wrap the cable at least 360° clockwise around the control-path strain relief on the library's electronics module bulkhead.
5. Connect the fiber cable to the MPU card, at the lower right of the electronics module bulkhead.
6. Close the rear door of the library.

**Note:** The MPU card must be placed in the lower slot on the MPV card.

## Fibre Channel Connection (Drives)

After following the directions outlined in [“Fiber-Optic Cable Installation”](#) on [page xxiv](#), consult your 9840 drive documentation.

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This chapter lists cartridges and labels, describes how to install diagnostic and cleaning cartridges within the library, and describes diagnostic tests that are necessary before placing the library into operation.

## ■ Identifying Cartridges and Labels

**Note:** The customer must *not* use DATA D3 (helical recording) cartridges or 3480-type cartridges in the L180 library.

Depending on which drives and which cartridges the customer has ordered, you might have to help the customer sort out labels and cartridges:

- To match DLT cartridges with their proper labels
- To distinguish DLT cartridges from 9840 cartridges
- To distinguish data cartridges from diagnostic and cleaning cartridges

**Note:** All cleaning cartridges have “CLN” somewhere on their VOLSER labels. All diagnostic cartridges have “DG” as the first two characters of their VOLSER labels. In addition, 9840 cleaning cartridges have a “U” on their media ID labels. (9840 diagnostic and data cartridges have an “R” on their media ID labels.)

[Table 5-1](#) lists DLT tape cartridges *without labels* that are available from StorageTek.

**Table 5-1. DLT Cartridges (No Labels)**

Part Number	Trade Name	Description
313126101	CompacTape III	10 GB, Native
313126201	CompacTape IIIXT	15 GB, Native
313126301	CompacTape IV	35 GB, Native
313126401	CompacTape III	Cleaning cartridge

[Table 5-2 on page 5-2](#) lists DLT tape cartridge *labels* that are available from StorageTek. Note that the labels have trade names that correspond with the cartridge trade names in [Table 5-1](#).

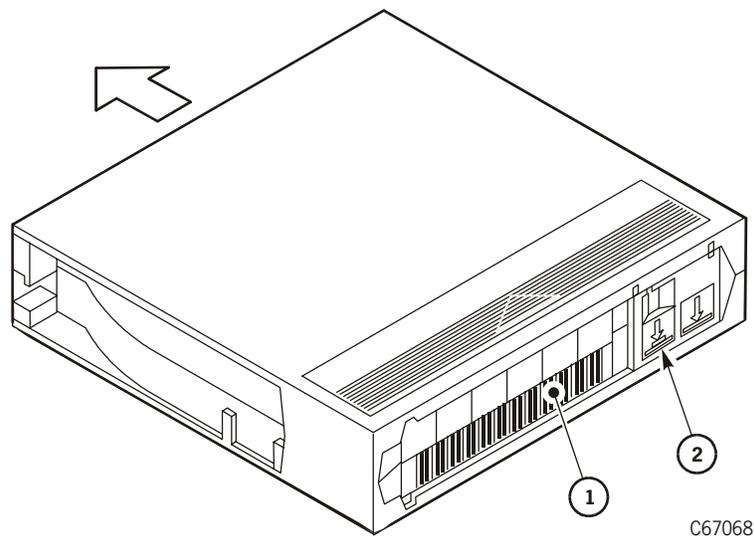
**Table 5-2. DLT Labels Only**

Part Number	Description
313126501	Label set, CompacTape III (C-type)
313126601	Label set, CompacTape IIIXT (E-type)
313126701	Label set, CompacTape IV (D-type)
313126801	Label set, Diagnostic (G-type)
313126901	Label set, Cleaning (C-type)

Table 5-3 lists DLT tape *cartridge with labels* that are available from StorageTek. Figure 5-1 shows the location of the VOLSER label and write protect switch on a DLT cartridge. The large arrow indicates how the cartridge loads into a storage cell.

**Table 5-3. DLT Cartridges (With Labels)**

Part Number	Description
313125601	CompacTape III
313125701	CompacTape IIIXT
313125801	CompacTape IV

**Figure 5-1. DLT Cartridge**

DLT Cartridge (C67068)

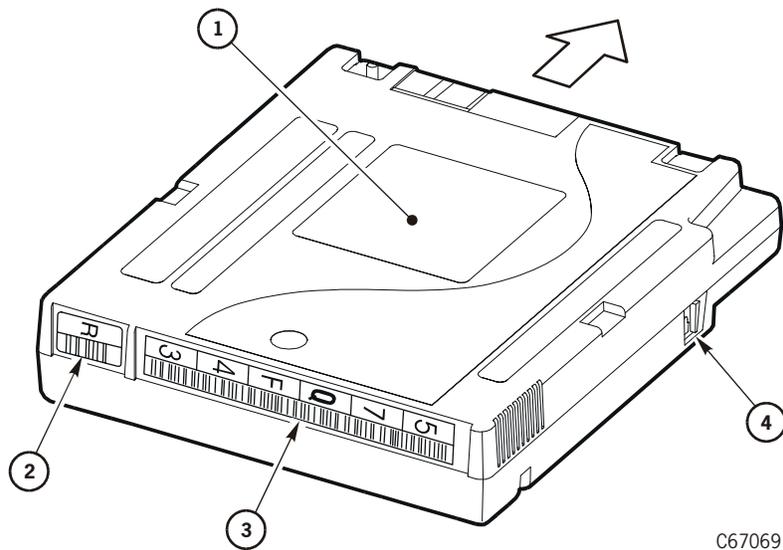
1. VOLSER label
2. Write protect switch

Table 5-4 lists 9840 tape cartridges available from StorageTek. Figure 5-2 shows the label and write protect switch locations on a 9840 cartridge. The large arrow indicates how the cartridge loads into a storage cell.

**Table 5-4. 9840 Cartridges**

Part Number	Description
310324601	9840 cleaning cartridges (5 pack)
310319401	20 GB data cartridge for diagnostic tests (5 pack)
309952901	9840 diagnostic and cleaning cartridge label set

**Figure 5-2. 9840 Cartridge**



C67069

9840 Cartridge (C67069)

1. Customer label
2. Media ID label (the R indicates a data cartridge)
3. VOLSER label
4. Write protect switch

## ■ Installing Diagnostic and Cleaning Cartridges

You must place diagnostic cartridges within the library prior to operation. If the customer wishes to enable the library's Auto Clean function, you also must place cleaning cartridges within the library and then reset it. (Cartridge installation instructions begin on page 5-5.)

### **CAUTION:**

***System degradation:* Make sure to check with the customer to determine which Auto Clean status is preferable. The Auto Clean enabled option is automatically configured when at least one cleaning cartridge is placed in the reserved area and the library is reset. The customer's client software must support the Auto Clean enabled option.**

Auto Clean activates the robot to load and unload a cleaning cartridge when a drive requires cleaning. The library uses diagnostic cartridges to run motion and drive loading tests.

The following paragraphs explain how to label diagnostic and cleaning cartridges, how to locate the reserved cells, and how to load cartridges into these cells.

## Labeling Cartridges

Figure 5-1 on page 5-2 and Figure 5-2 on page 5-3 show the correct placement of labels for cartridges.

To apply the diagnostic and cleaning labels:

1. From the drive installation kit, obtain the cartridge label packages:
  - PN 313126003 for DLT diagnostic cartridges
  - PN 313125902 for DLT cleaning cartridges
  - PN 309952901 for 9840 cleaning cartridges and diagnostic cartridges
2. Make sure that the cartridge has been at room temperature for at least 24 hours.
3. Clean the surface where the labels will be placed by using a cleaning solution made for this purpose.
4. Hold the cartridge so that the write-protect switch is toward you.
5. Attach a CLN label to all applicable cleaning cartridges.
6. Attach a DG label to all diagnostic tape cartridges.
7. Make sure that 9840 cleaning cartridges also have a "U" on their media ID label. (9840 diagnostic cartridges, like 9840 data cartridges, should have an "R" on their media ID label.)

## Locating Reserved Cells

Figure A-1 on page A-2 shows the location of the “reserved cell” area, which is a six-cell array below the CAP.

Within the reserved cell array, the top cell (“swap cell”) is reserved for in-transit cartridges. Do *not* place any cartridges into this cell. This cell has two functions:

1. It allows the robot to swap tapes within the library.
2. It is used as a temporary holding place if the library loses power and the robot has a cartridge in hand.

When power is restored, the robot automatically places this cartridge into the swap cell as part of the robotic initialization sequence.

The cells below the swap cell are reserved for cleaning and/or diagnostic cartridges. You may place any type of cleaning or diagnostic cartridges into these cells. If the customer *wants* the Auto Clean function enabled, at least one reserved cell must contain a cleaning cartridge. If the customer *does not want* Auto Clean enabled, no reserved cells may contain a cleaning cartridge.

## Inserting Diagnostic and Cleaning Cartridges

### CAUTION:

**System degradation: Do not place data cartridges into the reserved cells. The reserved cells are limited to cleaning and diagnostic cartridges only.**

**Ask the customer if the Auto Clean enabled option is desired. If the customer does not want to enable Auto Clean, do not place any cleaning cartridges into the reserved cells.**

To insert diagnostic and cleaning cartridges into the library manually:

1. Open the front door of the library by unlocking the top and bottom latches with the key provided.
2. Make sure that the swap cell (top-most reserved cell) is empty.
3. Place 9840/DLT cleaning and diagnostic cartridges into any of the other five cells in the reserved cell array. If you are unsure how to orient tapes within cells, see [Figure 5-4 on page 5-16](#).
4. Close the front door of the library by locking the top and bottom latches with the key provided.

## Importing Cleaning Cartridges through the CAP

When you want to import cleaning cartridges from the CAP into the reserved cells, power on the library (see [“Powering on the Library” on page 5-8](#)) and follow this procedure:

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 3480-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.

**Note:** You can use the snap-on retention cartridge cover to keep cartridges in place when carrying the magazine. 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.

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.

**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.
7. Press the **MENU** button to return the display to the “Main Menu.”
8. Press the arrow buttons until the cursor underscores **CLEANING INFORMATION**.
9. Press the **SELECT** button. The panel displays the “Cleaning Info” menu.
10. Press the arrow buttons until the cursor underscores **IMPORT CARTRIDGE**.

11. Press the **SELECT** button. The “Import Clean Cartridges” screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), and VOLSER.
12. 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 10.

13. Press the **SELECT** button to initiate the import. A message will appear to indicate that the import is complete.
14. Press the MENU button to exit the selection/message screen.

## 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. Power on the library (see [“Powering on the Library” on page 5-8](#)) and follow this procedure:

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.
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.
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 to initiate the export. A message will appear to indicate that the export is complete.
8. Press the MENU button to exit the selection/message screen.

## ■ Powering on the Library

To power on the library:

1. Open the rear door by gently pulling on the finger slot.
2. Lift the power switch to the ON position. (See [Figure 2-16 on page 2-37](#) for location.)
3. Close the rear door of the library.

An IPL and initialization will begin. For a description of the initialization process, see [Appendix B, “Initialization Sequence.”](#)

## ■ Preparing DLT Drives

You do *not* need to check the load handles on DLT during normal initialization and operation. As part of the initialization sequence, the load handles of the DLT drives are:

1. Checked for an “in flux” condition (to determine whether the handle requires cycling. If such a condition exists, the MPC card will cycle the handles to the “down” position.
2. Cycled to the “up” position by the MPC card as the final step in the initialization sequence.

The procedures in the following paragraphs describe how you must manually load and unload DLT drives if the drives require manual intervention.

## Mounting Cartridges to DLT Drives

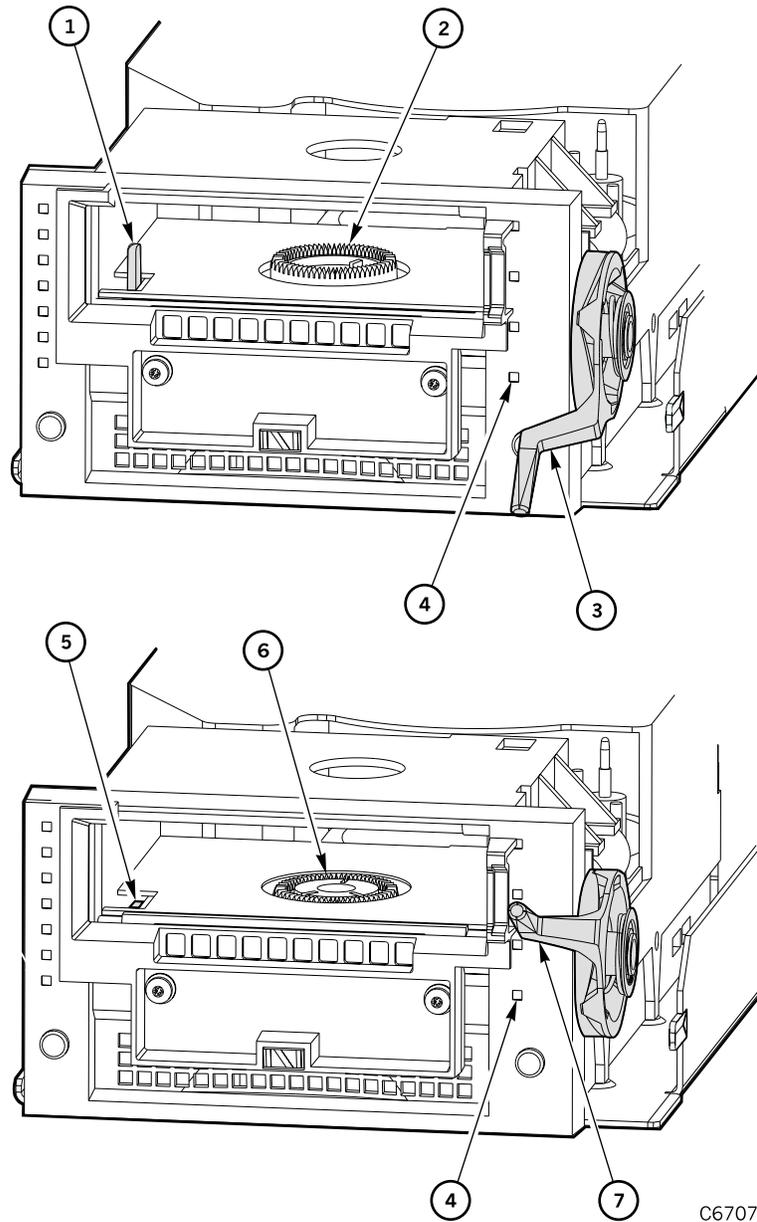
**CAUTION:**

***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 into a DLT drive:

1. Obtain the cartridge VOLSER, location and drive number from the system console.
2. Place the library offline.
3. Open the library front door by using the key to unlock the top and bottom latches. Turn the key counterclockwise to unlock the latches; then pull open the door.
4. Take ESD precautions.
5. Locate the cartridge.
6. Make sure that the DLT handle is up and the *Operate Handle* indicator is steadily on (see [Figure 5-3 on page 5-10](#)).

**Figure 5-3. Mounting and Dismounting Cartridges from DLT Drives**



Mounting and Dismounting Cartridges from DLT Drives (C67079)

1. Cartridge hook (UP)
2. Hub (UP)
3. Handle (DOWN)
4. Operate handle indicator
5. Cartridge hook (DOWN)

**Figure 5-3. Mounting and Dismounting Cartridges from DLT Drives (Continued)**

- 
6. Hub (DOWN)
  7. Handle (UP)
- 

**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 5-3 on page 5-10](#)). 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.

**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.**

7. 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.
8. 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.
9. Lower the drive handle.
10. Place the drive online.

**Dismounting Cartridges from DLT Drives**

To dismount a cartridge from a DLT drive:

1. Obtain the drive number from the system/server console and place the drive offline.
2. Open the library front door by using the key to unlock the top and bottom latches. Turn the key counterclockwise to unlock the latches; then pull open the door.
3. Take ESD precautions.
4. Locate the desired drive.
5. Press the **Unload** button on the drive.
6. Wait (about 12 seconds) for the *Operate Handle* indicator to remain steadily on.
7. 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.**

8. 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.

9. Store the cartridge in an empty cell or outside the library. If you store the cartridge in empty cell, you will have to reinitialize the library. (You can reinitialize the library by opening and closing the library's front door.)

10. Place the drive online.

## ■ Preparing 9840 Drives

Instructions for preparing the 9840 drives appear in the *9840 Tape Drive Product Manual*, PN 95741.

## ■ Checking the Subsystem

To test library operation before placing the machine online, you should run diagnostic tests. StorageTek suggests running two diagnostic tests from the library's operator panel: Get-Put and the Mount-Dismount Loop. Instructions for running these tests appear in the following paragraphs.

**CAUTION:**

**System interruption: If you wish to run tests from a laptop device, you must connect the laptop to the SER1 port on the electronics module bulkhead. Be sure the library is offline before you run tests through the SER1 port. The SER1 interface does not give a warning that the library will be taken offline.**

You also may run diagnostic tests from a laptop computer connected to the SER1 port on the electronics module bulkhead. The laptop baud rating, however, must be 38400.

### Get-Put Loop Diagnostic Test

The Get-Put loop diagnostic test validates cell-to-cell move capabilities by using a diagnostic cartridge and the swap cell. The robot:

- Retrieves (gets) the diagnostic tape from its storage cell
- Moves the hand and cartridge laterally and vertically
- Places (puts) the cartridge back into its reserved cell

To run the Get-Put diagnostic test:

1. Make sure that the library is offline.
2. Make sure that the front door is closed and that the library status screen is displayed on the operator panel.
3. Make sure that there is a diagnostic cartridge in the reserved area.
4. From the status screen, press the **MENU** button on the operator panel. The “Main Menu” will appear.
5. Press the arrow buttons until the cursor highlights **DIAGNOSTICS**.
6. Press the **SELECT** button. The “Main Diagnostics Menu” will appear.
7. Press the arrow buttons until the cursor highlights **GET-PUT LOOP**.
8. Press the **SELECT** button. The “Get-Put Mode” screen will appear.
9. Use the up and down arrow buttons to set the number of times you want the test to run.
10. 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.
12. After this diagnostic test runs to completion, press the **MENU** button to return to the main diagnostics menu.

**Note:** If the diagnostic test fails, a message and an FSC will appear on the operator panel.

## Mount-Dismount Loop Diagnostic Test

The Mount-Dismount loop diagnostic test validates the ability of the robot to load and unload a cartridge to a tape drive. The robot:

- Retrieves a diagnostic cartridge
- Loads the tape into a drive

When the drive dismounts the tape, the robot:

- Retrieves the cartridge
- Places it back into its reserved cell.

To run the Mount-Dismount diagnostic test:

1. Make sure that the library *and* target drive are offline.

**Note:** If you are already at the main diagnostics menu, skip to step 5.

2. Make sure that the front door is closed and that the library status screen is displayed on the operator panel.

3. Make sure that there is a diagnostic cartridge in the reserved area.
4. From the status screen, press the **MENU** button on the operator panel. The “Main Menu” will appear.
5. Press the arrow buttons until the cursor highlights **DIAGNOSTICS**.
6. Press the **SELECT** button. The “Main Diagnostic Menu” will appear.
7. Press the arrow buttons until the cursor highlights **DRIVE DIAGNOSTICS**.
8. Press the **SELECT** button. The list of available drives will appear.
9. Use the arrow buttons to move the cursor to the drive you wish to test.
10. Press the **SELECT** button. A list of drive diagnostic tests will appear.
11. Press the arrow buttons until the cursor highlights **MOUNT/DISMOUNT LOOP**.
12. Press the **SELECT** button. An editing screen will appear.
13. Use the up and down arrow buttons to set the number of times you want the test to run.
14. Press the **SELECT** button.
15. 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.
16. After this diagnostic test runs to completion, press the **MENU** button to return to the main diagnostic menu.

**Note:** If the diagnostic test fails, a message and an FSC will appear on the operator panel.

## Other Diagnostic Tests

You might want to run the library’s other diagnostic tests. Here are descriptions of the other functions that appear on diagnostic menus:

**Clean Drive**      This function is not a diagnostic test. It mounts a specified cleaning cartridge to a drive, initiates drive cleaning, and dismounts the cleaning cartridge.

**Note:** The Clean Drive routine does *not* require the library to be offline. Be sure to instruct the operator how to run this routine.

**Mount**              This test mounts a diagnostic tape to a selected drive.

**Dismount**          This test dismounts a diagnostic tape from a selected drive.

**Demo Mode** This test starts a Get-Put Loop with customer cartridges to simulate machine operation. See the following caution.

**CAUTION:**

***Audit update required:*** When Demo Mode completes, you must reinitialize the library so that it will audit the cells. (To reinitialize, open and close the front door.) You must then notify the customer to update the client system's library audit data.

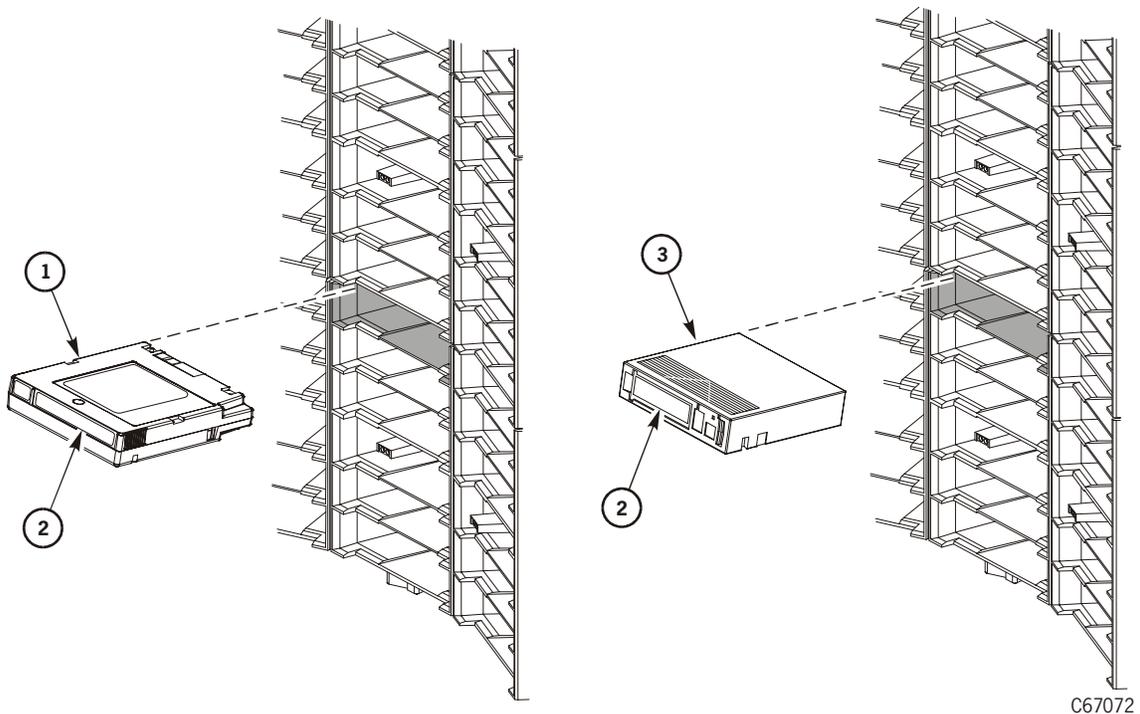
## ■ Inserting Data Cartridges

When the diagnostic tests have completed, the customer may load data cartridges into the library.

### Into Array Cells Directly

The most efficient way to load a great quantity of cartridges into the library is to insert them manually into the storage cells. [Figure 5-4](#) illustrates this method. (You must first unlock and open the library front door.)

**Figure 5-4. Placing Cartridges into Array Cells**



#### Placing Tapes into Array Cells (C67072)

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

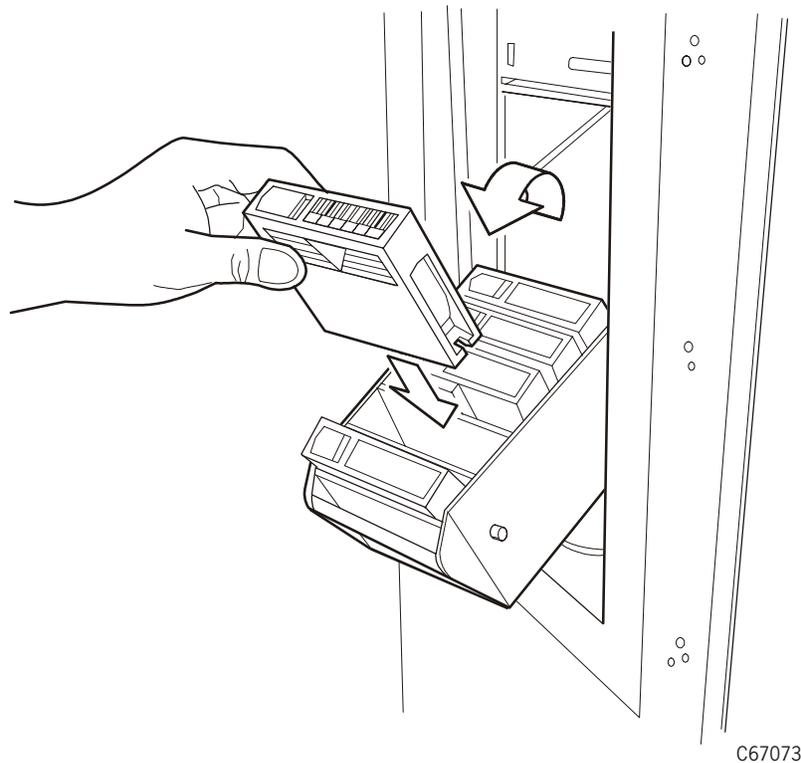
After you have inserted the cartridges, close and lock the front door. The robot automatically audits the cartridges and their locations within the library.

## Through the CAP

Customers may also enter tapes through the CAP. CAP entry is shown in [Figure 5-5](#) and [Figure 5-6](#) on page 5-18.

**Note:** With the CAP magazine pulled down as it is in these figures, you must load the cartridges “upside-down,” that is, with the customer label on the bottom.

**Figure 5-5. Loading the CAP—DLT Cartridge**

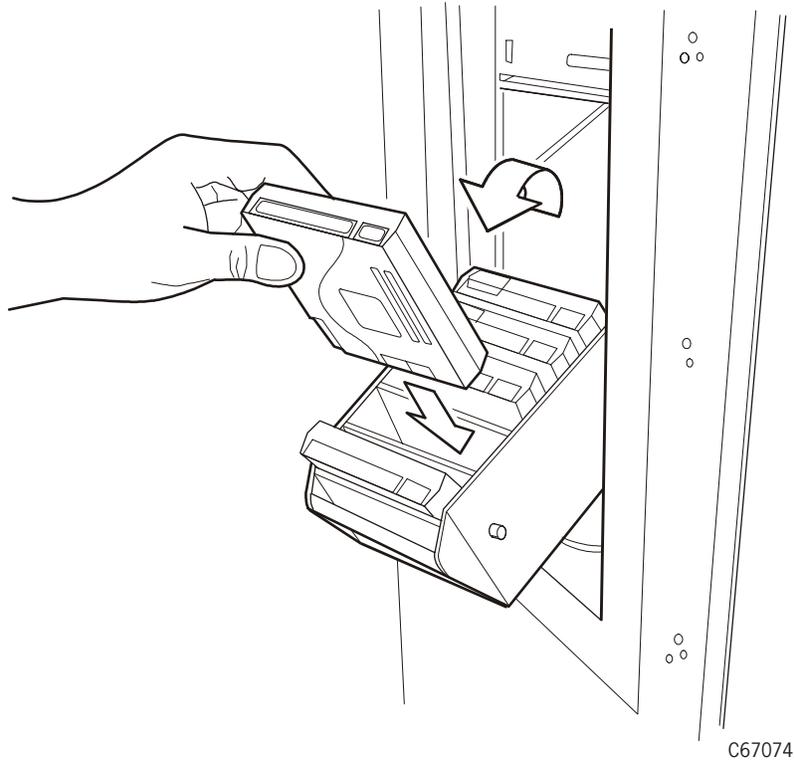


Customers may use the CAP to enter cartridges into and eject them from the library. Each CAP has two magazines, numbered one and two, from the top location to the bottom. Each cell location in the CAP is assigned an element number (see [Figure A-1](#) on page A-2).

Cartridges may be entered in any order into the magazine and CAP. When the customer closes the CAP door, the robot will audit all CAP cells for cartridge information and element number.

When the customer sends a command to eject cartridges through the CAP, however, the robot will place a specified cartridge into the lowest available element number in the CAP first.

**Figure 5-6. Loading the CAP—9840 Cartridges**



## ■ Placing the Library Online

When the customer is ready to use the library for production, request that the operator enter the system command to place all drives and the library online (if necessary). Then the operator should enter the command to load the audit data from the library to the client system.

Refer to the *L180 Tape Library Operator's Guide*, PN 95895, for instructions on operating the library.

# Library Elements and MPC Card

# A

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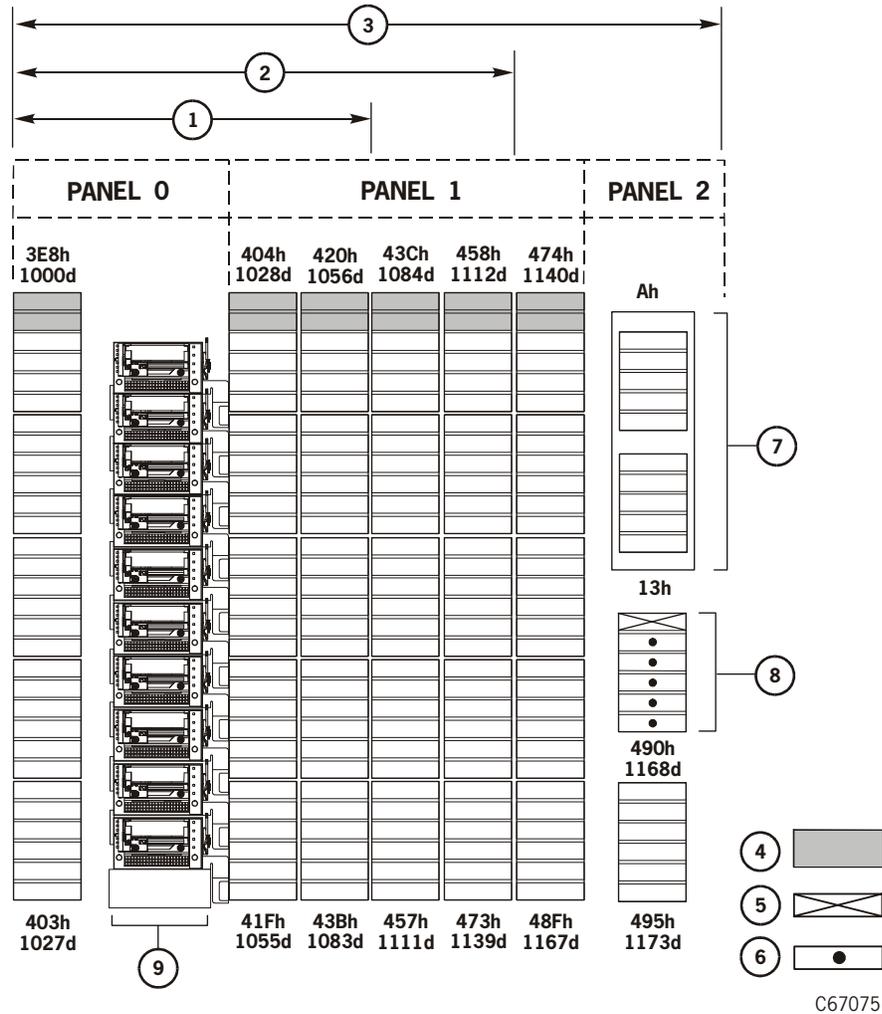
This appendix provides diagrams of the library elements for all L180 tape library models, of the MPC card connections, and of the major components within the library.

## ■ Wall Elements

The wall diagrams depict the SCSI element locations for all cell locations and other wall elements within the library. In [Figure A-1 on page A-2](#), the locations are noted at the top of the columns in hexadecimal (denoted by the “h” at the end of the number) and decimal (denoted by a “d” at the end of the number). In [Figure A-2 on page A-3](#), the locations are noted by panel, row, and column.

The drive types and locations will vary with your library options.

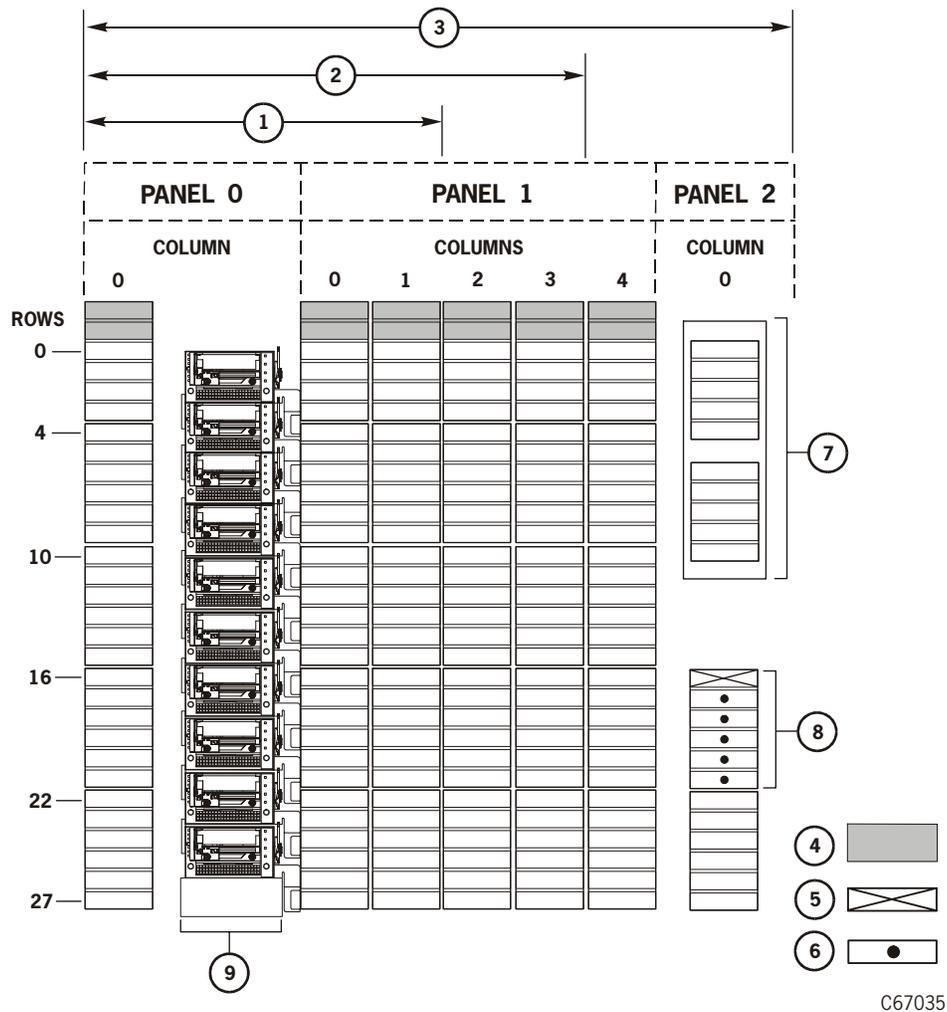
**Figure A-1. L180 Library Elements—Hexadecimal**



L180 Library Elements—Hexadecimal (C67075)

1. L180-80 = 84 data storage cells
2. L180-140 = 140 data storage cells
3. L180-180 = 174 data storage cells
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 containing DLT drives)

Figure A-2. L180 Library Elements—Panel, Row, Column



C67035

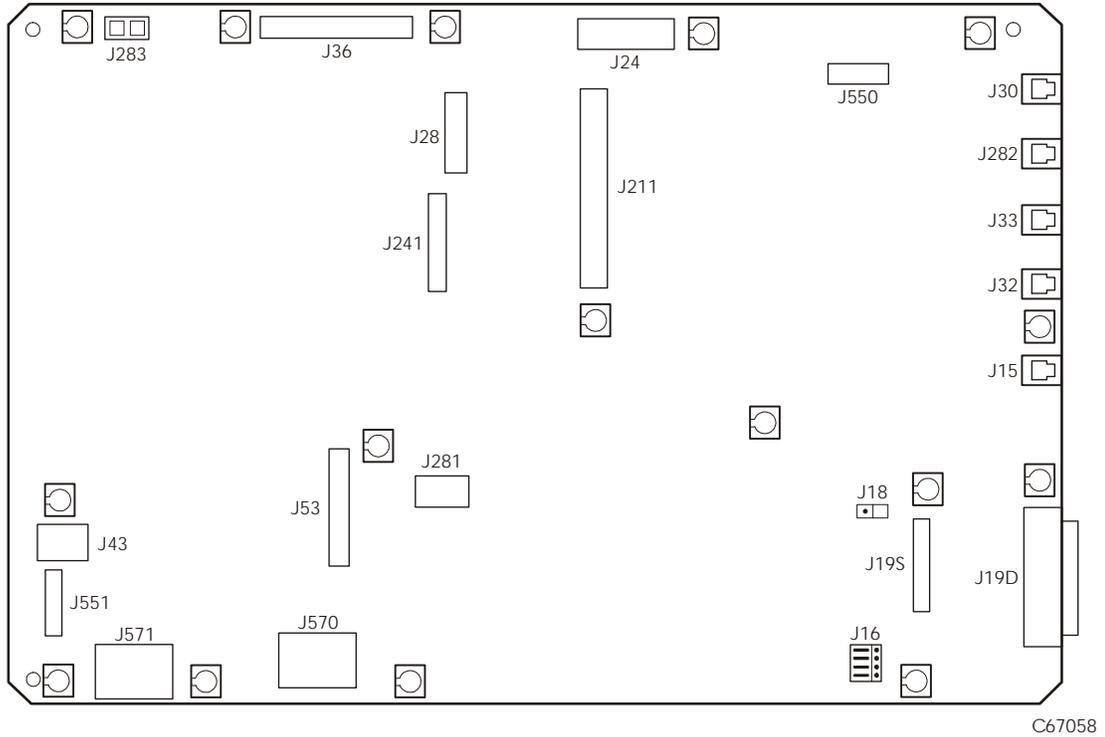
## L180 Library Elements—Panel, Row, Column (C67035)

1. L180-80 = 84 data storage cells
2. L180-140 = 140 data storage cells
3. L180-180 = 180 data storage cells
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 containing DLT drives)

## ■ The MPC Card

Figure A-3 shows the position of connectors on the MPC card. Table A-1 on page A-5 lists descriptions of the connections.

**Figure A-3. MPC Card Diagram**



**Table A-1. MPC Connectors**

<b>Connector</b>	<b>Function</b>
J283	Unused
J36	Servo signal lines
J24	Tape Transport Interface (TTI) for drives 0 to 9
J550	Connection to personality key (MPK card) (as required).
J30	CSE port, modem, or dumb terminal (RS423). Used for loading firmware.
J282	Unused
J33	Host serial port 1 (RS423) (diagnostic tests and service information)
J32	Host serial port 2 (RS423)—Not used
J15	Ethernet connector (TCP/IP)
J19D	SCSI Differential
J19S	SCSI Single-ended
J16	Single-ended or differential selection jumpers
J18	Terminating power jumper
J211	Connector for the CPCI Fibre Channel expansion card (MPV card) (see note)
J28	Operator panel
J241	Unused
J281	Engineering use only
J53	CAP and door
J570	DC power in from second MPF (DC power) supply
J571	DC power in from first MPF (DC power) supply
J551	DC Fans
J43	Servo power to robot and hand

**Note:** If the MPV card (PCI expansion bus) is present, one or two MPU cards will be attached to this card. The MPU card contains a Class 1 laser product that complies with sections 21CFR 1040.10 and 1040.11 of the Food and Drug Administration (FDA) regulations.

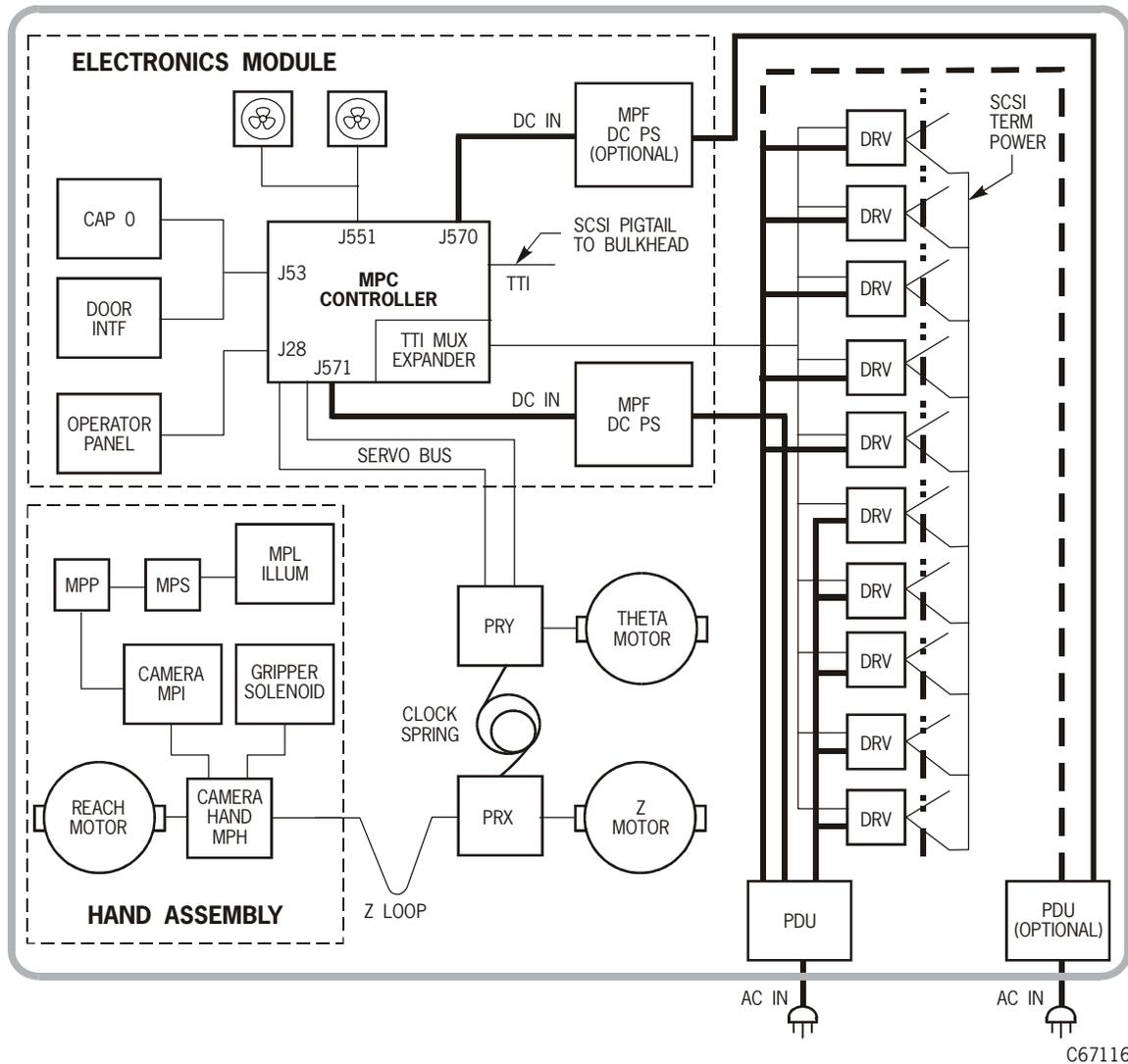
Class 1 laser products do not require any special safety precautions.

## Library Components

Figure A-4 provides an overall library diagram. It depicts the major electronic components and the relationship among them.

**Note:** The library in this diagram contains 10 DLT drives and an optional PDU.

**Figure A-4. Overall L180 Library Diagram**



# Initialization Sequence

## B

An initialization sequence occurs when the library powers on or when you open and close the library's front door. (When the library powers on, an IPL occurs, followed by the initialization sequence.)

The MPC card directs the initialization sequence, which consists of the following:

- Initialization and calibration of robotic mechanisms
- Calibration of the vision system
- Testing of robot motion
- Testing of hand assembly
- Audit of tapes within the library
- Drive targeting and check for "in flux" condition on DLT drives
- Audit of reserve cells
- Cycling of each drive's load handle (for DLT drives)

These steps are explained in the following sections.

## ■ Initialize and Calibrate Mechanisms

Robotic mechanism parameters are loaded into processor memory and calibration routines are executed. The initialization sequence requires a approximately three minutes. Monitored in this sequence are:

**Reach safe position:** The reach mechanism fully retracts and the reach safe sensor *must* be detected before any theta or Z motion is initiated. This prevents possible damage to the hand assembly or a customer tape.

**Z motor calibration:** The Z mechanism moves from end-stop to end-stop. The distance and time for this motion is compared against the mechanism parameters within the firmware.

**Theta motor calibration:** The theta mechanism moves from theta-stop to theta-stop. The distance and time for this motion is compared against the mechanism parameters within the firmware.

As there are three capacity variations for the library (Models L180-80, L180-140, L180-180), the library size is also determined during this step.

## ■ Vision Calibration

After calibration of the robotic motors, the robot moves to the vision calibration decal (below the drive column). Thresholds for the line scan camera are:

**Target:** Readability and accuracy of the target image for locating array positions

**Bar code:** Readability and accuracy of bar code information

**Note:** The camera is operational during initialization, during audit, and when tapes are entered into a CAP

During normal operation, the camera is turned off and tapes are located by referencing the VOLSER and cell location within the MPC card memory.

## ■ Hand-Camera Assembly Testing

Calibration and testing of the hand assembly is accomplished near the vision calibration decal. The proximity sensor is aimed at the decal and tested to be “on.” The hand is then moved away from the decal and the sensor is tested to be “off.”

The gripper mechanism is extended to test for proper opening and closing.

## ■ Audit

The next step for initialization is the audit of the library. The audit process requires five minutes.

### Audit Definition

An audit is the process of checking each user cell within a library. If a cell contains a tape, the camera reads the VOLSER label and transfers this data to the MPC card. The MPC card calculates the robotic position of the hand assembly (by referencing the theta and Z positions) and catalogs the tape location by:

- VOLSER
- SCSI element number or panel, row, column

If a user cell is empty, the location is recorded as “cell empty.” The reserved cells (explained below) are checked for cleaning cartridges (which will automatically configure the auto clean option) and for diagnostic test cartridges.

When all user and reserved cell locations are read and cataloged, the library audit is complete. *However*, the library audit information must be requested by the client system to update its tape volume database.

This two-step process—library audit and client update—ensures that both the library and client have current (and identical) listings of the library contents.

**Note:** Cartridges left in drives will not be audited.

## **Audit Conditions**

An audit begins when:

- You power-on the library
- You press the **RESET** button on the operator panel
- You open and close the library front door
- A system request to audit the library is entered at the client console

## **■ Drive Targeting**

The robot moves to each drive and calculates the position of the drive's target. This ensures accurate loading of tapes during machine operation. For DLT drives, the load handles are checked for “in flux” conditions. Any handles found to be in flux will be lowered by the MPC card.

## **■ Audit of Reserved Cells**

After drive targeting, the robot audits the six cells of the reserved area, below the cartridge access port (CAP). This area is explained below. If the library contains no DLT drives, this is the final initialization step.

## **■ Load Handling Cycling**

If DLT drives are present and they require cycling of the load handles, all handles are raised to the loading position. This is the final initialization step.

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# Glossary

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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 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 (CAP).”

**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 Tri-Optic label listing the VOLSER.

**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 tape cartridge storage locations in an L180 library; this inventory is by SCSI element or library number, panel, row, column.

**CCITT** Consultative Committee for International Telephone and Telegraph

**cell** A slot in the library that is used to store a tape cartridge.

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

**control path** This SCSI communication pathway enables the client to control library operations, such as mounting a tape to a drive.

**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 services engineer (CSE)** CSE refers in general to a StorageTek service representative. The CSE port is the port through which a service representative can load firmware code into the library.

**Customer Support Services (CSS)**

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

**D**

**daisy chain** The connection of two or more devices to the common bus cable.

**data path** This communication pathway lets the library and/or drives exchange data with the client.

**diagnostics** Tests, accessible through the library operator panel or the Library Horizon L-Series Monitor that allow a local user to run offline tests within the library.

**differential operation** A SCSI bus alternative in which the signal from the SCSI chip passes through a set of differential drivers/receivers. This alternative allows less noise on the line and can increase data transmission speeds. *See* "single-ended operation."

**drive** A device which 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**

**electronically erasable programmable read-only memory (EEPROM)** A memory component that can be erased and programmed while the component is left in the machine.

**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) which 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.

**field replaceable unit (FRU)** Assembly that is replaced in its entirety when any one of its components fails.

**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 simulates Web browser operation for the library. This interface is enabled through a personality module attached to the library.

**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.

**in-transit record** A temporary record written by the client software, noting that a cartridge has been moved from its home cell. Once this cartridge is returned to its home cell, the record is erased.

**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.

## 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 tape (36-track, compressed, and so on.)

**modulator/demodulator (Modem)** An electronic device that converts computer digital data to analog data for transmission over a telecommunications line (telephone line). At the receiving end, the modem performs the reverse function.

**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 central processing unit card for the library (See [Appendix A, “Library Elements and MPC Card”](#)).

**MPF card** The DC power supply card for the library.

**MPK card** An EEPROM-based card that holds library upgrade feature data. Also known as the library “personality module.”

**MPU card** The Fibre Channel expansion card for the library. It connects to the MPV card.

**MPV card** The Fibre Channel (CPCI) interface card between the library and drives.

## 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. (See “Ethernet address,” “IP address,” “library name,” and “subnet mask.”)

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

**O**

**OFC** Open Fiber Control safety system. The OFC system assures that when any link in a Fibre Channel loop is broken, the transmitter goes into a disabled state in which only eye-safe amounts of light are transmitted, until the link is reconnected.

**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**

**personality** A module or flash file that causes the operator panel to display a vendor's identification.

**personality module** Synonymous with the MPK card. It holds library upgrade feature data.

**PDU** *See* "power distribution unit (PDU)."

**power distribution unit (PDU)** The AC power unit (PDU) that distributes AC voltage to the drives and to the library DC power supplies.

**PRX card** The interconnecting card between the PRC card and the Z motor/hand logic. Z motor power and tachometer lines connect to this card, along with signal lines to/from the hand.

**PRY card** The interconnecting card between the PRC card and the theta motor/hand logic. Theta motor power and tachometer lines connect to this card, along with signal lines to/from the hand.

**R**

**RESET button** This button will start a initial microprogram 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** Electromechanical device for locating and moving cartridges.

**S**

**SC connector** A standard connector for high-speed data transfer. This type of connector is used on fiber optic cables.

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

**servo power interrupt (SPI)** A signal that removes voltage to a motor if over-travel is detected or a safety condition exists (for example, the main access door to the library is open). When the sensor or switch is made, the drive current to the motor is disabled and an error is posted. The SPI prevents 'servo runaway' for an out-of-range motor; it also prevents motors from starting up while the access door is open.

**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," "network gateway" and "library name.")

**T**

**TERMPWR** Terminator power. A SCSI bus signal for device termination networks.

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

**TTI** Tape Transport Interface.

**V**

**VOLID** *See* “volume serial label (VOLSER).”

**VOLSER** *See* “volume serial number (VOLSER).”

**volume** Magnetic tape cartridge.

**volume serial label (VOLSER)** 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. It is also referred to as the “Z tube.”

**Z column** The column 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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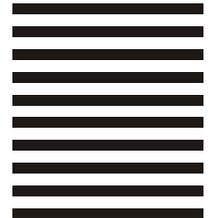
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**Storage Technology Corporation**  
One StorageTek Drive  
Louisville, CO 80028-2201  
USA



## **World Headquarters**

Storage Technology Corporation  
One StorageTek Drive  
Louisville, Colorado 80028 USA  
Phone: 303.673.5151  
Fax: 719.536.4053



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