L180
Tape Library

Installation Manual

STORAGETEK

L180
Tape Library

Installation Manual

Information contained in this publication is subject to change without notice. Comments concerning the contents of this publication should be directed to:

Information Development
Storage Technology Corporation
One StorageTek Drive
Louisville, CO 80028-3256
USA

URL: http://sts.stortek.com/sts/nid

Proprietary Information Statement:

This document and its contents are proprietary to Storage Technology Corporation and may be used only under the terms of the product license or nondisclosure agreement. The information in this document, including any associated software program, may not be reproduced, disclosed or distributed in any manner without the written consent of Storage Technology Corporation.

Export Destination Control Statement

These commodities, technology or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to U.S. law is prohibited.

Summary of Changes

EC	Date	Edition	Description
111222	November 1999	First	Initial Release
111426	March 2000	Second	Refer to this edition for a description of the changes.
111544	September 2000	Third	Refer to this edition for a description of the changes.
111569	November 2000	Fourth	Refer to this edition for a description of the changes.
111640	April 2001	Fifth	Refer to this edition for a description of the changes.
111680	September 2001	Sixth	Refer to this edition for a description of the changes.
111721	March 2002	Seventh	Refer to this edition for a description of the changes.
111752	May 2002	Eighth	Refer to this edition for a description of the changes.
111777	July 2002	Ninth	Refer to this edition for a description of the changes.
111810	December 2002	Tenth	Refer to this edition for a description of the changes.
111829	February 2003	Eleventh	Chapter 1: Added T9x40 to Interface Connections.
			Chapter 3: Added T9x40 to Drive Combinations.
			Chapter 5: Added dWWN note.
			Chapter 6: Updated "Ordering Cartridge Tapes and Labels."

This page intentionally left blank.

Contents

Contents

Figures

Tables

This page intentionally left blank.

Preface

This manual describes how to install an L180 Tape Library and its associated tape drives. This manual is intended for StorageTek and authorized third-party service representatives who will install the L180 Tape Library.

■ Organization

The organization of this manual is:

Index   "Index" assists in locating information in this publication.

■ 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

Naming conventions found in this publication for the L180 Tape Library include L180, tape library, and library. Naming conventions for the various tape drives also include drives or the specific name and model number for the tape drives, such as the T9840B Tape Drive.

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

Item	Example	Description of Convention
Buttons	MENU	Sans serif font; capitalization follows label on product (usually all uppercase)
Commands	Mode Select	Initial cap
Document titles	*System Assurance Guide*	Italic font
Emphasis	*not* or *must*	Italic font
File names	`fsc.txt`	Monospace font
Hypertext links	Figure 2-1 on page 2-5	Blue (prints black in hardcopy publications)

Item	Example	Description of Convention
Indicators	*Open*	Italic font; capitalization follows label on product (usually initial caps)
Jumper names	TERMPWR	All uppercase
Keyboard keys	\<Y\> \<Enter\> or \<Ctrl+Alt+Delete\>	Sans serif font; capitalization follows label on product (usually initial caps); enclosed within angle brackets
Parameters and variables	Device = *xx*	Italic font
Path names	`c:/mydirectory`	Monospace font
Port or connector names	SER1	Capitalization follows label on product; otherwise, all uppercase
Positions for circuit breakers, jumpers, and switches	ON	Default font; capitalization follows label on product; otherwise, all uppercase
Screen text (including screen captures, screen messages, and user input)	`downloading`	Monospace font
Switch names	Power	Sans serif font; capitalization follows label on product
URLs	http://www.storagetek.com	Blue (prints black in hardcopy publications)

■ Related Publications

You can find additional information in the following publications:

L180 Tape Library Documentation	Part Number
L180/L700 Tape Libraries General Information Manual	MT 9111
L180 Tape Library Illustrated Parts Catalog	95898
L180 Tape Library Hardware Operator's Guide	95895
L180 Tape Library Service Manual	95897
L180/L700 Tape Libraries Ordering and Configuration Guide	MT 9112
L700/L180 Tape Libraries Interface Reference Manual	95869

T9840 Tape Drive Documentation	Part Number
T9840/T9940 Tape Drive Service Reference Manual	95740
T9840 Tape Drive User's Reference Manual	95739
T9840/T9940 Tape Drive Installation Manual	95879

Tape Drive Documentation	Part Number
DLT7000 Tape Drive Product Manual	Quantum 81-60000-0x
DLT8000 Tape Drive Product Manual	Quantum 81-60118-0x
SDLT 220 Product Manual (Super DLTtape System)	Quantum 81-80000-0x
IBM Ultrium Tape Drive Setup, Operator, and Service Guide	CD included with drive
HP User's Guide for Ultrium Tape Drives	CD included with drive
Seagate Viper 200 LTO Tape Drive Product Manual	CD included with drive

APC Power Supply Publications	Part Number
L180 and L700 Tape Library Uninterruptible Power Supply Reference Manual	96047
APC Uninterruptible Power Supply manuals and online information.	Available from APC or see www.apc.com

■ Additional Information

StorageTek offers several methods for you to obtain additional information.

StorageTek's External Web Site

StorageTek's external Web site provides marketing, product, event, corporate, and service information. 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 CRC is a Web site that enables members to resolve technical issues by searching code fixes and technical documentation. CRC membership entitles you to other proactive services, such as HIPER subscriptions, technical tips, answers to frequently asked questions, addenda to product documentation books, 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 PowerPort.

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

e-Partners Site

StorageTek's e-Partners site is a Web site that provides information about products, services, customer support, upcoming events, training programs, and sales tools to support StorageTek's e-Partners. Access to this site, beyond the e-Partners Login page, is restricted. On the e-Partners 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.

The URL for the e-Partners site is http://members.storagetek.com.

Global Services Support Tools

StorageTek's Global Services Support Tools site provides tools that aid in the sales and support of StorageTek's products and services. This is an internal Web site for StorageTek employees.

The URL for the Global Services Support Tools is http://wwssto.stortek.com

Documents on CD

Documents on CD (3106600xx) contains portable document format (PDF) files of StorageTek's hardware product publications. To order Documents on CD, contact your local Customer Services Logistics Depot. *Documents on CD* is only for StorageTek employees.

Hardcopy Publications

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

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

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

- Visit StorageTek's PowerPort 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 e-mail to DistrL@louisville.stortek.com.

Safety

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

- Ensuring your 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".

- Do not remove, cut, or relocate any floor tiles indiscriminately. Before you manipulate floor tiles, make 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.

- Make 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.

■ 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 66ºC (150ºF) or below 4.5ºC (40ºF), 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 MΩ, and the coil cord should measure between 0.8 and 1.2 MΩ. 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.

■ Fiber-optic Safety

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

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

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

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

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

CLASS 1 LASER
LUOKAN 1 LASERLAITE
KLASSE 1 LASER APPARAT

Laser Product Label

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

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

Fiber-optic Cable 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 safely handling fiber-optic cables.

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.

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.

- Protect the cable from extreme temperature conditions.

- Install the connector's protective cover whenever the connector is not connected.

■ 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.

■ 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 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.

- 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.

  Note: The following figures outline some temperature recommendations:

L180, Recommendations for Equipment Rated to 35° C

(89.6° F)

Room Ambient Temperature (°C)

May Exceed Operating Temperatures

Fan Recommended

No Fan Needed

(59° F)

Rack Equipment Power (Watts)

L180, Recommendations for Equipment Rated to 40° C

(89.6° F)

Room Ambient Temperature (°C)

May Exceed Operating Temperatures

Fan Recommended

No Fan Needed

(59° F)

Rack Equipment Power (Watts)
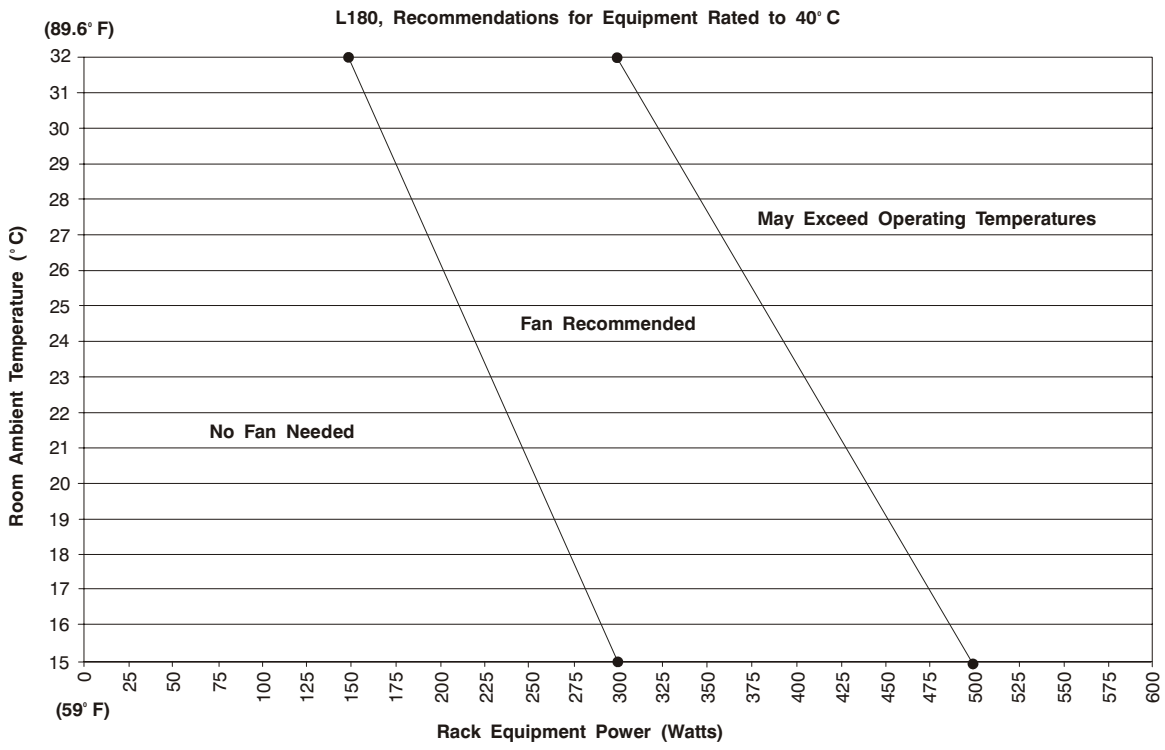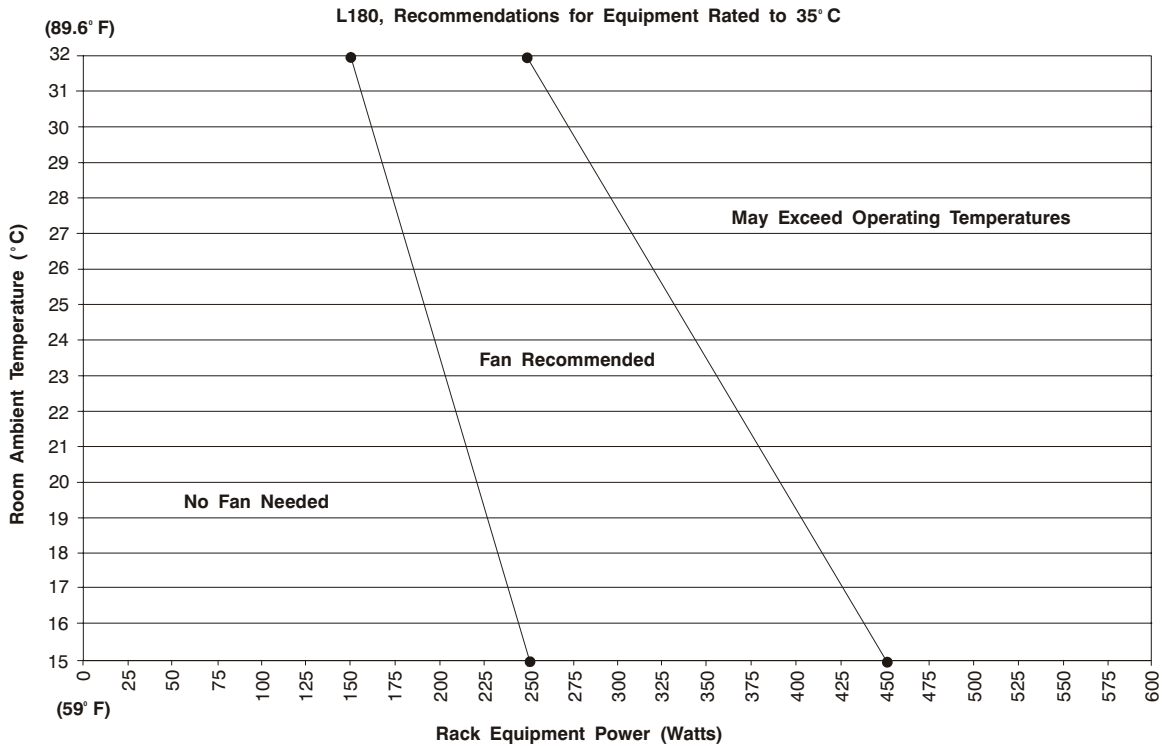
This page intentionally left blank.

About the Library

This chapter provides an overview of the StorageTek L180 Tape Library and describes the components, models and features, interfaces, and tape drives.

Important: Review the information in this chapter to become familiar with the library and its components before starting the installation. See Appendix E, "Specifications" for physical dimensions, power requirements, and operating environments.

■ Overview

The L180 Tape Library is a fully automated cartridge tape storage and retrieval system. Depending on the model type and feature set, the library can store from 84 to 174 data cartridges.

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 the library installation require two service engineers.

■ Components

Figure 1-1 on page 1-2 shows the major components of the library.

The library's front door provides access to the cartridge storage area, robot, and the tape drive front panels.

The rack door provides access to 6 units (U) of rack space. Six Us of rack space is the equivalent 0.27 m or (10.5 in.) of 0.48 m (19 in.) storage space for rack-mounted equipment, such as:

- Bridges and routers for network attachment
- Uninterrupted power supply as an optional feature
- Maintenance switch for the T9840 Tape Drives

The rear door provides access to the drive column, electronic components, interface connections, and rack space.

■ Electronic Components

Figure 1-2 on page 1-3 and Figure 1-3 on page 1-4 show the electronic components of the library. These components are in the slide-out electronics compartment behind the rear door.

Figure 1-1. Library Components (C67036)
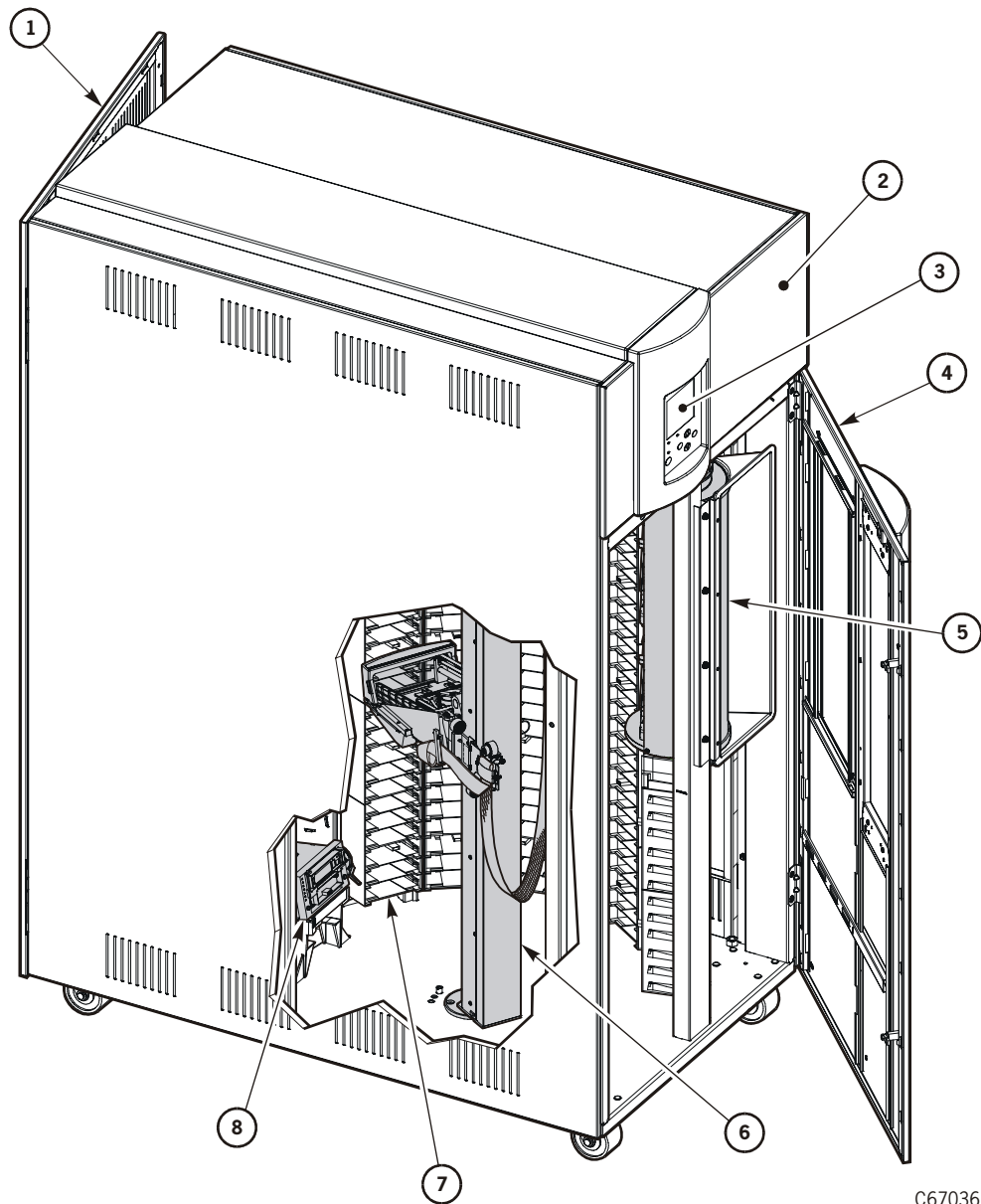
C67036

1. Rear door
2. Rack door
3. Operator panel
4. Front door
5. Cartridge access port (CAP)
6. Robotics
7. Arrays
8. Drives

Figure 1-2. Library Electronics Module Bulkhead (C67076)
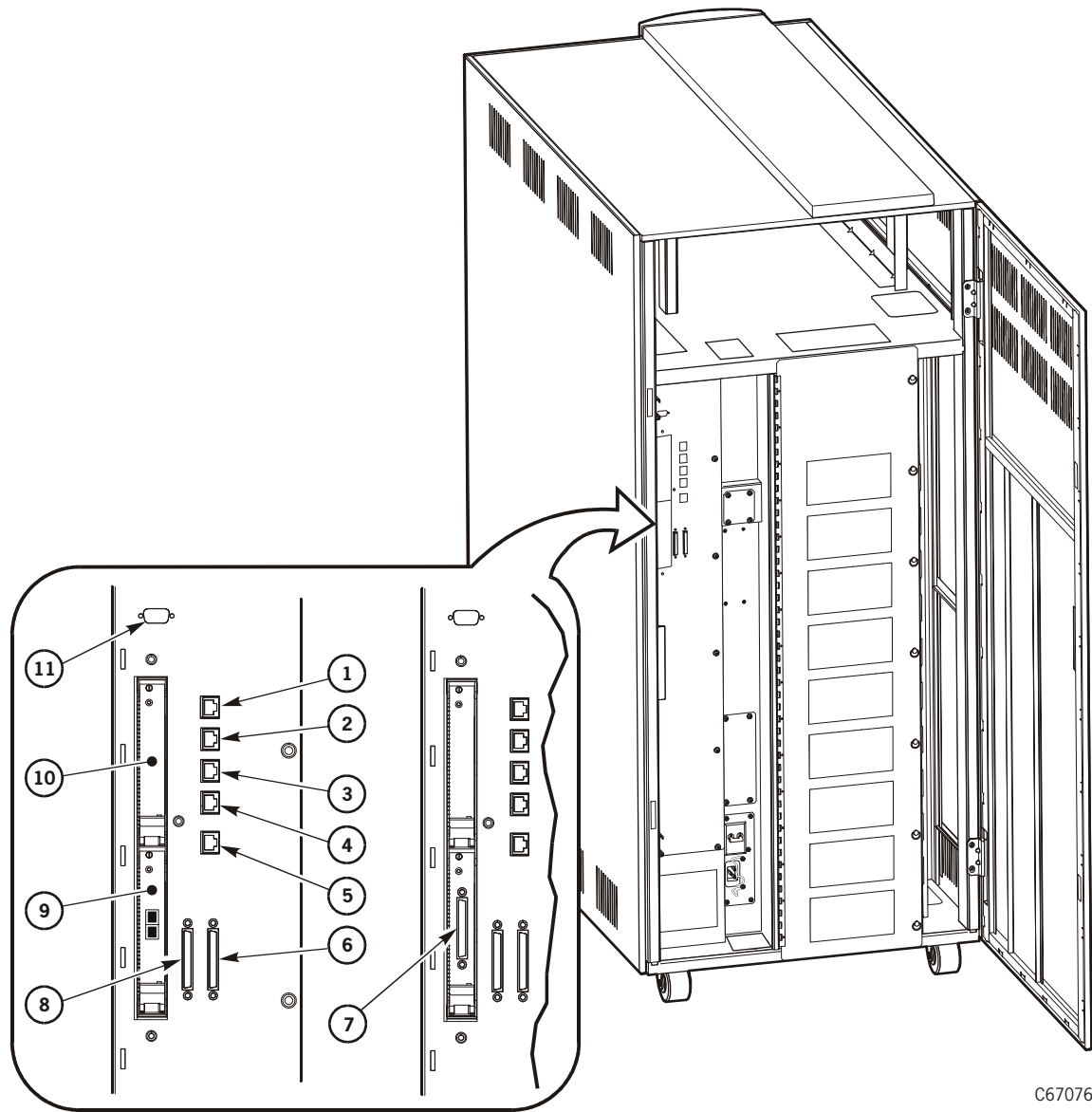
C67076

1. CSE port (microcode download)
2. Test (unused)
3. SER1 (serial for diagnostics and service)
4. SER2 (serial)
5. Enet (Ethernet connection)
6. SCSI (HVD)
7. SCSI (LVD)
8. SCSI (single-ended)
9. Slot 0 (Fibre Channel port 0)
10. Slot 1 (future expansion)
11. DB-9 connector for a Personality Module

Figure 1-3. Library Electronic Components (C67039)
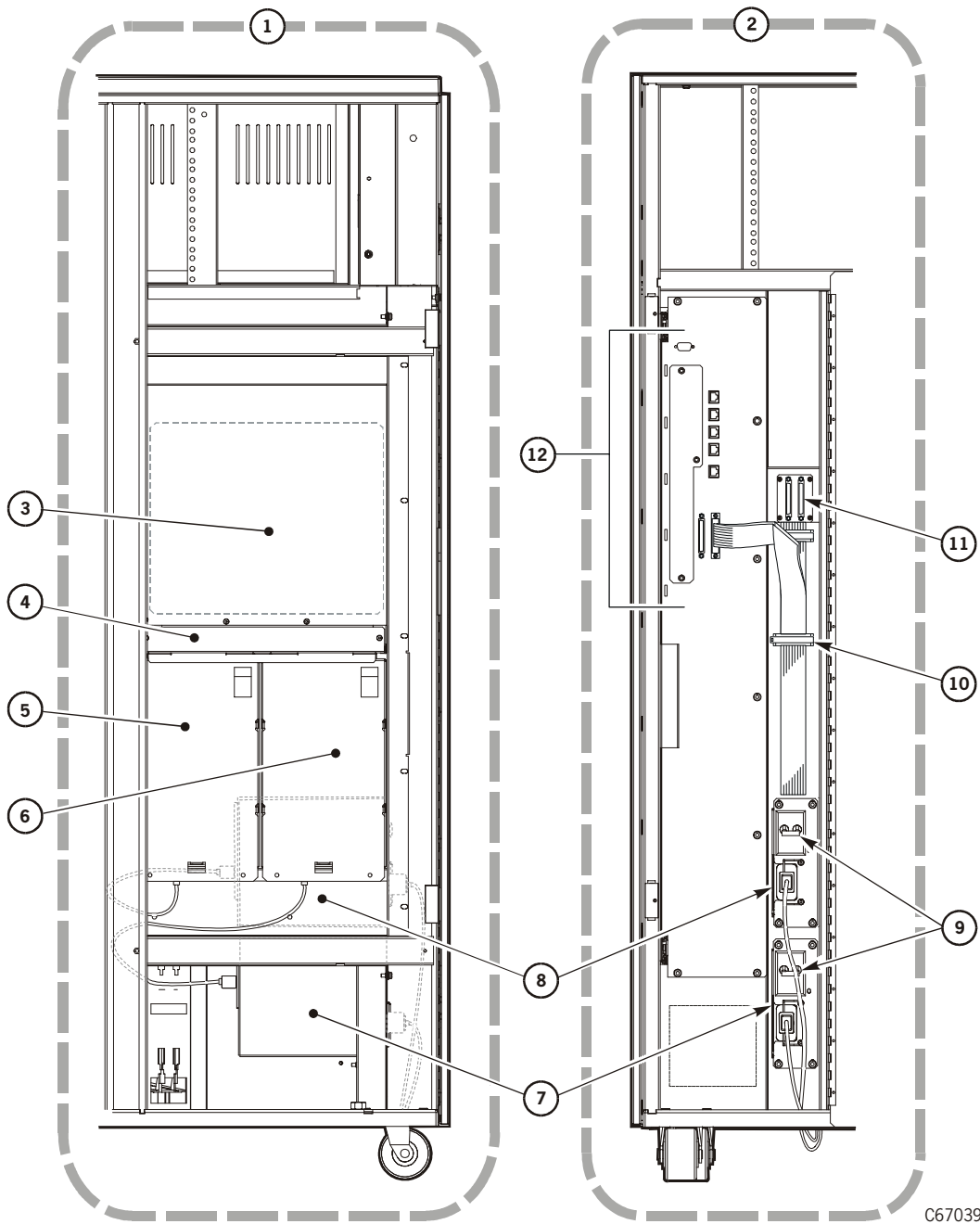
C67039

1. View from library side (cut away)
2. View from library rear
3. MPC/MPCL card (enclosed)
4. Fan enclosure
5. Standard DC power supply
6. Optional DC power supply
7. Main power distribution unit (PDU)
8. Optional power distribution unit (PDU)
9. Power switch (circuit breakers)
10. Cable clamp for library Y-cable
11. SCSI connectors
12. Electronics module bulkhead

■ Robotic Components

The robot contains three major components: the theta motor (controls lateral movement), the Z column motor (controls vertical movement), and the hand-camera assembly on the Z carriage (controls cartridge movement to and from cells, drives, and CAP).

Figure 1-4. Robotic Components (C67037)
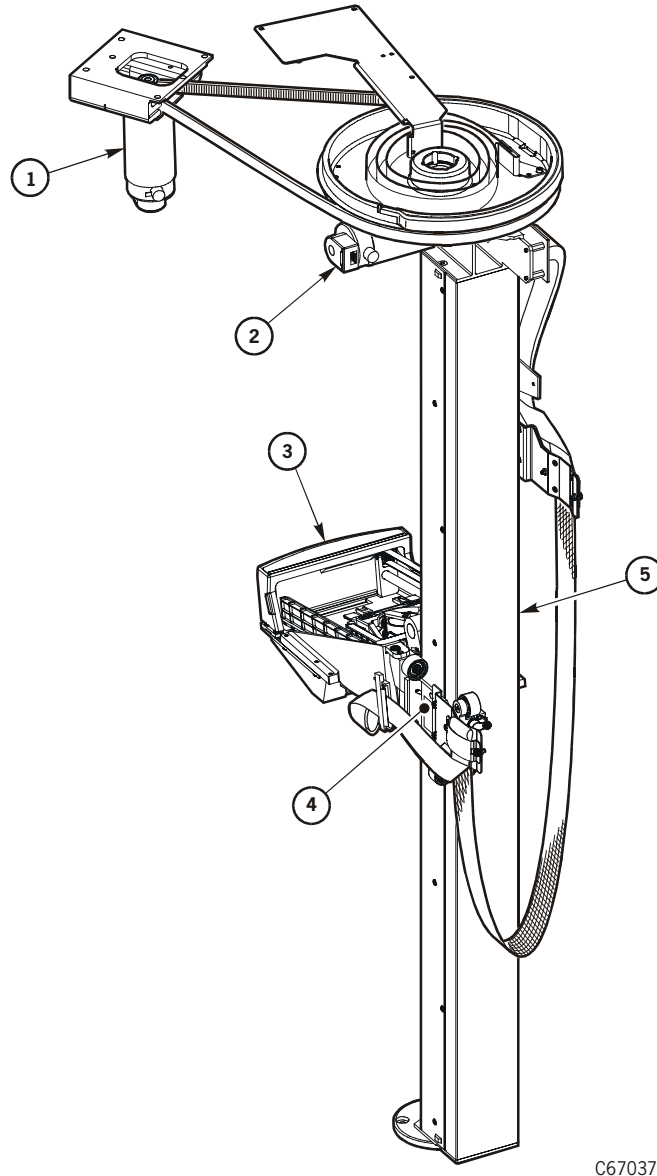
C67037

1. Theta motor
2. Z motor
3. Hand-camera assembly
4. Z carriage
5. Z column

Figure 1-5 shows the hand-camera assembly which consists of a gripper, a motor-driven drive belt for gripper extension, a bar code scanner card, and camera (enclosed in a case under the hand components).

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 (C67038)

C67038
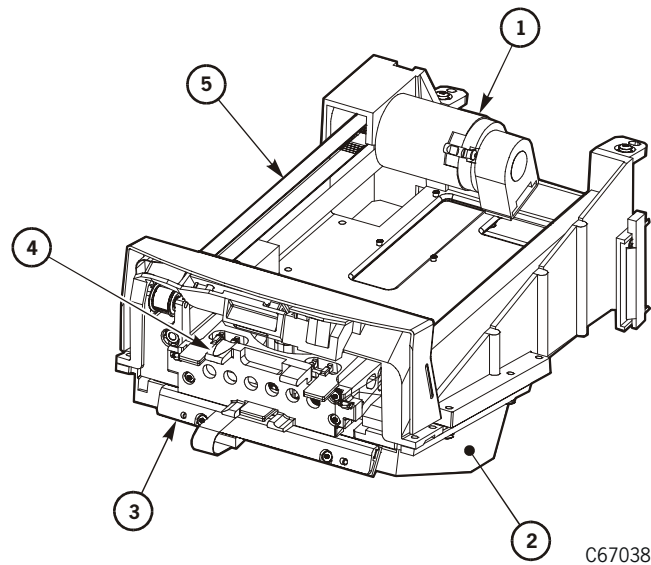
1. Motor
2. Camera housing
3. LED card
4. Gripper
5. Drive belt

■ Library Capacity

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.

Figure 1-6. Library Size Configurations (C67038)

C67035
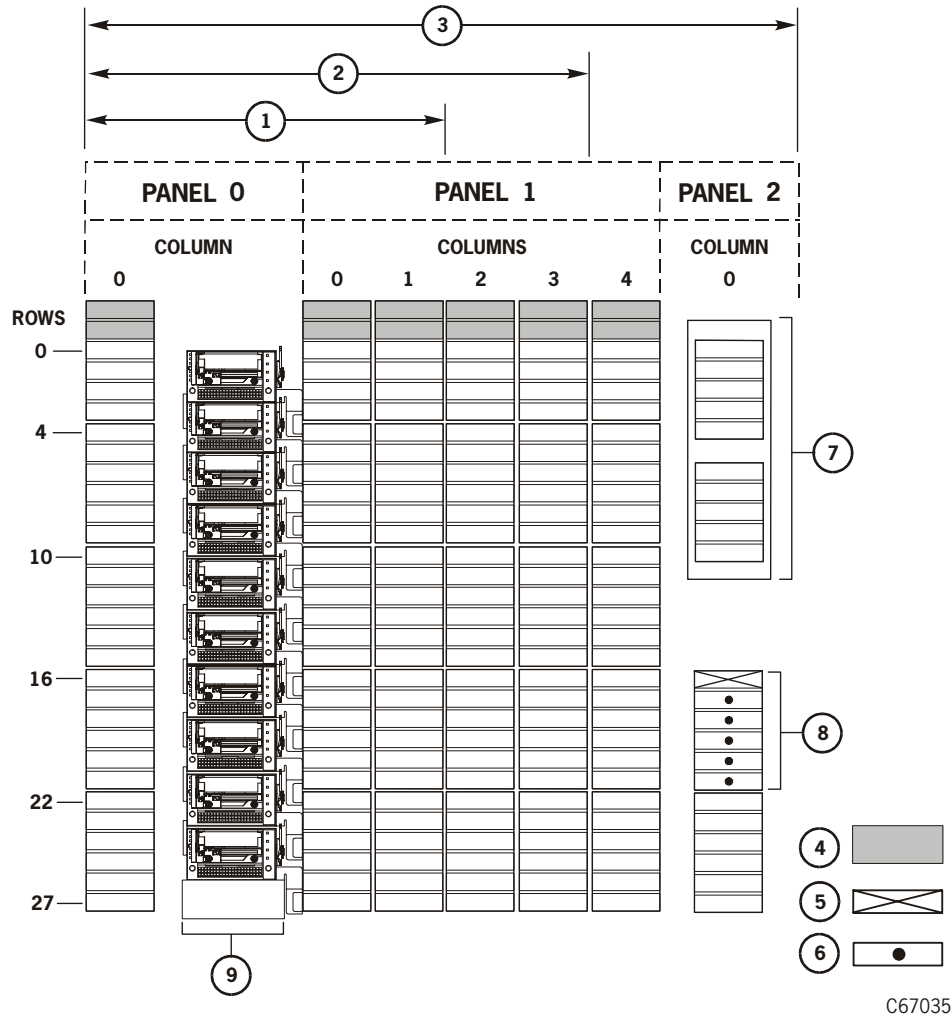
1. L180-80 Model = 84 data storage cells
2. L180-140 Model = 140 data storage cells
3. L180-180 Model = 174 data storage cells
4. Blocked storage cells (no cartridges permitted)
5. Swap cell
6. Reserved cells for cleaning or diagnostic cartridges
7. CAP
8. Reserved cell array
9. Drive column

■ Theta Stops

The three storage capacity variations are determined by the location of the theta stops. The microcode configures the capacity of the library from these locations during an IPL.

Figure 1-7. Theta Stops (C67118)
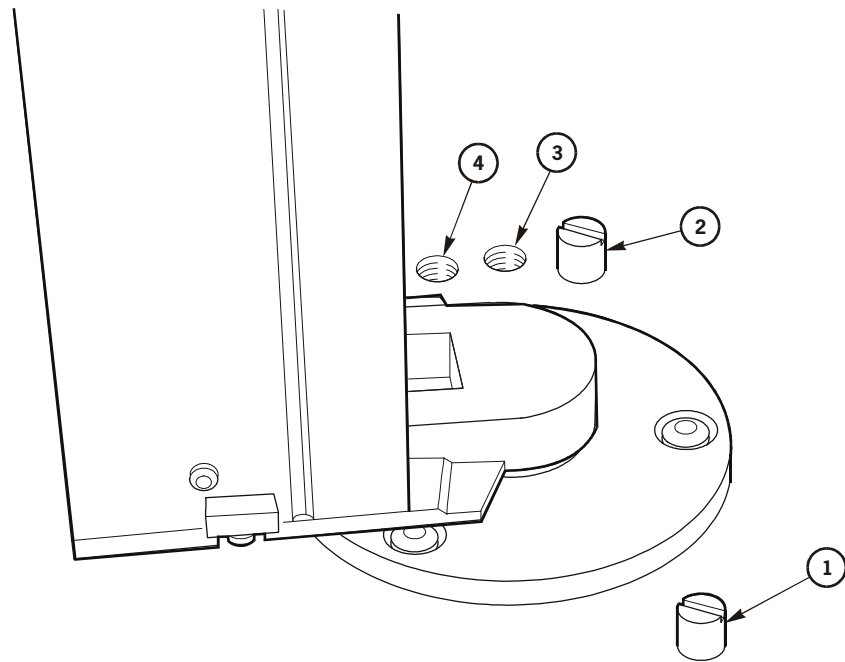
C67118

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

■ Interface Connections

The library and tape drives support the following interface connections:

- The library operates as:
  - High voltage differential (HVD) or low voltage differential (LVD) SCSI. Note: LVD operation requires the addition of the MPW card.
  - Fibre Channel with the addition of MPU and MVP cards

- DLT 7000, DLT 8000, or Super DLT drives (HVD SCSI only)

- LTO Ultrium drives (LVD SCSI, HVD SCSI, or Fibre Channel)

- T9840 drives (HVD SCSI, Fibre Channel, or ESCON)

- T9x40 drives (HVD SCSI or Fibre Channel) (9940 requires feature 99DR, the extended door)

CAUTION:
***Possible component or system damage:* For operation with LTO drives, the library's robotic hand must have the High Extra Force Hand assembly, conversion bill number 101376.**

Host Bus Adapter Requirements

CAUTION:
***Mismatching SCSI operation types:* The host bus adapter (HBA) in the customer's server must match the library's SCSI bus type. If the interface to the library is HVD, then the customer's server must contain an HVD-compatible HBA. Likewise, if the interface to the library is LVD, then the server must contain an LVD-compatible HBA.**

The server the SCSI bus attaches must have a compatible HBA. If the interface to the library is HVD, the customer's server must contain an HVD-compatible HBA. Likewise, if the interface to the library is LVD, then the server must contain an LVD-compatible HBA.

Table 1-1. HVD and LVD Device Requirements

Low Voltage Differential	High Voltage Differential
Library–MPW card attached to MPC card	Library–None
IBM Ultrium–None	HP Ultrium–converter card
HP Ultrium–None	HP Ultrium–converter card
Seagate Ultrium–Set by model number	Seagate Ultrium–Set by model number
Host Server–LVD Host Bus Adapter	Host Server–HVD Host Bus Adapter

SCSI Bus Precautions

You must use caution when connecting LVD or HVD interfaces. Equipment damage or bus-disabling situations may arise if the two types of interfaces are intermixed.

CAUTION:
Potential equipment damage: **The single-ended, LVD, and HVD SCSI alternatives are not compatible and cannot be mixed on the same SCSI bus.**

Table 1-2. SCSI Device/Bus Types: Precautions

If you plug this device type ...	into a Single-ended (SE) Bus Type ...	into an LVD Bus Type ...	into an HVD Bus Type ...
Single-ended (SE) device	No effect. This is a proper connection.	The entire bus will run in SE mode (with all SE restrictions).	The HVD bus will be *disabled*.
LVD device	The LVD device will run in SE mode.	No effect. This is a proper connection.	The LVD device will be *disabled (potential damage to the device)*.
HVD device	The HVD device will be *disabled*.	The LVD bus and all LVD devices will be *disabled (potential damage to LVD devices)*	No effect. This is a proper connection.

Fibre Channel

The following Fibre Channel cable and connector specifications are supported:

Table 1-3. Fibre Channel Cables and Connectors

Distance		FC-0 Code	Multimode Cable	Type	Connector
Meters	Feet				
2–300	6.5–985	100-M6-SN-I	62.5 µm	Shortwave laser w/o OFC	Duplex SC or LC
2–500	6.5–1640	100-M5-SN-I	50 µm		

■ Rack Area

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

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

The internal 6-unit (U) rack area, behind the top front door, may be used by customers for additional equipment. Requirements for this area are:

• See "Rack Safety and Precautions" on page xxix and make sure the customer understands this information.

• Route power cables through the cutouts in the bottom of the library frame. See Figure 2-1 on page 2-4 for access and service area requirements.

■ 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])
• 10 LTOs
• 6 StorageTek T9840s and one DLT drive

You may do so even if the library is connected to a single AC circuit.

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

At 200 to 240 VAC

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. 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.

Notes:

1. All new DLT drives ship with the PFC power supply (85 W).

2. You must use a locking plug on the library's power cord when the library contains a non-PFC DLT drive.

3. Please note the differences between the PFC and non-PFC drive configurations

Table 1-4. Maximum Number of Drives on a Single 220 VAC Circuit

Factor	220 VAC[1]			
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[2]	Non-locking	Locking[2]
Drive Type	**Maximum Number of Drives**			
T9840	6	6	6	6
LTO Ultrium	10	10	10	10
DLT w/non-PFC	5	10	5	10
DLT w/PFC[3]	10	10	10	10

Notes:

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.
2. You must use a locking plug on the library's power cord when the library contains a non-PFC DLT drive.
3. PFC power supplies have less leakage current and lower peak current demand on the AC input.

Power Cable Information

For each library, the customer must order the power cable and supply the correct receptacle.

Table 1-5 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 1-5. L180 Power Cables—By Part Number

Input Voltage	Country	If the Library Contains...	
		Only: • T9840 Drives • Newer DLT Drives • Ultrium Drives • Mixture of DLT, Ultrium, and T9840's	Older DLT Drives (with a non-PFC power supply)
100 – 127 VAC 15 A	U.S./Canada	Nema 5–15P PN 10083634	Nema 5–15P PN 10083634
	Japan	JIS 8303 PN 10083649	JIS 8303 PN 10083649
200 – 240 VAC 10 or 15 A	Australia	AS 3112 PN 10083650	Locking[1] IEC 60309 PN 10083635
	Europe[2]	CEE 7/7 PN 10083646	Locking IEC 60309 PN 10083635
	Italy	CEI.23 PN 10083651	Locking IEC 60309 PN 10083635
	South Korea	KS 8305 PN 10083656	Locking IEC 60309 PN 10083635
	South Africa	BS 546 or BS 1363 PN 10083655	Locking IEC 60309 PN 10083635
200 – 240 VAC 10 or 15 A	United Kingdom	BS 1363 PN 10083653	Locking[1] IEC 60309 PN 10083635
	U.S./Canada	NEMA 6–15 PN 10083644	Locking IEC 60309 PN 410573502 *or* NEMA L6–15P PN 10083645

Notes:

1. You must use a locking plug on the library's power cable when the library contains a non-PFC DLT drive.
2. Europe includes Denmark, Germany, Norway, Sweden, Finland, the Netherlands, Belgium, France, and Switzerland.

■ StorageTek's L-Series Library Admin

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

The L-Series Library Admin lets a library's users configure, operate, and monitor the library through a workstation or PC that is running a Netscape or Internet Explorer browser. The monitor must first be enabled and configured on the library.

Installation and configuration instructions appear in Appendix C or in the documentation that ships with the L-Series Library Admin components.

■ Other Interfaces and Connections

The library features three operator 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.

- An **Ethernet** cable that allows the customer to use the Simple Network Management Protocol (SNMP) for remote access to the library. See Appendix D for more information.

- A **CSE Port** that lets you download microcode to the library. See Appendix B for more information.

Installing the Library

<div style="text-align: right">**2**</div>

This chapter contains the procedures for preparing the L180 Tape Library location, unpacking and positioning the library, removing the shipping hardware, changing operating options, and connecting a laptop computer.

Table 2-1 on page 2-2 summarizes the steps required to install the library.

1. Remove this page from the book, and make sure all steps are completed in the sequence listed.

2. When you complete a procedure, check off the item in the table.

3. **Important!**
   Read and observe the information in "Safety" on page xxiii and "Fiber-optic Safety" on page xxvii before beginning the installation.

■ Tools

The following tools are necessary to install the library and tape 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 tool kit (StorageTek PN 4019). 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.

Table 2-1. Installation Checklist

Item	Procedure
	Chapter 2, Installing the Library
❑	"Preparing the Library Location" on page 2-3
❑	"Unpacking the Library" on page 2-6
❑	"Positioning the Library" on page 2-9
❑	"Unpacking the Library Interior" on page 2-10
❑	"Installing Optional Power Components" on page 2-13
❑	"Installing Rack-Mounted Components" on page 2-14
❑	"Installing Fibre Channel Components" on page 2-14
❑	"Configuring SCSI Options" on page 2-16
❑	"Connecting a Laptop Computer" on page 2-19
	Chapter 3, Installing the Tape Drives
❑	"Installing DLT Drives" on page 3-4
❑	"Installing LTO Drives" on page 3-8
❑	"Installing T9x40 Tape Drives" on page 3-12
	Chapter 4, Powering-On the Subsystem
❑	"Connecting Power" on page 4-4
❑	"Supplying Power" on page 4-6
	Chapter 5, Configuring the Subsystem
❑	"Entering Configuration Data" on page 5-5
	Chapter 6, Preparing the Subsystem
❑	"Installing Diagnostic and Cleaning Cartridges" on page 6-1
❑	"Preparing DLT Drives" on page 6-7
❑	"Preparing LTO Drives" on page 6-9
❑	"Preparing T9840 Drives" on page 6-10
❑	"Testing the Subsystem" on page 6-11
❑	"Inserting Data Cartridges" on page 6-14
	Chapter 7, Connecting the Interface Cables
❑	"Connecting the SCSI Library" on page 7-6
❑	"Connecting the Fibre Channel Interface" on page 7-12
❑	"Connecting the Ethernet Interface" on page 7-16
	Chapter 8, Placing the Library Online

■ Preparing the Library Location

When preparing the library location, make sure to:

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

See Figure 2-1 on page 2-4 for spacing requirements and cable access locations.

Note: Safety agency standards require that the power receptacle is located within 2.8 m (9.2 ft) of the library and 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 de courant 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 in 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 (C67043)

C67043
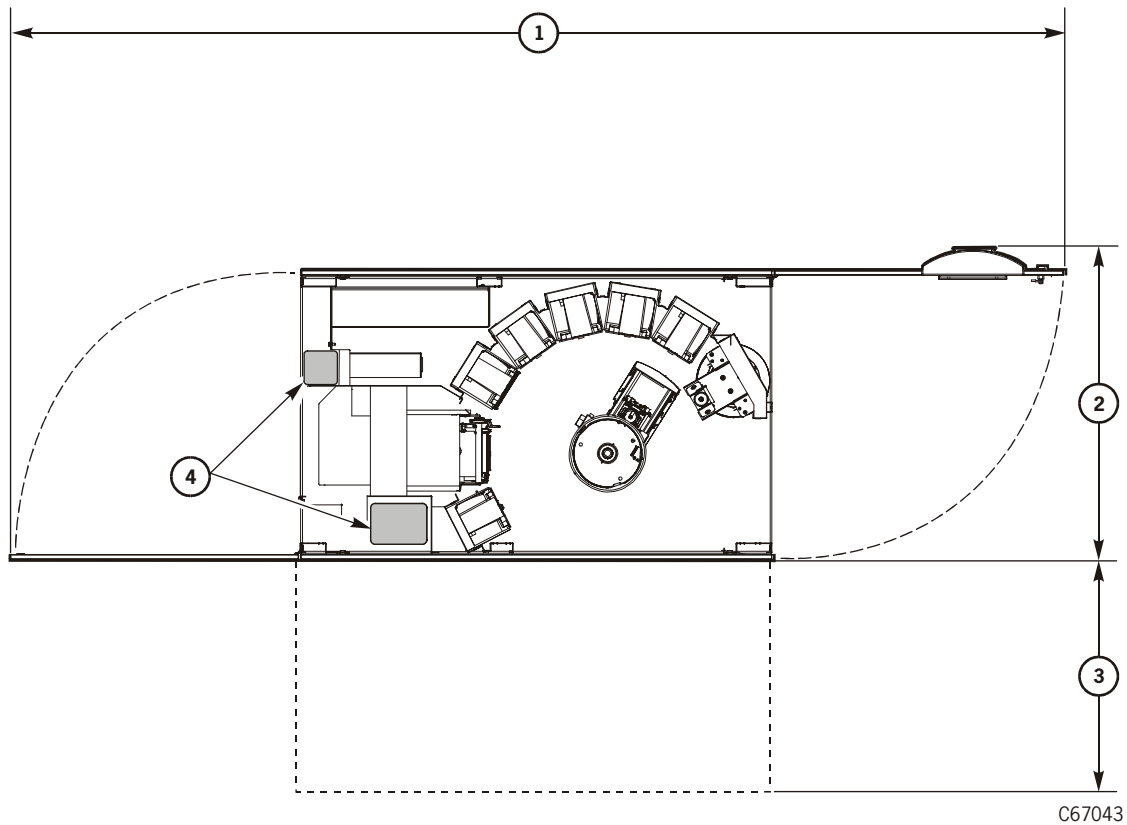
1. 2.6 m (8.5 ft) (both front and rear doors open)
2. 0.8 m (2.6 ft) (front and rack door open)
3. When positioning the library, consider that a minimum of 1.0 m (3.3 ft) might be necessary for removing the side panel during service calls.

   Note: These statements apply to side area clearance:

   • For normal operation, allow a minimum of 51 mm (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

■ 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.

See while performing these steps:

1. Remove and retain the shipping bill.

CAUTION:
***Potential backlash from straps*: Make sure that no one is near the shipping straps when you 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 la 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 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.

Eleventh Edition
StorageTek Proprietary

Figure 2-3. Library Packaging Removal (C67044)
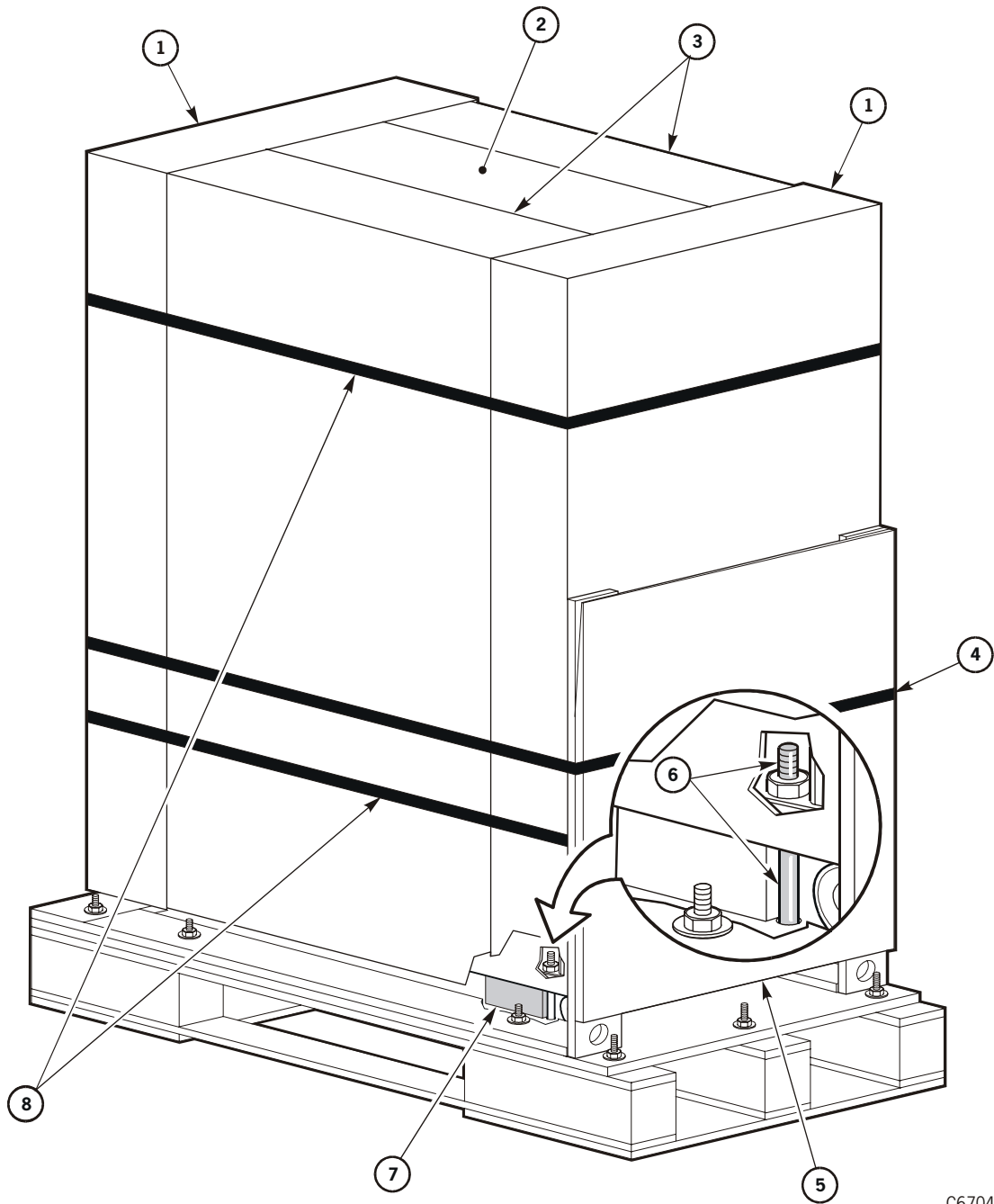
C67044

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

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

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 for Special Purposes

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.

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

Figure 2-4. Z Column Shipping Pin (C67045)
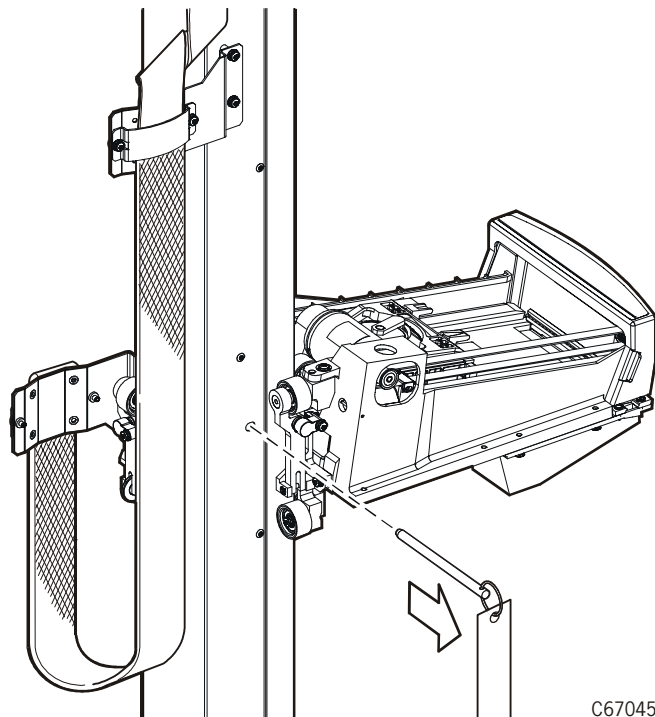
C67045

4. Locate and remove the theta shipping pin.

Note: Both shipping pins are marked with red ribbons.

Figure 2-5. Theta Shipping Pin (C67046)

C67046
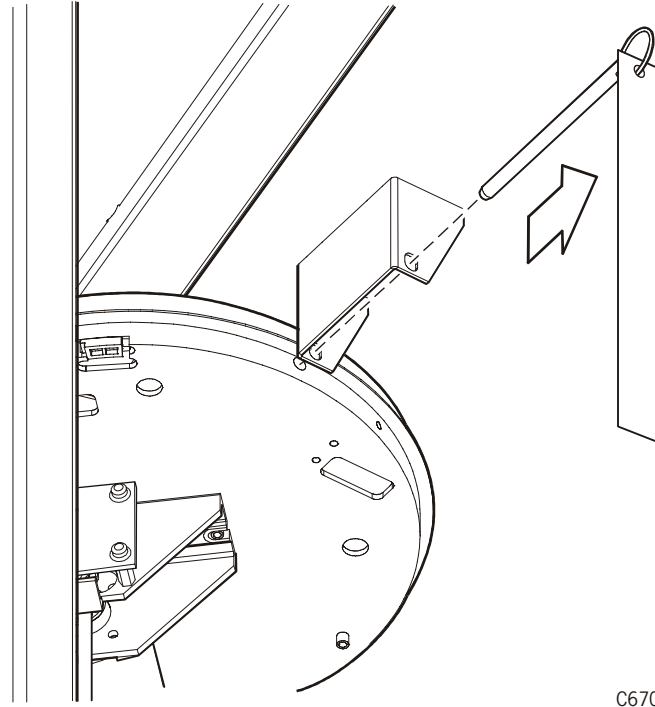
5. Retain the shipping pins. They are required for maintenance procedures to the Z and theta motors. Pins may be stored in holes provided in the rack floor. These holes are located in the front on the right-hand side.

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.

Eleventh Edition

StorageTek Proprietary

Figure 2-6. Z Column Rotation (C67047)

C67047
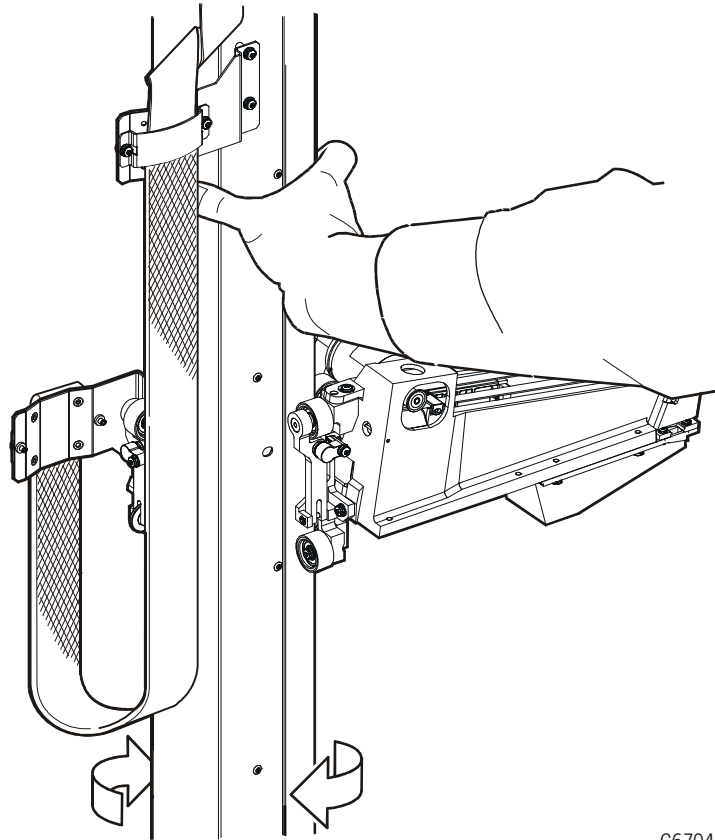
7. Place your hand under the hand camera assembly and raise it (on the Z carriage) so that you have comfortable access to the hand assembly.

8. 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.

9. Close the front door of the library by locking the top and bottom latches

■ Installing Optional Power Components

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

Optional DC Power Supply

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

- Optional DC power supply (feature code RMPS)
- Optional power distribution unit (PDU) ships with the optional DCPS
- Optional uninterruptible power supply (feature codes DPWR and EPWR)

For installation information, refer to the instructions that accompany these components in the shipping packages.

Optional Uninterruptible Power Supply

The library also has an optional uninterruptible power supply (UPS) that can be installed in the library rack area. Table 2-2 lists the feature numbers and conversion bill numbers for information about how to install the optional UPS:

Table 2-2. Optional UPS Feature Codes

Code	Description	Conversion Bill
EPWR	European power switch and UPS	101407
RPWR	Domestic power switch and UPS	101406

The optional UPS feature requires an optional cooling fan for the back door of the library. Table 2-3 lists the feature numbers and conversion bill numbers for information about how to install the cooling fans:

Table 2-3. Optional Cooling Fan Feature Codes

Code	Description	Conversion Bill
DFAN	Domestic cooling fan	101331
EFAN	European cooling fan	101332

Notes:

- Refer to these conversion bills for instructions and cable diagrams to install these optional features.

- Refer to the *L180 and L700 Tape Libraries Uninterruptible Power Supply Reference Manual* for more information about the UPS.

■ Installing Rack-Mounted Components

CAUTION:
Potential equipment damage: **Make sure to read and understand the "Rack Safety and Precautions" on page xxix before installing rack components.**

Heat within the rack area: **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 assist in cooling the rack area, use a conversion bill listed in Table 2-2 on page 2-13.**

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

Observe these notes when installing rack-mounted Fibre Channel components:

- Make sure that Fibre Channel devices (such as a bridge, switch, or hub) faces the *front* of the library to allow proper cable routing to the drives.

- Cables that exit a Fibre Channel device must follow the routing shown in Figure 7-8 on page 7-14.

■ Installing Fibre Channel Components

Read the following paragraphs for an overview of how to install Fibre Channel components into the library. Make sure you read "Fiber-optic Cable Handling" on page xxix and "Fiber-optic Cable Installation" on page xxviii before installing Fibre Channel components.

Library Connection

CAUTION:
Potential network error: **Do *not* connect the customer's Fibre Channel cables to the library until after you have configured the library and the tape drives in Chapter 5, "Configuring the Subsystem."**

For Fibre Channel connection to the library, you must install the compact PCI bus (CPCI) component (MPV card), a Fibre Channel card (MPU card), and the control-path strain relief.

Refer to the instructions enclosed with these components.

Drive Connection

Before you install the Fibre Channel tape drives in the L180 library, make sure that the library has a perforated drive access door instead of vertical louvers. L180 libraries that require this replacement door have these serial numbers: 0 to 18, 300 to 324, and 5000 to 5020.

If the library requires the perforated access door, order FB 62296 to replace it.

Drive Cable Strain Reliefs

The library shipping kit includes two strain reliefs for fiber-optic cables.

Install these strain reliefs and wrap the excess 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 standoffs on the side of the drive column.

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 other strain reliefs.

Figure 2-7. Attaching Fiber-Optic Cable Strain Reliefs (C67285)
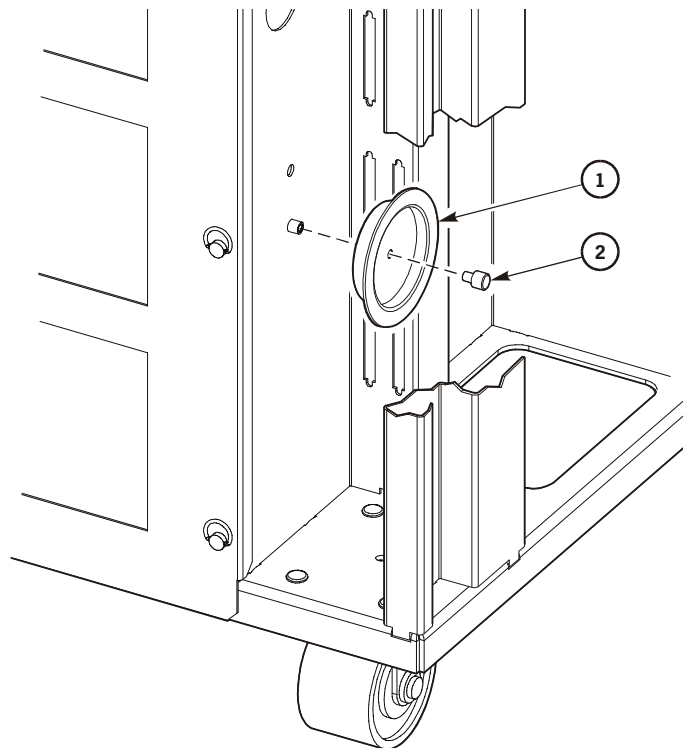
C67285

| 1. | Strain Relief | 2. | Thumbscrew |

■ Configuring SCSI Options

To support the LVD SCSI option, the factory ships the optional MPW card separately from the library.

To install the MPW card and its accessories, refer to the instructions that accompany the components in the shipping packages.

Changing Library SCSI Operating Options

The standard MPC/MPCL 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 using the following procedures:

Selecting the 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 important if:**

- **The library is some distance away from the server.**
- **The library contains T9840 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 jumper is set to the ON position (library supplying terminating power) at the factory.

The MPC/MPCL cards are set to high voltage differential operation at the factory. You may change the operation to single-ended (for the MPC card) or low voltage differential/single-ended (for the MPCL card) by changing the jumper (J16) on the respective card.

MPC Card

To change a library containing an MPC card to 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. Grasp the handle and 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. (Four screws are on the front face of the cover, and two screws are on the side.)

6. See Figure 2-8 on page 2-18 and check the location of the single-ended and differential jumper at J16.

7. Pull out the jumper and place it in the single-ended position.

8. At the edge connector on the right side of the MPC card, disconnect the cable from the rear (high voltage differential) connector on the MPC card and move it to the front (single-ended) connector.

9. Single-ended operation requires a special terminator, part 10148002.

10. Replace the cover on the MPC card. Secure it with the six screws.

11. 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

12. Re-clamp the library Y-cable to its original position

MPCL Card

To change a library containing an MPCL card to single-ended or low voltage differential 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. Grasp the handle and 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 MPCL card. (Four screws are on the front face of the cover, and two screws are on the side.)

6. See Figure 2-8 on page 2-18 and check the location of the single-ended and differential jumper at J16.

7. Pull out the jumper and place it in the single-ended position.

8. At the edge connector on the right side of the MPCL card, disconnect the cable from the rear (high voltage differential) connector on the MPCL card and move it to the front (low voltage differential/single-ended) connector.

9. For LVD operation, the library must be the last device on the SCSI bus and must use a single, shielded cable (PN 3136668xx) with feed-through terminator.

10. Replace the cover on the MPCL card. Secure it with the six screws.

11. 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

12. Re-clamp the library Y-cable to its original position

Figure 2-8. MPC/MPCL Card Connections and Jumpers (C67057)
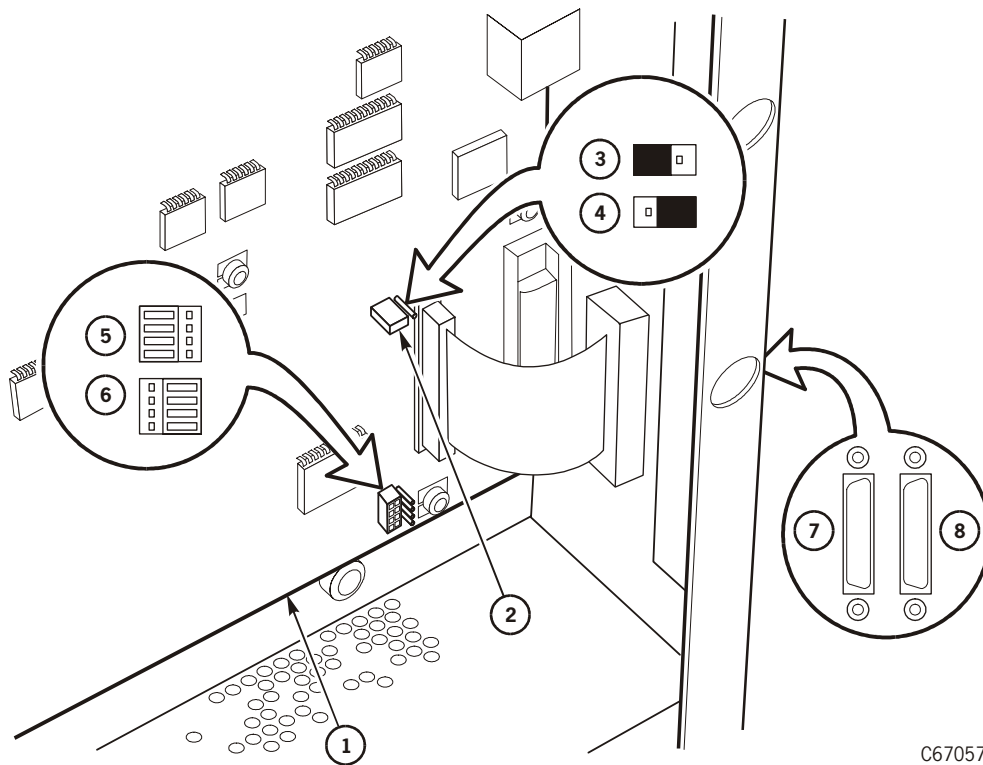
1. MPC/MPCL card
2. Terminating power strap (J18)
3. Terminating power ON position
4. Terminating power OFF position
5. Differential setting (J16)
6. Single-ended setting (J16)
7. Single-ended connector (front)
8. Differential connector (rear)

■ Connecting a Laptop Computer

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

- Complete service connection (CSE port)
- Remote (modem) connection (SER1 port)

Both types use RJ-45 cables (PN 4108289xx) and require a RJ-45–DB9 connector (PN 10410823) or CSE DOS Diagnostic cable (PN 24100134)

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

Older PCs	WIN2000 PCs
Baud rate = 38,400	Baud rate = 38,400
Data bits = 8	Data bits = 8
Parity bit = None	Parity bit = None
Stop bit = 1	Stop bit = 1
Direct to comm flow = none	Hardware flow control = on

CAUTION:
***Potential system interruption:* If you wish to run diagnostic tests from a laptop device, you may connect the laptop to either the SER1 port or the CSE port on the electronics module bulkhead. Make sure the library is offline before you run tests through either port. The command-line interface does not give a warning that the library will be taken offline.**

Complete Service Connection

To load the library's microcode, or to download the FSC log, or to run library diagnostics from the laptop instead of the operator panel, connect the RJ-45 cable from the laptop device to the top connector—labeled *CSE*—on the top of the electronics module. The baud rate is 9600.

Once the `flash97.exe` file is started, the microcode program determines its own loading baud rate (38,400) as part of the executable program.

Modem Connection

If you want only to run diagnostic tests or to download the FSC log, connect the RJ-45 cable from the laptop to the third connector—labeled *SER1*—from the top of the electronics module. The baud rate is 38,400 bps with `flash 97.exe`.

See for more information.

This page intentionally left blank.

Installing the Tape Drives

<div style="float:right">3</div>

This chapter contains the procedures for installing tape drives in the library.

■ Drive Installation Cautions

Read the following cautions before installing drives.

CAUTION:
***Potential equipment damage*:**

- **Do not power on the library until this manual indicates to do so.**

- **Do not mix single-ended or LVD drives with HVD drives on the same SCSI bus.**

- **Do not mix single-ended or differential terminators on the same SCSI bus.**

- **Before connecting SCSI drives to a server, make sure that the client's SCSI terminator is on and that the terminator type (LVD, HVD, or single-ended) matches the SCSI bus type.**

- ***Possible data loss:* StorageTek does not advise mixing DLT 7000 and DLT 8000 drives in the same library. If a DLT 7000 cartridge is inserted into a DLT 8000 drive, the tape can be read and written in 7000 mode. If a DLT 8000 cartridge is inserted into a DLT 7000 drive, the drive will indicate an error if a read command is issued and will write over any data present on the tape if a write command is issued at load point.**

Drives are shipped individually. Because of the size difference between them, you may choose from a variety of ways of installing them. You may 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 or LTO drive only. (The T9840 drive is too large to fit in this slot.)

Notes:

- 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.

- If you plan to install other drives in the future, you should initially install drives in the **top** slots and work down because the drives' logical numbers are assigned from top to bottom.

- 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 and software application viewpoint.

See Figure 3-1 on page 3-3 for the rules for combining drives.

■ Drive Combinations

The L180 library supports a combination of drives in various configurations. The library can hold up to 10 DLT and/or LTO drives, up to six T9840 drives, or a combination of these drives.

The drive positions or logical numbers are automatically assigned by the library during initialization. However, you must configure each drive's SCSI IDs and "on bus" or "off bus" status.

Within the drive column, an L180 library can hold:

- 10 Digital Linear Tape (DLT) drives (DLT 7000, DLT 8000, or Super DLT)
- 10 Linear Tape-Open (LTO) Ultrium drives
- Six T9840 Tape Drives (with room for one DLT drive)
- Six T9x40 Tape Drives (with room for one DLT drive)
- A mixture of DLT, Ultrium, and T9840 drives

The configuration procedure is explained in Chapter 5, "Configuring the Subsystem".

Figure 3-1. Tape Drives (C67052)

1. DLT or Ultrium drive *only* in the top-most slot

2. Two T9840 drives (shown): space equivalent to three DLT or Ultrium drives

3. Three DLT drives (shown) or three Ultrium drives: space equivalent to two T9840 drives

4. Mixed T9840 and DLT drives (shown), or three DLT drives, or three Ultrium drives, or two T9840 drives

C67052
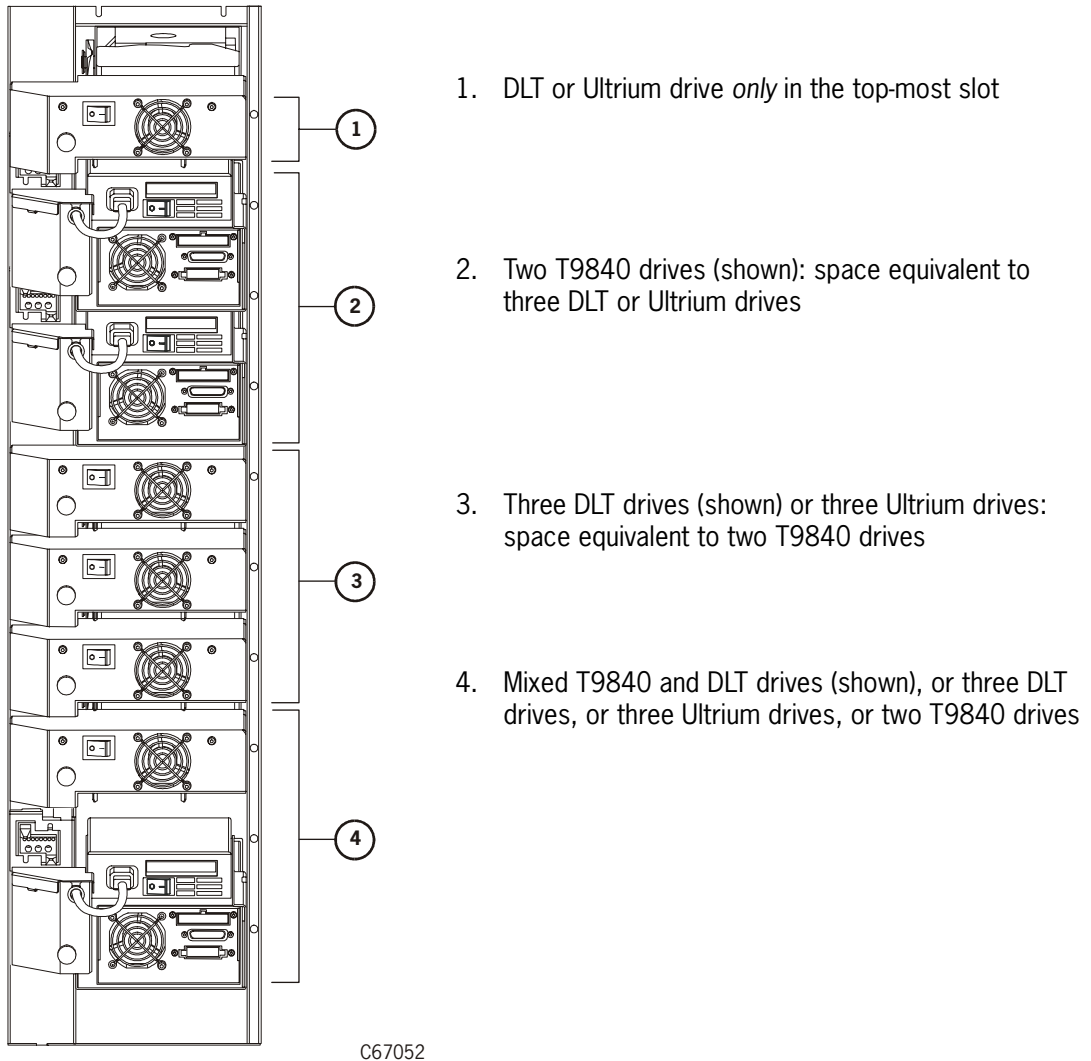
■ Installing DLT Drives

The L180 library supports the following DLT drives:

- DLT 7000
- DLT 8000
- Super DLT (SDLT) 220 or 320

CAUTION:
Possible data loss: **StorageTek does not advise mixing DLT 7000E and DLT 8000 drives in the same library. If a DLT 7000E cartridge is inserted into a DLT 8000 drive, the tape can be read but not written on. If a DLT 8000 cartridge is inserted into a DLT 7000E drive, the drive detects the tape as blank and will write over the information.**

Make sure that the labels match the drive type and interface required.

Figure 3-2. DLT Model Number and Interface Labels   (C67053)
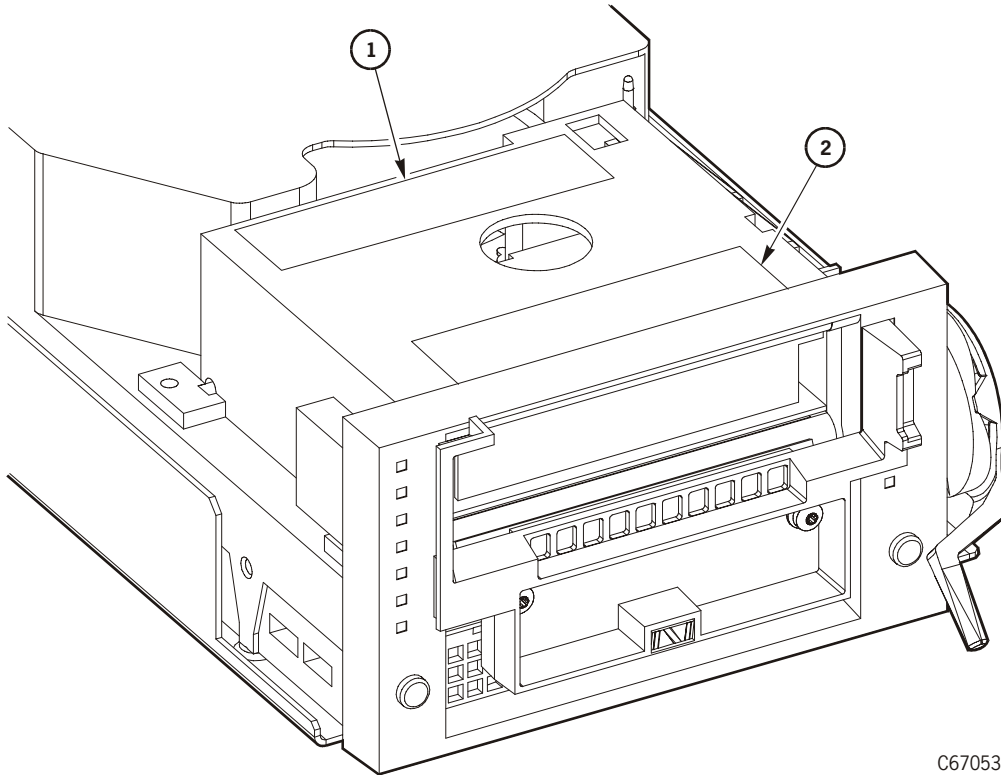
C67053

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 of the library by gently pulling on the finger slot.

2. Open the library drive access door (inside the rear door).

3. Open the drive package.

4. Remove the packing material.

Note: Check with the customer for a maintenance agreement on the 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 returned to the factory. Some maintenance agreements allow drive replacement by trained and certified personnel on the customer's staff.

5. Check the DLT drive for the terminating power jumper selection (TERMPWR).

Figure 3-3. DLT Drive Terminating Power Jumper (C67054)
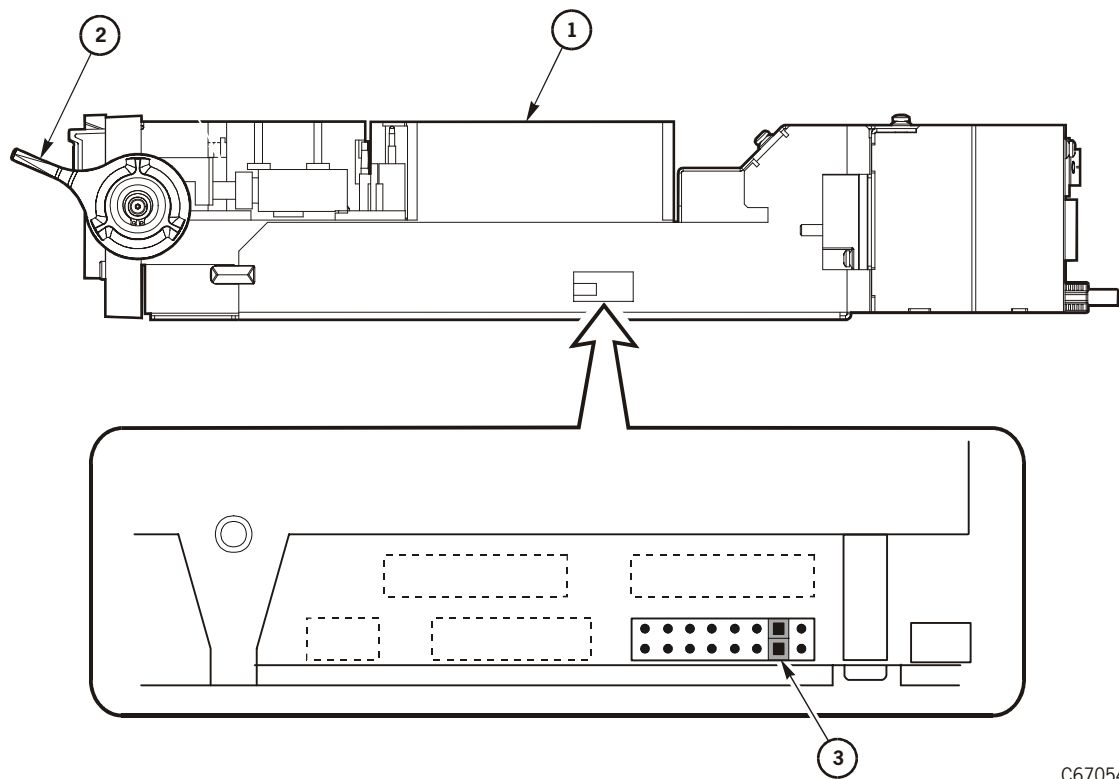
1. DLT drive
2. Load latch
3. TERMPWR jumper (enabled)

CAUTION:
Loss of data or degradation of performance: **StorageTek recommends that the devices at both ends of the bus supply terminating power. Industry standards advise that no more than three devices provide terminating power to the bus.**

6. 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 3-3.

    • TERMPWR OFF: Remove the jumper on the pins shown in Figure 3-3. Note: You can store the jumper by placing it on one pin only.

7. Carefully place the drive near the rear of the library.

8. Look inside the drive column area and determine which slot to use for the drive. See Figure 3-1 on page 3-3 for drive configuration rules.

CAUTION:
Potential bus error: **Do *not* connect the customer's SCSI bus cable to the library or to the drive bulkhead until after you have configured the library and the drives.**

9. Remove the drive's Y-cable and mounting screws from the drive box.

10. 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.

       See Figure 3-4 as you tilt the channel connector (with the jackscrew end at the bottom) into the slot next to the desired drive location.

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

    b. Work from the exterior of the drive bulkhead as you grasp the connector and thread the second jackscrew into the top of the connector.

    c. Make sure the connector aligns inside its slot and tightening both jackscrews with a 3/16-inch nut driver. Do not overtighten.

    d. Repeat Steps a through c for the second connector of the Y-cable.

    e. Apply the correct SCSI icon label to the bulkhead to identify the type of drive connection.

11. Remove and discard the drive slot cover. Note: To remove the cover, pull on the knob.

Figure 3-4. DLT Drive Cable Connections (C67056)

C67056
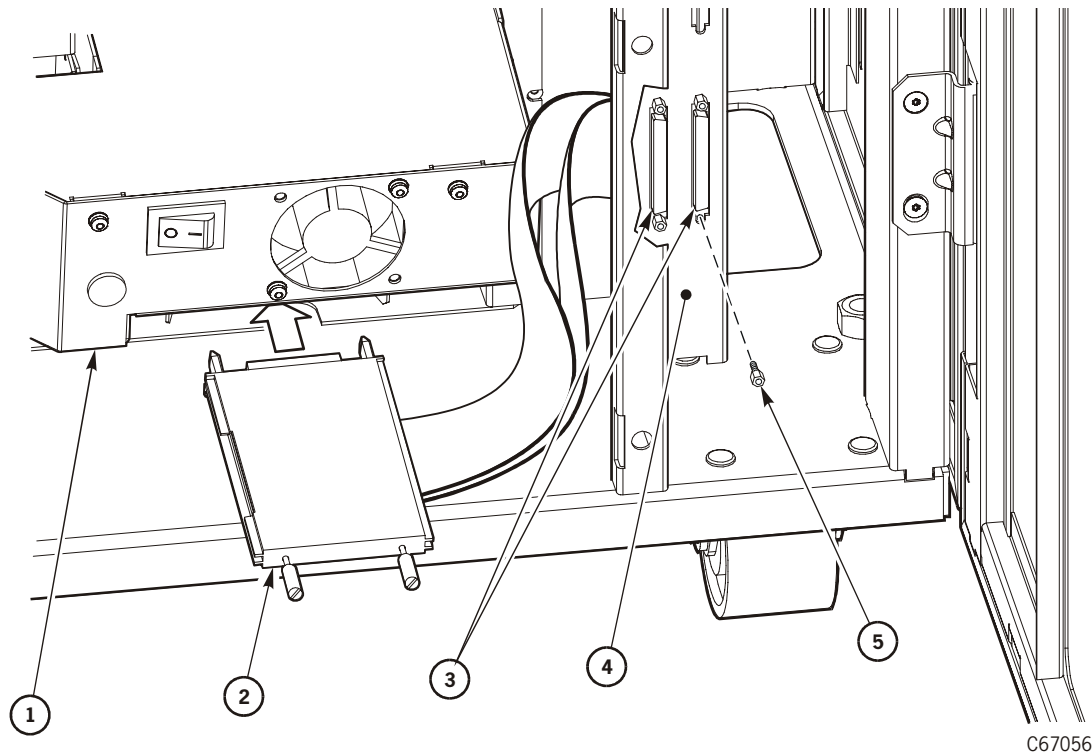
1. DLT Drive
2. SCSI connection at the drive (single end of drive Y-cable)
3. SCSI connection at the drive bulkhead (dual end of drive Y-cable)
4. Exterior of drive bulkhead
5. Jackscrew

CAUTION:
Connector damage: **Check the library drive connector and make sure it is not stuck in a locked position from the vibration during shipping. This connector provides power and library interface to the drive.**

12. Firmly grasp the drive at the rear with one hand and place the other hand under the drive tray.

13. Carefully guide the drive into its slot. Push it in as far as it will go and firmly seat the drive.

14. Turn the thumbscrew clockwise until it is secure, do not overtighten the thumbscrew

15. Connect the single end of the Y-cable to the SCSI connector on the rear of the drive.

16. Place the drive's power switch to the ON (|) position.

17. Install any other drives.

■ Installing LTO Drives

Figure 3-5 on page 3-9 shows the three models of LTO Ultrium drives for the library:

1. Hewlett-Packard (HP) LTO drive
2. IBM LTO
3. Seagate LTO drive

To unpack and install the drives:

1. Open the rear door by gently pulling on the finger slot.

2. Open the library's drive access door (inside the rear door):

3. Open the drive package.

4. Remove the packing material.

Note: Check with the customer for a maintenance agreement on the 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 returned to the factory.

5. Verify that the drive is LVD or HVD SCSI.

   Note: Remember that if the library is also to run on the same LVD bus, you must:

   • For MPC card, install the library CPCI interface kit with an MPW card attached, Conversion bill 101368

   • For MPCL cards, move the jumper at J16 to the LVD/SE position.

   Seagate drives will operate on either LVD or HVD interfaces, determined by the drive's part number (no adapter card required).

Note: If you have a Fibre Channel LTO drive, see the caution statement on page 3-11.

Figure 3-5. Ultrium Drives for HVD Operation (C67294)

HP   IBM   SEAGATE
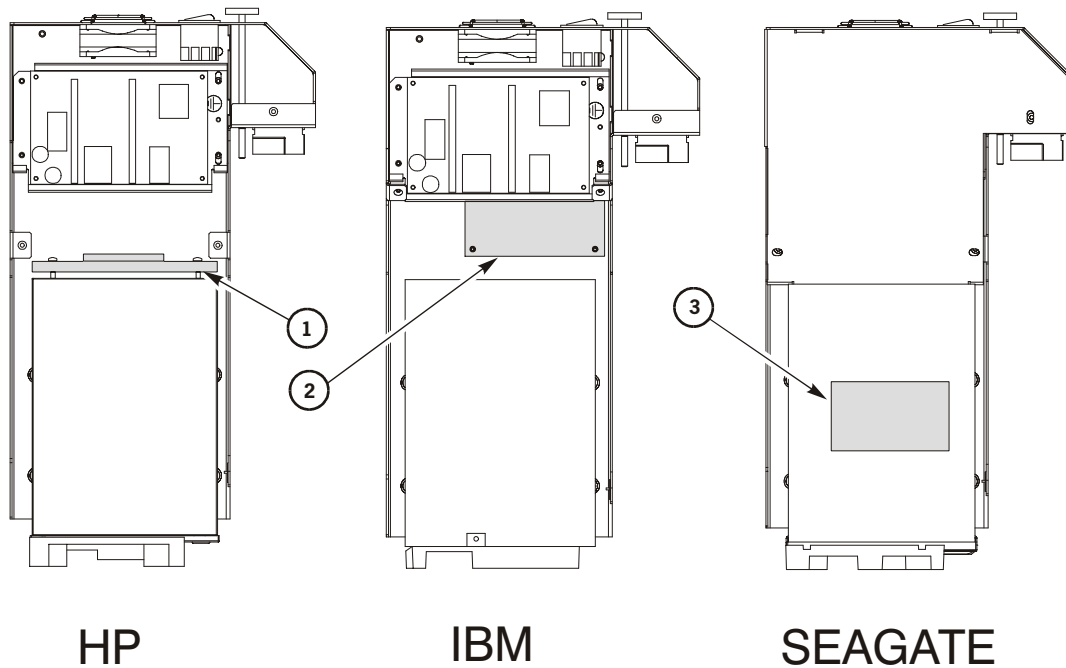
C67294

1. Converter card
2. Converter card
3. Seagate product label

6. To determine the SCSI type of the IBM or the HP LTO drive (the Seagate drive shows the SCSI type on a label on the unit):

a. Look for a label. If none exists:

b. Disengage the cover from the drive tray assembly by removing its three top screws and two side screws with a Torx T-15 bit.

c. Remove the cover.

d. Examine the tray area to the rear of the drive to determine if an LVD-to-HVD converter card is present.

Installing LTO Drives

7. Check the rear of the IBM or the Seagate LTO drive for the terminating power jumper selections.

Note: You *cannot* disable terminating power on the HP LTO drive.

To find the jumpers:

a. Remove three top screws and two side screws with a Torx T-15 bit from the cover from the drive tray assembly.

b. Remove the cover.

c. Examine the area next to the power connection on the rear of the drive.

Figure 3-6. Terminating Power—Seagate and IBM Ultrium Drives (C67295)
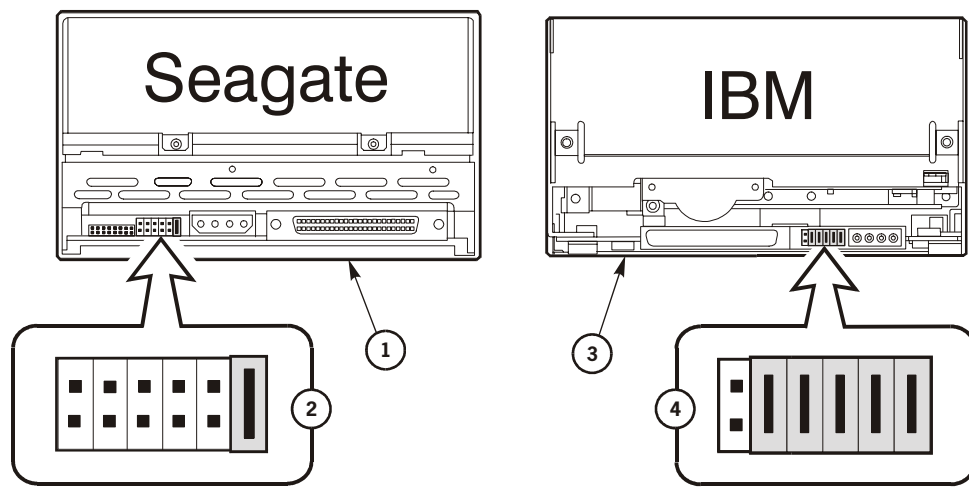
C67295

1. Seagate drive—shown with terminating power ON
2. IBM drive—shown with terminating power ON (The four jumpers - counting from right to left - are address jumpers that must be in place for library operation. Terminating power is the fifth jumper - counting from right to left)

Note: HP drive not shown. Terminating power is always ON and can not be changed.

CAUTION:
Loss of data or degradation of performance: **StorageTek recommends that the devices at both ends of the bus supply terminating power. Industry standards advise that no more than three devices provide terminating power to the bus.**

8. Verify whether TERMPWR for the drive is on or off (enabled or disabled) for each IBM LTO drive and Seagate LTO drive. If necessary, move the jumper to match the customer's requirement. Then replace the drive tray cover.

- TERMPWR On: Install the jumper on the pins as shown.
- TERMPWR Off: Remove the jumper from the pins shown.

9. Replace the drive tray cover.

CAUTION:
***Configuration problem*: Do not change any jumpers except for terminating power. The drive's SCSI address will be set at the library operator panel.**

***Connector damage*: Check the library drive connector and make sure it is not stuck in a locked position from the vibration during shipping. This connector provides power and library interface to the drive.**

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

10. Look inside the drive column area and determine which slot to use for the drive. See for drive configuration rules.

11. 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.

13. Turn the thumbscrew clockwise until it is secure, do not overtighten the thumbscrew

14. Connect the single end of the Y-cable to the SCSI connector on the rear of the drive.

15. Make sure to label the bulkhead with the appropriate SCSI icon.

16. Place the drive's power switch to the ON (|) position.

17. Install any other drives.

CAUTION:
***Potential equipment damage*: LTO drives now support a Fibre Channel interface (such as the IBM LTO drive). Make sure the cable clamp is installed on the fiber-optic cable to prevent it from breaking when you close the drive access door.**

StorageTek Proprietary

■ Installing T9x40 Tape Drives

Refer to the *T9x40 Tape Drive Installation Manual* to:

- Install T9x40 Tape Drives
- Install a maintenance switch for the Matrix application
- Obtain ESCON cables and installation instructions for the T9840B drives

Note: Before the new T9840 power supplies, it was physically impossible to install these tape drives in the wrong location. With the new power supplies; however, it *is* possible. Figure 3-7 shows the correct location to install T9840 drives.

Figure 3-7. T9840 Tape Drive Locations (C67365)
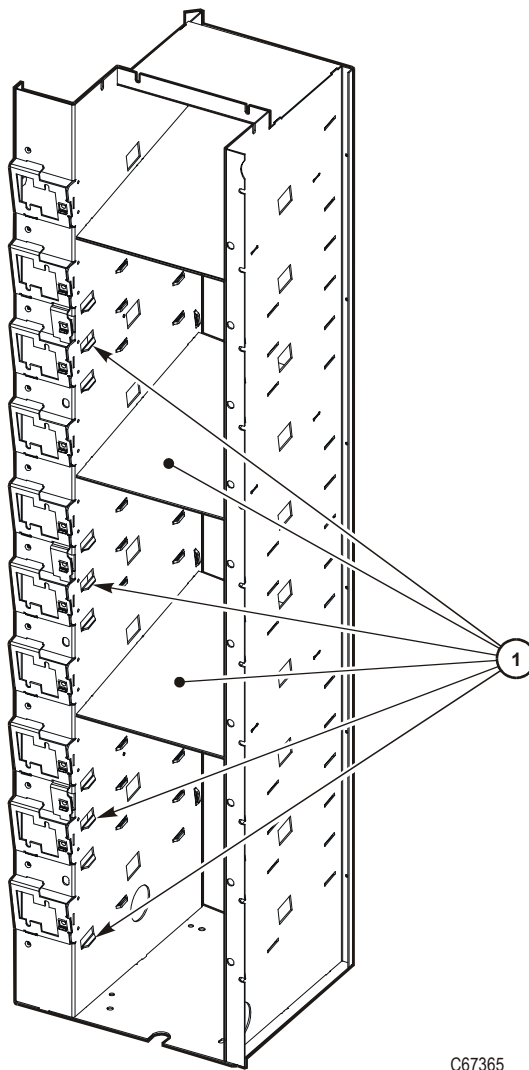
C67365

1. Tab and shelf locations for the T9840 Tape Drives.

Powering-On the Subsystem

4

This chapter contains the procedures for connecting the power cable and powering-on the library and tape drives.

CAUTION:
***Potential equipment damage*: Do not connect the library's power cable to the power source until you are told to do so in this manual. Make sure that the circuit breakers at the library power supply and for the power source are turned off.**

■ Power System

The library power system consists of:

- One or two AC power distribution units (PDUs)
- One or two DC power supplies that provide voltage to the library
- An *optional* uninterruptible power supply

AC Power Distribution Units

Each power distribution unit (PDU):

- Operates within 100 to 127 VAC or 200 to 240 VAC at 50/60 Hz
- Distributes AC voltage to a library DC power supply
- Protects the library from overcurrent by circuit breakers

The **standard** PDU supplies AC voltage to the robotics and drive column.

An **optional** PDU can supply power for redundancy.

Be aware that each PDU in a newer library supplies power to the robotics and *half* of the drives. So when the library has two PDUs (and a drive column with two power cords), connect each PDU to a separate, branch AC circuit.

If you are installing multiple drives in the library—and the library is a newer model with two power cords to the drive column—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 AC circuit, if one PDU loses power, then the customer still has some operational drives as well as operational library robotics.

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.

Note: If the library has the second, optional DC power supply, it must also have the optional PDU and a second power cord.

Uninterruptible Power Supply

An uninterruptible power supply (UPS) is an *optional* feature available from APC. The UPS is designed to help prevent blackouts, brownouts, sags, and surges in power. The UPS also helps filter out small disturbances and fluctuations in power until the voltage stabilizes.

Figure 4-1. Uninterruptible Power Supply (C67327)

C67327
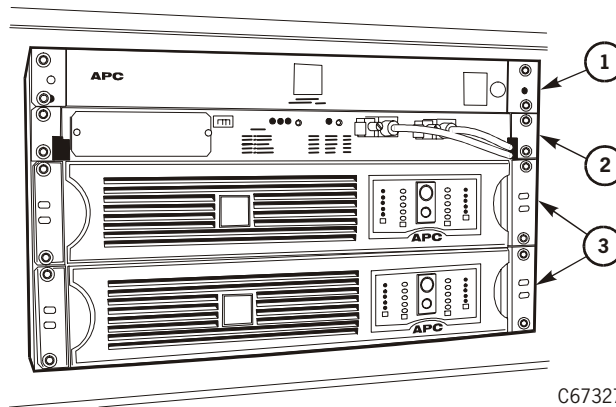
1. Power strip
2. Switch
3. Batteries

The optional UPS feature supplies power to the library and all other equipment connected to the power strip. If the library has this feature, follow the instructions in the conversion bill to connect the UPS to the customer's power supply and library components to the power strip.

Refer to the *L180 and L700 Tape Library Uninterruptible Power Supply Reference Manual* for additional information to install the UPS.

■ Drive Column Power

There are two drive-column power-cable configurations for the library:

- Single power cable
- Two power cables

To determine the type is present in a library, check the cables behind the PDU; single-power-cable models will have only one cable, and two-power-cable models will have connectors marked *PWR1* and *PWR2*.

Drive Column—Single Power Cable

If the library's drive column has only one power cable, then all of the drives will be on a single circuit.

If you install an optional power system in this type of library, the optional PDU will supply redundant power to the library robotics *only*.

Drive Column—Two Power Cables

Newer machines incorporate *two* power cables into the drive column. This enables more power configurations for the customer.

You can configure these newer models so that half of the drives are connected to one PDU, and the other half are connected to the other PDU.

Note: When installing drives in a library that has two PDUs and a two-power-cable drive column, attach each PDU to a separate branch circuit.

Drive Column Power Connections

If the library has *one* power cable running from the drive column, the plug for the column is connected at the rear of the standard PDU.

If there are *two* power cables running from the drive column, the plug labeled *PWR1* denotes the lower half of the drive column; *PWR2* denotes the upper half of the column. You may cross-couple the power plugs at the rear of the PDUs.

Note: StorageTek advises you to label which drives are connected to each PDU.

■ Connecting Power

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

CAUTION:
Potential equipment damage: **Make sure that the circuit breakers at the library power supply and for the power source are turned off.**

Figure 4-2. Library Power Supply, Cable, and Switch (C67065)
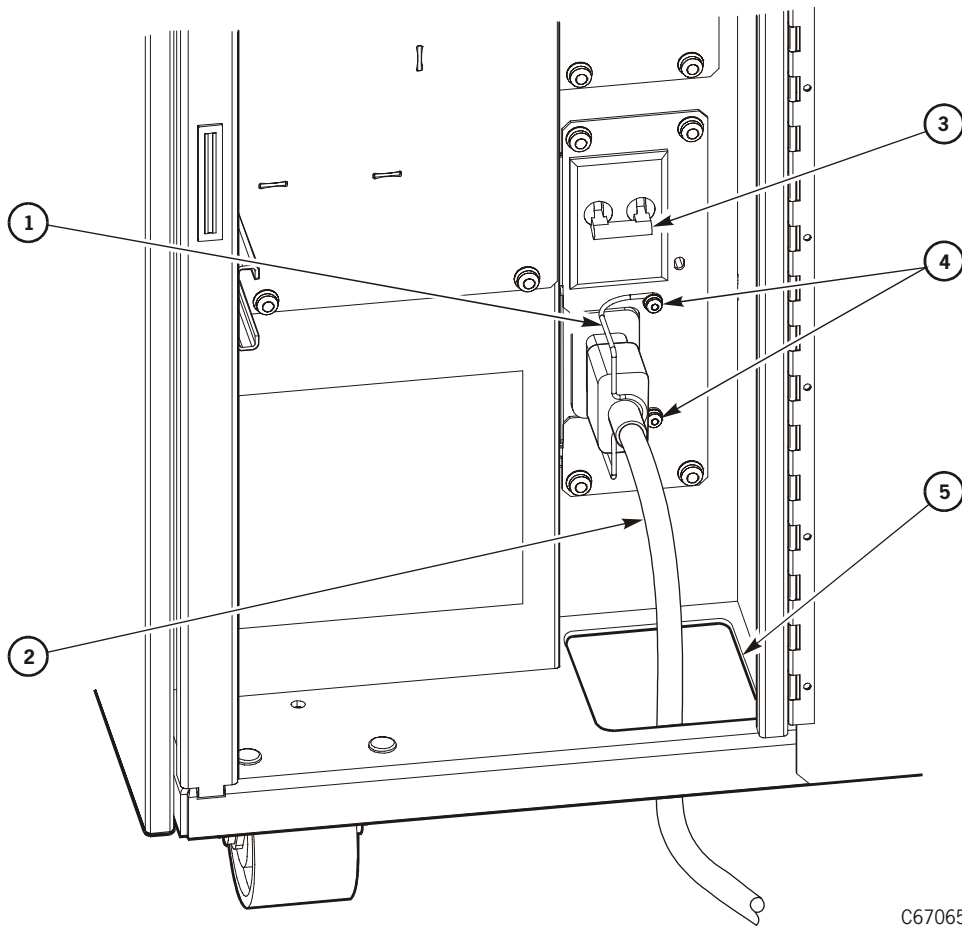
1. Strain relief
2. Power cable
3. Power switch
4. Strain relief screws (2)
5. Cable access hole

Routing the Power Cable

To route the power cable, see Figure 4-2 on page 4-4 and:

1. Make sure that the power source circuit breaker is turned off and that the library power switches are in the down (OFF) position.

2. Loosen the two screws (Torx 15) that hold the strain relief in place.

3. Insert the female connector through the hole in the library floor. Make sure the power cable is labeled with the 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 de courant 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 in 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.

Supplying Power

To connect the library to the power source:

1. Make sure that the male end of the cable is labeled with the library address and location.

2. Connect the power cable to the customers power receptacle.

3. Turn on the circuit breaker.

4. Make sure that the power switches for the drives are in the ON (|) position.

5. Close the drive access door.

6. Power-on the library by lifting up on the power switch. See Figure 4-2 on page 4-4 for the location of the power switch.

   The library will begin its initial program load (IPL) of the microcode and start the initialization sequence.

7. Close the rear door of the library.

■ Initialization Sequence

An initialization sequence occurs when the library powers-on or when you open and close the library's front door.

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

- 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. 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 microcode.

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 microcode.

Because there are three potential capacity variations for the library (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/MPCL 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 during initialization is the audit of the library.

Note: The audit process requires **five** minutes.

An audit is the process of checking each cell within a library. If a cell contains a tape, the camera reads the VOLSER label and transfers this data to the MPC/MPCL card, calculates the robotic position of the hand, and catalogs the location by:

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

If a user cell is empty, the location is recorded as "cell empty."

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/MPCL card.

Audit of Reserved Cells

After drive targeting, the robot audits the six cells of the reserved area, below the cartridge access port (CAP). Reserved cells are checked for cleaning cartridges (which will automatically configure the auto clean option) and for diagnostic test cartridges.

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.

Configuring the Subsystem

<div style="text-align: right">**5**</div>

This chapter describes how to configure the L180 Tape Library and its associated tape drives for operation.

Configuration data consists of library settings, client network connections, along with the number and types of tape drives. The library and its associated drives must be configured:

- During installation
- When the MPC/MPCL card is replaced
- When a drive is added to or removed from the library

Note: Microcode is factory-installed on all new machines and resides within a Flash PROM on the MPC/MPCL card. For new installations, a diskette or CD with current microcode is also provided. See Appendix B, "Loading Microcode" for instructions about how to download microcode if necessary.

Before starting the configuration procedure:

1. Read the sections describing the entries.

2. Determine your choices and write your configuration information in Table 5-1 on page 5-2 and Table 5-2 on page 5-3.

3. Make a copy of this information and keep it for future reference.

Table 5-1. Library Configurations

Configuration Option	Selection	
Library SCSI ID or Port 0 Address	❏ SCSI:	❏ F/C:
Library Capacity (Configured during IPL)	Number of slots:	
Fast Load	❏ Enabled	❏ Disabled
Auto Clean	❏ Enabled	❏ Disabled
Date and Time		
Library Name		
IP Address		
Network Gateway		
Subnet Mask		
DNS Configuration: Domain Name		
Primary Server		
Secondary Server		
Dynamic Worldwide Name (dWWN)		
DLT Cleaning Cartridge Warning Count		
9840 Cleaning Cartridge Warning Count		
LTO Cleaning Cartridge Warning Count		
Web Password		

Table 5-2. Tape Drive Configurations

Drive	Type	Interface	SCSI ID	On/Off Bus
0:		F/C ❏ SCSI ❏ ESCON ❏		
1:		F/C ❏ SCSI ❏ ESCON ❏		
2:		F/C ❏ SCSI ❏ ESCON ❏		
3:		F/C ❏ SCSI ❏ ESCON ❏		
4:		F/C ❏ SCSI ❏ ESCON ❏		
5:		F/C ❏ SCSI ❏ ESCON ❏		
6:		F/C ❏ SCSI ❏ ESCON ❏		
7:		F/C ❏ SCSI ❏ ESCON ❏		
8:		F/C ❏ SCSI ❏ ESCON ❏		
9:		F/C ❏ SCSI ❏ ESCON ❏		

When you see the Initial Status Sceen, you can start configuring the library and drives.

Figure 5-1. Initial Status Screen (C67314)

```
     STK L180 (Code VER X.XX.XX)
①──► CAP CLOSED

②──► LIBRARY ONLINE
③──► NO REMOTE USERS
            COLUMN 0
     00 BUSY
     01 BUSY
     02 ---
     03 LOADING
     04 EMPTY
④    05 EMPTY
     06 EMPTY
     07 ---
     08 ---
     09 ---
```

C67314
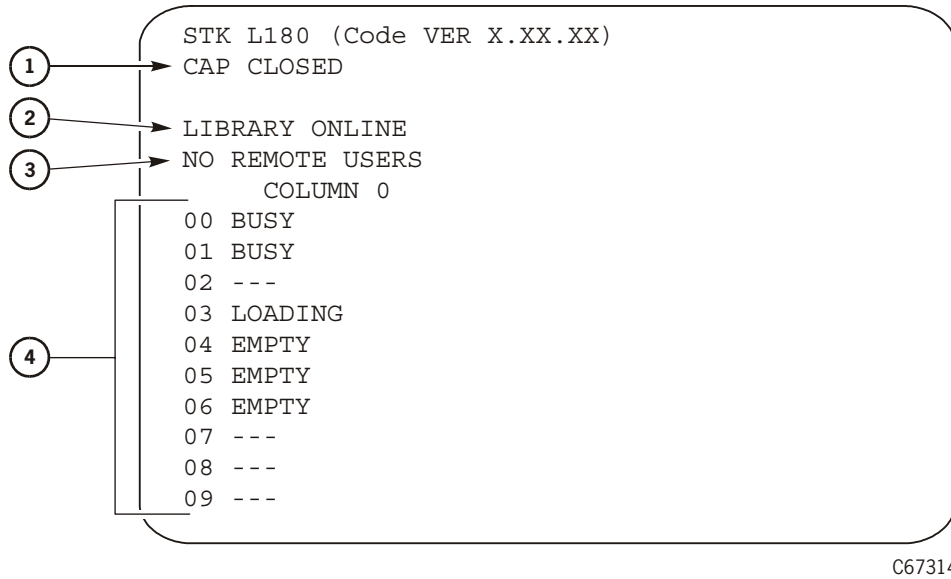
1. CAP status message
2. Library status message
3. Web Enabled indicates a Personality Module is present and Library Admin is enabled
4. Drive status messages

■ Entering Configuration Data

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

CAUTION:
***Potential system degradation:* Make sure that the library and associated drives are offline to the system before you start configuration.**

After you power-on or reset the library, the library performs an IPL. When the IPL is complete, the operator panel displays an initial status screen. Once you see this screen, you can begin entering configuration data through the operator's panel.

StorageTek recommends that you enter the configuration data in the following sequence (as presented in this manual):

1. Library configuration

2. Network configuration

3. Drive configuration

4. Display information (if necessary)

5. Cleaning cartridge warning count (if Auto Clean is enabled)

Operator Panel

Figure 5-2. Operator Panel Display, Buttons, and Indicators (C67080)

Eleventh Edition
StorageTek Proprietary
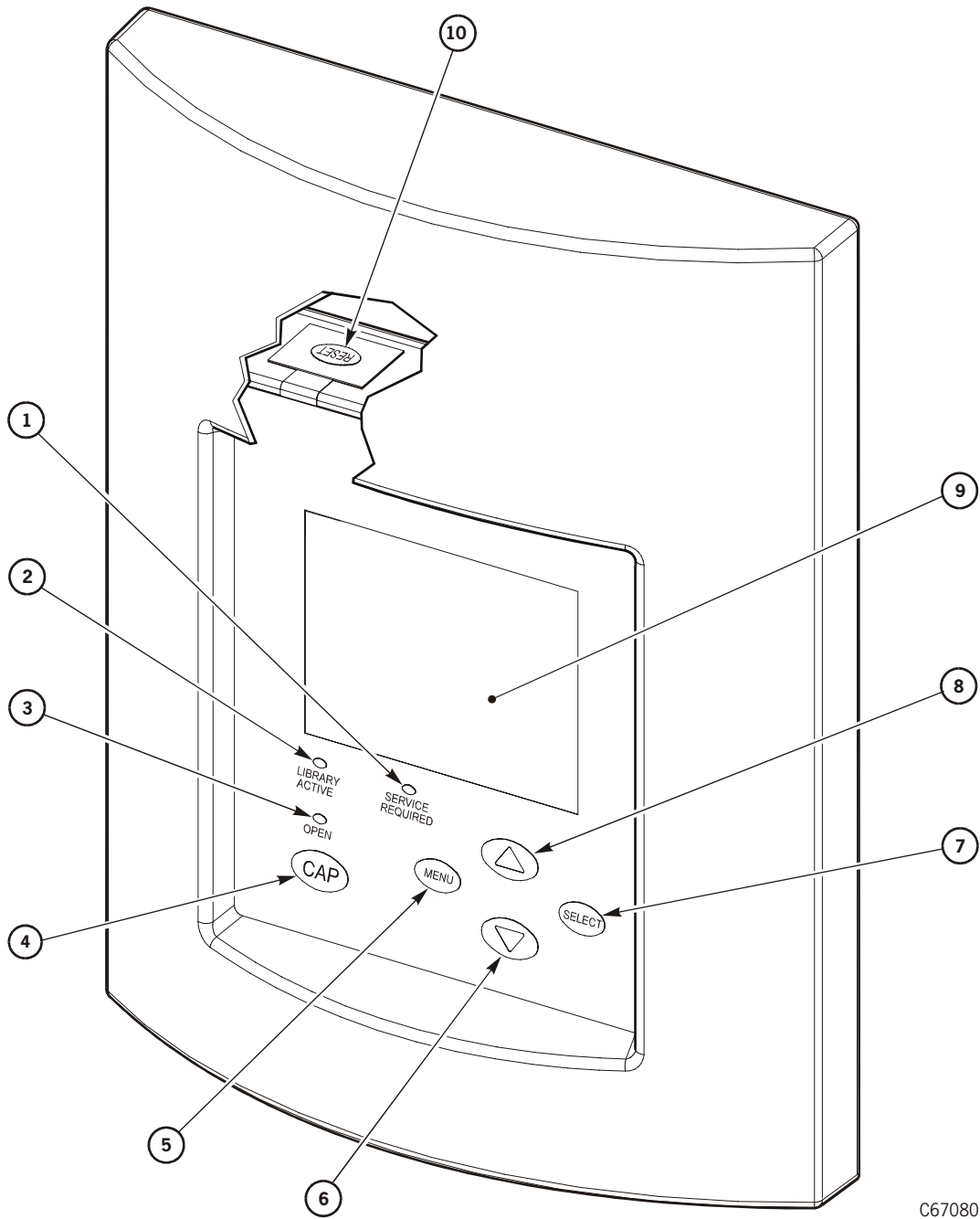
Figure 5-2. Operator Panel Display, Buttons, and Indicators (Continued) (C67080)

1. *Service Required* indicator is steadily red when human intervention is required and flashing when a fan has failed.
2. *Library Active* indicator flashes green when the library is operational.
3. *Open* indicator is steadily amber when the CAP door is open.
4. CAP button opens and closes the CAP.
5. MENU button
6. Down arrow moves the cursor down and decrements a value highlighted on the screen.
7. SELECT button selects an item, saves the currently highlighted value, and moves the cursor.
8. Up arrow moves the cursor up and increments a value highlighted on the screen.
9. Graphic display screen shows current information and errors, and allows you to input from menus.
10. RESET button starts an initial program load (IPL).

Main Menu

From the Initial Status screen, push the MENU button on the operator panel to see the Main Menu.

Figure 5-3. Main Menu

```
MAIN MENU:

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

Configuration Menu

Use the UP or DOWN arrows to select CONFIGURATION and then press the MENU button to select the Main Configuration Menu. This menu allows you to select the various configuration menus for the library, network and tape drives.

The cursor will line up with LIBRARY CONFIG.

Figure 5-4. Configuration Menu

```
MAIN CONFIGURATION MENU

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

Library Configuration

The Library Configuration Menu allows you to modify the library's configuration.

Figure 5-5. Library Configuration Menu

```
LIB CONFIG MENU:

LIB SCSI I/F
FAST LOAD: OFF
DATE: 04/01/2004
TIME: 23:59

AUTO CLEAN: OFF
USER CELLS: 84
```

Four entries complete the configuration choices for the library:

• SCSI ID below or Port 0 address
• Fast Load enabled/disabled
• Date
• Time

Library SCSI ID

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

Notes: When configuring the SCSI ID:

1. For a UNIX workstation, StorageTek recommends that you use a dedicated SCSI bus adapter:

    -   For wide adapters, you may assign identifiers from 0-14 for the library.
    -   For narrow adapters, the range of identifiers is 0-6.

2. If you choose to use the embedded system bus on the SPARC station, you should select IDs 6, 5, 2, or 0 for the library because the remaining targets are reserved for other Sun peripherals.

3. For IBM RISC System/6000 machines, available IDs on the 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 and includes the low voltage differential (LVD) or high voltage differential (HVD).

This value is automatically configured during IPL.

Setting the Library SCSI ID

If the control path for the library is SCSI, you must set a SCSI ID for the library.

To set this value:

1. From the Main Configuration Menu press the SELECT button.

   The Lib Config Menu will appear and the cursor will line up with `LIB SCSI I/F CONFIG`.

2. Press the SELECT button. The Lib SCSI I/F Config Menu will appear. This menu also displays the type of SCSI interface.

```
LIB SCSI I/F CONFIG MENU:

LIB SCSI I/F ID: 00

SCSI TYPE: LVD (or HVD)
```

3. Press the arrow buttons until the cursor underscores `SCSI ID`.

4. Press the SELECT button. The Set Lib SCSI ID Menu will appear.

5. Use the UP and DOWN arrows to change the ID.

6. When the ID is correct, press the SELECT button to save the changes. Press the MENU button to abort.

   • 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 configuration.

Port 0 Address

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

If you configure the library for **hard** addressing, you may input the Port 0 address yourself through the library's operator panel. 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.

Setting the Library Fibre Channel Port 0 Address

If the control path is Fibre Channel, you must set the port address.

To set this value:

1. From the Main Configuration Menu press the **SELECT** button. The Lib Config Menu will appear and the cursor will line up with `LIB FIBRE I/F CONFIG`.

2. Press the **SELECT** button. The Lib Fibre I/F Config Menu will appear.

   The cursor will line up with `PORT 0 CONFIGURATION`.

   ```
   LIB FIBRE I/F CONFIG MENU:

   LIBRARY WORLDWIDE ID:
   00.00.00.00.00.00.00.00

   PORT 0 WORLDWIDE ID:
   00.00.00.00.00.00.00.00

   PORT 0 CONFIGURATION
   ```

   Note: This menu also displays the Library and Port 0 Worldwide IDs. These two IDs are set at the factory and cannot be changed. Each ID is 64 bits and uses the IEEE registered format.

3. 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.

4. If you want the network software to set the library Port 0 address, you must set the `HARD ADDRESS` option to **DISABLED**:

   a. Press the arrow buttons until the cursor underscores `AUTO ADDRESS`.

   b. Press the **SELECT** button. The Port Hard Address Edit Menu will appear.

   c. Use the **UP** and **DOWN** arrows to select `DISABLED`.

   d. Press the **SELECT** button to save the selected option.

   Note: The default for the hard address option is `DISABLED`.

5. If you want to set the library Port 0 address, you must set the HARD ADDRESS option to **ENABLED** and enter a port address:

   a. Select ADDRESS from the Fibre Port 0 Configuration menu. The Port Address menu will appear.

   b. Use the UP and DOWN arrows to select a digit for each field in the three-field address. Permissible addresses are 000 through 125.

   c. Press the SELECT button to save the address.

• 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 configuration.

Fast Load Enabling/Disabling

Fast Load is an option that:

Enabled: The robot mounts a cartridge into a drive and then immediately performs its next task, not waiting for the tape drive to complete its loading cycle. (Enabled or On).

Disabled: The robot mounts a cartridge into a drive and waits at the drive until the tape is fully loaded before beginning its next task. (Disabled or Off).

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

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 arrows to select either ON or OFF.

4. When the screen displays your desired setting, press the SELECT button to save the changes. Press the MENU button to abort.

Date and Time

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

To set this value:

1. At the Lib Config Menu, press an arrow button to underscore:

   DATE or TIME

2. Press the **SELECT** button. An editing screen appears.

3. On the editing screen:

   - Use the **UP** and **DOWN** arrows to select a value for each field.
   - Use the **SELECT** button to move right to the next field.
   - Use the **MENU** button to move left to the previous field.

4. When the screen displays the desired setting: Press the **SELECT** button from the right-most field to save the changes. Press the **MENU** button from the left-most field to abort.

Auto Clean Enabled or Disabled

Auto Clean is an option that:

Enabled:	When a drive requires cleaning, the robot will retrieve a compatible cleaning cartridge from the reserved cell in the library and mount it into the drive. When the cartridge dismounts, the robot will return the cleaning cartridge to its cell location within the library. The MPC/MPCL card will keep track of usage and post an FSC in the log when the warning threshold has been reached.
Disabled:	When a drive requires cleaning, the operator must enter the compatible cleaning cartridge into the CAP, using the Clean Drive routine. The robot will retrieve the cartridge, mount the tape into the drive, and return the cartridge to the CAP when cleaning is complete. The operator must then remove the cleaning cartridge from the CAP and manually keep track of its usage.

Note: Make sure that the customer's software supports the Auto Clean option.

There are two ways to enable Auto Clean:

- Manually load valid cleaning cartridges into any of the 11 cells that are reserved for cleaning and diagnostic cartridges.

- Import valid cleaning cartridges into the reserved cell through the CAP.

The Auto Clean feature is automatically enabled if you load even one cleaning cartridge into the reserved cell area.

Library Capacity

Capacity is determined by the location of the theta stops and automatically configured during an IPL:

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

When Done

After you have completed the library configuration:

- If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, press RESET.

- If you have not changed the SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

- If you wish to set other configuration values, continue with "Network Configuration" on page 5-15.

Network Configuration

The Network Config Menu allows you to modify the library's network configuration and view the library's Ethernet address. The following screen shows one possible configuration.

Figure 5-6. Network Configuration Menu

```
NETWORK CONFIG MENU:
LIBRARY NAME:

_
IP ADDRESS:
 000.000.000.000
NETWORK GATEWAY:
 NOT SET
SUBNET MASK:
 000.000.000.000
DNS CONFIGURATION
DMN
SVR PRIMARY
SVR SECONDARY
DYNAMIC WORLDWIDE NAME
DHCP: DISABLED

ETHERNET ADDRESS:
00:10:4F:00:05:76
```

Notes:

- You might need to consult with the systems administrator for some information.

- See Appendix D, "SNMP" for information about how to configure and enable the library to support SNMP.

Use the same procedure to complete the library's *four* network entries:

1. At the Main Configuration Menu, press the down arrow to line up the cursor with NETWORK CONFIG.

2. At the Network Config Menu, press the **UP** and **DOWN** arrows to line the cursor up with each entry:

Entry	Description
LIBRARY NAME	The systems administrator might assign a library name that is mapped to the IP address. Do not enter a library name longer than 30 characters.
IP ADDRESS	For the customer to be able to use the L-Series Library Admin, you must set the IP address.
NETWORK GATEWAY	Entering this address is optional. It serves to indicate the gateway connection between subnets.
SUBNET MASK	The systems administrator might assign the library a subnet mask address if one is required.

3. Press the **SELECT** button. An editing screen appears.

4. On the editing screen:

   - Use the **UP** and **DOWN** arrows to select a value for each field.
   - Use the **SELECT** button to move right to the next field.
   - Use the **MENU** button to move left to the previous field.

5. After you have set the four network configurations, continue with "DNS Configuration" to complete the network entries for the library.

   Note: You only need to configure DNS if the SNMP agent is set to trap *named* recipients; if SNMP is set for *numbered* recipients, no entries are required.

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 is assigned by the system administrator.

IP Address

A four-byte Internet Protocol (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 **129.80.24.131**.

Note: The IP address must be set to use the L-Series Library Admin.

Simple Network Management Protocol

The L180 library supports Version 1 of the SNMP standard (SNMPv1). See Appendix D for more information about SNMP and how to enable it.

Subnet Netmask

The subnet mask is a four-byte notation (specified by the system administrator) to resolve routing within the customers intranet. This address allows the library to be accessible, through a subnet, on a large network. An example of a subnet mask entry is 255.255.254.0.

Web Password

If you are installing L-Series Library Admin, 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 using L-Series Library Admin. The Web password may be up to 30 characters.

Note: Contact StorageTek's Customer Support Services (CSS), the Customer Resource Center (CRC), or Product Support if you need to have the password reset.

DNS Configuration

The **first** entry you *must* make is the DMN (Domain Name) field.

1. Press the UP or DOWN arrows until the cursor underscores DMN.

2. Press the SELECT button. An editing screen appears.

3. On the editing screen:

   - Use the UP and DOWN arrows to select a value for each field.
   - Use the SELECT button to move right to the next field.
   - Use the MENU button to move left to the previous field.

4. Enter the main server's name, make sure to append**.**com at the end.

   • Press the SELECT button from the right-most field when the screen displays the desired setting to save the changes.

   • Press the MENU button from the left-most field to abort.

The **second** entry you *must* make is the Primary Server IP address.

1. Press the arrow button until the cursor underscores SVR Primary.

2. On the editing screen:

   - Use the UP and DOWN arrows to select a value for each field.
   - Use the SELECT button to move right to the next field.
   - Use the MENU button to move left to the previous field.

3. Press the **SELECT** button from the right-most field when the screen displays your desired setting to save the changes. Press the **MENU** button from the left-most field to abort.

The **third** entry you *may* make is the Secondary Server IP address. This assumes that your site has a secondary or backup server; if not, this entry is not required.

1. Press the arrow button until the cursor underscores SVR SECONDARY.

2. Follow the same procedure for configuring the Primary Server.

Viewing the Ethernet Address

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.

DNS Configuration

You must enter the Domain Name Service (DNS) configuration *only* if your Simplified Network Management Protocol (SNMP) agent is set to trap *named* recipients; if SNMP is set for *numbered* recipients, no entries are required.

Dynamic Worldwide Name

To correct re-configuration problems within a .customer's Fibre Channel network, 3.02 firmware includes the dynamic Worldwide Name (dWWN) enhancement. Previously, Fibre Channel devices contained fixed Worldwide names within the network. If a device (for example, a defective tape drive) required replacement, the new device was detected by the network as "unknown" and re-configuration of the network was required.

When enabled, dWWN assigns names to library drive *slots* rather than devices. When a drive is replaced, the new drive receives the same name as the one replaced, thereby eliminating the need for system re-configuration There are three Worldwide Names reserved for each drive: Node, Port A, and Port B.

Note: This feature requires corresponding drive code that supports the dynamic Worldwide Name feature as well. Currently, IBM LTO drive code 27Q1 is the only available supporting microcode. Microcode for other drives is in process and will be released with the next drive firmware versions.

With firmware version 3.04, you *cannot* mix dWWN-supported and non-dWWN supported drives when the dWWN feature is enabled on the library. In such a case, non-supported drives remain in the "configuring" state on the library operator panel.

Enabling dWWN

The dWWN feature (default set to OFF) is enabled through the CLI interface and, once enabled, the library must be IPLed.

CAUTION:
Changing the dWWN feature must be coordinated with the system administrator. The feature is usually enabled at installation time.

A record of the configuration should be kept; this is not only something that should always be done, but it absolutely essential with the dWWN feature to eliminate system issues in the case of an MPC/MPCL failure.

To enable dWWN:

1. Through the CLI interface, type in

   a. `wwn xxx.xxx.xxx.xxx`
      (where "xxx:xxx:xxx:xxx" equals the 12-digit serial number of the library—located on the agency approval sticker of the library). Be sure that each 3-digit group is separated by a colon.
      and press ENTER.

   b. Type in `wwn enable` and press ENTER.

2. IPL the library.

Dynamic Host Configuration Protocol

Dynamic Host Configuration Protocol (DHCP) is a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. With tape and tape automation, it is best that the library and tape drives keep the same (consistent) address. Currently set to `DISABLED`.

Ethernet Address

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

Library Worldwide ID

When a library has a Fibre Channel interface, the library's worldwide ID identifies the library as a node on the Fibre Channel network. 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. This is a four-byte address and must be specified by the system administrator.

When Done

After you have completed the network configuration:

- If you have not changed the library's network and DNS configuration and you are not setting other configuration values, press the MENU button until you exit all menus.

- If you have already changed the library's network configurations, SCSI ID or Port 0 address, and you are planning to exit the Main Configuration Menu at this time, press RESET.

- If you wish to set other configuration values, continue with .

Drive Entries

The Drive Configuration Menu allows you to modify portions of each drive's configuration. For each drive, the menu displays:

- Drive position
- Device type
- Interface type:
  - If the drive is SCSI, the display indicates the drive's SCSI ID and the bus relationship with the library (on bus or off bus).
  - If the drive is Fibre Channel, the menu displays FIBRE I/F.
  - If the drive is a T9840B with ESCON, the menu displays ESCON.

The panel displays 16 lines of data per menu. If your library contains more than eight drives, you must use the down arrow button to scroll to drives 08 and 09. The following screen shows one possible configuration.

Figure 5-7. Drive Configuration Menu

```
00 DLT7000_ID:01
        ON BUS: OFF
01 DLT8000_ID:02
        ON BUS: OFF
02 IBM_LTO_ID:03
        ON BUS: OFF
03 SGT_LTO_ID:04
        ON BUS: OFF
04 HP_LTO_ID: 05
        ON BUS: OFF
05 9840_FIBRE I/F

06 9840_FIBRE I/F

07 9840_ESCON
```

Eleventh Edition

SCSI Drive Entries

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.

CAUTION:
***System configuration problems:* When adding or replacing a SCSI drive, always check and, if necessary, configure the drive's SCSI ID at the library's operator panel.**

You set the drive SCSI IDs and bus status choices from the drive configuration menu and you can enter both values for each drive at the same time.

The format of the drive information appears in the following example:

```
00 DLT8000 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 during 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 is the drive type (DLT 8000 in this example). To the right of the drive type is the SCSI ID. On the next line is the drive's bus status.

These notes apply to configuring a T9840 SCSI drives:

- To configure a T9840 Tape Drive's SCSI ID and bus status from the library's operator panel, the drive must have version 1.24 or later. Check the drive's version, from the Main Menu.

- Configuring a T9840 Tape Drive might involve more than setting the drive's SCSI ID and bus status. Refer to the *T9840/T9940 Tape Drive Service Reference Manual* or *Installation Manual* for more information about the tape drive configuration options and instructions.

These notes apply to configuring LTO SCSI drives:

- LTO drives display as:
  - HP LTO for the Hewlett-Packard Ultrium drives
  - IBM LTO for the IBM Ultrium drives
  - SGT LTO for the Seagate Ultrium drives

- 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.

To configure SCSI tape drives:

1. 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.

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.

4. Use the **UP** and **DOWN** arrows 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 re-appear.

   Note: The new SCSI ID for the tape drive might not appear right away.

6. Press the **DOWN** arrow to get to the drive's second line of information (which is the drive's on bus status field).

7. Press the **SELECT** button. The Set Drive SCSI Bus Menu will appear.

8. Use the **UP** and **DOWN** arrows to change the bus status to `ON` or `OFF`.

9. When your choice is highlighted:

   - Press the **SELECT** button to save the changes.
   - Press the **MENU** button to abort.

   The drive configuration screen will reappear.

10. Continue these steps until all drives are configured.

Fibre Channel Drive Entries (LTO Only)

You may either set a hard Fibre Channel address of 0 for LTO drives or allow the address to be set automatically, through arbitration.

Note: Before you enter an LTO Fibre Channel address to 0, you must first set the drive's Fibre Channel hard address option to *enabled*.

If you configure the drive for soft addressing, you allow the network to configure the address. To do this, you must set the Fibre Channel hard address option to *disabled*. The default for this option is *disabled*.

To set this value:

1. Press the arrow buttons to scroll to the drive you wish to configure and press the **SELECT** button. The screen will allow you to select hard addressing to `enabled` or `disabled`.

2. Press the **UP** and **DOWN** arrows to line up with your choice.

3. Press **SELECT** and:

- If you select `enabled`, the hard address will be set to 0.
- If you select `disabled`, the address will arbitrate through the channel.

4. When your choice is highlighted:

   • Press the **SELECT** button to save the changes.
   • Press the **MENU** button to abort.

5. Continue these steps until all drives are configured.

Fibre Channel Drive Entries (T9840)

To configure a T9840 drive:

1. The drive must have firmware version 1.24 or higher. Check the drive's firmware version, by selecting `DRIVE INFO` from the Main Menu.

Figure 5-8. Drive Information Menu

```
DRIVE INFORMATION MENU:

VENDOR: STK
TYPE: 9840
STATUS: 00 EMPTY

SERIAL NUMBER:
  XXXXXXXXX

INTERFACE TYPE:
  FIBRE I/F

CODE VERSION:
  x.xx
```

2. Refer to the *T9840/T9940 Tape Drive Installation* or *Service Reference Manual* for information about T9840/T9940 drive configuration options and instructions.

Drive Configurations

After you have completed the drive configuration:

• If you have already configured the library's SCSI ID or Port 0 address, network entries, and you are planning to exit the Main Configuration Menu, press the **RESET** button.

• If you have not changed the library's configuration and you are not setting other configuration values, press the **MENU** button until you exit all menus.

• If you wish to set other configuration values, continue with "Display Information" on page 5-25.

Reporting SCSI Drive Information

Before you configure a drive, take note of its SCSI system address and whether it is "on bus" or "off bus." Record this information in Table 5-2 on page 5-3.

The first column in the table lists the logical drive number assigned to each drive. The library assigns this number during an IPL. The uppermost drive within the drive column is designated as "0," the next is "1," and so forth.

Note: 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 interface path (on bus) as the library or on a separate bus (off bus).

Display Information

Figure 5-9 shows an *example* of the display information screen. The Display Information Menu allows you to adjust the contrast and backlight on the display screen. These screen characteristics are saved in non-volatile memory.

Figure 5-9. Display Information Menu

```
DISPLAY INFO MENU:

CONTRAST: 09
  DEFAULT = 16

BACKLIGHT: 128
   DEFAULT = 128

RESTORE DEFAULTS

MENU TO EXIT
```

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

1. At the Main Configuration Menu, press the **UP** or **DOWN** arrows 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** arrows to change the 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. Press the **MENU** button to abort.

• If you have already configured the library, network, and tape drives, and are planning to exit the Main Configuration Menu, press the **RESET** button.

• If you have not changed the library's configuration, you may exit the configuration menu to do other tasks.
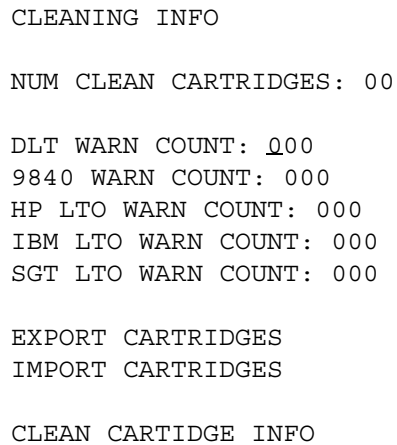
CAUTION:
Lost data: **You must press the RESET button for the configuration changes to take effect. If you try to exit the Main Configuration Menu, a message will appear requesting that you reset the library.**

■ Cleaning Cartridge Warning Count

Figure 5-10 shows an *example* of the cleaning information screen. If the customer has enabled the Auto Clean feature, use the operator panel to set the maximum number of times a cleaning cartridge can be used. This menu also lets you check the number of times a cleaning cartridge has been used.

Figure 5-10. Cleaning Information Menu

```
CLEANING INFO

NUM CLEAN CARTRIDGES: 00

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

EXPORT CARTRIDGES
IMPORT CARTRIDGES

CLEAN CARTIDGE INFO
```

After a predetermined count, a cleaning cartridge must be replaced and disposed of at the site. If Auto Clean is enabled, use the operator panel to set the warning count of a cleaning cartridge.

The warning count should be set *lower* than the cartridge's recommended usage (or maximum warning count displayed on the operator panel). This

setting will allow time to obtain a replacement cleaning cartridge. For example, if the maximum warning count equals 20 uses, you may want to set the warning count to 17 (or other, lower number).

Advise customers to always replace a used cleaning cartridge with a new, unused cleaning cartridge.

Note: You should periodically check the status of the cleaning cartridges.

To set the cleaning cartridge warning count:

1. Press the **MENU** button on the operator panel. The main menu screen will appear.

2. Press the arrow button until the cursor lines up with CLEANING INFO.

3. Press the **SELECT** button.

    The CLEANING INFO screen will appear. It displays the number of cleaning cartridges in the reserved area.

4. Press an arrow button until the cursor is at the appropriate cleaning cartridge's WARNING COUNT.

5. Press the **SELECT** button for your choice.

    An editing screen will appear. The editing screen will display the current setting for the cartridge warning count. The maximum warning count is shown below the current setting.

    The warning count should never exceed the maximum warning count displayed on the operator panel.

6. Press the arrow buttons to change the warning count.

7. Press the **SELECT** button to save the changes.
    Press the **MENU** button to abort.

8. Press the **MENU** button to return to the library status screen.

■ StorageTek's L-Series Library Admin

Before the customer can use the L-Series Library Admin 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 L-Series Library Admin 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 L-Series Library Admin. See Appendix C, "Library Admin" for Library Admin information.

■ Installing a Personality Module

If you are planning to use the L-Series Library Admin, install its personality module and other components according to the documentation included in the monitor shipping package. Consult this documentation for instructions about how to set required configuration data.

■ Setting the Password

If your library has StorageTek's L-Series Library Administrator installed or the customer is using a network manager application, you must set a Web password at the operator panel. For additional instructions about how to set this value, see the documentation that is shipped with the software.

Note: Contact Product Support if you need to reset the password.

■ 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.

Preparing the Subsystem

<div style="text-align:right">6</div>

This chapter describes how to place cartridges into the library and how to check the subsystem before placing the library into operation.

■ Installing Diagnostic and Cleaning Cartridges

You must place diagnostic cartridges in the library before operation. If the customer wishes to enable the Auto Clean function, you also need to place cleaning cartridges in the library.

CAUTION:
Potential system degradation: **Make sure the customer's software supports the Auto Clean option. Auto Clean is automatically configured when at least one cleaning cartridge is placed in the reserved area and the library is reset.**

Labeling the Cartridges

show the correct placement of labels for cartridges.

CAUTION:
Potential equipment damage: **Use only the drive manufacturer's cleaning cartridge to clean an LTO drive.**

To apply the diagnostic and cleaning labels:

1. From the drive installation kit, obtain the cartridge label sheets:

   - PN 313667301 for DLT, SDLT, and LTO cartridges
   - PN 313667201 for T9840 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. Attach a CLN label to all applicable cleaning cartridges.

5. Attach a DG label to all diagnostic tape cartridges.

Note: Make sure that T9840 cleaning cartridges have a "U" on their label and the diagnostic cartridges have an "R" on their label.

DLT Cartridges and Labels

The DLTtape III, IIIXT, and IV data cartridges are designed exclusively for use with the DLT 4000, DLT 7000, and DLT 8000 tape drives. The native capacity for these drives are:

- 20 GB on DLT 4000
- 35 GB on DLT 7000
- 40 GB on DLT 8000

Super DLTtape uses state of the art Advanced Metal Particle (AMP) technology to dramatically increase media capacity. The basic design, write protection switch, and label positions are unchanged from the DLTtape IV cartridges. The native capacity for a Super DLTtape is:

- 100 GB on SDLT

Figure 6-1 shows examples of these DLTtapes:

Figure 6-1. DLTtape Cartridges (C67028)

C67028
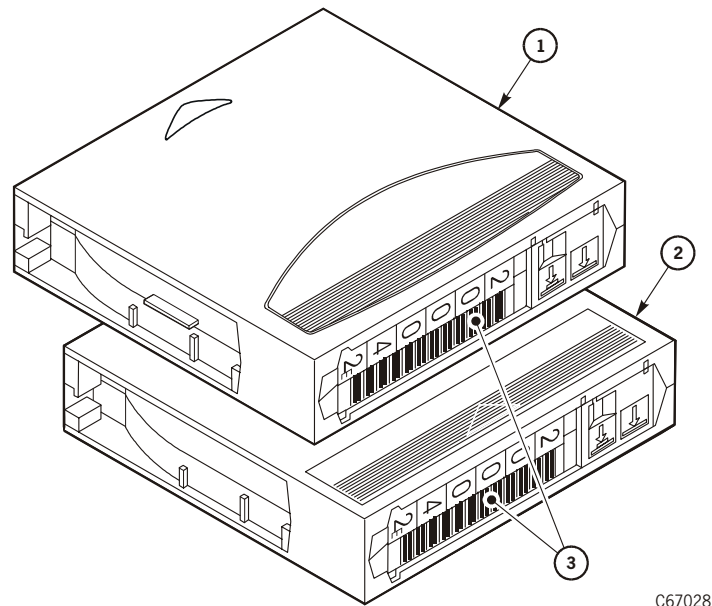
1. Super DLT cartridge
2. DLTape IV cartridge
3. VOLSER labels

LTO Cartridges and Labels

The advantage of the LTO specification is that any LTO data cartridge can work in any LTO tape drive; however, use only the drive manufacturer's cleaning cartridge to clean an LTO drive.

The Ultrium tape format is an implementation of the LTO (Linear Tape-Open) technology that is optimized for high capacity and performance with exceptional reliability in either a stand-alone or an automated environment. LTO Ultrium tapes use a single reel cartridge to maximize capacity that makes them ideal for backup, restore, and archive applications.

The LTO cartridge tape supports a wide range of applications with four different cartridge capacities (10, 30, 50, and 100 GB).

Note: Only the 100GB capacity is currently available from StorageTek.

Figure 6-2 shows the LTO Ultrium data cartridge.

Figure 6-2. LTO Cartridge (C67290)
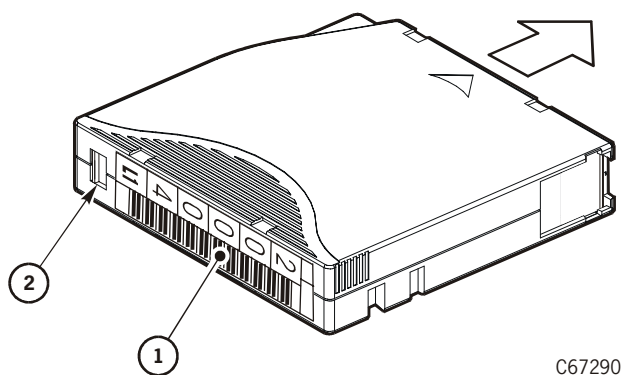
1. VOLSER label
2. Write protect switch

Table 6-1. LTO Cartridge Tape Unique Labels

Label	Type of Cartridge
Lx	Data cartridge
C$_1$ plus CLN	Cleaning cartridge for Hewlett Packard*
C$_2$ plus CLN	Cleaning cartridge for IBM*
C$_3$ plus CLN	Cleaning cartridge for Seagate*
CU plus CLN	Universal cleaning cartridge
L$_1$ plus DG	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for diagnostic tests)

Note: Each Ultrium drive has its unique cleaning cartridge.

Installing Diagnostic and Cleaning Cartridges

StorageTek T9840 Cartridges and Labels

The T9840 Tape Drives use a T9840 half-inch cartridge tape.

These tapes achieve fast access by having both the supply and take-up reels in the cartridge and performs a midpoint load.

Notes:
The media identification labels for T9840 cartridge tapes have unique letters:
- R = Standard and VolSafe data cartridge tape
- U = Cleaning cartridge

Figure 6-3 shows a cartridge:

Figure 6-3. T9840 Cartridge (C67069)

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

Locating Reserved Cells

Figure 1-6 on page 1-7 shows the location of the "reserved cell" area, which is a six-cell array below the CAP.

CAUTION:
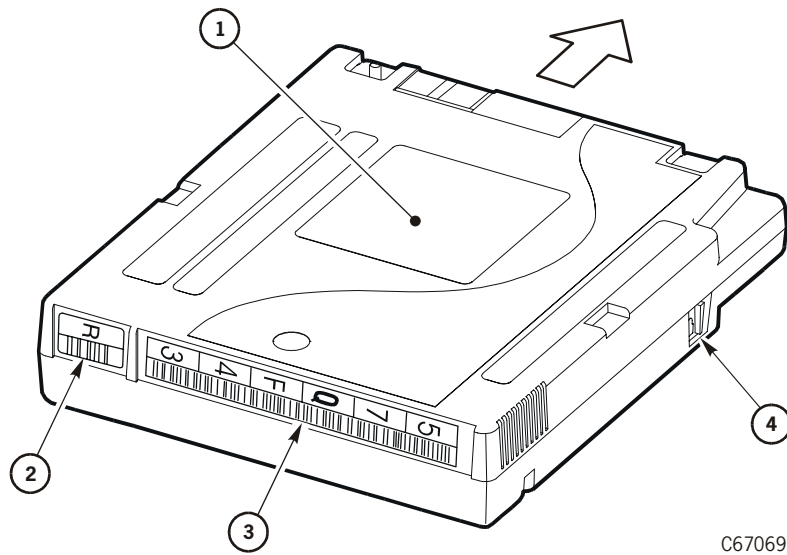***Swap cell*: Do *not* place any cartridges into the top cell. This is the swap cell and it is reserved for in-transit cartridges.**

The swap has two functions:

- It allows the robot to swap tapes within the library.

- It is used as a temporary holding place if the library loses power and the robot has a cartridge in hand.

The cells below the swap cell are reserved for cleaning and/or diagnostic cartridges. You may place any type of cleaning or diagnostic cartridge into any of these other 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.

2. Make sure that the swap cell (top-most reserved cell) is empty.

3. Place the cleaning and diagnostic cartridges into any of the other five cells. See Figure 6-6 on page 6-14 if you are unsure about how to orient tapes within cells.

Cleaning and Diagnostic Cartridge Starter Kits

StorageTek offers cleaning and diagnostic cartridge starter kits that contain one diagnostic and one cleaning cartridge with labels for each drive type; these are listed in Table 6-2.

Table 6-2. Cleaning and Diagnostic Cartridge Starter Kits

Tape Drive	Kit
T9840	313688601
DLT	313688001
SDLT 220	313688101
HP LTO Ultrium Vertical Labels	313688301
IBM LTO Ultrium Vertical Labels	313688501
Seagate LTO Ultrium Vertical Labels	313688401

See Table 6-3 on page 6-6 for more information about cartridges and labels.

Cartridge and Label Part Numbers

The information in Table 6-3 is supplied for StorageTek service representatives internal use only. See "Ordering Cartridge Tapes and Labels" on page 6-16 if the customer wants to order cartridges and labels or needs additional information.

Table 6-3. Cartridge and Label Part Numbers

Description	Cartridges	Labels		20 Tape Starter Kit
		Vertical	Horizontal	
Data Cartridges:				
DLTtape III	313126102	313126502		
DLTtape IIIXT	313126201	313126601		
DLTtape IV	313126301	313126702		313711501
Super DLT	100099701	309898101		313723301
LTO Ultrium HP Branded	100098701	313672202		313689101
LTO Ultrium Fuji	100098901	313672101	313700501	313689201 (vertical)
LTO Ultrium Maxell	100099101			313684001 (horizontal)
Cleaning Cartridges:				
DLT	313126401	313126902		
Super DLT	100098401	313744801		
HP LTO Ultrium	100098801	313671701	313699901	
IBM LTO Ultrium	100099801	313671901	313700001	
Seagate LTO Ultrium	100099201	313672001	313700101	
T9840 (5 pack)	310324601	313667201		
Diagnostic Cartridges:				
DLT	313126301	313126802		
Super DLT	100099701	313712501		
HP LTO Ultrium	100098901	313672901	313700601	
IBM LTO Ultrium	100098901	313672901	313700601	
Seagate LTO Ultrium	100098901	313672901	313700601	
T9840	310319401	313667201		
Note: For T9840 cartridges, check the drive documentation				

Eleventh Edition
StorageTek Proprietary

■ Preparing DLT Drives

Figure 6-4 shows examples of the DLT drive for procedures in the following paragraphs.

Figure 6-4. Mounting and Dismounting Cartridges from DLT Drives   (C67079)
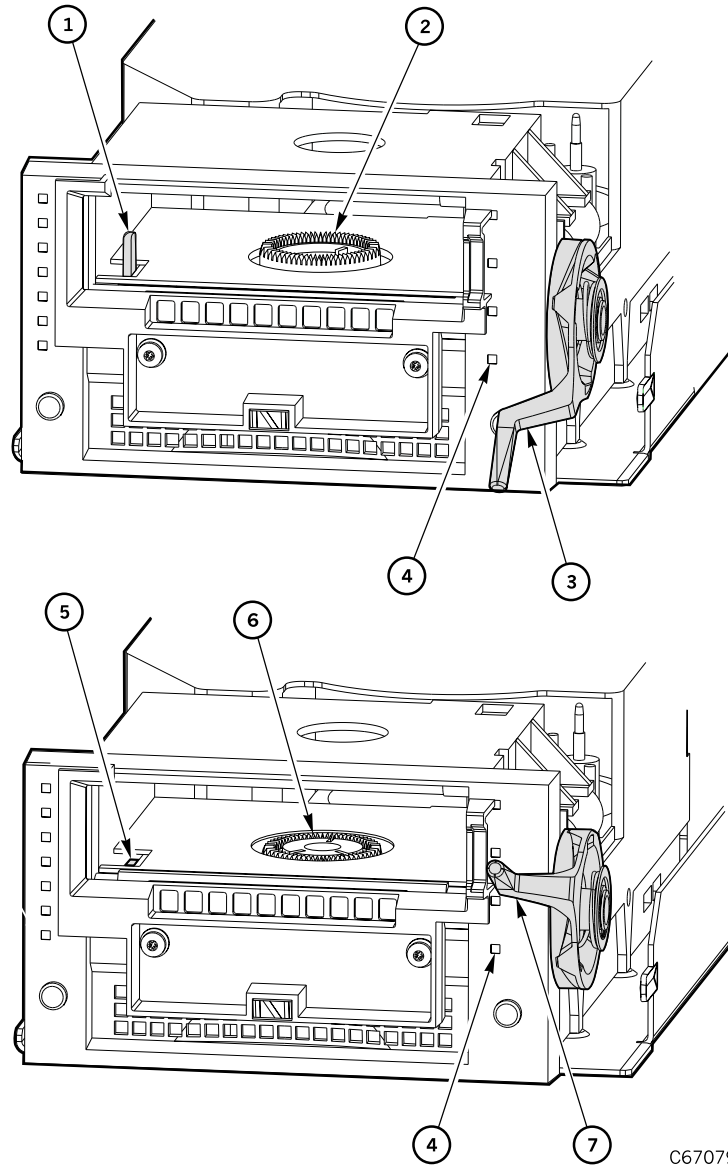
1. Cartridge hook (UP)	5. Cartridge hook (DOWN)
2. Hub (UP)	6. Hub (DOWN)
3. Handle (DOWN)	7. Handle (UP)
4. Operate handle indicator	

Eleventh Edition

StorageTek Proprietary

Mounting Cartridges to DLT Drives

See for the following procedures.

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

To mount a cartridge into a DLT drive:

1. Make sure that the DLT handle is up and the *Operate Handle* indicator is lit.

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.

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.**

2. 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.

3. Insert the cartridge into the drive and push the cartridge into the back of the drive until it is firmly seated.

4. Lower the drive handle.

Dismounting Cartridges from DLT Drives

To dismount a cartridge from a DLT drive:

1. Press the Unload button on the drive.

2. Wait (about 12 seconds) for the *Operate Handle* indicator to remain lit.

3. 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.**

4. Gently pull the cartridge from the drive.

■ Preparing LTO Drives

Check the documentation from the specific drive's manufacturer to ensure that it does not require any special pre-installation preparation.

The procedures in the following paragraphs describe how you manually load and unload LTO drives.

Figure 6-5. Mounting a Cartridge into an LTO Drive (C67317)
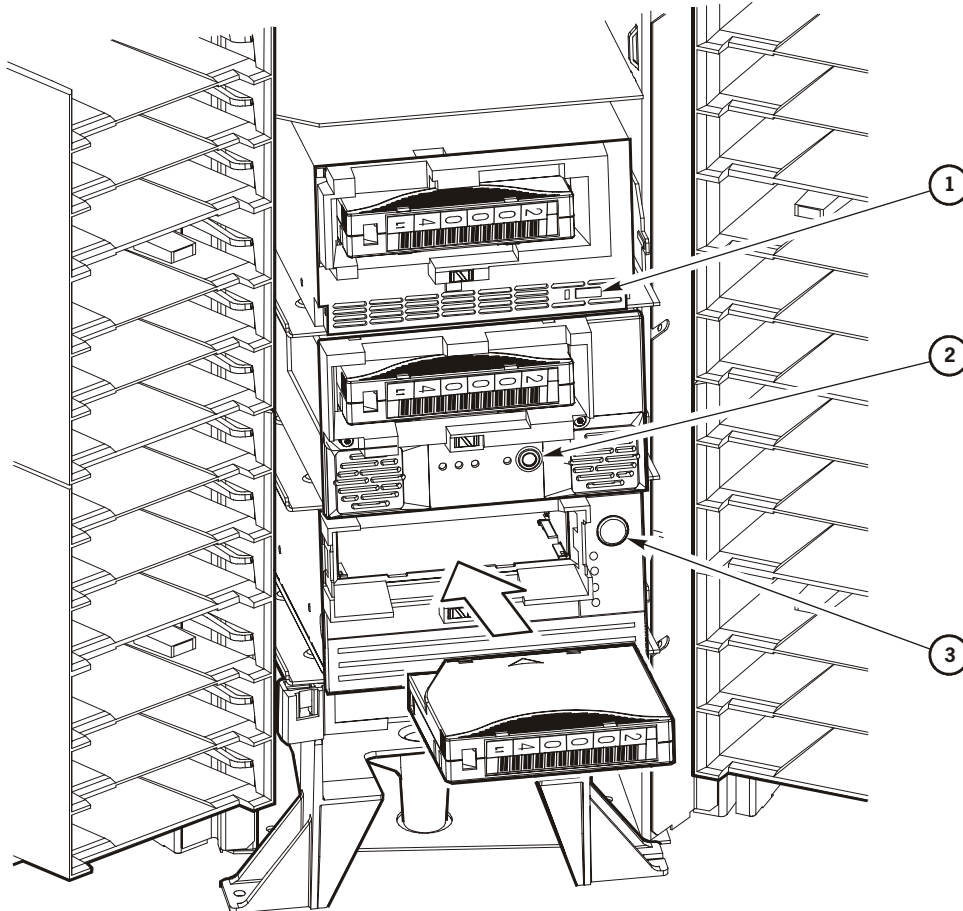
C67317

1. Cartridge dismount button on the IBM drive
2. Cartridge dismount button on the Seagate drive
3. Cartridge dismount button on the HP drive

Eleventh Edition

StorageTek Proprietary

Mounting a Cartridge to an LTO Drive

To mount a cartridge to an LTO drive:

1. Locate a cartridge.

2. Insert the cartridge into the LTO drive using the direction shown in Figure 6-5 on page 6-9.

3. Wait for the indicator on the front panel of the drive to stop blinking.

Dismounting a Cartridge from an LTO Drive

To dismount a cartridge from an LTO drive:

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

Note: Do not hold down the button.

One of the following conditions can occur:

- After the tape rewinds, the cartridge ejects from the LTO drive. Remove the cartridge from the LTO drive.

- The cartridge fails to eject after the tape rewinds. Refer to the drive manufacturer's documentation to correct this condition.

5. Gently pull the cartridge out from the drive.

■ Preparing T9840 Drives

Instructions for preparing the T9840 Tape Drives appear in the *T9840/T9940 Tape Drive Installation Manual*.

■ Testing the Subsystem

Before placing the library 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.

You also may run diagnostic tests from a laptop computer connected to either the SER1 port or CSE port on the electronics module. The laptop baud setting for the SER1 port is 38400 and for the CSE port 9600 (initially).

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

2. Make sure that there is a diagnostic cartridge in the reserved area.

3. From the status screen, press the **MENU** button on the operator panel. The Main Menu will appear.

4. Press the arrow buttons until the cursor highlights DIAGNOSTICS.

5. Press the **SELECT** button. The Main Diagnostics Menu will appear.

6. Press the arrow buttons until the cursor highlights GET-PUT LOOP.

7. Press the **SELECT** button. The Get-Put Mode screen will appear.

8. Use the up and down arrow buttons to set the number of times you want the test to run.

9. Press the **SELECT** button.

   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.

10. 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.

Note: If you are already at the main diagnostics menu, skip to Step 6.

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

2. Make sure that there is a diagnostic cartridge in the reserved area.

3. From the status screen, press the MENU button on the operator panel. The Main Menu will appear.

4. Press the arrow buttons until the cursor highlights DIAGNOSTICS.

5. Press the SELECT button. The Main Diagnostic Menu will appear.

6. Press the arrow buttons until the cursor highlights DRIVE DIAGNOSTICS.

7. Press the SELECT button. The list of available drives will appear.

8. Use the arrow buttons to move the cursor to the drive you wish to test.

9. Press the SELECT button. A list of drive diagnostic tests will appear.

10. Press the arrow buttons to highlight MOUNT/DISMOUNT LOOP.

11. Press the SELECT button. An editing screen will appear.

12. Use the up and down arrow buttons to set the number of times you want the test to run.

13. Press the SELECT button.

    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.

14. 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 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. Make 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.

Run Drive Check   This test will determine whether the specified drive is functioning. At the time of publication, the only drives that support this test are the DLT 8000 and the T9840. (The T9840 must be running code version 1.28 or later.)

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

■ Inserting Data Cartridges

When the diagnostic tests have completed, the customer may load data cartridges into the library as shown in Figure 6-6 and Figure 6-7.
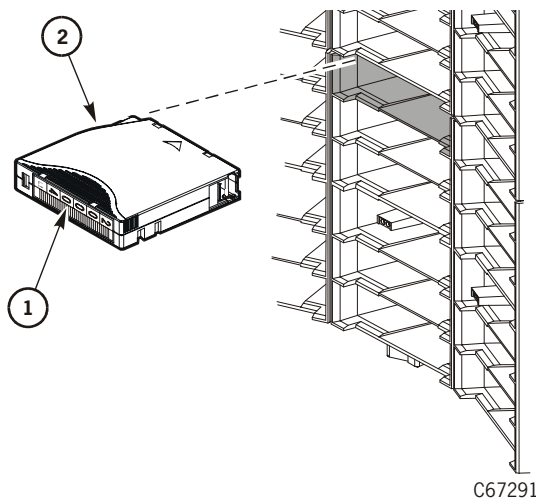
Note: The most efficient way to load a great quantity of cartridges into the library is to insert them manually into the storage cells.

Figure 6-6. Placing DLT and T9840 Cartridges into Array Cells (C67072)
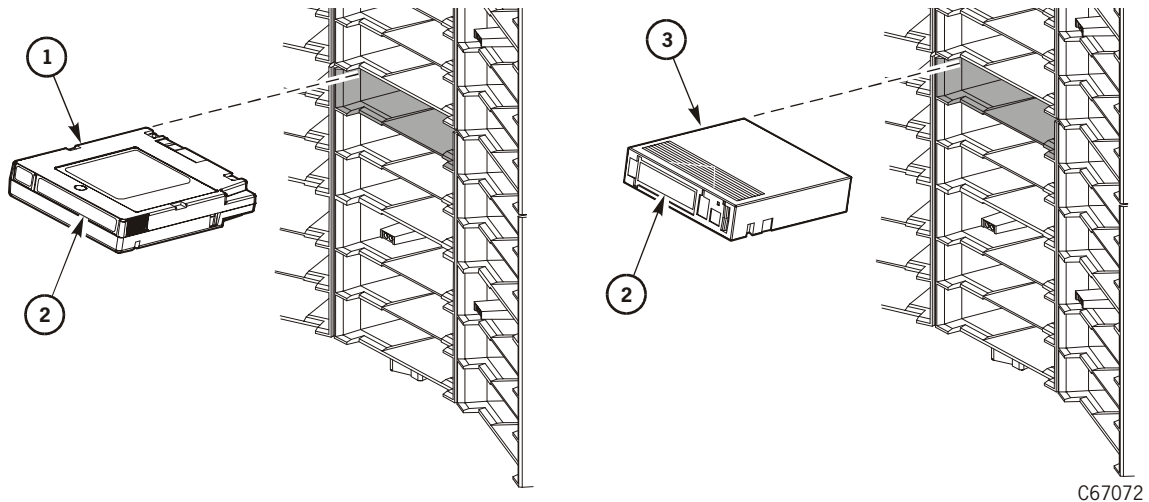
1. T9840 cartridge
2. VOLSER label
3. DLT cartridge

Figure 6-7. Placing LTO Cartridges into Array Cells (C67291)

1. VOLSER label
2. LTO Ultrium cartridge

Cartridges and Labels

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

- To match cartridges with their proper labels
- To distinguish between different types of cartridges
- To distinguish data cartridges from diagnostic and cleaning cartridges

Keep the following notes in mind about cartridge labels:

- All cleaning cartridges have "CLN" somewhere on their labels.
- All diagnostic cartridges have "DG" as the first two characters of their labels.
- DLT cartridges have "C", "D", and "E" in there labels depending on the tape.
- LTO cleaning cartridges have different labels that identify the vendor.
- LTO data and diagnostic cartridges have labels that are unique.
- T9840 cleaning cartridges have a "U" on their labels.
- T9840 diagnostic and data cartridges have an "R" on their labels.

Starter Kits

StorageTek created starter kits to help customers populate their library. Starter kits have pre-labeled cartridges with number ranges that are unique for each kit.

Notes: The following information applies to the starter kits and tables on the following pages.

- StorageTek does *not* supply labels to customers. They may order them from the various suppliers found at the Customer Resources Center at: http://www.support.storagetek.com.

- StorageTek does, however, supply pre-labeled cartridges for customers to immediately load and use in the library.

- Pre-labeled LTO cartridges are available only in 100 GB capacity.

- Cleaning and diagnostic kits contain one labeled cleaning cartridge and one labeled diagnostic cartridge with a volume serial number of 0 (zero) for each. Extra cleaning and diagnostic labels are sent with each library.

- Pre-labeled LTO cartridges are available with either vertical or horizontal label formats; the label orientation is a function of how the cartridges are stored outside the library, not inside the library.

- The part numbers listed in Table 6-3 on page 6-6 are for CSE internal use only. Customers ordering cartridges or labels must refer to the information on the Customer Resource Center Web site.

■ Ordering Cartridge Tapes and Labels

Contact your authorized Storagetek Selling Agent for labeled cartridges.

For labels, contact EDP/Colorflex at 1-888-438-8362 or http://www.colorflex.com.

For technical questions, contact the StorageTek Sales Support at 1-800-ask4stk or e-mail sales_support@storagetek.com.

Eleventh Edition
StorageTek Proprietary

Connecting the Interface Cables 7

This chapter explains how to connect:

- SCSI cables
- Fibre Channel cables
- Ethernet cables

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

■ Connecting the SCSI Interface

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

Note: If you are connecting the library or drives to an LVD SCSI bus, the cable can be no longer than 12 m (39.4 ft).

SCSI Terminators

A terminator is a device that attaches to the end-points of the SCSI bus or daisy chain. The terminator absorbs signals so that they do not reflect back down the bus and they keep the power levels of the bus consistent. A single terminator is required at the end of the bus. StorageTek has the following terminators:

- PN 10148002 (single-ended)
- PN 10148003 (HVD)
- PN 10048031 (LVD and single-ended)

HVD General Requirements

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 connector for the library connection.

Because system cables vary, you may need an adapter to connect to the library.

HVD Daisy-Chain Cables

If connecting the drives to a common path or connecting the library to the drive path, StorageTek provides daisy-chain cables listed in Table 7-1.

Table 7-1. SCSI Daisy-chain Cables

Length	Description	Part Number
25.4 cm (10 in.)	Drive to drive[1]	313109302
46 cm (18 in.)	Drive to drive[2]	310292001
213 cm (84 in.)	Between library and drive	313115701
1. For DLT or LTO drives in consecutive slot positions. 2. For T9840 drives in consecutive slot positions.		

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 7-2). The smaller, VHDC connector connects to the client SCSI card.

Figure 7-1. 68-Pin VHDC Connector (C67059)
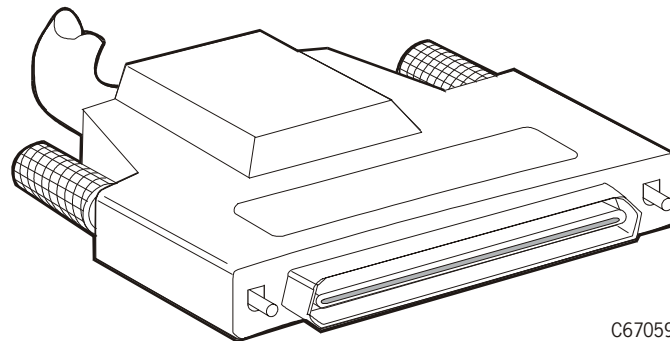
C67059

Table 7-2. 68-Pin Mini-D to 68-Pin VHDC Cables

Length	Above Floor PN	Plenum PN
3 m (9.8 ft)	10083594	Not available
6 m (19.7 ft)	10083595	
12 m (39.4 ft)	10083596	
15 m (49.2 ft)	10083597	
18 m (59.1 ft)	10083598	

High-Density 68-Pin Jackscrew Cables

Figure 7-2 is an example of the high-density 68-pin jackscrew cables that connect the library and drive. See Table 7-3 for a list of part numbers.

Figure 7-2. High Density 68-Pin Jackscrew Connector (C67060)
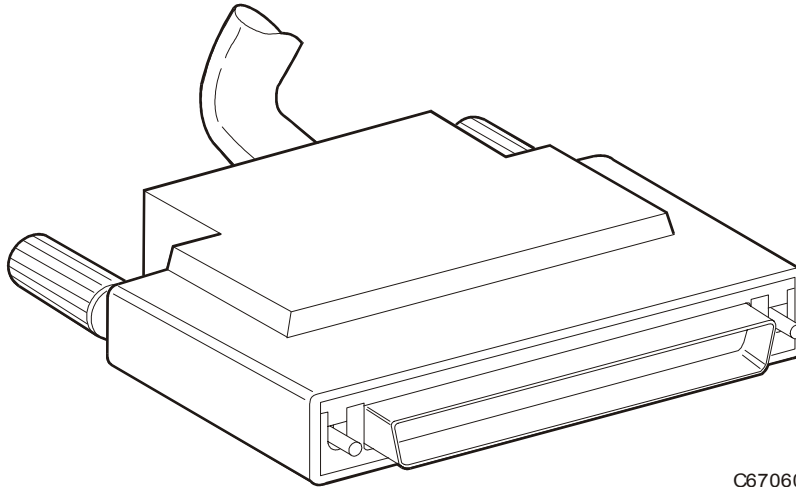
C67060

Table 7-3. 68-Pin High Density Jackscrew Cables

Length	Above Floor PN	Plenum PN*
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.		

Eleventh Edition

StorageTek Proprietary

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, use a cable listed in Table 7-4.
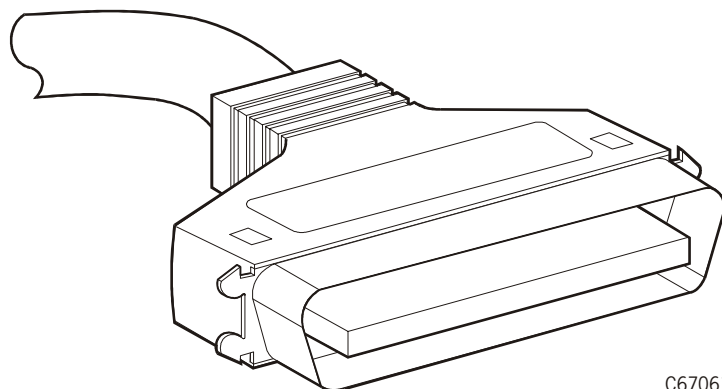
Figure 7-3. Centronics 50-Pin Latch Connector (C67061)

C67061

Table 7-4. Centronics 50-Pin to 68-Pin Jackscrew Cables

| Length	Above Floor PN	Plenum PN*
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

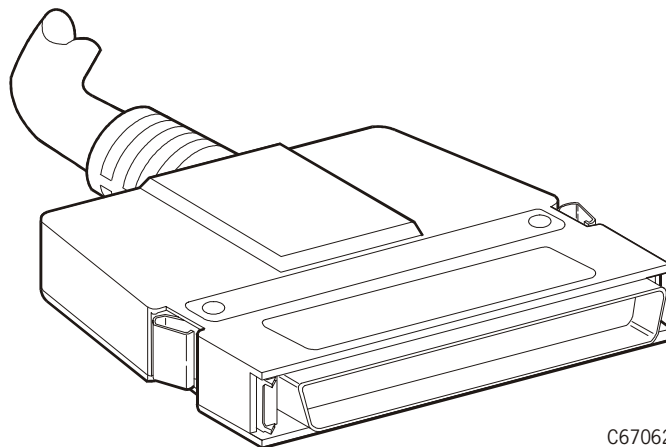**Figure 7-4. 68-Pin Mini-Centronics Connector** (C67280)
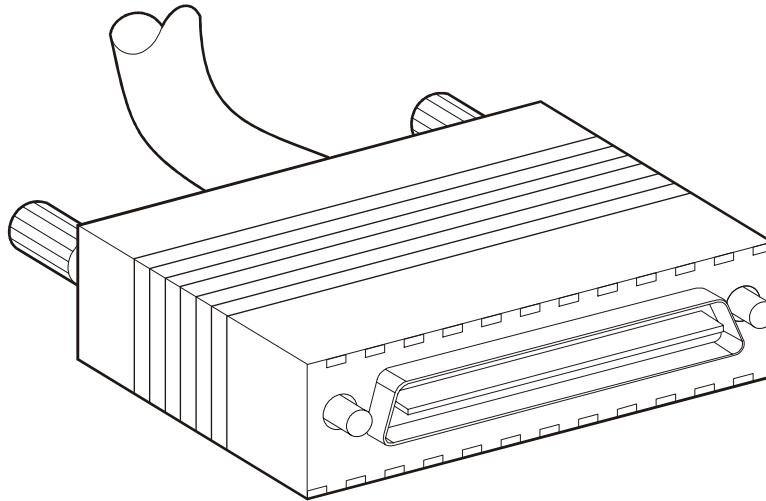
C67280

Special SCSI Adapter Cables

To adapt a 50-pin HD, latch block and rail, to fit a 68-pin connection, use a 3 m (10 ft) HD 50-to-68 pin Sun/SPARC latch, block and rail adapter (see Figure 7-5) part number 10083522

Figure 7-5. 50-Pin to 68-Pin Latch, Block and Rail Connector Adapter (C67062)

C67062

LVD Cables

If the control path from the library is LVD SCSI, then you must install an MPW card. The instructions for the card and connecting the SCSI cable are included. The supported universal SCSI cables (LVD or HVD) are listed in Table 7-5.

Table 7-5. Universal 68-Pin MD to 68-Pin MD

Length	Part Number
500 mm (19.7 in.)	10083676
3 m (9.8 ft)	10083679
5 m (16.4 ft)	10083680
10 m (32.8 ft)	10083681
300 mm (11.8 in.) Daisy-chain cable	10083675

Connecting the SCSI Library

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

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

The following paragraph pertains to connections in general. For connection to a Sun SPARC5, see "Server Connection—Sun Server" on page 7-7.

To connect the *control* cable:

1. Install the cable from the server to the connectors near the power bulkhead. (Route the cable up through the cable access hole in the floor tile at the rear of the library, and pass it over the power switches.)

2. Connect the SCSI cable to one of the two connectors.

    *   If the path *terminates* here, connect a terminator on the other connector

    *   If the path *continues* from this point, connect a second cable (daisy-chain cable) to the second connector and route this cable to the next connection.

3. Label the bulkhead with the appropriate SCSI icon.

Server Connection—Sun Server

Two types of connections to a Sun server are possible: single-ended and HVD. See your server documentation for the locations of these connections.

Table 7-6 provides some guidelines for this type of connection:

Table 7-6. SCSI Connection to Sun Server

Requirements	Single-ended[1]	HVD	LVD
Distance Restriction	3.7 m (12 ft) between the library and the server	Up to 18 m (60 ft) between the library and the server	Up to 12 m (39.4 ft) between the library and the server
Required Host Adapter Cards	None	• StorageTek PN 112167001 for 8 addresses[2] • StorageTek PN 309457301 for 16 addresses[2].	• Special HBA for use with an LVD SCSI bus
Special Cable	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	Universal cable (see Table 7-5 on page 7-6)
Connection at Sun Server	50-pin	68-pin	68-pin
SCSI Paths	Control path only	Can connect control path to data path	Can connect control path to data path

1. A single-ended connection is reserved for library control functions only.
2. 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 "Connecting the SCSI Library" on page 7-6.

Workstation and Embedded Bus Connection

When connecting to a UNIX workstation or embedded bus, follow the procedure described in "Connecting the SCSI Library" on page 7-6. 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 adapters, you may assign any address from 0 to 14.
  - For narrow 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, because the remaining targets are reserved for other Sun peripherals.

- For IBM RISC System/6000 servers, available addresses on the embedded system bus are 6, 5, 3, and 2.

Connecting SCSI Tape Drives

Notes: Observe these notes when making your SCSI drive connections:

- Make sure you comply with the length restrictions for your interface type.

- Label *each* drive with its client address (this will be very helpful if problems occur).

- Label the cables. These labels provide reliable identification for any future maintenance on the drives.

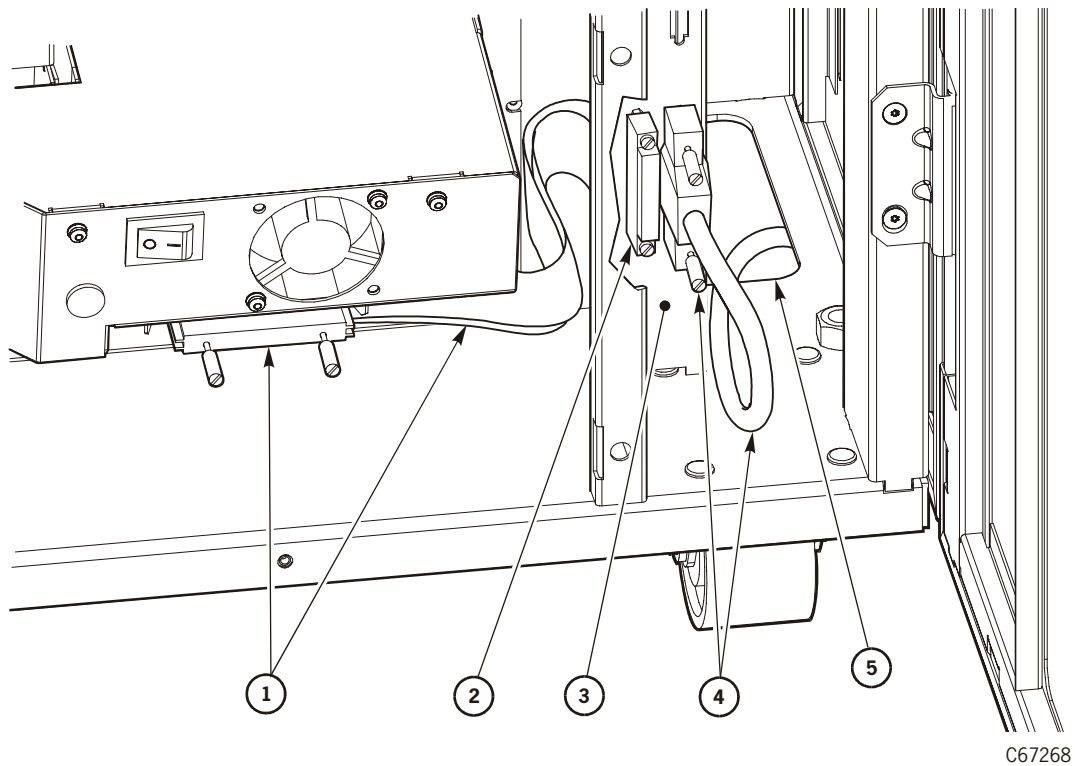- Figure 7-6 on page 7-9 shows an example of a connection to the drive bulkhead.

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

Direct Connection

For installations with *direct* data path connections:

1. Route the data cable up through the cable access hole in the library floor near the drive bulkhead.

2. Connect the cable to the appropriate connector at the drive bulkhead.

3. Make sure a terminator is installed.

Figure 7-6. Client Cable Connection at Drive Bulkhead (C67268)

C67268

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

Daisy-Chain Connection

Figure 7-7 on page 7-11 shows an example of two daisy-chain configurations using a variety or connection types, including:
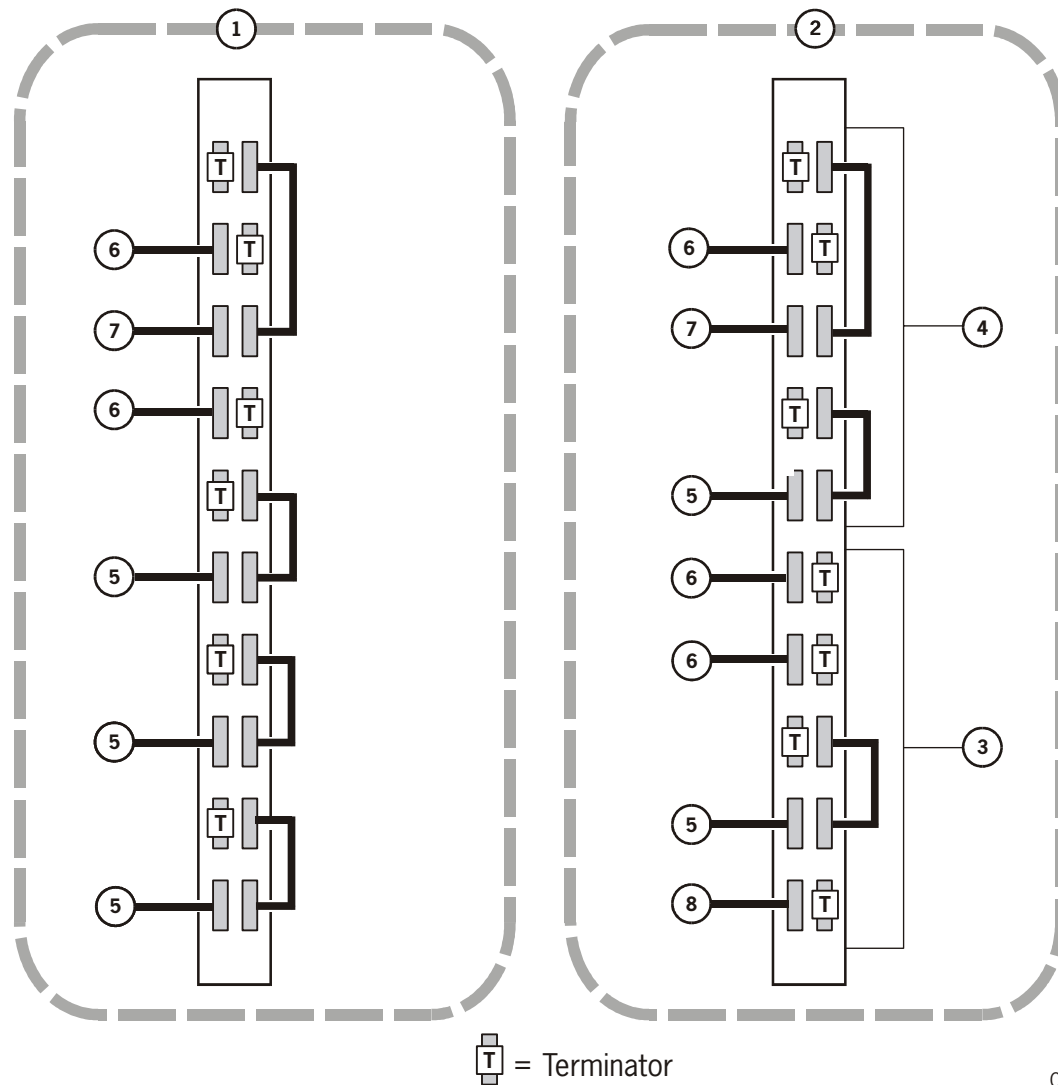
- Direct connection from a client to a tape drive
- Daisy chain connection using a short cable 25.4 cm (10 in.)
- Daisy chain connection using a long cable 46 cm (18 in.)
- Daisy chain connection from the library to a tape drive 213 cm (84 in.)

Important!
For best performance, StorageTek recommends connecting a maximum of two devices per daisy chain. Performance will *decrease as you increase* the number of drives in a chain.

For installations with *daisy-chain* data path connections:

1. Route the cable up through the cable access hole in the library floor near the drive bulkhead.

2. Connect the cable to the first connector of the first drive.

3. For a *short* daisy-chain connections (drive to drive):

    a. Install either cable PN 313109302 or PN 310292001 from the second connector of the first drive to the first connector of the next drive.

    b. Continue the chain until you reach the last drive on the chain.

    c. Install a terminator on the last drive connector.

4. For a *long* daisy-chain connections (library to drive):

    a. Install cable PN 313115701 between the library and a tape drive.

    b. Connect one end of the cable to the second connector of the drive.

    c. Route the cable down through the cable access hole on the floor near the drive bulkhead and under the floor of the library.

    d. Bring the cable up through the cable access hole on the floor near the power bulkhead.

    e. Connect the cable to one of the two connectors on the power bulkhead.

5. Make sure that a terminator is the last connection on the chain.

Figure 7-7. Example Daisy-Chain Connection of Drives (C67269)

[T] = Terminator

C67269

1. Single AC power circuit configuration
2. Dual AC power circuit configuration
    (requires optional PDU, optional DC power supply, and a two power cord drive column)
3. Drives powered by the standard PDU in a dual AC power circuit configuration
4. Drives powered by the optional PDU in a dual AC power circuit configuration
5. Daisy-chain connection using a *short* cable to connect two adjacent tape drives
6. Direct connection to a tape drive
7. Daisy-chain connection using a *long* cable to connect two separated tape drives
8. Daisy-chain connection from the library to a tape drive

> ***Important!***
> **For best performance, StorageTek recommends connecting a maximum of two devices per daisy chain. Performance will *decrease as you increase* the number of drives in a chain.**

■ Connecting the Fibre Channel Interface

Fibre Channel operation for the library requires:

- The optional MPV card, also referred to as the compact peripheral component interconnect (CPCI) assembly.

  This card attaches 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 (shown in Figure 2-7 on page 2-15).

Fibre Channel Cables

SC connectors are the standard for 1 Gb Fibre Channel devices such as the library and the T9840 Tape Drive. Part numbers with these connectors are listed in Table 7-7.

Table 7-7. Fiber-Optic Cables: 50 μm 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 ft)	10800128
250 m (820 ft)	10800129
500 m (1640 ft)	10800130

LC connectors are the industry standard for all 2 Gb-capable Fibre Channel devices such as the T9840B Tape Drive. Table 7-8, Table 7-9 and Table 7-10 on page 7-13 list the 2 Gb-capable cables and adapters:

Table 7-8. LC to SC Cables

Description	Length	Part Number
Optical Cable, LC to SC Duplex, Riser	10 m (32.8 ft)	10800231
Optical Cable, LC to SC Duplex, Riser	50 m (164 ft)	10800232
Optical Cable, LC to SC Duplex, Riser	100 m (328 ft)	10800233
Optical Cable, LC to SC Duplex, Plenum	10 m (32.8 ft)	10800234
Optical Cable, LC to SC Duplex, Plenum	50 m (164 ft)	10800235
Optical Cable, LC to SC Duplex, Plenum	100 m (328 ft)	10800236

Table 7-9. LC to LC Cables

Description	Length	Part Number
Optical Cable, LC to LC Duplex, Riser	10 m (32.8 ft)	10800221
Optical Cable, LC to LC Duplex, Riser	50 m (164 ft)	10800222
Optical Cable, LC to LC Duplex, Riser	100 m (328 ft)	10800223
Optical Cable, LC to LC Duplex, Plenum	10 m (32.8 ft)	10800224
Optical Cable, LC to LC Duplex, Plenum	50 m (164 ft)	10800225
Optical Cable, LC to LC Duplex, Plenum	100 m (328 ft)	10800226

Table 7-10. LC to SC Adapter Kit

Description	Part Number
LC to SC adapter kit (1 Gb limitation)	312105301

Fibre Channel Safety Precautions

When installing, connecting, and working with Fibre Channel devices, read and observe the information in "Fiber-optic Safety" on page xxvii.

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.**

Connecting the Library

To connect the library to a Fibre Channel interface:

1. Make sure that the library power switches are in the OFF (down) position.

2. Route the library's fiber-optic cable through the cable access hole in the library floor near the power bulkhead (see Figure 7-8 on page 7-14).

   If necessary, route this cable up through the floor in the library's rack to connect to a Fibre Channel hub or switch. Then route a cable from this equipment back down through the floor of the library's rack.

3. 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.

4. Connect the fiber cable to the MPU card, at the lower right of the electronics module bulkhead.

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

Figure 7-8 shows examples of how to route the fiber-optic cables:

Figure 7-8. Fiber Optic Cable Route (C67244)
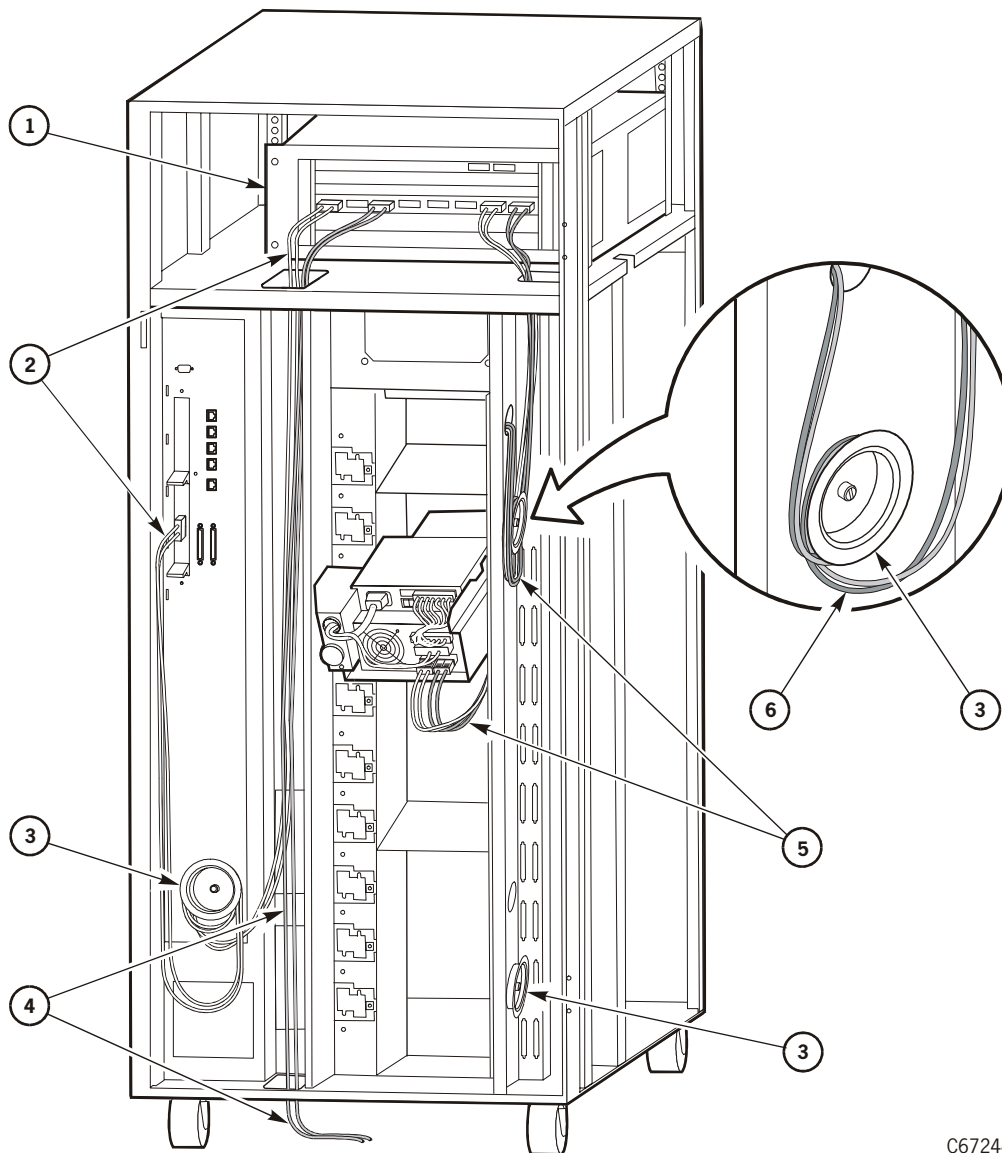
C67244

1. Fibre Channel switch or hub
2. Fiber-optic cable route to the library
3. Fiber-optic cable strain relief
4. Fiber-optic cable route to the network or server
5. Fiber-optic cable route to a drive
6. Wrap the fiber-optic cable clockwise around the strain relief.

Connecting Fibre Channel Tape Drives

After following the directions outlined in "Fiber-optic Cable Installation" on page xxviii, follow the instructions in the tape drive documentation, for example, the T9840B Tape Drive Installation Manual.

CAUTION:
***Potential equipment damage*: LTO drives now support a Fibre Channel interface (currently the IBM LTO drive). Make sure the cable clamp is installed on the fiber-optic cable to prevent it from breaking when you close the drive access door.**

■ Connecting the ESCON Interface

ESCON operation with the T9840B drive requires certain considerations that must be taken into account for correct operation:

- Library firmware must be version 3.01 or later

- MVS/Client Server Component (CSC) software, version 4.1 or later, must be resident within the host's operating system

- ACSLS (UNIX-based server) software, version 6.0.1 or later, must be resident within the server's operating system

To install and connect ESCON cables:

1. Mark each ESCON cable with the drive position number and device address.

2. Route the cables from the host, patch panel, or director to the library.

   Note: Do not attach either end of the cable at this time.

3. Route a sufficient length of cable through the cutout in the library bulkhead to connect to the drive.

4. Wrap at least one full turn of the cable onto the closest strain relief. See Figure 7-8 on page 7-14.

5. Remove the ESCON cable insert from the drive.

CAUTION:
***Equipment damage:* Do not force the fiber-optic plug into the connector.**

6. Remove the cable connector covers and clean the ends of the cable.

7. Connect the ESCON cable to the port on the rear of the tape drive.

■ Connecting the Ethernet Interface

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

1. Make sure that the library power switches are in the OFF (down) position.

2. Route the 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. (See Figure 1-2 on page 1-3 and callout 5 for the location.)

■ Matrix Switch

If you are installing a maintenance switch in the rack area for the T9840 Tape Drives, you need to install ferrite beads on the Ethernet cables at the switch and at each drive. This switch uses Matrix to emulate the operator panels of the T9840B drive.

Refer to the tape drive installation manual for instructions to install the switch and ferrite beads.

■ Remote Maintenance

See Appendix A, "Remote Setup" for information about connecting a modem to the library for remote access.

Placing the Library Online

After you have completed the installation, tested the library and tape drives, and connected the subsystem to the customers interface, it is now time to place the library online for the customer to use.

When the customer is ready to use the library, request that the operator enter the system command to place all drives and the library online.

Next, the operator should enter the command to load the audit data from the library to the client system.

1. Make sure the operator has a copy of the *L180 Tape Library Operator Guide*.

2. Refer to the operator guide for instructions about operating the library.

3. Complete the information on the following page and give it to the customer.

    This information will be helpful in the event something goes wrong.

For support call:
Account Name:
Site Location Number:

L180 Library Configuration and Information

Serial Number _____ **Model**: 180-cell ❑   140-cell ❑   80-cell ❑

Library SCSI ID _____ **Fibre Channel** ❑ _____ **Port 0 Address** _____

Fast Load: Enabled ❑   Disabled ❑

Auto Clean: Enabled ❑   Disabled ❑

Optional DC power supply/optional PDU: Installed ❑   Not Installed ❑

Uninterruptible power supply/optional UPS: Installed ❑   Not Installed ❑

Tape Drive Configuration and Information
Number of Drives Installed: _____

Drive 0 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 1 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 2 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 3 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 4 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 5 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 6 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 7 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 8 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Drive 9 SCSI ID _____   Fibre Channel ❑   ESCON ❑   On bus ❑   Off bus ❑
Model: DLT: 7000❑ 8000❑ Super❑ T9840 ❑ LTO ❑type:____   LVD ❑   HVD ❑   Fiber ❑

Remote Setup

A

This appendix provides information about how to setup the library for remote maintenance through the SER1 and the CSE ports on the MPC card.

- The SER1 port enables a remote or laptop computer to run diagnostic tests, examine the fault symptom code (FSC) log, view FSCs, or connect the library to a remote modem.

- The CSE port was used for the installation of Flash97 PROM code.

  Note: Use the "CLI Port—HyperTerminal Method" on page B-5 for all new code installations from Version 2.20 and higher.

CAUTION:
***Potential system interruption:* If you run diagnostic tests from a laptop device, you may connect the laptop to either the SER1 port or the CSE port on the electronics module bulkhead. Make sure the library is offline before you run tests through either port. The command-line interface does not give a warning that the library will be taken offline.**

■ CSE Port

You can use the CSE port to upload microcode to the library as well as to run diagnostics on the library and to download the FSC log.

Operation through the CSE port requires:

- RS423 or RS232 serial protocol

- An RJ-45 connector and CCITT cable (PN 410828901xx)*

- An RJ-45–DB9 adapter (PN 10410823) at the laptop connection*

- The communication must be set to:
    - 9600 baud (but switches to 38,400 baud after the `flash97.exe` starts)
    - Eight data bits
    - No parity bit
    - One stop bit

Note: *A 10-foot CCITT cable (with RJ-45 connector) and an RJ-45–DB9 adapter are included in the library's shipping kit or you can use the CSE DOS Diagnostic cable (PN 24100134).

■ SER1 Port

The communication for the SER1 port must be set to:

- 38,400 baud
- Eight data bits
- No parity bit
- One stop bit

Note: *A 10-foot CCITT cable (with RJ-45 connector) and an RJ-45–DB9 adapter are included in the library's shipping kit or you can use the CSE DOS Diagnostic cable (PN 24100134).

■ Modem Setup

To do a remote hookup, you will need:

- An auto-answer modem with all the proper regulatory approvals for the country in which it will be used

- A CCITT cable with RJ-45 connectors

- A serial device or laptop computer. Either device must:
  - Support dumb terminal mode
  - Use a standard modem communication utility

CCITT modular cable assemblies are available for connecting the adapter to the Machine Activated Routing Switch (MARS).

Table A-1 lists the StorageTek part numbers of the cables you can order.

Table A-1. CCITT Cables

Part Number	Length	
	Meters	**Feet**
4108289-02	6 m	19 ft
4108289-05	15 m	50 ft
4108289-20	30 m	100 ft
4108289-25	45 m	150 ft
4108289-30	60 m	200 ft
4108289-25	75 m	250 ft

Modem Switch Settings

If your installation requires a modem, allowing you to remotely link to the library, see Table A-2 for the modem DIP switch settings.

Note: Most modem settings can be done with DIP switches within the modem. This method is preferable because it allows automatic configuration if the modem power is cycled. Refer to your modem manual.

Table A-2. Modem Switch Settings

Configuration	Setting	Entry
Carrier Detect (CD) to remote system	ON	&C1
Data Set Ready (DSR) complies with CCITT, Clear To Send (CTS) always ON. (This setting does not appear on all modems.)	ON	\D3
Long form result code	ON	\VO
Auto answer	ON	SO=1
Auto-reliable mode	ON	\N3
Enable remote access. (This setting does not appear on all modems.)	ON	*E1
Data Terminal Ready (DTR)	ON	&D2
Disable rate adjust	ON	\JO

Serial Device or Laptop Computer Entries

If your modem does not permit setup through DIP switch settings:

1. Set your serial device or laptop computer to:

   - 38,400 baud
   - Eight bits
   - No parity bit
   - One stop bit

2. Power on the modem.

3. Connect the RJ-45 cable from your device to the modem.

4. Enter "dumb terminal mode" on your device.

5. Enter AT, then press <Enter> or <Return>. The modem should respond by displaying OK on the screen of your serial device or laptop computer. If it does not, inspect all cable connections and make sure the cables and connectors have the correct part numbers.

6. From your keyboard, enter:

   AT&F&W and press <Enter> or <Return>.

7. See Table A-2 and:

- For modems that require *all* settings, enter

  AT&C1\D3\VOSO=1\N3*E1&D2\JO&W and then press <Enter> or <Return>.

- For modems that do *not* require all settings, enter:

  AT&C1\VOSO=1\N3&D2\JO&W, then press <Return> or <Enter>

Testing the Modem

To test the modem configuration:

1. Set the modem to go off-hook in answer mode; on some modems this is done by a switch setting.

2. Open the rear door of the library.

3. Connect the CCITT cable from the modem to the phone jack on the top of the MPC card.

   Note: If your modem has a DTR indicator, this indicator will turn on.

4. Dial into the modem.

5. Enter \J0 to disable rate adjust.

6. When connected, enter P. The diagnostic menu will appear.

7. When you are done, exit the menu.

8. Enter ++++ and wait for the message of OK.

9. Enter ATH, and then press <Return> or <Enter> to disconnect.

Loading Microcode

B

This appendix provides information about how to update the microcode or firmware for the library. Library microcode is factory-installed on all new machines and resides within a Flash PROM on the MPC/MPCL card.

Note: Within this appendix, microcode and firmware are used synonymously.

- **Firmware** is the instructions or data that has been written into read-only-memory (ROMs, PROMs and EPROMs).

- **Microcode** is the instructions that directly control a microprocessor. A single machine-language instruction typically translates into several microcode instructions.

For new installations, a diskette or CD with current microcode is provided.

This appendix contains procedures for loading microcode:

- If there are problems with the microcode loaded at the factory
- If you need to update the code level during the installation

You can download currently supported microcode from the Multi-Platform Support Services Web site at http://mpss.stortek.com/.

This site contains a matrix of the supported Automated Tape Solutions Library and Tape Drive microcodes listed by product and includes the download file and release notes.

You must have a personal computer and the following to download the microcode to the MPC/MPCL card:

- An RJ-45 cable (PN 4108289xx)

- An RJ-45—DB9 adapter (PN 10410823) or

- CSE DOS Diagnostic cable (PN 24100134)

■ Download Methods

CAUTION:
Controller card damage: **The location of the command line interface (CLI) port has changed with edition 3.00 and later firmware. It is now designated as the CSE port (J30) on the MPC/MPCL card.**

There are four methods you can use to download firmware.

1. **Write Buffer command:** Directions for this method can found on the Customer Resource Center (CRC) Web site:

    *   Log-in to the CRC
    *   Select Product Information
    *   Select Current Products
    *   Choose a Product Family
    *   Select Tape and Tape Automation and click Next
    *   Scroll to Tape Libraries
    *   Select L180 Tape Library
    *   Select the *L700/180 Tape Libraries Interface Reference Manual*
    *   Refer to the information in the Write Buffer command (3Bh)

2. **SCSI toolbox:** Consult the SCSI Toolbox manual on the CRC for directions:

    *   Log-in to the CRC
    *   Select CRC Tools
    *   Select CS Tools
    *   Select the SCSI/FIBRE Toolbox User's Guide
    *   Search for Firmware Download instructions

3. **StorageTek L-Series Library Admin:** Refer to the CRC for information about this feature:

    *   Log-in to the CRC
    *   Select Product Information
    *   Select Current Products
    *   Choose a Product Family
    *   Select Software and click Next
    *   Scroll to and click on StorageTek L-Series Library Admin.

4. **Command line interface (CLI) ports:** Starting with microcode edition 2.20, there are two CLI port methods:

    *   DOS method
    *   HyperTerminal method

File Types

Before using one of the methods described in the section above, determine which firmware file type you wish to download:

Note: L180 microcode supports both the L180 and L700/L700e Tape Libraries. For the L180 you only need to download the MPC/MPCL firmware, use the mpcxyyzz.prm file.

CAUTION:
Incorrect file type: **The mpbxyyzz.prm file can only be loaded into an L700e library pair joined by a PTP. The L180 library *does not* support this file type.**

Table 2-1. Firmware Download Options

From Version[1]	To Version		
	MPC 2.xx	**MPC 3.00**	**MPC/MPCL 3.01 or later**
MPC 2.xx	Lib Admin, SCSI, and MPC CLI port using MPC release.prm file	Lib Admin, SCSI, and MPC CLI port using **mpc**xyyzz.prm file[2]	N/A
MPC 3.xx	MPC CLI port only, using release.prm and download old CLI command[3]	Lib Admin, SCSI, and MPC CLI port using **mpc**xyyzz.prm file[2]	Lib Admin, SCSI, and MPC CLI port using **mpc**xyyzz.prm file[2]

Notes:

1. 2.xx release.prm files used a Level 1 download header. For compatibility, 3.00 firmware uses a Level 1 header also. This allows 2.xx firmware to load 3.00 firmware. Version 3.00 or later firmware can accept wither a Level 1 or 2 download header. Starting with 3.01 and later, a Version 2 header will be used to ensure correct loading into the MPC/MPCL card.

2. Where **mpc** or **mpb** are the card designators and "xyyzz" is the firmware revision: "x" denotes the major revision number, "yy" is the minor revision number, and "zz" is the build number. For example, MPC revision 3.01.24 would be represented as **mpc**30124.prm.

3. Once a Version 2 header file is loaded into the MPC card, the only way to revert to a Version 1 level is by using the CLI port "download old" command. A Version 2 header file locks the firmware file type to the card type. Ensure that MPC firmware only downloads to the MPC card. A download will fail if you try to download MPC firmware into the MPB card; likewise, trying to load MPB firmware into the MPC card will result in failure.

CAUTION:
Controller card damage: **Make sure that all activity is stopped before loading microcode or controller card damage will occur. Do *not* open and close a library's access door during the procedure. Do *not* press the operator panel's RESET button.**

CLI Port—DOS Method

To download the firmware:

1. Connect the RJ-45 serial cable to the CSE port on the MPC/MPCL card.

2. Open a DOS window on your PC.

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>.

CAUTION:
Equipment Damage: **Do not attempt to perform any operations on the personal computer or library until the operator panel displays `DOWNLOAD COMPLETE`. Damage to the MPC/MPCL 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 20 minutes.

10. The 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. Activate the firmware by pressing 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.

CLI Port—HyperTerminal Method

Note: This method is *only* valid with firmware version 2.20 or later and the only method for 3.00 or later firmware.

CAUTION:
***Controller card damage:* The library must be fully initialized and the access door must be closed when using this method.**

To download the firmware:

1. Copy the `release.prm` firmware file to the directory you created on the C drive (`copy release.prm or abcxyyzz.prm c:/directory` name)

2. Attach your PC to the Command Line Interface (CLI) port labeled `CSE` on the MPC/MPCL card.

3. From your PC:

    a. For older machines, go to Start >Programs > Accessories > Hyperterminal and open a Hyperterminal session.

    b. For WIN2000 machines, go to Start > Programs > Accessories > Communications > Hyperterminal and open a Hyperterminal session.

4. Within the `file properties`, configure the connection as follows:

Older PCs	WIN2000 PCs
Baud rate = 38,400	Baud rate = 38,400
Data bits = 8	Data bits = 8
Parity bit = None	Parity bit = None
Stop bit = 1	Stop bit = 1
Direct to comm flow = none	Hardware flow control = xon/xoff

5. Click on **OK**.

6. In the Hyperterminal window, click on **ENTER**.

    The `CLI>` prompt will appear.

7. Type in: `download` and press the `Enter` key.

    A message will appear stating that you have *two minutes* to begin sending the new firmware version.

8. At the top of the window, find the **TRANSFER** button and point to **SEND FILE.**

    A box will appear, allowing you to browse to the file location of the firmware you copied in Step 1.

9. Double click on release.prm.

    The SEND FILE box will appear, showing the pathname and the protocol chosen. Protocol should be set to Z-MODEM.

10. Click on SEND.

    The status window for the transfer will appear.

CAUTION:
***Equipment Damage:* Do not attempt to perform any operations on the PC or library until the operator panel displays DOWNLOAD COMPLETE. Damage to the MPC card may occur if you do not wait for the process to complete.**

If, for any reason, the download does not complete successfully, make sure that the xon/xoff setting is valid for the current Hyperterminal session, then retry the download immediately.

Do *not* reset, cycle power, or open a library access door.

11. *Wait* for the following prompt: Reboot 'yes'?

12. Respond with 'yes' to reboot the machine and activate the firmware. Or you may power cycle or IPL the library to activate the firmware.

Notes:

•   If you do not reboot, power cycle, or IPL the library to activate the new firmware, the old firmware version will remain active. When the next reboot, power cycle, or IPL occurs, the new firmware will become active.

•   When the reboot is complete, verify that the version is correctly listed on the operator panel.

•   The fault symptom code (FSC) dictionary is also contained on the firmware diskette or CD. The file name is "fsc" and, when proper security safeguards are followed, this file may also be copied to a file on your personal computer.

Library Admin

<div style="text-align: right;">**C**</div>

StorageTek's L-Series Library Admin is an optional software product that resides internally in the library and is activated by using a Web browser. This product provides a Web-based, graphical user interface (GUI) that enables customers to monitor and perform library operations remotely.

Some of the features of Library Admin include the ability to:

- Get a virtual view of the library's cells
- Load microcode
- Generate useful reports about the library, drives, FSCs, and media
- Obtain valuable statistics about the library, drive, cells, and cleaning cartridge
- View and modify the configuration for the library, drives, and network
- Set the cleaning cartridge threshold
- Enable SNMP and add trap recipients (see Appendix D for more information)

For more information about StorageTek's L-Series Library Admin, visit:

> http://stagesupport.storagetek.com/LibraryAdminHelp/LSA.HTM

■ Requirements

Before installing the L-Series Library Admin, verify that the following requirements are met:

- Minimum system requirements:
    - 200MHz processor
    - 64 MB RAM (96 MB preferred).
- Library Microcode is at level 2.20.00 or higher.
- Ethernet connection to the library
- Have ordered and received a "Library Personality Module" which is used to enable the optional Library Admin feature.
- Have either Netscape Navigator 4.5 or later or Internet Explorer 5.0 or later browser installed.
- Java™ Plug-in Software 1.4 or later. You can download the Java plug-in from:

> http://java.sun.com/products/plugin

Note: After Library Admin is installed, the Web-based GUI with the Java plug-in is intuitive, easy to use, and requires minimal training.

■ Installation Instructions

Note: When the operator panel displays "Web Enabled," the Personality Module is installed and Library Admin is enabled.

To install the L-Series Library Admin:

1. Make sure the library is powered-on and initialized.

2. Make sure the library network configurations have been completed. See "Drive Entries" on page 5-21 for information.

Referring to Figure 1-2 on page 1-3:

3. Make sure the Ethernet (**Enet**) cable is connected.

4. Connect the Personality Module to the DB9 connector.

   Note: The Library Admin software is *disabled* if the Personality Module is not installed.

5. Reset the library (cycle power or open and close the front door).

6. Start the L-Series Library Admin by accessing Netscape or Internet Explorer and entering your library name or IP address at the Address Bar.

See Figure C-1 on page C-3 for an example of the Library Admin for the L180 and L700 Tape Libraries.

Table C-1. Library Admin Functions

Select Tab...	For Information About...
Monitor	• Cell map • Drive status • FSC log • Tape inventory
Maintenance	• Diagnosing a problem • Performing a code load • Generating reports • Rebooting the library
Statistics	• Library • Drives • Cells • Cleaning cartridge
Configuration	• Library • Drives • Network • Cleaning count threshold

Figure C-1 shows an example of the initial Library Admin Monitor Screen that shows the cell maps for the library.

The top and the left navigation bars allow you to select various functions as described in Table C-1.

Figure C-1. Library Admin Screen Example
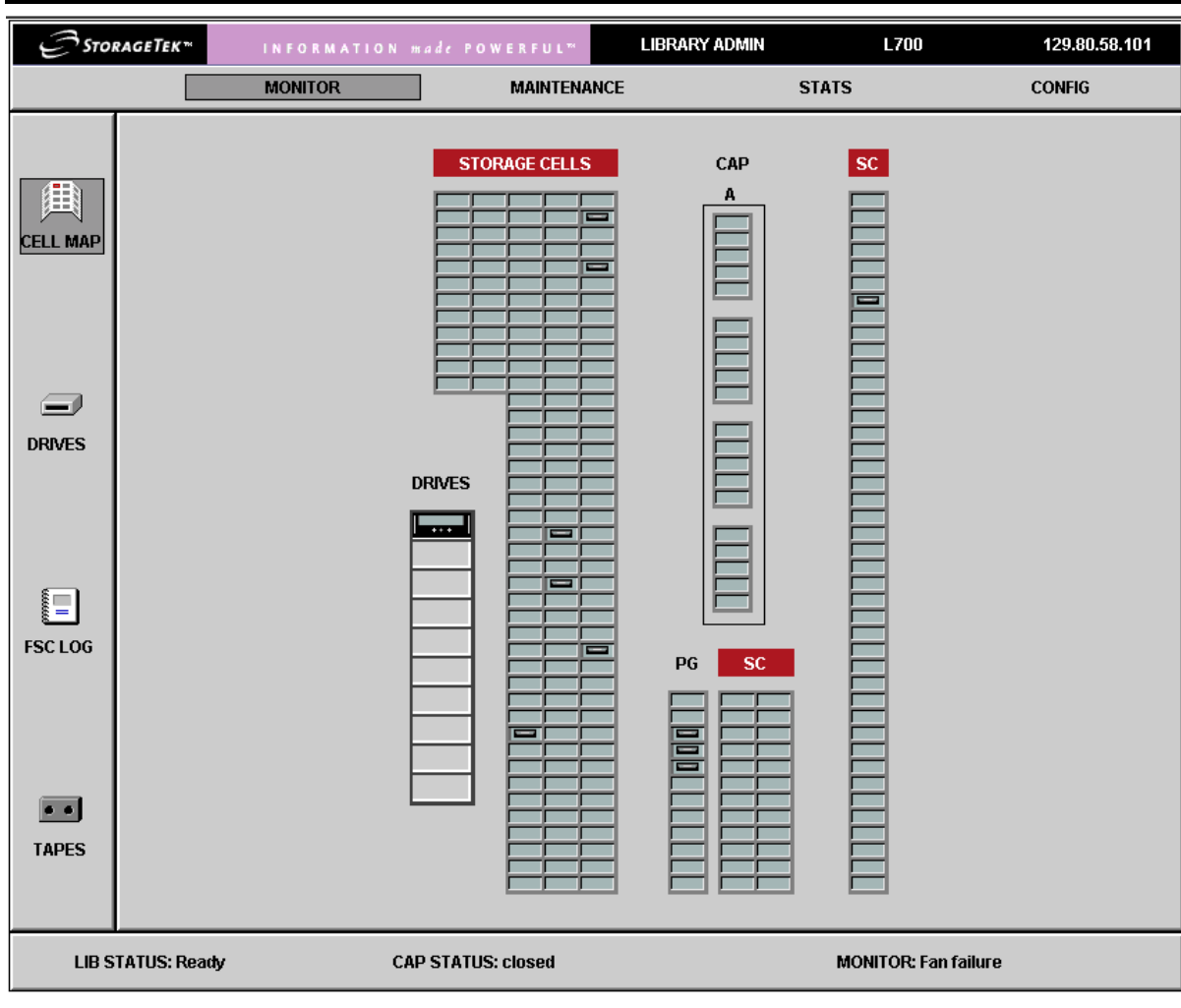
■ Library Statistics

Library statistics are divided into two major categories: counters and composite information. Both categories are explained in the following sections.

Counters

Counters are composed of 8-bit, 16-bit, and 32-bit elements. Each type is explained below.

8-bit Counters

8-bit counters have values from 0 to 2^8 minus 1 (or 255).

Drive Statistics

Drive statistics are composed of the following information, based upon the absolute element location of the drive:

1. PUT Retries—The number of times a PUT operation was retried for the specified location. Generally, two retries will be logged for one failed motion.

2. GET Retries—The number of times a GET operation was retried for the specified location. Generally, two retries will be logged for one failed motion.

3. Mount Count—The number of mount operations to a specified location

Cell Statistics

Cell statistics are composed of the following information, based upon the absolute element location of the cell:

1. PUT Retries—The number of times a PUT operation was retried for the specified location. Generally, two retries will be logged for one failed motion.

2. GET Retries—The number of times a GET operation was retried for the specified location. Generally, two retries will be logged for one failed motion.

16-Bit Counters

16-bit counters have values from 0 to 2^{16} minus 1 (or 65,535).

Table C-2. 16-Bit Counters

Bin	Description
IPL	Number of times the machine was booted. No distinction is made between powering-on or pressing the RESET button.
Door Open	Number of times the access door has been opened
GET Retries	Number of times a GET operation required a retry operation. A single move will have two retries before failing
GET Failures	Number of times a GET operation failed. For every failed GET operation, there will be two GET retries logged.
PUT Retries	Same as GET retries, but for PUT operations
PUT Failures	Same as GET failures, but for PUT operations
Label Retries	Same as GET retries, but for label reading operations
Label Failures	Same as GET failures, but for label reading operations
Target Retries	Same as GET retries, but for targeting operations
Target Failures	Same as GET retries, but for targeting operations

32-Bit Counters

32-bit counters have values from 0 to 2^{32} minus 1 (or 4,294,967,295).

Table C-3. 32-Bit Counters

Bin	Description
Move Count	Number of successful sets of GET/PUT operations (a single move consists of one GET and one PUT operation)
Mount Count	Same as move count, except that the move here involves mounting/dismounting a tape to/from a drive
Uptime Second Count	Number of time (in seconds) that the machine has been running
Empty Read	Number of times an empty cell was detected
Target Read	Number of successful targeting operations
Label Read	Number of time a cartridge label was read
Label Read 1*	Number of times algorithm 1 read a label
Label Read 2*	Number of times algorithm 2 read a label
Label Read 3*	Number of times algorithm 3 read a label
Label Unread 1*	Number of times algorithm 1 could not read a label
Label Unread 2*	Number of times algorithm 2 could not read a label
Label Unread 3*	Number of times algorithm 3 could not read a label
* Added for the purpose of tracking new vision algorithms supplied with firmware Versions 2.21.00 and later.	

Composite Information

Composite information contains statistics that keep track of *groups of data*, using units of time or some other discrete measurement. Composite information is supplied for cartridge access port (CAP) usage, library–wide drive performance, and individual drive performance.

Cartridge Access Port (CAP) Usage

CAP usage counters are 16-bit. The definitions are supplied below.

PUT Count

The CAP PUT count is the number of times a PUT was executed to a CAP, with bins incrementing when a CAP is opened. This provides an indication of how a CAP is being used. For example, if five PUTs were executed to a CAP, the "5" bin (see bin list below) would increment by one. Counts in the 21+ bin would indicate that the CAP is being used for normal operations, not just export operations.

Table C-4. CAP PUT Count

Bin	PUTs executed between CAP opens
Idle	0
1	1
2	2
3	3
4	4
5	5
6–10	6–10
11–15	11–15
16–20	16–20
21+	21 or more

Eleventh Edition

GET Count

The CAP GET count is the number of times a GET was executed from a CAP, with bins incrementing when a CAP is opened. This provides an indication of how a CAP is being used. For example, if 10 GETs were executed from a CAP, the "6–10" bin (see bin list below) would increment by one. Counts in the 21+ bin would indicate that the CAP is being used for normal operations, not just import operations.

Table C-5. CAP GET Count

Bin	GETs executed between CAP opens
Idle	0
1	1
2	2
3	3
4	4
5	5
6–10	6–10
11–15	11–15
16–20	16–20
21+	21 or more

Library-Wide Drive Performance

Job rate intervals are set to five and 15 minutes to best understand peak machine usage. These intervals were chosen because such data can generally be applied to thermal behavior of electromechanical components.

As examples, one customer may only require peak machine performance for a time less than five minutes. If so, some electromechanical components may not heat sufficiently to cause short- or long-term reliability issues. On the other hand, another customer may require peak performance for a full 15 minutes or longer. In this case, peak performance indicates that components will reach higher operating temperatures and, therefore, require more costly components.

Note: Drive mount times are included in these statistics; these times vary widely, depending on the drive type. As a result, these statistics cannot be used to determine if a library is meeting its published Exchanges Per Hour (EPH) specification.

Library-wide drive performance counters are 32-bit.

Five Minute Job Rate

This pool of statistics defines the hourly drive job rate the library was given during continuous five minute intervals. For example, if 13 mounts were executed during one five minute interval, the "151–175" usage bin (see below) would increment by one (13 mounts/5 minutes x 60 minutes/hour = 156 mounts per hour). If no mount activity takes place during a five minute interval, the "idle" bin will increment by one.

Table C-6. Library-Wide Performance—Five Minute Job Rate

Bin	Number of mounts within a five minute interval
Idle	0
1–25	1–2
26–50	3–4
51–75	5–6
76–100	7–8
101–125	9–10
126–150	11–12
151–175	13–14
176–200	15–16
201–225	17–18
226–250	19–20
251–300	21–25
301–350	26–29
351–400	30–33
401–450	34–37
451–500	38–41
501–550	42–45
551–600	46–50
611–650	51–54
651–700	55–58
701+	58+

Fifteen Minute Job Rate

This pool of statistics defines the hourly drive job rate the library was given during continuous fifteen minute intervals. For example, if 31 mounts were executed during one fifteen minute interval, the "101–125" usage bin (see below) would increment by one (31 mounts/15 minutes x 60 minutes/hour = 124 mounts per hour). If no mount activity takes place during a five minute interval, the "idle" bin will increment by one.

Table C-7. Library-Wide Performance—Fifteen Minute Job Rate

Bin	Number of mounts within a fifteen minute interval
Idle	0
1–25	1
26–50	2–3
51–75	4–5
76–100	6
101–125	7–8
126–150	9–10
151–175	11
176–200	12–13
201–225	14–15
226–250	16
251–300	17–20
301–350	21–23
351–400	24–26
401–450	27–30
451–500	31–33
501–550	34–36
551– 600	37–40
601–650	41–43
651–700	44–46
701+	47+

Individual Drive Performance

Performance statistics for individual drives is the third component of composite information. The counters for these statistics are mixed; a listing and an explanation are provided in Table C-8 on page C-11.

Table C-8. Individual Drive Performance

General—No Data Transfer*		
Bin	**Counter**	**Explanation**
Serial Number		Tracking is done by serial number rather than location. This allows for drive positional changes with no loss or inaccurate information.
		In addition, two extra information slots are allocated above the maximum drive count to allow for temporary swapping of drives.
PUT Retries	8-bit	Number of times a PUT was retried on this drive
GET Retries	8-bit	Number of times a GET was retried on this drive
Mount Count	16-bit	Number of times a mount was executed on this drive
Idle Time		How long (in seconds) the drive has not been able to transfer data across the host interface (for example, no cartridge loaded, loading, unloading)
Specific—Data Transfer Possible*		
Minimum	16-bit	Cartridge spent less than 30 seconds in a drive (probably a 9840-style drive)
30 sec to 5 minutes	16-bit	Cartridge spent from 30 seconds to 5 minutes in a drive
5 minutes to 10 minutes	16-bit	Cartridge spent from 5 minutes to 10 minutes in a drive
10 minutes to 30 minutes	16-bit	Cartridge spent from 10 minutes to 30 minutes in a drive
30 minutes to 60 minutes	16-bit	Cartridge spent from 30 minutes to 60 minutes in a drive
More than 60 minutes	16-bit	Cartridge spent more than 60 minutes in a drive

* "General" refers to statistics that relate to non-data transfer drive activities; "Specific" excludes loading/unloading activities and counts only the time that data may be transferred to/from the drive.

This page intentionally left blank.

SNMP

<div style="text-align: right">**D**</div>

This appendix describes the implementation of the Simple Network Management Protocol (SNMP) for the L180 Tape Library.

■ Overview

StorageTek's L-series library embedded agents support Version 1 of the SNMP standard (SNMPv1). SNMP is an application layer protocol that performs network management operations over an Ethernet connection using a User Datagram Protocol (UDP/IP).

SNMP allows systems administrators to query the library for configuration, operation, and statistical information. SNMP also allows the library to inform the systems administrator of potential problems.

System administrators and network managers use SNMP to monitor and receive status from the library, such as:

- Operational state of the library (microcode level, serial number, online)
- Status of the cartridge access port (open or closed, number of cells)
- Library elements (number of hands, columns, panels, cells, CAPs)
- Number of storage cells and media types stored in the library
- Number and types of tape drives installed in the library
- Plus many other variables defined in the database (MIB)

Figure D-1 on page D-2 shows a simple network block diagram that identifies the locations of the SNMP software application, DNS servers, and Library Admin. This figure also identifies the IP addresses, shows a map of DNS names, and other components involved in that configuration (such as the operator panel, Ethernet connections, location of the MIB, and the processor card).

Figure D-1. Example of an SNMP and DNS Network Block Diagram (C67375)
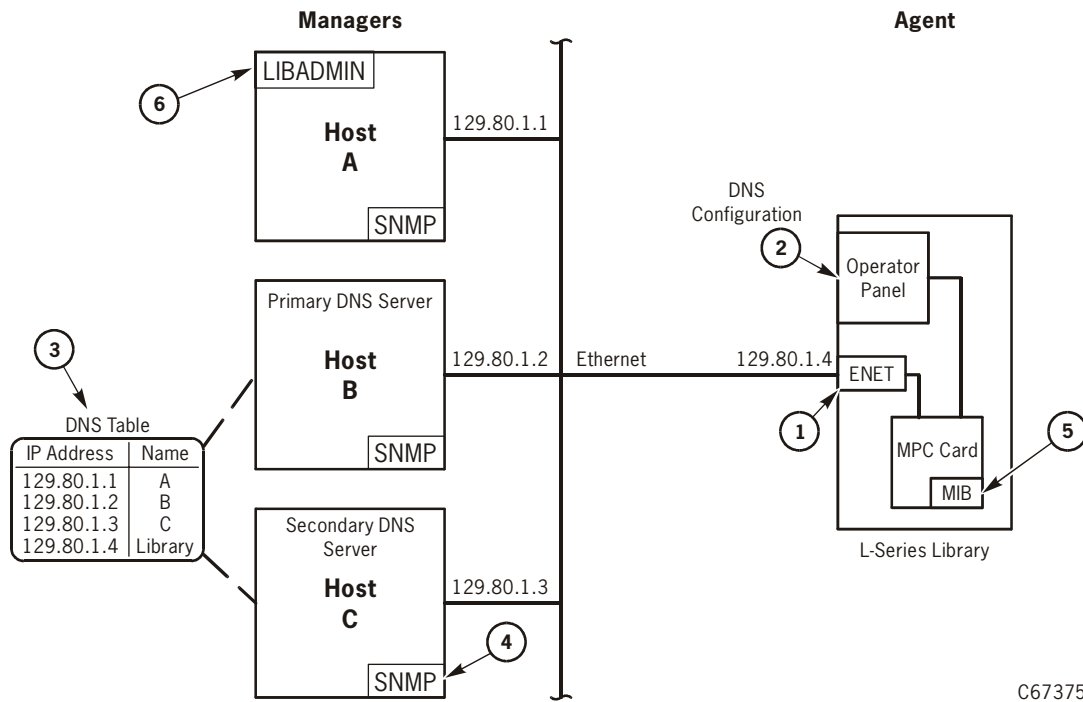
1. Ethernet connection (ENET) for the library.
2. To configure the library to support DNS, see "DNS Configuration" on page 5-17. Note: You must enter the Domain Name Service (DNS) configuration *only* if your SNMP agent is set to trap *named* recipients; if SNMP is set for *numbered* recipients (by using IP addresses), no entries are required.
3. An example of a table that matches IP addresses to selected DNS names.
4. SNMP software application that implements the role of manager. Some applications include:
   - HP Open View
   - IBM NetView
   - Sun Microsystems SunNet Manager
5. The MIB is stored on the MPC card. To view the contents of the MIB database in this example, point your browser to: http://*129.80.1.4*/Lseries.mib or http://*Library*/Lseries.mib
6. Library Admin is an *optional* feature for the library. It provides a GUI-based monitoring system and is *separate* from the SNMP application. Library Admin provides an easy and convenient way to configure the library SNMP agent using a network configuration panel or screen. Library Admin also provides other beneficial functions and display screens for the library.

■ SNMP Terms

SNMP uses a manager/agent structure, a database, and a small set of commands to exchange information. SNMP terms include:

- **Agent**–A module that resides within a managed device. The agent is responsible for responding to requests from the manager and for sending *traps* to a recipient that informs the systems administrator of potential problems.

- **Community string**–Applications use community strings for access control. The manager includes the community string in the SNMP messages to the agent. The agent consequently can accept or reject the operation.

- **Managed device**–A device that hosts the services of an SNMP agent that provides monitored information and controlled operations using SNMP. L-series libraries are managed devices.

- **Management Information Base (MIB)**–A collection of information stored in a database that contains configuration and statistical information for a managed device. For L-series libraries, a copy of the MIB is loaded with microcode and stored on the processor card. See "Management Information Base" on page D-4 for more information about the MIB.

- **Manager**–The thing that provides the communication link between the systems administrator and the managed devices on the network. A manager station or server allows the systems administrator to get information about the device through the MIB and to receive traps from an agent.

- **Recipient**–A location on a manager where the SNMP agent sends traps. This location is defined by the combination of either the IP address or DNS name and the port number. The default recipient port number is 162.

- **Trap**–A message that reports a problem, error, or a significant event that occurred within the device.

SNMP Commands

SNMPv1 offers a limited number of commands that follow a simple request/response exchange to communicate between the manager and the agent.

The **manager** issues requests such as:

- Get–A request for information of a specific variable.
- GetNext–A request for the *next* specific variable.
- Set–A request to change the value of a specific variable.

The **agent** responds with:

- Get-Response–A response to the manager's Get and GetNext commands.
- Trap–An asynchronous message to the recipient about an error or event.

Note: Refer to the SNMP software documentation for additional information.

Access Control

Because community strings provide a weak form of access control in SNMPv1, StorageTek's embedded agent will not rely on the so called "private" community string in order to accept changes to the library's configuration. Access control and authorization for **Set** operations is preformed by using an administrative password. Consequently StorageTek's embedded agent uses only one community string for both **Get** and **Set** operations.

Important:
You must first **Set** the MIB variable `lserLibConfigPassword` (1.3.6.1.4.1.1211.1.12.3.2) to the same value as the library password (see Chapter 5, "Configuring the Subsystem" for more information). Then subsequent **Set** operations are authorized for a specific period of time called the grace period.

Traps however, can be sent to recipients using alternate community strings. Different community strings can be specified while adding entries to the Trap Recipient List (see "Configuration" on page D-5)

■ Management Information Base

The MIB is a viewable document that contains descriptions about the characteristics for a managed device. These characteristics are the functional elements for that device which can be monitored using SNMP software. To access and view the contents of the MIB using a Web browser, enter the IP Address or DNS library name and Lseries.mib. For example: http://*IP.Address/* Lseries.mib or http://*library_name*/Lseries.mib.

Note: StorageTek's L-series libraries implement only MIB extensions defined in the LSERIES-TAPE-LIBRARY-MIB under the **private (4)** section as shown in Figure D-2 on page D-5.

Figure D-2. Management Information Base Hierarchy (C67376)

MIB Title: LSERIES-TAPE-LIBRARY-MIB
Object: iso.identified-organization.dod.internet.private.enterprise.storagetek.products.IseriesTapeLibrary
Equivalent Object Descriptor: 1.3.6.1.4.1.1211.1.12
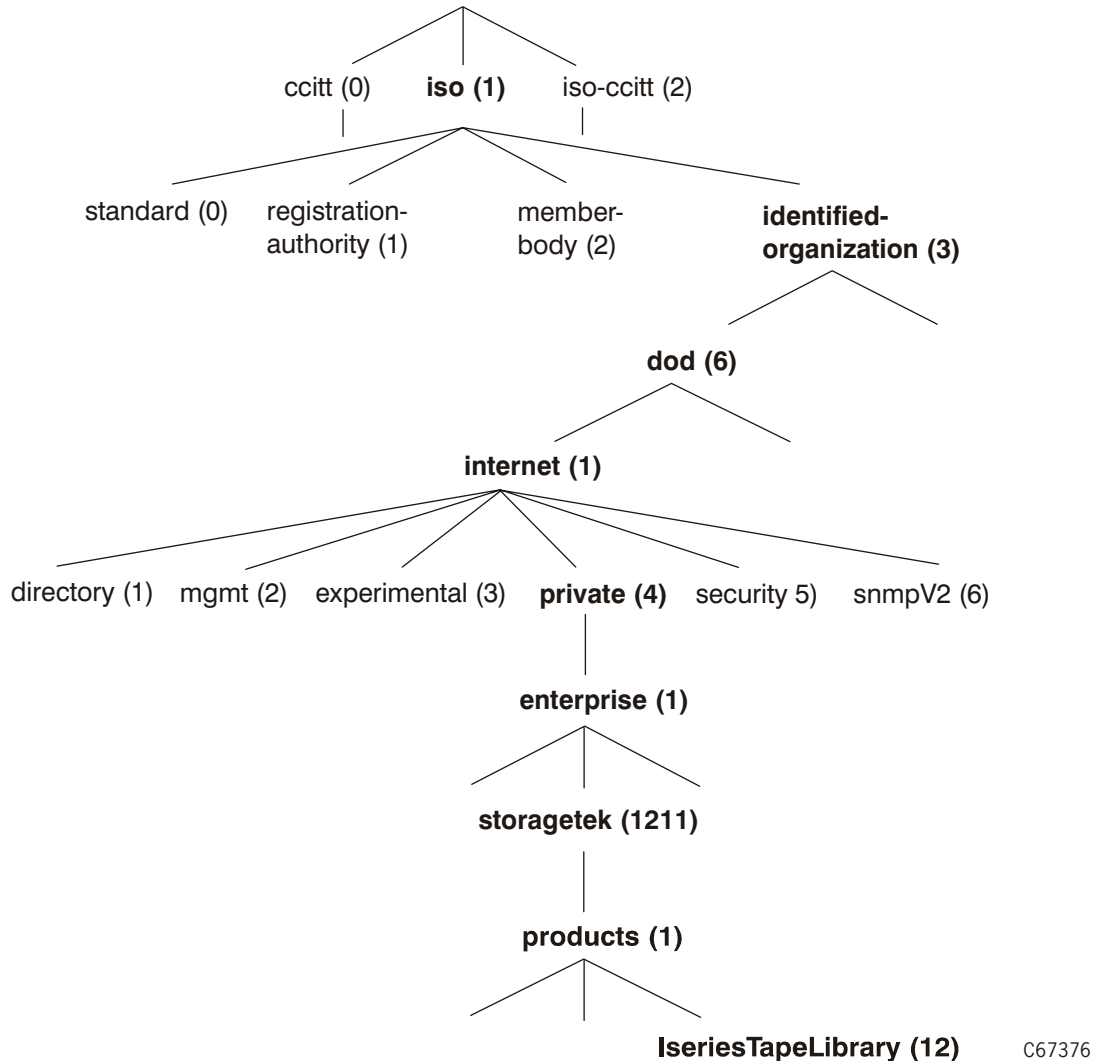
■ Configuration

There are three ways to configure the library to support SNMP, through:

- Library Admin
  An *optional* feature for the library but it is not required to support SNMP.
  See for examples of the Library Admin screens.

- CLI port (command line interface)
  See for an example of the help and help snmp commands.

- SNMP software application
  You can also use any SNMP application to change *some* of the agent's settings.
  You must be MIB-aware and refer to the Lseries.mib for specific information.

The library comes configured with some default settings shown in Table D-1:

Table D-1. SNMP Default Settings

Setting	Default	Description
Port number	`161`	Valid port numbers are 161, and 1024 to 65535.
Community String	`public`	Agent community string. When set to public, requests coming from *any* community string will be accepted.
Grace Period	`5 minutes`	1 to 5 minutes Once you enter the password, you have 1-5 minutes to Set any values for the agent.
Trap Recipient List	`Empty`	This list contains up to 12 recipients with no duplicate entries.
SNMP (*agent*)	`Disabled`	Enabled or disabled.

Starting SNMP

To start SNMP for the library, you need to:

1. Configure the library:

   a. **Enable** the agent.

   b. Add recipients to the trap list (if needed).

   c. Make any optional changes to the default settings.

2. **Re-IPL** the library.
   Note: You *must* re-IPL the library for the changes to take effect.

Library Admin

StorageTek's L-Series Library Admin is an optional, Web-based, graphical user interface (GUI) that enables systems administrators to configure the libraries to support SNMP. The following two figures show examples of the Library Admin network configuration screens.

shows a screen that allows you to:

- Configure the network
- Configure and enable the SNMP agent
- Change the default settings (port, community, and grace period)

Figure D-3. Network Configuration Screen—Configuring the SNMP Agent

Eleventh Edition
StorageTek Proprietary

Configuration

Figure D-4 shows an example of the network configuration screen for adding trap recipients. The L180 and L700 libraries allow up to 12 recipients to be added.

Figure D-4. Network Configuration Screen—Trap Recipients

Configuration

Command Line Interface

The command line interface (CLI) is another way to configure SNMP for the library. Figure D-5 shows an example of the CLI commands to configure SNMP for the library:

Figure D-5. CLI Help and Help SNMP Commands

```
cli> help
help [command]          help on a specific command
diag                    execute diagnostics
download                download new image to prom
fsc                     manipulate fault symptom codes
network                 manipulate network information
snmp                    manipulate SNMP configuration
time                    view/modify library date & time
password                reset/modify library admin password


cli> help snmp
snmp view               display SNMP Agent settings
snmp community [string]  set Community String
snmp [enable|disable]    enable of disable SNMP Agent
snmp port [port number]  set Agent Listening Port Number
                         (Valid: 161, 1024-65535)
snmp grace [number]      set Write Grace Period Number
                           ( 1-5 minutes )
snmp reset               set SNMP Agent configuration parameters
                         to default values
snmp list                display SNMP Trap Recipient List
snmp add                 add a member to the SNMP Trap Recipient List by
                         answering individual prompts for values.
snmp add [ipaddr|name]   add a member to the SNMP Trap Recipient List using
                         some default values
snmp add [ipaddr|name] [host port number]
                         add a member to the SNMP Trap Recipient List
                         using some default values
snmp delete [[ipaddr|name] [host port number]] | all
                         delete all or a selected member of the SNMP
                         Trap Recipient List
                  Where valid [host port number] values: (162, 1024-65535)

cli> _
```

SNMP Software Application

The third way to configure SNMP for the library is by using the software application. Consult the documentation that came with the software application for directions about how to configure StorageTek's L-Series Tape Libraries to support SNMP with that application.

95896   Eleventh Edition   D-9
StorageTek Proprietary

This page intentionally left blank.

Eleventh Edition
StorageTek Proprietary

Specifications

E

This appendix lists the specifications for the L180 Tape Library.

■ Physical Dimensions

Figure E-1. Physical Dimensions (C67041)
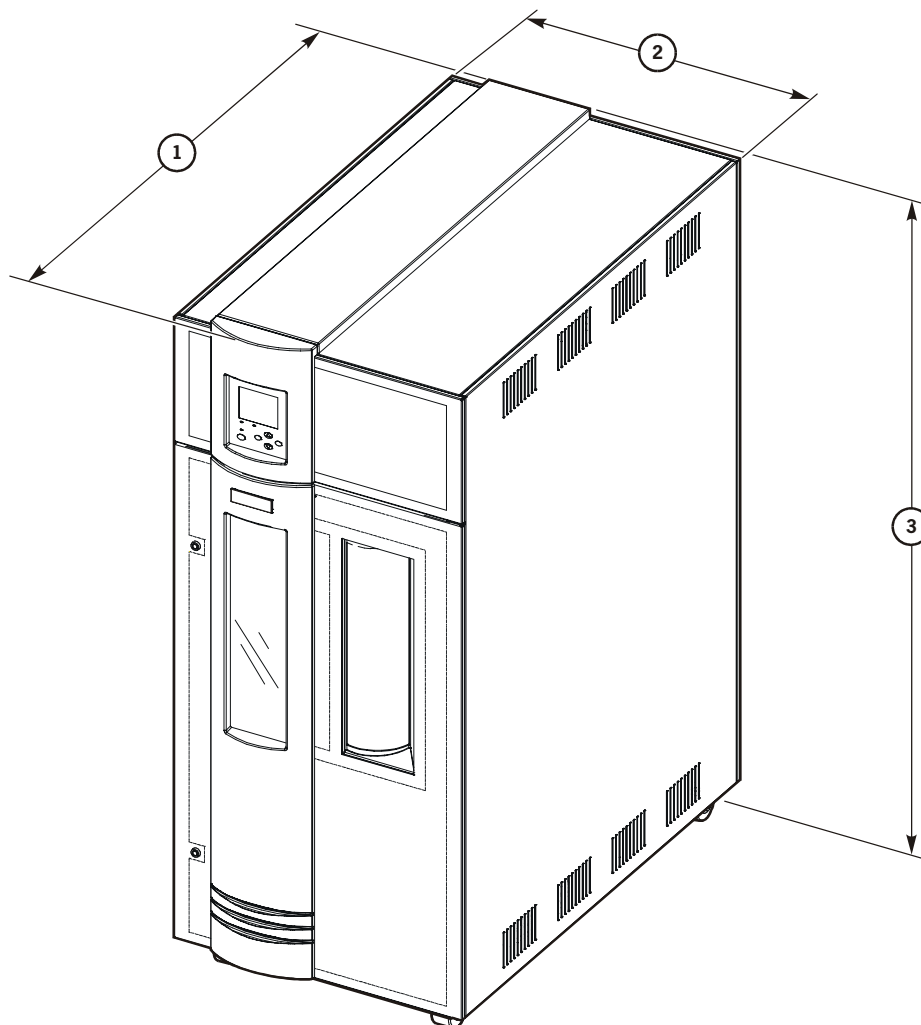
C67041

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

Note: Add 150 mm (6 in.) for top clearance and 100 mm (4 in.) on sides for cooling.

■ Power Specifications

Table E-1 lists library power specifications:

Table E-1. L180 Library Power Specifications

Power cable	**U.S./Canada:** 100 to 127 VAC UL/CSA power cable **International:** 200 to 240 VAC HAR power cable
Input voltage range	100 to 127 VAC / 200 to 240 VAC
Input current	**Library only:** 1.0 A at 120 VAC (0.5 A at 240 VAC)
Power configuration	**U.S./Canada:** Single-phase 100 to 127 VAC 50/60 Hz 15 A Service, 3-wire **International:** Single-phase 200 to 240 VAC 50/60 Hz 10 A Service, 3-wire
Power consumption	Library only: 120 W
Heat output	Library only: 410 BTU/hr (maximum)

■ Weight Variations

Table E-2 lists the variable specifications for the library. Note that weight varies with the quantity and type of drives installed.

Table E-2. L180-180 Library Weight Variations

L180-180	No Drives
Weight (including covers but without cartridges)	274.4 kg (605 lb)
Notes: 1. Each DLT cartridge weighs 223 g (7.85 oz). 2. Each T9840 cartridge weighs 262 g (9.17 oz). 3. Each LTO cartridge weighs 220 g (7.7 oz).	

■ Environmental Specifications

Table E-3 lists the environmental consideration for the library:

Table E-3. L180 Library Environmental Specifications

Temperature Operating Storage Shipping	 15º to 32ºC (59º to 90ºF) 10º to 40ºC (50º to 104ºF) -40º to 60ºC (-40º to 140ºF)
Relative Humidity Operating Storage Shipping	 20% to 80% (noncondensing) 10% to 95% (noncondensing) 10% to 95% (noncondensing)
Wet Bulb Maximum Operating Storage Shipping	 29.2ºC (84.5ºF) 35ºC (95ºF) 35ºC (95ºF)
Altitude Operating Storage Shipping	 0 to 3.05 km (0 to 10,000 ft) 0 to 3.05 km (0 to 10,000 ft) 0 to 15.24 km (0 to 50,000 ft)

■ Uninterruptible Power Supply

Table E-4 lists the UPS specifications:

Table E-4. UPS Specifications

Acceptable voltage	0 to 160 VAC @ 47 to 63 Hz
Output voltage	103 to 132 VAC
Maximum load: **Volt-amps** **Watts** **Amps** **BTUs/hr**	 1400 VA 950 W 12 A 171 Btu
Height **Width** **Depth**	21.6 cm (8.5 in.) 17 cm (6.7 in.) 44 cm (17.3 in.)
Weight	28.6 kg (63 lbs)
Battery life	3 to 6 years
Recharge time	2 to 5 hours
Replacement battery	RBC 24

Table E-5 lists the typical runtimes when operating on the battery:

Table E-5. Typical Runtimes

Load (Watts)	Volt Ampere	Time
65	100	4 hr 10 min
130	200	2 hr 16 min
195	300	1 hr 28 min
260	400	1 hr 3 min
325	500	47 min
390	600	36 min
455	700	28 min
520	800	23 min
585	900	18 min
650	1000	15 min
780	1200	11 min
910	1400	8 min

Index

Numerics

6U, defined, 1-1
9840
    cartridge labels, 6-1
    configuring, 5-22
    daisy-chaining, 7-10
    ESCON interface, 7-15
    preparing the, 6-10
    SCSI direct connections, 7-9

A

about the library, 1-1
access, cable, 2-3
ACSLS version, 5-9, 7-6
agent, D-3
alert messages in manual, xviii
altitude specifications, E-3
APC power supply, 4-2
applying cartridge labels, 6-1
arrays, arrangement of, 1-7
audit, 4-8
audit data from library, 8-1
Auto Clean, 5-13

B

bar code, 1-6
baud rate
    CSE port, A-1
    SER1 port, A-2
baud rate, CLI (CSE) port, B-5
browser, 1-14
BULL DPX/20 cable, 7-4

C

cables
    access holes, 2-3
    CCITT, A-2
    Ethernet, 7-16
    Fibre Channel specifications, 1-10

LVD required conversion bill, 2-18
    power, 4-4
    RJ-45 cables, B-1
    SCSI
        50-to-68 pin cables, 7-4
        68-pin jackscrew connector, 7-3
        HD 68-pin VHDC, 7-2
        special adapters, 7-5
    universal (LVD), 7-6
cables, external connections
    Fibre Channel, 2-14
    RJ-45, B-1
    SCSI to drive, 7-8
    SCSI to library, 7-6
calibration
    hand-camera assembly, 1-6
    robotics, 4-7
    vision, 4-7
capacity, of library, 5-14
cartridges
    cleaning
        labels, 6-1
        loading, 6-5
        location, 6-5
    diagnostic
        labels, 6-1
        loading, 6-5
        location, 6-5
    dismounting from drive manually, 6-8
    labels, ordering information, 6-6
    manual mounting of, 6-8
    media ID label, 6-4
    ordering, 6-16
    ordering information, 6-6
    starter kits, 6-5
    Ultrium, general information, 6-3
caution
    Auto Clean preference, 6-1
    backlash from straps, 2-6
    confined space, 2-10
    description of, xviii
    equipment damage, B-4, B-6
    ESD, 2-10
    hand damage, 2-11

See also DLT, 9840, LTO, and Ultrium
drop-off cell
    See swap cell.
dynamic Worldwide Name
    explained/enabling, 5-18

E

electronic components, 1-1
electronics module bulkhead, 1-3
e-Partners Web site, xxi
ESCON interface, 7-15
ESD
    caution, 2-10
    grounding kit, contents, xxv
    precautions and practices, xxv
    procedures to follow when servicing, xxv
Ethernet address
    defined, 5-19
    viewing the, 5-18
Ethernet connection (Enet connector), 7-16
export destination statement, -ii

F

Fast Load
    defined, 5-12
    enabling, 5-12
fault symptom code. *See* FSC
fiber-optic cables
    connections, 7-14
    connectors, xxviii
    handling, xxix
    installation, xxviii
    routing, 2-14
Fibre Channel
    cable specifications, 1-10
    dWWN, 5-18
    library cable connection, 7-13
    port address, 5-11
    worldwide IDs (library), 5-11
firmware
    DOS transfer, B-4
    download, 1-14
    hyperterminal transfer, B-5
FSC
    viewing, A-1
FSC dictionary, B-4, B-6

G

Get-Put loop test, 6-11
Global Services Support Tools, xxi
gripper mechanism, location of, 1-6
grounding
    for safety, xxiii
    kit, xxv
    procedures, xxvi

H

hand-camera assembly
    description of, 1-6
    location of, 1-5
hardcopy publications, xxii
HBA requirements, 1-9
High Voltage Differential *See* HVD
host bus adapters, 1-9
humidity specifications, E-3
HVD
    cables, 7-3
    daisy-chain cables, 7-2
    general requirements, 7-1
    precautions, 1-10
    VHDC cables, 7-2
hyperterminal
    firmware transfer, B-5
    protocol setup, B-5

I

indicators, operator panel, 5-6
initialization, 4-6
input power and drives, 1-11, E-3
installation
    fiber-optic cables, xxviii
installation procedures
    cables, 7-1
    checklist, 2-2
    configuration, 5-1
    drives, 3-1
    MPC card configuration, 2-16
    optional power components, 2-13
    power cable, 4-4
    site preparation, 2-3
    tools, 2-1
    unpacking library, 2-6

M

managed device, D-3
Management Information Base, D-3
media ID label, 6-4
media, ordering, 6-16
menu, 5-7
MIB, D-3, D-4
modem setup, A-2
modem switch settings, A-3
motor
    hand camera assembly, 1-6
    theta motor, 1-5
    Z motor, 1-5
Mount-Dismount loop test, 6-12
MPU card, 7-12
MPV card, 7-12
MPW card, 2-16

N

network
    dWWN, 5-18
network configuration menu, 5-15
network gateway
    configuration, 5-16
    description of, 5-20
notes, description of, xviii

O

operational parameters, E-3
operator panel
    buttons and LEDs, 5-7
    description of, 5-6
optional PDU, 2-13, 4-1
optional power supply, 2-13
ordering information
    cartridges and labels, 6-6
    Media Service center, 6-16
organization of information in this
  manual, xvii
overview, 1-1

P

packing material, 2-6

part number
    terminating power, 2-17
part numbers
    cartridges & labels, 6-6
    fiber-optic cables, 7-12
    power cables, 1-13
    publications, xix
    SCSI daisy-chain cables, 7-2
PDU (power distribution unit), 4-1
PDU (power distribution unit), optional. *See*
  optional PDU.
port
    CSE, 1-14
    Enet, 7-16
    locations, 1-3
    SCSI control, 7-6
Port 0 worldwide ID
    description of, 5-11
port address (Fibre Channel), 5-11
power
    cable, 1-13, 4-4
    cable routing, 4-5
    connecting to, 4-6
    described, 4-1
    drive column, 4-3
    redundancy, 4-3
    site power considerations, 1-11, E-3
    system components, 4-1
    wall receptacle, 2-3
power supply, DC, 4-2
precautions
    ESD, xxv
    handling fiber-optic cables, xxix
    safety, xxiii
    SCSI bus, 1-10
prevent ESD, xxv
Publications
    order numbers, xix
    related to this manual, xix

R

rack area, 1-11
    6U, definition of, 1-1
    door, location of, 1-1
    safety, xxix
recipient, D-3
related publications, xix

Sun server connections, 7-7
swap cell, 6-5

T

T9x40
    installing, 3-12
tapes
    installing, 6-14
    ordering, 6-16
    part numbers, 6-6
    See also cartridges
    starter kits, 6-5
temperature specifications, E-3
terminating power
    DLT jumper, 3-5
terminator
    SCSI differential, 7-1
    SCSI LVD/SE, 7-1
    SCSI single-ended, 7-1
terminator, part numbers, 2-17
TERMPWR, 2-16
theta motor, 1-5
theta stops, 1-8
time, setting the, 5-13
tools, required, 2-1
trap, D-3

U

Ultrium
    cartridge labels, 6-1
    cartridges, 6-3
    cartridges into arrays, 6-14
    label prefixes, 6-3
    loading a cartridge into, 6-10
    ordering cartridges, 6-6
    preparation, 6-9
    required library conversion bill, 1-9

terminating power, 3-10
    unloading a cartridge from, 6-10
uninterruptible power supply, 4-2
UNIX-based workstation
    connection, 7-8
UPS, 4-2
    conversion bills, 2-13

V

vision system, 1-6
VOLSER labels, 6-15

W

warning
    eye hazard from laser, xxvii
    messages in manual, xviii
    rack equipment in library, xxix
warning, description of, xviii
warning, heavy load, 2-7
Web password
    description of, 5-17
web password, 5-28
wet bulb specifications, E-3
wheel chocks, 2-9
worldwide ID
    library, 5-11
    Port 0, 5-11

Z

Z carriage, 1-5
Z motor
    function, 1-5
    location, 1-5
z-modem, firmware download, B-6

This page intentionally left blank.

Reader's Comment Form

Contact Us

Submit your questions, comments, and suggestions to StorageTek's Global Learning Solutions. We appreciate your correspondence and are committed to responding to you.

Publication Information

Publication Name:

Publication Part Number:

Questions and Comments:

Note: Staples can cause problems with automated mail sorting equipment. Please use pressure sensitive or other gummed tape to seal this form. If you would like a reply, please supply your name and address on the reverse side of this form.

Thank you for your cooperation. No postage stamp is required if mailed in the U.S.A.

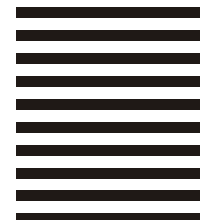TO COMPLY WITH POSTAL REGULATIONS, FOLD EXACTLY ON DOTTED LINES AND TAPE (DO NOT STAPLE)

BUSINESS REPLY CARD
FIRST CLASS   PERMIT NO. 2   LOUISVILLE, CO U.S.A.

POSTAGE WILL BE PAID BY ADDRESSEE

GLOBAL LEARNING SOLUTIONS MS 3256
STORAGE TECHNOLOGY CORPORATION
ONE STORAGETEK DRIVE
LOUISVILLE CO 80028-9989
USA

FOLD HERE AND TAPE   DO NOT STAPLE   FOLD HERE AND TAPE

If you would like a reply, please print:

Your Name:_____

Company Name:_____ Department:_____

Street Address:_____

City:_____

State:_____ Zip Code:_____

Storage Technology Corporation
One StorageTek Drive
Louisville, CO 80028-3256
USA

STORAGETEK

INFORMATION *made* POWERFUL™