

# *Compaq StorageWorks*

## **SSL2000 Series Library**

Reference Guide

First Edition (April 2000)  
Part Number 187193-001  
Compaq Computer Corporation

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Compaq StorageWorks SSL2000 Series Library Reference Guide  
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# About This Guide

This guide is designed to be used as step-by-step instructions for installation and as a reference for operation, maintenance, and troubleshooting.

## Text Conventions

This document uses the following conventions to distinguish elements of text:

<b>Keys</b>	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
<i>FILENAMES</i>	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase.
Type	When you are instructed to <i>type</i> information, type the information <b>without</b> pressing the <b>Enter</b> key.
<b>Enter</b>	When you are instructed to <i>enter</i> information, type the information and then press the <b>Enter</b> key.

## Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



**WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

---



**CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

---

**IMPORTANT:** Text set off in this manner presents clarifying information or specific instructions.

---

**NOTE:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

## Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.



Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

**WARNING:** To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

---



Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.

**WARNING:** To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

---



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

**WARNING:** To reduce the risk of injury from a hot component, allow the surface to cool before touching.

---



Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

**WARNING:** To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

---



Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

**WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

---

## Cabinet Stability



**WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
  - The full weight of the cabinet rests on the leveling jacks.
  - The stabilizing feet are attached to the cabinet if it is a single cabinet installation.
  - The cabinets are coupled together in multiple cabinet installations.
  - Only one component is extended at a time. A cabinet may become unstable if more than one component is extended for any reason.
-

## Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

### Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website at <http://www.compaq.com>.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

### Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. You can access the Compaq website at <http://www.compaq.com>.

## **Compaq Authorized Reseller**

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the Compaq website for locations and telephone numbers.

# Chapter 1

## System Description

### Introduction

The *Compaq StorageWorks SSL2000 Series* is a tape library system that combines Advanced Intelligent Tape™ (AIT) drive technology with advanced robotics. Designed for high duty-cycle online and near-online applications, such as hierarchical storage management, it is a superior performer in high-volume backup and archival service.

The Compaq StorageWorks SSL2000 Series Library can operate as a standalone library or can be combined with additional units to form a larger integrated system.

A Library can be equipped with one or two tape drives and a 20-slot tape cartridge magazine that includes one mail slot.

This chapter includes descriptions for:

- Library models
- Multi-unit Library systems
- Tape cartridge mail slot
- SCSI interface and bus performance considerations
- Shuttle lockdown mechanism
- Library features
- Advanced design features

## Library Models

Libraries are currently available with:

- A tabletop or rackmount version
- One or two tape drives
- An optional Pass-Through Mechanism (PTM) for connecting up to five library units
- AIT 2 technology
- A Fast/Wide, Low Voltage Differential (LVD)/Single Ended (SE) SCSI-2 interface

The drives used in the Library read from and write to 8 mm AIT 2 data tape cartridges with a native capacity of 35 GB or 50 GB (see Table 1-1).

---

**Table 1-1**  
**Library Models**

---

<b>Model Number</b>	<b>Configuration</b>
175195-B21	1 Drive, AIT 2 50 GB, tabletop, LVD/SE
175195-B22	2 Drive, AIT 2 50 GB, tabletop, LVD/SE
175196-B21	1 Drive, AIT 2 50 GB, rackmount, LVD/SE
175196-B22	2 Drive, AIT 2 50 GB, rackmount, LVD/SE

---

## Multi-Unit Library Systems

The Library features SmartScale Storage™ – an architecture that lets you combine multiple units into an integrated library system. This architecture enables the robotics in each of the Library units to exchange cartridges by means of a vertical PTM. Under the control of the unit you configure to be the master unit, the PTM integrates the robotics in the individual slave units into a single high-performance library robotics system. For more information, see Chapter 3, “Installing and Removing the Pass-Through Mechanism.”



The SmartScale Storage architecture gives you a truly scaleable library that can smoothly expand to meet your growing storage needs. You can start with a system configured to your present requirements, confident that as your storage needs evolve, adding units and extending the PTM can easily modify the Library. Add drives for faster performance or magazine space for greater capacity, as needed. Then just turn on the power, and immediately the system updates the system map so the host is informed of the expanded capability. The SmartScale Storage architecture has built-in redundancy so that if the master unit fails, a slave unit (slave 0) can be configured to take over as the master unit. This is done without having to make hardware changes except moving the motor cable to the new master.

## Tape Cartridge Magazine Mail Slot

If your host software permits, you can use the front slot in the tape cartridge magazine (the first slot you see when you open the door) as a mail slot for inserting or removing a single cartridge without interrupting host operations in progress. The mail slot is implemented as the SCSI IMPORT/EXPORT commands.

## SCSI Interface

The unit presents the following to the host:

- A single SCSI medium changer device with a single SCSI medium transport element
- A number of SCSI storage elements equal to the total number of cartridge magazine slots
- A single SCSI import/export element
- A number of SCSI data transfer elements equal to the total number of drives in the library

## Multi-Server Data Sharing

A host computer with a SCSI controller connected to a bus is a SCSI initiator. The Library is a SCSI target. SCSI rules permit multiple initiators on a single bus. Therefore, with the proper host software, it is possible to connect multiple hosts to a single Library over a single SCSI bus. This allows multiple hosts to operate the library robotics, loading and unloading cartridges as each host requires.

#### **1-4** *Compaq StorageWorks SSL2000 Series Library Reference Guide*

In a library system with many drives, it might be desirable to use multiple SCSI buses for the drives so the data transfer rate of the drives is not limited by bus bandwidth. Individual drives can be connected to separate hosts. Using special software, one of the hosts can act as a master server, processing all robotics commands and permitting several hosts to share a common database.

## SCSI Configuration

The Library standard SCSI interface is a Fast/Wide LVD/SE using high-density, 68-pin D-series connectors. For more information, see Chapter 2, “Installation.”

## SCSI Bus Performance Considerations

### Drives

With a standard Fast/Wide SCSI interface, each drive offers a sustained native data transfer rate of 6 MB/s. In a two-drive unit, the total native rate is twice these rates. The rates for compressed data are the native rates multiplied by the compression factor, which depends on file content, but averages approximately 2:1.

### Data Transfer Rate

The data transfer rate of the Library depends on the type of the AIT drive, number of drives, and the number of drives connected to the SCSI bus. The library robotics imposes minimal loading on the bus.

AIT-2	Fast/Wide	@ 40 MB/s (burst)
AIT-2	Sustained	@ 6 MB/s (native) @ 12 MB/s (compressed)

Each drive has a maximum sustained rate of 12 MB/s with compressed data. As a result, the transfer rate of a two-drive unit occupies the full bandwidth of the bus. Sharing a SCSI bus among more than two drives degrades the maximum performance of the library system.

## Internal Cabling Configuration

Each SCSI bus in the Library is wired separately. The library robotics and drive 1 share one bus; add-on drives are connected to separate SCSI buses. SCSI jumper cables are available to allow the drives and robotics of a unit to be daisy-chained to a single SCSI bus. For more detailed information, see Chapter 2, “Installation.”

## Bus Length Limitations

A single-ended Fast/Wide SCSI bus is limited in length to 10 ft (3 m), including cabling within the units. A differential Fast/Wide SCSI bus can be up to 82 ft (25 m) in length, including cabling within the units. If all devices and host adapter are LVD, length is limited to 39 ft (12 m).

## Independent SCSI Buses for SE

For those two-drive applications where both AIT drives run in SCSI SE mode (rather than LVD mode), each drive must be connected to its own SCSI bus.

## Physical Configuration

The Library is configured as a tabletop model. To convert a tabletop Library to a rackmounted model, order the Compaq Conversion Kit, part number 175199-B21.

## Shuttle Lockdown Mechanism

Compaq has installed a shuttle lockdown mechanism as a precautionary safety mechanism to prevent damage to the Library during shipment from the factory. The mechanism is a spring-loaded screw in the back of the Library that secures the shuttle to a bracket.

**NOTE:** You must release the shuttle lockdown mechanism before powering up the unit or it will not operate. See Chapter 2, "Installation," for more information.

## Library Features

Figures 1-1 through 1-3 shows some of the external features of the Library (see Tables 1-2 through 1-4).

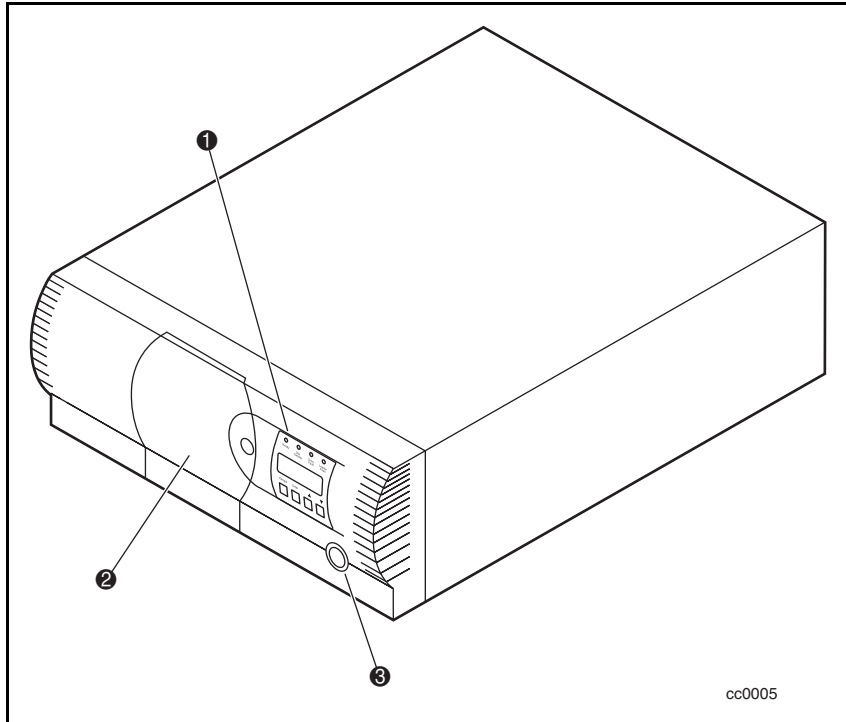


Figure 1-1. Library front view

**Table 1-2**  
**Library Front View**

Figure Legend	Description
①	Control panel
②	Magazine door
③	Power switch

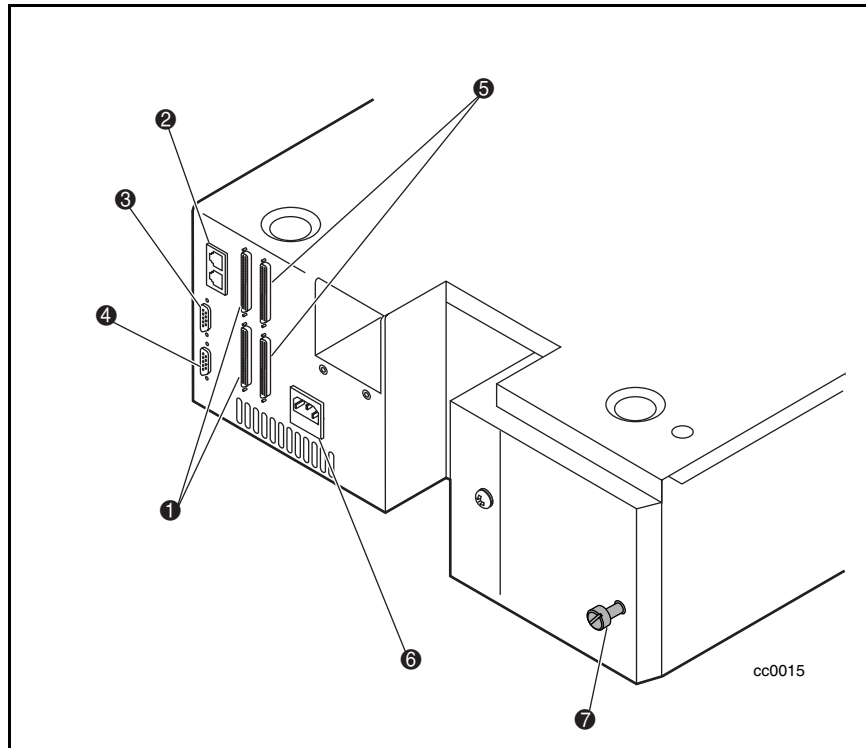


Figure 1-2. Library rear view

**Table 1-3**  
**Library Rear View**

Figure Legend	Description
①	DRV 1+ LIB
②	Expansion ports
③	Diagnostic
④	Motor
⑤	DRV 2
⑥	Power cord connector
⑦	Lockdown mechanism

## **Control Panel**

The control panel features a 4-line by 20-character backlit liquid crystal display, four LED indicators and four buttons. The buttons let you navigate through the menu structure to select and display operating modes, device status, diagnostic and maintenance functions, device history and error statistics, and library system configuration. The functions of the control panel are described in detail in Chapter 4, “Operation.”

## **Display**

The backlit, 4-line by 20-character control panel display provides a highly intelligible presentation of drive and loader status, menu choices, and error messages. The scrolling feature greatly expands the amount of information available to you.

## **Power Supply**

The AC power switch is located on the front panel of the unit. The autoranging power supply adjusts automatically to either of two operating voltage ranges. The ranges are 100-120 VAC and 220-240 VAC. The power supply is capable of operating at 47 or 63 Hz without any adjustment or modification. AC power is supplied to the power supply by a single IEC-compatible socket, which can be connected to any properly grounded outlet.

## Tape Cartridge Magazine

The rugged polymer magazine fits into an extruded track, which assures precise positioning for the library robotics (see Figure 1-3 and Table 1-4).

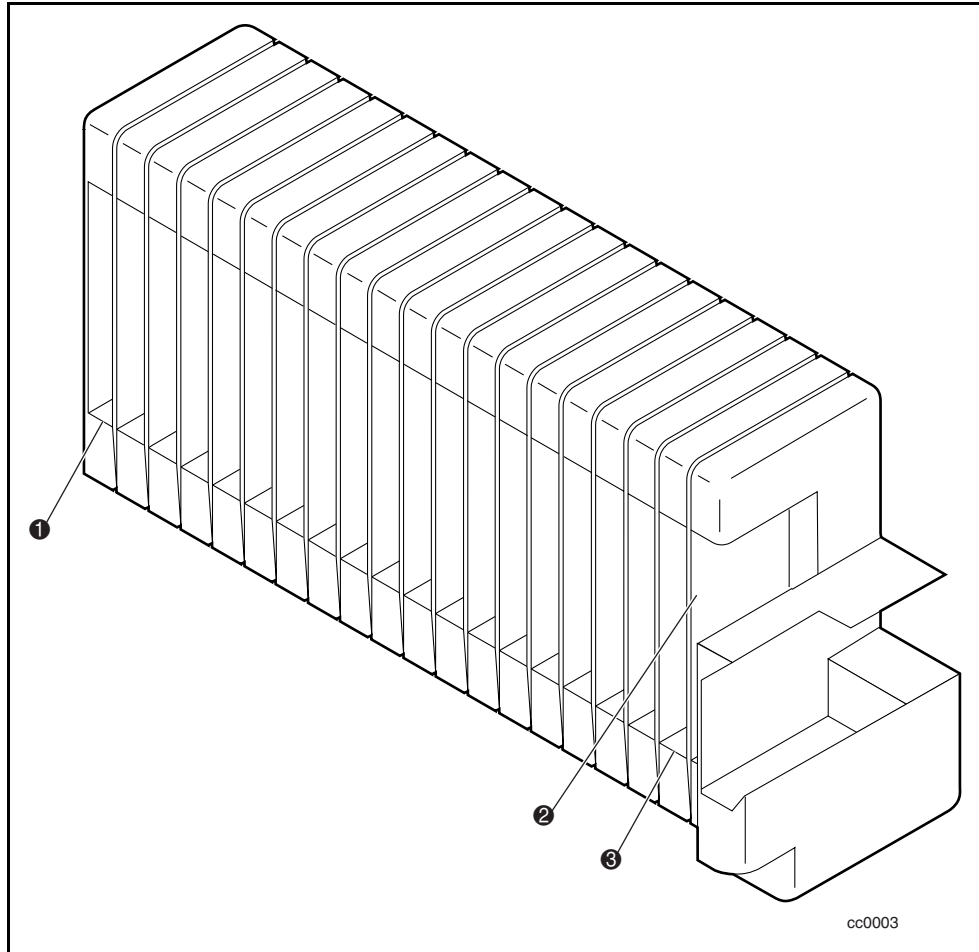


Figure 1-3. Tape cartridge magazine



**Table 1-4**  
**Tape Cartridge Magazine**

Figure Legend	Description
❶	Slot 18
❷	Mail slot
❸	Slot 0

The front slot in the magazine is a Mail Slot, used to add or remove cartridges without interrupting library operation. You can remove the magazine through the front door, but it is protected from tampering in either of two ways:

- An electronic combination lock, operated from the control panel
- The host issuing a SCSI PREVENT/ALLOW MEDIUM REMOVAL command

For more information on inserting and removing the magazine, see Chapter 4, “Operation.”

## Integral Fan Cooling

Each AIT drive contains a thermostat-controlled fan. In addition, a fan is mounted inside the Library to prevent critical parts from overheating.

## Robotics

The Library features Compaq Mainframe-Class™ Library Robotics. These advanced robotics can load any of the cartridges stored in the magazine into any of the tape drives.

## Bar Code Reader

A standard barcode reader is mounted on the cartridge shuttle. It reads barcode labels attached to each cartridge, and maintains the barcode data in memory as part of the library system map.

## Advanced Design Features

### Embedded Diagnostics

The Library provides three levels of embedded diagnostics:

*Power-On Self Test (POST)* — Performs various verification tests on the system's configuration, host interface and device control functions, as well as memory tests when you power on the unit.

*User Diagnostics* — Lets you display and change configuration options. Selected from front panel.

*CE Diagnostics* — Advanced diagnostics used by Customer Engineers (CEs) for servicing the Library. Selected from front panel.

For more information on user diagnostics, see Chapter 2, "Installation."

For more information on Customer Engineer Diagnostics, refer to the *Compaq StorageWorks SSL2000 Series Library Maintenance and Service Manual*.

### Error Checking

The drives used in the Library use read while write data checking and error-correction code (ECC) technology such as is used in audio CD, DVD, and laser discs.

### Buffer

Drives are equipped with an 8-MB buffer.

### Compression

All drives used in the Library use the Adaptive Lossless Data Compression (ALDC data compression algorithm developed by IBM).

## Capacity

The Library with its 20-cartridge magazine offers the formatted capacities listed in Table 1-5.

**NOTE:** Capacities are based on 19 storage slots.

**Table 1-5  
Tape Capacities**

<b>Native Capacity Per Cartridge</b>	<b>Per Cartridge Compressed (2:1)</b>	<b>Full Magazine Compressed (2:1)</b>
35 GB	70 GB	1,330 GB (665 native)
50 GB	100 GB	1,900 GB (950 native)

## Media Life

The media manufacturer rates the media used in the Library at over 30,000 end-to-end passes and specifies a shelf life of at least 30 years.

# *Chapter 2*

## **Installation**

### **Introduction**

This chapter describes how to install the Compaq StorageWorks SSL2000 Series Library (AIT Library), including:

- Unpacking
- Releasing the lockdown mechanism
- Setting up desktop and rackmount models
- Setting up interfaces and cables
- Configuring the Library
- Configuring a Library system
- Setting up reserved slots
- Configuration options and settings

### **Unpacking**

Unpack the Library and place it in the desired physical location. Save the packing materials for reuse in case you need to send the unit to Compaq for repairs.

## Releasing the Lockdown Mechanism

If you have not done so, release the lockdown mechanism on the Library using the lockdown screw at the back of the unit ( ❶ Figure 2-1).

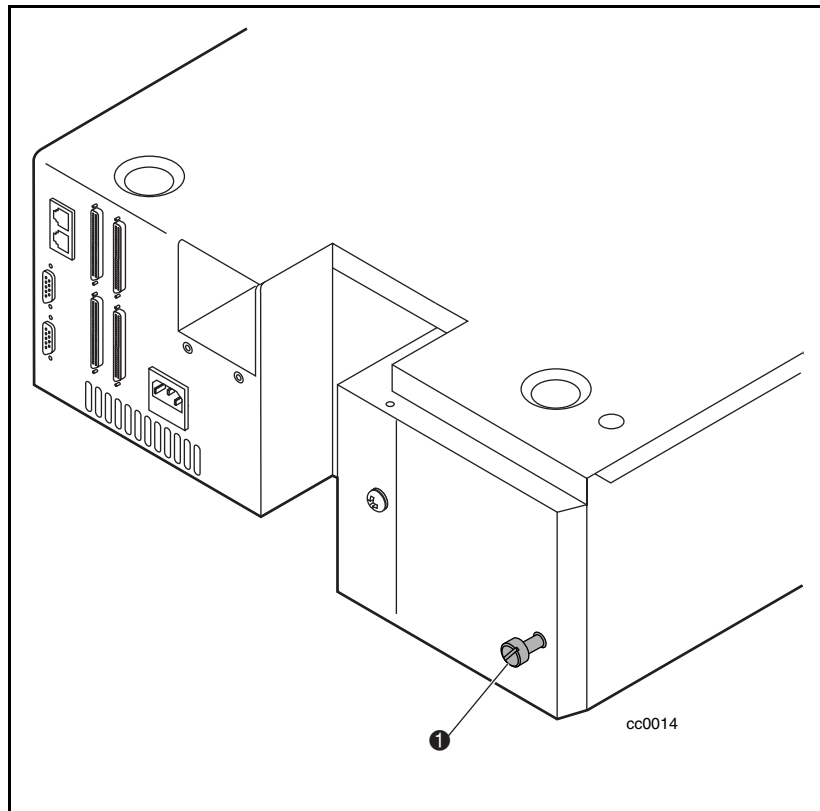


Figure 2-1. Lockdown mechanism screw

To release the lockdown mechanism:

1. Turn off the unit and then disconnect the power cord from the AC power source.
2. If necessary, reposition the unit for easier access to the back panel.

3. Turn the spring-loaded lockdown screw at the back of the unit counter-clockwise. The screw pops out and the lockdown mechanism releases from the shuttle ( ❶ Figure 2-2).
4. Connect AC power and then turn the unit power on.

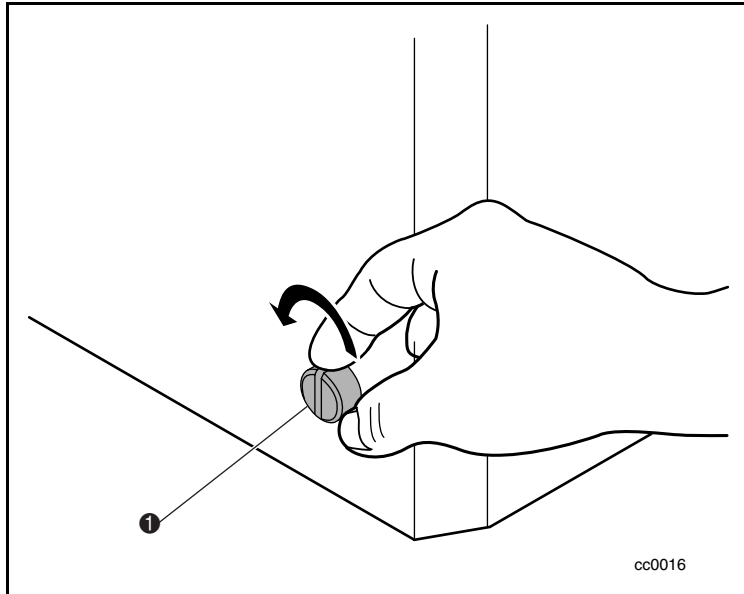


Figure 2-2. Releasing the lockdown mechanism

To lock the lockdown mechanism:

5. Park the shuttle assembly by selecting the Maintenance menu and then *Park* from the Main menu.

**NOTE:** The shuttle assembly moves to its home position, bringing the threaded hole into alignment with the lockdown screw.

6. Turn off the unit.
7. Disconnect the power cord from the AC power source.
8. If necessary, reposition the unit for easier access to the back panel.

9. Push in on the spring-loaded lockdown screw at the back of the unit and turn it clockwise ( ❶ Figure 2-3). This secures the shuttle to a bracket and locks it in place.

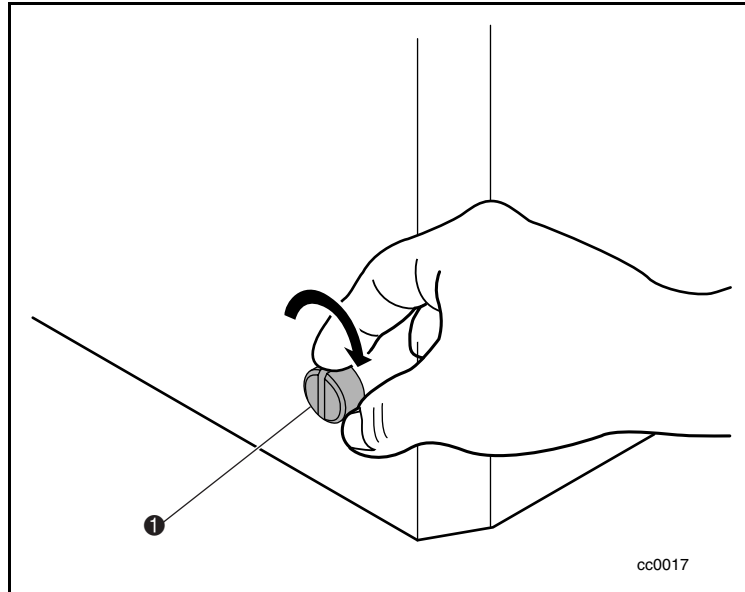


Figure 2-3. Locking the lockdown mechanism

## Setting up the Desktop Model

The Library tabletop model requires no mechanical assembly for mounting. Place the unit on a desk, table, server top, or other stable, horizontal surface. Make sure the cooling grilles at the rear of the unit are not obstructed. Allow 2 in (5 cm) of clearance behind the rear panel.

## Setting up the Rackmount Model

To convert a tabletop Library to a rackmount model, order the Compaq Conversion Kit, part number 175199-B21.

## Precaution

If you do mount the Library in a storage cabinet, be sure to take the following precautions:



**CAUTION:** Before moving and installing a Library into a storage cabinet, make sure that the robot is parked (using the control panel) and the lockdown mechanism is locked.

---



**CAUTION:** To prevent tipping, never slide units out of the storage cabinet so that more than 57 lb (226 kg) or 20% of the total storage cabinet weight is extended at any time.

---

## Removing the Desktop Outside Cover

Before installing the Library into a storage cabinet, you first remove the desktop outside cover (see Figure 2-4). To remove the outside cover:

1. Turn off power to the Library and then unplug it from the AC power source.
2. Remove the four screws that secure the outside cover to the unit.
3. Slide the outside cover toward the rear of the unit until it clears the lip behind the front panel.
4. Lift the outside cover up and away from the unit.
5. Save the hardware.



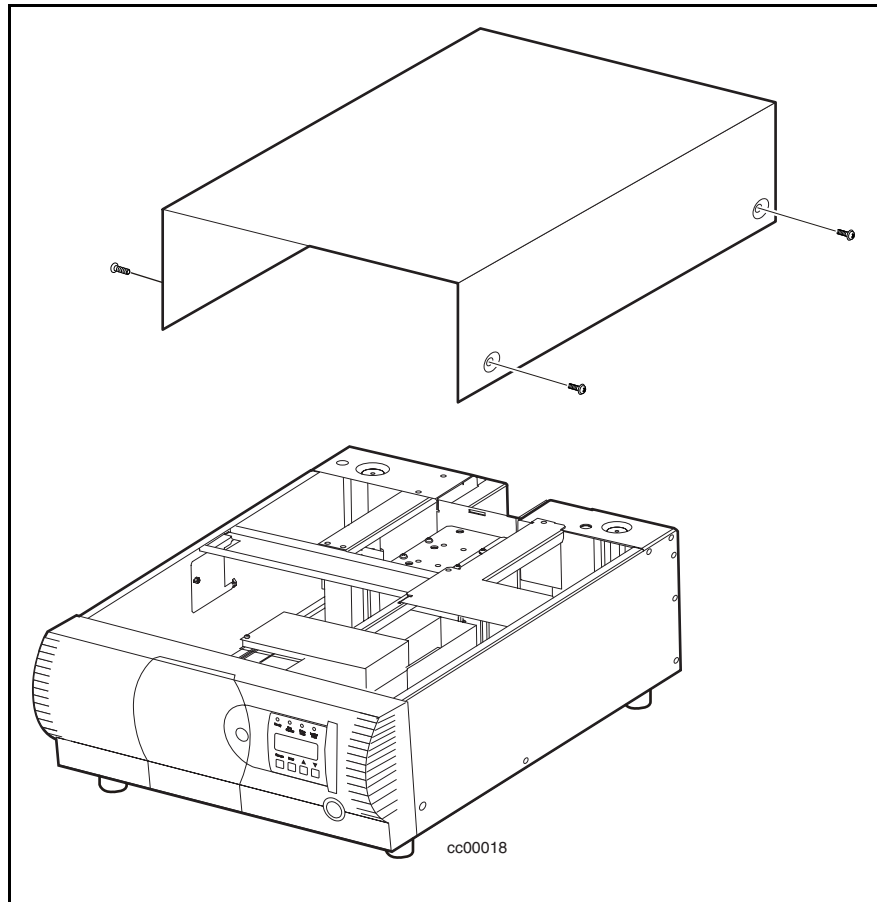


Figure 2-4. Removing the desktop outside cover

## Installing the Rackmount Top Cover

Install the rackmount top cover to protect the internal components of the Library prior to mounting it into a storage cabinet (see Figure 2-5). To install the rackmount top cover:

1. Place the top cover over the Library with each side flange facing to the outside of the unit.
2. Slide the top cover forward until it is flush with the front panel.

3. Secure the top cover to the Library using two screws (see Figure 2-5).
4. Remove the rubber feet.

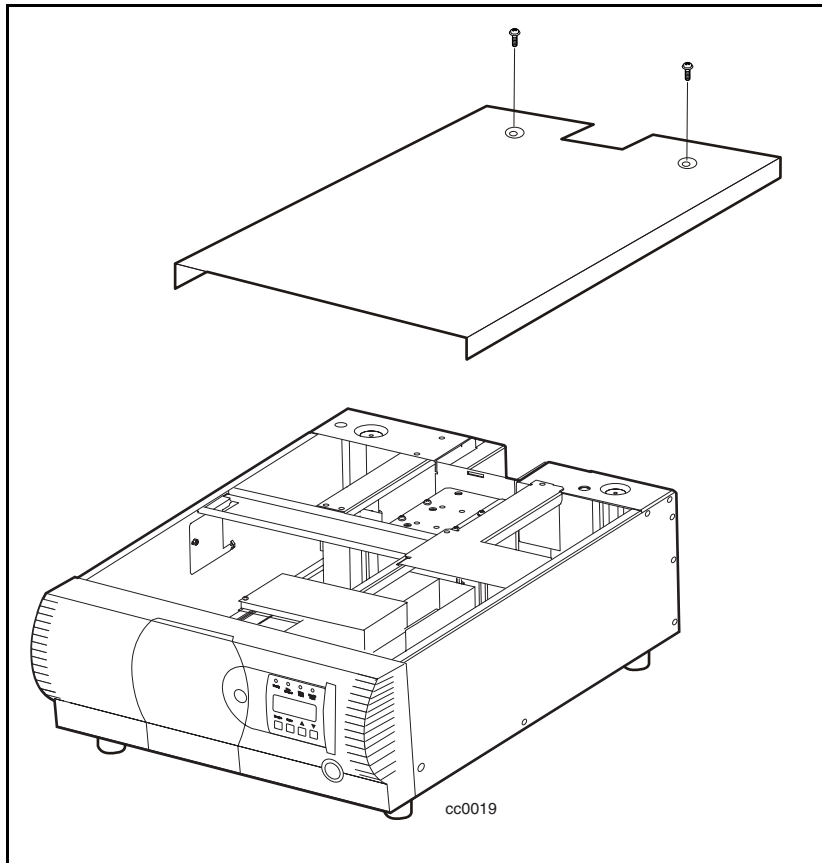


Figure 2-5. Installing the rackmount top cover

## Installing the Inner Slide Members

Attach an inner slide member to both sides of the Library using the following procedures. Make sure you attach each inner slide member of the rackmount slide assembly to the Library first and then each middle and outer slide members to the storage cabinet. To attach the inner slide members to the Library:

**NOTE:** The left and right slides are the same so there is no risk of confusing the parts upon reassembly.

1. Identify the parts of the rackmount slide assembly (see Figure 2-6 and Table 2-1).

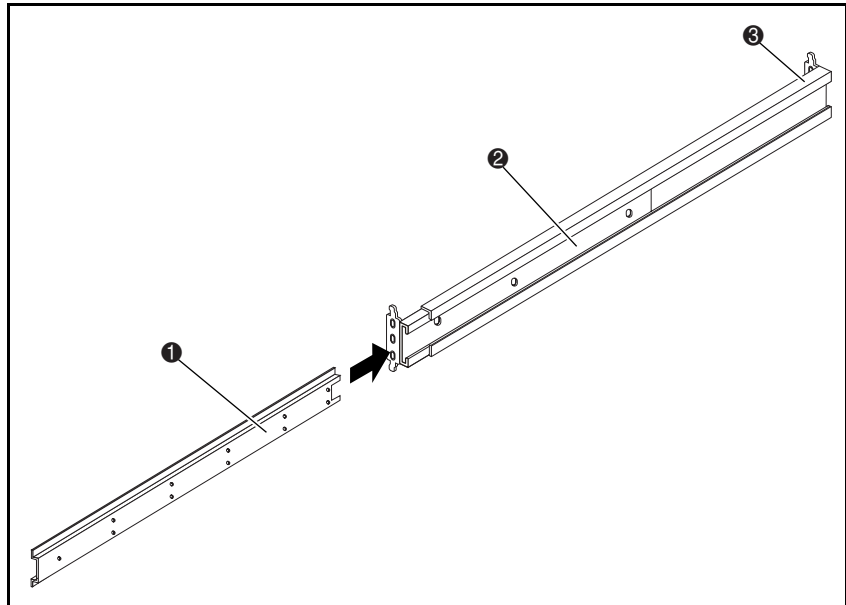


Figure 2-6. Rackmount slide parts

**Table 2-1**  
**Rackmount Slide Parts**

Figure Legend	Description
①	Inner slide member
②	Middle slide member
③	Outer slide member

2. Remove each inner member from each rackmount slide assembly.
3. Attach both inner members to the Library sides. Use six pan-head screws (three each side) inserted through the upper row of holes in each inner member (see Figure 2-7).

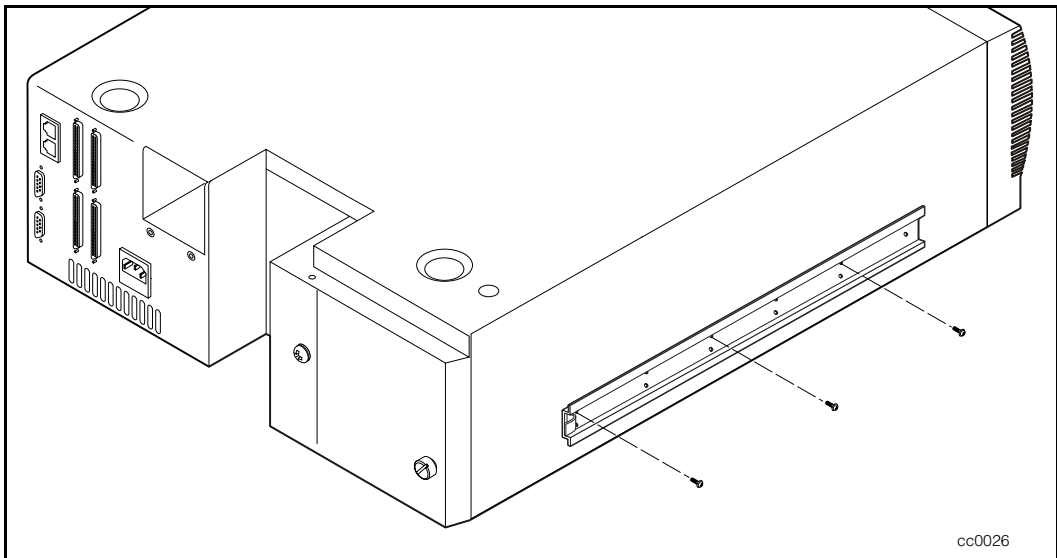


Figure 2-7. Installing the inner slides

## Installing the Panel Extensions

**NOTE:** The left and right slides are the same so there is no risk of confusing the parts upon reassembly.

1. Place a panel extension against one side of the Library so that the holes in the panel extension are aligned with the two holes in the chassis (see Figure 2-8).

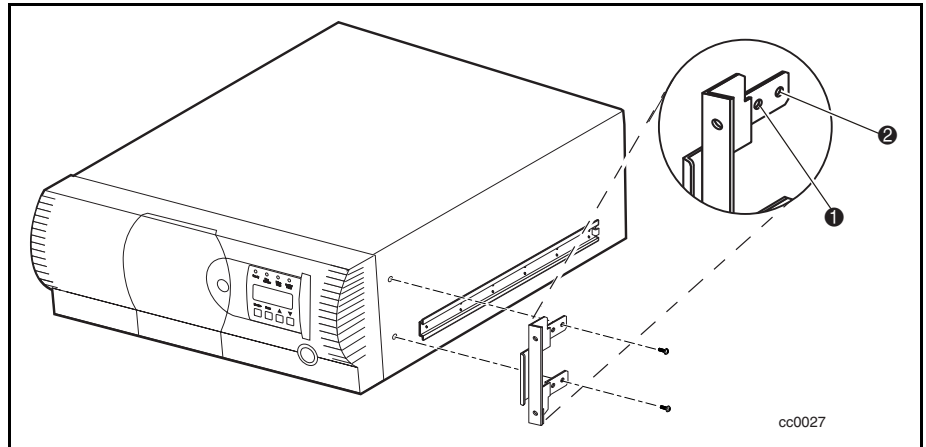


Figure 2-8. Installing the panel extension

2. Install two screws through the holes in the panel extension into the Library.

**NOTE:** The panel extension has two pairs of mounting holes. Use the forward pair for the regular mounting position (❶ Figure 2-8). Regular mounting leaves the curved front panel surface extending outward from the front of the storage cabinet. The rear pair of holes permit a flush mount position that leaves the front panel recessed into the storage cabinet (❷ Figure 2-8). You might choose flush mounting if, for example, you have storage cabinet doors that would be hindered by the protruding front panel.

3. Repeat steps 1 and 2 for the other side of the Library.

## Installing the Rackmount Model into a Storage Cabinet

1. With the inner slide members attached to the Library, install the middle and outer slide members to the storage cabinet, following the installation instructions in the *Compaq Rack Planning Guide*.
2. Using two people, lift the Library and visually align the inner and middle slide members. Carefully insert the Library's inner slide members into the extended middle slide members.
3. Slide the Library completely into the storage cabinet until the front panel touches it.
4. Secure the front panel to the storage cabinet using the supplied screws and cage nuts.

**NOTE:** If you are installing a pass-through mechanism (used for multi-unit Library systems), use the supplied "L" brackets (⚙ Figure 2-6). These brackets are shipped in the pass-through mechanism hardware kit or expansion kit. Install the brackets onto the outer slide member at the location shown in Figure 2-6.

## Setting up Interfaces and Cables

The following sections describe the cables required for each of the connectors at the rear panel (see Figure 2-9 and Table 2-2).

Refer to Chapter 3, "Installing and Removing the Pass-Through Mechanism," for detailed information on how to connect cables to the PTM motor housing assembly and Library units.

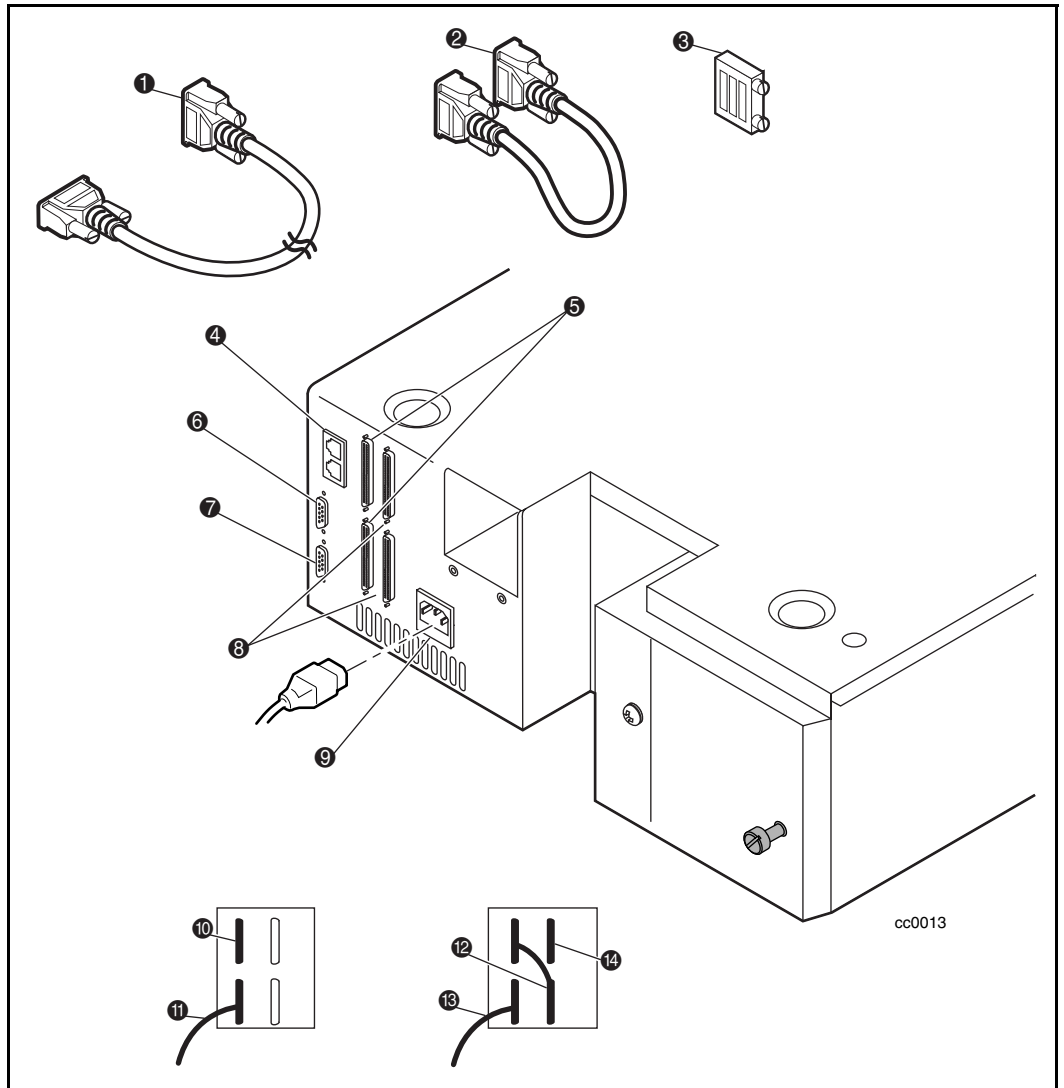


Figure 2-9. Connectors, SCSI terminator, and cables

**Table 2-2**  
**Connectors, SCSI Terminator, and Cables**

Figure Legend	Description
①	SCSI host cable
②	SCSI jumper cable
③	SCSI terminator
④	Expansion ports
⑤	DRV 0 + LIB
⑥	Diagnostic
⑦	Motor
⑧	DRV 1
⑨	AC power cord
⑩	SCSI terminator (1 drive configuration)
⑪	SCSI host cable (1 drive configuration)
⑫	SCSI jumper cable (2 drive configuration)
⑬	SCSI host cable (2 drive configuration)
⑭	SCSI terminator (2 drive configuration)

## Power Cord Connector

The power cord connector is an IEC-compatible connector at the rear panel. Connect a standard grounding AC cord to the connector on the Library, and connect the other end to a reliably grounded AC outlet or to a storage cabinet power outlet.

To maintain safety compliance, use an approved power cord:

- United States — UL listed
- Canada — CSA certified
- Europe — Harmonized marked <HAR> or nationally certified



## SCSI Interface Connectors

The Library is equipped with a Low Voltage Differential/Single-Ended (LVD/SE) SCSI interface.

**NOTE:** If your Library is used on a single-ended SCSI bus, the internal wiring length of any rackmounted SCSI system can approach the maximum length specification of a single-ended SCSI bus. You must locate the storage cabinet close to the host computer to avoid excessive bus length. It is also especially important in single-ended systems to use the highest quality SCSI cables. Bus errors caused by excessive length or poor quality cables can significantly degrade performance and reliability.

**NOTE:** For those two-drive applications where both AIT drives run in SCSI-SE mode (rather than LVD mode), each drive must be connected to its own SCSI bus.

Each drive is wired to an independent bus, with a pair of SCSI connectors. Drive 0 shares a SCSI bus with the Library's robotics. To fully use the bus bandwidth, connect all the SCSI buses together as shown in Figure 2-9. The insets in Figure 2-9 show how to connect the SCSI cable, the jumper cables, and the terminator for one or two-drive units.

Each of the drives in the Library and the robotics is a separate SCSI device. When any two or more devices are connected to the same SCSI bus, each separate SCSI device must be assigned a unique SCSI address. For information on assigning SCSI addresses, see "Configuration," later in this chapter.

To connect an Library to a host computer, the host must have at least one Wide SCSI controller and the appropriate driver software. The controller must be LVD/SE or differential, as required to match the unit interface.

## Interface Cable Specifications

The Library is a high-performance system. To avoid degradation of performance, use the highest-quality interface cables from a reputable manufacturer of computer cables. All SCSI cables used with the Library should meet the following requirements:

- Shielded or double-shielded, as required to meet EMI specifications
- Impedance match with cable terminators that meet current SCSI specifications
- Characteristic impedance between 115 and 160 ohms for differential

- 34-pair twisted-pair
- Each end of a twisted pair ground connected to chassis ground
- Maximum cable length of 10 ft (3 m) for a single-ended Fast/Wide SCSI bus, including the internal wiring of SCSI device
- Maximum cable length of 82 ft (25 m) for a differential Fast-Wide SCSI bus, including the internal wiring of SCSI device
- Maximum cable length of 39 ft (12 m) for an LVD SCSI bus
- Internal cable lengths of 22 in (56 cm) for Drive 0 and Robot and 15 in (38 cm) for Drive 1
- Cables of different impedances should not be used together

Additional specifications to assure the highest SCSI performance can be found in the current version of ANSI X3.131.

**NOTE:** This equipment has been tested for electromagnetic emissions and immunity using good quality shielded cables. If you use unshielded or poor quality cables, or otherwise vary from good practice, you might not comply with national and international rules.

## Configuring the Library

The Library is designed with many configuration options, each offering multiple settings to support a variety of applications and platforms. The setting of each option is stored in non-volatile memory in the unit. For most applications, you do not have to change the factory default settings. If you need to change the configuration, go on to the next section. If you are uncertain whether you need to change a setting, contact your Technical Support representative.

To change settings, use the control panel. For an overview of how the control panel works, and a description of the functions of the buttons, indicators and display, see “Entering the Menu Mode,” “Exiting the Menu Mode,” and “Navigating through the Menu Structure” in Chapter 4, “Operation.”

You can change the settings using the options contained in the Configuration menu described later in this chapter. Refer to your host computer documentation to determine which settings might need to be changed.

## Setting a SCSI ID

1. Turn the Library on and wait until the Power-On Self Test (POST) terminates and the Primary or Secondary Default screen appears on the display. You can toggle between the two with the  $\pi$  and  $\theta$  buttons.

Loader Idle  
Drv 0: No Tape  
Drv 1: Unloaded

Or

Ready

0 ▶ □ □ \_ \_ \_ \_ \_ □ ◀ 9  
10 ▶ □ □ \_ \_ \_ \_ \_ □ ◀ 18 ◀

2. At the Default screen, press the **Enter** button. The screen displays the following Main menu.

∪ Load/Unload  
Remove Magazine  
Maintenance Menu  
Configure Menu /

3. Press the  $\theta$  button three times to move the  $\cup$  to the Configure menu, then press the **Enter** button. The screen displays the following Configure submenu. Note that the / at the end of the fourth line means you can scroll to additional configuration options using the  $\theta$  button.

∪ SCSI Options ≤  
Library Options  
Barcode Options  
Set Element Base

4. To select a configuration option, press the  $\pi$  or  $\theta$  button on the control panel until the  $\nu$  appears next to the option you want to change. The first two choices on this menu, SCSI Options and Library Options, are actually categories of options. In this case, choose SCSI Options. Press the **Enter** button to display the options for that category. The following submenu appears:

```

ν Library Parity:
  *Enabled
  Library Bus ID:
    *0

```

**NOTE:** Look closely at the submenu listed above and note that the  $\nu$  on the display is next to line 1, and that line 2 is indented. This tells you that it is a two-tiered menu. The  $\pi$  and  $\theta$  buttons work on two levels in this kind of menu, which is typical of many submenus of the Configure menu. The first level is as follows: If you press the  $\theta$  button, the  $\nu$  moves to line 3. If you press the  $\pi$  button, the  $\nu$  moves back to line 1.

If you press the **Enter** button while the  $\nu$  is next to line 1 (or line 3), the  $\pi$  and  $\theta$  buttons operate on the second level. As a result, the  $\nu$  moves next to line 2 (or line 4), and a / appears at the end of line 4, indicating that there is a list of settings that can be selected using the  $\pi$  and  $\theta$  buttons.

The / at the end of line 4 means that there are other options that can be displayed by scrolling, using the  $\theta$  button repeatedly.

5. For example, set the Drive 0 bus ID to 3. With the  $\nu$  next to line 1, press the  $\theta$  button until the display scrolls as shown:

```

ν Library Bus ID:           ≤
  *0
  Drive 0 Bus ID:
    *4

```

6. With the  $\nu$  next to line 3, press the **Enter** button. The  $\nu$  moves to line 4, the / remains at the end of line 4, and a  $\leq$  displays at the end of line 1.
7. Use the  $\pi$  and  $\theta$  buttons to scroll line 4 to display the possible settings. Scroll up so that a 3 appears and then press the **Enter** button to save the new selection. An \* appears to the left of the 3 indicating it is the current selection.
8. Press the **Escape** button repeatedly until the submenu reappears.

Repeat this procedure for each configuration option you want to change.

## Configuring a Library System

All Libraries are factory-shipped as stand-alone units. To include them in a multi-unit Library system, you must first configure one unit as the master and all other units as slaves. Any Library can be configured to be a stand-alone, master, or slave.

Prior to configuring a Library system, see Chapter 3, “Installing and Removing the Pass-Through Mechanism,” for detailed information on how to connect cables to the pass-through motor housing and Library units.

### The Master Unit

The master unit controls the operations of a multi-unit Library system. All configuration changes to the system are performed at the operator panel of the master unit.

**NOTE:** In a storage cabinet, the master unit must occupy the top position to coordinate the action of the Pass-Through Mechanism (PTM).

To configure the master unit:

1. From the Default screen, press **Enter** to display the main menu.

```
  v Load/Unload
    Remove Magazine
    Maintenance Menu
    Configure Menu      /
```

2. Press the  $\theta$  button three times to move the  $\vee$  to the Configure menu, then press the **Enter** button. The following Configure submenu appears. The  $\vee$  at the end of the fourth line means you can scroll to additional configuration options using the  $\theta$  button.

```
  v SCSI Options
    Library Options
    Barcode Options
    Set Element Base   /
```

3. Press the  $\theta$  button to move the  $\vee$  to Library Options, then press the **Enter** button. The following screen appears:

```
  v Configuration
    *Standalone
    Unload Mode
    *Implicit          /
```

4. Press **Enter** to move the cursor to the second line.
5. Use the  $\theta$  and  $\pi$  buttons to change the option to Master.
6. Press **Enter** to save the selection.

**NOTE:** The change will not take effect until you reboot.

## The Slave Unit

You can configure the slave unit on the work bench before installation or after it is installed in a storage cabinet. If you configure it when it is already installed as part of a multi-unit Library system, be sure to either shut off power to the master unit or disconnect the serial cables. This lets you access Menu mode directly, thus avoiding communication interference from the master unit.

Each slave unit must have a unique one digit ID that you specify as part of the configuration procedure. You must stack and number the units as follows:

Master
Slave 0
Slave 1
Slave 2
Slave 3

To configure the slave unit:

1. From the Default Screen, press **Enter** to display the main menu.
  - ∪ Load/Unload
  - Remove Magazine
  - Maintenance Menu
  - Configure Menu /
2. Press the  $\theta$  button three times to move the ∪ to the Configure menu, then press the **Enter** button. The following Configure submenu appears. The / at the end of the fourth line means you can scroll to additional configuration options using the  $\theta$  button.
  - ∪ SCSI Options
  - Library Options
  - Barcode Options
  - Set Element Base /

3. Press the  $\theta$  button to move the  $\nu$  to Library Options, then press the **Enter** button. The following screen appears:

```
 $\nu$  Configuration
  *Standalone
  Unload Mode
  *Implicit      /
```

4. Press **Enter** to move the cursor to the second line.
5. Use the  $\theta$  and  $\pi$  buttons to change the option to Slave.
6. Press **Enter** to save the selection. The display at lines 3 and 4 changes to let you specify a numerical ID for the slave module.

```
 $\nu$  Configuration
  *Slave
  Unload Mode
  *0           /
```

**NOTE:** You must reboot the unit to display the Slave Mode ID.

7. Press the  $\theta$  button to move the  $\nu$  to Slave Address.
8. Press **Enter** to move the cursor to the number option on the fourth line.
9. Use the  $\theta$  and  $\pi$  buttons to change the number.
10. Press **Enter** to save the selection.

**NOTE:** The change will not take effect until you reboot.

## Setting up Reserved Slots

Use this option to withdraw some of the slots in the Library from use as storage slots to meet licensing requirements or to dedicate one or more slots as a cleaning slot.

## How Reserved Slots are Numbered

Ordinary cartridge slots are numbered from the front of the magazine to the rear (4 Figure 2-10). If you reserve one slot, it becomes *Reserved Slot #1* in the last slot of the magazine (1 Figure 2-10). If you reserve two slots, slot #17 becomes *Reserved Slot #1* (3 Figure 2-10), while slot #18 becomes *Reserved Slot #2* (2 Figure 2-10). Additional reserved slots continue in this rear-to-front pattern. If your software license limits you to less than the full magazine capacity, *Reserved Slot #1* always follows the last unreserved data cartridge.

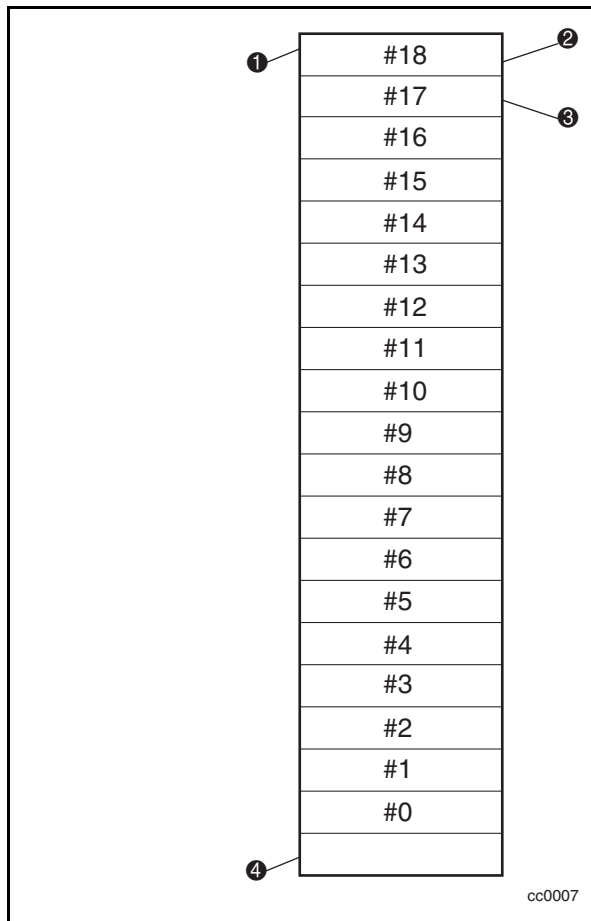


Figure 2-10. Reserved slot locations



## To Reserve Slots

1. From the Default screen, press the **Enter** button to display the Main menu.
2. From the Main menu, scroll down to the Configure menu and press the **Enter** button to display the following Configure submenu:

```
  v SCSI Options:
    Library Options
    Date and Time
    Set Element Base      /
```

3. Scroll down to Library Options and press the **Enter** button.
4. Scroll down to Reserved Slots and press the **Enter** button. The following screen appears:

```
Configuration:
  *Stand Alone
```

```
  .
  .
  .
  .
```

```
Baud Rate:
  *38,400
```

```
  v Reserved Slots:
    *0                ≤
```

5. Scroll down to the last line and specify the number of slots you are reserving. Press the **Enter** button to save.

If your software license limits the number of usable slots in the magazine, you must reserve the remaining slots. You can use any of the reserved slots to store a cleaning cartridge (see Chapter 5, “Maintenance”).

6. Press the **Escape** button repeatedly to return to the Default screen. Your choice takes effect the next time the Library is rebooted.

## Configuration Options

The following options are available in the Configuration menu.

### SCSI Options

**Library Parity:** Lets you enable or disable the library robotics SCSI bus parity checking. The default is Library Parity Enabled.

**Library Bus ID:** Lets you set the SCSI addresses of the library robotics. The default is 0.

**Drive 0 Bus ID:** Lets you set the SCSI addresses of the drives. The designators Drive 0 through Drive  $n$  refer to the first through  $n$ th drives, counting from the top unit in the Library system.

**Drive 1 Bus ID:** Lets you set the SCSI addresses of the drives. The designators Drive 1 through Drive  $n$  refer to the second through  $n$ th drives, counting from the top unit in the Library system.

**Vendor ID:** Lets you specify the response of the Library's robotics to the SCSI INQUIRY command in the Vendor ID field. The default is Compaq.

**Product ID:** Lets you specify the response of the Library's robotics to the SCSI INQUIRY command in the Product ID fields (Compaq SSL2000 Series) <Vendor unique>. The default is SSL2000.

**Negotiation Mode:** Lets you enable initiate synchronous negotiation. Initiate synchronous negotiation, if set, allows the Library to initiate SCSI synchronous negotiation with the host (the default is No). The Library always responds to host-initiated synchronous negotiation.

**Transfer Rate:** Lets you set the data transfer rate to 10 MB/s, 5 MB/s or asynchronous. The default is 10 MB/s.

**Mode Page 1F Length:** Lets you choose between two lengths of the mode sense/select device capabilities page (SCSI page 1Fh), which are short (14 bytes) and long (18 bytes), to accommodate different SCSI device implementations of this page. The default is Short.

**Initialize Element Status:** Lets you specify the unit's response to the SCSI INITIALIZE ELEMENT STATUS command. The possible settings are No Inventory, Force Inventory, and Force Label Scan. The default is No Inventory.

**Unit Attn Report:** Lets you select reporting of All or only One unit attention conditions. If set to All, the unit reports all unit attention conditions in sequence; if set to One, the unit reports only the highest priority condition. The default is All.

**SCSI Mode:** Defines the loader as SCSI-2 or SCSI-3. The default is SCSI-2.

**Post Recv'd Error:** Enables reporting of TapeAlert informational exception conditions with a Recovered Error sense key, when the Method of Reporting Information Exceptions (MRIE) field is set to a value of 0x3 in Mode Page 1Ch, or if the TapeAlert Mode option is set to Rec Error (cnd). The default is Disabled.

**Tape Alert Mode:** Specifies conditions for logging and reporting TapeAlert data. The default is Logging Disabled.

- *Logging Disabled*—Inhibits logging feature.
- *No Exceptions*—Device should not report information exceptions.
- *Unit Attention*—Report information exceptions with a Unit Attention sense key and an ASC/ASCQ of 5D/00.
- *Rec Error (cnd)*—Report information exceptions with a Recovered Error sense key and an ASC/ASCQ of 5D/00, if Recovered Error Reporting is enabled.
- *Rec Error (unc)*—Unconditionally report information exceptions with a Recovered Error sense key and an ASC/ASCQ of 5D/00.
- *No Sense*—Report information exceptions with a No Sense sense key and an ASC/ASCQ of 5D/00.
- *On Request*— Report information exceptions with a No Sense sense key and an ASC/ASCQ of 5D/00, only in response to an unsolicited Request Sense command.

## Library Options

**Configuration:** Lets you configure the Library as a stand alone, master, or slave unit. The default is stand alone.

**NOTE:** For multi-unit operation, you must first install a Pass-Through Mechanism. See chapter 3 “Installing and Removing the Pass-Through Mechanism” for further instructions.

**Unload Mode:** Lets you determine whether a SCSI MOVE MEDIUM command is interpreted as *Implicit* or *Explicit*. If Implicit, the unit unloads a drive before attempting to move a cartridge from that drive. If Explicit, the host must issue a SCSI UNLOAD command to a drive before each MOVE MEDIUM command that removes a cartridge from that drive. The default is Implicit.

**Numbering:** Lets you specify whether SCSI elements in the unit display with either zero or one. This affects *only* the front panel display, not the actual SCSI element addresses. The default is 0.

**Auto Clean:** Lets you enable an automatic cleaning cycle which operates as part of the cartridge unload sequence whenever the Use Cleaner LED lights. To use this option, you must have reserved a slot for a cleaning cartridge using the Reserve Slots option. The default is Disabled.

**Library Mode:** Lets you set the robotics operating mode to Random, Sequential 1, Sequential 2 or Sequential Split. The default is Random.

**NOTE:** The sequential operating modes are available in stand alone configuration only. If only one drive is installed, only the Sequential 1 option is available.

- *Random*—Normal operating mode. Enables complete host control of the robotics.
- *Sequential 0*—Loads cartridges in numerical order in all 19 magazine slots for Drive 0.
- *Sequential 1*— Loads cartridges in numerical order in all 19 magazine slots for Drive 1.
- *Sequential Split*—Loads cartridges in numerical order in magazine slots 0 through 9 for Drive 0 and magazine slots 10 through 18 for Drive 1.

**Baud Rate:** Lets you set the data transmission rate of the trace port. This function is intended for use by CEs only. The default is 38400 bits/s.

**Reserved Slots:** Lets you withdraw from use a specified number of slots in the back of the magazine. Some host software imposes size limits on tape library magazines for licensing purposes, and does not operate with a library that exceeds the licensed size. The default is 0.

**Model Number:** Lets you change the model number information displayed on the initial screens. You can choose between Compaq SSL2020, a blank line, and a vendor unique number. The Default is Compaq SSL2020.

## **Bar Code Options**

**Label Size:** Lets you limit length of the bar code label. Possible settings are 1 through 8. The default is 8.

**Label Alignment:** Lets you specify the alignment of a bar code label. The options are Left or Right. When used in conjunction with the label size option, strips unwanted trailing characters (left alignment) or leading characters (right alignment). The default is Left Alignment.

**Check Digit:** Lets you set the data transmission rate of the trace port. This function is intended for use by CEs only. The default is Enable/No Send.

## Set Element Base

**Transport:** Lets you set the base address of the robotics mechanism. The default is 0000.

**Storage:** Lets you set the base address of the 19 magazine slots. The default is 0001.

**Transfer:** Lets you set the base address of the drive. The default is 00E0 for Drive 0.

**Import/Export:** Lets you set the base address of the mail slot. The default is 00D0.

## Set Serial Number

**Serial Number:** Lets you alter the unit's serial number as stored in the unit. The Library's robotics reports these settings in response to the SCSI INQUIRY command in the Unit Serial Number Page.

## Set Default

**Compaq Defaults:** Resets all configuration options to Compaq defaults.

## Configuration Settings

Table 2-3 lists the configuration settings for the Library.

<b>Table 2-3 Library Configuration Options</b>		
<b>Option</b>	<b>Settings</b>	<b>Default</b>
<b>SCSI Options</b>		
Library Parity	Enabled, Disabled	Enabled
Library Bus ID	SCSI ID 0-15	0
Drive 0 Bus ID	SCSI ID 0-15	4
Drive 1 Bus ID	SCSI ID 0-15	5
Vendor ID	Compaq	Compaq
Product ID	SSL2020	SSL2020
Negotiation Mode	Initiate, Do Not Initiate	Do Not Initiate
Transfer Rate	Sync 5 MB/s, Sync 10 MB/s, Async Only	Sync 10 MB/s
Mode Page 1F Length	Short (000E), Long (0012)	Short
Init. Element Status	No Inventory, Force Inventory, Force Label Scan	No Inventory
Unit Attention Report	One, All	All
SCSI Mode	SCSI-2, SCSI-3	SCSI-3
POST Recovered Error	Enabled, Disabled	Disabled

*continued*

**Table 2-3**  
**Library Configuration Options** *continued*

<b>Option</b>	<b>Settings</b>	<b>Default</b>
Tape Alert Mode	Logging Disabled, No Exceptions, Unit Attention, Rec Error (cnd), Rec Error (unc), No Sense, On Request	Logging Disabled
<b>Library Options</b>		
Configuration	Stand Alone, Master, Slave	Stand Alone
Unload Mode	Implicit, Explicit	Implicit
Element Base	One Based, Zero Based	Zero Based
Auto Clean	Enabled, Disabled	Disabled
Library Mode	Random, Sequential 0, Sequential 1, Sequential Split	Random
Baud Rate	Auto, 2400, 9600, 19200, 38400, 57600, 115200	38400
Reserved Slots	0 through n (one less than magazine)	0
Model Number	Compaq SSL2020	Compaq SSL2020
<b>Bar Code Options</b>		
Label Size	1 through 6	6
Label Alignment	Left or Right	Left
Check Digit	Enable/Send or Enable/No Send	Enable/No Send

*continued*



**Table 2-3**  
**Library Configuration Options** *continued*

Option	Settings	Default
<b>Set Element Base Options</b>		
Transport	NNNN (hex)	0x0000
Storage	NNNN (hex)	0x0001
Transfer	NNNN (hex)	0x00F0
Import/Export	NNNN (hex)	0x00E0
<b>Set Serial Number Options</b>		
Serial Number	Format To Match nnnnnnnnnnnn	Format To Match nnnnnnnnnnnn
<b>Set Default Options</b>		
Compaq Defaults	Compaq Defaults	Compaq defaults

**NOTE:** The options listed in this table represent the version of the firmware in use when this manual was written. If the options displayed on your control panel differ from those described here, you can download the latest option descriptions from the Compaq website ([www.compaq.com](http://www.compaq.com)) or contact your Technical Support representative.

**NOTE:** The serial number must be set for compatibility with certain Library software.

## Installing and Removing the Pass-Through Mechanism

### Introduction

This chapter describes how to install and remove the Pass-Through Mechanism (PTM). The PTM enables the transfer of a single tape cartridge between two or more SSL2000 Series Libraries. The PTM can be used to connect up to five Libraries increasing the storage capacity of the entire library system.

This chapter includes procedures for:

- Installing a pre-assembled PTM
- Removing a PTM
- Cabling the PTM and multi-unit Library system
- Adding a PTM extrusion that includes:
  - Removing and replacing the elevator car
  - Removing the bottom pulley assembly
  - Installing a new belt

## Installing a Pre-Assembled PTM

To install a pre-assembled PTM:

1. Access the rear panels of the Library units in the storage cabinet and disconnect each one from its AC power source.
2. Loosen the screws that secure the Library unit's mounting ears to the front of the storage cabinet. Loosen the screws just enough to allow the Library units to move slightly in and out.

**NOTE:** Refer to the *Compaq Rack Planning Guide* for specific installation instructions.

3. Loosen the rear slide screws so that the Library units float freely in the storage cabinet.
4. Establish the nominal (midpoint) vertical position for the master unit and then tighten its rear slide screws.
5. Remove the retaining screw ② that secures the PTM port cover ① to the rear of each Library unit (see Figure 3-1).

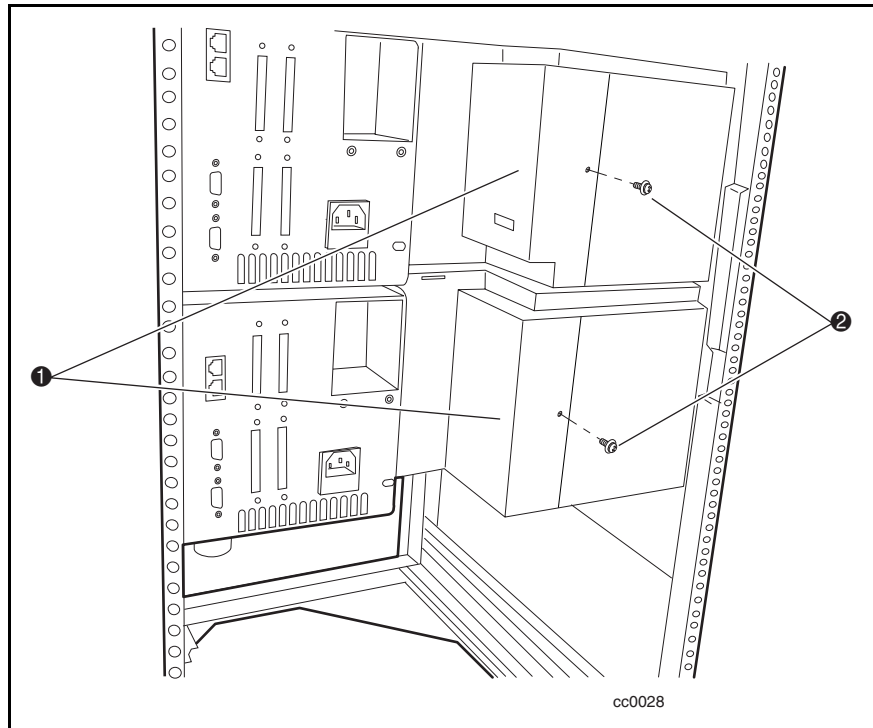


Figure 3-1. Removing the PTM port cover

6. Holding the PTM upright, position it against the rear panels so that the PTM motor housing assembly ❶ slides into the available space and the two pilot pins ❸ on the extrusion mate with the holes ❷ in the rear of the top Library unit (see Figure 3-2).

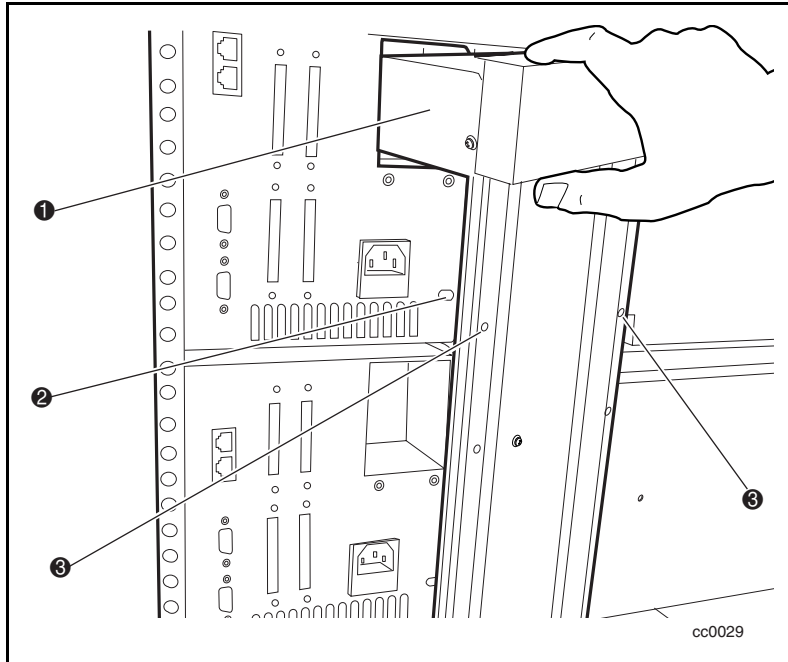


Figure 3-2. Installing the PTM

7. Attach the PTM to the master (top) unit using two bullet-nose thumbscrews ❶ and washers through the top two holes in the extrusion (see Figure 3-3). Do not fully tighten the thumbscrews at this time.

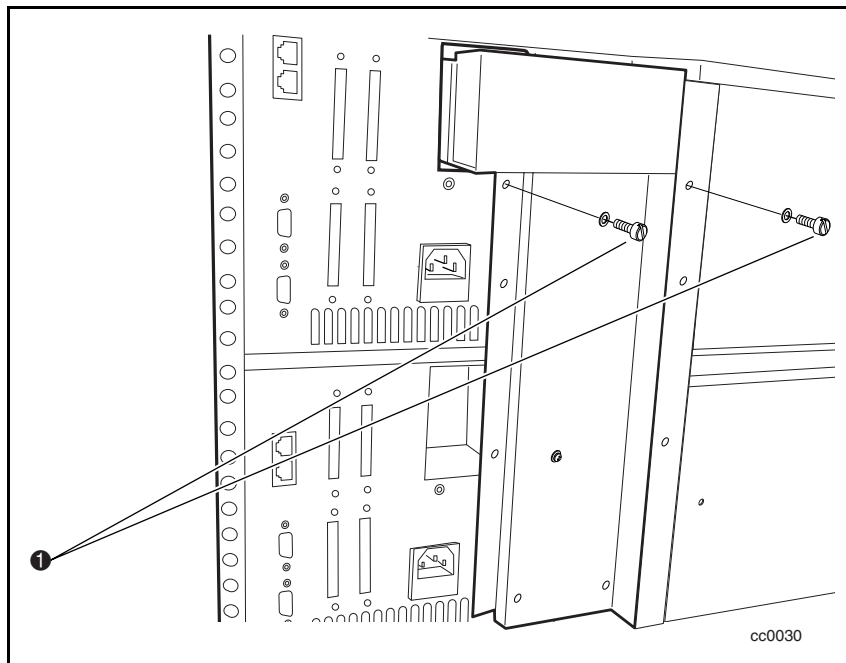


Figure 3-3. Securing the PTM to the master unit

8. Align the two holes on the extrusion with mounting holes on the slave unit and attach the PTM in place using two bullet-nose thumbscrews and washers (❶ Figure 3-4). Do not fully tighten the thumbscrews at this time.

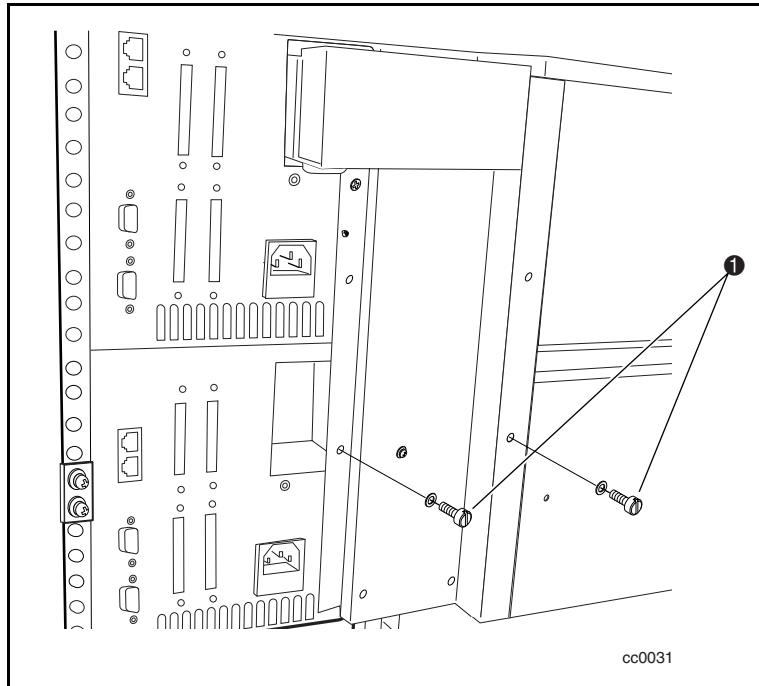


Figure 3-4. Securing the PTM to the slave unit

**NOTE:** If a screw hole is offset, push the slave unit slightly forward to make a gap between it and the channel. This lets you start threading the thumbscrews into the slave unit.

9. Repeat Steps 7 through 9 for each additional slave unit. Do not fully tighten the thumbscrews at this time.
10. Tighten all rear storage cabinet slide screws.
11. Tighten all PTM thumbscrews.
12. Tighten all screws that secure the Library unit's mounting ears to the front of the storage cabinet.
13. Attach all power and communication cables. See "Cabling the PTM and Multi-Unit Library System," described later in this chapter.

## Removing a PTM

To remove a PTM:

1. Access the rear panels of the Library units in the storage cabinet and disconnect each one from its AC power source.
2. Unplug the motor control cable from its connector on the PTM motor housing assembly (see Figure 3-5).
3. If the master unit (top) is to be removed for service, disconnect the motor cable and plug it into the unit directly below it (slave 0). Reconfigure slave 0 to be the master unit and slave 1 to be slave 0, slave 2 to be slave 1, and so forth (see Figure 3-5).

**NOTE:** There are software ramifications in reconfiguring a different Library and should only be done if necessary.

4. Disconnect the RJ45 cable from the unit to be removed or serviced and then plug it into the next unit so all units remain in series.

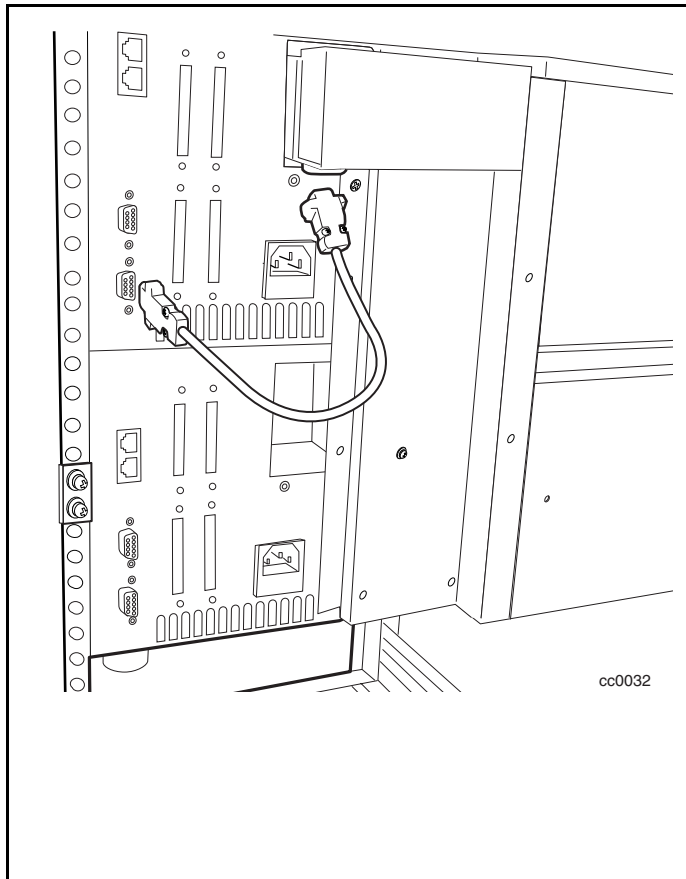


Figure 3-5. Unplugging the PTM motor housing assembly control cable

5. Remove the bullet-nose thumbscrews and washers (two per unit) that secure the PTM to the Library units (see Figure 3-4).
6. Gently pull the PTM out and away from the Library units.



## Cabling the PTM and Multi-Unit Library System

Cabling the PTM and multi-unit Library system includes attaching cables to the following interface connectors:

- PTM motor housing assembly
- Library unit

### Connecting to the PTM Motor Housing Assembly



**CAUTION:** Make sure the power is off to the unit that you plug the motor connector into.

---

1. Connect one end of the control cable to the connector in the PTM motor housing assembly (see Figure 3-5).
2. Connect the other end of the control cable to the motor connector on the master unit (see Figure 3-5).

## Connecting to Library Units

1. Attach a patch cable to one expansion port on the master unit (1 Figure 3-6).

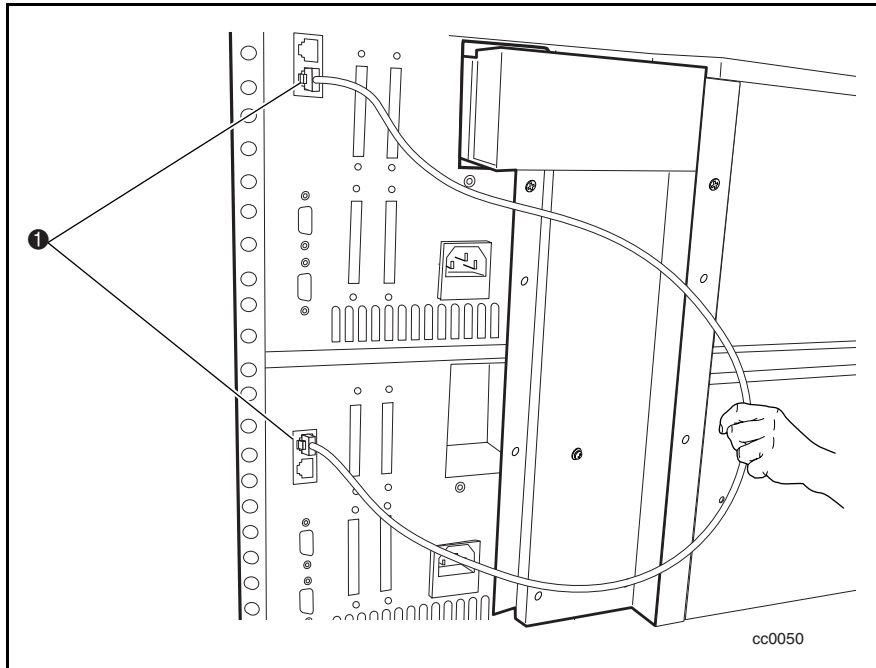


Figure 3-6. Connecting a patch cable

2. Use additional patch cables to connect successive slave units to the master unit. Connect all Library units in a daisy-chain fashion (1 Figure 3-7).

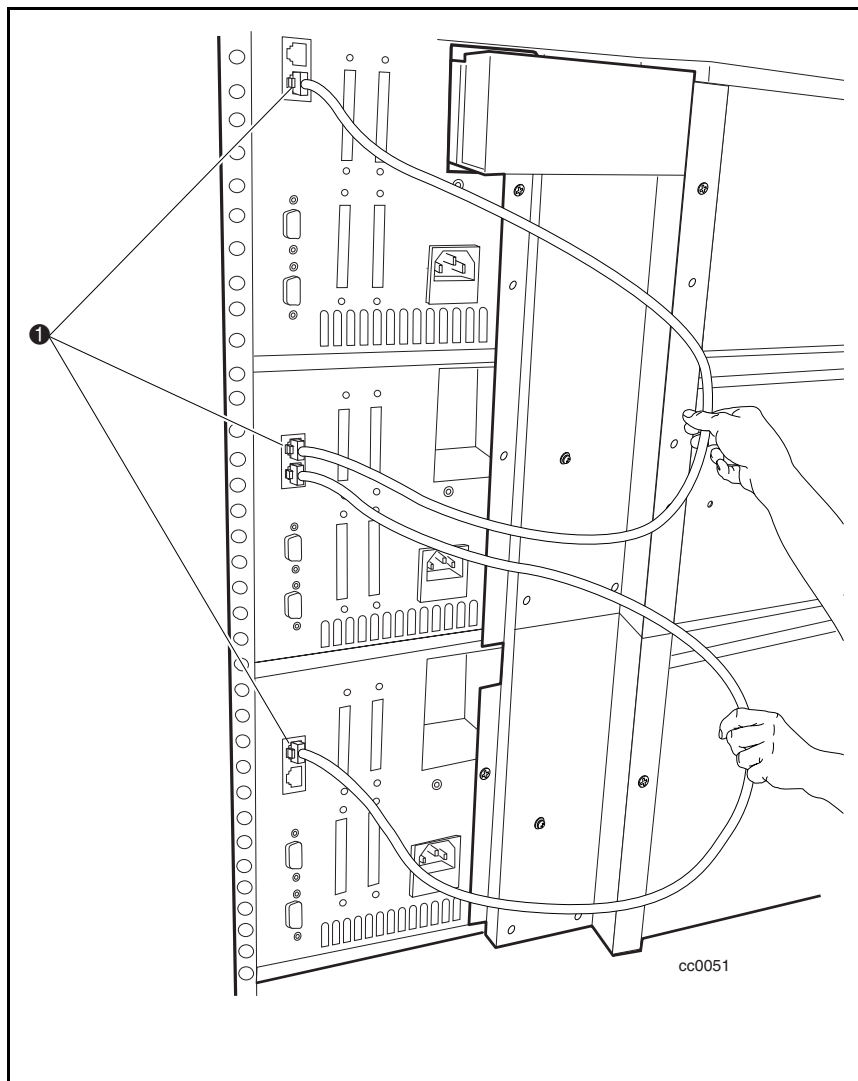


Figure 3-7. Connecting to Library units

## Adding a PTM Extrusion

This section describes how to add an extrusion to extend the PTM. To add an extrusion, you must first remove the PTM, the elevator car, and the bottom pulley assembly.

To add an expansion module:

1. Remove the PTM (if already installed).
2. Remove the elevator car (described later in this section).
3. Remove the bottom pulley assembly (described later in this section).
4. Move the location stop pin to the lowest PTM extrusion (❶ Figure 3-8).

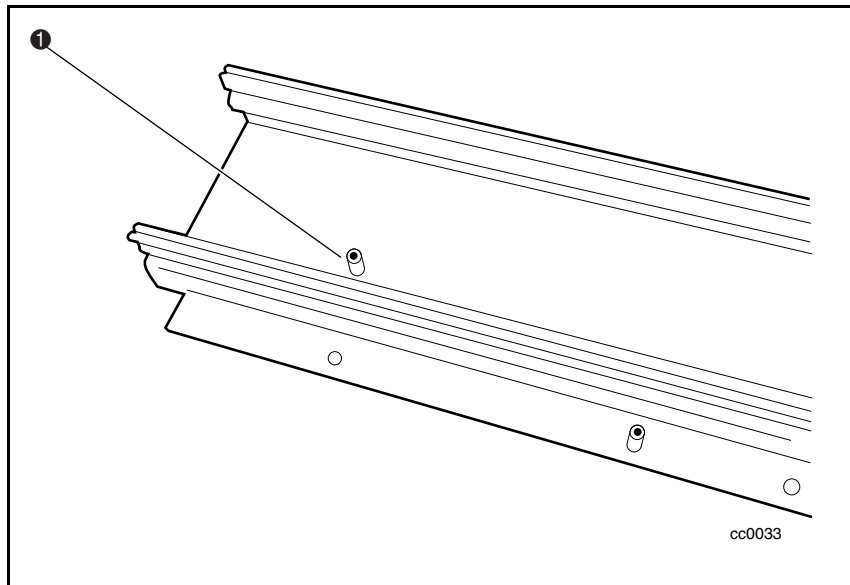


Figure 3-8. Location stop pin

5. Attach the tie bars with the screws to the PTM extrusion, making sure that the beveled edges of the tie bars are oriented as shown in (1) Figure 3-9).

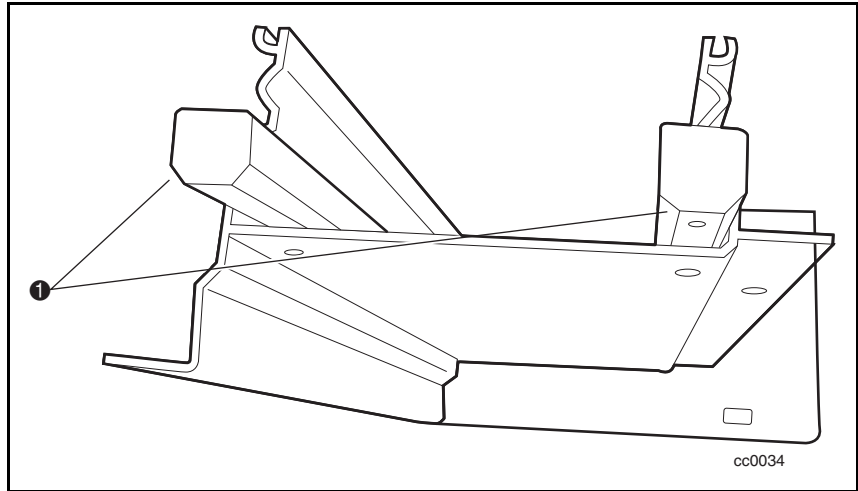


Figure 3-9. Attaching tie bars

6. Insert the tie bars (now mounted on the main PTM extrusion ❶) into the extension ❷, aligning the two PTM extrusions so that the channel patterns match (see Figure 3-10).

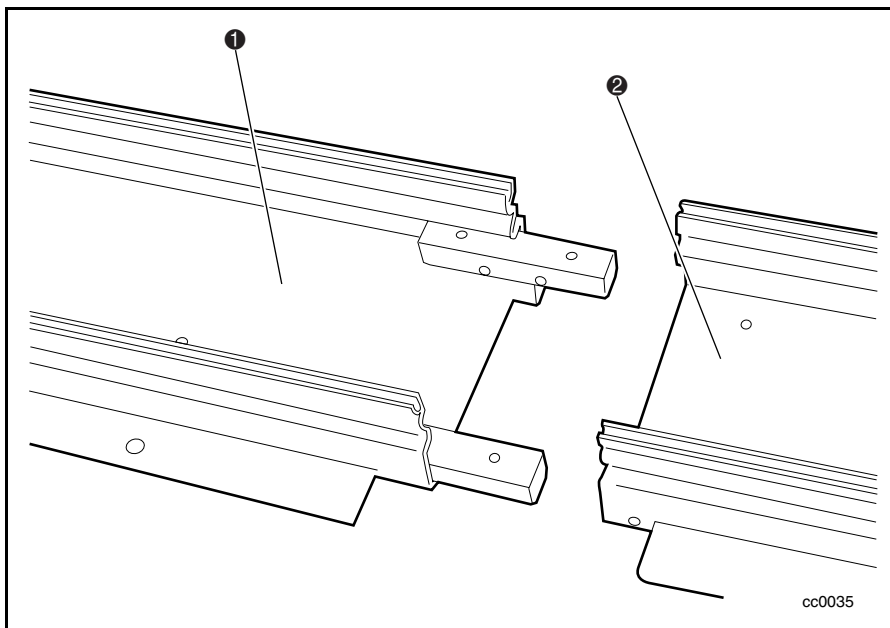


Figure 3-10. Attaching PTM extrusions

7. Attach the tie bars to the PTM extrusions using four screws (two each side). See Figure 3-11.
8. Move location stop pin to lowest PTM extrusion (1 Figure 3-8).

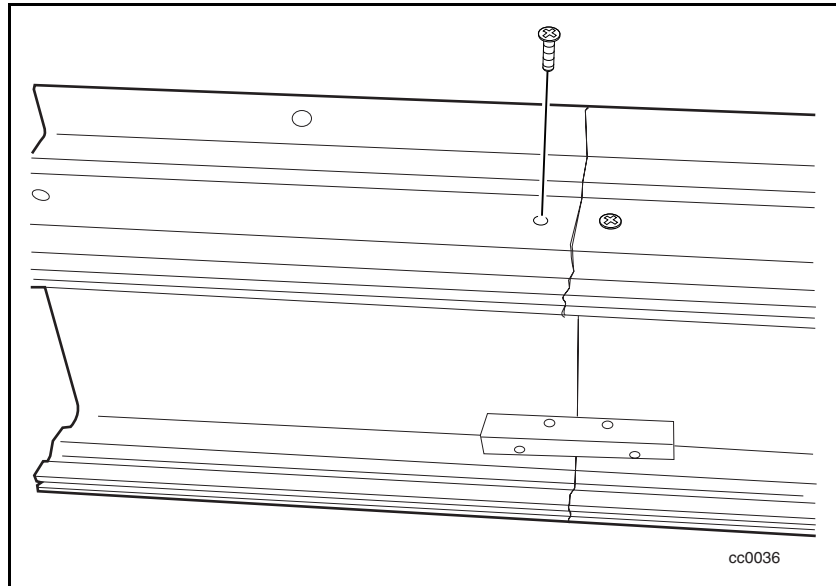


Figure 3-11. Attaching tie bars to the PTM extension

## Installing a New Belt

1. Obtain a belt from extension kit and then cut it to the appropriate length (see Figure 3-12).

**NOTE:** A new full-length belt is marked 2, 3, 4, and so forth indicating where to cut per number of Library units the PTM will service.

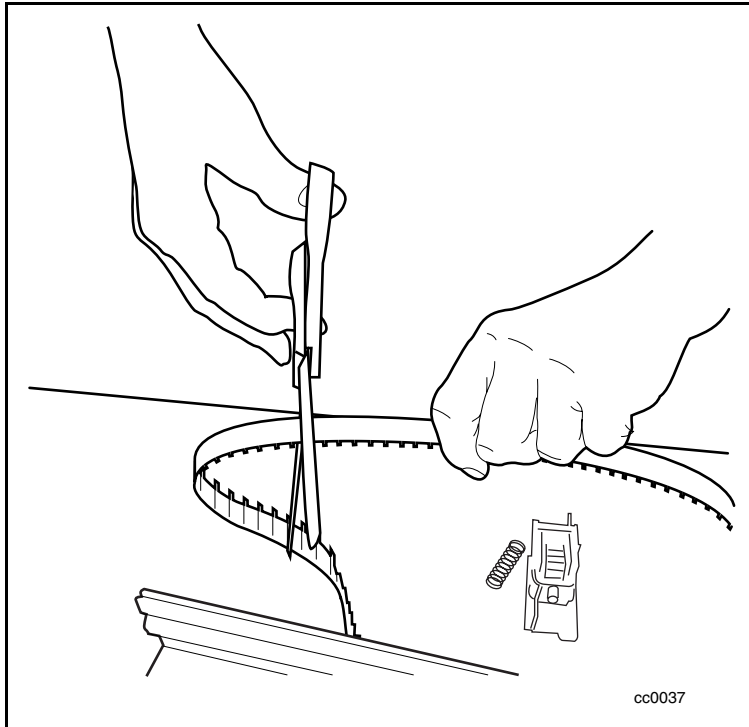


Figure 3-12. Cutting the belt

**NOTE:** The belt included with your kit accommodates up to four PTM extrusions. The belt is marked at numbered intervals, indicating the exact length needed for your Library system.

Number of Extrusions	Length of Belt
2	27 inches
3	41 inches
4	55 inches



2. Thread the belt through the bottom pulley. Note the orientation of the belt teeth and the location stop pin (❶ Figure 3-13).
3. Thread the belt through the top pulley.

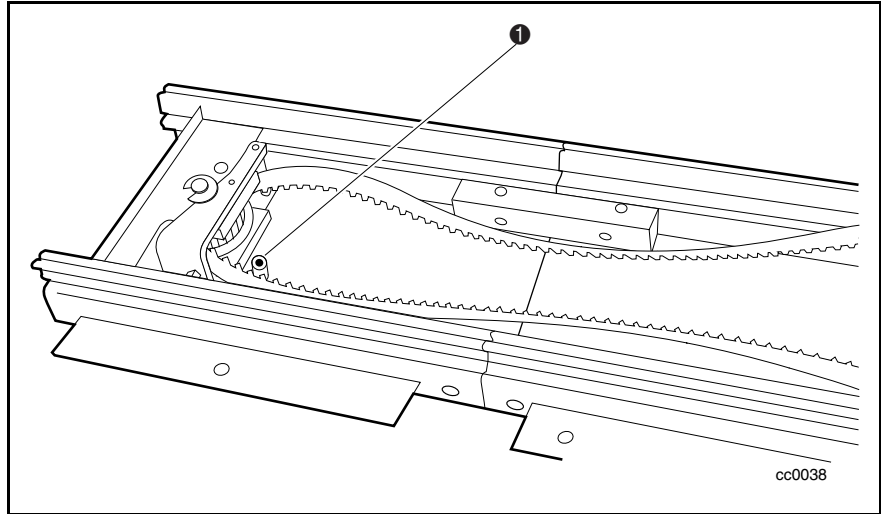


Figure 3-13. Threading the belt through the pulleys

4. Attach the belt clamp bracket to the belt on the side closest to the PTM motor housing assembly. Make sure one tooth of the belt fits tight in the space in the bracket ( **1** Figure 3-14).

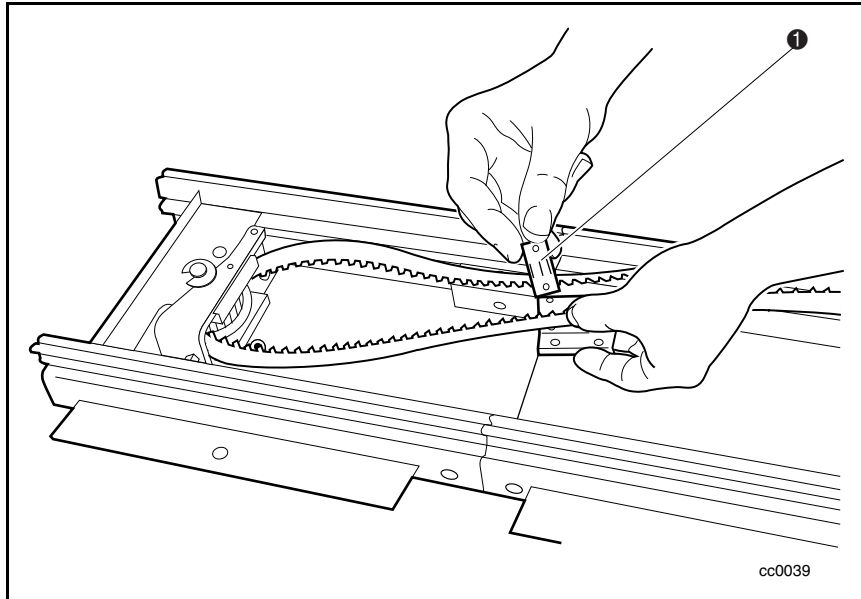


Figure 3-14. Attaching the belt clamp bracket

5. Replace the bottom pulley end cap, securing it with self-tapping screws on both sides ( ❶ Figure 3-15).

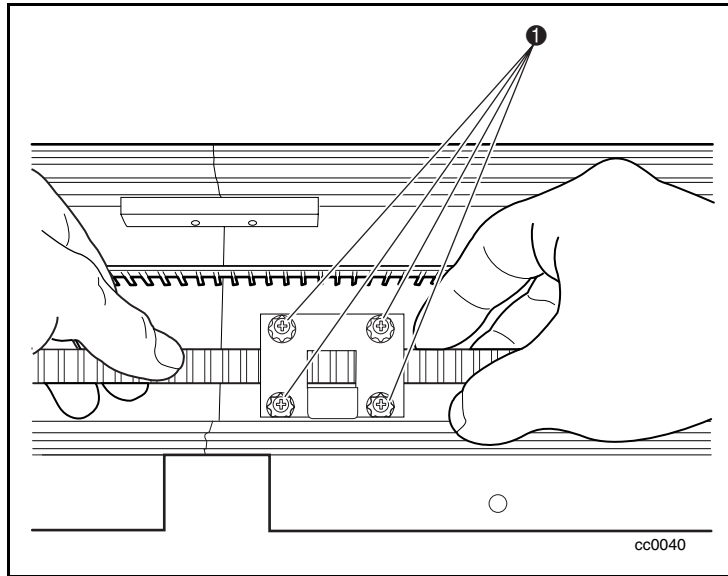


Figure 3-15. Replacing the bottom pulley end cap

6. Slide the spring over the tension post and then snap into place so that it rests squarely against the inside of the PTM track ( ❶ Figure 3-16).

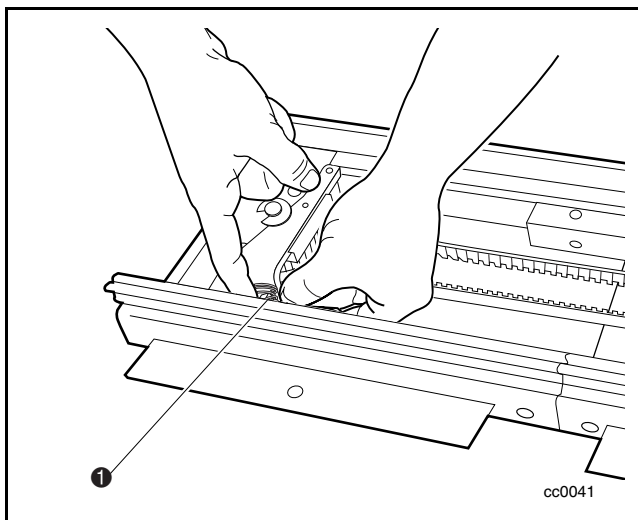


Figure 3-16. Snapping the spring over the tension post

## Removing the Elevator Car

1. Lay the PTM on a flat surface with the elevator car facing you (see Figure 3-17 and Table 3-1).

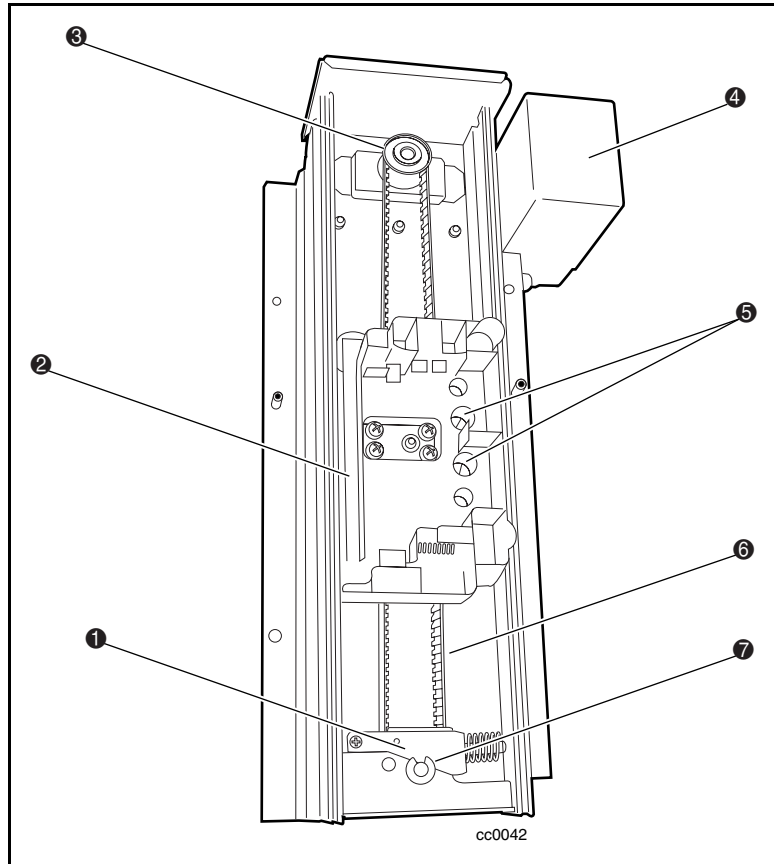


Figure 3-17. PTM layout

**Table 3-1**  
**PTM Components**

Figure Legend	Description
❶	Tensioner ramp
❷	Elevator car
❸	Upper pulley
❹	PTM motor housing assembly
❺	Captive screws (attaches elevator car to belt clamp)
❻	Drive belt
❼	Lower pulley

- Remove the two screws that secure the elevator car to the belt clamp bracket (❶ Figure 3-18).

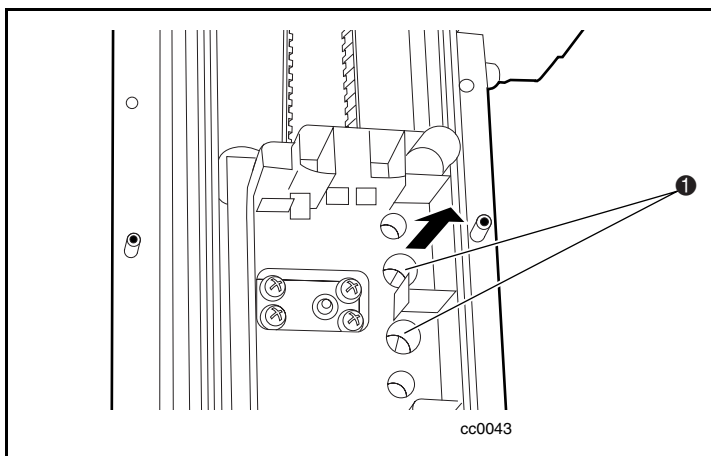


Figure 3-18. Releasing the elevator car

3. Press against the elevator springs to disengage the wheels from the PTM extrusion channel (see Figure 3-19).
4. Tilt the elevator to disengage the other pair of wheels.

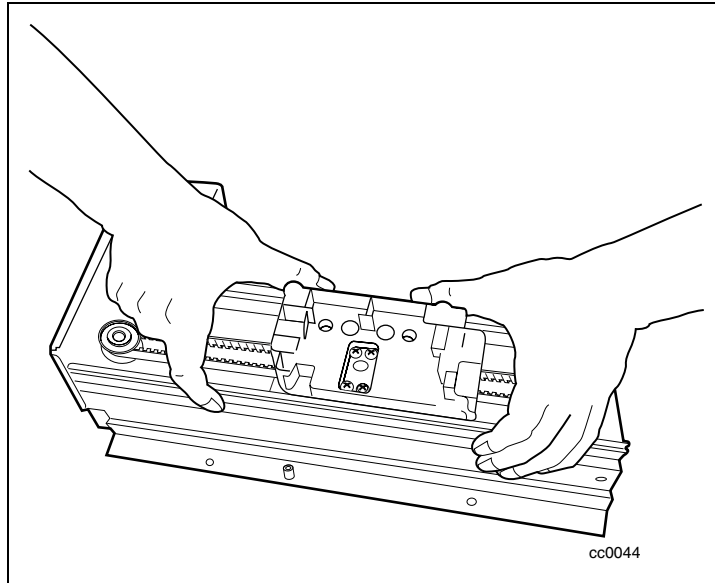


Figure 3-19. Disengaging the wheels

5. Lift the elevator car out of the PTM extrusion.

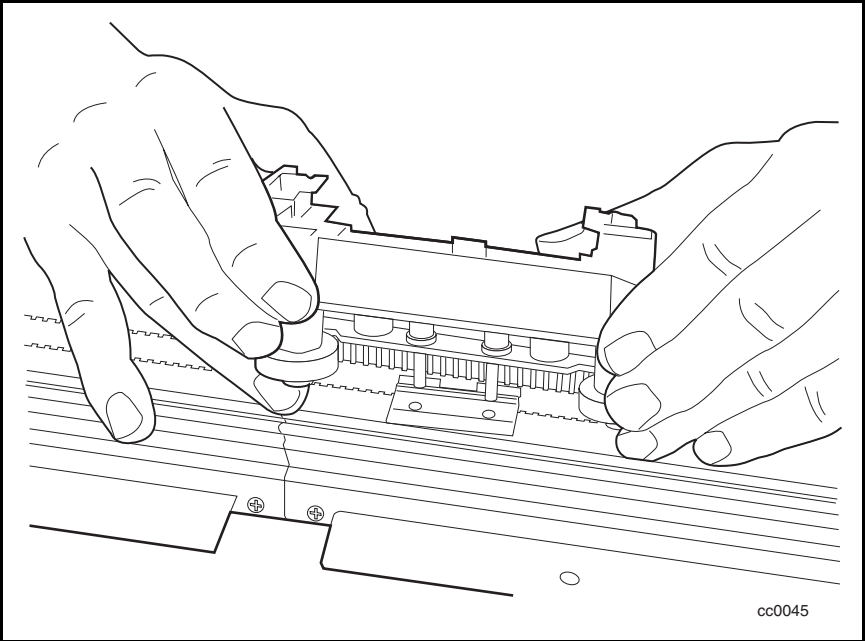


Figure 3-20. Removing the elevator car



## Replacing the Elevator Car

1. Position the belt clamp midway along the PTM. Place the elevator car into the PTM extrusion, over the belt clamp, engaging both pairs of wheels into the PTM extrusion channel. The wheels of the elevator car should ride in the "V" grooves of the PTM extrusion channel. The cartridge opening on the elevator car should face away from the PTM motor housing assembly (see Figure 3-19).
2. Replace and tighten the two captive screws that secure the elevator car to the belt clamp bracket (see Figure 3-18).

## Removing the Bottom Pulley Assembly

1. Push on the belt tensioner ramp to align its small hole with the hole in the bottom pulley assembly (❶ Figure 3-21).

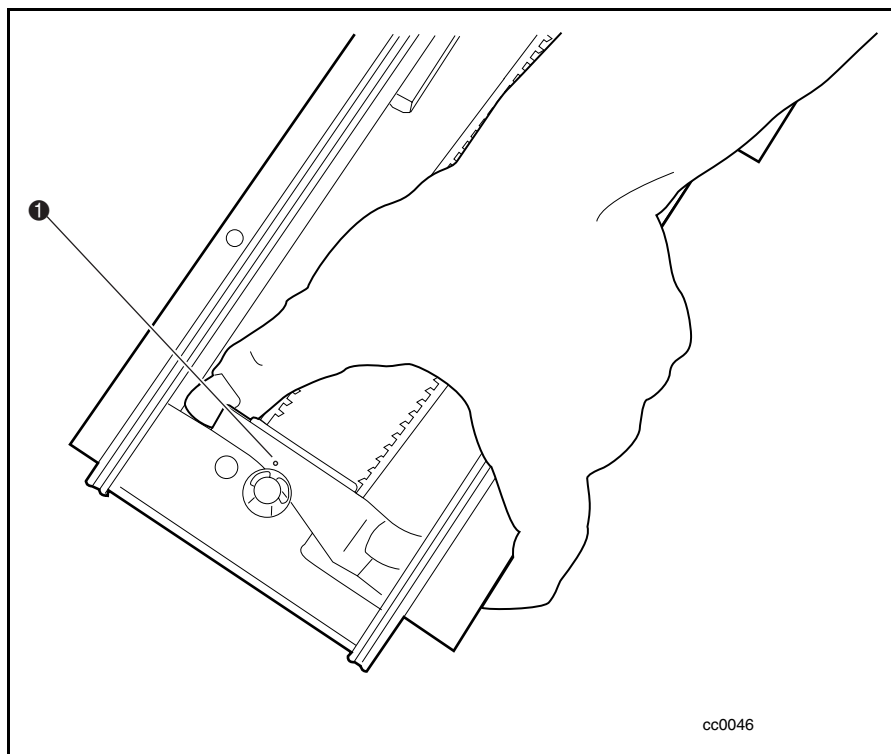


Figure 3-21. Aligning the belt tensioner ramp

cc0046

2. Insert a paper clip in the hole so that it removes tension from the belt and then leave it in place while completing the procedure (see Figure 3-22).

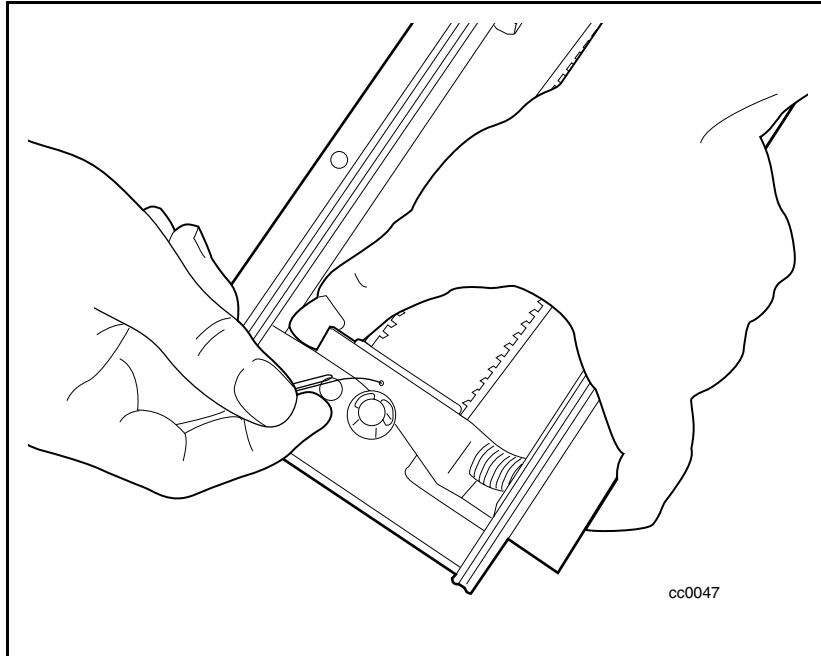


Figure 3-22. Removing tension from the belt

3. Loosen the retaining screws to remove the two belt clamp plates (see Figure 3-15).
4. Remove the belt from the PTM.

5. Remove the screws on both sides of the bottom pulley assembly ( ❶ Figure 3-23).

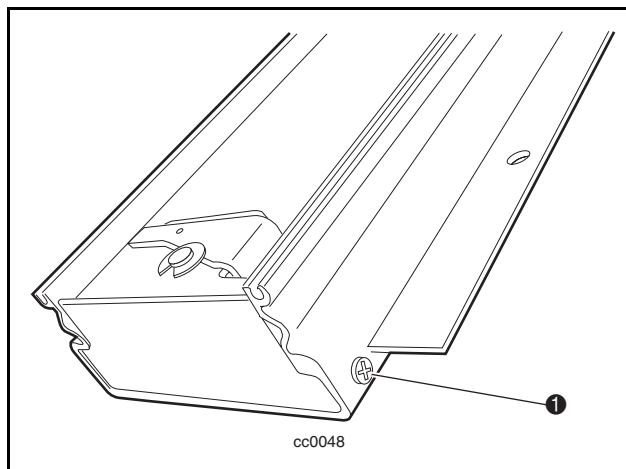


Figure 3-23. Releasing the bottom pulley assembly

6. Slide the bottom pulley assembly ❶ out of the PTM extrusion ❷ (see Figure 3-24).

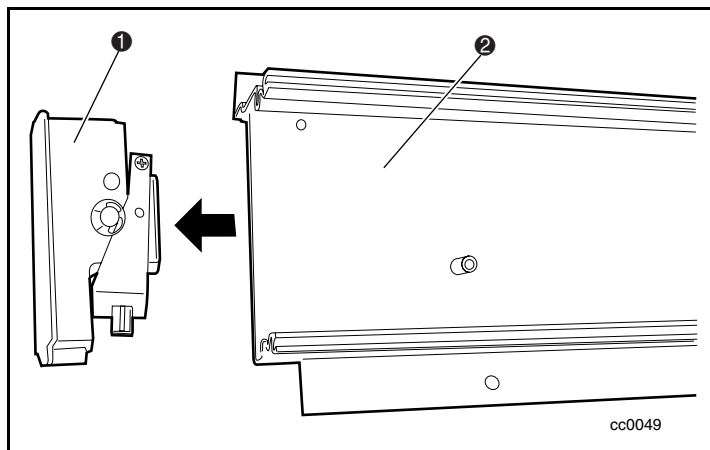


Figure 3-24. Removing the bottom pulley assembly

# *Chapter 4*

## **Operation**

### **Introduction**

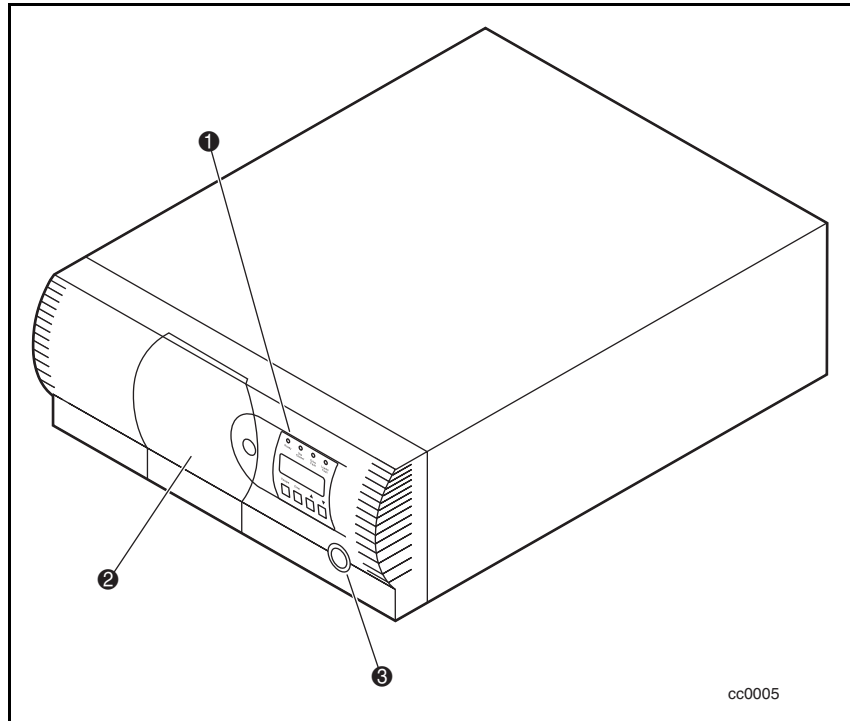
This chapter describes operating the SSL2000 Series Library (AIT Library) through the control panel at the front of the unit.

This chapter includes descriptions and or procedures for:

- Front panel
- LED indicators and buttons
- Front panel and media locks
- Startup display messages
- Using Library menus and modes
- Displaying firmware revisions
- Inserting and removing cartridges
- Tape cartridge requirements
- Bar code labels

## Front Panel

The front panel of the Library includes a power switch for the unit and the control panel, which has buttons, a display, and indicators (see Figure 4-1 and Table 4-1).



cc0005

Figure 4-1. Library front panel

---

**Table 4-1**  
**Library Front View**

---

<b>Figure Legend</b>	<b>Description</b>
❶	Control panel
❷	Magazine door
❸	Power switch

---

## **Power Switch**

The power switch controls the supply of AC power to the Library front panel. It is a push-on, push-off switch. When the power is on, the backplane of the control panel display lights.

## Indicators and Buttons

The control panel consists of four LED indicators, a four-line by 20-character backlit LCD display, and four buttons (see Figure 4-2 and Table 4-2).

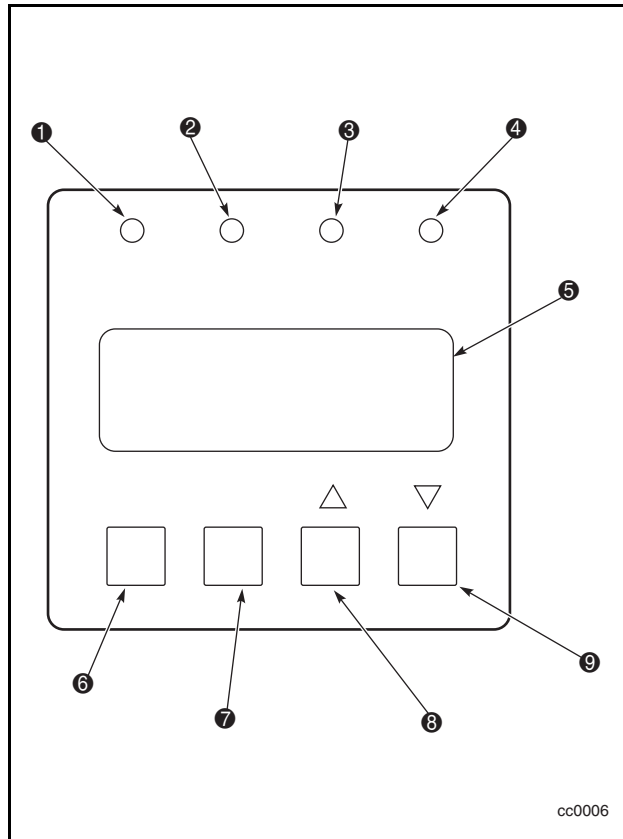


Figure 4-2. Library control panel

**Table 4-2**  
**Library Control Panel**

<b>Figure Legend</b>	<b>Description</b>
❶	Ready LED
❷	User cleaner LED
❸	Drive fault LED
❹	Loader fault LED
❺	Display panel
❻	Escape button
❼	Enter button
❽	Scroll up button
❾	Scroll down button

## LED Indicators

There are four LED indicators on the control panel, labeled Ready (green), Use Cleaner (yellow), Drive Fault (red), and Loader Fault (red).

The Ready LED (green) lights when the Library is ready to accept commands from the host computer. The Ready LED goes out when you enter the Menu mode, indicating that the Library is offline.

The Use Cleaner LED (yellow) indicates that one or more of the drives in the Library needs cleaning. Perform a cleaning operation as described in Chapter 5, “Maintenance.” When the Use Cleaner LED lights, you can find out which drive needs cleaning by selecting Cleaning Needed on the Drive Status submenu.

When either the Drive Fault or the Loader Fault LED (red) lights, a Fault screen appears on the LCD display. The Fault screen is described later in this chapter.

See Chapter 6, “Troubleshooting,” for a list of Fault Symptom Codes (FSC) and Error Recovery Procedures (ERP).



## Buttons

There are four buttons on the control panel: **Escape**, **Enter**, **π**, and **θ**. The buttons do not directly control specific functions or options. Instead, you use the buttons to navigate from the Default screen through a multi-level menu structure, then select the desired option from the appropriate menu using the **Enter** button. Table 4-3 lists the effect of each of the four buttons under various conditions.

### Using the Enter Button to Access Main Menu

To enter the Menu mode and display the Main menu from the Default screen, press the **Enter** button. When you enter the Menu mode, the Ready LED goes out. This means that the Library is offline, and the Library responds to all commands from the host with a SCSI Not Ready until you exit the Menu mode and the Ready LED lights.

### Using the Escape Button to Return to Default Screen

To return to the Main menu from a submenu, press the **Escape** button repeatedly until the Main menu appears. Pressing the **Escape** button while the Main menu is displayed exits the Menu mode and returns you to the Default screen.

## Using the Escape Button to Access Status Mode

To enter the Status Mode, which displays all aspects of the Library's operating and configuration status, press the **Escape** button at the Default screen. The Library remains online.

**Table 4-3**  
**Control Panel Button Functions**

Display/Mode	Escape	Enter	$\pi$	$\theta$
At POST Screen	N/A	N/A	N/A	
At Default Screen	Enters Status Mode	Enters Menu Mode	Toggles between Page 1 and Page 2	
In Status Mode (while online)	Returns to Default Screen	Same as in Menu Mode	Same as in Menu Mode	
In Menu Mode	Rejects Currently Displayed Choice, or  Aborts Control Panel Operation In Progress, or  Exits to Next Higher Menu Level, or  Exits Menu Mode to Default Screen	Accepts Currently Displayed Choice	Moves $\uparrow$ 1 Line Upward Through List of Options, or  Scrolls Part of Display 1 Line Toward Top of List of Options	Moves $\downarrow$ 1 Line Downward Through List of Options, or  Scrolls Part of Display 1 Line Toward Bottom of List of Options
At Fault Screen	N/A	Clears Soft Errors	N/A	N/A

**NOTE:** There is an auto-repeat feature for the  $\pi$  and  $\theta$  buttons. When you press either button for more than one-half second, the control panel behaves as if you were pressing and releasing the button about four times per second. This effect stops when you release the button.

## Front Panel and Media Locks

A security feature is available to avoid accidental interruption of Library operation by entering the Menu mode or removing cartridges while the host is accessing the Library. The front panel and the media can be electronically locked. When the front panel is locked, you can only enter the Menu mode after entering a 4-digit code. That is, when the Default screen appears, pressing the **Enter** button does not invoke the Menu mode until you enter the code. The front panel cannot be unlocked without using the Security submenu to unlock it.

The media can also be locked by software running on the host, using the SCSI ALLOW/PREVENT MEDIUM REMOVAL command. The Library provides no control panel override for this command. Usually, exiting the host software restores media access. In the event of host failure, you can restore media access by cycling the Library power.

Procedures for locking and unlocking front panels and media are described later in this chapter.

## Startup Display Messages

The display on the control panel is capable of displaying four lines of 20 characters each, to allow the use of easy-to-understand messages. Many of these messages and their functions are described in this chapter. Those displays that are described in other chapters are cross-referenced here as well.

## Power-On Self Test Screen

When power is first applied to the module, a series of Power-On Self Test (POST) diagnostics are performed. During POST execution, the model number of the module, the firmware revision, and the status or result of the test in progress are displayed on the control panel as shown:

```
Compaq SSL2020TL  
Firmware Level 0X.XX  
Checking Hardware
```

## Initialization Screens

After the POST completes, the library robotics are initialized. A series of screens similar to the one shown is displayed during this process.

```
Compaq SSL2020TL
Firmware Level 0X.XX
Initializing Loader
```

## Default Screen

After the POST diagnostics have concluded successfully and initialization is complete, the following Default screen appears. Note that the Default screen consists of two pages.

Page 1 Default screen:



```
Loader Idle
Drv0: Ready or No Tape
Drv1: Idle
```

Page 2 Default screen:

```
Loader Idle
0 ▶ □ □ _ _ _ _ _ □ ◀ 9
10 ▶ □ □ _ _ _ _ _ □ ◀ 18 ◀
```

Page 1 displays the library and drive status. Page 2 displays the library status (Line 1) and magazine slot status (Lines 3 and 4).

The library status lines show each slot as a rectangle. A solid block indicates that a cartridge is present. A hollow block indicates that a slot is empty.

Line 4 also shows the status of the mail slot. A  symbol indicates that a cartridge is in the mail slot. A  symbol indicates that the mail slot is empty.

The **π**, and **θ** buttons control which Default page is displayed.

## **Fault Screen**

When a fault is detected, a screen similar to the one shown appears. In addition, either the Drive Fault or the Loader Fault LED on the control panel lights.

```
Fault Code:          3004
Elevator Jammed
Power Down to Clear
```

The first line shows a numerical FSC. The second line shows a brief description of the error. The third and fourth lines contain a one- or two-line message describing the initial ERP.

For a list of FSCs and ERPs, see Chapter 6, “Troubleshooting.”

## **Using the Library Menus**

Use the Library menus (Figure 4-3) to display status information and to operate and configure the Library.

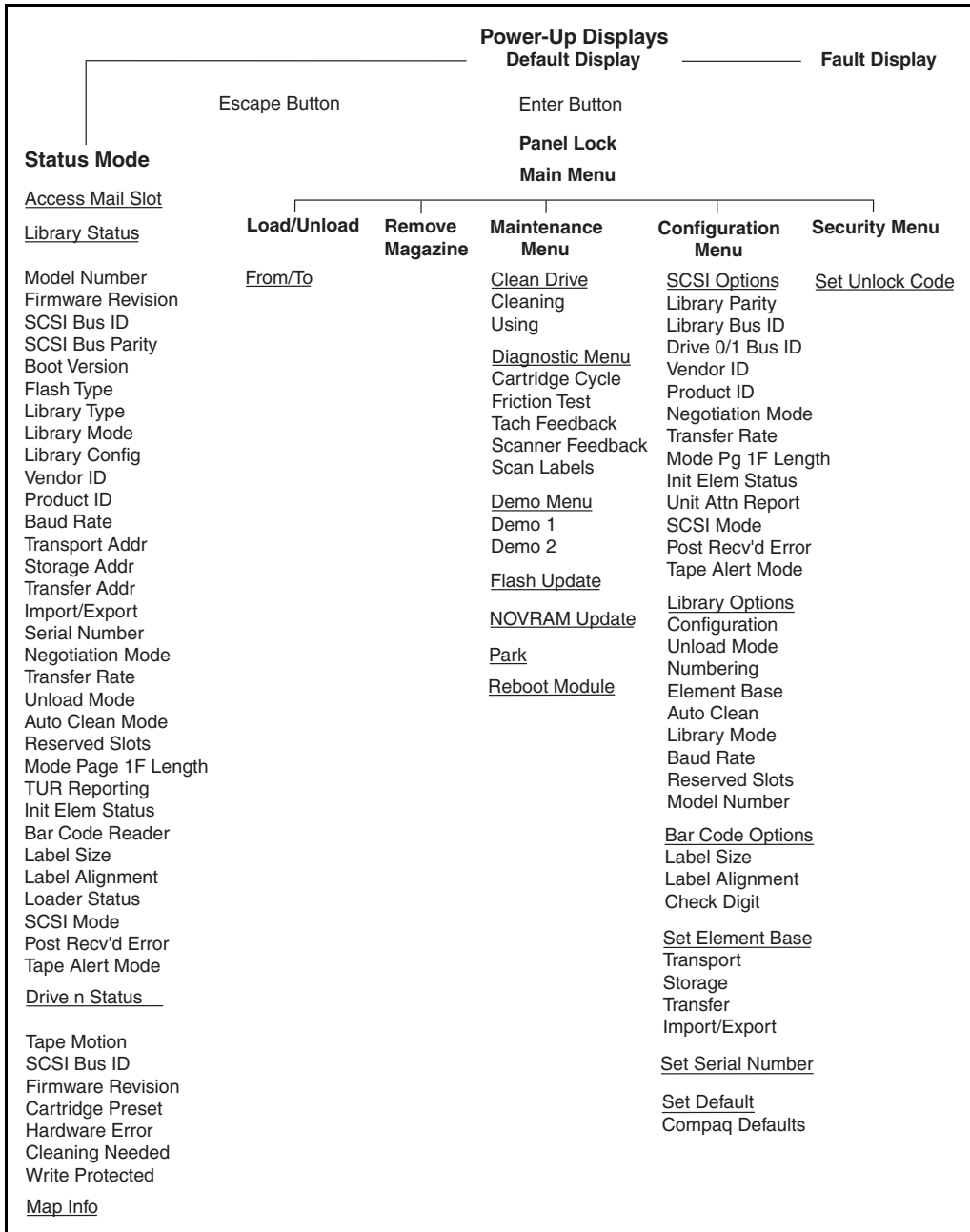


Figure 4-3. Library menus

## Using the Status Mode

You can enter the Status Mode by pressing the **Escape** button whenever the Default screen appears. Entering the Status Mode does not affect operation of the Library. When you enter the Status Mode, the following appears:

```
  v Access Mail Slot
    Library Status
    Drive 0 Status
    Map Info          /
```

## Exiting the Status Mode

To exit the Status Mode, press the **Escape** button until the Status menu appears. Press the **Escape** button again to display the Default screen.

## Exploring the Status Mode

The functions available in the Status Mode are:

- Access Mail Slot
- Library Status
- Drive *n* Status
- Map Info

Scroll up or down with the  $\pi$  and  $\theta$  buttons and press the **Enter** button to select the item.

## Library Status Submenu

When you select Library Status, the following menu appears:

```
Model Number:
  Compaq SSL2020TL
Firmware Revision:
  03.03          /
```

Scroll through this screen to view the list of available options:

- Model Number
- Firmware Revision
- SCSI Bus ID
- SCSI Bus Parity
- Boot Version
- Flash Type
- Library Mode
- Library Config
- Vendor Iden
- Product Iden
- Baud Rate
- Transport Address
- Storage Address
- Transfer Address
- Import/Export Addr
- Serial Number
- Negotiation Mode
- Transfer Rate
- Unload Mode
- Auto Clean Mode
- Reserved Slots
- Mode Page 1F Length
- TUR Reporting
- Initialize Element Status
- Barcode Reader
- Label Size
- Label Alignment
- Loader Status
- SCSI Mode
- Post Recv'd Error
- Tape Alert Mode

## Drive Status Menu

When you select either of the drives, the following menu appears:

↳ Tape Motion:

Idle

SCSI Bus ID:

4

/



Scroll through this screen to view the list of available options:

- Tape Motion
- SCSI Bus ID
- Firmware Revision
- Cartridge Present
- Hardware Error
- Cleaning Needed
- Write Protected

## Map Information Screen

When you select Map Info, the following screen appears. The location being reported appears on Line 1. The content of the bar code on the label, up to 6 characters, appears on Line 4.

```
Drv 0  
Occupied  
Label Valid  
XXXXXXXX /
```

The list of locations available for display on line 1 is as follows. If you do not designate any mail slots, those lines are omitted from the list.

- Drive0
- Drive1
- Slot0
- Slot1
- ...
- Slot18
- Mail Slot

Depending on the report for each location, Line 2 might display either Empty or Occupied, or, if a magazine is absent, Not Installed. Depending on the report for each location, Line 3 might display either Label Valid, or Label Not Present.

For each location reported, Line 4 displays the actual bar code on the label, up to 6 characters.

## Using the Menu Mode

**NOTE:** When the Library enters the Menu mode, the Ready LED goes out. This means that the module is offline, and responds to all commands from the host with a SCSI Not Ready until you exit the Menu Mode and the Ready LED comes on.

To prevent interruption of host operations, you can lock out the Menu Mode using the Security menu. See “Security Menu” later in this chapter. When all control panels are locked, you must enter your unlock code to display the Main menu.

When the Default screen appears, you can enter the Menu Mode by pressing the **Enter** button. The following Main menu appears:

```

v Load/Unload
  Remove Magazine
  Maintenance Menu
  Configure Menu      /
  
```

**NOTE:** If the control panel has been locked, the following screen appears instead of the one shown above. You must know the unlock code for the Library before you can continue.

Front Panel Locked

ENTER to Unlock  
ESCAPE to Exit

When you press the **Enter** button, the following screen appears:

```

Unlock Code          ≤
“
                    /
  
```

Using the  $\pi$  and the  $\theta$  button, set the first digit of the unlock code. Press the **Enter** button to move the cursor to the second digit and repeat the process. Press the **Escape** button, then the **Enter** button to confirm your entry. If the code is correct, the Main menu appears. If the code is incorrect, an error screen appears.

## Exiting the Menu Mode

To exit the Menu Mode and return to the Default screen, press the **Escape** button repeatedly. Each time you press the **Escape** button, the display moves to a higher menu level. When the Main menu appears, pressing the **Escape** button once returns to the Default screen. At this point, the Ready LED lights.

## Navigating through the Menu Structure

To select a submenu, move the  $\uparrow$  on the display to the desired line using the  $\leftarrow$  and  $\rightarrow$  buttons. Press the **Enter** button to select your choice and display the submenu. The / at the end of the fourth line means you can scroll to additional configuration options with the  $\rightarrow$  button.

The options available on the Main Menu are:

- Load/Unload
- Remove Magazine
- Maintenance Menu
- Configuration Menu
- Security Menu

## Load/Unload Menu

See “Loading and Unloading Tapes” later in this chapter.

## Remove Magazine Menu

When you scroll to Remove Magazine and press the **Enter** button, the magazine door swings open.

**NOTE:** If the message Magazine Locked appears on the screen, the host software has locked the magazine. Exiting your backup or host management software usually releases the lock. (The host management software should have a way to release the magazine without shutting down.) If the host fails, you can cycle power to the Library to release the lock.

## Maintenance Menu

The Maintenance menu options, intended for operator use, are described in Chapter 5, “Maintenance.” Additional Maintenance menu options used by service technicians are described in the *Compaq StorageWorks SSL2000 Series Library Maintenance and Service Guide*.

## Configure Menu

The Configure menu, how to use it, and the options available under it are described in Chapter 2, “Installation.”

## Security Menu

Use the Security menu to lock the control panel. This prevents inadvertent or unauthorized access to the Menu Mode, which takes the Library offline.

**NOTE:** You can display the Show Status menu without unlocking the panel (and without taking the Library offline) by pressing the **Escape** button at the Default screen.

When you select the Security menu, the following screen appears:

↳ Set Unlock Code  
Set Mail Slot Code

The Security Menu includes the following options:

- Set Unlock Code
- Set Mail Slot Code

To change the unlock code, or to enable or disable the panel locking function, scroll downward to Set Unlock Code. Press the **Enter** button. The following screen appears:

Unlock Code                    ≤  
\*“0000”

0000 Disables Lock        /

An underline cursor displays under the first digit. To set the first digit, press the  $\pi$  button or the  $\theta$  button until the number you want appears. To move the cursor to the second digit, press the **Enter** button. Repeat the process for each of the four digits. Be sure to remember the 4-digit number; you use it to enter the Menu Mode. Use an unlock code of 0000 to disable control panel locking.

When you have finished entering four digits, press the **Escape** button. The following screen appears. Your code appears instead of XXXX.

```
Unlock Code          ≤
  *"XXXX"
ENTER to Accept
ESCAPE to Exit      /
```

Press the **Enter** button to accept the displayed unlock code or **Escape** to return to the Main menu.

The next time you try to enter the Menu Mode, the following screen appears. You can still display the Status menu without using the security code by pressing the **Escape** button at the Default screen.

```
Front Panel Locked

ENTER to Unlock
ESCAPE to Exit
```

When you press the **Enter** button, the following screen appears:

```
Unlock Code          ≤
  "  "
                               /
```

Using the  $\pi$  and  $\theta$  buttons, set the first digit of the unlock code. Press the **Enter** button to move the cursor to the second digit and repeat the process. When you have finished, press the **Escape** button. The following screen appears:

```
Unlock Code
  *"XXXX"
ENTER to Validate
ESCAPE to Exit
```

Press the **Enter** button to validate your choice. If the code is correct, the Main menu appears. If the code is incorrect, an error screen appears. If you forgot your unlock code, contact your Technical Support representative for assistance.

## Displaying Firmware Revisions

You can display the library robotics firmware revision at any time by pressing the **Escape** button at the Default screen to enter the Status Mode. It displays as one of the options on the Library Status submenu of the Status menu. It is also displayed on line 2 of the POST Screen and the Initialization Screens.

## Loading and Unloading

The Load/Unload menus let you specify a source and a destination for a cartridge movement, so you use exactly the same procedure to load and unload. To load or unload a tape from the front panel, use the Load/Unload menus as follows:

Ready

```

0 ▶ □ □ _ _ _ _ _ _ _ □ ◀ 9
10 ▶ □ □ _ _ _ _ _ _ _ □ ◀ 18 ◀

```

From the Default screen, enter the Menu Mode by pressing the **Enter** button. The following Main menu appears with the  $\cup$  next to Load/Unload.

```

∪ Load/Unload
  Remove Magazine
  Maintenance Menu
  Configure Menu      /

```

Press **Enter** to display the first Load/Unload submenu, as shown.

```

From:
∪ *Slot 1
  To
  *Drv0                /

```

The  $\cup$  is next to line 2 of the display. Line 2 shows the top item in a scrollable list of sources. Note that a  $\theta$  has appeared on the right of the bottom line. This indicates that the  $\theta$  button can now be used to scroll through the list, and that the top item on the list is displayed. As soon as you press the  $\theta$  button, the following three things happen:

1. The list scrolls down one item (only line 2 scrolls).
2. An  $\leq$  displays on the right of line 1, meaning there are more options above the item displayed on line 2.

3. The \* at the left of line 2 (the current selection) disappears, meaning you have not selected an item from the list.

**NOTE:** The contents of the lists on line 2 and line 4 vary as follows.

### Initial Screen – From Line

The list on line 2 (the From line) includes every drive and magazine slot (including mail slots) with cartridges. (You cannot retrieve a cartridge from an empty slot or drive.)

### Initial Screen – To Line

The list on line 4 (the To line) includes all the valid destination choices, that is, drives and slots that are empty. (You can't put a cartridge into a full slot or drive.)

### Scroll List – To Line

There is another limitation on the To list. If you select a drive on the From screen, the To list can include only slots. If you select a slot on the From screen, the To list can contain only drives.

For example, load the cartridge that is in Slot 11 into any available drive. Use the  $\theta$  button to scroll line two to Slot 11. The following screen appears:

```
From:                ≤  
v Slot 11  
To:  
  Drv 0
```

When you scroll to your desired source, press the **Enter** button to select it. Two changes occur in the display as shown below:

1. The \* reappears at the beginning of line 2, indicating that you have made a selection.
2. The v moves to line 4, indicating that you can select a destination.

```
From:  
  *Slot 11  
To:  
v *Drv 0
```

Press the **Enter** button to select Drive 1 as the destination. The following Confirmation Screen appears:

From: Slot 11 To: Drv 0

ENTER to Execute

ESCAPE to Cancel

Press the **Enter** button to execute the load or unload or the **Escape** button to cancel or return to the From entry screen.

When you press the **Enter** button, the following screen appears: If the source is a drive, the word Unload appears in place of the word Load on line 4.

From: Slot 11 To: Drv 0

Load In Progress

When the load or unload operation completes, the Default screen reappears.

## Inserting and Removing Cartridges

The tape magazine must be removed from the Library in order to remove or insert cartridges (see Figure 4-4). Make sure the slot you want to use is not already reserved for a cartridge that is now in a drive. The safest way to do this is to unload all drives before removing the magazine. You can unload all the drives either through your host computer software or by using the LOAD/UNLOAD command on the Main menu.

Make sure the control panel is unlocked. When the control panel is locked, it is impossible to enter the Menu Mode. The host computer must allow removal of the magazine (❶ Figure 4-4). The host software can enable or disable the door unlock function using the SCSI PREVENT/ALLOW MEDIUM REMOVAL command. If the host is preventing removal, when you select Unlock Door on the Main menu and press the **Enter** button, the message Magazine Locked appears.

The host software should be able to release the magazine without shutting down. If host computer failure prevents the host from releasing the lock, cycle power to the Library.

---

**IMPORTANT:** If you are still unable to open the magazine door, see “Emergency Magazine Removal,” later in this chapter.

---



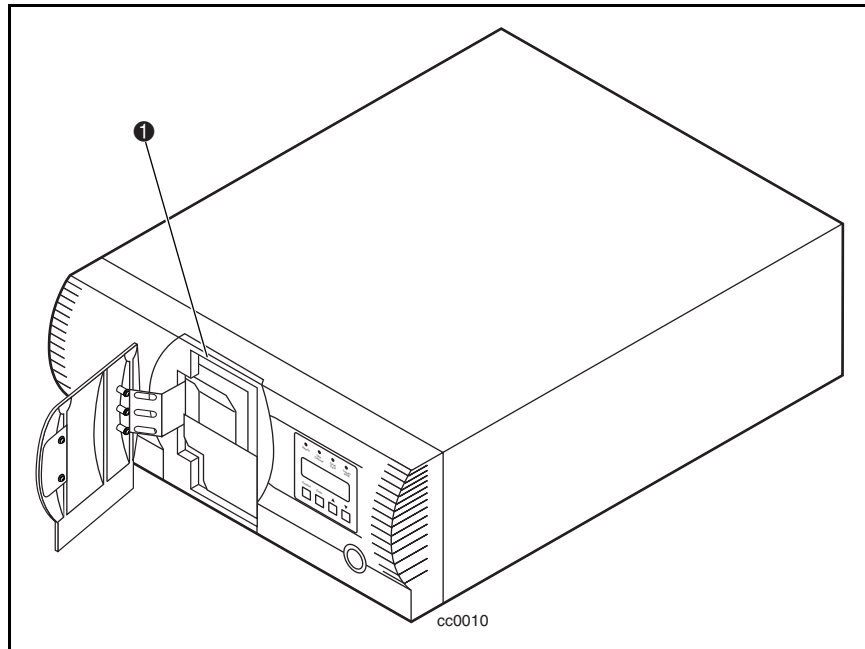


Figure 4-4. Magazine in place

## Removing the Magazine

Whenever a magazine is installed inside the module it is locked in place to prevent tampering or accidental removal. To remove the magazine, enter the Menu Mode by pressing the **Enter** button at the Default screen. At the Main menu, select Remove Magazine, and press the **Enter** button. The magazine door swings open.

## Emergency Magazine Removal

If a fault occurs that prevents removal of the magazine, turn the power off for five seconds. Power up while continuously pressing the  $\pi$  button. Continue to hold the button until all of the indicators on the control panel light, then go out. Release the button. The door swings open.

## Inserting Cartridges into the Magazine

A full magazine is shown in Figure 4-5. Insert cartridges so that the label end with the write protect switch is outward, with the write protect switch toward the bottom of the magazine. The lowest numbered cartridge slot in the magazine is closest to the handle ( ② Figure 4-5). The highest numbered cartridge slot is the farthest from the handle ( ① Figure 4-5).

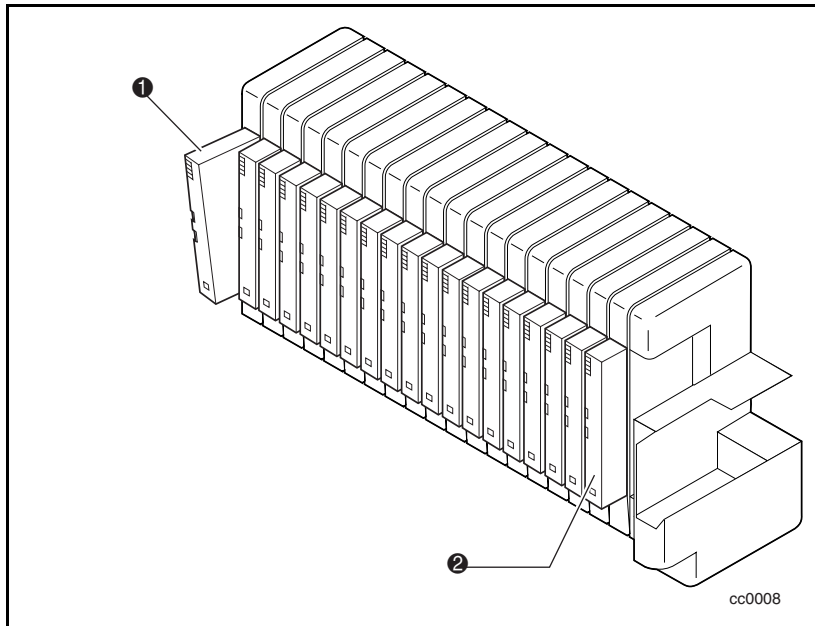


Figure 4-5. Tape magazine with cartridges installed

## Inserting the Magazine

If the magazine door on the front of the Library is closed and locked, open it, as follows. Enter the Menu Mode by pressing the **Enter** button at the Default screen. At the Main menu, select Remove Magazine and press the **Enter** button. The magazine door swings open. Slide the magazine through the door opening, with the cartridges protruding from the left. When the magazine is fully inserted, push the door closed until it locks.

## Using the Mail Slot

The mail slot is used only with host software that supports this feature ( ❶ Figure 4-6). To access the mail slot from the Default screen, press the **Escape** button to enter the Status Mode. Press the **Enter** button and the magazine door opens, exposing the Mail Slot. The magazine remains locked inside the module. The mail slot of the magazine can be tilted forward to insert or remove a cartridge. After inserting or removing the cartridge, close the magazine door.

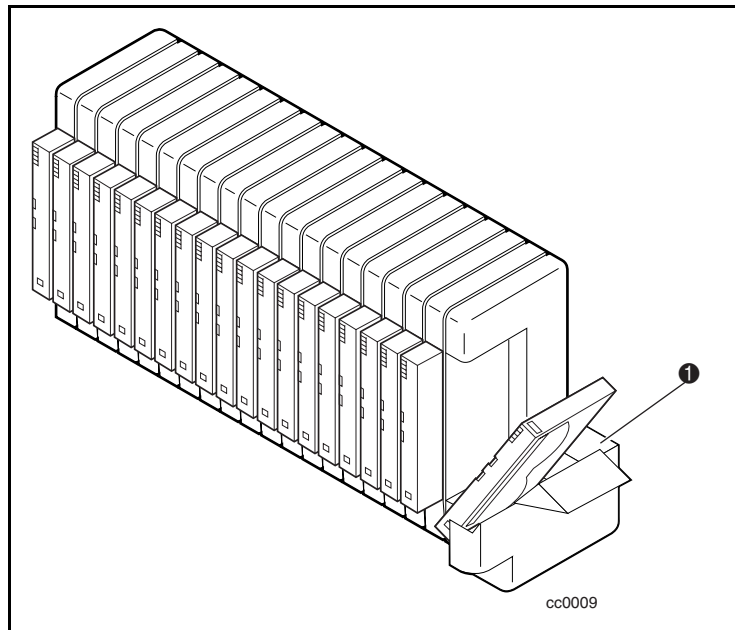


Figure 4-6. Mail slot location

## Tape Cartridge Requirements

The Library uses Advanced Intelligent Tape (AIT) 8 mm tape cartridges. They are designed for an MTBF of 250,000 hours.

**NOTE:** Handle and store tape cartridges in a clean, dust-free environment.

## Write Protecting Cartridges

To write protect a tape cartridge (disable data recording), slide the write protect switch up so that no orange color is visible in the lower small window (see Figure 4-7). To enable data recording, slide the write protect switch down until the orange indicator shows in both small windows.

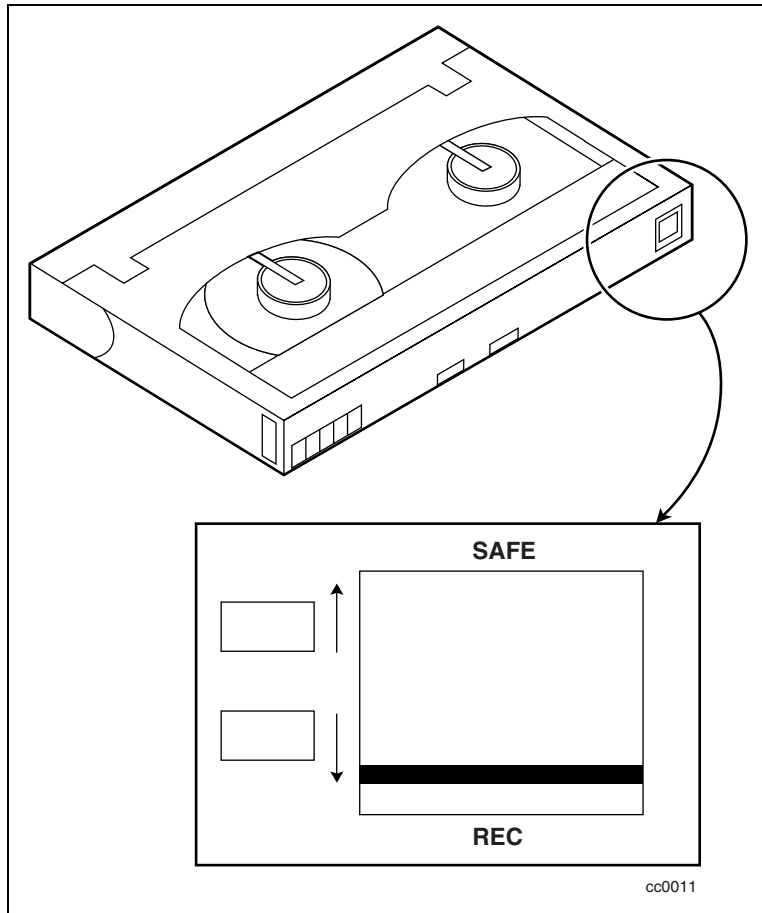


Figure 4-7. Tape cartridge write protection switch

## Bar Code Labels

Bar code labels should meet the following specifications (see Figure 4-8):

- Size: 2.1 in x 0.4 in (55 mm ❶ x 10.2 mm ❷)
- Stock: Label stock with adhesive back and matte overlamine
- Location: Mounts next to write-protect switch on cartridge
- Text: Six characters, any combination of alphabetic and numeric
- Bar Code: Code 39, Codabar, 3-of-9, standard 2-of-5, or interleaved 2-of-5, with a length of eight digits. Minimum element width is 0.3 in (7.5 mm)

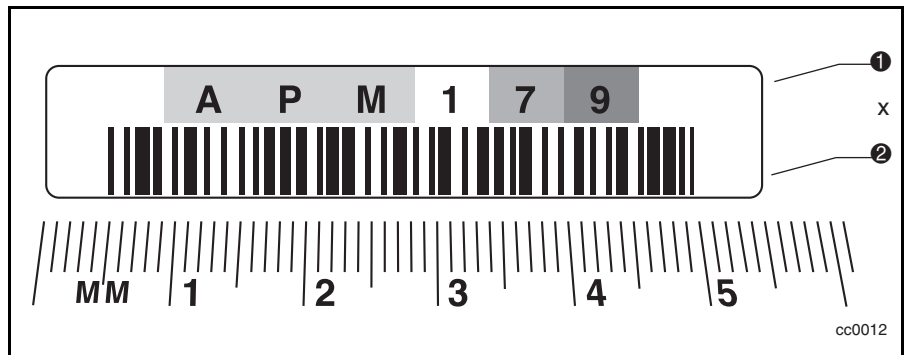


Figure 4-8. Bar code label size

# Multi-Unit Library System Operation

## Powering Up

All Library units should be powered up at the same time through the storage cabinet supplied power, or the master unit (top) should be powered up last if the Library units are powered up individually.

## Connecting a Multi-Unit Library System

The following procedure explains how to set the SCSI ID and SCSI host connections:

1. For maximum performance, connect only 2 AIT-2 drives to each SCSI host adapter.
2. For nominal performance, you can connect 3 AIT-2 drives per host.
3. Set the SCSI IDs through the master unit front panel dependent on the SCSI host adapter drive ratio.
4. On the master unit, the Library will take up a SCSI ID (default is 0).
5. AIT drives on different SCSI host adapters can have the same ID.

**NOTE:** If you use only two drives per SCSI host adapter, leaving the default setting will work provided there is no conflict with any other devices.

# Chapter 5

## Maintenance

### Introduction

This chapter describes the Clean Drive and Demo options contained in the Maintenance menu. You use the Clean Drive option to clean tape drives installed in the SSL2000 Series Library (AIT Library). You can use the Demo option to fully exercise the Library robotics.



**CAUTION:** Only qualified service technicians should perform the remaining options contained in the Maintenance menu.

---

**IMPORTANT:** Only perform the Clean Drive option from the Maintenance menu when the Library displays a message informing you that a drive needs cleaning.

---

**NOTE:** When Compaq issues new firmware, a qualified service technician must install it.

This chapter includes procedures for:

- Running a cleaning cartridge
- Removing the cleaning cartridge
- Exercising the Library robotics

## Running a Cleaning Cartridge

There are two ways to run a cleaning cartridge:

- *Automatically*—by enabling the Auto Clean option
- *Manually*—by selecting the CLEAN DRIVE command from the Maintenance submenu on the front panel display

### Running a Cleaning Cartridge Automatically

You can configure the Library so that it runs the cleaning cartridge automatically. Because the cleaning cartridge is abrasive, you should not use it unless Use Cleaner appears on the control panel screen. The completion of an unload operation on a drive that needs cleaning causes the Use Cleaner LED to light. This in turn activates an automatic cleaning cycle if Auto Clean has been selected from the Configuration menu.

To run a cleaning cartridge automatically using Auto Clean:

1. Reserve a slot as the cleaning slot:

See “Setting Up Reserved Slots” in Chapter 2.

If you have more than one reserved slot, the Cleaning Slot is the first reserved slot. Reserved slots are at the back of the magazine.

2. Install a cleaning cartridge into Reserved Slot #1.
3. Enable the Auto Clean option on the Configuration menu:  
From the Main menu, select Library Options / Auto Clean / Enabled.

### Running a Cleaning Cartridge Manually

1. Install the cleaning cartridge into any slot. ( Slot 0, for example.)
2. At the Default screen, press the **Enter** button. The following Main menu screen appears:

```

v Load/Unload
  Remove Magazine
  Maintenance Menu
  Configure Menu      /
```



3. Scroll down to the Maintenance menu and press the **Enter** button. The following Maintenance submenu appears:

```

v Clean Drive
  Diagnostic menu
  Demo Menu
  Flash Update      /

```

4. Press the **Enter** button once to select Clean Drive. The following Cleaning submenu appears:

```

Cleaning:
v *Drv 0
Using:
  *Slot 0

```

5. Press the **Enter** button to accept Drive0. The v moves to line 4 of the display. The choices available on Line 4 are slots 0 through 18. Press the **Enter** button again to use the cartridge in Slot 0.

**NOTE:** If you cannot use slot 1 for the cleaning cartridge, you can scroll line 4 to select another slot.

6. The following Cleaning Confirmation screen appears:

```

Cleaning:           Drive 0
Using:             Slot 0
ENTER To Execute
ESCAPE To Cancel

```

7. As the Cleaning Confirmation screen indicates, to execute the cleaning operation, press the **Enter** button. If the Cleaning Confirmation screen does not show your intended drive and cleaning cartridge, press the **Escape** button to return to the Cleaning submenu.

When you press the **Enter** button, the following Cleaning In Progress screen appears:

```

Cleaning:           Drive 0
Using:             Slot 0

```

Cleaning In Progress

When the cleaning operation completes, the Default screen reappears.

## Removing the Cleaning Cartridge

1. Examine the Default screen on the control panel to make sure the cleaning cartridge has been unloaded from the drive. If not, then unload it using the Load/Unload menu, as described in Chapter 4, "Operation."
2. Remove the magazine from the Library. See "Inserting and Removing Cartridges" in Chapter 4.
3. Remove the cleaning cartridge from the magazine.
4. Insert any desired data cartridge into the slot vacated by the cleaning cartridge.
5. Insert the magazine into the Library.
6. Close the magazine door.

## Exercising the Library Robotics

To fully exercise the library robotics, use the Demo option as follows:

1. From the Maintenance menu, select the Demo submenu.
2. Select Demo 1.

The library robotics begin to move cartridges randomly from slot to slot, displaying the number of passes on the screen.

If all slots in the magazine are full, Demo 1 loads a cartridge into DLT0 and leaves it there. If you press the  $\pi$  button while Demo 1 is running, the Library loads a cartridge into DLT0, unless DLT0 is full. If you press the  $\pi$  button again, the cartridge is unloaded from DLT0 and returned to the magazine.

Demo 1 runs continuously as long as the Library has power.

To pause Demo 1, press and hold the **Escape** button until a flashing message displays that the test is paused.

To stop Demo 1, press the **Escape** button a second time to return to the Main menu.

# Chapter **6**

## Troubleshooting

### Introduction

This chapter describes the problems that can cause the SSL2000 Series Library (AIT Library) to malfunction, including:

- Platform problems
- General drive errors
- Error recovery
- Fault Symptom Codes (FSCs)

### Platform Problems

Incorrect installation and configuration cause platform problems. In this case, the Library appears to be operating normally, but no data can be interchanged. You may or may not get an error code on the control panel. To identify an error caused by this type of problem, check your installation and configuration setup. See Chapter 2, “Installation,” for more information.

## General Drive Errors

General drive errors usually result from a miscommunication between a module's processor and a drive processor or a mechanical malfunction within the Library.

Both platform problems and general drive errors display an error message and a Fault System Code (FSC) on the control panel. Use the FSC to report errors to your Technical Support representative, or in some cases, to determine a recovery procedure.

A simple error recovery procedure appears at the bottom line of the control panel display. You can clear some errors by pressing the **Enter** button on the control panel or by cycling the power to the Library.

## Error Recovery

Figure 6-1 outlines the recommended steps for error recovery. You should follow this chart in all cases.

Error Recovery Procedures (ERPs) are listed in detail in Table 6-1; FSCs are listed in Table 6-2. An ERP is also listed for each FSC.

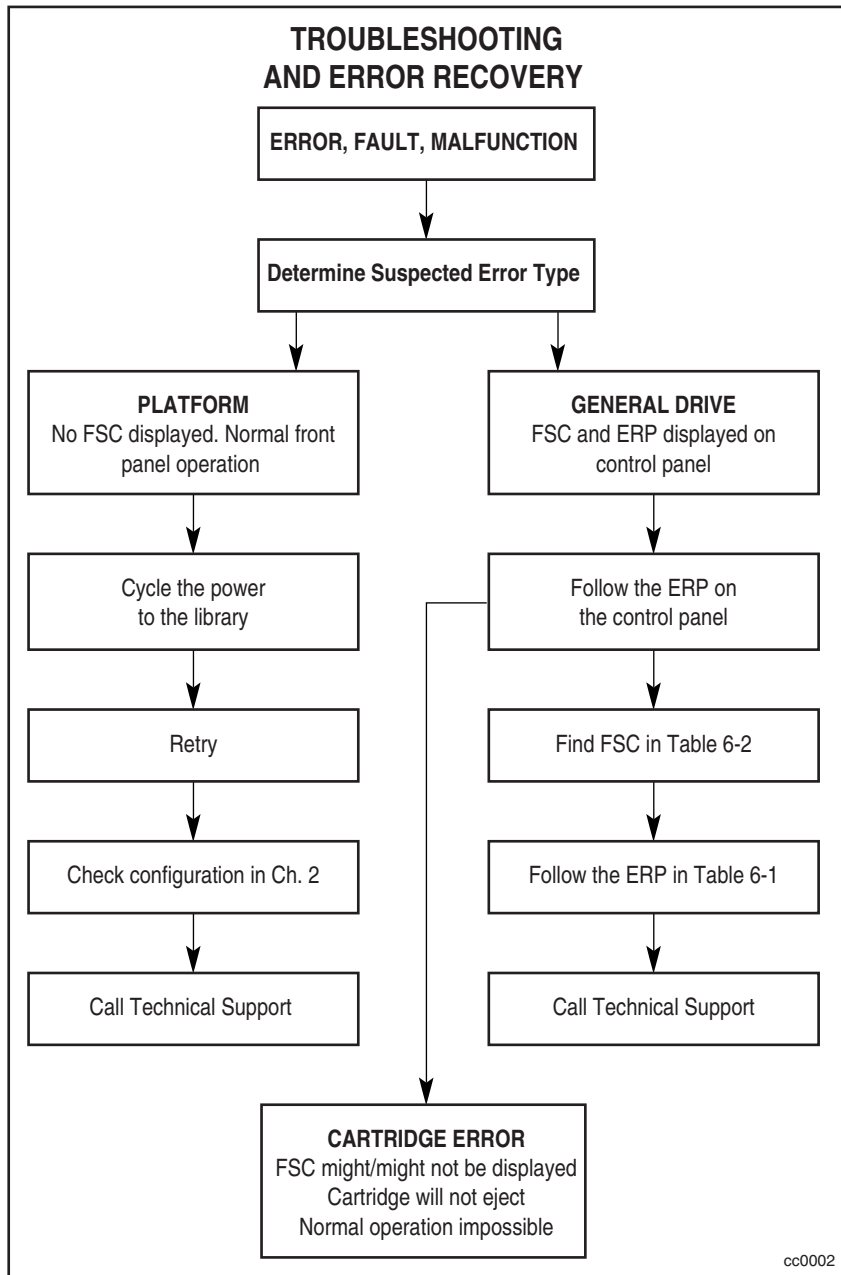


Figure 6-1. Troubleshooting flowchart

## Error Recovery Procedures

Table 6-1 lists ERPs for errors reported on the front panel of the Library. This list includes only those procedures that can be safely performed by you. The *Compaq StorageWorks SSL2000 Series Library Maintenance and Service Guide* includes additional procedures that can be performed by a qualified service technician.

---

**Table 6-1**  
**Error Recovery Procedures**

---

<b>ERP Code</b>	<b>Procedure/Description</b>
C	Cycle power to the Library using the AC switch on the front panel. Wait 30 seconds to power on again.
D	Turn off power to the Library and inspect connectors and cables.
F	Invalid operation. Select parameters correctly and try again.
G	Call Technical Support.

---

## Fault Symptom Codes (FSCs)

FSCs that appear on the Fault screen described in Chapter 4, “Operation.” A descriptive message and instructions for clearing the fault accompany each FSC. If a fault persists, look up the FSC in Table 6-2 to determine the error recovery procedure or to report to your Technical Support representative.

**Table 6-2**  
**Fault Symptom Codes**

<b>FSC</b>	<b>Message</b>	<b>ERP</b>
3001	Picker Tries Escd Power Down to Clear	C,D,G
3002	Picker Tach Errors Power Down to Clear	D,G
3003	Elevator Tach Errors Power Down to Clear	D,G
3004	Elevator Jammed Power Down to Clear	C,D,G
3005	Picker Jammed Power Down to Clear	C,D,G
5002	All Drives/Slots Empty Press Enter to Clear	F
5003	All Drives/Slots Full Press Enter to Clear	F
5012	All Drives Full Press Enter to Clear	F
5014	AIT Already Loaded Press Enter to Clear	F
5015	Expired Cleaning Cart Press Enter to Clear	F
5016	Not a Cleaning Cart Press Enter to Clear	F

If an error message appears that is not included in Table 6-2, write down the fault code number and follow the recovery procedure described on line 4 of the display. If the same error occurs again, call your Technical Support representative.

# *Appendix* **A**

## **Specifications**

### **Introduction**

This appendix lists the following specifications and regulatory requirements met by the Compaq StorageWorks SSL2000 Series Library (AIT Library):

- Specifications:
  - Operational performance
  - Reliability
  - Power
  - Mechanical
  - Environmental
  - Acoustic emission
- Regulatory requirements:
  - Safety
  - Electromagnetic Emission (EM)
  - FCC and VCCI



---

**Table A-1**  
**Operational Performance Specifications**

---

<b>Description</b>	<b>Specification</b>
Host Interface	Fast Wide SCSI (differential) Low Voltage Differential (LVD)
Number of cartridges, full magazine	19
Media type	AIT 8 mm, Advanced Metal Evaporated
Number of drives	1 or 2
Load time	15 sec (max), including picking from slot
Unload time	15 sec (max), including returning to slot
Rewind speed	160 in/sec
Sustained native data transfer rate, maximum	21.6 to 43.2 GB/hr
Native data capacity (full magazine)	950 GB
Compressed data capacity (2:1, full magazine)	1900 GB

---

**Table A-2**  
**Reliability Specifications (Drives)**

<b>Description</b>	<b>Specification</b>
Data error rate (recoverable)	1 in $10^{17}$ bytes
MTBF	250,000 hr @ 30% duty cycle
MTTR	30 min
Head life	50,000 tape motion hrs

**Table A-3**  
**Reliability Specifications (Library System Robotics)**

<b>Description</b>	<b>Specification</b>
Life expectancy, load/unload operations	1,000,000 cycles
Design life	7 yrs

**Table A-4**  
**Power Specifications**

<b>Description</b>	<b>Specification</b>
Voltage	115 to 240 VAC
Current	1.5 to 1.2 A
Line frequency	47 to 63 Hz

**Table A-5  
Mechanical Specifications (Tabletop Model)**

<b>Description</b>	<b>Specification</b>
Height	7.9 in (20 cm)
Width	17.3 in (44 cm)
Depth:	
Overall	24 in (61 cm)
Behind panel	22.75 in (57.79 cm)
Weight:	
Single drive	41 lbs (18.6 kg)
Dual drive	41.5 lbs (18.8 kg)

**Table A-6  
Mechanical Specifications (Rackmount Model)**

<b>Description</b>	<b>Specification</b>
Height	6.7 in (17 cm)
Width	17.3 in (44 cm)
Depth:	
Overall	24 in (61 cm)
Behind panel	22.75 in (57.79 cm)
Weight:	
Single drive	41 lbs (18.6 kg)
Dual drive	41.5 lbs (18.8 kg)

**Table A-7**  
**Environmental Specifications (Operating)**

<b>Description</b>	<b>Specification</b>
Dry bulb temperature	50°F to 104°F (10°C to 40°C)
Temperature gradient	1.8°F/min (1°C/min)
Temperature shock	59°F (15°C) over 2 min
Wet bulb temperature	78.8°F (26°C)
Relative humidity (non-condensing)	15% to 85%
Humidity gradient	10%/hr
Altitude	-100 ft to +10,000 ft (-305 m to 3050 m)

**Table A-8**  
**Environmental Specifications (Packed or Unpacked)**

<b>Description</b>	<b>Specification</b>
Dry bulb temperature	-40°F to 140°F (-40°C to 60°C)
Temperature gradient	36°F (20°C)/hr (across the range)
Temperature shock	27°F (15°C) (over 2 min)
Wet bulb temperature	86°F (30°C)
Relative humidity (non-condensing)	10% to 95%
Humidity gradient	10%/hr
Altitude	-100 ft to +10,000 ft (-305 m to 3050 m)

**Table A-9**  
**Environmental Specifications (Storage/Transit)**

<b>Description</b>	<b>Specification</b>
Dry bulb temperature	-40°F to 140°F (-40°C to 60°C)
Temperature gradient	45°F (25°C)/hr (across the range)
Temperature shock	27°F (15°C) (over 2 min)
Wet bulb temperature	86°F (30°C)
Relative humidity (non-condensing)	5% to 95%
Humidity gradient	10%/hr
Altitude (sea level)	-100 ft to +10,000 ft (-305 m to 3050 m)

**Table A-10**  
**Acoustic Emission Level**

<b>Drive Condition</b>	<b>Emission Level</b>
Drive in use (Intermittent robot motion excepted)	<50 dBA

## Safety

The Library carries the following Regulatory Agency product safety certifications.

**Table A-11**  
**Regulator Agency Product Safety Certifications**

<b>Description</b>	<b>Specification</b>
Certification	Standard
UL Listed	UL 1950
TUV/Product Service	EN 60 950
GS Mark	
CE Mark	EMC Directive, Low Voltage Directive
Canadian UL Listed	CSA 22.2 No. 950

## Electromagnetic Emission (EM)

### Notice

This equipment has been tested using double shielded cables for EM compliance. The use of unshielded cables or modifications requires system testing for EMI testing for compliance to the standard.

### Industry Canada

This Class A digital apparatus meets all requirements of the Canadian Interference-causing equipment regulations.

### Industrie Canada

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

## FCC Notice

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

**Table A-12**  
**Acoustic Noise Declaration Declared per ISO 9296 and ISO 7779**

Product	Sound Power Level $L_{wAd}$ , B		Sound Pressure Level $L_{pAm}$ , dBA (bystander position)	
	Idle	Operate	Idle	Operate
SSL2000 Series Library	6.4	7.0	48	48

**NOTE:** Current values for specific configurations are available from Compaq representatives 1 B = 10 dBA.

**Table A-13**  
**Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779 /DIN EN27779**

Gerät	Schalleistungspegel $L_{wAd}$ , B		Schalldruckpege $L_{pAm}$ , dBA (Bediener position)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
SSL2000 Series Library	6,4	7,0	48	48

**NOTE:** Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Compaq Vertretungen erhältlich. 1 B = 10 dBA.

## **FCC and VCCI Requirements**

The following FCC and VCCI notices apply to the Library.

### **Statement for Equipment Meeting FCC Class A Requirements**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) This device must accept any interference that may cause undesirable operation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.



## **Equipment Meeting VDE Class B Requirements (VFG 1046/84 and VFG 243/91 for Germany)**

Für Bundesrepublik Deutschland  
For Federal Republic of Germany  
Pour la République fédéral d'Allemagne

Bescheinigung des Herstellers/Importeurs  
Dieses Gerät ist Übereinstimmung mit den Bestimmungen der BMPT Vfg. 243/1991 und Vfg. 46/1992 in Verbindung mit EN55022:1987 (DIN VDE 0878-3:11.89) oder Vfg. 1046/1984 mit Vfg. 483/1986, funkentstört. Es trägt als Nachweis der EMV-Konformität entweder eine Konformitätskennzeichnung oder das freiwillige VDE-Funkschutzzeichen.

Der vorschriftsmäßige Betrieb mancher Geräte (z.B. Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die unten aufgeführten Hinweise.

Für Geräte die nicht mit dem VDE-Funkschutzzeichen versehen sind wurde dem Bundesamt für Zulassungen in der Telekommunikation (BZT) des Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung Zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

### **Betreiberhinweis**

Wir sind verpflichtet, Sie auf folgende Fakten hinzuweisen (BMPT-Amtsblattverfügung 243/91 bzw. 1046/84 §2, Abschnitt 5):

Dieses Gerät wurde funktechnisch sorgfältig entstört und geprüft. Wird deises Gerät innerhalb einer Anlage zusammen mit anderen Geräten betrieben, muß bei Inanspruchnahme der "Allgemeinen Betriebsgenehmigung" nach BMPT-AmtsblVfg. 243/91 bzw. 1046/84 die gesamte Anlage den unter §2, Abschnitt 1, genannten Voraussetzungen entsprechen.

### **Externe Datenkabel:**

Sollte ein Austausch der von Digital spezifizierten Datenkabel nötig werden, muß der Betreiber für eine einwandfreie Funkentstörung sicherstellen, daß Austausch kabel im Aufbau und Abschirmqualität dem Compaq Originalkabel entsprechen.

## VCCI Notice for Japan Class I Equipment

Japanese Voluntary Control Council for Interference (VCCI).

この装置は、第一種情報処理装置（商工業地域において使用されるべき情報処理装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。  
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。  
取扱説明書に従って正しい取り扱いをして下さい。

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an area adjacent thereto, radio interference may be caused to radios and TV receivers, and so on. Read the instructions for correct handling.

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