

Compaq StorageWorks

MSL5026 Library

User Guide

First Edition (April 2001)

Part Number: 231910-001

Compaq Computer Corporation

© 2001 Compaq Computer Corporation.

Compaq, the Compaq logo, and StorageWorks Registered in U. S. Patent and Trademark Office.

All other product names mentioned herein may be trademarks of their respective companies.

Confidential computer software. Valid license from Compaq required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Compaq shall not be liable for technical or editorial errors or omissions contained herein. The information in this document is provided "as is" without warranty of any kind and is subject to change without notice. The warranties for Compaq products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty.

Compaq service tool software, including associated documentation, is the property of and contains confidential technology of Compaq Computer Corporation. Service customer is hereby licensed to use the software only for activities directly relating to the delivery of, and only during the term of, the applicable services delivered by Compaq or its authorized service provider. Customer may not modify or reverse engineer, remove, or transfer the software or make the software or any resultant diagnosis or system management data available to other parties without Compaq's or its authorized service provider's consent. Upon termination of the services, customer will, at Compaq's or its service provider's option, destroy or return the software and associated documentation in its possession.

Compaq StorageWorks MSL5026 Library User Guide
First Edition (April 2001)
Part Number: 231910-001

Contents

About This Guide

Text Conventions	v
Symbols in Text	vi
Symbols on Equipment	vi
Rack Stability	vii
Getting Help	viii
Compaq Technical Support	viii
Compaq Website	viii
Compaq Authorized Reseller	ix

Chapter 1

Introduction

Models	1-2
Accessories	1-2
Tape Drives	1-3
Magazines	1-4
Power Supply.	1-5
Library Controller Board.	1-6
Robotics.	1-7
Factory-Defined Accessory PCI Slots.	1-8
Front Panel Indicators	1-9
Multi-Unit Library Systems.	1-10

Chapter 2

Installation

Setting up the Tabletop Model	2-2
Setting up the Rackmount Model	2-3
Applying Power to the Library	2-7
SCSI Cable Configurations	2-8
Supported SCSI Cables	2-8
Zero Tape Drive Single Host System	2-9
One Tape Drive Single Host System	2-10
Two Tape Drives Single Host System	2-11
Two Tape Drives Dual Host System	2-12

Chapter 3

Library Configuration

Factory Default Configuration Settings	3-2
Edit Library Options	3-3
Edit SCSI Options	3-5
Setting a SCSI ID	3-7
Setting Up a Reserved Slot	3-10
How Reserved Slots are Numbered	3-10
Setting Up Your Network	3-12

Chapter 4

Operation

Front Panel	4-2
Magazine Doors	4-3
Indicators	4-4
Front Panel and Media Security Locks	4-6
GUI Touch Screen	4-6
Host System	4-7
Inserting and Removing Tape Cartridges	4-8
Removing Magazines	4-8
Inserting Cartridges into a Magazine	4-9
Using the Mail Slot (Left Magazine Only)	4-11
Barcode Labels	4-12
Library Display Screens and Options	4-13
Initialization Screen	4-13
Library Status Screen	4-14
Technical Support Information Option	4-15
Mail Slot Access Option (Left Magazine Only)	4-15
Magazine Access Option	4-16
Move Media	4-16
LCD Contrast Controls	4-17
Power	4-17
Status	4-18
Online	4-18
Menu	4-19

Operation*continued*

Menu Selections	4-20
View System Data Area	4-20
Library Options	4-20
SCSI Options	4-22
Network Options	4-25
Library Info	4-26
Cartridge Map	4-26
Edit Options Area	4-27
Library	4-27
SCSI	4-28
Network	4-28
Passwords	4-29
Utilities Area	4-30
Maintenance	4-30
Diagnostics	4-31
Factory	4-32
Security Level	4-33

Chapter 5**Maintenance**

Running a Cleaning Cartridge	5-2
Automatically Running a Cleaning Cartridge	5-2
Manually Running a Cleaning Cartridge	5-2
Running a Cleaning Cartridge From the Mail Slot	5-3
Running a Cleaning Cartridge From a Data Cartridge Slot	5-3
Running a Cleaning Cartridge From the Cleaning Slot	5-4
Replacing a Cleaning Cartridge in a Reserved Slot	5-4
Replacing a Cleaning Cartridge in the Right Magazine	5-4
Replacing a Cleaning Cartridge in the Mail Slot	5-5

Chapter 6**Troubleshooting**

Introduction	6-1
Platform Problems	6-2
Error Recovery	6-2
Error Recovery Procedures	6-4
Fault Symptom Codes (FSCs)	6-5

Appendix A

Regulatory Compliance Notice

Federal Communications Commission Notice	A-1
Class A Equipment	A-2
Declaration of Conformity for Products Marked with FCC Logo, United States Only	A-2
Modifications	A-2
Cables	A-3
European Union Notice	A-3
Australian Notice	A-3

Appendix B

Specifications

Operational Performance	B-2
Reliability	B-2
Power	B-3
Mechanical	B-3
Environmental	B-4
Acoustics	B-5
Safety	B-6

Appendix C

Electrostatic Discharge

Grounding Methods	C-1
-----------------------------	-----

Appendix D

Removing and Replacing a Tape Drive

Instructions	D-1
------------------------	-----

Index

Chapter 1

Introduction

The Compaq *StorageWorks*™ MSL5026 Library is a tape library system that combines Dynamic Linear Tape (DLT) drive technology with advanced robotics. Designed for backup operations with high-end networks and high-performance servers, the library is the next generation performer in high-volume backup and archival service. The library also features high availability, maximum storage density, and easy serviceability.

The library's SCSI interface-to-host system supports Low Voltage Differential (LVD) or Single Ended (SE). The tape drives and robotics control functions each use separate SCSI connections and SCSI ID addresses. Library SCSI I/O is provided through two VHDCI-series, 68-pin, Micro-D SCSI connectors located at the rear of the unit directly under the tape drives. Robotics SCSI I/O is provided through two VHDCI-series, 68-pin, Micro-D SCSI connectors located on the library controller board.

The remainder of this chapter describes the major components of the library, including:

- Models and accessories
- Tape drives
- Magazines
- Power supply
- Library controller board
- Robotics
- Accessory PCI slots
- Front panel indicators
- Multi-unit library systems

Models

The library can operate as a stand-alone unit or can be rack-installed to form a larger integrated library system. The library contains up to two tape drives, two removable tape cartridge magazines, and robotics capable of random or sequential tape cartridge operation.

Accessories

Table 1-1 lists the accessories that are available for the library.

IMPORTANT: Do not mix DLT 40/80 tape drives with SDLT 110/220 tape drives.

Table 1-1 Accessories

Compaq Part Number	Description
232483-001	ASSY, DR 40/80 GB HOT PLUG
232483-002	ASSY, DR 110/220 GB HOT PLUG
174538-001	MRU
165198-006	Kit, CD VERITAS Backup Exec
165199-005	Kit, CD CA ARCServeIT
165197-006	Kit, CD, Compaq Storage Utility SW
321092-003	RS232 Cable 6 ft.
330563-001	Conn SCSI-3 68P Active Terminator (LVD/SE)
330582-001	Cable Assy SCSI Jmpr 68P Int 12-in
200855-001	Diagnostic Software Package
295596-001	DLT Barcode Label Data
295368-001	DLT Barcode Label Cleaning
188526-001	SDLT Media
232079-B21	SDLT Cleaning Cartridge
231912-001	Tabletop to Rackmount Conversion Kit

Tape Drives

The library supports a 0-drive, 1-drive, or 2-drive combination (see Figure 1-1). All inactive tape drives are hot-plug capable (see Table 1-2). SCSI I/O is accomplished through two VHDCI-series, 68-pin, Micro-D SCSI connectors located at the rear of the library directly beneath each tape drive.

IMPORTANT: All tape drive types must match. Do not mix DLT 40/80 tape drives with SDLT 110/220 tape drives.

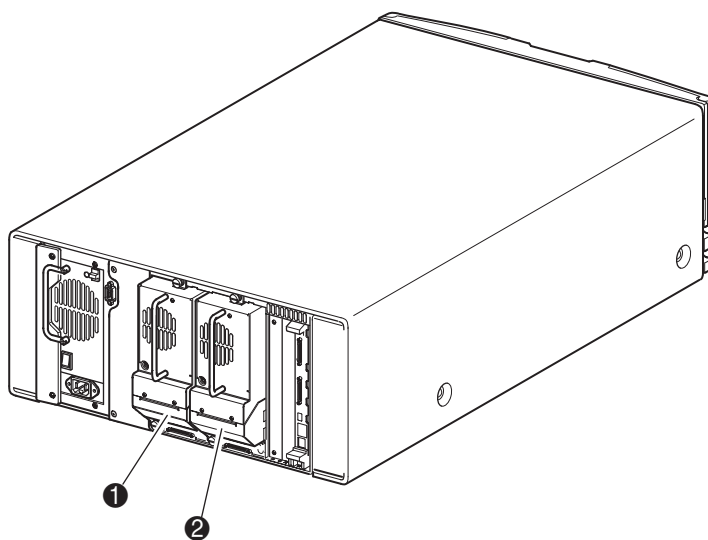


Figure 1-1. Library tape drive locations

- ❶ Tape Drive 1
- ❷ Tape Drive 0

Table 1-2 Tape Drives

Compaq Part Number	Tape Drive Type
232483-001	DLT 40/80 LVD
232483-002	SDLT 110/220

Magazines

The library contains two removable tape cartridge magazines that are accessible through the front doors (see Figure 1-2).

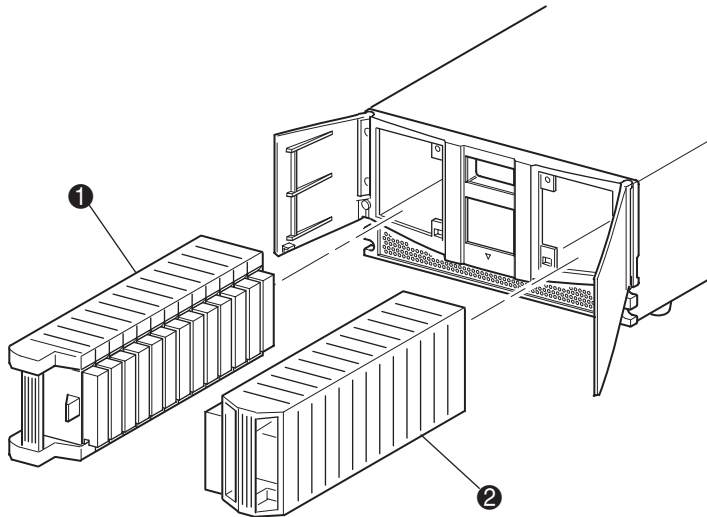


Figure 1-2. Library magazines

- ❶ Left Magazine (with integrated mail slot)
- ❷ Right Magazine

Looking from the front of the library, the left tape magazine also includes a mail slot, which is accessible when that magazine's door is open. Pivoting forward, this mail slot feature lets you insert or remove a single tape without having to unlock and remove the magazine. If a full 13-slot tape cartridge magazine is required, the library can be reconfigured to recognize the mail slot as a standard tape cartridge slot. The right tape magazine contains fixed cartridge slots (no mail slot feature), so it retains its full 13-slot capacity at all times.

Power Supply

A single, modular power supply is accessible from the rear of the library (see Figure 1-3). This auto-ranging power supply is capable of using either 110 VAC or 220 VAC power, at 50 Hz or 60 Hz, and is easily removed without requiring special tools.

Power to the library is supplied through an AC connector at the rear panel of the power supply. Library power is normally controlled from the Graphical User Interface (GUI) touch screen; however, a manual power disconnect switch, located at the rear of the power supply, can also be used.

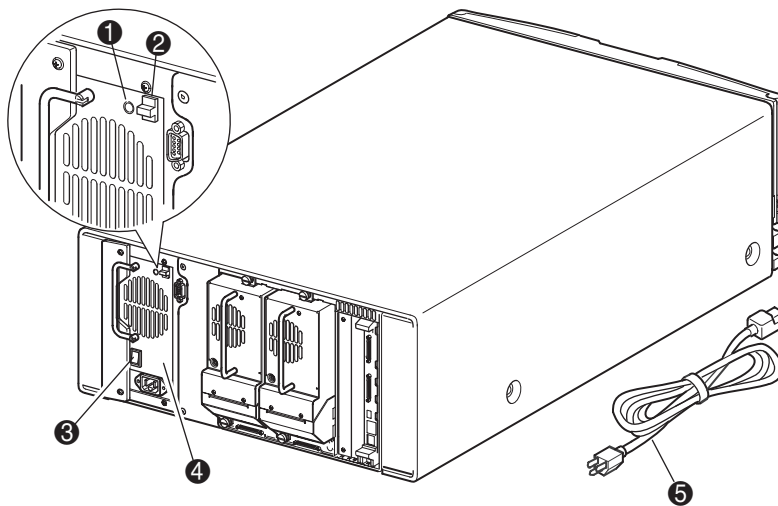


Figure 1-3. Library power supply

- ❶ Power On LED (lights after touching the front panel display)
- ❷ Power Supply Release Latch
- ❸ Power Switch
- ❹ Power Supply
- ❺ AC Power Cord

Library Controller Board

The library controller board contains a single microprocessor and associated logic devices to control all robotics operations and manage overall library functions. The microprocessor enables the SCSI interface between the library and the host system.

The library controller board is installed in a card cage at the rear of the library and can be serviced without requiring special tools (see Figure 1-4).

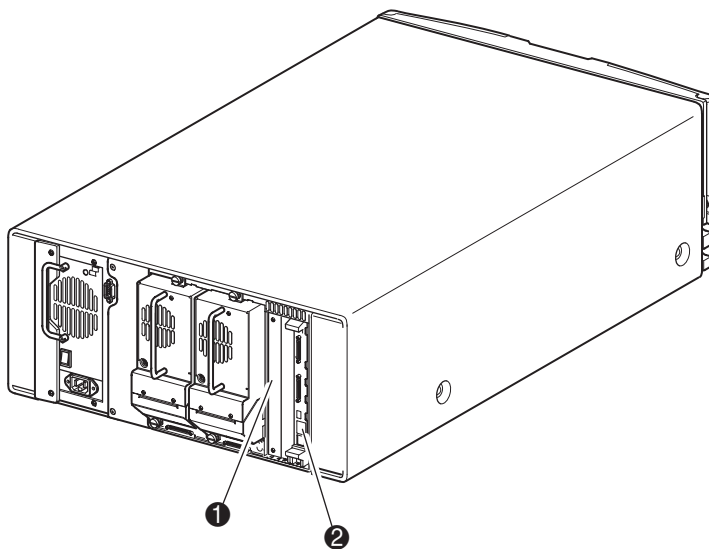


Figure 1-4. Library controller board

- ❶ Factory-Defined Accessory PCI Slots (2)
- ❷ Library Controller Board

Robotics

The library robotics consists of a cartridge shuttle, motor hardware, motor drives, and other support electronics (see Figure 1-5). These robotics are capable of picking and placing tapes throughout a 180-degree arc that consists of the tape drives, tape cartridge magazines, and an optional Pass-Through Mechanism (PTM).

The cartridge shuttle assembly includes a mounted barcode reader for scanning tape cartridges installed in the magazines and tape drives.

NOTE: Both a full barcode reader scan and a physical scan are conducted each time the library is initially powered up or each time a tape magazine is accessed.

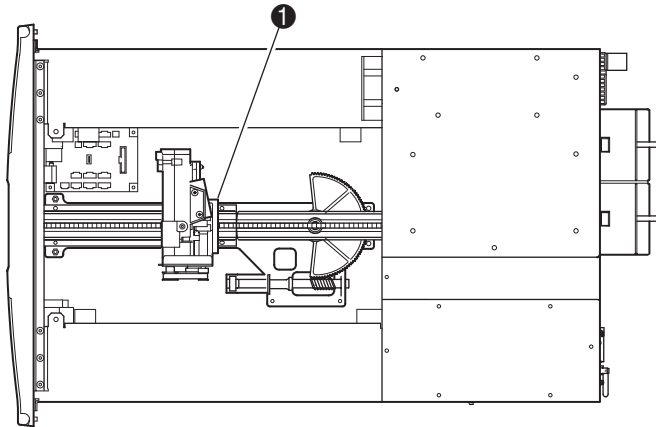


Figure 1-5. Library robotics

- ❶ Cartridge Shuttle Assembly with Integral Bar Code Reader

Factory-Defined Accessory PCI Slots

The library contains a rear-access card cage and a 32-bit, 33-MHz Compact PCI backplane (see Figure 1-6). This backplane contains the plug-in connectors for the library's controller board and two optional factory-defined PCI add-in cards. Factory-defined add-in cards can only be used in these optional slots.

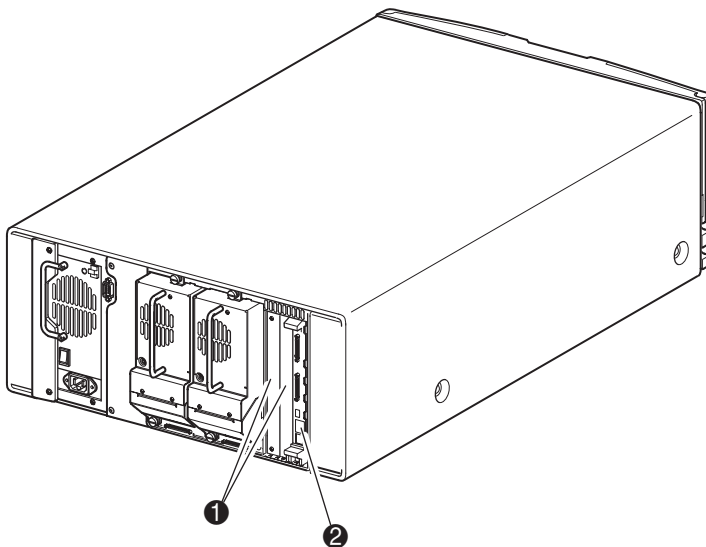


Figure 1-6. Library card cage

- ❶ Factory-Defined Accessory PCI Slots (2)
- ❷ Library Controller Board

Front Panel Indicators

The library front panel indicators consist of the following:

- Viewing window—lets you visually check the library’s internal operations.
- GUI touch screen—manually operated to set up and configure the library.
- Library status LED—displays the library’s operational status.

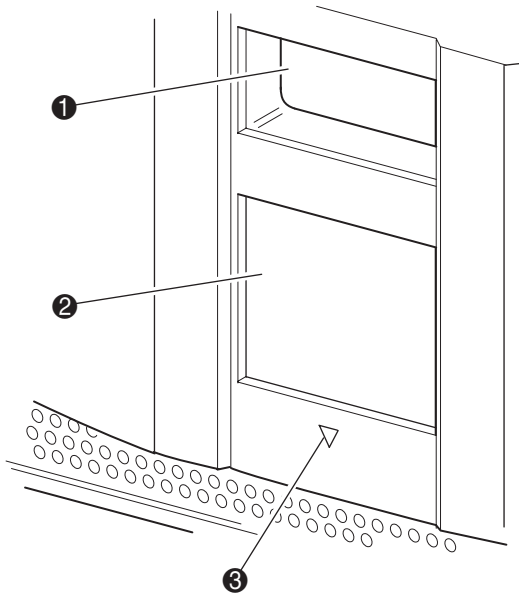


Figure 1-7. Library front panel

- ❶ Viewing Window
- ❷ GUI Touch Screen
- ❸ Library Status LED

Multi-Unit Library Systems

Future releases of the library can be stacked in a scalable combination with additional MSL5026 libraries to form a multi-unit, rack-mounted configuration. Through use of a rear-mounted PTM, all multi-unit libraries in the stack can operate together as a single virtual library system. Stacked units are interconnected through their rear panel Ethernet connections and an external Ethernet hub mounted to the rack. The external Ethernet hub also provides an additional connector when libraries are combined in their maximum stacked height.

A maximum of seven libraries can be connected together in this manner. Any combination of libraries, not exceeding 35U in total stacked height, can also be used. A multi-unit library system appears to the host computer system and library control software as a single library. For multi-unit applications, the top library becomes the primary master unit and all other lower libraries are slave units. Note that the PTM continues to function each time a slave library is physically removed from the rack configuration during normal library operation.

The library's robotics can pick and place tape cartridges into a movable elevator that encompasses the full length of the PTM. In this manner, individual tapes can be passed up or down between the libraries contained in the stack. Robotics access to the PTM is located at the rear of the unit, between the tape drives and the power supply (see Figure 1-8).

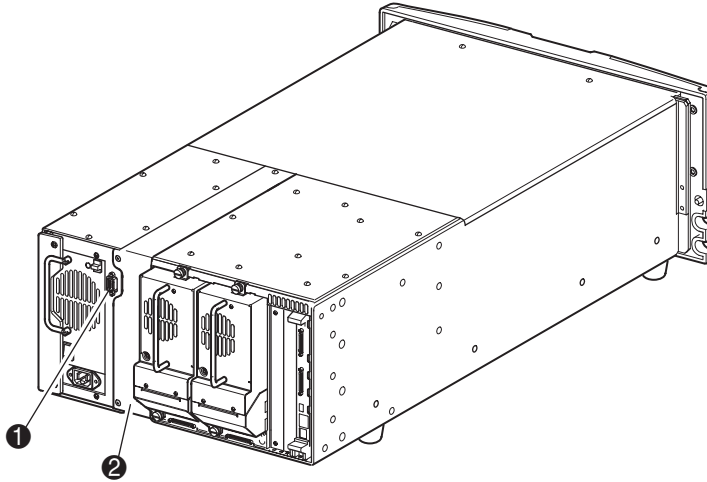


Figure 1-8. Library PTM mounting location

- ❶ PTM Interface Connector
- ❷ PTM Mounting Location

The library also supports fail-over protection for multi-unit, rack-mounted applications. For example, if the primary master library fails, you can invoke the library system's fail-over mode. In this mode, one of the connected slave units serves as the secondary master library that now communicates with the host system through the SCSI interface. The source of power to the PTM's drive motor is switched from the original primary master library to the newly-assigned secondary master library.

Chapter 2

Installation

This chapter explains how to install the Compaq StorageWorks MSL5026 Library. Sections in this chapter include the following:

- Setting up the tabletop model
- Setting up the rackmount model
- Applying power to the library
- SCSI cable configurations

Setting up the Tabletop Model

The library tabletop model requires no mechanical assembly for mounting (see Figure 2-1). Place the library on a desk, table, or other stable, horizontal surface. Make sure the cooling grills at the front and the fans at the rear of the library are not obstructed. Allow 12 inches (30.4 cm) of clearance at the front and rear for magazine and hot-plug tape drive access.

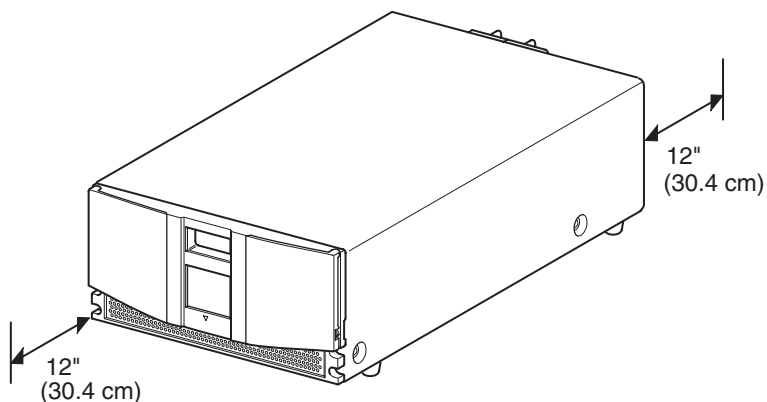


Figure 2-1. Tabletop model clearances

Setting up the Rackmount Model

Setting up the rackmount model requires a template, storage cabinet slide rails, and two people to physically install the library in a storage cabinet.

To setup the rackmount model:

1. Use the template that shipped with the library to mark the location of the mounting hardware on the mounting rails of the storage cabinet (see Figure 2-2).

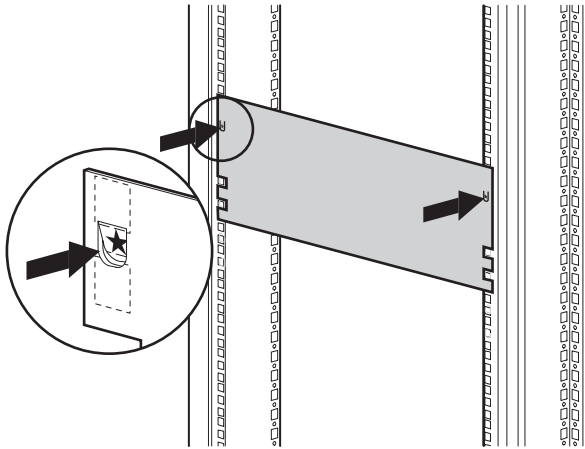


Figure 2-2. Library template

2. Remove the template and then attach the rails using the supplied fasteners (see Figure 2-3). The front rail brackets are threaded to directly accept screws. The rear brackets are not threaded and require cage nuts in the storage cabinet's rear vertical rails.

NOTE: Refer to the *Compaq Rack Reference Guide* for detailed cage nut installation instructions.

IMPORTANT: Fully tighten the front rail screws. Leave the rear rail screws "finger tight" to prevent binding when mounting the library.

- a. Fully extend the slide rails ❶ on both sides of the storage cabinet until they lock.
- b. Slide the inner guide rail ❷ as far as possible to the front of the rail assembly.

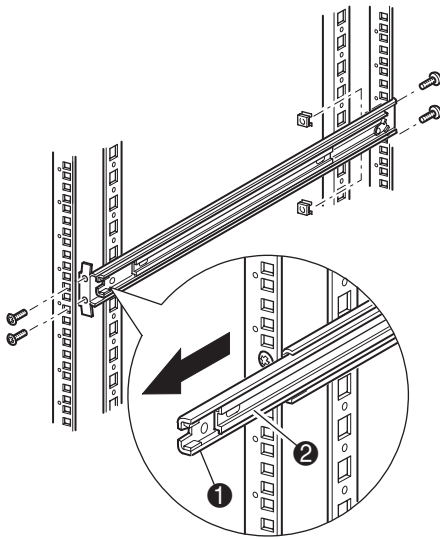


Figure 2-3. Installing the rails

3. Install the two slide-on cage nuts, aligned two rack units above the rail bracket screws, on each of the front storage cabinet vertical rails (see Figure 2-4).



WARNING: Two people should perform the next step. Make certain, when the library is fully extended, that a force of 20% of the storage cabinet's weight, but not more than 57 pounds (26 kg), applied in any direction other than upwards, does not cause the storage cabinet to overbalance.

4. Using two people, lift the library and visually align the inner and intermediate slide rails.



CAUTION: The library is heavier toward the tape drive end (rear). The library can be made lighter by removing the tape drive(s) prior to installation.

5. Carefully insert the library's inner slide rails into the extended intermediate slide rails (see Figure 2-4).



WARNING: A storage cabinet might become unstable if more than one component is extended for any reason. Extend only one component at a time.

6. Slide the library completely into the storage cabinet until the front panel touches it.
7. Fully tighten the rear rail screws.

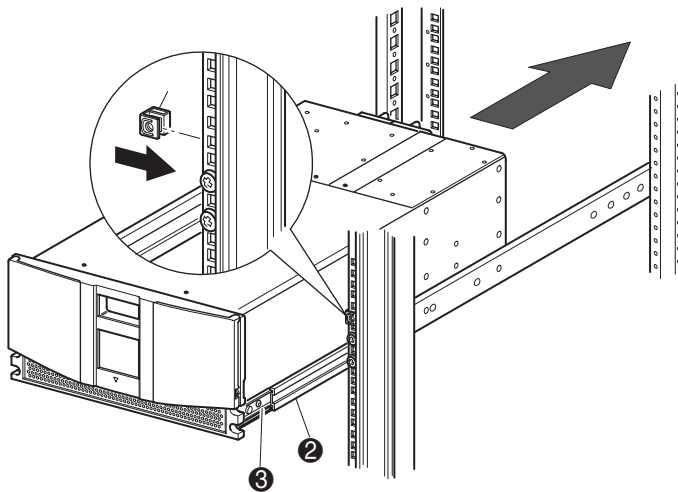


Figure 2-4. Installing the library

8. Remove the tape to open the doors for installation.
9. Remove and discard the pull-tabs used to block the latch mechanism. Do not close the doors.
10. With the doors open, secure the front panel to the storage cabinet using the two retaining screws (see Figure 2-5). Close the doors.
11. You can now apply power to the library.

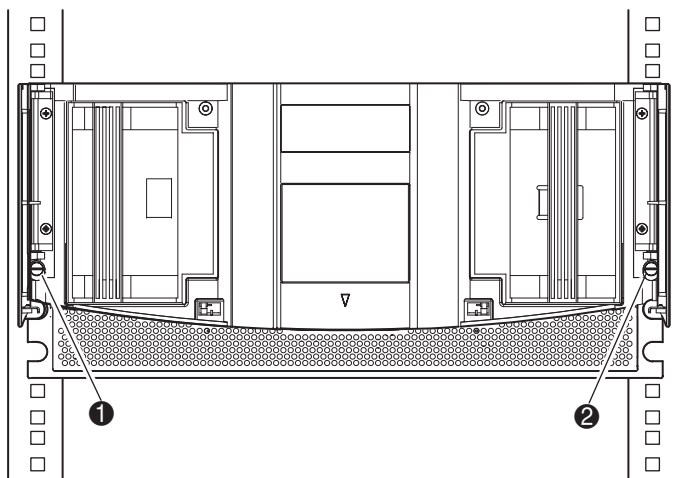


Figure 2-5. Securing the library

- ❶ Left Retaining Screw
- ❷ Right Retaining Screw

Applying Power to the Library

To apply power to the library (see Figure 2-6):

1. Connect the supplied power cord **1** to the power supply's receptacle.
2. Toggle the power switch **2** on.
3. Press anywhere on the Graphical User Interface (GUI) touch screen **3** to activate the display and power up the library.

NOTE: Rackmount model shown.

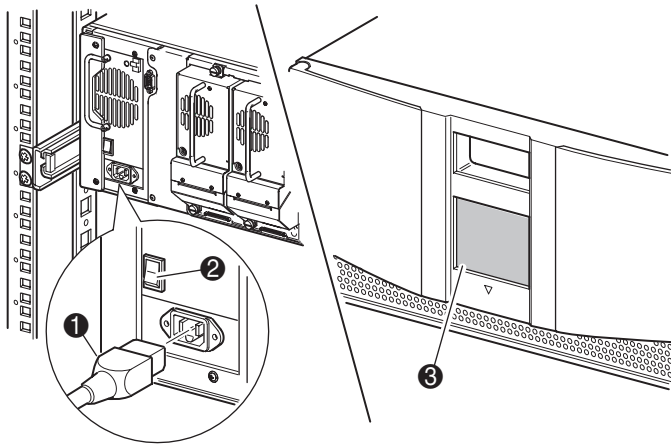


Figure 2-6. Applying power to the library

SCSI Cable Configurations

This section describes the supported SCSI cable configurations for the library. Supported SCSI configurations include:

- No tape drive single host system.
- One tape drive single host system.
- Two tape drives single host system.
- Two tape drives dual host system.

NOTE: Host cables are not supplied.

Supported SCSI Cables

NOTE: If your library is used on a single-ended SCSI bus, you must locate the storage cabinet close to the host computer to avoid excessive bus length. It is also 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.

Each of the tape drives in the library and the robotics constitute a separate SCSI bus. When any two or more devices are connected to the same SCSI bus, each separate SCSI device must be assigned a unique SCSI ID. For information on assigning SCSI IDs, see [Chapter 3, “Library Configuration.”](#)

NOTE: SCSI IDs are set at the factory. If you want to change any of the factory defaults, you can do so using the GUI touch screen.

To connect a library to a host system, the host system must have at least one Wide LVD/SE controller and the appropriate driver software.

Zero Tape Drive Single Host System

Figure 2-7 shows a typical SCSI cable configuration for a library with no tape drive installed.

NOTE: This configuration is supported only in rackmounted multi-unit library systems.

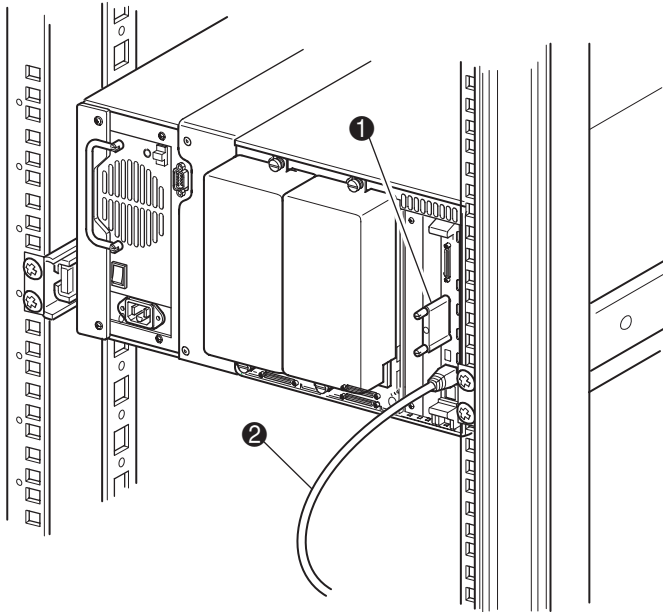


Figure 2-7. SCSI cable configuration (no tape drive single host system)

- ❶ SCSI Terminator
- ❷ To Host System

One Tape Drive Single Host System

Figure 2-8 shows a typical SCSI cable configuration for a library with one tape drive (drive 0) installed.

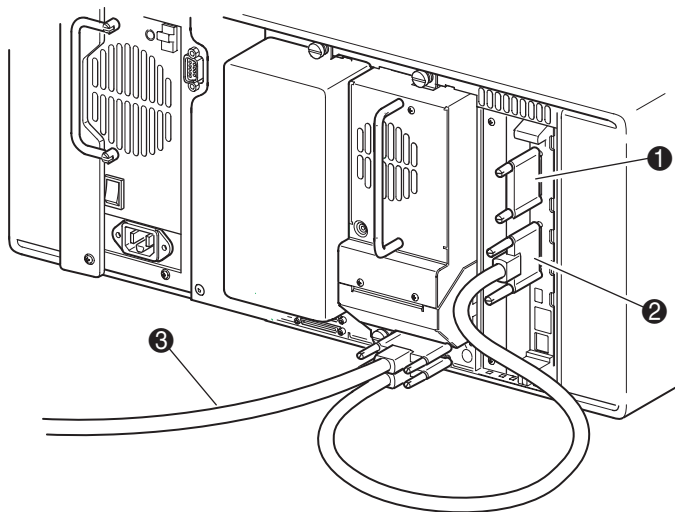


Figure 2-8. SCSI cable configuration (one tape drive single host system)

- ❶ SCSI Terminator
- ❷ To Library Controller Board
- ❸ To Host System

Two Tape Drives Single Host System

Figure 2-9 shows a typical SCSI cable configuration for a library with two tape drives installed using a single host system.

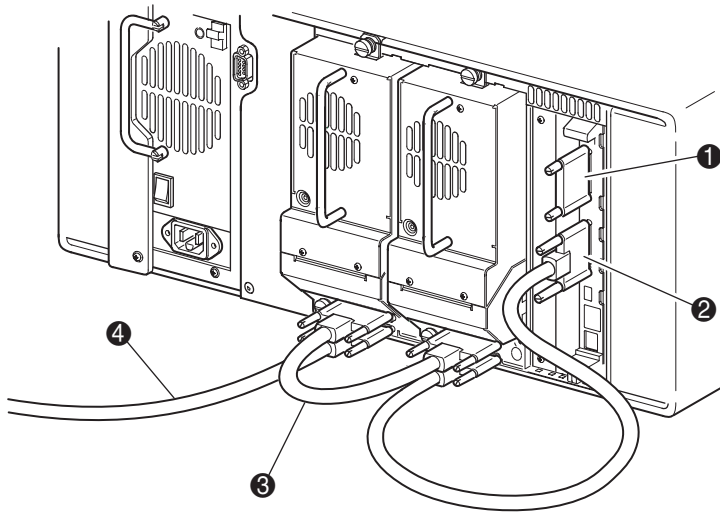


Figure 2-9. SCSI cable configuration (two tape drives single host system)

IMPORTANT: The short .25m jumper cable ③ is designed for this use only. Stretching it to reach the library controller board can damage the cable. Use the longer .5m jumper cable (supplied) to connect the tape drive and the library controller board.

- ① SCSI Terminator
- ② To Library Controller Board
- ③ Jumper Cable
- ④ To Host System

Two Tape Drives Dual Host System

Figure 2-10 shows a typical SCSI cable configuration for a library with two tape drives installed using a dual host system.

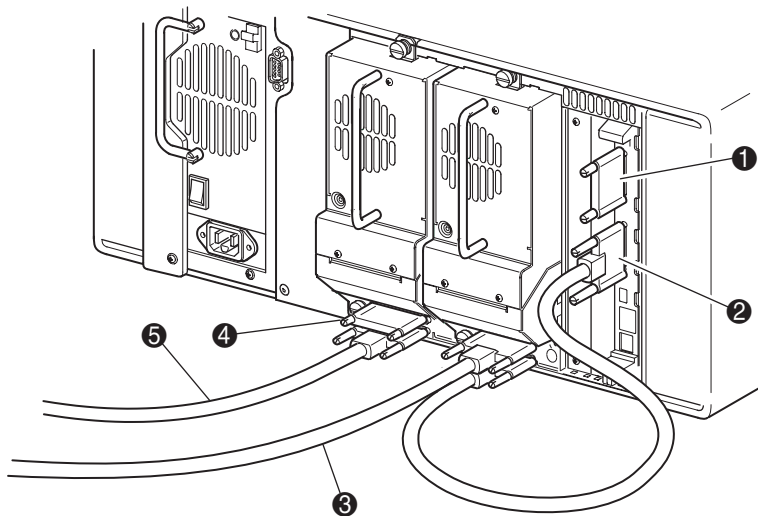


Figure 2-10. SCSI cable configuration (two tape drives dual host system)

- ❶ SCSI Terminator
- ❷ To Library Controller Board
- ❸ To Host System (drive 0)
- ❹ SCSI Terminator
- ❺ To Host System (drive 1)

Chapter 3

Library Configuration

This chapter explains how to configure the Compaq StorageWorks MSL5026 Library for normal operation. Sections in this chapter include the following:

- Factory default configuration settings
- Setting a SCSI ID
- Setting up a reserved slot
- Setting up your network

Factory Default Configuration Settings

Tables 3-1 and 3-2 list the the factory default configuration settings for the library. For most applications, you do not have to change the factory default settings; however, if you do need to change a configuration setting, use the instructions provided in the following sections. If you are uncertain whether you need to change a setting, contact your authorized service provider.

Configuration settings that might need to be changed include:

- Setting a SCSI ID
- Setting up a reserved slot
- Setting up a network

You change configuration settings using the Graphical User Interface (GUI) touch screen. For a complete description of how the GUI touch screen works, see [Chapter 4](#), “[Operation](#).”

Edit Library Options

These options are available from the Library Edit Options area of the GUI touch screen Main menu.

Table 3-1 Edit Library Options

Option	Description
Library Remains Offline After Power-up Initialization	Library does not go online after power-up initialization. You must select the Online option from the Menu screen on the Graphical User Interface (GUI) touch screen. The default is Disabled.
Auto Power-Up An Installed Drive	Enables a tape drive to be automatically powered up (after a delay), after replacing a tape drive if you do not explicitly power up the tape drive from the GUI touch screen. The default is Enabled.
Unload Mode	Lets you determine whether a SCSI MOVE MEDIUM command is interpreted as Implicit or Explicit. If Implicit, the library unloads a tape drive before attempting to move a cartridge from that tape drive. If Explicit, the host must issue a SCSI UNLOAD command to a tape drive before each MOVE MEDIUM command that removes a cartridge from that tape drive. The default is Implicit.
Total Reserved Slots	Lets you remove from use a specified number of slots at the rear of the magazine. Some host software imposes size limits on library magazines for licensing purposes, and does not operate with a library that exceeds the licensed size. The default is 0.
Auto Clean Mode	Lets you enable an automatic cleaning cycle. To use this option, you must have reserved a slot for a cleaning cartridge using the Total Reserved Slots option. The default is Disabled.
Drive and Slot Numbering	Lets you specify whether SCSI elements in the library displays with either zero or one. This only affects the GUI touch screen, not the actual SCSI element addresses. The default is 0.
Library Mode	Lets you set the robotics operating mode to Random, Sequential Drv0, Sequential Drv1, and Sequential Split. The default is Random (Sequential Mode Unavailable). Sequential Mode: Selecting a sequential mode (using Library Mode) enables the library robotics to unload a full tape cartridge (or at the end of data), select, load the next tape cartridge from the appropriate magazine, and then automatically continue read/write operations without software intervention. Two options are available: Normal and Recirculate.

Table 3-1 Edit Library Options (Continued)

Option	Description
LCD Contrast Adjust	The LCD contrast controls let you increase or decrease the contrast of the LCD display. The incremental steps are set by adjusting the LCD Contrast Adjust option from the Library option. Incremental steps can range from 0 to 31 depending on your preference. The default is 16.
Mail Slot Mode	Lets you enable or disable the mail slot in a library. The default is Mail Slot Enabled.
Barcode Label Size	Lets you limit the length of the bar code label. Possible settings are 1 through 8. The default is 8.
Barcode Label Assignment	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, this option strips unwanted trailing characters (left alignment) or leading characters (right alignment). The default is Left Align.
Barcode Label Check Digit	Lets you specify whether to enable or disable the verification of a check digit character in the barcode label. The default is Disabled.

Edit SCSI Options

The following options are available from the SCSI Edit Options area of the GUI touch screen Main menu.

Table 3-2 Edit SCSI Options

Option	Description
Drive 0 Bus ID	Lets you set the SCSI addresses of the drives. The designators Drive 0 (outer tape drive) through Drive <i>n</i> refer to the first through <i>n</i> th drives, counting from right to left starting with the top unit in the Library system.
Drive 1 Bus ID	Lets you set the SCSI addresses of the drives. The designators Drive 1 (inner tape drive) through Drive <i>n</i> refer to the second through <i>n</i> th drives, counting from left to right starting with the top unit in the Library system.
Library SCSI Bus ID	Lets you set the SCSI addresses for the library robotics. The default is 0.
Library SCSI Bus Parity	Lets you enable or disable the library robotics SCSI bus parity checking. The default is Library SCSI Bus Parity Enabled.
SCSI Mode	Defines the loader as SCSI-2 or SCSI-3. The default is SCSI-3.
Unit Attention Reporting	Lets you select reporting of All or only One stacked-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 Report All.
Init Element Status	Lets you specify the library's response to the SCSI INITIALIZE ELEMENT STATUS command. The possible settings are No Inventory, Force Inventory, and Force Label Scan. The default is Force Inventory.
Test Unit Ready Reporting	Lets you specify the response to a TEST UNIT READY command if the library is in Sequential Mode. The possible settings are Standard or Custom. The default is Custom.
Device Capability Page 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 (14 bytes).
Transport Element Base Address	Lets you set the base address for the robotics mechanism. The default is 0x0.
Storage Element Base Address	Lets you set the base address for the magazine slots. The default is 0x20.
Transfer Element Base Address	Lets you set the base address for the tape drives. The default is 0x1e0.

Table 3-2 Edit SCSI Options (Continued)

Option	Description
Import/Export Element Base Address	Lets you set the base address for the mail slot. The default is 0x1c0.
Product Identification	Lets you specify the response of the library's robotics to the SCSI INQUIRY command in the Product ID fields. The default is "MSL5000 Series."
Vendor Identification	Lets you specify the response of the library's robotics to the SCSI INQUIRY command in the Vendor ID field. The default is COMPAQ.
Post Recovered Errors	The default is Disabled.
TapeAlert Mode	Specifies conditions for logging and reporting the following Tape Alert data options. The default is Logging Disabled.
	Logging Disabled: Inhibits the logging feature.
	No Exceptions: The library must not report information exceptions.
	Generate Unit Attention: Reports information exceptions with a Unit Attention sense key and an ASC/ASCQ of 5D/00.
	Conditionally Generate Recovered Error: Reports information exceptions with a Recovered Error sense key and an ASC/ASCQ of 5D/00, if Recovered Error Reporting is enabled.
	Unconditionally Generate Recovered Error: Unconditionally reports information exceptions with a Recovered Error sense key and an ASC/ASCQ of 5D/00.
	Generate No Sense: Reports information exceptions with a No Sense sense key and an ASC/ASCQ of 5D/00.
	Report on Unsolicited Request Sense: Reports information exceptions with a No Sense sense key and an ASC/ASCQ of 5D/00, only in response to an unsolicited REQUEST SENSE command.
Abort Move Status	Lets you specify the SCSI response while aborting a SCSI command. The possible settings are Busy or Not Ready. The default is Not Ready.
Door Open Response	Lets you specify the SCSI response when a library door is open. The settings are Ready or Not Ready. The default is Not Ready.
Initiate Wide Data Transfer Negotiation	Lets you enable the library to initiate a SCSI synchronous and wide data transfer negotiation with the host. The settings are Do Not Initiate or Initiate. The default is Do Not Initiate.
Data Speed Transfer	Lets you set the SCSI data transfer rate to Synchronous, 10 MB/sec, 5 MB/sec or Asynchronous Only. The default is Synchronous, 10 MB/s.

Setting a SCSI ID

Each tape drive installed in the library requires a unique SCSI ID. The information provided in this section shows you how to set a SCSI ID.

To set a SCSI ID:

1. Turn the library on and wait until the Power-On Self Test (POST) completes and the Compaq Initialization or Status screen appears on the display.
2. Select the Menu option from the Status screen.
3. Enter the appropriate password. See the section on “[Front Panel and Media Security Locks](#)” in [Chapter 4](#) for instructions on how to set passwords.

4. Select SCSI in the Edit Options area to display the following screen.

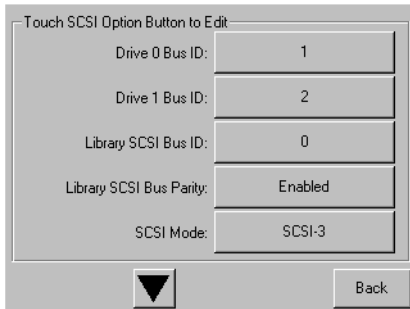


Figure 3-1. SCSI option selection screen

NOTE: You can move to the next sequential SCSI options screen by selecting the ▼. To return to the previous SCSI options screen select the ▲ or **Back** button to return to the Menu screen.

5. For example, to set the Drive 0 Bus ID to 3:
 - a. Select the box next to the text "Drive 0 Bus ID:." The Drive 0 Bus ID screen appears on the display (see Figure 3-2). This screen displays the current Drive 0 Bus ID along with the new value that you request.

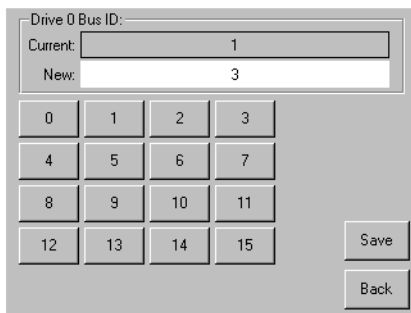


Figure 3-2. Drive 0 bus ID screen

- b. Touch the block that contains the number 3. This places your request into the New data field.
- c. Touch the Save option to confirm your request. A confirmation screen appears on the display (see Figure 3-3).

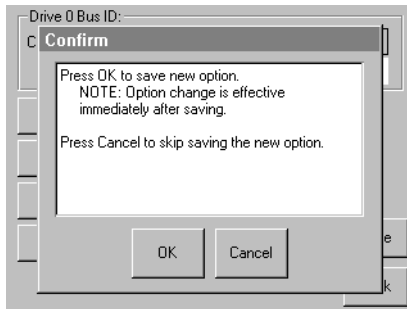


Figure 3-3. SCSI ID confirmation screen

- d. Select OK to confirm. A new SCSI ID now appears in the Drive 0 Bus 0 data field (see Figure 3-4).

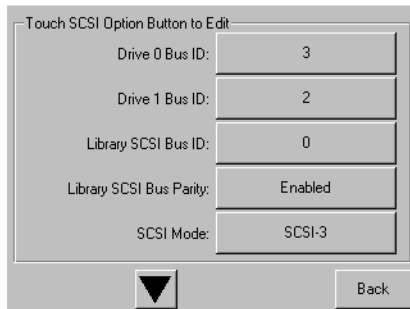


Figure 3-4. Drive 0 bus 0 data field screen

6. Touch the **Back** button repeatedly to return to the Main menu screen.
7. Repeat this procedure to set any remaining SCSI IDs.

Setting Up a Reserved Slot

Use this option to remove some of the tape cartridge slots in the library from use as storage slots to dedicate one or more tape cartridge slots as a cleaning slot.

How Reserved Slots are Numbered

Standard tape cartridge slots are numbered from the front of the magazine to the rear (see Figure 3-5). If you reserve one slot, it becomes Reserved Slot #1 in the last slot of the magazine. Additional reserved slots continue in this rear-to-front pattern.

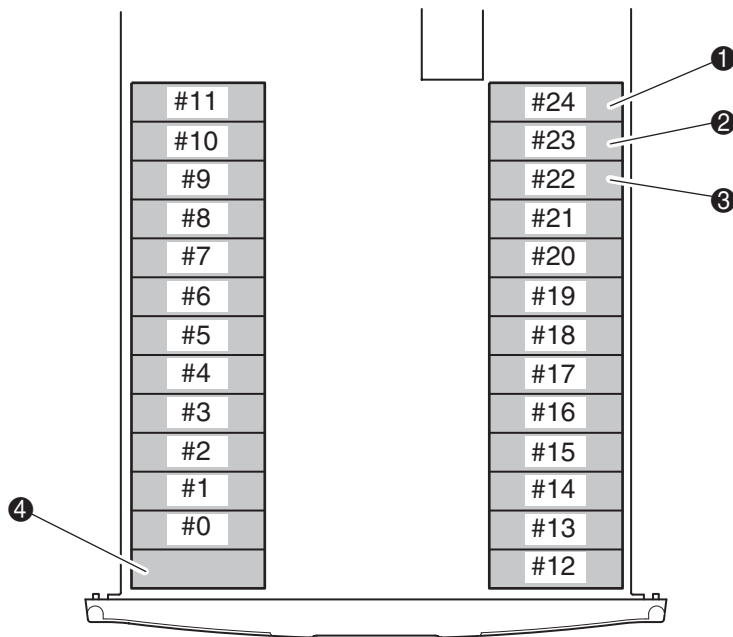


Figure 3-5. Reserved slot locations

- ❶ Reserved Slot #1
- ❷ Reserved Slot #2
- ❸ Reserved Slot #3
- ❹ Mail Slot (Left Magazine Only)

To reserve a slot:

1. From the Menu screen, touch the Library option from the Edit Options area.
2. From the Library options screen, press the ▼ to scroll to the screen that contains the Total Reserved Slots option (see Figure 3-6).

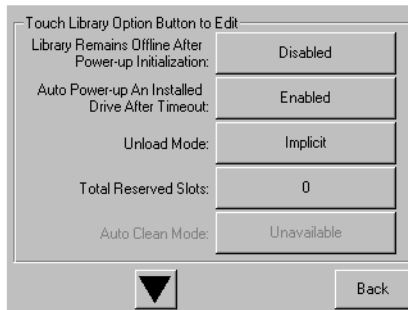


Figure 3-6. Total reserved slots screen

3. Press the associated box next to the Total Reserved Slots option. A numeric keypad appears on the display (see Figure 3-7).

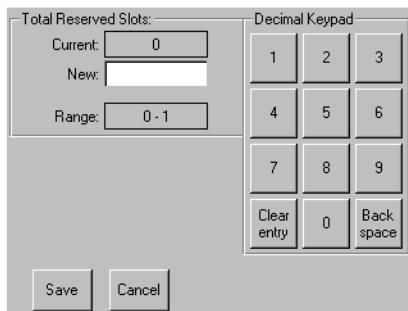


Figure 3-7. Reserved slots numeric keypad screen

4. Enter either 0 or 1 and then press Save to confirm your change. A confirmation screen appears on the display (see Figure 3-8).



Figure 3-8. Total reserved slots confirmation screen

5. Press the **Back** button repeatedly to return to the Main menu screen. Your choice takes effect the next time you boot the library.

Setting Up Your Network

The library automatically obtains an IP address from the DHCP server when the library is powered up. The library also supports fixed addresses through the front panel. To set a fixed address:

1. From the Menu screen, touch the Network options from the Edit Options area. The IP Address Determination screen appears (see Figure 3-9).

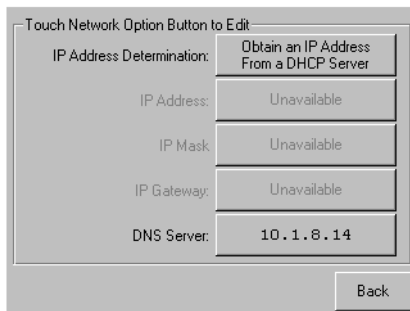


Figure 3-9. IP address determination screen

2. Touch the IP Address Determination option (see Figure 3-9) and then the User-Specified IP Address option (see Figure 3-10).

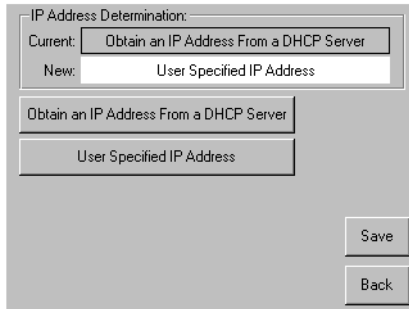


Figure 3-10. User-specified IP address screen

3. Save and confirm your selection.
4. Touch each IP address option and then use the keypad to enter each IP address (see Figure 3-11):

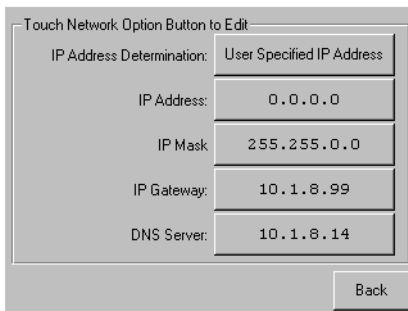


Figure 3-11. Fixed IP address screen

5. Press the **Back** button repeatedly to return to the Main menu screen.

Chapter 4

Operation

This chapter describes how to operate the Compaq StorageWorks MSL5026 Library. Sections in this chapter include the following:

- Front panel
- Inserting and removing tape cartridges
- Library display screens and options

Front Panel

The front panel of the library includes the left and right magazine doors, a Graphical User Interface (GUI) touch screen, a library status LED, and a viewing window (see Figure 4-1).

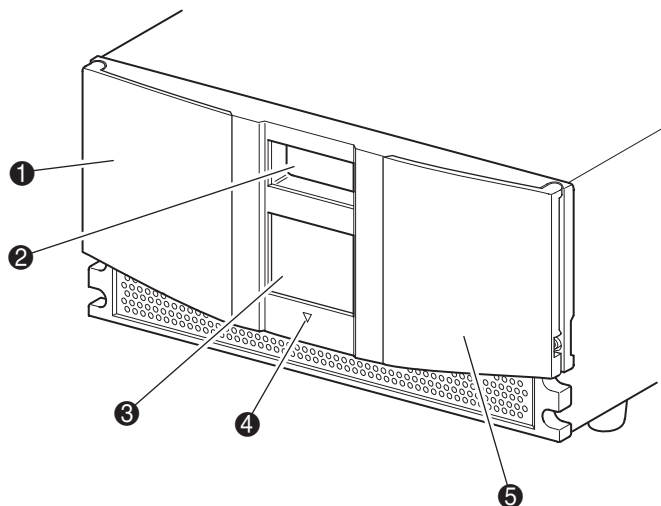


Figure 4-1. Library front panel

- ❶ Left Magazine Door
- ❷ Viewing Window
- ❸ GUI Touch Screen
- ❹ Library Status LED
- ❺ Right Magazine Door

Magazine Doors

The magazine doors have both an electrical release (via the GUI touch screen) and a manual release. It is always recommended that you open the magazine doors using the GUI touch screen. However, should the GUI touch screen fail, you can manually open them by pushing a small metal pin or paper clip into the mechanical releases directly behind the front panel grill (see Figure 4-2).



CAUTION: The magazine doors must only be opened manually in an emergency. Failure to do so may cause data loss and equipment damage.

NOTE: The library performs a complete inventory each time a magazine door is manually opened and then closed.

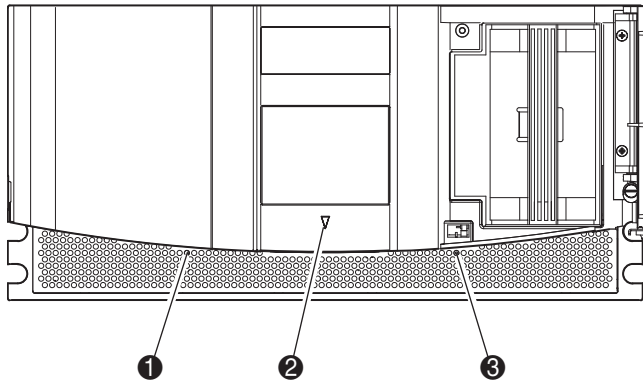


Figure 4-2. Magazine door mechanical releases

- ❶ Left Magazine Door Release
- ❷ Library Status LED
- ❸ Right Magazine Door Release

Indicators

The library front panel indicators consist of a GUI touch screen and a library status LED (see Figure 4-3 and Table 4-1).

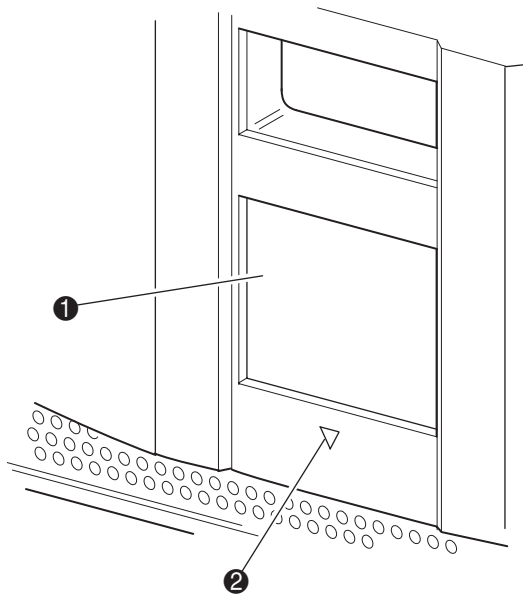


Figure 4-3. Library indicators

- ❶ GUI Touch Screen
- ❷ Library Status LED

Table 4-1 Library Status LED

Indicator	Description
Solid green	The library is operating correctly under normal conditions.
Flashing green	The library is operating correctly; however, a change is being made on the GUI touch screen that interrupts the current library operation.
Solid amber	The library is in a fault state as detailed by the error message on the GUI touch screen.

Front Panel and Media Security Locks

The following security features are available to help you avoid accidental interruption of library operation.

GUI Touch Screen

The GUI touch screen offers four levels of security (see Figures 4-4 and 4-5):

- User Level 1—allows access to the mail slot.
- User Level 2—allows magazine access and lets you move media.
- Service—allows access to the menu that lets you view/edit library and SCSI options.

NOTE: The library ships with a factory default service password of 5566.

- Factory—allows access to library operations that can only be performed by qualified service technicians.

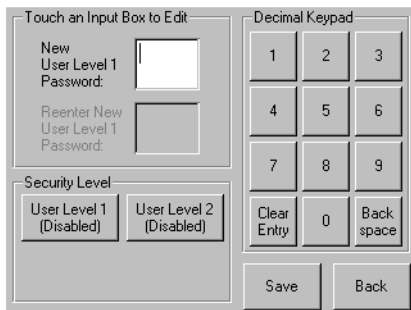


Figure 4-4. User password levels

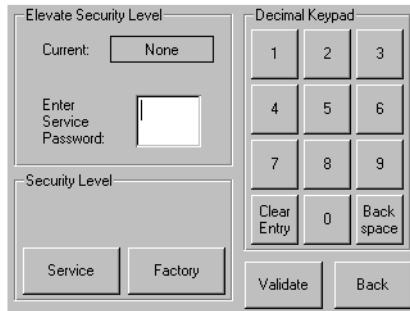


Figure 4-5. Service and factory password levels

Each password is represented by four decimal digits that are stored in NVRAM in a range of 0001 to 9999. Note that 0000 is used to disable password verification for that level.

Enabling a password causes all disabled higher levels to also be enabled to that value. As a result, prior to accessing a higher level operation, you are prompted first to enter the higher level password. This method prevents you from protecting a low-level operation and not be susceptible to someone entering an unprotected Menu mode and changing the lower-level password to defeat it.

You can also use a higher level password to gain access to a lower level operation. For example, use the Factory password to access the Move Media operation. Using the Factory password to access the Menu option also gives full access (without validating) to the Factory operations.

Host System

Media can also be locked by software running on the host, using the SCSI ALLOW/PREVENT MEDIUM REMOVAL command. The library provides no GUI touch screen 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 magazine doors and media are described later in this chapter.

Inserting and Removing Tape Cartridges

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

Removing Magazines

You must manually remove the library magazines. You access the magazines using the Magazine Access option from the library Status screen. This option lets you open the left or right magazine doors separately or both magazine doors at the same time. After opening the appropriate magazine door, pull the magazine out and away from the library chassis (see Figure 4-6).

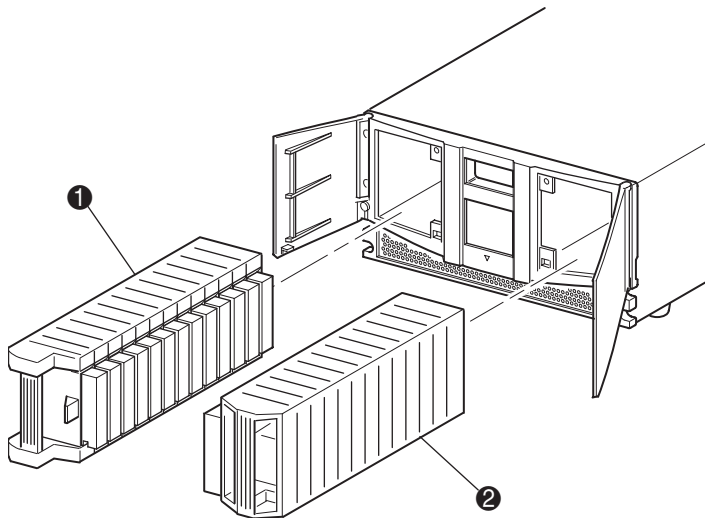


Figure 4-6. Removing tape cartridge magazines

- ❶ Left Magazine
- ❷ Right Magazine

Inserting Cartridges into a Magazine

A full left magazine is shown in Figure 4-7. Note that the lowest numbered tape cartridge slot ❷ is the one closest to the front of the magazine.

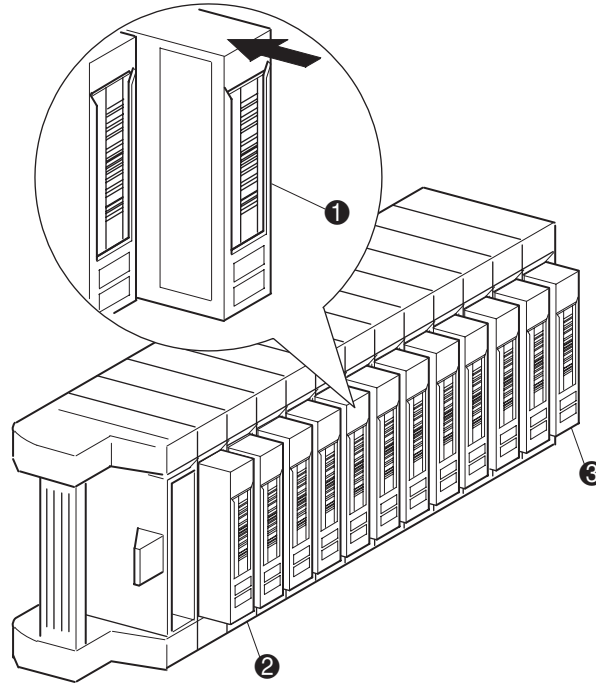


Figure 4-7. Left tape magazine with tape cartridges installed

- ❶ Tape Cartridge Orientation for Left Magazine
- ❷ Lowest Numbered Tape Cartridge Slot (Slot 0)
- ❸ Highest Numbered Tape Cartridge Slot (Slot 11)

Insert tape cartridges so that the bar code labels are facing outward (see Figure 4-8).

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

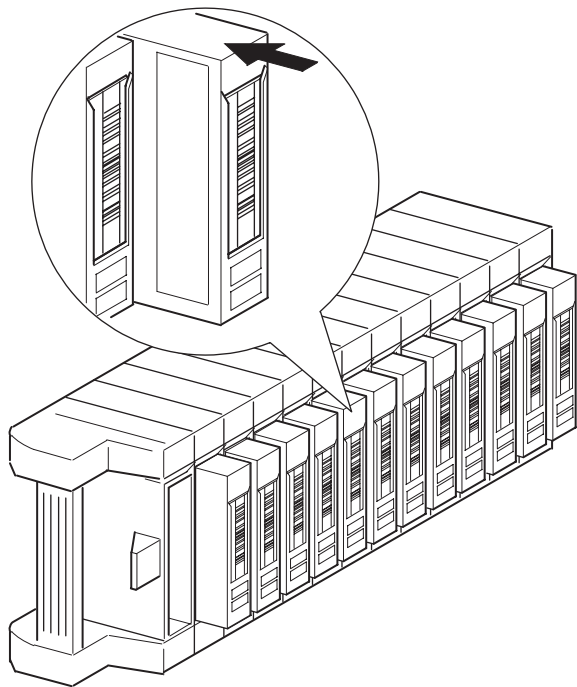


Figure 4-8. Inserting a tape cartridge (left magazine)

Using the Mail Slot (Left Magazine Only)

The mail slot is used only with host system software that supports this feature. The mail slot feature lets you insert or remove a single tape without removing the entire magazine. You access the mail slot using the Mail Slot Access option from the library Status screen. This option lets you open the left magazine door for mail slot access. After opening the left magazine door, pivot the mail slot forward to insert a tape cartridge (see Figure 4-9).

IMPORTANT: The mail slot must be enabled (factory default) using the Mail Slot Mode option from the Edit Library Options menu. See Table 4-2 for more information.

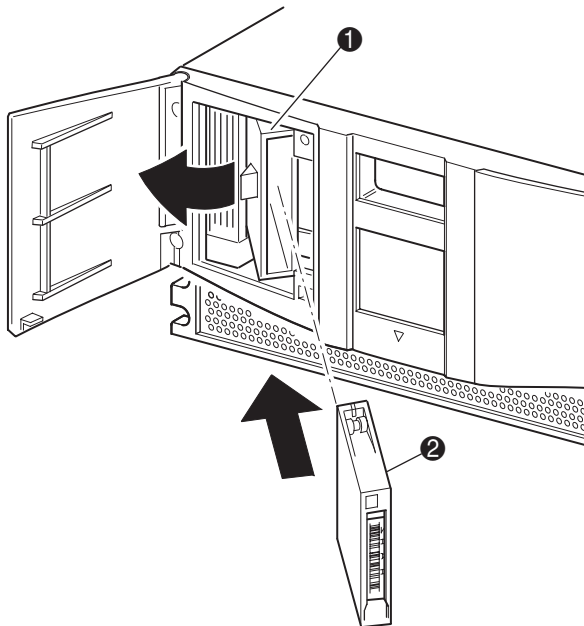


Figure 4-9. Left magazine mail slot

- ❶ Mail Slot Holder
- ❷ Tape Cartridge

Barcode Labels

Only Compaq barcode labels are supported with the library. To order additional labels, contact your authorized Compaq reseller. Use Compaq Part Number 295596-001.

Figure 4-10 shows you how to attach a barcode label onto a tape cartridge.

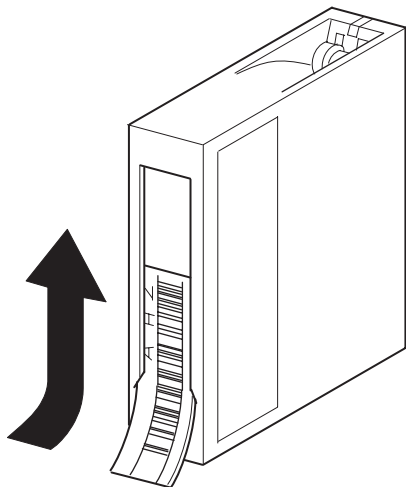


Figure 4-10. Attaching a barcode label onto a tape cartridge

Library Display Screens and Options

The library GUI touch screen displays graphics and text characters in the form of easy-to-understand messages. Graphics and text messages, along with their functions, are described in this section.

Initialization Screen

When power is first applied to the library, a series of Power-On Self Test (POST) diagnostics are performed. After the POST completes, the following initialization screen appears:



Figure 4-11. Initialization screen

Library Status Screen

After the POST executes successfully and the library initialization completes (approximately 45 seconds), the following library Status screen appears:

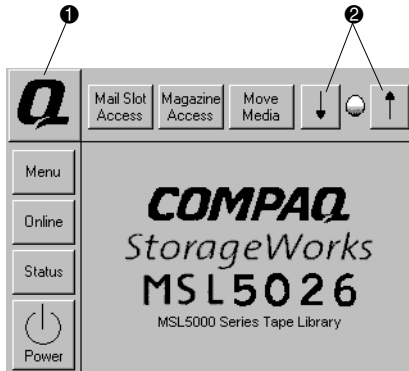


Figure 4-12. Library status screen

- ❶ Technical Support Information Option
- ❷ LCD Contrast Controls

The library Status screen lets you select the following options:

- Technical Support Information Option
- Mail Slot Access
- Magazine Access
- Move Media
- LCD Contrast Controls
- Power
- Status
- Online
- Menu

The remainder of this section describes each of the options that are available from the library Status screen.

Technical Support Information Option

Selecting this option lets you display Compaq-specific technical support assistance information (see Figure 4-13). If you are having difficulty with a direct connection, instructions on how to contact your local service provider is included, along with a toll-free number to contact Compaq directly. For further assistance, you can also access Compaq's website at www.compaq.com.

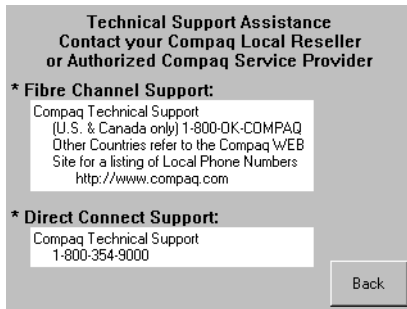


Figure 4-13. Technical support information screen

Mail Slot Access Option (Left Magazine Only)

Selecting this option lets you display the Mail Slot Access screen (Figure 4-14). This option lets you gain access to the mail slot without powering down the library. Note that the mail slot is reserved for the first tape cartridge slot in the left magazine and can be password protected.

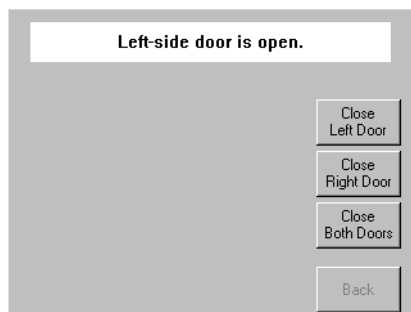


Figure 4-14. Mail slot access screen

Magazine Access Option

Selecting this option lets you display the Magazine Access screen (Figure 4-15). The Magazine Access option lets you gain access to the left magazine, right magazine, or both magazine doors for tape cartridge placement or removal. Note that this option can also be password protected.

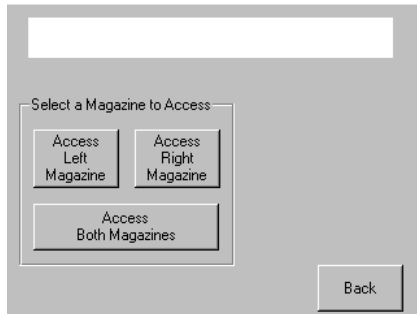


Figure 4-15. Magazine access screen

Move Media

Selecting this option lets you display the Move Media screen (see Figure 4-16). The Move Media option lets you remove a cleaning cartridge from a tape drive, the right magazine, or the mail slot in the left magazine. This option also lets you load and unload tape cartridges from the installed tape drives.

See the section on [“Replacing a Cleaning Cartridge in a Reserved Slot”](#) in [Chapter 5](#) for detailed removal information.

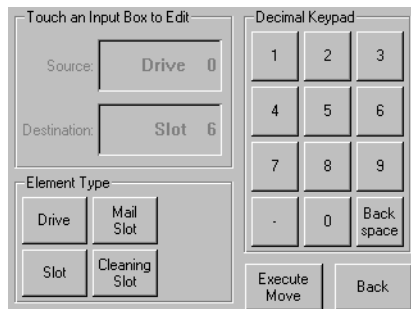


Figure 4-16. Move media screen

LCD Contrast Controls

Selecting these options let you increase or decrease the contrast of the LCD display (see Figure 4-12). Incremental steps are set by adjusting the LCD contrast controls from the library Status screen. Incremental steps can range from 0 to 31 depending on your preference.

Power

Selecting this option initiates a library power-down operation. After a successful power down, a confirmation message appears (Figure 4-17).

NOTE: The library moves the shuttle assembly to the parked position before powering down.

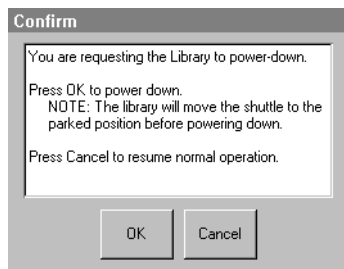


Figure 4-17. Power-down confirmation message screen

Status

Selecting this option lets you display a Status screen (Figure 4-18). This screen lets you identify a tape drive type, view physical tape drive status, tape drive cleaning information, and tape cartridge information.

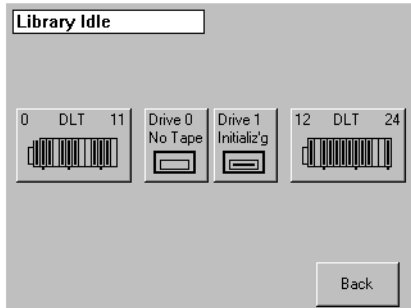


Figure 4-18. Status screen

Online

Selecting this option lets you place the library online or offline.

NOTE: The library automatically comes online after a power-up initialization. You can use this option to place the library offline.

Menu

Selecting this option lets you view, configure, and use the library (Figure 4-19). The Menu option displays three distinct areas:

- View System Data
- Edit Options
- Utilities

For a complete description of these areas, see the section on “[Menu Selections](#)” described later in this chapter.

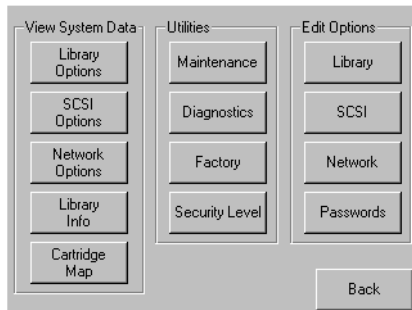


Figure 4-19. Menu screen

Menu Selections

This section describes the three Menu areas:

- View System Data
- Edit Options
- Utilities

View System Data Area

The View System Data area lets you select the following screens:

- Library Options
- SCSI Options
- Network Options
- Library Info
- Cartridge Map

Library Options

Selecting this option lets you view the settings defined from the Library option in the Edit Options area (see Figure 4-20).

NOTE: You can move to the next sequential Library Options screen by selecting the ▼. To return to the previous Library Options screen select the ▲ or **Back** button to return to the Menu screen.

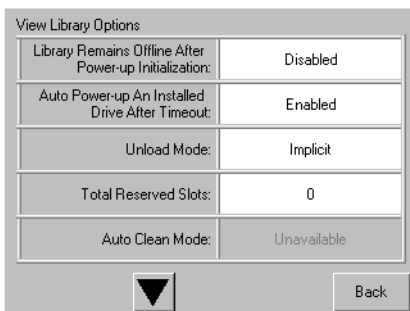


Figure 4-20. View library options screen

Table 4-2 lists and describes the available Library options.

Table 4-2 View Library Options	
Option	Description
Library Remains Offline After Power-up Initialization	Library does not go online after power-up initialization. You must select the Online option from the Menu screen on the Graphical User Interface (GUI) touch screen. The default is Disabled.
Auto Power-Up An Installed Drive	Enables a tape drive to be automatically powered up (after a delay), after replacing a tape drive if you do not explicitly power up the tape drive from the GUI touch screen. The default is Enabled.
Unload Mode	Lets you determine whether a SCSI MOVE MEDIUM command is interpreted as Implicit or Explicit. If Implicit, the library unloads a tape drive before attempting to move a cartridge from that tape drive. If Explicit, the host must issue a SCSI UNLOAD command to a tape drive before each MOVE MEDIUM command that removes a cartridge from that tape drive. The default is Implicit.
Total Reserved Slots	Lets you remove from use a specified number of slots at the rear of the magazine. Some host software imposes size limits on library magazines for licensing purposes, and does not operate with a library that exceeds the licensed size. The default is 0.
Auto Clean Mode	Lets you enable an automatic cleaning cycle. To use this option, you must have reserved a slot for a cleaning cartridge using the Total Reserved Slots option. The default is Disabled.
Drive and Slot Numbering	Lets you specify whether SCSI elements in the library displays with either zero or one. This only affects the GUI touch screen, not the actual SCSI element addresses. The default is 0.
Library Mode	Lets you set the robotics operating mode to Random, Sequential Drv0, Sequential Drv1, and Sequential Split. The default is Random (Sequential Mode Unavailable).
	Sequential Mode: Selecting a sequential mode (using Library Mode) enables the library robotics to unload a full tape cartridge (or at the end of data), select, load the next tape cartridge from the appropriate magazine, and then automatically continue read/write operations without software intervention. Two options are available: Normal and Recirculate.

Table 4-2 View Library Options (Continued)

Option	Description
LCD Contrast Adjust	The LCD contrast controls lets you increase or decrease the contrast of the LCD display. The incremental steps are set by adjusting the LCD Contrast Adjust option from the Library option. Incremental steps can range from 0 to 31 depending on your preference. The default is 16.
Mail Slot Mode	Lets you enable or disable the mail slot in a library. The default is Mail Slot Enabled.
Barcode Label Size	Lets you limit the length of the bar code label. Possible settings are 1 through 8. The default is 8.
Barcode Label Assignment	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, this option strips unwanted trailing characters (left alignment) or leading characters (right alignment). The default is Left Align.
Barcode Label Check Digit	Lets you specify whether to enable or disable the verification of a check digit character in the barcode label. The default is Disabled.

SCSI Options

Selecting this option lets you view the settings defined from the SCSI option in the Edit Options area (see Figure 4-21).

NOTE: You can move to the next sequential SCSI Options screen by selecting the ▼. To return to the previous SCSI Options screen, select the ▲ or **Back** button to return to the Menu screen.

The screenshot shows a window titled "View SCSI Options" with the following fields and values:

Drive 0 Bus ID:	4
Drive 1 Bus ID:	5
Library SCSI Bus ID:	0
Library SCSI Bus Parity:	Enabled
SCSI Mode:	SCSI-3

At the bottom of the window, there is a downward-pointing triangle button (▼) and a "Back" button.

Figure 4-21. View SCSI options screen

Table 4-3 lists and describes the available selections.

Table 4-3 View SCSI Options	
Option	Description
Drive 0 Bus ID	Lets you set the SCSI addresses of the drives. The designators Drive 0 (outer tape drive) through Drive <i>n</i> refer to the first through <i>n</i> th drives, counting from right to left starting with the top unit in the Library system.
Drive 1 Bus ID	Lets you set the SCSI addresses of the drives. The designators Drive 1 (inner tape drive) through Drive <i>n</i> refer to the second through <i>n</i> th drives, counting from left to right starting with the top unit in the Library system.
Library SCSI Bus ID	Lets you set the SCSI addresses for the library robotics. The default is 0.
Library SCSI Bus Parity	Lets you enable or disable the library robotics SCSI bus parity checking. The default is Library SCSI Bus Parity Enabled.
SCSI Mode	Defines the loader as SCSI-2 or SCSI-3. The default is SCSI-3.
Unit Attention Reporting	Lets you select reporting of All or only One stacked-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 Report All.
Init Element Status	Lets you specify the library's response to the SCSI INITIALIZE ELEMENT STATUS command. The possible settings are No Inventory, Force Inventory, and Force Label Scan. The default is Force Inventory.
Test Unit Ready Reporting	Lets you specify the response to a TEST UNIT READY command if the library is in Sequential Mode. The possible settings are Standard or Custom. The default is Custom.
Device Capability Page 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 (14 bytes).
Transport Element Base Address	Lets you set the base address for the robotics mechanism. The default is 0x0.
Storage Element Base Address	Lets you set the base address for the magazine slots. The default is 0x20.
Transfer Element Base Address	Lets you set the base address for the tape drives. The default is 0x1e0.
Import/Export Element Base Address	Lets you set the base address for the mail slot. The default is 0x1c0.

Table 4-3 View SCSI Options (Continued)

Option	Description
Product Identification	Lets you specify the response of the library's robotics to the SCSI INQUIRY command in the Product ID fields. The default is "MSL5000 Series."
Vendor Identification	Lets you specify the response of the library's robotics to the SCSI INQUIRY command in the Vendor ID field. The default is COMPAQ.
Post Recovered Errors	The default is Disabled.
TapeAlert Mode	Specifies conditions for logging and reporting the following Tape Alert data options. The default is Logging Disabled.
	Logging Disabled: Inhibits the logging feature.
	No Exceptions: The library must not report information exceptions.
	Generate Unit Attention: Reports information exceptions with a Unit Attention sense key and an ASC/ASCQ of 5D/00.
	Conditionally Generate Recovered Error: Reports information exceptions with a Recovered Error sense key and an ASC/ASCQ of 5D/00, if Recovered Error Reporting is enabled.
	Unconditionally Generate Recovered Error: Unconditionally reports information exceptions with a Recovered Error sense key and an ASC/ASCQ of 5D/00.
	Generate No Sense: Reports information exceptions with a No Sense sense key and an ASC/ASCQ of 5D/00.
	Report on Unsolicited Request Sense: Reports information exceptions with a No Sense sense key and an ASC/ASCQ of 5D/00, only in response to an unsolicited REQUEST SENSE command.
Abort Move Status	Lets you specify the SCSI response while aborting a SCSI command. The possible settings are Busy or Not Ready. The default is Not Ready.
Door Open Response	Lets you specify the SCSI response when a library door is open. The settings are Ready or Not Ready. The default is Not Ready.
Initiate Wide Data Transfer Negotiation	Lets you enable the library to initiate a SCSI synchronous and wide data transfer negotiation with the host. The settings are Do Not Initiate or Initiate. The default is Do Not Initiate.
Data Speed Transfer	Lets you set the SCSI data transfer rate to Synchronous, 10 MB/sec, 5 MB/sec or Asynchronous Only. The default is Synchronous, 10 MB/s.

Network Options

Selecting this option lets you view the settings defined from the Network option in the Edit Options area (see Figure 4-22). Table 4-4 lists and describes the available options.

NOTE: There are no factory default settings for networks. Contact your network administrator for specific information on connecting the library to a network.

View Network Options	
IP Address Determination:	Obtain an IP Address From a DHCP Server
IP Address:	Unavailable
IP Mask:	Unavailable
IP Gateway:	Unavailable
DNS Server:	10.1.8.14

Back

Figure 4-22. View network options screen

Table 4-4 View Network Options

Option	Description
IP Address Determination	Lets you obtain an IP address from a DHCP server or a user specified IP address.
DNS Server	Lets you select a DNS server address.

Library Info

Selecting this option lets you display the Miscellaneous Library Info screen (Figure 4-23). This screen displays the library's firmware revision, boot code, and local IP address that is currently in use.

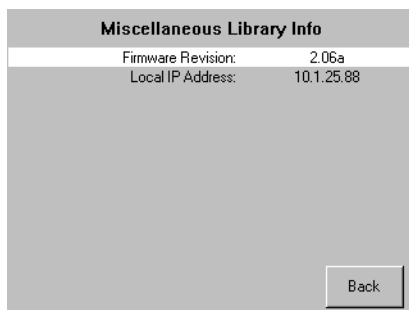


Figure 4-23. View library info screen

Cartridge Map

Selecting this option provides you with a layout of the slots and cartridges that are currently being used in the library.

Edit Options Area

The Edit Options area lets you select the following screens:

- Library
- SCSI
- Network
- Passwords

Library

Selecting this option lets you define the Library options used to configure the library for your specific needs (see Figure 4-24). Table 4-2 lists and describes the available options.

NOTE: You can move to the next sequential Library screen by selecting the ▼. To return to the previous Library screen select the ▲ or **Back** button to return to the Menu screen.

Touch Library Option Button to Edit	
Library Remains Offline After Power-up Initialization:	Disabled
Auto Power-up An Installed Drive After Timeout:	Enabled
Unload Mode:	Implicit
Total Reserved Slots:	0
Auto Clean Mode:	Unavailable

▼ Back

Figure 4-24. Edit library options screen

SCSI

Selecting this option lets you define the SCSI options used to configure the library for your specific needs (see Figure 4-25). Table 4-3 lists and describes the available options.

NOTE: You can move to the next sequential SCSI screen by selecting the ▼. To return to the previous SCSI screen select the ▲ or **Back** button to return to the Menu screen.

Touch SCSI Option Button to Edit	
Drive 0 Bus ID:	1
Drive 1 Bus ID:	2
Library SCSI Bus ID:	0
Library SCSI Bus Parity:	Enabled
SCSI Mode:	SCSI-3

▼ Back

Figure 4-25. Edit SCSI options screen

Network

Selecting this option lets you define the Network options used to configure the library for your specific needs (see Figure 4-26). Table 4-4 lists and describes the available options.

Touch Network Option Button to Edit	
IP Address Determination:	Obtain an IP Address From a DHCP Server
IP Address:	Unavailable
IP Mask:	Unavailable
IP Gateway:	Unavailable
DNS Server:	10.1.8.14

Back

Figure 4-26. Edit network options screen

Passwords

Selecting this option lets you define the Password options used to configure the library for your specific needs (see Figure 4-27). See the section on “[Front Panel and Media Security Locks](#)” described earlier in this chapter.

Touch an Input Box to Edit		Decimal Keypad		
New Service Password:	<input type="text"/>	1	2	3
Reenter New Service Password:	<input type="text"/>	4	5	6
Security Level		7	8	9
User Level 1 (Disabled)	User Level 2 (Disabled)	Clear Entry	0	Back space
Service (Enabled)		Save	Back	

Figure 4-27. Edit passwords options screen

Utilities Area

The Utilities area lets you select the following screens:

- Maintenance
- Diagnostics
- Factory
- Security Level

Maintenance

Selecting this option lets you perform system maintenance on, or replace, the following components (see Figure 4-28):

- Clean One Drive
- Clean Both Drives
- Replace Drive
- Set User Defaults
- Reboot Module
- Flash Drive From SCSI
- Flash Drive From Tape

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 MSL5026 Library Maintenance and Service Guide*.

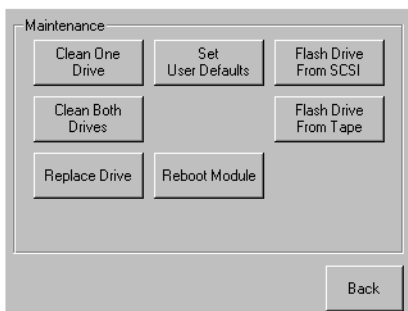


Figure 4-28. Maintenance screen

Diagnostics

Selecting this option lets you perform system diagnostics and calibration on the following components (see Figure 4-29).

- Cartridge Cycle
- Touch Screen Calibrate
- Drive Cycle

The Diagnostics menu options, intended for operator use, are described in [Chapter 5, “Maintenance.”](#) Additional Diagnostics menu options used by service technicians are described in the *Compaq StorageWorks MSL5026 Library Maintenance and Service Guide*.

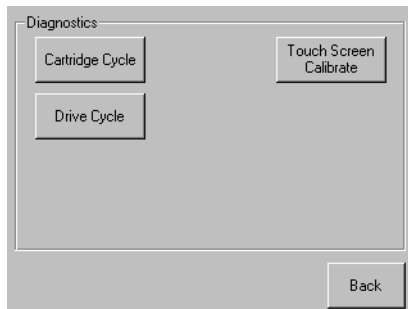


Figure 4-29. Diagnostics screen

Factory

Selecting this option lets you perform factory operations on the following components (see Figure 4-30).

- Passwords
- Clear SRAM Contents
- Set Factory Defaults
- Motor Diag

The Factory menu options, intended for operator use, are described in [Chapter 5](#), “[Maintenance](#).” Additional Factory menu options used by service technicians are described in the *Compaq StorageWorks MSL5026 Library Maintenance and Service Guide*.

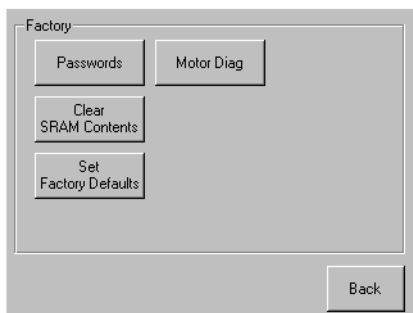


Figure 4-30. Factory screen

Security Level

Selecting this option lets you select either a Service or Factory security level (see Figure 4-31).

NOTE: The library ships with a factory default service password of 5566.

Elevate Security Level		Decimal Keypad		
Current:	None	1	2	3
Enter Service Password:	<input type="text"/>	4	5	6
Security Level		7	8	9
Service	Factory	Clear Entry	0	Back space
		Validate	Back	

Figure 4-31. Security level screen

Chapter 5

Maintenance

This chapter describes the Clean One Drive menu option contained in the Maintenance submenu of the Utilities area on the front panel display. You use the Clean One Drive menu option to clean tape drives installed in the Compaq StorageWorks MSL5026 Library.



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

IMPORTANT: Only perform the Clean One Drive menu option 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:

- Automatically running a cleaning cartridge.
- Manually running a cleaning cartridge.
- Replacing a cleaning cartridge in a reserved slot.

NOTE: Cleaning operations described in this chapter only refer to the DLT model of the MSL5026 Library.

Running a Cleaning Cartridge

Because the cleaning cartridge is abrasive, you should not use it unless the message “Use Cleaner” appears on the front panel display. There are two ways to manage the cleaning of the installed tape drives:

- Automatically, by enabling Auto Clean Mode.
- Manually, by selecting the Clean One Drive menu option from the Maintenance submenu on the front panel display.

Automatically Running a Cleaning Cartridge

You can configure the library so that it automatically runs the cleaning cartridge mode. After a tape drive that needs cleaning completes an unload operation, it sends a cleaning needed message to the library. This activates an automatic cleaning cycle if the cleaning cartridge slot has been reserved and Auto Clean Mode has been selected from the library Options menu.

To automatically run a cleaning cartridge using Auto Clean Mode:

1. Reserve a cleaning cartridge slot. See the section on “Setting Up a Reserved Slot” in [Chapter 3](#) for more information.
2. Enable Auto Clean Mode. See the section on “Edit Library Options” in [Chapter 3](#) for more information.

Manually Running a Cleaning Cartridge

A cleaning cartridge can be installed and run from one of three locations:

- The Mail Slot—This location has the advantage of not needing to remove a magazine to use a data cartridge slot or to reserve a cleaning cartridge slot.
- A Data Cartridge Slot—This location requires removing a magazine to insert a cleaning cartridge in a data cartridge slot and then removing it after cleaning.
- The Cleaning Slot—This location requires reserving the last data cartridge slot for exclusive use as a cleaning cartridge slot. The advantage with this method is that the cleaning cartridge is stored in the library and is always available for use. It needs to be handled only when it expires and needs to be replaced. See the section on “Setting up Reserved Slots” in Chapter 2 for more information.

Running a Cleaning Cartridge From the Mail Slot

1. Install a cleaning cartridge into the Mail Slot.
2. Select the Clean One Drive menu option from the Maintenance submenu on the front panel display.
3. Select Source and then Mail Slot in the Element Type box.
4. Select Cleaning. If the default entry is not the tape drive to be cleaned, press Drive in the Destination Element Type box to sequence through the available tape drive choices. Or, use the Decimal Keypad Backspace and Numeric Keys to enter the tape drive number directly.
5. When the source and destination entries are correct, select Execute Clean.
6. When the cleaning cycle completes, the library returns the cleaning cartridge back to the Mail Slot. To remove the cleaning cartridge, select Mail Slot Access from the library Status screen.

Running a Cleaning Cartridge From a Data Cartridge Slot

1. Install a cleaning cartridge into an appropriate data cartridge slot (Slot 0, for example).
2. Select the Clean One Drive menu option from the Maintenance submenu on the front panel display.
3. Select Source. If the default entry is not the slot with the cleaning cartridge, press Slot in the Element Type box to sequence through the available cartridge slots. Or, use the Decimal Keypad Backspace and Numeric Keys to enter the slot number directly.
4. Select Cleaning. If the default entry is not the tape drive to be cleaned, press Drive in the Destination Element Type box to sequence through the available tape drive choices. Or, use the Decimal Keypad Backspace and Numeric Keys to enter the tape drive number directly.
5. When the source and destination entries are correct, select Execute Clean.
6. When the cleaning cycle completes, the library returns the cleaning cartridge back to the data cartridge slot. To remove the cleaning cartridge, select Magazine Access from the library Status screen.

Running a Cleaning Cartridge From the Cleaning Slot

1. Reserve the cleaning cartridge slot. See the section on “Setting Up a Reserved Slot” in [Chapter 3](#) for more information.
2. Install a cleaning cartridge in the reserved slot.
3. Select the Clean One Drive menu option from the Maintenance submenu on the front panel display. Note that the Source window defaults to the cleaning slot (Cln’g Slot 0).
4. Select Cleaning. If the default entry is not the tape drive to be cleaned, press Drive in the Destination Element Type box to sequence through the available tape drive choices. Or, use the Decimal Keypad Backspace and Numeric Keys to enter the tape drive number directly.
5. When the destination entry is correct, select Execute Clean.
6. When the cleaning cycle completes, the library returns the cleaning cartridge back to the cleaning cartridge slot (Cln’g Slot 0). To remove the cleaning cartridge, select Magazine Access from the library Status screen.

Replacing a Cleaning Cartridge in a Reserved Slot

When the cleaning cartridge has been used up, a message appears on the front panel display indicating that the cleaning cartridge has expired. Examine the library Status screen to make sure that the cleaning cartridge has been unloaded from the tape drive to the reserved slot. If not, then unload it using the Move Media menu option from the library Status screen.

A cleaning cartridge can be removed and replaced by removing the right magazine or using the mail slot in the left magazine.

Replacing a Cleaning Cartridge in the Right Magazine

1. Select Magazine Access from the library Status screen.
2. Remove the magazine from the library.
3. Remove the expired cleaning cartridge from the last slot. Mark it EXPIRED and then properly dispose of it.
4. Place a new cleaning cartridge in the last slot of the magazine.
5. Replace the right magazine.

Replacing a Cleaning Cartridge in the Mail Slot

1. Select the Move Media menu option from the library Status screen.
2. Select Source and then press Cleaning Slot in the Source Element Type box.
3. Select Destination and then press Mail Slot in the Destination Element Type box.
4. Select Execute Move to place the cleaning cartridge in the Mail Slot.
5. When the move completes, press the **Back** button to access the default front panel display.
6. Select Mail Slot Access from the library Status screen and then remove the expired cleaning cartridge. Mark it EXPIRED and then properly dispose of it.
7. Place a new cleaning cartridge in the Mail Slot.
8. Select the Move Media option from the library Status screen.
9. Select Source and then press Mail Slot in the Source Element Type box.
10. Select Destination and then press Cleaning Slot in the Destination Element Type box.
11. Select Execute Move to put the new cleaning cartridge in the reserved slot.

Chapter 6

Troubleshooting

Introduction

This chapter describes the problems that can cause the Compaq StorageWorks MSL5026 Library to malfunction, including:

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

Platform Problems

An incorrect installation or configuration can cause platform problems. In this case, the library appears to be operating normally, but no data can be interchanged. You also might or might not get an error code on the Graphical User Interface (GUI) touch screen. To identify an error caused by this type of problem, check your installation and configuration setup. See [Chapter 2, “Installation,”](#) for information on how to correctly install and configure the library.

General drive errors usually result from a miscommunication between a library processor and a tape drive processor or a mechanical malfunction within the library. Both platform problems and general drive errors display an error message and a Fault Symptom Code (FSC) on the GUI touch screen. Use an FSC to report errors to your service provider, or in some cases, to determine a recovery procedure.

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 along with their related ERPs.

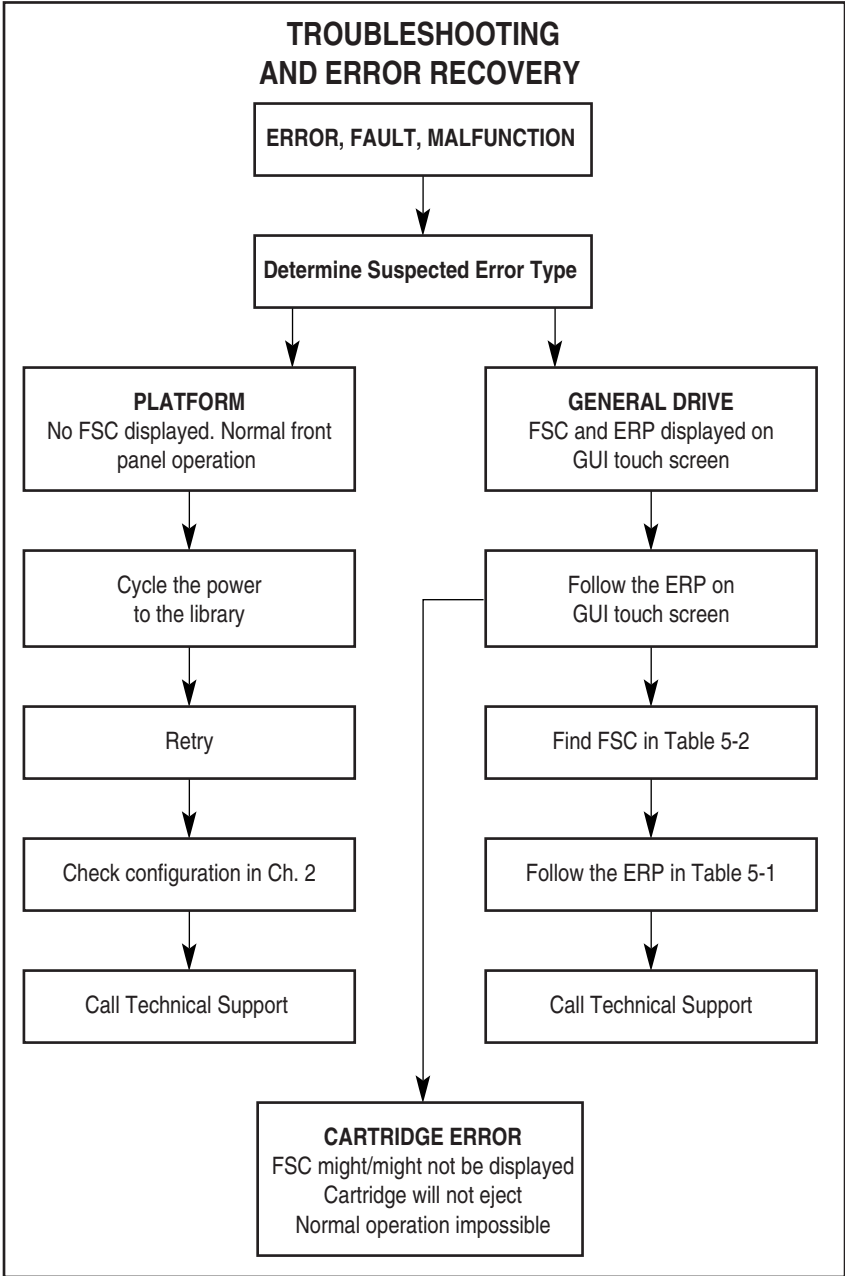


Figure 6-1. Troubleshooting flow chart

Error Recovery Procedures

Table 6-1 lists ERPs for errors reported on the GUI touch screen of the library. This list includes only those procedures that can be safely performed by an end user. The *Compaq StorageWorks MSL5026 Library Maintenance and Service Guide* includes additional procedures that can be performed by a qualified service technician.

Table 6-1 Error Recovery Procedures	
ERP Code	Procedure/Description
C	Cycle power to the library using the Power option on the GUI touch screen. Wait 30 seconds to power up 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 GUI touch screen are 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 it to your service provider.

Table 6-2 Fault Symptom Codes

Message	FSC	ERP
Unused Interrupt	0x0101	C,D,G
Enqueue'g a Null Ptr	0x0102	C,D,G
Invalid Cmd Rec'd	0x0103	C,D,G
Trc. Comm Open Error	0x0201	C,D,G
Novram Init. Error	0x0301	
Novram Chksum Error		
Press Continue to Initalize		
Novram to Default Configuration	0x0302	
Novram Program Error	0x0303	C,G
Novram Downld. Error	0x0304	C,G
Novram Data Error	0x0305	C,G
Novram Update Error	0x0306	C,D,G
Invalid Display Char	0x0401	C,G
Invalid Display Line	0x0402	C,G
Barcode Not Active Error	0x0501	C,D,G
RAM Init. Error	0x0602	C,G
Slv. Comm Open Error	0x0701	C,D,G
Not In Br. Menu Mode	0x0801	C,D,G
Invalid Novram Upd.	0x0802	C,D,G
Executing Immed. Cmd	0x0803	G
OS Catastrophic Error	0x0901	G
OS Task Exit Error	0x0902	G
SCSI Firmware Error	0x1001	D,G
SCSI FIFO Empty	0x1002	D,G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
SCSI FIFO Error	0x1003	D,G
SCSI Gross Error	0x1004	C,D,G
Illegal SCSI Cnt Cmd	0x1005	C,D,G
SCSI Message Error	0x1006	D,G
SCSI Invalid Element	0x1007	D,G
SCSI No Pending Int.	0x1008	D,G
SCSI Invalid Int.	0x1009	D,G
No Active Command	0x1020	D,G
SCSI Invalid Request	0x1021	D,G
SCSI Invalid Semaphore	0x1022	D,G
SCSI Invalid State	0x1023	D,G
SCSI Invalid Ctl Msg	0x1024	D,G
Overlapped Ctl Cmds	0x1025	C,D,G
Overlapped Ctl Msgs	0x1026	C,D,G
Control Process Busy	0x1027	C,G
Control Initializing	0x1028	C,G
Control Seq. Mode	0x1029	C,G
Invalid SCSI Id	0x1030	C,D,G
Ctl. Invalid Command	0x2001	C,G
Undefined Config	0x2002	C,G
Invalid Drive State	0x2003	C,G
Loader Not Ready	0x2004	C,G
SCSI Id Not Set	0x2005	C,D,G
DLT Comm. Open Error	0x2006	C,D,G
Door Fault	0x2007	C,G
Illegal Move	0x2008	C,G
Cart Unaccessible	0x200C	F
Drive In Error	0x200D	C,G
No Magazine	0x200E	F
Removal Prevented	0x200F	F
Ctl. Firmware Error	0x2010	C,G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
Ctl. Firmware Error	0x2011	C,G
Ctl. Firmware Error	0x2012	C,G
Ctl. Firmware Error	0x2013	C,G
Ctl. Firmware Error	0x2014	C,G
Ctl. Firmware Error	0x2015	C,G
Ctl. Firmware Error	0x2016	C,G
DLT Timeout Error	0x2030	C,D,G
DLT Timeout Error	0x2031	C,D,G
DLT Timeout Error	0x2032	C,D,G
DLT Timeout Error	0x2033	C,D,G
DLT Timeout Error	0x2034	C,D,G
Invalid Ctl Msg	0x2040	C,G
Invalid Ctl Msg	0x2041	C,G
Invalid Ctl Msg	0x2042	C,G
Invalid Ctl Msg	0x2043	C,G
No Free Queues	0x2050	C,G
No Free Queues	0x2051	C,G
No Free Queues	0x2052	C,G
No Free Queues	0x2053	C,G
No Free Queues	0x2054	C,G
Calib. Error Port 0	0x2060	C,D,G
Calib. Error Port 1	0x2061	C,D,G
Calib. Error Port 2	0x2062	C,D,G
Calib. Error Port 3	0x2063	C,D,G
Calib. Error Port 4	0x2064	C,D,G
Calib. Error Port 5	0x2065	C,D,G
Calib. Error Port 6	0x2066	C,D,G
Calib. Error Port 7	0x2067	C,D,G
Pass-thru Init Error	0x206f	C,D,G
Command Timeout		
Enter to Reboot	0x2070	C,G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
Command Timeout	0x2071	C,G
Stow Error		
Enter to Reboot	0x2074	C,G
Fetch Error		
Enter to Reboot	0x2075	C,G
Motor Fault Condition	0x3000	C,G
Shuttle Tach Errors	0x3001	C,G
Picker Tach Errors	0x3002	C,G
Rotary Tach Errors	0x3003	C,G
Vertical Tach Errors	0x3004	C,G
Passthru Tach Errors	0x3005	C,G
Shuttle Watchdog Error	0x300A	C,G
Picker Watchdog Error	0x300B	C,G
Rotary Watchdog Error	0x300C	C,G
Vertical Watchdog Error	0x300D	C,G
Passthru Watchdog Error	0x300E	C,G
Bin Fetch Failure	0x3011	C,G
Bin Stow Failure	0x3012	C,G
Drive Fetch Failure	0x3013	C,G
Drive Stow Failure	0x3014	C,G
Drive Timeout Failure	0x3015	C,D,G
Drive Status Failure	0x3016	C,D,G
Drive In Flux Timeout	0x3017	C,D,G
Drive Load Retry Failed	0x3018	C,G
Drive Open Door Failed	0x3019	C,G
Drive Close Door Failed	0x301A	C,G
Drive Communication Error	0x301B	C,D,G
Undefined Config	0x3020	C,G
No Cart Found During Fetch	0x3021	C,G
Orphan Not Stowed	0x3030	C,G
Motor Firmware Error	0x3040	C,G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
Missing Magazine	0x3050	F
No Cartridges In Library	0x3051	F
Too Many Cartridges	0x3052	F
Zone Sequence Error	0x3060	C,G
Picker Jammed	0x3100	C,G
Picker Jammed	0x3102	C,G
Picker Jammed	0x3103	C,G
Picker Jammed	0x3104	C,G
Picker Jammed	0x3105	C,G
Picker Jammed	0x3106	C,G
Picker Jammed	0x3107	C,G
Picker Jammed	0x3108	C,G
Picker Jammed	0x3109	C,G
Picker Jammed	0x310A	C,G
Picker Jammed	0x310B	C,G
Picker Jammed on Stow	0x310F	C,G
Picker Retries Excd.	0x3110	C,G
Picker Retries Excd.	0x3111	C,G
Picker Retraction Error	0x3115	C,G
Shuttle Jammed	0x3200	C,G
Shuttle Jammed	0x3201	C,G
Shuttle Jammed	0x3202	C,G
Shuttle Jammed	0x3203	C,G
Shuttle Jammed	0x3204	C,G
Shuttle Jammed	0x3205	C,G
Rotary Jammed	0x3300	C,G
Shuttle on backwards	0x3301	C,G
Rotary Cannot find Zones	0x3302	C,G
Rom CRC Error	0x4001	C,G
Ram Test Failed	0x4002	C,G
Comm. Uart Error	0x4010	C,G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
Trace Uart Error	0x4011	C,G
Barcode Uart Error	0x4012	C,G
DLT 1 Uart Error	0x4013	C,G
DLT 2 Uart Error	0x4014	C,G
No DLTs Attached	0x5001	F
All DLTs/Slots Empty	0x5002	F
All DLTs/Slots Full	0x5003	F
No Slots Installed	0x5004	F
No DLTs Attached	0x5010	F
All Slots Empty	0x5011	F
All DLTs Full	0x5012	F
DLT Timeout Error	0x5013	F
DLT Already Loaded	0x5014	F
Expired Clean'g Cart	0x5015	F
Not a Clean'g Cart	0x5016	F
No Slots Installed	0x5017	F
All DLTs/Slots Empty	0x5020	F
Bad Cartridge Map	0x5021	C,G
Bad Novram Setting	0x5030	C,G
Bad Setting	0x5032	C,G
Set Density Failed	0x5033	C,G
Set Compress. Failed	0x5034	C,G
DLT Timeout Error	0x5035	C,D,G
DLT Timeout Error	0x5036	C,D,G
DLT Set Bus ID Error	0x5037	C,G
SCSI Lock Overrides	0x5038	F
Invalid Unlock Code	0x5039	F
Slave Cmd Failure	0x5090	C,D,G
Comm Port Open Error	0x6001	C,D,G
Comm Port Send Error	0x6002	C,D,G
Comm Port Recv Error	0x6003	C,D,G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
EnQ Without IDs	0x6004	D,G
DeQ Without IDs	0x6005	D,G
EnQ Null Pointer	0x6006	D,G
No Free Comm Blks	0x6007	D,G
Pkt Send Error	0x6010	D,G
Pkt Receive Error	0x6011	D,G
Status Unexpected	0x6012	D,G
Invalid Com Blk Type	0x6013	D,G
Invalid Com Blk Type	0x6014	D,G
Ack Timeout - Out	0x6015	D,G
Ack Timeout - In	0x6016	D,G
Ack Invalid - Out	0x6017	D,G
Ack Invalid - In	0x6018	D,G
Comm Port Ack Error	0x6019	D,G
Slave Addr Invalid	0x6022	D,G
Slave Req Unknown	0x6023	D,G
Slave Has No Pkts	0x6024	D,G
Pkt ID Invalid	0x6025	D,G
No Slaves to Flash	0x6026	D,G
Master Has No Flash	0x6027	G
Slave Unavailable	0x6028	D,G
Slave Has No Flash	0x6029	G
Slave Dev. Incompat.	0x6030	G
Slave Boot Incompat.	0x6031	G
Slave Main Flash Err	0x6032	G
Slave Boot Flash Err	0x6033	G
Slave Re-Boot Failed	0x6034	C,D,G
Slave Update Err	0x6035	C,D,G
Invalid Image Size	0x6036	F,G
Command Timeout	0x6037	D,G
Slave Spcl Flash Err	0x6038	G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
Pkt Send Error	0x6040	D,G
Pkt Receive Error	0x6041	D,G
Status Unexpected	0x6042	D,G
Invalid Com Blk Type	0x6043	D,G
Invalid Com Blk Type	0x6044	D,G
Command Overlap	0x6045	D,G
No Pkts to Send	0x6046	D,G
Invalid Direction	0x6047	D,G
Master Pkt ID Bad	0x6048	D,G
Command response from unexpected source	0x7001	D,G
Control command execution failed	0x7002	D,G
Control response not matched to a known command	0x7003	D,G
Loader response not matched to a known command	0x7004	D,G
Drive response not matched to a known command	0x7005	D,G
Flash response not matched to a known command	0x7006	D,G
Drive index on Update Status message was invalid	0x7007	C,D,G
The Drive response was not expected	0x7008	C,D,G
The opcode for a WORD message was unknown	0x7009	C,D,G
The opcode for a DWORD message was unknown	0x700A	C,D,G
The button causing library to go offline was unknown	0x700B	C,D,G
Destination Xchg was Null	0x700C	C,G
Sending of a cmd failed	0x700D	C,G
Boot ROM CRC Error	0xB001	C,D,G
Boot RAM Test Failed	0xB002	C,D,G
Boot Comm Open Error	0xB004	C,D,G
Boot Novram Error	0xB005	C,D,G
Boot Unused Int.	0xB006	C,D,G
Flash Init. Error	0xB007	C,D,G
Boot UART 0 Error	0xB010	C,D,G
Boot UART 1 Error	0xB011	C,D,G
Boot UART 2 Error	0xB012	C,D,G

Table 6-2 Fault Symptom Codes (Continued)

Message	FSC	ERP
Boot UART 3 Error	0xB013	C,D,G
Boot UART 4 Error	0xB014	C,D,G
No Flash Installed	0xF001	G
Invalid Comm Port	0xF002	C,D,G
Could Not Open Comm	0xF003	C,D,G
Invalid H/W Config.	0xF005	D,G
Incompatible Image	0xF006	G
Flash Erase Error	0xF010	G
Flash Download Error	0xF011	G
Flash Program Error	0xF012	
Flash CRC Error	0xF013	G
Flash Slave PF NULL	0xF019	G
Flash Slave Type	0xF01A	G
Flash Protect Error	0XF020	G
Cannot Be Programmed, Remove Flash Device	0xF020	

If an error message appears that is not included in Table 6-2, write down the fault code number and follow the recovery procedure. If the same error occurs again, call your service provider.

Appendix **A**

Regulatory Compliance Notice

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (that is, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have a FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment



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



ACHTUNG: Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.



AVERTISSEMENT : Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

Declaration of Conformity for Products Marked with FCC Logo, United States Only

This device complies with 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 received, including interference that may cause undesired operation. For questions regarding this declaration, contact:

Compaq Computer Corporation
P. O. Box 629
Marlboro, Massachusetts 01752

To identify this product, refer to the Series number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Compaq Computer Corporation may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

- EN55022 (CISPR 22)—Electromagnetic Interference
- EN50082-1 (IEC801-2, IEC801-3, IEC801-4)—Electromagnetic Immunity
- EN60950 (IEC950)—Product Safety

Australian Notice

This customer equipment is to be installed and maintained by service personnel, as defined by AS/NZS 3260 Clause 1.2.14.3. Service Personnel. Incorrect connection of connected equipment to a General Purpose Outlet could result in a hazardous situation. Safety requirements are not fulfilled unless the equipment is connected to a wall socket outlet with protective earth contact.

Appendix **B**

Specifications

This appendix lists the following specifications met by the Compaq StorageWorks MSL5026 Library:

- Operational performance
- Reliability
- Power
- Mechanical
- Environmental
- Acoustics
- Safety

Operational Performance

Table B-1 Operational Performance Specifications

Description	Specification
Host SCSI interface	LVD/SE
Number of cartridges (2 full magazines)	26
Number of drives	0, 1, or 2
Load time	<10 seconds, estimated ¹
Unload time	<10 seconds, estimated ¹
Drive compatibility	Compaq DLT 40/80 SDLT 110/220
Maximum data capacity (native)	1.04 TB (DLT 40/80) 2.80 TB (SDLT 110/220)
Maximum transfer rate (native)	43.2 GB/hr (DLT) 79.2 GB/hr (SDLT 110/220)

¹Excluding Pass-Through Mechanism (PTM) access

Reliability

Table B-2 Reliability Specifications

Description	Specification
Robotics MTBF	>250,000 hours ¹
Robotics MSBF	>2,000,000 cartridge cycles
Library MSBF	>10,000 load/unload cycles
Design life	7 years @ 30% duty cycle
MTTR	<10 minutes (most FRUs)

¹Excluding power supply, tape drives, and cooling fans

Power

Table B-3 Power Specifications

Description	Specification
Voltage	100 to 240 VAC, +/- 10%
Current	3.0 to 6.0 A
Line frequency operating range	47 to 63 Hz
Power consumption	397 W
Maximum peak power consumption	449 W

Mechanical

Table B-4 Mechanical Specifications (Tabletop Model)

Description	Specification
Height	8.75 inches (22.2 cm), nominal (5U)
Width	19 inches (48.3 cm)
Depth	31.5 inches (80 cm)
Weight	60.0 pounds (27.2 kg), estimated (with 2 tape drives installed)

Table B-5 Mechanical Specifications (Rackmount Model)

Description	Specification
Height	8.75 inches (22.2 cm), nominal (5U)
Width	17 inches (43.2 cm)
Depth	31.5 inches (80 cm)
Weight	60.0 pounds (27.2 kg), estimated (with 2 tape drives installed)

Environmental

Table B-6 Environmental Specifications (Operating)

Description	Specification
Dry bulb temperature	50°F to 104°F (10°C to 40°C)
Temperature gradient	1.8°F/min (1°C/min)
Temperature shock	27°F (15°C) over 2 minutes
Wet bulb temperature	78.8°F (26°C)
Relative humidity (noncondensing)	15% to 85%
Humidity gradient	10%/hr
Altitude	-1000 feet to +10,000 feet (-305 m to 3050 m)

Table B-7 Environmental Specifications (Packed or Unpacked)

Description	Specification
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 minutes)
Wet bulb temperature	86°F (30°C)
Relative humidity (noncondensing)	10% to 95%
Humidity gradient	10%/hr
Altitude	-1000 feet to +10,000 feet (-305 m to 3050 m)

Table B-8 Environmental Specifications (Storage/Transit)

Description	Specification
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 minutes)
Wet bulb temperature	86°F (30°C)
Relative humidity (noncondensing)	5% to 95%
Humidity gradient	10%/hr
Altitude	-1000 feet to +10,000 feet (-305 m to 3050 m)

Acoustics

Table B-9 Acoustic Noise Declared per ISO 9296 and ISO 7779

Product	Sound Power Level $L_{W,Ad}$ B		Sound Pressure Level $L_{p,Am}$ dBA (bystander position)	
	Idle	Operate	Idle	Operate
MSL5026 Library	6.4	7.0	48	48

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

**Table B-10
Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779/DIN 27779**

Gerät	Schalleistungspegel $L_{W,Ad}$ B		Schalldruckpegel $L_{p,Am}$ dBA (bediener position)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
MSL5026 Library	6,4	7,0	48	48

HINWEIS: Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Compaq Vertretungen erhältlich. 1 B = 10 dBa.

Safety

The library carries the following Regulatory Agency product safety certifications.

Table B-11 Regulatory Product Safety Certifications	
Description	Specification
UL Listed Mark	UL 1950 (standard for safety of information technology equipment)
TUV GS Mark (Germany)	EN 60 950, IEC950 (standard for safety of information technology equipment)
CE Mark (European Union)	Low Voltage Directive, 72/23/EEC, European Union
CUL Mark (Canadian UL)	CAN/CSA 22.2 No. 950 (standard for safety of information technology equipment)

Appendix **C**

Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm +/- 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized Compaq reseller install the part.

NOTE: For more information on static electricity, or assistance with product installation, contact your authorized Compaq reseller.

Appendix *D*

Removing and Replacing a Tape Drive

This appendix explains how to add a tape drive to the library. See [Chapter 1](#), “[Introduction](#),” for a list of tape drives supported by the library.

Instructions

To add a tape drive:

1. Unpack the tape drive and visually inspect it for any damage. If you feel that the tape drive has been damaged, return it to Compaq for a replacement.

NOTE: Compaq tape drives are hot-plug capable, so you do not have to turn the library off while removing or installing a tape drive.

2. Remove the blank panel that covers the appropriate tape drive mounting bay (see Figure D-1). Save the blank panel for future use.

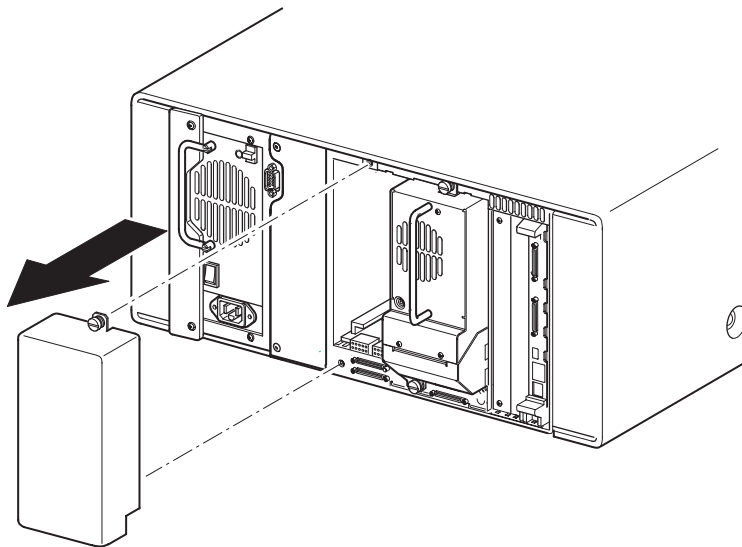


Figure D-1. Removing a tape drive mounting bay blank panel

3. Slowly insert the tape drive into the mounting bay. Make sure you push the tape drive all the way in so it fully seats in the mating connectors at the rear of the library (see Figure D-2).



CAUTION: When inserting a drive, make sure it goes in straight to ensure proper alignment with the tape drive and library mating connectors. Failure to do so might cause connector damage.

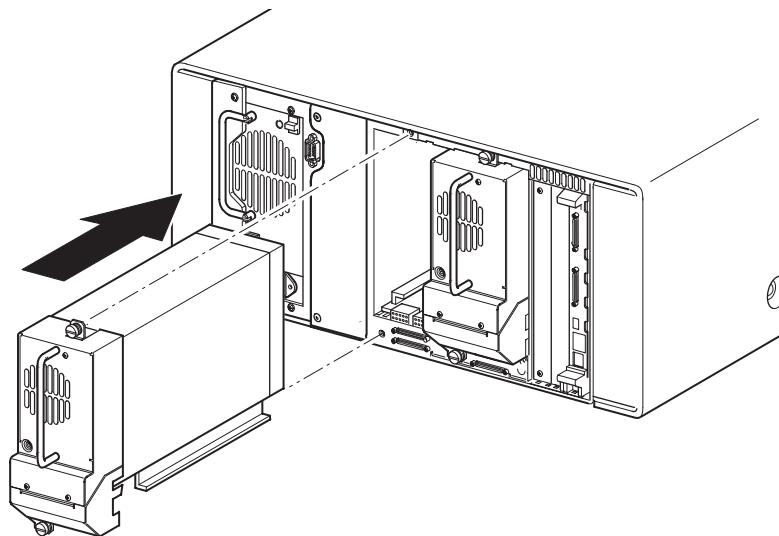


Figure D-2. Installing a tape drive

4. Using a flat-blade screwdriver, secure the tape drive to the library using the two thumbscrews.
5. Configure the tape drive. See [Chapter 3](#), “[Library Configuration](#).”

Index

A

abort move status 3-6, 4-24
accessories 1-2
acoustic specs B-5
auto clean mode 4-21
auto power-up 3-3, 4-21

B

bar code 4-12
barcode label assignment 3-4, 4-22
barcode label check digit 3-4, 4-22
barcode label size 4-22
barcode reader 1-7
base address 3-5
blank panel D-2
blank panel removal D-2
bus ID 3-5
bus parity 3-5

C

cable configuration
 1 tape drive, 1 host 2-10
 2 tape drives, 1 host 2-11
 2 tape drives, 2 hosts 2-12
 no tape drive 2-9
cable configurations 2-8
cage nuts 2-4
card cage 1-8
cartridge map 4-26
cartridge shuttle assembly 1-7
caution x
cleaning cartridge 5-2
 automatic 5-2

cleaning slot 5-4
data cartridge slot 5-3
mail slot 5-3
mail slot, replacing 5-5
manual 5-2
replacing 5-4
reserved slot 5-4
right magazine, replacing 5-4

Compaq

Authorized Reseller xiii
Technical Support xii
website xii

connection

network x

controller

wide LVD/SE 2-8

conventions ix

D

data speed transfer 3-6, 4-24
device capability page length 3-5, 4-23
diagnostics 4-31
 cartridge cycle 4-31
 drive cycle 4-31
 touch screen calibrate 4-31
DNS server 4-25
door open response 3-6, 4-24
doors 2-6, 4-3
 mechanical releases 4-3
drive 0 bus ID 4-23
drive 1 bus ID 4-23
drive and slot numbering 3-3, 4-21

E

edit options 4-19, 4-27
electronics controller card 1-6
electrostatic discharge C-1
environmental specs B-4
equipment symbols x
error recovery procedures 6-2
errors
 post recovered 3-6, 4-24

F

factory options
 clear SRAM contents 4-32
 motor diag 4-32
 passwords 4-32
 set factory defaults 4-32
fail-over 1-11
fasteners 2-4
fault symptom codes 6-5
front panel 4-2
FSCs 6-5

G

grounding methods C-1
GUI touch screen 1-9, 4-6

H

help xii
host system 4-7
hot xi

I

icons
 symbols x
illustrated
 applying power 2-7
 attaching a barcode 4-12
 blank panel removal D-2
 cable configuration 2-9, 2-10, 2-11, 2-12
 card cage 1-8
 controller board 1-6
 front panel 1-9, 4-2
 indicators 4-4

 inserting a tape cartridge 4-10
 installing the library 2-5
 installing the rails 2-4
 left magazine mail slot 4-11
 left tape magazine 4-9
 magazines 1-4
 mechanical releases 4-3
 power supply 1-5
 PTM mounting location 1-11
 removing magazines 4-8
 reserved slot locations 3-10
 robotics 1-7
 securing the library 2-6
 tabletop model clearances 2-2
 tape drive locations 1-3
 template 2-3
 troubleshooting flow chart 6-3
import/export element base address 3-6, 4-23
indicators 4-4
 front panel 1-9
init element status 3-5, 4-23
initialization screen 4-13
initiate wide data transfer negotiation 3-6, 4-24
installing rails 2-4
installing the library 2-5

L

labels
 bar code 4-12
latch mechanism 2-6
LCD contrast adjust 3-4, 4-22
LCD contrast controls 4-17
library
 display screens and options 4-13
 operation 4-1
 options 3-3
library info 4-26
library mode 3-3, 4-21
library options 4-20
library SCSI bus ID 4-23
library SCSI bus parity 4-23
library status LED 1-9

- library systems
 - multi-unit 1-10
- locks 4-6
- M**
- magazine
 - door mechanical releases 4-3
 - doors 4-3
 - inserting cartridges 4-9
- magazines 1-4
 - removing 4-8
- mail slot 4-11
- mail slot access 4-11
- mail slot holder 4-11
- mail slot mode 3-4, 4-22
- maintenance 4-30, 5-1
 - clean both drives 4-30
 - clean one drive 4-30
 - flash drive from SCSI 4-30
 - flash drive from tape 4-30
 - reboot module 4-30
 - replace drive 4-30
 - set user defaults 4-30
- mechanical specs B-3
- menu 4-19
- menu selections 4-20
- models 1-2
- N**
- network 3-2
- network options 4-25
- Notice
 - Class A equipment A-2
- notice
 - Australian A-3
 - cables A-3
 - Declaration of Conformity for Products A-2
 - European Union A-3
 - Federal Communications Commission A-1
 - modifications A-2
 - regulatory compliance A-1
- O**
- offline 3-3, 4-21
- online 4-18
- operation 4-1
- operational performance B-2
- options
 - edit 4-27
 - network 4-25, 4-28
 - passwords 4-29
 - SCSI 3-5, 4-22, 4-28
- P**
- Pass-Through Mechanism (PTM) 1-7
- password 4-7
- passwords 4-29
- PCI slots 1-8
- post recovered errors 3-6, 4-24
- power specs B-3
- power supply 1-5, 2-7
- power switch 2-7
- product identification 3-6, 4-24
- PTM 1-7, 1-11
- R**
- rack stability xi
- rackmount model 2-3
- regulatory compliance notice A-1
- regulatory notices A-1
- reliability B-2
- remove and replace tape drive D-1
- reserved slot 3-2
- reserved slot locations 3-10
- reserved slots 3-3, 3-10
 - numbering 3-10
- retaining screws 2-6
- robotics 1-7, 1-11

S

- safety xi
 - safety specs B-6
 - screen
 - diagnostics 4-31
 - drive 0 bus 0 data field 3-9
 - drive 0 bus ID 3-8
 - edit library options 4-27
 - edit network options 4-28
 - edit passwords options 4-29
 - edit SCSI options 4-28
 - factory options 4-32
 - initialization 4-13
 - magazine access 4-16
 - mail slot access 4-15
 - maintenance 4-30
 - menu 4-19
 - move media 4-16
 - power-down confirmation message 4-17
 - reserved slots numeric keypad 3-11
 - SCSI ID confirmation 3-9
 - SCSI option selection 3-8
 - security level 4-33
 - service and factory password levels 4-7
 - status 4-14, 4-18
 - technical support information 4-15
 - total reserved slots 3-11
 - total reserved slots confirmation 3-12
 - user password levels 4-6
 - view library info 4-26
 - view library options 4-20
 - view network options 4-25
 - view SCSI options 4-22
 - SCSI
 - bus IDs 3-5
 - bus parity 3-5
 - cable configurations 2-8
 - IDs 2-8
 - IDs, setting 3-7
 - options 3-5, 4-22
 - SCSI IDs 3-2
 - SCSI mode 4-23
 - securing the library 2-6
 - security level 4-33
 - set up
 - network 3-12
 - rackmount model 2-3
 - reserved slots 3-10
 - tabletop model 2-2
 - setting a SCSI ID 3-7
 - shock x, xi
 - shuttle assembly 1-7
 - slide rails 2-3
 - inner 2-5
 - intermediate 2-5
 - specifications B-1
 - acoustics B-4, B-5
 - environmental B-4
 - mechanical B-3
 - operational performance B-2
 - power B-3
 - reliability B-2
 - safety B-6
 - stability xi
 - status screen 4-14, 4-18
 - storage cabinet 2-3, 2-4, 2-5
 - storage element base address 3-5, 4-23
 - symbols
 - equipment x
 - text x
- ## **T**
- tabletop model 2-2
 - tape alert mode 3-6, 4-24
 - tape cartridge
 - requirements 4-12
 - tape cartridges
 - inserting and removing 4-8
 - tape drive
 - remove and replace D-1
 - tape drives 1-3
 - technical support xii
 - template 2-3, 2-4
 - test unit ready reporting 3-5, 4-23

- text conventions ix
- text symbols x
- total reserved slots 4-21
- transfer element base address 3-5, 4-23
- transport element base address 3-5, 4-23
- troubleshooting 6-1
 - error recovery 6-2
 - procedures 6-4
 - fault symptom codes 6-5
 - flow chart 6-3
 - platform problems 6-2
- troubleshooting flow chart 6-3

U

- unit attention reporting 3-5, 4-23

- unload mode 3-3, 4-21
- utilities 4-19, 4-30
 - diagnostics 4-31
 - factory 4-32
 - maintenance 4-30
 - security level 4-33

V

- vendor identification 3-6, 4-24
- view system data 4-19, 4-20
- viewing window 1-9

W

- warning x