

hp StorageWorks

MSL5000 series library user guide

Part Number: 231910-003

Third Edition (August 2002)

This guide is to be used as step-by-step instructions for installing and as a reference for operating, troubleshooting, and upgrading.



i n v e n t

© Hewlett-Packard Company, 2002. All rights reserved.

Hewlett-Packard Company makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Hewlett-Packard. The information contained in this document is subject to change without notice.

HP, Compaq, and StorageWorks are trademarks of Hewlett-Packard Company in the U.S. and/or other countries.

Compaq Computer Corporation is a wholly-owned subsidiary of Hewlett-Packard Company.

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

Printed in the U.S.A.

MSL5000 series library user guide
Third Edition (August 2002)
Part Number: 231910-003

Contents

About this Guide

Text Conventions	ix
Symbols in Text	xi
Symbols on Equipment	xi
Rack Stability	xii
Getting Help	xiii
Technical Support	xiii
Product Website	xiii
Authorized Reseller	xiii

1 Introduction

Models	1-2
Accessories	1-2
Tape Drives	1-3
Magazines	1-4
Power Supplies	1-5
Robotics	1-7
Library Controller Board	1-8
Factory-Defined Accessory PCI Slots	1-9
Embedded Fibre Channel Board	1-10
Front Panel Indicators	1-10
Multi-Unit Library Systems	1-11

2 Installation

Setting up the Tabletop Model	2-2
Converting a Tabletop Model to a Rackmount Model	2-3
Setting up the Rackmount Model	2-4
Applying Power to the Library	2-9
SCSI Cable Configurations	2-10
Supported SCSI Cables	2-10

Two Tape Drives Dual Host System 2–11
 Four Tape Drives Dual Host System 2–12

3 Library Configuration

Default Configuration Settings 3–2
 Setting a SCSI ID 3–2
 Setting Up a Reserved Slot. 3–5
 Reserved Slot Numbering 3–5
 Setting Up Your Network 3–11

4 Operation

Front Panel 4–2
 Magazine Doors 4–3
 Indicators 4–4
 Front Panel and Media Security Locks 4–5
 GUI Touch Screen 4–5
 Host System 4–6
 Inserting and Removing Tape Cartridges 4–6
 Removing Magazines 4–7
 Inserting Cartridges into a Magazine 4–8
 Using Mail Slots (Left Magazines Only) 4–10
 Barcode Labels 4–11
 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 Magazines 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
 Menu Selections 4–20
 View System Data Area 4–20
 Library Options 4–20
 SCSI Options 4–23

Network Options	4-27
Library Info	4-28
Cartridge Map	4-28
Edit Options Area	4-29
Library	4-29
SCSI	4-30
Network	4-30
Passwords	4-31
Utilities Area	4-31
Maintenance	4-32
Diagnostics	4-33
Factory	4-33
Security Level	4-34

5 Remote Management Interface

Operation	5-2
Accessing the Remote Management Interface	5-2
Status	5-4
Move Media	5-5
Setup	5-6
Library Configuration	5-7
SCSI Configuration	5-8
Drive Configuration	5-9
Functions	5-10
History	5-11

6 Maintenance

Running a Cleaning Cartridge	6-2
Automatically Running a Cleaning Cartridge	6-2
Manually Running a Cleaning Cartridge	6-2
Running a Cleaning Cartridge From a Mail Slot	6-3
Running a Cleaning Cartridge From a Tape Cartridge Slot	6-3
Running a Cleaning Cartridge From a Cleaning Slot	6-4
Replacing a Cleaning Cartridge in a Reserved Slot	6-4
Replacing a Cleaning Cartridge in a Right Magazine	6-5
Replacing a Cleaning Cartridge in a Mail Slot	6-5
Updating the Firmware	6-6

Updating via the Remote Management Interface	6-6
Updating Via Serial Connection	6-7
Firmware Flashing Procedure	6-7
Verifying the Firmware Level	6-7

7 Troubleshooting

Introduction	7-1
Platform Problems	7-2
Error Recovery	7-2
Error Recovery Procedures	7-4
Fault Symptom Codes (FSCs)	7-5

A Regulatory Compliance Notices

Federal Communications Commission Notice	A-1
Class A Equipment	A-1
Class B Equipment	A-2
Modifications	A-2
Cables	A-2
Declaration of Conformity for products marked with the FCC logo - United States only	A-2
Canadian Notice (Avis Canadien)	A-3
Class A Equipment	A-3
Class B Equipment	A-3
European Union Notice	A-4
Taiwanese Notice	A-4
Japanese Notice	A-5

B Specifications

Operational Performance	B-2
Power	B-3
Mechanical	B-3
Environmental (All models)	B-4
Acoustics	B-5
Safety	B-6

C Electrostatic Discharge

Grounding Methods	C-2
-----------------------------	-----

D Removing and Replacing a Tape Drive	
Instructions	D-2
E Configuration Examples	
SCSI Cable Configurations	E-1
Configuration Examples	E-2
Pass-Through Mechanism Cabling	E-13
Configuration Examples	E-13
F Optional Fibre Channel Card	
Host Prerequisites	F-1
Connectors and Indicators	F-2
Power Indicator	F-2
Serial Port	F-2
Ethernet Port	F-3
Fibre Channel Port	F-3
SCSI VHDCI Connectors	F-3
Configuration	F-4
Default Ethernet Settings	F-4
Configuration Examples	F-5
Resetting the Fibre Channel Card	F-8

Index

About this Guide

The following sections are covered:

- Text Conventions
- Symbols in Text
- Symbols on Equipment
- Rack Stability
- Getting Help
- Authorized Reseller

Text Conventions

This document uses the conventions in Table 1 to distinguish elements of text.

Table 1: Text Conventions

Element	Convention	Examples
<ul style="list-style-type: none">• Named Keys• Key Sequences	Bold	Home, Print Screen, Num Lock, Esc, PgUp A plus sign (+) between two keys means that you should press them simultaneously: Ctrl+A, Ctrl+Home, Alt+Ctrl+Del
<ul style="list-style-type: none">• Menu Items• Directory Names• Button Names• Dialog Box Names	Initial Caps (for UNIX, AIX, and Solaris directory names, the exact case of every character is displayed).	On the File menu, choose Save. Save the file in the C:\StorageSets\Default directory. (UNIX, AIX, Solaris): Save the file in the /home/newuser/practice directory. To back up files, click the Backup Now button. In the Save As dialog box, choose the drive then the folder.

Table 1: Text Conventions (Continued)

Element	Convention	Examples
<ul style="list-style-type: none"> • User Input and System Responses (Output and Error Messages) • COMMAND NAMES • Drive Names 	<p>Initial Caps and monospace font.</p> <p>COMMAND NAMES appear in upper case, unless they are case sensitive (UNIX, AIX, and Solaris command names are case sensitive and will not appear in uppercase).</p> <p>Entered <variables> are displayed in angle brackets (< >) and all lower case.</p>	<p>User Input and System Responses:</p> <ul style="list-style-type: none"> • To exit from the program, type <code>Exit</code>. • At the prompt, type this command: <code>SHOW THIS_CONTROLLER</code> (no variable) • To see your settings, give the command: <code>SHOW <storage sets> FULL</code> (with variable) • You will see the <code>Continue?</code> message. <p>Command Names</p> <ul style="list-style-type: none"> • Use <code>SET THIS_CONTROLLER</code> to change parameters. • To manage storage, enter <code>RUN <i>sysmgr.exe</i></code> • (UNIX, AIX, Solaris): To list files, give the <code>ls</code> command. • Drive Names: Navigate to your CD-ROM drive (usually <code>D:</code> or <code>E:</code>).
<i>filenames</i>	<p>Unless case sensitive, use <i>lowercase italics</i>. If filenames are case-sensitive (UNIX, AIX, Solaris) or are easier to understand with some upper case letters, the exact case of each character is displayed.</p>	<p>To configure storage, edit <i>storageset.ini</i>. Changes are stored in <i>NewSystemConfigurationFile.ini</i>. (UNIX, AIX, Solaris): Errors are logged to <i>MixedCaseFile.txt</i>.</p>
Menu Command Sequences	<p>Initial Caps, with a right angle bracket (>) between items. Menu items are displayed as shown on screen.</p>	<p>To compare documents, choose: Tools > Documents > Compare.</p>
URLs	<p>Sans serif font.</p>	<p>For update notices, visit: http://thenew.hp.com</p>

Symbols in Text

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



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



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

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

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

Symbols on Equipment



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

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



Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

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



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

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



Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

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



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

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

Rack Stability



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

- The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - In single rack installations, the stabilizing feet are attached to the rack.
 - Racks are coupled in multiple rack installations.
 - Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.
-

Getting Help

If you still have a question after reading this guide, contact service representatives or visit our website.

Technical Support

In North America, call the technical support at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week.

NOTE: For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP website:

<http://thenew.hp.com/country/us/eng/support.html>.

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

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

Product Website

The HP website has the latest information on this product as well as the latest drivers. Access the HP website at: http://www.compaq.com/storage/tape_index.html.

Authorized Reseller

For the name of your nearest authorized reseller:

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

Introduction

The HP StorageWorks MSL5000 series library is a tape library system that combines Digital Linear Tape (DLT), Super DLT (SDLT), and LTO (Linear Tape-Open) 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 SCSI interface-to-host system supports Low Voltage Differential (LVD). 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 each tape drive. 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
- Robotics
- Library controller board
- Accessory PCI slots
- Front panel indicators
- Multi-unit library configurations

Models

The MSL5000 series library family includes the following models:

- MSL5026SL
- MSL5026DLX
- MSL5026S2
- MSL5030L1
- MSL5052SL
- MSL5052S2
- MSL5060L1

Any MSL5000 series library can operate as a standalone unit or can be installed in a rack to form a larger integrated multi-unit library configuration. MSL5026/MSL5030 libraries contain up to two tape drives, two removable tape cartridge magazines, and robotics capable of random or sequential tape cartridge operation.

MSL5052/MSL5060 libraries contain up to four tape drives, four removable tape cartridge magazines, and robotics capable of random tape cartridge operation.

Accessories

Contact your authorized service provider or visit the HP website at www.compaq.com/storage/tape_index.html for the most current list of accessories that are available for an MSL5000 series library.

IMPORTANT: Mixing media from different types of tape drives should only be done in association with your application software media partitioning guidelines.

Tape Drives

MSL5000 series libraries support up to four tape drives (see Figure 1–1). 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.

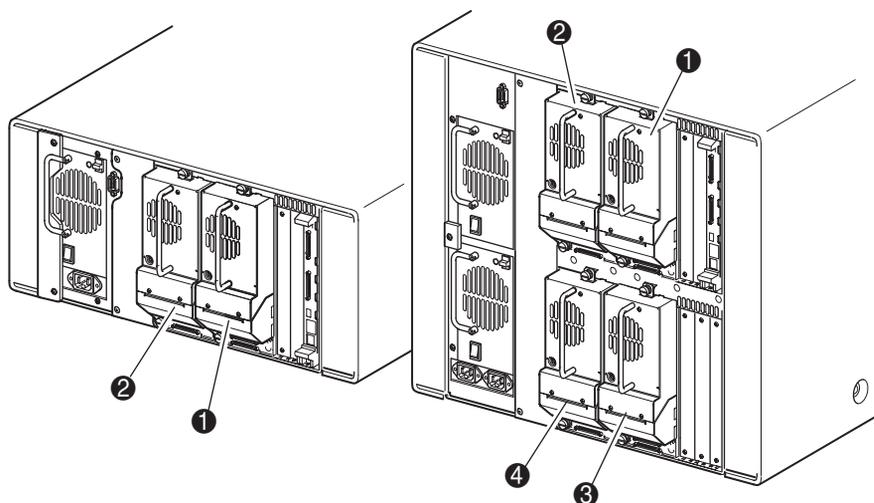


Figure 1–1: Library tape drive locations

- ❶ Tape Drive 0
- ❷ Tape Drive 1
- ❸ Tape Drive 2
- ❹ Tape Drive 3

Magazines

MSL5000 series libraries contain two or four removable tape cartridge magazines that are accessible through the front doors (see Figure 1–2).

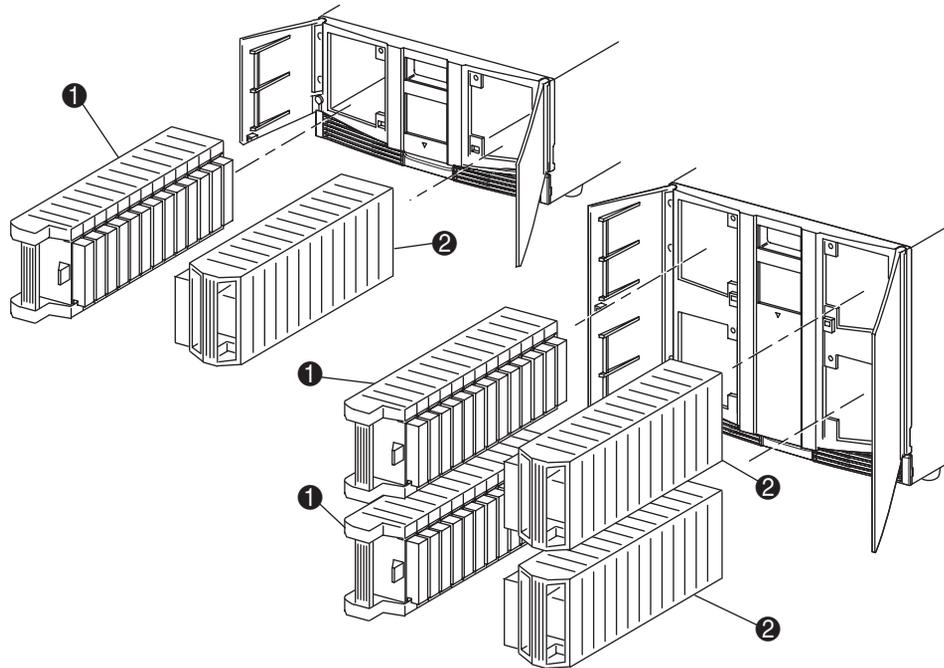


Figure 1–2: Library magazines

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

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

Power Supplies

MSL5000 series libraries support one or two power supplies that are accessible from the rear of the unit (see Figure 1–3). These auto-ranging power supplies are capable of using any nominal AC voltage between 100 VAC and 240 VAC power, at 50 Hz or 60 Hz, and are easily removed without requiring special tools.

Power to the library is supplied through AC connectors at the rear panel of each power supply receiver. Library power is normally controlled from the Graphical User Interface (GUI) touch screen; however, a manual power disconnect switch, located at the rear of each power supply is provided.



CAUTION: The power supply is not to be removed by the operator. Hazardous voltage is present in the cavity if the power cord is not removed.

Power supplies can be easily replaced in maintenance/service mode using a #1 Phillips screwdriver to remove the power supply bracket.

For the MSL5052/MSL5060 libraries, two power supplies are supported to provide redundancy for mission critical operations. Both power supplies share the load under normal operating conditions, however, if one of the power supplies fail the remaining power supply assumes the full load (see Figure 1-3 on the following page).

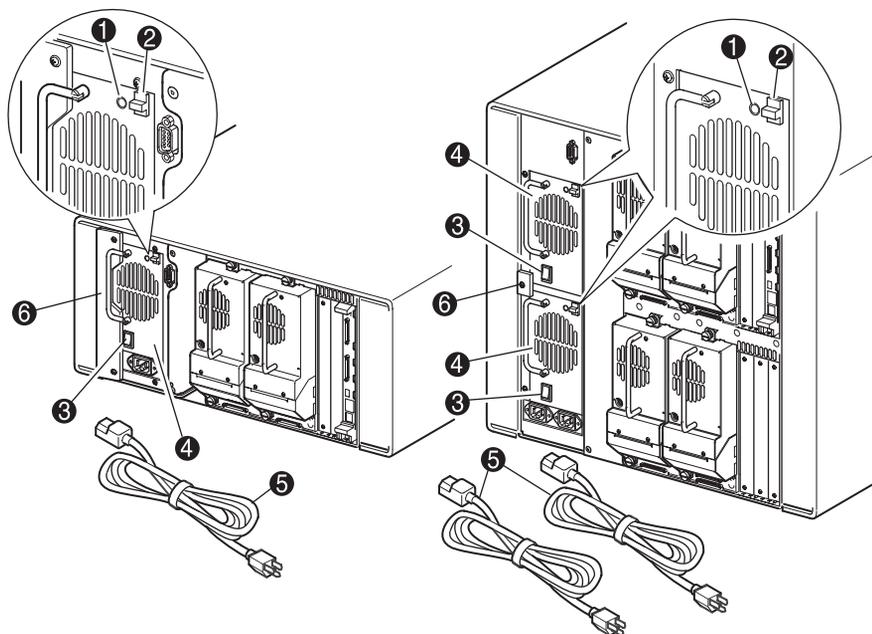


Figure 1-3: Library power supplies

NOTE: For the MSL5052/MSL5060, the left AC power receptacle is for the bottom power supply. The right AC power receptacle is for the top 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(s)
- ❻ Power supply bracket

Robotics

MSL5000 series library robotics consist of a cartridge shuttle, motor hardware, motor drives, and other support electronics (see Figure 1–4). The MSL5052MSL5060 library also contains a vertical axis mechanism that enables the robotics to travel between the upper and lower tape cartridge magazines. 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.

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

In MSL5052MSL5060 libraries, the robotic-PTM interface is at the lower vertical axis PTM elevator position only.

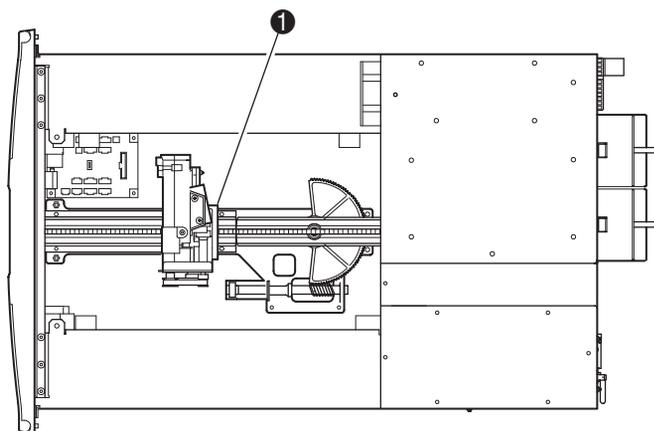


Figure 1–4: Library robotics (top cover removed, MSL5026 shown)

- ① Cartridge Shuttle Assembly with Integral Barcode Reader

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.

NOTE: The SCSI terminator must always be connected to the library controller board for proper operation when configured as standalone or master.

The library controller board is installed in a card cage at the rear of the library and can be serviced with using only a #1 Phillips screwdriver (see Figure 1–5).

IMPORTANT: For MSL5000 series libraries, the library controller board must be installed in the right slot of the card cage area (upper card cage area for the MSL5052/MSL5060). The remaining slots on the MSL5000 series libraries do not support the required connections for the library controller board to operate correctly.

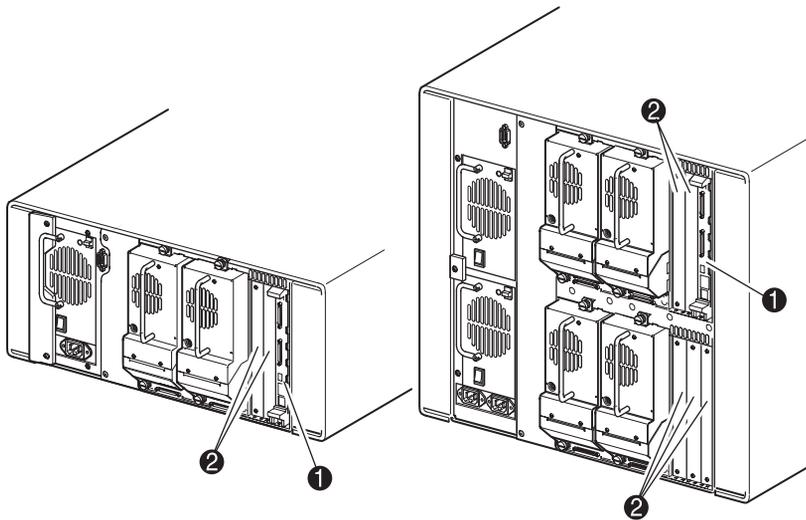


Figure 1–5: Library controller board

- ❶ Library Controller Board
- ❷ Factory-Defined Accessory PCI Slots (up to 5)

Factory-Defined Accessory PCI Slots

MSL5000 series libraries contain one or two rear-access card cages and one or two 32-bit, 33-MHz Compact PCI backplanes (see Figure 1–6). These backplanes contain the plug-in connectors for a library controller board and up to five optional HP-defined PCI add-in cards.



CAUTION: Use of non-HP qualified PCI option cards can damage your MSL5000 series library and will void product warranty. Follow all installation, configuration, and operating instructions shipped with the option card upgrade kit.

IMPORTANT: For MSL5000 series libraries only, the library controller board must be installed in the right slot of the card cage area (upper card cage area for the MSL5052/MSL5060).

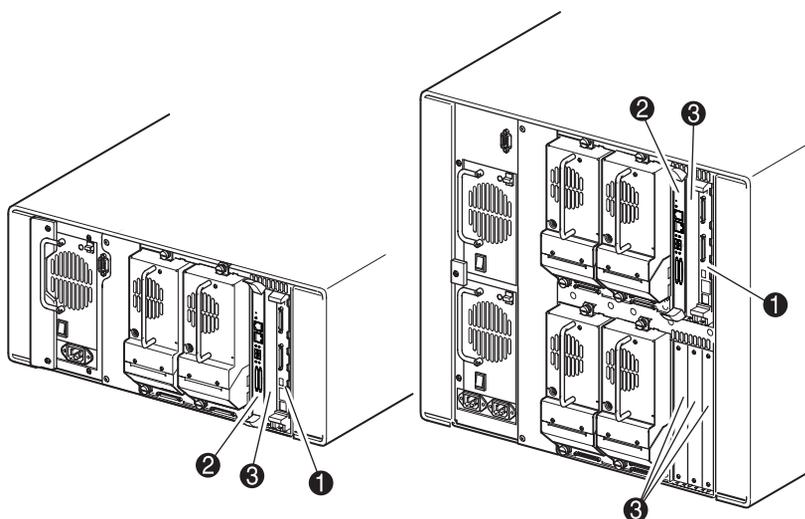


Figure 1–6: Library card cages

- ❶ Library Controller Board
- ❷ Optional Embedded Fibre Channel Board
- ❸ Factory-Defined Accessory PCI Slots (up to 5)

Embedded Fibre Channel Board

Some models of the MSL5000 series libraries ship with an optional embedded Fibre Channel board in the slot next to the library controller board.

This board enables connectivity between MSL5000 series libraries and Fibre Channel based storage area networks (SANs), allowing them to be attached to either a Fibre Channel Arbitrated Loop (FC-AL) or switched fabric. See Appendix F for additional information on configuring and using the optional Fibre Channel board.

Front Panel Indicators

The library front panel indicators consist of the following:

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

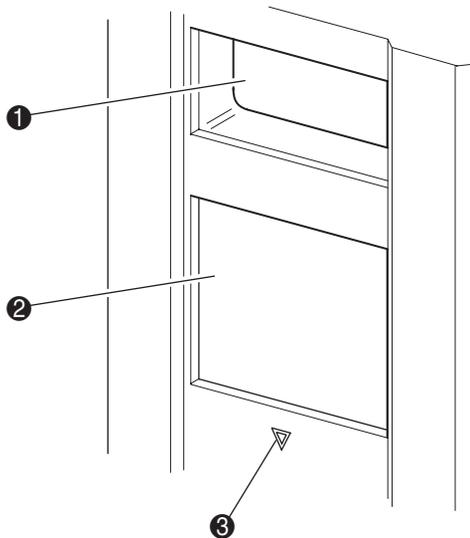


Figure 1–7: Library front panel

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

Multi-Unit Library Systems

MSL5000 series libraries can be stacked in a scalable combination with additional MSL5026/MSL5030 and MSL5052/MSL5060 libraries to form a multi-unit library configuration. Through use of a rear-mounted Pass-Through Mechanism (PTM), all libraries in a multi-unit library configuration can operate together as a single virtual library system. Stacked libraries are interconnected through their rear panel Ethernet connections to a supplied LAN hub that mounts to the rack enclosure. The LAN hub also provides a Wide Area Network (WAN) connector when libraries are combined in their maximum stacked height.

A maximum of four MSL5052/MSL5060 or eight MSL5026/MSL5030 libraries can be connected together in this manner. Any combination of eight libraries, not exceeding 40 Units (40U) in total stacked height, can also be used. A multi-unit library configuration appears to the host computer system and application software as a single library. For multi-unit applications, the top library becomes the master unit and all other libraries are slave units.



WARNING: The PTM continues to function each time a slave library is physically removed from the rack enclosure configuration during normal library operation. Refer to the *hp StorageWorks Pass-Through Mechanism Reference Guide* for detailed installation, configuration, and operation information.

The library 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 multi-unit library configuration under the master library control. Robotics access to the PTM is located at the rear of the library beneath the PTM cover (see Figure 1–8 on the following page).

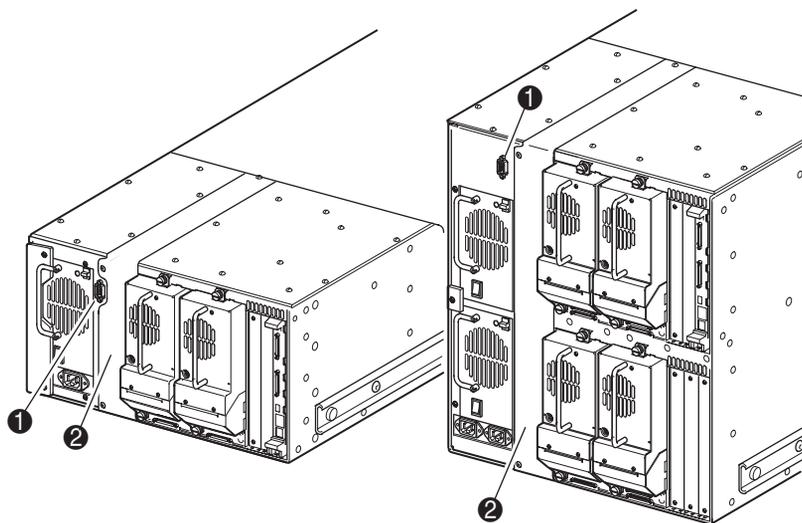


Figure 1–8: Library PTM mounting location

- ❶ PTM Interface Connector
- ❷ PTM Mounting Cover (removal required for PTM installation)

Installation

This chapter explains how to install an HP StorageWorks MSL5000 series library. Sections in this chapter include:

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

IMPORTANT: Be sure to keep and store all shipping materials from your MSL5000 series library.

Setting up the Tabletop Model

Library tabletop models require 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 18 inches (50 cm) of clearance at the front and rear for magazine and hot-plug tape drive access, without the need to reposition the library.

NOTE: To reduce tabletop clearance requirements, temporarily move the library forward or rearward to access the hot-plug drive shoes and magazines, respectively.

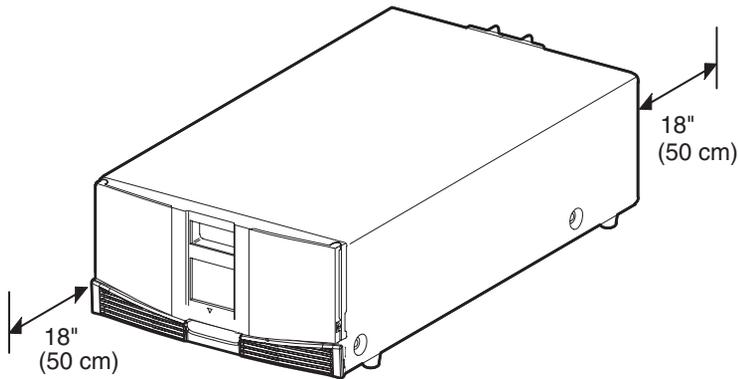


Figure 2–1: Tabletop model clearances (MSL5026 shown)

Converting a Tabletop Model to a Rackmount Model

To make a tabletop library ready for rack enclosure installation:

1. Remove the rubber feet.

Remove the cover.

Attach the inner rails to the library using the supplied allen wrench and screws. Tighten the screws until snug.

Proceed to “Setting up the Rackmount Model.”

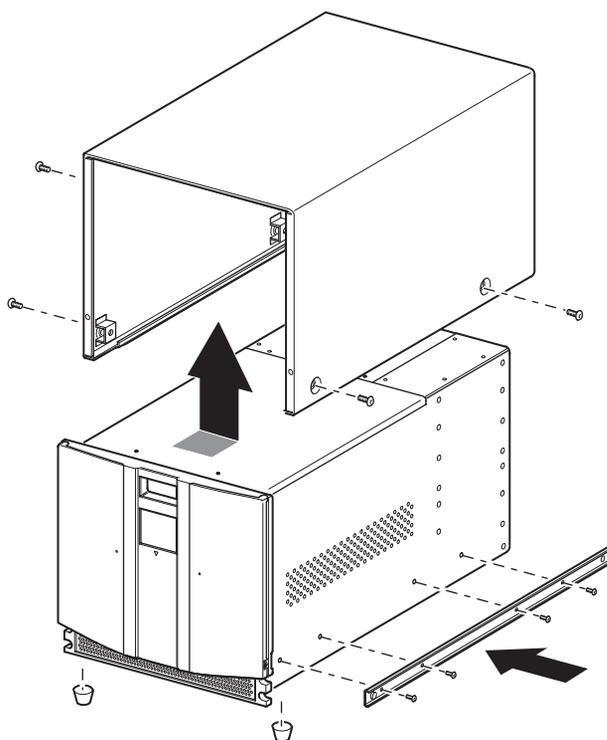


Figure 2–2: Converting a tabletop model

Setting up the Rackmount Model

Setting up the rackmount model requires a template, rack enclosure slide rails, and a mechanical lift to physically install the library in a rack enclosure.

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 rack enclosure (see Figure 2–2). The black dots along the sides of the template indicate the top of a U.

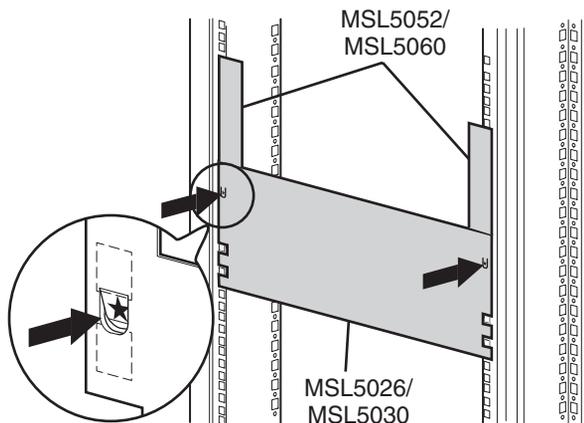


Figure 2–3: Library template (9000 rack enclosure shown)

NOTE: For HP rack system/e and AlphaServer H9A rack enclosures, refer to the appropriate rack rail adapter kit.

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/clip nuts in the rack enclosure rear vertical rails.

NOTE: Refer to the *Compaq Rack Products Reference Guide* for detailed cage nut installation instructions on 7000/9000/10000 racks.

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 **1** on both sides of the rack enclosure until they lock.
- b. Slide the inner guide rail **2** as far as possible to the front of the rail assembly.

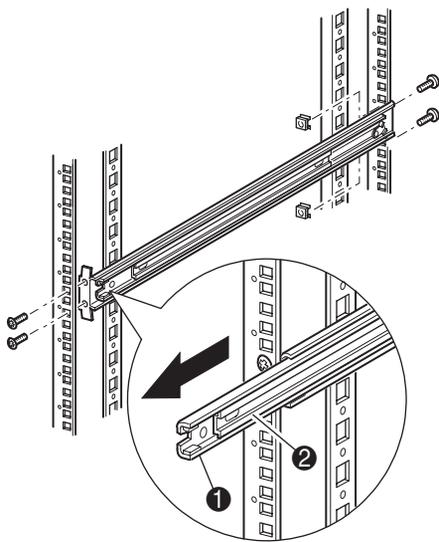


Figure 2–4: Installing the rails

3. Install the two slide-on clip nuts ❶, (previously marked using the template, two holes above the top bracket screw holes) on each of the front rack enclosure vertical rails (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 rack enclosure's weight, but not more than 57 pounds (26 kg), applied in any direction other than upwards, does not cause the rack enclosure 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).

5. Carefully insert the library's inner slide rails ❷ into the extended intermediate slide rails ❸ (see Figure 2-4).
6. Slide the library into the rack enclosure until the rail locks are engaged.



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

7. Push in on the rail locks to release the library and slide the library completely into the rack enclosure.
8. Fully tighten the rear rail screws.

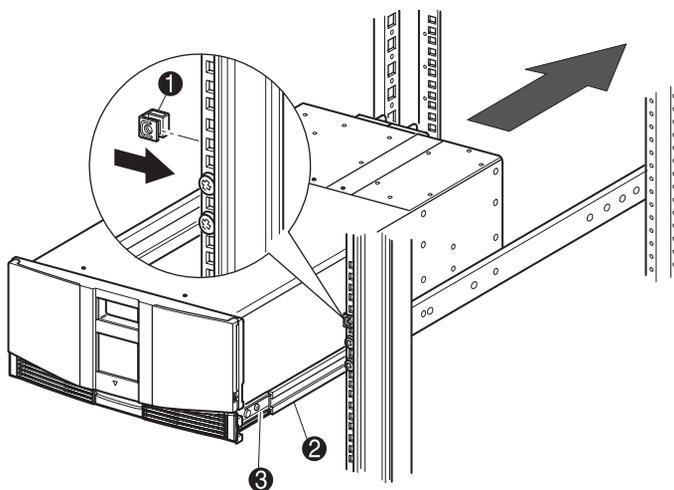


Figure 2–5: Installing the library (Model MSL5026 shown)

9. Remove the tape to open the doors for installation.
10. Remove and discard the pull-tabs used to block the latch mechanism.

IMPORTANT: Do not close the doors. You must have access to the two retaining screws to complete the installation.

If necessary, see chapter 4, “Operation,” for information on how to manually open the library doors.

11. With the doors open, secure the front panel to the rack enclosure using the two retaining screws (see Figure 2–5). Close the doors.

You can now cable the library.

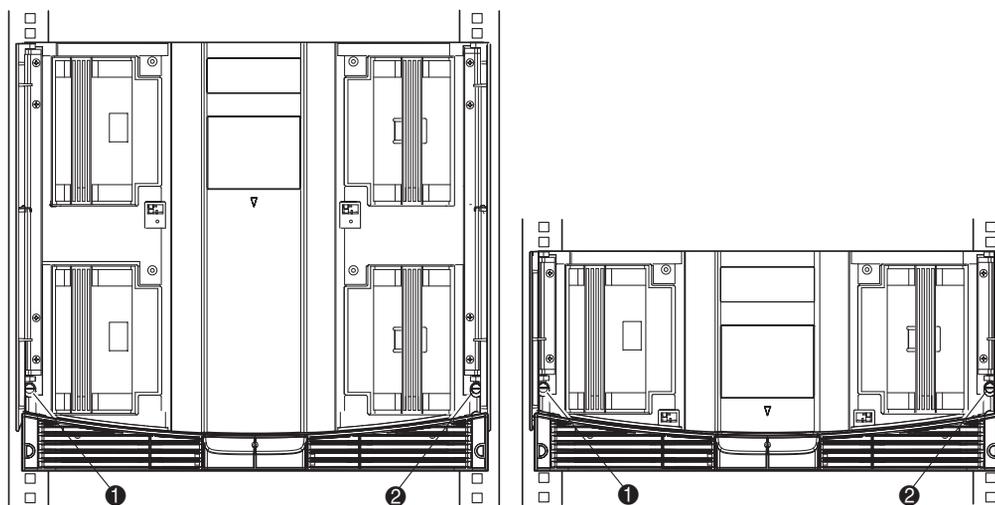


Figure 2-6: Securing the library

- 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 each supplied power cord **1** to each power supply receptacle.
NOTE: The left AC power receptacle is for the bottom power supply. The right AC receptacle is for the top power supply. (MSL5052/MSL5060 only).
2. Toggle each power switch **2** on.
3. Press anywhere on the Graphical User Interface (GUI) touch screen **3** to activate the display and turn the library on.

IMPORTANT: The SCSI terminator must always be connected to the library controller board for proper operation if configured as a master or standalone.

NOTE: Using a piece of tape to lift one corner, carefully remove the appliqué from the GUI touch screen.

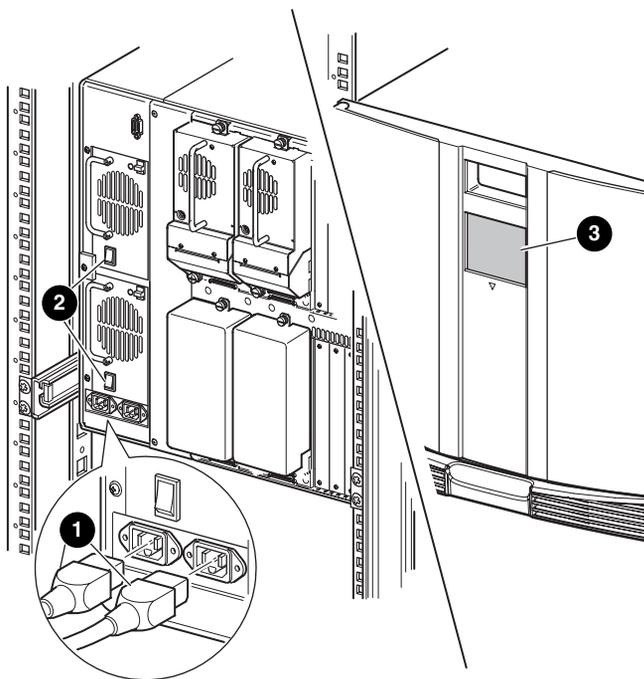


Figure 2–7: Applying power to the library (MSL5052 rackmount shown)

SCSI Cable Configurations

This section describes supported SCSI cable configurations for the library.

NOTE: MSL5000 series libraries support 1 to 4 host and 1 to 4 tape drive SCSI configurations. Contact your authorized reseller for a list of supported configurations.

The following SCSI configurations are detailed in this section:

- Two tape drives dual host system (MSL5026/MSL5030).
- Four tape drives dual host system (MSL5052/MSL5060).

NOTE: Host cables are not supplied with any MSL5000 series library.

See Appendix E for additional configuration examples.

Supported SCSI Cables

NOTE: For optimum performance, a maximum of two tape drives per SCSI bus is recommended.

Each of the tape drives in the library and the library controller constitute an independent SCSI target. 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 controller and the appropriate driver software.

Two Tape Drives Dual Host System

Figure 2–7 shows a typical SCSI cable configuration for a library with two tape drives installed using a dual host system.

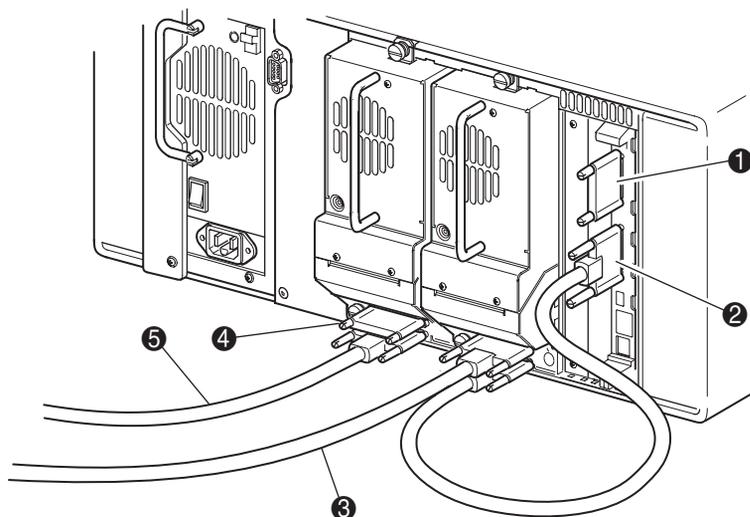


Figure 2–8: MSL5026/MSL5030 SCSI cable configuration (two tape drives dual host system)

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

Four Tape Drives Dual Host System

Figure 2–8 shows a typical SCSI cable configuration for a library with four tape drives installed using a dual host system.

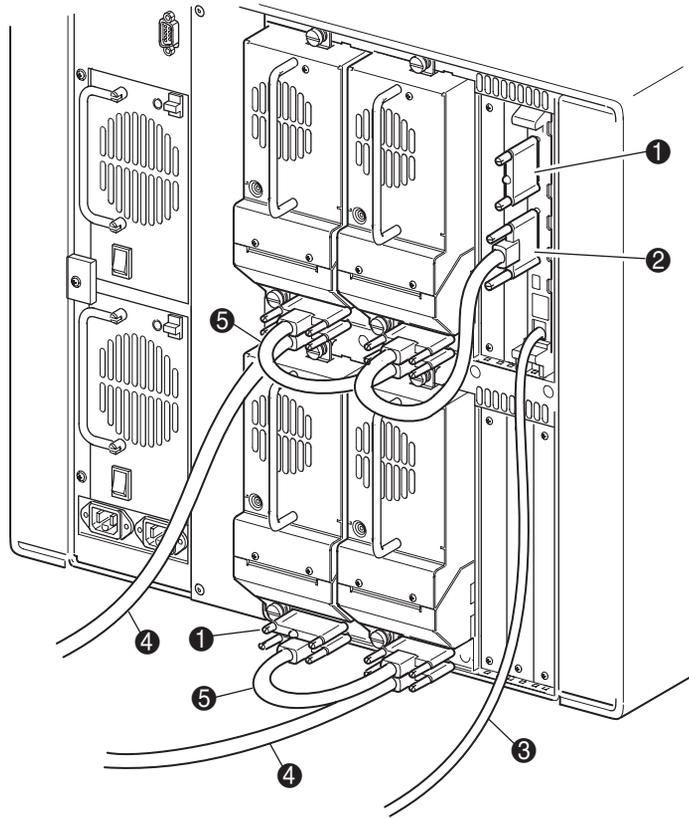


Figure 2–9: MSL5052/MSL5060 SCSI cable configuration (four tape drives dual host system)

IMPORTANT: The short 9.8-inch (0.25M) jumper cables ⑤ are designed for this use only. Stretching either one to reach the library controller board can damage the cable. Use the longer 19.8-inch (0.5M) cable ② to connect the tape drive and the library controller board.

- ① SCSI Terminator
- ② 0.5M jumper cables
- ③ RS-232 diagnostic cable (for service only)
- ④ To Host System
- ⑤ 0.25M or 0.5M jumper cable

See Appendix E for additional configuration examples.

Library Configuration

This chapter explains how to configure an HP StorageWorks MSL5000 series library for normal operation. Sections in this chapter include:

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

Default Configuration Settings

For most applications, you do not have to change the 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 HP 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

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.”

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 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.

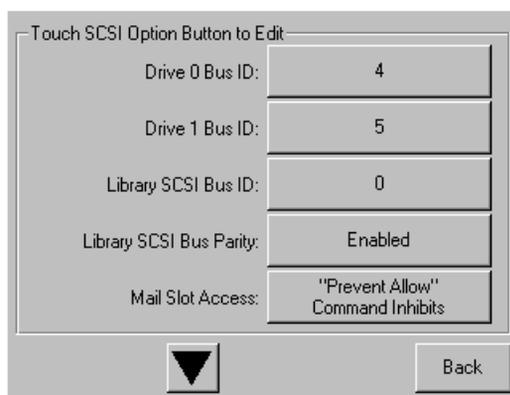


Figure 3-1: SCSI option selection screen (MSL5026 shown)

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.

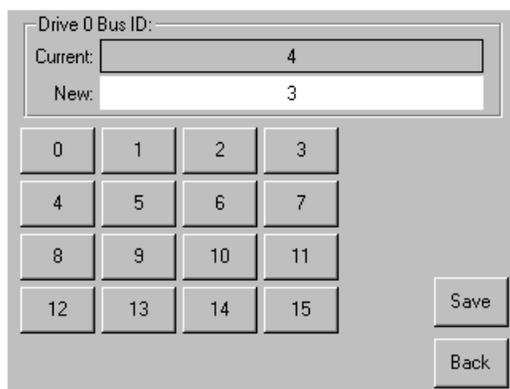


Figure 3-2: Drive 0 bus ID screen

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

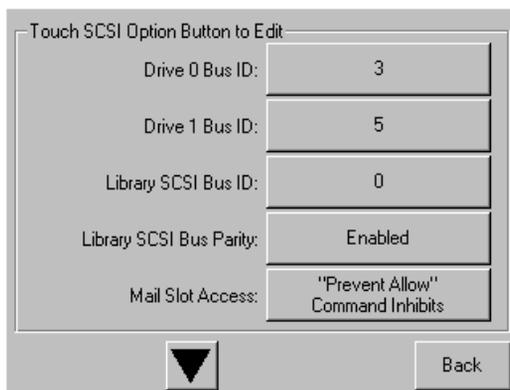


Figure 3–4: Drive 0 bus ID data field screen (MSL5026 shown)

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

Setting Up a Reserved Slot

Use this option to designate one or more tape cartridge data storage slots as a cleaning slot.

IMPORTANT: Reserved slots may be incompatible with some application software.

Reserved Slot Numbering

Standard tape cartridge slots are numbered from the front of the magazine to the rear (see Figure 3–5 and Figure 3–7). If you reserve one slot, it becomes Reserved Slot #1 in the last slot of the last magazine. Additional reserved slots continue in this rear-to-front pattern.

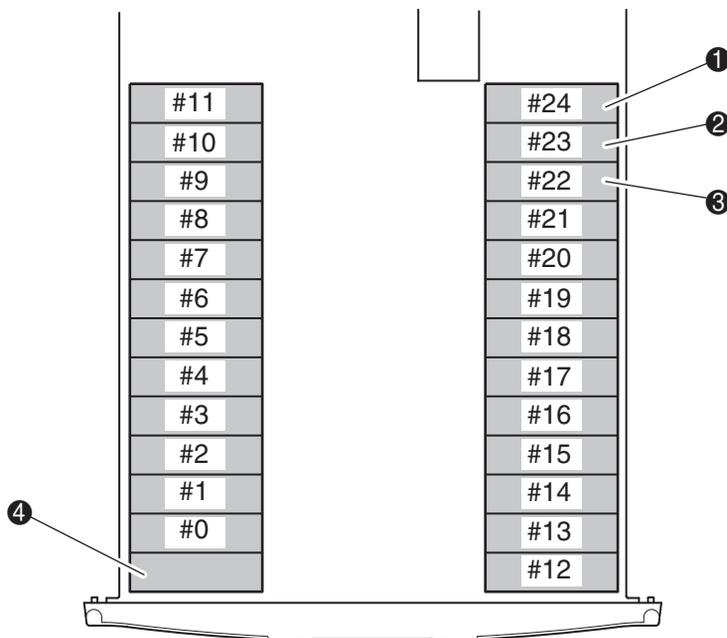


Figure 3–5: Reserved slot locations, DLT/SDLT (MSL5026)

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

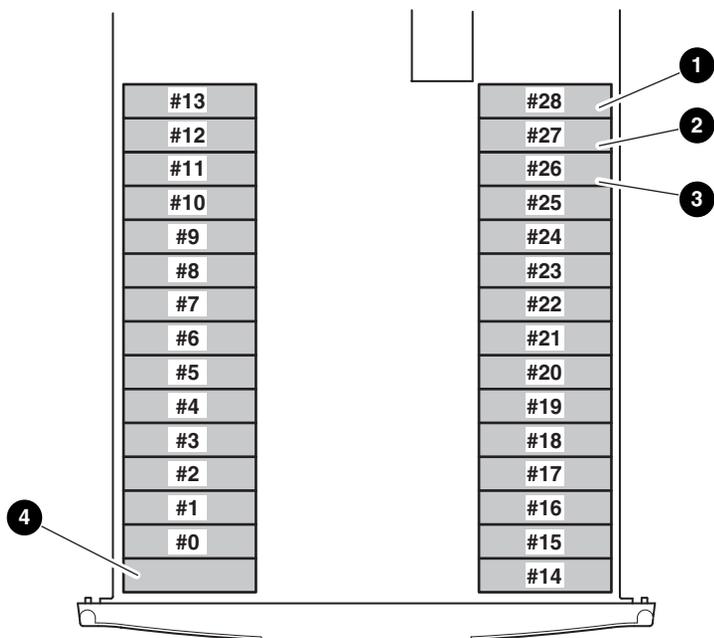


Figure 3–6: Reserved slot locations, LTO (MSL5030)

- ❶ Reserved Slot #1
- ❷ Reserved Slot #2
- ❸ Reserved Slot #3

Mail Slot (Left Magazine Only)

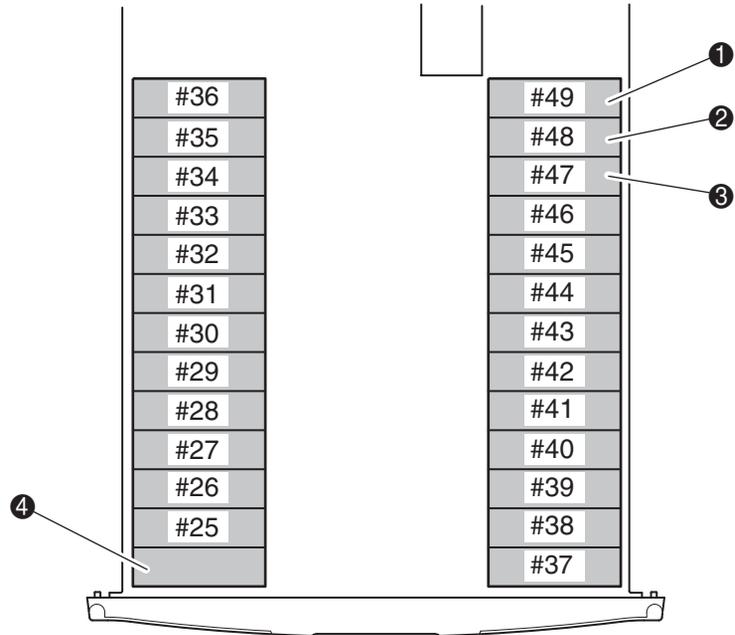


Figure 3-7: Reserved slot locations, DLT/SDLT (MSL5052)

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

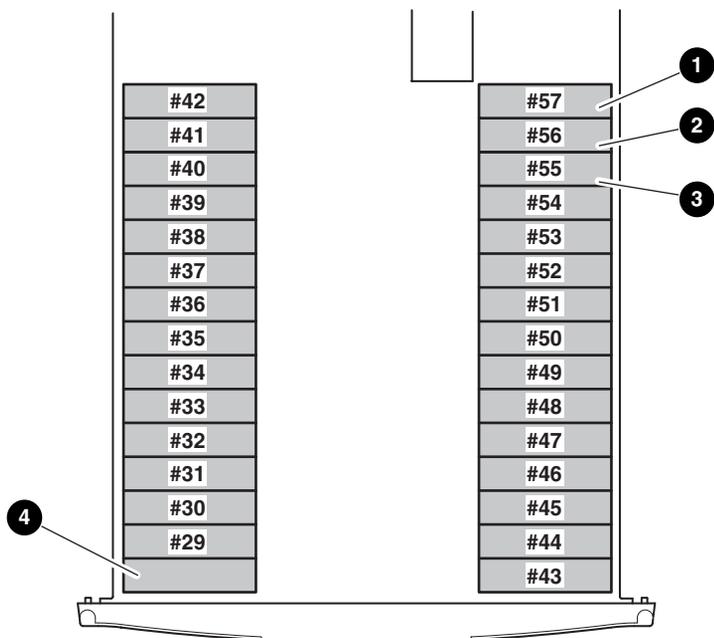


Figure 3–8: Reserved slot locations, LTO (MSL5060)

- ❶ Reserved Slot #1
- ❷ Reserved Slot #2
- ❸ Reserved Slot #3

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 3–9).

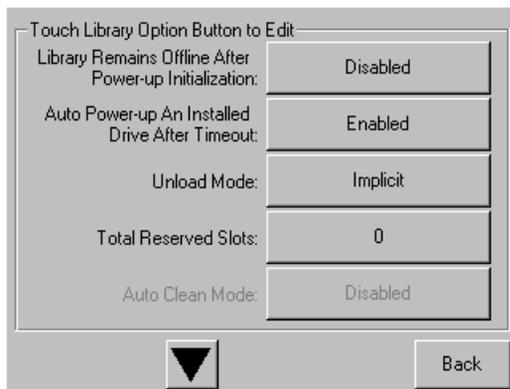


Figure 3–9: Total reserved slots screen

3. Press the associated box next to the Total Reserved Slots option. A numeric keypad appears on the display (see Figure 3–10).

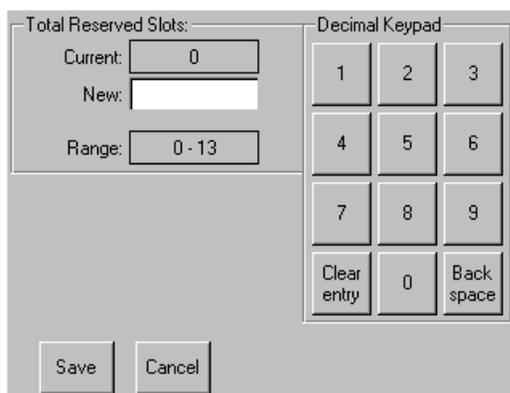


Figure 3–10: Reserved slots numeric keypad screen

4. Enter the number of slots to reserve and then press Save to confirm your change. A confirmation screen appears on the display (see Figure 3–11). Press **OK** to save.

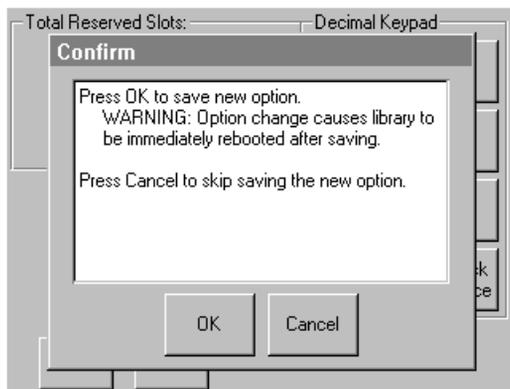


Figure 3–11: Total reserved slots confirmation screen

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 a DHCP server when the library is powered up. The library also supports user-specified fixed addresses through the front panel. To set a fixed address:

1. From the Menu screen, touch Network from the Edit Options area. The IP Address Determination screen appears (see Figure 3–12).

Touch Network Option Button to Edit	
IP Address Determination:	User Specified IP Address
IP Address:	10.1.10.98
IP Mask:	255.255.0.0
IP Gateway:	10.1.8.99
DNS Server:	10.1.8.14

Save Cancel

Figure 3–12: IP address determination screen

2. Touch the IP Address Determination option (see Figure 3–12) and then the User Specified IP Address option (see Figure 3–13).

IP Address Determination:

Current: User Specified IP Address

New: User Specified IP Address

Obtain IP Addresses From a DHCP Server

User Specified IP Address

OK

Back

Figure 3–13: User-specified IP address screen

3. Touch OK to confirm your selection.

4. Touch each IP address option and then use the keypad to enter each IP address (see Figure 3–14).
5. Save and confirm your selections.

Touch Network Option Button to Edit	
IP Address Determination:	User Specified IP Address
IP Address:	10.1.10.98
IP Mask:	255.255.0.0
IP Gateway:	10.1.8.99
DNS Server:	10.1.8.14
Save Cancel	

Figure 3–14: Fixed IP address screen

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

This chapter describes how to operate an HP StorageWorks MSL5000 series 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).

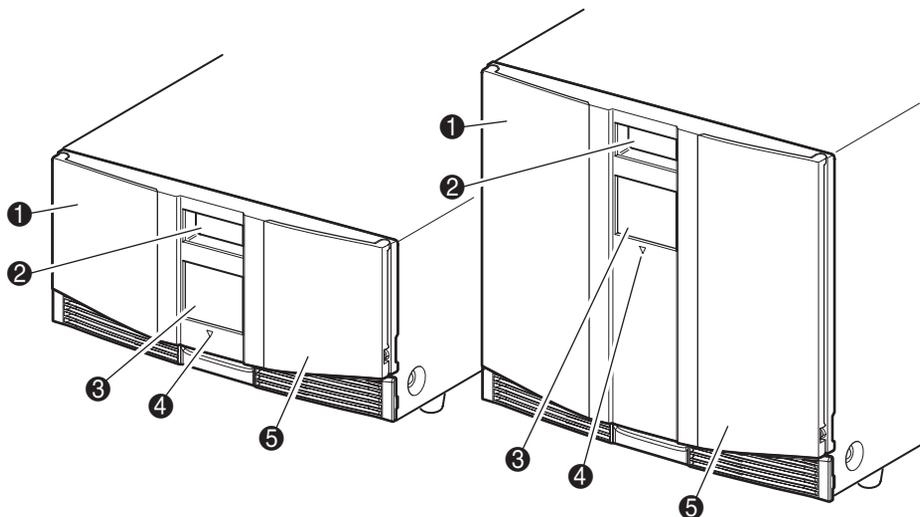


Figure 4–1: Library front panel

- 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 (see Figure 4–2).



CAUTION: The magazine doors must only be opened manually in an emergency. Failure to follow normal procedures can cause data loss and equipment damage.

NOTE: The library may not perform a complete inventory each time a magazine is manually removed and then replaced using the emergency release.

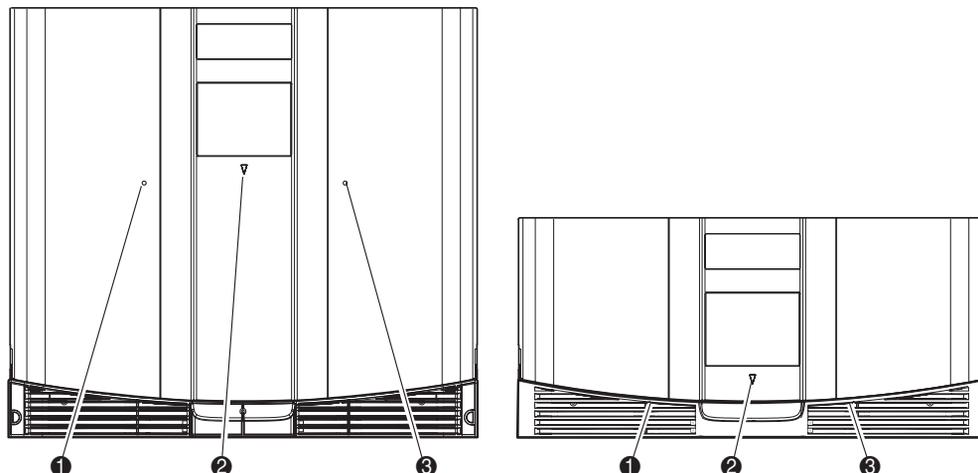


Figure 4–2: Magazine door mechanical releases (emergency access)

- 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).

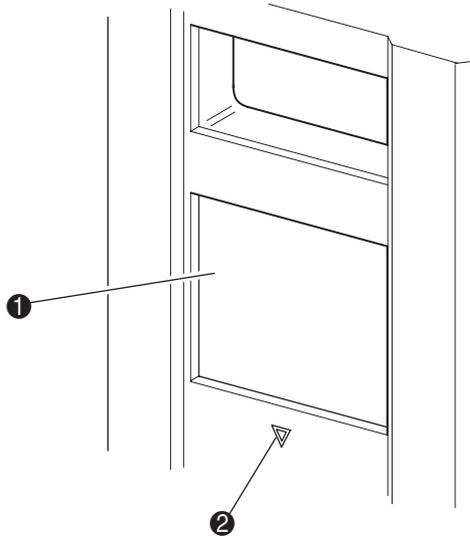


Figure 4–3: Library indicators

- 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 (off-line).
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 three levels of security (see Figure 4-4):

- User Level 1—allows access to the mail slot(s).
- User Level 2—allows magazine access, mail slot access, SCSI options, diagnostics, 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 default service password of 5566.

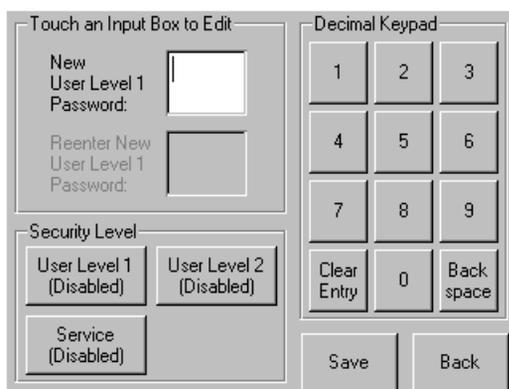


Figure 4-4: Password levels

Each password is represented by four decimal digits that are stored in NVRAM in a range of 0001 to 9999.

NOTE: 0000 is used to disable password verification for each level.

Enabling a password at a lower level re-enables disabled higher levels to that value. As a result, prior to accessing any higher level operation, you are prompted first to enter the new higher level password.

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

NOTE: To restore passwords if forgotten, use Set User Defaults using the MSL5000 Utility and diagnostic cable. Note that any configuration that was previously set will be lost.

Host System

Media can also be locked by software running on the host. 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

Unless you are using the mail slot(s), a tape magazine must be removed from the library 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.

IMPORTANT: Do not add more tape cartridges to the library than its rated slot capacity.

Removing Magazines

Library magazine removal is a manual operation. Access the magazines using the Magazine Access option from the library Status screen. For the MSL5026/SML5030, this option lets you open the left or right magazine doors separately or both magazine doors at the same time. For the MSL5052/MSL5060, this option lets you open the upper-left, lower-left, or right magazines separately or both magazine doors at the same time. After opening the appropriate magazine door, pull the magazine out from the library chassis (see Figure 4–5).

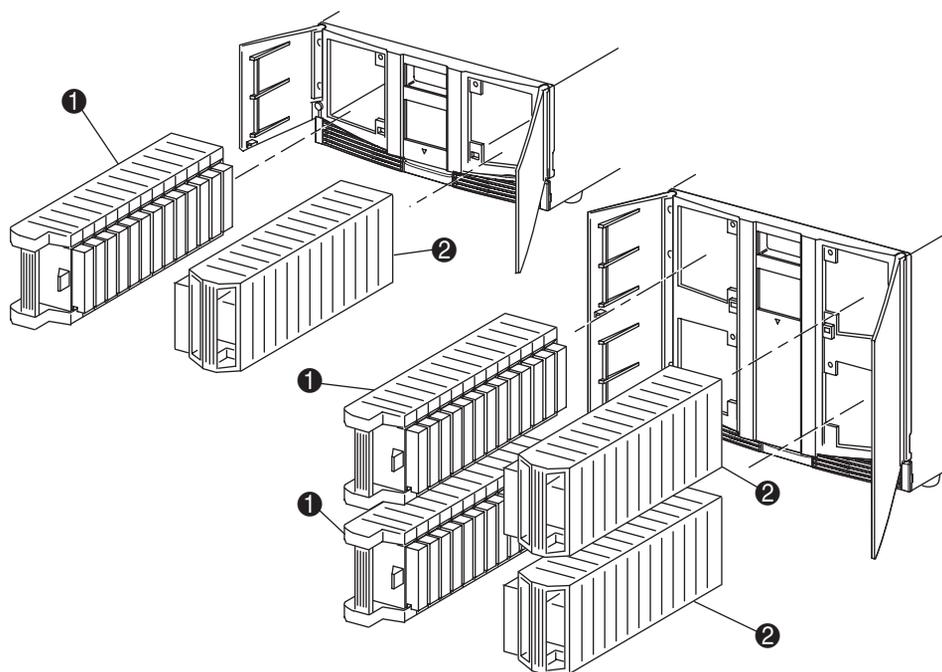


Figure 4–5: Removing tape cartridge magazines

- ❶ Left Magazine(s)
- ❷ Right Magazine(s)

Inserting Cartridges into a Magazine

A full left magazine is shown in Figure 4–6. For the MSL5026/SML5030, the lowest numbered tape cartridge slot ❷ is the one closest to the front of the magazine. For the MSL5052/MSL5060, the lowest numbered tape cartridge slot ❷ is the one closest to the front of the upper-left magazine.

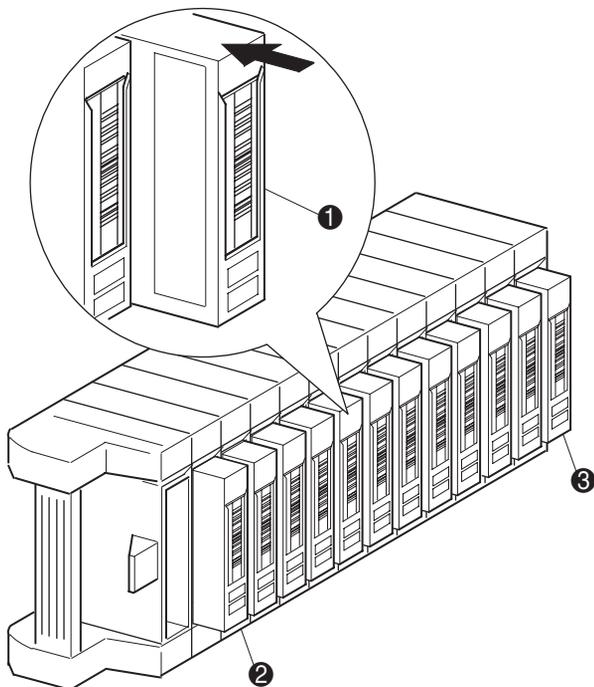


Figure 4–6: Left tape magazine with tape cartridges installed (SDLT shown)

- ❶ Tape Cartridge Orientation for Left Magazine
- ❷ Lowest Numbered Tape Cartridge Slot
- ❸ Highest Numbered Tape Cartridge Slot

Insert tape cartridges so that the bar code labels are facing outward (see Figure 4–7).

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

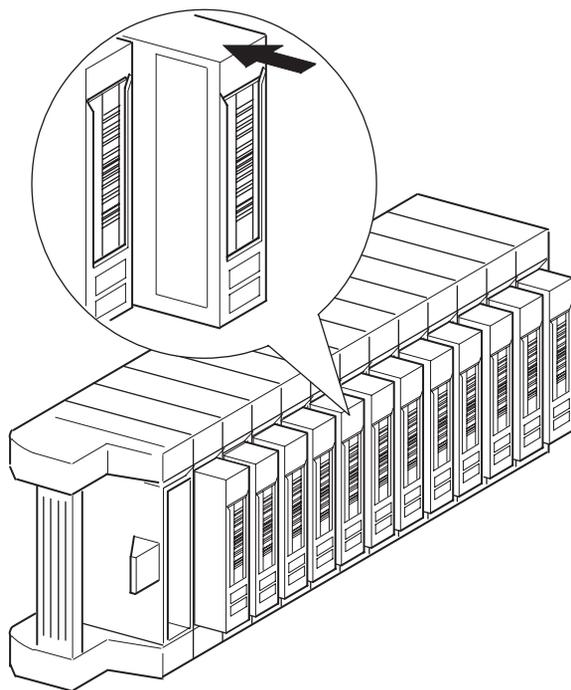


Figure 4–7: Inserting a tape cartridge (left magazine, SDLT shown)

Using Mail Slots (Left Magazines Only)

Mail slots are 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. Access the mail slots using the Mail Slot Access option from the library Status screen. This option lets you open a left magazine door for mail slot access. After opening a left magazine door, pivot the mail slot forward to insert a tape cartridge (see Figure 4–8).

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

NOTE: Disabling a mail slot allows it to be used for an additional data slot, but this may be incompatible with some applications.

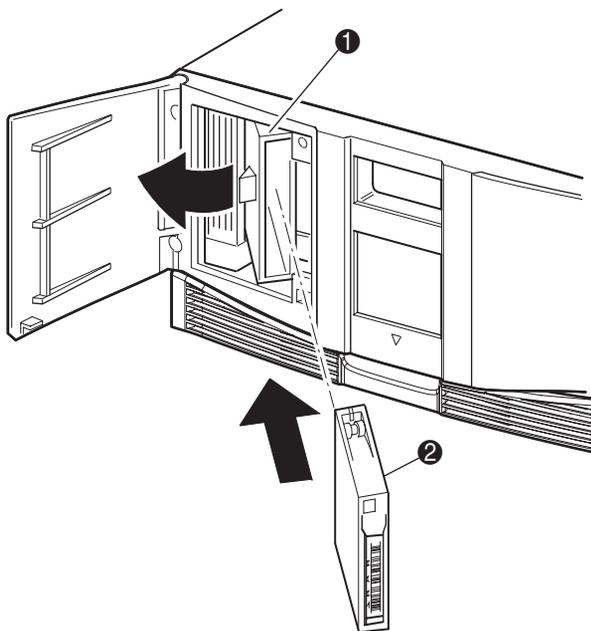


Figure 4–8: Left magazine mail slot (MSL5026 shown)

- ❶ Mail Slot Holder
- ❷ Tape Cartridge

Barcode Labels

Only HP or Compaq barcode labels are supported with the library. To order additional labels, contact your authorized reseller.

Figure 4–9 shows you how to attach a barcode label onto an SDLT or DLT tape cartridge.

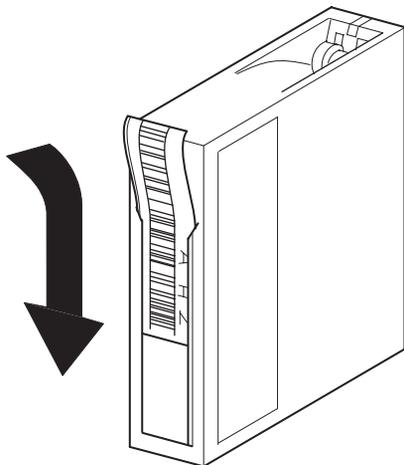


Figure 4–9: Attaching a barcode label to an SDLT tape cartridge

Figure 4-10 shows you how to attach a barcode label onto an LTO Ultrium 1 cartridge.

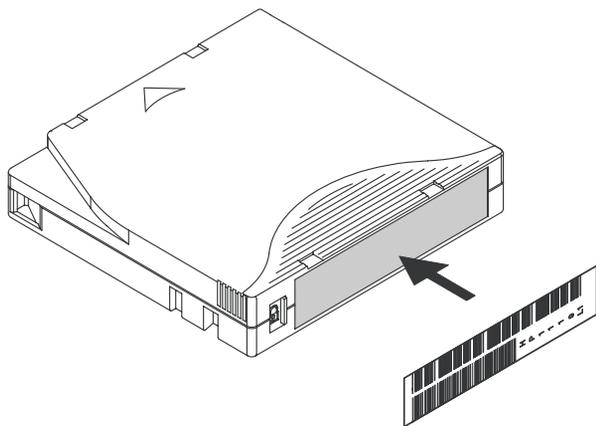


Figure 4–10: Attaching a barcode label to an LTO Ultrium 1 tape cartridge

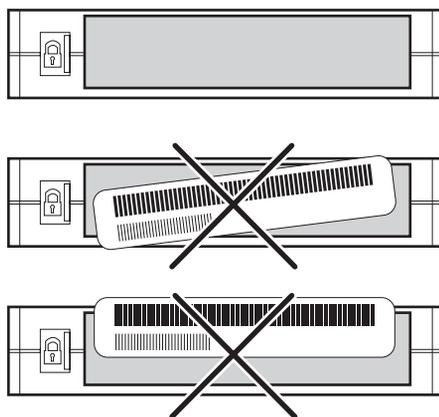


Figure 4–11: Proper LTO Ultrium 1 barcode label placement

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 while library inventory and scalability configuration occurs:



Figure 4–12: Initialization screen

Library Status Screen

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

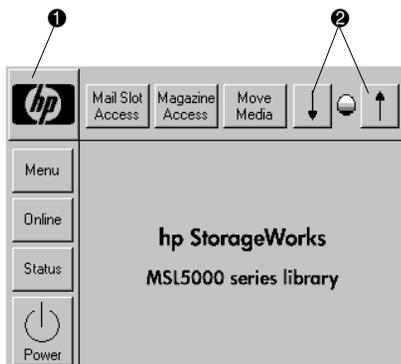


Figure 4–13: Library status screen (MSL5026 shown)

- ❶ Technical Support Information Option
- ❷ LCD Contrast Controls (volatile settings)

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 Information
- Online/Offline
- Menu Access

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 HP-specific technical support assistance information (see Figure 4–14). 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 HP directly. For further assistance, you can also access the HP website at <http://thenew.hp.com/country/us/eng/support.html>.



Figure 4–14: Technical support information screen

Mail Slot Access Option (Left Magazines Only)

Select this option to display the Mail Slot Access screen (Figure 4–15). This option lets you gain access to a mail slot without powering down the library. Note that a mail slot is reserved for the first tape cartridge slot in a left magazine and can be password protected or fully disabled. If disabled, this menu button is absent. On MSL5052/MSL5060 libraries, solenoids restrict access to the selected mail slots.

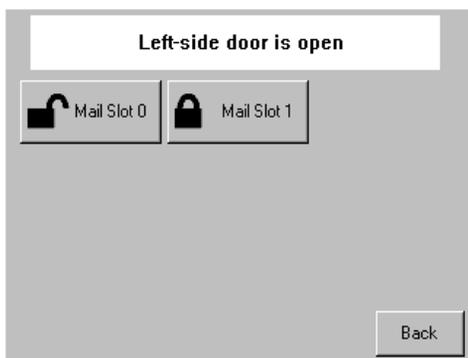


Figure 4–15: Mail slot access screen (MSL5052 shown)

Magazine Access Option

Select this option to display the Magazine Access screen (Figure 4–16). For the MSL5026/MSL5030, this option lets you gain access to the left or right magazine doors separately or both magazine doors for tape cartridge placement or removal. For the MSL5052/MSL5060, this option lets you gain access to the upper-left, lower-left, or right magazines separately or both magazine doors for tape cartridge placement or removal. Note that this option can also be password protected.



Figure 4–16: Magazine access screen (MSL5026 shown)

Move Media

Select this option to display the Move Media screen (see Figure 4–17). The Move Media option lets you remove a cartridge from a tape drive, a data slot in any magazine, or a mail slot in a 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 6 for detailed removal information.



CAUTION: DLT, SDLT, and LTO Ultrium 1 cleaning cartridges must only be used in their respective drive types or drive damage can result.



CAUTION: Remove media from all drives and slots prior to library transport.

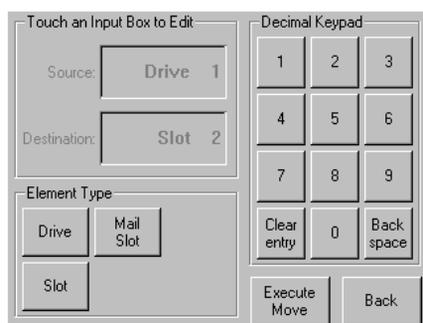


Figure 4–17: Move media screen

LCD Contrast Controls

Select these options to increase or decrease the contrast of the LCD display (see Figure 4-13). 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. These settings are volatile and are restored to default values upon reboot or power cycling.

Power

Select this option to initiate a library power-down operation. After a successful power down, a confirmation message appears (see Figure 4–18).

IMPORTANT: The library moves the shuttle assembly to the parked position before powering down. This is necessary for any library transport.



Figure 4–18: Power-down confirmation message screen

Status

Select this option to display an information Status screen (Figure 4–19). From this screen, touch a magazine icon to display detailed information about the cartridges in that magazine. Touch a drive icon to view drive ID information, cleaning status, cartridge information, and drive status.

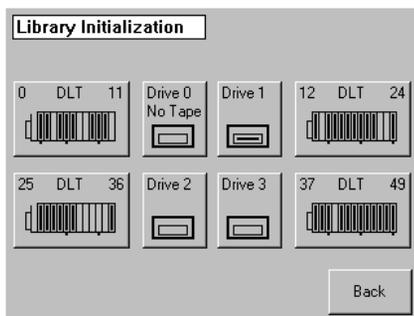


Figure 4–19: Status screen (MSL5052 shown)

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 4–20). The Menu option displays three distinct areas:

- View System Data
- Utilities
- Edit Options

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

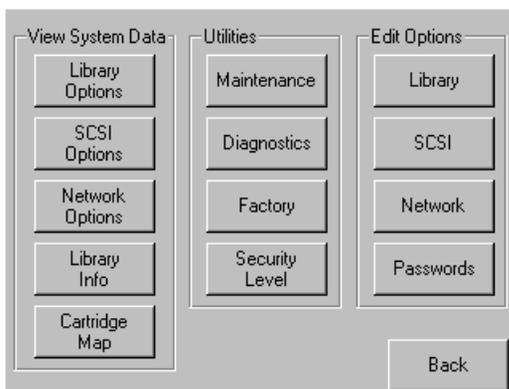


Figure 4–20: Menu screen

Menu Selections

This section describes the three Menu areas:

- View System Data
- Edit Options
- Utilities

View System Data Area

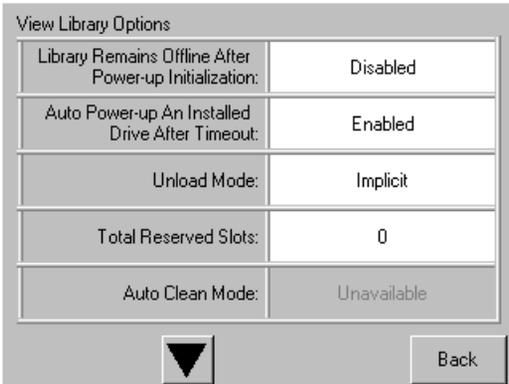
The View System Data area lets you select the following screens:

- 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 4–21).

NOTE: You can move to the next subsequent 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.



The screenshot shows a window titled "View Library Options" containing a table of settings. At the bottom of the window, there is a downward-pointing triangle button and a "Back" button.

Setting	Value
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

Figure 4–21: 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 GUI touch screen. The default is Disabled.
Auto Power-Up An Installed Drive After Timeout	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 a 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 tape drive 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 based or one based. Note that this only affects the GUI touch screen, not the actual SCSI element addresses. The default is Zero Based.
Library Mode	Lets you set the robotics operating mode to Random, Sequential Drv0, Sequential Drv1, and Sequential Split for the MSL5026/MSL5030. The MSL5052/MSL5060 is not supported in sequential modes. The default is Random (Sequential Mode Unavailable).

Table 4–2: View Library Options (Continued)

Option	Description
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.
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(s) in a library. For the MSL5026/MSL5030, the default is Mail Slot Enabled. For the MSL5052/MSL5060, the default is Both Mail Slots Enabled.
Barcode Label Size	Lets you limit the length of the barcode 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.
Barcode Reader	Lets you enable or disable the barcode reader retries option. The default is Retries Enabled.
Module Configuration	Lets you configure a library for standalone, master, or slave operation. The default is Standalone.

SCSI Options

Selecting this option lets you view the settings defined from the SCSI option in the Edit Options area (see Figure 4–22).

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.

View SCSI Options	
Drive 0 Bus ID:	4
Drive 1 Bus ID:	5
Library SCSI Bus ID:	0
Library SCSI Bus Parity:	Enabled
Mail Slot Access:	"Prevent Allow" Command Inhibits

▼ Back

Figure 4–22: 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 drive 0. 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 master unit in the scaled Library system.
Drive 1 Bus ID	Lets you set the SCSI addresses of drive 1. The designators Drive 1 (inner tape drive) through Drive <i>n</i> refer to the second through <i>n</i> th drives, counting from right to left starting with the master unit in the scaled Library system.
Drive 2 Bus ID (MSL5052/MSL5060 only)	Lets you set the SCSI addresses of drive 2. The designators Drive 2 (lower, outer tape drive) through Drive <i>n</i> refer to the third through <i>n</i> th drives, counting from right to left starting with the master unit in the scaled Library system.

Table 4–3: View SCSI Options (Continued)

Option	Description
Drive 3 Bus ID (MSL5052/MSL5060 only)	Lets you set the SCSI addresses of drive 3. The designators Drive 3 (lower, inner tape drive) through Drive <i>n</i> refer to the fourth through <i>n</i> th drives, counting from right to left starting with the master unit in the scaled 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.
Mail Slot Access	“Prevent Allow” Command Inhibits or “Prevent Allow” Command Ignored (used for some backup applications). “Prevent Allow” Command Inhibits is the default.
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.

Table 4–3: View SCSI Options (Continued)

Option	Description
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.
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	<p>Specifies conditions for logging and reporting the following Tape Alert data options. The default is Logging Disabled.</p> <p>Logging Disabled: Inhibits the logging feature.</p> <p>No Exceptions: The library must not report information exceptions.</p> <p>Generate Unit Attention: Reports information exceptions with a Unit Attention sense key and an ASC/ASCQ of 5D/00.</p> <p>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.</p> <p>Unconditionally Generate Recovered Error: Unconditionally reports information exceptions with a Recovered Error sense key and an ASC/ASCQ of 5D/00.</p> <p>Generate No Sense: Reports information exceptions with a No Sense sense key and an ASC/ASCQ of 5D/00.</p>

Table 4–3: View SCSI Options (Continued)

Option	Description
	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 Transfer Speed	Lets you set the robot or library SCSI data transfer rate to Synchronous, 10 MB/s, 5 MB/s, 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 4–23). 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 your network.

View Network Options	
IP Address Determination:	User Specified IP Address
IP Address:	0.0.0.0
IP Mask:	0.0.0.0
IP Gateway:	0.0.0.0
DNS Server:	0.0.0.0

Figure 4–23: Default view network options screen

NOTE: The IP Address, IP Mask, IP Gateway, and DNS Server become available after selecting “User Specified IP Address” from the Network screen under Edit options.

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.
IP Address	Lets you select an IP Address.
IP Mask	Lets you select an IP Mask.
IP Gateway	Lets you select an IP Gateway.
DNS Server	Lets you select a DNS server address.

Library Info

Selecting this option lets you display the Miscellaneous Library Info screen (Figure 4–24). This screen displays the library’s firmware revision, local IP and Ethernet address that is currently in use, and the unit serial number.

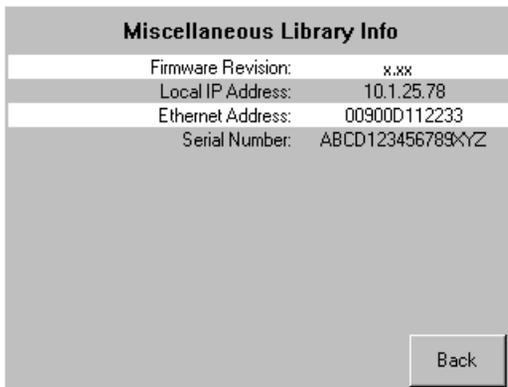


Figure 4–24: View library info screen

Cartridge Map

Selecting this option provides you with a layout of the slots and cartridges that are currently being used in the library. Barcode labels are displayed if enabled and in use.

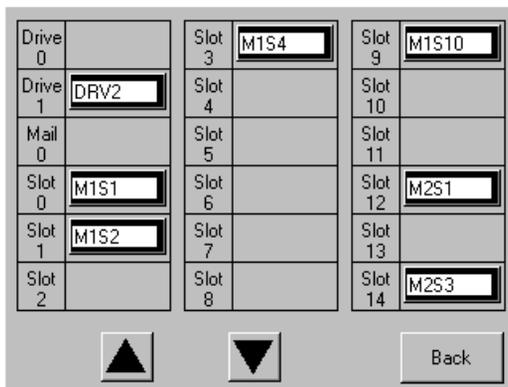


Figure 4–25: Cartridge map screen

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 4–26). Table 4–2 lists and describes the available options.

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

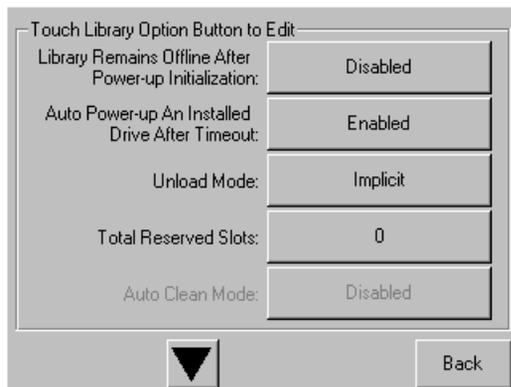


Figure 4–26: Edit library options screen

SCSI

Selecting this option lets you define the SCSI options used to configure the library for your specific needs (see Figure 4–27). Table 4–3 lists and describes the available options.

NOTE: You can move to the subsequent 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:	4
Drive 1 Bus ID:	5
Library SCSI Bus ID:	0
Library SCSI Bus Parity:	Enabled
Mail Slot Access:	"Prevent Allow" Command Inhibits

▼ Back

Figure 4–27: 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 4–28). Table 4–4 lists and describes the available options.

Touch Network Option Button to Edit	
IP Address Determination:	User Specified IP Address
IP Address:	10.1.10.98
IP Mask:	255.255.0.0
IP Gateway:	10.1.8.99
DNS Server:	10.1.8.14

Save Cancel

Figure 4–28: 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 4–29). See the section on “Front Panel and Media Security Locks” described earlier in this chapter.

The screenshot displays a configuration screen for passwords. It is divided into several sections:

- Touch an Input Box to Edit:** Contains two input fields. The first is labeled "New User Level 1 Password:" and the second is labeled "Reenter New User Level 1 Password:".
- Security Level:** Contains three buttons: "User Level 1 (Disabled)", "User Level 2 (Disabled)", and "Service (Disabled)".
- Decimal Keypad:** A numeric keypad with buttons for digits 1-9, 0, "Clear Entry", and "Back space".
- Bottom Buttons:** "Save" and "Back" buttons.

Figure 4–29: 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 4–30):

- Clean Drive
- Replace Drive
- Set User Defaults
- Reboot Module
- Flash Drive From SCSI
- Flash Drive From Tape
- Drive Format
- Force Reconfiguration

The Maintenance menu options, intended for operator use, are described in Chapter 6, “Maintenance.” Additional Maintenance menu options used by service technicians are described in the *hp StorageWorks MSL5000 series library Maintenance and Service Guide*.

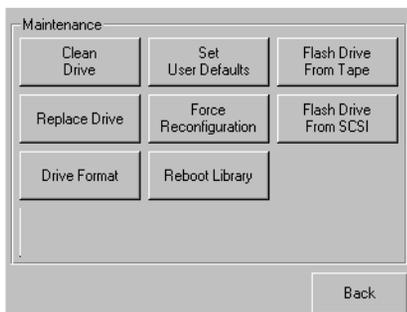


Figure 4–30: Maintenance screen

Diagnostics

Selecting this option lets you perform a system calibration on available components (see Figure 4–31). Available options are dependent on the specified user level.

The Diagnostics menu options, intended for operator use, are described in Chapter 6, “Maintenance.” Additional Diagnostics menu options used by service technicians are described in the *hp StorageWorks MSL5000 Series Maintenance and Service Guide*.

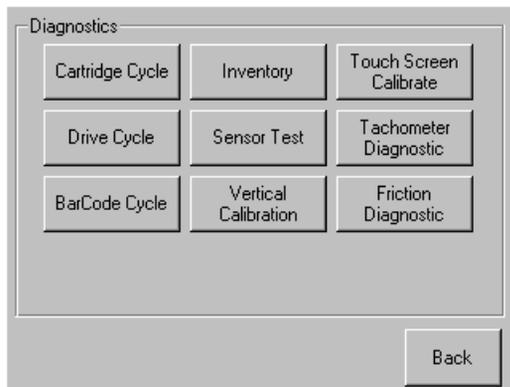


Figure 4–31: Diagnostics screen

NOTE: The Vertical Calibration button is only available on MSL5052/MSL5060 libraries.

Factory

The Factory menu options are intended for use by factory personnel only.



CAUTION: Unauthorized use of the Factory option could render the library inoperable.

Security Level

Selecting this option lets you select passwords for a security level (see Figure 4–32).

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

NOTE: Setting a value 0000 for a given level disables that level.

The screenshot shows a graphical user interface for setting security levels. It is divided into three main sections:

- Elevate Security Level:** Contains a 'Current:' label with a dropdown menu showing 'None'. Below it is a section for 'Enter User Level 1 Password:' with an empty text input field.
- Security Level:** Contains two buttons labeled 'User Level 1' and 'User Level 2'. Below these is a 'Service' button.
- Decimal Keypad:** A numeric keypad with buttons for digits 1-9, 0, 'Clear Entry', and 'Back space'. At the bottom of the keypad are 'Validate' and 'Back' buttons.

Figure 4–32: Security level screen

Remote Management Interface

Many of the same operations performed from the front panel can also be performed remotely using the Remote Management Interface. The interface lets you monitor and control your automated tape library from any terminal connected to your network or via the World Wide Web. The Remote Management Interface hosts a dedicated, protected Internet site that displays a graphical representation of your library.

After establishing a connection to the library, open any HTML browser and enter the IP address of the library. (See “Setting the IP Address” or contact your web administrator.) Be sure that proxy server settings in your browser are disabled.

This internet site can be accessed using either Microsoft Internet Explorer (3.0 or higher) or Netscape (3.0 or higher). The Remote Management Interface shows you overall status at a glance and presents a control panel for making adjustments and viewing details down to the cartridge level.

To use the Remote Management Interface, you must have the following available:

- A 10 BaseT Ethernet Network
- A Dedicated IP Address (either Internet or local)
- A Host computer with COM port (initial setup and alternative maintenance procedures only)
- A computer with a Web Browser installed that has access to your network.

Two configurations for the Remote Management Interface are available:

- World Wide Accessible
- Local Area Network

Operation

To configure the Remote Management Interface you must set the IP addresses. See Chapter 3, “Library Configuration.”



CAUTION: Some options of the Remote Management Interface take the library offline. This active mode can interfere with host-based application software, causing data loss. Be sure that the library is idle before attempting to perform any remote operations that will take the library offline.

Accessing the Remote Management Interface

To access your library remotely the library must be in the ready mode to establish communications with the Remote Management Interface. If you are unable to access the unit with your browser, verify the library is not being operated locally.

1. Type the IP address in the Location field of your Internet browser, and press **Enter**.

The browser connects to the Remote Management Interface and displays a login prompt.

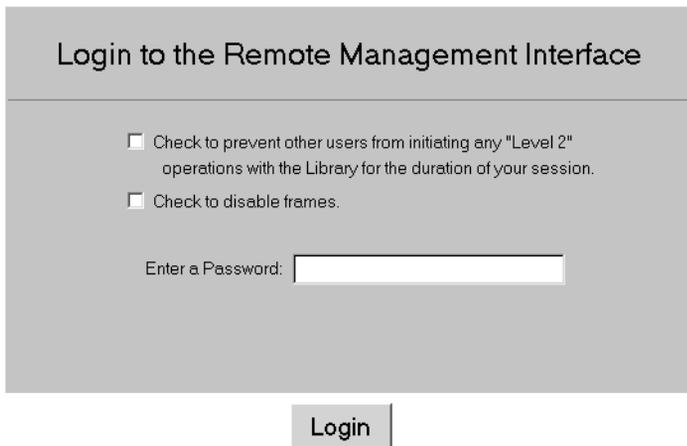


Figure 5–1: Remote Management Interface login screen

2. Enter your level 1 or level 2 password in the appropriate field and click Login.

NOTE: The default level 1 password is 1. The default level 2 password is 2. The level 1 password only allows use of passive features, such as viewing library status.

Use the *MSL5000Util.exe* diagnostic utility to change the default passwords.

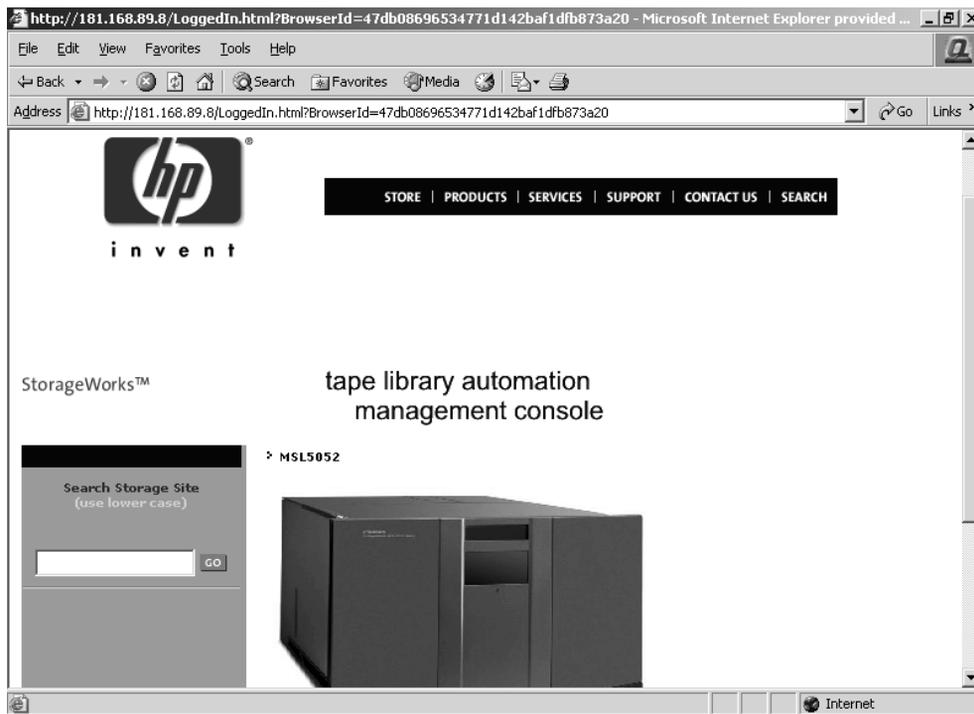


Figure 5–2: Remote Management Interface main screen

3. Click on the library to access the Status screen.

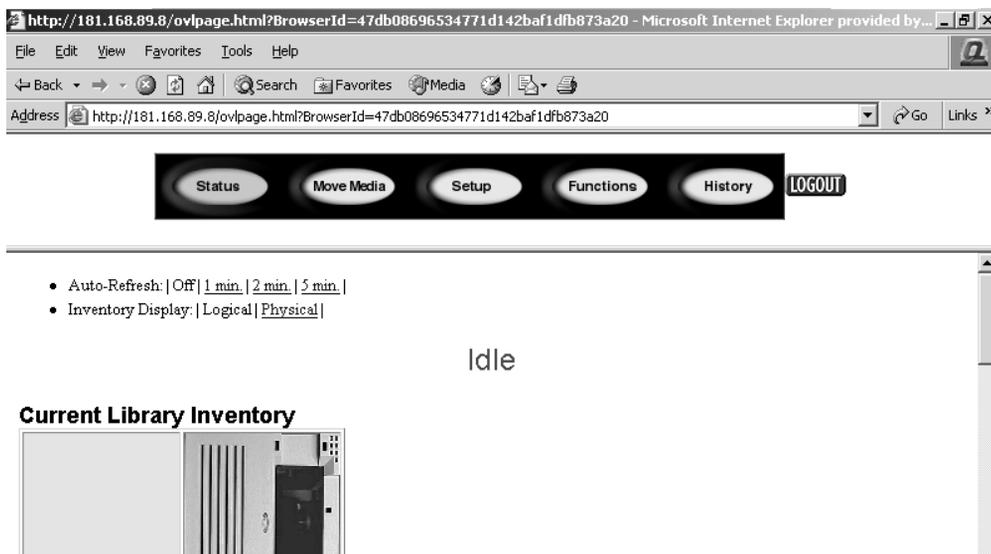


Figure 5-3: Status screen

Status

Click the Status button to view a display of itemized status information for the library in general and for each drive. Scroll down to view additional information. You can configure two browser settings from this screen:

- Auto refresh: off / 1 min / 2 min / 5 min
This setting ensures the status of your library displayed on the browser remains current.
- Inventory Display: Logical / Physical
This setting enable you to display your library either logically (drives and slots are grouped separately) or physically (drives and slots are grouped by library module), depending on your preference.

Information available from this screen:

- Library Status
- Drive Status (Summary)
- Full Drive Status is available through the Full Drive Status button

Move Media



CAUTION: Do not move tapes while library application software is running. Fatal software faults may occur.

This button allows you to move a selected cartridge to a target drive or cartridge slot.

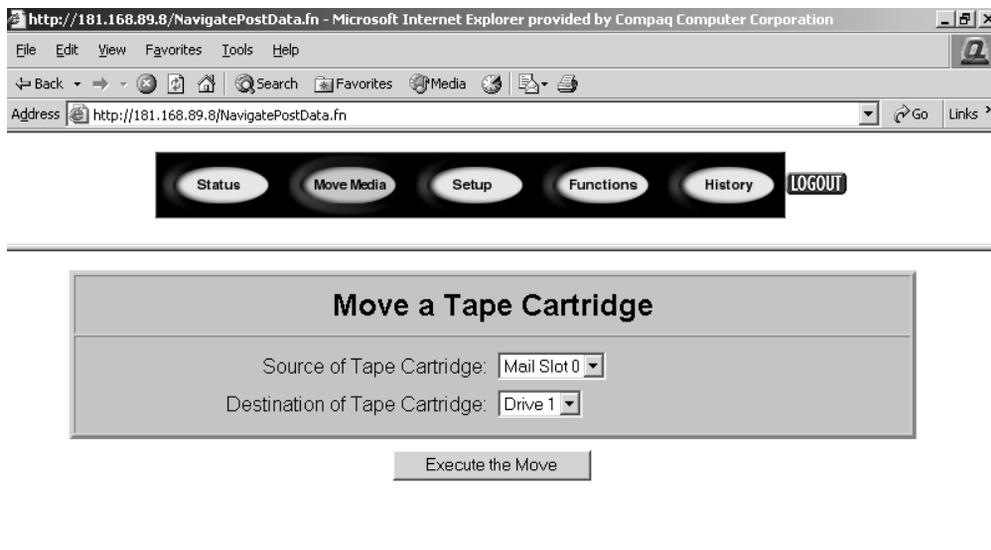


Figure 5–4: Move media screen

1. Specify the source slot and destination.
2. Click Execute the Move.

A screen appears warning you that selecting confirm causes the library to go offline during the move media operation. After the move media operation completes a completion message appears.

Setup

Click Setup for button-and-browser controls that let you set library, SCSI, and drive configuration options, also available on the Menu, Edit Options area of the GUI.

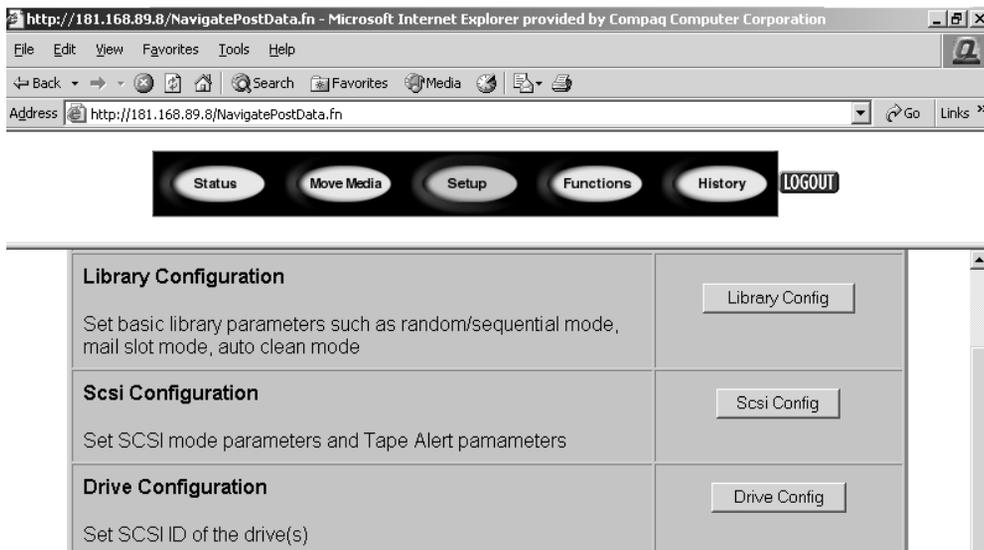


Figure 5-5: Setup screen

Library Configuration

Click Library Config to set basic library parameters.

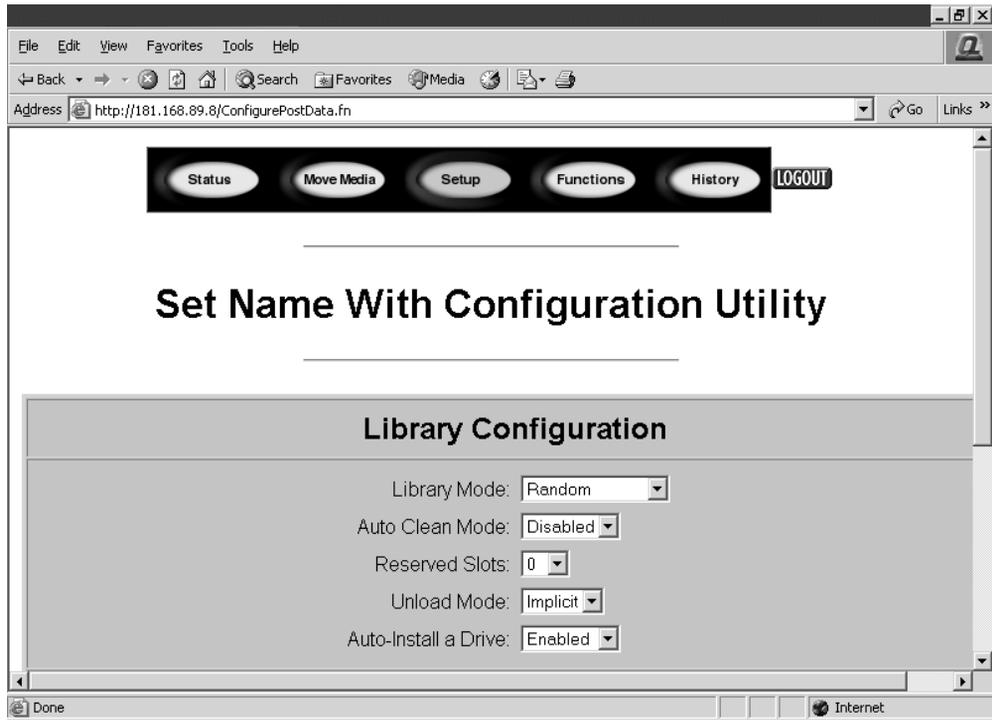


Figure 5–6: Library configuration screen

SCSI Configuration

Click SCSI Config to SCSI mode and Tape Alert parameters.

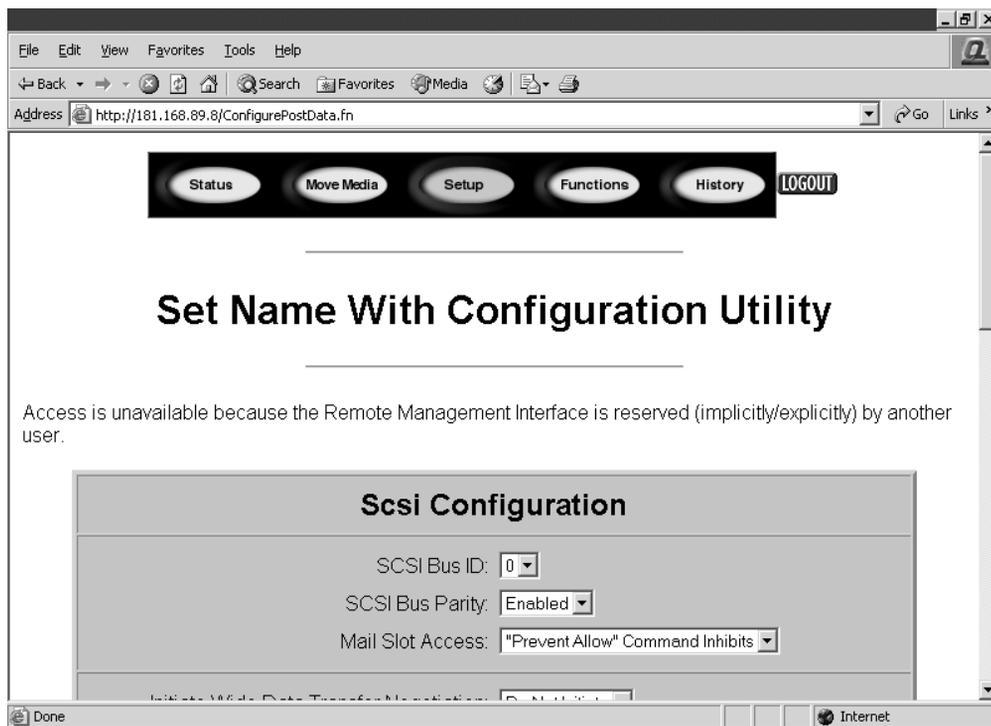


Figure 5-7: SCSI configuration screen

Drive Configuration

Click Drive Config to set the SCSI IDs of the drives.

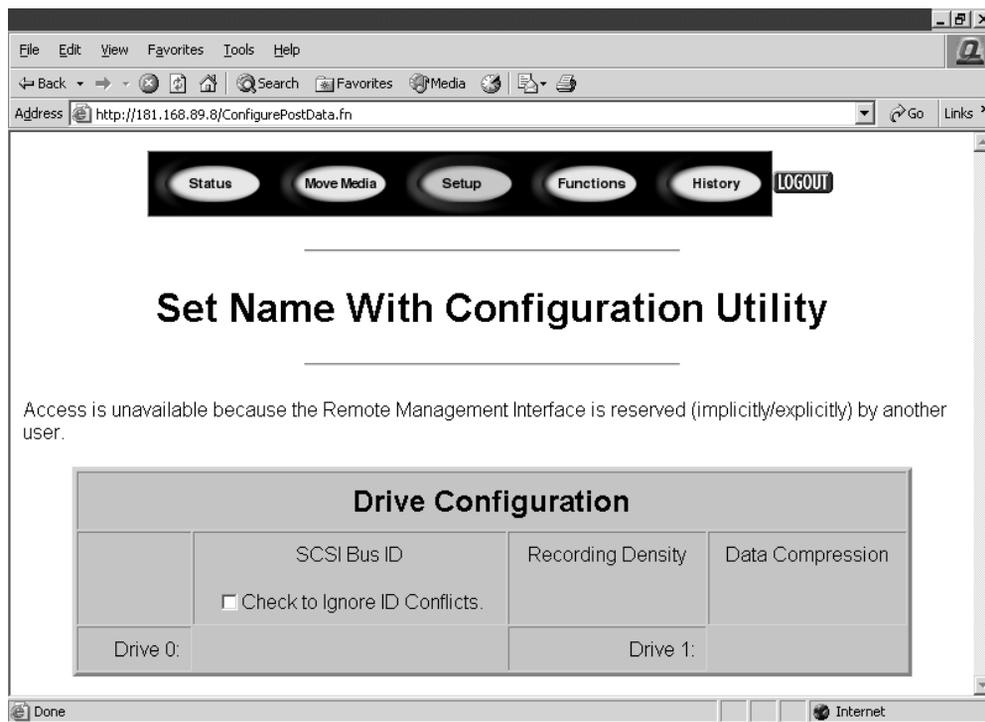


Figure 5–8: Drive configuration screen

Functions

The Functions pages present button-and-browser controls lists of selectable files. Scroll down for additional dialog boxes corresponding to the below functions.



Figure 5-9: Functions screen

Functions available from this screen:

- Drive cleaning operation
- Timed or Free running library diagnostic
- Library flash operation
- Reset the Library

History

Click History to list files that you can display or download. Scroll down for additional menus.

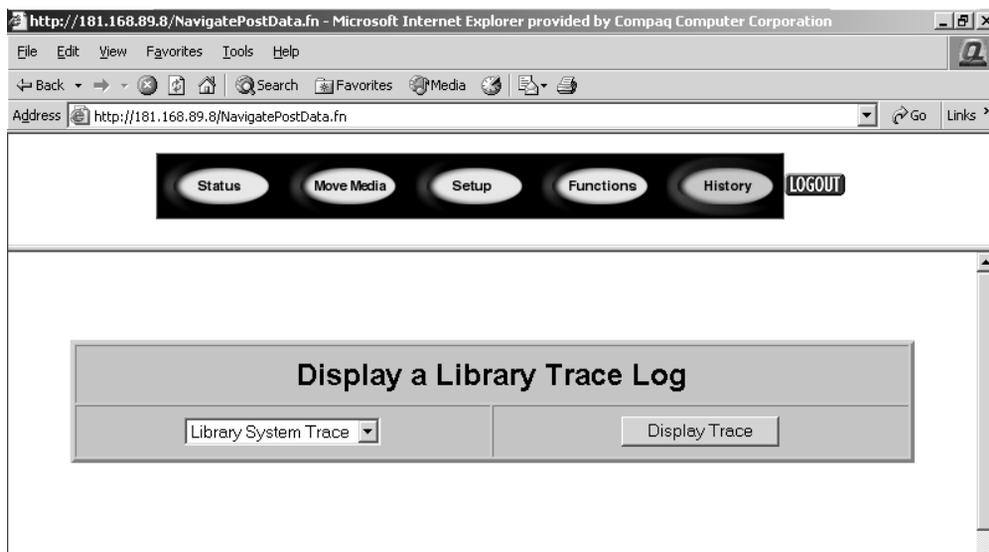


Figure 5–10: History screen

When you select a file, a Save As window appears, letting you select a network destination for the download. When you select display a trace log, the log will be seen through the browser.

Maintenance

This section describes the Clean Drive menu option contained in the Maintenance submenu of the Utilities area on the front panel display. You use the Clean Drive menu option to clean tape drives installed in HP StorageWorks MSL5000 series libraries.



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



CAUTION: Only perform the Clean Drive menu option when the library displays a message informing you that a tape drive needs cleaning. Excessive, unrequested cleaning can damage the tape drives.

This chapter includes library procedures for:

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

IMPORTANT: Backup application software must be compatible with the library autoclean feature to avoid robot command conflicts. HP does not support preventive autocleaning operation.

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 three ways to manage the cleaning of the installed tape drives:

- Automatically, by application software.
- Automatically, by enabling Auto Clean Mode.
- Manually, by selecting the Clean 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, Auto Clean Mode has been selected from the library Options menu, and the appropriate cartridge technology is loaded.

To configure the library to use Auto Clean Mode, do the following:

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 “Library Display Screens and Options” in Chapter 4 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 Tape Cartridge Slot—This location requires removing a magazine to insert a cleaning cartridge in a tape cartridge slot and then removing it after cleaning.
- The Cleaning Slot—This location requires reserving the last tape 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 a Reserved Slot” in Chapter 3 for more information.

Running a Cleaning Cartridge From a Mail Slot

1. Install a cleaning cartridge into a Mail Slot.
2. Select the Clean 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 a Mail Slot. To remove the cleaning cartridge, select Mail Slot Access from the library Status screen.

Running a Cleaning Cartridge From a Tape Cartridge Slot

1. Install a cleaning cartridge into an appropriate tape cartridge slot (Slot 0, for example).
2. Select the Clean 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 tape cartridge slot. To remove the cleaning cartridge, select Magazine Access from the library Status screen.

Running a Cleaning Cartridge From a Cleaning Slot

1. Reserve a cleaning tape cartridge slot. See the section on “Setting Up a Reserved Slot” in Chapter 3 for more information.
2. Install a cleaning cartridge in a reserved slot.
3. Select the Clean 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 to the mail slot using the Move Media menu option from the library Status screen.

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

Replacing a Cleaning Cartridge in a Right Magazine

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

Replacing a Cleaning Cartridge in a 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 a 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 a 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 a mail slot.

Updating the Firmware

MSL5000 series libraries can be flashed using the Remote Management Interface or the *MSL5000Util.exe* diagnostic utility and diagnostic cable.

Updating via the Remote Management Interface

To update the firmware using the Remote Management Interface you need LAN connection to the library or an Ethernet connection to the World Wide Web.

1. Login to the Remote Management Interface.

NOTE: See Chapter 5 for additional information on setting up and using the Remote Management Interface.

2. Click Functions.
3. Scroll down to Library Flash Operation.



Figure 6–1: Upgrading the firmware using the Remote Management Interface

4. Select Flash Library from Remote File or Flash Library from Local File.

NOTE: If you select Flash Library from Local File, the *.bin file must be copied to the /upload directory, which is located on the library at the IP Address/upload.

5. Click Start the Flash. The library firmware automatically updates.
6. The library will reboot. Verify the firmware level has been updated successfully.

Updating Via Serial Connection

To update the firmware using the *MSL5000Util.exe* you will need:

- *MSL5000Util.exe* and the proper version of firmware, available for download from the HP website at http://www.compaq.com/storage/tape_index.html
- Cable assembly, serial RJ11 to DB9
- PC with available serial port

Firmware Flashing Procedure

1. Install the *MSL5000Util.exe* on the PC.
2. Copy the firmware image (*.bin) into the same directory that the *MSL5000Util.exe* was installed.
3. Connect the library diagnostic port to the PC using the supplied cable assembly.
4. Start the *MSL5000Util.exe*.
5. Click **Connect**, select the PC serial port that the cable assembly is connected to, and then click **OK**.
6. Click **Download>Browse**. Navigate to the directory with the firmware image *.bin.
7. Click **OK**. The library firmware automatically updates.
IMPORTANT: If the flash process does not complete, select a lower baud rate option, available under the Connect window, and try again.
8. The library will reboot. Verify the firmware level has been updated successfully.

Verifying the Firmware Level

To verify the firmware level:

1. Touch Menu on the GUI.
2. Touch Library Info in the View System Data area.

The firmware revision appears in the Miscellaneous Library Info screen.

Troubleshooting

Introduction

This chapter describes the problems that can cause an HP StorageWorks MSL5000 series library to malfunction, including:

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

NOTE: Each library is supplied with an RS232 diagnostic cable and *MSL5000Util* diagnostic utility (on floppy). Usage is described in the *hp StorageWorks MSL5000 series library Maintenance and Service Guide*.

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 tape 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.

Errors that appear to be library and/or drive related may have another root cause. These can include operator error, improper HBA driver, incompatible application software, poor SCSI cabling, unsupported modes, and so on.

Error Recovery

Figure 7–1 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 7–1; FSCs are listed in Table 7–2 along with their related ERPs.

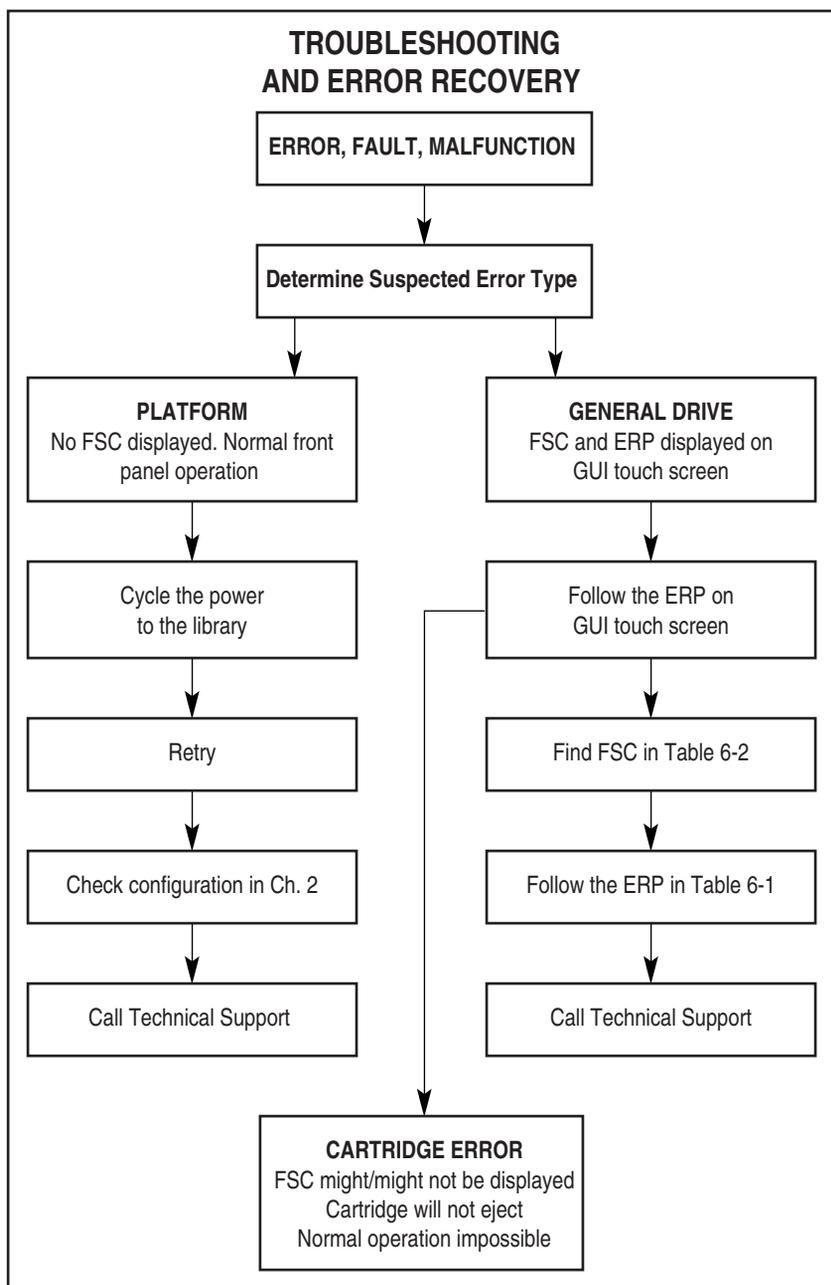


Figure 7-1: Troubleshooting flow chart

Error Recovery Procedures

Table 7–1 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 *hp StorageWorks MSL5000 series library Maintenance and Service Guide* includes additional procedures that can be performed by a qualified service technician.

Table 7–1: 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 7–2 to determine the error recovery procedure or to report it to your service provider.

Table 7–2: Fault Symptom Codes

Message	FSC	ERP
Novram Update Error	0306	G
Barcode Not Active Error	0501	D,G
OS Catastrophic Error	0901	G
OS Task Exit Error	0902	G
Invalid Ethernet (MAC) Address	0A01	F
Invalid IP subnet Mask (255.255.255.255)	0A02	F
SCSI Firmware Error	1001	D,G
SCSI FIFO Empty	1002	D,G
SCSI FIFO Error	1003	D,G
SCSI Gross Error	1004	C,D,G
Illegal SCSI Cnt Cmd	1005	C,D,G
SCSI Invalid Element	1007	D,G
SCSI No Pending Int.	1008	D,G
SCSI Invalid Int.	1009	D,G
Loader Not Ready	2004	C,G
Door Open (status only)	2009	F
Cart Unaccessible	200C	F
Drive In Error	200D	C,G
No Magazine	200E	F
Removal Prevented	200F	F
Ctl. Firmware Error	2010	C,G
Drive Timeout Error	2030	C,G
Drive Code Update Command Error	2080	C,G
Move Command Failure	2081	C,G
Open Mail Slot Fault	2090	C,G

Table 7-2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Open Left Door Fault	2091	C,G
Open Right Door Fault	2092	C,G
Open Doors Fault	2093	C,G
Open DLT Handle Fault	2094	C,G
No IP Address Found	20a0	C,G
No IP Address Mode Fault	20a1	C,G
Unknown Exchange For The Async message	20b0	C,G
Drive In Error	20c0	C,G
Drive In Error	20c1	C,G
Motor Fault Condition	3000	C,G
Picker Tach Errors	3002	C,G
Bin Fetch Failure	3011	C,G
Drive Fetch Failure	3013	C,G
Drive Timeout Failure	3015	C,D,G
Drive Status Failure	3016	C,D,G
Drive In Flux Timeout	3017	C,D,G
Drive Load Retry Failed	3018	C,G
Drive Open Door Failed	3019	C,G
Drive Close Door Failed	301A	C,G
Drive Communication Error	301B	C,D,G
Drive Get General Status Fail	301C	C,D,G
Drive Get Status 3 Fail	301D	C,D,G
Undefined Config	3020	C,G
Orphan Cartridge not stowed	3030	C,G
Chassis S/N Mismatch. Previous S/N retained	3031	G
Chassis S/N Character count is not correct	3032	G
Chassis S/N did not scan	3033	G
Chassis S/N save operation failed	3034	G
Motor Firmware Error	3040	C,G
Loader Received Invalid Command	3041	C,G

Table 7-2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Motor Firmware Error	3042	C,G
Missing Magazine	3050	F
No Cartridges In Library	3051	F
Too Many Cartridges	3052	F
Need 1 Drive Minimum	3054	F
Invalid Magazine Type	3057	F
Magazine Type Change Not Handled	3058	F
Drive Type Not Supported	3059	F
Diag Fetch, Drive not loaded	305b	F
Diag Timeout waiting for drive empty, ready	305d	F
Invalid bin number	305f	F
Zone Sequence Error	3060	C,D,G
Drive 0 Eject Failed	3074	C,G
Drive 1 Eject Failed	3075	C,D,G
Drive 2 Eject Failed	3076	C,D,G
Drive 3 Eject Fail	3077	C,D,G
Diag get drive 0 status failed	3078	C,D,G
Diag get drive 1 status failed	3079	C,D,G
Diag get drive 2 status failed	307a	C,D,G
Diag get drive 3 status failed	307b	C,D,G
Drive Stow Failed, Media Returned to Source	3082	F
Drive Stow Failed, Media Remains in Drive	3083	F
UnSupported Drive For Requested Operation	3084	F
No Retry On Fetch/Stow	308F	F
Picker Jammed	3100	C,G
Picker Jammed 2	3102	C,G
Picker Jammed 3	3103	C,G
Picker Jammed 4	3104	C,G
Picker Jammed 5	3105	C,G
Picker Jammed 6	3106	C,G

Table 7-2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Picker Jammed 7	3107	C,G
Picker Jammed 8	3108	C,G
Picker Jammed 11	310B	C,G
Picker Jammed on Stow	310F	C,G
Picker Retries Exceeded 1	3111	C,G
Picker Retries Exceeded 3	3113	C,G
Picker Retraction Error	3115	C,G
Shuttle Jammed	3200	C,G
Rotary Jammed	3300	C,G
Shuttle on Wrong Side Of The Rotary	3301	C,G
Passthrough Elevator Jammed	3400	C,G
Vertical Elevator Jammed	3500	C,G
All Slots Empty	5011	F
Drive Already Loaded	5014	F
Expired Clean'g Cart	5015	F
Not a Clean'g Cart	5016	F
Drive Timeout Error	5035	C,D,G
Move Command Fail	503B	F
Clean Operation Timeout	503C	F
Drive Status Fail	503D	F
Command response from unexpected source	7001	D,G
Control command execution failed	7002	D,G
Control response not matched to a known command	7003	D,G
Loader response not matched to a known command	7004	D,G
Drive response not matched to a known command	7005	D,G
Flash response not matched to a known command	7006	D,G

Table 7-2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Drive index on Update Status message was invalid	7007	C,D,G
The Drive response was not expected	7008	C,D,G
The opcode for a WORD message was unknown	7009	C,D,G
The opcode for a DWORD message was unknown	700A	C,D,G
The button causing library to go offline was unknown	700B	C,D,G
Destination Xchg was Null	700C	C,G
Sending of a cmd failed	700D	C,G
Deactivating a drive that is not attached	700E	C,G
Deactivation of a drive failed	700F	C,G
Drive removal failed	7010	C,G
Drive is Active failed	7012	C,G
Control Com Unidentified	7013	C,G
Drive status update failed	7014	C,G
Loader command execution failed	7015	C,G
Sequential command execution failed	7016	C,G
Destination Xchg for msg. was Null	7017	C,G
Bad src mod in peg msg	7018	C,G
Peg message wrapping a Null msg. ptr.	7019	C,G
Xchg conversion failed	701A	C,G
Invalid L-drive number to convert	701B	C,G
Invalid P-drive number to convert	701C	C,G
Invalid mod number to convert	701D	C,G
Unknown drive type	701E	C,G
The Scsi response was not expected	701F	C,G
The Flash response was not expected	7020	C,G
Scsi response not matched to a known command	7021	C,G

Table 7-2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Unexpected state after NonVolConfig cmd	7022	C,G
Unexpected state after SCSI mode cmd	7023	C,G
Unexpected state after SCSI init cmd	7024	C,G
Cartridge reject recovery failed	8001	C,D,G
Drive Fan stalled	8002	C,D,G
Drive load did not complete	8003	C,D,G
Invalid drive was installed	8004	F
Slto unmask drive failed	8005	F
Slto mask drive failed	8006	F
Slto unload drive (in load retry) failed	8007	F
Is Drive Unloaded Failed	8008	F
Orphan cartridge recovery failed	9001	C,D,G
Master pass-thru opto failed.	9003	C,D,G
SMX send error	A001	C,G
SMX receive error	A002	C,G
Comm free list empty	A003	C,G
Invalid comm. put attempt	A004	C,G
Invalid comm. get attempt	A005	C,G
Comm initialization error	A006	C,G
Put of a NULL comm.	A007	C,G
Msg contains no comm.	A008	C,G
Comm return address is unknown	A009	C,G
Bad Image CRC	F001	F
Flash erase sector failed	F002	F
Flash program sector failed	F003	C,G
Bad flash CRC	F004	C,G
Flash exit error	F005	C,G
Incompatible image	F006	F
Buffer allocation failed	F402	F

If an error message appears that is not included in Table 7–2, write down the fault code number and follow the recovery procedure. If the same error occurs again, call your authorized service provider.

Regulatory Compliance Notices

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 an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment

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

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company 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.

Declaration of Conformity for products marked with the 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 your product, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

Or, call

1-800- 652-6672

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

Or, call

(281) 514-3333

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

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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

European Union Notice



Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

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

- EN 55022 (CISPR 22) - Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) - Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) - Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) - Power Line Flicker
- EN 60950 (IEC 60950) - Product Safety

Taiwanese Notice

警告使用者：

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

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

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

B

Specifications

This appendix lists the following specifications met by an HP StorageWorks MSL5000 series library:

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

Operational Performance

Table B-1: Operational Performance Specifications

Description	MSL5026/SML5030 Specification	MSL5052/MSL5060 Specification
Host SCSI interface	LVD/SE	LVD/SE
Number of cartridges (2 full magazines)	26 DLT/SDLT 30 LTO Ultrium 1	52 DLT/SDLT 60 LTO Ultrium 1
Number of drives	0, 1, or 2	0, 1, 2, 3, or 4
Load time	<10 seconds, estimated ¹	<15 seconds, estimated ¹
Unload time	<10 seconds, estimated ¹	<15 seconds, estimated ¹
Drive compatibility	DLT 40/80 (optional) SDLT 110/220 SDLT 160/320 LTO Ultrium 1	DLT 40/80 (optional) SDLT 110/220 SDLT 160/320 LTO Ultrium 1
Maximum data capacity (native)	1.04 TB (DLT 40/80) 2.80 TB (SDLT 110/220) 4.16 TB (SDLT 160/320) 2.6 TB (LTO Ultrium 1)	2.08 TB (DLT 40/80) 5.72 TB (SDLT 110/220) 8.32 TB (SDLT 160/320) 5.2 TB (LTO Ultrium 1)

¹Excluding Pass-Through Mechanism (PTM) access

Power

Table B–2: Power Specifications

Description	MSL5026/MSL5030 Specification	MSL5052/MSL5060 Specification
Voltage	100 to 240 VAC, +/- 10%	100 to 240 VAC, +/- 10%
Current	3.0 to 6.0 A	3.0 to 6.0 A
Line frequency operating range	50 to 60 Hz	50 to 60 Hz
Power consumption	190 W (2 tape drives)	344 W (4 tape drives)
Maximum peak power consumption	240 W (2 tape drives)	430 W (4 tape drives)

Mechanical

Table B–3: Mechanical Specifications (Tabletop Model)

Description	MSL5026/MSL5030 Specification	MSL5052/MSL5060 Specification
Height	9.5 inches (24 cm), nominal (5U)	18.5 inches (47 cm), nominal (10U)
Width	19 inches (48.3 cm)	19 inches (48.3 cm)
Depth	31.5 inches (80 cm)	31.5 inches (80 cm)
Weight	63 pounds (28.6 kg), estimated (with 2 tape drives installed)	136 pounds (61.8 kg), estimated (with 4 tape drives installed)

Table B–4: Mechanical Specifications (Rackmount Model)

Description	MSL5026/MSL5030 Specification	MSL5052/MSL5060 Specification
Height	8.75 inches (22.2 cm), nominal (5U)	17.5 inches (44.4 cm), nominal (10U)
Width	17 inches (43.2 cm)	17 inches (43.2 cm)
Depth	31.5 inches (80 cm)	31.5 inches (80 cm)
Weight	61 pounds (27.7 kg), estimated (with 2 tape drives installed)	123 pounds (55.9 kg), estimated (with 4 tape drives installed)

Environmental (All models)

Table B-5: 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)	20% to 80%
Humidity gradient	10%/hr
Altitude	-1000 feet to +10,000 feet (-305 m to 3050 m)

Table B-6: 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-7: Environmental Specifications (Transit - Short Term)

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 +40,000 feet (-305 m to 12,200 m)

Acoustics

Table B–8: Acoustic Noise Declared per ISO 9296 and ISO 7779

Sound Power Level $L_{W,Ad}$ B			Sound Pressure Level $L_{p,Am}$ dBA (bystander position)	
Product	Idle	Operate	Idle	Operate
MSL5026 Library	6.4	7.0	48	48
MSL5052 Library	6.4	7.0	48	48

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

**Table B–9:
Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779/DIN 27779**

Schalleistungspegel $L_{W,Ad}$ B			Schalldruckpege $L_{p,Am}$ dBA (bediener position)	
Gerät	Leerlauf	Betrieb	Leerlauf	Betrieb
MSL5026 Library	6.4	7.0	48	48
MSL5052 Library	6.4	7.0	48	48

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

Safety

The library carries the following Regulatory Agency product safety certifications.

Table B–10: Regulatory Product Safety Certifications

Description	Specification
UL Listed Mark	UL 1950 (standard for safety of information technology equipment)
TUV GS Mark (Germany)	EN60950, IEC950 (standard for safety of information technology equipment third edition)
CE Marking (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)

Electrostatic Discharge

To prevent damage to 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 can damage system boards or other static-sensitive devices. This type of damage can 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 \pm 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 HP authorized reseller install the part.

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

D

Removing and Replacing a Tape Drive

This appendix explains how to add a tape drive to an HP StorageWorks MSL5000 series 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, contact HP for a replacement.

NOTE: HP 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.

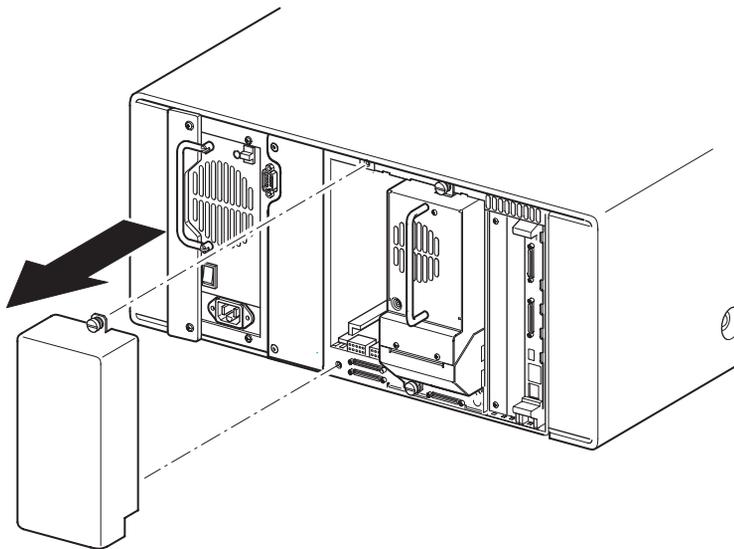


Figure D-1: Removing a tape drive mounting bay blank panel (MSL5026 shown)

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

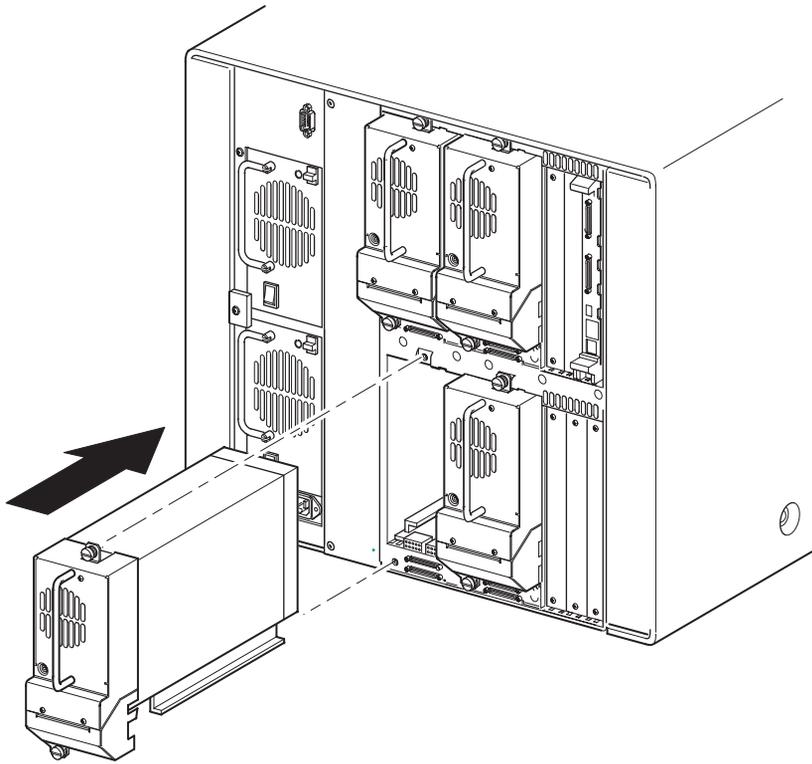


Figure D-2: Installing a tape drive (MSL5052 shown)

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.”

Configuration Examples

SCSI Cable Configurations

Use the following guidelines when configuring your SCSI cables:

- Use the highest quality SCSI cables.
NOTE: 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 library controller constitute a separate SCSI target. When any two or more devices are connected to the same SCSI bus, each separate SCSI device must be assigned a unique SCSI ID.
- SCSI IDs are set at the factory. Use the GUI touch screen to change any of the factory defaults.
- To connect a library to a host, the host must have at least one Wide LVD/SE controller and the appropriate driver software.
- For best performance, do not attach more than two drives per SCSI bus.
- It is recommended that the robot and corresponding drives on the same bus are attached to host bus 0.

Configuration Examples

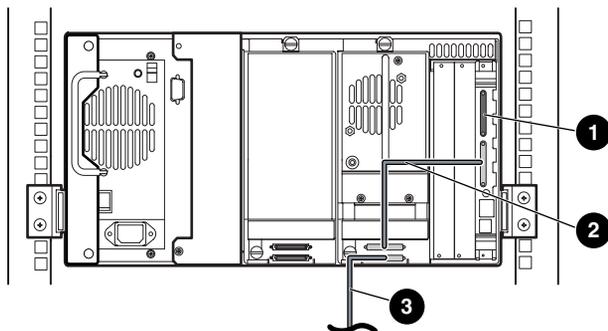


Figure E-1: Single MSL5026/MSL5030, 1 host/1 drive

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ Host cable (Bus 0, to host system)

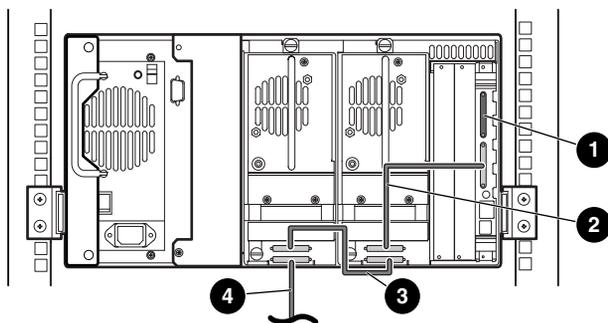


Figure E-2: Single MSL5026/MSL5030, 1 host/2 drives

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ 0.25M cable or 0.5M cable
- ❹ Host cable (Bus 0, to host system)

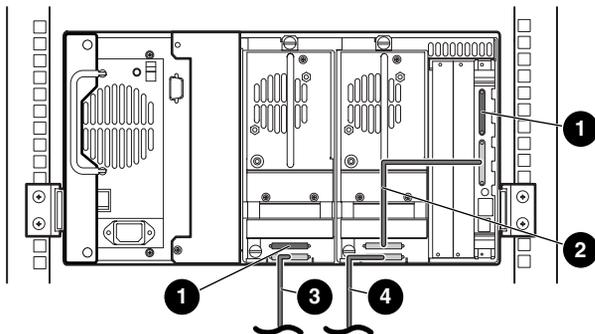


Figure E-3: Single MSL5026/MSL5030, 2 hosts/2 drives

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ Host cable (Bus 1, to host system)
- ❹ Host cable (Bus 0, to host system)

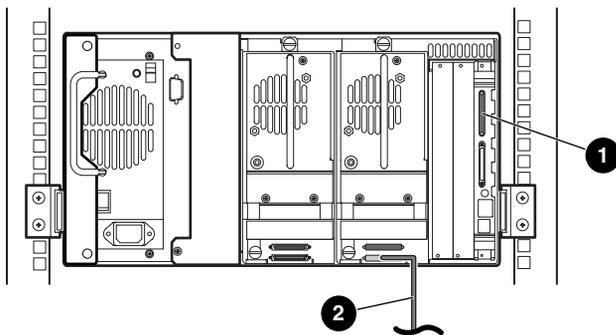


Figure E-4: Single MSL5026/MSL5030, 1 host/1 drive, sequential mode

- ❶ SCSI Terminator
- ❷ Host cable (to host system)

Notes:

- There is no SCSI connection to the library controller module.
- There is a terminator installed on the library controller module.

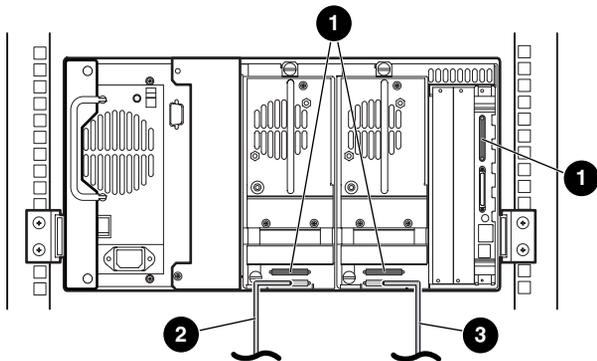


Figure E-5: Single MSL5026/MSL5030, 2 hosts/2 drives, split sequential mode

- ❶ SCSI Terminator
- ❷ Host cable (Bus 1, to host system)
- ❸ Host cable (Bus 0, to host system)

Notes:

- There is no SCSI connection to the library controller module.
- There is a terminator installed on the library controller module.
- This configuration requires a third LVD/SE SCSI terminator. Only two are shipped with the MSL5026/MSL5030 and are attached to each drive.

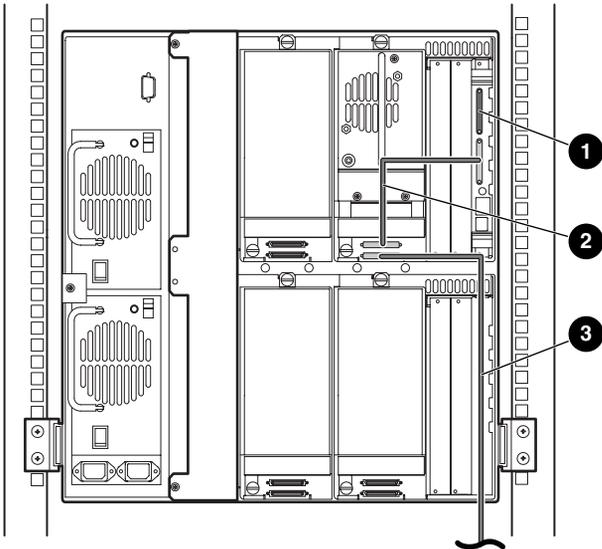


Figure E-6: Single MSL5052/MSL5060, 1 host/1 drive

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ Host cable (Bus 0, to host system)

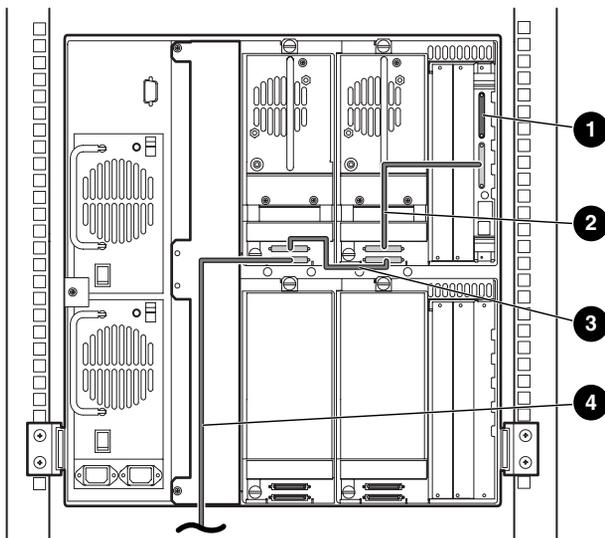


Figure E-7: Single MSL5052/MSL5060, 1 host/2 drives

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ 0.25M cable or 0.5M cable
- ❹ Host cable (Bus 0, to host system)

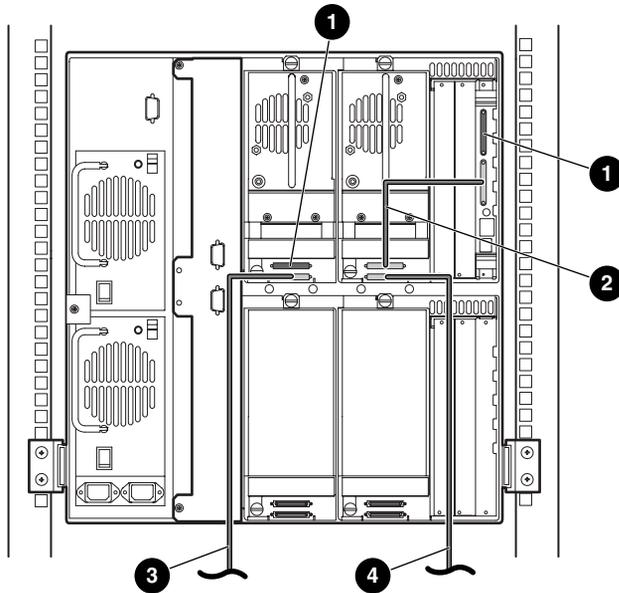


Figure E–8: Single MSL5052/MSL5060, 2 hosts/2 drives

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ Host cable (Bus 1, to host system)
- ❹ Host cable (Bus 0, to host system)

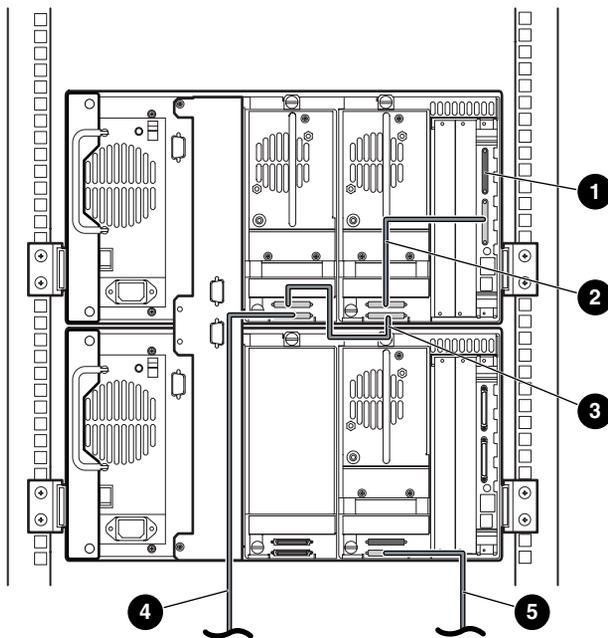


Figure E-9: Single MSL5052/MSL5060, 2 hosts/3 drives

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ 0.25M cable or 0.5M cable
- ❹ Host cable (Bus 0, to host system)
- ❺ Host cable (Bus 1, to host system)

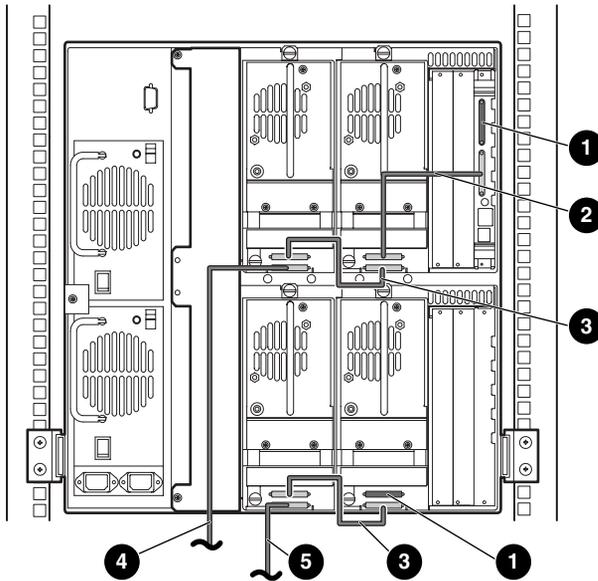


Figure E-10: MSL5052/MSL5060, 2 hosts/4 drives

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ 0.25M cable or 0.5M cable
- ❹ Host cable (Bus 0, to host system)
- ❺ Host cable (Bus 1, to host system)

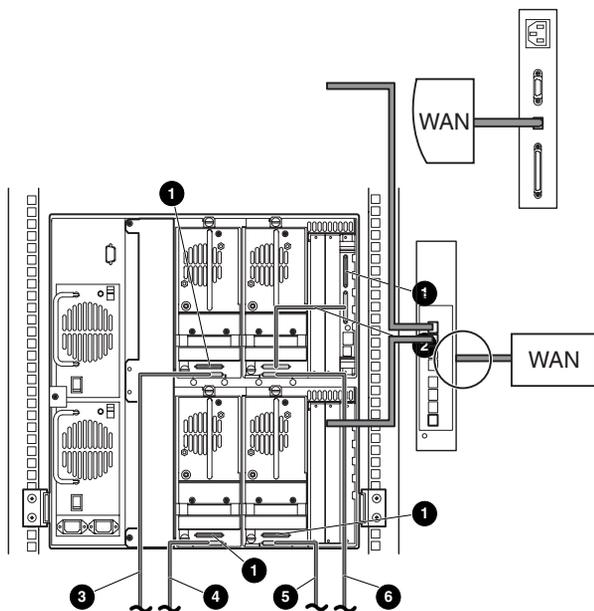


Figure E-11: Single MSL5052/MSL5060, 4 hosts/4 drives

- 1** SCSI Terminator
- 2** 0.5M cable
- 3** Host cable (Bus 1, to host system)
- 4** Host cable (Bus 3, to host system)
- 5** Host cable (Bus 2, to host system)
- 6** Host cable (Bus 0, to host system)

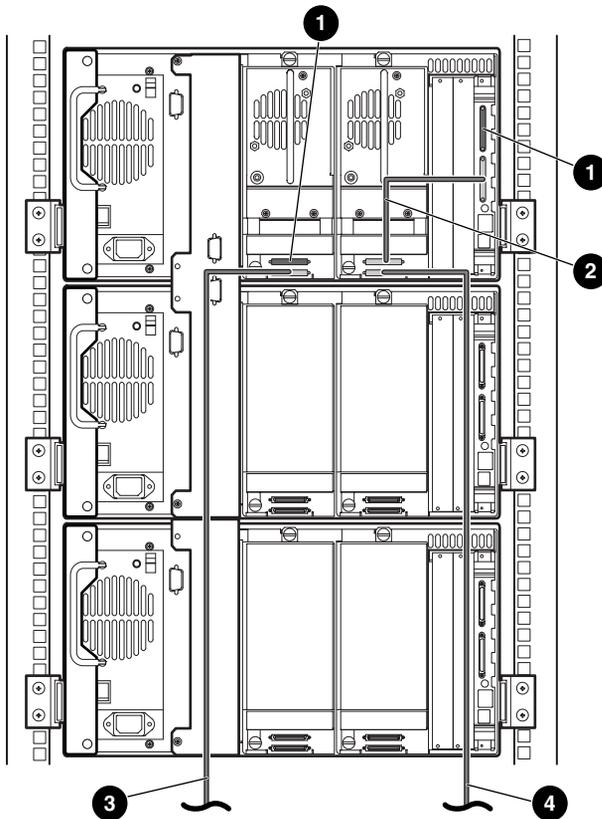


Figure E-12: MSL5026/MSL5030 Multi-unit, 2 hosts/2 drives in master/no drives in slaves

- ❶ SCSI Terminator
- ❷ 0.5M cable
- ❸ Host cable (Bus 1, to host system)
- ❹ Host cable (Bus 0, to host system)

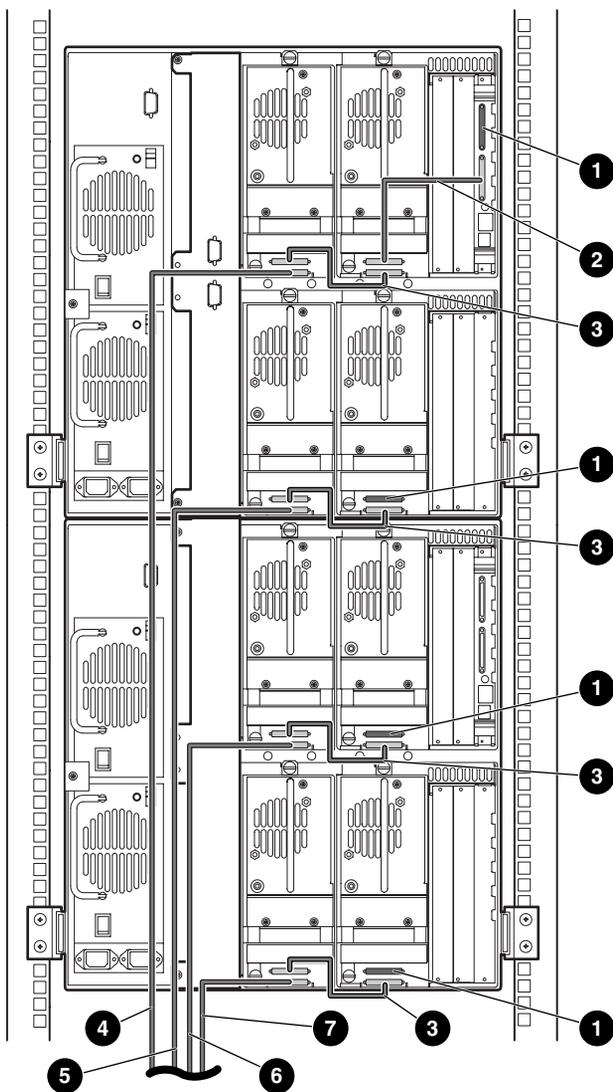


Figure E-13: MSL5052/MSL5060 Multi-unit, 4 hosts/8 drives

- ❶ SCSI Terminator
 - ❸ 0.25M cable or 0.5M cable
 - ❺ Host cable (Bus 2, to host system)
 - ❻ Host cable (Bus 3, to host system)
- ❷ 0.5M cable
 - ❹ Host cable (Bus 1, to host system)
 - ❼ Host cable (Bus 4, to host system)

Pass-Through Mechanism Cabling

Use the following guidelines when configuring your PTM:

- All libraries must be powered off.
- Connect motor cable from the master library unit to the PTM base unit.
- Connect one ethernet cable from each library unit in the configuration to the router.

Configuration Examples

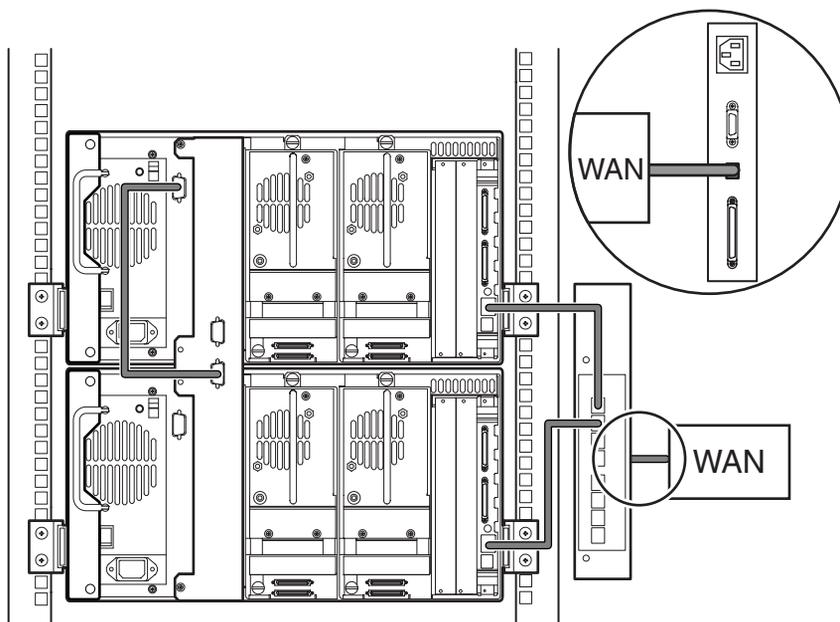


Figure E-14: MSL5026/MSL5030 Multi-unit, single master/slave

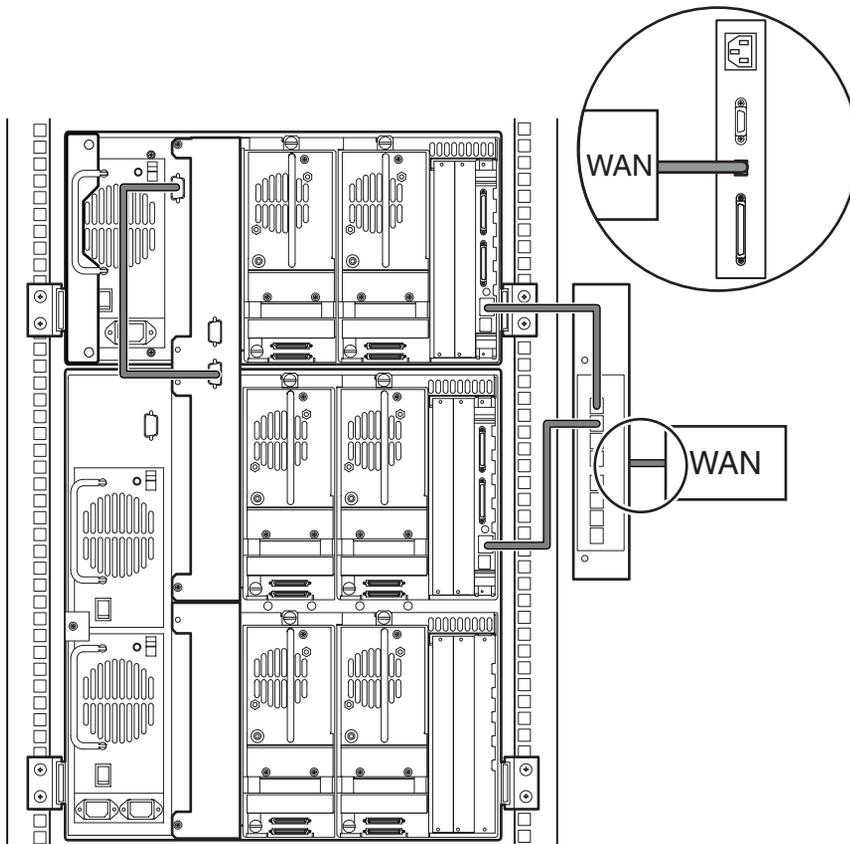


Figure E-15: MSL5026/MSL5030 master with MSL5052/MSL5060 slave

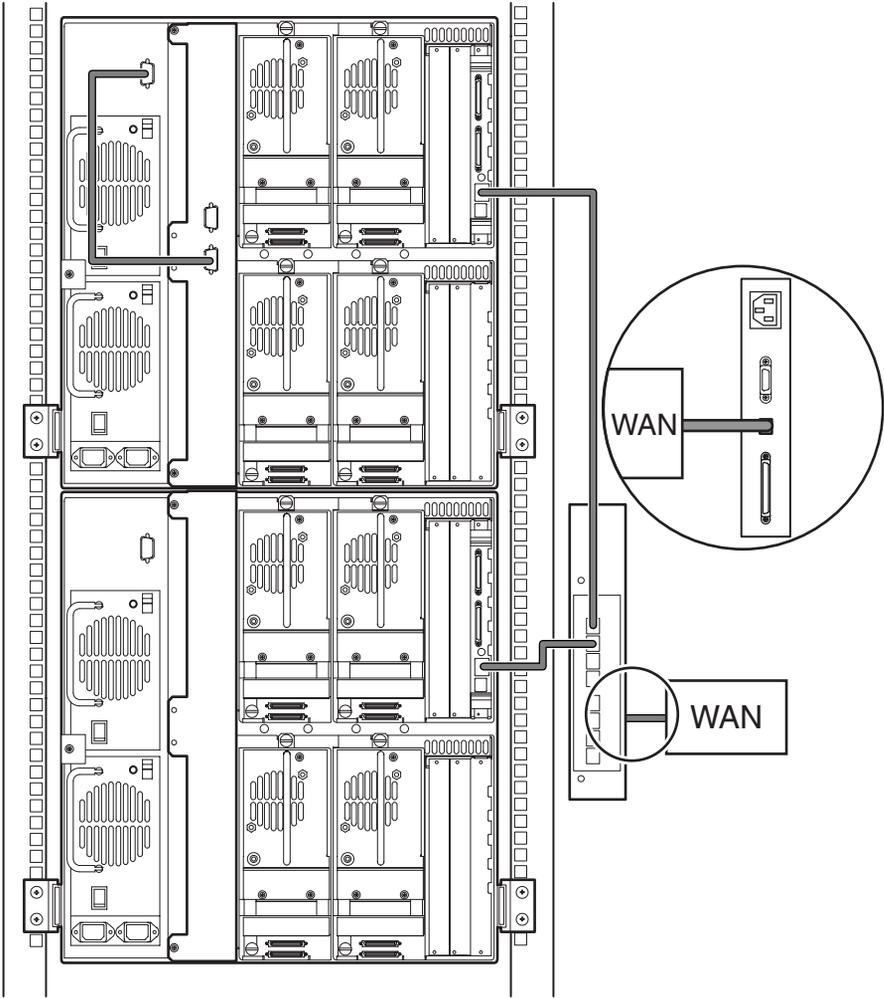


Figure E-16: MSL5052/MSL5060 Multi-unit, single master/slave

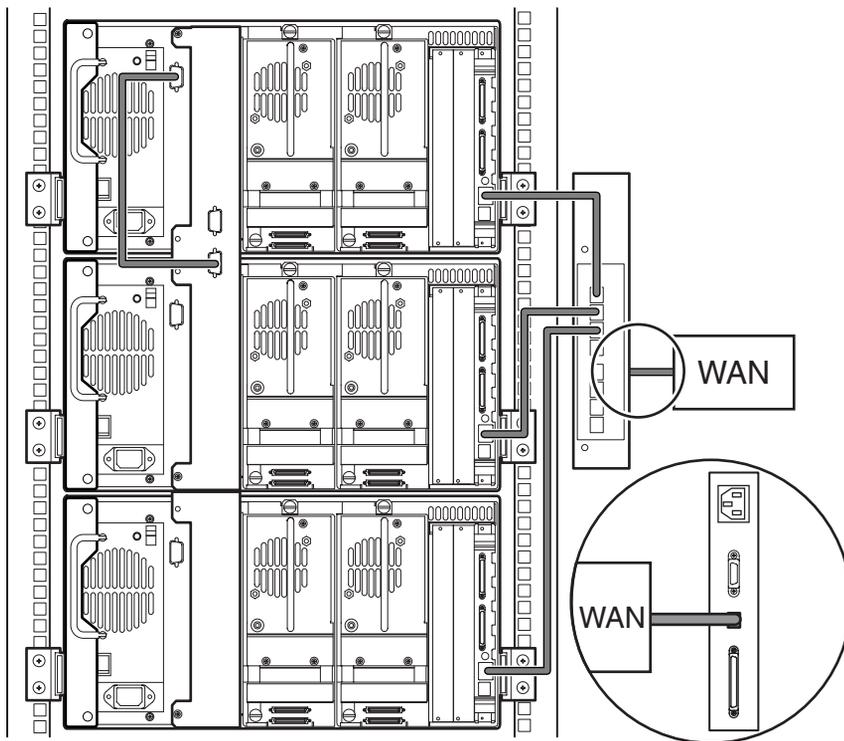


Figure E-17: MSL5026/MSL5030 Multi-unit, single master/multiple slaves

Optional Fibre Channel Card

The optional Fibre Channel card enables connectivity between MSL5000 series libraries and Fibre Channel based storage area networks (SANs), allowing them to be attached to either a Fibre Channel Arbitrated Loop (FC-AL) or switched fabric.

Host Prerequisites

To use Fibre Channel, check the host for the following:

- Fibre Channel backup software, host interface adapters, and associated device drivers.
- Host that acts as an initiator using the Fibre Channel controller to communicate with Fibre Channel SCSI target devices.
- Backup software with robust error recovery. Fibre Channel is an open system, similar to LAN. Consequently, Fibre Channel is subject to data flow interruptions from power cycling, connections, disconnections, and ESD charges.

Connectors and Indicators

Figure F-1 shows the connectors and indicators for the optional Fibre Channel board.

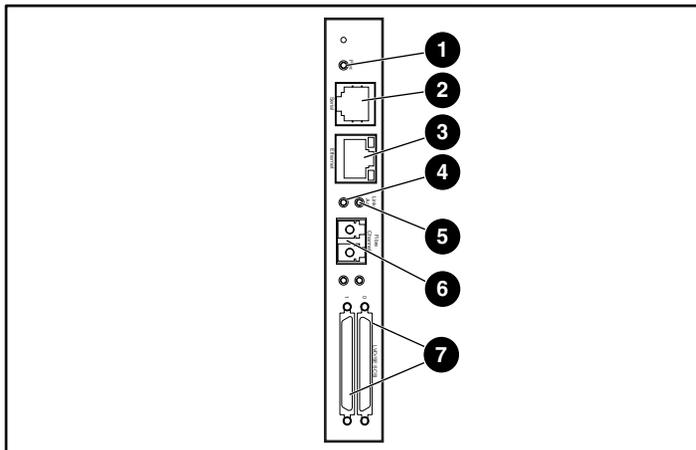


Figure F-1: Connectors and indicators

- | | |
|----------------------------|------------------------------|
| ❶ Power LED | ❷ Serial RJ-11 connector |
| ❸ Ethernet RJ-45 connector | ❹ Fibre Channel activity LED |
| ❺ Fibre Channel link LED | ❻ FC-LC connector |
| ❼ SCSI VHDCI connector (2) | ❼ |

Power Indicator

The Fibre Channel card has one power LED ❶. LED definitions:

- Green - power has been applied
- Yellow - POST is in process or processor problems present

Serial Port

The Fibre Channel card has one serial port ❷. The serial port can be used to access the Serial/Telnet user interface, which is used to locally manage and configure the Fibre Channel card.

Ethernet Port

The Fibre Channel card has one Ethernet port ③. LED definitions:

- Activity - there is port activity
- Link - a valid Ethernet link exists

Fibre Channel Port

The Fibre Channel card has one Fibre Channel port ⑥. LED definitions:

- Green (ACT) - Fibre Channel port activity ④
- Green (LINK) - a valid Fibre Channel link exists ⑤

SCSI VHDCI Connectors

The Fibre Channel card has two SCSI VHDCI connectors. A green LED indicates activity on the corresponding port.

Configuration

For detailed configuration information, refer to the StorageWorks by Compaq Network Storage Router User Guide available on the MSL5000 Series Documentation CD or on the HP website at: http://www.compaq.com/storage/tape_index.html.

Before attempting to configure the Fibre Channel board, a basic understanding of Fibre Channel and SCSI devices is recommended. For information on SCSI standards, refer to publications from X3T10 committee of ANSI (American National Standards Institute). For more information on Fibre Channel standards, refer to publications from the X3T11 committee of ANSI. To purchase approved American National Standards and Technical Reports, contact ANSI at (212)642-4900.

Default Ethernet Settings

The basic factory default values are:

- IP address: `http://1.1.1.1/`
- Subnet mask: `255.255.255.0`
- Gateway address: `0.0.0.0`
- User name: `root`
- Password: `password`

HP recommends that you change these values from the defaults.

All settings within the configuration are pre-set with default values. These values are set to allow the Fibre Channel card into most HP environments with little or no configuration changes.

After changing the basic default values listed above, carefully consider any additional configuration changes.

After the initial configuration is established, HP recommends backing up the configuration to an external file. If needed, during a recovery process, this file can then be restore back onto the router.

Configuration Examples

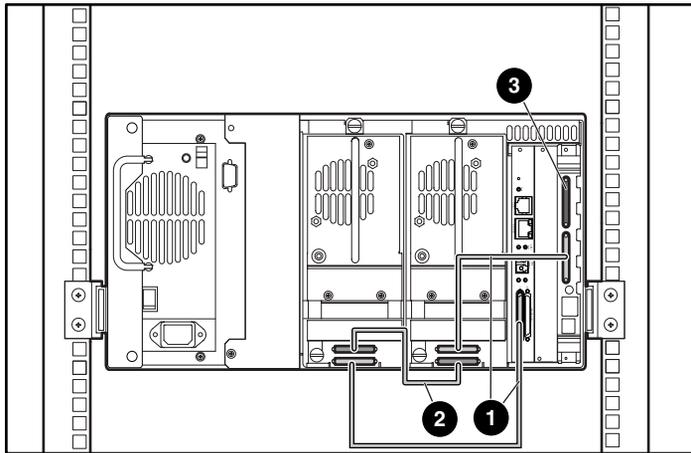


Figure F-2: MSL5026/MSL5030 standalone

- ❶ 0.5M cable
- ❷ 0.25M cable or 0.5M cable
- ❸ Terminator

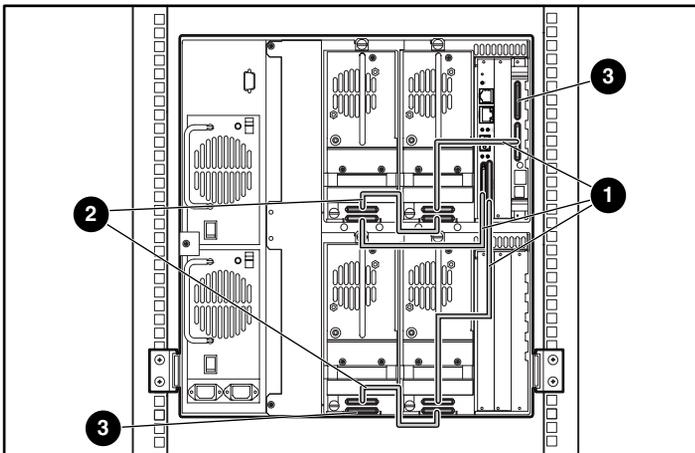


Figure F-3: MSL5052/MSL5060 standalone

- ❶ 0.5M cable
- ❷ 0.25M cable or 0.5M cable
- ❸ Terminator

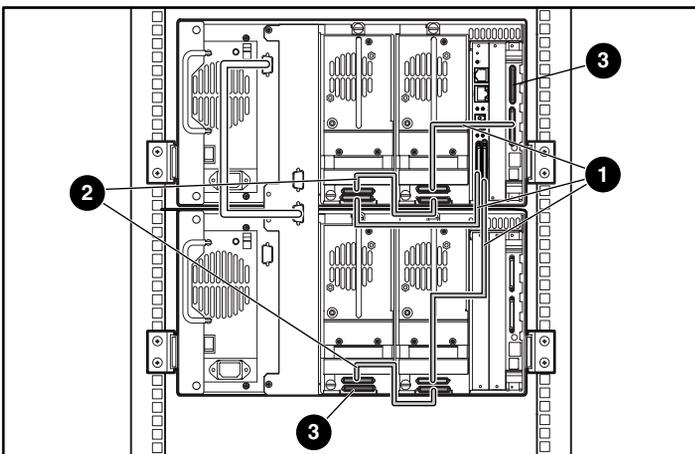


Figure F-4: MSL5026/MSL5030 stacked

- ❶ 0.5M cable
- ❷ 0.25M cable or 0.5M cable
- ❸ Terminator

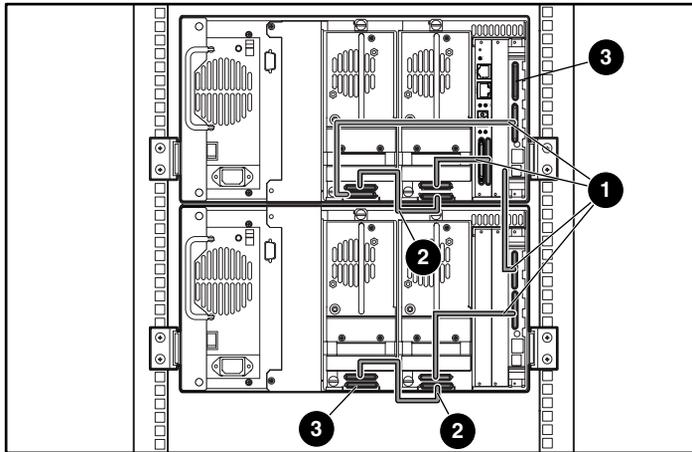


Figure F-5: MSL5026/MSL5030 dual standalone

- ❶ 0.5M cable
- ❷ 0.25M cable or 0.5M cable
- ❸ Terminator

Resetting the Fibre Channel Card

The Fibre Channel card can be reset by using a paper clip or other sturdy tool to push the reset switch shown in Figure F-6.

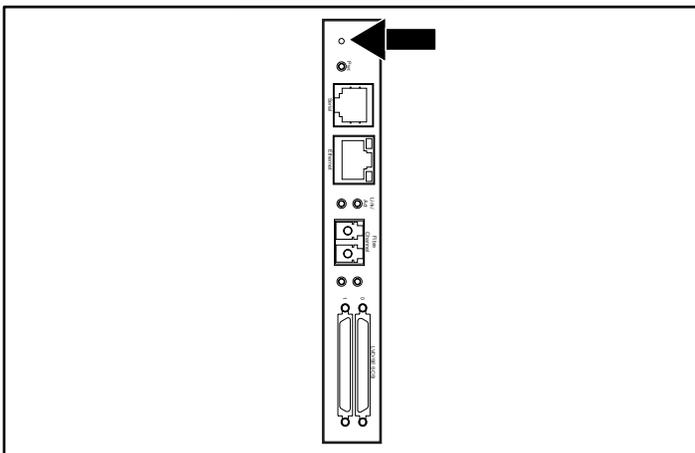


Figure F-6: Reset switch

Index

A

abort move status 4-26
acoustic specs B-5
authorized reseller xiii
auto power-up 4-21

B

barcode
 label
 assignment 4-22
 check digit 4-22
 labels 4-11
 reader 1-7
base address 4-25
blank panel D-2
blank panel removal D-2
bus ID 4-23, 4-24
bus parity 4-24
button names, convention defined ix

C

cable configuration 2-10
 2 tape drives, 1 host 2-11
 2 tape drives, 2 hosts 2-12
 PTM E-13
 PTM examples E-13
 SCSI E-1
 SCSI examples E-2
card cage 1-9
cartridge map 4-28
cartridge shuttle assembly 1-7
Caution, symbol and definition xi
cleaning cartridge
 automatic 6-2

cleaning slot 6-4
mail slot 6-3
mail slot, replacing 6-5
manual 6-2
replacing 6-4
reserved slot 6-4
right magazine, replacing 6-5
running 6-2

clip nuts 2-6
command names, convention defined x
controller
 wide LVD/SE 2-10
conventions
 button names, defined ix
 command names, defined x
 dialog box names, defined ix
 directory names, defined ix
 drive names, defined x
 filenames, defined x
 key sequences, defined ix
 keyboard keys, defined ix
 menu command sequences, defined x
 menu items, defined ix
 named keys, defined ix
 system responses, defined x
 URLs, defined x
 user input, defined x

D

data speed transfer 4-26
device capability page length 4-24
diagnostics 4-33
dialog box names, convention defined ix
directory names, convention defined ix

DNS server 4-27
door open response 4-26
doors 2-7
 magazine 4-3
 mechanical releases 4-3
 open for installation 2-7
drive and slot numbering 4-21
drive names, convention defined x

E

edit options 4-19, 4-29
electrical shock hazard, symbol and definition xi
electronics controller card 1-7
electrostatic discharge C-1
environmental specs B-4
equipment symbols xi
error recovery procedures 7-2
errors
 post recovered 4-25
European Union Notice A-4
excessive weight, symbol and definition xii

F

fasteners 2-4
fault symptom codes 7-5
fibre channel board
 described 1-10
 location 1-9
fibre channel card
 configuration examples F-5
 configuring F-4
 Ethernet settings F-4
 resetting F-8
filenames, convention defined x
firmware
 level
 recommended 6-7
 verifying 6-7
 updating 6-6
 upgrade requirements 6-7
front panel 4-2
FSCs 7-5

G

getting help xiii
 technical support xiii
grounding methods C-2
GUI touch screen 1-10, 4-5

H

Help, obtaining xiii
host system 4-6
hot surface, symbol and definition xii

I

illustrated
 applying power 2-9
 attaching a barcode 4-11, 4-12
 blank panel removal D-2
 cable configuration 2-11, 2-12
 card cage 1-9
 controller board 1-8
 front panel 1-10, 4-2
 indicators 4-4
 inserting a tape cartridge 4-9
 installing the library 2-7
 installing the rails 2-5
 left magazine mail slot 4-10
 left tape magazine 4-8
 magazines 1-4
 mechanical releases 4-3
 power supply 1-6
 PTM mounting location 1-12
 removing magazines 4-7
 reserved slot locations 3-5, 3-6, 3-7, 3-8
 robotics 1-7
 securing the library 2-8
 tabletop model clearances 2-2
 tape drive locations 1-3
 template 2-4
 troubleshooting flow chart 7-3
import/export element base address 4-25
Important, defined xi

- indicators
 - front panel 1–10
 - library 4–4
- init element status 4–24
- initialization screen 4–13
- initiate wide data transfer negotiation 4–26
- installing rails 2–5
- installing the library 2–7
- K**
- key sequences, convention defined ix
- keyboard keys, convention defined ix
- L**
- labels, barcode 4–11
- latch mechanism 2–7
- LCD contrast adjust 4–22
- LCD contrast controls 4–17
- library
 - display screens and options 4–13
- library info 4–28
- library mode 4–21
- library options 4–20
- library status LED 1–10
- library systems
 - multi-unit 1–11
- locks 4–5
- M**
- magazines 1–4
 - door mechanical releases 4–3
 - doors 4–3
 - inserting cartridges 4–8
 - removing 4–7
- mail slot
 - access 4–10
 - holder 4–10
 - mode 4–22
 - using 4–10
- maintenance 4–32
 - clean one drive 4–32
 - flash drive from SCSI 4–32
 - flash drive from tape 4–32
 - reboot module 4–32
 - replace drive 4–32
 - set user defaults 4–32
- mechanical specs B–3
- menu
 - option 4–19
 - selections 4–20
- menu command sequences, convention defined x
- menu items, convention defined ix
- models 1–2
- multiple power source, symbol and definition xii
- N**
- named keys, convention defined ix
- network interface connection, symbol and definition xi
- network options 4–27
- Note, defined xi
- O**
- offline 4–21
- online 4–18
- operational performance B–2
- options
 - edit 4–29
 - network 4–27, 4–30
 - passwords 4–31
 - SCSI 4–23, 4–30
- P**
- Pass-Through Mechanism (PTM) 1–7
- password
 - levels 4–5
 - option 4–31
- PCI slots 1–9
- post recovered errors 4–25
- power specs B–3
- power supply 1–5, 2–9
- power switch 2–9
- product identification 4–25
- PTM
 - and robotics 1–11
 - configuration examples E–13

R

rack stability xii
rackmount model 2–4
reliability B–3
reserved slots 4–21

- change settings 3–2
- locations 3–5, 3–6, 3–7, 3–8
- numbering 3–5
- setting up 3–5

retaining screws 2–7
robotics 1–9, 1–11

S

safety specs B–6
screen

- diagnostics 4–33
- drive 0 bus 0 data field 3–4
- drive 0 bus ID 3–3
- edit library options 4–29
- edit network options 4–30
- edit passwords options 4–31
- edit SCSI options 4–30
- initialization 4–13
- magazine access 4–16
- mail slot access 4–16
- maintenance 4–32
- menu 4–19
- move media 4–17
- power-down confirmation message 4–18
- reserved slots numeric keypad 3–9
- SCSI ID confirmation 3–4
- SCSI option selection 3–3
- security level 4–34
- status 4–14, 4–18
- technical support information 4–15
- total reserved slots 3–9
- total reserved slots confirmation 3–10

view library info 4–28
view library options 4–20
view network options 4–27
view SCSI options 4–23

SCSI

bus IDs 4–23
bus parity 4–24
cable configuration examples E–2
cable configurations 2–10
IDs 2–10
IDs, setting 3–2
options 4–23
securing the library 2–8
security level 4–34
set up

- network 3–11
- rackmount model 2–4
- reserved slots 3–5
- tabletop model 2–2

setting a SCSI ID 3–2
shuttle assembly 1–7
slide rails 2–4

- inner 2–6
- intermediate 2–6

specifications

- acoustics B–4, B–5
- environmental B–4
- mechanical B–3
- operational performance B–2
- power B–3
- reliability B–3
- safety B–6

status screen 4–14, 4–18
storage element base address 4–25
symbols

- in text xi
- on equipment xi

T

tabletop model
 converting to rackmount 2–3
 setting up 2–2

tape alert mode 4–25

tape cartridges
 inserting and removing 4–6
 requirements 4–11

tape drives
 adding D–2
 location 1–3
 removal and replacement D–1

technical support xiii

template 2–4

test unit ready reporting 4–24

text symbols xi

transfer element base address 4–25

transport element base address 4–24

troubleshooting
 error recovery 7–2
 procedures 7–4
 fault symptom codes 7–5
 flow chart 7–3
 platform problems 7–2

troubleshooting flow chart 7–3

U

unit attention reporting 4–24

unload mode 4–21

URLs, convention defined x

user input, convention defined x

utilities 4–19, 4–31
 diagnostics 4–33
 factory 4–33
 maintenance 4–32
 security level 4–34

V

vendor identification 4–25

view system data 4–19, 4–20

viewing window 1–10

W

Warning
 electrical shock hazard symbol, defined xi
 excessive weight symbol, defined xii
 hot surface symbol, defined xii
 multiple power source symbol, defined xii
 network interface connection symbol, defined xi
 symbol and definition xi

website xiii

websites
 technical support xiii

