

StorageTek SL150

Library Guide



E22579-22
January 2022



StorageTek SL150 Library Guide,

E22579-22

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Contents

Preface

Documentation Accessibility	xv
Class 1 Laser Product Notice	xv
Diversity and Inclusion	xv

1 About the SL150 Library

Base Module	1-2
Expansion Module	1-3
Mailslot	1-4
Magazine	1-4
Robot	1-4
Remote Interface	1-5
Front Touch Screen	1-6
Library Specifications	1-6
Weights and Dimensions	1-7
Power Requirements	1-8
Library Cartridge Capacity	1-8
Networking and Host Communication	1-9
IPv6 Network Address Support	1-10
Selecting a Switch that Uses Power Over Ethernet (POE)	1-10
Configuring a SAN Connection	1-10
Software that Supports the SL150	1-11
Automated Cartridge System Library Software (ACSLs)	1-11
StorageTek Tape Analytics (STA)	1-11
Service Delivery Platform 2 (SDP2)	1-12
Oracle Key Manager 3 (OKM)	1-12
SL150 Marketing Part Numbers	1-12
Configuration and Ordering Examples	1-15
Order Media and Labels	1-16

2 Install the Library

Verify the Site Meets Environmental Requirements	2-1
Temperature and Humidity Limits	2-1
Airborne Contaminants Limits	2-2
Positive Pressurization and Ventilation - Hot Aisle Containment System (HACS)	2-3
Electrostatic Discharge	2-3
Prepare the Rack	2-3
Unpack and Acclimate the Library	2-5
Install the Base Module	2-5
Unpack the Base Module Accessory Kit	2-6
Install the Base Module Back Rails	2-7
Install the Base Module Front Rails	2-8
Connect the Base Module Front Rail to the Back Rail	2-9
Secure the Base Module Front Rail	2-9
Verify the Installation of the Base Module Front Rail	2-10
Install the Clip Nuts (square hole racks only)	2-11
Mount the Base Module	2-12
Engage the Base Module with the Rail	2-12
Remove the Cartridge Magazine with the Hex Key	2-13
Remove the Cable Clip in the Base Module	2-13
Secure the Base Module to the Rack	2-14
Install the Expansion Module	2-14
Unpack the Expansion Module Accessory Kit	2-15
Remove the Library Floor	2-17
Install Clip Nuts for the Expansion Module (for square hole racks only)	2-18
Prepare the Expansion Module by Removing the Cartridge Magazines	2-19
Install the Floor in the Bottom Expansion Module	2-19
Mount the Expansion Module	2-21
Install the Rear Rails for the Expansion Module	2-22
Secure the Expansion Module to the Rack Front	2-23
Replace the Cartridge Magazines	2-23
Label the Modules	2-23
Install the Hook and Loop Strap	2-24
Install Power Supplies and Tape Drives	2-25
Remove the Power Supply Slot Cover	2-27
Insert a Power Supply into the Slot	2-27
Remove the Drive Slot Cover	2-28
Insert a Tape Drive Tray into the Slot	2-28
Cable the Library	2-29
Cable the Expansion Modules	2-29

Connect Cables to the Drives and Power Supplies	2-31
Connect the Network Port	2-32
Align and Dress the Cables and Cords	2-32
Unlock the Robot	2-32
Unlock the Knob-type Robot Lock	2-33
Unlock the Thumbscrew-type Robot Lock	2-33
Apply Power to the Library	2-34
Configure the Library After Powering-on for the First Time	2-34
Configure the Library: Login with the Default Admin	2-35
Configure the Library Step 1 of 6: Change the Default Administrator Password	2-35
Configure the Library Step 2 of 6: Configure the Network Port 1	2-36
Configure the Library Step 3 of 6: Set the Library Date and Time	2-37
Configure the Library Step 4 of 6: Set the Drive Element Addressing Mode	2-37
Configure the Library Step 5 of 6: Configure the Mailslot, Reserved Slots and Volume Label Format	2-38
Configure the Library Step 6 of 6: Review and Apply Initialization Settings	2-39
Configure the Library: Finish the New Configuration	2-40
Run a Self-Test	2-40
Stopping a Self-test	2-41

3 Basic User Interface Operations

Log In to the Remote Interface	3-1
Log Out of the Remote Interface	3-1
Show, Hide, and Reorder Table Columns	3-1
Export a Table as a Spreadsheet	3-2
Print a Table	3-2

4 Configure the Library

Run the Configuration Wizard	4-1
Configure the Network Interfaces	4-2
Verify Job Activity and Launch the Wizard	4-2
Configure Network Port 1	4-2
Configure Network Port 2	4-3
Set the Library Date and Time	4-4
Configure Library Settings	4-4
Partition the Library	4-6
Access the Partitioning Screen	4-6
Create a New Partition	4-7
Assign Resources to the Partition	4-7
Delete an Existing Partition	4-8

Configure Library Managed Encryption (LME)	4-8
Obtain Information from OKM	4-9
Configure the SL150 to Manage Encryption	4-9
Verify the SL150 Agent is Enrolled	4-9
Review and Apply Configuration Wizard Changes	4-10
Update Firmware	4-10
Identify Current Firmware Versions	4-10
Download Firmware from My Oracle Support	4-10
Verify the Download	4-11
Upgrade the Library Firmware	4-11
Revert to the Previous Library Firmware	4-12
Manage the Library's SSL/TLS Certificate for HTTPS	4-12
Generate a Self-Signed Certificate	4-13
Install a Third-Party Signed Certificate	4-13
Verify the Library Has a Self-Signed Certificate	4-13
Export Certificate Signing Request (CSR) File	4-13
Obtain Required Certificates	4-14
Import the Certificate File	4-14
Configure Accessibility Settings	4-14
Set Automatic Screen Refresh	4-14

5 Users

User Roles and Access	5-1
Change Your Password	5-1
Reset Another User's Password	5-2
Add a User and Assign a Role	5-2
Remove a User	5-3
Change an Assigned Role	5-3

6 Tape Cartridges (Media)

Library Support of LTO9 Tape Calibration	6-2
Media Labels	6-2
Tape Media ID	6-2
Tape Cartridge Types	6-3
M8 Cartridge Type	6-4
Label Format Types	6-4
Support for Non-Standard Label Formats	6-4
Prepare Diagnostic, Cleaning, and Data Tape Cartridges	6-5
Apply a Label to a Tape Cartridge	6-6

View a List of Tape Cartridges	6-6
View Tape Cartridge Health (Media Health)	6-7
Guidelines for Handling Tape Cartridges	6-7
Inspect a Tape Cartridge	6-7
Clean the Tape Cartridge Exterior	6-8
Store Tape Cartridges	6-9
Load the Magazines (Bulk Loading)	6-9
Unlock and Remove the Magazines	6-9
Load the Left Magazine in the Base Module	6-10
Load the Remaining Magazines	6-11
Lock the Magazines and Audit the Library	6-11
Update Media Health After a Bulk Load	6-11
Import or Export Cartridges Using the Mailslot	6-12
Assign the Mailslot to a Partition	6-12
Import Tape Cartridges	6-13
Export Tape Cartridges	6-13
Open the Mailslot	6-13
Close the Mailslot	6-14
Unassign the Mailslot	6-14
Move Tape Cartridges with the Remote Interface	6-15
Determine the Required Number of Reserved System Slots	6-15
Determine the Number of Cleaning Cartridges	6-16
Manage Expired Cleaning Cartridges	6-17
Monitor Cleaning Cartridges Using the Remote Interface	6-17
Replace Expired Cleaning Tapes Using the Remote Interface	6-17
Replace Expired Cleaning Tape Using the Host Application	6-18
Media Validation	6-18
Add a Drive to the Media Validation Pool	6-19
Remove a Drive from the Media Validation Pool	6-20
Start a Media Validation	6-20
Manually Cancel a Validation in Progress	6-21
Clear a Media Validation Drive Reservation	6-21
Monitor Media Validation	6-21
Media Validation Types	6-24
Effects of a Library Restart on Media Validation	6-24
Why Aren't the Media Validation Drives Showing in STA?	6-24

7 Tape Drives

Supported Tape Drives	7-1
Bridged Tape Drives	7-2

Library Managed Encryption (LME)	7-2
Behavior of Library Port 1 and Port 2 with LME	7-3
View Drive Information	7-4
Configure Drive Cleaning	7-4
Enable Library-Managed Drive Auto Cleaning	7-5
Configure Host-Managed Drive Cleaning	7-5
Configure Automatic Cleaning in Oracle Secure Backup During Drive Setup	7-6
Set Up Auto Cleaning with FUJIFILM Object Archive	7-6
Set Up NetBackup for Reactive Cleaning	7-6
Set Up Symantec Backup Exec Drive Cleaning	7-7
Set Up Reactive Cleaning for HP StorageWorks Enterprise Backup Solution with HP Data Protector	7-7
Set Up As-Needed Cleaning in IBM Tivoli Storage Manager (TSM)	7-7
Set Up Tape-Alert Cleaning in EMC Networker	7-8
Set Up CommVault Drive Cleaning	7-8
Manually Clean a Drive (Not Recommended)	7-8
Restart a Drive	7-9
Enable or Disable Drive Ports	7-9
Update the Drive Firmware	7-10

8 Monitor the Library

View the Library Screen	8-1
View the Library State	8-2
Library LED Status Indicators	8-2
Determine the Possible Cause of a Degraded or Failed Library State	8-3
View User and Host Activity	8-3
Configure Simple Network Management Protocol (SNMP)	8-4
SNMP Versions	8-4
SNMP Traps	8-5
Enable or Disable SNMP	8-5
Configure an SNMP User	8-5
Configure an SNMP Trap Recipient	8-6
Send a Test Trap	8-6
Download the Management Information Base (MIB)	8-6
Enable or Disable the Service Delivery Platform (SDP2)	8-7
Configure Email Notifications	8-7
Enable or Disable Email Notifications	8-7
Configure Email Recipients	8-8
Send a Test Email Alert	8-8

9 Service the Library

Place the Library Online or Offline	9-1
Power On the Library	9-2
Library Startup Sequence	9-2
Power Off the Library	9-2
Controlled Power-Down from the Interface	9-3
Forced Power-Down	9-3
Lock the Robot	9-3
Lock the Knob-type Robot Lock (new version)	9-4
Lock the Thumbscrew-type Robot Lock (older version)	9-4
Restart the Library	9-5
Restarting the Library Following a Power Outage	9-5
Audit the Library	9-5
Monitor an Audit in Progress	9-6
Move the Library Rack	9-6
Enable the Locate Light	9-6
Troubleshoot the Library	9-7
Diagnose a Browser-Based User Interface Problem	9-7
Diagnose a Library Problem	9-7
Diagnose Why You Cannot Login to the Remote Interface	9-8
Use the Health Table to Diagnose the Issue	9-8
Check if a Fault is Closed in the Health Log	9-9
Locate and Remove a Cartridge Stuck in a Magazine Slot	9-9
Locate and Clear Obstructions, Such as Loose or Protruding Cartridges	9-10
Save the Health Log to a File	9-11
Run a Self-Test	9-11
Restore the Factory Default Configuration	9-12
SAS-2 and SAS-3 Configuration Issues	9-13
Get Parts and Technical Support	9-13
Check for Relevant Knowledge Articles	9-14
Get Firmware Updates	9-14
Create a Service Request	9-14
Run a Self-Test	9-14

10 Replace Components (CRUs & FRUs)

CRU Locations	10-2
Drive Tray Removal and Replacement	10-2
Remove the Drive Tray	10-3
Replace the Drive Tray	10-4
Remove New Drive Tray from Package	10-4

Replace the Drive Tray	10-4
Verify the Library Recognized the New Drive Tray	10-4
Install the Drive Slot Cover	10-5
Power Supply Removal and Replacement	10-5
Remove the Power Supply	10-6
Replace the Power Supply	10-6
Install a Power Supply Slot Cover	10-7
Front Control Panel Removal and Replacement	10-7
Remove the Front Control Panel	10-8
Replace the Front Control Panel	10-9
Module Controller Removal and Replacement	10-10
Remove the Module Controller	10-10
Replace the Module Controller	10-11
Robot Module Removal and Replacement	10-12
Remove the Robot Module	10-12
Park and Lock the Robot	10-12
Slide Robot CRU Out of Base Module	10-13
Manually Retract the Robot	10-13
Manually Disengage the Robot	10-14
Cut the Robot Cables	10-15
Manually Remove the Robot CRU	10-15
Manually Remove the Z Platform	10-15
Clean Up After Manually Removing the Robot	10-16
Replace the Robot Module	10-16
Reinsert the Robot CRU and Unlock the Robot	10-16
Reconnect Cabling to the Base	10-16
Expansion Module Chassis Removal and Replacement (FRU)	10-17
Remove an Expansion Module	10-18
Power Down, Lock the Robot, and Remove Magazines	10-18
Remove the Floor, Cables, and Cords	10-18
Remove Operational Expansion Modules Below the Defective Module	10-19
Remove Components from the Defective Module	10-19
Replace the Expansion FRU Chassis	10-20
Install the Expansion Module Chassis	10-20
Install CRUs, Fillers, and Magazines in Replaced Module	10-20
Install the Remaining Expansion Modules	10-21
Cable the Library and Power On After Installing the Expansion Module	10-21
Base Module Chassis Removal and Replacement (FRU)	10-21
Remove the Base Module Chassis	10-22
Lock the Robot and Remove Expansion Modules	10-22
Remove Base Chassis and Parts for Reuse	10-22

Replace the Base Module Chassis	10-23
Install the Base Module into the Rack	10-23
Install the Base Module CRUs and Expansion Modules	10-23
Reinstall Magazines and Dress the Cables	10-24
Validate the Component Installation	10-24
Return CRU Components to Oracle	10-25
Lock the Robot for Shipment within a Rack	10-25
Power Down the Library and Verify Robot Position	10-25
Install the Shipping Clip	10-26

A Slot Mapping and Cartridge Locations

Cartridge Slot Addressing	A-1
Reserved Slot Addressing	A-1
Drive, Mailslot, Power Supply, and Robot Addressing	A-1
SCSI Element Addressing	A-2
Example Library Configurations and Slot Maps	A-2

Glossary

Index

List of Figures

1-1	Base Module and Two Expansion Modules (Front View)	1-1
1-2	Base Module and Expansion Modules (Rear View)	1-2
1-3	Front Control Panel Home Screen	1-6
2-1	Rear View of Sun Rack II (PDU on Right Side)	2-4
2-2	Base Module Accessory Package Mounting Hardware	2-6
2-3	Back Rail Position	2-7
2-4	Back Rails Installed	2-8
2-5	Front Rail Installation (Left Rail Shown)	2-9
2-6	Mounting Block for Front Rail (Right Rail Shown)	2-10
2-7	Rails Installed - Front View	2-11
2-8	Clip Nut Location for the Base Module	2-11
2-9	Tab and Rail Engagement	2-12
2-10	Cable Clip Removal	2-14
2-11	Expansion Module	2-15
2-12	Expansion Module Accessory Package Hardware	2-16
2-13	Library Floor Removal from the Base Module	2-17
2-14	Expansion Module Clip Nut Installation	2-18
2-15	Magazine Latches	2-19
2-16	Library Floor	2-20
2-17	Floor Secured	2-20
2-18	Scratch Avoidance	2-21
2-19	Alignment Tab Seated	2-22
2-20	Expansion Module Back Rail and Clip Nut	2-22
2-21	Expansion Module ID Label	2-24
2-22	Hook and Loop Strap	2-24
2-23	SL150 Library Rear View	2-25
2-24	Power Supply	2-26
2-25	Tape Drive Tray	2-26
2-26	Initial Cabling Example	2-29
2-27	Cabling the Expansion Modules	2-31
6-1	Correct Label Orientation	6-6
8-1	LEDs on Front of Base Module	8-2
8-2	LEDs on Rear of Base Module	8-3
8-3	LEDs on Rear of the Expansion Module	8-3
10-1	Tape Drive Tray CRU (HP LTO-5)	10-3

10-2	Power Supply CRU	10-6
10-3	Rear View of the Front Control Panel	10-8
10-4	Bullwheel Gear and Robot Lock	10-14
10-5	Expansion Module FRU	10-17
10-6	Module Rear Rail Removal	10-19
10-7	Base Module FRU	10-22
10-8	Cable Attachment	10-24
A-1	Non-Partitioned One Module Library, Standard Mailslot, and No Reserved Cells	A-2
A-2	Non-Partitioned Two Module Library, Expanded Mailslot, and No Reserved Cells	A-3
A-3	Non-Partitioned 15 Module Library, Standard Mailslot, and Three Reserved Cells	A-4

List of Tables

1-1	Shipping (Packaged) Weights and Dimensions	1-7
1-2	Component (Unpackaged) Weights and Dimensions	1-7
1-3	Storage Slot, Mailslot, and Drive Counts for Different Configurations	1-9
2-1	Gas Limit Recommendations	2-2
7-1	Port Configuration Options	7-3
8-1	SNMP Trap Levels	8-5

Preface

This guide provides comprehensive information about Oracle's StorageTek SL150 Modular Tape Library. It is intended for anyone involved with planning, installation, operation, or maintenance of the SL150 library.

Documentation Accessibility

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Class 1 Laser Product Notice

The StorageTek SL150 Modular Tape Library contains a class-1 laser as defined by IEC 60825-1 Ed. 3 (2014) and EN 60825-1:2014.

Caution:

Use of controls or adjustments or performance of procedures other than those specified may result in hazardous radiation exposure.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers and partners we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

1

About the SL150 Library

Oracle's StorageTek SL150 Modular Tape Library is a scalable, rack-mounted, modular automated tape library.

- [Base Module](#)
- [Expansion Module](#)
- [Mailslot](#)
- [Magazine](#)
- [Robot](#)
- [Remote Interface](#)
- [Front Touch Screen](#)
- [Tape Cartridges \(Media\)](#)
- [Tape Drives](#)
- [Library Specifications](#)
- [Networking and Host Communication](#)
- [Software that Supports the SL150](#)
- [SL150 Marketing Part Numbers](#)

The SL150 library has two module types: the Base Module and Expansion Modules. Each module has two drive slots and stores up to 30 tapes in two 15-slot magazine (one on the left side and the other on the right side). Additionally, a four slot mailslot resides in the Base Module for importing or exporting tapes. The library must have one Base Module and can contain up to 14 Expansion Modules.

Figure 1-1 Base Module and Two Expansion Modules (Front View)



L207_225

Illustration Legend:

- 1 - Base module (Module 1)
- 2 - Expansion module (Module 2)
- 3 - Left cartridge magazines
- 4 - Right cartridge magazines
- 5 - Front control panel
- 6 - Mailslot

Figure 1-2 Base Module and Expansion Modules (Rear View)

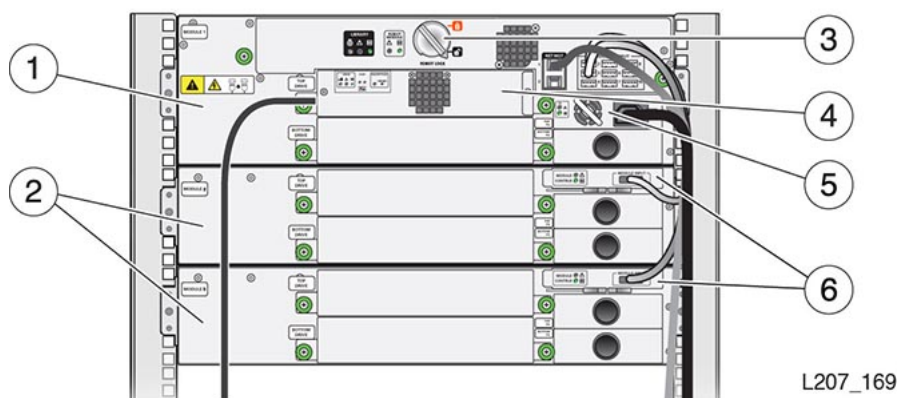


Illustration Legend:

- 1 - Base module (Module 1 label is on the rear panel of the module)
- 2 - Expansion modules (a label with the module number is on the rear panel)
- 3 - Robot lock (knob-type)
- 4 - Tape drive tray
- 5 - Power supply
- 6 - Module controller

Base Module

The Base Module contains the main hardware components of the library. One Base Module is required per library.

The Base Module is a 3U rack mounted unit. Each library must contain a Base Module at the top of the library. A single Base Module is the smallest library configuration.

The Base Module ships with:

- Front control panel
- Two 15-slot tape magazines (left and right)
- Standard Mailslot with four tape slots (firmware version 2.25, and later, supports a 19 slot Expanded Mailslot configuration)
- Robot
- Power supply (with an option to add a second power supply)

- Tape drive (with an option to add a second drive)
- Accessory kit containing rail components, attachment hardware, and labels

The rear of the Base Module contains an Ethernet port for remote management and nine USB Type A ports to connect to Expansion Modules.

Related Topics

- [Install the Base Module](#)
Install the Base Module in a standard rack before installing any Expansion Modules below it.
- [Base Module Chassis Removal and Replacement \(FRU\)](#)
The entire Base Module can be removed and replaced by Oracle service.

Expansion Module

An Expansion Module provides additional cartridge storage and tape drive capacity. You can install up to 14 Expansion Modules below the Base Module.



Note:

Support for 14 Expansion Modules requires hardware level 12 and firmware 3.00 or above. Hardware level 11 and below only supports 9 Expansion Modules.

Each Expansion Module can contain up to two drives and two power supplies. However, they ship without tape drives or power supplies installed.

The Expansion module only requires a power supply if you install a tape drive in it. If you do not install a tape drive, the Expansion Module can operate off of the power provided by the USB cable connected to the Base Module. If you install a drive in the Expansion Module, you must also install at least one power supply. You can add a second power supply for redundancy, however one power supply can provide power for two drive.

Each Expansion Module requires 2U of rack space. The Base Module connects to each of the Expansion Modules using a USB Type A connector.

An Expansion Module ships with:

- Two 15-slot tape magazines (left and right)
- Module controller
- Expansion cable that has two USB Type A connectors
- Mounting hardware to secure the module to the rack
- Identification labels

Related Topics

- [Install the Expansion Module](#)
Install up to 14 Expansion Modules below the Base Module to increase drive and cartridge capacity.
- [Expansion Module Chassis Removal and Replacement \(FRU\)](#)
The entire Expansion Module is a FRU that can be removed and replace by Oracle service.

Mailslot

The mailslot imports and exports cartridges without interfering with robot operations. It is often referred to as a cartridge access port (CAP) in other StorageTek libraries.

The four cartridge mailslot is located above the right magazine in the Base Module. You can use the mailslot to import or export cartridges without disrupting other library operations.

The optional expanded mailslot configuration converts the right-side 15-slot magazine of the Base Module into an additional mailslot. Configuring the expanded mailslot requires library firmware version 2.25 or later.

Related Topics

- [Tape Cartridges \(Media\)](#)
Tape cartridges store data. Each tape cartridge must be compatible with at least one tape drive in the library.
- [Import or Export Cartridges Using the Mailslot](#)
Use the mailslot to import or export cartridges without interrupting robot operations.

Magazine

Each magazine provides 15 storage slots for tape cartridges. Each library module has a left and right magazine.

Magazines slides into the module and store tape cartridges for the robot to access. During normal library operations, the magazines stay in place. In certain cases, you can use the magazine to bulk load cartridges.

The optional expanded mailslot configuration converts the right-side 15-slot magazine of the Base Module into an additional mailslot. Configuring the expanded mailslot requires library firmware version 2.25 or later.

Related Topics

- [Remove the Cartridge Magazine with the Hex Key](#)
A specialized hex key tool allows you to remove the cartridge magazine.
- [Load the Magazines \(Bulk Loading\)](#)
Bulk load the magazines to save time importing cartridges.

Robot

The robot retrieves and inserts cartridges into the mailslot, storage cells, and tape drives.

Within the Base Module, a bull wheel and pulley rotate to raise and lower the robot hand, which contains a label barcode scanner and retractable grippers to grab and release cartridges. During shipment the robot is locked at the top of the Base Module within the Robot Module. You must unlock the robot before use.

Related Topics

- [Robot Module Removal and Replacement](#)
The Robot Module is a CRU located at the top of the Base Module.
- [Unlock the Robot](#)
Unlock the robot before operating the library.
- [Lock the Robot](#)
Lock the robot if removing or replacing the robot, moving the library, or preparing the library for shipment.

Remote Interface

The remote interface is a browser-based application used to monitor and managed the library.

The remote interface allows you to interact with the library and view library status. You can access the remote interface from any workstation with a network connection to the library. Since the interface is web-based, you do not need to download or locally install anything. The main areas of the remote interface are described below.



1. **Masthead** — Displays the current user and allows you to set user preferences, access the help, and logout
2. **Status Bar** — Displays the current library state and allows you to control the online/offline and on/off state of the library.
3. **Library Activity Bar** — Displays current library operations and allows you to access the activity log.
4. **Navigation** — Each button navigates to view different parts of the interface. Depending upon the user's role, some of these buttons may not appear.
5. **Content** — Changes depending on the navigation area selected

Related Topics

- [Log In to the Remote Interface](#)
Access the remote interface from any workstation with a network connection to the library.

- [Log Out of the Remote Interface](#)
Log out when you are done using the interface.

Front Touch Screen

The library has a small touch screen on the front of the Base Module used for basic monitoring and configuration.

The touch screen is on the front of the Base Module. You can use the touch screen to check on library status and configuration when you are working directly with the hardware. However, the touch screen only provides access to a limited set of functions. You cannot carry out most system-configuration and administration tasks.

Figure 1-3 Front Control Panel Home Screen



Status Bar — Located at the top of every screen. The status bar displays the current library state and contains the Home button, Copyright information button, and library activity button.

Home screen — The various home screen buttons provide access to information on library components. Use the various screens to operate and monitor the library from the local op panel. You can click the Home button in the upper-left of the Status bar at anytime to return to the home screen.

Library Specifications

Use library specifications to help plan how to implement the SL150 library. These include component weights, dimensions, power requirements, and tape cartridge capacity.

- [Weights and Dimensions](#)
- [Power Requirements](#)

- [Library Cartridge Capacity](#)

Weights and Dimensions

Size and weight for SL150 library components both packaged for shipping and unpackaged.

In the tables below:

- Base complete weight includes base chassis, two magazines, robot, one drive, and one power supply.
- Expansion complete weight includes expansion chassis, two magazines, one drive, and one power supply.

Table 1-1 Shipping (Packaged) Weights and Dimensions

Component	Width	Height	Depth	Weight
Base	63.5 cm (25 in)	40.6 cm (16 in)	115.6 cm (45.5 in)	43 kg (94.8 lbs) for pallet and complete weight 28.6 kg (63 lbs) for pallet and chassis only
Expansion	61 cm (24 in)	24.8 cm (9.75 in)	113 cm (44.5 in)	15.9 kg (35 lbs) for complete weight 12.3 kg (27 lbs) for chassis only
Tape Drive	41.6 cm (16.4 in)	21 cm (8.25 in)	43.8 cm (17.25 in)	3.6 kg (8 lbs)
Power Supply	20.3 cm (8 in)	14.6 cm (5.75 in)	30.5 cm (12 in)	1.6 kg (3.6 lbs)
Robot CRU	47.6 cm (18.75 in)	20.3 cm (8 in)	96.5 cm (38 in)	8.3 kg (18.4 lbs)
Op Panel CRU	24.5 cm (9.6 in)	9.5 cm (3.75 in)	46 cm (18.1 in)	1 kg (2.25 lbs)
Magazine CRU	31.1 cm (12.25 in)	26.4 cm (10.4 in)	73 cm (28.75 in)	3.4 kg (7.5 lbs)



Note:

You can install the SL150 in a rack with front to rear rail spacing from 457 mm (18 inches) to 902 mm (35.5 inches).

Table 1-2 Component (Unpackaged) Weights and Dimensions

Component	Width	Height	Depth	Weight
Base	48 cm(18.9 in) std. 19 in rack	3U (13.34 cm/5.25 in)	92.5 cm (36.4 in)	24.4 kg (53.9 lbs) for complete weight 13.1 kg (28.9 lbs) for chassis only
Expansion	48 cm(18.9 in) std. 19 in rack	2U (8.89 cm/3.5 in)	92.5 cm (36.4 in)	12.1 kg (26.7 lbs) for complete weight 7.5 kg (16.5 lbs) chassis only

Table 1-2 (Cont.) Component (Unpackaged) Weights and Dimensions

Component	Width	Height	Depth	Weight
Tape Drive	20.3 cm (8 in)	4.1 cm (1.6 in)	28.4 cm (11.2 in)	2 kg (4.58 lbs)
Power Supply	9.5 cm (3.75 in)	3.2 cm (1.25 in)	22.9 cm (9 in)	0.8 kg (1.82 lbs)
Robot CRU	38.1 cm (15 in)	6.4 cm (2.5 in)	86.9 cm (34.2 in)	5.1 kg (11.18 lbs)
Op Panel CRU	13 cm (5.1 in)	2.5 cm (1 in)	35 cm (13.75 in)	0.4 kg (0.9 lbs)
Magazine CRU	13.7 cm (5.4 in)	8.25 cm (3.25 in)	61.6 cm (24.25 in)	0.9 kg (1.9 lbs)

Power Requirements

Power usage for the SL150 depends on the components installed.

Component	Idle (W)	Steady State Maximum (W)
Base module (one power supply)	35	38
Expansion module (no power supplies or drives)	1	1
Tape Drive	9	29.5
Additional Power Supply	6	6

For volt-amp (VA) measurements, add 2 percent to the Watt value.

For Btu/hr, multiply the total wattage number by 3.414.

Refer to the power calculator at:

<http://www.oracle.com/us/products/servers-storage/sun-power-calculators/calc/sl150-power-calculator-1954625.html>

A minimum library configuration has a total idle power of 44 W (150 Btu/hr) and a steady state maximum of 67.5 W (230 Btu/hr).

A ten module library with 20 tape drives and 20 power supplies has a total idle power of 338 W (1154 Btu/hr) and a steady state maximum of 751 W (2564 Btu/hr).

Library Cartridge Capacity

The number of cartridges the library can hold depends on the Base Module hardware level and software version.

- Hardware level 12 and firmware 3.00+ supports up to 15 modules, 1 to 450 tape cartridges, and 1 to 30 tape drives.
- Hardware levels up to 11 with firmware 2.6 and below support up to 10 modules, 1 to 300 tape cartridges, and 1 to 20 tape drives.
IMPORTANT: You cannot upgrade older hardware to level 12. You must order a new library to have hardware level 12.

Table 1-3 Storage Slot, Mailslot, and Drive Counts for Different Configurations

Modules	Total Storage Slots for Standard Mailslot Configuration	Total Storage Slots for Expanded Mailslot Configuration	Total Drive Slots
Base Module	30	15	2
Base Module plus one Expansion Module (Each Expansion has 30 storage slots and 2 drive slots)	60	45	4
Base Module plus two Expansion Modules	90	75	6
Base Module plus three Expansion Modules	120	105	8
Base Module plus four Expansion Modules	150	135	10
Base Module plus five Expansion Modules	180	165	12
Base Module plus six Expansion Modules	210	195	14
Base Module plus seven Expansion Modules	240	225	16
Base Module plus eight Expansion Modules	270	255	18
Base Module plus nine Expansion Modules	300	285	20
Base Module plus 10 Expansion Modules	330	315	22
Base Module plus 11 Expansion Modules	360	345	24
Base Module plus 12 Expansion Modules	390	375	26
Base Module plus 13 Expansion Modules	420	405	28
Base Module plus 14 Expansion Modules	450	435	30

Networking and Host Communication

The SL150 supports IPv6. The library has requirements when selecting a switch and configuring a SAN.

- [IPv6 Network Address Support](#)
- [Selecting a Switch that Uses Power Over Ethernet \(POE\)](#)
- [Configuring a SAN Connection](#)

Related Topics

- [Behavior of Library Port 1 and Port 2 with LME](#)
The LME configuration affects the behavior of library port 1 and 2.

- [SAS-2 and SAS-3 Configuration Issues](#)
The SAS driver for Solaris 10 (Update 8 and later) and Solaris 11 (11.1 and later) disrupts communications between Oracle Solaris and common tape backup applications.

IPv6 Network Address Support

The dual-stack network configuration supports both IPv4 and IPv6.

Library firmware versions 2.0 and later support a dual-stack network configuration that uses both IPv4 and IPv6. In dual-stack mode, the library continues to recognize IPv4 addresses while adding the use of IPv6 addresses. To configure the network address, see [Configure the Network Interfaces](#). Always consult with the network administrator before configuring or changing IPv6 addressing and to get the length of the network prefix for your location.

Selecting a Switch that Uses Power Over Ethernet (POE)

Network switches providing power over Ethernet (POE) must be IEEE certified.

When selecting a POE switch, make sure that it is IEEE certified. A switch that is not IEEE certified might provide too much current over the cable and overload the Ethernet connection on the library. Results of an overload appear as the Ethernet port being unresponsive and the remote management interface not working.

Configuring a SAN Connection

You can connect the library to the host HBA through a storage area network (SAN). Configure zoning on the FC switch so only the backup servers access the library.

Zoning

Use zoning to partition a SAN into logical groupings of devices so that each group is isolated from the other and can only access the devices in its own group. Two types of zoning exist: Hardware zoning (based on physical fabric port number) and Software zoning (defined with the World Wide Node Name (WWNN) or World Wide Port Name (WWPN)).

The dynamic World Wide Name (dWWN) feature assigns world wide names to the library drive slots rather than the drives themselves, which allows you to swap or replace a drive without bringing down the entire operating system.

Persistent Binding

When a server is started, it discovers attached devices and assigns SCSI target and LUN IDs. It is possible for these SCSI assignments to change between restarts. Some operating systems do not guarantee that devices will always be allocated the same SCSI target ID after restarting. Also, some software depends on this association, so you do not want it to change.

The issue of SCSI ID assignment is addressed by persistent binding. Persistent binding is a host bus adapter (HBA) function that allows a subset of discovered targets to be bound between a server and device.

Implemented by a WWNN or WWPN, persistent binding causes a tape drive's WWN to be bound to a specific SCSI target ID.

Software that Supports the SL150

Oracle's storage software can help maximize performance, simplify management, and reduce total cost of ownership of the SL150.

- [Automated Cartridge System Library Software \(ACSLs\)](#)
- [StorageTek Tape Analytics \(STA\)](#)
- [Service Delivery Platform 2 \(SDP2\)](#)
- [Oracle Key Manager 3 \(OKM\)](#)

Automated Cartridge System Library Software (ACSLs)

ACSLs manages all library operations, efficiently sharing library resources with any ACSLS-enabled application, allowing centralized library control across multiple StorageTek libraries.

To use ACSLS, you must set the SL150's Drive Element Addressing mode to Installed Drives Only.

ACSLs Version	Description
8.2	Minimum level to support the SL150
8.3 patch 2	Minimum level to support library firmware version 2.25+ which supports new ASC and ASCQ reporting
8.3 patch 3	Minimum level to support LTO-5 and LTO-6 with SL150 firmware version 2.50.
8.4	Minimum level to support LTO-5 and LTO-6 with SL150 firmware version of 2.60.
8.4 with patch 1	Minimum level to support LTO-7 with SL150 firmware version of 2.60.
8.2, 8.3, and 8.4	These versions do not support the Expanded Mailslot configuration (19 mailslots) available with library firmware version 2.25 or later.

Refer to the ACSLS documentation for additional information regarding support for the SL150 library and tape drives. See <https://docs.oracle.com/en/storage/storage-software/acsls/>.

StorageTek Tape Analytics (STA)

StorageTek Tape Analytics (STA) is an intelligent monitoring application for tape libraries.

STA simplifies tape storage management and allows you to make informed decisions about future tape storage investments based on the current health of the tape storage environment. STA tracks mounts, dismounts, and media usage within your tape library system. STA requires a dedicated server. Oracle recommends that you place the STA server on the same subnet as the library to improve SNMP UDP reliability. To set up communications between the STA server and the libraries, you must perform some configuration procedures on the libraries and some on the STA server.

For more information, refer to the STA documentation at: <https://docs.oracle.com/en/storage/storage-software/storagetek-tape-analytics/>

Oracle recommends minimum STA version 2.2.1 to support the SL150 Library.

Why aren't the SL150 media validation drives appearing in STA?

For media validation drives to appear in STA, you must set the Drive Element Addressing mode to Address All Drive Slots. Note that this setting conflicts with what is required for ACSLS.

Service Delivery Platform 2 (SDP2)

The StorageTek Service Delivery Platform 2 (SDP-2) is a support solution that provides faster problem resolution, analysis and trending, and improved diagnostics.

SDP is a remote application that can be installed on a Linux server that connects to the library. SDP collects device events and alerts support analysts, providing remote diagnosis and automatic service requests (ASR).

For more information, contact an Oracle representative or visit: <https://www.oracle.com/support/premier/auto-service-request.html>

Related Topics

- [Enable or Disable the Service Delivery Platform \(SDP2\)](#)
SDP2 can send automated service requests (ASR) when the library encounters an issue. Enable or disable SDP2 from the remote interface.

Oracle Key Manager 3 (OKM)

OKM provides data security by creating, storing, and managing the encryption keys for stored data.

OKM uses a cluster of Key Management Appliances (KMAs) that connect to encryption agents (such as tape drives). The KMAs can be managed using a secure GUI or CLI. For HP LTO drives, OKM connects to individual tape drives. For drives IBM LTO-6 or higher, OKM connects to the library if using Library Managed Encryption (LME).

For more information on OKM, refer to the OKM documentation at <https://docs.oracle.com/en/storage/storage-software/oracle-key-manager/>

Related Topics

- [Library Managed Encryption \(LME\)](#)
The library can manage encryption for IBM LTO-6 and higher drives.

SL150 Marketing Part Numbers

Use marketing part numbers when ordering SL150 components.

All drives listed are half-height. Oracle recommends a maximum SAS cable length of six meters.

The FC cables are multimode (50-micron) fiber-optic cables that connect Fibre Channel devices. These cables are orange with tan LC connectors. The tape drive only supports LC connectors and short wavelength SFP modules. Riser cable materials are not classified according to flammability. Plenum cables meet UL standards for flammability.

The SAS HD cables support a 12 Gb/s transfer rate, and must be used when the tape drive is connected to a SAS-3 HBA. Two LTO tape drives can be connected to one SAS-3 HBA with this cable.

Part Type	Description	Initial Order Part Number	Upgrade Part Number
Base Module	30 slots, one power supply, one IBM LTO7 8Gb FC	7114334	N/A
Base Module	30 slots, one power supply, one IBM LTO7 6Gb SAS	7114339	N/A
Base Module	30 slots, one power supply, one IBM LTO8 8Gb FC	7118433	N/A
Base Module	30 slots, one power supply, one IBM LTO8 6Gb SAS	7118432	N/A
Base Module	30 slots, one power supply, one IBM LTO9 8Gb FC	7602778	N/A
Base Module	30 slots, one power supply, one IBM LTO9 6Gb SAS	7602777	N/A
Exp. Module	30 slots (contains no tape drive or power supply)	7101763	7101770
Tape Drive	IBM LTO7 — 8Gb FC	7114335	7114343
Tape Drive	IBM LTO7 — 6Gb SAS	7114338	7114345
Tape Drive	IBM LTO8 — 8Gb FC	7118437	7118351
Tape Drive	IBM LTO8— 6Gb SAS	7118438	7118350
Tape Drive	IBM LTO9— 8Gb FC	7602769	N/A
Tape Drive	IBM LTO9— 6Gb SAS	7602770	N/A
Tape Drive (activation file)	Encryption Key for LTO 7/8/9 tape drives (one required for each drive enrolled with OKM)	LTO-ENCRYPT-ACTIVE	N/A
Power Supply	Power supply	7101769	7101771
Magazine	Pair of magazines: one left and one right	N/A	7101774
Ethernet Cable	CAT5E, 50 inches, shielded	CABLE10187035-Z-A	CABLE10187035-Z
Ethernet Cable	CAT5E, 8 feet, shielded	CABLE10187033-Z-A	CABLE10187033-Z
Ethernet Cable	CAT5E, 35 feet, shielded	CABLE10187034-Z-A	CABLE10187034-Z
Ethernet Cable	CAT5E, 55 feet, shielded	CABLE10187037-Z-A	CABLE10187037-Z
FC Cable	LC-LC, 50/125/ duplex, riser, 1 meter	CABLE10800307-Z-A	CABLE10800307-Z
FC Cable	LC-LC, 50/125/ duplex, riser, 3 meter	CABLE10800340-Z-A	CABLE10800340-Z
FC Cable	LC-LC, 50/125/ duplex, riser, 5 meter	CABLE10800341-Z-A	CABLE10800341-Z
FC Cable	LC-LC, 50/125/ duplex, riser, 2 meter	CABLE10800308-Z-A	CABLE10800308-Z
FC Cable	LC-LC, 50/125/ duplex, riser, 10 meter	CABLE10800310-Z-A	CABLE10800310-Z

Part Type	Description	Initial Order Part Number	Upgrade Part Number
FC Cable	LC-LC, 50/125,OM4, 50 meter, riser	7106951	7106952
FC Cable	LC-LC, 50/125/ duplex, plenum, 10 meter	CABLE10800313-Z-A	CABLE10800313-Z
FC Cable	LC-LC, 50/125/ duplex, OM4, 50 meter, plenum	7106953	7106954
SAS Cable	1x2, 3 M mini SAS to mini SAS cable	7100274	7100275
SAS Cable	1x1, 3 M mini SAS to mini SAS cable	7100276	7100277
SAS HD Cable	1x1, 3 M mini SAS HD to mini SAS cable	N/A	7106737
SAS HD Cable	1x1, 6 M mini SAS HD to mini SAS cable	N/A	7104500
SAS HD Cable	1x2, 5 M mini SAS HD to mini SAS cable	N/A	7111455
Power Cable	Japan, 2.5 m, METI plug, IEC60320-1-C13 connector, 15A	PWRCORD10083243-A	PWRCORD10083243-Z
Power Cable	Australia, 2.5 m, SA3112 plug, IEC60320-1-C13 connector, 10 A	PWRCORD10083244-A	PWRCORD10083244-Z
Power Cable	Italy, 2.5 m, CEI23 plug, IEC60320-1-C13 connector, 10 A	PWRCORD10083245-A	PWRCORD10083245-Z
Power Cable	Switzerland, 2.5 m, SEV1011 plug, 10A, IEC60320-1-C13 connector, 10 A	PWRCORD10083246-A	PWRCORD10083246-Z
Power Cable	United Kingdom, 2.5 m, BS1363A plug, 10A, IEC60320-1-C13 connector, 10 A	PWRCORD10083247-A	PWRCORD10083247-Z
Power Cable	Denmark, 2.5 m, DEMKO107 plug, IEC60320-1-C13 connector, 10 A	PWRCORD10083248-A	PWRCORD10083248-Z
Power Cable	South Africa, 2.5 m, BS546 plug, IEC60320-1-C13 connector, 16 A	PWRCORD10083636-A	PWRCORD10083636-Z
Power Cable	Europe, 2.5 meters, CEE 7/VII plug, IEC60320-1-C13 connector, 10 A	PWRCORD10187018-A	PWRCORD10187018-Z
Power Cable	North America, 2.3 m, NEMA 5-15 plug, IEC60320-1-C13 connector, 10 A	PWRCORD10187019-A	PWRCORD10187019-Z
Power Cable	North America, 3.0 m, NEMA 5-15 plug, IEC60320-1-C13 connector, 15 A	PWRCORD10187061-A	PWRCORD10187061-Z
Power Cable	Taiwan, 2.5 m, CNS10917 plug, IEC60320-1-C13 connector, 10 A	PWRCORD10187086-A	PWRCORD10187086-Z
Power Cable	Jumper, 1 m, straight IEC60320-2-2 Sheet E(C14)plug, right angle IEC60320-1-C13 connector, 10A. 250 VAC	333U-10-10-C14	PWRCORD10187055-Z

Part Type	Description	Initial Order Part Number	Upgrade Part Number
Power Cable	Argentina, 2.5 m, IRAM207	333A-25-10-AR	N/A
Power Cable	XATO, PWRCRD, 2.5 meter, Brazil C13	333A-25-10-BR	N/A
Power Cable	PWRCORD, CHINA, 2.5 meter, GB2099, 10A	333A-25-10-CN	N/A
Power Cable	PWRCORD, ISRAEL, 2.5 meter, SI-32, 10A	333A-25-10-IL	N/A
Power Cable	PWRCORD, INDIA, 2.5 meter, IS1293, 10A	333A-25-10-IN	N/A
Power Cable	PWRCORD, KOREA, 2.5 meter, KSC8305, 10A	333A-25-10-KR	N/A

Configuration and Ordering Examples

The components you need to order varies based on the library configuration.

Example 1: 30 cartridge library with an IBM LTO-7 FC drive, a second FC drive, and a second power supply (redundant power):

- 7114334 — Base Module, 30 slots with IBM LTO-7 half-height FC tape drive
- 7114335 — Drive, IBM LTO-7, half-height FC
- 7101769 — Power supply

Example 2: 60 cartridge library with two partitions, a total of four IBM LTO-8 drives (2 SAS and 2 FC), and four power supplies:

- 7118432 — Base Module, 30 slots with one IBM LTO-8 half-height SAS tape drive
- 7101763 — Expansion Module, 30 slots
- 7118438 — Drive, IBM LTO-8, half-height SAS
- 7118437 — Drive, IBM LTO-8, half-height FC (x2)
- 7101769 — Power supply (x3)

Example 3: 90 cartridge library with one IBM LTO-8 FC drive

- 7118433 — Base Module, 30 slots with one IBM LTO-8 half-height FC tape drive
- 7101763 — Expansion Module, 30 slots (x2).
Note that an Expansion Module receives power from the Base Module. The Expansion Module requires a power supply only when it contains a tape drive.

Example 4: Upgrade an existing library without partitions from 30 to 120 cartridges with a SAS drive in each module (power is not redundant):

- 7101770 — Expansion Module, 30 slots (x3)
- 7118438 — Drive, IBM LTO-8, half-height SAS (x3)
- 7101771 — Power supply (x3)

Order Media and Labels

You can order tape cartridges and labels from Oracle or third-party vendors.

- Call 1.877.STK.TAPE to order media from your local reseller or to obtain media pre-sales support.
- E-mail: tapemediaorders_ww@oracle.com

See the tape media area on the Oracle website for additional information.

<https://www.oracle.com/storage/tape-storage/lto-data-cartridge/>

Related Topics

- [Media Labels](#)
The library identifies cartridges by the barcode label attached to the front of the cartridge. Each label must follow specific guidelines to be read by the library.

2

Install the Library

The SL150 library installs into a standard 19-inch rack. You must install the Base Module first, and then install any Expansion Modules below it.



Note:

These installation instructions use the Sun Rack II (a standard Oracle 19-inch rack). If your rack is different, use the instructions as a basic guide but alter the steps accordingly.

Library installation involves the following tasks:

- [Verify the Site Meets Environmental Requirements](#)
- [Prepare the Rack](#)
- [Unpack and Acclimate the Library](#)
- [Install the Base Module](#)
- [Install the Expansion Module](#)
- [Install Power Supplies and Tape Drives](#)
- [Cable the Library](#)
- [Unlock the Robot](#)
- [Apply Power to the Library](#)
- [Configure the Library After Powering-on for the First Time](#)
- [Run a Self-Test](#)

Verify the Site Meets Environmental Requirements

Make sure the site meets environmental requirements to prevent equipment damage.

- [Temperature and Humidity Limits](#)
- [Airborne Contaminants Limits](#)
- [Positive Pressurization and Ventilation - Hot Aisle Containment System \(HACS\)](#)
- [Electrostatic Discharge](#)

Temperature and Humidity Limits

To increase reliability and prevent equipment damage, maintain the environment between the recommended temperature and humidity ranges.

Temperature:

- Operating: +10° to +40°C (+50° to +104°F)
- Non-operating -40° to +60°C (-40° to +140°F)

Relative Humidity:

- Operating: 20% to 80% (40% to 50% recommended) non-condensing
- Non-operating: 10% to 95% non-condensing

Airborne Contaminants Limits

Maintain airborne contaminate levels below the limits to prevent equipment damage.

The operating environment for the library must meet to the following requirements:

- ISO 14644-1 Class 8 Environment
- Total mass of airborne particulates must be less than or equal to 200 micrograms per cubic meter
- Severity level G1 per ANSI/ISA 71.04-1985

Particles ten microns or smaller are particularly harmful to most data processing hardware. Gasses that are particularly dangerous to electronic components include chlorine compounds, ammonia and its derivatives, oxides of sulfur, and petrol hydrocarbons. In the absence of appropriate hardware exposure limits, health exposure limits must be used.

Humidification with chlorinated water is a common source of airborne chlorine. Appropriately-designed carbon filters must be used to ensure safe levels of airborne chlorine when chlorinated water is used for humidification.

Table 2-1 Gas Limit Recommendations

Chemical	ASHRAE	OSHA (PEL)	ACGIH	NIOSH
Acetic Acid (CH ₃ COOH)	Not defined	10 ppm	Not defined	Not defined
Ammonia (NH ₃)	3500 µg/m ³	350 ppm	25 ppm	Not defined
Chlorine (Cl ₂)	2100 µg/m ³	31 ppm (c)	Not defined	0.5 ppm (c)
Hydrogen Chloride (HCl)	Not defined	5 ppm (c)	Not defined	Not defined
Hydrogen Sulfide (H ₂ S)	50 µg/m ³	320 ppm (c)	10 ppm	10 ppm
Ozone (O ₃)	235 µg/m ³	30.1 ppm	Not defined	Not defined
Petrol-hydrocarbons (C _n H _n)	Not defined	500 ppm	75 ppm	300 ppm
Sulfur Dioxide (SO ₂)	80 µg/m ³	35 ppm	2 ppm	0.5 ppm (c)
Sulfuric Acid (H ₂ SO ₄)	Not defined	1 ppm	Not defined	1 ppm (c)

Some basic precautions to follow:

- Do not allow food or drink into the data center.
- Do not store cardboard, wood, or packing materials in the data center clean area.
- Identify a separate area for unpacking new equipment from crates and boxes.
- Do not allow construction or drilling in the data center without first isolating sensitive equipment. Dry wall and gypsum are especially damaging to equipment.

Positive Pressurization and Ventilation - Hot Aisle Containment System (HACS)

Adequate airflow prevents equipment damage.

When installing the SL150 in an HACS environment, the system must maintain adequate air flow from the cold to hot aisle. Ensure that there is no turbulent air directed at the installed equipment which may reduce the cooling capability of the cold aisle supply air. The HACS pressure differential should have neutral to negative pressure in the hot aisle. To achieve this, you may need to install rack doors on contributing or affected racks. If this is ineffective to reduce air impediment, you may need to install a supplemental air removal unit to boost airflow through the equipment.

Electrostatic Discharge

A discharge of static electricity might damage static-sensitive devices which may reduce the life expectancy of the product.

Avoid electrostatic discharge when handling parts. Electrostatic discharge can damage components. Follow the guidelines below to prevent electrostatic discharge.

Electrostatic Discharge Prevention

- 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 work areas.
- Place parts on a grounded surface before removing them from the container.
- Avoid touching pins, leads, or circuitry.
- Use proper grounding practices when touching a static-sensitive component or assembly.

Grounding Methods to Prevent Electrostatic Discharge

- Use a wrist strap connected by a ground cord to a grounded chassis.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

Note:

If you do not have the suggested equipment for proper grounding, arrange for an authorized reseller to install the part.

Prepare the Rack

Verify the rack meets requirements to ensure a smooth library installation.

Rack Requirements

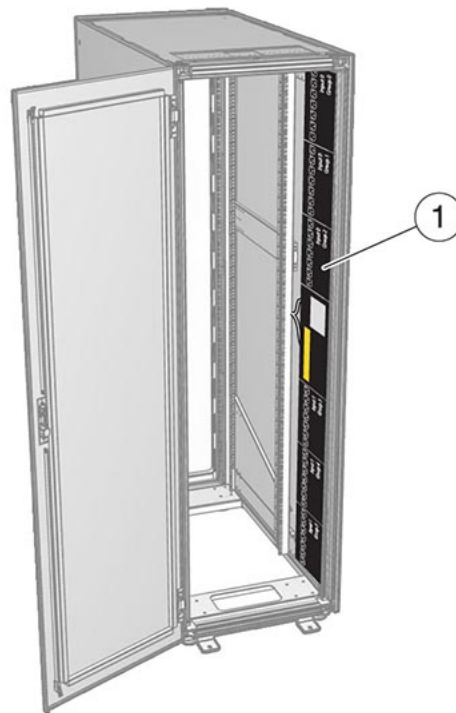
- Rack must contain four posts.

- Front and rear service clearance must be at least 965 mm (38 inches).
- Front of the rack must face the cool aisle and the rear face the warm aisle.
- Rack must be level (left to right and front to back). The installed library must remain level for proper operation.
- Vertical rail spacing should be between 457 mm (18 in) and 902 mm (35.5 in).
- Provide sufficient rack space to install the Base Module (3U) and any Expansion Modules (2U each).

Rack Preparation

- Position the power distribution unit (PDU) on the right side of the rack as viewed from the rear of the rack (see [Figure 2-1](#)). The power supply outlets are on the right side of the SL150 library. Refer to the rack and power distribution unit documentation for instructions to install the PDU
- To provide access during installation of a library module, remove the front door from the rack.

Figure 2-1 Rear View of Sun Rack II (PDU on Right Side)



L207_136

Illustration Legend:

1 - Power Distribution Unit (PDU)

Unpack and Acclimate the Library

Carefully unpack components and acclimate the library to the installation environment to prevent equipment damage.

1. Transport the packaged unit to the staging area. Use a pallet jack to transport the Base Module.
2. Remove plastic wrap and cut shipping straps.

 **WARNING:**

An unpacked Base Module containing one tape drive and one power supply weighs approximately 21.5 kg (47 pounds).

3. Open the carton.
4. Remove the front rails from the Base Module packing material and set them aside. The rails will be used later.
5. Remove the foam pieces above the library module.
6. Remove the accessory package at the end of the module, and set it aside.
7. Remove the plastic covering the module.
8. Grasp the module by the sides, lift it out of the carton, and set it down. Do not lift the Base Module by the front control panel, the tape drive, or the tape drive filler.
9. Acclimate the module to the environment. If the module is colder than the location and sufficient humidity exists, condensation may occur.
10. Remove the pallet and any packaging materials from your work area.

Install the Base Module

Install the Base Module in a standard rack before installing any Expansion Modules below it.

Installing the Base Module involves the following tasks:

- [Unpack the Base Module Accessory Kit](#)
- [Install the Base Module Back Rails](#)
- [Install the Base Module Front Rails](#)
- [Mount the Base Module](#)

Tools Required

#2 Phillips screwdriver (not provided)

Related Topics

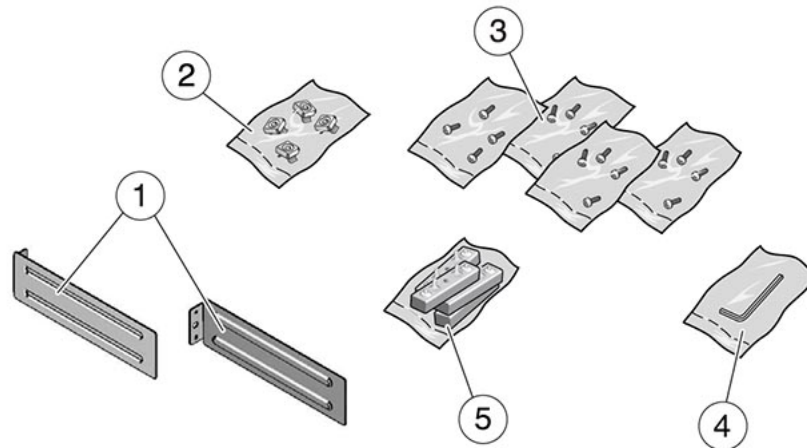
- [Base Module](#)
The Base Module contains the main hardware components of the library. One Base Module is required per library.

Unpack the Base Module Accessory Kit

Verify that the Base Module kit contains the correct components before installation.

- Back rails
- 10–32 clip nuts (used in racks with square holes)
- Assorted screws:
 - 8–32 X 5/8 screws (used with the mounting block)
 - 10–32 X 5/8 screws (used with clip nuts and racks with 10-32 threaded holes)
 - M5 0.8 X 16 mm screws (used with M5 threaded hole racks)
 - M6 16 mm screws (used with M6 threaded hole racks)
- Hex key (used to manually open a magazine)
- Mounting block

Figure 2-2 Base Module Accessory Package Mounting Hardware



L207_139

Illustration Legend:

- 1 - Back Rails**
- 2 - Clip Nuts**
- 3 - Screws (Assorted Types)**
- 4 - Hex Key**
- 5 - Mounting Block**

Install the Base Module Back Rails

The back rails will connect to the front rails and support the module. Install the back rails before the front rails.

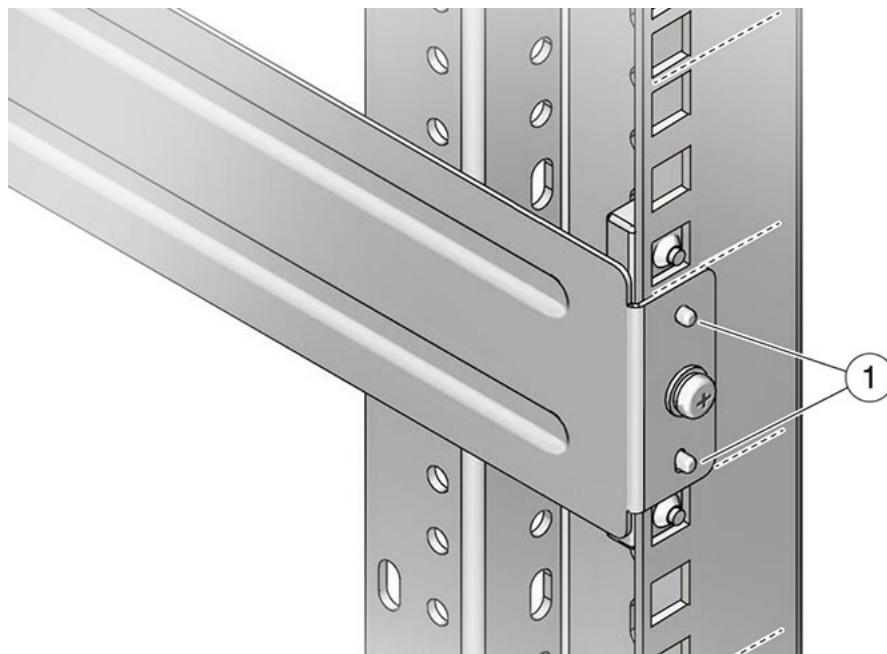
Parts Required

Back rails (1 left, 1 right)

Two Mounting blocks

Two 8–32 X 5/8 screws

Figure 2-3 Back Rail Position

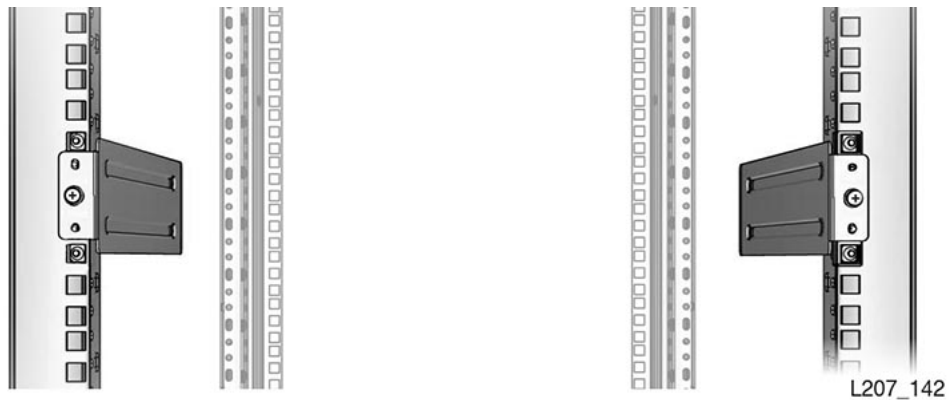


L207_141

Illustration Legend:

1 - Pins

Figure 2-4 Back Rails Installed



1. Locate where you will mount the Base Module within the rack, allowing space for Expansion Modules (use the rail installation template as necessary).
2. Verify that the rails will reside with a single U boundary. Do not mount the block with the pins straddling a U boundary.
3. From the accessory kit, select the appropriate attachment hardware for your rack, and set the other hardware aside.

 **Note:**

A rack with square mounting holes uses the clip nuts and 10-32 X 5/8 screws (the M5 and M6 screws are only used in threaded hole racks).

4. At the back of the rack, position the mounting block so the screw hole is in the second hole (center hole) of the rack unit. Position the back rail so the rail extends to the interior of the rack, align the mounting block pins with the holes in the rail bracket (see [Figure 2-3](#)).
5. Verify the pins and screw hole are within the boundaries of a single rack unit.
6. Insert the 8-32 screw into the mounting block hole, and turn the screw several full turns by hand. Tighten the 8-32 screw with a #2 Phillips screwdriver.
7. Make sure the wide surface of the back rail is plumb with the inside edge of the rack stile. The back rails should neither tilt in nor out.
8. Repeat the procedure for the other back rail. Verify the top edges of the rails are level with each other (see [Figure 2-4](#)).

Install the Base Module Front Rails

The front rails engage the back rails and support the module.

Tools Required

#2 Phillips screwdriver.

Parts Required

Front rails (1 left, 1 right)

Two Mounting blocks

Two 8–32 X 5/8 screws

Complete the following tasks to install the front rails:

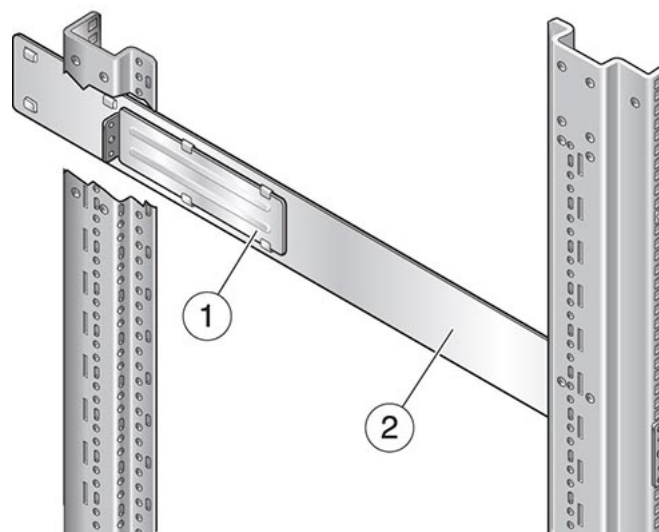
- [Connect the Base Module Front Rail to the Back Rail](#)
- [Secure the Base Module Front Rail](#)
- [Verify the Installation of the Base Module Front Rail](#)
- [Install the Clip Nuts \(square hole racks only\)](#)

Connect the Base Module Front Rail to the Back Rail

Align and slide the two pieces of the Base Module's rail together.

1. Position the front rail with the rail tabs toward the outside of the rack.
2. Slide the front rail toward the back rail to engage the tabs of the front rail.
3. Push the front rail into the rack until the front edge of the rail is approximately 60 mm (2.4 inches) from the rack stile.

Figure 2-5 Front Rail Installation (Left Rail Shown)



L207_143

Illustration Legend:

1 - Back Rail

2 - Front Rail

Secure the Base Module Front Rail

Use the mounting block and screws to secure the front rail to the rack.

1. Position the mounting block behind the rack stile in the second U of the three U span. See [Figure 2-6](#). You might need to flex the front of the rail away from the rack stile while positioning the mounting block.

Figure 2-6 Mounting Block for Front Rail (Right Rail Shown)

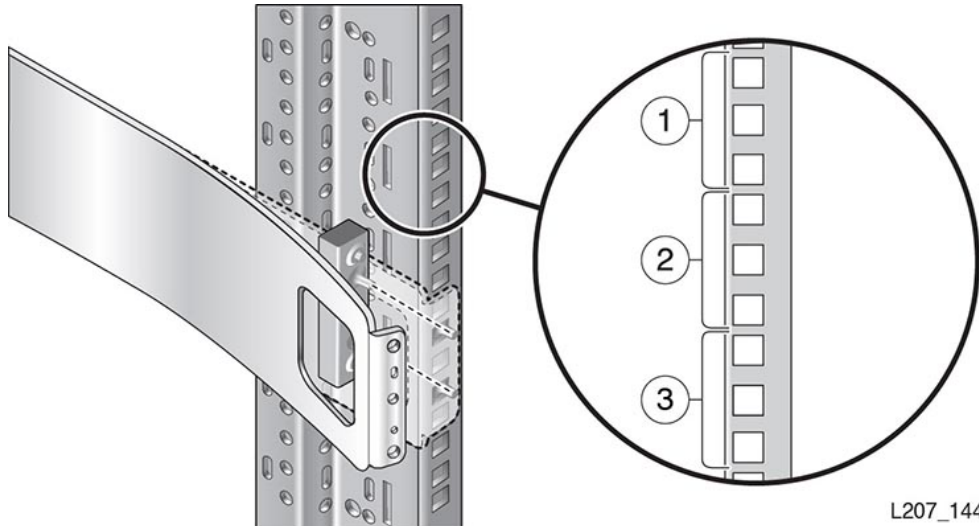


Illustration Legend:

- 1 - First U
- 2 - Second U
- 3 - Third U

2. Hold the block in position. Push the front rail against the rack stile.
3. Insert the 8–32 screw through the hole in the front rail and thread the screw by hand a few turns into the mounting block.
4. Tighten the 8–32 screw with a Phillips screwdriver while making sure that the rail is plumb with the inside edge of the rack stile.

 **Note:**

The front rail should not tilt in or out.

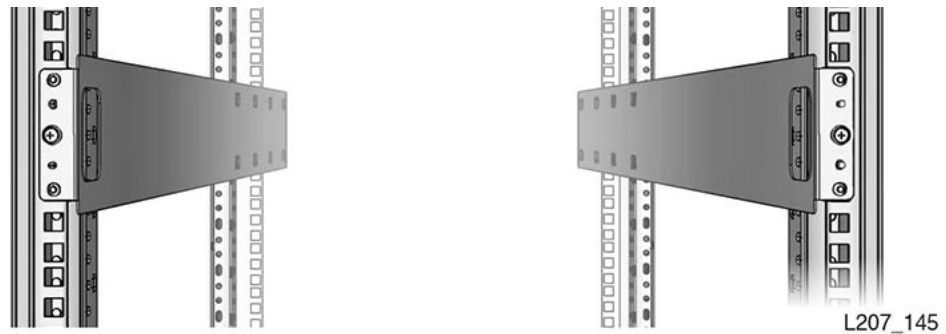
5. Repeat to install other front rail on the other side of the rack

Verify the Installation of the Base Module Front Rail

The rails must be parallel and properly installed before mounting the Base Module.

1. Verify that the rack rails are parallel with each other. See [Figure 2-7](#). If they are not parallel, reinstall the rails. Do not proceed unless the rails are parallel.
2. If your rack has threaded holes, proceed to [Mount the Base Module](#).

Figure 2-7 Rails Installed - Front View



Install the Clip Nuts (square hole racks only)

Racks with square holes require a clip nut and a 10–32 X 5/8 screw. The square clip nut is placed on the inside of the rack stile.

Figure 2-8 Clip Nut Location for the Base Module

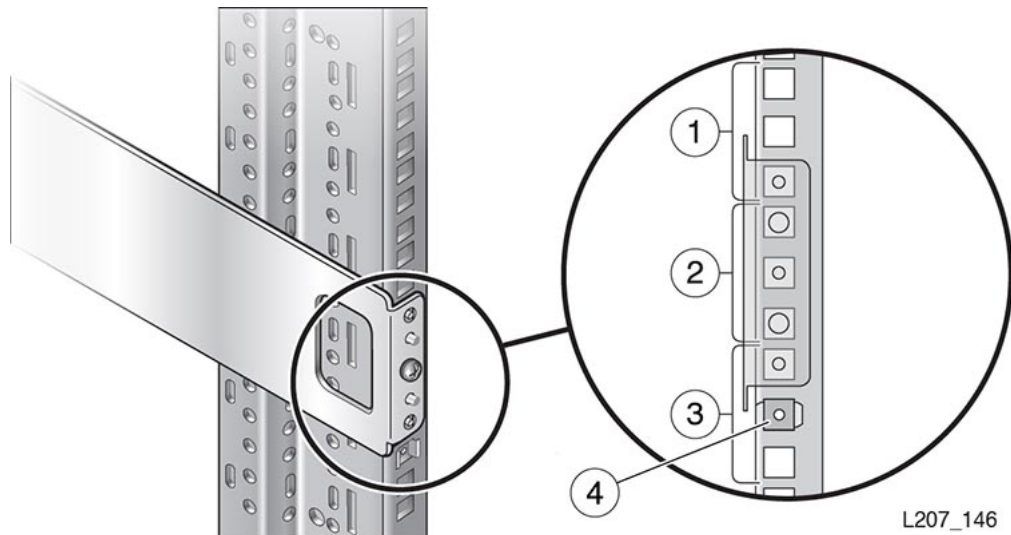


Illustration Legend:

1 - First U

2 - Second U

3 - Third U

4 - Clip Nut in the Second Hole of the Third U

1. Locate the hole immediately below the front rail (second hole in the third U).
2. Seat one edge of the clip nut into the hole from the rear of the rack stile.

💡 Tip:

For better access to compress the spring, position the clip nut tabs horizontally and seat the edge toward the outside of the stile. See [Figure 2-8](#), callout 4.

3. Compress the other edge of the clip nut and seat it in the hole. A small flat blade screwdriver can simplify the compression.
4. Repeat for each front rail.

Mount the Base Module

The Base Module mounts to the rails and secures to the rack.

- Engage the Base Module with the Rail
- Remove the Cartridge Magazine with the Hex Key
- Remove the Cable Clip in the Base Module
- Secure the Base Module to the Rack

Engage the Base Module with the Rail

The Base Module has tabs on each side that engage with the rails.

Figure 2-9 Tab and Rail Engagement

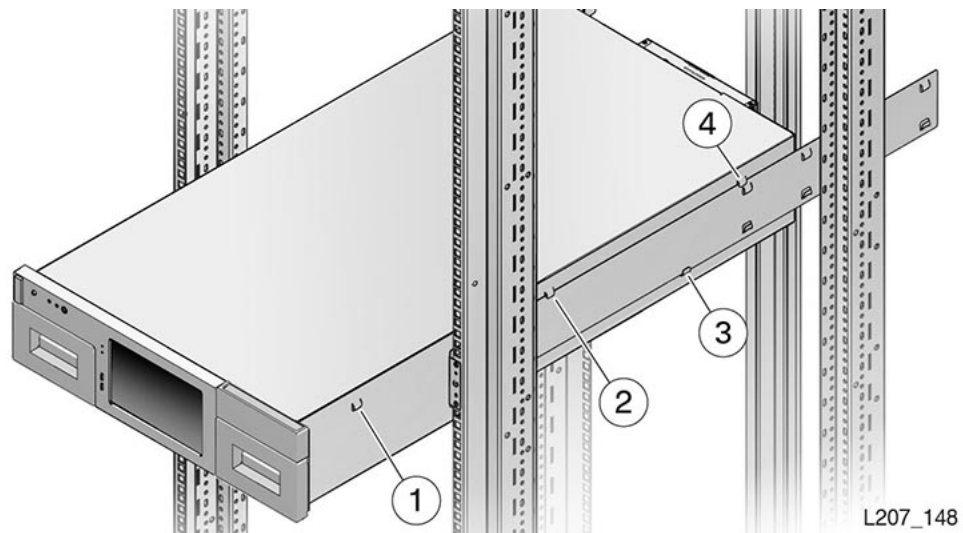


Illustration Legend:

1 - Front Tab

2 - Center Tab

3 - Bottom Tab

4 - Rear Tab

1. Grasp the module along the sides and lift the back above the rack rails. Never lift the module by the front control panel or the tape drive. Always lift the module from the side.
2. Guide the module into the rack and set the rear side-tabs on the rack rails (see figure above).

 **Note:**

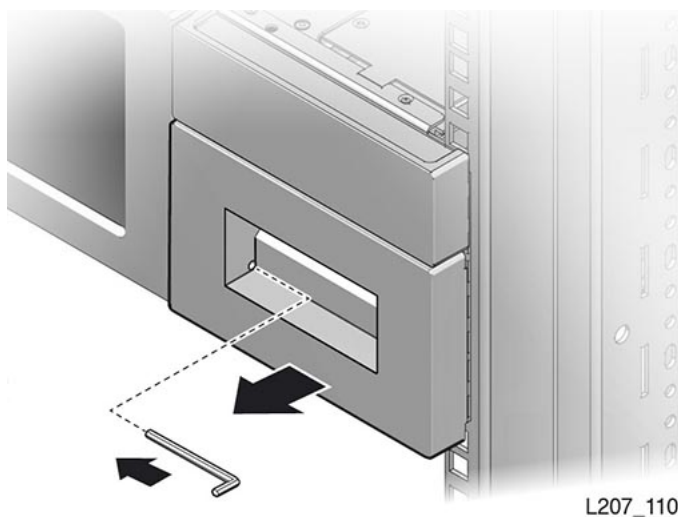
If the module does not fit properly, remove it from the rack. Adjust the rail spacing as necessary. *Never* bend the Base Module side tabs.

3. Push the module into the rack to engage the bottom and center side tabs.
4. Push the module into the rack until the front side-tabs approach the front of the rack rails.
5. Lift the module up slightly, push it into the rack, and set the front tabs down on the rack rail.

Remove the Cartridge Magazine with the Hex Key

A specialized hex key tool allows you to remove the cartridge magazine.

1. Insert the hex key in the hole at the lower inside corner of the cartridge magazine.



2. Align the hex key shaft parallel with the magazine face.
3. Push the tool slowly into the hole to release the latch located behind the touch screen, and hold the hex key in place.
4. Pull the magazine a short distance out of the library.
5. Remove the hex key and store it for future use.
6. Support the bottom of the magazine with your other hand during removal.
7. Pull the magazine out of the module, and set it aside. Note the orientation of the magazine. The left and right side magazines are different.

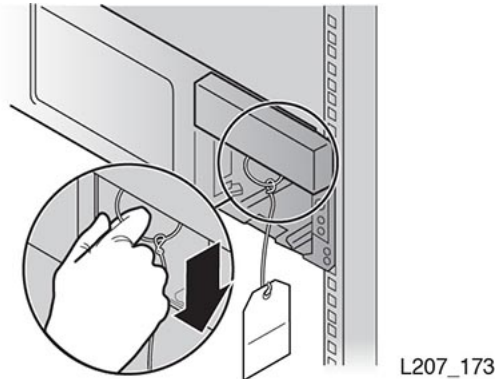
Remove the Cable Clip in the Base Module

A clip secures the cable for shipping. You must remove it during installation.

1. Remove both cartridge magazines from the Base Module.
2. Locate the tag in the right cartridge magazine opening.

3. Grasp the ring and pull down.
4. Discard the cable clip unless you intend to reshipe the library after rack installation.

Figure 2-10 Cable Clip Removal



Secure the Base Module to the Rack

Two screws secure the module frame to the rack.

1. Obtain the correct screws for your rack (either 10-32, M5, or M6). Use the 10-32 screw when the rack has square mounting holes (this screw mates with the clip nut).
2. Insert a screw through each bottom hole of the Base Module frame and thread each a few full turns.
3. Fully tighten both screws.
4. Reinsert the magazines if you are not installing Expansion Modules. Do not put cartridges in the magazine slots.

Note:

Left and right magazines are unique. Orient the magazine so the cartridge openings face the Front Control Panel.

Install the Expansion Module

Install up to 14 Expansion Modules below the Base Module to increase drive and cartridge capacity.

Installing the Expansion Module involves the following tasks:

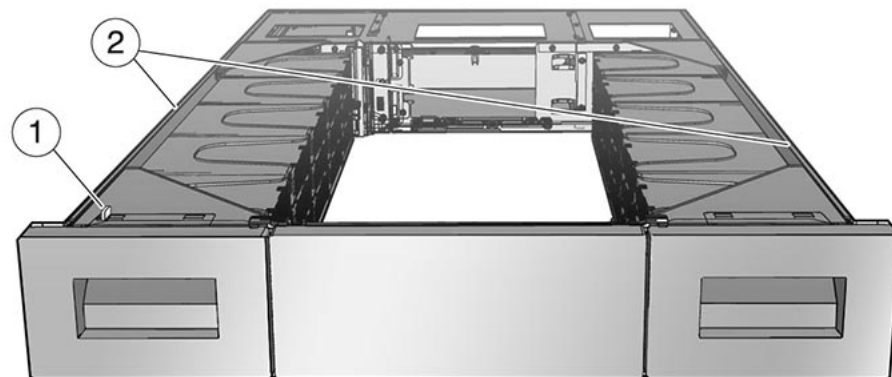
- [Unpack the Expansion Module Accessory Kit](#)
- [Remove the Library Floor](#)
- [Install Clip Nuts for the Expansion Module \(for square hole racks only\)](#)
- [Prepare the Expansion Module by Removing the Cartridge Magazines](#)

- [Mount the Expansion Module](#)
- [Install the Rear Rails for the Expansion Module](#)
- [Secure the Expansion Module to the Rack Front](#)
- [Replace the Cartridge Magazines](#)

Tools Required

#2 Phillips screwdriver.

Figure 2-11 Expansion Module



L207_150

Illustration Legend:

- 1 - Alignment Tab**
- 2 - Flanges**

Related Topics

- [Expansion Module](#)
An Expansion Module provides additional cartridge storage and tape drive capacity. You can install up to 14 Expansion Modules below the Base Module.

Unpack the Expansion Module Accessory Kit

Check that the Expansion Module kit contains the correct components.

- Back rails
- 10–32 clip nuts (used in racks with square holes)
- Assorted screws:
 - 10–32 X 5/8 screws (used with clip nuts and racks with 10-32 threaded holes)
 - M5 0.8 X 16 mm screws (used with M5 threaded hole racks)

- M6 16 mm screws (used with M6 threaded hole racks)
- Expansion interconnect cable with USB Type A connectors
- Label set (Module 2 through Module 10)
- Hook and loop strap
- Pop-in rivet
- Hex key

Figure 2-12 Expansion Module Accessory Package Hardware

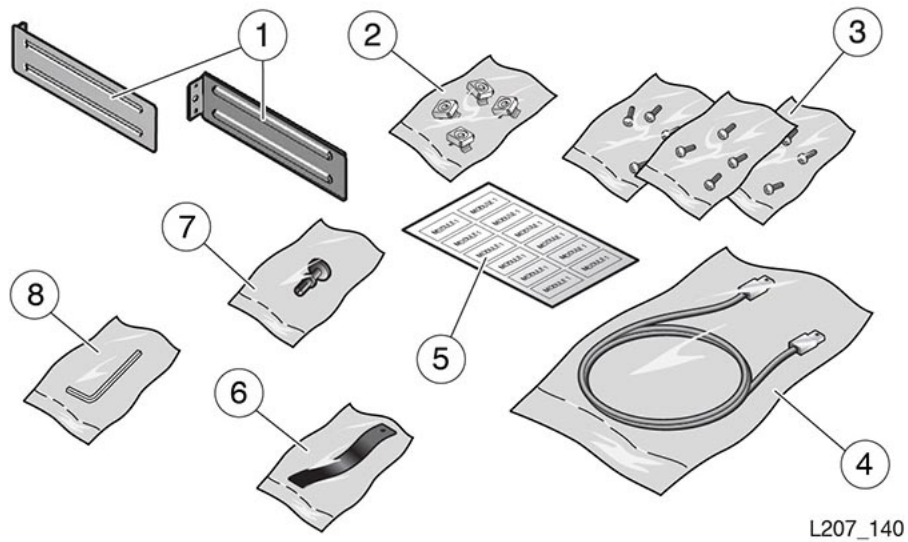


Illustration Legend:

- 1 - Back Rails**
- 2 - Clip Nuts**
- 3 - Screws (Assorted)**
- 4 - Expansion Cable with USB Type A Connectors**
- 5 - Module Labels**
- 6 - Hook and Loop Strap**
- 7 - Rivet**
- 8 - Hex Key**

Remove the Library Floor

Remove the library floor to add an Expansion Module.

Figure 2-13 Library Floor Removal from the Base Module

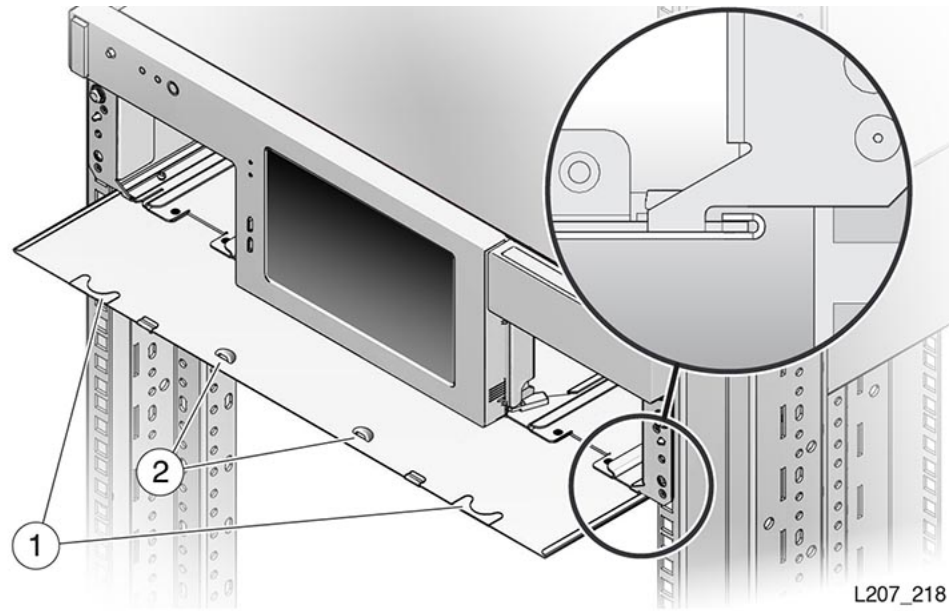


Illustration Legend:

- 1 - Floor Finger Holds**
- 2 - Floor Lock (Improved Floor Design)**

1. If you are upgrading an existing library, power down the library and verify that you have locked the robot.
See [Power Off the Library](#).
2. Remove the cartridge magazines from the bottom module of the library.
See [Remove the Cartridge Magazine with the Hex Key](#).
3. Grasp the holds on the front edge of the floor in the magazine bay (see figure).
4. Pull the floor out the front of the module, and set it aside.

Tip:

If the floor does not move, reach through the magazine opening and push down on the floor behind the touch screen panel to unseat the floor locking tabs. Then pull the floor forward.

Install Clip Nuts for the Expansion Module (for square hole racks only)

If using a rack with square holes, you must install clip nuts to secure the module.

If the rack has threaded holes, skip to [Prepare the Expansion Module by Removing the Cartridge Magazines](#).

Figure 2-14 Expansion Module Clip Nut Installation

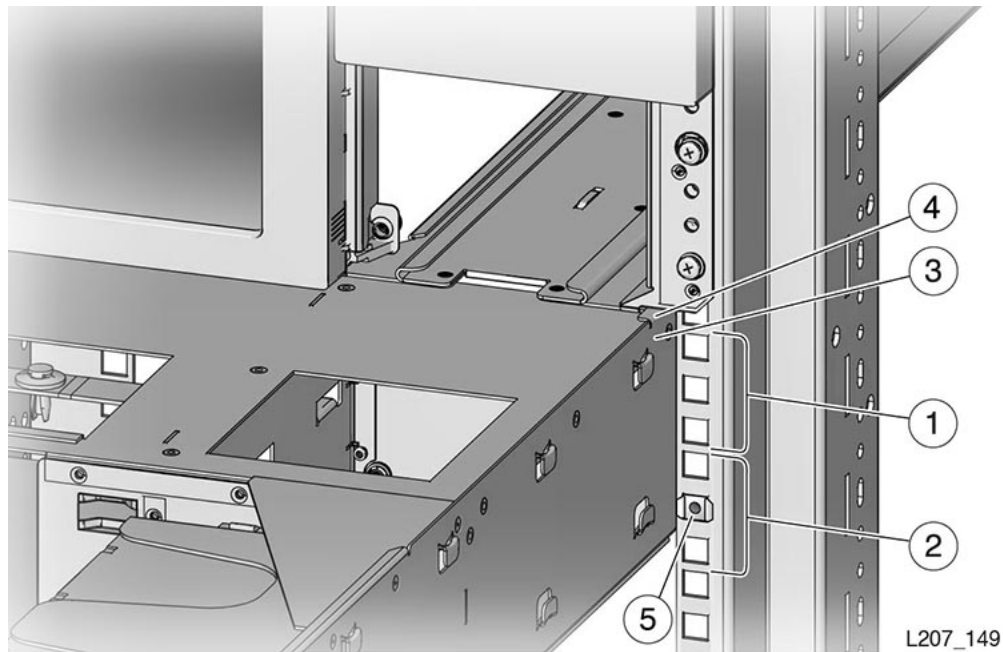


Illustration Legend:

1 - First U

2 - Second U

3 - Module Flange

4 - Module Engagement

5 - Clip Nut Location (Second Hole of the Second U)

1. Locate the middle hole of the second U (5th hole down from the junction of the first U boundary) on both the left and right rail stiles for installation of the clip nut. Use the Rail Installation Template, if desired.
See [Figure 2-14](#).
2. For each clip nut location:
 - a. Seat one edge of the clip nut into the hole from the back of the rack stile.
 - b. Compress the other edge of the clip nut and seat it in the hole.
3. Make sure the clip nuts are parallel (in the identical mounting hole).
4. Locate the 2U space at the back of the rack directly below the installed module.
5. Insert a clip nut in the third hole down from the junction of the first U boundary on both the left and right rail stiles.

6. Make sure the clip nuts are parallel (in the identical mounting hole).

Prepare the Expansion Module by Removing the Cartridge Magazines

Remove the cartridge magazines to access the mounting holes of the Expansion Module.

Figure 2-15 Magazine Latches

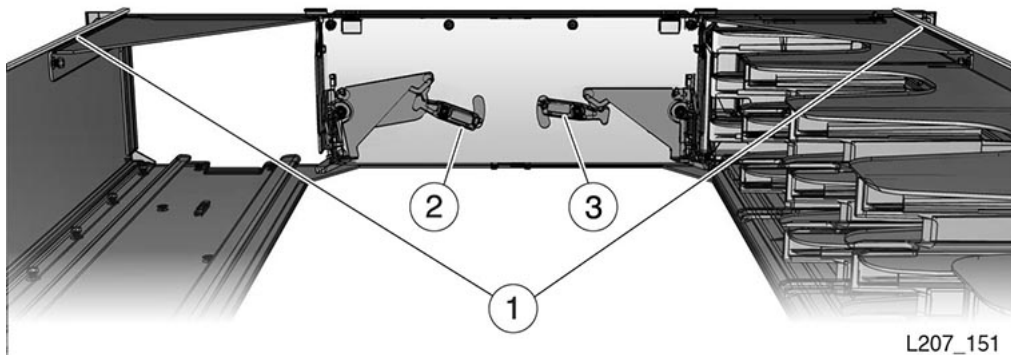


Illustration Legend:

- 1 - Module Flanges**
- 2 - Unlatched Position**
- 3 - Latched Position**

1. Remove the Expansion Module from the shipping container.
See [Unpack and Acclimate the Library](#).
2. Reach behind the front panel and lift the latch to release the magazine.
The Expansion Module is open at the top, and the latches are located behind the front face of the module.

Tip:

You can also release the magazine with the hex tool . See [Remove the Cartridge Magazine with the Hex Key](#).

3. Remove and set aside the cartridge magazines.

Install the Floor in the Bottom Expansion Module

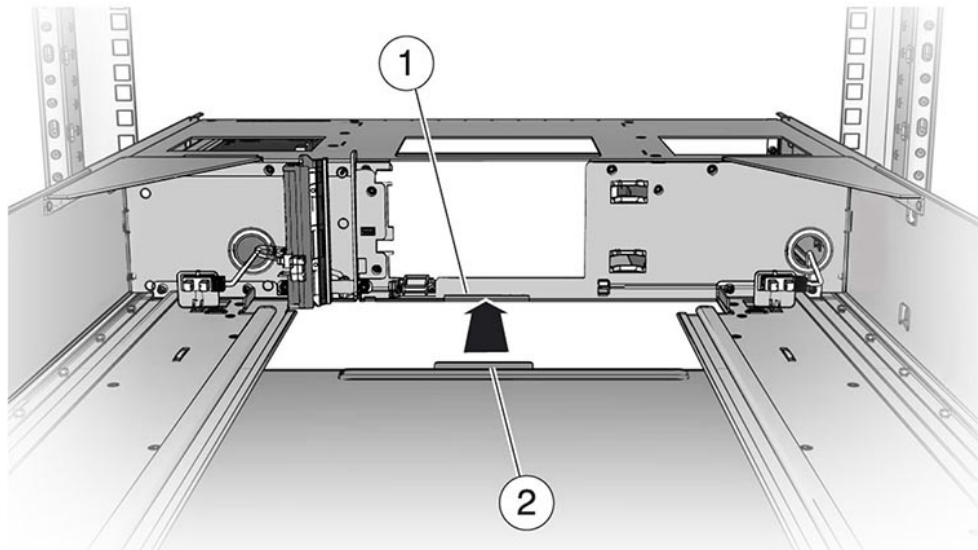
Install the floor on the module that will reside at the bottom of the library.

Only perform this procedure for the bottom module. It is easiest to install the floor before mounting the bottom module into the rack.

1. Turn the module over.
2. Orient the floor so the finger holds are facing the inside of the cartridge magazine slot (see [Figure 2-13](#)).

3. Insert the rear edge of the floor into the grooves at the bottom of the module.
4. Push the floor in and engage the rear floor tab with the module slot (see [Figure 2-16](#)).
5. Push the floor in and seat the floor clip in each magazine bay (see [Figure 2-17](#)).
6. Turn the module over and verify the floor clips properly engage the chassis.

Figure 2-16 Library Floor

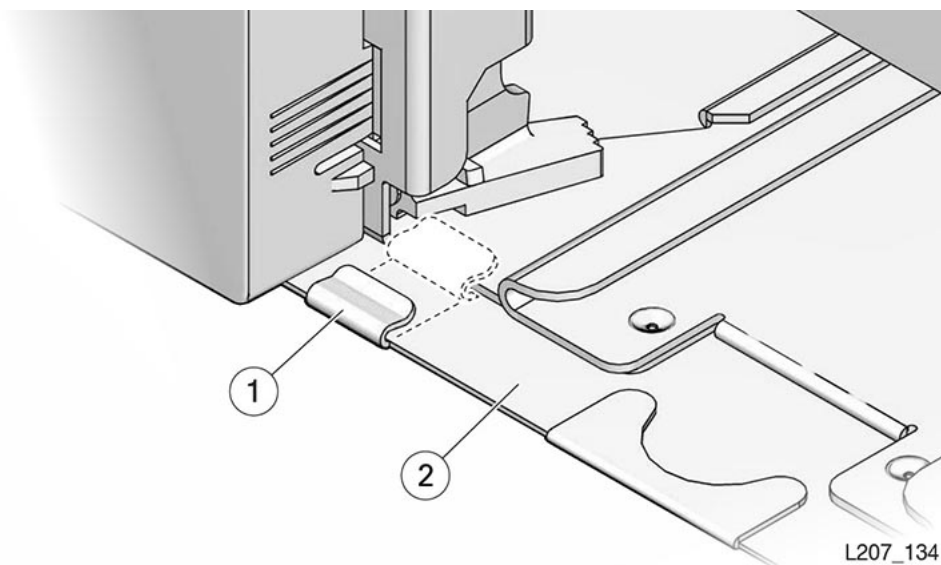


L207_111

Illustration Legend:

- 1 - Floor Slot
- 2 - Floor Tab

Figure 2-17 Floor Secured



L207_134

Illustration Legend:

- 1 - Floor Clip
- 2 - Floor

Mount the Expansion Module

The Expansion Module mounts to the bottom of the module already in the rack.

1. Lift the module to the bottom of the installed module. Grasp the module by the sides. Do not lift the module by the tape drive filler.
2. Insert the rear edge of the module flange into the grooves on the bottom edge of the installed module and push the 2U Expansion Module in approximately 75 millimeters (3 inches).
3. Lower the front edge of the module approximately 10 mm (0.4 inch), guide any sharp metal edges away from the upper module front panel, and push the module in until the sharp edges are past the front panel (see [Figure 2-18](#)).

▲ Caution:

Do not scratch the front panel of the module above.

4. Raise the front of the 2U module, push the module in, and engage the module left and right side flanges with the grooves in the already installed module.
5. Push the module in and seat the alignment tab in the slot of the left magazine bay (see [Figure 2-19](#)).

Figure 2-18 Scratch Avoidance

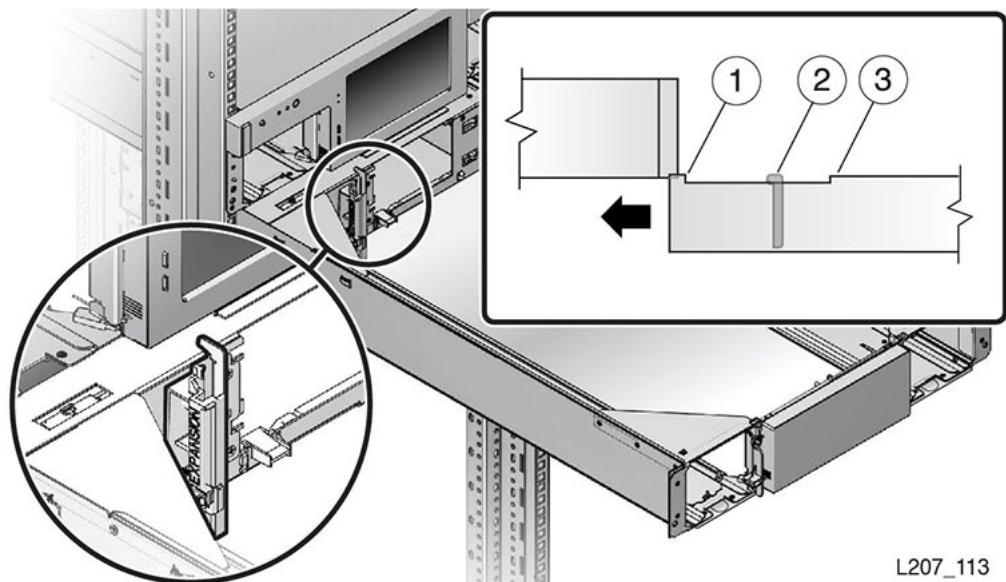


Illustration Legend:

- 1 - Flange (Short Section)
- 2 - Tall Metal Part with Sharp Edges
- 3 - Flange (Long Section)

Figure 2-19 Alignment Tab Seated

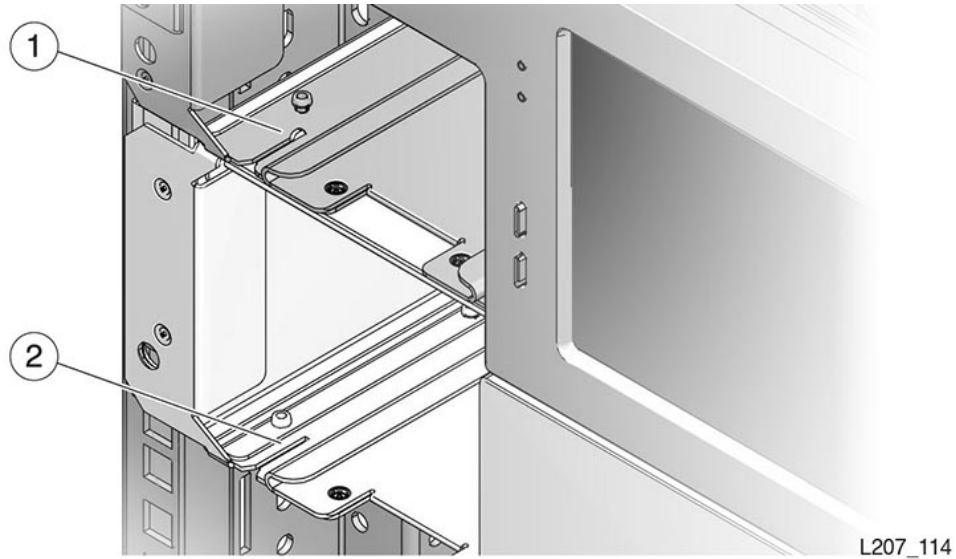


Illustration Legend:

- 1 - Tab Seated in Slot
- 2 - Slot in Magazine Bay

Install the Rear Rails for the Expansion Module

The rear rails secure the Expansion Module to the rear of the rack.

1. Slide the back rail under the Expansion Module tabs (see [Figure 2-20](#)).

Figure 2-20 Expansion Module Back Rail and Clip Nut

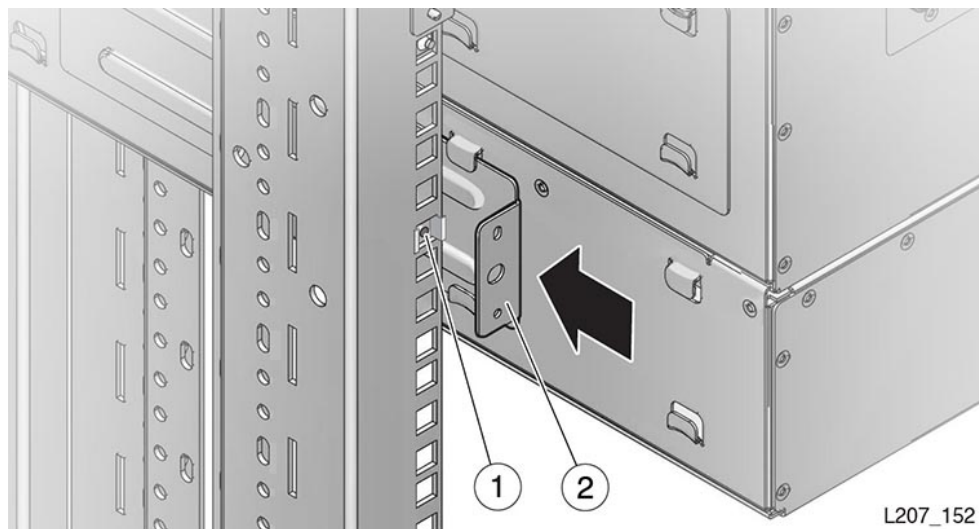


Illustration Legend:

1 - Clip Nut

2 - Rear Rail

2. Push the back rail against the rack vertical rail.
3. Secure the back rail to the rack vertical rail with a screw. Use a 10-32 screw for a rack with square holes (the screw mates with a clip nut).
4. Repeat for the rail on the other side of the module.

Secure the Expansion Module to the Rack Front

The Expansion Module secures to the rack front with two screws.

1. Insert a screw in the lower left side of the module and thread it a few turns. Use a 10-32 screw for a rack with square holes (the screw mates with a clip nut).
2. Insert a screw in the lower right side of the module and thread it a few turns.
3. Fully tighten both screws.
4. Install another Expansion Module, if applicable (start with [Unpack the Expansion Module Accessory Kit](#)).

Replace the Cartridge Magazines

Replace the magazines after all modules are installed in the rack.

1. Verify the magazines are empty. Do not put cartridges in the magazine slots.
2. Note that left and right magazines are unique. Orient the magazine with the cartridge slots facing toward the center of the module.
3. Lift the magazine and engage it the track in the magazine slot.
4. Push the magazine fully into the slot.
5. Repeat as necessary until each Expansion Module has two magazines.

Label the Modules

Add stickers at the rear of each module to help with identification.

1. Locate the scribe lines in the upper left corner of the Expansion Module (as viewed from the back of the rack).
2. Obtain the module label sheet from the accessory kit.
3. Peel the proper label from the label sheet. The sheet has labels for Module 2 through Module 15.
4. Orient the label properly, align the label with the scribe lines, and adhere the label to the chassis.

Figure 2-21 Expansion Module ID Label

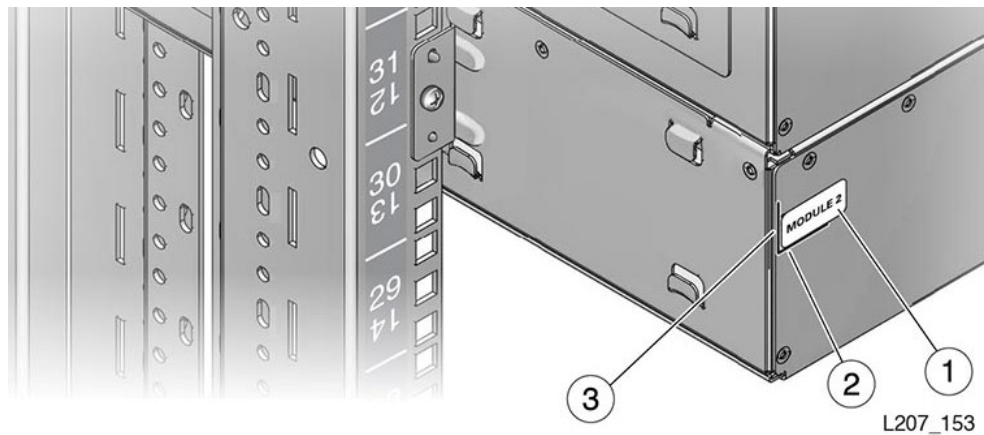


Illustration Legend:

- 1 - Module Label
- 2 - Horizontal Scribe Line
- 3 - Vertical Scribe Line

Install the Hook and Loop Strap

The hook and loop strap mounts to the rear of the module and assists in cable management.

1. Insert the rivet into a hole in the hook and loop strap (see [Figure 2-22](#)).

Figure 2-22 Hook and Loop Strap

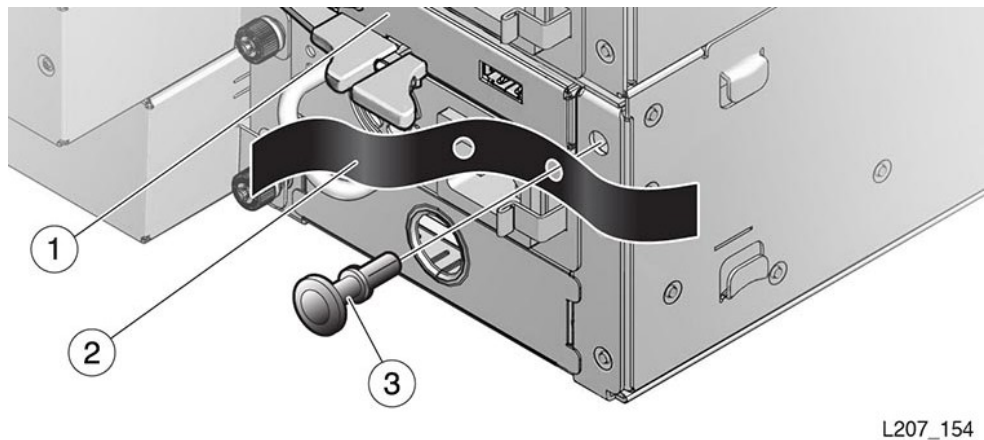


Illustration Legend:

- 1 - Module Controller
- 2 - Hook and Loop Strap
- 3 - Rivet

2. Pull the plunger back from the rivet face.
3. Align the rivet with the hole beside the module controller.
4. Push the rivet into the hole.
5. Push the plunger in to secure the rivet.

Install Power Supplies and Tape Drives

Power supplies and tape drives install into the rear of each module.



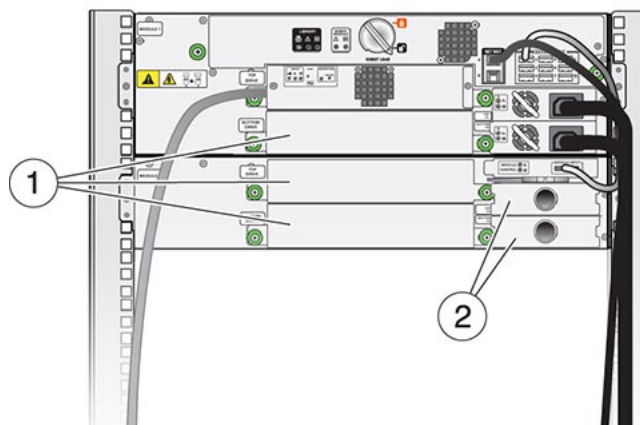
Note:

If you are not installing additional drives or power supplies, skip to [Cable the Library](#).

- [Remove the Power Supply Slot Cover](#)
- [Insert a Power Supply into the Slot](#)
- [Remove the Drive Slot Cover](#)
- [Insert a Tape Drive Tray into the Slot](#)

You can add power supplies and tape drives while the library is powered-on. However, you must *restart* the library for it to recognize the tape drives if the library is not set to address all drive slots.

Figure 2-23 SL150 Library Rear View

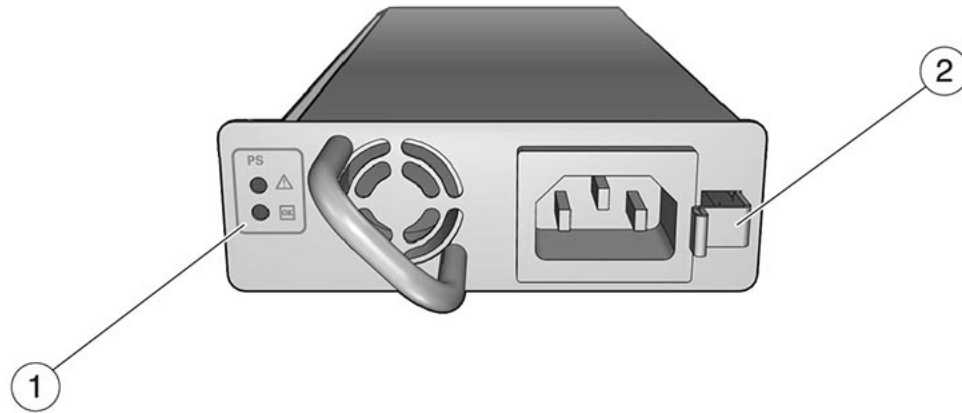


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Illustration Legend:

- 1 - Tape Drive Filler
- 2 - Power Supply Filler

Figure 2-24 Power Supply

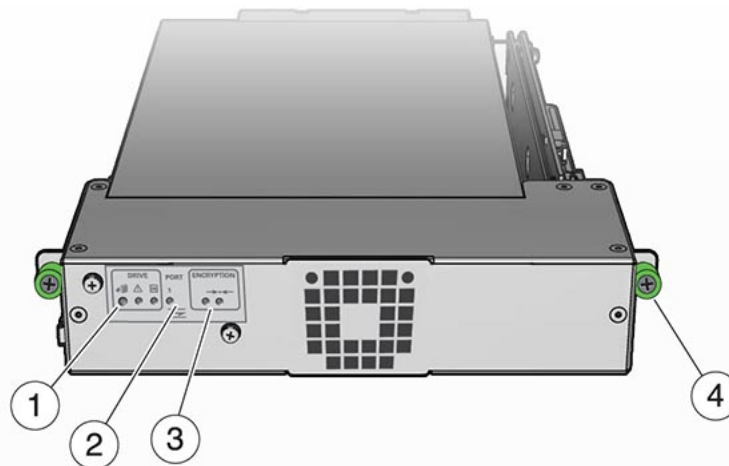


L207_115

Illustration Legend:

- 1 - Power Supply Indicators
- 2 - Power Supply Latch

Figure 2-25 Tape Drive Tray



L207_116

Illustration Legend:

- 1 - Drive Indicators
- 2 - Port Indicators (HP drives only)

3 - Encryption Indicators

4 - Thumbscrew (One on Each Side of the Tray)

Related Topics

- [Tape Drives](#)
Tape drives read and write data on tape cartridges. The SL150 supports LTO half-height SAS and FC drives.
- [Power Requirements](#)
Power usage for the SL150 depends on the components installed.

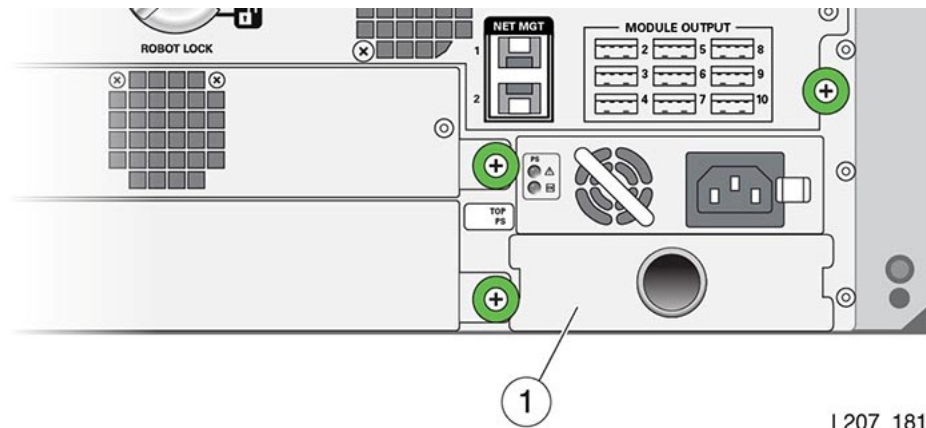
Remove the Power Supply Slot Cover

The power supply filler covers an empty power supply slot.

⚠ WARNING:

Do not operate the library with an open and empty power supply or tape drive slot. Always have a cover in place.

1. Hook your finger in the hole of the power supply cover.
2. Pull the cover from the power supply slot and set it aside.



Insert a Power Supply into the Slot

Power supplies provide power to the tape drives and library components.

1. Remove the power supply filler from the slot (see [Remove the Power Supply Slot Cover](#)).
2. Remove the power supply from the shipping carton.
3. Grasp the power supply by the handle with one hand and support the bottom of the supply with your other hand.
4. Guide the power supply into the power supply slot.
5. Make sure the power supply is latched in place.
6. Connect a power cord to the power supply receptacle and a receptacle on the rack power strip.

7. Gather cord slack to the outside of the library and wrap the hook and loop strap(s) around the cord.

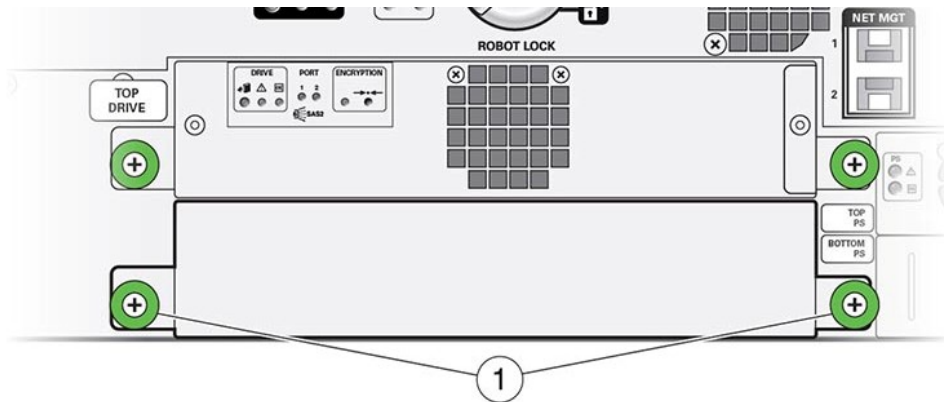
Remove the Drive Slot Cover

The tape drive filler covers an empty drive slot.

⚠ WARNING:

Do not operate the library with an open and empty power supply or tape drive slot. Always have a cover in place.

1. Loosen the thumbscrew on each side of the tape drive slot cover.



L207_162

2. Grasp the captive screws and pull the cover toward you.
3. Remove the cover from the drive slot and set it aside.

Insert a Tape Drive Tray into the Slot

Each module contains two slots for tape drives. The drives slide into the slot from the back of the module.

⚠ Caution:

Equipment damage. Do not touch the drive tray circuit card or static sensitive components. The circuit card is located on the right side of the drive tray.

1. Follow accepted practices to prevent ESD.
2. Remove the tape drive filler from the slot (see [Remove the Drive Slot Cover](#)).
3. Remove the drive tray from the shipping carton. Handle the drive tray by the rear corners (close to the thumbscrews) and the bottom of the tray. Avoid contact with the top cover of the actual tape drive.

4. Grasp the rear corners of the drive tray and guide the front of the drive tray into the library drive slot. Push the drive tray completely into the drive slot.
5. Tighten the thumbscrews. Ensure there is no tray movement in any direction.
6. Connect the interface cable to the port on the left side of the drive.

Cable the Library

Connects cables to the Base and Expansion Modules, drives, power, and network ports.

- [Cable the Expansion Modules](#)
- [Connect Cables to the Drives and Power Supplies](#)
- [Connect the Network Port](#)
- [Align and Dress the Cables and Cords](#)

Figure 2-26 Initial Cabling Example

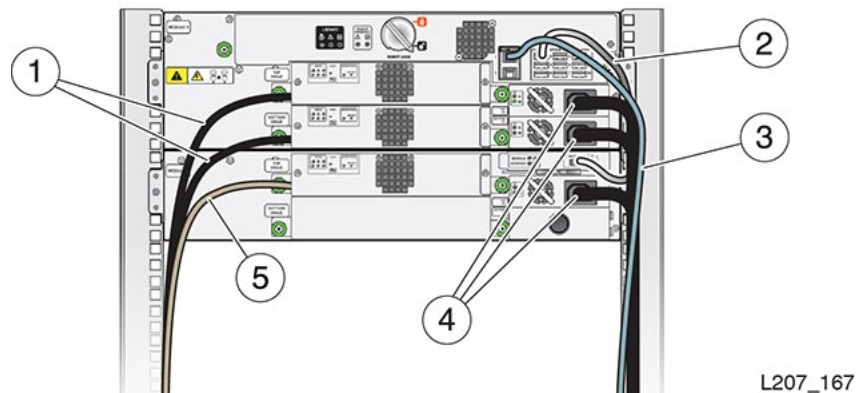


Illustration Legend:

- 1 - Tape Drive Fibre Channel Cable**
- 2 - Expansion Cable**
- 3 - Ethernet Cable (Net Mgt Port 1)**
- 4 - Power Supply Cord**
- 5 - Tape Drive Serial Attached SCSI (SAS) Cable**

Cable the Expansion Modules

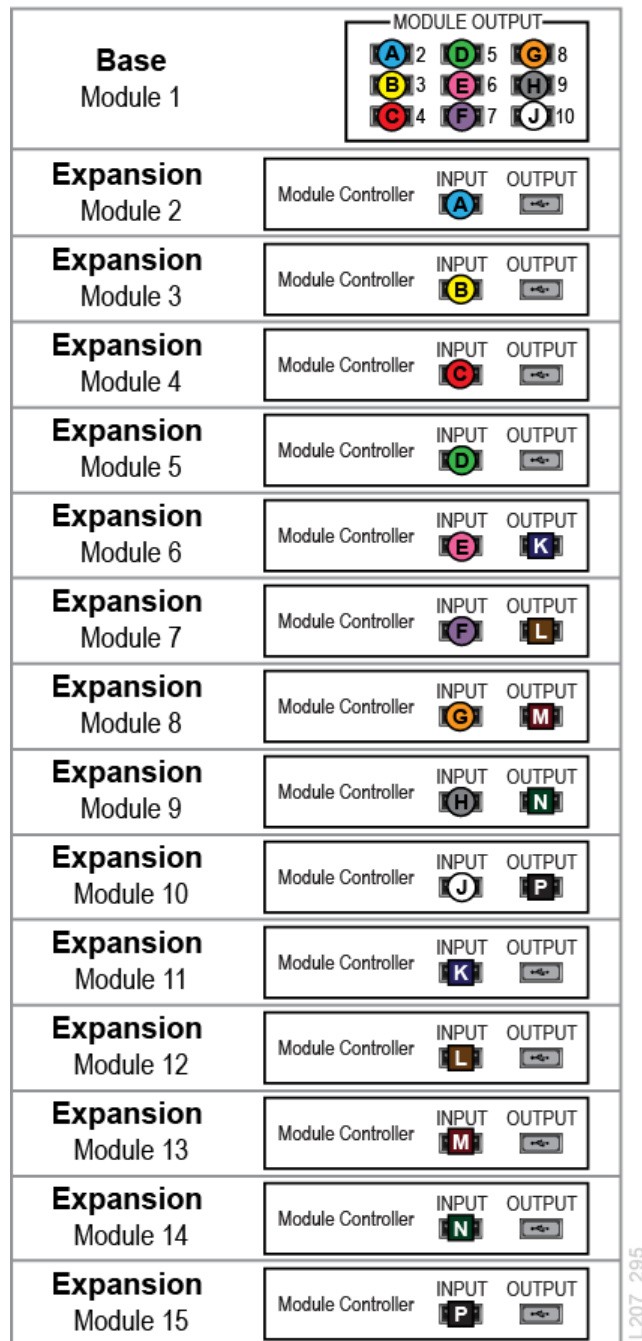
The Expansion Modules connect to the Base Module using USB cables.

Connect expansion interconnect cables between the ports listed in the table below or see the diagram below (matching letters connect together).

These Output Ports:	Connect to:
Base Module Output Port 2	Module 2 Controller Input Port
Base Module Output Port 3	Module 3 Controller Input Port

These Output Ports:	Connect to:
Base Module Output Port 4	Module 4 Controller Input Port
Base Module Output Port 5	Module 5 Controller Input Port
Base Module Output Port 6	Module 6 Controller Input Port
Base Module Output Port 7	Module 7 Controller Input Port
Base Module Output Port 8	Module 8 Controller Input Port
Base Module Output Port 9	Module 9 Controller Input Port
Base Module Output Port 10	Module 10 Controller Input Port
Module 1 thru 5 Controller Output	Do not connect anything. Leave dust cover in place.
Module 6 Controller Output Port	Module 11 Controller Input Port
Module 7 Controller Output Port	Module 12 Controller Input Port
Module 8 Controller Output Port	Module 13 Controller Input Port
Module 9 Controller Output Port	Module 14 Controller Input Port
Module 10 Controller Output Port	Module 15 Controller Input Port
Module 11 thru 15 Controller Output	Do not connect to anything. Leave dust cover in place.

Figure 2-27 Cabling the Expansion Modules



Connect Cables to the Drives and Power Supplies

Connect the power cables to the power supplies and FC/SAS cables to the drives.

1. For each power supply, connect the power cord to the power supply and the power distribution unit in the rack.

2. For each installed tape drive, connect the interface cable (FC or SAS) to the tape drive interface port. Attach a label indicating the tape drive position in the module and port to ensure proper connection after a servicing the drive.

 **Note:**

The interface port is located on the left side of the drive tray assembly (as viewed from the rear of the library).

Connect the Network Port

The network ports provide communication to external applications and a connection to the BUI.

There are two Ethernet network ports on the rear of the Base Module. Always use shielded Ethernet cables to connect the library.

1. Locate the NET MGT area of the Base Module (above the power supply and left of the Module Output ports).
2. Insert the Ethernet cable plug in the top ports, designated with a 1 and 2 on the chassis. The ports used depend on your LME configuration.
3. Attach a label to the cable indicating the network port to ensure proper connection after servicing the library.

Related Topics

- [Behavior of Library Port 1 and Port 2 with LME](#)
The LME configuration affects the behavior of library port 1 and 2.

Align and Dress the Cables and Cords

Proper cable management helps with servicing the library.

1. Gather cable slack to the outside edge of the Expansion Module, if necessary.
2. Wrap the hook and loop strap around the cables and cords.
3. Stow excess cord and cable length into the cavity between the rack stile and the side cover.

Unlock the Robot

Unlock the robot before operating the library.

The robot is locked during shipment to prevent damage. You must unlock it before operating the library. Locate the robot lock on the back of the Base Module. Follow the instructions that match your lock type:

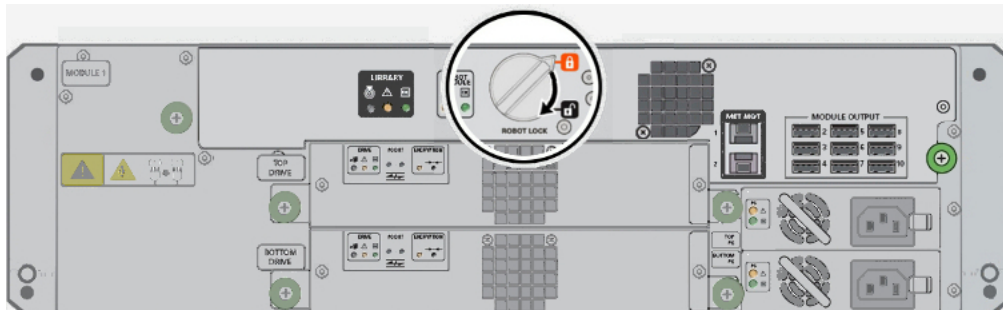
- [Unlock the Knob-type Robot Lock](#)
- [Unlock the Thumbscrew-type Robot Lock](#)

Unlock the Knob-type Robot Lock

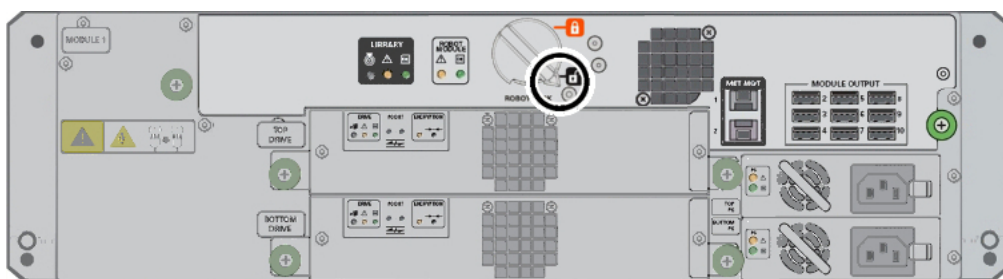
Unlock the robot by twisting the knob at the back of the Base Module.

The knob-type robot lock is on newer hardware versions.

1. Turn the knob clockwise until it clicks into place.

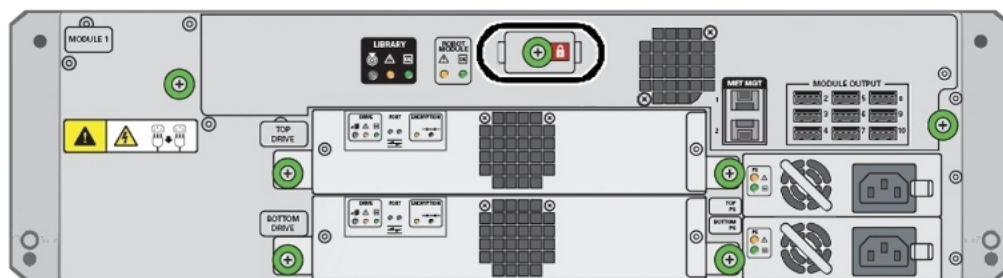


2. The pointer on the knob should point past the black, unlocked padlock icon:.



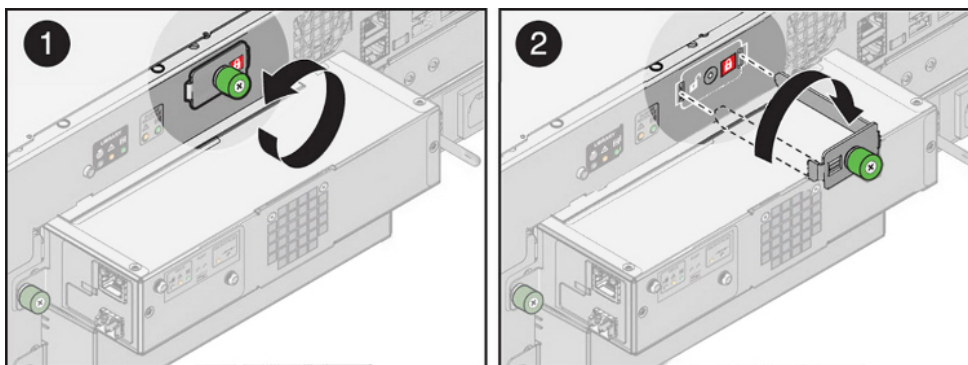
Unlock the Thumbscrew-type Robot Lock

Unlock the robot by pulling out, flipping over, and re-inserting the thumbscrew-type lock.



The thumbscrew lock is on older hardware versions.

1. Loosen the thumbscrew. Pull the lock assembly straight out until the long tab comes out of the slot at left.
2. Rotate the lock clockwise 180 degrees, and slide the long tab into the slot at right.
Verify that the white unlocked padlock icon is visible in the small window.




3. Secure the lock assembly by tightening the captive screw.

Apply Power to the Library

Powering on the library starts initialization.

Apply power to the library after you have completely installed all hardware components.

1. Make sure the robot is unlocked (see [Unlock the Robot](#)).
2. Verify all cords and cables are connected (see [Cable the Library](#)).
3. Press the power button  on the front panel of the Base Module (upper left).

The time duration of the startup varies based the size of the library. See the [Library Startup Sequence](#) for what the library does during the startup.

Caution:

Do not manually remove a cartridge magazine while the library is starting up. You could damage the robot or other internal components. Only manually remove the magazine when the library is *operational* and *offline*.

Configure the Library After Powering-on for the First Time

The library will launch the Initialization Wizard after the first power on. Use the front touch screen to configure the library with the wizard.


- [Configure the Library: Login with the Default Admin](#)
- [Configure the Library Step 1 of 6: Change the Default Administrator Password](#)
- [Configure the Library Step 2 of 6: Configure the Network Port 1](#)
- [Configure the Library Step 3 of 6: Set the Library Date and Time](#)
- [Configure the Library Step 4 of 6: Set the Drive Element Addressing Mode](#)
- [Configure the Library Step 5 of 6: Configure the Mailslot, Reserved Slots and Volume Label Format](#)
- [Configure the Library Step 6 of 6: Review and Apply Initialization Settings](#)

- [Configure the Library: Finish the New Configuration](#)

Configure the Library: Login with the Default Admin

The initial library configuration requires you to login with a default admin account.

The default password is only temporary and used for logging in following the initial power-up of the library. The customer will change the password during the initial configuration to eliminate any security risks.

1. After powering on the library for the first time, tap **Start**.
2. Log in as the default `admin` user.
3. Tap the **keyboard** button .
4. Enter the default password: `passw0rd`. This password is temporary and will be changed in the next configuration step.
5. Tap **Done**.
6. Tap **Log In**.

Configure the Library Step 1 of 6: Change the Default Administrator Password

Change the default admin password for security.

The customer should change the default admin password.

1. Tap the **keyboard** button .
2. Have the customer enter a new administrator password.

 **Note:**

The password must be at least eight characters long and contain one or more numeric or special characters. The value `passw0rd` is invalid.

3. Tap **Next**.
4. Enter the new password again in the **Verify New Password** field.
Make sure to remember the default user ID (`admin`) and your *new* password.
5. Tap **Done**.

 **Note:**

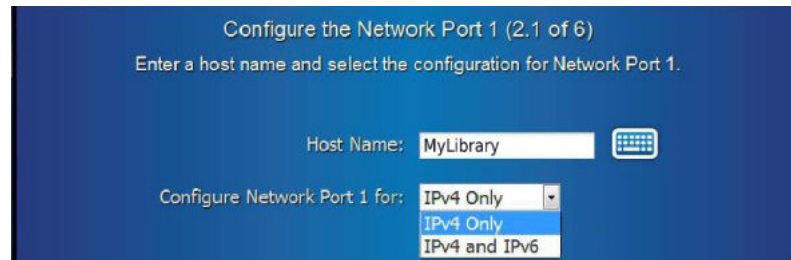
The six large dots in the password fields do not represent the actual number of characters you entered for the password.

If an error message appears, click the keyboard button to access the keyboard screen and clear the password field before you tap any key. Repeat the previous steps as necessary to correct the password entries.

6. Tap **Next**.

Configure the Library Step 2 of 6: Configure the Network Port 1

The network port supports an IPv4 or IPv6 address.



1. Enter the host name:
 - a. Tap the **Keyboard** button .
 - b. Clear the default value. Enter a new host name and then tap **Next**.

 **Note:**

Valid host names can contain the following characters: **A** through **Z**, **a** through **z**, **0** through **9**, and the hyphen (-). A hyphen cannot be the first or last character in the host name. Neither the space nor the underscore (_) is supported.

- c. Select an IP address type: **IPv4 only** or **IPv4 and IPv6**.
 - d. Tap **Next**.
2. *Option 1: Configure Network Port 1 with an IPv4 Address:*
 - a. Use the Configure IPv4 list to select either **Static** or **DHCPv4**.
 If you select **DHCPv4**, for a successful startup, DHCPv4 must be running on your network.
 If you select **Static**, tap the **keyboard** button and then enter the following:
 - **Address** — Clear the default value. Enter the IPv4 Address in the format XXX.XXX.XXX.XXX and then tap **Next**.
 - **Netmask** — Clear the default value. Enter the IPv4 Netmask in the format XXX.XXX.XXX.XXX and then tap **Next**.
 - **Gateway** — Clear the default value. Enter the IPv4 Gateway value in the format XXX.XXX.XXX.XXX and then tap **Done**.
 - b. Verify the values are correct (you can change any incorrect value by tapping the keyboard button). Tap **Next**.
3. *Option 2: Configure Network Port 1 with an IPv6 Address"*
 - a. Use the Configure IPv6 list to select **DHCPv6**, **Stateless (SLAAC)**, or **Static**.

- If you select the DHCPv6 option, for a successful startup, DHCPv6 must be running on your network.
 - If you selected **Static**, you must enter the IPv6 Address, Prefix Length, and Gateway.
- b. Verify the values are correct (you can change any incorrect value by tapping the keyboard button). Tap **Next**.

Configure the Library Step 3 of 6: Set the Library Date and Time

Configure the library date and time to match the desired time zone.

1. Set the library time zone:
 - a. Select the **Time Zone** from the list.
 - b. Select the **Closest City or Region** from the list.
 - c. Tap **Next**.
2. Configure the date and time by selecting either **Manually** or **Using Network Time Protocol** from the list.
 - If you select **Using Network Time Protocol**, you must provide the IP address of a Network Time Protocol server on your network. The steps are similar to those for setting an IP address for Network Port 1.
 - If you select **Manually**, enter the current date in the format MM/DD/YYYY. Enter the current time in the format HH:MM:SS where HH represents 24-hour format.

3. Verify the values are correct (change any incorrect value by tapping the keyboard button). Tap **Next**.

Configure the Library Step 4 of 6: Set the Drive Element Addressing Mode

The drive element addressing mode affects how the library assigns SCSI element IDs to tape drives.



Note:

Code versions before 2.0 will not include this step.

1. Select the **Drive Element Addressing Mode** from the list. The options are:

Address All Drive Slots (Recommended)

All drives, including empty drive slots, are assigned a sequential SCSI element address which is always reported to attached hosts. In this mode, the library does not need to be restarted for newly installed drives to become usable by attached hosts, and drive SCSI element addresses never change. Also, empty drive slots can be assigned to a partition.

You should select this setting if using STA. Otherwise, media validation drives will not show within STA.

Address Only Installed Drives

Only installed drives are assigned a sequential SCSI element address. Empty drive slots are not assigned a SCSI element address and are not reported to attached hosts. In this mode, the library must be restarted before newly installed drives are usable by attached hosts, and drive SCSI element addresses may change. Also, only installed drives can be assigned to a partition.

You must select this setting if using ACSLS.

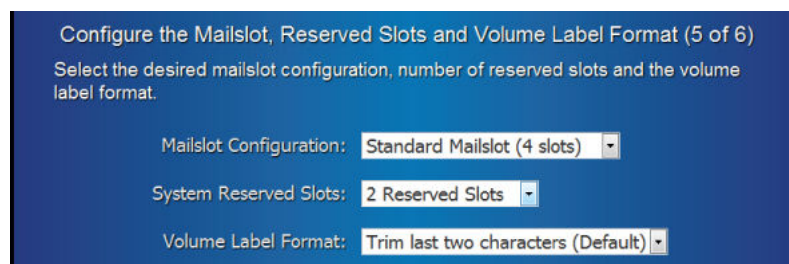
2. Tap **Next**.

Configure the Library Step 5 of 6: Configure the Mailslot, Reserved Slots and Volume Label Format

Configure the mailslot type, number of reserved system slots, and volume label format.

Note:

Code versions before 2.0 will not include an option for mailslot configuration.



1. Configure the mailslot.

Note:

Refer to the ACSLS documentation for release levels which support the Expanded Mailslot Configuration.

Select the mailslot type from the list that corresponds to your configuration:

- Standard Mailslot (4 slots)
 - Expanded (19 slots)
2. Set the system reserved slots.

System reserved slots are storage slots in the SL150 library typically used to house cleaning tapes or diagnostic tapes. Use the **System Reserved Slots** list to select the desired number of slots (see [Determine the Required Number of Reserved System Slots](#)).

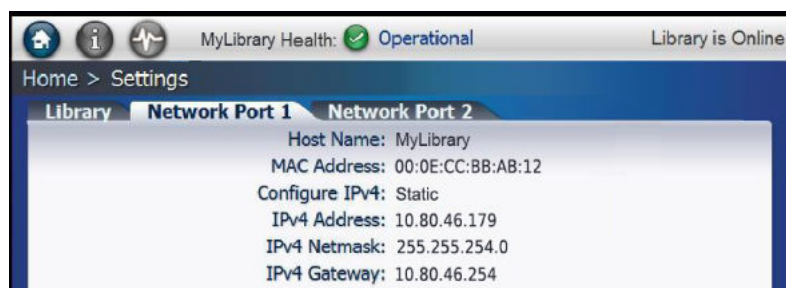
 - No reserved slot
 - 1 reserved slot
 - 2 reserved slots
 - 3 reserved slots
 3. Set the volume label format. Use the **Volume Label Format** list to select the desired number of slots and then tap **Next**.

To accommodate various cartridge labeling schemes, the SL150 library supports labels eight to 14 characters long and provides a label windowing feature that lets you specify how the labels should be interpreted by the host application. See [Label Format Types](#) for a description of the format types.

Configure the Library Step 6 of 6: Review and Apply Initialization Settings

Verify all settings are correct before applying the configuration.

1. Verify the value of each initialization setting (tap **Previous** to alter any incorrect value before applying changes).
2. To verify the network settings, tap the **Settings** button on the Home screen, and then tap the **Network Port 1** and **Network Port 2** tabs.



3. If all settings are correct, tap **Apply**.
4. The library restarts. The duration of the restart depends on the size of library.

⚠ Caution:

Do not manually remove a cartridge magazine while the library is starting up. You could damage the robot or other internal components. Only manually remove the magazine when the library is *operational* and *offline*.

5. After the restart completes, the Home screen appears on the touch screen. The **Library Health** displays in the status bar at the top of the screen. If the library is not Operational, perform the troubleshooting procedures listed in [Service the Library](#) before proceeding.

Configure the Library: Finish the New Configuration

Fine tune the configuration of the library to meet your specific needs.

After the initial configuration, the newly installed tape library should be operational. However, to finish the configuration and fully integrate the equipment into your environment, you may need to carry out additional tasks:

- Upgrade library or drive firmware (see [Update Firmware](#)).
- Add any additional users that you require (see [Add a User and Assign a Role](#)).
- Set up system monitoring, if required (see [Configure Simple Network Management Protocol \(SNMP\)](#)).
- Configure system notifications, if required (see [Configure Email Notifications](#)).
- Load cartridge magazines (see [Tape Cartridges \(Media\)](#)).

Run a Self-Test

A self-test can help troubleshoot library issues and confirm proper installation.

Before placing a newly installed or reconfigured library into production, you should run a full self-test.

1. Before running a self-test, verify the following:
 - There is at least one diagnostic tape ("DG" label) in the mailslot or reserved system slot. The diagnostic tape should be compatible with at least one unoccupied drive.
 - The mailslot is closed and all magazines are securely latched.
 - At least one of the four slots in the standard mailslot is empty.
 - At least one slot in the library is empty.
2. From the remote interface, select **Library** in the left menu.
3. From the **Library** drop-down **Library** , select **Run Self Test**.
4. Select a test type:
 - **Basic Self Test** — a quick (6 move) test used to verify basic library function to test robot access to the corner locations of the library.
 - **Full Self Test** — a thorough test that moves a tape to every slot and to every unoccupied drive compatible with the chosen diagnostic tape. A full test can take significant time depending on the number of modules in the library, so plan accordingly.
5. Optionally, select **Set the Library back Online** to automatically bring the library online after the test (the library goes offline to perform the self test)
6. Click **OK** to start the test.

 **Note:**

If the test fails, click **Degraded** to open a health table identifying a failed or degraded component. See [Use the Health Table to Diagnose the Issue](#) more information.

7. If you did not check the **Set the Library back Online** checkbox, remember to bring the library back online manually, once you are ready. See [Place the Library Online or Offline](#).

Stopping a Self-test

Stop a self-test to resume library operations.

To stop a test that is in progress, from the **Library** drop-down **Library ▾**, select **Stop the current test**. The test may take a few moments to stop. If the diagnostic cartridge was not returned to its reserved cell at the end of the test, move the diagnostic cartridge now.

Related Topics

- [Move Tape Cartridges with the Remote Interface](#)
The remote interface can move cartridges when you cannot use the host application.

3

Basic User Interface Operations

Basic operations are common actions used to interact with the user interface, such as logging in, reordering columns, or printing a table.

- [Log In to the Remote Interface](#)
- [Log Out of the Remote Interface](#)
- [Show, Hide, and Reorder Table Columns](#)
- [Export a Table as a Spreadsheet](#)
- [Print a Table](#)

Log In to the Remote Interface

Access the remote interface from any workstation with a network connection to the library.

1. In a browser, enter the URL of the library. Your workstation must have network access to the library.
2. Enter your **User ID** and **Password**. Contact the library administrator if you do not have login credentials.
3. Click **Log In**.

Related Topics

- [Remote Interface](#)
The remote interface is a browser-based application used to monitor and manage the library.

Log Out of the Remote Interface

Log out when you are done using the interface.

For security, never leave a session open and unattended. Always log out of the interface when you are finished using it.

1. Near the top right of the interface, click **Log Out**.
2. Wait until the "Logged Out" dialog indicates that you have successfully signed out before closing the browser window.

Show, Hide, and Reorder Table Columns

Selectively show, hide, and change the order of table columns to help view particular information.

1. On a page with a table, click the **View** drop-down.
2. Select **Columns**, and then select the columns to show/hide.


3. Select **Reorder Columns...**, and then use the up and down arrows to order the columns.

Related Topics

- [Export a Table as a Spreadsheet](#)
Export an `.xls` file for any of the tables found in the remote interface. Use a spreadsheet application to analyze the exported table data.
- [Print a Table](#)
Print any table in the remote interface.

Export a Table as a Spreadsheet

Export an `.xls` file for any of the tables found in the remote interface. Use a spreadsheet application to analyze the exported table data.

1. Navigate to the table.
2. Click **Export** .
3. Save the file to the desired location.
4. Open the file in a spreadsheet application (such as Microsoft Excel).

Note:

The extension of the file is `.xls`, but the format is html. When opening the file in a spreadsheet program, you may need to confirm the file is not corrupt and from a trusted source. You can also view the file in a web browsers by renaming the `.xml` file extension to `.html`.

Related Topics

- [Print a Table](#)
Print any table in the remote interface.
- [Show, Hide, and Reorder Table Columns](#)
Selectively show, hide, and change the order of table columns to help view particular information.

Print a Table

Print any table in the remote interface.

1. Navigate to the table.
2. Click **Print** .

Related Topics

- [Show, Hide, and Reorder Table Columns](#)
Selectively show, hide, and change the order of table columns to help view particular information.

- [Export a Table as a Spreadsheet](#)
Export an `.xls` file for any of the tables found in the remote interface. Use a spreadsheet application to analyze the exported table data.

4

Configure the Library

Update the library configuration using the wizard, update library firmware, and manage the library's certificate.

- [Run the Configuration Wizard](#)
 - [Configure the Network Interfaces](#)
 - [Set the Library Date and Time](#)
 - [Configure Library Settings](#)
 - [Partition the Library](#)
 - [Configure Library Managed Encryption \(LME\)](#)
- [Update Firmware](#)
- [Manage the Library's SSL/TLS Certificate for HTTPS](#)
- [Configure Accessibility Settings](#)
- [Set Automatic Screen Refresh](#)


Related Topics

- [Configure the Library After Powering-on for the First Time](#)

The library will launch the Initialization Wizard after the first power on. Use the front touch screen to configure the library with the wizard.

Run the Configuration Wizard

The configuration wizard sets the library time, network parameters, library settings, partitioning, and encryption.

1. From the remote interface, select **Configuration** in the left menu.
2. Click **Configure** .
3. Within the Configuration Wizard, select each configuration task that you need to perform, and then click **Next**. Proceed to the relevant sections:
 - [Configure the Network Interfaces](#)
 - [Set the Library Date and Time](#)
 - [Configure Library Settings](#)
 - [Partition the Library](#)
 - [Configure Library Managed Encryption \(LME\)](#)
 - [Review and Apply Configuration Wizard Changes](#)

**Note:**

You cannot configure the network interfaces and encryption simultaneously.

Configure the Network Interfaces

Configure the library's two local area network interfaces for communication to external applications.

- **Network Port 1** — connects browser-based, remote user interface clients to the interface server on the library.
- **Network Port 2** — a second network connection for service use or for library managed encryption (LME) for OKM communication.

Before deciding on a configuration, review the [Behavior of Library Port 1 and Port 2 with LME](#) and consult with your network administrator. Support for IPv6 and local addressing requirements can vary from site to site.

- [Verify Job Activity and Launch the Wizard](#)
- [Configure Network Port 1](#)
- [Configure Network Port 2](#)

**Note:**

You cannot configure the network settings and library encryption in the same instance of the Configuration Wizard. Configure the network settings, allow the library to restart, and then configure library encryption.

Verify Job Activity and Launch the Wizard

Modifying the network settings will affect host communication. Verify there is no library activity before changing the network settings.

1. Check the activity log for active jobs, such as tape moves or mounts. Never change the network configuration during active jobs, if at all possible.
2. If any tape jobs are active, wait for them to complete before continuing. You may want to take the library offline before configuring to prevent host activity. See [Place the Library Online or Offline](#).
3. [Run the Configuration Wizard](#). Select **Configure Network Settings**.

Configure Network Port 1

Port 1 is primarily used for sending UI, SNMP, and email alerts (SMTP) traffic.

1. Enter the desired library name in the **Host Name** field.

Valid host names contain characters in the ranges [A-Z], [a-z], and [0-9], plus the hyphen (-). A hyphen cannot be the first or last character in the host name.

Spaces and underscores () are not supported.

2. From the "Configure Network for" drop-down list select either: **IPv4 only** or **IPv4 and IPv6**
3. From the "Configure IPv4" drop-down list select either:
 - **Static** — You must enter the Address, Netmask, and Gateway. In most cases, you will want to choose Static so that library interface clients can always find the server at a stable, well-known network location.
 - **DHCP** — A DHCP server must be running on your network to use this setting.
4. From the "Configure IPv6:" drop-down list select either:
 - **Static** — You must enter the Address, Prefix Length, and Gateway. In general, if your DNS (Domain Name Service) supports IPv6 addresses, select Static so that library interface clients can always find the server at a stable, well-known network location.
 - **Stateless (SLAAC)** — If DNS does not support IPv6 addresses, select Stateless (SLAAC). With a stateless address, library interface clients can find the server at an address based on the unique MAC (media access control) address of the network interface card in the robot/controller assembly. A stateless address will not change unless the robot has to be replaced
 - **DHCPv6** — If a DHCPv6 server is available on your network, you can select DHCPv6. Be aware the network address of the library user interface will change.
5. Click **Next**.

Related Topics

- [IPv6 Network Address Support](#)
The dual-stack network configuration supports both IPv4 and IPv6.

Configure Network Port 2

Optionally, configure Network Port 2 for library managed encryption (LME).

LME requires library code 3.50 and above. Configuring Port 2 will force LME through Port 2 only. Leaving the Port 2 configuration set to the default will for LME through Port 1 only (if you enable LME).

Note:

Do not configure Port 2 for any other use than with LME, otherwise you may encounter issues. If you are not using LME, Oracle recommends that you leave Port 2 set to the defaults. See [Behavior of Library Port 1 and Port 2 with LME](#) for more information.

1. From the **Network Port 2** list, select **On** or **Off**.

The library supports Port 2 being on the same subnet as the KMA IPv4 addresses. Entering a gateway is not required if Port 2 and the KMA are on the same subnet. You should enter a gateway that can reach all OKM cluster KMA's.

 **Note:**

You must configure Port 2 with a different subnet than Port 1 to create a secure and private network connection to pass the encryption keys between the library and the OKM cluster.

2. From the "Configure IPv4" drop-down list select either:
 - **Static** — You must enter the Address, Netmask, and Gateway. In most cases, you will want to choose Static so that library interface clients can always find the server at a stable, well-known network location.
 - **DHCP** — A DHCP server must be running on your network to use this setting.
3. Click **Next**.

Related Topics

- [Library Managed Encryption \(LME\)](#)
The library can manage encryption for IBM LTO-6 and higher drives.
- [Configure Library Managed Encryption \(LME\)](#)
Configure LME to have the library manage the encryption enrollment and key delivery of all IBM LTO-6 or higher drives.
- [IPv6 Network Address Support](#)
The dual-stack network configuration supports both IPv4 and IPv6.

Set the Library Date and Time

Use the configuration wizard to set the library date and time.

1. [Run the Configuration Wizard](#). Select **Set the Library Date and Time**.
2. Select the **Time Zone** and **Closest City or Region** from the drop-down lists. Click **Next**.
3. Either set the time **Manually** or use **NTP**:
 - **Manually** — Enter the date using the format *mm/dd/yyyy* (month/day/year). Enter the time using the format *hh:mm:ss* (hour:minute:seconds).
 - **Network Time Protocol** — Enter the addresses of up to three NTP servers.
4. Click **Next**.

Configure Library Settings

Library settings include the Drive Element Addressing mode, Drive Auto Clean mode, mailslot configuration, reserved system slot configuration, partitioning configuration, bridged drive selection, and volume label format.

1. [Run the Configuration Wizard](#). Select **Configure Library Settings**.
2. From the "Drive Element Addressing Mode:" drop-down, select either:
 - **Address All Drive Slots (Recommended)** — Assigns new SCSI hardware addresses to all drive bays in the library, whether or not drives are actually installed.

Select this if:

- You are using STA. If you don't select this option, media validation drives will not show in STA.
 - You are installing a new library. This means host system drive assignments do not need to be remapped when drives are subsequently added or replaced.
 - **Address Only Installed Drives** — Assigns SCSI address to drive bays that contain an installed drive. Does not address empty drive bays.
Select this if:
 - You are using ACSLS.
 - You are upgrading an SL150 library that does not currently assign addresses to empty drive bays. Selecting *Address Only Installed Drives* retains the current addresses and assigns the next address in sequence to the new drive.
3. From the "Drive Auto Clean:" drop-down, select either:
 - **On** — Enables library auto cleaning. You must have one or two cleaning cartridges in reserve slots to enable this feature. See [Configure Drive Cleaning](#) for more information.
 - **Off** — Disables library auto cleaning. You must configure host-managed cleaning or manually clean. See [Configure Drive Cleaning](#) for more information.
 4. From the "Mailslot Configuration:" drop-down, select either:
 - **Standard (4 slots)**
 - **Expanded (19 slots)** — Converts the right magazine of the Base Module into an additional mailslot. The magazine must be empty before selecting this configuration. Requires 2.25 code and above.
 5. From the "System Reserved Slots:" drop-down, select the number of slots. If you are unsure, see [Determine the Required Number of Reserved System Slots](#).
 6. From the "Library Partitioning:" drop-down, select either:
 - **Partitioning Off**
 - **Partitioning On** — You will need to partition the library now, see [Partition the Library](#).
 7. From the "Library Bridge Drive:" drop-down, select a drive to designate as the bridged drive. The default bridged drive is Module 1 Top Drive. See [Bridged Tape Drives](#) for more information.
 8. From the "Library Volume Label Format:" drop-down, select a label format. For a description of each type, see [Label Format Types](#).
 9. From the "Library Fast Load" drop-down, select whether to enable or disable the Library Fast Load option. This option applies to all tape mounts in the library. Select either:
 - **Off** (default and recommended) — All moves to a drive will not complete until the tape has been loaded by the drive and the drive has transitioned to either the "Loaded" or other failure state in the case of a failure. Additionally, when this option is off, the library will move the tape back to the source if possible, before returning status.
 - **On** — All moves to a drive will complete once the robot places the tape in the drive. If the load fails for any reason, the tape remains in the drive. The host is responsible for moving the tape out of the drive.

 **Note:**

All Media Validation mounts are normal (not fast load) even if the "Library Fast Load" option is set to **On**.

Partition the Library

Partitioning breaks the library into smaller sections and allows multiple host systems to access library resources.

Each partition acts as an independent library, but all partitions share the reserved cells, the single robot, and the four-cartridge mailslot. Partitioning allows multiple hosts to access the library.

Requirements:

- Maximum of eight partitions (code versions before 2.0 only support two partitions)
- Each partition must have its own bridged drive
- Each partition must have at least one magazine
- Mailslot must be closed, locked, and empty before changing the partitioning configuration

Partitioning Tasks:

- [Access the Partitioning Screen](#)
- [Create a New Partition](#)
- [Delete an Existing Partition](#)
- [Assign Resources to the Partition](#)

Related Topics

- [Bridged Tape Drives](#)
A bridged drive provides a single, unified control and data communication path between the library/partition and the host using the SAS or FC drive interface.

Access the Partitioning Screen

Access the "Configure Library Partitioning" screen through the configuration wizard.

Pre-requisite: Tapes cannot be in the mailslot while configuring partitioning.

1. [Run the Configuration Wizard](#).
2. Select **Configure Library Settings**, and then click **Next**.
3. From the "Library Partitioning:" drop-down, select **Partitioning On**, and then click **Next**.
4. If at any point you do not wish to proceed, click **Previous** or **Cancel**.

Create a New Partition

Create a partition to segregate library resources. Each partition appears as a separate library to host applications

For each partition select a name, a bridged drive, and the label format.

1. [Access the Partitioning Screen](#).
2. Click **Add Partition**.
3. Enter the **Partition Name**.
4. Select a **Bridged Drive** from the list. Each partition must have a bridged drive.
5. Select a **Volume Label Format** from the list.
6. Add additional partitions as necessary.
7. [Assign Resources to the Partition](#).

Assign Resources to the Partition

Resources assigned to a partition can only be used by that partition.

Assign each partition at least one bridged drive and one cartridge magazine.

Pre-requisites:

- You are in the partitioning wizard (if not, see [Access the Partitioning Screen](#)).
- You have already created at least one partitioning definition (if not, see [Create a New Partition](#)).

1. In the left-hand menu, select a partition.

The selected partition's name is bolded and has a dark box next to the name. Such as **Partition 5**.

2. To **add** resources to the selected partition, click on an unassigned resource (gray in color).

For example: **Unassigned: Module 3 Top Drive**

3. To **remove** resources from the selected partition, click on a resource the partition owns (same color as the partition).

For example: **Partition 5: Module 2 Left Magazine**

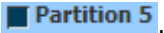
4. Once you are finished modifying the overall partitioning configuration, review your changes and then click **Next**.

Delete an Existing Partition

Delete a partition to remove the partition definition and unassign all resources in the partition.

Caution:

Before deleting a partition, make sure that it no longer holds tape cartridges that contain valid data. When you reassign the slots, the host application that controls the new partition may treat any resident tape cartridges as scratch volumes.

1. Move all tape cartridges out of the partition you want to delete.
2. [Access the Partitioning Screen](#)
3. In the left-hand menu, select a partition.
The selected partition's name is bolded and has a dark box next to the name.
Such as .
4. Click **Delete Partition**, just below the list of partitions.
5. Click **OK**. Reassign resources as needed (see [Assign Resources to the Partition](#)).
6. Otherwise, if you are finished, click **Next**. Then, review and apply the configuration changes.

Related Topics

- [Export Tape Cartridges](#)
Use the mailslot to remove tapes from the library.
- [Move Tape Cartridges with the Remote Interface](#)
The remote interface can move cartridges when you cannot use the host application.

Configure Library Managed Encryption (LME)

Configure LME to have the library manage the encryption enrollment and key delivery of all IBM LTO-6 or higher drives.

- [Obtain Information from OKM](#)
- [Configure the SL150 to Manage Encryption](#)
- [Verify the SL150 Agent is Enrolled](#)

Related Topics

- [Library Managed Encryption \(LME\)](#)
The library can manage encryption for IBM LTO-6 and higher drives.

Obtain Information from OKM

Configure the SL150 as an agent within OKM and record the information.

Have the OKM administrator use the OKM GUI to create an SL150 library agent and then record the following information to use in the SL150 configuration:

- OKM Cluster IP address
- Agent Name
- Passphrase

Configure the SL150 to Manage Encryption

With code version 3.50 and above, the library can manage encryption.

Note:

You cannot configure the network settings and library encryption in the same instance of the Configuration Wizard. Configure the network settings, allow the library to restart, and then configure library encryption.

1. Library encryption must be configured separately and after all other library configuration options. Ensure you have completed the network configuration and rebooted the library before configuring encryption. If not, see [Configure the Network Interfaces](#).
2. [Run the Configuration Wizard](#). Select **Configure Library Encryption**.
3. From the "Library Encryption Status:" drop-down, select **Encrypting**.
This globally enables library managed encryption for all IBM LTO-6+ drives within the library regardless of the partitioning configuration.
4. Enter the following information:
 - OKM Cluster IP address
 - Agent ID
 - Agent Passphrase
5. Note the port that will be used for OKM communication in the "Connect to OKM using:" field.
If you altered the Port 2 configuration, all LME traffic will go through Port 2. If you left the Port 2 configuration set to the default values, LME traffic will go through Port 1.
6. Leave the OKM tuning parameters at their default setting unless instructed to change them by your OKM administrator.
7. Click **Next**. Review and apply the changes.

Verify the SL150 Agent is Enrolled


Confirm the library is enrolled as an agent in OKM.

After confirming the changes within the Configuration Wizard, have the OKM administrator go to the OKM GUI and verify that the SL150 agent now shows "Enrolled: True".

See the OKM documentation for more information.

Review and Apply Configuration Wizard Changes

Verify and accept changes you made in the configuration wizard to apply the settings.

1. Within the configuration wizard, review the **Summary of Configuration Changes** screen. Altered settings are indicated by "changed" or "added" in the changes column.
2. Note any alerts  at the bottom of the screen.
3. If you see a problem, click **Previous** to return to an earlier screen or **Cancel** to quit.
4. Otherwise, select the **Accept all changes** check box, and then click **Apply**.

Update Firmware

Regularly check for firmware updates. Keep the library and drives up to date.

- [Identify Current Firmware Versions](#)
- [Download Firmware from My Oracle Support](#)
- [Upgrade the Library Firmware](#)
- [Update the Drive Firmware](#)
- [Revert to the Previous Library Firmware](#)

Identify Current Firmware Versions

View the currently installed firmware versions for the library and drives.

1. From the remote interface, select **Firmware** in the left menu.
2. On the **Library Firmware** tab, note the *Current Firmware Version* field
3. Click the **Drive Firmware** tab. For each drive in the list, note the values:
 - *Firmware Version* — contains an alphanumeric string
 - *Type* — a vendor identifier plus an LTO Generation number
 - *Interface Type* — Fibre (for Fibre Channel) or SAS (for Serial Attached Small Computer System Interface)

Related Topics

- [Update the Drive Firmware](#)
Keep drive firmware up to date with the most current and supported drive firmware.
- [Upgrade the Library Firmware](#)
Update the library firmware to access the latest features.

Download Firmware from My Oracle Support

Download library and drive firmware to your workstation to upload it to the library.

1. Log in to My Oracle Support: <https://support.oracle.com>.
2. Click the **Patches & Updates** tab.
3. Within the **Patch Search** area, click on the **Product or Family (Advanced)** link.
4. In the **Product is** field, enter:
 - *For library firmware:* Enter `SL150`, and then select **StorageTek SL150 Modular Tape Library** from the list of results.
 - *For drive firmware:* Enter `LTO`, and then select the drive model (for example, **IBM LTO7 Tape Drive**).
5. From the **Release** drop-down list, select the release version you want to download (for example 3.20 for library firmware, or HH-FC or HH-SAS for drive firmware).
6. Click **Search**.
7. In the **Patch Search Results** table, click a row. A button bar displays.
8. Click **Read Me** to confirm the firmware version.

For drive firmware, make sure it is intended for the SL150 library. Note the firmware release level. Scan the drive firmware Read Me file for lines like the following:

```
Unbundled Product: StorageTek LTO-6hh FC Tape Drive for the SL150 library
Unbundled Release: 23DS
```

9. Click **Download**, and then within the download dialog click the file name to begin the download.

Library firmware is named `p12345678_xyz0_Generic.zip`, where `p12345678` represents a part number, `x` represents the major release number, and `yz` represents the minor release number.

Drive firmware is named `123456_01.zip`, where `123456_01` represents a part number.

10. Verify the checksum of the file (see [Verify the Download](#)).

Verify the Download

Confirm the file downloaded correctly by comparing the checksum.

1. At the bottom of the **File Download** dialog, click on the **View Digest Details** link.
2. Copy the MD5 and SHA checksums and paste them into a text file.
3. Verify the integrity of the downloaded ZIP file. Using a suitable checksum utility, calculate the MD5 or SHA-1 digest value of the downloaded file, and compare the result to the corresponding MD5 or SHA-1 value saved in your text file.

You can use `digest` (Oracle Solaris) and `dgst` (Linux). Microsoft offers the File Checksum Integrity Verifier command line utility (`fciv.exe`), available from the Microsoft Download Center.


4. If the digest value that you calculated for the file does not match the value displayed in the dialog, the file is corrupt and cannot be installed successfully. Stop here, and re-download the firmware zip.

Upgrade the Library Firmware

Update the library firmware to access the latest features.

1. Verify you are using a compatible browser to upgrade the firmware. Some browsers may falsely show upload progress, but not actually upload the firmware.

Recommended browsers:

- Mozilla Firefox ESR (Extended Support Release)
 - Microsoft Edge
 - Google Chrome
2. Download the library firmware (see [Download Firmware from My Oracle Support](#)).
 3. Extract the firmware ZIP (the extracted file should contain a .tar file and release notes).
 4. Log in to the remote interface as an administrator.
 5. Select **Firmware** in the left menu.
 6. Select the **Library Firmware** tab, and then click **Upgrade** .
 7. Browse to the folder that contains the firmware, and select the SL150_xyz0.tar file, where xyz0 is the four-digit form of the release number.
 8. To install the new firmware and restart the library, click **OK**.

Depending on the browser, you may see the **Uploading %** in the bottom-left corner of the window or an active circle on the browser tab, while some browsers may not show any indication of the initial file upload progress.

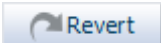
 **Note:**

Some browsers may appear to show the file upload progress, but will not actually transfer the file. If the upload takes an excessive amount of time, cancel the upload and try one of the recommended browsers.

9. If the firmware upgrade fails, verify the file (see [Verify the Download](#)). If the file is ok, create a service request (see [Create a Service Request](#)).

Revert to the Previous Library Firmware

Roll back to the previously installed version if you have problems with a library firmware update.

1. Log in to the remote user interface as an administrator.
2. Click **Firmware** in the left menu.
3. To roll back the library firmware, click **Revert** .
4. If the library has been operating normally and if its contents have not changed, check the **Bypass audit for a faster restart ...** check box.
5. Click **OK** to restart the library and activate the old firmware.

Manage the Library's SSL/TLS Certificate for HTTPS

The library's certificate encrypts SSL/TLS traffic to and from the library.


At initial installation, the library includes a default certificate that must be replaced with either a self-signed or third-party verified certificate. At a minimum, replace the default certificate with a new self-signed certificate. Then, optionally, you can install a certificate signed by a certifying authority (CA).

- [Generate a Self-Signed Certificate](#)
- [Install a Third-Party Signed Certificate](#)

Generate a Self-Signed Certificate

The library can generate a self-signed certificate to encrypt SSL/TLS traffic.

A self-signed certificate is secure, but will require you to manually tell the browser to trust the certificate before you can view the login screen. To eliminate this browser security exception, you can install a certificate signed by a certifying authority (CA) (see [Install a Third-Party Signed Certificate](#)).

1. Click **Configuration** in the left navigation area of the GUI.
2. Click the **Certificate** tab, and then click **New Certificate** .
3. Enter in the certificate information.

Install a Third-Party Signed Certificate

Install a third-party certificate to encrypt SSL/TLS traffic and eliminate the browser warning caused by a self-signed certificate.

- [Verify the Library Has a Self-Signed Certificate](#)
- [Export Certificate Signing Request \(CSR\) File](#)
- [Obtain Required Certificates](#)
- [Import the Certificate File](#)

Verify the Library Has a Self-Signed Certificate


Before installing a third party certificate, the library must have a self-signed certificate installed.

You cannot go directly from the default certificate to a third-party certificate. The library must have a self-signed certificate before installing a third-party signed certificate.

To install the self-signed certificate, see [Generate a Self-Signed Certificate](#).

Export Certificate Signing Request (CSR) File

Export the file required to send to the certifying authority (CA).

1. Click **Configuration** in the left navigation area of the GUI.
2. Click the **Certificate** tab, and then click **Export CSR** .
3. Click **Download**.
4. Submit the CSR to the third-party certifying authority (CA).

Obtain Required Certificates


Ensure you have all the required information from the CA before importing the certificate.

Verify that you have obtained the following:

- Primary certificate of the trust anchor CA (such as VeriSign's public primary root CA)
- Intermediate certificate of the issuing SSL CA (optional). In cases where there is no intermediate issuer, you can omit the intermediate certificate. This is highly site-specific, so check with your company's security experts for requirements.
- Your newly issued SSL certificate

Import the Certificate File

Import the CA certificate file into the library to replace the self-signed certificate.

1. Click **Configuration** in the left navigation area of the GUI.
2. Click the **Certificate** tab, and then click **Import Certificate** .
3. Copy and paste each certificate file into the text box and click **Next**. To skip the intermediate certificate, leave the box blank and click **Next**.

Configure Accessibility Settings

Users with visual impairments can adjust Accessibility Settings when logging into the remote interface.

1. From the login screen, select **Set Accessibility Settings**.
 - **Screen reader** - If you are using a screen reader, select this option. The interface generates components that have rich user interface interaction and are accessible through the keyboard.
 - **High contrast** - The interface generates high-contrast-friendly visual content. High-contrast mode is designed for use with operating systems or browsers that have high-contrast features enabled.
 - **Large-fonts** - The interface generates browser zoom-friendly content.
2. Click **Log In** to close the property sheet and log in to the library.

You can navigate between the different parts of an SL150 user interface screen, menu, or list using the tab and arrow keys on the keyboard. You select interface elements by pressing the Return key on the keyboard.

Set Automatic Screen Refresh

Control when the screen of the remote interface refreshes.

The interface automatically refreshes by default. However, you may want to pause this functionality and only refresh the screen using your browser controls.

1. In the top-right of the remote interface, click **Preferences**.

2. Select **Pause Automatic Refresh** or **Resume Automatic Refresh** from the drop-down menu.

When auto-refresh is paused, you must use your web browser's reload/refresh control.

5

Users

The library limits access to the system based on user and role. The administrator can assign and manage users.

- [User Roles and Access](#)
- [Change Your Password](#)
- [Reset Another User's Password](#)
- [Add a User and Assign a Role](#)
- [Remove a User](#)
- [Change an Assigned Role](#)

User Roles and Access

A user's role determines their access to library functions.

The administrator can assign a user one of the following roles:

- **Viewer** — a read-only role. Viewers can login, monitor library operations, and view component states and properties, but they cannot alter the configuration or operation of the library.
- **Operator** — limited control over the operation of the library, but cannot change the configuration. Operators can take the library online/offline, power the library on/off, import and export cartridges, and run self-tests.
- **Administrator** — has full control over the operation and configuration of the library, and can manage other users. The administrator can grant or deny users access, assign user roles, set and change library properties, configure the TCP/IP connection and SNMP communication. Since the administrator role can alter configuration settings, you should limit the number of users with this role.
- **Service** — a special role for service technicians. The service user has all the privileges of an administrator except for managing users. When you require the assistance of an Oracle service representative, you can create a log-in account for the service person and assign the account to the Service user.

Related Topics

- [Add a User and Assign a Role](#)
The administrator can add users and assign roles.

Change Your Password

Change your password at any time.

1. In the dashboard area at the top of the interface, click the **Preferences** control.
2. From the context menu, select **Change Password**.

3. In the **Old Password** field, enter your current password.
4. In the **Password** field, enter your new password.
5. In the **Verify Password** field, re-enter your new password.

 **Note:**


The password must be at least eight characters long and contain one or more numeric or special characters. The value `passwd` is invalid.

Related Topics

- [Reset Another User's Password](#)
The administrator can change the password of another user.

Reset Another User's Password

The administrator can change the password of another user.

1. Log into the remote interface with the administrator role.
2. Select **Users** in the left menu.
3. Select the user account by clicking on the corresponding table row.
4. Click **Reset Password** .
5. Enter a new password.

 **Note:**


The password must be at least eight characters long and contain one or more numeric or special characters. The value `passwd` is invalid.

Related Topics

- [Change Your Password](#)
Change your password at any time.

Add a User and Assign a Role

The administrator can add users and assign roles.

1. Log into the remote interface with the administrator or service role.
2. Select **Users** in the left menu.
3. Click **Add User** .
4. Enter a User ID and Password. Assign a role from the drop-down list.

 **Note:**


Once the account is set up, users can choose their own passwords.

Related Topics

- [User Roles and Access](#)
A user's role determines their access to library functions.
- [Change Your Password](#)
Change your password at any time.


Remove a User

The administrator can delete users, removing their access to the library.

1. Log into the remote interface with the administrator role.
2. Select **Users** in the left menu.
3. Select the user account by clicking on the corresponding table row.
4. Click **Delete User** .

Change an Assigned Role

The administrator can change the role of a user.

1. Log into the remote interface with the administrator role.
2. Select **Users** in the left menu.
3. Select the account by clicking on the corresponding table row.
4. Click **Change Role** .
5. Select a role from the drop-down list.

Related Topics

- [User Roles and Access](#)
A user's role determines their access to library functions.

6

Tape Cartridges (Media)

Tape cartridges store data. Each tape cartridge must be compatible with at least one tape drive in the library.



Note:

LTO-8 and above can read and write one generation back. LTO-7 and below can read two generations back and write one generation back. For best capacity and performance, always use cartridges of the same generation as your drives.

Media Labels

- [Order Media and Labels](#)
- [Tape Media ID](#)
- [Tape Cartridge Types](#)
- [M8 Cartridge Type](#)
- [Label Format Types](#)
- [Support for Non-Standard Label Formats](#)
- [Prepare Diagnostic, Cleaning, and Data Tape Cartridges](#)
- [Apply a Label to a Tape Cartridge](#)

View, Import, Export, and Move Cartridges

- [View a List of Tape Cartridges](#)
- [View Tape Cartridge Health \(Media Health\)](#)
- [Guidelines for Handling Tape Cartridges](#)
- [Import or Export Cartridges Using the Mailslot](#)
- [Load the Magazines \(Bulk Loading\)](#)
- [Move Tape Cartridges with the Remote Interface](#)

Cleaning Cartridges and Reserved Slots

- [Determine the Required Number of Reserved System Slots](#)
- [Determine the Number of Cleaning Cartridges](#)
- [Manage Expired Cleaning Cartridges](#)
- [Monitor Cleaning Cartridges Using the Remote Interface](#)
- [Replace Expired Cleaning Tapes Using the Remote Interface](#)
- [Replace Expired Cleaning Tape Using the Host Application](#)

Media Validation

- [Add a Drive to the Media Validation Pool](#)
- [Remove a Drive from the Media Validation Pool](#)
- [Start a Media Validation](#)
- [Manually Cancel a Validation in Progress](#)
- [Clear a Media Validation Drive Reservation](#)
- [Media Validation Types](#)
- [Effects of a Library Restart on Media Validation](#)
- [Why Aren't the Media Validation Drives Showing in STA?](#)

Library Support of LTO9 Tape Calibration

When LTO9 media is first loaded into the LTO9 drive, the drive automatically initiates tape calibration, which includes initialization and characterization of the cartridge.

IMPORTANT: IBM has stated that LTO9 calibration may require 20 minutes to 2 hours to complete.

During calibration, the drive state will indicate “Calibrating” and no other actions, including host access, can be performed on the drive.

When calibration is complete, the drive will automatically transition to the “Loaded” state and the media will be available for host access. If an uninitialized LTO9 tape is moved to a drive to perform any type of media validation, any attempt to cancel the media validation while in the “Calibrating” state will fail with “Drive is busy calibrating”.

Media Labels

The library identifies cartridges by the barcode label attached to the front of the cartridge. Each label must follow specific guidelines to be read by the library.

The library identifies individual cartridges using ANSI standard, code 39 barcode labels that are attached to the front of the tape cartridge. The label has both alphanumeric characters and a machine-readable barcode. The following sections describe labeling standards and tape cartridge types.

- [Tape Media ID](#)
- [Tape Cartridge Types](#)
- [Label Format Types](#)
- [Support for Non-Standard Label Formats](#)
- [Apply a Label to a Tape Cartridge](#)
- [Order Media and Labels](#)

Tape Media ID

Standard LTO data cartridge labels have a unique, customer-assigned, six-character volume ID, followed by a two-character media ID field.

The valid media ID characters are:

- L5 = LTO Generation 5
- L6 = LTO Generation 6
- L7 = LTO Generation 7
- L8 = LTO Generation 8
- L9 = LTO Generation 9

 **Note:**

See [Library Support of LTO9 Tape Calibration](#).

- M8 = LTO Generation 7 cartridge initialized to 9TB capacity (only compatible with LTO8 drives)
- LV = LTO Generation 5 WORM
- LW = LTO Generation 6 WORM
- LX = LTO Generation 7 WORM
- LY = LTO Generation 8 WORM
- LZ = LTO Generation 9 WORM
- CU = LTO Universal cleaning

Related Topics

- [M8 Cartridge Type](#)
The M8 cartridge is an LTO7 cartridge with increased storage capacity.
- [Support for Non-Standard Label Formats](#)
The SL150 can accommodate non-standard LTO labels to support proprietary labeling schemes.

Tape Cartridge Types

There are three cartridge types: data, cleaning, and diagnostic.

- **Data tapes** — used to store customer data. The label is six-character volume ID followed by a two character media ID. Such as ABC123L8, where ABC123 is the volume ID and L8 is the media ID for an LTO-8 cartridge.
- **Cleaning tapes** — used to clean tape drives. The label is a six-character volume ID with CLNU_{nn} for plus the cleaning-specific media ID, where CLNU is the cleaning tape identifier and nn is a sequence of numbers (for example, CLNU01CU would be a universal LTO cleaning tape).
- **Diagnostic tapes** — used for diagnosing tape drive issues. The label is a six-character volume ID with DG[space]_{nnn} plus the media ID, where DG[space] is the diagnostic tape identifier, and nnn is a sequence of numbers (for example, DG 001L7 would be an LTO7 diagnostic tape label).

Related Topics

- [Tape Media ID](#)
Standard LTO data cartridge labels have a unique, customer-assigned, six-character volume ID, followed by a two-character media ID field.

M8 Cartridge Type

The M8 cartridge is an LTO7 cartridge with increased storage capacity.

An M8 cartridge is an LTO7 cartridge initialized to a 9TB capacity by an LTO8 drive (instead of the standard 6TB capacity of a standard LTO7 cartridge). For an LTO8 drive to initialize an LTO7 cartridge to M8, the cartridge must be new (unused) and contain an M8 label. Only LTO8 drives can read and write M8 cartridges.

The library must be at code 3.50 or above to support the M8 cartridge type.

Label Format Types

The label format determines how the tape library passes the label values to the host application. Oracle recommends using the default setting.

No type checking

Passes all characters in the label without modification and without checking the media domain and type. Use this option if your labels do not identify the media type:

M123456789AB does not, for example, contain a media descriptor, such as L5.

Prepend last two characters

Passes all the characters after moving the last two characters in the label to the front:

KL1020L5 is translated to L5KL1020.

Full label

Passes the first eight characters in the physical label: KL1020L5 is translated to KL1020L5.

Trim last character

Passes the first seven characters in the physical label: KL1020L is translated to KL1020L.

Trim last two characters (default)

Passes the first six characters in the physical label: KL1020L5 is translated to KL1020.

Trim first two characters

Passes the third through eighth characters in the physical label: KL1020L5 is translated to 1020L5.

Trim first character

Passes the second through eighth characters in the physical label: KL1020L5 is translated to L1020L5.

Support for Non-Standard Label Formats

The SL150 can accommodate non-standard LTO labels to support proprietary labeling schemes.

By default, the library uses the eight-character label format that is standard for LTO cartridges. While most backup and storage management applications support the standard LTO labeling format, a few use proprietary labeling schemes to track volumes. If you use such an application, you can, in most cases, configure the SL150

to automatically translate between the physical labels on your cartridges and the logical label format that the application uses internally.

Translating Between Physical and Logical Labels

To accommodate the fullest range of possible labeling schemes, the library supports labels 8 to 14 characters long and provides a *label windowing* feature that lets you specify how labels should be interpreted when communicating with the host application.

So, for example, if the host application uses only a portion of the physical cartridge label to identify volumes, you can tell the library to construct a logical label using a subset of the characters. Alternatively, if the physical cartridge label is simply a string of characters that does not identify the media domain (LTO) and generation, you can tell the library to skip domain and type checking and send all characters to the host without any further processing (you should *not* use this option, if your labels include a domain and type).

Managing Unidentifiable, Unsupported, or Missing Labels

If the physical label on a cartridge is missing, misapplied, damaged, or incorrectly formatted, the cartridge can be loaded and stored in the library. Since the library software cannot identify the cartridge, it marks the Tape Label field of the corresponding tape properties sheet [UNREADABLE].

Prepare Diagnostic, Cleaning, and Data Tape Cartridges

Prepare cartridges before importing them into the library.

Prepare a Diagnostic Tape Cartridge

Diagnostic cartridges are specially labeled data cartridges used for testing library robotics and drives. You can purchase diagnostic cartridges or you can create them by applying an Oracle-supplied diagnostic label to any available, blank LTO tape. Oracle recommends that you have a diagnostic tape on hand during system configuration and at all times thereafter, if possible.

To create a diagnostic cartridge, apply the `DG` label from the library's accessory kit to a blank LTO data cartridge.

Prepare Cleaning Tape Cartridges

Universal cleaning cartridges carry the media descriptor `CU`. Note that Oracle strongly recommends universal cleaning tapes and requires their use with library-managed drive cleaning. Apply the appropriate label to the cleaning cartridge. Labels for universal cleaning cartridges take the form `CLNUxxCU`, where `CLNU` is a descriptive prefix, `xx` is a sequence number, and `CU` is the media descriptor for universal cleaning media.

Prepare the Data Tape Cartridges

Locate the correct label for the data tape and apply the label. Make sure that the label's media ID matches the cartridge type.

If you need to configure the library for a non-standard labeling scheme, see [Support for Non-Standard Label Formats](#).

Related Topics

- [Apply a Label to a Tape Cartridge](#)
Properly apply a label to ensure the library can recognize the cartridge.

- [Tape Media ID](#)
Standard LTO data cartridge labels have a unique, customer-assigned, six-character volume ID, followed by a two-character media ID field.

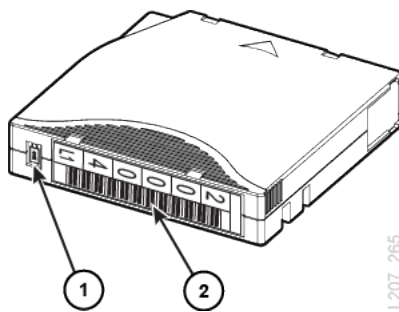
Apply a Label to a Tape Cartridge

Properly apply a label to ensure the library can recognize the cartridge.

When handling cartridges, follow all precautions in [Guidelines for Handling Tape Cartridges](#).

1. Clean the surface where the label will be placed using a small amount of isopropyl alcohol-based cleaning solution. Never use any other type of solvent.
2. Orient the label with the barcode side down. Orient the cartridge so that the write-protect switch is to your left (see figure below).
3. Peel the backing off the label. Apply the label within the slight indentation. The label must not overlap the edges of this indentation.

Figure 6-1 Correct Label Orientation



- 1 - Write Protect Switch
- 2 - Cartridge label correctly applied (barcode side down/character side up)

Related Topics

- [Media Labels](#)
The library identifies cartridges by the barcode label attached to the front of the cartridge. Each label must follow specific guidelines to be read by the library.

View a List of Tape Cartridges

The list of tape cartridges displays the type, label, media health, and location of each cartridge in the library.

1. From the remote interface, select **Tapes** in the left menu.
2. Select a tape, and then right-click (or use the **Actions** drop-down) to either move it or view properties.




Related Topics

- [View Tape Cartridge Health \(Media Health\)](#)
The library reports any tape alerts which affect the tape's media health after it has been dismounted from a drive.

- [Move Tape Cartridges with the Remote Interface](#)
The remote interface can move cartridges when you cannot use the host application.

View Tape Cartridge Health (Media Health)

The library report any tape alerts which affect the tape's media health after it has been dismantled from a drive.

1. From the remote interface, select **Tapes** in the left menu.
2. View the Media Health column. Possible states are:
 - **Unknown**  — the tape has not yet been mounted in a drive, therefore the health of the tape is not known.
 - **Operational**  — the last time the tape was unloaded, the drive reported no "suspect" tape alerts.
 - **Suspect**  — the last time the tape was unloaded, the drive presented one or more "suspect" tape alerts. These alerts are shown in the Tapes table.

Guidelines for Handling Tape Cartridges

Properly handle tapes to prevent damage and data loss.

Caution:

Improperly handling tape cartridges can cause loss of data or damage the library.

- Keep tapes clean and inspect for damage before each use.
- When unwrapping the plastic from a new cartridge, use the string or pull tab. Do not use letter openers, knives, box cutters, scissors, or other sharp instruments.
- Never open a tape cartridge housing.
- Do not handle tape that is outside the cartridge; the tape edge might be damaged.
- Do not expose the tape or cartridge to direct sunlight, moisture, excessive temperatures, or magnetic fields.
- Transport cartridges in shock resistant cases

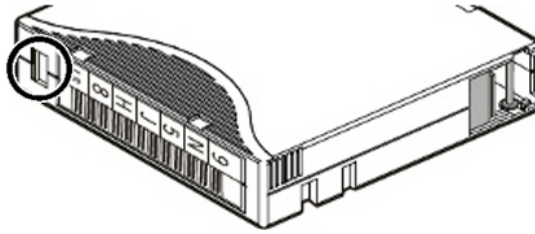
Inspect a Tape Cartridge

Always inspect a tape before you insert it into a drive or a library to prevent damage.

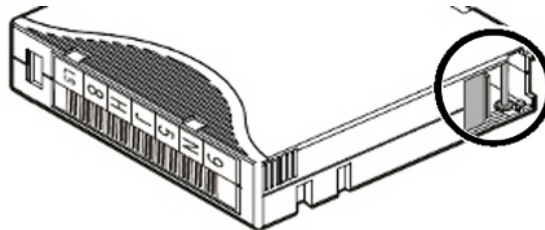
Never use a damaged tape. A defective or dirty tape can damage the tape drive. Look for:

- Dirt or debris
- Cracked or broken housing
- Damaged hub-wheel teeth

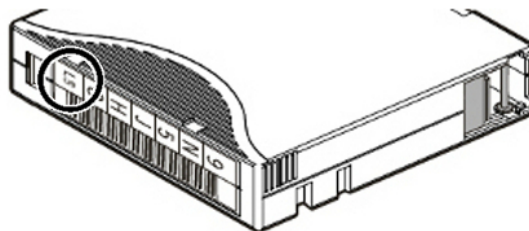
- Damaged write-protect switch (front left of cartridge, see below). The switch should slide easily.



- Damaged leader door or pin (located on near rear of cartridge, see below). The door should open cleanly and snaps shut when released. The pin should be straight.



- Liquid in the tape cartridge
- Labels not firmly attached, or that extend over the tape cartridge edge
- Incorrect media type. The cartridge type must be supported by the drives in the library. Verify that the two digit media ID is supported .



Related Topics

- [Tape Media ID](#)
Standard LTO data cartridge labels have a unique, customer-assigned, six-character volume ID, followed by a two-character media ID field.

Clean the Tape Cartridge Exterior

Keep tape cartridges clean to prevent damage or data loss.

Wipe all dust, dirt, and moisture from the cartridge with a lint-free cloth. Use StorageTek Tape Cleaner Wipes to clean the cartridge exterior. These wipes are saturated with isopropyl alcohol. Do not let any solution touch the tape or get inside the cartridge.

▲ Caution:

To avoid damage to cartridges, do not use acetone, trichloroethane, toluene, xylene, benzene, ketone, methylethyl ketone, methylene chloride, ethyldichloride, esters, ethyl acetate, or similar chemicals to remove labels or clean cartridges.

Store Tape Cartridges

Properly storing tapes prevents data loss and damage.

Store tapes in a clean, temperature controlled environment. Before using a tape cartridge, ensure that it has been in its operating environment for at least 24 hours so that it can adjust to changes in temperature and humidity. Do not take a tape cartridge out of its protective wrapping until you are ready to use it. Use the tear string (not a sharp instrument) to remove the wrapping.

Related Topics

- [Verify the Site Meets Environmental Requirements](#)
Make sure the site meets environmental requirements to prevent equipment damage.

Load the Magazines (Bulk Loading)

Bulk load the magazines to save time importing cartridges.

Before putting the library into production or when you have a significant number of cartridges to export or import, it makes sense to bulk load the library using the magazines. The library must always perform an audit after bulk loading.

- [Unlock and Remove the Magazines](#)
- [Load the Left Magazine in the Base Module](#)
- [Load the Remaining Magazines](#)
- [Lock the Magazines and Audit the Library](#)
- [Update Media Health After a Bulk Load](#)

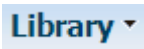
Related Topics

- [Magazine](#)
Each magazine provides 15 storage slots for tape cartridges. Each library module has a left and right magazine.

Unlock and Remove the Magazines

Unlock the magazines using the remote interface before sliding them out.

Always use the remote interface to unlock the magazines whenever possible. However, you can also manually unlock them using the hex key (see [Remove the Cartridge Magazine with the Hex Key](#)).

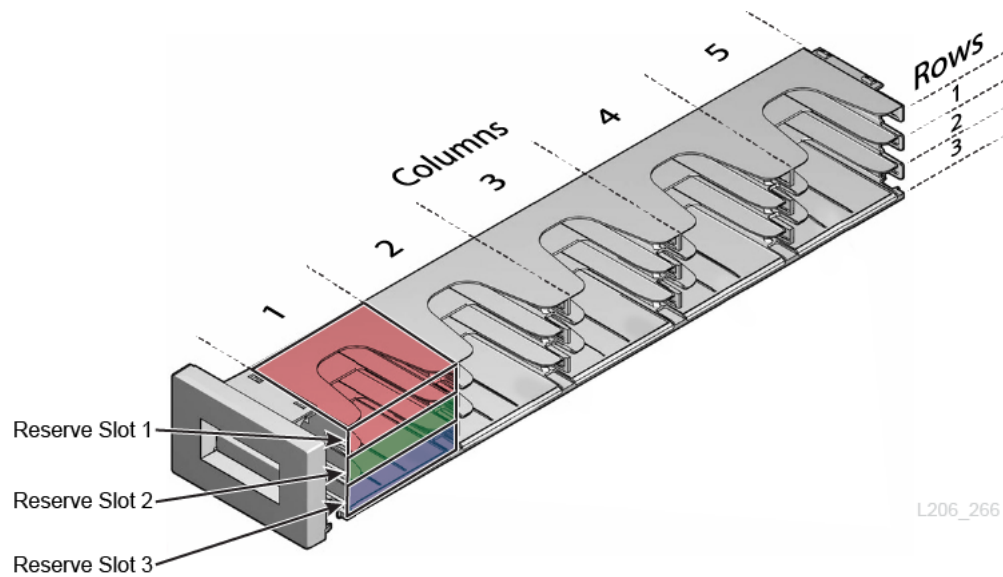
1. From the remote interface, select **Library** in the left menu.
2. From the **Library** drop-down menu , select **Unlock Magazines**.

3. Select the magazines to unlock and click **OK**. The library remains offline and busy until all selected magazines are unlocked.
4. Slide magazines smoothly out of the enclosure, supporting the underside with one hand.

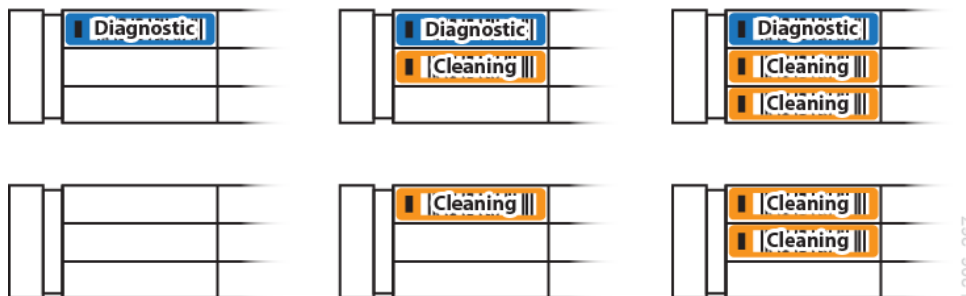
Load the Left Magazine in the Base Module

Load the left Base Module magazine first. It contains the reserved system slots.

The figure below shows the layout of the Base Module left magazine.



1. Optionally, populate the reserve slots with diagnostic and/or cleaning cartridges (see [Determine the Required Number of Reserved System Slots](#)). Place the diagnostic cartridge at the top (if using), followed by the cleaning cartridges. The following are all valid reserve slot configurations:



2. When inserting the cartridges into the magazine, orient the cartridge with the hub down and the label on the open side of the magazine. Gently push the cartridge into the slot until the plastic retention spring snaps into place.
3. If using host-managed drive cleaning, place one or two LTO universal cleaning cartridges in *unreserved*, data slots. Reserved slots are optional, so the following figure could represent a valid configuration for host-managed cleaning.



4. Load the remaining slots with data tapes.
5. Once loaded, reinstall the left magazine. Be careful to hold the magazine so that tapes do not fall out. Push the magazine into place until it latches with a click.

Load the Remaining Magazines

Load the rest of the magazines in the library with tape cartridges.

Note:

If using the 19-slot mailslot configuration, leave the right Base Module magazine empty.

1. Slide each magazine out of the enclosure, supporting the underside with one hand.
2. Load data cartridges into the magazine slots.
REMINDER: If host-managed drive cleaning and partitioning the library, place one, preferably two, LTO universal cleaning cartridges in each partition.
3. Once loaded, reinstall the magazines. Be careful to hold each magazine so that tapes do not fall. Push the magazine into place until it latches with a click.

Lock the Magazines and Audit the Library

The magazines must be locked and audited before the library can use the tapes.

1. Log in to the remote user interface.
2. From the **Library** drop-down menu **Library** ▾, select **Lock and Audit Magazines**.
3. Optionally, select **Set the Library back Online...** to automatically bring the library online after the audit.
4. Click **OK** to lock the magazines, take the library offline, and start the audit.
See [Audit the Library](#).

Update Media Health After a Bulk Load

After bulk loading tapes, Media Health for many cartridges will be listed as "Unknown".

The library assesses each tape and updates the Media Health state whenever the cartridge mounts a drive. As the library mounts cartridges during the course of routine operations, the library progressively updates the Media Health property, replacing the "Unknown" values.

To force an immediate update of an individual cartridge, take the library offline and mount the cartridge.

Related Topics

- [View Tape Cartridge Health \(Media Health\)](#)
The library reports any tape alerts which affect the tape's media health after it has been dismounted from a drive.
- [Place the Library Online or Offline](#)
Change the state of the library using the remote interface. An offline library will not perform host operations.
- [Move Tape Cartridges with the Remote Interface](#)
The remote interface can move cartridges when you cannot use the host application.

Import or Export Cartridges Using the Mailslot

Use the mailslot to import or export cartridges without interrupting robot operations.

To load or unload cartridges using the mailslot, carry out the following tasks:

1. [Assign the Mailslot to a Partition](#) (if the library is partitioned),
2. [Open the Mailslot](#)
3. [Import Tape Cartridges](#) or [Export Tape Cartridges](#)
4. [Close the Mailslot](#)
5. [Unassign the Mailslot](#)

Related Topics


- [Mailslot](#)
The mailslot imports and exports cartridges without interfering with robot operations. It is often referred to as a cartridge access port (CAP) in other StorageTek libraries.

Assign the Mailslot to a Partition

In a partitioned library, you must assign the mailslot to a partition before exporting or importing tapes.

For information on how SCSI hosts handle a shared mailslot, see the *SL150 SCSI Reference Guide*.

Assign the Mailslot Using the Remote Interface

1. Select **Library** from the left menu.
2. From the **Mailslot** drop-down , select **Assign**.
3. Select a partition from the **Assign Mailslot to Partition** drop-down list.

Assign the Mailslot Using the Local Operator Panel

1. On the home screen, tap **Mailslot**.
2. Tap **Assign to a Partition** at the bottom of the screen.
3. Select a partition to assign.

Related Topics

- [Unassign the Mailslot](#)
Unassign the mailslot when you are finished importing/exporting so that other partitions can access the mailslot.

Import Tape Cartridges

Use the mailslot to import tapes into the library.

1. If importing into a partitioned library, assign the mailslot to a partition (see [Assign the Mailslot to a Partition](#)).
2. [Open the Mailslot](#). Place the tapes in the mailslot. [Close the Mailslot](#) .
3. Use the host application to move the tapes from the mailslot to the storage slots.
If you cannot use the host application, you may move the tapes with the remote interface. Then, update the host application database to account for the new tapes.
4. In a partitioned library, once you are finished importing tapes, unassign the mailslot (see [Unassign the Mailslot](#)).

Related Topics

- [Move Tape Cartridges with the Remote Interface](#)
The remote interface can move cartridges when you cannot use the host application.

Export Tape Cartridges

Use the mailslot to remove tapes from the library.

1. If exporting from a partitioned library, assign the mailslot to a partition (see [Assign the Mailslot to a Partition](#)).
2. Use the host application to move the tapes from the storage slots to the mailslot.
If you cannot use the host application, you can move tapes using the remote interface. Then, after closing the mailslot update the host application database to account for the removed tapes.
3. [Open the Mailslot](#). Remove the tapes. [Close the Mailslot](#) .
4. In a partitioned library, once you are finished exporting tapes, unassign the mailslot (see [Unassign the Mailslot](#)).

Related Topics

- [Move Tape Cartridges with the Remote Interface](#)
The remote interface can move cartridges when you cannot use the host application.

Open the Mailslot

Open the mailslot to add or remove tapes from the library.

1. If using a partitioned library, make sure the mailslot is assigned to a partition (see [Assign the Mailslot to a Partition](#)).
2. Open the mailslot with the user interface:

- If using the *remote interface*: Select **Library** in the left menu. From the **Mailslot** drop-down **Mailslot** ▾, select **Open** and then click **OK**.
 - If using the *local touch panel*: On the Home screen, tap **Mailslot**. Tap **Open Mailslot**. If you do not see an Open Mailslot button, the mailslot is incorrectly assigned.
3. Pull the standard mailslot out from the upper-right corner of the Base Module.
If using the expanded mailslot, slide out the right magazine in the Base Module, supporting the weight with one hand. Be careful to hold it so that tape cartridges do not fall out of the slots
 4. Add and/or remove cartridges, following the guidelines for handling tape cartridges.

Related Topics

- [Guidelines for Handling Tape Cartridges](#)
Properly handle tapes to prevent damage and data loss.

Close the Mailslot

Close the mailslot after adding or removing cartridges.



Note:

The library cannot access mailslots until the mailslot is latched (you will hear a noticeable click).

1. Push the mailslot into place until it latches with a noticeable click. If the mailslot does not latch, it may trigger needless, multiple re-audits of the mailslot.
If using the expanded mailslot, grasp the front handle while supporting the magazine weight with the other hand. Carefully align the magazine with the right magazine bay of the Base Module, and gently push it in.
2. If using a partitioned library, unassign the mailslot (see [Unassign the Mailslot](#)).

Related Topics

- [Guidelines for Handling Tape Cartridges](#)
Properly handle tapes to prevent damage and data loss.

Unassign the Mailslot

Unassign the mailslot when you are finished importing/exporting so that other partitions can access the mailslot.

Unassigning the Mailslot Using the Remote User Interface

1. Select **Library** from the left menu.
2. From the **Mailslot** drop-down **Mailslot** ▾, select **Unassign**.
3. Click **OK**.

Unassigning the Mailslot Using the Local Operator Panel

1. On the Home screen, tap **Mailslot**.
2. Tap the **Unassign Mailslot** button at the bottom of the interface.
3. Tap **OK**.

Related Topics

- [Assign the Mailslot to a Partition](#)
In a partitioned library, you must assign the mailslot to a partition before exporting or importing tapes.

Move Tape Cartridges with the Remote Interface

The remote interface can move cartridges when you cannot use the host application.

Note:

- Always use the host application to move tapes when possible. Moving cartridges with the SL150 interface can cause host database inconsistencies that force audits.
- See [Library Support of LTO9 Tape Calibration](#) for important information regarding library behavior during LTO9 tape calibration.

1. If the library is partitioned and you will be moving a tape to/from the mailslot, assign the mailslot to a partition (see [Assign the Mailslot to a Partition](#)).
2. Select **Library** in the left menu. Right-click on a tape, select **Move Tape**.
3. At the top of the screen. Optionally, check the **Set the Library back Online ...** checkbox (the library automatically goes offline when moving tapes with the remote interface). Click **OK**.
4. The **Source** field is pre-populated. To select a **Destination**, click on where you want to move the tape to within the graphical library map.
5. To move the tape, click **OK**.
6. If you did not check the **Set the Library back Online ...** checkbox, remember to bring the library back online once you are ready.

Determine the Required Number of Reserved System Slots

Reserved system slots store diagnostic and cleaning cartridges. The number of required slots depends on your cleaning strategy and diagnostic needs. You can reserve up to a maximum of three slots.

- **Diagnostic Cartridge** — may require 1 reserved slot.

If you are planning to use a diagnostic cartridge, Oracle recommends that you configure one reserved system slot to hold it. This insures that it is always available when needed. But if storage space is at a premium, you can also import the diagnostic cartridge from the mailslot as needed.

- **Cleaning Cartridge** — may require 2 reserved slots.
If using library auto cleaning or manual cleaning: configure at least one, preferably two reserved slots. Two cleaning cartridges in reserved slots minimizes downtime by insuring a usable cleaning cartridge is always available, so drives do not sit idle while awaiting cleaning.
If using host-managed cleaning: do not configure system reserved slots for cleaning cartridges. Host applications cannot access system reserved slots. Cleaning cartridges must reside in storage slots controlled by the host application.

Related Topics

- [Configure Library Settings](#)
Library settings include the Drive Element Addressing mode, Drive Auto Clean mode, mailslot configuration, reserved system slot configuration, partitioning configuration, bridged drive selection, and volume label format.

Determine the Number of Cleaning Cartridges

Cleaning cartridges clean tape drives. The number of cartridges required depends on partitioning and your drive cleaning strategy.



Note:

Always use new cleaning cartridges. To the library, every newly imported cleaning cartridge is new, with a usage count of zero. So if you load used cleaning cartridges, you will not have an accurate count of the number of remaining cleanings.

At least two cleaning cartridges should be available for drive cleaning. The total number of cleaning cartridges in the library and where they need to reside depends on your drive cleaning strategy and partitioning configuration.

- **If using library auto-cleaning or manual cleaning:** Oracle recommends that you provide two, new, LTO universal (CU) cleaning cartridges into reserved system slots. The partitioning configuration does not affect this number.
- **If using host-managed cleaning:** the number of cleaning cartridges required depends on your partitioning configuration.

For a non-partitioned library, Oracle recommends that you provide two, new, LTO universal (CU) cleaning cartridges placed into storage slots.

For a partitioned library, Oracle recommends that you provide two, new, LTO universal (CU) cleaning cartridges *per partition*. A host application cannot access drives or library slots that are not in the partition that it controls. So each partition must contain cleaning media. For example, three partitions would require three cleaning tapes at a minimum and six for best drive availability

Related Topics

- [Configure Drive Cleaning](#)
Manage drive cleaning in one of three ways: library-managed, host-managed, or manually.

Manage Expired Cleaning Cartridges

Remove expired cleaning cartridges from the library and replace them with a new cartridge.


A cleaning cartridge expires when a drive determines the cartridge is no longer usable. When the drive identifies an expired cartridge, it notifies the library. The library dismounts the cartridge, flags it as expired, and alerts the remote interface. Remove expired cleaning cartridges and replace them with new one.

If you have configured your backup or storage management application to automatically handle cleaning requests, the application may manage cleaning media for you. Consult the vendor's documentation for details.

- [Monitor Cleaning Cartridges Using the Remote Interface](#)
- [Replace Expired Cleaning Tapes Using the Remote Interface](#)
- [Replace Expired Cleaning Tape Using the Host Application](#)

Monitor Cleaning Cartridges Using the Remote Interface

Monitor the cleaning cartridges to make sure they have not expired.

1. In the remote interface, select **Library** in the left menu.
2. Right-click a cleaning cartridge , and then select **Properties**.
3. Note the **Cleaning Tape Status** and **Uses Remaining**.
4. If the cartridge is expired or very soon to expire, replace it.
 - If the cartridge is in a reserved system slot, see [Replace Expired Cleaning Tapes Using the Remote Interface](#).
 - If the cartridge in a host application-managed storage slot, see [Replace Expired Cleaning Tape Using the Host Application](#).

Replace Expired Cleaning Tapes Using the Remote Interface

Use the remote interface to replace cleaning cartridges in the reserved system cells.

1. From the remote interface, select **Library** in the left menu.
2. If the library is partitioned, unassign the mailslot before proceeding (see [Unassign the Mailslot](#)).
3. Right-click on the expired cleaning tape, and move it to the mailslot (see [Move Tape Cartridges with the Remote Interface](#)).
4. Open the mailslot and remove the expired cleaning tape (see [Open the Mailslot](#)).
5. Dispose of the expired tape promptly, so that expired tapes are not inadvertently reused.
6. Place a new cleaning tape in the mailslot. Then close the mailslot (see [Close the Mailslot](#)).
7. Move the new cleaning tape from the mailslot to the reserved system slot (see [Move Tape Cartridges with the Remote Interface](#)).

Related Topics

- [Monitor Cleaning Cartridges Using the Remote Interface](#)
Monitor the cleaning cartridges to make sure they have not expired.
- [Replace Expired Cleaning Tape Using the Host Application](#)
Use the host-application to remove expired cleaning tapes that are within host-managed storage slots.

Replace Expired Cleaning Tape Using the Host Application

Use the host-application to remove expired cleaning tapes that are within host-managed storage slots.

1. If the library is partitioned, [Assign the Mailslot to a Partition](#).
2. Move the expired tape into the library mailslot using the host application. Consult your application documentation for instructions.
3. [Open the Mailslot](#), and remove the expired cleaning tape.
4. Dispose of the expired tape promptly, so that expired tapes are not inadvertently reimported and reused.
5. Place a new cleaning tape in the mailslot. Then [Close the Mailslot](#).
6. Import the new cleaning tape into the library using the host application. Consult your application documentation for instructions.

Related Topics

- [Monitor Cleaning Cartridges Using the Remote Interface](#)
Monitor the cleaning cartridges to make sure they have not expired.
- [Replace Expired Cleaning Tapes Using the Remote Interface](#)
Use the remote interface to replace cleaning cartridges in the reserved system cells.

Media Validation

Media validation evaluates tapes by verifying that the drive can read the data written on the tape.

To use the media validation feature, the library must be at firmware version 3.70 or above. For StorageTek Tape Analytics (STA) initiated media validation, the library must be at firmware version 3.80 or above.

A drive can validate a tape by reading the data previously written on it. The tape is considered valid if the drive does not encounter errors during the read. The drive will report SCSI sense data for any errors encountered to help identify the issue.

There are three levels of media validation: Basic, Standard, and Complete. Basic reads the cartridge memory. Standard reads up to the first two wraps of data on the tape. Complete reads all data on the tape.

Media validation requires at least one drive dedicated to media validation. You can assign only IBM LTO6 or higher drives to the media validation pool (HP LTO drives are not supported). There is no limit on the number of drives you can add to the pool, but there must be at least one bridged drive in the library. Bridged drives cannot be used for media validation. Media validation drives are invisible to host applications and can

only be used for media validation. While a tape is being validated, the library spoofs the tape's original location to the host. If a host requests a tape currently being validated, the library will cancel the validation and return the tape to its original slot to allow the tape to then be mounted by the host command.

About Media Validation

- [Media Validation Types](#)
- [Effects of a Library Restart on Media Validation](#)
- [Why Aren't the Media Validation Drives Showing in STA?](#)

Configure Media Validation

- [Add a Drive to the Media Validation Pool](#)
- [Remove a Drive from the Media Validation Pool](#)

Start, Stop, or Monitor Media Validation

- [Start a Media Validation](#)
- [Manually Cancel a Validation in Progress](#)
- [Monitor Media Validation](#)
- [Clear a Media Validation Drive Reservation](#)

Add a Drive to the Media Validation Pool

Add IBM LTO6 or higher drives to the pool to dedicate them for media validation.

Media validation drives are invisible to host applications and can only be used for media validation. If the drive you select for media validation currently belongs to a partition, the library will automatically remove it from the partition before placing it in the media validation pool.

1. From the **Library** page or **Drives** table, right-click an IBM LTO6 or higher drive. Valid drives show "Capable" in the Media Validation Status column of the Drives table.
2. Select **Use for Media Validation** to add the drive to the pool.
3. The library must go offline to perform this action. Use the checkbox to select whether or not to automatically bring the library back online. Click **OK**.

The library will go offline, disable the drive data ports, and add the drive to the media validation pool. The drive is no longer available for host operations.



The drive will be marked with MV on the Library page and the Drives table will show "Ready" in the Media Validation Status column once the library successfully adds the drive to the media validation pool.

Remove a Drive from the Media Validation Pool

Drives remain dedicated for media validation until you explicitly remove them from the media validation pool.

1. From the **Library** page or **Drives** table, right-click a media validation drive.
2. Select **Stop Using for Media Validation** to remove the drive from the pool.
3. The library must go offline to perform this action. Use the checkbox to select whether or not to automatically bring the library back online. Click **OK**.

The library will go offline, enable the drive data ports, and remove the drive from the media validation pool.

4. If using a partitioned library, assign the drive to a partition.

See [Assign Resources to the Partition](#).

Start a Media Validation

Evaluate a tape cartridge by reading data previously written on the tape. The tape is considered valid if the drive does not encounter errors during the read.

Caution:

Repeated use of media validation will reduce the life of the tape. Do not use this feature frequently.

1. From the **Library** page or **Tapes** table, right-click a tape.
2. Select **Start Media Validation**.
If the option is grayed-out, there is not a compatible drive available. Available drives show "Ready" in the Media Validation Status of the Drives table.
3. If there are multiple compatible drives, select the drive to use from the **Media Validation Drive** drop-down list.
4. Select the [Media Validation Type](#) from the drop-down. Click **OK**.
5. View the progress and results using the **Tapes** table, **Drives** table, or **Library** page. See [Monitor Media Validation](#) for more information.

Note:

If a host requests a tape currently being validated, the library stops the validation and dismounts the tape to its original location, then the library performs the host operation. The host is not aware of the dismount except that the move or mount can appear to take longer than normal.

6. If there is an error with the validation, you should first try the tape in another drive.

Manually Cancel a Validation in Progress

Cancel an in-progress validation to return the tape to its original slot.

The library will automatically cancel a validation if a host requests the use of a tape currently being validated. Use this procedure if you need to manually cancel a validation.



Note:

An attempt to cancel media validation while an uninitialized LTO9 tape is in the “Calibrating” state will fail with “Drive is busy calibrating”. See [Library Support of LTO9 Tape Calibration](#).

If the drive is currently reserved by a remote client (such as STA), canceling the media validation does not clear the reservation. The drive will remain available for use by the remote client. To manually clear the reservation, see [Clear a Media Validation Drive Reservation](#).

1. From the **Library** page or **Tapes** table, right-click a tape currently being validated.
2. Select **Cancel Media Validation**.

If the option is not listed, the validation is not running or is not in a state that can be canceled (such as unloading).

Clear a Media Validation Drive Reservation

In rare cases, a remote client (such as STA) may be unable to clear a reservation that it has on a media validation drive. You may need to manually clear the reservation.

You can clear a reservation if the drive is empty, but currently reserved by a remote client. Normally, the remote client manages drive reservations, so you should only perform this procedure if the remote client is unable to clear the reservation itself.

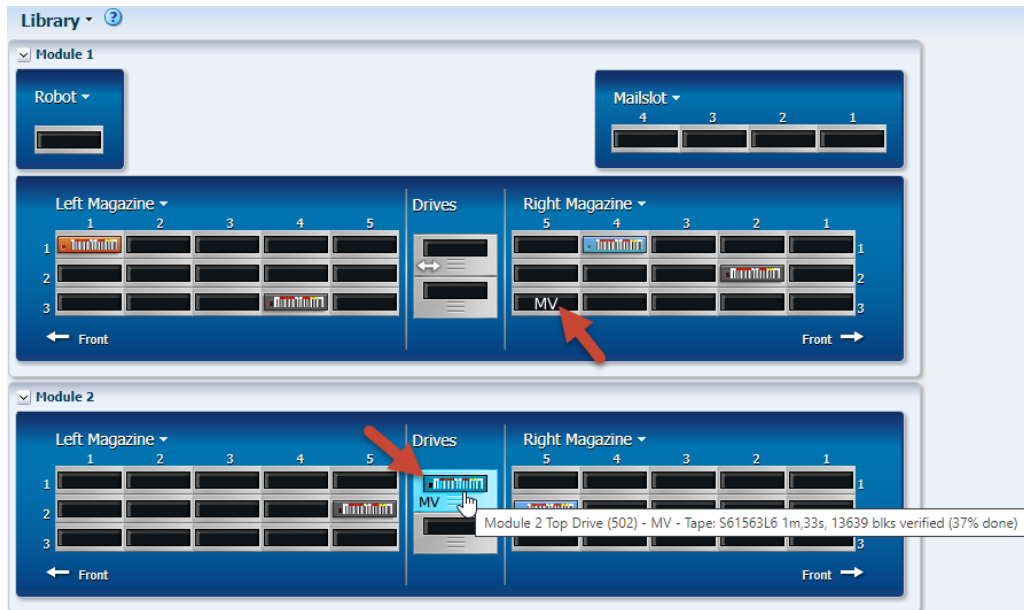
1. From the **Library** page or **Drives** table, right-click the drive.
2. Click **Clear MV Reservation**.

Monitor Media Validation

View the status of a media validation on the Library page, Drives table, Tapes table, or Activity Log.

Library Page

Hover over the media validation drive on the Library page to view the current status. MV will appear in the vacated slot where the tape was located. This is where the library will return the tape once the media validation completes. You can also hover over the MV slot to view progress information.



Drives Table

The Drives table shows the current Media Validation Status.

Drive	Media Validation Status
Module 1 Top Drive	✓ Capable
Module 1 Bottom Drive	✓ Capable
Module 2 Top Drive	✓ Ready

Possible values are:

- **Blank** - the drive is not currently in the media validation pool and cannot be added.
- **Capable** - the drive is not currently in the media validation pool but can be added.
- **Ready** - the drive is assigned to the media validation pool but not currently performing a validation.
- **Reserved by {hostname or IP address}** - the drive is reserved by STA. The hostname or IP address identifies the STA host that made the reservation.
- **Progress Info** - the current progress of the validation, including the elapsed time, number of blocks verified, and percent complete.

Tapes Table

The Tapes table has a Media Validation Status section which shows the status for each tape.

Tapes ?						
Actions ▾ View ▾		Media Validation Status				Media Health
Tape Label		Last Validation ▲▼	Type	Drive SN	Result	
ORD302L6	⚠	2031-02-12T13:53:06	Standard	90WT011640	Failed, mount failure	Suspect
S61563L6	✔	2031-02-12T13:03:05	Complete	90WT011640	Success - 1h,6m,45...	Operational
CLNU23CU	?					Unknown

Possible values are:

- **Last Validation** - information about the last validation that occurred for this tape.
 - *Blank* - the tape has never been validated.
 - *Date and time* - the date and time of the last completed validation.
 - *In progress* - a validation is currently in progress.
- **Type** - the type of validation (Basic, Standard, or Complete).
- **Drive SN** - the drive serial number that performed the validation.
- **Result** - the results of the last performed media validation for this tape.
 - *Blank* - the tape has never been validated
 - *Progress info* - the current progress of the validation, including the elapsed time, number of blocks verified, and percent complete.
 - *Success* - the validation completed successfully and took the shown amount of time (in hours, minutes, seconds).
 - *Failed* - the validation failed and the reason or sense data (if available) is shown.

Activity Log

The User Activity tab of the Activity Log shows all media validation activity. View the activity log by clicking the Activity Log button in the upper right of the screen.

Library Activity Log					
User Activity		Host Activity			
Start Time	Action Name	Detail	By	Duration	Status ▲▼
2031/02/12 13:00:28 MST	Media Validation Finished	Moving Tape S61563L6 from Module 2 Top Drive to Module 1,Right,3,5 - Finishing Complete validation, result: Success - 1h,6m,45s, 596050 blks verified	kilauea10	2:36	COMPLETED
2031/02/12 12:40:06 MST	User Login	User admin has logged in	admin	0:00	COMPLETED
2031/02/12 11:52:42 MST	Media Validation Started	Moving Tape S61563L6 from Module 1,Right,3,5 to Module 2 Top Drive - Starting Complete validation	admin	1:05	COMPLETED
2031/02/12 11:48:02 MST	Use Drive for Media Validation	Setting the Library Offline Applying the new Port Settings to Module 2 Top Drive Applying new Media Validation settings Setting the Library Online	admin	0:07	COMPLETED

Possible media validation actions include:

- **Use Drive for Media Validation** – drive was assigned to the media validation pool and made unavailable for host use.
- **Stop Using Drive for Media Validation** – the drive was taken out of the media validation pool and made available for host use.
- **Media Validation Started** – a media validation was initiated. This action involves mounting the tape into the MV drive and initiating the validation. There is no separate activity log action for a validation in progress. The “By” name is the user name of the SL150 operator that performed the action or the name or IP address of the STA host if the media validation was initiated by an STA host.

- **Media Validation Finished** –an automatic operation that is performed by the library after a media validation completes (successfully or with error). The “By” name shows the name of the library. This action only involves dismounting the tape from the media validation drive.
- **Media Validation Canceled** – a media validation was canceled. This action involves stopping the running validation and performing the dismount. The “By” name is the user name of the SL150 operator that performed the action or, for an STA initiated validation, the name or IP address of the STA host.
- **Media Validation Stopped** – an automatic operation that is the result of a host requesting the tape to be mounted (or moved). This action stops the currently running validation and dismounts the tape to the original location. A subsequent separate Move action is the performed to facilitate the host request. The “By” name shows the name of the library.

Media Validation Types

There are three validation types: Basic, Standard, and Complete.

Type	Description	Approx. Duration
Basic	Loads the tape, reads the Cartridge Memory (CM), unloads, and returns the tape to its prior slot. If the CM is okay then the tape will load without errors and will not report any tape alerts.	2 minutes
Standard	Loads the tape, reads the Cartridge Memory (CM), reads up to the first two wraps, unloads, and returns the tape to its prior slot.	<30 minutes
Complete	Loads the tape, reads the Cartridge Memory (CM), reads every block on the tape, unloads, and returns the tape to its prior slot.	Up to 24 hours, depending on the amount of data on the tape.

Effects of a Library Restart on Media Validation

Manual intervention is required if the library restarts during an in-progress media validation.

If the library restarts while a media validation is in progress, the validation will stop. When the library comes back up, the tape will remain loaded in the drive, but media validation will not automatically resume. You must manually cancel the media validation and then start a new validation. Media validations cannot be resumed from where they last left off.

Media validation that was halted due to a system (drive or library) restart, will show a status of “Failed to complete” and the Last Validation Time will show “System restarted”. The tape will still appear to be in its source location to SCSI hosts and will be automatically moved back if the host requests the tape to be moved.

Why Aren't the Media Validation Drives Showing in STA?

If the SL150's Drive Element Addressing mode is set incorrectly, the media validation drives will not appear in the STA application.

You must set the SL150 to Address All Drive Slots mode if using STA and media validation. If the mode is Address Only Installed Drives, the media validation drives will not show within STA.

See [Configure Library Settings](#) to change the Drive Element Addressing mode.

7

Tape Drives

Tape drives read and write data on tape cartridges. The SL150 supports LTO half-height SAS and FC drives.

About Tape Drives

- [Supported Tape Drives](#)
- [Bridged Tape Drives](#)

Drive Encryption

- [Library Managed Encryption \(LME\)](#)
- [Configure Library Managed Encryption \(LME\)](#)
- [Behavior of Library Port 1 and Port 2 with LME](#)

Drive Management

- [View Drive Information](#)
- [Configure Drive Cleaning](#)
- [Restart a Drive](#)
- [Enable or Disable Drive Ports](#)
- [Update the Drive Firmware](#)

Media Validation

- [Add a Drive to the Media Validation Pool](#)
- [Remove a Drive from the Media Validation Pool](#)
- [Clear a Media Validation Drive Reservation](#)

Drive Replacement

- [Drive Tray Removal and Replacement](#)

Supported Tape Drives

The SL150 supports certain generations and manufacturers of LTO drives.

You can install a mix of HP and IBM LTO drives of various generations within the library. The library supports the following drive types:

- HP LTO half-height generation 5 or 6 SAS or short wavelength FC interface
- IBM LTO half-height generation 6, 7, 8, or 9 SAS or short wavelength FC interface

 **Note:**

LTO-8 and above can read and write one generation back. LTO-7 and below can read two generations back and write one generation back. For best capacity and performance, always use cartridges of the same generation as your drives.

Bridged Tape Drives

A bridged drive provides a single, unified control and data communication path between the library/partition and the host using the SAS or FC drive interface.

A non-partitioned library requires one bridged drive. A partitioned library requires one bridged drive per partition. You select the bridged drive during library configuration.

- Code versions earlier than 2.0 support two partitions, and a maximum of two bridged drives located in the Base Module.
- Code version 2.01, and later, supports up to eight partitions and bridged drives located in designated Expansion Modules.

You must connect the bridged drive to an HBA supporting multiple LUNs (also referred to as LUN scanning). The SL150 Library uses a single SCSI ID and two logical unit numbers (LUN). LUN 0 controls the tape drive and LUN 1 which is configured as a SCSI medium changer device controls the robotics. Data is sent to the remaining LUN on the bridged drive or to LUNs on the other, unbridged drives in the partition, all of which are configured as SCSI sequential-access (tape) devices.

Related Topics

- [Configure the Library](#)
Update the library configuration using the wizard, update library firmware, and manage the library's certificate.

Library Managed Encryption (LME)

The library can manage encryption for IBM LTO-6 and higher drives.

With library code 3.50 or above, the library can manage enrollment and key delivery for IBM LTO-6 and higher drives. Each drive that you enroll still requires an encryption activation file. However, with LME, the library is the OKM agent instead of individual drives, meaning you only need to enroll the library with OKM rather than individual drives. Enabling LME globally enables encryption for all IBM LTO-6+ drives within the library regardless of the partitioning configuration. You will still need to use VOP to enroll HP LTO drives.

Related Topics

- [Oracle Key Manager 3 \(OKM\)](#)
OKM provides data security by creating, storing, and managing the encryption keys for stored data.
- [Configure Library Managed Encryption \(LME\)](#)
Configure LME to have the library manage the encryption enrollment and key delivery of all IBM LTO-6 or higher drives.

- [Behavior of Library Port 1 and Port 2 with LME](#)
The LME configuration affects the behavior of library port 1 and 2.

Behavior of Library Port 1 and Port 2 with LME

The LME configuration affects the behavior of library port 1 and 2.

With library code 3.50 and above, you can configure Network Port 2 for library managed encryption (LME). Enabling LME on Port 2 changes the behavior of the ports. If you do not configure Port 2, the behavior of the ports continues to function as before (with Port 1 sending UI, SNMP, and email alerts (SMTP) traffic, and Port 2 reserved for service use).

Note:

If you plan to configure Port 2, use a separate subnet/gateway than Port 1, otherwise all traffic will go through Port 1.

Table 7-1 Port Configuration Options

Configuration	Port 1 Settings	Port 2 Settings
LME enabled on Port 2	Configured normally. Used for UI, SNMP, SMTP, SDP-2 traffic.	New address with different subnet and gateway than Port 1. Used for OKM traffic only and direct Service laptop connection.
LME enabled on Port 1 (Not recommended as key traffic will be mixed with other traffic.)	Configured normally. Used for UI, SNMP, SMTP, OKM traffic.	192.168.10.10 (default) Used for SDP-2 traffic and direct Service laptop connection.
LME disabled with Port 2 unchanged	Configured normally. Used for UI, SNMP, SMTP traffic.	192.168.10.10 (default) Used for SDP-2 traffic and direct Service laptop connection.
LME disabled with Port 2 altered (Leave Port 2 setting unchanged unless using it for LME.)	Configured normally. Used for UI, SNMP, SMTP traffic.	New address with different subnet and gateway than Port 1. Used for SDP-2 traffic and direct Service laptop connection.

Port 1 Behavior with LME Enabled on Port 2

With Port 2 enabled for LME, Port 1 continues to act as the primary port for the customer to manage the library sending UI, SNMP, and email alert (SMTP) traffic. In addition, Port 1 will send SDP-2 traffic. Since the library will only send LME (OKM) traffic through Port 2, this requires the Oracle Service tool SDP-2 to now be connected to Port 1 when LME is enabled on Port 2.

Port 2 Behavior with LME Enabled on Port 2

When Port 2 is configured for LME, the library will send all OKM communication through Port 2 (as long as you configure Port 1 and 2 on different subnets). A service representative can still directly connect to port 2 for troubleshooting when the port is configured for LME.

However, they must configure the laptop with a valid IP address on the same subnet as Port 2. If the OKM Cluster is on the same subnet as Port 2, then access to Port 1 from any device on Port 2's subnet is restricted. Connection to Port 1 is only allowed outside of the Port 2 subnet.

Related Topics

- [Configure Library Managed Encryption \(LME\)](#)
Configure LME to have the library manage the encryption enrollment and key delivery of all IBM LTO-6 or higher drives.

View Drive Information

The Drives table displays the type, location, and state of each drive in the library.

1. In the remote interface, select **Drives** in the left menu.
2. For more options, select a drive and then right-click or use the **Actions** drop-down.
3. Note the drive state. The library polls the drive approximately every 10 seconds. Possible states are:
 - Empty
 - Cleaning
 - Loading
 - Loaded
 - Reading
 - Writing
 - Rewinding
 - Unloading

Related Topics

- [Tape Drives](#)
Tape drives read and write data on tape cartridges. The SL150 supports LTO half-height SAS and FC drives.

Configure Drive Cleaning

Manage drive cleaning in one of three ways: library-managed, host-managed, or manually.

LTO drives may require occasional cleaning with a compatible cleaning cartridge. The drive will notify the library or host application when it requires cleaning. Select your method of managing drive cleaning:

- [Enable Library-Managed Drive Auto Cleaning](#)
- [Configure Host-Managed Drive Cleaning](#)
- [Manually Clean a Drive \(Not Recommended\)](#)


Related Topics

- [Manage Expired Cleaning Cartridges](#)
Remove expired cleaning cartridges from the library and replace them with a new cartridge.
- [Determine the Number of Cleaning Cartridges](#)
Cleaning cartridges clean tape drives. The number of cartridges required depends on partitioning and your drive cleaning strategy.

Enable Library-Managed Drive Auto Cleaning

Library managed cleaning automatically mounts a cleaning tape when the drive requests it.

Library-managed auto cleaning is the easiest and most flexible way to clean drives. When enabled, the library automatically mounts a cleaning cartridge when the drive requests it.

1. Verify there is at least one universal LTO cleaning cartridge (media type `CU`) in a reserved system slot (see [View a List of Tape Cartridges](#)). For best drive availability, place two cleaning cartridges in reserved slots.
2. From the remote interface, select **Configuration** in the left menu.
3. Click **Configure** .
4. Select **Configure Library Settings**, and then click **Next**.
5. Set **Drive Auto Clean** to **On**.
6. Set **System Reserved Slots** to 1 or 2. To use the auto cleaning, you must reserve at least one system slot for a cleaning cartridge.
7. Click **Next**. If applicable, click **Next** again to bypass the partitioning configuration.
8. On the summary screen, select **Accept all changes** and then click **Apply**.

Related Topics

- [Determine the Required Number of Reserved System Slots](#)
Reserved system slots store diagnostic and cleaning cartridges. The number of required slots depends on your cleaning strategy and diagnostic needs. You can reserve up to a maximum of three slots.

Configure Host-Managed Drive Cleaning

The host application can manage the cleaning of the drives that it controls. The configuration of cleaning depends on the host application.

Many storage-management and backup applications can manage drive cleaning (such as Oracle Secure Backup, Symantec NetBackup, IBM Tivoli Storage Manager, and others). A cleaning cartridge must be available in a storage slot the host application controls.

Advantage of host-managed cleaning:

- The host remains in control of its assigned drives and storage slots at all times.

Disadvantage of host-managed cleaning:

- In a partitioned library, each partition must contain a compatible cleaning tape, meaning you must provide duplicate cleaning tapes across partitions. The extra cleaning tapes take up slots that could otherwise hold data tapes.

The sections below summarize the procedures for configuring host-managed cleaning. Always refer to the host documentation for full details.

- [Configure Automatic Cleaning in Oracle Secure Backup During Drive Setup](#)
- [Set Up Auto Cleaning with FUJIFILM Object Archive](#)
- [Set Up NetBackup for *Reactive Cleaning*](#)
- [Set Up Symantec Backup Exec Drive Cleaning](#)
- [Set Up Reactive Cleaning for HP StorageWorks Enterprise Backup Solution with HP Data Protector](#)
- [Set Up *As-Needed Cleaning* in IBM Tivoli Storage Manager \(TSM\)](#)
- [Set Up *Tape-Alert Cleaning* in EMC Networker](#)
- [Set Up CommVault Drive Cleaning](#)

Configure Automatic Cleaning in Oracle Secure Backup During Drive Setup

Configure drive cleaning for Oracle Secure Backup during the drive setup.

When you add tape drives to your Oracle Secure Backup configuration, select **Yes** from the **Auto clean** list. Enter the following information:

- **Clean interval (duration)** — The desired interval between cleaning cycles.
- **Clean using emptiest** — Select **Yes** to use cleaning cartridges in round-robin fashion, starting from the least-used cartridge. Select **No** to use each cleaning cartridge until it expires, starting from the cartridge with the fewest remaining cleaning cycles (the default).

Set Up Auto Cleaning with FUJIFILM Object Archive

FUJIFILM Object Archive automatically cleans the drive based on information from tape alerts.

1. Verify all cleaning cartridges are properly labeled.
2. FUJIFILM Object Archive automatically cleans drives when it detects a “Cleaning Required” tape alert.

Set Up NetBackup for *Reactive Cleaning*

Set up NetBackup for Reactive Cleaning using either the Administration Console or the commandline.

Setup Reactive Cleaning Using the Administration Console

1. From the Administration Console, select **Media and Device Management**.
2. Select **Device Monitor**, and then select **Drives**.
3. In the **Drive Status** pane, select an SL150 drive and then open the **Actions** menu.
4. Select the **Set Cleaning Frequency** parameter, and set the value to **0** (zero). This tells NetBackup to clean drives in response to Tape Alerts.
5. Repeat until you have configured all SL150 drives.

Setup Reactive Cleaning Using the Commandline

1. To add a drive to the NetBackup configuration, use the command `tpconfig -add -drive -type [hcart|hcart2|hcart3] path drivepath -cleanfreq 0`, where:
 - `hcart*` is the generic NetBackup media identifier.
 - `drivepath` is the path to the device file for the drive. Stop here.
2. If you have already added the drives to your NetBackup configuration, run the command `/usr/openv/volmgr/bin/tpclean/tpclean -F drive_name 0`, where:
 - `drive_name` is the name that was assigned to the drive when it was added to the NetBackup device configuration.
 - `0` is the value that turns off frequency-based cleaning in favor of reactive cleaning.

Set Up Symantec Backup Exec Drive Cleaning

Set up Symantec Backup Exec for drive cleaning using the interface.

1. On the Backup Exec navigation bar, select **Devices**.
2. Select **Robotic Libraries**, and then select the robotic library for which you are setting up the cleaning.
3. Click **Slots** to display the library's slots in the right pane.
4. Select the slot that contains the cleaning tape.
5. In the task bar, under **General Tasks**, select **Properties**.
6. Select the **Cleaning Slot** option, and click **OK**.
7. Make sure that the cleaning tape is located in the slot that you defined as the cleaning slot.

Set Up Reactive Cleaning for HP StorageWorks Enterprise Backup Solution with HP Data Protector

Data Protect automatically configures reactive cleaning.

1. Verify all cleaning cartridges are properly labeled.
2. Data Protector detects the properly labeled cleaning cartridges and automatically sets up reactive cleaning.

Set Up *As-Needed Cleaning* in IBM Tivoli Storage Manager (TSM)

Use the `DEFINE DRIVE` or `UPDATE DRIVE` commands to setup drive cleaning.

1. To configure on-demand cleaning for a drive that has not yet been added to your TSM configuration, use the `DEFINE DRIVE` command.
2. To configure on-demand cleaning for a drive that has already been added to your TSM configuration, use the `UPDATE DRIVE` command.
3. Using the chosen command, set the drive parameter `CLEANFREQUENCY` to `ASNEEDED`.

Set Up *Tape-Alert Cleaning* in EMC Networker

EMC Networker automatically cleans drives if it is configured to receive Tape Alerts from the drive.

To enable Tape Alerts, set up the Networker Common Device Interface (CDI) as follows.

1. In the NetWorker Administration interface, click on **Devices**, and select **View, Diagnostic Mode**.
2. Select **Devices** from the navigation tree.
3. In the Devices table, right-click on one of the SL150 tape drives, and select **Properties** from the context menu.
4. In the Properties window, select the **Advanced** tab.
5. In the Device Configuration area of the Advanced tab, under CDI settings, select **SCSI Commands: Sends explicit SCSI commands to tape devices**.
6. Repeat steps 3-5 until the Common Device Interface has been configured for all SL150 tape drives.

Set Up CommVault Drive Cleaning

Use the ComCell interface to set up drive cleaning in CommVault.

1. In the ComCell interface, right-click on the SL150 library, and select **Properties** from the context menu.
2. When the Library Properties sheet appears, select the **Drives** tab.
3. In the Enable Auto-Cleaning section of the tab, check the **On sense code** check box.

Manually Clean a Drive (Not Recommended)

Manually clean a drive by monitoring the remote interface for cleaning messages and responding accordingly.

Caution:

Over-cleaning can damage drives. Only mount a cleaning tape when the drive indicates that it requires cleaning.

Check for Drives that Require Cleaning

1. Log in to the remote interface.
2. Check the **Library Health** indicator at the top of the screen. If it is in the *Degraded* state, click on it, and examine the Health Table for code **9030, DRIVE_NEEDS_CLEANING**.
3. If a drive needs cleaning, note the drive address (module number and either Top or Bottom). Use the library user interface to clean the drive (see below).

Use the Remote Interface to Clean a Degraded Drive

1. Verify that a drive needs cleaning (see above).
2. Make sure that the library contains at least one unexpired LTO universal cleaning cartridge (media type `CU`).
3. Select **Library** in the left menu.
4. Locate the drive that needs cleaning. Hover over the drive and verify the drive address is correct.
5. Right-click on the drive, and then select **Clean Drive**.
6. Select a cleaning tape from the drop-down list.
7. Optionally, select **Set the Library back Online ...**
If you do not select this option, remember to bring the library back online once the cleaning finishes.

Restart a Drive

Restart the drive to power it off, on, and then initialize the drive which may resolve some drive problems.

1. In the remote interface, select **Library** in the left menu.
2. Right-click the drive, and then select **Restart Drive**.

Related Topics

- [Audit the Library](#)
During an audit the robot checks each cartridge slot, recording cartridge labels and locations to create a tape catalog.

Enable or Disable Drive Ports

Enable or disable the drive ports from the remote interface.

There are two ports on the drive that you can enable or disable as needed.

Caution:

Changing the Port Settings on a bridged drive may cause an interruption in host activity.

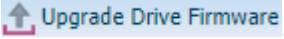
1. In the remote interface, select **Library** in the left menu.
2. Right-click a drive, and then select **Drive Port Settings**.
3. In the drop-down for each port, select either **Enable** or **Disable**.

Update the Drive Firmware

Keep drive firmware up to date with the most current and supported drive firmware.

Make sure that the proper device driver is installed, if applicable. Use Windows Update to obtain the driver for an IBM tape drive. Download the driver from the HP website, if needed. For example, Oracle has qualified the HP LTO-5 and LTO-6 drives with Windows driver 3.5.0.0.

If possible, update drive firmware during periods when host applications are not heavily using of the library. The library cannot respond to host commands during the updates, which may take up to 20 minutes per tape drive.

1. Download the drive firmware (see [Download Firmware from My Oracle Support](#))
2. Extract the drive firmware ZIP (the extracted folder should contain HTML and text release notes, a `LEGAL_LICENSE.TXT` file, a `tload.tar` file, and two versions of the firmware file).
3. Log in to the remote user interface as an administrator.
4. Take the library offline (see [Place the Library Online or Offline](#)).
5. Select **Firmware** in the left menu. Click the **Drive Firmware** tab.
6. Click **Upgrade Drive Firmware** .
7. Click on the table entries to select the drive(s) that you want to update (hold down the Shift key to select multiple drives). Click **Next**.
8. Browse to the folder that contains the drive firmware, and select the file with the `.E` extension (such as `Z5BD.E`).
9. Verify you have selected the correct file, and then click **Upgrade**. The update begins immediately.

If you are updating multiple drives, you can click **Cancel** to skip the upgrade for any drives that have not yet been processed. However, the upgrade that is currently underway will continue.
10. If a firmware upgrade fails, make sure that the chosen firmware is correct for the LTO generation and interface specification of the drive. If it is not, repeat this procedure to download a copy of the correct firmware.
11. When all firmware is up to date, bring the library back online.

Related Topics

- [Identify Current Firmware Versions](#)
View the currently installed firmware versions for the library and drives.

8

Monitor the Library

Monitor library operations for component failures and operational problems.

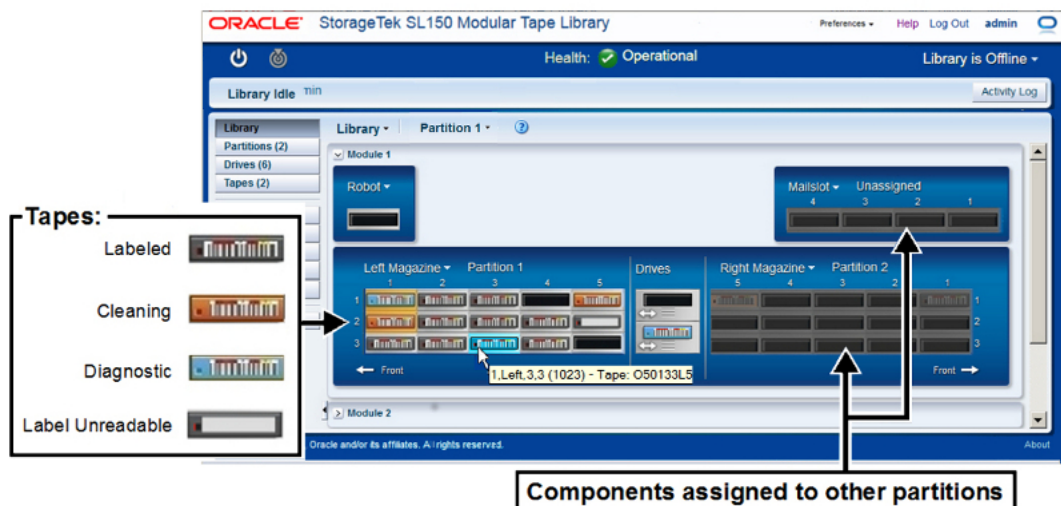
- [View the Library Screen](#)
- [View the Library State](#)
- [View User and Host Activity](#)
- [Configure Simple Network Management Protocol \(SNMP\)](#)
- [Enable or Disable the Service Delivery Platform \(SDP2\)](#)
- [Configure Email Notifications](#)

View the Library Screen

The Library screen of the remote interface displays a graphical representation of library components.

1. From the remote interface, select **Library** in the left menu.
2. Hover over a component to see detailed information. For example, hover over a tape to display the corresponding slot address and label.

You can view the whole library or a single partition at a time. When viewing one partition, resources assigned to the other partitions are grayed out.






Related Topics

- [View the Library State](#)
The status bar at the top of the interface displays library health, which represents the combined state of every component in the library.

View the Library State

The status bar at the top of the interface displays library health, which represents the combined state of every component in the library.




- **Operative**  — the library is fully operational.
- **Degraded**  — a device in the library has failed or is offline, but the library can continue to function (such as a faulty drive).
- **Failed**  — a device has failed and the library cannot function (such as a failed robot).

 **Note:**

Clicking the library state in the status bar displays the Library Health pop-up which you can use to troubleshoot the library (see [Determine the Possible Cause of a Degraded or Failed Library State](#)).

Library LED Status Indicators

LEDs on the front control panel and rear of the library indicate status.

Indicator	Indicator State	Meaning
	Green OK is solid.	The library or component is fully operational.
	Green OK is solid. Amber ! is solid.	The library or component is degraded. It is still operating but with reduced functionality.
	Amber ! is solid.	The library or component has failed and cannot perform its function.

Indicator Locations

Figure 8-1 LEDs on Front of Base Module



Figure 8-2 LEDs on Rear of Base Module

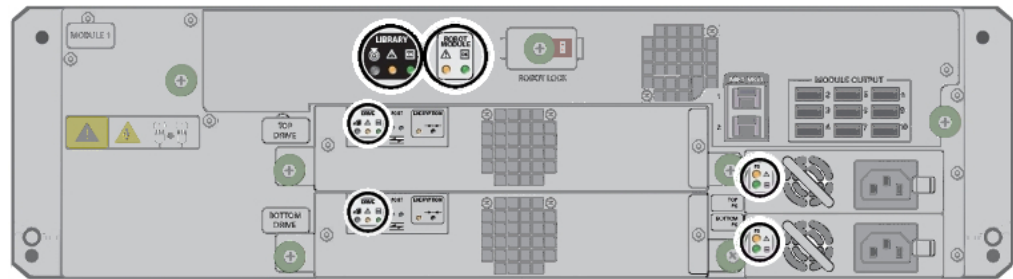




Figure 8-3 LEDs on Rear of the Expansion Module



Determine the Possible Cause of a Degraded or Failed Library State

Click the library health in the status bar to display a list of faults.

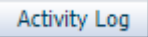
1. Click on the **Degraded**  or **Failed**  health state in the status bar.
2. Use the **Library Health** pop-up to view the list of library faults. Look through the suspected components and recommended actions lists to determine how to correct the faulty library state.

Related Topics

- [View the Library State](#)
The status bar at the top of the interface displays library health, which represents the combined state of every component in the library.
- [Diagnose a Library Problem](#)
The health table, health log, and self-tests help diagnose library problems.
- [Troubleshoot the Library](#)
Troubleshoot common user interface and library problems.

View User and Host Activity

The activity log displays recent user and host activity.

1. Click **Activity Log**  near the top-right of the screen.
2. Click either the **User Activity** tab or **Host Activity** tab to view the library activity.

Configure Simple Network Management Protocol (SNMP)

Network management applications can monitor the library using the Simple Network Management Protocol (SNMP).

The library's SNMP agent can automatically send traps to alert network management stations of faults and configuration changes. You can configure the library's SNMP agent to automatically send traps that alert up to six network management stations about faults and configuration changes. The library supports both SNMP version 2c and version 3.

- [SNMP Versions](#)
- [SNMP Traps](#)
- [Enable or Disable SNMP](#)
- [Configure an SNMP User](#)
- [Configure an SNMP Trap Recipient](#)
- [Send a Test Trap](#)
- [Download the Management Information Base \(MIB\)](#)

SNMP Versions

The version of SNMP determines credential requirements.

There are two SNMP versions supported by the library: v3 and v2c.

- **v3** — Version 3 is not backward compatible, but it supports a more secure authentication method and can encrypt management data. Always choose v3 unless you need compatibility with older SNMP versions and have no security concerns. v3 requires the following information:
 - **User Name**
 - **Authentication Protocol** — Select **SHA** for best security or **MD5** for compatibility with systems that use MD5.
 - **Authentication Passphrase** — Enter a strong user-authentication password.
 - **Privacy Protocol** — Select **AES** (Advanced Encryption Standard) for best security or **DES** (Data Encryption Standard) for compatibility with systems that use DES.
 - **Privacy Passphrase** — Enter a strong data-protection password.
 - **Engine ID** — Only required when adding a trap recipient. In most cases accept the default value. If you must override this value, enter a hexadecimal value that starts with 0x and does not contain either all zeroes (0) or all sixteens (F).
- **v2c** — Backward compatible with earlier versions of the standard, but it is not secure because authentication credentials (community strings) and management data are exchanged in clear text.

This is the less secure option. Only select this option if you need compatibility with older SNMP versions. v2c requires the following information:

- **Community Name** — A 31-character, alphanumeric password or phrase. Do not use factory-set default community names or obvious strings like *public* and *private*.

SNMP Traps


The SL150 returns a finite set of SNMP traps.

Table 8-1 SNMP Trap Levels

Trap Level	Description
1	error log entry
2	warning log entry
3	info log entry
4	configuration
11	agent start
13	test
14	heartbeat A (2.5 minute period)
15	heartbeat B (24 hour period)
21	Library Status Good
25	Library Status Check
27	Environmental Hardware Check
41	Drive Status Good
45	Drive Status Check
61	CAP (mailslot) Status Good
63	CAP (mailslot) Status Open
65	CAP (mailslot) Status Check
100	<i>Proprietary</i>
102	<i>Proprietary</i>

Enable or Disable SNMP




Enable or disable SNMP using the remote interface.

1. From the remote interface, select **SNMP** in the left menu.
2. Click the **SNMP is Enabled/Disabled**  drop-down.
3. Select either **Enable SNMP** or **Disable SNMP**.
4. Click **OK** to confirm the change.

Configure an SNMP User

SNMP users can access the library's SNMP agent. You can add, modify, or delete an SNMP user.




1. From the remote interface, select **SNMP** in the left menu.
2. Select the **SNMP Users** tab.

3. Click **Add SNMP User** , or select a user and then click **Edit SNMP User**  or **Delete SNMP User** .
 - See [SNMP Versions](#) for the required version information.

Configure an SNMP Trap Recipient


You can add, modify, or delete an SNMP trap recipient. You can configure up to six trap recipients.

An SNMP trap recipient is a network management station that you designate to receive notifications sent by the SNMP agent on the library.

1. From the remote interface, select **SNMP** in the left menu.
2. Click the **SNMP Trap Recipients** tab.
3. Click **Add Trap Recipient** , or select a recipient and then click **Edit Trap Recipient**  or **Delete Trap Recipient** .
 - **Host Address** — IP address of the management host that will receive the traps
 - **Trap Level** — Comma-delimited list of the Trap Levels to send to this management station. For a list of valid entries, see [SNMP Traps](#).
 - **Version** — The SNMP version. See [SNMP Versions](#) for details on additional required information.

Send a Test Trap

Send a test trap (level 13) to all trap recipients to verify the configuration.


1. From the remote interface, select **SNMP** in the left menu.
2. Click the **SNMP Trap Recipients** tab.
3. Click **Send a Test Trap** . If the icon is grayed-out, try clicking on a recipient in the list. Make sure you have enabled SNMP.

Related Topics

- [Enable or Disable SNMP](#)
Enable or disable SNMP using the remote interface.
- [SNMP Traps](#)
The SL150 returns a finite set of SNMP traps.


Download the Management Information Base (MIB)

The MIB defines entities and OIDs used in SNMP. Use the remote interface to download the MIB.

1. From the remote interface, select **SNMP** in the left navigation menu.
2. Click **Download Mib** .
3. Save the file or view it in a text editor.

Enable or Disable the Service Delivery Platform (SDP2)

SDP2 can send automated service requests (ASR) when the library encounters an issue. Enable or disable SDP2 from the remote interface.

1. From the remote interface, select **SNMP** in the left menu.
2. Click the **SDP2 is Enabled/Disabled**  drop-down.
3. Select either **Enable SDP2** or **Disable SDP2**.
4. If enabling SDP2, you must also complete the following:
 - a. Enable SNMP. See [Enable or Disable SNMP](#). You can configure SDP2 without enabling SNMP. But you cannot enable SDP2 until you enable SNMP.
 - b. Configure an SNMP trap recipient to receive trap levels: 13, 14, 15, 102. See [Configure an SNMP Trap Recipient](#). To use SDP2, you must configure at least one SNMP trap recipient to receive the specified traps.
 - c. The button should now read **SDP2 is Enabled (Configured)**. If not, verify you have enabled SNMP and have a recipient configured with the trap levels: 13, 14, 15, 102.

Related Topics

- [Service Delivery Platform 2 \(SDP2\)](#)
The StorageTek Service Delivery Platform 2 (SDP-2) is a support solution that provides faster problem resolution, analysis and trending, and improved diagnostics.


Configure Email Notifications

Email notifications send automatic alerts whenever the library state or health changes.

- [Enable or Disable Email Notifications](#)
- [Configure Email Recipients](#)
- [Send a Test Email Alert](#)

Enable or Disable Email Notifications




Enable or disable email notifications using the remote interface.

1. From the remote interface, select **Email Alerts** in the left menu.
2. Click **Configure** .
3. Set **Email Alerts** to **On** (Enabled) or **Off** (Disabled).
4. If enabling email alerts, enter the following information:
 - **SMTP Host Address** — IP address of the Simple Mail Transport Protocol server that will handle outgoing mail for the library.
 - **SMTP Port** — The network port used by your SMTP server. The default is 25, but you may choose any non-reserved port. Reserved ports include 0, 22, 80, 67, 68, 123, 514, 546, 547, 161, 162, and all ports in the range 33200-33500.
 - **From Name** — The name that should appear in the sender field of the email. The default is "Library Alert".

- **From Email** — The email address that should appear in the sender field of the email.
- **Secure Connection** — Select **TLS** unless the network does not support TLS. **SSL** is an older protocol that offers less protection. **None** provides no cryptographic protection.
- If using TLS or SSL, enter a user name and password.


Configure Email Recipients

The library sends notifications only to configured recipients.

1. From the remote interface, select **Email Alerts** in the left menu.
2. Click **Add Recipient** , or select a recipient and click **Edit Recipient**  or **Delete Email Recipient** .
 - **Alert on Health and/or Change** — When selected, the library will notify the recipient when the library health status changes.

Send a Test Email Alert

Send a test email to verify that email notifications are properly configured.

1. From the remote interface, select **Email Alerts** in the left menu.
2. Select a recipient, and then click **Send Test Email** .

9

Service the Library

Perform routine library maintenance to correct library issues.

WARNING:

Oracle's StorageTek SL150 Modular Tape Library contains a Class-1 laser, as defined by IEC 60825-1 Ed. 2 (2007). Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This section covers routine procedures you may need to perform when servicing or troubleshooting the library. For details on removing or replacing specific components, see [Replace Components \(CRUs & FRUs\)](#).

- [Place the Library Online or Offline](#)
- [Power On the Library](#)
- [Power Off the Library](#)
- [Restart the Library](#)
- [Audit the Library](#)
- [Move the Library Rack](#)
- [Enable the Locate Light](#)
- [Troubleshoot the Library](#)
- [Get Parts and Technical Support](#)
- [Run a Self-Test](#)

Place the Library Online or Offline

Change the state of the library using the remote interface. An offline library will not perform host operations.

Always take the library offline before performing any maintenance that might conflict with host data operations. After you complete the disruptive activity, you can bring the library back online and continue host operations.

1. If taking the library offline, stop any host activity before proceeding.
2. From the remote interface, click the **Library is Online/Offline** drop-down in the upper-right.
3. Select either **Set Library Offline** or **Set Library Online**.

Power On the Library

Power on the library from the front of the Base Module.

1. Gain physical access to the library. When the library is off, the browser-based user interface is not running, so you cannot power the system on remotely.
2. Verify the robot is unlocked (if not, see [Unlock the Robot](#)).
3. Ensure that the bottom library module has the floor installed.
4. Press the power button on the front upper-left of the base.



The library boots and performs an audit.

Related Topics

- [Audit the Library](#)
During an audit the robot checks each cartridge slot, recording cartridge labels and locations to create a tape catalog.

Library Startup Sequence

The library follows a specific sequence to verify operations after powering on.

1. The robot unparks and the hand fully retracts.
2. The robot determines the order of the modules, starting at the top and moving down one module at a time.
3. The wrist sweeps through its full range of motion and the hand moves through the full track range. The reach mechanism extends and retracts.
4. The magazines latch.
5. The library runs a full audit. When the audit completes and all drives are *ready*, the library is operational (see [Monitor an Audit in Progress](#)).


Power Off the Library

There are two methods of powering off the library: controlled and forced.

- **Controlled Power-Down from the Interface** — Always recommended, if possible.
- **Forced Power-Down** — Cuts power at the library or rack. Use this method only when the controlled method does not work.

Controlled Power-Down from the Interface

Always use the remote interface to power down the library when possible.

1. Stop any host activity.
2. From the remote interface, click the power button  in the upper-left, and then select **Power Down Library**.
3. Optionally, select **Prepare the Robot for removal before the library powers down**. This parks the robot at the top of the library. Select this option if you are powering down for any of the following reasons:
 - Removing or replacing the robot.
 - Moving the rack or moving the library to a new rack.
 - Preparing the library for shipment.

If you selected "Prepare the Robot for removal", you must lock the robot (see [Lock the Robot](#)).

Forced Power-Down

Use the forced power-down method only if the controlled power-down did not work.

1. Stop any host activity.
2. Remove power from the library using one of the following methods:
 - a. Press the front panel power button and hold it until the library shuts down (approximately 10 seconds).
 - b. Remove power from *all* power supplies (disconnect the power cord from all power supplies or set the PDU or power strip switch to the off position).

Lock the Robot

Lock the robot if removing or replacing the robot, moving the library, or preparing the library for shipment.

1. Perform a controlled power-down and make sure to select **Prepare the Robot for removal before the library powers down** (see [Controlled Power-Down from the Interface](#)). This parks the robot in a protective housing at the top of the library.
2. Locate the robot lock on the back of the Base Module. There are two robot lock types. Following the procedure for your lock type.
 - [Lock the Knob-type Robot Lock \(new version\)](#)
 - [Lock the Thumbscrew-type Robot Lock \(older version\)](#)
3. After locking, within the power-down dialog, select **I have secured the Robot Lock in the locked position**.

Related Topics

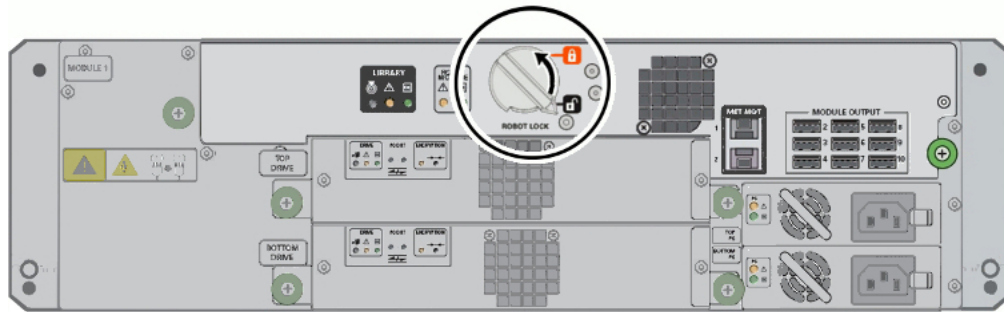
- [Unlock the Robot](#)
Unlock the robot before operating the library.

- [Lock the Robot for Shipment within a Rack](#)
Lock the robot into place when shipping the library installed in the rack.

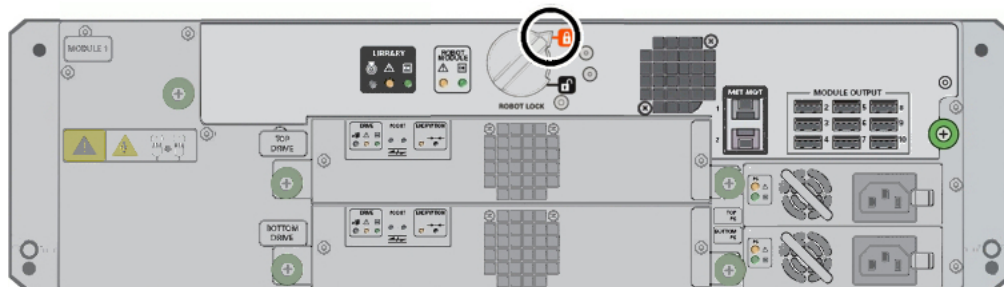
Lock the Knob-type Robot Lock (new version)

The newer lock style is a knob that you twist.

To lock, turn the knob counter-clockwise until it clicks into place.

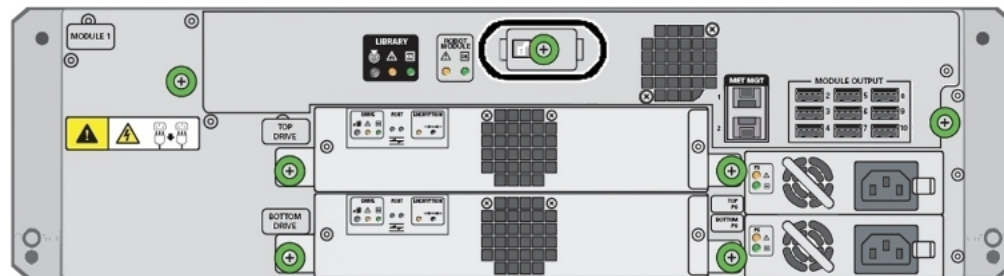


The pointer on the knob should point past the red, locked padlock icon.



Lock the Thumbscrew-type Robot Lock (older version)

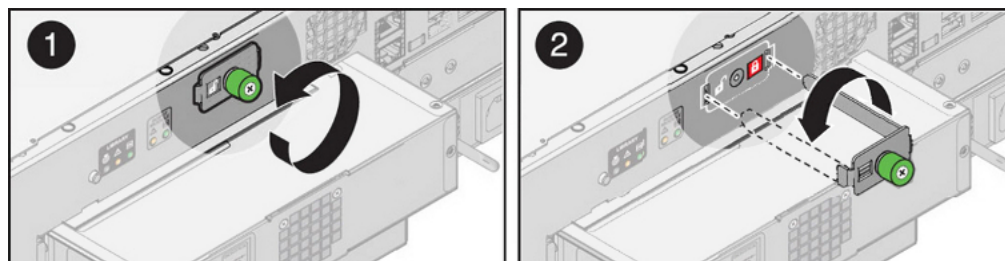
The older lock style has a lock assembly secured with a thumbscrew.



1. Loosen the captive thumbscrew on the lock assembly. Pull the lock straight out until the long tab comes out of the slot at right.

2. Rotate the lock assembly counterclockwise 180 degrees, and slide the long tab into the slot at left.


Verify a red locked padlock icon is visible in the small window.



3. Secure the lock assembly by tightening the captive screw. The robot is now locked.

Restart the Library

Restart the library to reboot the operating system which may resolve some library issues.

1. Click the power button  in the upper-left of the user interface, and then select **Restart Library**.
2. If the library has been operating normally and if its contents have not changed, select **Bypass audit for a faster restart ...**

The option is not available if magazines are open or if the library has been in the Inoperative state.

Restarting the Library Following a Power Outage

If a power outage occurs, the library returns to its last power state once power is restored.

When power is restored, the library powers up and runs just long enough to check its previous power state. If the library was ON before the outage, it will be ON afterward. If it was OFF, the library powers itself OFF after a few seconds.

Restarting a library that was off prior to a power interruption is like powering on any other library that is off. See [Power On the Library](#).

Audit the Library

During an audit the robot checks each cartridge slot, recording cartridge labels and locations to create a tape catalog.

The library must audit whenever tapes are manually moved (meaning moved with human intervention) so that it can update the catalog. The library automatically performs an audit whenever it powers up or whenever you reinsert magazines. Normally, host applications request audits. However, you can audit the library from the remote interface, but you should avoid this, if possible, as it interrupts host operations.

To manually initiate an audit:

1. From the remote interface, select **Library** in the left menu.

2. From the **Library** drop-down menu **Library** ▾, select **Audit Library**.
3. Optionally, select **Set the Library back Online ...**
4. To take the library offline, start the audit, and close the dialog, press **OK**.
5. If you did not check the **Set the Library back Online ...** checkbox, remember to bring the library back online once you are ready.

Monitor an Audit in Progress

Track the progress of the audit on the Library screen of the remote interface.

The duration of an audit depends on the size of the library. For example, a 30-slot library can take about 7 minutes to audit. You can monitor the progress of an audit.

1. In the remote interface, select **Library** in the left menu.
Grayed-out cartridge icons represent unaudited slots. As the audit progresses, audited slots return to their normal appearance.
2. Hover over a slot to show the current cartridge label information.


Move the Library Rack

Power off the library and lock the robot before moving the rack to prevent equipment damage.

1. Power the library off (see [Power Off the Library](#)).
2. Secure the robot (see [Lock the Robot](#)).
3. If the floor is uneven, remove all magazines from library as tape cartridges can shift and obstruct library robotics when the library is restarted.
 - a. Unlock all magazines using the remote interface or local operator panel. Press the **Select All** option on the **Unlock Magazines** dialog.
 - b. Remove all magazines.
4. Set the rack PDU circuit breakers to OFF and disconnect the PDU power cord(s) from the main circuit.
5. Label and disconnect any host connection or LAN cables.
6. Raise any leveling pads until the casters are supporting the rack. Release any rack anti-tip device(s), and remove any wheel chocks.
7. Move the library to its new location. Reset the leveling pads.
8. Reinstall the magazines.
9. Reconnect power, host-connections, and local area network (LAN) cables.
10. Unlock the robot (see [Unlock the Robot](#)).
11. Power the library on (see [Power On the Library](#)).

Enable the Locate Light

The locate light helps physically identify a particular SL150 when you have multiple SL150s in your data center.

1. In the remote interface, click the *locate* icon  in the upper left of the screen.
2. Select **Switch Locate Light On**.
3. The physical locate LEDs activate on the front control panel and in the black rectangle on the robot CRU.



Troubleshoot the Library

Troubleshoot common user interface and library problems.

- [Diagnose a Browser-Based User Interface Problem](#)
- [Diagnose a Library Problem](#)
- [Restore the Factory Default Configuration](#)
- [SAS-2 and SAS-3 Configuration Issues](#)

Diagnose a Browser-Based User Interface Problem

The browser level and type may cause issues with the remote interface.

1. If you have problems with a browser, try a different browser. Check the SL150 firmware release notes for known incompatibilities.
2. If you start to have problems with a browser that used to work, check for recent changes to the browser configuration:
 - If scripting (Javascript) has been disabled, enable it.
 - If browser plug-ins or extensions have been installed or updated recently, disable or uninstall the add-on software.
 - If browser software has been recently updated, roll back the update and revert to the previous version.
3. If an update is available for the browser, install it.
4. If you still have problems after you have tried the latest versions of several browsers, open a service request. See [Get Parts and Technical Support](#).

Diagnose a Library Problem

The health table, health log, and self-tests help diagnose library problems.

- [Diagnose Why You Cannot Login to the Remote Interface](#)

- [Use the Health Table to Diagnose the Issue](#)
- [Check if a Fault is Closed in the Health Log](#)
- [Locate and Remove a Cartridge Stuck in a Magazine Slot](#)
- [Locate and Clear Obstructions, Such as Loose or Protruding Cartridges](#)
- [Save the Health Log to a File](#)
- [Run a Self-Test](#)

Diagnose Why You Cannot Login to the Remote Interface

A network issue or power failure may prevent you from logging in to the remote interface.

1. Go to the library and check the local operator panel.
2. If the local operator panel is working and the remote user interface is not, check the Ethernet cable connected to NET MGT port 0 at the rear of the library. Check for network problems.
3. If the local operator panel is also not working, make sure that the library has power. Check the power cord connected to each power supply. Check the data-center power outlet. Check breakers.
4. If the library is connected to power, check the LED Indicators on the library and its components:
 - Power supplies — If an amber power supply LED is lit or if both power supply LEDs are dark, replace the power supply. See [Power Supply Removal and Replacement](#).
 - Robot Module — If an amber Robot Module LED is lit or if both robot LEDs are dark, replace the robot. See [Robot Module Removal and Replacement](#).
5. If the robot module is OK, restart the library, and repeat this procedure.
6. If problems persist after you have restarted the library and repeated the above diagnostic steps, go to [Get Parts and Technical Support](#), check for relevant knowledge articles, and then, if necessary, open a service request.

Use the Health Table to Diagnose the Issue

The health table provides fault codes and possible reasons for a library issue.

1. Log in to the remote interface, take the library offline, and use the health table.
2. To access the health table, click the **Degraded** or **Failed** indicator in the status bar.
3. Note the **Fault Code** listed in the health table. Suggested fixes are listed below:
 - *Fault Code 903:*
 - **If Drive Auto Clean is enabled** — If the drive listed in the suspected component field is mounted, wait. The library will attempt a cleaning once the tape dismounts.

If the fault persists after the tape dismounts, a cleaning cartridge is unavailable or expired. Load a new, LTO universal cleaning cartridge into a reserved slot. Then clean the drive using the library user interface.

- **If using host-managed drive cleaning** — Consult the host application documentation and make sure that fresh cleaning media are available. If necessary, clean the drive listed using the library user interface.
 - *Fault Code 9108:*
 - If the Suspect Component is one or more magazines, see [Locate and Remove a Cartridge Stuck in a Magazine Slot](#).
 - If the Suspect Component is one or more drives, the cartridge may be stuck in the drive. Go to [Get Parts and Technical Support](#), and check for relevant knowledge articles. If you cannot find a resolution, open a service request
 - *Fault Code 9109 or 9102 thru 9107:*
 - See [Locate and Clear Obstructions, Such as Loose or Protruding Cartridges](#).
 - *All other Fault Codes:*
 - Follow the **Recommended Action** listed in the health table one at a time and in the order specified in the suspect components list. See [Replace Components \(CRUs & FRUs\)](#).
If you replace the robot, the operator panel, or the chassis of library module 1, power-cycle the library as soon as you finish. These three components maintain records of the product serial number and configuration settings. If you replace more than one of them at a time, without restarting the library, this information will be lost.
4. After attempting a fix, if the connection status indicator shows **Library is Inoperative**, restart the library and then see [Check if a Fault is Closed in the Health Log](#) below.

Check if a Fault is Closed in the Health Log

Confirm you fixed an issue by verifying that the fault record has been closed in the health log.

The fault record should update after you attempt a fix or restart the library.

1. Select **Service** in the left menu. Select the **Health Log** tab
2. Locate the row for the fault and note the value of the *Type* field:
 - If the record is still **Open**, you have not yet isolated the problem. Note the next **Suspect Component** and repeat [Use the Health Table to Diagnose the Issue](#) above.
 - If the record is **Closed**, but the library status is still **Degraded**, check for remaining faults in the health table and repeat [Use the Health Table to Diagnose the Issue](#) above.
 - If you **Closed** all fault records and still cannot get the library into Operational condition, go to [Get Parts and Technical Support](#), check for relevant knowledge articles, and, if you cannot find a resolution, open a service request. Include fault codes and details of the actions that you have taken.

Locate and Remove a Cartridge Stuck in a Magazine Slot

How to resolve **Fault Code 9108** if the **Suspect Components** indicates one or more magazines.

1. Identify the problem slot. Correlate the details of the failed move, as listed in the **Library Activity Panel**, with the **Suspect Components** field of the corresponding **Library Health** record.

2. Manually unlock the magazine that contains the problem (see [Remove the Cartridge Magazine with the Hex Key](#)).
If you feel any significant resistance when you try to remove the magazine, STOP and check for obstructions. Go to [Locate and Clear Obstructions, Such as Loose or Protruding Cartridges](#).
3. Set the magazine on a flat surface, be careful to not spill cartridges.
4. Locate the slot with the stuck cartridge. Grasp the cartridge by the top and bottom gripping surfaces. Gently try to free the cartridge. Do not force it.
 - **If you free the cartridge**, check the storage slot for damage or defects.
If you find any damage to the magazine, request a replacement. Go to [Get Parts and Technical Support](#), and create a service request.
If you find no damage, reseal the cartridge in its slot and make sure that it is moving freely. Reinstall the magazine in its bay and power up the library and see [Check if a Fault is Closed in the Health Log](#).
 - **If you cannot free the cartridge**, go to [Get Parts and Technical Support](#), and check for relevant knowledge articles. If you cannot find a resolution, open a service request.


Locate and Clear Obstructions, Such as Loose or Protruding Cartridges

How to resolve **Fault Code 9102-9107, 9109** or **Suspect Components** or **Recommended Action** fields indicate a robot obstruction.

1. Remove the magazine that will give you the best view of the interior of the library. If you feel any significant resistance when attempting to remove the magazine, do not force it. Instead, remove a magazine on the opposite side of the library.
2. Using the empty magazine bay as a window, look inside the library. Try to locate obstructions, particularly loose or protruding cartridges. Look across, above, and below.
3. If you cannot see any obstructions, gain additional visibility by removing additional magazines.
4. If you see a cartridge protruding from a storage slot in one of the magazines or lying on the bottom of the library, reach in through the open magazine bay and try to remove it.
5. If you cannot reach the cartridge, remove additional magazines for additional clearance.
6. If you cannot remove the problem cartridge, stop here. Go to [Get Parts and Technical Support](#), and check for relevant knowledge articles. If you cannot find a resolution, open a service request.
7. If you successfully removed the problem cartridge, remove the source magazine and check the source storage slot for defects.
8. If you find any damage to the source magazine, request a replacement. Go to [Get Parts and Technical Support](#), and open a service request.
9. Otherwise, reseal the errant cartridge in its storage cell.
10. Reinstall all removed magazines in their original bays.
11. Once you have reinserted the magazines, start the library and then see [Check if a Fault is Closed in the Health Log](#).

Save the Health Log to a File

Save the system health log when you need to work on diagnostics offline or need to open a service request.


1. From the remote interface, select **Service** in the left menu and then select the **Health Log** tab.
2. Click **Export** , and then save the file.

The HTML-based `SL150_HealthLog.xls` file is compatible with current spreadsheet applications, such as Microsoft Excel and Apache OpenOffice Calc. To view these files in web browsers, simply rename the file using the `.html` file extension in place of `.xls`.

Run a Self-Test

A self-test can help troubleshoot library issues and confirm proper installation.

Before placing a newly installed or reconfigured library into production, you should run a full self-test.

1. Before running a self-test, verify the following:
 - There is at least one diagnostic tape ("DG" label) in the mailslot or reserved system slot. The diagnostic tape should be compatible with at least one unoccupied drive.
 - The mailslot is closed and all magazines are securely latched.
 - At least one of the four slots in the standard mailslot is empty.
 - At least one slot in the library is empty.
2. From the remote interface, select **Library** in the left menu.
3. From the **Library** drop-down **Library** , select **Run Self Test**.
4. Select a test type:
 - **Basic Self Test** — a quick (6 move) test used to verify basic library function to test robot access to the corner locations of the library.
 - **Full Self Test** — a thorough test that moves a tape to every slot and to every unoccupied drive compatible with the chosen diagnostic tape. A full test can take significant time depending on the number of modules in the library, so plan accordingly.
5. Optionally, select **Set the Library back Online** to automatically bring the library online after the test (the library goes offline to perform the self test)
6. Click **OK** to start the test.

 **Note:**

If the test fails, click **Degraded** to open a health table identifying a failed or degraded component. See [Use the Health Table to Diagnose the Issue](#) more information.

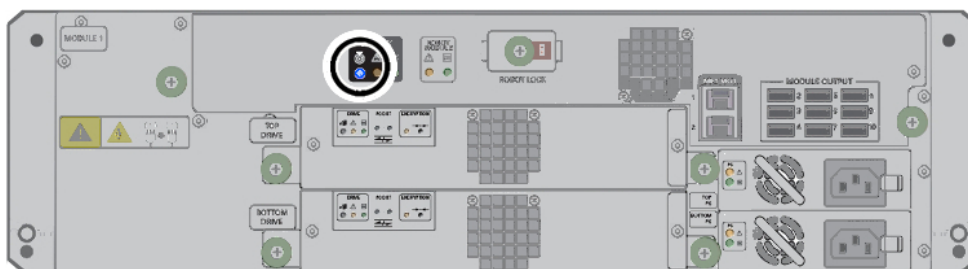
7. If you did not check the **Set the Library back Online** checkbox, remember to bring the library back online manually, once you are ready. See [Place the Library Online or Offline](#).

Restore the Factory Default Configuration

Restore the library to factory defaults settings to erase the existing configuration.

Record any important library configuration information because restoring will erase all configuration information. Only reset the configuration as a last resort.

1. This procedure requires two people. One person at the front of the library and one at the rear. A single person cannot reach both buttons simultaneously.
2. Find the locator buttons — front upper left and rear top center (see below)



3. Push and release either one of the locator buttons.
4. Once the locator buttons light, *simultaneously* push and hold both front and rear buttons for about 10 seconds until the lights rapidly flash.

Note:

After 3-4 seconds, the lighted locator buttons flash slowly. After 10 seconds, the locator buttons should start to flash rapidly.

5. When the lighted locator buttons start flashing *rapidly*, release both buttons. The library is now reset to defaults. It should power down and restart.

Note:

If either Locate button is released before the fast flash rate, the reset process terminates.

6. If the library does not power-on automatically, press the power button.



7. Run the initial installation wizard and reconfigure the library as you would when setting up a new unit (see [Configure the Library After Powering-on for the First Time](#)).

SAS-2 and SAS-3 Configuration Issues

The SAS driver for Solaris 10 (Update 8 and later) and Solaris 11 (11.1 and later) disrupts communications between Oracle Solaris and common tape backup applications.

The SAS driver only allows one device driver to attach per device (sg, sgen, st, and so forth). Users must have every component in the following list to be affected:

- Oracle Solaris 10 (Update 8 or later) or Solaris 11 (11.1 and later)
- Any SAS-2 or SAS-3 HBA
- Tape drives or libraries using a SAS-2 or SAS-3 connection
- A backup application that requires multiple SAS drivers. The most common backup applications that use multiple device drivers include:
 - CA ARCserve
 - HP Data Protector
 - IBM Tivoli Storage Manager

A SAS tape drive attached through a SAS-2 or SAS-3 HBA will work on the Solaris system using just the Solaris native commands such as `dd` or `tar`. However, this configuration is recommended for a stand-alone drive only.

If you want to use Oracle Solaris 10 (Update 8 and later) or Solaris 11 (11.1 and later) and a SAS-2 or SAS-3 HBA, you should use one of the following backup applications:

- Oracle Secure Backup (OSB): 10.4.0.2 or later
- EMC Networker: current release level with all patches applied
- Symantec NetBackup: current release level with all patches applied

Get Parts and Technical Support

Contact Oracle support when a library issue cannot be resolved.

- [Check for Relevant Knowledge Articles](#)
- [Get Firmware Updates](#)
- [Create a Service Request](#)

Check for Relevant Knowledge Articles

Knowledge articles provide information on how to resolve or prevent issues.

1. Log in to My Oracle Support at <https://support.oracle.com>.
2. Select the **Knowledge** tab.
3. In the **Knowledge Base** area, select the **Search & Browse** tab.
4. In the **Select a product or product line field**, enter **StorageTek SL150 Modular Tape Library**.
5. In the **Go directly to the best match** area, click the **Information Center: StorageTek SL150 ...** link.
6. In the Information Center document, select the **Resources** tab, and browse the links on the page.

Get Firmware Updates

Updating library and drive firmware may resolve some issues.

See [Update Firmware](#).

Create a Service Request

Open a service request to receive help from Oracle support.

1. Save a library health log (see "[Save the Health Log to a File](#)").
2. Log in to My Oracle Support at <https://support.oracle.com>.
3. Select the **Service Requests** tab.
4. Click the **Help** control in the upper right corner of the Oracle support page.
5. From the **Help** drop-down menu, select **How do I create a new SR?**
6. Follow the instructions provided.

Run a Self-Test

A self-test can help troubleshoot library issues and confirm proper installation.

Before placing a newly installed or reconfigured library into production, you should run a full self-test.

1. Before running a self-test, verify the following:
 - There is at least one diagnostic tape ("DG" label) in the mailslot or reserved system slot. The diagnostic tape should be compatible with at least one unoccupied drive.
 - The mailslot is closed and all magazines are securely latched.
 - At least one of the four slots in the standard mailslot is empty.
 - At least one slot in the library is empty.
2. From the remote interface, select **Library** in the left menu.

3. From the **Library** drop-down **Library** ▾, select **Run Self Test**.
4. Select a test type:
 - **Basic Self Test** — a quick (6 move) test used to verify basic library function to test robot access to the corner locations of the library.
 - **Full Self Test** — a thorough test that moves a tape to every slot and to every unoccupied drive compatible with the chosen diagnostic tape. A full test can take significant time depending on the number of modules in the library, so plan accordingly.
5. Optionally, select **Set the Library back Online** to automatically bring the library online after the test (the library goes offline to perform the self test)
6. Click **OK** to start the test.

 **Note:**

If the test fails, click **Degraded** to open a health table identifying a failed or degraded component. See [Use the Health Table to Diagnose the Issue](#) more information.

7. If you did not check the **Set the Library back Online** checkbox, remember to bring the library back online manually, once you are ready. See [Place the Library Online or Offline](#).

10

Replace Components (CRUs & FRUs)

Some library issues may require you to replace library components. Only replace a single component at a time.

Caution:

The Robot Module, front control panel, and Base Module chassis are critical to maintaining the product serial number and customer settings. *Only replace one unique device during a single power-down cycle.*

This section assumes you have isolated the issue and have replacement parts on hand. If you have not determined the problem, see [Troubleshoot the Library](#).

- [CRU Locations](#)
- [Drive Tray Removal and Replacement](#)
- [Power Supply Removal and Replacement](#)
- [Front Control Panel Removal and Replacement](#)
- [Module Controller Removal and Replacement](#)
- [Robot Module Removal and Replacement](#)
- [Expansion Module Chassis Removal and Replacement \(FRU\)](#)
- [Base Module Chassis Removal and Replacement \(FRU\)](#)
- [Validate the Component Installation](#)
- [Return CRU Components to Oracle](#)
- [Lock the Robot for Shipment within a Rack](#)

CRU Locations

CRUs include the front control panel, drive tray, robot module, module controller, and power supply.

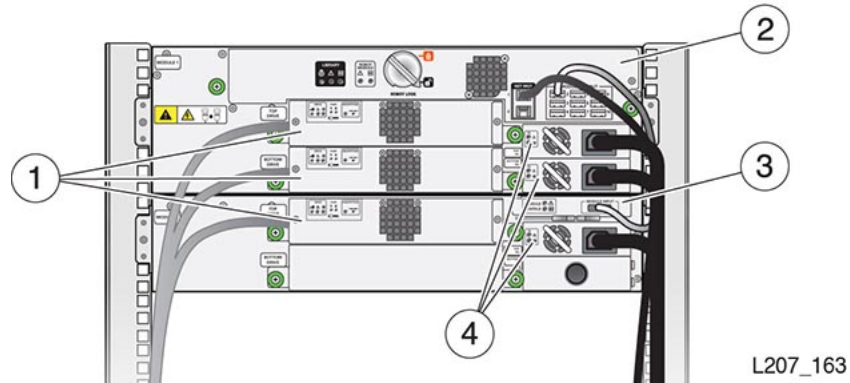


Illustration Legend:

- 1 - Tape Drive Tray
- 2 - Robot (in the Base Module)
- 3 - Module Controller (in the Expansion Module)
- 4 - Power Supply

Drive Tray Removal and Replacement

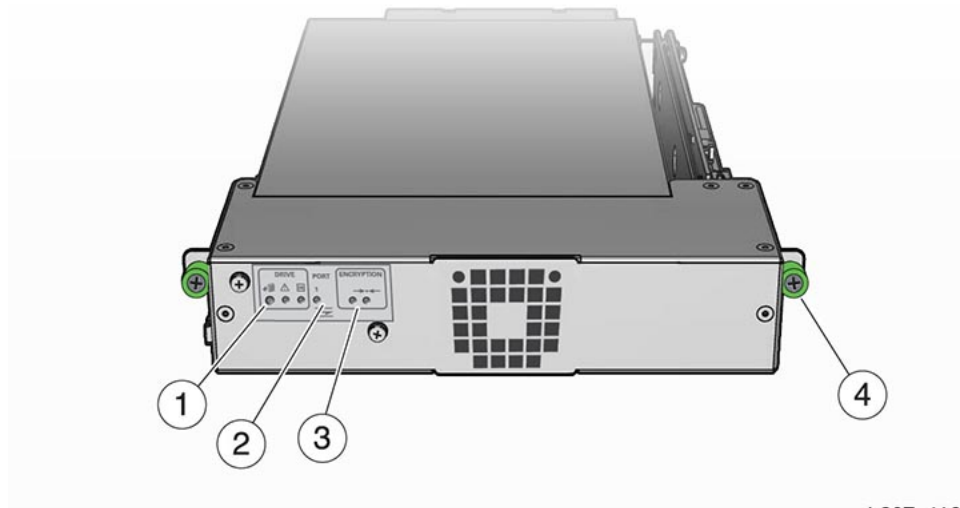
The drive tray is a CRU that can be removed and replaced while the library is online.

⚠ WARNING:

Do not operate the library with an open and empty power supply or tape drive slot. Always have a cover in place.

- [Remove the Drive Tray](#)
- [Replace the Drive Tray](#)
- [Remove the Drive Slot Cover](#)
- [Install the Drive Slot Cover](#)

Figure 10-1 Tape Drive Tray CRU (HP LTO-5)



L207_116

Illustration Legend:

- 1 - Drive Indicators
- 2 - Port Indicator (HP SAS and HP LTO-6 FC Drives)
- 3 - Encryption Indicator and IP Reset Switch (HP drives only)
- 4 - Thumbscrew (Drive Tray has Two Thumbscrews)

Remove the Drive Tray

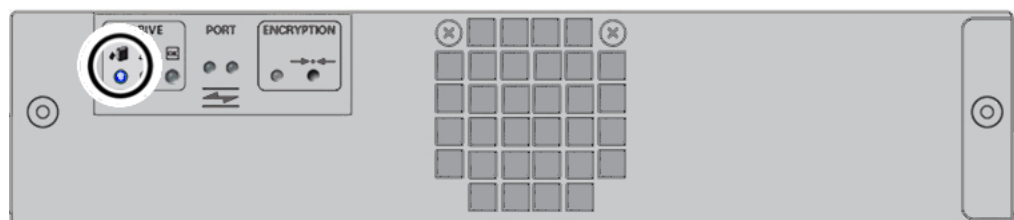
Remove a drive tray for replacement or relocation.



Note:

Removing a bridged drive disconnects the host from the library.

1. In the remote interface, select **Library** in the left menu. Right-click on the drive, and then select **Remove Drive**.
2. At the back of the library, locate the drive tray with the blue LED indicator (upper left corner).



3. Label and then disconnect the cables from the drive tray.
4. Loosen the two green thumbscrews on the drive tray. Grasp the drive tray, pull it out of the slot, and set it on a work surface.

Replace the Drive Tray

Replacing the drive tray involves unpacking the new tray, installing the tray, and verify the library recognizes the tray.

- [Remove New Drive Tray from Package](#)
- [Replace the Drive Tray](#)
- [Verify the Library Recognized the New Drive Tray](#)

Remove New Drive Tray from Package

Remove the drive tray with care to ensure you do not damage the tray.

Caution:

Equipment damage. Do not touch the circuit card or static sensitive components. Follow accepted practices to prevent damage from ESD.

1. Handle the drive tray by the rear corners (near the thumbscrews) and the bottom of the tray. Avoid contact with the top cover of the tape drive.
2. Remove the replacement drive tray from the shipping carton. Save the packaging materials to return the failed CRU.

Replace the Drive Tray

Slide the new tray into the drive slot and reconnect the cables.

1. Grasp the rear corners of the drive tray and guide it into the drive slot. Push the drive tray completely into the drive slot.
2. Verify that the indicators are active on the rear of the drive tray.
3. Tighten the thumbscrews. Ensure there is no tray movement in any direction.
4. Connect the interface cable(s) and Ethernet cable (if applicable) on the left side of the drive tray.

Verify the Library Recognized the New Drive Tray

The library interface must display the drive within the Drives table for the library to use it.

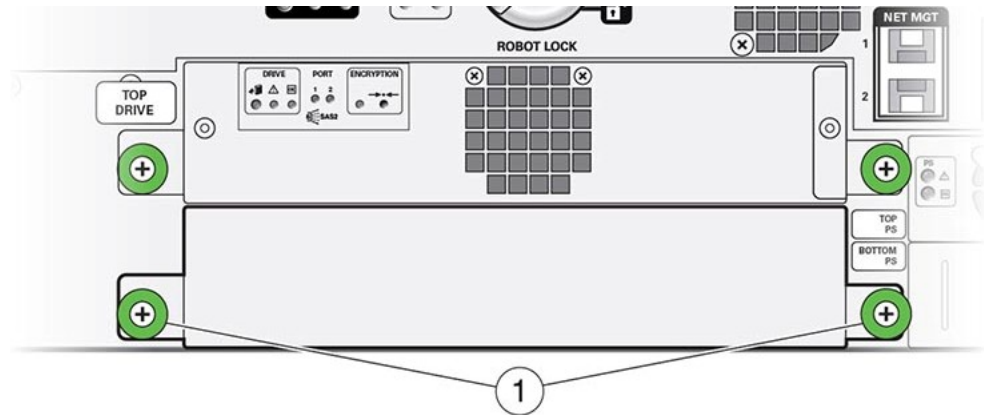
1. Confirm that the library recognizes the drive. The drive should appear in the Drives table. See [View Drive Information](#). It can take some time for the indicators to show the drive is operational.
2. Make sure the drive port is enabled. See [Enable or Disable Drive Ports](#).

3. Identify the tape drive firmware version and upgrade if necessary. See [Update Firmware](#).

Install the Drive Slot Cover

A drive filler covers an empty drive tray slot.

1. Position the tape drive cover with the spring fingers facing up.
2. Grasp the captive screws and guide the cover into the tape drive slot.
3. Tighten both thumbscrews.



L207_162

Power Supply Removal and Replacement

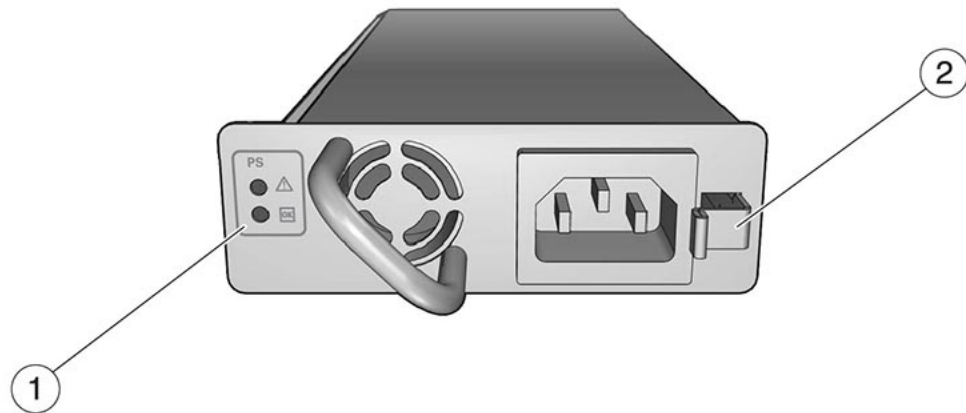
The power supply is a CRU that can easily be removed and replaced.

⚠ WARNING:

Do not operate the library with an open and empty power supply or tape drive slot. Always have a cover in place.

- [Remove the Power Supply](#)
- [Replace the Power Supply](#)
- [Remove the Power Supply Slot Cover](#)
- [Install a Power Supply Slot Cover](#)

Figure 10-2 Power Supply CRU



L207_115

Illustration Legend:

- 1 - Power Supply Indicators**
- 2 - Power Supply Latch**

Remove the Power Supply

The power supply resides in a slot in the Base Module or Expansion Module.

1. If the library only has one power supply, power off the library before proceeding (see [Power Off the Library](#)).
2. Disconnect the power cord from the defective power supply.
3. Press the latch towards the left (toward the fan) to release the power supply.
4. Grasp the power supply by the handle, pull it out of the library, and set it aside.

Replace the Power Supply

The power supply resides in a slot in the Base Module or Expansion Module.

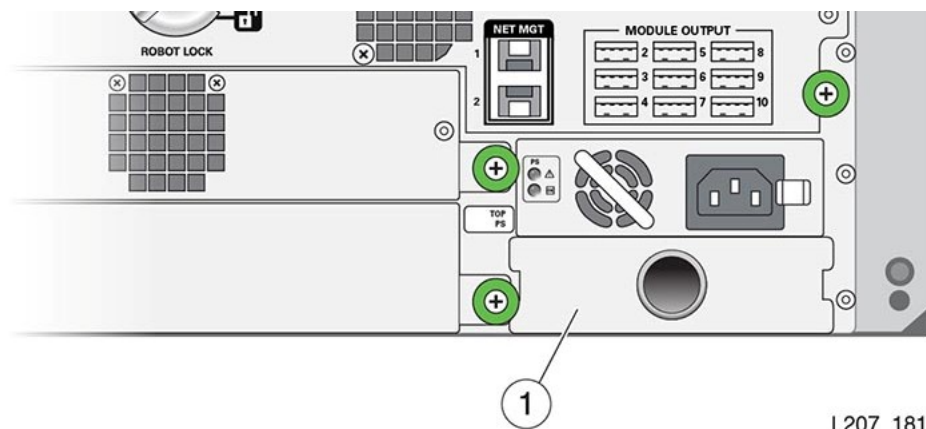
1. Remove the power supply filler, if necessary (see [Remove the Power Supply Slot Cover](#)).
2. Remove the power supply from the shipping carton.
3. Grasp the supply by the handle and support the bottom with your other hand.
4. Orient the power supply as shown in [Figure 10-2](#) (oriented with LEDs on left).
5. Align the rear of the supply with the module slot. Push the supply fully into the module slot. Make sure the power supply is secured in the module slot.
6. Connect the power cord to the power supply receptacle.

7. Verify that the **OK** indicator is active on the power supply. If not, continue to [Validate the Component Installation](#).

Install a Power Supply Slot Cover

The filler covers an empty power supply slot.

1. Position the cover with the spring fingers facing up.
2. Insert the tabs on the right side of the cover into the power supply slot until the notch is near the module frame.
3. Seat the cover notch against the module frame edge.
4. Push the left side of the cover into the power supply slot.



Front Control Panel Removal and Replacement

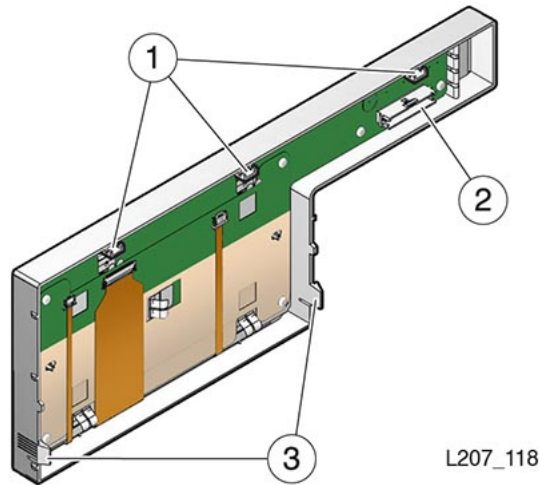
The front control panel is a CRU located at the front of the Base Module.

- [Remove the Front Control Panel](#)
- [Replace the Front Control Panel](#)

▲ Caution:

The front control panel maintains the product serial number and customer settings. *After installing the panel, you must power-cycle the library before installing any other component.*

Figure 10-3 Rear View of the Front Control Panel



L207_118

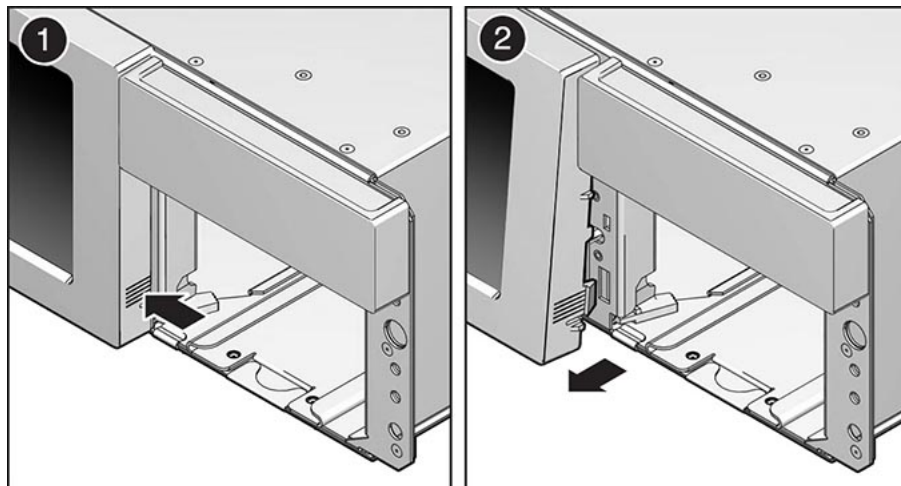
Illustration Legend:

- 1 - Tabs**
- 2 - Jack**
- 3 - Latches**

Remove the Front Control Panel

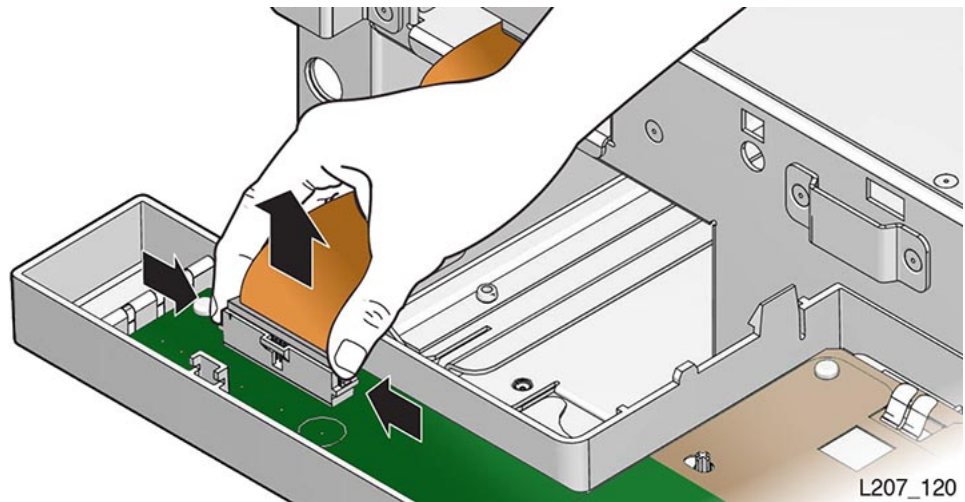
The front control panel latches into the front of the Base Module. Use care when removing the panel.

1. Power down the library (see [Power Off the Library](#)).
2. Remove both cartridge magazines from the Base Module (see [Unlock and Remove the Magazines](#)).
3. Press the latch inside *each* magazine bay inner wall and pull the bottom edge of the panel away from the module until the panel unlatches (see image below).



L207_119

4. Free the tabs on the top edge of the panel from the module.
5. Rotate the top edge of the panel away from the top of the module about 90 degrees and hold the panel in this position with one hand.
6. Disconnect the ribbon cable plug from the jack located on the circuit card.



7. Set the panel CRU on the anti-static mat.

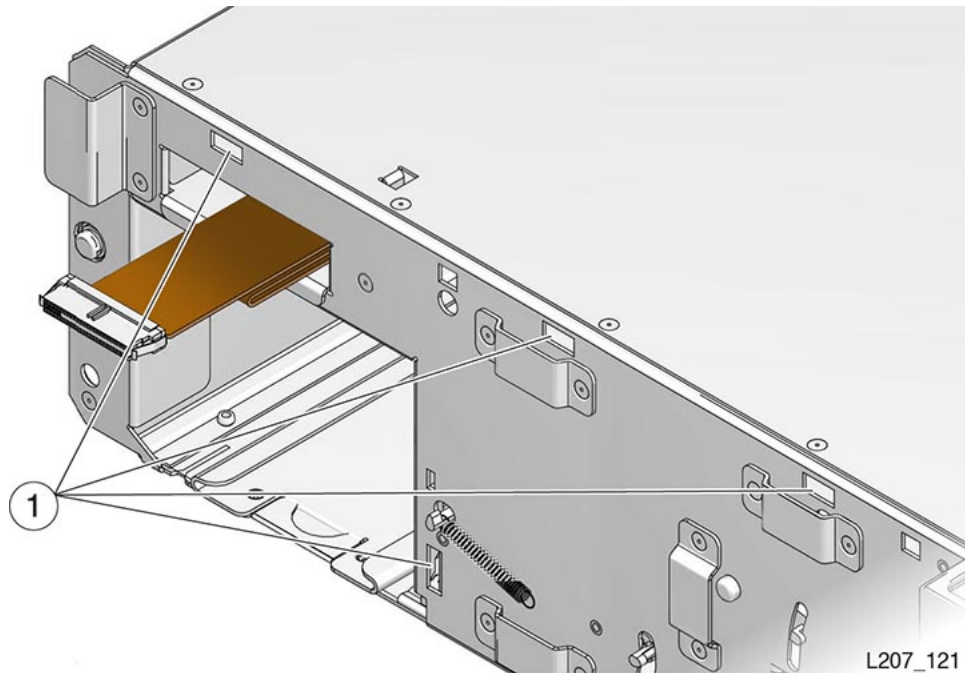
Replace the Front Control Panel

The control panel connects to a cable and latches into the front of the Base Module.

▲ Caution:

ESD damage. Do not touch any exposed electronic components, cables, or contacts.

1. Remove the replacement front control panel from its packaging.
2. Grasp the panel by the plastic housing and raise it to the Base Module.
3. Attach the cable to the circuit card jack at the back of the panel. Make sure the connector is flush with the jack.
4. Insert the tabs on the top edge of the panel into the Base Module slots (see image below for slot locations).



5. Rotate the front control panel down and press the bottom edge into the Base Module slots. The panel snaps in place.
6. Replace both cartridge magazines. Lock the magazines and audit the library (see "[Lock the Magazines and Audit the Library](#)").
7. Power-cycle the library. Follow the power on procedures (see "[Validate the Component Installation](#)").

Module Controller Removal and Replacement

The Module Controller is a CRU located in the upper right rear of the Expansion Module.

The Module Controller obtains power from the expansion cable connected to a Module Output port on the Base Module.

- [Remove the Module Controller](#)
- [Replace the Module Controller](#)

Remove the Module Controller

The Module Controller latches into the upper-right rear of the Expansion Module.

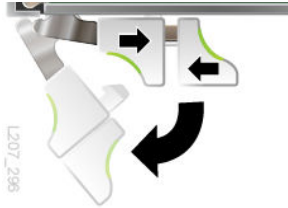


Note:

Be aware of ESD (see [Electrostatic Discharge](#)).

1. Locate the Module Controller (see [CRU Locations](#)).
2. Power down the library (see [Power Off the Library](#)).

3. Disconnect the expansion cable plug from the *input* port on the Module Controller.
4. Disconnect the expansion cable plug from the *output* port on the Module Controller of a library with a tape capacity of greater than 300 tapes. This action applies to Module 6 through Module 10.
5. Pinch the latch tabs and pull the latch towards you.



6. Pull the controller card out of the module slot.
7. Set the Module Controller on the anti-static work surface.

Replace the Module Controller

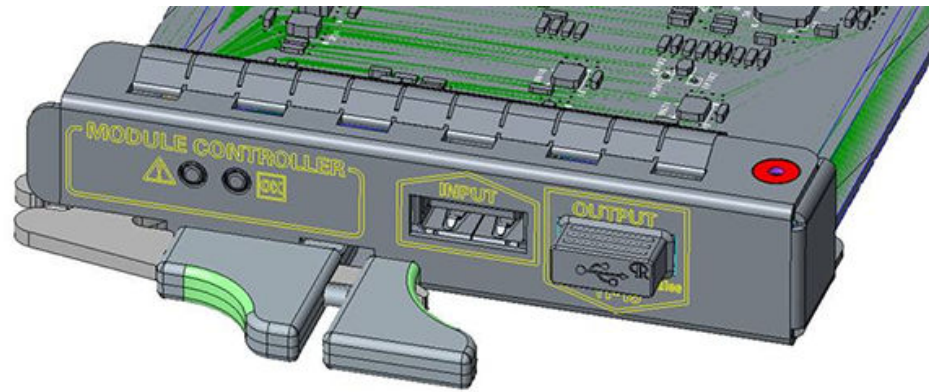
The Module Controller latches in to the upper-right rear of the Expansion Module.

▲ Caution:

ESD damage. Do not touch any electronic components or electrical contacts.

1. Remove the replacement module controller from the ESD packaging.
2. Grasp the Module Controller without touching components or electrical contacts, and open the retaining latch.
3. Insert the Module Controller, component side up, into the module slot.
4. Seat the latch in the slot to secure the Module Controller.
5. Connect the expansion cable *input* plug to the Module Controller input port.
6. Connect the expansion cable *output* plug to the Module Controller output port. This applies to libraries with tape capacity greater than 300 tapes (Module 6 through Module 10). You must remove the dust cover from the output port.

For cabling, see [Cable the Expansion Modules](#).



7. Insert the failed Module Controller into the ESD packaging.
8. Follow the power on procedures (see [Validate the Component Installation](#)).

Robot Module Removal and Replacement

The Robot Module is a CRU located at the top of the Base Module.

The robot *must be parked* in the Base Module with the robot lock engaged and the thumbscrews loosened before attempting to remove the Robot Module.

- [Remove the Robot Module](#)
- [Manually Retract the Robot](#)
- [Manually Disengage the Robot](#)
- [Replace the Robot Module](#)

▲ Caution:

The Robot Module, front control panel, and Base Module chassis are critical to maintaining the product serial number and customer settings. *Only replace one unique device during a single power-down cycle.*

Remove the Robot Module

You must park and latch the robot before attempting to remove the Robot Module.

- [Park and Lock the Robot](#)
- [Slide Robot CRU Out of Base Module](#)

Park and Lock the Robot

Parks the robot at the top of the Base Module, where you can lock it into place.

1. Power down the library with the “to prepare the robot for removal” option enabled. See [Controlled Power-Down from the Interface](#).

If the robot cannot be parked by using the power-down procedure, perform the manual robot extraction procedure. See [Manually Retract the Robot](#).

2. Remove the top drive tray or drive filler from the Base Module. See [Remove the Drive Slot Cover](#) or [Remove the Drive Tray](#).
3. Look through the drive slot and locate the position of the robot.
4. Verify the robot is fully seated against the ceiling of the library.
Repeat the parking procedure if necessary to make sure the robot is secured in the proper position.
5. [Lock the Robot](#).
6. Replace the top drive or drive filler in the Base Module.

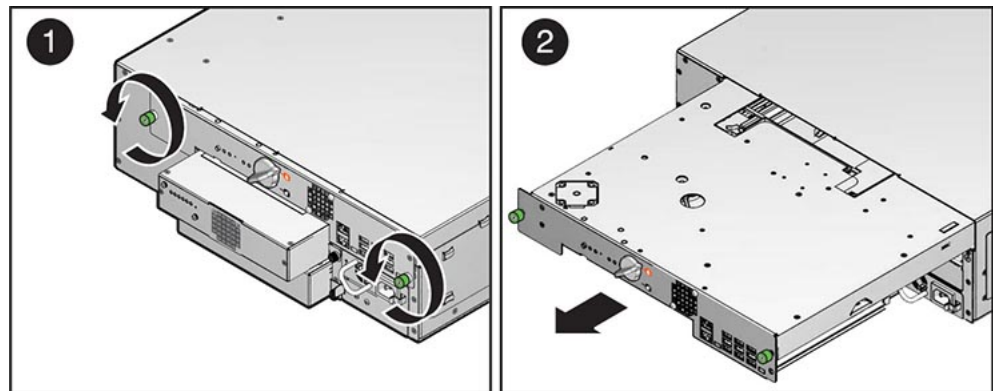
Slide Robot CRU Out of Base Module

The Robot Module slides out of the top-rear of the Base Module.

 **Note:**

The robot CRU weighs approximately 5 kg (11 pounds).

1. Label the cables connected to the robot CRU as necessary.
2. Disconnect all cables attached to the robot CRU.
3. Loosen the robot module thumbscrews.



L207_161

4. Grasp the robot module thumbscrews and pull the robot approximately 25cm (10 inches) out of the Base Module.
5. Reposition your hands near the center of the extended robot.
6. Pull the robot completely out of the Base Module, and set it on the anti-static work surface.
7. Proceed to [Replace the Robot Module](#).

Manually Retract the Robot

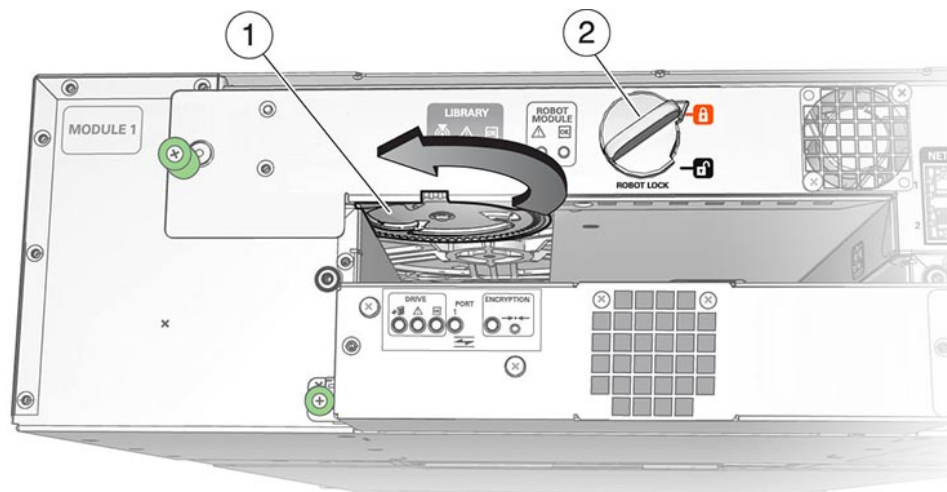
Manually retract the robot when you cannot park the robot by using the power-down procedure.

1. Always attempt to have the library park the robot before attempting this procedure (see [Park and Lock the Robot](#)).
2. Remove the top drive tray from the Base Module (see [Drive Tray Removal and Replacement](#)).
3. Locate the bullwheel gear inside the library and above the top drive slot (see image below).
4. Look through the drive slot and locate the position of the robot.
5. Turn the gear with your thumb to raise the robot, hold the gear in position with a finger, reposition your thumb, and turn the gear. Repeat as necessary until the robot is at the top of the Base Module.

If the robot does not retract, disengage it (see [Manually Disengage the Robot](#)).

6. Hold the bullwheel gear with the robot fully raised until you lock the robot.
7. Return to Step 5 of [Park and Lock the Robot](#) and continue through the last step of robot removal (see [Slide Robot CRU Out of Base Module](#)).

Figure 10-4 Bullwheel Gear and Robot Lock



L207_160

Illustration Legend:

- 1 - Bullwheel Gear
- 2 - Robot Lock (Improved Design)

Manually Disengage the Robot

Manually disengage the robot when you cannot get the robot to retract by other methods. Use this as a last resort.

▲ Caution:

Perform this procedure *only* if either the library power down (Step 1 of [Park and Lock the Robot](#)) or [Manually Retract the Robot](#) does not work. This procedure *damages* the robot assembly.

- [Cut the Robot Cables](#)
- [Manually Remove the Robot CRU](#)
- [Manually Remove the Z Platform](#)
- [Clean Up After Manually Removing the Robot](#)

Cut the Robot Cables

To manually remove the robot, you must cut the cables to the robot to allow the Z-platform to move.

1. Make sure the library is powered down.
2. Remove all tape drives from the Base Module.
3. Cut the accordion cable (folded ribbon cable).
4. Reach into the library and cut both rear suspension cables.
5. Cut the front suspension cables. The Z platform should settle to the floor of the bottom module.

Manually Remove the Robot CRU

With the cables cut, you can manually remove the Robot Module.

1. Loosen the robot module thumbscrews.
2. Grasp the robot module thumbscrews and pull the robot approximately 25cm (10 inches) out of the Base Module.
3. Reposition your hands along the sides of the extended robot and close to the Base Module.
4. Pull the robot completely out of the Base Module, and set it aside.

Manually Remove the Z Platform

With the cables cut, the Z platform of the robot will be at the bottom of the library. You must raise it and slide it out of the Robot CRU opening.

1. Remove the cartridge magazines from the Base Module.
2. Remove cartridge magazines from Expansion Modules until you locate the Z platform.

 **Note:**

You can also perform this procedure at the rear of the library by removing the tape drives or drive fillers from the modules, and reaching through the drive openings.

3. Grasp the platform by reaching through either the magazine or tape drive openings.
4. Raise the platform by hand to the top of the Base Module.
5. Push the platform through the robot CRU opening at the rear of the Base Module far enough so that it does not slip back inside the library.
6. Go to the back of the library, grasp the robot CRU, and remove it from the library.

Clean Up After Manually Removing the Robot

Verify no components are left within the library and that you replace all magazines.

1. Inspect the library floor and remove any debris resulting from the broken robot.
2. Replace all cartridge magazines and tape drives removed during this procedure.
3. Follow the replace robot procedures. See [Replace the Robot Module](#).

Replace the Robot Module

The Robot Module slides into the rear of the Base Module.

- [Reinsert the Robot CRU and Unlock the Robot](#)
- [Reconnect Cabling to the Base](#)

Reinsert the Robot CRU and Unlock the Robot

The Robot Module slides into the rear of the Base Module. The robot must be unlocked before use.

1. Remove the replacement robot from its shipping carton, and set it on the anti-static mat. Save the packaging materials for the return of the failed CRU.
2. Grasp the robot near the center with the thumbscrews facing you.
3. Insert the robot into the Base Module.
4. Push the robot fully into the module.
5. Tighten the thumbscrews on each side of the robot CRU.
6. [Unlock the Robot](#).

Reconnect Cabling to the Base

Reconnect the cabling to the Base Module.

1. Plug the expansion cable for Module 2 through Module 10 into the appropriate Base Module connector . See [Cable the Expansion Modules](#).

For example, connect the *output* plug of the expansion cable to Port 2 on the robot CRU and the *input* plug of the cable to the Module 2 controller input port.

 **Note:**

The initial design of the expansion cable did not have plug labels.

2. Plug the Ethernet cables into the appropriate Net Mgt ports.
3. Follow the power on procedures . See [Validate the Component Installation](#).

Related Topics

- [Cable the Library](#)
Connects cables to the Base and Expansion Modules, drives, power, and network ports.

Expansion Module Chassis Removal and Replacement (FRU)

The entire Expansion Module is a FRU that can be removed and replace by Oracle service.

The Expansion Module is a field-replaceable unit (FRU) and must be serviced by an Oracle service person. Customers should not replace the Expansion Module.

You *must* transfer cartridge magazines, tape drives, tape drive fillers, power supplies, power supply fillers, and the module controller from the failed module to the FRU, as applicable. You might need to remove operational modules to access the defective one.

- [Remove an Expansion Module](#)
- [Replace the Expansion FRU Chassis](#)

Figure 10-5 Expansion Module FRU

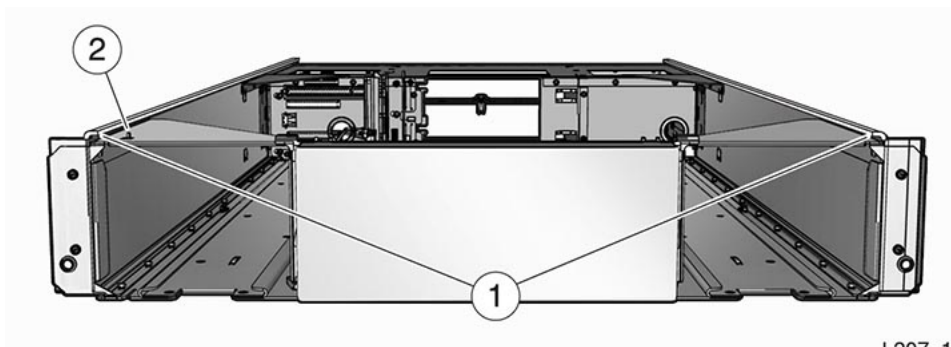


Illustration Legend:

- 1 - Flange
- 2 - Tab

Remove an Expansion Module

Removal of the Expansion Module is complicated and must be performed by an Oracle Service representative.

- [Power Down, Lock the Robot, and Remove Magazines](#)
- [Remove the Floor, Cables, and Cords](#)
- [Remove Operational Expansion Modules Below the Defective Module](#)
- [Remove Components from the Defective Module](#)

Power Down, Lock the Robot, and Remove Magazines

You must park and lock the robot before attempting to remove an Expansion Module.

1. Power down the library with the option enabled to prepare the robot for removal. See [Controlled Power-Down from the Interface](#).
2. [Park and Lock the Robot](#).
3. Remove the magazines from the defective module. Remove the magazines from all modules below it, and remove the magazines from the module directly above it. See [Remove the Cartridge Magazine with the Hex Key](#).

Remove the Floor, Cables, and Cords

Remove the library floor and any cables or cords connected to the failed module or any module below it.

1. Grasp the library floor at the thumb-holds within the magazine openings.
2. Pull the floor out from the front of the bottom module.

 **Note:**

If the floor does not move, reach through the magazine opening and push down on the floor behind the touch screen panel to unseat the floor locks. Pull the floor forward with your other hand.

3. Disconnect the expansion cable plug(s) from the port(s) at each affected Expansion Module controller. Module 6 through Module 10 could have both ports connected.

 **Note:**

The original design of the expansion controller had a single port only.

4. Open the hook and loop strap, extract all cables and cords, then remove the hook and loop strap (open the plunger on the plastic rivet).
5. Disconnect the power supply cord.

6. Disconnect the drive interface and Ethernet cables, as applicable.

Remove Operational Expansion Modules Below the Defective Module

To access the defective module, you must remove all modules below it.

1. Remove tape drives and power supplies to lighten the weight of the Expansion Module.
See [Remove the Drive Tray](#) and [Remove the Power Supply](#).
2. Remove the Phillips screws securing the Expansion Module to the front of the rack.
3. Grasp the module, pull it forward until the break in the flange is visible, lower the front of the module, pull it free from the module above it, and away from the rack.
4. Set the module down and away from the front of the rack.
5. Remove the Phillips screws and rear rails from the module. Leave the clip nut in place.
See [Figure 10-6](#).
6. Repeat until you have removed the all modules below the defective module.

Figure 10-6 Module Rear Rail Removal

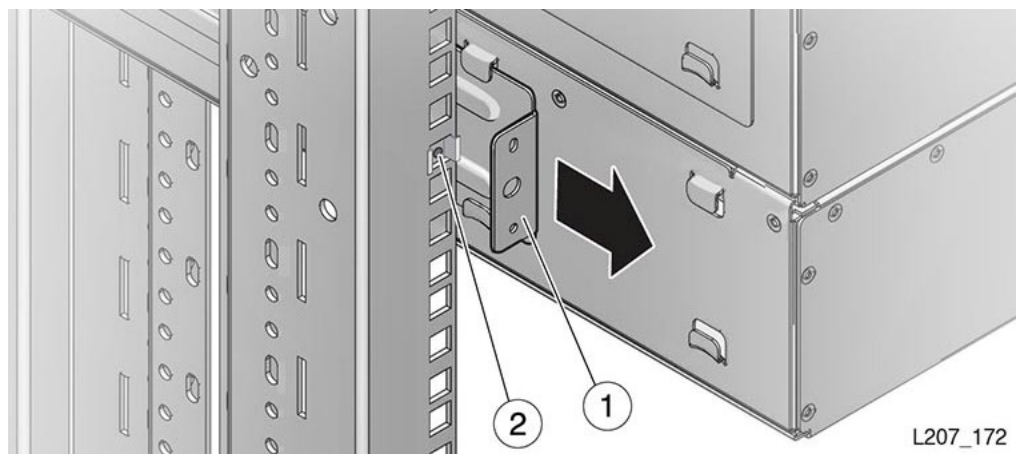


Illustration Legend:

- 1 - Rear Rail
- 2 - Clip Nut

Remove Components from the Defective Module

Save functional components to be reused in the replacement module.

1. Remove the functional components as applicable:
 - [Remove the Drive Tray](#)
 - [Remove the Drive Slot Cover](#)
 - [Remove the Power Supply](#)
 - [Remove the Power Supply Slot Cover](#)

- [Remove the Module Controller](#)
2. Remove the failed Expansion Module.

Replace the Expansion FRU Chassis

Replacing the Expansion Module is very similar to installing a new Expansion Module.

- [Install the Expansion Module Chassis](#)
- [Install CRUs, Fillers, and Magazines in Replaced Module](#)
- [Install the Remaining Expansion Modules](#)
- [Cable the Library and Power On After Installing the Expansion Module](#)

Install the Expansion Module Chassis

Install the Expansion Module in the rack below an existing module.

1. Grasp the Expansion Module chassis by the sides and remove it from the shipping carton.
2. Remove the magazines from the Expansion Module.
See [Prepare the Expansion Module by Removing the Cartridge Magazines](#).
3. If this will be the bottom module of the library, install the library floor now.
See [Install the Floor in the Bottom Expansion Module](#).
4. Mount the module.
See [Mount the Expansion Module](#).
5. Install the rails.
See [Install the Rear Rails for the Expansion Module](#).
6. Secure the module.
See [Secure the Expansion Module to the Rack Front](#)

Install CRUs, Fillers, and Magazines in Replaced Module

Reinstall the functional components removed from the defective Expansion Module.

1. Install the module controller.
See [Replace the Module Controller](#).

Tip:

When the library capacity is more than 300 cartridges, you will not connect the output port for Module 6 through Module 10 now. You connect the port when installing Module 11 through Module 15.

2. Install the tape drive assembly.
See [Replace the Drive Tray](#).
3. Install the tape drive filler.

See [Install the Drive Slot Cover](#).

4. Install the power supply.
See [Replace the Power Supply](#).
5. Install the power supply filler.
See [Install a Power Supply Slot Cover](#).
6. Insert the cartridge magazines.
See [Replace the Cartridge Magazines](#).

Install the Remaining Expansion Modules

Replace modules below the new Expansion Module.

1. Locate the next Expansion Module for installation (refer to the module number label on the back of the module).
2. Repeat the installation tasks until all Expansion Modules and CRUs are installed.
See [Install the Expansion Module Chassis](#).
See [Install CRUs, Fillers, and Magazines in Replaced Module](#).
3. Make sure you have installed the floor in the bottom module.
See [Install the Floor in the Bottom Expansion Module](#).

Cable the Library and Power On After Installing the Expansion Module

After installing the module, you must reconnect cabling and power on the library.

1. Reconnect all cables.
See [Cable the Library](#).
2. Secure the hook and loop strap to the replaced Expansion Module (close the plunger of the rivet).
3. Align, dress, and secure cables in the hook and loop straps.
4. Follow the power on procedures.
See [Validate the Component Installation](#).

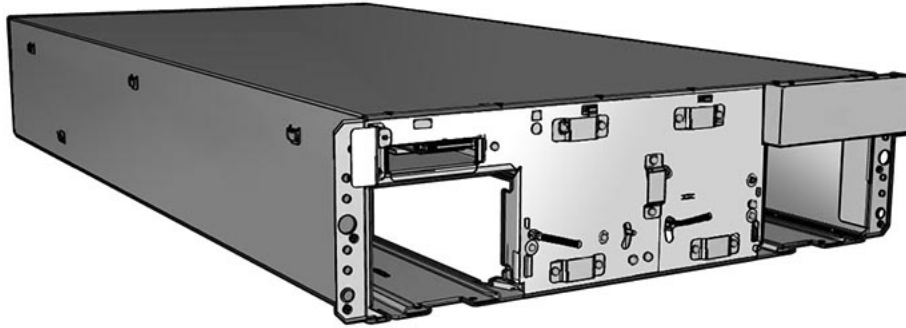
Base Module Chassis Removal and Replacement (FRU)

The entire Base Module can be removed and replaced by Oracle service.

The Base Module is a field-replaceable unit (FRU) and must be serviced by an Oracle service person. Customers should not attempt to replace the Base Module. You must transfer the cartridge magazines, front control panel, tape drive(s), tape drive filler, power supply, power supply filler, and the robot from the defective Base Module to the new FRU.

- [Remove the Base Module Chassis](#)
- [Replace the Base Module Chassis](#)

Figure 10-7 Base Module FRU



L207_126

▲ Caution:

The Robot Module, front control panel, and Base Module chassis are critical to maintaining the product serial number and customer settings. *Only replace one unique device during a single power-down cycle.*

If the library has Expansion Modules, remove all of the Expansion Modules to access the defective Base Module.

Remove the Base Module Chassis

Removal of the Base Module is complicated and must be performed by an Oracle Service representative.

- [Lock the Robot and Remove Expansion Modules](#)
- [Remove Base Chassis and Parts for Reuse](#)

Lock the Robot and Remove Expansion Modules

Before removing the Base Module, the robot must be parked and locked. All Expansion Modules below the Base must be removed.

Removing and replacing the Base Module can only be performed by an Oracle Service representative.

1. [Park and Lock the Robot.](#)
2. Remove all modules below the Base Module.
See [Remove an Expansion Module.](#)

Remove Base Chassis and Parts for Reuse

Remove functional components for reuse before removing the Base Module chassis.

1. Remove the following applicable parts from the Base Module:

- [Unlock and Remove the Magazines](#)
 - [Remove the Drive Tray](#)
 - [Remove the Drive Slot Cover](#)
 - [Remove the Power Supply](#)
 - [Remove the Power Supply Slot Cover](#)
 - [Remove the Front Control Panel](#)
 - [Remove the Robot Module](#)
2. Remove the screws securing the Base Module to the front of the rack.
 3. Extract the module from the rack.

Replace the Base Module Chassis

Replacing the Base Module is very similar to installing a new Base Module.

- [Install the Base Module into the Rack](#)
- [Install the Base Module CRUs and Expansion Modules](#)
- [Reinstall Magazines and Dress the Cables](#)

Install the Base Module into the Rack

The Base Module mounts into a standard 19-in rack.

1. Grasp the Base Module chassis by the sides and remove it from the shipping carton.
2. If there are no Expansion Modules for this library, install the floor in the Base Module.
See [Install the Floor in the Bottom Expansion Module](#).
3. [Mount the Base Module](#).

Install the Base Module CRUs and Expansion Modules

Reinstall the function components removed from the defective Base Module and install any Expansion Module.

1. Reinstall the Base Module components.
 - [Replace the Robot Module](#)
 - [Replace the Drive Tray](#)
 - [Install the Drive Slot Cover](#)
 - [Replace the Power Supply](#)
 - [Install a Power Supply Slot Cover](#)
 - [Replace the Front Control Panel](#)
2. Reinstall the Expansion Modules. See [Replace the Expansion FRU Chassis](#). Make sure to install the floor in the bottom module.
3. Re-cable the Expansion Modules. Connect the specific Base Module port to the controller card port of the associated Expansion Module. See [Cable the Expansion Modules](#) for details.

Reinstall Magazines and Dress the Cables

Reinstall the cartridge magazines into all modules and dress any cabling.

1. Install cartridge magazines in all modules.
See [Replace the Cartridge Magazines](#).
2. Align and dress the cables. Secure the cables in the hook and loop straps, if applicable.

Figure 10-8 Cable Attachment

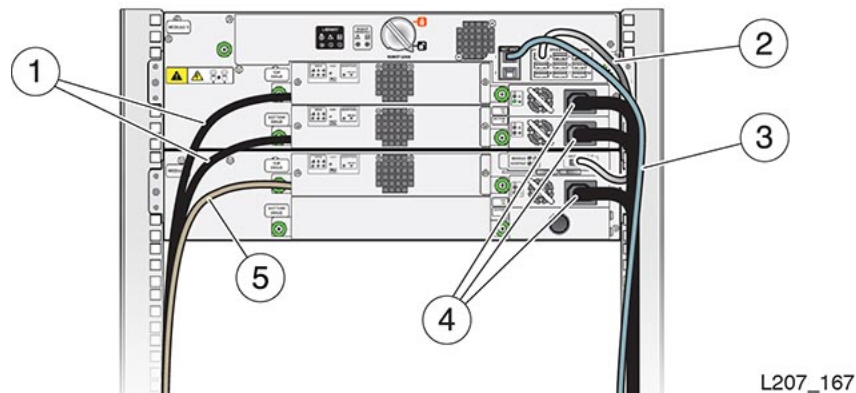


Illustration Legend:

- 1 - Tape Drive With Fibre Channel Cable
- 2 - Expansion Module Cable
- 3 - Ethernet Cable
- 4 - Power Supply Cord
- 5 - Tape Drive With SAS Cable

3. Connect the power cord to each installed power supply.
4. Follow the power on procedures.
See [Validate the Component Installation](#).

Validate the Component Installation

Verify the CRU or FRU was properly installed and that the library is fully functional.

1. Power on the library (see [Power On the Library](#)).
2. Check the **OK** LED indicators on all CRUs.
3. Verify that the library health state is *operational* from either the touch screen or the remote interface (see [View the Library State](#)).

If the health state is degraded or failed, see [Troubleshoot the Library](#) to assist with resolving the problem.

4. Perform an operational check of replaced CRUs, as applicable:
 - Front Panel — Test the panel for general operation (locate light, touch screen, open the mailslot, and so forth).
 - Module Controller — Confirm that the library recognizes the module controller (Modules area of the touch screen or Library area of the SL150 remote interface).
5. Run the offline self tests from the remote interface (see [Run a Self-Test](#)).
6. Set the library to the online state (see [Place the Library Online or Offline](#)) and log out of the remote interface.
7. Run host application commands to ensure that the library and drive applications are synchronized. See your host tape application documentation for guidance.

Return CRU Components to Oracle

Return the robot and tape drive tray CRUs to Oracle.

Instructions on how to return a CRU should have been provided with the CRU.

Dispose of all other CRUs or recycle them, as appropriate.

Lock the Robot for Shipment within a Rack

Lock the robot into place when shipping the library installed in the rack.



Caution:

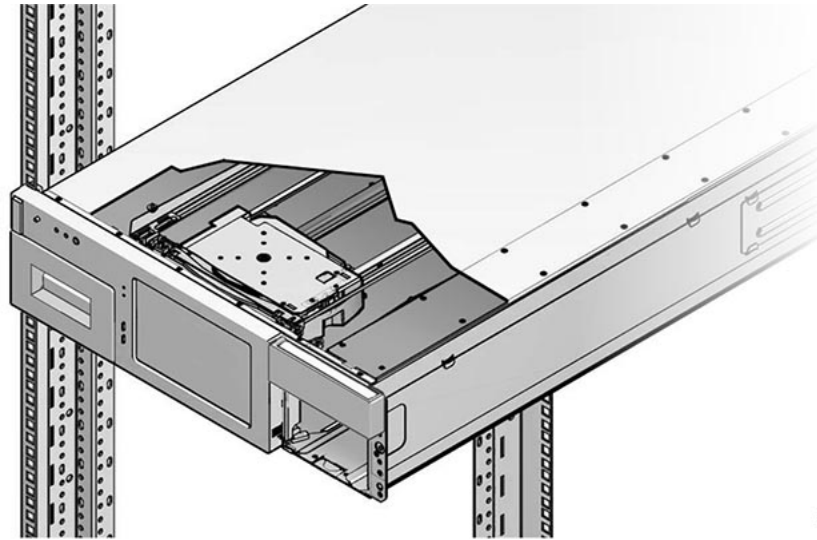
Improper installation of the lock could cause damage during shipment.

- [Power Down the Library and Verify Robot Position](#)
- [Install the Shipping Clip](#)

Power Down the Library and Verify Robot Position

The robot needs to be at the top and front of the Base Module to be locked into place.

1. Power down the library with the “to prepare the robot for removal” option enabled (see [Controlled Power-Down from the Interface](#)).
2. Lock the robot (see [Lock the Robot](#)).
3. Remove the right cartridge magazine from the Base Module (see [Remove the Cartridge Magazine with the Hex Key](#) if necessary).
4. Make sure the robot has positioned the hand against the ceiling and front face of the library (see image below).

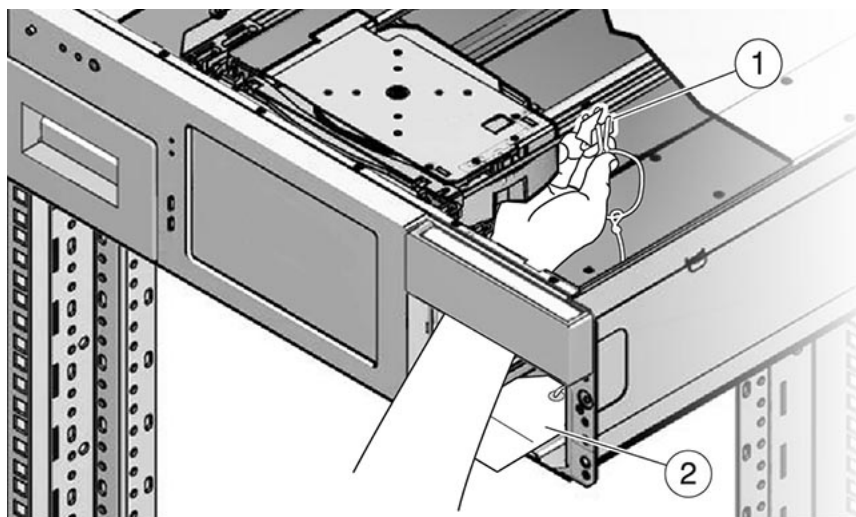


L207_184

Install the Shipping Clip

The shipping clip secures the robot hand for shipment.

1. Verify the robot is in position (see [Power Down the Library and Verify Robot Position](#)).
2. Grasp the shipping clip and reach through the cartridge magazine opening.
3. Open the shipping clip and install it over the 7 mm steel shaft behind the hand assembly (see image below).

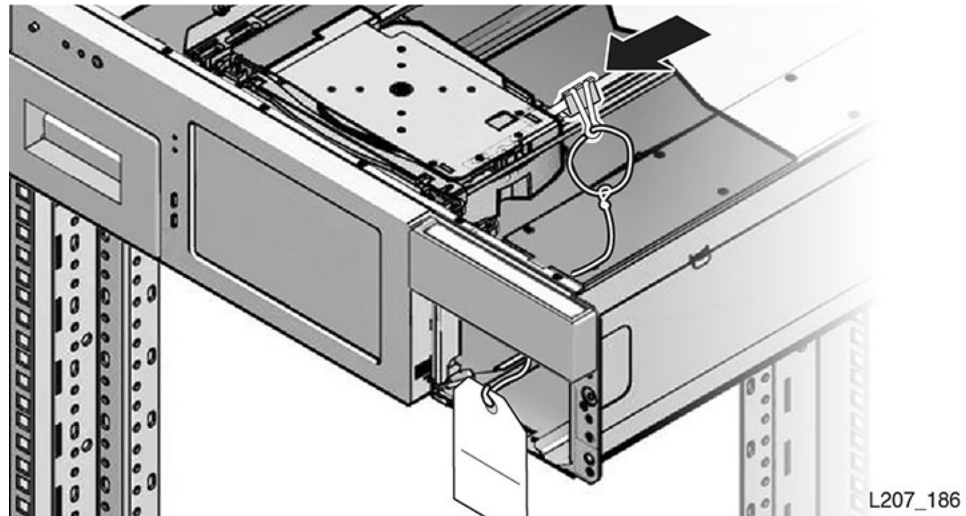


L207_185

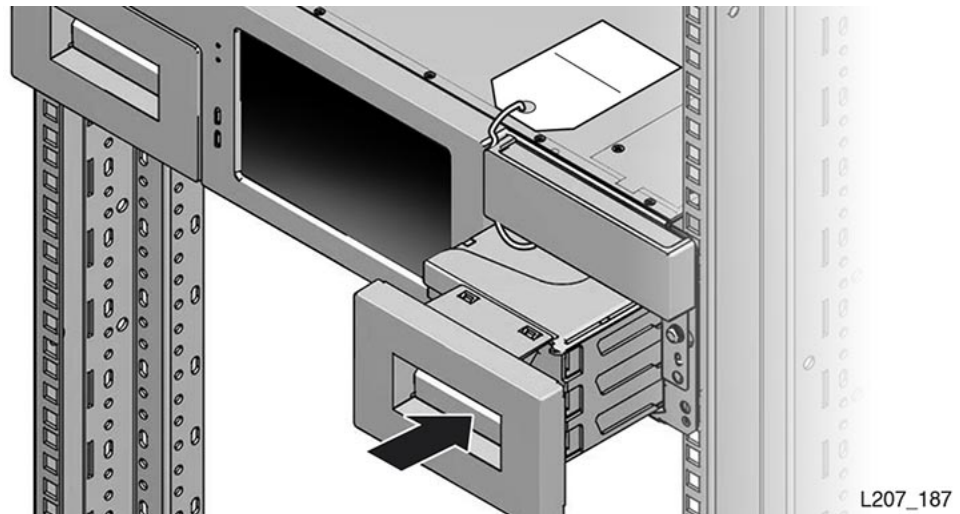
Illustration Legend:

- 1 - Opened Shipping Clip
- 2 - Instruction Tag

4. Squeeze the clip to reduce the clamping force on the shaft and slide the clip toward the hand assembly (see image below). The hand will be contained between the front wall and the clip.



5. Guide the instruction tag out of the cartridge magazine slot. Route the string and instruction tag between the mailslot and right side of the front control panel and set it on top of the Base Module (see image below).



6. Replace the right magazine in the Base Module and verify the magazine is securely latched.

A

Slot Mapping and Cartridge Locations

Each slot in the library has a corresponding address. Addressing can refer to SCSI element ID or library addressing.

- [Cartridge Slot Addressing](#)
- [Drive, Mailslot, Power Supply, and Robot Addressing](#)
- [SCSI Element Addressing](#)
- [Example Library Configurations and Slot Maps](#)

Cartridge Slot Addressing

Library slots are identified by *library-module, side, row, column*.

- *library-module* is the module that contains the slot. Modules are numbered by starting from the Base Module (1) and counting down.
- *side* identifies the magazine within the module either `Left` or `Right`.
- *row* is the row of the slot within the magazine, numbered starting from the top of magazine(1) and counting down.
- *column* is the column of the slot within the magazine, numbered starting from the handle side of the magazine, at the front of the library, and counting to the back.

Reserved Slot Addressing

The library can have a maximum of three reserved slots each with a unique address.

There are maximum of three reserved slots in the library. Only the following slot addresses can be used as reserved slots (see [Determine the Required Number of Reserved System Slots](#)). Reserved slots do not have a SCSI element address.

- 1, Left, 1, 1
- 1, Left, 2, 1
- 1, Left, 3, 1

Drive, Mailslot, Power Supply, and Robot Addressing

Each component has a unique address based on location in the library.

Component	Physical addressing
Drives	<i>module,top bottom</i>
Mailslot	<i>slot number</i>
Expanded Mailslot	<i>module,side,row,column</i>

Component	Physical addressing
Power Supply	<i>module,top bottom</i>
Hand (Robot)	No address

SCSI Element Addressing

See the *SL150 SCSI Reference Guide* for more information.

Example Library Configurations and Slot Maps

Library addressing varies depending on the library configuration.

Figure A-1 Non-Partitioned One Module Library, Standard Mailslot, and No Reserved Cells

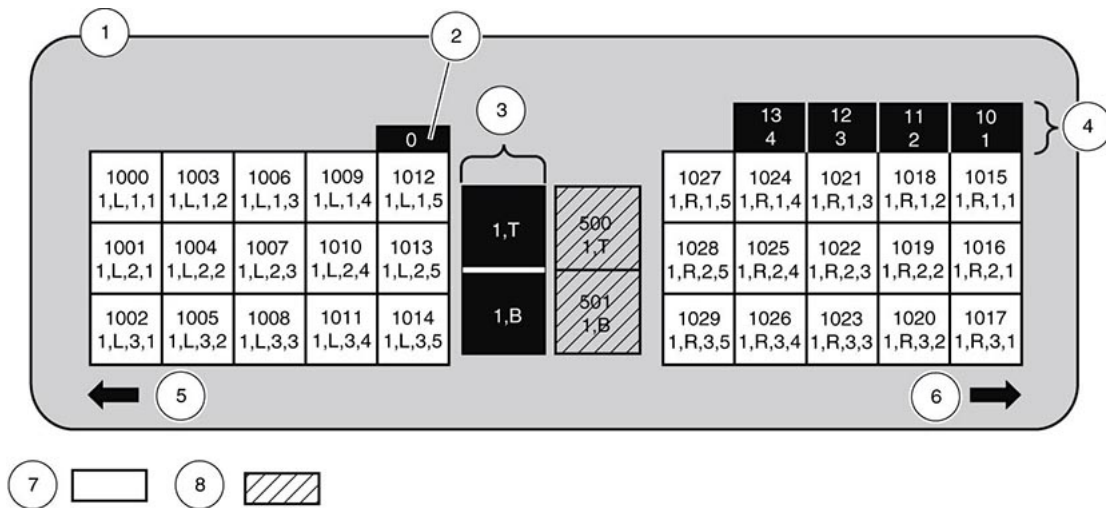
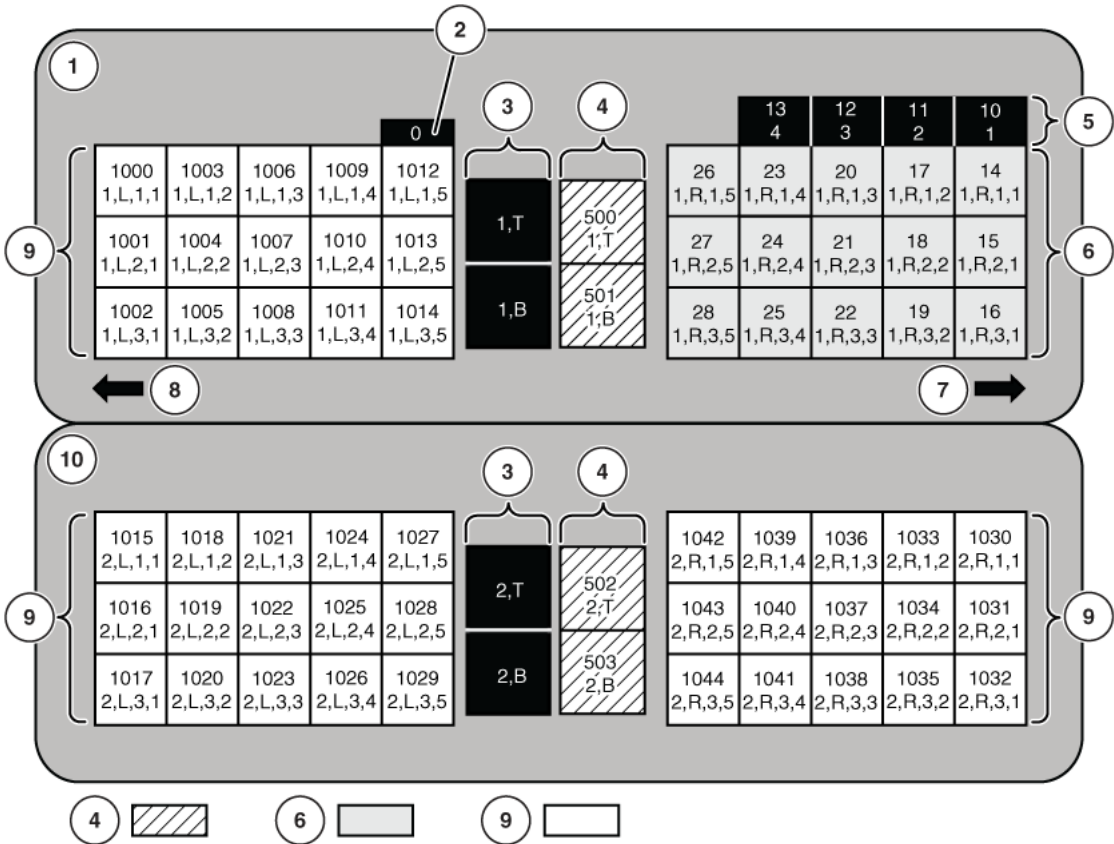


Illustration Legend:

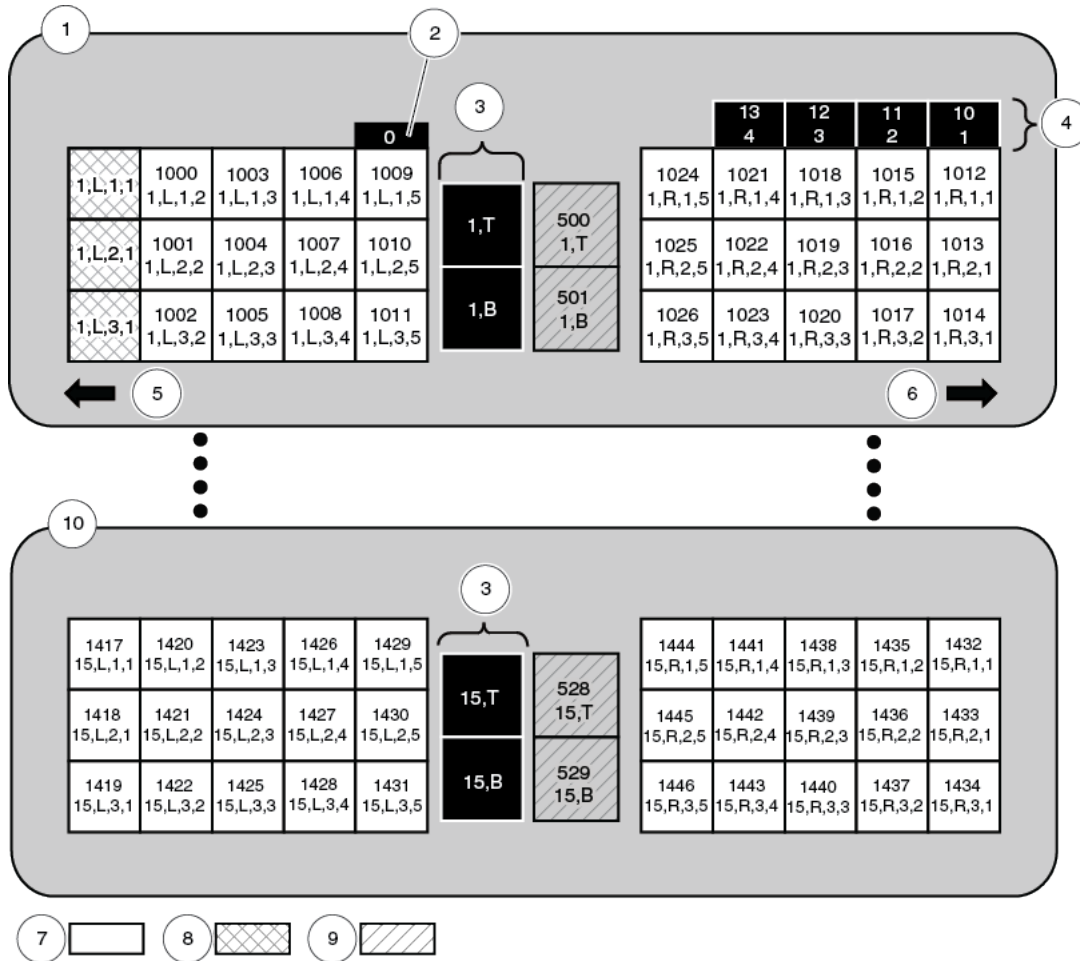
- 1 - Module 1 (Base)
- 2 - Robot
- 3 - Power supplies
- 4 - Standard mailslots
- 5 - Left magazine front
- 6 - Right magazine front
- 7 - Storage slots
- 8 - Tape drives

Figure A-2 Non-Partitioned Two Module Library, Expanded Mailslot, and No Reserved Cells



- Illustration Legend:**
- 1 - Module 1 (Base)
 - 2 - Robot
 - 3 - Power supplies
 - 4 - Tape drives
 - 5 - Standard mailslot
 - 6 - Mailslot expansion
 - 7 - Right magazine front
 - 8 - Left magazine front
 - 9 - Storage slots
 - 10 - Module 2 (Expansion)

Figure A-3 Non-Partitioned 15 Module Library, Standard Mailslot, and Three Reserved Cells



Glossary

alphanumeric

A character or group of characters that identifies a register, a particular part of storage, or some other data source or destination. (A).

arm

The robotic assembly that is lowered between the columns of tapes. The arm hangs on four wires from the Z mechanism. The arm includes the hand, the rails the hand rides on, the track motor that moves the hand along the rails, and the KLT card.

audit

The process of recording the location of all tapes in a library.

bar code

A code consisting of a series of bars of varying widths. This code appears on the external label attached to the spine of a tape cartridge and is equivalent to the volume serial number (VOLSER). This code is read by the machine vision system of the library.

Base chassis

The sheet metal and plastic chassis that makes up the framework of the Base Module (Module 1).

Base Module

The smallest, fully functional library consisting of the base chassis with the robot, front control panel, mailslot, one or two power supplies, up to two half-height LTO Ultrium tape drives, left magazine, and right magazine. The Base Module is always mounted at the top of the library and identified as Module 1.

cartridge

A storage device that consists of magnetic tape on a supply reel in a protective housing. The spine of the cartridge usually contains a label listing the volume identification number. Also called tape, tape cartridge, tape volume, or cassette.

cell

See [slot](#).

cleaning cartridge

A tape cartridge that contains special material to clean the tape path in a transport or drive. LTO Ultrium cleaning cartridge labels have a CLN prefix and a CU media identifier.

configuration

The manner in which the hardware and software of an information processing system is organized and interconnected. (T)

data cartridge

A term used to distinguish a cartridge onto which a tape drive may write data.

diagnostics

Pertaining to the detection and isolation of errors in programs and faults in equipment.

dismount

To remove a tape from a drive.

drive

A drive controls the movement of the tape and records or reads the data on the tape as desired by the customer (see [tape drive](#)).

drive cleaning

The device feature that uses a cleaning cartridge to clean a tape drive.

drive slot

The space in the library where the tape drive resides.

drive tray

See [tape drive](#).

dynamic host configuration protocol (DHCP)

A network protocol that enables a server to automatically assign an IP address to devices on a network. DHCP assigns a number dynamically from a defined range of numbers for a given network.

encryption

The process of changing data into a form that cannot be read until it is deciphered, protecting the data from unauthorized access and use.

Ethernet

A local-area, packet-switched bus topology that enables the connection of several computer systems. The Ethernet architecture is similar to the IEEE 802.3 standard.

expanded mailsot

An optional library configuration to increase the capacity of the Mailslot from four to 19 cartridges. A logical entity containing four slots in the Standard Mailslot plus 15 slots in the Base Module right magazine (the Mailslot Expansion).

expansion cable

A cable used to connect Expansion Modules to the Base Module. Each end of the cable has a USB A style connector.

expansion chassis

The sheet metal and plastic chassis that makes up the framework for Module 2–15.

Expansion Module

An Expansion Module can be added to the bottom of an existing library to increase its capacity for drives and tape cartridges (tapes). The Expansion Module consists of the expansion chassis, a module controller, up to two power supplies, up to two half-height LTO Ultrium tape drives, a left magazine, and a right magazine. The Expansion Modules are always mounted below the Base Module and are identified as Module 2 through 15.

export

The action in which the device places a cartridge into the mailslot so that the operator can remove the cartridge. Also called eject.

FC

See [Fibre Channel](#) .

fiber optics

The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials such as glass, fused silica, and plastic.
(E)

fiber-optic cable

A cable made of ultra-thin glass or silica fibers which can transmit data using pulses of laser light. Fiber-optic cables have several advantages over copper cables: they have much less signal loss; they allow information to be transmitted at higher speeds and over longer distances; they are not affected by external electrical noise; and they are better for transmissions which require security.

Fibre Channel

The National Committee for Information Technology Standards standard that defines an ultrahigh-speed, content-independent, multilevel data transmission interface that supports multiple protocols simultaneously. Fibre Channel supports connectivity to millions of devices over copper or fiber-optic physical media and provides the best characteristics of both networks and channels over diverse topologies.

front control panel

An assembly mounted on the front of the base chassis. It includes the touch screen operator panel, various LEDs and switches, and associated electronics.

get

An activity in which a robot obtains a cartridge from a slot or drive.

gripper

The portion of the hand assembly that grasps and holds a cartridge.

GUI

Graphical user interface. Software that allows the user to control the device through visual screens.

hand

The robotic mechanism that grabs tape cartridges and moves them between slots and the drive. It is a component of the arm. The hand has a reach mechanism that gets tape cartridges from slots or drives and puts them into slots or drives. The hand also

has a wrist mechanism that rotates the hand to allow it to reach cartridges on either side or the drives at the back of the library.

hardware

All or part of the physical components of an information processing system, such as computers or peripheral devices. (T) (A)

HBA

See host bus adapter.

host bus adapter (HBA)

A circuit installed in a multi-platform host or device that interfaces between the device and the bus.

host computer

In a computer network, a computer that usually performs network control functions and provides end users with services such as computation and database access. (T)

host interface

An interface between a network and host computer. (T)

import

The process of bringing a cartridge into the library from the mailslot. Also called enter.

indicator

A device that provides a visual or other indication of the existence of a defined state. (T)

initial program load (IPL)

A process that activates a device reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these programs at initial program load execution. Devices running firmware usually reload the functional firmware from a diskette or disk drive at initial program load execution.

initialization

The operations required for setting a device to a starting state, before the use of a data medium, or before implementation of a process. (T)

interface

Hardware, software, or both, that links systems, programs, or devices. (IBM)

internet protocol (IP)

A protocol used to route data from its source to its destination in an Internet environment. (IBM)

inventory

The process of reading and storing in memory the bar code identification and location of all tape cartridges in a library.

IP

See internet protocol.

IPL

See initial program load.

LC connector

A standard fiber-optic cable connector for Fibre Channel data transfer.

LED

Light emitting diode. An electronic device that lights up when electricity is passed through it.

left magazine

A plastic assembly containing 15 tape slots that can be inserted into the left side (as viewed from the front) of Modules 1–15. Left magazines and right magazines are not interchangeable.

library

A robotic system that stores, moves, mounts, and dismounts tape cartridges that are used in data read or write operations.

LME

Library Managed Encryption. A feature introduced with library code 3.50 where the library manages the enrollment and key delivery for IBM LTO-7 and higher drives for use with OKM.

LTO

An acronym for Linear Tape-Open technology which is a set of data format standards created to enable data interchange among tape drives produced by a consortium of manufacturers. With LTO standards, the tape cartridges are interchangeable among tape drive brands.

LUN

Logical Unit Number. An address for a component of a SCSI device. In this device, the host computer sends the SCSI commands for the *library* to LUN 1 of the master *tape drive* and sends SCSI commands for the tape drive itself to LUN 0.

MAC address

The media access control address is a unique identifier assigned to devices for communication on a physical network.

magnetic tape

A tape with a magnetizable layer on which data can be stored. (T)

magnetic tape drive

A mechanism for controlling the movement of magnetic tape, commonly used to move magnetic tape past a read head or write head, or to allow automatic rewinding. (I) (A)

mailslot

The standard mailslot is a plastic and metal assembly located in the upper right corner of the base chassis used to enter tapes into the library and to remove tapes from the library. Previous StorageTek libraries called this a CAP (Cartridge Access Port).

mailslot expansion

A term describing the Base Module right magazine (the magazine immediately below the Standard Mailslot) when the library has the expanded mailslot configuration. The mailslot capacity expands from four cartridges (Standard Mailslot) to 19 cartridges.

management information base (MIB)

An ASCII text file organized hierarchically that describes the elements (configuration and statistical information) of a managed device. When a manager requests information, or a managed device generates a trap, the MIB translates the numeric strings into readable text that identifies each data object within the message.

midplane

A card mounted in the base chassis or expansion chassis that is behind the tape slots and in front of the tape drives. Other cards connect to it either by direct connection or by a cable.

Module 1

See [Base Module](#).

module controller

A card inserted into the back of Modules 2–15 that controls the operation of the module. It is connected to the robot by an expansion cable.

Module X (2 through 15)

See [Expansion Module](#) .

mount

To place a tape in a drive and make it accessible to the host system.

multimode fiber

An optical fiber designed to carry multiple signals, distinguished by frequency or phase, at the same time.

net mask

A 32-bit, or 4-byte number, in dotted decimal format (typically written as four numbers separated by periods, such as 255.255.0.0 or 255.255.255.0) that is applied to an IP address to identify the network and node address of a host or router interface. (*Synonymous with subnet mask.*)

network

An arrangement of nodes and branches that connects data processing devices to one another through software and hardware links to facilitate information interchange.

offline

Neither controlled by, nor communicating with, a computer. (IBM)

OKM

Oracle Key Manager, which provides encryption keys to the tape drives.

online

Pertaining to the operation of a functional unit when under the direct control of the computer. (T)

operator panel

A component of the front control panel consisting of a seven inch WVGA color touch screen.

partition

A segmented part of the library that acts to hosts as a separate and independent tape library. The partition must have one bridged drive and at least one magazine. Partitions share the mailslot and robot, but the tape drives and magazines within each partition are for use solely by that partition. Other partitions cannot use these tape drives or magazine storage slots.

port

A specific communications end point within a host. A port is identified by a port number. (IBM)
(2) In Fibre Channel, an access point in a device where a link attaches.

power supply

An AC to DC power supply that mounts into the rear of a module Module (1–15). Referred to as top power supply or bottom power supply when referring to a power supply installed in a specific module.

power supply filler

A metal frame that slides into a power supply slot when a power supply will not be used in that slot.

put

An activity in which a robot places a cartridge into a slot or drive.

release

A distribution of a new product or new function and fixes for an existing product. (IBM)

right magazine

A plastic assembly containing 15 tape slots that can be inserted into the right side (as viewed from the front) of Modules 1–15. Right magazines and left magazines are not interchangeable.

robot

An assembly that incorporates the bulk of the Module 1 electronics and the robotic components. This assembly is a combination of mechanical components, electronics, and a

sheet metal housing. It is located at the top of the base chassis and incorporates the arm, Z mechanism, a CPU board, plus the KLC and KLZ cards.

SAS

Serial Attached SCSI. A computer bus technology and serial communication protocol for direct attached storage devices, including disk drives and high-performance tape drives.

SCSI

Small Computer System Interface. A standard interface and command set for transferring data between mass storage and other devices. The host computer uses SCSI commands to operate the device. Depending on the model, physical connection between the host computer and the tape drive will use a parallel SCSI, SAS, or Fibre Channel interface.

SLAAC

Stateless automatic address configuration. The process of a host generating its own address by using a combination of locally available information, such as a MAC address, and information that is advertised by routers.

slot

An empty location into which something else may be placed. Most commonly used when referring to the locations in the magazine or mailslot where tape cartridges are placed. Power supplies and drives are also placed in slots.

switch

In Fibre Channel technology, a device that connects Fibre Channel devices together in a fabric.

tape

Also known as cartridge, tape cartridge, tape volume, volume, or cassette.

tape cartridge

A container holding magnetic tape that can be processed without separating the tape from the container. The device uses data and cleaning cartridges. These cartridges are not interchangeable. See cartridge.

tape drive

An electro-mechanical device that moves magnetic tape and includes mechanisms for writing and reading data to and from the tape. The drive is mounted into a proprietary tray (sometimes called a sled).

tape drive filler

A metal frame that slides into a tape drive slot when a tape drive will not be used in that slot.

Terabyte

A unit of storage, abbreviated T or TB, equal to 1,024 Gigabytes.

U

A measure of chassis height. 1U in rack measurement is 44.45 millimeters (1.75 inches).

Ultrium

An LTO tape format optimized for high capacity and performance. The Ultrium tape format uses a single reel cartridge to maximize capacity.

USB

Universal Serial Bus. A serial bus standard used to interface devices.

World Wide Name

A unique identifier in a Fibre Channel or SAS storage network. The first three bytes are derived from an IEEE Organizationally Unique Identifier (OUI), which defines the manufacturer or vendor. The remaining five bytes are assigned by the vendor.

WORM

An acronym for Write Once Read Many times, a class of recording systems that allow recording and adding data, but not altering recorded data.

wrist

A component of the hand assembly that rotates the hand horizontally.

Z mechanism

The robotic assembly mounted at the back of the robot that raises and lowers the arm. The Z mechanism includes a motor, gears, the bullwheel, and the wires and pulleys that hold the arm. As the motor turns, the bullwheel rotates and extends or retracts the wires to lower or raise the arm.

Index

Symbols

.xls file, [3-2](#), [9-11](#)

A

accessibility settings, [4-14](#)
accessory kit, [2-6](#), [2-15](#)
acclimate, [2-5](#)
ACSLs, [1-11](#)
activity log, [8-3](#)
addressing, [A-1](#)
 cartridge slots, [A-1](#)
 drive, [A-1](#)
 element mode, [2-37](#), [4-4](#)
 mailslot, [A-1](#)
 power supply, [A-1](#)
 reserved slot, [A-1](#)
 robot, [A-1](#)
admin
 default, [2-35](#)
 manage users, [5-1](#)
 role description, [5-1](#)
airborne contaminants, [2-2](#)
airflow, [2-3](#)
alerts, [8-7](#)
alignment tab, [2-21](#)
applying a label, [6-6](#)
audit, [9-5](#), [9-6](#)
auto clean, [4-4](#), [6-16](#), [7-5](#)

B

base module
 about, [1-2](#)
 accessory kit, [2-6](#)
 back rails, [2-7](#)
 front rails, [2-8](#)
 installing, [2-5](#)
 mounting, [2-12](#)
 mounting hardware, [2-6](#)
 remove/replace, [10-21](#)
bridged drive, [4-4](#), [7-2](#)
browser, [9-7](#)
BUI

 See user interface
bulk loading cartridges, [6-9](#)

C

CA, [4-13](#)
cable
 Ethernet, [2-32](#)
 expansion module, [2-29](#)
 FC, [2-31](#)
 installation, [2-29](#)
 management, [2-24](#), [2-32](#)
 network ports, [2-32](#)
 power supply, [2-31](#)
 SAS, [2-31](#)
 tape drive, [2-31](#)
CAP
 See mailslot
capacity, [1-8](#)
cartridge, [6-1](#)
 about, [6-1](#)
 bulk load, [6-9](#)
 cleaning, [6-3](#), [6-16](#), [6-17](#)
 cleaning type, [6-8](#)
 data, [6-3](#)
 diagnostic, [6-3](#)
 export, [6-13](#)
 handling, [6-7](#)
 health, [6-7](#)
 import, [6-13](#)
 import/export, [6-12](#)
 inspect, [6-7](#)
 label, [6-2](#), [6-6](#)
 loose, [9-10](#)
 M8, [6-4](#)
 magazine, [1-4](#), [2-23](#)
 magazine removal, [2-19](#)
 media id, [6-2](#)
 move, [6-15](#)
 ordering, [1-16](#)
 preparing for import, [6-5](#)
 slot addressing, [A-1](#)
 status, [6-7](#)
 storing, [6-9](#)
 stuck, [9-9](#)

cartridge (*continued*)
 types, 6-3
 view list, 6-6
 volume ID, 6-3

certificate, 4-12
 self-signed, 4-13
 third-party, 4-13

certifying authority, 4-13

change password, 5-1

change role, 5-3

checksum, 4-11

cleaning
 cartridge exterior, 6-8
 configuration, 7-4
 host-managed, 7-5
 library managed, 7-5
 manual, 7-8

cleaning cartridge, 6-5, 6-15–6-17

clip for shipping, 10-26

clip nuts, 2-18

close mailslot, 6-14

code
 See firmware

column, A-1

configuration
 example, 1-15, A-2
 SAS issues, 9-13
 wizard, 4-1

configure
 accessibility, 4-14
 apply changes, 4-10
 bridge drive, 4-4
 certificate, 4-12
 date and time, 2-37, 4-4
 drive auto clean, 4-4
 drive cleaning, 7-4
 element addressing mode, 2-37, 4-4
 initial power-on, 2-34
 label format, 4-4
 library, 4-1
 library settings, 4-4
 LME, 4-8
 mailslot, 2-38, 4-4
 partition, 4-4, 4-6
 port 1, 2-36, 4-2
 port 2, 4-2
 reserved slot, 2-38, 4-4
 restore defaults, 9-12
 SNMP, 8-4
 volume label format, 2-38

contaminants, 2-2

control panel
 remove/replace, 10-7

controller
 remove/replace, 10-10

CRU, 10-1, 10-2, 10-25

D

data cartridge, 6-5

date, 2-37, 4-4

default admin, 2-35

delete partition, 4-8

delete user, 5-3

diagnose, 8-3, 9-7

diagnostic cartridge, 6-5, 6-15

dimensions, 1-7

download
 firmware, 4-10
 MIB, 8-6

drive
 See tape drive

drive tray
 See tape drive

E

eject cartridges
 See export

electrostatic discharge, 2-3

element addressing mode, 2-37, 4-4

email notification, 8-7

encryption, 1-12
 about LME, 7-2
 configuration, 4-8

enter cartridges
 See import

environmental requirements, 2-1

Ethernet, 2-32

expanded mailslot
 See mailslot

expansion module
 about, 1-3
 accessory kit, 2-15
 back rails, 2-22
 cabling, 2-29
 clip nuts, 2-18
 install, 2-14
 magazine, 2-23
 mounting, 2-21
 remove cartridge magazines, 2-19
 remove/replace, 10-17
 securing to rack, 2-23

expired cleaning cartridge, 6-17

export, 6-13
 cartridges, 6-12, 6-13
 table, 3-2

F

factory default, [9-12](#)
 fault codes, [9-8](#)
 fault record, [9-9](#)
 FC, [2-31](#)
 field replaceable unit
 See FRU
 firmware, [4-10](#)
 download, [4-10](#)
 revert, [4-12](#)
 update, [4-10](#), [4-11](#)
 update drive code, [7-10](#)
 verify download, [4-11](#)
 versions, [4-10](#)
 view current, [4-10](#)
 FRU, [10-1](#), [10-17](#), [10-21](#)

H

HACS, [2-3](#)
 handling cartridges, [6-7](#)
 health log, [9-9](#), [9-11](#)
 health table, [9-8](#)
 high contrast, [4-14](#)
 hook and loop strap, [2-24](#)
 host activity, [8-3](#)
 host-managed cleaning, [7-5](#)
 HTTPS, [4-12](#)
 humidity, [2-1](#)

I

import, [6-13](#)
 cartridges, [6-12](#), [6-13](#)
 initialization, [2-34](#)
 wizard, [2-34](#)
 inspecting cartridges, [6-7](#)
 install
 base module, [2-5](#)
 cables, [2-29](#)
 expansion module, [2-14](#)
 library, [2-1](#)
 power supply, [2-25](#)
 rails, [2-7](#), [2-8](#)
 tape drive, [2-25](#)
 validation, [10-24](#)
 IPv6, [1-10](#)

K

knob-type lock, [2-33](#)
 knowledge article, [9-14](#)

L

label
 applying, [6-6](#)
 configure format, [2-38](#), [4-4](#)
 format types, [6-4](#)
 module, [2-23](#)
 non-standard, [6-4](#)
 ordering, [1-16](#)
 labels, [6-2](#)
 large fonts, [4-14](#)
 LED, [8-2](#)
 library
 audit, [9-5](#)
 capacity, [1-8](#)
 certificate, [4-12](#)
 configure, [4-1](#)
 diagnose issue, [9-7](#)
 graphical representation, [8-1](#)
 health, [8-3](#)
 installation, [2-1](#)
 monitoring, [8-1](#)
 move, [9-6](#)
 offline/online, [9-1](#)
 power off, [9-2](#)
 power on, [9-2](#)
 restart, [9-5](#)
 revert firmware, [4-12](#)
 self-test, [2-40](#), [9-11](#), [9-14](#)
 service, [9-1](#)
 startup sequence, [9-2](#)
 state, [8-2](#), [8-3](#)
 update firmware, [4-11](#)
 library firmware
 See firmware
 library managed encryption
 See LME
 library-managed cleaning, [7-5](#)
 library-module, [A-1](#)
 LME, [7-2](#)
 about, [7-2](#)
 configuration, [4-8](#)
 port behavior, [7-3](#)
 local operator panel
 See touch screen
 locate light, [9-6](#)
 lock
 knob-type, [2-33](#)
 thumbscrew-type, [2-33](#)
 lock robot, [9-3](#)
 login
 default admin, [2-35](#)
 remote interface, [3-1](#)
 login issue, [9-8](#)

logout, [3-1](#)
 remote interface, [3-1](#)

LTO
 M8, [6-4](#)
 supported generations, [7-1](#)

M

magazine

about, [1-4](#)
 bulk loading, [6-9](#)
 latch, [2-19](#)
 replace, [2-23](#)
 stuck cartridge, [9-9](#)

mailslot, [1-4](#)

about, [1-4](#)
 addressing, [A-1](#)
 assign, [6-12](#)
 close, [6-14](#)
 configure, [2-38](#), [4-4](#)
 import/export cartridges, [6-12](#)
 open, [6-13](#)
 unassign, [6-14](#)

manual drive cleaning, [7-8](#)

media

See cartridge

media id, [6-2](#)

media validation, [6-18](#), [6-19](#)

cancel, [6-21](#)
 library restart, [6-24](#)
 remove drive, [6-20](#)
 run a validation, [6-20](#)
 types, [6-24](#)

MIB, [8-6](#)

module

base, [1-2](#), [10-21](#)
 bottom, [2-19](#)
 cabling, [2-29](#)
 controller, [10-10](#)
 expansion, [1-3](#), [10-17](#)
 expansion module, [2-14](#)
 floor, [2-17](#), [2-19](#)
 ID label, [2-23](#)
 robot, [1-4](#), [10-12](#)

monitor

audit, [9-6](#)
 library, [8-1](#)
 SDP2, [1-12](#)
 STA, [1-11](#)

mount

base module, [2-12](#)
 expansion module, [2-21](#)

mounting hardware, [2-15](#)

move

cartridge, [6-15](#)

move (*continued*)

library, [9-6](#)

my oracle support, [4-10](#), [9-14](#)

N

network

IPv6 support, [1-10](#)
 persistent binding, [1-10](#)
 port 1, [2-36](#)
 port configuration, [2-36](#), [4-2](#)
 ports, cabling, [2-32](#)
 SAN, [1-10](#)
 switch, [1-10](#)
 zoning, [1-10](#)

notification, email, [8-7](#)

number of slots, [1-8](#)

O

obstruction, [9-10](#)

offline, [9-1](#)

OKM

about, [1-12](#)

online, [9-1](#)

open mailslot, [6-13](#)

operator, [5-1](#)

ordering

cartridge, [1-16](#)
 configuration example, [1-15](#)
 label, [1-16](#)
 part numbers, [1-12](#)

P

packaging size, [1-7](#)

part numbers, [1-12](#)

partition

access partitioning screen, [4-6](#)
 assign resources, [4-7](#)
 bridged drive, [7-2](#)
 configure, [4-6](#)
 create, [4-7](#)
 delete, [4-8](#)
 requirements, [4-6](#)

password

change another user, [5-2](#)
 change your password, [5-1](#)
 default admin, [2-35](#)

port

configuration, [2-36](#), [4-2](#)
 LME behavior, [7-3](#)
 network port 1, [2-36](#), [4-2](#)
 network port 2, [4-2](#)

port (*continued*)
 tape drive, 7-9

power
 initial start up, 2-34
 off, 9-2
 on, 9-2
 usage, 1-8

power supply
 addressing, A-1
 cable, 2-31
 install, 2-25, 2-27
 remove/replace, 10-5
 slot cover, removal, 2-27

print a table, 3-2

R

rack
 move, 9-6
 prep, 2-3
 requirements, 2-3
 shipment, 10-25
 square hole, 2-18

rails
 back, 2-7, 2-22
 front, 2-8

refresh screen, 4-14

remote interface
 See user interface

remove/replace, 10-1
 base module, 10-21
 control panel, 10-7
 controller, 10-10
 drive tray, 10-2
 expansion module, 10-17
 power supply, 10-5
 robot, 10-12

replace components, 10-1

reserved slot, 2-38, 4-4, 6-15, A-1

reset password, 5-2

restart
 drive, 7-9
 library, 9-5

restore defaults, 9-12

revert firmware, 4-12

robot
 about, 1-4
 addressing, A-1
 knob-type lock, 2-33
 lock, 9-3, 10-25
 remove/replace, 10-12
 thumbscrew-type lock, 2-33
 unlock, 2-32
 verify position, 10-25

role
 administrator, 5-1
 assignment, 5-2
 change, 5-3
 operator, 5-1
 service, 5-1
 viewer, 5-1

row, A-1

S

SAS, 2-31, 9-13

scratch avoidance, 2-21

screen reader, 4-14

screen refresh, 4-14

SCSI
 element ID, 2-37, 4-4

SDP2, 1-12
 enable/disable, 8-7

self-signed certificate, 4-13

self-test
 run, 2-40, 9-11, 9-14
 stop, 2-41

service, 5-1

service request, 9-14

servicing the library, 9-1

shipping
 clip installation, 10-26
 robot lock, 2-32, 10-25
 specifications, 1-7

shutdown, 9-2

side, A-1

sign-out
 See logout

site
 requirements, 2-1, 2-2

slot addressing, A-1

slot cover
 power supply, 2-27
 tape drive, 2-28

slot map, A-2

SNMP
 configure, 8-4
 MIB, 8-6
 STA, 1-11
 traps, 8-5
 v2c, 8-4
 v3, 8-4
 version, 8-4

specs, 1-7

spreadsheet
 See table

SSL, 4-12

STA, 1-11

staging, 2-5

startup sequence, [9-2](#)
 static, [2-3](#)
 status indicator, [8-2](#)
 storing cartridges, [6-9](#)
 stuck cartridge, [9-9](#)
 switch
 POE, [1-10](#)

T

table, [3-2](#)
 export, [3-2](#)
 manage columns, [3-1](#)
 print, [3-2](#)
 tape
 See cartridge
 tape drive, [2-28](#), [7-1](#)
 about, [7-1](#)
 addressing, [A-1](#)
 auto clean, [4-4](#)
 bridged, [7-2](#)
 bridged drive, [4-4](#)
 cable, [2-31](#)
 cleaning, [7-4](#)
 element addressing, [2-37](#), [4-4](#)
 firmware, [4-10](#)
 firmware, update, [7-10](#)
 install, [2-25](#), [2-28](#)
 manage, [7-1](#)
 ports, [7-9](#)
 remove/replace, [10-2](#)
 restart, [7-9](#)
 slot cover, removal, [2-28](#)
 state, [7-4](#)
 supported types, [7-1](#)
 view info, [7-4](#)
 technical support, [9-13](#)
 temperature, [2-1](#)
 third-party certificate, [4-13](#)
 thumbscrew-type lock, [2-33](#)
 time, [2-37](#), [4-4](#)
 TLS, [4-12](#)
 touch screen, [1-6](#)
 trap levels, [8-5](#)
 troubleshoot, [8-3](#), [9-7](#)
 self-test, [2-40](#), [9-11](#), [9-14](#)

U

UI

 See user interface
 unassign mailslot, [6-14](#)
 unlock robot, [2-32](#)
 unpack
 base module, [2-6](#)
 expansion module, [2-15](#)
 library, [2-5](#)
 update
 drive firmware, [7-10](#)
 library firmware, [4-10](#)
 user
 activity, [8-3](#)
 add, [5-2](#)
 assign role, [5-2](#)
 change password, [5-2](#)
 change role, [5-3](#)
 managing, [5-1](#)
 remove, [5-3](#)
 roles, [5-1](#)
 user interface, [1-5](#), [3-1](#)
 basic operations, [3-1](#)
 browser issue, [9-7](#)
 library screen, [8-1](#)
 login, [3-1](#)
 login issue, [9-8](#)
 logout, [3-1](#)
 remote, about, [1-5](#)

V

v2c, [8-4](#)
 v3, [8-4](#)
 validate media, [6-18](#)
 ventilation, [2-3](#)
 viewer, [5-1](#)
 volume ID, [6-4](#)
 volume label format, [4-4](#)

W

weight, [1-7](#)
 wizard
 apply changes, [4-10](#)
 configuration, [4-1](#)
 initialization, [2-34](#)