

StorageTek SL8500

Library Guide

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StorageTek SL8500 Library Guide

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Preface

Oracle's StorageTek SL8500 modular library system is an enterprise storage solution that provides fully automated tape-cartridge storage and retrieval. This guide provides a general overview of the tape library and covers installation planning, configuration, and operation of the library.

Related Documentation

Additional SL8500 library documentation can be found at:
<https://docs.oracle.com/en/storage/tape-storage/index.html>

IMPORTANT: Starting with FRS_8.67, the content of this document has been frozen. All subsequent product updates are documented within the SL8500 Release Notes. Refer to that document for the latest changes and product update information.

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Library Overview

- [Library Modules](#)
- [Hardware Components](#)
- [Storage Capacity](#)
- [Power Configuration Options](#)
- [Optional Library Features](#)
- [Networking and Communication](#)
- [Library Monitoring](#)
- [Library Management Software](#)
- [Ordering](#)

Library Modules

Customer Interface Module (CIM)

There is one CIM at the front of the library which contains:

- 648 data cartridge slots, 198 slots for diagnostic and cleaning cartridges, and 24 end slots or targeting and drop-off
- Touch screen operator panel and keypad
- Two load-sharing DC power supplies
- Service safety door for maintenance activity
- CAPs and two elevator assemblies that transfer up to four cartridges each between rails

Storage Expansion Module (SEM)

A library can have up to five SEMs. Each SEM contains 1,728 customer-usable data cartridge slots.

Robotics Interface Module (RIM)

In a basic library, the RIM is between the DEM and CIM. In a library with additional storage, the RIM is between the DEM and a SEM. The RIM contains 800 data cartridge slots, pass-thru ports (PTPs) used to connect adjacent libraries in a library complex, and access to the front of the drives.

Drive and Electronics Module (DEM)

There is one DEM at the rear of the library which contains the AC power distribution units (PDUs), load sharing DC power supplies, four accessory racks, electronics control module, and tape drive bay with 64 slots.

Figure 1-1 Drive Expansion Module (rear view)

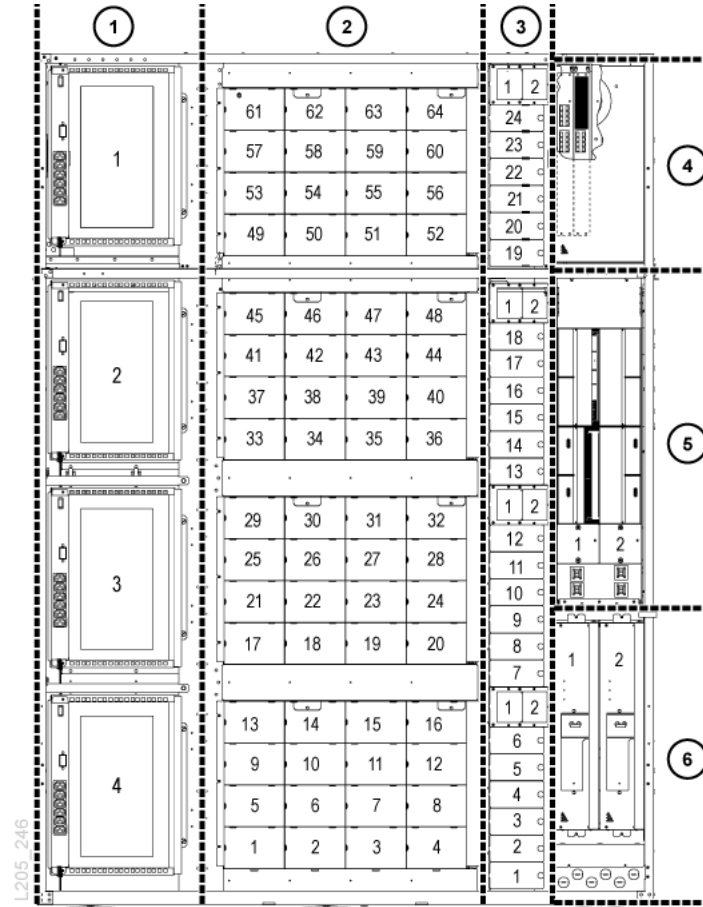
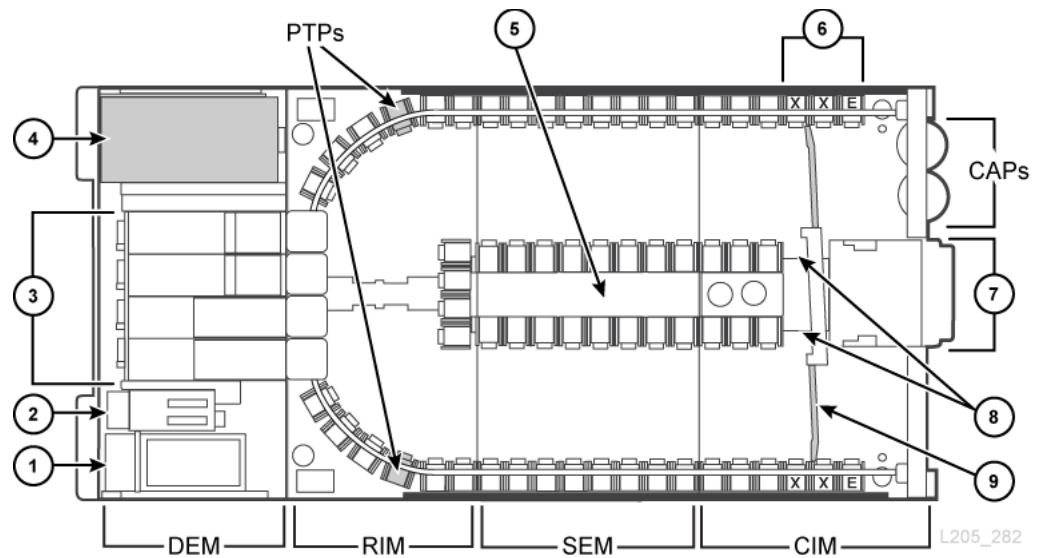


Figure Legend:

- 1. Accessory rack
- 2. Drive bay
- 3. DC power supplies
- 4. Ethernet switches
- 5. Electronics control module
- 6. AC PDUs

Figure 1-2 Library Modules (top view)**Figure Legend:**

1. AC power and electronics control module
2. DC power supplies
3. Tap drive bay
4. Accessory rack
5. Inner wall cartridge slots
6. Reserved slots (E = end stop, X = diagnostic cartridge)
7. Operator panel
8. Elevators
9. Service safety door

Hardware Components

- [Electronics Control Module](#)
- [Cartridge Access Ports \(CAPs\)](#)
- [Robotics](#)
- [Elevators](#)
- [Pass-thru Ports \(PTPs\)](#)
- [Library Cameras](#)
- [Accessory Racks](#)
- [Keypad](#)
- [Local Operator Panel](#)
- [Service Safety Door](#)

Electronics Control Module

The electronics control module (ECM) is responsible for electronics control, robotic and drive control, and host connectivity. The ECM is located in the rear of the library in the DEM. The main controller cards are the HBCR (library controller) and HBT (drive controller).

Figure 1–3 Electronics Control Module

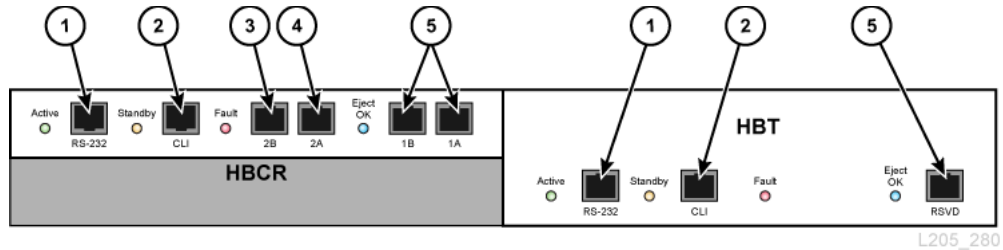


Figure Legend:

1. Serial port (reserved)
2. Serial port (CLI port for service representatives)
3. Primary Ethernet port
4. Dual TCP/IP Ethernet port
5. Ethernet port (reserved)

Command-Line Interface (CLI)

The command-line interface (CLI) is used by Oracle support to configure and diagnose the library. Service representatives can access the CLI through the electronics control module:

- Serial Port Connection on the HBCR card (RS-232) and a HyperTerminal connection to enter the commands.
- Ethernet Port Connection (ports 1A, 2A, or 2B) on the HBCR card and a secure shell (PuTTY) to enter the commands.

Redundant Electronics Option

The optional redundant electronics (RE) feature provides failover protection with a second set of controller cards including HBCR, HBT, HBS, and an internal Ethernet switch. If an active controller experiences errors, operations switch automatically to a stand-by controller, with minimal disruption to library and host operations. For more information, see "[Redundant Electronics Overview](#)" on page D-1.

Cartridge Access Ports (CAPs)

CAPs import and export cartridges. There are two types of CAPs:

- [Bulk CAP](#)
- [Rotational CAPs](#) (legacy)

An SL8500 library cannot contain both CAP types. It may contain either the bulk CAP, or a maximum of two rotational CAPs.

Bulk CAP

The bulk CAP consists of eight CAPs located on the front access doors of the library. There are two CAPs per rail, each with 36 slots (three 12-slot magazines). The library now comes standard with bulk CAPs. To upgrade a library with rotational CAPs to the bulk CAP, see ["Cartridge Access Ports"](#) on page 1-20.

Figure 1-4 SL8500 Internal view (with bulk CAP)

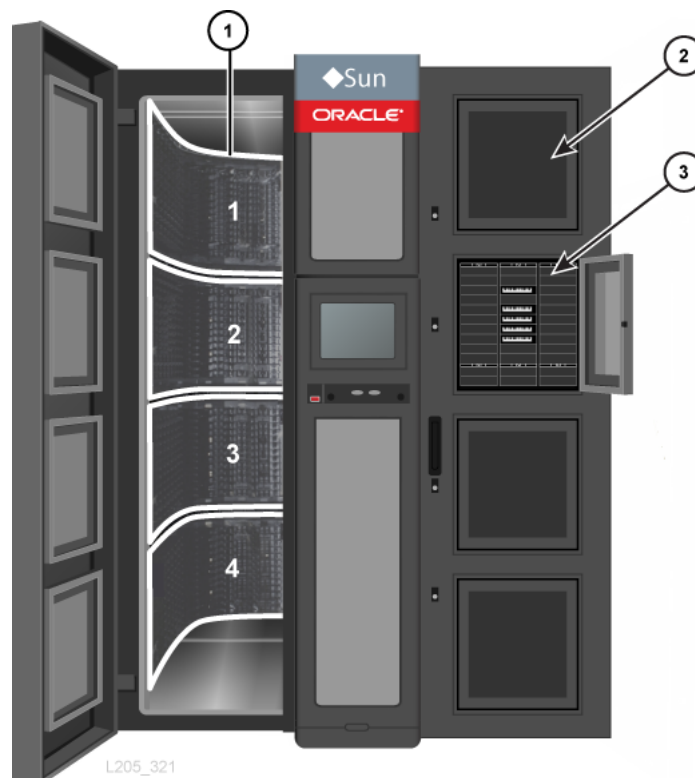
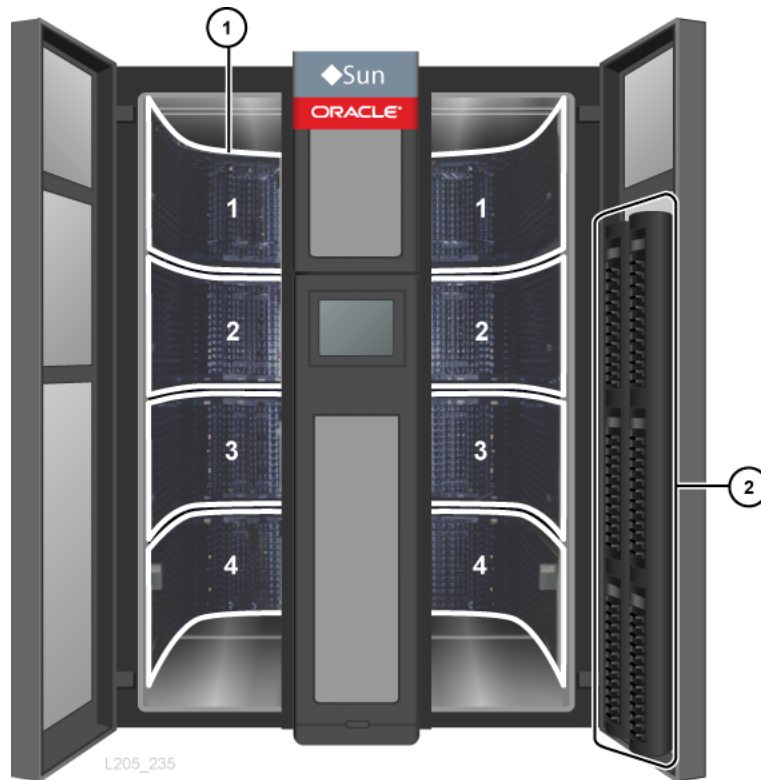


Figure Legend:

1. Rails, numbered 1 to 4 (top to bottom)
2. Closed CAP
3. Open CAP with three 12-slot magazines

Rotational CAPs

A rotational CAP consists of 39 slots (three 13-slot magazines). The library came standard with one rotational CAP, with the option for an additional rotational CAP. Rotational CAPs are located on the right front access door. A single rotational-CAP spans across rails 2, 3, and 4. Entering or ejecting cartridges from rail 1 requires an elevator operation.

Figure 1–5 SL8500 Internal View (with rotational CAPs)**Figure Legend:**

1. Rails, numbered 1 to 4 (top to bottom)
2. Rotational CAPs

Robotics

Robots move cartridges between CAPs, elevators, PTPs, storage slots, and tape drives. Each library can have either four (standard) or eight robots (redundant robotics option). The four rails of the library provide power and communication to the robots.

Elevators

An elevator moves cartridges vertically between rails. There are two 4-slot elevators in the front of the library, between the front access doors and the service safety door of the CIM.

Pass-thru Ports (PTPs)

A PTP moves up to two cartridges at a time horizontally between two libraries in a library complex. A separate frame, installed between two adjacent libraries, houses four PTP mechanisms — one PTP for each rail. The PTPs are located on the curved sections of the RIM near the tape drives (see [Figure 1–2](#)). Installing or servicing a PTP does not interrupt existing library operations. Each PTP slides out of the frame from the rear of the library for servicing.

Plan ahead before adding a new library to a complex. Although the library complex can expand in either direction, adding a new library to the left (when viewed from the front) is less disruptive (see "[Pass-thru Port Planning](#)" on page 2-11).

Library Cameras

A camera system (WebCam) allows you to remotely see the inside of the library. There is one camera on each side (left/right) of the library, mounted in the upper frame of the front access door. The library cameras use third party monitoring software and attach to a 10Base-T/100Base-TX Ethernet connection to provide remote audio and video. The table below lists the library camera specifications:

OS Compatibility	Windows 7, Vista, XP SP3
Minimum Browser Requirements	Windows Explorer 6.0 SP3
Dimensions	Depth: 74mm (2.9 in.); Width: 100mm (3.9 in.); Height: 100mm (3.9 in.) Weight: 345 g (12.2 oz or 0.76 lb)
Connectivity	Ethernet 10Base-T/100Base-TX
Camera	¼ MOS color sensor, 1.3 megapixels Min illumination: 0.6 lx color, 0.5 lx black/white
Video	Max resolution: 1280x960 at 30fps; 8x Digital Zoom H.264 digital video format; NTSC video format
Audio	Built-in microphone, two way audio capable

Accessory Racks

The SL8500 library provides space for four 19 inch racks. Each rack is 6U (U = 4.4 cm (1.75 in.)) and oriented so the components mount vertically. Oracle cannot mandate what equipment you install, however you should follow the guidelines below to prevent voiding the warranty.

Table 1–1 Rack Specifications

Description	Value/Range
Maximum weight	The accessory rack is mounted on slides rated for 80 kg (175 lb). Safe load is 64 kg (140 lb).
Mounting	Components must function in a vertical position. Rails are not provided; use the mounting hardware supplied by the manufacturer.
Height	48.25 cm (19 in.)
Width	27.3 cm (10.75 in.) including power strip
Depth	72 cm (28 in.) safe length is 66 cm (26 in.)
Mount-points	72.4 cm (28.5 in.) between mounting points
Thermal Requirements	880 watts (3,000 Btu/hr) maximum per rack module.
Air flow	Two cooling fans. Maximum volume per 6u rack module is 241 scfm.
Power ¹	200–240 VAC, 50 to 60 Hz, 4 Amps maximum. Six IEC320 C13 outlet receptacles
Regulatory agency compliance	Minimum requirements: Safety –UL or CSA and Electromagnetic –Class A certification from agencies such as the FCC or BSMI.

¹ The N+1 power configuration supports racks 2 and 4. Powering racks 1 and 3 requires the 2N power configuration.

Keypad

There is a keypad on the front of the library with:

- Two buttons to open and close the CAPs.
- Eight LEDs that indicate library activity and status.

- Two safety locks that allow service representatives to place the library in maintenance mode.
- A red safety button that cuts power to the robots in the library.

Figure 1–6 Keypad

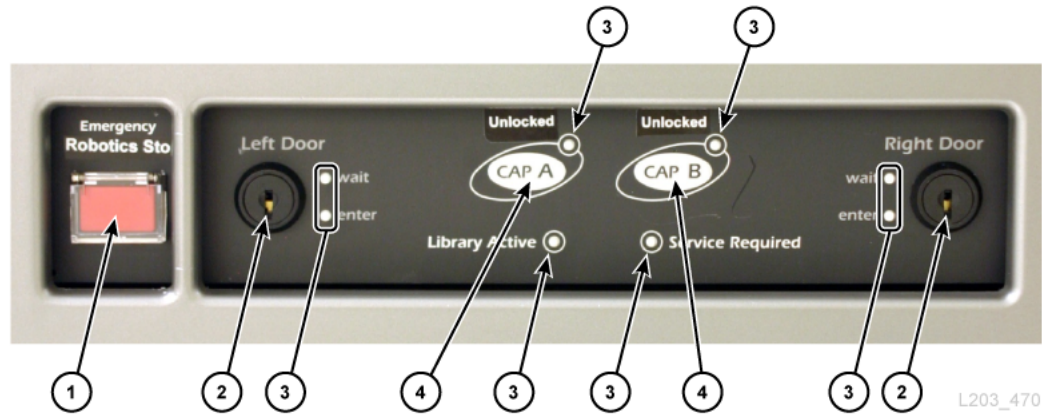


Figure Legend:

1. Emergency robotics stop switch (ERS)
2. Service safety door lock
3. Indicator
4. Lock/unlock CAP button (rotational CAPs only)

Local Operator Panel

The local operator panel is a 12-inch touch screen display on the front of the library. The panel uses StorageTek Library Console (SLC) software to access diagnostics, library status, library and drive monitoring, and functional information.

Service Safety Door

The service safety door is a sliding door that moves to the left or right side of the library, depending upon which maintenance lock is activated. Using the safety door places the library in service mode. The safety door separates the front maintenance area from the library interior so a service representative can safely replace a front frame component while the library remains fully operational.

Note: Only qualified service representatives with a maintenance key can initiate service mode.

Supported Tape Drives

- StorageTek T-series T9840 A/B/C/D, T9940 B, and T10000 A/B/C/D
- HP LTO generations 2, 3, 4, 5, and 6
- IBM LTO generations 2, 3, 4, 5, 6, 7, and 8
- Quantum SDLT 600 and DLT-S4

Note: LTO-8 drives can read and write one generation back. LTO-5, 6, and 7 drives 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.

For more information, see the tape drive section on the Oracle website:

<http://www.oracle.com/us/products/servers-storage/storage/tape-storage/overview/index.html>

OKM Encryption-Compatible Tape Drives

- StorageTek T10000 A, B, C, D
- StorageTek T9840 D
- HP LTO generations 4, 5, 6
- IBM LTO generations 4, 5, 6, 7

For more information, see "[Tape Drive Encryption](#)" on page 1-21.

Storage Capacity

The physical capacity of the library depends on the number of SEMs installed. Each SEM increases the slot count by 1,728 (excluding reserved slots). Physical capacity must be activated by a hardware activation file. Only activated slots can be used for data storage and accessed by a client. Inactivated slots are not recognized by the library. You can purchase active capacity in 100, 250, 500, and 1000 slot increments.

To configure capacity, see "[Configuring Capacity](#)" on page 6-1.

Library Configuration	Rotational CAP Physical Cartridge Capacity	Bulk CAP Physical Cartridge Capacity
Base configuration	1,448	1,360
One SEM	3,176	3,088
Two SEMs	4,904	4,816
Three SEMs	6,632	6,544
Four SEMs	8,360	8,272
Five SEMs (maximum)	10,088	10,000

Power Configuration Options

The power configuration of the SL8500 library depends on the power source and power redundancy options you select.

Power Redundancy Options

There are two power redundancy options. To determine the number of load sharing power supplies required to support each option, see "[DC Power Supplies](#)" on page 1-11.

N+1 Power Configuration (standard)

- Provides DC power redundancy by adding an additional load-sharing power supply to each DC power grid.
- One load-sharing power supply for every two robots plus one redundant power supply.
- One load-sharing power supply for every eight drives plus one redundant power supply.
- Contains two power distribution units (PDUs): one system PDU and one N+1 PDU.
- Supports two racks (2 and 4).

2N Power Configuration

- Provides both DC and AC redundancy
- Provides one power supply for every four tape drives and one supply for every robot.
- Requires a second AC power source for a second system PDU.
- Supports all four racks.

AC Power Source Options

There are three external AC power options. A licensed electrician should connect the external power cables. For additional information, see "[AC Power Connections](#)" on page 1-11.

Delta

- Requires one three-phase input for each system PDU.
- 200–240 VAC, line-to-line, three-phase, 40 Amps, 50–60 Hz (mostly used in the United States).
- Used when the voltage measured from phase-to-phase is 200-240 VAC.
- Requires four wires (three phases plus ground). Does not use neutral (a fifth wire).

Wye

- Requires one three-phase input for each system PDU.
- 200–240VAC, line-to-neutral, three-phase, 24 Amps, 50–60 Hz (mostly used in Europe).
- Used when the voltage measured from phase-to-phase is 380–415 VAC.
- Requires five wires (three phases, ground, and neutral). Neutral (N) is required.

Single-phase

- Requires three single phase inputs for each system PDU (three circuits for N+1 or six circuits for 2N)
- 200–240 VAC, single phase, 24 Amps, 50–60 Hz

AC Power Connections

AC wiring from the power source branch circuit must be installed in conduit (flexible or rigid) with a 90-degree elbow-down fitting. If plugs and connectors are required instead of using conduit, the table below lists the Hubbell part numbers (or equivalent) to use.

Table 1–2 Hubbell Connectors and Plugs (IEC 309)

Description	Part Number
Single Phase US plug 30 amp	HBL330P6W
Single Phase US connector 30 amp	HBL330C6W
Single Phase Europe plug 32 amp	HBL332P6W
Single Phase Europe connector 32 amp	HBL332C6W
Wye plug 32 amp	HBL532P6W
Wye connector 32 amp	HBL532C6W
Delta plug 60 amp	HBL460P9W
Delta connector 60 amp	HBL460C9W
NEMA Delta receptacle (250 V, 50 Amp)	L15-50 R
NEMA Delta plug (250 V, 50 Amp)	L15-50 P

Circuit Breaker Ratings

The minimum circuit breaker ratings required for the service panel are listed in the tables below. Wire size should be determined by the electrician.

Table 1–3 Circuit Breaker Ratings

Option	Panel Breaker / Service Rating	Connector	PDU Breaker
Single Phase	30 Amps	US — 30 Amps Europe — 32 Amps	30 Amps
Delta	50 Amps	US — 50 Amps (NEMA), 60 Amps (IEC 309) Europe — 63 Amps	40 Amps
Wye	30 Amps	US — 30 Amps Europe — 32 Amps	30 Amps

DC Power Supplies

The tape drives and robots use the same 1200W DC power supplies. The number of DC load sharing power supplies required depends on the library configuration and power options selected. Use the tables below to determine the number of power supplies to order. For ordering information, see "[Power Configurations](#)" on page 1-23.

Table 1–4 Tape Drive DC Power Supplies

Quantity of Drives to Power	Power Supplies Required for N+1	Power Supplies Required for 2N
0 - 16	3	4
17 - 24	4	6
25 - 32	5	8
33 - 40	6	10
41 - 48	7	12
49 - 56	8	14

Table 1–4 (Cont.) Tape Drive DC Power Supplies

Quantity of Drives to Power	Power Supplies Required for N+1	Power Supplies Required for 2N
56 - 64	9	16

Table 1–5 Robotics DC Power Supplies

Robotics Configuration	Power Supplies Required for N+1	Power Supplies Required for 2N
Standard	3	4
Redundant	5	8

Power Usage

Table 1–6 SL8500 Power Specifications

Component	Idle Watts	Max Continuous Watts
Base Library	263	349
Redundant Robotics	92	154
Redundant Electronics	79	98
Pass-thru Ports (4 mechanisms)	80	92
Rack space (each)	68	720
T9840 drive (each)	79	100
T10000A/B/C drive (each)	61	93
T10000D drive (each)	64	127
LTO drive (each)	30	46
SDLT drive (each)	38	52

You can use an online power calculator to estimate the electrical and heat loads for typical operating conditions of a library configuration.:

<http://www.oracle.com/us/products/servers-storage/sun-power-calculators/index.html>

Optional Library Features

The following features are optional features for the SL8500 library.

Partitioning

Library partitioning is an optional feature that reserves library resources for the exclusive use of specified hosts. Partitioning is enabled with a hardware activation file (see "[Activating Optional Features](#)" on page 5-1). You can partition a single library or a library complex using SLC.

Single Library Partitioning

- Can contain up to eight partitions.
- The smallest slot increment is one array.
- The smallest drive increment is one drive.

Library Complex Partitioning

- Can contain up to 16 partitions.

- The smallest slot increment is a quarter rail.
- The smallest drive increment is one drive.
- Partition boundaries can span across pass-thru ports (PTPs).
- Requires minimum library firmware 8.31 and SLC 6.25.
- Requires the following minimum level for library management software:
 - ACSLS 8.3
 - HSC 6.2: PTF L1H16SG (VM)
 - ELS 7.0: PTF L1H15SI (MVS), ELS 7.1: PTF L1H16SJ, ELS 7.2: integrated

For more details about the partitioning feature, see "[Partitioning the Library](#)" on page 7-1.

Media Validation

Media validation allows you to verify all T10000 tape cartridge types using SLC. The following validation methods are available: Basic Verify, Standard Verify, and Complete Verify. Media validation provides a "pass" or "suspect" result for each tape cartridge tested.

Media validation requires a designated pool of T10000C or T10000D tape drives. Up to ten drives can be placed in the media validation pool using SLC. The drives in the pool are not available to hosts. The pool is not considered a partition and does not contain cartridges.

The media validation feature requires minimum firmware SL8500 FRS_8.31, SLC FRS_6.25, and a high memory HBT card. For more information about media validation using SLC, see "[Validating Media](#)" on page 11-1.

Networking and Communication

The SL8500 library has several connectivity and network topology options. A TCP/IP connection provides the host library interface (HLI) used to communicate with library management applications such as ACSLS or ELS/HSC.

The library controller card is responsible for coordinating all component operations within the library and providing the interface connection with the host. There are two separate Ethernet connections for host to library communications—Ports 2A and 2B.

- Port 2B provides the primary host connection (standard).
- Port 2A provides the optional Dual TCP/IP connection or it can be used to connect to SLC.

Host Connectivity Options

There are several host connectivity options that offer flexibility and redundancy to support a variety of customer requirements:

- *Dual TCP/IP* provides two connections between a library or a library complex and an ACSLS or ELS/HSC host(s). Dual TCP/IP avoids the single point of failure when there is only one connection between the library and the host. See "[Dual TCP/IP Overview](#)" on page E-1.
- *Multi TCP/IP* provides multiple connections between a library complex and an ACSLS or ELS/HSC host(s). In addition to redundancy in connectivity, this feature

also helps reduce contention and improve performance of the library and tape drives. See "[Multi TCP/IP Overview](#)" on page F-1.

- *Redundant Electronics (RE)* provides redundant library control and communications, and protects against failure should the active HBC/HBCR card fail or if communication to the card is lost. See "[Redundant Electronics Overview](#)" on page D-1.

Switched Fabric Topology

In a switched fabric topology, all nodes on the storage area network connect to Fibre Channel switches that provide optimized, dynamic interconnections between nodes. When an SL8500 library is connected to a Fibre Channel switch or fabric-capable host, it automatically configures itself for switched topology. This configuration can support up to 16 million ports on the fabric.

To configure library-attached drives on an SL8500 library, you must use a switched fabric topology. The SL8500 library does not support tape drives configured in arbitrated loops.

Port Bonding

Port bonding combines multiple ports to create redundancy. The SL8500 library uses an active-backup mode. In active-backup mode, there is one bond with two slave ethernet interfaces. If the active interface fails, the backup interface becomes active. With minimum library firmware 8.31 and a second Ethernet switch installed in the library, port bonding is automatically enabled—no command or activation file is required.

Dynamic World Wide Name

The SL8500 library uses the dynamic World Wide Name (dWWN) feature. When enabled, dWWN assigns world wide names to the library drive slots rather than the drives themselves. Therefore, when a drive is replaced, it is assigned the same WWN as the drive it replaced, preventing reconfiguration of the network. Both library and tape drives must have microcode or firmware that supports the dWWN feature.

With the dWWN feature enabled, tape drives do not keep their original WWNs when they are migrated between libraries. A drive that was previously known to the SAN under its own, drive-specific WWN will no longer be recognized. Therefore, you should configure all drive bay slots in the library and verify that the tape drive data path is bound correctly over the SAN.

Library Monitoring

The library can be monitored using SLC or Simple Network Management Protocol (SNMP). Additionally, service representatives can use the Log SnapShot feature to collect logs from the controller cards.

StorageTek Library Console (SLC)

SLC is a GUI application for configuring, monitoring, and managing the SL8500 library. SLC is included with the purchase of an SL8500 library. You can access SLC from the local operator panel, a stand-alone version on a workstation, or through a browser. For installation requirements and additional information, see "[Installing StorageTek Library Console](#)" on page 3-1.

Library Attach

Library Attach (LibAttach) for Windows Servers is a client application that enables Windows networks to use Oracle's StorageTek storage libraries. LibAttach provides the connection between a Windows application and ACSLS through a TCP/IP network.

LibAttach is included with the SLC download. No additional activation is required. For more information, refer to the Library Attach documentation on OTN.

Simple Network Management Protocol (SNMP)

SNMP is an application layer protocol that performs network management operations over an Ethernet connection. SNMP allows the library to inform the administrator of potential problems. The administrator can query the library for configuration, operation, and statistical information using SNMP traps. The library supports SNMP v2c and SNMP v3.

There is a Management Information Base (MIB) on the controller card which contains information that describes the library, components, and configuration. For more information, see the *StorageTek Tape Library SNMP Reference Guide*.

Log SnapShot Feature

The Log SnapShot feature is a utility that gathers, compresses, and encrypts logs from a given controller card or from an entire library such as the SL8500 library. A log snapshot can be generated using the CLI or SLC. Only authorized Oracle representatives have access to the data obtained from the Log SnapShot utility.

Service Delivery Platform

The Service Delivery Platform (SDP) is a smart appliance that monitors the library and T-series drives. SDP provides remote diagnosis by logging device events and alerting Oracle support if there is an issue.

For more information, see "[Service Delivery Platform](#)" on page 1-25.

Library Management Software

Library management software controls the library by allocating drives and requesting library operations, such as entering, mounting, dismounting, and ejecting cartridges. Library management software manages the library database, which tracks volume identifiers (vol-ids), attributes, and locations of cartridges.

There are two main library management options:

- [Automated Cartridge System Library Software \(ACSL\)](#)
- [Enterprise Library Software \(ELS\)](#)

Automated Cartridge System Library Software (ACSL)

ACSL is centralized, multi-platform library management software for an open-systems environment. ACSL manages all library operations and shares library resources with any ACSL-enabled application. A single instance of ACSL can manage multiple libraries. The key benefits of ACSL include:

- Centralized library control across multiple StorageTek libraries, including legacy technology.

- Optimized library performance through load balancing, automatic request recover and retry, and multiple request processing in parallel.
- Reduced downtime through dynamic configuration capabilities and queuing commands during short-term library outages.
- Enriched reporting and management capabilities for ease of use

Enterprise Library Software (ELS)

ELS incorporates multiple software products to monitor and manage tape libraries and virtual solutions for a mainframe environment.

Host Software Component (HSC) and Storage Management Component (SMC)

HSC manages volume pools and communication with the SL8500 library. HSC resides on the host, but is transparent to the operating system. A separate component, SMC, provides the interface between z/OS operating systems and HSC. SMC resides on all MVS hosts that perform tape processing with HSC.

HSC and SMC work together to influence allocations and determine policies, volume locations, and drive ownership. HSC and SMC translate user requests into library commands and provide message handling.

Virtual Tape Control System (VTCS)

VTCS is the host software that enables centralized management of StorageTek virtual tape libraries, such as VSM and VLE. VTCS manages virtual tape volumes and drives, which includes the migration and recall of virtual volumes and the use of real tape cartridges and drives.

Concurrent Disaster Recovery Test (CDRT)

CDRT enables disaster recovery testing while the library or virtual storage is in use.

Independent Software Vendors (ISVs)

There are a variety of ISVs that support the SL8500 library. Some applications include:

- ASG Time Navigator
- CA ArcServe
- Commvault Simpana
- Dell NetVault
- EMC DiskXtender
- EMC NetWorker
- FileTek StorHouse
- HP Data Protector
- IBM HPSS
- IBM Tivoli TSM
- MassTech MassStor
- DIVA
- Oracle HSM

- Oracle Secure Backup
- Quantum StorNext
- SGI DMF
- SGL FlashNet
- Veritas NetBackup

Not every application is tested on every platform or version. To ensure the software is supported, contact an Oracle marketing or sales representative, or application vendor. Oracle representatives can check compatibility with the Interoperability Tool.

Other Storage System Solutions

The SL8500 library is compatible with several other Oracle products to provide a multifaceted storage solution. This list is not all-inclusive. For more information contact an Oracle sales representative or visit:

<http://www.oracle.com/us/products/servers-storage/storage/tape-storage/overview/index.html>

Client System Component (CSC)

The CSC allows SMC on MVS to use ACSLS as its library server. One CSC is Library Station, which allows an open systems client to use HSC on MVS as its library server.

Expert Performance Reporter (ExPR)

ExPR software collects performance data and generates reports about status and performance. It provides information on manual tape systems, as well as Nearline and VSM tape systems. ExPR has both an MVS component and a PC component.

Extended High Performance Data Mover (ExHPDM)

ExHPDM is utility software that performs high-speed backup and restore of data sets by interleaving very large block sizes on high-speed, high-capacity tape devices. ExHPDM achieves its speed by treating all data equally regardless of the type. Its only function is to move data from disk to very fast tape and back again.

The ExHPDM software moves blocks of data in parallel from several concurrently executing MVS application programs. The data from the application programs is buffered into 256 KB tape block sizes in the application program's address space, and the 256 KB blocks are interleaved onto single or multiple tape volumes.

Library Content Manager (LCM)

LCM — formerly Expert Library Manager (ExLM) — manages Nearline and VSM resources. LCM optimizes overall performance by assuring there are adequate resources available for a scheduled job. LCM also includes LCM Explorer, a graphical user interface that allows a user to configure LCM by creating configuration files instead of parameter files.

StorageTek Tape Analytics (STA)

STA is an intelligent monitoring application available exclusively for StorageTek Modular Tape Libraries. It simplifies tape storage management and helps make informed decisions about future tape storage investments based on the current health of the tape storage environment.

With STA allows you to monitor multiple libraries from a single, browser-based user interface. STA can manage open systems and mainframe, mixed-media, and mixed-drive environments across multiple library platforms. STA allows you to increase the use and performance of tape investments by performing detailed performance trending analyses. These analyses are based on a regularly-updated database of library operations.

Virtual Storage Manager (VSM)

VSM stores virtual tape volumes on a disk buffer called the Virtual Tape Storage Subsystem (VTSS). VSM then migrates the virtual tape volumes to real tape volumes mounted on real tape drives in the library. The primary host software for VSM is the Virtual Tape Control System (VTCS). VTCS manages virtual tape volumes and drives, which includes the migration and recall of virtual volumes and the use of real tape cartridges and drives.

Virtual Library Extension (VLE)

VLE can be added to a VSM for additional capacity. VLE provides an economical second tier of disk storage that can be used to boost the overall VSM storage capacity or use VSM as a tapeless virtual library.

Ordering

This section provides the part numbers for ordering the SL8500 library and components. Contact Sales Assistance at +1.888.672.2534 for more information.

The tables throughout this chapter provide the part numbers for library components and upgrade options. The ATO number is for initial orders and PTO is for orders after the initial purchase of an SL8500 library.

Ordering Process

1. **Physical Configuration** — order a base library and optional expansion modules.
2. **Hardware Options** — select hardware options (CAPs, PTPs, redundant robotics, and redundant electronics).
3. **Tape Drives** — order tape drives (T10000 and LTO).
4. **Tape Cartridges and Labels** — order tape cartridges and labels.
5. **Power Configurations** — select a power redundancy option (N+1 or 2N). Order the required number of power supplies, AC power cords, and PDUs (to calculate requirements, see "[Power Configuration Options](#)" on page 1-9).
6. **Hardware Activation Files** — determine the active capacity required. Quantity options include: +100, +250, +500, +1000. Select optional features (partitioning, dual TCP/IP, multi TCP/IP).
7. **Cables** — select required cables.
8. **Support** — select maintenance options and professional service options.

Hardware Activation Files

Hardware activation files enable library features. You can download the files through Oracle's Software Delivery Cloud, and then add and remove them from the library using the SLC (see the "[Activating Optional Features](#)" on page 5-1). Hardware activation files are required to enable:

- Active capacity
- Partitioning
- Dual TCP/IP
- Multi TCP/IP

Physical Configuration

Order a base library, select the desired number of SEMs, and corresponding rail kit.

Base Library

The base library includes a CIM, SEM, RIM, DEM, operator panel, four robots, CAPs, service safety door, and web cameras. It is the smallest configuration you can order.

Base Library Part Number Description	ATO
Base Module with 1,360 slots (2,000 active slots)	7113666
Base Module with 1,360 slots (2,000 active slots) for non-EU countries	7114548

Storage Expansion Modules (SEMs)

The library can contain up to 5 SEMs to increase the capacity of the library.

SEM Part Number Description	ATO	PTO
SEM with 1,728 slots (no active slots)	7100898	SL8500-EXP-FRZ-N

Rail Kits

Order one rail kit that correspond to the total number of SEMs.

Rail Kit Part Number Description	ATO	PTO
Rail kit for one SEM	7100886	XSL8500-1EF-RAIL-N
Rail kit for two SEMs	7100888	XSL8500-2EF-RAIL-N
Rail kit for three SEMs	7100889	XSL8500-3EF-RAIL-N
Rail kit for four SEMs	7100891	XSL8500-4EF-RAIL-N
Rail kit for five SEMs	7100892	XSL8500-5EF-RAIL-N

Hardware Options

- [Accessory Racks](#)
- [Cartridge Access Ports](#)
- [Internal Ethernet Switch](#)
- [Pass-thru Ports](#)
- [Redundant Electronics](#)
- [Robots](#)
- [Service Safety Door](#)
- [Touchscreen Op Panel](#)

Accessory Racks

The library provides space for up to four traditional 19-inch racks to be installed in the DEM. Equipment should meet the rack requirements (see "Accessory Racks" on page 1-7). The number of racks supported in the library is determined by the library power configuration:

- N+1 power configuration = 2 racks max
- 2N power configuration = 4 racks

Description	ATO	PTO
6u Accessory Rack	7100942	XSL8500-RACK-Z-N

Cartridge Access Ports

To upgrade a library with rotational CAPs to the bulk CAP, purchase the upgrade kit listed below.

Description	PTO
Bulk CAP upgrade kit ¹²³	7113597
Optional — Additional 12-slot CAP magazine (for Bulk CAPs)	7113791

¹ The D-link library camera is incompatible with the bulk CAP. If you have a D-link camera, contact your service representative.

² Libraries purchased prior to August 2005 may require an HBN card upgrade. Contact your service representative.

³ An HBCR is required for bulk CAP. If you have an HBC card, contact your service representative.

Internal Ethernet Switch

Description	PTO
Internal Ethernet Switch	XSL8500-ETHRNT-Z
Internal Ethernet Switch for non-EU countries	7114566

Pass-thru Ports

Connecting two or more SL8500 libraries with pass-thru ports (PTPs) creates a library complex. The PTPs are installed between the DEMs and RIMs of the adjacent libraries.

A single order of PTP mechanisms includes a set of four PTP mechanisms, one mechanism for each rail area between the libraries. The ILC kit includes the Ethernet hub and cables to connect the additional libraries. Each ILC kit can support up to five libraries in a complex. Order two kits for a complex with more than five libraries.

Description	ATO	PTO
PTP without mechanisms (frame only)	7100926	XSL8500P-BLANK-N
PTP mechanisms (set of four)	7100919	XSL8500-MECH-Z-N
PTP mechanisms (set of four) for non-EU countries	7114553	7114568
Hub and intra-library communications (ILC) kit	7100924	XSL8500P-HUB-Z-N
Hub and intra-library communications (ILC) kit for non-EU countries	7114552	7114567

Redundant Electronics

The optional redundant electronics (RE) feature provides failover protection with a second set of controller cards including an HBCR, HBT, HBS, and an internal Ethernet switch. For upgrades, order both PTO parts listed below.

Description	ATO	PTO
Redundant Electronics	7100917	XSL3000-REDELCT-Z and 7101366
Redundant Electronics for non-EU countries	7114551	7114540 and 7114565

Robots

Each library comes standard with four robots. Optionally you can order four additional robots for redundant robotics. See also "[Power Configurations](#)" on page 1-23.

Description	ATO	PTO
Redundant robots (four additional)	7100928	XSL8500-4BOT-Z-N
Redundant robots (four additional) for non-EU countries	7114550	7114564

Service Safety Door

Description	PTO
Service Safety Door	XSL8500-SVDR-Z-N

Touchscreen Op Panel

Description	PTO
Touch Screen Op Panel	XSL8500-TSOP-Z-N

Tape Drives

See the tape storage area on the corporate website for additional information:

<http://www.oracle.com/us/products/servers-storage/storage/tape-storage/overview/index.html>

For more information about encryption, see the *Oracle Key Management Overview and Planning Guide* on OTN.

Tape Drive Encryption

There are two encryption key management options:

- Application-managed — an application manages the keys using the data path.
- OKM-managed — Oracle Key Manager (OKM) appliance manages the keys using an ethernet connection outside the data path which is generally more secure.

Support for application-managed and OKM-managed encryption depends on the drive type.

T10000 Encryption All T10000 generations are encryption-ready, however enabling either application-managed or OKM-managed encryption requires a T10K-EKEY-A-N encryption activation permit. You can order an encryption activation permit at any

time (during initial purchase or afterwards). After purchasing the permit, use Virtual Operator Panel (VOP) to enable encryption. T10000C and T10000D drives no longer require encryption license keys to enable encryption.

LTO Encryption OKM-managed encryption requires an LTO-ENCRYPT-ACTIVE encryption activation permit. Application-managed encryption using the data path does not require a permit.

HP LTO 5 and 6 drives support both OKM-managed and application-managed encryption.

IBM LTO 5, 6, and 7 drives require an encryption card in the drive tray to interface with OKM (LTO 5 and 6 use the Belisarius card. LTO 7 may have either the Belisarius card or the LKM card. LTO 7 drive trays with LKM began shipping in July 2018). Note to use drive trays with LKM cards, the library must be in ADI mode.

You may purchase a drive with or without OKM compatibility. To upgrade a non-OKM-compatible IBM drive, you can purchase a kit to add the encryption card.

Re-using Encryption Activation Permits If you previously purchased an activation permit for an older drive, you can re-use the activation permit when upgrading to a newer generation drive of the same family, as long as the total number of encryption enabled drives does not exceed your total number activation permits for that family. For example, if you have six T10K-EKEY-A-N activation permits, you can only have a total of six encryption-enabled T10000 drives (regardless of generation).

T10000 Drives

There may be other configurations for the T10000 tape drives than those listed below. For more information, see the drive specific *Systems Assurance Guide* on the OTN.

T-series Tape Drive Type	Part Number
T10000D 16Gb Fibre Channel	7105797
T10000D 16Gb FICON	7105798
T10000 encryption activation permit for one drive ¹	T10K-EKEY-A-N

¹ See "[T10000 Encryption](#)" and "[Re-using Encryption Activation Permits](#)" above.

LTO Drives

LTO Tape Drive Type	Part Number
IBM LTO8 Fibre Channel no OKM compatibility	7118442
IBM LTO7 Fibre Channel with OKM compatibility	7113987
IBM LTO7 Fibre Channel no OKM compatibility	7113988
Encryption Upgrade Kit for IBM drives (Belisarius card)	7113290
LTO encryption activation permit for one drive ¹	LTO-ENCRYPT-ACTIVE

¹ See "[LTO Encryption](#)" and "[Re-using Encryption Activation Permits](#)" above

Conversion Kits

Tape drive conversion kits convert drives previously used in an SL3000 library for use in the SL8500 library.

Tape Drive Conversion Kit	Part Number
IBM LTO generation 3 or higher	7110127
HP LTO generation 3 or higher	7110128
T9840C/D	7110129
T10000A/B/C	7110130
T10000D	7110131

Tape Cartridges and Labels

To order tape cartridges or labels:

- Call 1.877.STK.TAPE
- E-mail tapemediaorders_ww@oracle.com

See the tape storage area on the corporate website for additional information:

<http://www.oracle.com/us/products/servers-storage/storage/tape-storage/overview/index.html>

Power Configurations

You must select a power redundancy and AC power configuration. Refer to "[Power Configuration Options](#)" on page 1-9 for more information.

Power Options	ATO	PTO
Delta Power	7100930	XSL8500-DELTAZ-N
Delta Power for non-EU countries	7114555	7114571
Wye Power	7100938	XSL8500-WYE-Z-N
Wye Power for non-EU countries	7114556	7114572
Single Phase Power	7100929	XSL8500-1PH-Z-N
Single Phase Power for non-EU countries	7114554	7114570

DC Power Supplies

The number of DC 1200W power supplies required depends on the power configuration (N+1 or 2N) and the number of components in the library. Refer to "[DC Power Supplies](#)" on page 1-11 to determine the number of power supplies required.

DC Power Supply Description	ATO	PTO
DC 1200W Power Supply ¹	7100931	XSL8500-DR-PWR-Z-N

¹ Power supply for tape drives and robotics

Hardware Activation Files

The following features are enabled with a hardware activation file. For information about downloading and installing activation files, see "[Activating Optional Features](#)" on page 5-1.

Library Feature Description	ATO	PTO
Dual TCP/IP host interface activation permit	7100932	XSL8500-DTCPIP-N
Multi-TCP/IP host interface activation permit		XSL8500-MTCPIP-N

Capacity Activation

For libraries with library firmware FRS_7.x and higher, use the table below for slot upgrade part numbers.

Active Capacity Description	ATO	PTO
100 Slot Upgrade activation permit	7100880	7100945
250 Slot Upgrade activation permit	7100881	7100946
500 Slot Upgrade activation permit	7100882	7100947
1,000 Slot Upgrade activation permit	7100883	7900948

Cables

The following sections provide information about the different interface cables. When ordering cables, keep this in mind:

- *Riser cables* can be used in computer rooms and are not classified according to flammability or toxic gas emissions.
- *Plenum cables* are designed for installation in air ducts and manufactured to meet UL standards for flammability and produce little smoke.

Ethernet Cables

The library uses Ethernet cables for TCP/IP connections, which include host and library-to-library communications.

Ethernet Cable Part Number Description	PTO
CAT5E, 8 ft, 24 AWG, Shielded	CABLE10187033-Z-N
CAT5E, 35 ft, 24 AWG, Shielded	CABLE10187034-Z-N
CAT5E, 50 IN, 24 AWG, Shielded	CABLE10187035-Z-N

Fiber-Optic Cables

LC connectors are the industry standard for all 2 Gbps or higher Fibre Channel devices. SC connectors are the standard for 1 Gbps Fibre Channel devices such as the T9840A tape drive. The SL8500 drive tray requires LC plugs for connection on the rear panel. When re-using T9840A tape drives, you will need to use an SC to LC adapter. The SL8500 drive tray only supports LC connectors.

LC-LC 50/125 Micron Fiber-Optic Cables	ATO	PTO
50 m (164 ft) FC cable OM4, 50/125 Duplex riser	7106951	7106952
50 m (164 ft) FC cable OM4, 50/125 Duplex plenum	7106953	7106954
3 m (9.8 ft) Duplex riser	CABLE10800340-Z-A	CABLE10800340-Z-N
5 m (16.4 ft) Duplex riser	CABLE10800341-Z-A	CABLE10800341-Z-N
10 m (32.8 ft) Duplex riser	CABLE10800310-Z-A	CABLE10800310-Z-N
10 m (32.8 ft) Duplex plenum	CABLE10800313-Z-A	CABLE10800313-Z-N

LC to LC, 9/125 Micron Two Gigabit Fiber-Optic Cables	Part Number
10 m (32.8 ft) Duplex, Riser	CABLE10800331-Z-N
50 m (164 ft) Duplex, Riser	CABLE10800333-Z-N
100 m (328 ft) Duplex, Riser	CABLE10800306-Z-N

LC to LC, 9/125 Micron Two Gigabit Fiber-Optic Cables	Part Number
10 m (32.8 ft) Duplex, Plenum	CABLE10800330-Z-N
50 m (164 ft) Duplex, Plenum	CABLE10800332-Z-N
100 m (328 ft) Duplex, Plenum	CABLE10800305-Z-N

ESCON Cables	Part Number
13 m (40 ft) Riser	CABLE10800289-Z-N
107 m (350 ft) Riser	CABLE10800292-Z-N
13 m (40 ft) Plenum	CABLE10800285-Z-N
31 m (100 ft) Plenum	CABLE10800286-Z-N
107 m (350 ft) Plenum	CABLE10800288-Z-N

Support

Service and support representatives are available to assist with hardware and software problem resolution. During the initial order and installation planning, you can contact local and remote support with any questions.

Service Delivery Platform

The Service Delivery Platform (SDP) is a support enhancement solution that provides faster problem resolution, analysis, trending, and improved diagnostic capabilities. The SDP consists of a smart appliance placed at the customer site that connects to the library and any StorageTek T-series tape drives. The SDP collects device events and alerts support analysts, providing remote diagnosis and auto service requests (ASR).

For more information, customers should contact an Oracle representative, or visit: <http://www.oracle.com/technetwork/systems/asr/documentation/oracle-installed-storage-330027.html>

Oracle Premier Support for Systems

Oracle Premier Support is a fully integrated support solution which features:

- Complete system coverage and unlimited 24/7 access to Oracle system specialists
- Essential product updates, such as firmware
- Personalized, proactive IT support and rapid-response hardware service

For more information, visit: <http://www.oracle.com/us/support/index.html>

Contacting Support

The Oracle Global Customer Support Contacts Directory can be found at: <http://www.oracle.com/us/support/contact-068555.html>

To submit, update, or review service requests, go to My Oracle Support at: <https://support.oracle.com/>

Installation Planning

This chapter provides planning information and requirements to consider before installation of the SL8500 library. Key planning considerations include:

- [Dimensions and Weights](#)
- [Installation Site Requirements](#)
- [Cabling](#)
- [Fire Suppression Planning](#)
- [Pass-thru Port Planning](#)
- [Time and Personnel](#)
- [Installation Tools](#)
- [Transporting the Library](#)

Dimensions and Weights

Ensure there is adequate space for the library, future expansions, and service areas.

Table 2–1 Library Weights and Measures

Component	Length	Width	Height	Empty Weight ¹	Full Weight ²
DEM	30.0 in. (76.2 cm)	67.25 in. (170.8 cm)	93.15 in. (236.6 cm)	1,300 lbs (590 kg)	2,725 lbs (1236 kg)
RIM	30.0 in. (76.2 cm)	67.25 in. (170.8 cm)	93.15 in. (236.6 cm)	775 lbs (352 kg)	1,825 lbs (828 kg)
SEM	37.5 in. (95.25 cm)	67.25 in. (170.8 cm)	93.15 in. (236.6 cm)	850 lbs (386 kg)	1,775 lbs (805 kg)
CIM ³	37.5 in. (95.25 cm)	67.25 in. (170.8 cm)	93.15 in. (236.6 cm)	1,483 lbs (673 kg)	2,020 lbs (916 kg)
PTP frame	59.4 in. (150.8 cm)	6.76 in. (17.17 cm)	91 in. (231.1 cm)	N/A	266 lbs (121 kg)
Front Service Area	26.0 in. (66 cm)	71.25 in. (181 cm)	N/A	N/A	N/A
Rear Service Area	35.0 in. (89 cm)	74.30 in. (188.7 cm)	N/A	N/A	N/A

¹ Base library configuration with N+1 power and four robots; without tape drives or tape cartridges.

² All tape drives, DC power supplies, and cartridges, with 2N power, four robots, doors and facade, but does not include a full rack.

³ Weight values are for a CIM with the bulk CAP

Figure 2-1 Sample Library Layout (Top View)

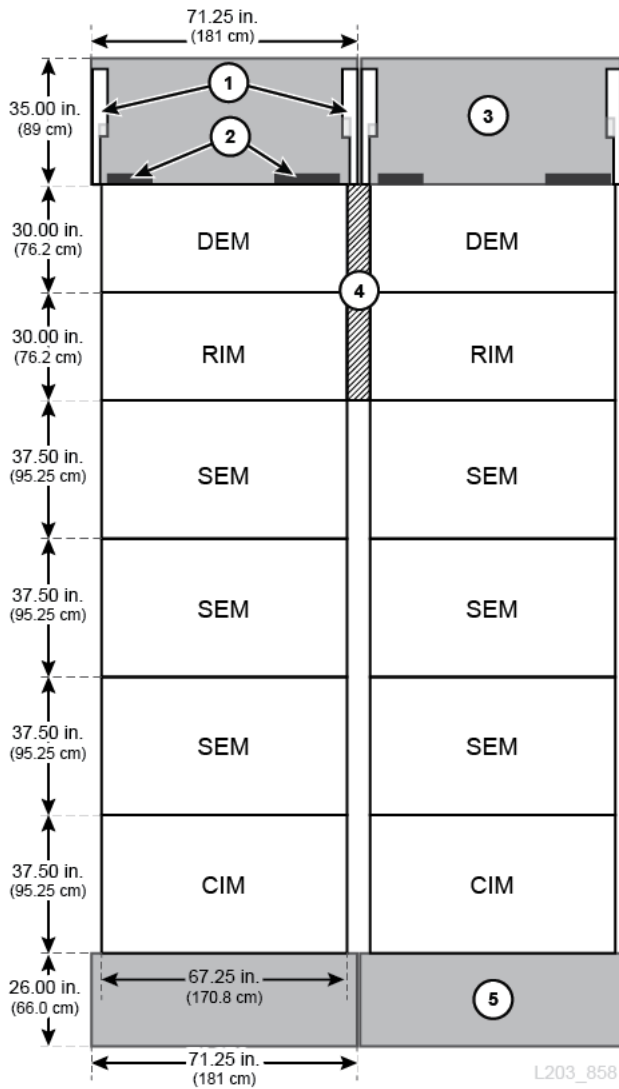


Figure Legend:

- 1. Rear doors (open)
- 2. Cable cut outs
- 3. Rear service area
- 4. PTP frame
- 5. Front service area

Tape Drives and Cartridges Weights and Dimensions

The weights below are for reference only, check the drive specific documentation for exact weights and measures.

Table 2-2 Drive Tray Weights and Measures

Drive Tray	Height	Width	Length	Weight
Drive tray only	10.8 cm (4.25 in.)	16.5 cm (6.5 in.)	85 cm (33.5 in.)	4.3 kg (9.5 lb)

Table 2–3 Tape Drive and Cartridge Weights

Drive Type	Tape Drive Weight (with drive tray)	Cartridge Tape Weight
T9840	8.2 kg (18.0 lb)	262 g (9.2 oz)
T9940	11 kg (24.3 lb)	262 g (9.2 oz)
T10000	9.4 kg (20.75 lb)	264 g (9.31 oz)
LTO	6.9 kg (15 lb)	210 g (7.4 oz)
SDLT	6.7 kg (14.8 lb)	222.5 g (7.85 oz)

Shipping Weights and Dimensions

The SL8500 library is delivered on pallets that can measure up to 2.5 m (8.25 ft) in length and weigh up to 481 kg (1060 lb). Ensure there are forklifts or pallet jacks that can handle these pallets. If moving between floors, verify the elevator can handle these loads.

Note: The values listed are estimates and subject to change. The values are for a bulk CAP library.

Total Pallet Weights

The total weight of the pallets for various library configurations are listed below. If ordering the optional CAP, increase the total weight by 33 kg (73 lb). CAPs are shipped on their own pallet. Similarly, if ordering redundant robotics, increase the total weight by 65 kg (143 lb). Four additional robots are shipped on an additional #10 pallet. Additional pallets not listed below may be shipped depending on the library features ordered.

Table 2–4 Total Pallet Weights for a Selected Library Configuration

Configuration	Pallets Shipped	Approximate Total Weight
Basic Library	1, 2, 3, 4, 5, 6, 7, 8, 9, 9A, 10	2481 kg (5,470 lb)
One SEM	1, 2, 3, 4, 4A, 5, 6, 7A, 8, 8A, 9, 9A, 10	3090 kg (6,814 lb)
Two SEMs	1, 2, 3, 4, 4A (x2), 5, 6, 7B, 8, 8A (x2), 9, 9A, 10	3709 kg (8,178 lb)
Three SEMs	1, 2, 3, 4, 4A (x3), 5, 6, 7C, 8, 8A (x3), 9, 9A, 10	4336 kg (9,562 lb)
Four SEMs	1, 2, 3, 4, 4A (x4), 5, 6, 7D, 8, 8A (x4), 9, 9A, 10	4887 kg (10,777 lb)
Five SEMs	1, 2, 3, 4, 4a (x5), 5, 6, 7E, 8, 8A (x5), 9, 9A, 10	5436 kg (11,987 lb)

Shipping Pallets Weights and Dimensions

The individual pallet sizes and weights are listed below:

Table 2–5 Shipping Pallets –Weights and Dimensions

Pallet	Description	Height	Width	Length	Weight
1	Lower DEM	205 cm (81 in.)	97 cm (38 in.)	185 cm (73 in.)	480 kg (1058 lb)
2	Upper DEM	87 cm (34 in.)	97 cm (38 in.)	185 cm (73 in.)	160 kg (353 lb)
3	Lower RIM	198 cm (78 in.)	99 cm (39 in.)	183 cm (72 in.)	293 kg (646 lb)
4	Upper RIM	94 cm (37 in.)	94 cm (37 in.)	188 cm (74 in.)	113 kg (249 lb)
4A	SEM - Frame (one per SEM)	120 cm (47 in.)	105 cm (41 in.)	244 cm (96 in.)	357 kg (787 lb)
5	CIM	120 cm (47 in.)	82 cm (32 in.)	244 cm (96 in.)	332 kg (732 lb)
6	Z-frame	76 cm (30 in.)	66 cm (26 in.)	246 cm (97 in.)	136 kg (300 lb)

Table 2–5 (Cont.) Shipping Pallets –Weights and Dimensions

Pallet	Description	Height	Width	Length	Weight
7	Basic library rails (no SEMs)	33 cm (13 in.)	112 cm (44 in.)	125 cm (49 in.)	100 kg (220 lb)
7A	Rail Kit for one SEM	33 cm (13 in.)	112 cm (44 in.)	218 cm (86 in.)	182 kg (400 lb)
7B	Rail Kit for two SEMs	33 cm (13 in.)	112 cm (44 in.)	315 cm(124 in.)	272 kg (600 lb)
7C	Rail Kit for three SEMs	51 cm (20 in.)	112 cm (44 in.)	315 cm(124 in.)	372 kg (820 lb)
7D	Rail Kit for four SEMs	51 cm (20 in.)	112 cm (44 in.)	315 cm(124 in.)	395 kg(871 lbs)
7E	Rail Kit for five SEMs	46 cm (18 in.)	107 cm (42 in.)	310 cm(122 in.)	416 kg (917 lb)
8	Base Module Arrays	122 cm (48 in.)	115 cm (45 in.)	150 cm (59 in.)	161 kg (355 lb)
8A	SEM Arrays (one per SEM)	122 cm (48 in.)	115 cm (45 in.)	153 cm (60 in.)	171 kg (377 lb)
9	Covers and Rear Doors	112 cm (44 in.)	114 cm (45 in.)	254 cm(100 in.)	346 kg (762 lb)
9A	Bulk CAP, safety door, op panel	112 cm (44 in.)	114 cm (45 in.)	254 cm(100 in.)	296 kg (652 lb)
10	4 Robots (additional pallet with redundant robotics)	72 cm (28 in.)	97 cm (38 in.)	140 cm (55 in.)	65 kg (143 lb)
PF PLT	Performance Kit	61 cm (24 in.)	107 cm (42 in.)	107 cm (42 in.)	38 kg (84 lb)

Package Component Weights and Dimensions

The package weights and dimensions for additional components are listed below:

Table 2–6 Component Package Weights and Dimensions

Description	Height	Width	Length	Weight
Rotational CAP	36 cm (14 in.)	38 cm (15 in.)	229 cm (90 in.)	22 kg (48 lb)
Façade- Upper and Lower (pallet 9)	13 cm (5 in.)	49 cm (19 in.)	242 cm (95 in.)	19 kg (40 lb)
Copper Kit for Rails 76 in. (pallet 7A)	8 cm (3 in.)	44 cm (17 in.)	196 cm (77 in.)	9 kg (20 lb)
Copper Kit for Rails 114 in. (pallet 7B)	8 cm (3 in.)	92 cm (36 in.)	178 cm (70 in.)	12 kg (25 lb)
Copper Kit for Rails +114in. (pallet 7C)	8 cm (3 in.)	92 cm (36 in.)	178 cm (70 in.)	14 kg (30 lb)
Drive Bay	94 cm (36 in.)	59 cm (23 in.)	83 cm (32 in.)	37 kg (80 lb)
HBS	16 cm (6 in.)	26 cm (10 in.)	61 cm (24 in.)	5 kg (10 lb)
Op Panel/Display	31 cm (12 in.)	41 cm (16 in.)	46 cm (18 in.)	11 kg (23 lb)
PDU	28 cm (11 in.)	74 cm (29 in.)	74 cm (29 in.)	9 kg (19 lb)
PDU N+1	21 cm (8 in.)	61 cm (24 in.)	69 cm (27 in.)	9 kg (19 lb)
Power Supplies	23 cm (9 in.)	26 cm (10 in.)	46 cm (18 in.)	5 kg (10 lb)
Drive Tray - Common SL8500	31 cm (12 in.)	33 cm (13 in.)	102 cm (40 in.)	14 kg (30 lb)
Drive - Common	107 cm (42 in.)	107 cm (42 in.)	138 cm (54 in.)	173 kg (380 lb)
LTO Drive on SL8500 Tray	31 cm (12 in.)	33 cm (13 in.)	102 cm (40 in.)	12 kg (26 lb)
9940 Drive on SL8500 Tray	31 cm (12 in.)	33 cm (13 in.)	125 cm (49 in.)	18 kg (38 lb)
9940 Drive	107 cm (42 in.)	72 cm (28 in.)	127 cm (50 in.)	118 kg (260 lb)
Rack Module (19" Rack)	64 cm (25 in.)	51 cm (20 in.)	92 cm (36 in.)	19 kg (40 lb)
Safety Door	33 cm (13 in.)	66 cm (26 in.)	229 cm (90 in.)	20 kg (42 lb)

Installation Site Requirements

- [Physical Space](#)
- [Floor Requirements](#)
- [Ceiling Requirements](#)

- [Environmental Requirements](#)

Physical Space

Ensure there is adequate space in elevators, passageways, and the construction area. If modules will be added in the future, ensure there is enough space to expand the library (see "[Dimensions and Weights](#)" on page 2-1).

Floor

Ensure that the weight and coplanar requirements are satisfied (see "[Floor Requirements](#)" on page 2-5").

Transportation

If the equipment must be transported on elevators, the elevator cars must be capable of safely handling the weight. Additionally, ensure that the components can pass through doorways and fit in elevators. For more information, see "[Shipping Weights and Dimensions](#)" on page 2-3 and "[Transporting the Library](#)" on page 2-14.

Construction Area

The minimum working area (not including the space required for the pallets) is approximately 56 m² (600 ft²).

Waste Disposal

Sales and service personnel should plan with customers on the disposal of all packing material. Determine if waste bins or recycling containers will be provided on site, or whether an independent company will handle the disposal at additional cost.

Floor Requirements

A raised floor is not required if the site meets all environmental requirements and has adequate airflow (see "[Environmental Requirements](#)" on page 2-7).

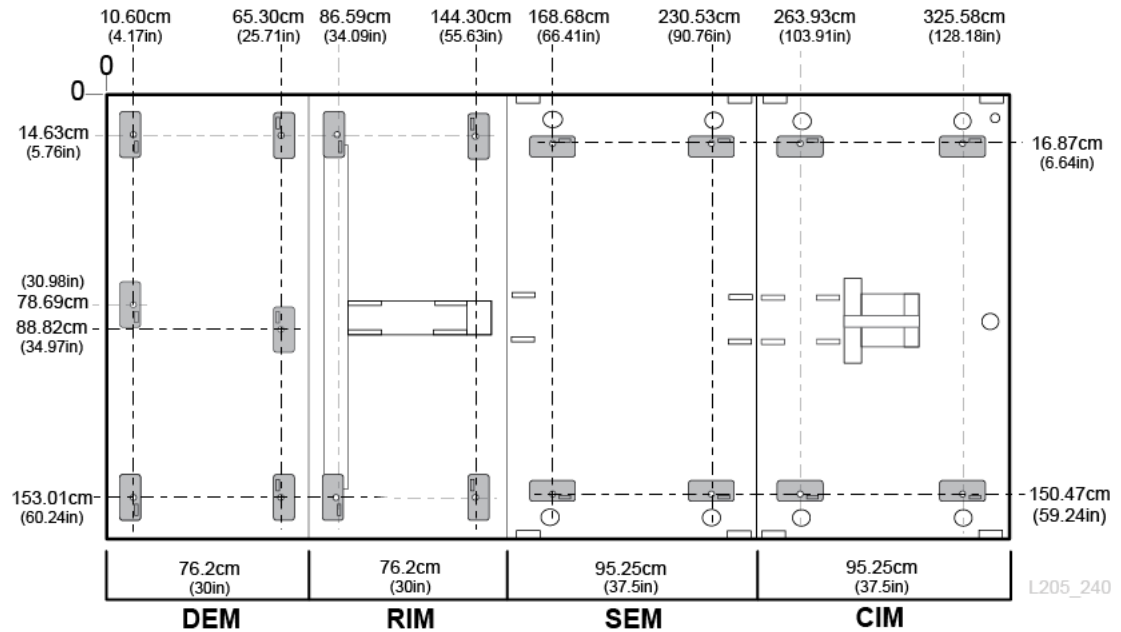
Weight and Load Distribution

Ensure all elevators transporting the library can safely handle the weight (see "[Shipping Weights and Dimensions](#)" on page 2-3).

Ensure the site floor can support the weight of the library (see [Table 2-1](#), "[Library Weights and Measures](#)"). The floor must be capable of supporting 454 kg (1,000 lb) per weight distribution pad, which measure 4 by 8 inches. There are four distribution pads per module, except for the DEM which has six pads.

The 454 kg (1,000 lb) weight represents the modules, plus a factor of safety to accommodate for torque values, installation procedures, component variances, and the floor construction. When adjusting the weight pads during installation, the load distribution may not be evenly spread to each pad—one or more of these pads may be subject to higher loads that near the 454 kg (1,000 lb) value.

Figure 2-2 Weight Pad Locations



Co-planar Requirements

Robots must travel along a level plane throughout the library. Any excessive out-of-plane conditions can cause frame damage, binding, premature wear, or damage to the robots.

The site floor should be laser-leveled before receiving any equipment. The library modules must be level across the width (from left to right) and installed on the same horizontal plane to within ± 25 mm (1 in.) tolerance. The floor variations cannot exceed $28 \text{ mm} \pm 0.8 \text{ mm}$ (1.1 in. ± 0.0325 in.) throughout the length of the library.

For future library expansion, check the entire floor adjacent to the library for a library complex or in front of the library for SEMs. Adjust each library module so that the rails are on the same plane.

Ceiling Requirements

The DEM and RIM contain an upper module and a lower module. Installing the upper module requires adequate ceiling clearance.

- *Recommended method:* Hang the modules on the clamps then swing the upper modules into place. This method requires at least 239 cm (94 in.) of floor-to-ceiling clearance and a minimum of three people to lift the module.
- *Optional method:* Remove the clamps (for clearance), lift the upper modules up and slide them over the lower modules. This requires four people to accomplish (one person on each corner) and 236.6 cm (93.15 in) of floor-to-ceiling clearance.

CAUTION: Check for any equipment that may hang from the ceiling before installing the upper modules.

Height Adjustments

The library height specifications are:

- Minimum height =231.4 cm (91 in.)
- Maximum height =236.6 cm (93.15 in.)

Adjust the floor-to-module distance to meet the "[Co-planar Requirements](#)" on page 2-6. The floor-to-module distance should be adjusted to 25.4 mm \pm 0.8 mm (1 in. \pm 0.0325 in.). The absolute minimum floor-to-module height permitted is 19 mm (0.75 in.) the maximum height is 47mm (1.85 in.).

Clearances

The table below lists the minimum library-to-ceiling clearances for installation of side covers, front and rear doors, and the upper modules. To calculate maximum height, use the library height and add the overhead clearance.

Table 2-7 Overhead Clearances

Description	Overhead Clearance
Side cover installation	1.9 cm (0.75 in.)
Upper RIM installation	1.3 cm (0.5 in.)
Facade installation, Upper DEM installation	2.5 cm (1 in.)
CIM and SEM roof installation	4.5 cm (1.75 in.)

Environmental Requirements

For optimal reliability, maintain the environment between the recommended ranges.

Description	Temperature	Relative Humidity (non-condensing)	Wet Bulb Maximum	Maximum Altitude
<i>Operating</i>	15 to 32°C (60 to 90°F) dry bulb	20% to 80% ¹	29.2°C (84.5°F)	3.05 km (10,000 ft)
<i>Storage</i>	10 to 40°C (50 to 104°F)	10% to 95%	35.0°C (95.0°F)	3.05 km (10,000 ft)
<i>Shipping</i>	-40 to 60°C (-40 to 140°F)	10% to 95%	35.0°C (95.0°F)	15.24 km (50,000 ft)

¹ Oracle recommends maintaining a relative humidity of 40% to 50%.

Airborne Contaminants

Airborne particulates can damage tape libraries, drives, and tapes. The operating environment for the tape 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 2–8 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.

Seismic or Earthquake Ratings

The requirements for seismic compatibility vary dramatically throughout the world. It is recommended that you work with local experts familiar with the local code and requirements. Professional Services can also be engaged to help coordinate this activity.

Airflow

In the SL8500 library, air flows front-to-back (CIM-to-DEM). The airflow required depends on the number of components installed in the library. Plan for the cooling requirements of all data center equipment.

Table 2–9 Airflow Requirements (at 1atm, 22°C/72°F)

Component	Required Airflow	Quantity
Tape drive	0.57m ³ /min. (20 ft ³ /min.) each	64 max
DC power supply	0.71m ³ /min. (25ft ³ /min.) each	24 max
Rack Modules	13.59m ³ /min. (480ft ³ /min.) each	4 max
Electronics Module	4.42m ³ /min. (156ft ³ /min.) each	1

A maximum configured library with 64 tape drives, 24 DC power supplies, four rack modules, and the electronic control module would require 112.3 m³/min. (3956 ft³/min.) of air supply to avoid recirculation.

Most configurations are smaller than this and require less airflow. For example, 12 tape drives, 12 DC power supplies, four robots, one rack module, and the electronic control module would require 33.3 m³/min. (1176 ft³/min.).

Power Requirements

A licensed electrician should install the library's external AC wiring. For more information about power requirements of the SL8500, see ["Power Configuration Options"](#) on page 1-9.

Cabling

The rear library doors have notches on the top and bottom for routing interface and power cables to the tape drives and PDUs. In the table below, left and right are when viewing the rear of the library.

Table 2–10 Door Notch Dimensions

Location	Length	Width
Top Left	25 cm (10 in.)	3.8 cm (1.5 in.)
Bottom Left	40.6 cm (16 in.)	7 cm (2.75 in.)
Top Right	25 cm (10 in.)	3.8 cm (1.5 in.)
Bottom Right	33 cm (13 in.)	7 cm (2.75 in.)

Ethernet, power, and interface cables should be routed through floor or ceiling cutouts of the site. Cutouts should be located near the rear corners of the DEM. The recommended "rough-in" AC feed (power cable) measured from the top of the raised floor to the input of the power distribution unit is 46 cm (18 in.).

Make sure any cabling or conduit inside the library does not interfere with the removal and replacement of any components, such as the DC power supplies, electronics control module, tape drives, or accessory rack equipment. See [Figure 2–3](#) below.

If the existing fire suppression cutouts are not being used, use flexible conduit or cables to route power connections to the AC power supply from above the library. If the fire suppression cutouts are being used, new cutouts should be made in the frame to route conduit or cables to the AC power supply. Optional routing to the left of the tape drive bays may be used for clearance. However, use flexible conduit for the tape drive DC power supply grid.

Figure 2-3 Conduit and Cable Routing (Rear View)

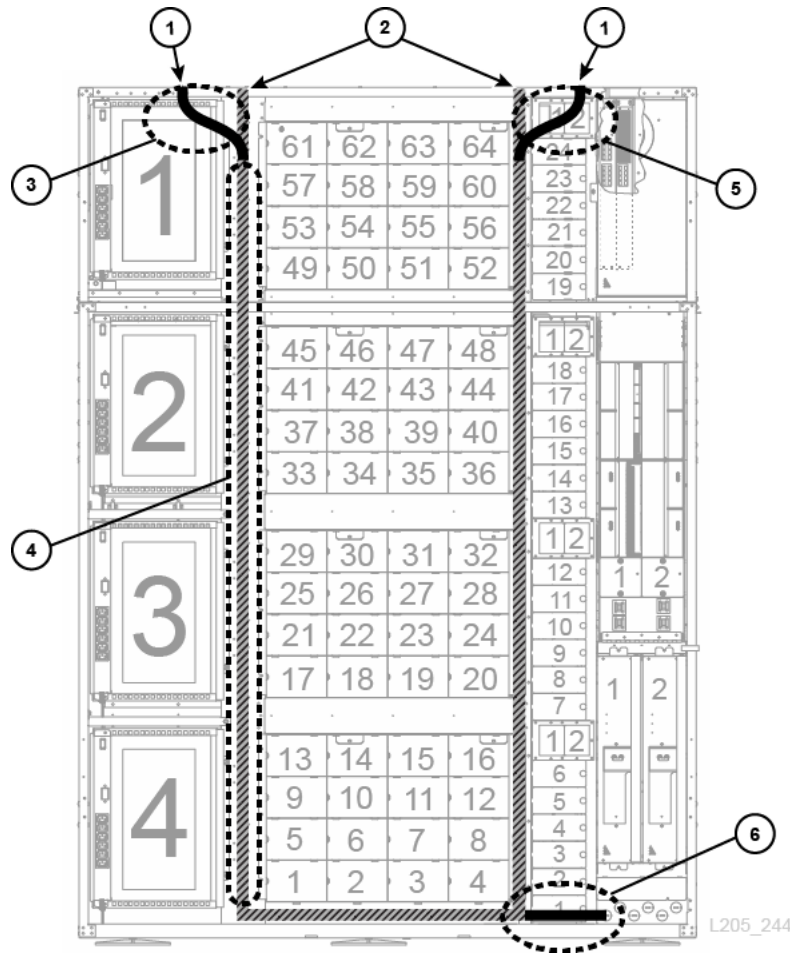




Table 2-11 Legend for Figure 2-3

	Flexible Conduit
	Rigid Conduit

1. Fire suppression cutouts (route cables here if not using fire suppression)
2. New frame cutouts (if fire suppression cutouts are being used)
3. Obstruction to avoid — accessory racks and equipment
4. Optional routing used for clearance, be aware of possible tape drive interference and ethernet cables
5. Obstruction to avoid — HBS and internal switches
6. Obstruction to avoid — tape drive DC power supply

Fire Suppression Planning

The library’s smoke detector cuts all power to the library when smoke is detected. You can restore power to the library by resetting the AC circuit breakers on the PDUs.

The library does not ship with a fire suppression system, but there are two 5 cm (2 inch) diameter nozzle openings in each module (see Figure 2-4). Plates, 7 cm (2.75

inch) square and 1.2 mm (0.048 inch) thick, cover the openings and can be drilled to custom fit nozzles. Nozzles must be clear of robotic operations and cannot protrude more than 2.54 cm (1 inch) into the library. Professional Services can assist with fire suppression planning (contact your Oracle sales representative).

Figure 2-4 Fire Suppression Ceiling Access (viewed from the top of the library)

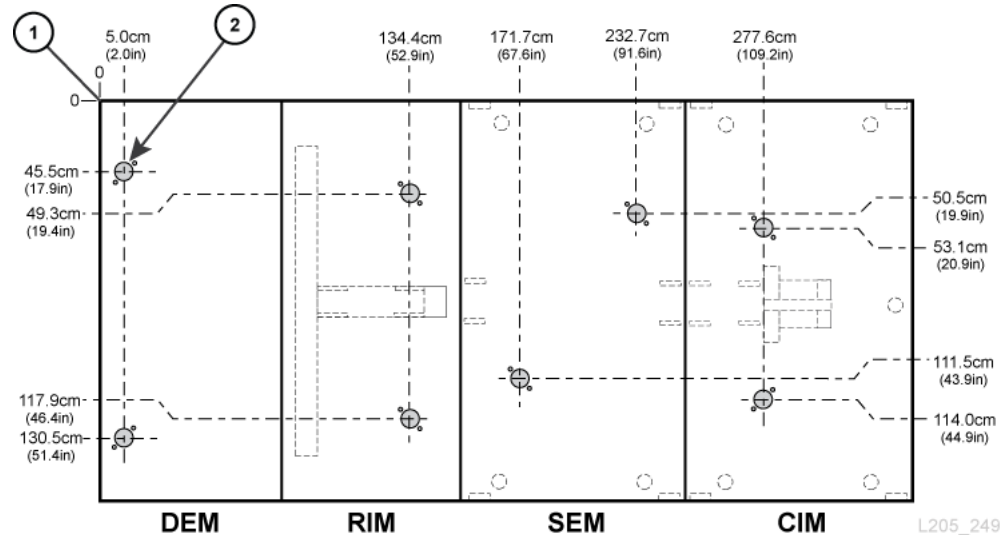


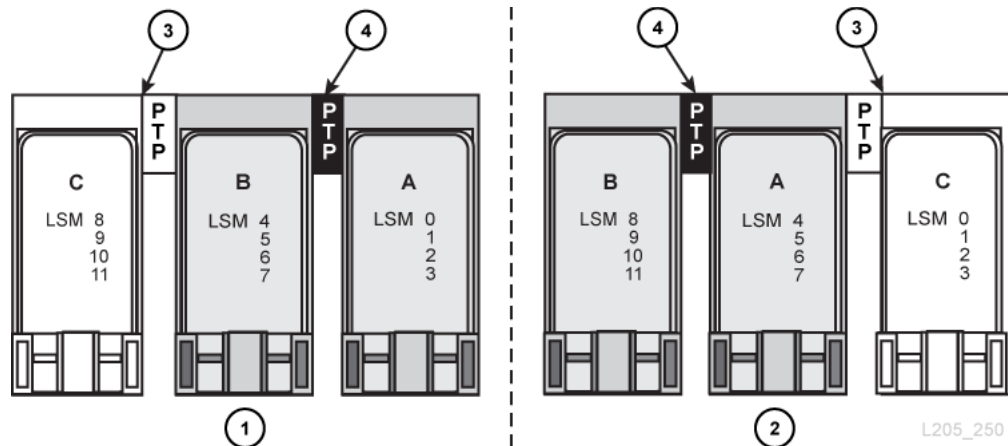
Figure Legend:

1. Datum (measurements are without covers or doors)
2. Nozzle cutout

Pass-thru Port Planning

Although the library complex can expand in either direction, adding a new library to the left is non-disruptive. To expand the library complex in the other direction, you must bring the library offline to re-configuration the system and re-IPL the library. [Figure 2-5](#) shows two examples of a three-library complex.

- Example 1, on the left, shows the preferred non-disruptive method of adding another library (C) to the left of the library complex.
- Example 2, on the right, shows the disruptive method. Adding another library (C) to the right of the library complex requires a reconfiguration of LSM numbering.

Figure 2-5 Pass-thru Port Planning Example**Figure Legend:**

1. Preferred, non-disruptive method of installation
2. Disruptive method of installation
3. New library and PTP
4. PTP connecting existing libraries

Time and Personnel

When preparing for an SL8500 installation, it is important to consider personnel requirements, which include safe lifting and time.

Lifting

The upper drive bay and robotic rail modules must be manually lifted for installation. These modules weigh approximately 40 kg (85 lb) and are raised a height of 1.7 m (5.5 ft). There are two methods for installing the upper module. Be aware that one of the methods requires four people to complete. For more information about the upper module installation methods, see "[Ceiling Requirements](#)" on page 2-6.

Time

The estimated time to physically install a library is about 24 hours. This is based on three qualified people working approximately eight hours each. For initial planning, allow for two days to completely install the library. This provides time to ensure a quality installation and allows for training. Time factors to consider include:

- Guiding the pallets from the dock to the installation site
- Removing packaging material when floor space is limited
- Lifting requirements of 40 kg (85 lb) to attach upper frame assemblies
- Configuring the library and up to 64 drives with switches and cables

Installation Tools

The table below lists the tools contained in the installation kit (part number 24100250). The installation kit is currently not available for order. There are sufficient kits in the field to support installation needs. Oracle service representatives should obtain a kit from their local area and ensure that the following tools are in the kit.

- Kit dimensions are: 99 cm (39 in.) long, 71 cm (28 in.) wide, and 51 cm (20 in.) high. The kit comes with an extendable handle and wheels.

Table 2–12 Installation Tools for Tool Kit

Description	Part Number
Copper rail connector extraction tool	313921001
Frame jacks with handles (adjustable jack)	313880803 (check availability)
Serial cable for laptop	24100134
Crossover cable for laptop	24100163
Tape drive power kit	314831204
Torx screwdriver and bits	Obtain locally
3/8-in. drive ratchet wrench with 6 in. extension 1/4-in., 3/8-in., and 5/16-in. socket for 3/8-in. drive 1/4-in. and 5/16-in. hex(Allen) on 3/8-in. drive	Obtain locally
3/4-in., 5/8-in., and 9/16 in. combination wrench	Obtain locally
25 ft tape measure, 2 ft level	Obtain locally
Utility knife, wire side cutters, rubber mallet	Obtain locally
Flashlight, step stool, work gloves, safety glasses	Obtain locally
Volt/Ohmmeter	Obtain locally

Track Stop Installation Tools

Both the rack alignment tool kit (418644901) and original track alignment (419894001) tool have been distributed to regional depots. Service representatives can order and check out the special tools as typically done for spare parts. Use two rack alignment kits and two track alignment tools to work both sides of the library in parallel. Installation time for five SEMs is approximately 5 hours.

The rack alignment tool kit (418644901) includes:

- Short tool (418623102)
- Long tool (418623002)
- Serialized shipping container

Additional tools to be acquired locally:

- 1/16 hex Allen driver — required
- Step stool and knee pads — recommended
- SL8500 Array Extraction Tool (24100275) — if available

The rack stops (418626901) are packaged in kits of 17 stops and are used in groups of 16 so spares will always be available.

Table 2–13 Rack Stops Per Library

SEMs	Rack Stops Per Rail	Total Rack Stops Per Library	Quantity of PN 418626901
0	1	16	1
1	1	16	1
2	1	16	1
3	1	16	1
4	5	80	5

Table 2–13 (Cont.) Rack Stops Per Library

SEMs	Rack Stops Per Rail	Total Rack Stops Per Library	Quantity of PN 418626901
5	6	96	6

Transporting the Library

There are special considerations to follow when transporting the components of the library to the installation site. If necessary, you can unpack the library components from the pallets to move them to the installation site. Follow the unpacking instructions on the outside packaging material or installation manual. The tables that follow list the specifications for these components.

Adjustable Jacks

You may need a special jack to assist in unpacking, moving, and positioning the larger modules. This jack is part of the tool kit, which is required for an installation (see "[Installation Tools](#)" on page 2-12).

Module Components

The DEM and RIM come in two parts: a lower and an upper module. The lower DEM is the heaviest component of the library. Use care when moving this component.

The CIM is not pre-assembled and must be constructed on-site. Allow 3 m (10 ft) of space at the end of the box or pallet to unpack these components. A rear section and a front section, called the Z frame must be attached to the floor of the CIM.

The SEM is not pre-assembled and must be constructed on-site. Allow 3 m (10 ft) of space at the end of the box or pallet to unpack these components.

Module	Pallet	Height	Width	Depth	Weight
DEM lower	1	173 cm (68 in.)	168 cm (66 in.)	76 cm (30 in.)	386 kg (850 lb)
DEM upper	2	58.5 cm (23 in.)	168 cm (66 in.)	76 cm (30 in.)	37 kg (80 lb)
RIM lower ¹	3	176.5 cm (69.5 in.)	168 cm (66 in.)	76 cm (30 in.)	--
RIM upper ¹	4	54.6 cm (21.5 in.)	168 cm (66 in.)	76 cm (30 in.)	--
SEM floor	4A	167.6 cm (66 in.)	94.6 cm (37.25 in.)	3.8 cm (1.5 in.)	67 kg (147 lbs)
SEM ceiling	4A	167.6 cm (66 in.)	95.25 cm (37.5 in.)	3.8 cm (1.5 in.)	25 kg (54 lbs)
SEM center wall	4A	227.3 cm (89.5 in.)	44.5 cm (17.5 in.)	95.25 cm (37.5 in.)	80 kg (175 lbs)
SEM outer walls	4A	231 cm (91 in.)	186.7 cm (73.5 in.)	4.4 cm (1.75 in.)	58 kg (127 lbs)
CIM floor	5	167.6 cm (66 in.)	94.6 cm (37.25 in.)	3.8 cm (1.5 in.)	84 kg (185 lbs)
CIM ceiling	5	167.6 cm (66 in.)	95.25 cm (37.5 in.)	3.8 cm (1.5 in.)	25 kg (54 lbs)
CIM walls	5	231 cm (91 in.)	186.7 cm (73.5 in.)	4.4 cm (1.75 in.)	58 kg (127 lbs)
CIM Z-frame	6	227.3 cm (89.5 in.)	44.5 cm (17.5 in.)	51 cm (20 in.)	77 kg (170 lbs)
Front doors (bulk CAP)	9	231 cm (91 in.)	61.5/66 cm (24.25/26 in.)	8.25 cm (3.25 in.)	43 kg (95 lbs)
Rear doors	9	231 cm (91 in.)	85.7 cm (33.75 in.)	10 cm (4 in.)	--
Rack assembly	--	48.26 cm (19 in)	33.65/38 cm (13.25/15 in.)	--	--

¹ Diagonal stabilizers are attached to help move and handle the RIM.

Rails

Rails are on pallet 7 and are composed of five major parts:

1. Clamps (installed at the factory)
2. Rail extrusions
3. Bottom floor extrusion
4. Geared tracks
5. Power/signal strips

Depending on the number of SEMs, the rails can be the longest components in the library. The extrusion lengths are 1 m (3.3 ft), 2 m (6.4 ft), 3 m (9.5 ft), and 3.9 m (12.6 ft).

Installing StorageTek Library Console

Oracle's StorageTek Library Console (SLC) is a GUI application for configuring, monitoring, and managing the SL8500 tape library.

Note: Customer data on tape cartridges is never available to SLC or the library. The external data interface of the tape drives is separate from the library infrastructure.

- [Selecting an SLC Version](#)
- [Downloading the SLC Media Pack](#)
- [Installing Standalone \(Remote\) SLC](#)
- [Installing Web-launched SLC](#)
- [Upgrading SLC on the Local Op Panel](#)

Selecting an SLC Version

You can perform the procedures in this document with any of the following SLC versions, unless otherwise noted.

- **Standalone** — SLC runs remotely from any system that has a network connection to the library.
- **Web-launched** — SLC is installed on a web server (or server running a web application such as Tomcat, Apache or GlassFish), allowing individual clients to use a browser to access SLC.
- **Local Operator Panel** — SLC is pre-installed on the library, enabling library operators to access most SLC functions directly at the library.

Downloading the SLC Media Pack

The media pack includes the web-launched SLC server, web-launched SLC client, and the standalone SLC.

1. Go to the Oracle Software Delivery Cloud at:
<http://edelivery.oracle.com/>
2. Click **Sign In/Register**.
3. Search for **SLC**, and then select **Oracle StorageTek Library Console** version. Click **Select Platform**.

4. Verify Oracle StorageTek Library Console is listed under Selected Products, and then click **Continue**.
5. Read the terms and restrictions. Indicate your acceptance, and then click **Continue**.
6. Save the zip file. Extract the media pack to the desired location.

Installing Standalone (Remote) SLC

1. Uninstall all previous versions of SLC before updating.
2. Download and extract the standalone SLC media pack (see "[Downloading the SLC Media Pack](#)" on page 3-1).
3. Select the SLC installer file for your operating system (refer to the media pack readme).
4. Review the information. Click **Next**.
5. Specify where to install SLC. Click **Next**.
6. Specify where to create the SLC shortcut icons. Click **Next**.

Note: On Solaris, you cannot choose the default root directory. Oracle recommends `/u-sr/bin` or a similar location.

7. Verify the information is correct. Click **Install**.
8. Click **Done**.

Supported Platforms

- Solaris 10 SPARC, Solaris 10 x86
- Windows Server 2008 SP2 64-bit, Windows 2012 Enterprise Server
- Windows 7 SP1 64-bit, Windows 8 64-bit, Windows 8.1 64-bit
- Oracle Unbreakable Linux 5 (2.6.18) 32-bit
- SUSE Enterprise Linux 10.2 (2.6.16) 32-bit

Security Considerations

SLC interfaces with the primary library interface (PLI) over SSL, which provides a secure communication path between the library and the SLC session. This prevents unauthorized network users from monitoring library activity.

Installing Web-launched SLC

You only need to install web-launched SLC updates on the server. You can update the web-launched SLC server while it is running. After the updates are installed, they are downloaded automatically when a client starts the application.

1. Download and extract the web-launch SLC server (.war) file (see "[Downloading the SLC Media Pack](#)" on page 3-1).
2. Deploy the file on the server (refer to the web server documentation).

Minimum Browser Requirements

- Internet Explorer 8 (on Windows 7: 64 bit)
- Firefox 17.0.2 ESR (on Windows 7: 64 bit)

Security Considerations

The web-launched SLC is digitally signed, which guarantees that the software has been issued by Oracle Corporation and has not been altered or corrupted since it was created. As a Java Web Start process, the web-launched SLC includes the security features provided by the Java 2 platform.

Important: You are responsible for implementing all appropriate additional security systems, including firewalls, and user access.

Upgrading SLC on the Local Op Panel

1. Select **Tools > Diagnostics**, and then select the **Library** in the device tree.
2. Click the **Activate Code** tab.
3. In the Target list, select the code package to activate (in this case **SLConsole**).
4. In the Available Versions section, select the code version to activate. Click the **Activate** button.
5. When the activation process finishes, click **OK**.

Logging In To SLC

Note: After an RE failover, log in using the IP address or DNS alias of the newly active library controller (previously the standby controller).

- [Logging In For the First Time After Library Installation](#)
- [Logging In to the Standalone SLC](#)
- [Logging In to the Web-launched SLC](#)
- [Logging In to the Local Operator Panel](#)
- [Changing a User Password](#)

Logging In For the First Time After Library Installation

1. With the **admin** user ID, log in to SLC with the first eight characters of the activation password provided by Oracle.
2. Change the **admin** password:
 - a. Select **Tools > User Mgmt**
 - b. Complete the password fields.
 - c. Click **Modify**.

Logging In to the Standalone SLC

1. To start SLC on your system, either:
 - Double-click the **SLC** desktop icon.
 - Select **Start > RunSLConsole** or **Launch > RunSLConsole**.
2. Enter your login information. Click **Log on**.

Logging In to the Web-launched SLC

To log in using a browser, download Mozilla Firefox from <http://www.mozilla.com>. On Solaris platforms, you can also log in to the web-launched SLC using the command line.

1. Obtain the DNS alias or IP address of the SLC server.
2. Choose a login method:

- **Command line** — Available on Solaris only. In the terminal window, enter:
`javaws http://server_ID:port_ID/opel/slc.jnlp`
 - **Browser** — Available on either Windows or Solaris. In a browser on the client system, go to the SLC Web Start application:
`http://server_ID:port_ID/opel`
- where:
- *server_ID* — Either the IP address or DNS alias of the SLC server.
 - *port_ID* — Port ID of the SLC application, typically 8080.
 - **opel** — The name (context root) of the web-launched SLC application on the server.
3. Click **Launch Now**.
 4. Specify the action to take with the slc.jnlp file. Select either:
 - **Open with Java Web Start Launcher** to start SLC directly.
 - **Save to Disk** to save the slc.jnlp file to your client and log in to the SLC later.
 5. If this is your first time running the web-launched SLC, complete the digital signature warning dialog box (verify the publisher and click **Run**).
 6. Enter your SLC login information. Click **Log on**.

Logging In to the Local Operator Panel

Only one user at a time can log in to the local operator panel.

1. If the screen is blank, touch the screen anywhere to activate the login screen.
2. Enter your login information.
3. Click **Log on**.

Changing a User Password

Each site has a fixed set of user IDs: **admin** (customer administrator), **service** (Oracle support representative), and **oem** (third-party field service technician). Each user ID is assigned a set of permissions that determines access to utilities within SLC.

1. Log in to SLC using the account you want to modify.
2. Select **Tools > User Mgmt**
3. Complete the following fields: **Current Password**, **New Password**, and **Retype Password**.
4. Click **Modify**.

Activating Optional Features

Hardware activation files enable optional features of the library, such as capacity upgrades and partitioning. You must install one hardware activation file for each feature.

- [Downloading a New Hardware Activation File](#)
- [Installing a New Hardware Activation File](#)
- [Displaying Current Hardware Activation Files](#)
- [Deleting a Hardware Activation File](#)
- [Enabling Features on a Library with Firmware Before FRS_7.00](#)

Downloading a New Hardware Activation File

Only use this procedure for libraries with firmware FRS_7.00 or above. For libraries with lower firmware levels, see "[Enabling Features on a Library with Firmware Before FRS_7.00](#)" on page 5-3.

1. Go to the Oracle Software Delivery Cloud at:
<http://edelivery.oracle.com/>
2. Click **Sign In /Register**.
3. Read the terms and restrictions. Indicate your acceptance.
4. Search for SL8500, and then select the hardware activation file. Click **Select Platform**.
5. Select **GENERIC (All Platforms)**, and then click **Select**.
6. Verify the correct hardware activation file is listed under Selected Products, and then click **Continue**.
7. Select the available release. Click **Continue**.
8. Read the terms and restrictions. Indicate your acceptance, and then click **Continue**.
9. Save the zip file, and then extract it to the desired location.

Installing a New Hardware Activation File

Note: As of firmware FRS_8.31 and SLC 6.25, a single partitioning hardware activation file activates partitioning across an entire library complex.

1. Use SLC to log in to the target library.
2. Select **Tools > Hardware Activation**.
3. Click the **Install Hardware Activation Keys** tab.
4. Browse to the hardware activation file.
5. Review the hardware activation file details. Click **Install**.
6. Verify that the activation file installed successfully (see "[Displaying Current Hardware Activation Files](#)" on page 5-2).

Note: You may need to perform additional tasks to use the new feature (see "[Configuring Capacity](#)" on page 6-1 and "[Partitioning the Library](#)" on page 7-1).

Displaying Current Hardware Activation Files

Note: To display a log of all hardware activation activity, use the Reports utility (see "[Viewing Library and Device Reports with the Reports Utility](#)" on page 14-1).

1. Log in to the target library.
As of firmware FRS_8.31 and SLC 6.25, all hardware activation files for a library complex are shown on a single screen. You can log in to any library in the complex.
2. Select **Tools > Hardware Activation**
3. Click the **Current Hardware Activation Keys** tab.

Deleting a Hardware Activation File

Deleting a hardware activation file is rarely necessary and can impact library operations. Having extra hardware activation files installed on a library does not cause problems (for example, capacity activation files that exceed the physical capacity of the library).

1. Use SLC to log in to the target library.
2. Select **Tools > Hardware Activation**.
3. Click the **Delete Hardware Activation Files** tab.
4. Select the activation file to delete.

5. Verify the correct activation file is selected, and click **Delete**.

Note: You may need to perform additional tasks after deleting the file (see "[Deleting a Partition](#)" on page 7-2).

Enabling Features on a Library with Firmware Before FRS_7.00

For SL8500 libraries with firmware before FRS_7.00, contact Oracle support to enable optional features. For firmware FRS_7.00 or above, use the processes described in "[Downloading a New Hardware Activation File](#)" on page 5-1.

Configuring Capacity

Note: The library controller automatically assigns capacity in a partitioned library. You can only configure capacity in a non-partitioned library.

- [Applying the Default Capacity Configuration in a Single Library](#)
- [Creating a Custom Capacity Configuration in a Single Library](#)
- [Creating a Custom Capacity Configuration in a Library Complex](#)
- [Resolving Orphaned Cartridges Caused by Capacity Changes](#)
- [Guidelines for Customizing Capacity Activation](#)
- [Effect on HLI Hosts after Modifying the Capacity Configuration](#)

Applying the Default Capacity Configuration in a Single Library

For a non-partitioned single library with a single host, the library can automatically activate the capacity after you install the hardware activation file.

As of firmware FRS_8.31, the default configuration activates capacity from the drives-outward until the capacity license is exhausted.

1. To prevent conflicts, coordinate with other library users before configuring the library.
2. From standalone or web-launched SLC, select **Tools > Select Active Cells**.
3. Click the **Design By Library** tab.
4. Click **Apply Default Capacity**.

Note: Applying the default capacity removes all drives from the media validation pool. To re-add the drives, see "[Defining the Media Validation Pool](#)" on page 11-1.

Caution: If there are warnings, DO NOT commit the changes. Click **Details >>**, then perform recovery moves on the orphaned cartridges (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1).

5. Reconfigure library host applications to recognize the changes (see the host software documentation).

Creating a Custom Capacity Configuration in a Single Library

Note: You can click **Refresh** to discard uncommitted changes and restore the last saved configuration. You must apply the configuration to save it to the library controller.

1. To prevent conflicts, coordinate with other library users before configuring the library.
2. From standalone or web-launched SLC, select **Tools > Select Active Cells > Design By Library** tab.
3. Select areas of the library from the drop-down lists. Then, click **Add** (to select the area for activation) or **Remove** (to deactivate the area).
4. After you complete the configuration, click **Apply User Design**.

Caution: If there are warnings, DO NOT commit the changes. Click **Details >>**, then perform recovery moves on the orphaned cartridges (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1).

5. Reconfigure library host applications to recognize the changes (see the host software documentation).

Creating a Custom Capacity Configuration in a Library Complex

Note: You can click **Refresh** to discard uncommitted changes and restore the last saved configuration. You must apply the configuration to save it to the library controller.

1. To prevent conflicts, coordinate with other library users before configuring the library.
2. From standalone or web-launched SLC, select **Tools > Active Cells**.

Note: Clicking **Reset Capacity** removes the current capacity configuration and all drives from the media validation pool, requiring you to create a new custom capacity design.

3. Select areas of the library (you can click the Rail or Library buttons, or click individual areas). Then, click **Add** (to activate) or **Delete** (to deactivate).

Red sections indicate activate capacity. White sections indicate inactive capacity. The smallest capacity activation increment is a quarter rail for a maximum of 16 regions per library.
4. After you complete the configuration, click **Apply User Design**.

Caution: If there are warnings, DO NOT commit the changes. Click **Details >>**, then perform recovery moves on the orphaned cartridges (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1).

5. Reconfigure library hosts to recognize the changes (see the host software documentation).

Resolving Orphaned Cartridges Caused by Capacity Changes

Changing the active capacity of the library may cause orphaned cartridge errors. A cartridge becomes orphaned when it is inaccessible to the host.

To resolve orphaned cartridges, you can:

- Generate a report of orphaned cartridges (see "[Generating Active Capacity Reports](#)" on page 14-2).
- Audit the library (see "[Auditing the Library](#)" on page 12-1).
- Perform recovery moves on a cartridge (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1).

For partitioned libraries, see "[Resolving Orphaned Cartridges Caused by Partitioning Changes](#)" on page 7-5.

Guidelines for Customizing Capacity Activation

- Select storage resources in the largest blocks possible (rails, library sides, or library walls). Avoid selecting individual drives and storage arrays.
- For best access to drives, activate library inner and outer library walls together and activate storage slots near the tape drives.
- When rapid import and export of cartridges is a priority, activate storage slots near the Cartridge Access Ports (CAPs).
- Avoid deactivating a slot containing a cartridge or manually moving a cartridge to an inactive slot. This will create an orphaned cartridge.

Effect on HLI Hosts after Modifying the Capacity Configuration

Initiate an audit through the host software after modifying the capacity configuration.

After activating capacity, the affected library will temporarily go offline and then come back online. While offline, the library stops accepting new incoming host jobs, but will complete the jobs already accepted. There is no need to disconnect and re-connect the HLI host.

The library controller sends an asynchronous message to any host, notifying them that the library configuration has changed. ACSLS hosts must perform an audit of a non-partitioned library to account for the new capacity. Hosts can continue processing jobs while the audit takes place.

Partitioning the Library

Library partitioning reserves library resources (drives, slots, and bulk CAPs) for the exclusive use of a specified host. Partitioning is included with a new library purchase. You no longer need to purchase the feature separately. However, partitioning is still enabled with a hardware activation file (see "[Activating Optional Features](#)" on page 5-1).

As you allocate slots to a partition, the library controller automatically activates these slots. Ensure there is enough purchased capacity for your partitioning design. Partitions can be non-contiguous.

Note: Rotational CAPs are a shared library resource, so you cannot assign them to a partition (see "[Sharing CAPs in a Partitioned Library](#)" on page 7-5).

- [Partitioning the Library Using SLC](#)
- [Sharing CAPs in a Partitioned Library](#)
- [Resolving Orphaned Cartridges Caused by Partitioning Changes](#)
- [Maximizing Library Performance when Partitioning](#)

Partitioning the Library Using SLC

Note: No partitioning changes occur until you apply the changes with the **Commit** tab. To discard uncommitted changes, click **Refresh**.

- [Adding a Partition ID](#)
- [Changing the Name of a Partition](#)
- [Deleting a Partition](#)
- [Allocating Resources in a Partition for a Single Library](#)
- [Allocating Resources in a Partition for a Library Complex](#)
- [Committing Partitioning Changes](#)

Adding a Partition ID

1. Stop all host operations.

2. Select **Tools > Partitions > Summary (Step 2)** tab.
3. In the Partition Allocation Summary area, click **Add Partition**.
4. Select a partition ID from the drop-down list and enter a partition name. Partition IDs do not need to be consecutive.
5. Click **OK**.
6. For a single library, proceed to "[Allocating Resources in a Partition for a Single Library](#)" on page 7-2.
For a library complex, proceed to "[Allocating Resources in a Partition for a Library Complex](#)" on page 7-3.

Deleting a Partition

When you delete a partition, all resources allocated to the partition are marked available, all host connections for the partition are deleted, and the partition ID is deleted.

1. Move valid data cartridges out of the partition that you will delete (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1).
2. Stop all host operations.
3. Select the **Tools > Partitions > Summary (Step 2)** tab.
4. In the Partition Allocation Summary table, select the partition to delete.
5. Click **Delete Partition**.
6. For a single library, click the **Design by Library (Step 3)** tab. Then, click **Verify**.

Caution: If there are warnings, click **Details >>** and perform recovery moves on the orphaned cartridges (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1). The re-verify the design.

For a library complex, verification is automatic.

7. If there are no warnings, proceed to "[Committing Partitioning Changes](#)" on page 7-4.

Changing the Name of a Partition

1. Select **Tools > Partitions > Summary (Step 2)** tab.
2. In the Partition Allocation Summary table, select partition to modify.
3. Click **Modify Partition**.
4. Enter the partition name. Click **OK**.
5. Proceed to "[Committing Partitioning Changes](#)" on page 7-4.

Allocating Resources in a Partition for a Single Library

1. Select the **Tools > Partitions > Design by Library (Step 3)** tab.
2. Select a partition ID from the drop-down list.
3. Select the areas of the library using the drop-down lists. Click **Add** (to allocate) or **Remove** (to unallocated).

Note: You can assign bulk CAPs to a partition. Bulk CAPs are the larger rectangles on the ends of each rail. An S indicates a shared CAP.

4. To refine the partition, select **Remove Array** or **Add Array** from the second drop-down list. Then, click the drives, arrays, or bulk CAPs to modify.
5. Repeat steps 2 - 4 for each partition ID.

Note: To re-assign a resource from one partition to another, you must remove the resource from the initial partition before re-allocating it.

6. When you complete the partition design, click **Verify**.

Caution: If there are warnings, click **Details >>** and perform recovery moves on the orphaned cartridges (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1). Then re-verify the design.

7. If there are no warnings, proceed to "[Committing Partitioning Changes](#)" on page 7-4.

Specifications for Single Library Partitioning

- Up to eight partitions.
- Smallest slot increment is one array.
- Smallest drive increment is one drive.

Allocating Resources in a Partition for a Library Complex

1. Select the **Tools > Partitions > Design (Step 3)** tab.
2. Select a partition from the options in the upper left (if there are no partitions, see "[Adding a Partition ID](#)" on page 7-1).
3. Select resources of the library. You can click the Rail or Library buttons, or click individual areas.

Note: You can assign bulk CAPs to a partition. Bulk CAPs are the larger rectangles on the ends of each rail. An S indicates a shared CAP.

4. Click **Add** (to allocate) or **Delete** (to unallocate).
5. Repeat steps 2-5 for each partition.

Note: To re-assign a resource from one partition to another, you must remove the resource from the initial partition before re-allocating it.

6. Proceed to "[Committing Partitioning Changes](#)" on page 7-4.

Specifications of Library Complex Partitioning

- Up to 16 partitions total, with a maximum of eight per library.

- Smallest slot increment is a quarter rail (for example: the inner wall of rail 1 on the right side of the library)
- Smallest drive increment is one drive.
- Partition boundaries can span across pass-thru ports (PTPs).

Committing Partitioning Changes

No changes are made to the partitioning configuration until you complete these procedures.

1. To prevent configuration conflicts, you should make the library unavailable to other users and stop all host operations before committing partitioning changes.
2. Select the **Commit (Step 4)** tab.
3. Click **Apply**.

Caution: If there are warnings, **DO NOT** commit the changes. Click **Details >>**. Then, perform recovery moves on the orphaned cartridges (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1).

4. Update any affected host applications to recognize the changes (see the host software documentation).

Meaning of the SLC Partitioning Icons

Table 7-1 Library Partitioning Icons






Icon	Description
 (white rectangle)	Available — area of rail not yet assigned to a partition
 (colored rectangle)	Allocated — area of rail assigned to a partition
 (white rectangle with S)	Shared Bulk CAP
Library complex partitioning only   (thick black border)	Selected — area chosen for modification. Clicking Add assigns the area to a partition. Clicking Delete makes the area available to other partitions.

Figure 7-1 Library Complex Partitioning Example

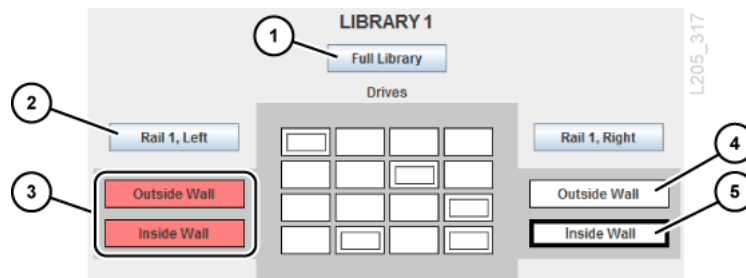


Figure Legend:

1. Selects the full library

2. Selects a half rail
3. Allocated half rail to red partition
4. Available quarter rail
5. Selected quarter rail (indicated by the thick black border)

Sharing CAPs in a Partitioned Library

In a partitioned library, hosts can share CAPs. Each host can reserve the CAP when needed, and then release the CAP when it is no longer required. A host can reserve a CAP if the CAP is empty, closed, locked, and not already reserved by another partition. CAP auto enter mode is disabled in partitioned libraries, because it interferes with the reservation system (see "[Auto Enter Mode](#)" on page 8-5).

If the partition does not release the CAP reservation and you cannot terminate the enter or eject command in ACSLS or ELS, a library administrator must override the reservation (see "[Overriding a CAP Reservation of a Partition](#)" on page 8-3).

Resolving Orphaned Cartridges Caused by Partitioning Changes

In partitioned libraries, an orphaned cartridge is in a slot not allocated to the original host. Orphaned cartridges can occur when you change the size of a partition, delete a partition, or move a cartridge to a slot or drive that is not allocated to a partition.

In a partitioned library, orphaned cartridges can cause data loss. A host that finds an orphaned cartridge in its partition may treat the cartridge as a scratch volume and overwrite the data.

SLC will warn you when it identifies orphaned cartridges. To resolve orphaned cartridges:

- Generate a report of orphaned cartridges (see "[Generating Active Capacity Reports](#)" on page 14-2)
- Audit the library (see "[Auditing the Library](#)" on page 12-1)
- Perform a recovery move on the cartridge (see "[Moving Cartridges \(Recovery Moves\)](#)" on page 10-1)

Maximizing Library Performance when Partitioning

- Partition storage slots in the largest blocks possible (rails, library sides, or library walls). Partition complete library rails to minimize the use of elevators. In a library complex, keep a partition contained within a library to minimize the use of PTPs.
- For best access to drives, activate inner and outer library walls together.
- Avoid partitioning individual drives and storage slot arrays. Individually select and deselect resources only when you need to fine-tune a capacity that has already been broadly defined in larger blocks.
- For quicker enter and ejects, partition storage slots close to the CAPs. For quicker access to stored data, partition storage slots close to the drives.

Operating a CAP

Cartridge access ports (CAPs) are used to enter or eject cartridges. There are two CAP types: bulk CAPs and rotational CAPs. For an overview of the CAP types, see "Cartridge Access Ports (CAPs)" on page 1-4.

- [Entering Cartridges Using a CAP](#)
- [Ejecting Cartridges Using a CAP](#)
- [Removing a CAP Magazine from a Bulk CAP](#)
- [Locking/Unlocking a CAP](#)
- [Overriding a CAP Reservation of a Partition](#)
- [Modifying Bulk CAP Messages](#)
- [Enabling and Disabling a Bulk CAP](#)
- [CAP Modes](#)
- [Guidelines for using CAPs](#)

See Also

- ["Sharing CAPs in a Partitioned Library"](#) on page 7-5

Entering Cartridges Using a CAP

CAP magazines are removable. You can place cartridges in any magazine slot and in any order with the hub gear facing down and cartridge label facing you.

Caution: CAP magazines must be standing up when you load cartridges. Placing the CAP magazine on its back while loading cartridges can cause robot errors due to improper cartridge alignment.

Caution: To avoid equipment damage, do not force the CAP to open or close. Do not enter unlabeled cartridges or place cartridges upside-down.

1. Initiate the enter operation at the host (see the host software documentation).
2. When the unlock indicator turns on, press the CAP button.
3. Place the cartridges in the CAP with the hub gear face down and barcode toward you.

4. If using a bulk CAP, close the CAP door and press the **CAP** button.

If using a rotational CAP, press the **CAP** button to close the CAP.

The library moves the cartridge from the CAP to a storage slot, records the cartridge's location, and sends the location to the host. When the CAP is empty, the library returns the CAP to its default state.

How to Use CAPs to Maximize Library Performance

- Place cartridges that require numerous enters and ejects adjacent to CAP magazines.
- Load magazines adjacent to the rail in which the cartridges will reside.
- To help identify which cartridges go to which rail, place labels outside the CAP to indicate the type of cartridge for a magazine.
- Enter cartridges using a CAP magazine adjacent to the rail with compatible tape drives.

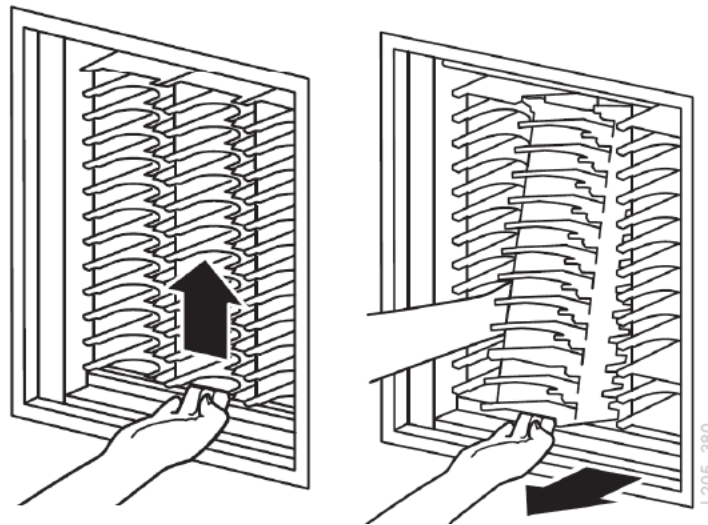
Ejecting Cartridges Using a CAP

Caution: To avoid equipment damage, do not force the CAP to open or close.

1. Initiate the eject operation at the host (see the host software documentation).
2. When the unlock indicator turns on, press the **CAP** button.
The CAP door opens.
3. Remove all cartridges from the CAP.
4. If using a bulk CAP, close the CAP door and press the **CAP** button.
If using a rotational CAP, press the **CAP** button to close the CAP.
5. The robot continues filling the CAP until all cartridges you specified are exported. Repeat step 2 through step 4.

Once the library ejects all cartridges, the robot audits the CAP to verify it is empty (the robot does not read cartridge labels during export operations). Then, the library erases the location of the cartridge from the library controller database and the host database. The CAP returns to its default state.

Removing a CAP Magazine from a Bulk CAP



Locking/Unlocking a CAP

Normally, the host software unlocks or locks a CAP. However, you can use the following procedure if you cannot unlock the CAP through the host. An unlocked CAP is reserved by the library and unavailable to all hosts until it is locked.

Note: If the CAP is reserved by a host, the host must release the CAP reservation before you can unlock the CAP.

1. Attempt to unlock the CAP using the host software.
2. If you cannot unlock the CAP through the host, in SLC select **Tools > Diagnostics**.
3. Expand the **CAP** folder. Select the CAP to modify.
4. Click the **Access** tab.
5. In the Locked pull-down list select:
 - **False** to unlock.
 - **True** to lock.
6. Click **Apply**.

Overriding a CAP Reservation of a Partition

If the partition does not release the CAP reservation and you cannot terminate the enter or eject command on the host, use this procedure to override the CAP reservation.

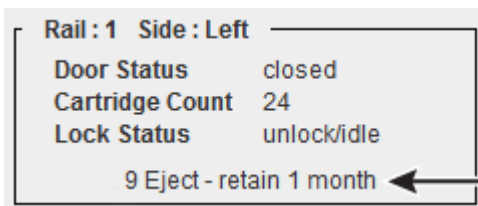
Note: You must follow all steps in this procedure, or the CAP could become unavailable to all partitions.

1. In SLC, select **Tools > Diagnostics**.
2. Expand the **CAP** folder, and then select the CAP to override.

3. Click the **Unreserve** tab. Note the partition ID of the CAP.
4. Click **Apply** to override the reservation.
5. If the CAP is locked, unlock it (see "[Locking/Unlocking a CAP](#)" on page 8-3).
6. Open the CAP. Remove any cartridges.
7. Close the CAP. The library verifies the CAP is empty. The CAP status changes to "unreserved", which makes the CAP available to all partitions.
8. Determine if you should re-enter the cartridges into the library. Ensure you enter the cartridges into the correct partition.

Modifying Bulk CAP Messages

SLC can display a CAP notification message based on a message number sent from ACSLS or ELS during an enter or eject. The message displays on the Systems Details CAP Status page after the CAP unlocks (see "[Viewing Device Status and Properties](#)" on page 13-2).



You must configure the message in SLC (see below) and send the message number with an enter or eject request from the host (see the host software documentation).

Creating a New Bulk CAP Message

1. In SLC, select **Tools > Configuration**.
2. Click the **Cap Usage Messages** tab.
3. Click **Add**.
4. Enter a message number (between 4 and 99).
5. Enter the message (maximum of 80 characters). Click **OK**.

Note: Messages longer than 18 characters will be cut off on the CAP status page. However, from the status page you can click on the message to view a pop-up of the entire message.

6. Click **Apply**.

Modifying or Deleting an Existing Bulk CAP Message

Note: You cannot modify or delete the first four messages.

1. In SLC, select **Tools > Configuration**.
2. Click the **Cap Usage Messages** tab.
3. Select a message from the list, and then click **Modify** or **Delete**.

4. Click **Apply**.

Enabling and Disabling a Bulk CAP

The library will not use a disabled bulk CAP for entering or ejecting cartridges. For example, if you cannot comfortably operate the top CAPs, you should disable the CAPs on rail 1.

1. In SLC, select **Tools > Configuration**.
2. Click the **Enable/Disable CAP** tab.
3. Select **Disable** or **Enable** for the CAP.
4. Click **Apply**.

CAP Modes

Auto Enter Mode

Only non-partitioned HLI libraries support the CAP auto enter mode (see the host software documentation to enable auto enter).

CAP auto enter mode enables a library operator to open a CAP and initiate an enter operation without issuing an explicit enter request. CAPs in auto enter mode are left unlocked and do not require a host reservation.

Manual Mode

Manual mode is the most secure method of CAP operations. When in manual mode, the system locks a CAP by default, and its LED is off. To initiate an enter or eject operation using a manual CAP, you must enter an explicit enter or eject request before pressing **CAP Open** on the keypad.

Guidelines for using CAPs

- Insert cartridges with the correct orientation (hub gear facing down and label facing you). You can skip slots in the CAP when loading cartridges.
- Verify all cartridges are properly labeled before placing them into a CAP. Do not enter unlabeled cartridges.
- To enter cartridges more efficiently, load the CAP magazines prior to issuing the enter command.
- If only one CAP is required to do the job, do not use multiple CAPs. Opening multiple CAPs will increase the audit time.
- If a robot adjacent to the CAP is inoperative, that CAP (or portion of a rotational CAP) is inaccessible.

Configuring Drives

- [Configuring Drive Cleaning](#)
- [Configuring the Drive Tray Serial Numbers](#)
- [Maximizing Library Performance Through Drive Placement](#)

Configuring Drive Cleaning

Library tape drives require periodic cleaning with a cleaning cartridge to prevent read/write errors. Library management software (such as ACSLS or ELS) must manage drive cleaning.

As of SL8500 firmware FRS_8.31 and SLC 6.25, the library will automatically clean media validation drives. Therefore, libraries using media validation must have cleaning cartridges in the reserved system slots. You can enter media validation cleaning cartridges using SLC (see "[Importing or Exporting Diagnostic or Cleaning Cartridges](#)" on page 10-3). Additionally, you can manage cleaning cartridges using the CLI (see the [cleaning](#) section of [Appendix B, "Command Line Interface Reference"](#)).

Configuring Host-Managed Drive Cleaning

1. In SLC, select **Tools > Configuration**. Disable auto cleaning for the library and all partitions. Click **Apply**. (The auto clean function is disabled by default).

Note: Enabling/disabling auto clean is not available through SLC. It is only available to the library administrator through the CLI.

2. Enable automatic cleaning from the host.
 - a. For ELS, see the *ELS System Programmer's Guide* to enable the cleaning function.
 - b. For ACSLS, automatic cleaning is enabled by default. See the *ACSLs Administrator's Guide*.
3. Use ACSLS or ELS commands to enter cleaning cartridges into the library.

Note: Do not use the SLC Import/Export page to enter cleaning cartridges for host managed cleaning.

4. Use ACSLS or ELS to monitor the status of cleaning cartridges and drives.

5. Use the ACSLS or ELS commands to eject cleaning cartridges from the library. You cannot use the SLC Import/Export page to eject host-managed cleaning cartridges.

Configuring the Drive Tray Serial Numbers

1. Select **Tools > Configuration**.
2. Click the **Drive Tray S/N** tab.
3. Click **Refresh** to display the current data.
4. To edit an individual drive tray serial number:
 - a. Double-click the Drive Tray S/N field.
 - b. Enter the drive tray serial number. Proceed to step 6.
5. To edit multiple drive tray serial numbers at once, you can edit a comma-separated value (csv) file:
 - a. Click **Export**, and then save the file to a desired location.
 - b. Open the file and edit only the drive tray serial numbers. Do not alter any other values. Save the changes.
 - c. In SLC, click **Import**. Locate the updated .csv file, and then click **Open**.
6. Click **Apply**, then **Yes**.

Maximizing Library Performance Through Drive Placement

- To reduce elevator and pass-thru activity, place multiple drive types on each rail.
- Group together tape drives and compatible cartridges on the same rail.
- For high mount rate applications, do not place sixteen drives on an rail. This can lead to increased wait times for the robot to be available. High mount rate applications may require clustering drives on more than one rail.
- In a redundant robotics library, install drives in the outer columns (± 2) first. This allows both robots to access drives at the same time.

Managing Cartridges

- [Moving Cartridges \(Recovery Moves\)](#)
- [Locating Cartridges](#)
- [Viewing Cartridge Information](#)
- [Importing or Exporting Diagnostic or Cleaning Cartridges](#)
- [Cartridge Types](#)
- [Handling Cartridges](#)
- [Maximizing Library Performance Through Cartridge Placement](#)

See Also:

- ["Entering Cartridges Using a CAP" on page 8-1](#)
- ["Ejecting Cartridges Using a CAP" on page 8-2](#)
- ["Resolving Orphaned Cartridges Caused by Partitioning Changes" on page 7-5](#)
- ["Resolving Orphaned Cartridges Caused by Capacity Changes" on page 6-3](#)

Moving Cartridges (Recovery Moves)

Moving a cartridge using SLC only updates the cartridge's location in the library controller database. You must perform an audit from the host software to update the host database to prevent mount failures.

To view a table of all cartridges in the library, see ["Viewing Cartridge Information"](#) on page 10-2.

Caution: To avoid data loss, use caution when moving cartridges in partitioned libraries. Accidentally moving a cartridge from one partition to another will orphan the cartridge and the new partition may overwrite the existing data.

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **RcvrMove** tab.
3. Select the Source Location Mode:
 - For **VOLID**, enter the vol-id of the cartridge to move.
 - For **Location**, select the cartridge's current location (**CAP**, **Slot**, **Drive**, **Reserved Slots**).

4. Select the Destination Location type (**CAP**, **Storage Slots**, **Drive**, and **Reserved Slots**) and select the destination address.

Note: Only select Drive if the source is a CAP or reserved slot.

Do not move data cartridges into reserved slots. Reserved slots should only contain diagnostic or cleaning cartridges.

5. Click **Start**.
6. Initiate a library audit from the host software to update the host database (see the tape management software documentation).

Locating Cartridges

You can search for a cartridge by volume ID, internal library address, or HLI address.

To view a table of all cartridges in the library, see "[Viewing Cartridge Information](#)" on page 10-2.

Locating a Cartridge by Volume ID

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **Search** tab.
3. Select **VOLID**.
4. Enter the volume ID (use * as a wildcard).
5. From the Requester drop-down list, select the format for the search results:
 - **default** to display in library internal address format.
 - **hli0** or **hli1** to display in HLI-PRC address format.
6. Select the Cartridge Type.
7. Click **Search**.

Locating a Cartridge by Address

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **Search** tab.
3. Select **Location**.
4. Select the search criteria from the drop-down list, and enter the address (wildcards are invalid).
5. From the Requester drop-down list, select the type of address you entered in the Location field.
6. Click **Search**.
7. Click . . . to see details about the cartridge.

Viewing Cartridge Information

1. In SLC, select **Tools > Reports**.

2. Expand the **Status Summary** folder in the navigation tree.
3. Select the **Cartridge Table**.

See Also

- ["Viewing Library and Device Reports with the Reports Utility"](#) on page 14-1

Importing or Exporting Diagnostic or Cleaning Cartridges

Caution: The library will treat used cleaning cartridges as new. To avoid equipment damage, do not re-import used cleaning cartridges.

The library stores diagnostic and cleaning cartridges in reserved system slots. Host library applications cannot access these cartridges. The library can perform only one diagnostic or cleaning cartridge import or export operation at a time. The library controller reserves the CAP for the entire operation.

Before importing, verify all cartridges have a proper label. Diagnostic cartridges must have DG as the first two characters of the eight character volume ID. Cleaning cartridges must have CLN as the first three characters.

Importing Diagnostic or Cleaning Cartridges

Note: As of SL8500 firmware FRS_7.00 and SLC 5.50, host applications (such as ACSLS or ELS) must manage drive cleaning. For host managed cleaning, do not use the following procedure. Instead, enter cleaning cartridges using the host software.

1. Verify that the library has enough empty system slots. Robot recovery and library initialization requires one empty system slot on each side of the library.
2. Verify that the CAP is empty, not reserved by a host, closed, and locked (see ["Viewing Device Status and Properties"](#) on page 13-2).
3. In SLC, select **Tools > Diagnostics**.
4. Expand the **CAP** folder in the device tree. Select a **CAP** to use.
5. Click the **Import/Export** tab.
6. In the Operation section, select **Import Cleaning/Diagnostic cartridges**.
7. In the "Select favored rail for import" list, select the preferred storage rail or **No affinity**.

Note: The library enters diagnostic and cleaning cartridges into system slots on the selected rail if space is available. Otherwise, the library distributes cartridges among all system slots.

8. Click **Start**.
9. Load the cartridges into the CAP (see ["Entering Cartridges Using a CAP"](#) on page 8-1).

Exporting Diagnostic or Cleaning Cartridges

1. Verify that the library has enough empty system slots. Robot recovery and library initialization requires one empty system slot on each side of the library.
2. Verify that the CAP is empty, not reserved by a host, closed, and locked (see ["Viewing Device Status and Properties"](#) on page 13-2).
3. In SLC, select **Tools > Diagnostics**.
4. Expand the **CAP** folder in the device tree. Select a **CAP** to use.
5. Click the **Import/Export** tab.
6. Select the type of export operation.
7. Click **Start**.
8. When the unload notification appears, unload the CAP (see ["Ejecting Cartridges Using a CAP"](#) on page 8-2).

Cartridge Types

- Data cartridges — store customer data.
- Diagnostic cartridges — used by service representatives to run read/write tests on drives (see ["Importing or Exporting Diagnostic or Cleaning Cartridges"](#) on page 10-3)
- Cleaning cartridges — clean the tape path and read/write heads of the tape drives (see ["Configuring Drive Cleaning"](#) on page 9-1)

Cartridge Labels

For information about media label standards, see the *Barcode Technical Brief* on OTN. All library cartridges must have a readable external label. The robot reports an error when it encounters an unreadable label.

Non-labeled cartridges are not supported. The library exports any non-labeled cartridges it finds through the CAP. A non-labeled or unknown type cartridge will not mount to a drive.

Handling Cartridges

Caution: When cartridges are improperly handled, loss of data or damage to a library component can occur.

- Keep cartridges clean and inspect them for damage before each use.
- Never open a cartridge.
- Do not handle tape that is outside the cartridge.
- Do not expose the tape or cartridge to direct sunlight, moisture, or magnetic fields.

Inspecting a Cartridge

Always inspect a cartridge before you insert it into a tape drive or a library. A defective or dirty cartridge can damage a tape drive. Never use a damaged cartridge. Look for:

- Dirt or debris
- Cracked or broken housing
- Damaged write-protect switch
- Liquid in the cartridge
- Labels not firmly attached, or that extend over the cartridge edge

Cleaning the Cartridge Exterior

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

Caution: *Potential 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.

Storing Cartridges

Store cartridges in a clean environment. Do not take a 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. Before using a cartridge, ensure that it has been in its operating environment for at least 24 hours.

Maximizing Library Performance Through Cartridge Placement

- Group together cartridges and compatible drives on the same rail. Mount cartridges in tape drives that are on the same rail and limit the distance cartridges must travel. Minimize elevator operations between rails within a library and pass-thru operations between libraries.
- Ensure that each rail has the enough empty slots, data cartridges, scratch cartridges, and tape drives to support peak usage.
- Move inactive cartridges out of the library. Move less frequently used cartridges away from the drives and more frequently used cartridges closer to the drives.
- Load magazines adjacent to the rail in which the cartridges will reside..
- Use Library Content Manager (LCM) to automatically manage free slots for z/OS customers.
- Use the float option available with host management software (ACSLs and HSC).
- Place cartridges that require significant enters and ejects on rails adjacent to a CAP. In libraries with rotational CAPs, place inactive cartridges on the top rail.

Validating Media

- [Media Validation Requirements](#)
- [Defining the Media Validation Pool](#)
- [Starting or Resuming Media Validation](#)
- [Stopping a Validation](#)
- [Updating Host Information After Modifying the MV Pool](#)

Media Validation Requirements

- Minimum SL8500 FRS_8.31 and SLC 6.25 (for T10000 cartridges)
- Minimum SL8500 FRS_8.67 and SLC 6.71 (for LTO cartridges)
- A designated pool of LTO 6/7/8 drives in ADI mode or T10000C/D drives at TTI level 5.40+
- High-memory HBT card
- Minimum STA 2.0 to automate media validation for T10000 cartridges (optional)

Defining the Media Validation Pool

To validate the integrity of cartridges using the media validation (MV) feature, you must define a pool of valid drives. You can perform media validation with the following drive types:

- LTO 6, 7, or 8 in ADI mode (requires minimum FRS_8.67 and SLC 6.71)
- T10000C or T10000D at TTI level 5.40+ (requires minimum FRS_8.31 and SLC 6.25)

The pool is not considered a partition, does not contain cartridges, and hosts cannot access the drives in the pool.

Note: The library automatically cleans MV drives regardless of the auto clean status for the library. You should ensure there are cleaning cartridges in the library.






1. For a library complex, you can log in to any library within the complex to modify the MV pool. Verify all libraries in the complex are online.
2. Verify that hosts are not using the drives you want to add to the pool. Adding a drive to the MV pool will trigger an automatic reconfiguration in all ELS hosts attached to the library

3. In SLC, select **Tools > Media Validation**. Click the **Slot Selection** tab.
4. Click **Refresh** to display the latest configuration.
5. Place a maximum of 10 drives into the pool. Highlight the drive slots, and then click **Add** or **Remove**.

Note: When adding drives to the MV pool, the library (or affected partition) will go offline.

6. Click **Apply**.
7. If using a partitioned library reassign any drive slots removed from the pool to a partition (see "[Partitioning the Library](#)" on page 7-1).
8. Reconfigure host applications (see "[Updating Host Information After Modifying the MV Pool](#)" on page 11-3).

Media Validation Drive Pool Icons

SLC Drive Icon	Meaning
	Empty drive slot
	Slot contains either an invalid drive type or a correct drive type in an invalid state
	Correct drive type (T10000C/D or LTO 6/7/8 in ADI) in a valid state
	Partition number of drive slot
	Drive slot is in media validation pool

Starting or Resuming Media Validation

You can only validate one cartridge at a time per each SLC session. To automate the process for T10000 cartridges, use StorageTek Tape Analytics 2.0 or above (see the STA documentation).

1. Log in to the library. For a library complex, log in to the library that contains the drive that you will use for validation.
2. In SLC, select **Tools > Media Validation**. Click the **Media Validation** tab.
3. Select a drive. If there are no drives listed, see "[Defining the Media Validation Pool](#)" on page 11-1.

Note: You may not be able to select a drive if the drive is in an invalid state, the drive type is invalid, the IBM LTO drive is not in ADI mode, or you are not logged into the library containing the drive.

4. Select a cartridge from the list or enter a VOLSER in the cartridge label field.
5. Select a validation type (see [Validation Types](#) for a description).

Note: If media validation is interrupted, select the **Complete Resume** or **Complete Plus Resume** to resume where the validation left off. You cannot resume an LTO validation, Basic Verify, Standard Verify, or Rebuild MIR.

6. Click **Start**. Validation begins if the cartridge loads successfully.

Once validation completes, the library returns the tape to its source location (if available, otherwise the library moves the tape to a system slot for host recovery).

Validation Types

Type of Validation	T10000 Description	LTO Description	Approximate Duration per Cartridge
Basic Verify	Simple mount/dismount of the cartridge to determine if MIR is unreadable or out of sync.	Simple mount/dismount of the cartridge. Reads the CM on the mount.	2 minutes
Standard Verify	Starts at beginning of tape (BOT). Reads 1000 records from BOT. Reads wrap that contains EOD, then into the EOD. Reads outermost wraps on top and bottom bands to verify edges.	Starts at beginning of tape (BOT). Reads 2 wraps, then stops the validation.	30 minutes
Complete Verify or Complete Resume	Starts at beginning of tape (BOT) or resumes where it left off. Reads data at tape speed.	Starts at beginning of tape (BOT) and verifies to EOD. Resume not available.	T10000C: 6 hours T10000D: 9 hours max LTO: 5 to 8 hours
Complete Plus ¹ or Complete Plus Resume	Starts at beginning of tape (BOT) or resumes where it left off. Checks DIV CRC to determine if it exists.	Not Available	T10000C: 6 hours for compression ratios less than 2.5:1. T10000D: 9 hours for compression ratios less than 3:1
Rebuild MIR	Starts at invalid position in the MIR. Reads data at tape speed	Not Available	T10000C: 5 hours T10000D: 9 hours

¹ Plus StorageTek Data Integrity Validation — encryption key management system required.

Stopping a Validation

If a host requests a cartridge currently being validated, the validation stops. You can also stop the validation using SLC.

1. Log in as the user who initiated the validation.
2. In SLC, select **Tools > Media Validation**.
3. Select the **Media Validation** tab.
4. Click **Stop**.

Once validation stops, the library returns the tape to its source location (if available, otherwise the library moves the tape to a system slot for host recovery).

Updating Host Information After Modifying the MV Pool

- For ACSLS, you must initiate re-configuration after modifying the MV pool. Use the `config drives <panel_id>` utility. For more information, see the *ACSLs Administrator's Guide*.

- For ELS, no action is required after modifying the MV pool. ELS hosts automatically reconfigure. However, the reconfiguration can cause a disruption in mount/dismount requests when trying to set a lock on the control data set (see the host management documentation).

Effect on HLI Hosts of Modifying the MV Pool

After adding drives to the MV pool, the library (or affected partition) will go offline. The affected hosts receive "Configuration Changed", "LSM Ready", and then "Not Ready" messages from the library. ELS automatically removes drives moved to the MV pool from its configuration. ACSLS automatically updates drives moved to the MV pool to an offline state, but ACSLS requires you to initiate re-configuration.

After removing drives from the MV pool, the library and partitions remain online. For a non-partitioned library, the drive slots are available to hosts immediately. ELS hosts begin re-configuration, but ACSLS hosts require you to initiate re-configuration. For a partitioned library, you must allocate the drive slot removed from the MV pool to a partition (see "[Partitioning the Library](#)" on page 7-1).

Auditing the Library

An audit verifies cartridge locations and updates the library database, which contains the volume ID, current location, and verified status for each cartridge.

The library automatically performs an audit after an access door closes or after the library initializes.

Note: Initiating an audit from SLC only updates the library database. To update the host database, you must initiate an audit from the host.

- [Performing a Physical Audit of the Entire Library](#)
- [Performing a Physical Audit on a Range of Cells](#)
- [Performing a Verified Audit on a Range of Cells](#)
- [Meaning of the Audit Indicator](#)

See Also

- ["Viewing Cartridge Information"](#) on page 10-2

Performing a Physical Audit of the Entire Library

Note: You cannot stop a physical audit after it begins.

For an entire library audit, the robot visits all slots (storage, CAP, drive, reserved), updates the cartridge database, and changes the "verified" status of cartridge locations to true.

Do not run this audit during peak activity periods (see ["Effects of an Entire Library Audit"](#) below). The audit takes approximately 0.5 seconds per cartridge slot.

1. In SLC, select **Tools > Diagnostics**.
2. Select the **Library** in the device tree.
3. Click the **Audit** tab.
4. Select **Yes** for Entire Library (select **No** for Physical Audit and Verified Audit).
5. Click **Audit**.

Effects of an Entire Library Audit

Although an entire library audit is a background process and does not interrupt library operations, it does require sharing of robot resources. You may notice that library operations take slightly longer to perform until the audit finishes. There may be a slight delay in processing a request that requires information about a location not yet audited because the library will audit the location before processing the request.

Performing a Physical Audit on a Range of Cells

Note: You cannot stop a physical audit after it begins.

1. In SLC, select **Tools > Diagnostics**.
2. Select the **Library** in the device tree.
3. Click the **Audit** tab.
4. Select **Yes** for Physical Audit (select **No** for Entire Library and Verified Audit).
5. From the drop-down lists, select the internal address for the starting and ending locations of the audit.
6. Click **Audit**.

Performing a Verified Audit on a Range of Cells

A verified audit validates the status of a specific cartridge location or range of locations in the cartridge database. If a cartridge address has a verified status of *false*, a physical audit of that location is performed and the cartridge database is updated.

1. In SLC, select **Tools > Diagnostics**.
2. Select the **Library** in the device tree.
3. Click the **Audit** tab.
4. Select **Yes** for Verified Audit (select **No** for Entire Library and Physical Audit).
5. From the drop-down lists, select the internal address for the starting and ending locations of the audit.
6. Click **Audit**.

Meaning of the Audit Indicator

To indicate an audit is in progress, the SLC displays a spinning indicator and the message "Audit in progress". When you see this indicator do not open the library access door. This will cause the audit to restart.

The audit indicator only displays when an audit is initiated automatically (library access door has been opened and closed, library power up or reboot). The indicator does not display for audits initiated from SLC or the host.

Viewing Library and Device Information

SLC only displays the latest library and device information saved to the library controller database. Click **Refresh** to update SLC with the latest configuration data.

- [Viewing Library Operational Status](#)
- [Viewing Library Properties and Configuration](#)
- [Viewing Device Status and Properties](#)
- [Viewing the Local Operator Panel Type](#)
- [Meaning of Library and Device Status Indicators in SLC](#)

See Also

- ["Generating Reports and Logs"](#) on page 14-1
- ["Viewing Cartridge Information"](#) on page 10-2

Viewing Library Operational Status

1. In SLC, select **Tools > System Detail**. Select the **Library** in the device tree.
2. Click the **Status** tab.
3. Select a secondary tab:
 - **General** - displays the current operational state of the library. These values update whenever there is host activity, background operations, or operator activity. You can place the library online or offline with this tab (see ["Taking the Library Offline"](#) on page 15-1 and ["Bringing the Library Online"](#) on page 15-2).
 - **Complex** - displays the current operational state of a library complex.
 - **Status Module** - displays library status alerts. This feature is available only if service is active on the library. See also ["Clearing Library Status Alerts"](#) on page 16-6.
 - **HLI** - displays the current status of all HLI interface ports on the library. Information includes the local TCP/IP socket, local IP, connection status, port status, and transmission sent and received from the time of connection.
 - **Internal Networks** - displays port status.

Viewing Library Properties and Configuration

1. In SLC, select **Tools > System Detail**. Select the **Library** in the device tree.

2. Click the **Properties** tab.
3. Select a secondary tab:
 - **General** - displays the physical, mechanical, logical, and network configuration of the library.
 - **Complex** - displays IP address information for a library complex.
 - **Library Controller** - displays details of the library controller, including the serial number and firmware versions.
 - **Drive Controller** - displays details of the drive controller, including the serial number and current firmware versions.

Viewing Device Status and Properties

You can view information about CAPs, drives, robots, redundant electronics, power supplies, and the safety door. You can also view device information using the SLC Reports utility (see "[Viewing Library and Device Reports with the Reports Utility](#)" on page 14-1).

1. In SLC, select **Tools > System Detail**.
2. Select the device folder in the device tree.
3. For status and properties information, expand the device folder. Select a device.
4. Select a tab. Depending on the device you selected, refer to the corresponding information below.

Note: For a bulk CAP library, select the CAP folder and click **Status** to view all CAPs at once and the bulk CAP enter/eject messages (see "[Modifying Bulk CAP Messages](#)" on page 8-4).

Device Status and Properties Tabs

- **Status Tab** - displays the current operational state of the device
- **Properties Tab** - displays device configuration information, including the serial number and current firmware levels

Drive Tabs

Only drives have the following system details tabs.

- **Display Tab** - displays network data, the Virtual Operator Panel (VOP) for T10000 and T9840D drives, and drive LED status
- **Drive Tray Tab** - displays the current status of a drive tray

Drive Status	Meaning
Empty	No cartridge is mounted to the drive.
Unloaded	Cartridge is ready for dismount.
Ready	Cartridge is loaded.
NotCommunicating	Controller card can not communicate with the drive.
rewindUnload	Drive is busy rewinding and unloading.

Redundant Electronics Card Status

"A" indicates the left card slot and "B" indicates the right card slot, as viewed from the back of the library.

- **hbca**: Library controller, A (left) slot
- **hbcB**: Library controller, B (right) slot
- **hbta**: Drive controller, A (left) slot
- **hbtB**: Drive controller, B (right) slot




Card Status	Meaning
Duplex: Software ready, switch possible	Active library controller is functioning normally.
Not installed	Card is not installed in the library.
Ok	Active or standby drive controller card is functioning normally.
Pre-standby: software not ready	Standby library controller card is loading standby code and is not ready to be used in an automatic failover or manual switch.
Standby: software ready	Standby library controller card is functioning normally and can be used for an automatic failover or manual switch.

Viewing the Local Operator Panel Type

1. In SLC, select **Tools > Diagnostics**.
2. Select the **Library** in the device tree, and then click the **OpPanel Tab**.

The type is listed at the bottom of the screen. A W indicates windows-based and a DL or OL indicates linux-based.

Meaning of Library and Device Status Indicators in SLC

SLC Icon	Meaning
	Normal
	Warning
	Error

Health Status of a Device

The device tree of the System Details and the Diagnostics utility displays device health status.

- Normal — library device is functioning normally
- Warning — device is offline or operating in a degraded state
- Error — device has experienced a failure

Communication Status

The lower left of all SLC screens shows communication status, which indicates the communication status between SLC and the library controller.

- Normal — SLC is communicating normally with the library controller

- Warning — server is taking longer than 10 seconds to respond
- Error — server is taking longer than 30 seconds respond

After about 30–60 seconds of lost communication with the library controller, the heartbeat monitor turns gray, then red, and displays:

Heartbeat message not received from the library controller.

Log off the SLC and log on again to restore communication.

Health Status of the Library

The lower right of all SLC screens shows the library health status.

- Normal — all library devices are functioning normally
- Warning — one or more library devices is offline or operating in a degraded state
- Error — one or more library devices has experienced a failure

After a device error is fixed, the library health indicator changes to "Warning". The indicator will not change to "Normal" until the library is taken offline. If there are multiple problems with a device or status alert condition, the health indicator displays the most severe condition.

Generating Reports and Logs

- [Viewing Library and Device Reports with the Reports Utility](#)
- [Generating Active Capacity Reports](#)
- [Generating Partitioning Reports \(Single Library Only\)](#)
- [Generating Diagnostic Files for Oracle Support](#)
- [Monitoring Library Events](#)

See Also

- ["Viewing Library and Device Information"](#) on page 13-1
- ["Viewing Cartridge Information"](#) on page 10-2

Viewing Library and Device Reports with the Reports Utility

All report output is a static display of information at the time the report is generated. Click **Update** in the upper right corner to refresh the information.

Note: Running multiple instances of SLC on the same workstation can cause inconsistent data on reports. It is recommended that only one user at a time produce SLC reports.

1. In SLC, select **Tools > Reports**.
2. In the navigation tree, expand a report folder. Select a report.

You can access additional reports from the **Partitions** utility or the **Active Capacity** utility. You can view individual device information using the **System Details** utility.

Table 14–1 SLC Reports

Folder	Report	Description
Statistics	Drive Events	Displays drive events and errors. The report can display up to 70 entries.
	Drive Media Events	Displays cartridge error events that have occurred with a drive. The report can display up to 500 entries.
	General Events	Displays a summary of library operational events.
	Media Events	Displays cartridge errors. The report can display up to 2000 entries.
Log	EventLog	Displays a log of events based on severity (see "Severity" on page 14-5).

Table 14–1 (Cont.) SLC Reports

Folder	Report	Description
Status Summary	Cartridge Table	Lists cartridge location, media type, label, and status information.
	Device Reserve Table	Lists elevator, robot, and PTP reservation information.
	Drive Table	Lists drive location, type, and serial number information.
	CAP Summary	Lists the location of the CAPs.
	Cartridge Summary	Lists the location, media type, and label information for all cartridges in the library.
	Drive Summary	Lists drive location, type, serial number, code information, and device details.
	Library Information	Lists the library physical configuration, code version, and state of the library.
	Robot Summary	Lists robot address and state.
Status Detail	CAP/Drive/Robot Details	Lists identifying information, code version, and status of the devices.
	Library Details	Lists the library physical configuration, code version, and state of the library.
Versions	Hardware Versions	Lists the FRU serial number for controller cards, CAPs, robots, and PTPs.
	Software Versions	Lists the code version for controller cards, CAPs, elevators, robots, and PTPs.
Audit Log	Feature Audit Log	Lists all feature activation activity for the life of the library. To view only the current hardware activation files, see " Displaying Current Hardware Activation Files " on page 5-2.
CAP Usage Messages	Messages	Lists the CAP usage messages. To define the messages, see " Modifying Bulk CAP Messages " on page 8-4

Generating Active Capacity Reports

1. In SLC, select **Tools > Select Active Cells > View Reports** tab.
2. Select a report:
 - **Cartridge and Cell Media Summary** - displays slot addresses and volume serial numbers (volsers) for media within the active capacity area
 - **Orphaned Cartridge Report** - displays a detailed list of all orphaned cartridges

Generating Partitioning Reports (Single Library Only)

1. In SLC, select the **Tools > Partitions > Reports** tab.
2. Select a type of report from the menu:
 - **Cartridge Cell and Media Summary** — displays slot addresses and volume serial numbers (volsers) for the media in each partition
 - **Orphaned Cartridge Report** — displays slot addresses and volume serial numbers (volsers) for orphaned cartridges
 - **Partition Summary** — displays the resources allocated to each partition
 - **Partition Details** — displays details for a specific partition ID

Generating Diagnostic Files for Oracle Support

Your Oracle support representative may request that you capture and transfer the Management Information Base (MIB) or Log Snapshot file.

Generating the Library SNMP MIB File

1. In SLC, select **Tools > Diagnostics**.
2. Click the **Library** folder in the navigation tree.
3. Click the **TransferFile** tab.
4. Select **SNMP MIB**. Click **Transfer File**.
5. Save the file using a .txt suffix.
6. E-mail the file to your Oracle support representative.

Generating the Library Log Snapshot File

You must save the log within 15 minutes of generation. The file is encrypted.

1. In SLC, select **Tools > Diagnostics**.
2. Click the **Library** folder in the navigation tree.
3. Click the **Transfer File** tab.
4. Select **Log Snapshot**.
5. Select either **All Devices** or **Selected Device**. If you choose Selected Device, select the device.
6. Click **Generate Log Snapshot on Library**.
7. Click **Yes**, and then **OK**.
8. Click **Transfer Log Snapshot To Your Computer**.
9. Save the file using the automatically generated name.
10. E-mail the file to your Oracle support representative.

Monitoring Library Events

The library controller continually monitors library operations and logs all events. Using the Monitors utility of SLC, you can open an event monitor to display event data or spool it to a file. Event monitors are useful tools for root cause analysis.

- [Event Monitor Types](#)
- [Starting an Event Monitor](#)
- [Saving Event Monitor Data to a File](#)
- [Displaying Result Code Definitions](#)

Starting an Event Monitor

1. In SLC, select **Tools > Monitors**.
2. Expand the **Permanent Monitors** folder in the navigation tree.
3. Click an event monitor type (see "[Event Monitor Types](#)" on page 14-4). Click **Open**.
4. Use the **Monitor** menu to pause, resume, permanently stop, or clear the event monitor. Use the **Spool File** menu to save the event monitor to a file (see "[Saving Event Monitor Data to a File](#)" on page 14-4).

Note: To arrange multiple event monitors on one screen, use the **Window** menu in the upper right corner.

Saving Event Monitor Data to a File

You may need to send the file to your Oracle support representative to assist in diagnosing problems.

1. Open an event monitor (see "[Starting an Event Monitor](#)" on page 14-3).
2. In the event monitor window, select **Spool File > Start Spooling**.
3. Browse to the desired directory, enter the file name, and click **Save**.
4. To stop spooling, select **Monitor > Stop Spooling**.

Displaying Result Code Definitions

Result codes identify the library event type (result codes are the same as library EventIds).

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **Search** tab.
3. In the Search Type list, select **Result Code**.
4. To search for a specific result code, enter the complete code (wildcards or partial codes are invalid).

To list all result codes, select **List All**.

5. Click **Search**.

Event Monitor Types

There are four types of event monitors: All, Error Warn Info, Error and Warnings, and Errors. Each monitor type logs events based on the severity of the event. For example, the Errors monitor only logs error events (see "[Severity](#)" on page 14-5 for a description of the event types).

Each event logged in the event monitor contains the following information:

Time

Identifies when the event occurred.

Device ID

Identifies the library address of the device corresponding to the event.

User

Identifies the user that originated the event. This is "root" for HLI or SCSI host activities.

I / F

Identifies the interface type of the requester. The interface can be hli, scsi, or default (for SLC or CLI requests).

Activity

Identifies the command that was issued, such as "load drive".

Request Identifier

Identifies all host interface requests. Helps track the sequence of log activity resulting from each host request.

Severity

Identifies the significance of the event. Some event data is non-volatile, meaning it persists across system power cycles.

Error — non-volatile data indicating a fault that prevented a request (host or diagnostic) from completing successfully.

Warning — non-volatile data indicating a fault that has not stopped the library's ability to complete requests (host or diagnostic). A warning can identify a loss of performance or a condition that may indicate future irrecoverable errors.

Information — volatile data indicating general device or library information (such as the device state, device added, listener registered, tray serial number updated, and so on). This information may be important to establish a history of activity for the warning or error event.

Trace — volatile data indicating diagnostic activity tracing.

Result Code

Identifies the library event type (result codes are the same as library EventIds). To search for the meaning of the Result Code using SLC, see "[Displaying Result Code Definitions](#)" on page 14-4 or refer to the SL8500_FRSxxx_JavaErrorCodes.html file included in the library firmware code package.

Result Text

Provides information about the results of the request or event.

Changing Online/Offline Status and Rebooting

- [Taking the Library Offline](#)
- [Bringing the Library Online](#)
- [Taking a Device Offline](#)
- [Bringing a Device Online](#)
- [Rebooting the Library](#)
- [Rebooting the Local Operator Panel](#)
- [Rebooting an Elevator](#)
- [Rebooting a Robot](#)

Taking the Library Offline

Note: Always try to take the library offline with ACSLS or ELS software before using SLC.

1. Take all library drives offline (see "[Taking a Device Offline](#)" on page 15-2).
2. In SLC, select **Tools > System Detail**.
3. Select the **Library** in the device tree.
4. Click the **Status** tab, and then the **General** tab.
5. In the Transition Request field, click **Take offline**.
6. Click **Apply**. Before the library goes offline, all outstanding library jobs complete.
7. Wait for the offline confirmation message. If the library does not come offline, check the status of the library (see "[Viewing Library Operational Status](#)" on page 13-1).

When to place the library offline:

- Before powering down the library
- Before opening a library access door
- When the library is inoperative and requires maintenance

Bringing the Library Online

Note: Always try to bring the library online with ACSLS or ELS software before using SLC.

1. In SLC, select **Tools > System Detail**.
2. Click the **Library** in the device tree.
3. Click the **Status** tab, and then the **General** tab.
4. In the Transition Request field, click **Bring online**.
5. Click **Apply**.
6. If applicable, bring the library online to ACSLS and ELS hosts (see the host software documentation).

Taking a Device Offline

Note: Always try to take a device offline with ACSLS or ELS tape management software before using SLC.

1. In SLC, select **Tools > System Detail**.
2. Expand the device folder (CAP, robot, or drive). Select the device to modify.
3. Click the **Status** tab.
4. In the Transition Request list, select **Take Offline**. The system completes all outstanding jobs for the device before taking the device offline

When robot goes offline, it moves to the end of the rail, and the library cannot use it. If the library is using the redundant robotics feature, the second robot will take all requests.

5. Click **Apply**.

Bringing a Device Online

Note: Library devices that are offline and in an error state cannot go online. The error condition must be corrected first.

1. In SLC, select **Tools > System Detail**.
2. Expand the **CAP** folder. Select the CAP to modify.
3. Click the **Status** tab.
4. In the Transition Request list, select **Bring Online**.
5. Click **Apply**.

Rebooting the Library

Rebooting the library involves reloading the firmware from flash memory and restarting the library controller.

1. In SLC, select **Tools > Diagnostics**.
2. Click the **Library** folder in the navigation tree.
3. Click **Reboot**.
4. All other users must log off. Click **OK**.
5. If the library is online, click **OK** to take the library offline.
6. Click **OK** to reboot the library.
7. Click **OK** to terminate this SLC session. Do not log back in to the SLC until the library has fully initialized.

Rebooting the Local Operator Panel

You may need to reboot the local operator panel if it hangs or the help content is not visible. You can reboot at the local operator panel or from a remote SLC session.

1. In SLC, select **Tools > Diagnostics**.
2. Select the **Library** in the device tree, and then click the **OpPanel** tab.
3. Click the **Reboot Operator Panel** button.
4. If rebooting from the local operator panel, the screen will go blank. The reboot is complete when the operator panel comes back online.

If rebooting from a remote SLC session, "Reboot Complete" indicates the reboot of the local operator panel has finished.

Rebooting an Elevator

1. Select **Tools > Diagnostics**.
2. Expand the **Elevator Folder**, and then select an elevator.
3. Click **Reboot**.
4. Click **OK** to reboot the elevator.

Rebooting a Robot

1. Select **Tools > Diagnostics**.
2. Expand the **Robot Folder**, and then select a robot.
3. Click **Reboot**.
4. Click **OK** to reboot the robot.

- [Basic Troubleshooting](#)
- [Running a Library Self-Test](#)
- [Running a Device Self-Test](#)
- [Diagnosing Robotic Issues](#)
- [Determining the Status of a Controller Card](#)
- [Clearing Library Status Alerts](#)
- [Initiating a Manual RE Switch Using SLC](#)
- [Calibrating the Touch Screen](#)
- [Troubleshooting Host Connectivity](#)

See Also

- ["Changing Online/Offline Status and Rebooting"](#) on page 15-1
- ["Generating Diagnostic Files for Oracle Support"](#) on page 14-2
- ["Monitoring Library Events"](#) on page 14-3
- ["Servicing the Library"](#) on page 17-1

Basic Troubleshooting

Before running diagnostic tests or contacting Oracle support, review the following troubleshooting tips.

Service Required (amber) LED is constantly on

Use SLC to check the health of the library and the attached devices (drives, CAPs, and robots). See "[Viewing Library and Device Information](#)" on page 13-1.

To perform a health check:

1. Log in to the SLC.
2. Access the System Detail module, **Tools > System Detail**.
3. Check the navigation tree for the following indicators: Device Healthy or Device Error

Additional checks:

1. Check the Status (for example, online/offline) and Statistics (for example, uptime, downtime, errors and warnings) tabs for more information on the health of the library and devices.

2. Ensure the cartridges are fully seated and properly oriented in their storage slots.
3. Inspect the X table for any foreign objects or debris and remove them if found.

CAP Open LED is on and blinking

Open the CAP and ensure the cartridges properly seated. Close the CAP.

SLC does not display modified data or information remains static

Check the SLC Heartbeat icon.

Robot Fault or Library Fault Amber LED is constantly on

1. Check the SLC for any displayed error messages. Write down the error messages reported.
2. Open the front door. Observe and note the state of the cartridges, hand, and tape drives.
3. Ensure cartridges are fully seated and properly oriented in their storage slots.
4. Ensure packing materials have been removed.
5. Inspect the library floor for any objects or debris. If there are any, remove them.
6. Check the status of the tape drives.
7. Close the front door.
8. Ensure the tape drives are fully seated and locked forward by pushing and pulling on the rear of the drive tray. Any motion of the tray indicates that it requires re-seating and locking down.

Client computer cannot communicate with the library or tape drives

Ensure cables are securely attached to their connectors on the rear of the library, the tape drives, and the client computer.

Library cannot communicate with the drives and drive status on the SLC displays "Not communicating"

Ensure cables are securely attached to their connectors on the rear of the library, the drives, and the client computer.

Repeated or excessive drive cleaning or cleaning messages

1. Replace the cleaning cartridge with a new cleaning cartridge.
2. Run the Library Self-Test and note if errors are reported for the drive.
3. Run any client computer-based drive diagnostic tests.

Running a Library Self-Test

Use library self-tests to help diagnose issues. Library self tests can be non-disruptive (cartridges are returned to their original locations) or disruptive (cartridges may be placed in new locations).

Note: Before performing a disruptive test, the library must be taken offline (see ["Taking the Library Offline"](#) on page 15-1).

1. Make sure the proper drive diagnostic cartridges are in the library (see ["Importing or Exporting Diagnostic or Cleaning Cartridges"](#) on page 10-3).
2. In SLC, select **Tools > Diagnostics**, and click the **Library** folder.

3. Click the **SelfTest** tab.
4. In the Mode list, select the type of self-test:
 - **Non-Disruptive** - all cartridges used in the test are returned to their original locations
 - **Disruptive** - cartridges may be returned to new locations. The library must be taken offline to all hosts before running this test.
5. Click **Run**. Test results display when the test completes.
6. For disruptive tests, bring the library online to resume normal operations.

What the library checks during a self-test:

- Verifies the communication path between the library controller, drives, elevators, and robots.
- Performs get and put operations to check the health of the robots, elevators, and CAPs. This includes get and put operations from a reserved system slot to a random empty storage slot or CAP slot.
- Performs a full library audit.
- Performs mounts and dismounts of diagnostic cartridges for all the drives installed in the library. The self-test does not begin unless a diagnostic cartridge is found in the system slots. If the system finds a compatible diagnostic cartridge, the self-test repeats for each drive type. If the system does not find a diagnostic cartridge for a drive type, the system skips the mount/dismount operation for the drive.

Running a Device Self-Test

Use device self-tests to help diagnose issues. A self-test can be performed on a CAP, robot, or drive.

Note: Running a self-test on a bulk CAP requires human intervention to open and close the CAP door.

Running a Self-Test on All CAPs (Bulk CAP Only)

1. In SLC, select the **Tools >Diagnostics**, and then select the **CAP Folder**.
2. In the Mode list, select **Non-Disruptive** (disruptive tests require the library to be taken offline to all hosts).
3. Click **Run**.
4. Open and close the CAP doors as indicated. A message appears when the test finishes.

Running a Self-Test on an Individual Device

1. In SLC, select **Tools >Diagnostics**.
2. Expand the device folder (CAP, robot, drive, PTP, or elevator) in the device tree. Select the device.

Note: To perform a robot self-test, diagnostic cartridges must be available in the library (see ["Importing or Exporting Diagnostic or Cleaning Cartridges"](#) on page 10-3).

3. In the Mode list, select **Non-Disruptive**.
4. Click **Run**. A message appears when the test finishes.

Diagnosing Robotic Issues

Diagnostic moves can help monitor or diagnose robotic problems by issuing a series of "get" and "put" operations. The system chooses a robot for the diagnostic move based on the minimum and maximum ranges set for the target and pool addresses. Multiple robots may be selected if the address range requires it.

Successful diagnostic moves do not rearrange the cartridges in the library — the system returns cartridges to their original locations. However, some diagnostic move failures can cause cartridges to be left in new locations.

Defining a Diagnostic Move

Note: Diagnostic moves require sharing of robot resources. You should not run a diagnostic move during peak activity periods.

You can set up and run multiple diagnostic move routines simultaneously if the target and pool ranges for each diagnostic move do not overlap.

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **DiagMove** tab, and then the **Manage** tab.
3. In the Defined Sequence section, click **Add**.
4. Define the target address range (the area used for "get" operations).
 - a. Select a slot type.
 - b. Select the starting and ending locations for the range.
5. Click **Next**.
6. Define the source address range (the area used to supply cartridges or empty slots if a target address does not contain a cartridge or no empty slots are available.)
 - a. Select a slot type.
 - b. Select the starting and ending locations.
7. Click **Next**.
8. Name the move and specify a move count (between 1 and 5000).
9. Select an access order, move type, and enable/disable the pre-move compatibility check (see below for details).
10. Click **Finish**. The new diagnostic sequence is listed in the Defined Sequences section. See ["Starting a Diagnostic Move"](#) on page 16-5.

A diagnostic move is defined by:

- **Target Address Range** — defines the area used to perform the "get" operation in a diagnostic move. Valid target address types are storage slots, CAP, drive and storage slots, system slots, or all.

Note: All resources within the target address range are reserved. However, only the location currently being accessed by the robot for a get/put operation is unavailable to the host.

- **Pool Address Range** — defines the area used to supply cartridges or empty slots if a target address does not contain a cartridge or no empty slots are available. The pool and target address can overlap.
- **Access Order** — determines how the robot performs get operations within the target address range. There are two options:
 - *Sequential* — robot performs a get operation starting with the first location in the target address range. The robot continues visiting the locations sequentially through the range until it completes the requested number of moves.
 - *Random* — robot randomly picks a location in the target address range to get a cartridge. The robot can also visit the same location in the target address range multiple times to get a cartridge; however, if you specify enough move requests, the robot is guaranteed to visit all slots. The random access routine ends after the requested number of moves is complete.

Starting a Diagnostic Move

Note: You can run multiple moves simultaneously as long as the target and pool address ranges for the moves do not overlap.

Before starting a diagnostic move, you must define the move (see "[Defining a Diagnostic Move](#)" on page 16-4).

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **DiagMove** tab, and then the **Manage** tab.
3. In the Defined Sequences section, select a diagnostic move. Click **Open**.
4. Select **File > Start Sequence**.

Saving a Diagnostic Move

You can save a defined diagnostic move to a file and use it to restore a move that has been deleted from the library or copy it to a different library.

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **DiagMove** tab, and then the **Manage** tab.
3. In the Defined Sequence section, select a diagnostic move, and then click **Save** at the top of the SLC screen.

Monitoring and Controlling Open Diagnostic Moves

To start a diagnostic move, see ["Starting a Diagnostic Move"](#) on page 16-5.

1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **DiagMove** tab, and then the **Monitor** tab.
3. Each monitor window indicates the status of the move:

Status Indicators	Valid Values
Spooling Status — whether the move output is being saved to a file	True, False
State — execution state of the move	Running, pausing, paused, stopping, stopped
Health — health state of the move	OK, warning, error
Completed moves — number of moves completed	Count

4. Use the **File** menu in each Monitor window to start/stop/pause the sequence, clear the output window, or start/stop spooling.

Determining the Status of a Controller Card

Controller card status is indicated by LEDs on the card and displayed in SLC (see ["Viewing Device Status and Properties"](#) on page 13-2). You can use the status of the card to troubleshoot issues with the library.

The LEDs and meanings are the same on both card types (HBC and HBT).

Controller Card LED	Definition
ACTIVE - Green	Card is functioning as the active and is running active code.
STANDBY - Amber	Card is functioning as the standby and is running standby code.
FAULT - Red	Card has experienced a serious error.
EJECT OK - Blue	Support representative can safely initiate a card eject.

Clearing Library Status Alerts

You can only clear alerts marked as "Clearable" and only if service is active on the library.

Clearing an alert only removes it from the Status Module display; it does not resolve the underlying cause. The library health indicator returns to "Normal" if there are no other device or status alerts. If the alert is subject to periodic updates, it will reappear at the next update cycle.

1. In SLC, select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Status** tab, and then the **Status Module** tab.
3. On the Clear Alert Number list, select the alert number to clear, and then click **Apply**.

Initiating a Manual RE Switch Using SLC

Note: You can also initiate a manual RE switch using host software or the CLI (see ["Ways to Initiate a Manual Failover"](#) on page D-3).

This procedure is not available at the local operator panel.

1. Verify the device state of the card indicates "switch is possible" (see ["Viewing Device Status and Properties"](#) on page 13-2).
2. In SLC, select **Tools > Diagnostics**.
3. Select the **Redundant Electronics** folder
4. Click **Apply** to begin the switch process. If there is a problem with the standby library and drive controller cards, you are not allowed to continue with the switch.
5. If there are no errors, click **Yes**.
6. Click **OK** to log off the SLC.
7. Wait until the switch is complete before logging back into the library. You must specify the IP address or DNS alias of the new active controller.

Calibrating the Touch Screen

Alignment of the touch screen is calibrated at the factory. If the touch screen becomes mis-aligned, you can re-calibrate or reset it. The method for calibrating the touch screen depends on the type and version (see ["Viewing the Local Operator Panel Type"](#) on page 13-3).

- If you have a Linux-based local operator panel (DL or OL), you can re-calibrate it yourself or reset it to factory setting with the procedures below.
- If you have a Windows-based local operator panel (W), contact your Oracle support representative.

Re-calibrating the Local Operator Panel

1. For an accurate calibration, make sure there is no debris on the touch screen.
2. Log in to the local operator panel. Select **Tools > Calibrate**.
3. Click **Calibrate**.
4. A series of targets will display. Gently tap the center of each target with your finger or a pointing stylus.
5. To save the new settings:
 - a. Tap the **Click Me** buttons.
If the buttons do not depress, the touch screen is not properly aligned. Discard the new settings (see step 6).
 - b. Click **OK** to save the new settings.
6. To discard the new settings:
 - a. Let the timer run out without tapping the **Click Me** button.
 - b. Return to step 3 and re-calibrate.

The local operator panel reboots automatically after an unsuccessful second calibration and restores the previously saved alignment.

Resetting the Local Operator Panel to Factory Settings

1. Log into the local operator panel.
2. In SLC, select **Tools > Calibrate**.
3. Click **Reset Calibration**. The local operator panel reboots.

Troubleshooting Host Connectivity

- Use a sniffer (a device or program that traces the network traffic for the library).
- Display the port statistics on the switch or router connected to the library. Search for any errors.
- Run a trace with the library management software that displays host-to-library packets and transmissions.
- Verify that two separate hosts are not competing to manage one library or one partition. To view current host connections, see "[Viewing Library Operational Status](#)" on page 13-1. Click the **HLI** tab.

Servicing the Library

- [Turning Off the Library](#)
- [Turning On the Library](#)
- [Entering the Library without the Service Safety Door in Place](#)
- [Using the Emergency Robotics Stop Switch](#)
- [Manually Mounting or Dismounting a Cartridge](#)
- [Operating the Service Safety Door](#)

See Also

- ["Troubleshooting"](#) on page 16-1

Turning Off the Library

Caution: If you turn off the library without performing the following procedure, you risk possible equipment damage, cartridge damage, or loss of data.

1. Ensure that all library requests have completed.
2. Take the library and the drives offline.
3. Ensure that the drives are empty by verifying the drive state using the SLC (see ["Viewing Library and Device Reports with the Reports Utility"](#) on page 14-1).
4. Open the rear doors of the library.
5. Locate the power distribution unit (PDU) in the lower-right and set the power switch to the OFF position (0). If the library has a 2N power configuration, switch off both PDUs.

For more information about PDUs, see the ["Power Configuration Options"](#) on page 1-9.

Turning On the Library

1. Verify that the front access doors are closed and locked.

Note: If you do not want to turn on the robots, CAPs, and the elevators, leave the front access doors open.

2. Set the power switch to the ON position.
If the library has a 2N power configuration, switch on both PDUs.

Entering the Library without the Service Safety Door in Place

Note: Opening an access door without the safety door in place will stop all library operations. When the library comes back online, it will perform a full audit. See also "[Operating the Service Safety Door](#)" on page 17-3.

1. Follow all safety precautions (see "[Safety Precautions when Entering the Library](#)" on page 17-2).
2. Place the library offline (see "[Taking the Library Offline](#)" on page 15-1).
3. Unlock and open the front access door. Lock the access door open and retain the key
4. If necessary, move the robots out of your way starting with the bottom rail. Avoid damaging the robot's mechanical or electronic components. The robot should move freely. Do not force the robot if movement is restricted.
5. Before you exit the library, verify that there are no loose items or people in the library.
6. Close and latch the doors.
7. Lock the doors and retain the key.
8. Bring the library online (see "[Bringing the Library Online](#)" on page 15-2).

Safety Precautions when Entering the Library

WARNING: To prevent the door from accidentally closing, lock the access door open and retain the key.

- Verify the library is offline. Do not enter the library or move any of the robots if you suspect the robots are online.
- Do not attempt to override any of the electrical or mechanical safety devices in the library.
- Inform someone in the immediate area that you are going to enter the library.
- Locate the mechanical door releases (yellow handles on the inside of the access doors). If the doors close while you are inside the library, push the mechanical release to unlock and open the door.
- Always leave both the front access doors open while inside the library.
- Know the physical restrictions of the library. Be careful not to bump you body or snag clothing on the arrays (there is only 0.4 m [18 in.] of aisle clearance).

Using the Emergency Robotics Stop Switch

The emergency robotics stop (EMS) switch cuts all power to the robots.

In the unlikely event that someone becomes locked inside the library and the system begins to turn on, lights flash for 30 seconds before the robot starts to move. This provides enough time for someone outside the library to push the emergency robotic stop switch.

Figure 17-1 Emergency Robotic Stop Switch



1. Emergency Robotic Stop Switch (ERS)

Manually Mounting or Dismounting a Cartridge

Refer to the drive documentation before manually mounting a cartridge.

Caution: Keep your hands clear of the drive's mechanical and electronic components.

1. Record the volume ID, cartridge location, and drive slot provided by the library management software.
2. Locate the drive ("[Viewing Library and Device Reports with the Reports Utility](#)" on page 14-1). L
3. Locate the cartridge ("[Locating Cartridges](#)" on page 10-2).
4. Orient the cartridge so that the hub gear is facing down and the vol-id label is facing you.
5. Push the cartridge into the drive. Do not force the cartridge. If you feel some resistance as you insert the cartridge, verify that you are inserting the correct cartridge type for the drive.
6. To dismount the drive, press the **UNLOAD** switch on the front of the drive.
If the cartridge does not eject, refer to the drive documentation.

Operating the Service Safety Door

You can use the SLC to monitor the status of the safety door (see "[Viewing Device Status and Properties](#)" on page 13-2).

The safety door is a sliding barrier that temporarily closes off the left or right area between the front door and the rear of the elevator assembly. Service representatives can activate the service safety door with a maintenance key. With the safety door in place, a service representative can open the front door to access a faulty robot without bringing the library offline.

With the safety door in place, the library continues to process host requests. The library will queue any mount requests for slots next to or behind the safety door until the service representative finishes. Once the access door is closed and locked, the service safety door moves to the center of the library. The robots then resume their full service.

Accessing the Left Maintenance Area

Before activating the safety door, the service representative should take the left elevator and left bulk CAPs offline using SLC. After completing the maintenance activity, the service representative should bring the left elevator and bulk CAPs back online.

Accessing the Right Maintenance Area

Before activating the safety door, the service representative should take the right elevator and rotational or right bulk CAPs offline using SLC. After completing the maintenance activity, the service representative should bring the CAPs and the right elevator online.

Software and Hardware Requirements for Library Features

Media Validation

- High-memory HBT card
 - If using RE, both HBT cards should be high-memory
- Minimum FRS_8.31 and SLC FRS_6.25
- See also: "[Media Validation Requirements](#)" on page 11-1

Partitioning

- Minimum FRS_7.01 and SLC 5.50 (for single library partitioning)
- Minimum FRS_8.31 and SLC 6.25 (for library complex partitioning)
 - ACSLS 8.3, HSC 6.2: PTF L1H16SG (VM), ELS 7.0: PTF L1H15SI (MVS), ELS 7.1: PTF L1H16SJ, ELS 7.2: integrated

Redundant Electronics

- Minimum FRS_6.00 and SLC version 4.65
- See also: "[Redundant Electronics Requirements](#)" on page D-1

Enabling ADI Mode

- High-memory HBT
 - If using RE, both HBT cards must be high-memory
- Minimum FRS_8.36

Sending Rich Drive Data to STA

- A high-memory HBT is required for T10000 drives running TTI 5.40+ to send all data to STA. Without a high-memory HBT, the drives operate normally, but STA only receives basic data.

Command Line Interface Reference

This appendix describes the Command Line Interface (CLI) commands available for an Admin user. Since the CLI is firmware-based, not all commands may be available for your library.

Admin accessible CLI commands include:

- [audit](#)
- [capCommand](#)
- [cleaning](#)
- [config](#)
- [date](#)
- [drive](#)
- [hwActivation](#)
- [mediaValidation](#)
- [network](#)
- [partition](#)
- [reControl](#)
- [snmp](#)
- [ssh](#)
- [time](#)
- [traceRoute](#)
- [version](#)
- [whereAmi](#)

audit

This command performs a physical audit on all or part of the library.

audit

Displays help for the audit command, the same as "help audit".

audit *

Initiates a physical audit of the entire library. This command returns immediately and displays no results.

Example:

```
SL8500> audit *
requestId
requestId 9
Done
Failure Count 0
Success Count 1
COMPLETED
```

audit <device address> <address>

Performs a physical audit of a single address and displays the results.

- *<device address>* - specifies the robot to use in library, rail, column, side, row format.
- *<address>* - specifies the slot location to audit in library, rail, column, side, row format.

Example:

```
SL8500> audit 1,4,0,1,0 1,4,-45,1,1
requestId
requestId 9
Attributes Media Label #EMPTY..
Object      Location    1,4,-45,1,1
Done
Failure Count 0
Success Count 1
COMPLETED
```

audit <device address> <start address> <end address>

Performs a physical audits of a range of addresses and displays the results.

- *<device address>* - specifies the robot to use in library, rail, column, side, row format.
- *<start address> <end address>* - specifies the starting and ending slot location to audit in library, rail, column, side, row format. Only the row is variable between the start and end addresses.

Example:

```
SL8500> audit 1,4,0,1,0 1,4,-45,1,1 1,4,-45,1,2
requestId
requestId 10
Attributes Media Label #EMPTY..
Object      Location    1,4,-45,1,1

Attributes Media Label EN34410R
Object      Location    1,4,-45,1,2
...
Done
Failure Count 0
Success Count 5
COMPLETED
```

audit multiRowScan {enable | disable | print} <device address>

Enables or disables multiple row scan audit capability to speed up audit time.

- **print** - prints the multi-row scan audit state.
- *<device address>* - specifies the robot to use in library, rail, column, side, row format.

Example:

```
SL8500> audit multiRowScan print 1,1,0,1,0
requestId
requestId 8401
Attributes Multi Row Scan enabled
Object      Robot      1,1,0,1,0
Done
Failure Count 0
Success Count 1
COMPLETED
```

capCommand

This command is for managing CAPs.

capCommand

Displays help for the capCommand command, the same as "help capCommand".

capCommand <enable|disable> <device_address>

Enables or disables a CAP on a rail (for bulk CAP only). Certain situations may prevent a CAP from being disabled, such as a reservation by a host.

- *<device address>* - specifies the CAP to release in library, rail, column, side, row format.

capCommand forceUnreserve <device address>

Forces the release of a CAP. If cartridges are in the CAP, the reservation changes to "default". If there are no cartridges in the CAP, the reservation changes to "none".

- *<device address>* - specifies the CAP to release in library, rail, column, side, row format.

capCommand {lock | unlock} <device address>

Locks or unlocks a CAP specified by the device address.

- *<device address>* - specifies the CAP to lock/unlock in library, rail, column, side, row format.

cleaning

This family of commands displays and controls cleaning and diagnostic cartridge-related functions within the library. Only customers with the media validation feature should use these commands.

cleaning

Displays help for the cleaning command, the same as "help cleaning".

cleaning list cleaning

Lists all cleaning cartridges in the system slots.

Example:

```
SL8500> cleaning list cleaning
requestId
requestId 9001
Attributes Expired false
Label      CLN0080U
Location   1,1,-52,1,13
Max Usage Count 100
```

Media Type	9840_Cleaning
Status	ok
Usage Count	0
Object Cartridge	cleaning

cleaning import <cap device address> [to { 1 | 2 | 3 | 4 | * }]

Imports cleaning and diagnostic cartridges to system slots. Only one import/export operation is allowed at a time. There must be a minimum 9 empty system slots for SL8500 libraries to allow imports.

- *<cap device address>* - specifies the CAP to use for the import operation, in library, rail, column, side, row format.
- **to { 1 | 2 | 3 | 4 | * }** - specifies the rail to import cartridge to if possible (optional)

Example:

```
SL8500> cleaning import 1,2,55,1,0 to 1
requestId
requestId 10101
Message CAP open(ing). Place cartridges to import in CAP, then close CAP.Use
CONTINUE cmd to proceed...
Done
Failure Count 0
Success Count 0
COMPLETED
```

cleaning export <cap device address> cleaning select { 1 | 2 | 3 | 4 | expired }

Exports selected cleaning cartridges. Only one import/export operation is allowed at a time.

- *<cap device address>* - specifies the CAP to use for the export operation, in library, rail, column, side, row format.
- **select { 1 | 2 | 3 | 4 | expired }** - specifies the rail number to export cleaning cartridges from.

Example:

```
SL8500> cleaning export 1,2,55,2,0 cleaning select expired
requestId
requestId 9601
Address      1.4.-52.1.12
Success      Cartridge Exported
Volume Label CLN002CU
Message CAP open(ing). Remove cartridges, then close CAP.Use CONTINUE cmd to
proceed...
Done
Failure Count 0
Success Count 1
COMPLETED
```

cleaning export <cap device address> <cartridge address>

Exports a specific cleaning or diagnostic cartridge to the specified cap. Only one import/export operation is allowed at a time.

- *<cap device address>* - specifies the CAP to use for the export operation, in library, rail, column, side, row format.
- *<cartridge address>* - specifies the location of the cartridge to export in library, rail, column, side, row format. The specified cartridge must be in a system slot and must be either a cleaning or diagnostic cartridge.

Example:

```

SL8500> cleaning export 1,2,55,2,0 1,4,-52,1,12
requestId
requestId 9601
Address      1.4.-52.1.12
Success      Cartridge Exported
Volume Label CLN002CU
Message CAP open(ing). Remove cartridges, then close CAP.Use CONTINUE cmd to
proceed...
Done
Failure Count 0
Success Count 1
COMPLETED

```

cleaning threshold list

Displays a list of cleaning cartridge types and their warning thresholds. Each cleaning cartridge type has 4 attributes:

- Index - cleaning cartridge type used by the "cleaning threshold set" command
- Media type - the type of cleaning cartridge used
- Maximum usage count - recommended max usage by tape manufacturer
- Warning threshold value - user-defined threshold that determines when a warning status is set for a cleaning cartridge once its usage count reaches that threshold.

Example:

```

SL8500> cleaning threshold list
requestId
requestId 15001
Attributes
Object      Index          1
            Media Type      SgtUltrium1_Cleaning
            Recommend Max Usage 100
            Warning Threshold  0
Attributes
Object      Index          3
            Media Type      T10000_Cleaning
            Recommend Max Usage 50
            Warning Threshold  0

```

cleaning threshold set <warning threshold value> <list index number>

Sets a warning threshold value for a particular cleaning cartridge type.

- *<warning threshold value>* - can be any positive integer up to 1000. A value of 0 indicates no warning threshold.
- *<list index number>* - cleaning cartridge type as specified by the index number from the table listing of the "cleaning threshold list" command.

Example:

```

SL8500> cleaning threshold set 55 11
requestId
requestId 15101
Attributes
Object      Success true
Done
COMPLETED

```

cleaning driveWarning set { on | off }

Sets the drive cleaning warning flag to either on or off.

- **on** - the drive health status will be set to warn if it needs cleaning
- **off** - the drive health status is not affected if the drive needs cleaning

config

This command will either display the current physical library configuration or set library configuration parameters.

config

Displays help for the config command, the same as "help config".

config complexId set {1 - 127}

Sets the complexId used for SDP for just the library in which the command is executed. If more than one library exists in a complex, the complexId must be set individually for each library in the complex.

config complexId set {1 - 127} <library address>

Sets the complexId used for SDP for a remote library. If more than one library exists in a complex, the complexId must be set individually for each library in the complex.

- *<library address>* - specifies the library in library, rail, column, side, row format. For example: 2, 0, 0, 0, 0.

config complexId clear

Clears the complexId number for a library. This command will restart the network stack and cause the SDP ILC IP address to stop responding.

config complexId clear <library address>

Clears the complexId number for a remote library. This command will restart the network stack and cause the SDP ILC IP address to stop responding.

- *<library address>* - specifies the library in library, rail, column, side, row format. For example: 2, 0, 0, 0, 0.

config complexId print

Displays the current complexId for the library in which the command is executed.

config ilc print

Display the ilc status.

config ilc {enable | disable}

Enables or disables the Inter-Library Communications (ILC) LAN. If a disable is requested, the library must first be taken offline using the "accessState offline <device address>" command.

config libraryId print

Displays the current library identifier for this library.

config libraryId set {1 - 32}

Sets the libraryId with a value from 1-32. The library must be offline for this command.

config print

Displays the current physical library configuration.

config serviceInfo print

Displays the library service information.

config serviceInfo set

Sets service information: contact 'contactName' phone 'phoneNumber' streetAddr 'streetAddress' city 'city' state 'state' country 'country' zip 'zipCode' description 'description data'.

Currently the maximum string length is 31 characters. Each string must be delimited by ' ' (single quotes) to provide the ability to use spaces and other characters.

Example:

```
SL8500> config serviceInfo set city 'Denver' contact 'Andy' country 'USA'
description 'Manager' phone '303 222-4444' state 'CO' streetAddr '1 tape drive'
zip '80027'
```

```
requestId
requestId 1512402
Device serviceInfo
Success true
Done
Failure Count 0
Success Count 1
COMPLETED
```

date

This command sets the library date in Greenwich Mean Time (GMT).

date

Displays help for the date command, the same as "help date".

date print

Displays the current system date.

date <MM> / <DD> / <YYYY>

Sets the system date. In a library complex, the library with libraryId = 1 is the master. Change the date on the master library.

- <MM> - two digit month
- <DD> - two digit day
- <YYYY> - four digit year

drive

This command displays information about the drives or executes the drive utilities such as adiEnable, fastLoad, power, and rewindUnload.

drive

Displays help for the drive command, the same as "help drive".

drive adiEnable {on | off | print}

Turns on or off or prints status of drive discovery with ADI. Once enabled, any subsequently added drives will attempt ADI drive discovery. To enable ADI for all ADI capable drives in the library, the library must be rebooted.

drive fastLoad {on | off | print}

Turns on or off or prints the status of the fastLoad feature. FastLoad changes the behavior of drive mounts (move commands). With fastLoad on, the robot will not wait for a complete load of a PUT to a drive, but will go immediately to the next operation. Also changes the behavior of the rewindUnload command to return immediately, not waiting for the drive to unload. The state of the fastLoad applies to all drives.

Note: This command only affects commands issued in the same CLI session where this command was issued.

drive print { <drive address> | * }

Displays summary drive information: location, state, status, type, firmware version, interface type, in use, serial number, state (online/offline), status (ok, warning, or error), and drive vendor.

- *<drive address>* - specifies the drive in library, rail, column, side, row format.
- * - displays drive information for all drives in the library

drive search {on | off} <drive address>

Causes the green LED on the drive tray to blink. Blinking continues until the search off command issued. Used to locate a drive within the library.

- *<drive address>* - specifies the drive in library, rail, column, side, row format.

hwActivation

This command activating certain library features after purchasing a hardware activation permit.

Note: The library must be rebooted when disabling openVolser, dualRobot, partitioning, or redundant electronics.

hwActivation

Displays help for the hwActivation command, same as "help hwActivation".

hwActivation addLicenseFile

Adds a license file. The license file must be named *SL8500_license_config.dsf*. The full path name being */usr/local/SL8500_license_config.dsf*.

hwActivation deleteFile <index>

Deletes the specified installed feature file.

- *<index>* - specifies file number to delete as specified in the library controller hwActivation module database. See "hwActivation listFiles".

hwActivation listFiles

Lists the installed feature files in the library controller hwActivation module database.

hwActivation print

Lists all of the enabled features in the library controller hwActivation module database.

mediaValidation

This command manages the media validation feature.

mediaValidation

Displays help for the mediaValidation command, same as "help mediaValidation"

mediaValidation print { all | poolOnly } { * | @ }

Displays drive locations of the media validation pool.

- **all** - lists all drive slots
- **poolOnly** - lists only drive slots in the media validation pool
- ***** - displays only information for the target library
- **@** - displays information for the entire complex

mediaValidation reservation clear <drive address>

Clears media validation reservation for specified drive.

- *<drive address>* - specifies the drive in library, rail, column, side, row format.

mediaValidation stopValidation <drive address>

Stops a validation currently in progress. Cartridge is returned to source storage slot.

- *<drive address>* - specifies the drive in library, rail, column, side, row format.

network

This command is used to configure and display network configuration for the controller card.

network clone [Port 2B IP address] [Port 2A IP address]

Used for redundant electronics configuration. Copies all port, routing, and IP policy configurations to side B HBC. IP addresses are replaced with the ones specified in the command for side B. If no port IP address is specified, then they are not set on side B.

network config print

Displays the target library side (A or B) that is set for network commands.

network config side {a | b}

Sets the target library side for network commands.

network config clear

Clears the network configuration. This command stops network connectivity. Reconfiguration requires access to the serial port on the HBC card.

network export

Exports library network configuration file (.inc) and generates a network configuration script (.scr). It can only be used in cases where no prior network configurations have been set.

network gateway <IP address>

Sets the external network default gateway.

network gateway clear

Clears the external network default gateway.

network import

Imports a library network configuration file (.Inc).

network ip <IP address>

Sets the IP address of port 2B.

network ip address add <IP address> dev {2A | 2B}

Sets the IP address of a particular port.

network ip address del <IP address> dev {2A | 2B}

Removes the IP address of a port.

network ip address show [dev {2A | 2B}]

Displays the current address information for a particular port or both ports if dev is not specified.

network ip link set dev {2A | 2B} {up | down}

Sets the operation status of a port, which controls whether a port can send and receive Ethernet traffic.

- **up** - sets port online
- **down** - sets port offline

network ip policy {enable | disable} dev {2A | 2B}

Enables or disables policy routing for device 2A or 2B.

network ip policy status

Displays policy routing status for devices 2A and 2B.

network ip policy route {add | del} <IP address> dev {2A | 2B}

Adds or deletes a static route to policy for device 2A or 2B.

network ip policy route {add | del} <IP address> via <Gateway IP address> dev {2A | 2B}

Adds or deletes a static route to policy for device 2A or 2B via gateway.

network ip policy route show [dev {2A | 2B}]

Displays policy route information for device 2A or 2B.

network ip route add default via <IP address>

Sets the default gateway routing IP address.

network ip route delete default

Deletes the default gateway routing IP address.

network ip route {add | del} <IP address [/netmask] > dev {1A | 1B | 2A | 2B}

Adds or deletes a static IP (Internet Protocol) routing address for a specified host. This command also enables a user to set the netmask for a particular port.

Example:

```
SL8500>network ip route add 129.80.81.59/24 dev 1B  
COMPLETED
```

network ip route {add | del} <IP address [/netmask] > via <Gateway IP address>

Adds or deletes a static route to a destination network IP gateway address.

network ip route show [dev {2A | 2B}]

Displays the current routing table information or routing table information for a particular port.

network name <host name string>

Sets the host name.

network netmask <netmask>

Sets the external network netmask in xxx.xxx.xxx.xxx form.

network print

Displays the current network configuration for the external Ethernet ports (2A and 2B).

partition

This command displays the current status or disables the partition feature.

partition

Displays help for the partition command, same as "help partition".

partition autoClean set { * | <Partition Id> }

Set auto clean in a specified partition (0, for a non-partitioned library).

partition attribute status { * | <Partition Id> }

Displays the status attributes of a single specified partition or all partitions.

partition disable

Disables partitioning in the library.

partition getCapacity

Displays the capacity values for library or any defined partitions.

partition status

Displays the current partitioning status.

partition setCapacity { <Partition Id> , <Capacity> }

Sets the capacity for the designated partition. Existing partitions not listed in the command will have their capacity set to zero.

Example:

```
SL8500> partition setCapacity 1,200 2,50 3,600
  requestId 7601
  Done
  Failure Count 0
  Success Count 1
COMPLETED
```

partition setNonPartitionedHLI

Sets the partition to hli0. If there are any drives in the media validation pool, they must be removed beforehand. If in complex, it sets all the libraries to hli0.

partition set state {online | offline} <Partition Id>

Sets the current state (offline/online) of a specified partition.

reControl

This command controls/switches the redundant electronics and retrieves the library controller redundant electronics statuses.

reControl

Displays help for the reControl command, same as "help reControl".

reControl status [<library address> | *]

Retrieves the redundant electronics status.

- *<library address>* - specifies the library in library, rail, column, side, row format. For example: 2, 0, 0, 0, 0.
- * - retrieves status from all libraries in a complex

snmp

This command configures the Simple Network Management Protocol (SNMP). For more information, see the *SNMP Reference Guide* on OTN.

ssh

This command controls configuration for the ssh daemon/server which resides on the HBC. This is the protocol utility which SLC and other various applications use to connect to the library controller.

ssh print

Prints the current ssh daemon protocol settings.

ssh set version1and2

Sets the ssh daemon protocol restriction to v1 and v2. (this is the default). The ssh server is restarted.

ssh set version2

Sets the ssh daemon protocol restriction to v2 only.

time

This command sets the library time in military time notation.

time

Displays help for the time command, same as "help time".

time print

Displays the current system time.

time <HH> : <MM>

Sets the system time. Resolution is within one minute. In a library complex, the library with libraryId = 1 is the master. Change the time on the master library.

- *<HH>* - two digit hour
- *<MM>* - two digit minute

time <HH> : <MM> : <SS>

Sets the system time. Resolution is within one second. In a library complex, the library with libraryId = 1 is the master. Change the time on the master library.

- *<HH>* - two digit hour
- *<MM>* - two digit minute
- *<SS>* - two digit second

traceRoute

This command traces the network route to a specified IP address.

traceRoute <IP Address>

Executes a traceRoute to the IP address specified.

version

This command displays the customer version and the versions of the software for the device(s) requested.

version print [<device address> | *]

Displays the software version of code for a device or all devices.

- *<device address>* - specifies the device in library, rail, column, side, row format.

whereAmi

This command displays the system and logic card information relative to the library and card related to redundant electronics command is being executed.

whereAmi

Displays the information relating to where the command is being issued.

Example:

```
SL8500> whereAmI
  Host Name: gulibtst02b
  Port 2B IP Address: 172.20.151.24
  Library Type: SL8500
  HBC side: B
  Active side: B
COMPLETED
```

Library Addressing Reference

Note: Left and right are in reference to viewing the library from the CAP-side (front) unless otherwise specified.

- [Translating a Slot Address Between HLI and Library Format using SLC](#)
- [Comparison of Addressing Schemes](#)
- [Understanding Structural Elements Used in Addressing](#)
- [Internal Library Addressing Scheme](#)
- [HLI-PRC Addressing Scheme](#)
- [Physical Hardware Numbering for Tape Drives](#)
- [Reserved Internal IP Addresses](#)

Translating a Slot Address Between HLI and Library Format using SLC

You can use SLC to translate between an internal library address (Library, Rail, Column, Side, Row) and an HLI address (LSM, panel, row, column) used by ACSLS and ELS.

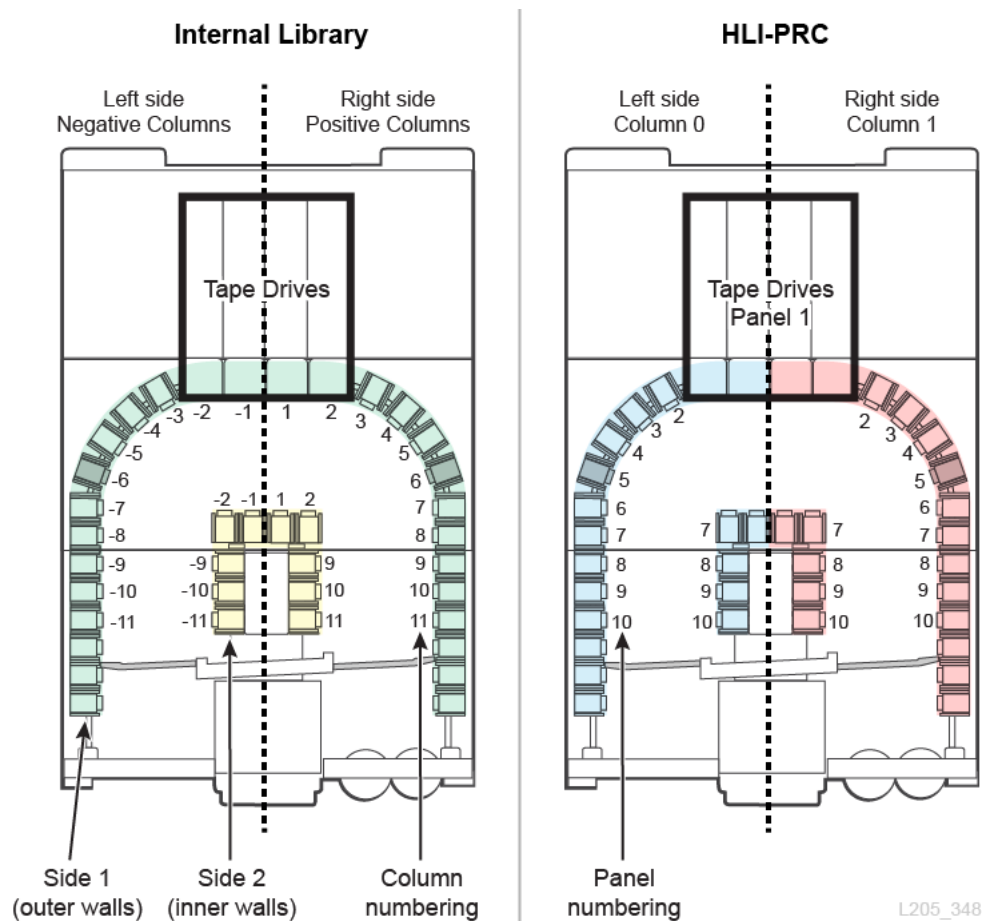
1. In SLC, select **Tools > Diagnostics**. Select the **Library** in the device tree.
2. Click the **Search** tab.
3. Select **Location**.
4. Select the search criteria from the drop-down list, and enter the address (wildcards are invalid).
5. From the Requester drop-down list, select **hli0** if you entered an HLI addresses or select **default** if you entered an internal library address.
6. Click **Search**.
7. If you entered an HLI address, the internal library address displays in the Address column of the search results. If you entered an internal library address, click . . . to view the HLI address.

Comparison of Addressing Schemes

- [Internal Library Addressing Scheme](#) (Library, Rail, Column, Side, Row) — used by the firmware and internal communications to represent all devices and locations within the library.

- Begins at 1 and uses negative numbers.
- Column indicates the horizontal location in the library
- Outer wall row numbering is 1 to 13, and inner wall numbering is 1 to 14.
- **HLI-PRC Addressing Scheme** (LSM, Panel, Row, and Column) — used by HLI clients, such as ACSLS and ELS, to represent library locations and components.
 - Begins with 0 and uses only positive numbers.
 - Column indicates the left or right side of the library
 - Outer wall row numbering is 0 to 12, and inner wall numbering is 13 to 26.
- **Physical Hardware Numbering for Tape Drives** — identifies the drive slot locations assigned by the HBC card.

Figure C-1 Internal Library versus HLI-PRC Addressing (top view of library)



Understanding Structural Elements Used in Addressing

Walls

- Each side of the library (left/right) has an inner wall and an outer wall.

Standard Arrays

- 14-slot arrays on the inner wall

- 13-slot arrays on the outer walls

Special Arrays

- 8-slot arrays above the pass-thru port
- 8-slot arrays under the stop brackets for the service safety door
- 4-slot arrays on the elevators and pass-thru ports
- 3-slot arrays at the ends of each rail
- 12-slot arrays for bulk CAP magazine

Rails (LSMs)

Each library has four robotic rails. For HLI addressing, each of these rails is considered a library storage module (LSM).

Columns (Panels)

Columns (equivalent to panels in HLI-PRC addressing) refer to the horizontal location of a component in the library (similar to the columns in a spreadsheet). Special columns include:

- Corners because there is no inner wall
- Pass-thru ports because the top six slots are inaccessible because of the PTPs
- Pass-thru port panels because the top cartridge slot (under the port) is reserved as a redundant robotics drop-off slot (two for each rail, one on each side)

Internal Library Addressing Scheme

- [Internal Library Addressing Overview](#)
- [Drive Internal Library Addressing](#)
- [Rotational CAP Internal Addressing](#)
- [PTP Internal Addressing](#)
- [Elevator Internal Addressing](#)
- [Robot Internal Addressing](#)

Internal Library Addressing Overview

Internal library addressing designates location using Library, Rail, Column, Side, Row (L,R,C,S,W).

- **Library** — the number of the library within a library complex (always 1 for a single library)
- **Rail** — robotic rails numbered top down from 1 to 4.
- **Column** — the horizontal location of a device or slot. Column numbering begins at the center of the drive bays and increments +1 to the right or -1 to the left as you move toward the front of the library:
 - +1 is just right of the center of the drive bays.
 - -1 is just to the left of center of the drive bays.
 - The first columns containing tape cartridges are +3 and -3.

- **Side** — indicates the inner and outer wall, left or right robots, or left or right rotational CAP.
 - Outer wall =1, Inner wall =2
 - Left robot =1, Right robot =2 (in non-redundant robotics the side is always 1)
 - Right rotational CAP =1, Left rotational CAP =2 (for Bulk CAPs the side is always 1)
- **Row** — The vertical location of a device or slot. Rows are consecutively numbered from the top (1) down (to 13 outer wall and 14 inner wall).

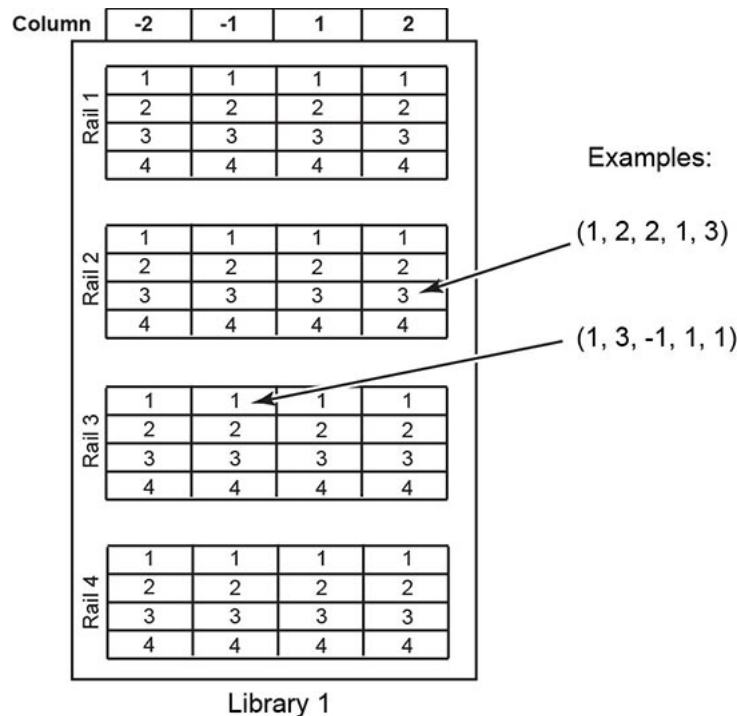
Components (such as CAPs, elevators, PTP, and robots) have unique addressing rules:

- A **row** value equal to 0 indicates the address is referring to the device, not a slot in the device.
- The **side** value may not directly correlate to inner and outer walls.
- The **column** value of elevators and CAPs depends on the number of storage expansion modules in the library.

Drive Internal Library Addressing

Drives always have a column value between -2 and 2, a side value of 1, and a row value between 1 and 4.

Figure C-2 Tape Drive Internal Library Addressing (viewed from front of library)



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Rotational CAP Internal Addressing

- **Rail and Row:**
 - When numbering the device, the rail value is 2 and the row value is 0.

- When numbering a specific slot, the rail refers to the rail adjacent to the CAP magazine (can be values 2-4) and the row is the slot in the CAP magazine (can be values 1-13).
- **Column:** The column value is the number of customer accessible columns plus 3. In a library with no SEMs, there are 11 customer accessible columns, therefore the CAP column value is 14.
- **Side:**
 - Right CAP = side value of 1
 - Left CAP = side value of 2

Example

For firmware address **1, 3, 22, 2, 10**: The library value is 1. The rail is the third from the top (3). The library contains one SEM (19 customer accessible columns plus 3 = 22). The CAP is on the left side (2). The slot is the 10th in the CAP magazine.

Bulk CAP Internal Addressing

Figure C-3 Bulk CAP Slot Arrays

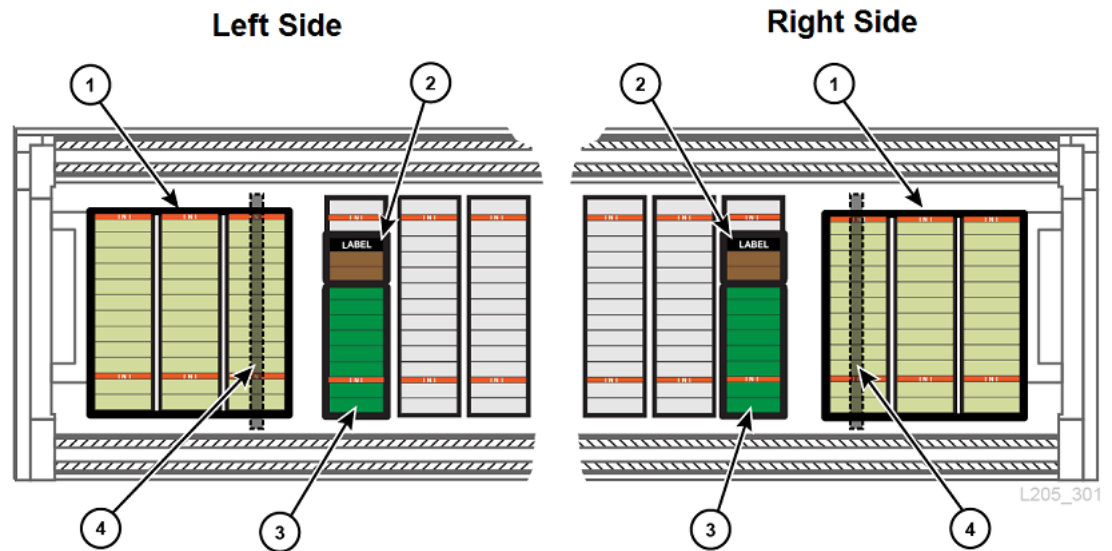


Figure Legend

1. Bulk CAP arrays (12-slots each)
2. Three pack array
3. Reserved system cells
4. Service safety door

Bulk CAP addressing:

- **Rail:** The rail number adjacent to the CAP (1 - 4).
- **Row:** When numbering the device, the row value is 0. When numbering a specific slot, the row value is the slot in the CAP magazine (1 - 12).

- **Column:** The CAP magazines occupy the last three columns in the library. If the library has one SEM, there are 19 customer accessible column. Therefore, the CAP magazines would be in column 20, 21, and 22.
- **Side:** Always a value of 1.

Example

For firmware address **1, 3, 22, 2, 10**: The library value is 1. The rail is the third from the top (3). The library contains one SEM (19 customer accessible columns, so column 22 is the outer-most column). The CAP is on the left side (2). The slot is the 10th in the CAP magazine.

PTP Internal Addressing

- **Rail:** The value (1 to 4) refers to the rail adjacent to the PTP.
- **Column:** Right PTP = column value of +6, left PTP = column value of -6.
- **Side:** The side value is always 1, because the PTPs are on the outer wall.
- **Row:**
 - When numbering the device, the row is 0.
 - When numbering a specific slot, the row is the slot in the PTP (1 or 2).

Example

For firmware address **1, 2, -6, 1, 0**: The library value is 1. The PTP is the second rail from the top (2). It is on the left side (column -6), outer wall (side 1), and the address is referring to the device (0).

Elevator Internal Addressing

- **Rail:** The value is always 0, since the elevators do not correspond to a specific rail.
- **Column:** The number of customer accessible columns plus 2. In a library with no SEMs, there are 11 customer accessible columns, therefore the elevator column value is 13.
- **Side:** The value is always 2 because the elevators are on the inner wall.
- **Row:**
 - When numbering the device, the row is 0.
 - When numbering a specific slot, the row is the slot in the elevator (1-4).

Example

For firmware address **1, 0, 21, 2, 4**: The library value is 1. The elevators span all rails (0). The library contains one SEM (19 customer accessible columns plus 2 = 21). The elevator is on the inner wall (side 2), and the address is referring to the fourth slot in the elevator.

Robot Internal Addressing

- **Rail:** The value (1 to 4) refers to the rail the robot is on.
- **Column:** The value is always 0.
- **Side:**
 - If there is only one robot per rail, the value is always 1.

- For redundant robotics, the left robot = 1, and the right robot = 2.
- **Row:**
 - When numbering the device, the row is 0.
 - When numbering the specific slot, the row is the slot value (1).

Example

For firmware address **1, 1, 0, 2, 0**: The library value is 1. The robot is on the top rail (1). The robot spans all columns (0). It is the right robot in a redundant robotics system (2), and the address is referring to the device (0).

HLI-PRC Addressing Scheme

- [HLI-PRC Addressing Scheme Overview](#)
- [Library Complex LSM Numbering](#)
- [Drive HLI-PRC Addressing](#)

HLI-PRC Addressing Scheme Overview

HLI-PRC addressing begins with 0, uses only positive numbers, and has four parameters: LSM, Panel, Row, and Column.

- **LSM:** Each rail is considered a separate library storage module (LSM). LSMs are numbered 0 to 3 (from the top down).

The libraries in a complex are identified by LSM (see "[Library Complex LSM Numbering](#)" on page C-7).

- **Panel:** Indicates the horizontal position in the library. Panels span across the width of the library to include both sides (left and right) and both walls (inner and outer) for each LSM. Panel 1 = Drives. Panel 2 to n = Storage slots

Table C-1 Panel Numbering for Various Library Configurations

Configuration	Panel Numbering						
Base Library	RIM (2-7)	CIM (8-10)					
One Expansion Module	RIM (2-7)	SEM (8-15)	CIM (16-18)				
Two Expansion Modules	RIM (2-7)	SEM (8-15)	SEM (16-23)	CIM (24-26)			
Five Expansion Modules	RIM (2-7)	SEM (8-15)	SEM (16-23)	SEM (24-31)	SEM (32-39)	SEM (40-47)	CIM (48-50)

- **Row:** Is the vertical location of a tape cartridge and are consecutively numbered from the top down. Outer walls = 0 to12. Inner walls = 13 to 26.
- **Column:** Indicates the left or right side of the library (as viewed from the front). Left = 0. Right = 1.

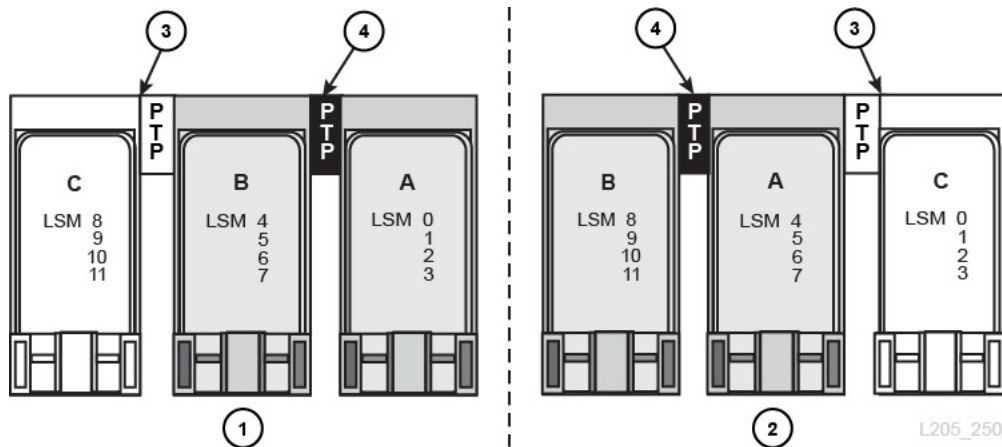
Library Complex LSM Numbering

In a library complex, the LSM number increases sequentially with each additional library. The LSM numbering continues with the following pattern for up to ten libraries:

- Library 1: LSM 0 to 3
- Library 2: LSM 4 to 7
- Library 3: LSM 8 to 11

When adding an additional library to a complex, you should add libraries from right to left (viewed from the CAP-side of the library). Expanding left to right re-numbers the LSMs requiring you to reconfigure hosts.

Figure C-4 Pass-thru Port Planning Example

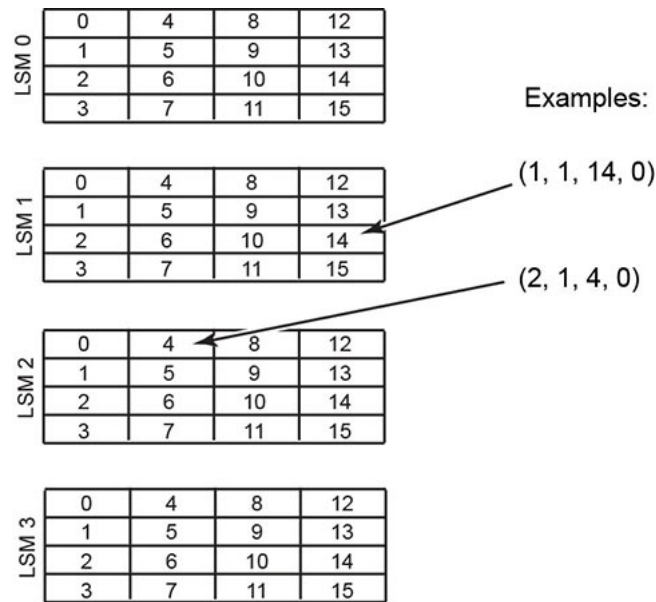


1. Recommended method with the library added to the left which increases the LSM numbering sequentially
2. Disruptive method, which requires a reconfiguration of LSM numbering.
3. New library
4. Pass-thru-port connecting existing libraries

Drive HLI-PRC Addressing

For drives, the panel value is always equal to 1, the column value is always equal to 0, and the row value is between 0 and 15.

Figure C-5 Tape Drive HLI-PRC Addressing (viewed from front of library)



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CAP HLI-PRC Addressing

The HLI addressing format for a CAP is (LSM, CAP ID, row, column).

- **LSM** - For rotational CAPs, LSM this is always 1. For bulk CAP, LSM corresponds to the rail containing the CAP. Numbered 0 to 3 from top to bottom in a single library. For a complex, see "[Library Complex LSM Numbering](#)" on page C-7.
- **CAP ID** - Left CAP is 0. Right CAP is 1.
- **Row** - Each CAP appears as one continuous column. For rotational CAP, row 0 is at the top and row 38 is at the bottom. For bulk CAP, row 0 is at the top-left corner, and row 35 is at the bottom-right corner of the CAP.
- **Column** - Always 0.

Figure C-6 Bulk CAP HLI-PRC Addressing

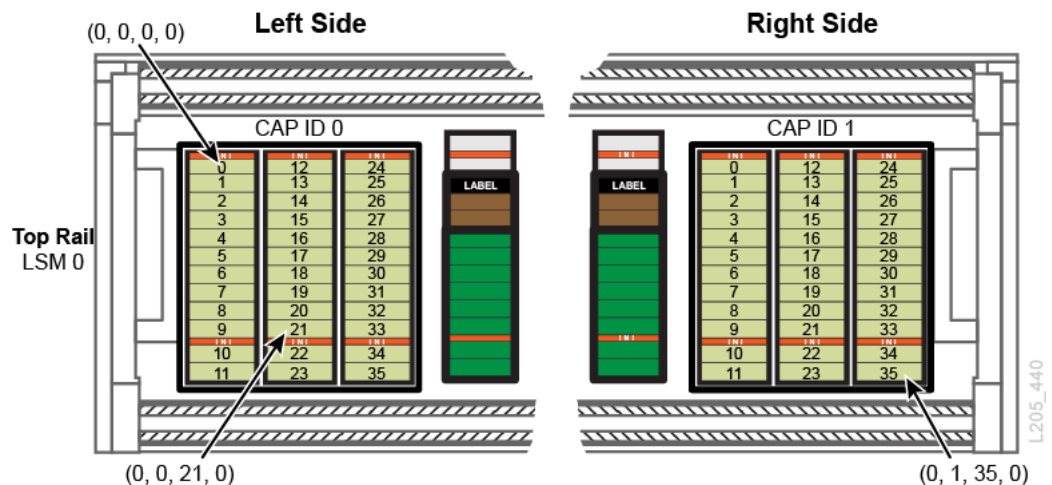
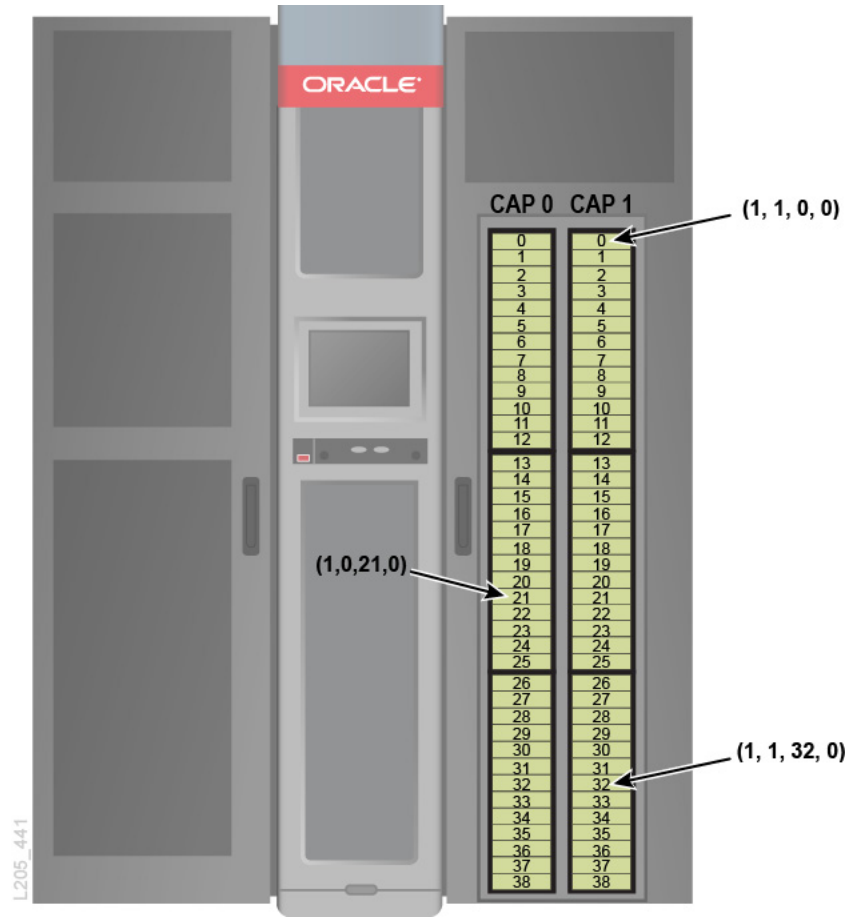


Figure C-7 Rotational CAP HLI-PRC Addressing



Physical Hardware Numbering for Tape Drives

The HBC card assigns a physical hardware number from 1 to 64.

Figure C-8 Physical Hardware Numbering of Tape Drive (viewed from rear of library)

Rail 1	61	62	63	64
	57	58	59	60
	53	54	55	56
	49	50	51	52
Rail 2	45	46	47	48
	41	42	43	44
	37	38	39	40
	33	34	35	36
Rail 3	29	30	31	32
	25	26	27	28
	21	22	23	24
	17	18	19	20
Rail 4	13	14	15	16
	9	10	11	12
	5	6	7	8
	1	2	3	4

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Figure C-9 Comparison of Tape Drive Numbering (viewed from front of the library)

		Column			
		-2	-1	1	2
Hardware	Rail 1	64	63	62	61
		60	59	58	57
		56	55	54	53
		52	51	50	49
	Rail 2	48	47	46	45
		44	43	42	41
		40	39	38	37
		36	35	34	33
	Rail 3	32	31	30	29
		28	27	26	25
		24	23	22	21
		20	19	18	17
Rail 4	16	15	14	13	
	12	11	10	9	
	8	7	6	5	
	4	3	2	1	
HLI-PRC	LSM 0	0	4	8	12
		1	5	9	13
		2	6	10	14
		3	7	11	15
	LSM 1	0	4	8	12
		1	5	9	13
		2	6	10	14
		3	7	11	15
	LSM 2	0	4	8	12
		1	5	9	13
		2	6	10	14
		3	7	11	15
LSM 3	0	4	8	12	
	1	5	9	13	
	2	6	10	14	
	3	7	11	15	
Firmware	Rail 1	1	1	1	1
		2	2	2	2
		3	3	3	3
		4	4	4	4
	Rail 2	1	1	1	1
		2	2	2	2
		3	3	3	3
		4	4	4	4
	Rail 3	1	1	1	1
		2	2	2	2
		3	3	3	3
		4	4	4	4
Rail 4	1	1	1	1	
	2	2	2	2	
	3	3	3	3	
	4	4	4	4	

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Reserved Internal IP Addresses

IP Address	Description
10.0.0.0/24	Internal device network.
10.0.11.0/24	ILC network. Host IP addresses based on library identifier.
10.x+2.11.0/24 or 10.(1...253) + 2.11.0/24	SDP aliasing. X = complex identifier (1...253).
10.0.4.0/24	Rail 0 device network.
10.0.3.0/24	Rail 1 device network.
10.0.2.0/24	Rail 2 device network.
10.0.1.0/24	Rail 3 device network.

Redundant Electronics Overview

The optional redundant electronics (RE) feature provides failover protection for the library controller. If the library controller or drive controller experiences errors, operations will switch to the standby controller. The library controller and drive controller installed on the same side of the card cage always switch as a pair.

RE allows an Oracle support representative to replace a faulty card while the library is online and provides minimal disruption during firmware upgrades.

Note: Any reference to HBCR also refers to HBC.

- [Redundant Electronics Requirements](#)
- [Redundant Electronics Configuration Examples](#)
- [What Occurs During a Failover](#)
- [Factors that Prevent an RE Switch](#)
- [Factors that Initiate and Automatic Failover](#)
- [Ways to Initiate a Manual Failover](#)
- [Firmware Upgrades with RE](#)

See Also:

- ["Initiating a Manual RE Switch Using SLC"](#) on page 16-7

Redundant Electronics Requirements

- Two library controller cards (HBCR)
- Two drive controller cards (HBT)

Note: To enable ADI mode, both cards must be high-memory HBTs.

If using media validation, Oracle recommends that both cards be high-memory HBTs.

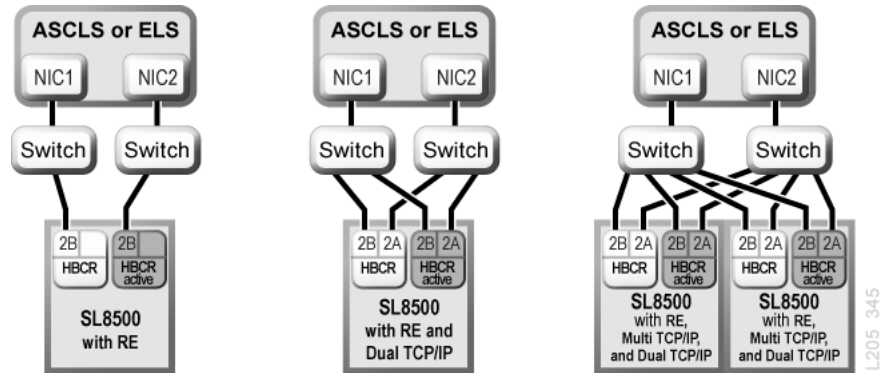
- Minimum SL8500 firmware version FRS_6.00 and SLC version 4.65
- Hardware activation file enabled using the CLI

Redundant Electronics Configuration Examples

Each library controller card requires its own unique IP address. For dual TCP/IP, each card requires two unique IP addresses: one for the primary port 2B and one for the secondary port 2A. Therefore, a library with RE and dual TCP/IP requires four unique IP addresses.

On each controller card, port 2B and 2A must be on different broadcast domains. However, port 2B on the active card and port 2B on the standby card can be on the same broadcast domain. The same is true for the 2A ports.

Figure D-1 Redundant Electronics Configuration Examples



See also: "[Dual TCP/IP Overview](#)" on page E-1 and "[Multi TCP/IP Overview](#)" on page F-1.

What Occurs During a Failover

In a controller card failover, the active library controller attempts to complete all in-process jobs and copies the cartridge database to the standby controller card. If the database cannot be copied (usually only in a sudden failure), you must perform an audit after failover (see "[Auditing the Library](#)" on page 12-1). The library returns any in-transit cartridges to their home slots. The library places any cartridges it cannot return to a home slot in a system slot for host recovery (see the host software documentation).

After all in-process jobs complete or time out, the cards switch roles. The standby controller becomes active and the previously active controller becomes the standby. If the previously active controller cannot bring up the standby software, the controller enters a fault state.

Effect of a Failover on Users

- Users of tape management software (Symantec or Virtual Storage Manager) do not see an interruption.
- HLI host applications queue requests during the failover process for completion after the failover switch. For ACSLS, only mount and dismount requests are affected (see the host software documentation).
- SLC and CLI connections are terminated. You must re-establish connections to the library using the IP address or DNS alias of the new active library controller (the former standby controller).

Factors that Prevent an RE Switch

- The standby library or drive controller is in a fault or eject state.
- The standby code is not running on the standby library or drive controller cards.
- A firmware download or card initialization is in progress.

Factors that Initiate and Automatic Failover

An automatic failover can be initiated by either the active or standby library controller.

The active library controller initiates an automatic failover when:

- Its partner drive controller card is not installed or it is not communicating.
- It detects a catastrophic internal software error.

The standby library controller initiates an automatic failover if the active controller is not functioning normally.

Ways to Initiate a Manual Failover

Before initiating a manual switch, you should verify that the standby library and drive controllers are running normally. You can initiate a manual switch using:

- **Host tape management** (ACSLS or ELS) — Failover can be initiated from either the active or standby library controller. The standby library controller accepts only set `host path group` and `force switchover` HLI requests.
- **SLC** — Failover is initiated from the active library controller only (see ["Initiating a Manual RE Switch Using SLC"](#) on page 16-7).
- **CLI** — An Oracle support representative can initiate failover from either the active or standby library controller.

You may want to perform a manual switch after initial installation of the standby cards, after a firmware upgrade, or periodically to check that the failover function is working properly. It is not possible to manually switch the library controllers without the drive controllers — the controllers are always switched as a pair.

Firmware Upgrades with RE

Firmware upgrades for RE libraries are minimally disruptive to library operations. The library loads and unpacks new code simultaneously on the active and standby controller cards and on all devices. Then the library activates code and re-initializes the controllers and most devices. Under most circumstances, the library bypasses robot initialization.

The loading, unpacking, and activation of code does not disrupt library operations until the library reboots. During the reboot process (which takes approximately 10 minutes), the host applications (ACSLS and ELS) queue all mount and dismount requests. After the reboot is complete, the queued requests are submitted to the library controller.

See ["Upgrading Library Firmware"](#) on page G-1 for firmware download and activation information.

Dual TCP/IP Overview

Dual TCP/IP provides two connections between the host and the library using the primary port 2B and secondary 2A of the HBC/HBCR card. If the primary host connection fails, the library automatically uses the secondary connection.

- [Minimum Requirements for Dual TCP/IP](#)
- [Using a Shared Network](#)
- [Configuring Dual TCP/IP](#)
- [Dual TCP/IP Configuration Examples](#)

See Also

- ["Redundant Electronics Overview"](#) on page D-1
- ACSLS or ELS documentation

Minimum Requirements for Dual TCP/IP

- ACSLS 7.1 with PUT0701 for Solaris or AIX. Oracle recommends ACSLS 8.1 or above.
- NCS 6.2 with the following PTFs for HSC/MVS/VM: SOS620 L1H168G, SMS620 L1H168F, and MSP: MSP PTF LF620DL.
- All switch or router ports must be configured to auto negotiate. The SL8500 ports are configured to auto negotiate by default and support 10/100 Mbps speeds.
- Hardware activation file (see [Chapter 5, "Activating Optional Features"](#))

Using a Shared Network

Note: Oracle recommends a private network for maximum throughput, minimum resource contention, and higher security.

If you must use a shared network:

- Directly connect the library to a switch or router that filters out undirected (broadcast) traffic.
- Place the library on its own subnet. This may protect the library from receiving broadcast messages.
- Use a managed switch or router to:

- Set priorities on ports to supply the host and library with higher priority.
- Provide dedicated bandwidth between the host and library.
- Create a virtual local area network (VLAN) between the host and library.
- Use a virtual private network (VPN) to insulate host-to-library traffic from other interference, such as irrelevant broadcasts.

Network Broadcast Issues on a Shared Network

Broadcasts sent to all network nodes may be directed to the library. The library cannot efficiently process requests while it is receiving these irrelevant broadcasts. As a result, the host may lose the connection to the library.

Heavy network traffic can also overwhelm the Ethernet controller on the HBC/HBCR card. As a result, the controller continuously resets.

ARP Floods on a Shared Network

The SL8500's processor can be overwhelmed by floods of address resolution protocol (ARP) broadcasts. You should connect the library behind a switch or router.

Configuring Dual TCP/IP

Note: Before configuring dual TCP/IP, gather information regarding the network, routing, and IP addresses from the administrator or use the appropriate `network ip` command.

- [Configuring the Library for Dual TCP/IP](#)
- [Configuring an ACSLS Host for Dual TCP/IP](#)
- [Configure an ELS Host for Dual TCP/IP](#)

Configuring the Library for Dual TCP/IP

Use the `route` command to manage the routing tables. Define routes for the 2A and 2B ports to the hosts.

1. Using the CLI, take both ports offline:

```
SL8500> network ip link set dev 2A down
SL8500> network ip link set dev 2B down
```

2. Add the new IP addresses and subnet masks for both ports:

```
SL8500> network ip address add IP_address/netmask dev 2A
SL8500> network ip address add IP_address/netmask dev 2B
```

3. To make the change active, bring both ports online:

```
SL8500> network ip link set dev 2A up
SL8500> network ip link set dev 2B up
```

4. Enter the network routing configuration for each port:

- For multiple hosts, add the IP address and netmask for each host:

```
SL8500> network ip route add IP_address/netmask dev 2A
SL8500> network ip route add IP_address/netmask dev 2B
```

- For a single host, no netmask value is required:

```
SL8500> network ip policy route add host_IP_address dev 2A
SL8500> network ip policy route add host_IP_address via gateway_IP_address
dev 2A
SL8500> network ip policy enable 2A |2B
SL8500> network ip policy status
```

5. Verify the configuration.

```
SL8500> network ip address show
SL8500> network ip route show
SL8500> network ip policy route show dev 2A |2B
```

6. Check the date and time for accuracy.

```
SL8500> time
time print
time HH: MM
time HH:MM:SS
```

7. Test the configuration to ensure you can access the library through both ports.

Configuring an ACSLS Host for Dual TCP/IP

For the ACSLS server, you should use the `acsconfig` command or the Dynamic Configuration `config` utility to configure two network interfaces on two separate subnets. Use the `route` command to define the two routes on the ACSLS server. A second physical connection improves reliability.

1. Update the routing tables of the ACSLS server by following the ACSLS documentation. If there is a single network interface on the ACSLS server, no special routing is required on the host.
2. Using the UNIX command prompt at the ACSLS server, use the Dynamic Config command to add a port connection to the SL8500.
 - a. Ensure the ACS is in online or diagnostic mode to ACSLS.
 - b. Use `config port acs_id` to add a port.
 - c. If not already online, bring the ACS online to ACSLS.
3. To remove or replace an existing IP address with a different port:
 - a. Shut down ACSLS by issuing `kill.acsss` (for 7.3 and below) or `acsconfig disable` (for 8.0 and above).
 - b. Configure the new ports by issuing `acsconfig`.
 - c. Bring ACSLS back online by issuing `rc.acsss` (for 7.3 and below) or `acsconfig enable` (for 8.0 and above)

For more information, see the *ACSL S Administrator's Guide*.

Configure an ELS Host for Dual TCP/IP

1. Update the routing tables of the IBM mainframe by following the ELS documentation. If there is a single network interface on the IBM mainframe, no special routing is required on the host.
2. At the IBM mainframe console or PARMLIB, use the `LMUPATH` control statement to define network LMU attachments.

3. Specify a second `LMUADDR` parameter to define the dual TCP/IPs. ELS automatically determines whether the connection is dual TCP/IP or dual LMU.
4. Take the ACS offline, issue the `LMUPDEF` command, and bring the ACS back online to pick up the revised `LMUPATH` statement that includes the second connection.

For more information, see the ELS documentation.

Dual TCP/IP Configuration Examples

- [ACSLs Dual TCP/IP and Shared Subnets Example](#)
- [ACSLs Dual TCP/IP Through a Public Network Example](#)
- [ACSLs High Availability Dual TCP/IP Example](#)
- See also "Redundant Electronics Configuration Examples" on page D-2 for an example of RE and dual TCP/IP.

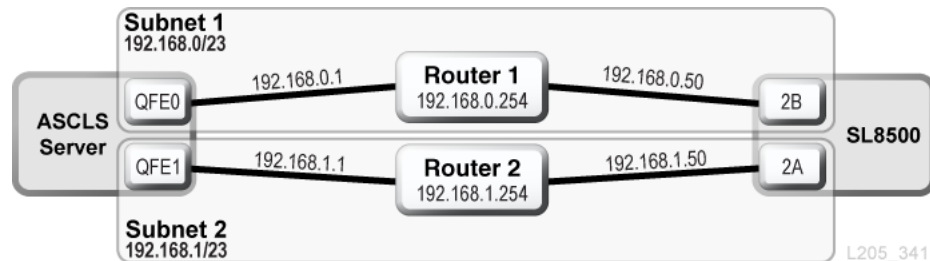
ACSLs Dual TCP/IP and Shared Subnets Example

In this example, the ACSLS server and the library share two separate subnets. The SL8500 uses a one-to-one relationship with the network interfaces on the ACSLS server. The network interface card on subnet 192.168.0/23 connects to port 2B and the network interface card on subnet 192.168.1/23 connects to port 2A.

Routing

Force a relationship by using the UNIX `route` commands. For more information, see the *ACSLs Administrator's Guide*.

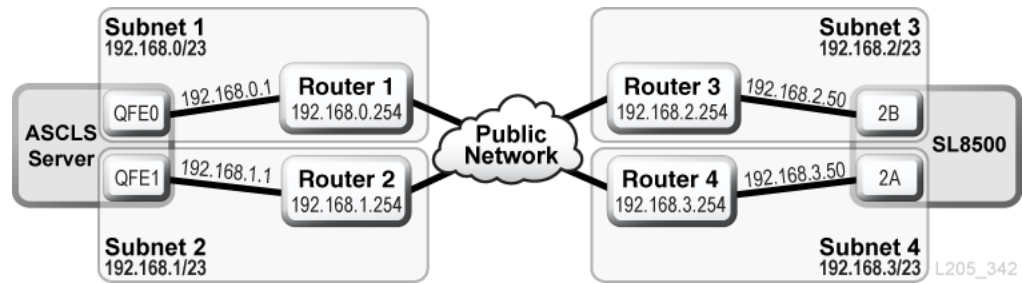
Figure E-1 ACSLS Dual TCP/IP with Shared Subnets



ACSLs Dual TCP/IP Through a Public Network Example

In this example, the ACSLS server contains two network interfaces that reside on two separate subnets. Both interfaces pass through a public network and into two different subnets before connecting to the SL8500 library. This configuration uses the same commands as in the first example.

Figure E-2 ACSLS Dual TCP/IP



ACSLs High Availability Dual TCP/IP Example

The following example is an ACSLS High Availability (HA) environment that requires dual TCP/IP. The purpose of the HA environment is to have two ACSLS servers, one active and one standby. In this configuration, two ACSLS servers connect six network interfaces (three on each server) to two separate subnets. A third subnet connects the two ACSLS servers through a public network.

For more information on ACSLS HA and dual TCP/IP, see the *ACSLs Administrator's Guide*.

Routing

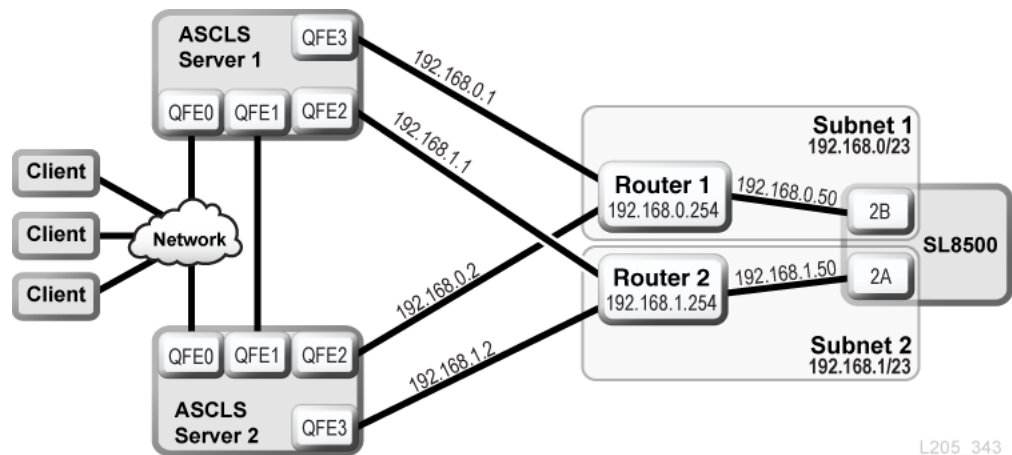
You should separate the SL8500 network interfaces over two different subnets when using ACSLS HA. The two different ACSLS servers use different network interfaces; therefore, you should add custom route entries to both ACSLS HA servers. Add the IP addresses for both servers to the SL8500 configuration.

Routing Tables

Add custom entries to the routing tables on the ACSLS server; however, any customized routing table entries will be lost after a reboot of the ACSLS server. To maintain custom routing table entries, create scripts to add custom routes. Place the scripts in the rc directory structure for automatic execution at boot time.

For more information, refer to the *ACSLs Administrator's Guide*.

Figure E-3 ACSLS High Availability Dual TCP/IP

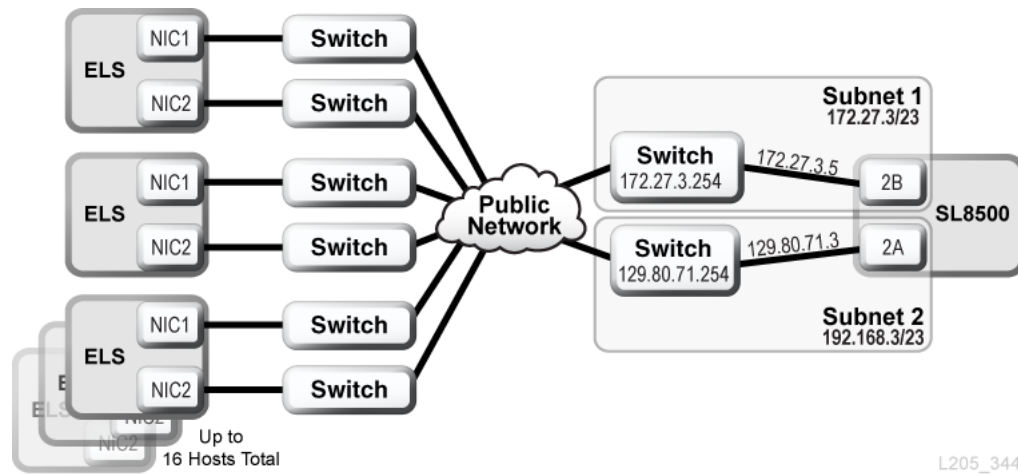


ELS/HSC and Dual TCP/IP Example

The following example shows a preferred configuration for mainframe systems using dual TCP/IP. The mainframe host contains two network interfaces residing on two separate subnets. Each connection travels through a public network, then connects to two different subnets before reaching the SL8500 library.

For more information, refer to the ELS documentation.

Figure E-4 ELS/HSC Dual TCP/IP



L205_344

Multi TCP/IP Overview

Multi TCP/IP allows hosts to connect to multiple libraries in a complex. If the connection to one library in the complex fails, the host can still communicate through other libraries in the complex. ACSLS hosts support up to 15 connections and ELS hosts support up to 32 connections.

- [Minimum Multi TCP/IP Requirements](#)
- [Configuration Recommendations](#)
- [Multi TCP/IP Configuration Examples](#)

See Also:

- ["Dual TCP/IP Overview"](#) on page E-1
- ["Redundant Electronics Overview"](#) on page D-1
- ACSLS and ELS documentation

Minimum Multi TCP/IP Requirements

- A library complex
- SL8500 firmware version FRS_3.97 and SLC version 3.38
- ACSLS 7.1 or 7.1.1 with PUT0701 (HA 2.0 also requires PTF 6514766). ACSLS 8.1 or above is required to support 15 library connections.
- ELS version 7.0 with PTF L1H168H, or ELS version 7.1 with PTF L1H168I
- Hardware activation file (see [Chapter 5, "Activating Optional Features"](#))

Configuration Recommendations

- Always use multiple subnets for redundancy.
- For single connections between the ACSLS server and each SL8500 in the complex, routing tables are not necessary.
- For a library with dual and multi TCP/IP, use the CLI to configure routing for port 2A. Ensure port 2A and 2B are on separate broadcast domains.
- For ELS, use the LMUPATH control statement to define multiple LMUADDR parameters. The parameters are the IP addresses for the multi TCP/IP connections.

In the following example, the host is connected to four SL8500 libraries.

```
LMUPATH ACS(00)LMUADDR(123.456.789.012,123.456.789,
013,123.456.789.014,123.456.789.015)
```

Multi TCP/IP Configuration Examples

Figure F-1 Multi TCP/IP Connections to a Library Complex

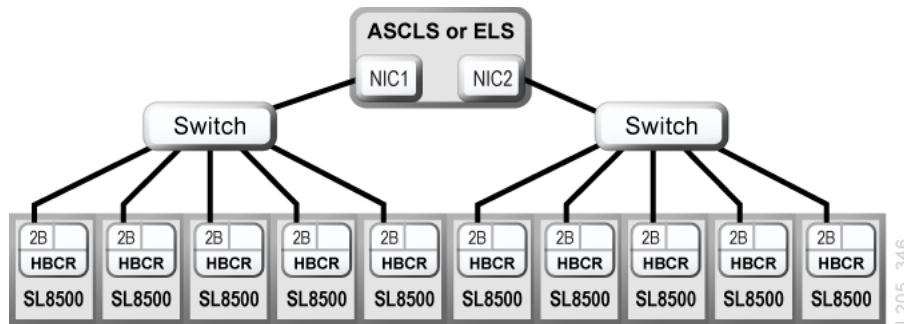
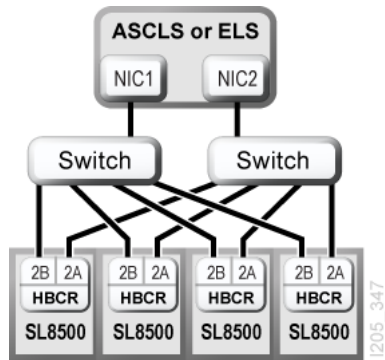


Figure F-2 Dual and Multi TCP/IP Connections to a Library Complex



For more information, see ["Dual TCP/IP Overview"](#) on page E-1.

Upgrading Library Firmware

The library controller stores up to two versions of firmware. This allows the library to continue normal operations, running one version of firmware, while you load and unpack an upgraded version. Since activating firmware requires a reboot, this allows you to upgrade firmware at a convenient time for library users.

After activating the upgraded code, the library retains the previous version of code, so that you can revert without having to download and unpack it again. However, reverting to a previous version of code is not recommended, you should only do so when instructed to by Oracle support.

- [Downloading Firmware from My Oracle Support](#)
- [Loading Firmware](#)
- [Activating Firmware](#)
- [Downgrading Firmware](#)

Note: Library firmware does not contain drive code upgrades (see the drive-specific documentation for drive code information).

Downloading Firmware from My Oracle Support

1. Go to My Oracle Support (MOS): <https://support.oracle.com/>
2. Sign in to your MOS account.
3. Click the **Patches & Updates** tab.
4. In the Patch Search tab, click **Product or Family (Advanced)**.
5. In the Product field, enter **SL8500** and then select **Sun StorageTek SL8500 Modular Library System** from the drop-down list.
6. In the Release field, select the firmware version.
7. Click **Search**.
8. Click the link under Patch Name.
9. Click **Download** and save the file to a location on your system. Extract the ZIP archive to a folder on your system.

Loading Firmware

Note: This procedure is for upgrading to FRS_8.60 or above. The current firmware must be a minimum of FRS_8.51 and SLC 6.60. To install an older version, to downgrade firmware, or if your current firmware version is below FRS_8.51 contact Oracle support.

Note: Code load is not available at the local operator panel.

1. Download the code to the system you will use to run SLC (see "[Downloading Firmware from My Oracle Support](#)" on page G-1).
2. Review the pre-requisites and code load instructions provided with the download.
3. Log in to SLC.

If you are upgrading an SL8500 complex, you can start an SLC session on any library in the complex. The upgrade propagates to all libraries in the complex from a single SLC session.

4. Select **Tools > Diagnostics**, and then select the **Library** in the device tree.
5. Click the **Load Code** tab.
6. Click **Browse**, and then locate the firmware package on your system. Within the firmware package, select the SL8500_FRS<X.XX>_firmware.jar file.
7. In the File Load Console Window, verify the file contents contain the FRS version of code you intend to load.

```
File Load Console Window
---- FILE CONTENTS ----

FRS_X.XX (Y.YY.YY) ←
library kernel.plmage 6.86.11 kernel.plmage
library disk.hbc.plmage 7.86.28 disk.hbc.plmage
```

8. Click the **Load** button. The process could take up to 10 minutes as the library loads and then unpacks the code.
9. Verify the package unpacked successfully (Failed 0). If there are any failures, contact Oracle support.

```
File Load Console Window
Successful v21.01.10_31mp.random:urges1*unpacked:LC1
Successful v21.15.00_u-boot.bin - unpacked:LC1
Unpack completed
---- FINAL UNPACK STATUS ----
Successful 48
Failed 0 ←
```

Activating Firmware

Note: To activate code, the library must reboot. Schedule the activation accordingly.

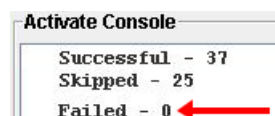
1. If you have not already downloaded and unpacked the code, see "[Loading Firmware](#)" on page G-2).
2. Take the library and all drives offline before activating new code (see "[Taking the Library Offline](#)" on page 15-1).
3. In SLC, select **Tools > Diagnostics**, and then select the **Library** in the device tree.
4. Click the **Activate Code** tab.
5. From the Target drop down list, select the code package to activate (in this case **SL8500 Code**). In the Available Versions section, select the code version to activate (usually the highest FRS version listed).



6. Click the **Activate** button. Read the caution, and then click **OK**. Approximate activation time is 45 minutes (+/- 15) for a four robot configuration. An eight robot configuration can increase this time by about 25 minutes.

Caution: Do not open the door or power cycle the SL8500 or robots during this phase. Potential damage can be done to controller cards. Do not reboot any devices in the library or execute any operations on the library while activating code.

7. When the Overall Progress bar reaches 100%, verify that the code activated successfully (Failed - 0). Skipped means that the version is already on the device, so activation is not necessary. If something failed, contact Oracle support.



8. When the activation process finishes and there are no failures, click **Reboot** to reboot the library (in a complex click **All Libraries In Complex**).
9. Click **OK** to terminate the SLC session. After library initialization completes, you can log back in to SLC.

Approximate time is 3 to 5 minutes for SLC reconnect and 5 to 8 minutes for all devices to become green on SLC (if the front access doors have not been opened, otherwise, an audit is automatically triggered, which can take 20-120 minutes depending on the size of the library).

Note: If you encounter errors while updating firmware, contact Oracle support.

Downgrading Firmware

Contact Oracle support if you wish to downgrade code or install a version of code below FRS_8.51.

Barcode Labels

This document describes the requirements for cartridge barcode labels used in Oracle's StorageTek tape libraries. All tape cartridges must have a proper barcode label. Mis-aligned, mis-oriented, or improperly-labeled cartridges may cause equipment damage.

- [Barcode Standards](#)
- [Label Design](#)
- [Applying a Label](#)
- [Label Care](#)

Barcode Standards

StorageTek libraries use labels based on the Code 39 barcode standard (refer to ANSI/AIM BC1/1995, Uniform Symbology Specification - Code 39). This standard uses discrete barcodes, meaning a fixed pattern of bars represents a single character. Each character is made up five black and four white, where three bars are wider than the others.

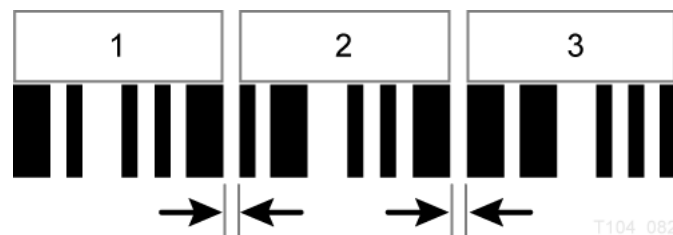
For example, [Figure H-1](#) represents the letter A using six narrow bars and three wide bars (two black and one white).

Figure H-1 Code 39 Barcode Standard — Letter A



When multiple barcode characters are arranged together as a label, a narrow white bar is placed between the individual characters. This bar is called the inter-character gap.

Figure H-2 Code 39 Barcode Standard — Inter-Character Gap



Label Design

Each label must have a six-character volume serial ID (vol-id) and a one- or two-character media ID. The media ID identifies the cartridge type. The labels can only use the uppercase letters A through Z, the numbers 0 through 9, and an asterisk (*) for the start and stop character (for example, *ABC123L6*, where ABC123 is the vol-id and L6 is the media ID).

The StorageTek T-series cartridge labels made by Tri-optic use a dollar sign (\$) as the start and stop character. Never use the asterisk or dollar sign as part of the customer-defined characters of a barcode. Barcode algorithms only decode the characters between the end stops, ignoring any characters outside. Refer to the table below for examples.

Table H-1 Start and Stop Character Placement

Actual Barcode Label	After Decoding	Result
ABC123L6	ABC123L6	Correct label
*ABC*23L6*	ABC	Misplaced stop character
*ABC1234L6	Unreadable	No stop character

Figure H-3 Barcode Placement Standards (T10000 and LTO)

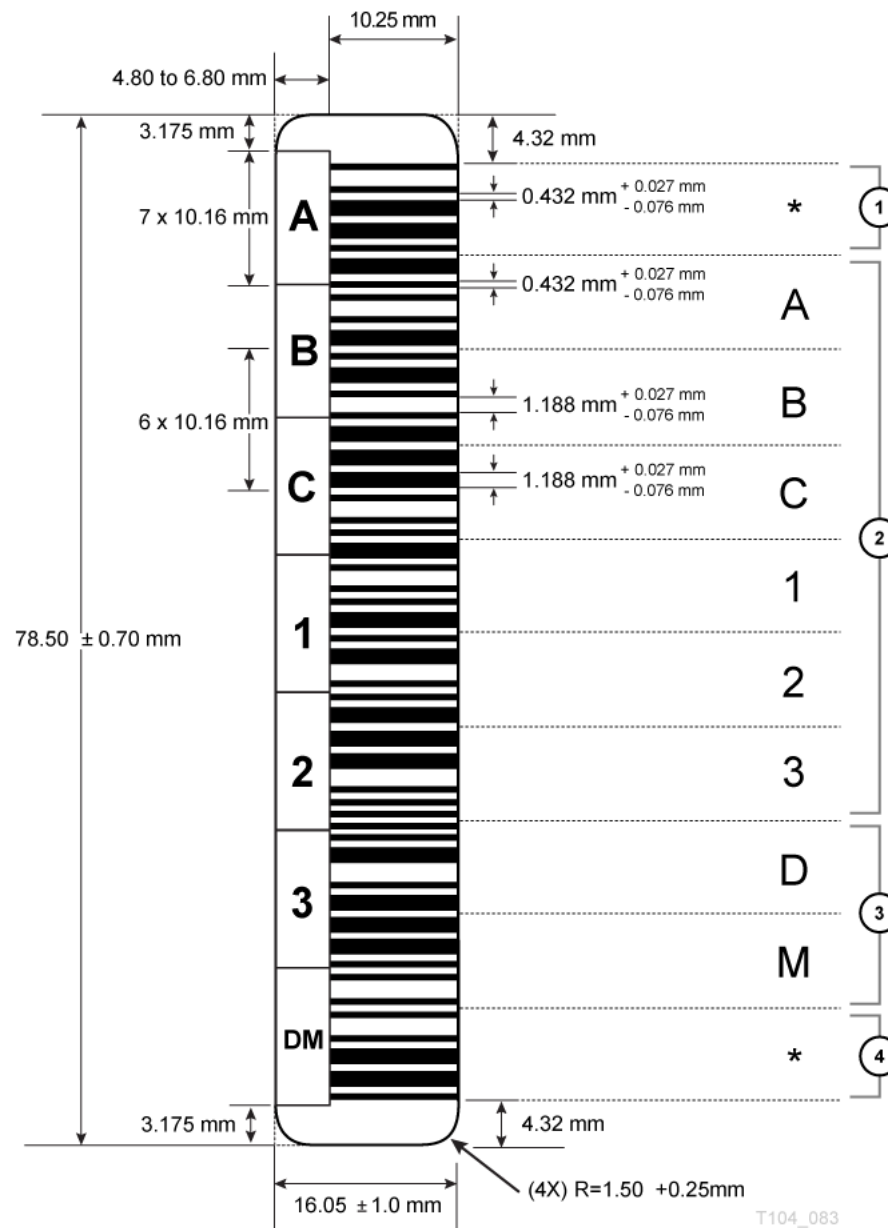


Figure Legend:

1. Start character
2. Volume ID
3. Media ID
4. Stop character

LTO

These cartridges require an eight-character label — a six-character vol-id and a two-character media ID. The media ID characters are:

- L3 = Generation 3

- L4 = Generation 4
- L5 = Generation 5
- L6 = Generation 6
- L7 = Generation 7
- L8 = Generation 8
- LT = Generation 3 WORM
- LU = Generation 4 WORM
- LV = Generation 5 WORM
- LW = Generation 6 WORM
- LX = Generation 7 WORM
- LY = Generation 8 WORM
- CU = universal cleaning

T9840 and T9940

These cartridges require a six-character vol-id label plus a separate one-character media ID label. Only Tri-Optic Corporation, American Eagle Systems/Wrightline, or Imation Corporation can print these labels. The media ID characters are:

- R = T9840 data
- U = T9840 A/B/C cleaning
- Y = T9840 D cleaning
- P = T9940 data
- W = T9940 cleaning

T10000

These cartridges require an eight-character label — a six-character vol-id and a two-character media ID. The media ID characters are:

- T1 = T10000 A/B data
- T2 = T10000 C/D data
- TS = T10000 A/B sport
- TT = T10000 C/D sport
- CT = cleaning (A and B only)
- CL = universal cleaning

Cleaning and Diagnostic Labels

Cleaning and diagnostic cartridges require unique labels to distinguish them from data cartridges. The first three alphanumeric characters in the vol-id determine the type of cartridge.

- **Cleaning cartridges** — use CLNnnn for the vol-id plus the cleaning-specific media ID, where CLN is the cleaning cartridge identifier and nnn is a sequence of numbers (for example, CLN001CU could be an LTO cleaning cartridge label).

- **Diagnostic cartridges** — use DG[space]nmn plus the media ID, where DG[space] is the diagnostic cartridge identifier, and nm is a sequence of numbers (for example, DG 001L6 could be an LTO6 diagnostic cartridge label).

Cartridge Label Examples

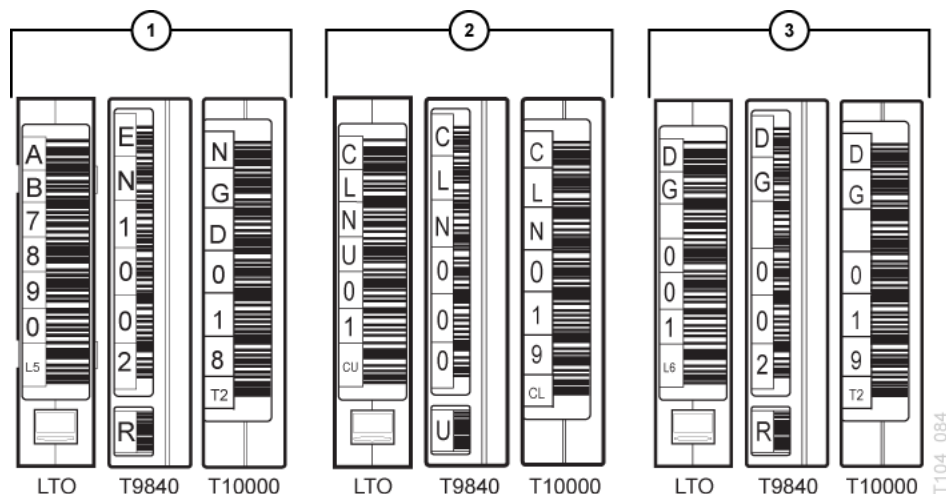


Figure Legend:

1. Data cartridges
2. Cleaning cartridges
3. Diagnostic cartridges

Applying a Label

Caution: Mis-aligned, mis-oriented, or improperly-labeled cartridges may cause equipment damage.

Guidelines for applying the labels include:

- Inspect and clean the cartridge. Wipe all dust, dirt, and moisture using a lint-free cloth. Use a safe cleaning solution (such as isopropyl alcohol) to clean the cartridge exterior housing.
- Ensure the cartridge and label are oriented correctly. Orient the label with the barcode below the human-readable characters and the cartridge with the hub-side down. For LTO cartridges, hold the cartridge so that the write-protect switch is toward you. For a T10000 cartridge, ensure the write-protect switch is away from you. For a T9840 cartridge, ensure the write-protect switch is on the right side.
- Apply the labels with in the recess on the cartridge as straight as possible. Ensure the edges of the label are parallel to the edges of the cartridge. The label must not overlap the edge of the recessed area.
- For T9840 and T9940 labels, align the vol-id label and media ID label.
- For best adhesion, apply the label within one year of purchase.

Figure H-4 Cartridge Label Orientation

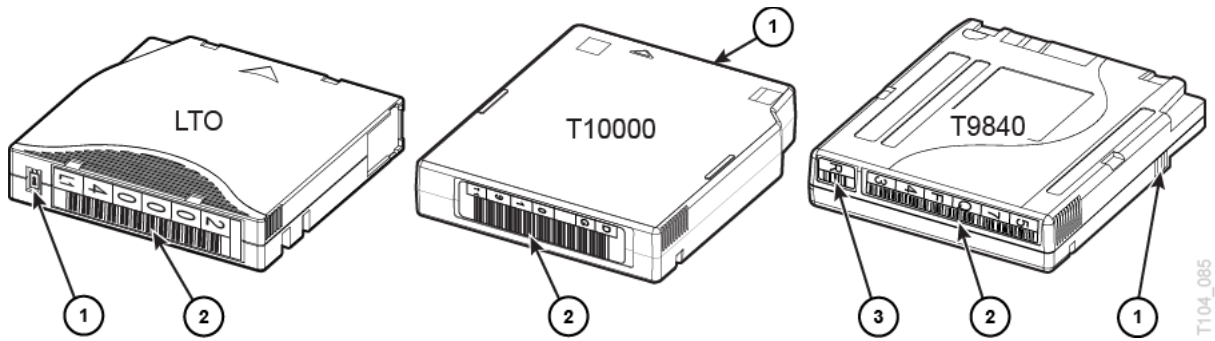


Figure Legend:

- 1. Write-protect switch
- 2. Cartridge label
- 3. Separate media ID label (T9840 and T9940 only)

T9840 and T9940 Label Issues

All media ID labels must have a correctly sized white area above and below the barcode. If the white area is too small, the radius of the label die can cut into the first black bar of the barcode, causing barcode read errors.

Figure H-5 White Area on Separate Media ID Label

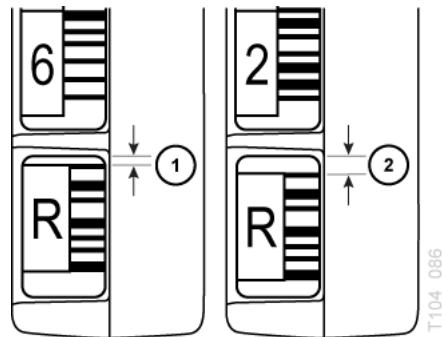
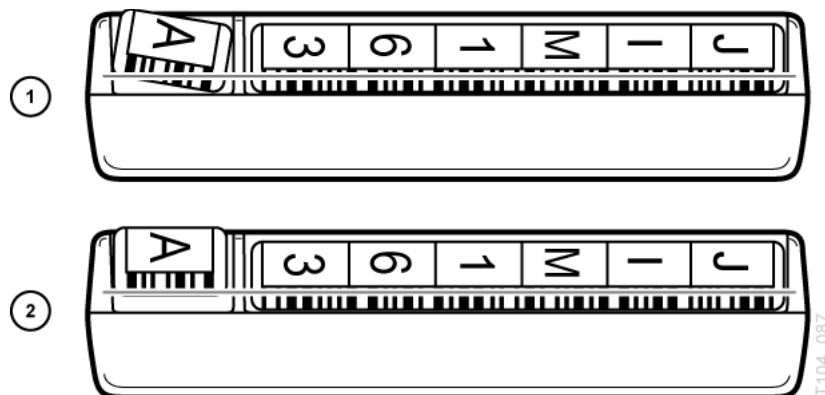


Figure Legend:

- 1. White area is too small
- 2. Correctly sized white area

The media ID label must be aligned with the vol-id label. Ensure the media ID label is not rotated or off-center from the vol-id label.

Figure H-6 Mis-aligned Media ID Label**Figure Legend:**

1. Rotated media ID label
2. Off-center media ID label

Label Care

Proper label care is required to prevent barcode read errors or damage to the equipment:

- Keep the barcode intact. Do not mark or damage the barcode label or place any kind of tape across the label.
- Remove old labels completely before applying a new label. Do not apply a new label on top of an old one.
- Do not use sharp instruments to seat or remove a label.

Glossary

2N

An optional power configuration that provides both AC and DC redundancy. There is one power supply for every four tape drives and one supply for every robot. This configuration requires a second AC power source to support an additional system PDU. All four accessory racks are powered. *See also* [N+1](#).

ADI

Automation drive interface. Supports rich data for StorageTek Tape Analytics.

access door

A door on either side of the CIM through which service personnel can enter the library.

active slot

A storage slot that can be used for cartridge storage.

active capacity

The number of storage slots the library is authorized to use for storage. This cannot exceed the [installed capacity](#) or the [purchased capacity](#). Same as [allocated capacity](#).

allocated capacity

The number of active slots. Allocated capacity cannot exceed the [purchased capacity](#) defined by the hardware activation file. Same as [active capacity](#). *See also* [unallocated capacity](#).

audit

An inventory of cartridge locations in all areas of the library, including the slots in the storage and reserved areas. Audits occur when:

- The library initializes at power-on.
- After either one or both access doors are opened and closed without activating the service safety door.
- A physical audit request is made through SLC.

See also [host audit](#), [physical audit](#), [verified audit](#) and [virtual audit](#).

away library

The SL8500 library located on the left side of a [home library](#), as viewed from the front. The away library does not supply power to, control, or recover the pass-thru port.

CAP

See [cartridge access port \(CAP\)](#).

CLI

Command line interface.

capacity

The storage capacity of the library. See also [active capacity](#) and [installed capacity](#).

cartridge

A container holding magnetic tape that can be mounted to a drive to read or write data. The library uses data, diagnostic, and cleaning cartridges.

cartridge access port (CAP)

A port built into the door panel of the library used to import or export cartridges.

cartridge array

A plastic housing that holds multiple cartridges when not in use. The inner walls of the SL8500 library consist of 14-slot arrays and the outer walls consist of 13-slot arrays.

cleaning cartridge

A tape cartridge that used to clean the tape path in a drive. Cleaning cartridges are drive specific and should be replaced after a limited number of uses.

customer interface module (CIM)

The front module of the SL8500 library which contains the touch screen operator panel and allows service personnel to access the library and service bay.

DEM

See [drive and electronics module \(DEM\)](#).

dWWN

See [dynamic WWN](#).

data cartridge

A cartridge used to store data.

diagnostic cartridge

A cartridge used for diagnostic routines of a drive.

drive and electronics module (DEM)

The module in the SL8500 library that houses the electronics control module, power distribution units (PDUs), power supplies, accessory racks and equipment, and tape drives for the library. The module is located at the rear of the library.

drive array

The metal housing installed in the drive and electronics module for mounting tape drive tray assemblies. The drive and electronics module holds up to four array assemblies, and each array holds up to 16 tape drive tray assemblies.

drive bay

A section of the drive array that holds one tape drive tray.

drive bay address

A two-digit integer (01–64) that represents the physical locations into which drive tray assemblies are inserted.

drive tray

A metal chassis, cables, electronic cards, and tape drive used to interface the tape drive to the tape library. The drive tray contains the drive controller card (HBD or LOD).

Dual TCP/IP

Provides two separate host connections between the host software (ACSL or HSC) and the library controller.

dynamic WWN

When enabled, dWWN assigns names to library drive slots rather than devices. When a drive is replaced, the new drive receives the same name as the one it replaced, thereby eliminating the need for system re-configuration. dWWN assigns names to individual tape drive slots rather than devices

ECM

See [electronics control module \(ECM\)](#).

ELS

See [Enterprise Library Software](#).

ERS

See [emergency robotics stop switch \(ERS\)](#).

eject

See [export](#).

electronics control module (ECM)

A module that includes the HBK card, HBC/HBCR card, and HBT card. The ECM Processes commands from a host system assembly, coordinates the activities of library components, and monitors status inputs from sensors and switches

elevator

The device that transports cartridges vertically. The SL8500 library features two elevators that move cartridges between the rails of the library.

emergency robotics stop switch (ERS)

A switch located on the CIM keypad that removes all power to the robots.

enter

See [import](#).

Enterprise Library Software

The software products that automate tape operations for mainframe clients.

export

The library places a cartridge into a CAP slot so that an operator can remove the cartridge from the library. Same as [eject](#).

FRU

Field replaceable unit.

failover

The act of moving to a secondary or redundant path when the primary path fails.

front controller module

The module that houses the controller for the elevators, CAPs, turntables, and safety barrier.

front facade

The external portion of the CIM, between the access doors, that holds the keypad and local operator panel.

get

An activity in which a robot obtains a cartridge from a slot or drive.

HLI/PRC

Host Library Interface/Panel Row Column

home library

The library that provides power, signal, and control lines to the [pass-thru port \(PTP\)](#) mechanisms. This is the library on the right of a library complex as viewed from the front.

host audit

The process of updating the cartridge vol-ids and locations in a host database. This audit is initiated by a host command.

hot swap

Removal and replacement of a system component while system power remains on and system operations continue.

hot-pluggable

The capability that allows an Oracle service representative to replace a system component while power to the system is maintained. This feature allows hardware maintenance actions and hardware upgrades to proceed without disrupting subsystem availability. *Contrast with* [hot swap](#).

import

The process of placing a cartridge into the cartridge access port so that the library can insert it into a storage slot.

inactive slot

A storage slot that is explicitly deactivated and cannot be used for cartridge storage.

installed capacity

The number of storage slots physically present in the library.

interlock switch

A switch that disconnects power to library mechanisms, excluding tape drives, when the front door is opened.

keypad

The interface located on the CIM. The keypad contains the CAP open/close buttons, safety door locks, and the ERS button.

LCM

See [Library Content Manager \(LCM\)](#).

LTO

See [linear tape open format \(LTO\)](#).

library complex

Two or more SL8500 libraries attached to each other with a [pass-thru port \(PTP\)](#).

library controller (LC)

The HBC/HBCR card within the library that controls operations and communicates with the operator panel.

Library Content Manager (LCM)

Software that provides content management for mainframe automated tape environments. Works with host software component, virtual storage manager and your tape management system.

library operator panel

See [touch screen operator control panel](#).

library storage module (LSM)

Library component connected to other LSMs in a library complex with a pass-thru port. Same as an SL8500 rail.

linear tape open format (LTO)

A set of tape data format standards created to enable data interchange among different LTO Ultrium tape drive vendors. These standards allow data cartridges to be shared.

magazine

A removable array that holds cartridges and is placed into the cartridge access port (CAP).

Multi TCP/IP

Using TCP/IP connections to multiple libraries to provide redundant communication paths between the host software (ACSL or HSC) and an SL8500 [library complex](#).

MIR

Media Information Region (MIR). A kind of map or directory of the location of user data on the physical media. This capability allows the drive to optimize access to user data, saving vital time to data access. The MIR data on an encrypted tape is not encrypted.

N+1

The standard power configuration that provides DC power redundancy by adding an additional DC power supply to DC power grid. There is one power supply for every two robots plus one redundant supply and one supply for every eight drives plus one redundant supply. There are two PDUs: one system PDU and one N+1 PDU. Only accessory racks 2 and 4 are powered. See also [2N](#).

online replacement

Replacement or service of a module while the library remains operational. The service person may be required to power off the module before removing or replacing it.

operator panel

See [touch screen operator control panel](#).

orphaned cartridge

A cartridge in a partitioned library that is located in an unallocated slot or drive (that is, a slot or drive not allocated to any defined partition). Cartridges may become orphaned when partition boundaries are changed, partitions are deleted, or cartridges are manually moved to unallocated or inaccessible slots.

PDU

See [power distribution unit \(PDU\)](#).

PLI

See [primary library interface \(PLI\)](#).

PTP

See [pass-thru port \(PTP\)](#).

pass-thru port (PTP)

An electro-mechanical device that allow one library storage module to pass a cartridge to another adjacent library storage module in the same complex. A [library complex](#) is a series of libraries connected with pass-thru ports. SL8500 libraries are joined together by four PTPs because there are four rails. See also [home library](#) and [away library](#).

physical audit

Physical audits occur when the robots:

- Scan the cartridge locations in the library
- Verify the volumes
- Update the library control card inventory
- Set the status of the cartridge location to true

physical capacity

The number of storage slots in the library. Compare to [active capacity](#).

power distribution unit (PDU)

A device for the distribution of AC line power from one inlet to multiple outlets. Multiple PDUs provide higher availability because the power continues if one PDU (or its alternating current source if the PDUs use separate AC sources) loses power.

primary library interface (PLI)

The communication path between the operator panel and the library controller.

purchased capacity

The total number of storage slots authorized for activation. The value is defined by the hardware activation file. See also [allocated capacity](#) and [active capacity](#).

put

An activity in which a robot places a cartridge into a slot or drive.

RE

See [redundant electronics \(RE\)](#).

RIM

See [robotics interface module \(RIM\)](#).

rail

(1) That portion of the upper robot track assembly that provides power and communication to the robot. (2) All of the cartridge slots and drives accessible through a rail.

redundant electronics (RE)

A feature that provides failover protection in enterprise libraries. RE uses a two sets of library controller cards. At any given time, one set is active and the other set is standby. The active library controller can failover to the standby in response to a command from ACSLS or the SLC. Automatic failover can be initiated by the library if a library card failure.

robot

A mechanism that moves horizontally along a track to transport tape cartridges to and from other locations in the library.

robotics interface module (RIM)

The module containing the curved rails and [pass-thru port \(PTP\)](#) assemblies.

selected slot

A storage slot that cannot currently be used for cartridge storage, but will be made active automatically by the library controller when activated capacity is increased.

service area

An area between the access doors of the customer interface module and the safety barrier. In the service area, a redundant or inoperable robot can be stored for service and other mechanisms can be repaired or replaced.

service safety door

A motor-driven barrier that lowers and raises. This door separates the service areas of the front interface assembly from the rest of the library. The SSD allows service personnel to safely repair or replace library mechanisms while the front access door is opened and closed., without interference with most library operations.

slot

A storage location for a cartridge with the library.

TTI

See [tape transport interface \(TTI\)](#).

tape drive

An electromechanical device that moves magnetic tape and includes mechanisms for writing and reading data to and from the tape.

tape storage area

The area in the library where cartridges are stored.

tape transport interface (TTI)

An interface to control and monitor tape movement.

touch screen operator control panel

A flat-panel display with a touch screen interface and a panel mount computer. This feature is attached to the front of the library.

track

The horizontal path upon which a robot travels.

unallocated capacity

The number of storage slots available for capacity activation. This value is equal to the [purchased capacity](#) minus the [allocated capacity](#).

vol-id

Volume ID assigned to a cartridge. Same as [VOLSER](#).

VOLSER

Volume serial number. Same as [vol-id](#).

VSM

See [virtual storage manager \(VSM\)](#).

VTCS

See [virtual tape control system \(VTCS\)](#).

VTD

See [virtual tape drive \(VTD\)](#).

VTSS

See [virtual tape storage subsystem \(VTSS\)](#).

verified audit

Verified audits are invoked from the SLC and actually validate the status of a specific cartridge slot or range of slots.

virtual audit

Virtual audits are invoked from the SLC and only display the cartridge inventory in the console screen (either local or remote).

virtual storage manager (VSM)

A storage solution that virtualizes volumes and transports in the buffer of a virtual tape storage subsystem to improve media and transport use.

virtual tape control system (VTCS)

The primary host code that controls activity and information about VTSSs, VTVs, RTDs, and MVCs.

virtual tape drive (VTD)

An emulation of a physical transport in the VTSS that looks like a physical tape transport to MVS. The data written to a VTD is really being written to DASD. The VTSS has 64 VTDs that do virtual mounts of VTVs.

virtual tape storage subsystem (VTSS)

The DASD buffer containing virtual volumes (VTVs) and virtual drives (VTDs). The VTSS is a STK RAID 6 hardware device with microcode that enables transport emulation. The RAID device can read and write "tape" data from/to disk, and can read and write the data from/to an RTD.

virtual tape volume (VTV)

A portion of the DASD buffer that appears to the operating system as a real tape volume. Data is written to and read from the VTV, and the VTV can be migrated to and recalled from real tape.

WWN

See [World Wide Name](#).

World Wide Name

A 64-bit address that uniquely identifies each individual device and vendor, much like the MAC address of an Ethernet interface. Each port on a Fibre Channel network must have a its own WWN. The WWN is not just a physical hardware address. It also serves as the logical address of a node on the SAN. The SAN configuration changes if any of the attached hardware changes. If a device fails and is replaced, the WWN of the node changes, forcing reconfiguration of the SAN. There are three World wide Names reserved for each drive bay: Node, Port A, and Port B.

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 - floor capacity, 2-5
- working area, 2-5