

StorageTek SL8500 Modular Library System

User's Guide



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Summary of Changes

Current Updates

EC	Date	Revision	Description
—	June 2010	KB	<p>Former Chapter 3, “SL8500 Automated Library Operations”— Separated into the following chapters:</p> <ul style="list-style-type: none">■ Chapter 5, “Library Management”■ Chapter 7, “CAP Management”■ Chapter 8, “Drive Management”■ Chapter 9, “Cartridge Management”■ Chapter 10, “Drive Cleaning”■ Chapter 11, “Robot and Power Supply Management”■ Chapter 12, “Elevator and Pass-Thru-Port Management” <p>The following updates are marked with change bars in the margins:</p> <p>Redundant Electronics – See Chapter 6, “Redundant Electronics Management” for details.</p> <p>Firmware upgrade to all libraries in a complex simultaneously. See “Library Firmware Upgrades” in Chapter 13, “SL Console Diagnostics and Utilities” for details.</p> <p>Hardware Activation Files for reviewing optional features activated on the library – See Chapter 3, “Hardware Activation Files” for details.</p> <p>Continued on next page</p>

EC	Date	Revision	Description
—	June 2010	KB	<p>Linux local operator panel – See the following sections for details:</p> <ul style="list-style-type: none"> ■ “Virtual Keypad” ■ “Touch Screen Calibration” ■ “Re-calibrate the Local Operator Panel” ■ “Reset the Local Operator Panel Calibration” <p>New library management reports and screens:</p> <ul style="list-style-type: none"> ■ Status alert messages ■ Log snapshot file <p>New drive reports and screens:</p> <ul style="list-style-type: none"> ■ Drive Events Reports ■ Drive Media Events Report ■ Drive Network Data ■ Drive LED Status <p>New cartridge reports and screens:</p> <ul style="list-style-type: none"> ■ Library Cartridge Table ■ Media Events Report <p>Company and product name updates throughout.</p>

Previous Updates

EC	Date	Revision	Description
—	November 2007	KA	<p>Added information regarding the optional Web-launched SL Console feature:</p> <ul style="list-style-type: none"> ■ Added new Chapter 2, “StorageTek Library Console”, describing how to install and use the different modes of the SL Console application, including the Web-launched SL Console. ■ Added Appendix C, “Web-launched SL Console Server”, describing how to install and manage the Web-launched SL Console server.

EC	Date	Revision	Description
114189	March 2007	K	Updated for library partitioning feature. New information includes: <ul style="list-style-type: none"> ■ “Library Partitioning” on page 22 ■ “Configuring Library Partitions” on page 34 ■ “Using CAPS in a Partitioned Library” on page 53
114164	August 2006	J	Safety: <ul style="list-style-type: none"> ■ Modified the safety information for Emergency Robotics Stop Switches and Smoke Detection. ■ Included a section on Fire Suppression. Chapter 3: Added information on host to library communication to include the dual TCP/IP feature. See Appendix C: <ul style="list-style-type: none"> ■ Updated the trap notification level to include the level 11. ■ Updated the trap severity code to include the group 11.
114146	May 2006	H	Refer to this edition for the list of changes
114119	September 2005	F	Refer to this edition for the list of changes
111974	May 2005	Fifth	Refer to this edition for the list of changes
111959	February 2005	Fourth	Refer to this edition for the list of changes
111945	November 2004	Third	Refer to this edition for the list of changes
111920	July 2004	Second	Refer to this edition for the list of changes
111906	May 2004	First	Initial release

Preface

This User's Guide is intended primarily for SL8500 library system administrators and operators. It can also be used by Oracle StorageTek partners and support representatives.

Most of the information pertains to the library hardware, the StorageTek Library Console, and related operations. For specific drive information or for client application software commands, see the appropriate drive or software documentation.

Related Documentation

The following lists contain the names and order numbers of publications that provide additional information about *the product*.

The documentation is available online at:

<http://docs.sun.com>

SL8500 Library Documentation	Part Number
<i>SL8500 Best Practices Guide</i>	TM0017
<i>SL8500 Systems Assurance Guide</i>	MT9229
<i>SL8500 SNMP Reference Guide</i>	3161946xx
<i>SL8500 Host Connectivity Technical Brief</i>	3161958xx

Tape Drive Documentation	Part Number
<i>Hewlett Packard Ultrium Tape Drive Manual</i>	CD included with drive
<i>IBM Ultrium Tape Drive Manual</i>	CD included with drive
<i>T10000 Tape Drive Installation Manual</i>	96173
<i>T10000 Tape Drive Service Manual</i>	96175
<i>T10000 Virtual Operator's Panel User's Guide (for Service Representatives)</i>	96180
<i>T9840 Tape Drive User's Reference Manual</i>	95739
<i>T9x40 Tape Drive Installation Manual</i>	95879
<i>T9x40 Tape Drive Service Reference Manual</i>	95740
<i>Seagate Ultrium Tape Drive Product Manual</i>	CD included with drive
<i>Super DLT600 Product Manual</i>	CD included with drive
<i>T9840 Tape Drive User's Reference Manual</i>	95739
<i>T9940 Tape Drive Operator's Guide</i>	95989

Tape Management Software Publications	Part Number
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Automated Cartridge System Library Software (ACSLS)

<i>ACSLS Administrator's Guide</i>	3161201xx
<i>ACSLS Messages</i>	3161202xx
<i>ACSLS Quick Reference</i>	3161204xx

Host Software Component (HSC) MVS Publications

<i>HSC Configuration Guide</i>	3126422xx
<i>HSC Messages and Codes Guide</i>	3126425xx
<i>HSC Operator's Guide</i>	3126423xx
<i>HSC Reference Summary Guide</i>	3126426xx
<i>HSC System Programmer's Guide</i>	3126424xx

Other Publications	Part Number
---------------------------	--------------------

<i>Product Regulatory and Safety Compliance Manual</i>	3161956xx
<i>American National Standard Dictionary for Information Processing Systems</i>	ANSI X3/TR-1-82
<i>American National Standard Magnetic Tape and Cartridge for Information Interchange</i>	ANSI X3B5/87-009
<i>Magnetic Tape Labels and File Structure for Information Interchange</i>	ANSI X3.27-1978
<i>SCSI-3 Parallel Interface (SPI)</i>	ANSI X3T9.2/91-010R7
<i>Small Computer System Interface</i>	ISO 9316:1989
<i>Fibre Optics User's Guide</i>	9433

Documentation, Support, and Training

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SL8500 User's Guide, part number 96154

Introduction

This chapter introduces the major hardware components and provides the library specifications for Oracle's StorageTek SL8500 modular library system, which is referred to as the SL8500 library or just the "library" throughout this manual. For software information and drive information, refer to the publications that pertain to these specific topics.

The library is a robotic system that mounts cartridges into storage slots or into drives for read/write operations. It also moves cartridges between the cartridge access port (CAP) to storage slots or between slots.

Library Overview

The SL8500 library is a fully automated cartridge tape storage and retrieval system.

The base library stands 2.37 m (7.76 ft.) tall, 1.7 m (5.6 ft.) wide, and 2.76 m (9.1 ft.) deep. Depending on the model and features selected, one SL8500 library can store from 1,448 to 6,632 cartridge tapes and house from four to 64 tape drives.

A library complex consists of two or more libraries connected by pass-thru ports (PTPs). A complex can contain over 320,000 customer usable cartridges and 2,048 tape drives.

The approximate speed of each robot (termed HandBot™ high performance robotics) is from 2 m (75 in.) to 2.5 m (100 in.) per second.

Single Physical SL8500 Library – Base

The minimum SL8500 library configuration is composed of:

- A Drive and Electronics Module, containing from 4 to 64 tape drives and the controlling circuit cards for the library
- One Robotics Interface Module, containing up to 800 cartridge storage slots
- Multiple HandBots (four – eight) that service four rails. They move horizontally along rails and vertically along their individual Z axes. They retrieve cartridges from both inner and outer walls (and the elevator and CAPs) by pivoting 180 degrees

- One Customer Interface Module that contains 648 data cartridges slots, 198 diagnostic and cleaning cartridges slots, 24 end slots (eight 3-slot arrays) for targeting and drop-off cells, and an LED display
- A standalone SL Console or Web-launched SL Console – StorageTek Library Console™ software, which provides an operator panel display on the customer’s local computer
- An elevator assembly located in the front (Customer Interface Module), that transfers cartridges vertically across rail boundaries (elevator) or from one side of the library to the other
- A standard cartridge access port (CAP) that allows up to 39 cartridges to be entered/ejected at one time

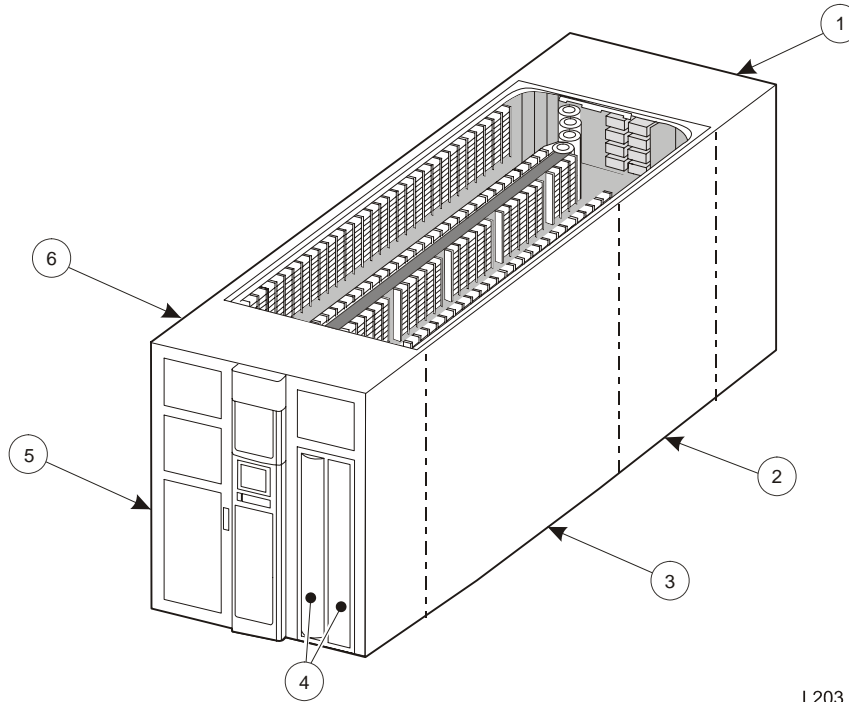
Single Physical SL8500 Library – Options

Options for each stand-alone SL8500 library are:

- A maximum of five additional storage expansion modules, providing 1,728 cartridge storage slots each, to a maximum cartridge storage number of 10,088 cartridges within one library
- A touch-panel local operator panel in the middle of the Customer Interface Module, between the two access doors
- An second CAP (CAP B)
- Redundant HandBots (maximum of four) that provide redundancy should one robot encounter a failure
- One service safety door for maintenance activity
- Library partitioning – an optional feature that allows SL8500 rails (LSMs) to be partitioned for exclusive use by separate hosts. See [Chapter 4, “Library Partitions”](#) on [page 87](#) for details.

A view of a library with one expansion frame is shown in [FIGURE 1-1 on page 3](#).

FIGURE 1-1 Library Modules



L203_009

- | | |
|---------------------------------|--|
| 1. Drive and electronics module | 4. CAPs A and B (shown on front, right door) |
| 2. Robotics interface module | 5. Left front door |
| 3. Storage expansion module | 6. Customer Interface Module |

Library Modules

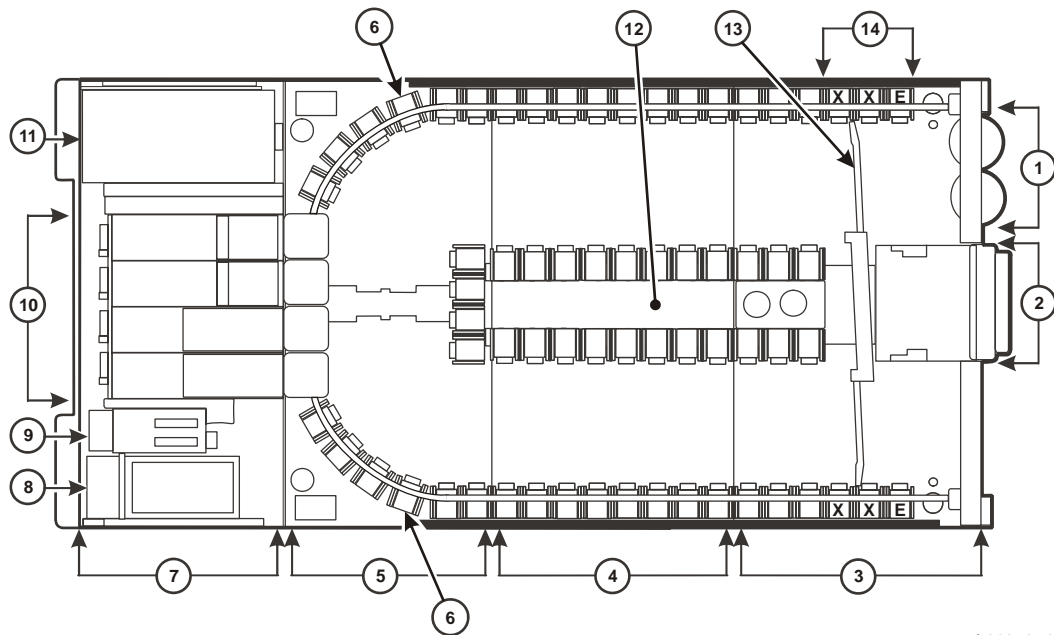
The base library consists of three modules:

- Robotics Interface Module
- Drive and Electronics Module
- Customer Interface Module

Besides these three modules, up to three Storage Expansion Modules may be added per library to increase capacity. These expansion modules are installed between the Robotics Interface Module and the Customer Interface Module.

With a pass-thru port (PTP) installed between two or more libraries, all libraries can share their cartridges and effectively act as a single system. See [“Library Complex” on page 19](#) for details.

FIGURE 1-2 Base Library with One Storage Expansion Module



L203_054

- | | |
|--|--|
| 1. Cartridge Access Ports (2) Caps | 8. AC Power Supplies Electronic Control Module |
| 2. Facade Operator Panel (Optional) Icey Pad | 9. DC Power Supplies |
| 3. Customer Interface Module | 10. Tape Drives |
| 4. Storage Expansion Module | 11. Accessory Racks |
| 5. Robotics Interface Module | 12. Inner Wall |
| 6. PTP (Pass Through Port) | 13. Service Door |
| 7. Drive Electronics Module | 14. Reserved Columns |
| | E= End Stop |
| | X= Diagnostic & Cleaning Cartridge |

Capacities

A basic library can store up to 1,448 data cartridges. This total does not include cartridges in the cartridge access port (CAP) or the reserved slots. A total of 198 slots are dedicated to diagnostic and cleaning cartridges. See [Appendix A, “Cartridge Slot Locations”](#) for information on slot locations.

There are also eight drop-off slots in the library, two for each robot. These slots are used in the event of a robotic failure when there is still a cartridge in the hand.

[TABLE 1-1](#) shows the data cartridge capacities in a single library.

TABLE 1-1 Data Cartridge Capacity

	Module Type	Cartridge Capacity
Basic Library	Drive and Electronics ¹	0
	Robotic Interface	800
	Customer Interface ²	648
	Basic library	1,448
Expansion Modules	First storage expansion module	3,176
	Second storage expansion module	4,904
	Third storage expansion module	6,632
	Fourth storage expansion module	8,360
	Fifth storage expansion module	10,088

¹ There are no cartridge storage locations in the Drive and Electronics Module.
² The Customer Interface Module contains 198 storage slots for cleaning and diagnostic cartridges.

Note – The totals shown do not include slots in the cartridge access port (CAP) and pass-thru-port.

See [Appendix A, “Cartridge Slot Locations”](#) for information on reserved slots and cartridge addresses.

Robotics Interface Module

There are four robotic rail assemblies in the library that provide both power and communications to the four or eight robots. Each robot can service up to 16 tape drives.

One robotics interface module contains up to 800 cartridge storage slots.

Elevators

Elevators provide vertical pass-thru operations between rails within the same library. Both elevators are located in the front of the library between the front access doors and the Service Safety Door. Each of the four rails share the two elevators.

Robots

The robots move cartridges between storage slots, tape drives, and the CAPs. SL8500 robots have the following components:

- Rail, brush, and Robot assemblies
- A Z-mechanism for vertical motion of the hand
- A wrist-mechanism for lateral or horizontal motion
- A bar-code scanner for both targeting and reading cartridge labels
- A proximity sensor for detection of empty slots and unlabeled cartridges
- A belt-driven gripper mechanism for gripping the sides of the cartridges

See the following figures:

- [FIGURE 1-3, “Robot on the Power Rail” on page 7](#)
- [FIGURE 1-4, “Robot \(Detail\)” on page 7](#)

Note – Because of the four individual rails, each robotic assembly is considered a library storage module (LSM). So the architecture of the SL8500 provides four separate and unique LSMs within a single library.

FIGURE 1-3 Robot on the Power Rail)

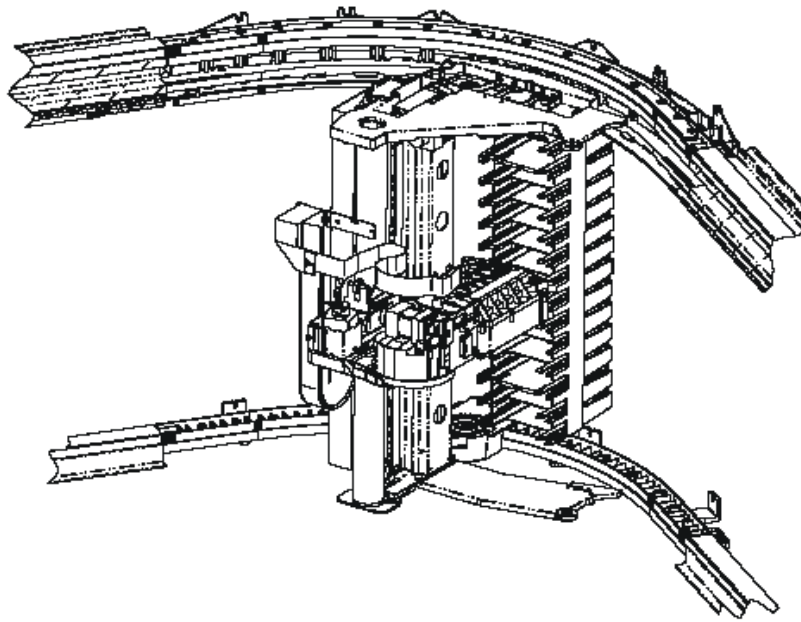
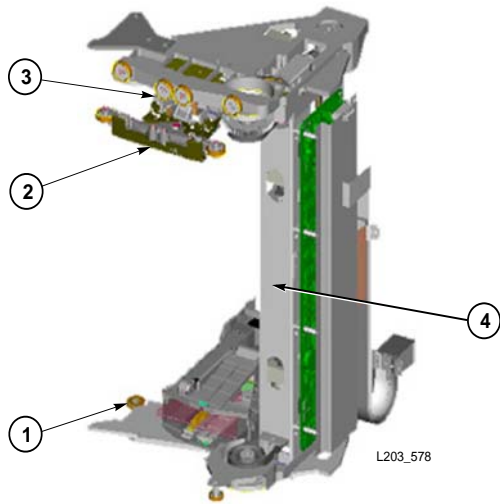


FIGURE 1-4 Robot (Detail)



- 1. Lower pulley
- 2. Pre-load assembly
- 3. Gripper
- 4. HBB card

FastLoad Feature

To optimize system performance, the Robots automatically implement the Fast Load capability. Once a Robot successfully inserts a cartridge into a drive, it is immediately available for the next request and does not wait until the drive reports that the cartridge has been loaded. The SL8500 library control electronics waits to return the response to the mount request until it detects that the tape drive has successfully loaded the cartridge tape.

Redundant Robots

Two Robots can service a single rail section within the library, providing redundancy. Each Robot has two motors, if one fails, the other motor is powerful enough to move the defective Robot into the forward service area. If both the motors fail for a Robot, then the redundant Robot moves the defective Robot into the forward service area thus continuing Robot operations.

Library Cameras

An Ethernet-based library camera system (WebCam) with monitoring software is an optional feature of the SL8500 library. The camera allows you to remotely see the inside of the SL8500 library. The WebCam attaches to a 10Base-T, 100Base-T Ethernet connection and provides remote, high-quality, audio and video. This feature contains two cameras that mount in the upper frame of the front access door – one on each side of the library.

Note – The WebCam feature uses a third-party camera designed for the security surveillance market and is subject to change without notice.

Drive and Electronics Module

The following information is a summary of drive and cartridge support provided by the SL8500. For complete details on drive support, see the *StorageTek SL8500 Systems Assurance Guide*.

The major components of the Drive and Electronics module include:

- **Tape Drives** – Slots for 1 to 64 tape drives
- **Electronics Control Module** (ECM) and cards for library operation
- **Power**
 - AC power distribution units N+1 (standard) or 2N (optional)
 - Load sharing DC power supplies that provide power for the tape drives and HandBots
- Accessory racks to mount network devices and components, servers, and the service delivery platform

Tape Drives

SL8500 library supports from 1 to 64 drives. The interface to these drives is fiber-optic based; meaning Fibre Channel, FICON¹, or ESCON² attachments.

The following table lists the supported vendors, drives types, and interfaces.

TABLE 1-2 Supported Drives

Vendor	Drive Type	Host Interface Type
StorageTek	T9840A	Fibre Channel, ESCON
	T9840B	Fibre Channel, FICON, ESCON
	T9840C	Fibre Channel, FICON, ESCON
	T9840D	Fibre Channel, FICON, ESCON
	T9940B	Fibre Channel, VSM ESCON
	T10000A & B	Fibre Channel, FICON
HP	Linear Tape-Open (LTO 2, 3, 4 & 5)	Fibre Channel
IBM	Linear Tape-Open (LTO 2, 3, 4 & 5)	Fibre Channel
Quantum	Linear Tape-Open (LTO 3)	Fibre Channel
Quantum	Super DLT (SDLT600)	Fibre Channel

1. Short for Fiber Connection, or Fiber Connectivity – IBM’s fiber optic channel technology that extends the capabilities ESCON. FICON supports full duplex data transfers over longer distances.
2. Short for Enterprise Systems Connection, or Enterprise Systems Connectivity – an IBM fiber optic channel technology that supports half duplex data transfers up to 200 Mb/s.

StorageTek T-Series Tape Drives

The StorageTek T-Series tape drives are small, modular, high-performance drives designed for both the enterprise and client-server environments.

T9x40

StorageTek's T9x40 tape drives are high-performance drives designed for enterprise and client-server environments. There are two models available:

T9840 The access-centric T9840 tape drive is ideal for applications that demand high data throughput and fast recall. These drives give you access to data at an average of 8 seconds, with transfer rates up to 30 MB/s and capacity up to 75GB.

The SL8500 supports all models of the T9840 (A, B, C, and D).

T9940B The T9940B tape drive is designed for high-capacity storage applications. It uses a single reel cartridge tape for higher capacities of up to 200 GB with transfer rates of up to 30 MB/s.

Note: The T9940A tape drive is not supported.

T10000

StorageTek's T10000 are high-capacity, high-performance tape drives. These drives use a single reel data cartridge with native capacity of 500GB (T10000A) or 1TB (T10000B) and transfer rates of up to 120 MB/s. These tape drives are designed to take advantage of the 4 Gb/s speeds in storage area networks (SANs).

LTO Ultrium

Ultrium Linear Tape-Open (LTO) technology was developed jointly by Hewlett-Packard (HP), IBM, and Seagate to enable data interchange among different LTO Ultrium tape drive vendors. LTO is an "open format" technology, which means that users have multiple sources of product and media. The "open" nature of LTO technology enables compatibility between the three different vendors.

The SL8500 supports LTO generations 1, 2, 3, 4, and 5 available from HP, IBM, and Quantum. These drives use a single reel data cartridge with native transfer rates and capacities of up to

- 35MB/s with capacities of 200GB for LTO2 drives
- 80 MB/s with capacities of 300GB for LTO3 drives
- 120 MB/s with capacities of 800GB for LTO4 drives

- 140 MB/s with capacities of 1500GB (1.5TB) for LTO5 drives

TABLE 1-3 LTO Drive Backward Readability

	LTO Gen 2 Drive	LTO Gen 3 Drive	LTO Gen 4 Drive	LTO Gen 5 Drive
LTO 1 media	Read and write	Read only	No action	No action
LTO 2 media	Read and write	Read and write	Read only	No action
LTO 3 media	No action	Read and write	Read and write	Read only
LTO 4 media	No action	No action	Read and write	Read and write
LTO 5 media	No action	No action	No action	Read and write

Super DLT

The Super DLT (SDLT) is a standard for mid-range UNIX and Windows platforms. The SDLT 600 incorporates an advanced tape recording technology for high capacity tapes, up to 300 GB, with transfer rates of 36 MB/s.

Electronics Control Module

Each library contains an electronics control module.

HBK Card

The HBK card contains flash memory and feature upgrade controls; it resides on a separate logic card within the control module. It contains the configuration, firmware versions, and features for the library.

Configuration

Library configuration is retained on the flash memory card. This saves significant time in cases where an HBC card must be replaced, because the new card fetches the configuration from flash memory instead of requiring manual re-configuration by a service representative.

Firmware Versions

Flash memory holds both the most recently activated firmware version and the previous firmware version. Therefore, if there is a requirement to return machine control to a previous version, a service representative merely re-activates the previous version and places the now-deactivated version into the “previous” state.

Features

When features are added to a library, they are tracked to the machine's serial number³. Any upgrade must be matched to the serial number before activation. The upgrade process is accomplished over the command line interface (CLI) by the service representative.

HBC Card

The HBC card is the library controller, responsible for coordinating all component operations within the library. It is the interface between the host and the library. One HBC card can control a library's operation, but a second HBC is available to assure redundancy. Operating voltage for HBC cards is +3.3 VDC.

In addition to the cards in the electronics control module, the HBC card interfaces with the following cards and components:

- Ethernet hubs (Library-to-library LANs, tape drive service LAN)
- TCP/IP/Web host interface
- HBS cards (robots)
- Power, smoke, and environmental monitoring circuits throughout the library
- Flash memory

HBT Card

The HBT card translates commands from the HBC controller card into unique drive commands, transferred across differential RS422 lines. The HBT card contains 66 Universal Asynchronous Receiver/Transmitters (UARTs); 64 are responsible for the parallel-to-serial conversion for the tape drives and the remaining two communicate with the tape environmental monitor card (HBD card).

Power

There are five power grids that distribute power throughout the library. Two of the power grids carry 220 VAC; the other three carry 48 VDC.

- The two AC power grids distribute 220 VAC to the different Load Sharing Power Supplies, Electronics Control Module (ECM), and accessory racks.
- The three DC power grids supply 48 VDC to the tape drives, robots, and front frame components.
 - The Drive Power Grid supports up to 64 tape drives (with the proper number of Load Sharing Power Supplies). A single tape drive power supply provides power for up to 8 tape drives, so at least 8 power supplies are required for 64 tape drives (in an N+1 configuration).
 - The Robot and Pass-thru Port (PTP) Power Grid supplies power to the robots and the four pass-thru ports (PTP). A single power supply can power up to four robots, so two power supplies are required for eight robots.
 - The Front Frame Power Grid is powered by a single Load Sharing Power Supply that supplies 48 VDC power to the two Cartridge Access Ports if present, two Elevators, and the Service Safety Door.

3. The machine serial number is on the rear, bottom of the Tape Drive and Electronic Module.

Note – The power supply for the Front Frame Power Grid is in the Customer Interface Module. All the other Load Sharing Power Supplies are located in the Drive and Electronics Module.

Power Consumption

Power consumption for the library is as follows:

- Single phase configurations
 - 24 Amps per phase (minimum) – 13.0kW, 44,382 Btu/hr
 - 768 Amps per phase (maximum) – 416 kW, 1.4 M Btu/hr
- Three phase configurations
 - 40 Amps per phase (minimum) – 13.0 kW, 44,382 Btu/hr
 - 280 Amps per phase (maximum) – 416 kW, 1.4 M Btu/hr

Note – Power cabling must be done by a licensed electrician.

Power Configurations

Two power configurations are available for the SL8500 library:

1. N+1 base power configuration
2. 2N power configuration

N+1 Base Power Configuration

The base power configuration contains one system power distribution unit (PDU) and one N+1 PDU.

- The system PDU, connected directly to the branch circuit, provides AC power to three DC power grids and the electronics control module.
- The N+1 PDU supplies added +48 VDC load sharing power to each of the three DC power grids and an extra AC-to-DC power supply for the electronics control module.

The base power configuration provides power to the:

- Tape drive power supplies
- Robotic rail power supplies
- Customer Interface Module power supplies
- Touch screen local operator panel
- Electronics control module power supplies

Note – The base power configuration does not offer redundant AC power.

2N Power Configuration

The 2N power configuration contains the base power configuration (PDU 1) and a second PDU, PDU number 2.

This configuration provides power to the same components as N+1, plus power for:

- Optional, redundant load sharing power supplies
- Two additional accessory racks for customer components
- Redundant controller cards

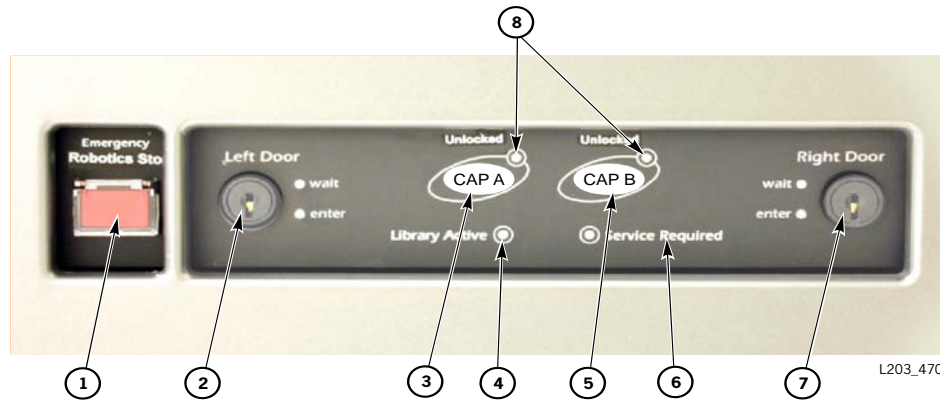
Note – The 2N PDU is required for the 2N drive power, 2N robotic power, and also for the additional rack installed.

Customer Interface Module

Controls and Indicators

FIGURE 1-5 illustrates the SL8500 controls and indicators.

FIGURE 1-5 Controls and Indicators



- | | |
|-----------------------------------|----------------------------------|
| 1. Emergency robotics stop switch | 5. CAP B button |
| 2. Left service safety door key | 6. Service required indicator |
| 3. CAP A button | 7. Right service safety door key |
| 4. Library active indicator | 8. CAP unlocked indicators |

The controls and indicators include the following buttons, switches, and indicators:

TABLE 1-4 Keypad Switches, Buttons, and Indicators

Emergency robotics stop switch	Actuate the emergency robotics stop switch to disconnect DC power to the power rails. When it is safe to restore power, press the switch to restore power to the rails.
Service safety door keys (left and right doors)	Allows the service representatives to place the library in maintenance mode.
CAP A button	Press to open and close CAP A.
Library active indicator	
CAP B button	Press to open and close CAP B.

TABLE 1-4 Keypad Switches, Buttons, and Indicators

Service required indicator	This red indicator is lit when operator intervention is required.
Right service door key	
CAP unlocked indicators	The amber LED light is On when the CAP is unlocked, and Off when locked. When the light is On and blinking, manual intervention required. Open the CAP and make sure the cartridges in the CAP slots are properly seated.

Local Operator Panel

The local operator panel is an optional feature of the SL8500 which is built into the Customer Interface Module. It enables you to run the SL Console application directly at the library from a flat-screen display with a touch-screen interface.

For details see [“Local Operator Panel” on page 16](#).

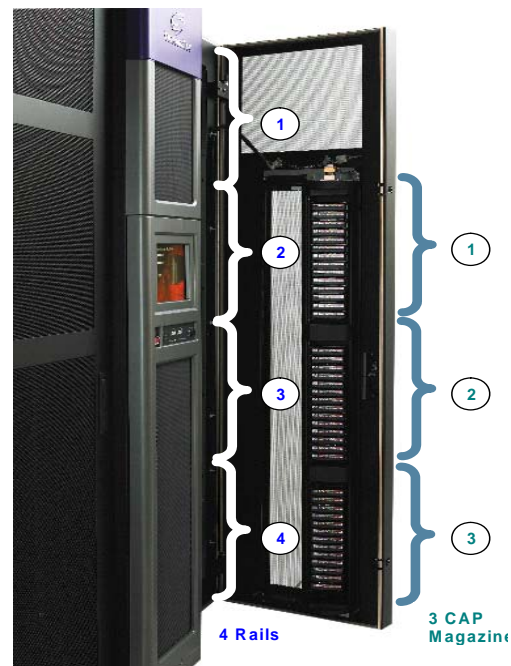
Cartridge Access Port (CAP)

SL8500 library CAPs are installed on the right access door of the Customer Interface Module. CAPs allow operators to enter cartridges and eject cartridges from the library. A total of 39 cartridges can be imported or ejected at one time through each CAP.

[FIGURE 1-6 on page 17](#) illustrates the CAPs. See [“CAP Operations” on page 145](#) for information on using the CAPs.

Note – CAPs operate only while the library is in automated mode.

FIGURE 1-6 CAP



The CAP spans across three rails – 2, 3, and 4 (LSMs 1, 2, and 3).

Storage Expansion Modules

Besides the basic configuration, up to five Storage Expansion Modules may be added per library to increase capacity. These expansion modules are installed between the Robotics Interface Module and the Customer Interface Module.

Each Storage Expansion Module can contain up to 1,728 data cartridge slots.

Library Complex

A library complex is created by connecting two or more SL8500 libraries together with Pass-thru Ports (PTPs).

The maximum size library complex possible consists of either:

- 32 libraries for Host Software Component (HSC) systems, connected through PTPs, containing over 320,000 cartridge slots and 2,048 tape drives.
- 31 libraries for Automated Cartridge System Library Software (ACSL) connection, connected through PTPs, containing over 320,000 cartridge slots and 1,984 tape drives.

Note – A library complex with functional pass-thru ports (PTPs) cannot be partitioned. All PTPs must be disabled before partitioning can be enabled. See [“Partition Features and Restrictions” on page 87](#) for details.

Pass-thru Ports

A PTP is an electro-mechanical device that allows one Library Storage Module (LSM) to pass a cartridge to another library storage module within the same complex.

For example: If an operating system issues a mount request, and all the tape drives are busy in that LSM and library, the PTP can pass the cartridge to another library where an idle tape drive can satisfy the mount request.

There are eight PTP locations in an SL8500 library, two locations per rail (or LSM). These locations are on the curved portions of the Robotic Interface Module near the tape drives. Therefore, they provide quick access to the drives.

The SL8500 PTPs consist of a separate frame ([FIGURE 1-7](#)) that is installed between the Drive and Electronics Module and the Robotics Interface Module. Each frame has four separate PTP mechanisms that can pass up to two cartridges each between LSMs (one cartridge mechanism) for a total of eight cartridges.

The maximum size of a library complex connected through PTPs is 7 libraries.

FIGURE 1-7 Pass-thru Port



Note – Because elevators transfer cartridges from one LSM to another, these transfers are also pass-through operations. The elevators are thus internal PTPs, considered by host software to be on Panel 0.

The following terms and definitions apply to SL8500 PTP operations:

Home library	Provides power, signal, and control lines to the PTP mechanisms. This is the library on the right as viewed from the front.
Away library	Always located on the left side of a Home library, as viewed from the front.
Source	Contains the home slot location for the cartridge that will be passed through to an adjacent library.
Destination	Contains the tape drive or slot location in the adjacent library where the cartridge will be mounted or stored.

All SL8500 libraries come equipped and ready for the addition of the PTP frame — no additional walls are needed on existing libraries.

The software applications — ACSLS and HSCsupport PTP operations.

Physical characteristics for the PTP assembly are listed in [TABLE 1-5](#).

TABLE 1-5 PTP Assembly – Physical Characteristics

Height	231 cm (91 in.)
Width	17.2 cm (6.76 in.)
Depth	150.8 cm (59.4 in.)
Weight	121 kg (266 lb)
Power	+48 VDC, supplied from the home side (left side of the library, as viewed from the front) by the corresponding HBF card for each rail.

Operating Firmware

Operating firmware is resident on the HBC card from the factory. Some key features of the SL8500 firmware are:

- Two firmware versions may be held on the HBC card. When firmware is upgraded, the earlier image of firmware remains in memory and may be restored if required.
- Auto Discovery of additional tape drives
- Auto Discovery of new cartridge slots and added libraries
- Automatic handling of dynamic World Wide Name (dWWN) assignments (See [“Dynamic World Wide Name” on page 25](#)).

Host Interfaces

Host interface connections to the library are done with one of two methods:

- TCP/IP protocol over an Ethernet 10/100-baseT physical interface.
- Fibre Channel physical interface using SCSI commands and protocol.

TCP/IP

The SL8500 library uses TCP/IP protocol over an Ethernet physical interface to manage and communicate with the library. This interface enables both enterprise-level (HSC) and open system platforms (ACSLs) to connect to and communicate with the SL8500.

Note – A private network connection to an Ethernet hub or switch is recommended for maximum throughput and minimum resource contention.

The HBC card is the library controller responsible for coordinating all component operations within the library and providing the interface connection with the host.

Definitions and Terminology

Terminology associated with TCP/IP and dual TCP/IP are:

- Dual path – Two distinct physical paths within a network architecture that interconnect two host systems. Note that these paths are between host systems, not between a host and an SL8500 library.
- Dual TCP/IP – Provides two separate host connections between the host software (ACSLs or HSC) and the library controller. When both communication paths are available, ACSLS and HSC use both of them to communicate with the SL8500.
- Ethernet – a local-area network (LAN) architecture that serves as the basis for the IEEE 802.3 standard. Ethernet is one of the most widely implemented LAN standards.
 - 10Base-T: 10 Mbps baseband Ethernet over twisted pair cables with a maximum length of 100 meters.
 - 100Base-T: 100 Mbps baseband Ethernet over twisted pair cable.
- Mbps – megabits per second, a unit of measure for data transfer speed (a megabit is equal to one million bits). Newer versions of Ethernet, called Gig-E or 1000Base-T support data transfers of 1 gigabit (1,000 Mbps).
- Multi-homed – the host system contains more than one network interface – this does not imply redundancy.
- Netmask: – also known as network mask or subnet mask. This entry makes the library accessible through a subnet on a larger network, using a number from 0 to 32; for example, 126.80.70.121/23.
- Redundant TCP/IP – relates to dynamic routing or switching from a primary interface to a secondary interface in the event of a network failure on one interface.
- Static Routing – routing information in the host system is manually configured by the system administrator. This is the only routing method supported by SL8500.

- TCP/IP – Transmission Control Protocol/Internet Protocol

TCP is one of the main protocols in networks that enable two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets are delivered in the order they were sent.

IP specifies the format of packets and the addressing scheme.

Dual TCP/IP

Note – This feature requires FRS_3.08 or higher library firmware.

There are two separate Ethernet connections on the HBC card for host-to-library communications – Ports 2B and 2A. See [FIGURE 1-8](#) for a detailed illustration.

- Port 2B provides the primary connection for host communications – this is the standard connection for SL8500 libraries.
- Port 2A provides the Dual TCP/IP host connection – this is an optional feature for SL8500 libraries.

An example of how dual TCP/IP information appears on the SL Console is shown below.

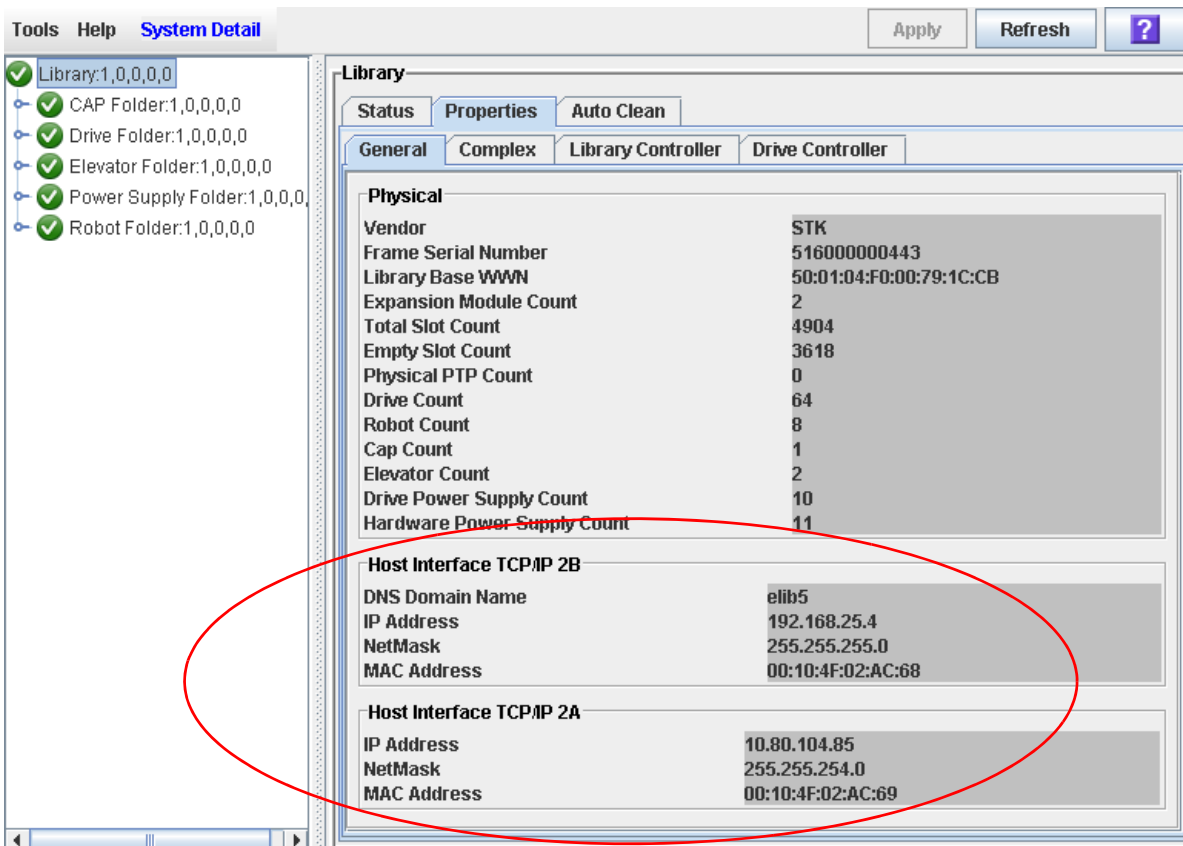
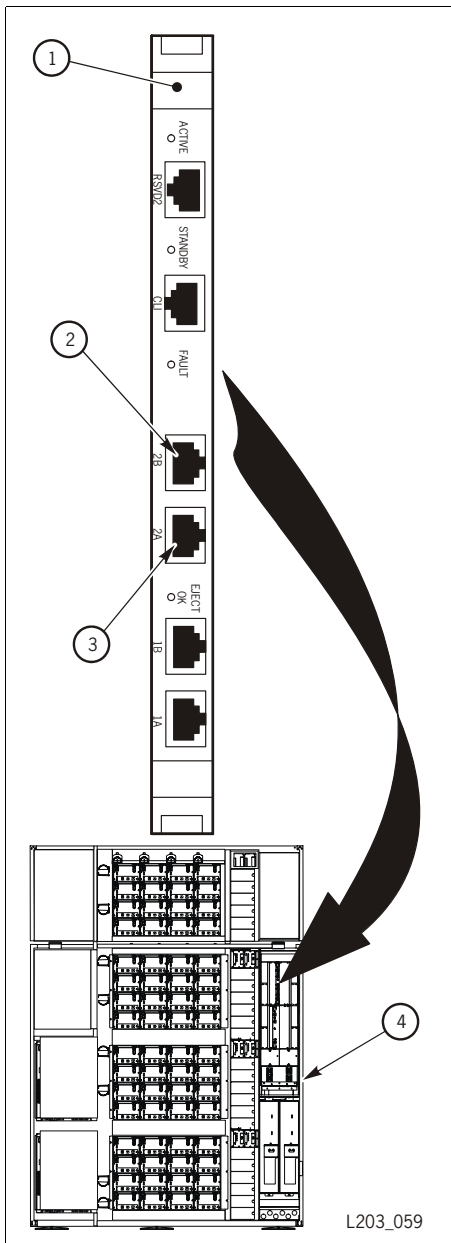


FIGURE 1-8 TCP/IP Connections



1. HBC card (library controller)
2. Port 2B – primary TCP/IP host connection
3. Port 2A – secondary dual TCP/IP host connection
4. Electronics control module (ECM)

Note: The other two Ethernet connections – Ports 1A and 1B – are reserved and for library-to-library communications for the pass-thru ports.

Note – A private network connection to an Ethernet hub or switch is recommended for maximum throughput and minimum resource contention.

Consult with your Service Representative to identify the appropriate network topology for your site and to configure your SL8500 library to support Dual TCP/IP.

Fibre Channel

Topologies include:

- Switched Fabric
- Arbitrated Loop

Switched Fabric

Note – This topology is the only one supported for library-attached drives.

A switched fabric provides dynamic interconnections between nodes and multiple, simultaneous Fibre Channel connections for the network.

If the library is connected to a Fibre Channel switch or fabric-capable host, it configures itself as a switched topology. A switched fabric topology can support up to 16 million ports logged into the fabric.

Arbitrated Loop

Note – The library does not support forcing Arbitrated Loop connection by setting a Hard ALPA (Arbitrated Loop Physical Address).

Dynamic World Wide Name

Each connection (port) in a Fibre Channel environment must have a unique ID called the World Wide Name (WWN). The WWN is a 64-bit address that identifies each individual device, company, with vendor information. 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. There are three World wide Names reserved for each drive bay: Node, Port A, and Port B.

Note – Both library and tape drives must have microcode or firmware that supports the dynamic World Wide Naming feature.

Caution – *System problems:* When enabling dWWN, all drives must be at the proper firmware level. If a drive has down level firmware, it will remain in the “configuring” state and is unavailable for host use.

Caution – Changing the dWWN feature must be coordinated with the system administrator. The feature is usually enabled at installation time. It is important to keep a record of the configuration, in order to eliminate system issues in the case of an failure.

Important:

Tape drives that are migrated from other libraries will be assigned a different WWN when installed in an SL8500 library. The existing storage area network will not associate this new WWN with the originally assigned name. A best practice is to configure all drive bay slots in the library and verify that the tape drive data path is bound correctly over the network.

Library Management Software

The library management software is used to control the library hardware and manage the library database. When the library is in automated mode, cartridge mount and dismount operations occur without manual intervention. The software determines the location of a cartridge by accessing the audit data uploaded from the library. The software then allocates the drive to receive the cartridge.

The library management software also retains cartridge VOLID, location, and attribute information, plus perform activities such as mounts and dismounts, enters and ejects.

Oracle offers several library management software components depending on the platform, connection type, and operating system.

Nearline Control Solutions

Some of the Oracle suite of Nearline Control Solutions (NCS) software products are described in the sections below.

Client System Component

Oracle's MVS/CSC provides client functions and communications between an MVS host and Oracle's Library Control System (LCS) or server on a non-MVS host. MVS/CSC allows the MVS client to perform automatic tape handling on a StorageTek library in addition to sharing multiple host systems (both IBM and non-IBM).

The MVS/CSC can communicate with Oracle's LibraryStation in an MVS-only environment, or the SMC and the Oracle's StorageTek HTTP server can provide communication between MVS hosts.

Storage Management Component

Storage Management Component (SMC) is the interface between IBM's OS/390 and z/OS operating systems and an Oracle library. SMC performs the allocation processing, message handling, and SMS processing for the NCS solution. SMC resides on the MVS host system with HSC and/or MVS/CSC, or on a remote system using the StorageTek HTTP server to communicate with the HSC. SMC communicates with HSC or MVS/CSC to determine policies, volume locations, and drive ownership.

Note – SMC is a required NCS component.

Oracle StorageTek HTTP Server

The StorageTek HTTP Server for OS/390 and z/OS optionally provides the middleware to allow communication between the SMC (client) and a remote HSC subsystem (server). The HTTP server executes as a separate subsystem on the MVS host where the remote HSC subsystem resides.

Host Software Component

When an SL8500 library is in a stand-alone configuration with an MVS host, the host must run a version of Oracle's Host Software Component (HSC) along with the Storage Management Component (SMC).

Oracle's HSC and SMC:

- Influence allocations
- Intercept mount and dismount messages
- Receive requests from the interface and translates them into commands

HSC resides within the MVS host, but is invisible to the actual operating system. Versions of HSC that support library complex operation are:

- HSC 6.0 (with additional PTFs) or higher
- HSC 6.1 with Near Continuous Operation (NCO)

Caution – For customers using HSC 6.1 with NCO: Upgrading the library complex configuration without performing a LIBGEN, MERGEcds, or stopping/restarting HSC is possible, but this requires assistance from your Oracle support representative.

For new drives, higher levels of HSC may be required.

LibraryStation

LibraryStation provides a communications interface between HSC and a client system running an open systems host (either MVS or open systems), allowing network clients to access the library services of a Sun Automated Cartridge System (ACS) through the MVS host system. LibraryStation can communicate with the MVS/CSC in an MVS-only environment, or the SMC and the Sun StorageTek HTTP server can provide communication between MVS hosts. LibraryStation executes in the HSC address space on MVS.

ACSLs

ACSLs is a software package that manages library contents and controls library hardware for the mounting and dismounting of cartridges. This application provides library management services such as cartridge tracking, pooling, reports, and library control.

Note – ACSLS 7.1 (with PUT0601, for Near Continuous Operation) or higher is required to support PTP and T10000 tape drive operation.

This application maintains a database that tracks tape volume names and their current locations in the tape libraries. In CSC configurations, ACSLS manages the library control software that runs in the UNIX-based Library Control System.

Note – The ACSLS application is sold to support a defined number of cartridge slots.

Library Specifications

TABLE 1-6 Library Specifications

Physical	
■ Hmeight	2.37 m (236.6 cm) or 7.76 ft (93.15 in.)
■ Width	1.7 m (170.8 cm) or 5.6 ft (67.25 in.)
■ Depth (Base Library)	2.8 m (276.9 cm) or 9.1 ft (109 in.)
■ With 1 expansion module	3.7 m (372.1 cm) or 12.2 ft (146.5 in.)
■ With 2 expansion modules	4.7 m (467.4 cm) or 15.3 ft (184 in.)
■ With 3 expansion modules	5.6 m (562.6 cm) or 18.5 ft (221.5 in.)
■ Weights	Library only:
■ Base Library	1954 kg (4,309 lb)
■ With 1 expansion module	2392 kg (5,274 lb)
■ With 2 expansion modules	2830 kg (6,239 lb)
■ With 3 expansion modules	3396 kg (7,487 lb)
■ Weight distribution per pad	454 kg (1,000 lb)
■ Pass-thru Port	
■ Height	231 cm (91 in.)
■ Width	17.2 cm (6.76 in.)
■ Depth	150.8 cm (59.4 in.)
■ Weight	121 kg (266 lb) including the mechanisms
■ Service Clearances	
■ Customer Interface Module	66 cm (26 in.)
■ Drive & Electronics Module	85 cm (33.5 in.)
■ Pass-thru port (between)	15.24 cm (6 in.)
■ Temperature	
■ Operating	+16 to +32°C (+60 to +90°F)
■ Shipping	-30.5 to +49°C (-23 to +120°F)
■ Storing	+4.4 to +32°C (+40 to +90°F) +25.6°C (+78°F) maximum, non-condensing
■ Wet bulb (operating)	
■ Humidity	20% to 80%
■ Operating	5% to 90%
■ Shipping	20% to 80%
■ Storing	
■ Operating Heat Output	44,380 Btu/hr (maximum loading**) Calculation for this is: 3.41214 x Watts = Btu/hr
■ Power Consumption	13.0 kW (maximum loading**) Single phase configuration and three phase configurations 13.7 kVA kVA = kWatts ÷ Power factor The power factor for the SL8500 = 0.95

**Maximum loading includes 64 tape drives, 4 fully loaded racks, 8 HandBots, all the front frame components (CAPs, service door, and elevators), plus redundant control modules.

TABLE 1-6 Library Specifications (Continued)

Physical	
Tape Drive Weights <i>without</i> Tray	Tape Drive Weights <i>with</i> Drive Tray
<ul style="list-style-type: none"> ■ T9840 = 3.9 kg (8.5 lb) ■ T9940 = 6.8 kg (15.0 lb) ■ IBM LTO = 2.5 kg (5.5 lb) ■ HP LTO = 2.5 kg (5.5 lb) ■ Drive Tray = 4.3 kg (9.5 lb) 	<ul style="list-style-type: none"> T9840 = 8.2 kg (18.0 lb) T9940 = 11 kg (24.3 lb) IBM LTO = 6.9 kg (15 lb) HP LTO = 6.9 kg (15 lb)
<ul style="list-style-type: none"> ■ Cartridge Tape Weights are approximately 227 g (8.0 oz) or 0.227 kg (0.5 lb) 	

StorageTek Library Console

Introduction

The StorageTek Library Console (SL Console) is a Java-based software application that provides a graphical user interface (GUI) for monitoring and managing the StorageTek library.

Following are some of the activities you can perform with the SL Console:

- Manage and configure library partitions (optional feature)
- View and modify status and properties of the library and associated devices (drives, CAP, robots, and elevators)
- Perform an audit on all or part of the library
- Perform a self-test on the library or an associated device
- Perform a diagnostic move (exercise a robot)
- Locate a cartridge
- Move a cartridge from one location to another
- Display library logs
- Display error explanations
- Download new library firmware while the library is in operation
- Display context-sensitive help

SL Console Modes

Depending on your needs, you can run the SL Console in any of the following modes. For details and procedures, see:

- [“Local Operator Panel” on page 39](#)
- [“Web-launched SL Console” on page 41](#)
- [“Standalone SL Console” on page 43](#)

SL Console Security

Security features built into the SL Console control both user authentication and user authorization. The security features include:

- User IDs – User IDs control user authentication. Each user must have a valid, active user ID and password to log in to the SL Console.
- Access permissions – Access permissions control user authorization. Each user ID is assigned a set of access permissions, which determine the types of requests the user can submit through the SL Console. For example, in order to modify the system properties of a drive, a user must log in with a user ID that has the proper access permissions.

When you log in to the SL Console with a valid user ID, password, and library name, the system authenticates your identity and then authorizes your access to the various SL Console functions.

User IDs

To log in to the SL Console, you must have a valid, active user ID. Each user ID must be assigned a password.

There are a fixed set of user IDs at a site. The user IDs include `admin` (customer administrator), `service` (Oracle Customer Services Engineer), and `oem` (third-party field service technician). When you log in successfully, the SL Console displays your user ID in the status bar of the screen.

Only one user at a time can be logged in to the local operator panel. Any number of users can connect to a library through the standalone SL Console or Web-launched SL Console.

Activation Password

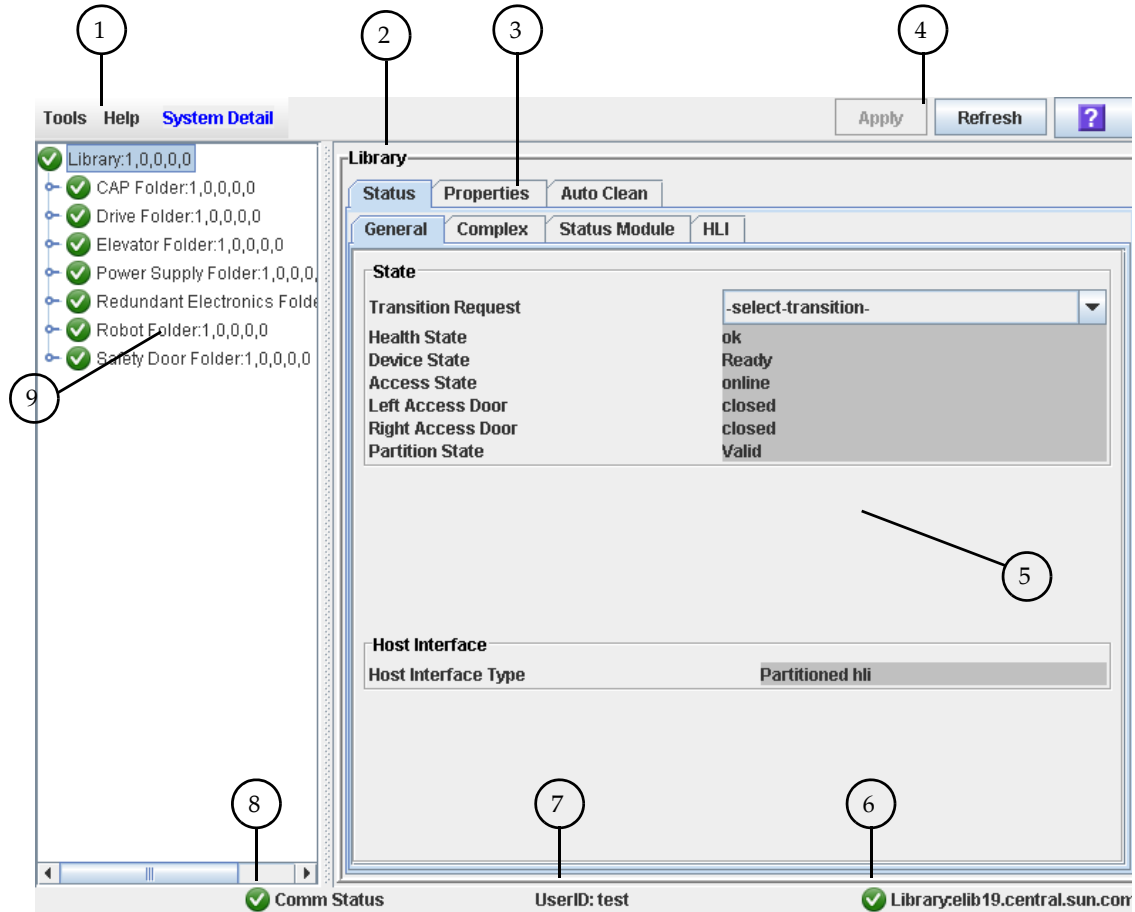
Before any users at your site can use the SL Console for the first time, your library administrator must activate the “admin” userid with a special activation password. Your Oracle support representative provides your administrator with the activation password, which is valid for one-time use only.

After logging in with the activation password, the administrator must change the admin user ID password to ensure system security.

For details about this process, see the appropriate library *Installation Guide*.

SL Console Screen Display

The following figure and table explain the components of the SL Console screen.



Component Name	Description
1	Menu bar – includes the Tools Menu and the Help Menu Tools menu provides access to System Detail, Reports, Monitors, Utilities, Partitioning, User Management, and Log off functions. Help menu provides access to the table of contents of the help system. It also identifies the version of the SL Console in use.
2	Title bar Displays the title of the current screen.
3	Function tabs Identifies the available functions for a screen.
4	Options bar Location of buttons related to the screen (for example, Apply , Refresh , Print). Always includes the SL Console Help button (?). See “Synchronizing the Display With the Controller Database” on page 34 for details on using the Apply and Refresh buttons.
5	Work area Location of the screen data.

	Component Name	Description
6	Library health indicator	Identifies the library to which the SL Console is connected, and displays a graphical representation of the library health.
7	UserID indicator	Displays the user ID currently logged in to the SL Console.
8	Server communication health indicator	Displays a graphical heartbeat monitor indicating the state of server communication health.
9	Device tree	Lists the devices included in the library.

Modifying the Screen Layout

Note – This feature is available starting with SL Console version FRS_3.30. It is available on selected screens only.

You can modify the layout and display of selected SL Console screens as follows.

Display Option	Instructions
Sort the display by any column	Click the heading of the column you want to sort by. Initially the sort is in ascending order. Click the heading again to switch between ascending and descending order.
Arrange the columns in any order	Click and drag a column heading horizontally to any position in the heading row.
Resize the columns	Click the border of the column heading and drag it left or right to change the column width.

Synchronizing the Display With the Controller Database

Logging In

The SL Console gets all library configuration data from the library controller. Therefore, you should be careful when logging in to the SL Console before the library has fully initialized. You may see warnings that configuration data is not yet available, in which case you need to exit and log in again at a later time. Additionally, if a library audit is performed as part of initialization, until the audit is complete, any configuration data displayed may not be completely up-to-date and accurate.

Making Library Configuration Updates

When you first bring up an SL Console screen, the display reflects the most recently saved data from the library controller database. If you use the screen to modify the library contents or configuration, your changes do not update the controller database until you commit your changes by clicking the **Apply** button. Multiple users can access the library at the same time, using the SL Console, command line interface, and various

host applications to make their own changes to the library contents and configuration. If other users make changes and apply them to the controller database, you will not see these changes until you click **Apply** or **Refresh** on your screen. Therefore, the display you see on the SL Console may not reflect the actual saved library configuration at a given point in time.

For these reasons, if you are making major modifications to the library configuration – adding modules, defining partitions, etc. – it is important that you coordinate these changes with other library users. Failure to do so could result in conflicts within the controller database.

SL Console Reports

The SL Console library reports provide information on the library and its associated devices (for example, drives, robots, and CAPs), events, and tape cartridges. You can use the reports to monitor library activity and identify potential problems. In addition to displaying the reports on-screen, you can save the report data to a file, which you can then print or include in e-mail.

All report output is a static display of information sent from the library controller at the time the report is generated. The SL Console does not update the information dynamically unless you explicitly select the **Update** button on the Options bar.

Note – Running multiple instances of the standalone SL Console or Web-launched SL Console on the same PC or workstation can cause problems such as inconsistent data on reports. It is recommended that only one user at a time produce SL Console reports on a PC or workstation, unless all instances of the SL Console are the same version.

Report Types

The SL Console provides the following types of reports:

- Log – detailed system event logs
- Statistics – statistical information on library operations
- Status Detail – details on the status of the library and associated devices, such as CAPs, drives, and robots
- Status Summary – summary information on the status of the library and associated devices
- Version – details about library hardware and software versions

Report Options Bar

The Options bar on each report allows you to perform the following functions:

- [Search a Library Report](#)
- Update the report with current data
- [Save Library Report Data to a File](#)

Report Procedures

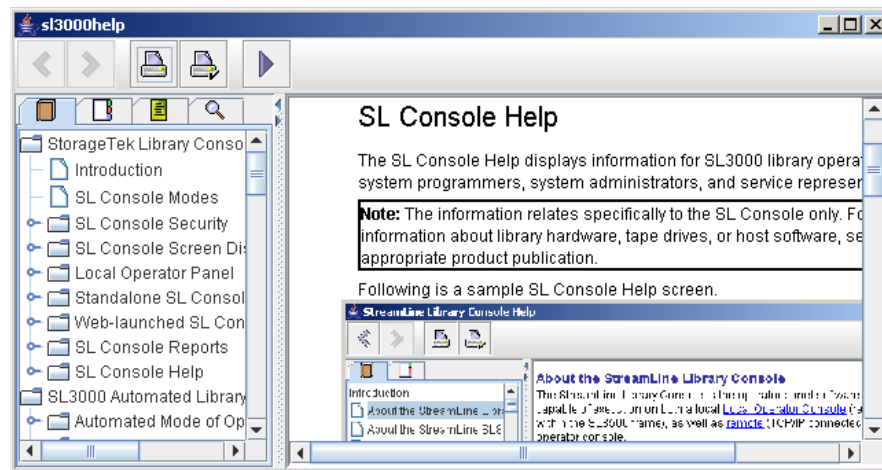
For report procedures, see [“General SL Console Report Tasks”](#) on page 61.

SL Console Help

The SL Console Help displays information for library operators, system programmers, system administrators, and service representatives.

Note – The information relates specifically to the SL Console only. For information about library hardware, tape drives, or host software, see the appropriate product publication.

Following is a sample SL Console Help screen.



Accessing the SL Console Help

You can display the SL Console Help from any SL Console screen. Use either of the following methods:

- To display context-sensitive help for the current SL Console screen, click the ? button in the Options bar.
- To display general help information, click **Help > Contents** in the Menu bar.







Help Navigation

The left panel of the SL Console Help screen displays either of the following:

- Table of contents (TOC) – An outline of topics and subtopics
- Index – A list of terms and topics, in alphabetical order

The right panel displays the Help topic itself.

The top of the SL Console Help screen includes the following navigation buttons.

Button	Action
 Back	Retraces your steps, going backward one topic at a time.
 Forward	Retraces your steps, going forward one topic at a time.
 Print	Displays the Print popup, which allows you to print one or more topics: <ul style="list-style-type: none">■ To print the current topic, click the Print button.■ To print a different topic, click the topic title in the SL Console Help table of contents, and click the Print button.■ To print more than one topic, highlight the topics in the SL Console Help table of contents by pressing Shift-Click or Ctrl-Click, and then click the Print button.
 Print Setup	Displays the Page Setup popup, which allows you to modify your print page layout.
 TOC	Displays the SL Console Help table of contents.
 Index	Displays the SL Console Help index.

Tips for Using the SL Console Help

- You can minimize, maximize, or resize the Help screen to accommodate your needs.
- You can resize the left and right panels of the Help screen by clicking the border between them and dragging it left or right.
- Most topics include a **Related Topics** button at the bottom of the page. Click on this button to display and navigate to help topics containing related information.

Local Operator Panel

The local operator panel is an optional feature of the library, which is built in to the Customer Interface Module. It enables you to run most of the SL Console application directly at the library from a flat-screen display with a touch screen interface.

The local operator panel has the following features:

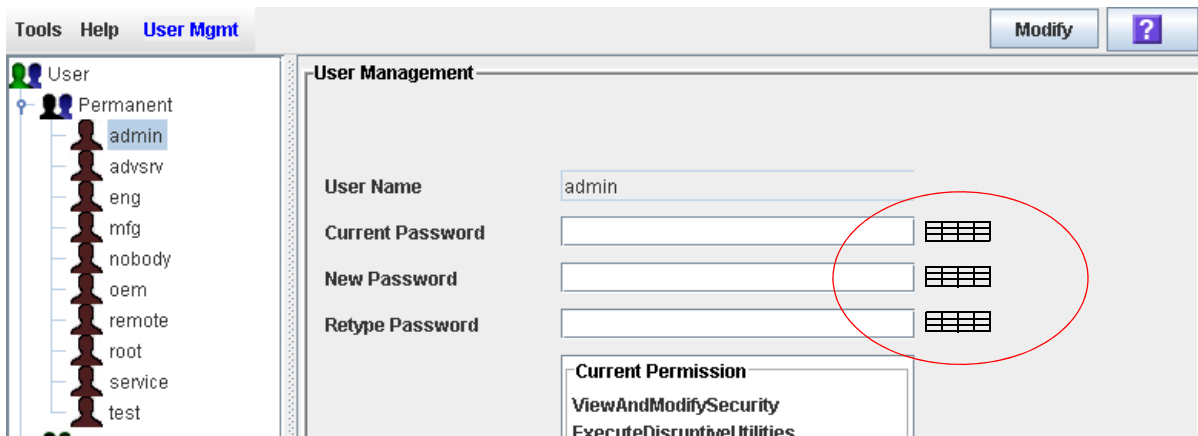
- Flat-panel display (12.1-inch), resident within the library
- Touch screen interface, allowing alphanumeric data entry; stylus available; see “Virtual Keypad” for details.
- No keyboard or mouse option

LEDs located directly below the local operator panel provide the following status information:

- Library Active – Library processor is working.
- Wait – Library firmware is loading.
- Service Required – Library is rebooting.

Virtual Keypad

Some screen fields require you to make a text entry. The local operator panel displays a keyboard icon next to these fields. By clicking on the keyboard icon, you can display a virtual keypad, which allows you to enter valid alphanumeric characters into the field. The following figure illustrates the keyboard icons on a sample screen.



The virtual keypad provides the standard alphanumeric and symbol characters. It allows you to enter only characters that are valid for the current field; characters that are not valid are grayed out.

The virtual keypad also provides the following cursor movement buttons:

Button	Function
Insert	If highlighted, inserts text at the cursor position. If not highlighted, replaces text to the right of the cursor.
Home	Places cursor at the beginning of the field.
Del	Deletes character to the right of the cursor.
End	Places cursor at the end of the field.
Back	Deletes character to the left of the cursor
Clear	Clears the entire field
Left	Moves cursor one character to the left
Right	Moves cursor one character to the right
OK	Submits the text entry in the field
Cancel	Cancels the text entry in the field and dismisses the virtual keypad

Touch Screen Calibration

Alignment of the local operator panel touch screen is calibrated at the factory. The factory settings are appropriate for most situations, and it is usually not necessary for you to make any adjustments. On rare occasions, however, the touch screen may come out of alignment or need adjustment.

To re-calibrate the touch screen, proceed as follows:

- If you have a Linux-based local operator panel, you can re-calibrate it yourself. See [“Re-calibrate the Local Operator Panel” on page 69](#) for detailed instructions.
- If you have a Windows-based local operator panel, contact your Oracle support representative. Windows-based local operator panels can be re-calibrated only by an authorized service representative.

If you have a Linux-based local operator panel, you can re-set the touch screen to its factory settings at any time. See [“Reset the Local Operator Panel Calibration” on page 72](#) for detailed instructions.

Web-launched SL Console

The Web-launched SL Console is a standard feature of the library. It enables the SL Console to be installed on a centralized Web server. Individual clients can then use a supported Web browser to download the Web-launched SL Console. Using the Web-launched SL Console you can connect to any library for which you have a valid user ID.

The Web-launched SL Console is delivered to clients as a Java Web Start process, which executes outside the browser.

Security Considerations

The Web-launched SL Console software is digitally signed, which guarantees that it 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 SL Console includes the security features provided by the Java 2 platform.

The customer is responsible for implementing all appropriate additional security systems, including firewalls, user access, etc.

Client Requirements

You can download the Web-launched SL Console to clients meeting the following requirements:

Platform	Solaris 9 – SPARC (Firefox 2.x) Solaris 10 – SPARC (Firefox 2.x) Windows 2000 – 32 bit (IE 5, IE 5.5, Firefox 2.x) Windows XP – 32 bit (IE 6, IE 7, Firefox 2.x) Windows Vista – 32 bit (IE 7, Firefox 2.x)
Other	<ul style="list-style-type: none">■ Java 1.5 Plug-in (the browser will install this automatically if it is not present already)■ Ethernet connection to the library■ Ethernet connection to the Web-launched SL Console server

Web-launched SL Console Updates

Updates to the Web-launched SL Console only need to be installed on the centralized Web server. Once the updates are installed on the server, they are downloaded automatically to all clients whenever the application is started on the client.

Starting the Web-launched SL Console on a Client

You can use either of the following methods to start and log in to the Web-launched SL Console on a client:

- From a command line (Solaris only) or supported browser. See [“Log in to the Web-launched SL Console Using a Browser or Command Line” on page 48](#).
- By double-clicking the `slc.jnlp` icon on your client. In order to use this method from a client, you must use the browser method at least once and save the `slc.jnlp` file locally. See [“Log in to the Web-launched SL Console Using an Icon” on page 53](#).

Standalone SL Console

The standalone SL Console is a standard feature of the StorageTek library. It enables you to run the SL Console application remotely from a PC or workstation that has a network connection to the library. Using the standalone SL Console you can connect to any library for which you have a valid user ID.

Security Considerations

The SL Console application interfaces with the primary library interface (PLI) over a security software layer (SSL). The SSL provides a secure communication path between the library and the customer's SL Console; sessionthis prevents an unauthorized network user from monitoring library activity.

Installation Requirements

You can install the standalone SL Console on a computer meeting the following requirements:

Platform	Solaris 9 – SPARC Solaris 10 – SPARC Windows 2003 Server – 32 bit Windows XP Client – 32 bit Windows Vista – 32 bit
Other	Ethernet connection to the library

The standalone SL Console software is available for download at the following Oracle Corporation sites:

User	Location Name	URL
Oracle Customers	Oracle Sun Download Center	http://www.sun.com/download/index.jsp
Oracle Partners and OEMs	Oracle Sun Partner Exchange	https://spe.sun.com/spx/control/Login

Note – You must have a valid login ID and password for the download site you are using. Contact your Oracle support representative for assistance.

Standalone SL Console Updates

Note – Before you can install a new version of the standalone SL Console, you must uninstall the previous version. See your PC or workstation documentation for detailed instructions. Running multiple versions of the SL Console on the same PC or workstation can cause problems such as inconsistent data on reports.

Once you have uninstalled the previous version of the SL Console, see the following procedures for detailed instructions on upgrading the software.

- [“Download the Standalone SL Console Installer” on page 74](#)
- [“Install the Standalone SL Console” on page 75](#)

SL Console Task Summary

SL Console tasks are divided into the following categories:

- [“General SL Console Usage Tasks” on page 46](#)
- [“General SL Console Report Tasks” on page 61](#)
- [“Local Operator Panel Calibration Tasks” on page 68](#)
- [“Standalone SL Console Installation Tasks” on page 73](#)

General SL Console Usage Tasks

Task	Page
Log in to the Local Operator Panel	47
Log in to the Web-launched SL Console Using a Browser or Command Line	48
Log in to the Web-launched SL Console Using an Icon	53
Log in to the Standalone SL Console	57
Log Off the SL Console	59
Change a User Password	60

▼ Log in to the Local Operator Panel

Use this procedure to log in to the local library.

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

1. If the touch screen panel is blank, touch the screen anywhere to activate the Login screen.
2. Use the virtual keypad to enter your login information (see [“Virtual Keypad” on page 39](#) for details).

User ID: *SLC_login*

Password: *password*

where:

- *SLC_login* is the SL Console user ID.
- *password* is the password assigned to this user ID.

Note – The user ID you use determines the screens you can access. See [“SL Console Security” on page 32](#).

3. Click **Log on**.

▼ Log in to the Web-launched SL Console Using a Browser or Command Line

Note – Before you perform this activity, you must obtain the DNS alias or IP address of the SL Console server. Depending on how your Web-launched SL Console server has been set up, it may be accessible only by IP address. See your library administrator for assistance.

Note – The command line option is available on Solaris platforms only.

On Windows 2000, you may need to install a Java plugin for your Web browser before performing this procedure. You can download the plugin from the following location: http://java.sun.com/products/archive/j2se/5.0_04/index.html

On Solaris platforms, it is easier to log in to the Web-launched SL Console using the command line. If you prefer to log in using a Web browser, however, you need to download a recent version of the Firefox Web browser from the following location: www.mozilla.com

1. Choose your login method:

- Command line – available on Solaris only. Proceed to [Step 2](#).
- Web browser – available on either Windows or Solaris. Proceed to [Step 3](#).

2. Open a terminal window, and type the following command:

```
javaws http://server_ID:port_ID/opel/slc.jnlp
```

where:

- *server_ID* is either of the following:
 - IP address of the SL Console server (in *nnn.nnn.nnn.nnn* format)
 - DNS alias of the SL Console server
- *port_ID* is the port ID of the SL Console application, typically 8080
- *opel* is the name (context root) of the Web-launched SL Console application on the server.

Proceed to [Step 4](#).

3. Start a supported Web browser on your client PC or workstation (see “[Client Requirements](#)” on [page 41](#) for a list of supported browsers), and in the Location Bar or Address field, enter the URL of the SL Console Web Start application:

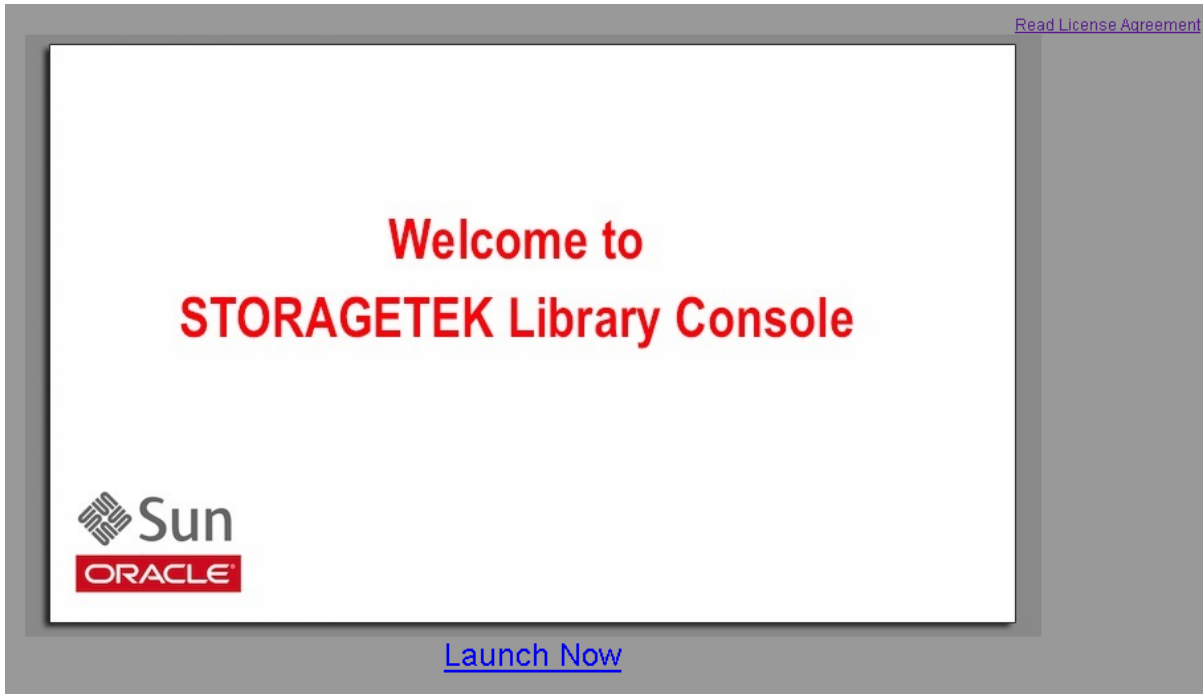
```
http://server_ID:port_ID/opel
```

where:

- *server_ID* is either of the following:
 - IP address of the SL Console server (in *nnn.nnn.nnn.nnn* format)
 - DNS alias of the SL Console server
- *port_ID* is the port ID of the SL Console application; typically 8080
- *opel* is the name (context root) of the Web-launched SL Console application on the server.

Note – You can bookmark this URL for future logins.

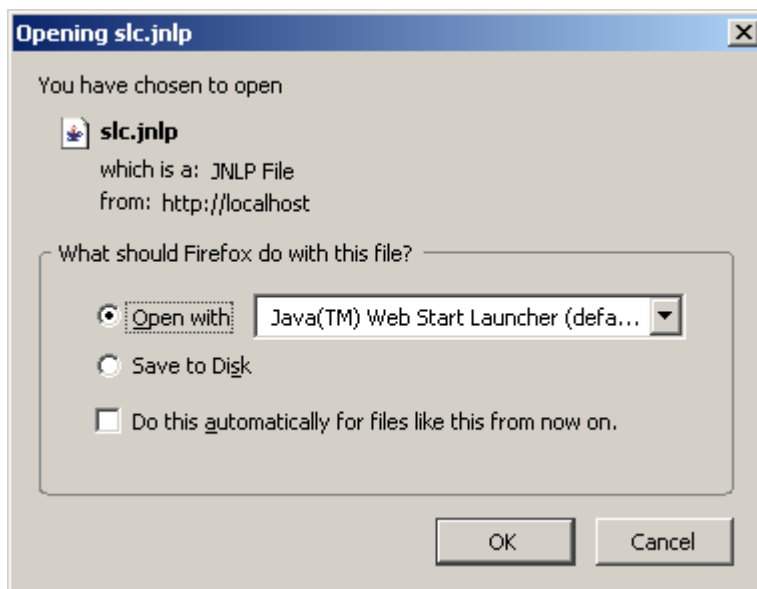
The **SL Console Launch** screen appears.



4. Click Launch Now.

The Web Start process retrieves the Web-launched SL Console application from the server. Any updates are downloaded automatically.

The **Opening slc.jnlp** popup appears.



5. Complete the popup as follows:

- a. Specify the action you want to take with the `slc.jnlp` file:
 - Click the **Open with Java(TM) Web Start Launcher** radio button if you want to start the SL Console directly.
 - Click the **Save to Disk** radio button if you want to save the `slc.jnlp` file to your client and log in to the SL Console later. See [“Log in to the Web-launched SL Console Using an Icon”](#) on page 53 for login instructions.
- b. Optionally click the **“Do this automatically for files like this from now on”** checkbox. If you make this selection, this popup will not appear during future logins.
- c. Click **OK**.

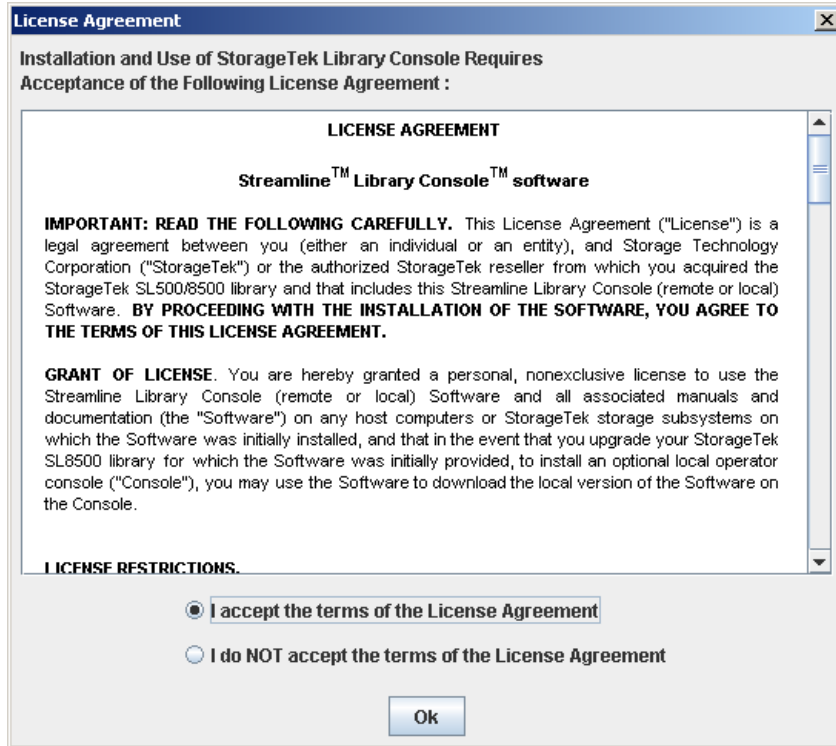
If this is the first time you are running the Web-launched SL Console, a digital signature warning popup appears.



6. Complete the popup as follows:
 - a. Verify the Publisher.
 - b. Optionally click the **“Always trust content from the publisher”** checkbox. If you make this selection, this popup will not appear during future logins.

c. Click Run.

If this is the first time you are running the Web-launched SL Console, the **License Agreement** popup appears.



7. Scroll down to read the complete license agreement. Click, "I accept the terms of the License Agreement", and then click OK.

The SL Console Login screen appears.



The screenshot shows the login interface for the Sun ORACLE STORAGE TEK LIBRARY CONSOLE. At the top left is the Sun ORACLE logo. To its right, the text 'STORAGE TEK LIBRARY CONSOLE' is displayed. Below the logo and text are three input fields: 'User ID', 'Password', and 'Library'. The 'Library' field is a dropdown menu. Below the input fields are four buttons: 'Log on', 'Help', 'About', and 'Exit'.

8. Enter your login information, and click Log on.

User ID: *SLC_login*

Password: *password*

Library: *library_ID*

where:

- *SLC_login* is the SL Console user ID.
- *password* is the password assigned to this user ID.
- *library_ID* is the library to which you want to connect, expressed in either of the following ways:
 - IP address of the library, in dotted decimal notation (*nnn.nnn.nnn.nnn*)
 - DNS alias of the library

Note – The user ID you use determines the screens you can access. See ["SL Console Security"](#) on page 32.

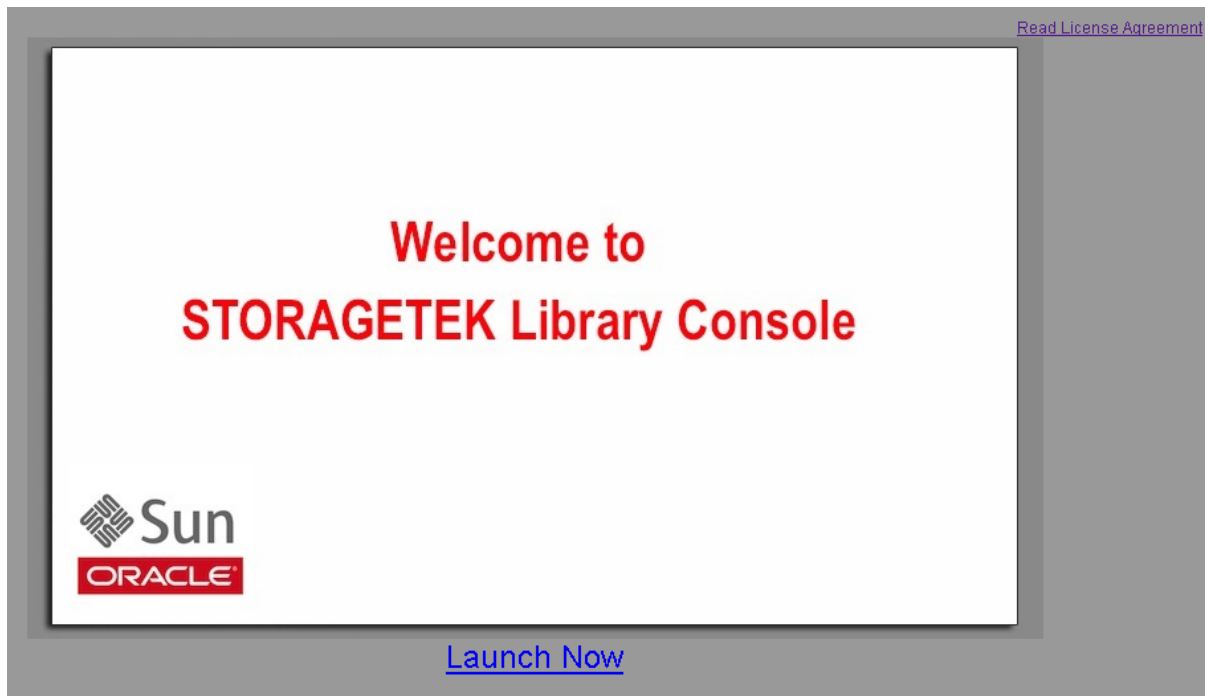
▼ Log in to the Web-launched SL Console Using an Icon

Note – In order to perform this activity, you must first save the Web-launched SL Console `slc.jnlp` file to your client. See [“Log in to the Web-launched SL Console Using a Browser or Command Line”](#) on page 48 for details.

1. **Double-click the `slc.jnlp` desktop icon on your client.**

The Web Start process retrieves the Web-launched SL Console application from the server. Any updates are downloaded automatically.

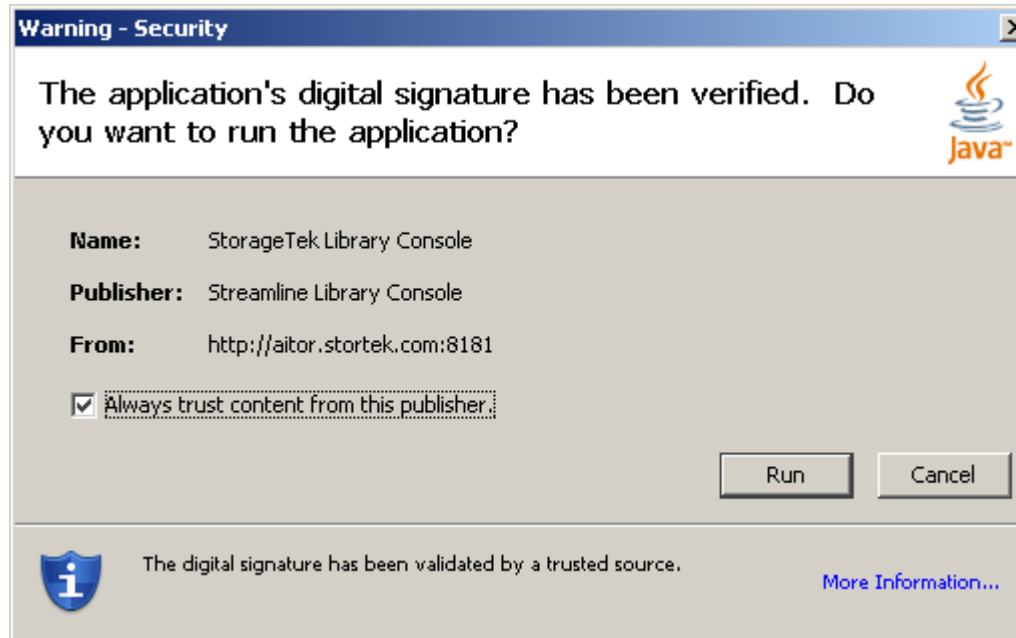
The **SL Console Launch** screen appears.



2. Click Launch Now.

The Web Start process retrieves the Web-launched SL Console application from the server. Any updates are downloaded automatically.

If this is the first time you are running the Web-launched SL Console, a security warning popup appears.

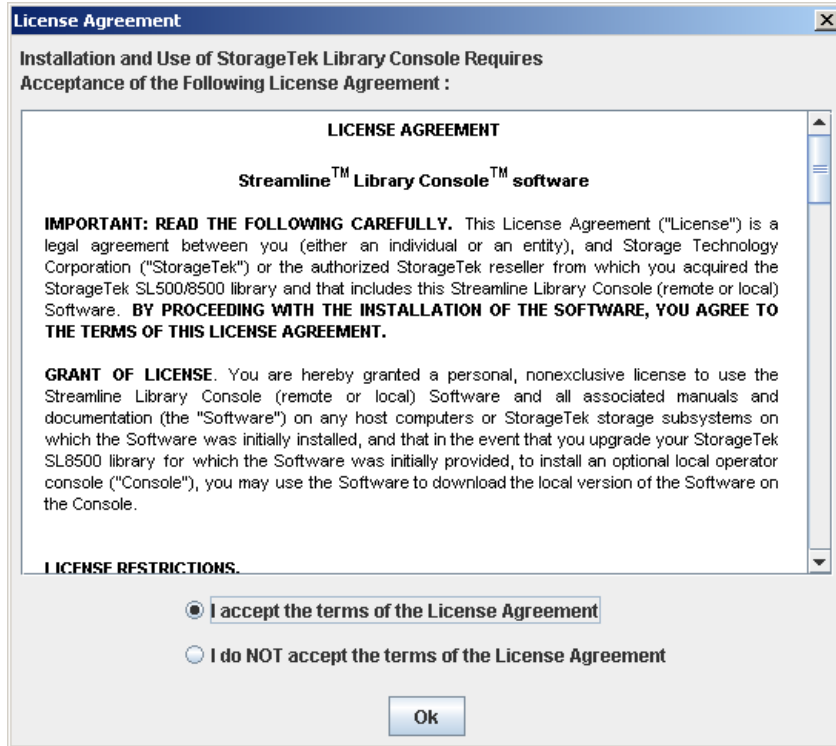


3. Complete the popup as follows:

- a. Verify that the Publisher is Oracle Corporation
- b. Optionally click the "Always trust content from the publisher" checkbox. If you make this selection, this popup will not appear during future logins.

c. Click Run.

If this is the first time you are running the Web-launched SL Console, the **License Agreement** popup appears.



4. Scroll down to read the complete license agreement. Click, "I accept the terms of the License Agreement", and then click OK.

The SL Console Login screen appears.



The screenshot shows the login interface for the Sun ORACLE STORAGE TEK LIBRARY CONSOLE. At the top left is the Sun logo with 'ORACLE' below it. To the right, it says 'STORAGE TEK LIBRARY CONSOLE'. Below the logos are three input fields: 'User ID', 'Password', and 'Library'. The 'Library' field is a dropdown menu. At the bottom, there are four buttons: 'Log on', 'Help', 'About', and 'Exit'.

5. Enter your login information, and click Log on.

User ID: *SLC_login*

Password: *password*

Library: *library_ID*

where:

- *SLC_login* is the SL Console user ID.
- *password* is the password assigned to this user ID.
- *library_ID* is the library to which you want to connect, expressed in either of the following ways:
 - IP address of the library, in dotted decimal notation (*nnn.nnn.nnn.nnn*)
 - DNS alias of the library

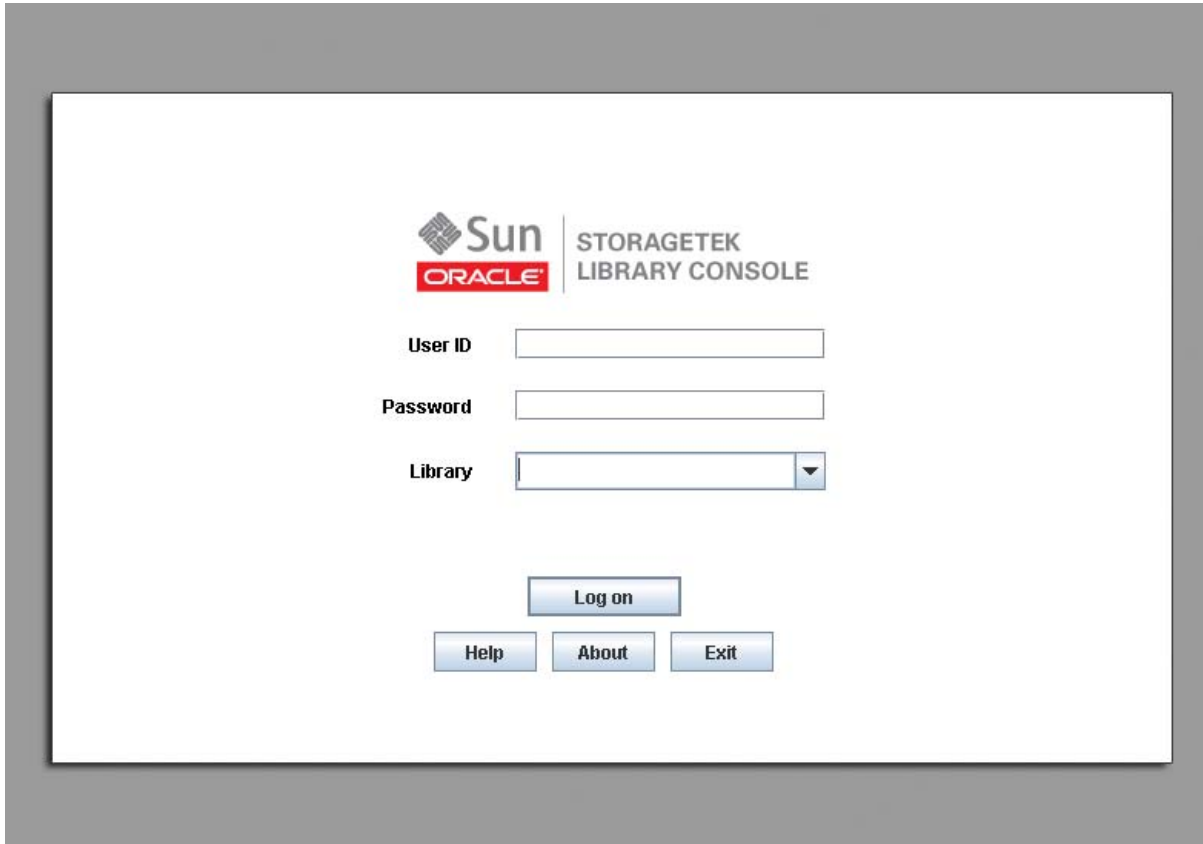
Note – The user ID you use determines the screens you can access. See ["SL Console Security"](#) on page 32.

▼ Log in to the Standalone SL Console

1. Start the SL Console application on your PC or workstation by doing either of the following:

- Double-click the **SL Console** icon on the desktop.
- Select **Start > RunSLConsole** or **Launch > RunSLConsole**

The SL Console starts and the **Login** screen appears.



2. Enter your login information.

User ID: *SLC_login*

Password: *password*

Library: *library_ID*

where:

- *SLC_login* is the SL Console user ID.
- *password* is the password assigned to this user ID.
- *library_ID* is the library to which you want to connect, expressed in either of the following ways:
 - IP address of the library, in dotted decimal notation (*nnn.nnn.nnn.nnn*)
 - DNS alias of the library

Note – The user ID you use determines the screens you can access. See [“SL Console Security” on page 32](#).

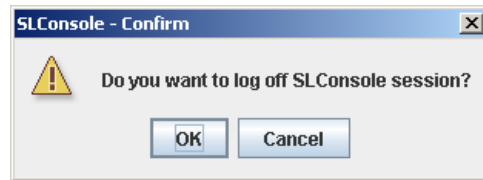
3. Click Log on.

▼ Log Off the SL Console

Note – Before you log off, make sure all operations for the current SL Console session have completed (for example, code loads, audits, diagnostic moves).

1. From any SL Console screen, select **Tools > Log Off**.

The **Confirm** popup appears.



Note – To remain logged in to the SL Console, click **Cancel**. You are returned to the originating screen without logging off.

2. Click **OK**.

You are logged off the SL Console, and the **Login** screen appears.



3. Click **Exit** to close the SL Console.

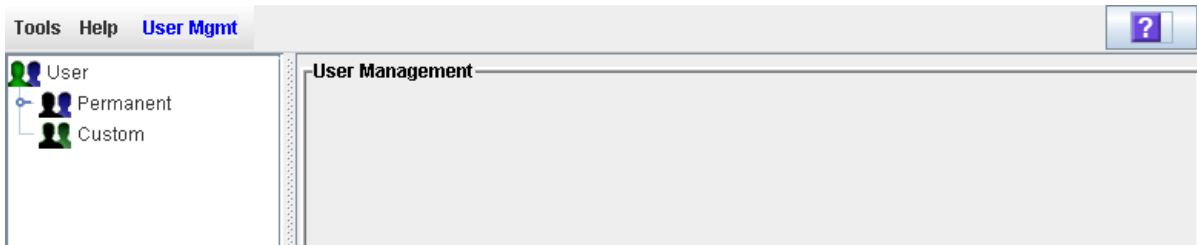
▼ Change a User Password

Use this procedure to change the password for a user account.

1. Log in to the SL Console using any of the modes available to you (local operator panel, Web-launched SL Console, or standalone SL Console). You must log in using the user account you want to modify.

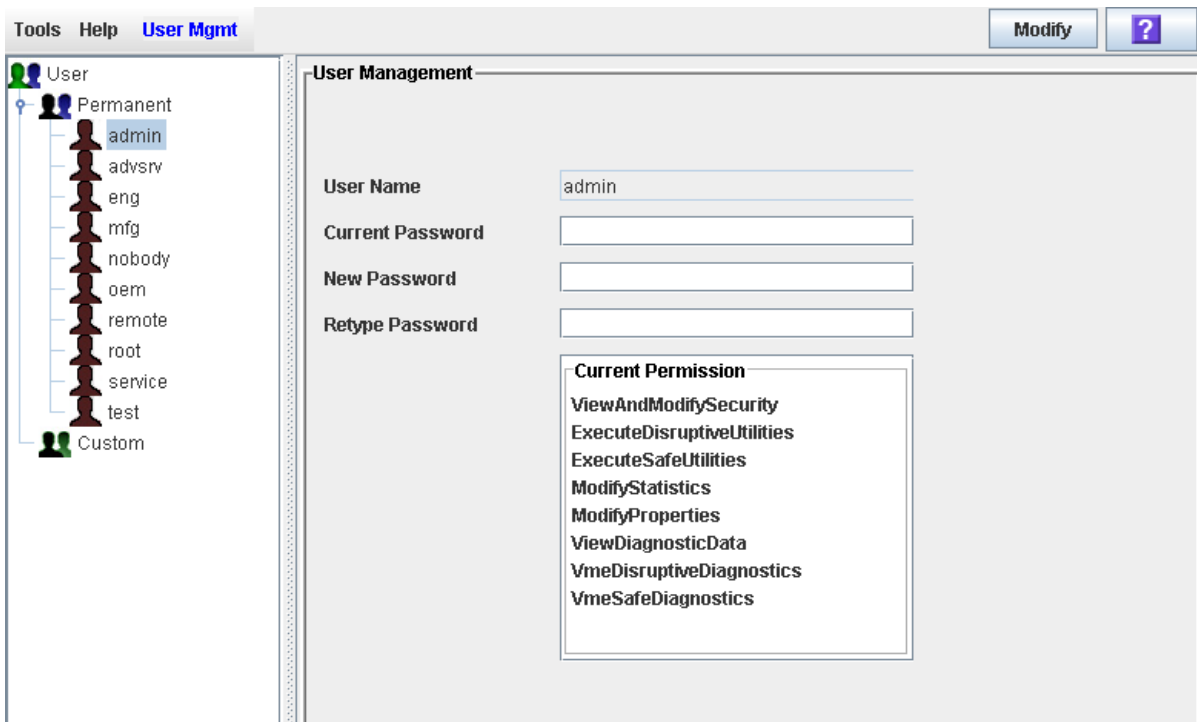
2. Select Tools > User Mgmt.

The User Management screen appears.



3. On the User tree, expand the Permanent folder, and click the user account you want to modify (the user account you are logged in as).

Detailed information for the user account is displayed.



4. Complete the following fields: Current Password, New Password, and Retype Password.

5. Click Modify.

The password for the account is updated.

General SL Console Report Tasks

Task	Page
Display a Library Report	62
Search a Library Report	64
Save Library Report Data to a File	66

▼ Display a Library Report

Use this procedure to display library reports available from the **Tools > Reports** menu.

Note – All report output is a static display of information sent from the library controller at the time the report is generated. The SL Console does not update the information dynamically unless you explicitly select the **Update** button on the Options Bar.

If you want to search the report data or save it to a file, see the following procedures:

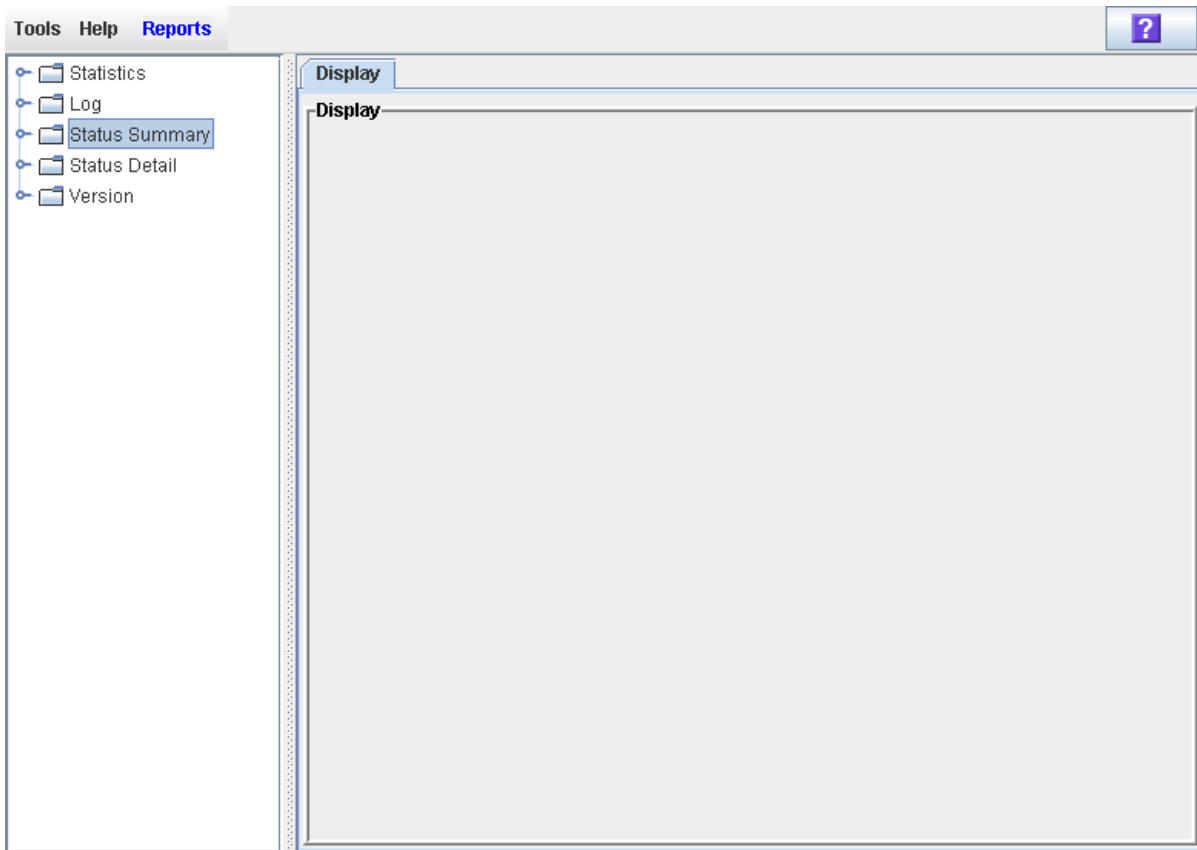
- [“Search a Library Report” on page 64](#)
- [“Save Library Report Data to a File” on page 66](#)

Additional reports are available from the following menus:

- **Tools > Partitions**

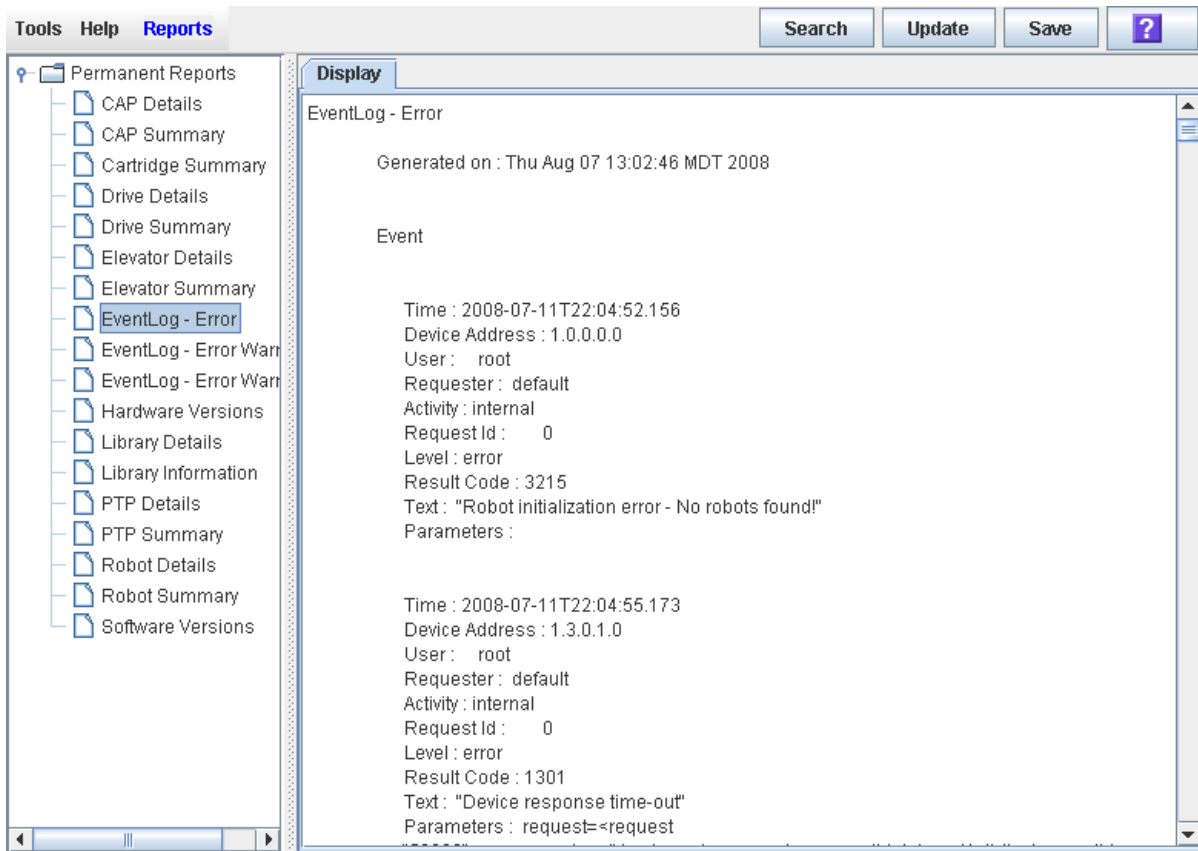
1. Select **Tools > Reports**.

The reports **Display** screen appears. All library report options are listed in the navigation bar.



2. Click the report you want to display.

The selected report is displayed.

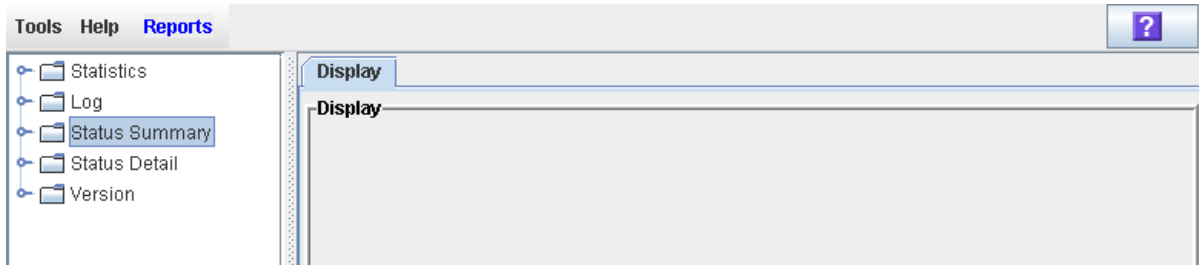


▼ Search a Library Report

Use this procedure to search a library report for a specified text string. This procedure can be performed on any of the library report screens.

1. Select Tools > Reports.

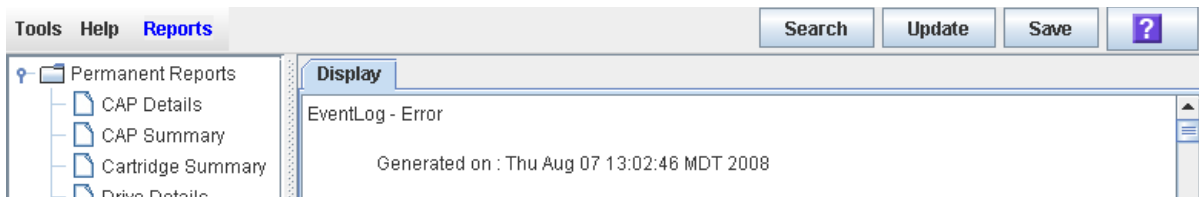
The reports **Display** screen appears. All library report options are listed in the navigation bar.



2. In the navigation bar, expand a report category to see the report options.

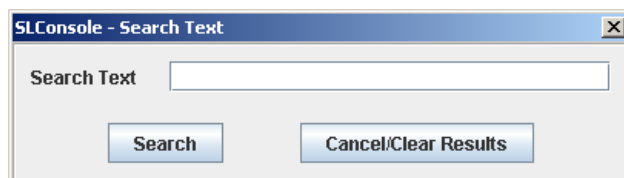
3. Click the report you want to display.

The specified report is displayed. All report screens include the **Search** button on the Options Bar.



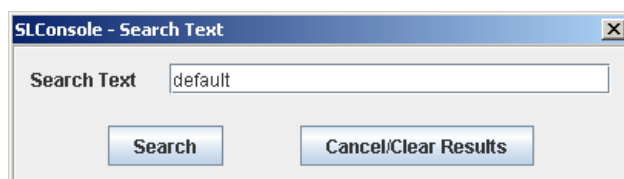
4. Click Search.

The **Search Text** popup appears.

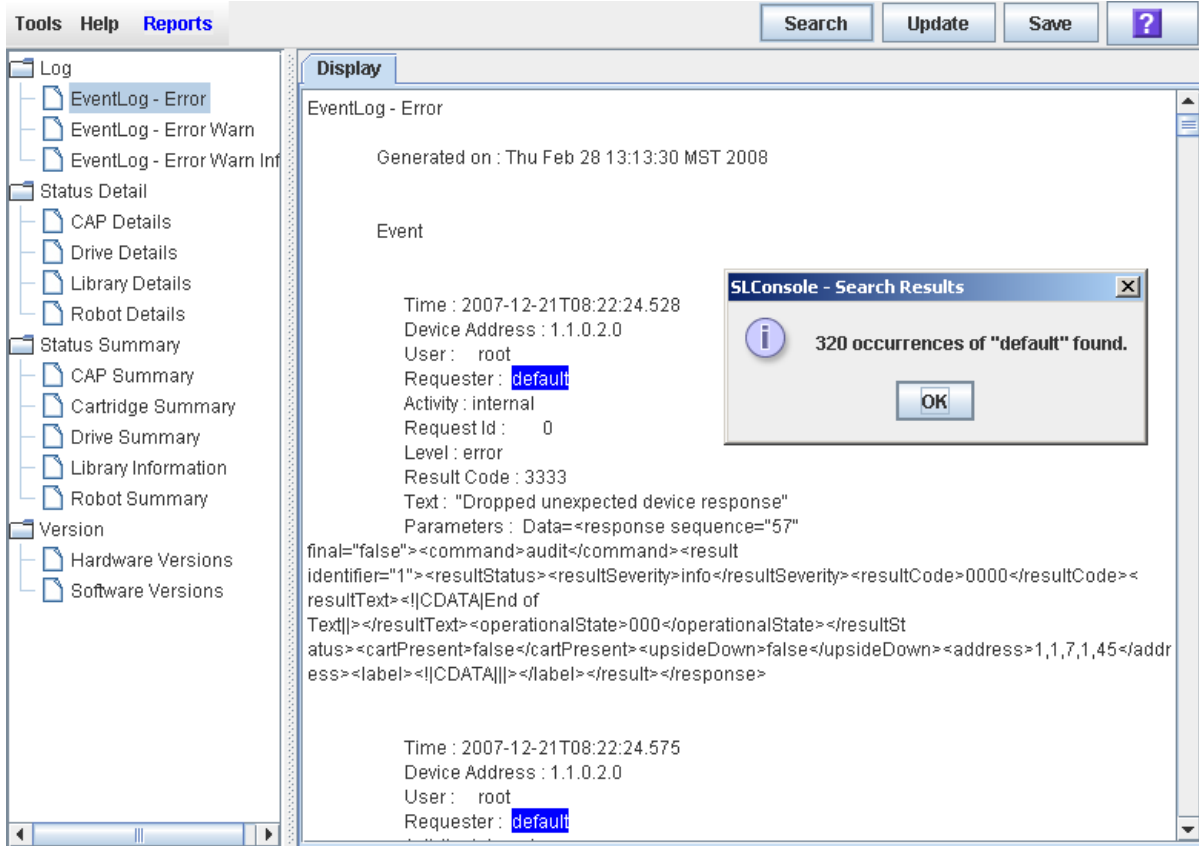


5. Enter the text string you want to search for, and click Search.

Note – The search is case-sensitive, and wildcards are not supported.



6. The Search Results popup appears, displaying the number of occurrences of the text string. All instances of the text string in the report are highlighted.



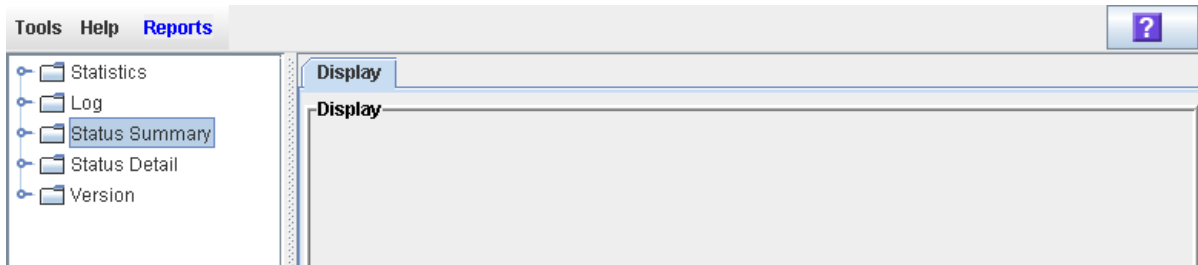
7. Click OK to dismiss the popup.

▼ Save Library Report Data to a File

Use this procedure to display a library report and save the data to a file. Depending on the report, you can save to in text (.txt), HTML, XML format. This procedure can be performed from any of the library report screens.

1. Once the file is saved, you can print it or include it in e-mail. This may be useful for communicating about library issues with your Oracle support representative. **Select Tools > Reports.**

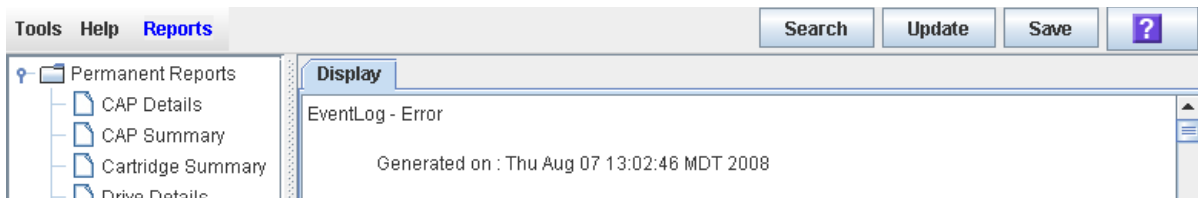
The reports **Display** screen appears. All library report options are listed in the navigation bar.



2. In the navigation bar, expand a report category to see the report options.

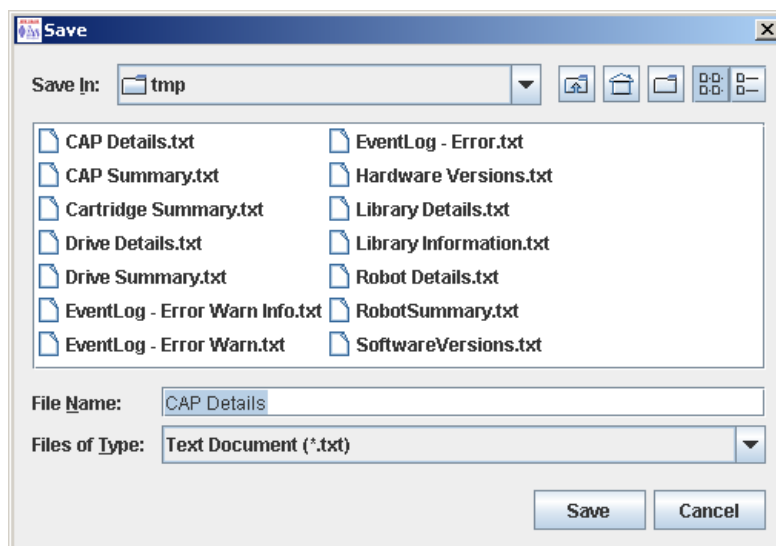
3. Click the report you want to display.

The specified report is displayed. All report screens include the **Save** button on the Options Bar.



4. Click Save.

The **Save** popup appears.



5. Browse to the directory where you want to save the file. In the File Name field, you can accept the default entry or enter a different file name.
6. In the Files of Type pull-down, select the format in which you want to save the data (HTML, Text, XML).
7. Click Save.

The data is saved to the specified file.

Note – If the file exists already, a popup appears prompting you whether you want to replace the file.

Local Operator Panel Calibration Tasks

Task	Page
Re-calibrate the Local Operator Panel	69
Reset the Local Operator Panel Calibration	72

▼ Re-calibrate the Local Operator Panel

Use this procedure to change the alignment of the local operator panel touch screen. The touch screen comes pre-calibrated from the factory, and in most cases no adjustment is necessary. Typically, you would use this procedure only if the touch screen has come out of alignment.

Note – This procedure can be performed only at a Linux-based local operator panel. To re-calibrate a Windows-based local operator panel, contact your Oracle support representative.

Note – Before beginning this procedure, make sure there is no debris on the touch screen, as this can interfere with an accurate calibration.

Note – You can re-set the touch screen to its factory settings at any time. See [“Reset the Local Operator Panel Calibration” on page 72](#) for detailed instructions.

1. **Log in to the local operator panel.**

See [“Log in to the Local Operator Panel” on page 47](#) for detailed instructions.

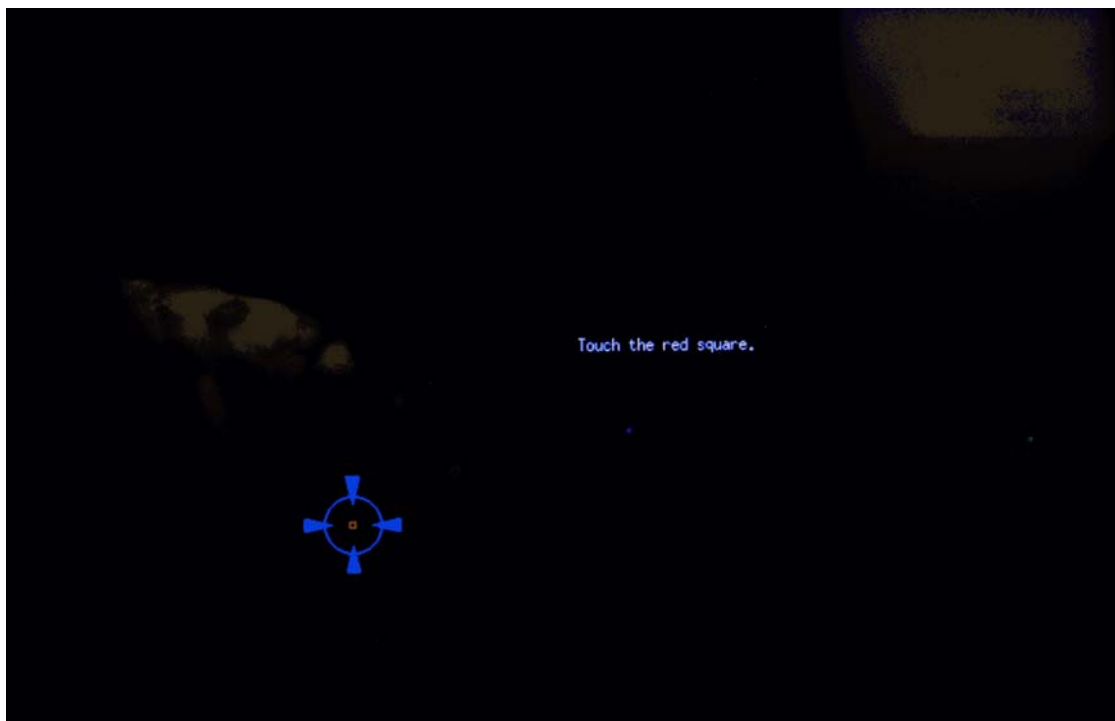
2. **Select Tools > Calibrate.**

The **Select Calibration Option** popup appears.



3. **Click Calibrate.**

The alignment sequence begins. Ten targets are presented sequentially on the screen.



4. **Gently tap in the center of each target with your finger or a pointing stylus.**

This aligns the screen according to your touch. Be sure to touch the center of each target so you can get an accurate calibration.

Note – If you tap outside of a target, you can potentially mis-align your touch screen. Depending on the severity of the mis-alignment, you may have trouble logging back into the local operator panel if you save these new settings. See [Step 7](#) for instructions on discarding settings.

After you touch the last target of the alignment sequence, the first of two **Accept Calibration** popups appears, with a **Click Me** button on the left side of the popup.



5. **Proceed as follows with the agility test, depending on whether the new alignment settings are good:**

- To save the new alignment settings, proceed to [Step 6](#).
- To discard the new settings, proceed to [Step 7](#).

6. **Use the following steps to save the new settings.**

- a. **On the Accept Calibration popup, touch the Click Me button within the indicated time period.**

- If the button depresses when you touch it directly, the touch screen is properly aligned. The second **Accept Calibration** popup appears, this time with a **Click Me** button on the right side of the popup.



- If the button does not depress when you touch it directly, the touch screen is not properly aligned and you should discard the new settings. Proceed to [Step 7](#).
- b. **On the second Accept Calibration screen, touch the Click Me button within the indicated time period.**

If you depress the button successfully, the alignment settings are saved and the **Calibration Accepted** popup appears.



- c. **Click OK to dismiss the popup and save the new settings.**

The new settings are effective immediately, and the display returns to the SL Console screen. The local operator panel is not rebooted.

7. **Use the following steps to discard the new settings.**

- a. **On either Accept Calibration popup, let the timer run out without touching the Click Me button.**

The **Retry Calibration** countdown message appears.



- b. **The calibration sequence screen is presented again. Return to [Step 4](#) to try the calibration a second time.**

If you are not able to successfully calibrate the screen on the second try, the local operator panel is rebooted automatically, and the alignment is restored to the previously saved settings.

▼ Reset the Local Operator Panel Calibration

Use this procedure to restore the alignment of the local operator panel touch screen to the factory settings. This procedure forces a reboot of the local operator panel, which takes several minutes.

Note – This procedure is available only for a Linux-based local operator panel. To reset the calibration of a Windows-based local operator panel, contact your Oracle support representative.

1. **Log in to the local operator panel.**

See [“Log in to the Local Operator Panel”](#) on page 47 for detailed instructions.

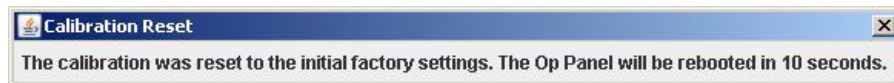
2. **Select Tools > Calibrate.**

The **Select Calibration Option** popup appears.



3. **Click Reset Calibration.**

The current touch screen calibration settings are discarded, and the alignment is restored to the factory settings. The **Calibration Reset** countdown message is displayed.



The local operator panel is rebooted automatically, and the display returns to the SL Console screen.

Note – The reboot takes several minutes.

Standalone SL Console Installation Tasks

Task	Page
Download the Standalone SL Console Installer	74
Install the Standalone SL Console	75

▼ Download the Standalone SL Console Installer

Use this procedure to download the standalone SL Console installer program from the Oracle download site, and initiate it on your PC or workstation.

Note – Your Oracle CSE may have performed this procedure for you during library installation.

Note – You must have a valid login ID and password for the download site you are using. Contact your Oracle support representative for assistance.

1. Start a Web browser on your PC or workstation.
2. In the Address or Location Bar, enter the URL of the appropriate Oracle download site. See [“Installation Requirements”](#) on page 43 for details.
3. Log in to the Oracle download site using your assigned login ID and password.
4. Navigate to the standalone SL Console installer file.
5. Select the SL Console code level you want.
6. Select the appropriate installer file for your platform:
 - Microsoft Windows: SLConsole_Windows.exe
 - Oracle Sun Solaris: SLConsole_Solaris.bin
7. Save the file to your PC or workstation.

Note – To complete the installation, see [“Install the Standalone SL Console”](#) on page 75.

▼ Install the Standalone SL Console

Use this procedure to install the standalone SL Console on your PC or workstation.

Note – Your Oracle CSE may have performed this procedure for you during library installation.

Note – Prior to using this procedure, you must have downloaded the standalone SL Console installer program. See [“Download the Standalone SL Console Installer”](#) on page 74.

1. **Double-click the SL Console installer file icon on your PC or workstation to start the installation.**

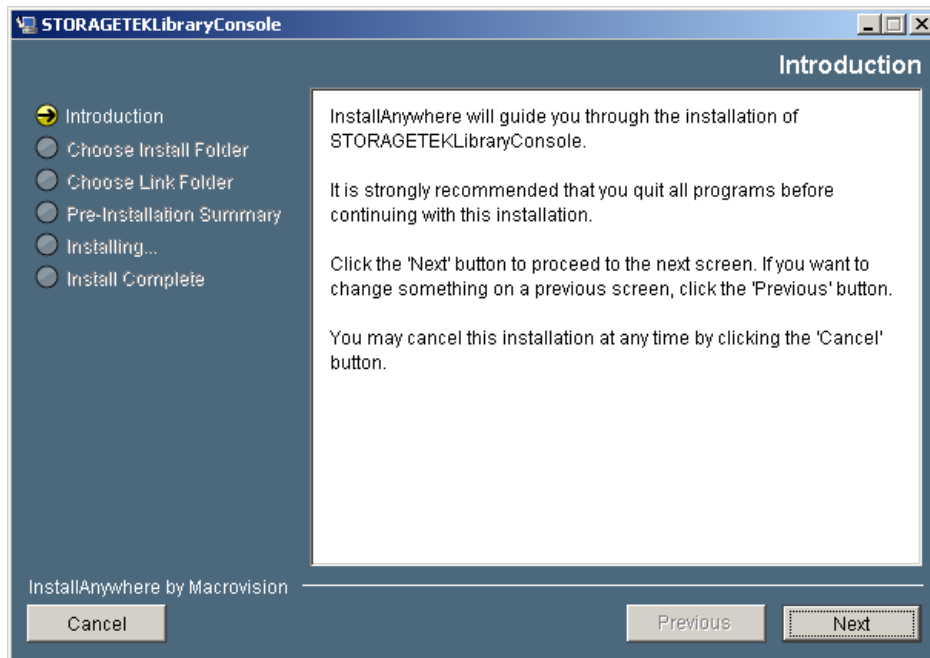
A digital signature warning popup appears.



2. **Verify the name of the file and click Run.**

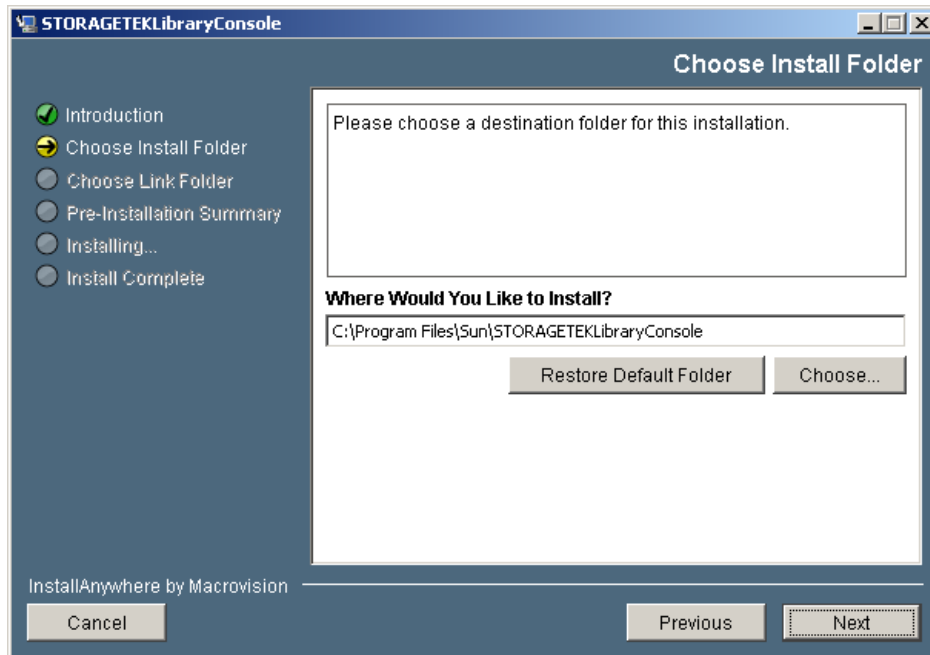
The installation wizard begins and the **Introduction** screen appears.

Note – At any time during the installation wizard, you can click **Cancel** to cancel the installation or **Previous** to return to the previous screen and re-enter information.



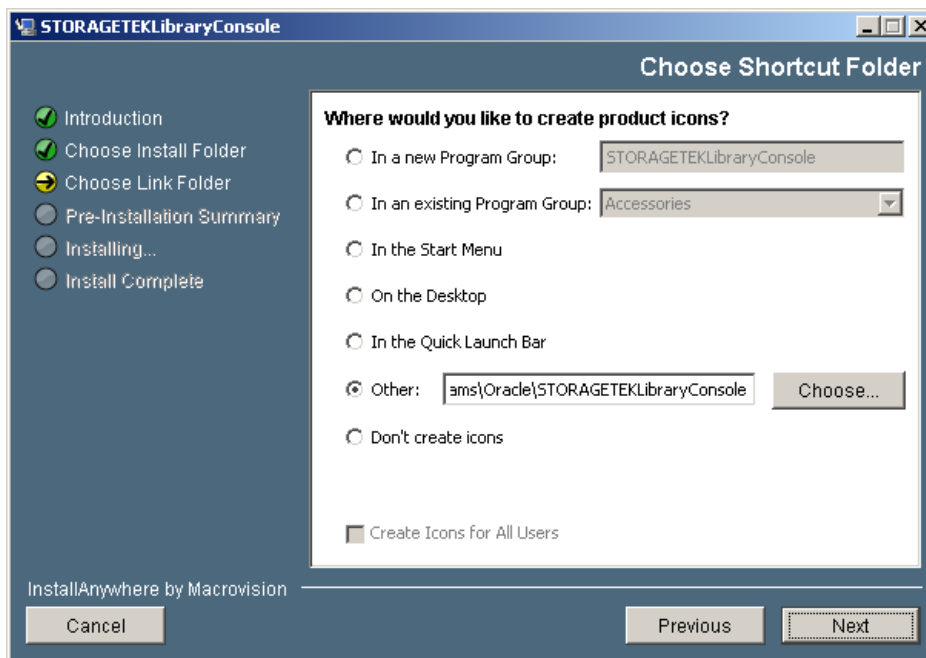
3. Review the information, and click Next.

The **Choose Install Folder** screen appears.



- Specify where you want to install the SL Console program. You can accept the default location displayed, or you can click Choose to browse to a different directory. Click Next to continue.

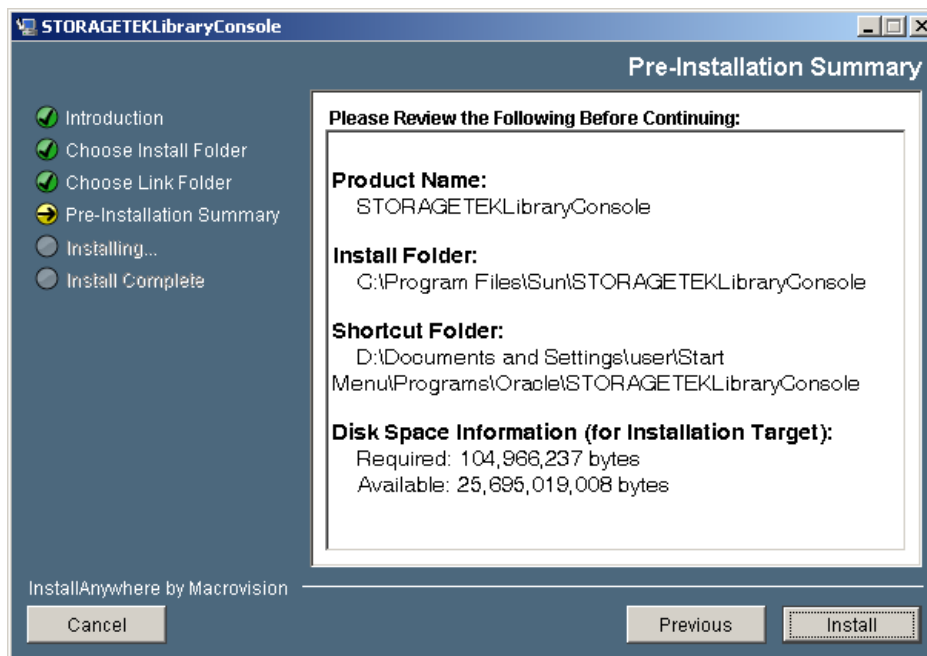
The **Choose Shortcut Folder** screen appears.



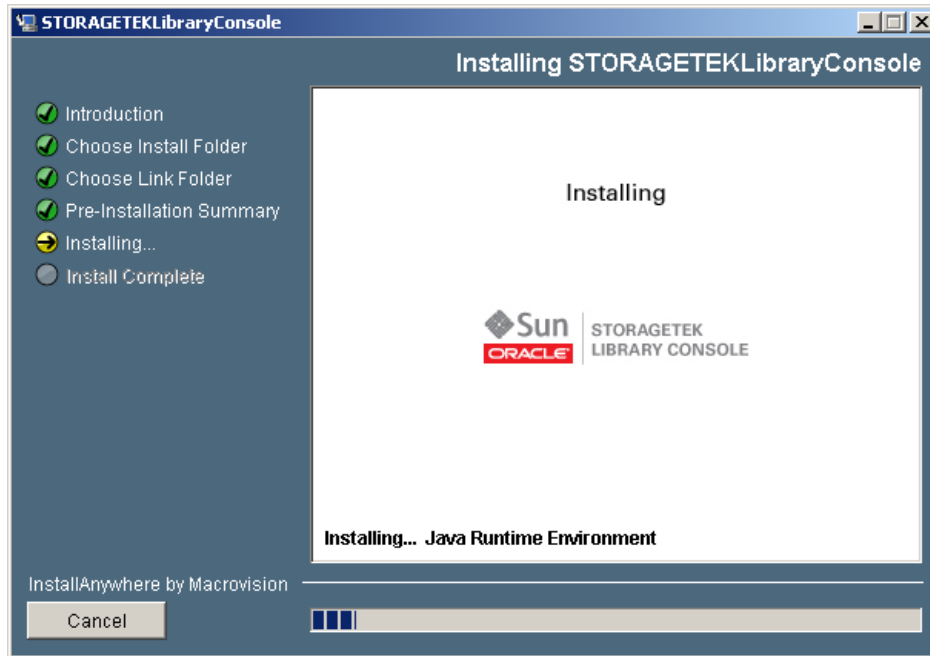
- Enter the location where you want to create the SL Console shortcut icons. You can accept the default location displayed, or you can click one of the other choices listed and specify a different location. Click Next to continue.

Note – On Solaris, the default location for shortcuts is the user’s home directory. However, shortcuts cannot be created in /, which is the root user’s home, so if you are installing on a Solaris platform as root you must choose something other than the default location. In this case, it is recommended that you choose /usr/bin or a similar location.

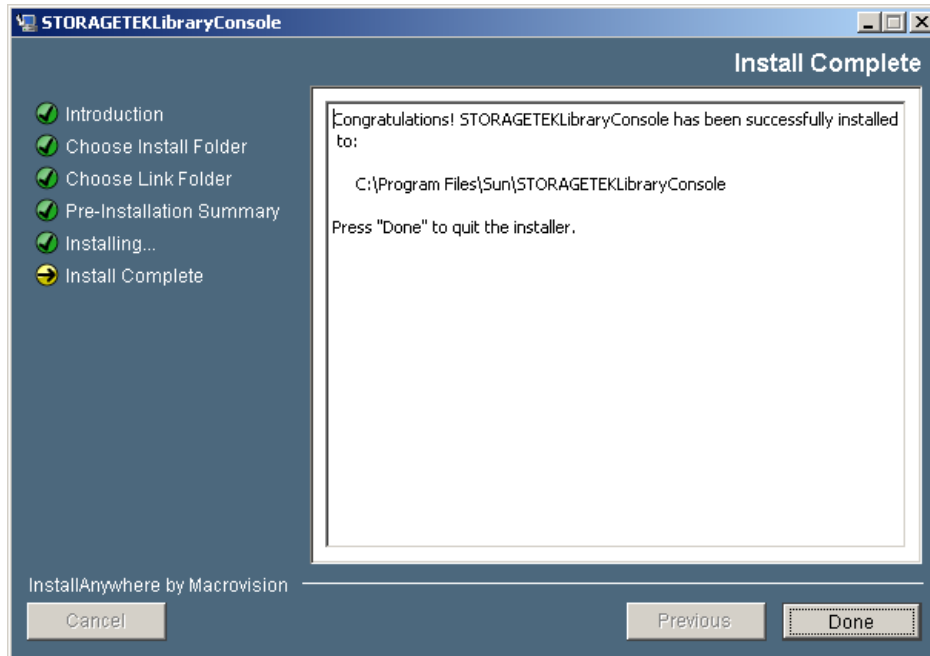
The **Pre-Installation Summary** screen appears.



6. Review the information and verify that it is all correct. Click Install to continue. The installation begins, and the **Installing SL Console** screen appears.



7. When the installation finishes, the **Install Complete** screen appears.



8. Review the information and click Done to exit the installation program.

Hardware Activation Files

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

Your Oracle support representative can activate selected optional features on your SL8500 library by installing a hardware activation file. The hardware activation file is installed on the target library through the command line interface (CLI).

The hardware activation file is a digitally signed Java Archive (.jar) file containing one or more activation keys for features you have purchased. All activated SL8500 features you have purchased for a library are included in a single hardware activation file.

In order to ensure that features are activated on the correct library, the hardware activation file includes the serial number of the target library and can only be installed on that library.

SL8500 activation keys currently do not expire.

Hardware Activation File Tasks

This section provides detailed instructions for all tasks involved in installing and managing hardware activation files for library features.

Hardware Activation File Installation Process

Following is a summary of the hardware activation file installation process.

1. You purchase one or more features for a specific Oracle StorageTek library from Oracle Corporation
2. Your Oracle support representative installs the hardware activation file and any necessary hardware on the target library.
3. You can use the SL Console to display and verify the features on the target library.
4. See the following topics for detailed information about implementing specific activated features:
 - [“Library Partitions” on page 87](#)
 - [“Redundant Electronics Management” on page 125](#)

Hardware Activation File Task Summary

Note – You can perform these tasks from the standalone SL Console or Web-launched SL Console only. They are not available at the local operator panel.

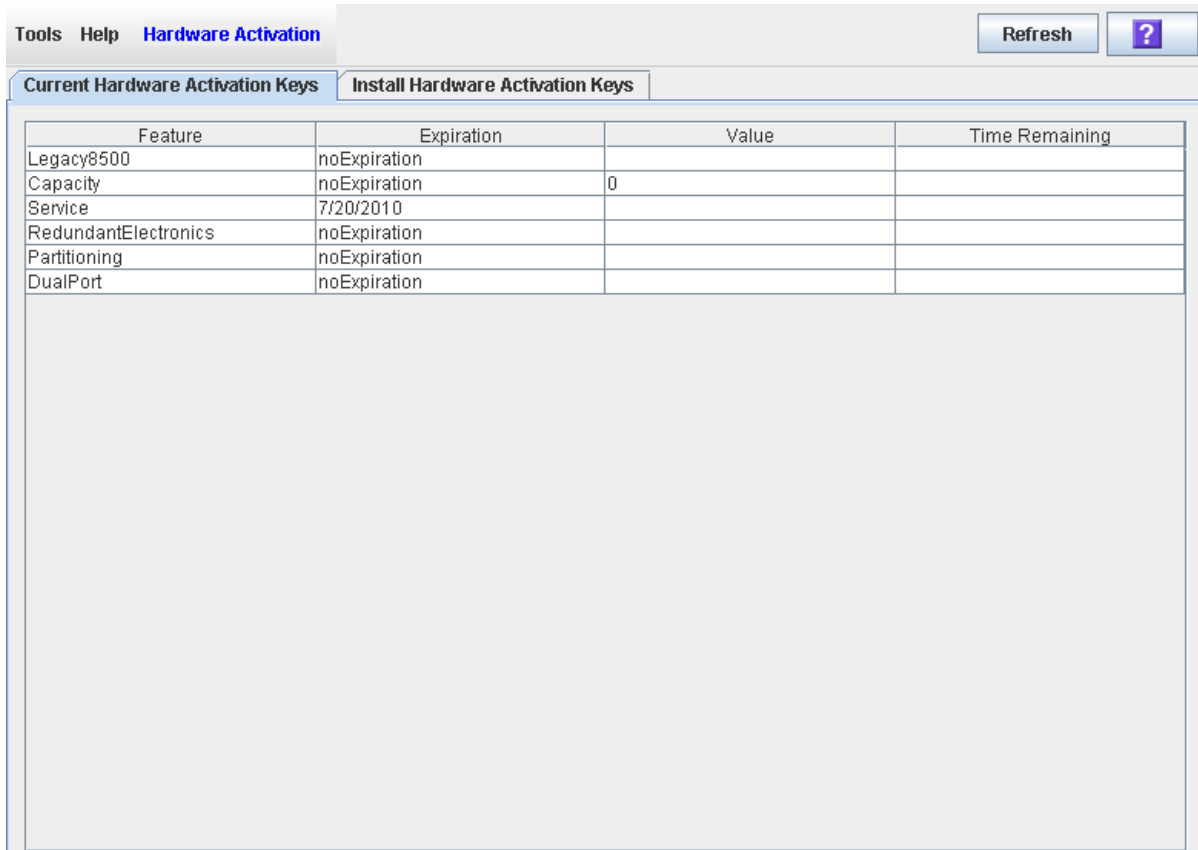
Task	Page
Display Current Hardware Activation File	84

▼ Display Current Hardware Activation File

Use this procedure to display the features currently activated on the library you are logged in to.

1. **Select Tools > Hardware Activation, and click the Current Hardware Activation Keys tab.**

The **Current Activation Keys** screen appears, listing the currently activated features.



Feature	Expiration	Value	Time Remaining
Legacy8500	noExpiration		
Capacity	noExpiration	0	
Service	7/20/2010		
RedundantElectronics	noExpiration		
Partitioning	noExpiration		
DualPort	noExpiration		

Screen Fields

Feature

Name of the feature activated on the library.

Expiration

Number of days until the feature is due to expire or has expired. If there is no expiration date, the field displays "noExpiration."

Value

Qualification for the feature, if applicable. For example, for the Capacity feature, this field displays the total capacity the activation file provides. Depending on the feature, the field may be blank or indicate "None".

Time Remaining

Amount of time remaining until the expiration of the feature. If there is no expiration date, the field is blank.

Buttons

Click to reboot the library.

Refresh

Click to refresh the display with current data from the library controller database.

? (Help)

Click to display online help for the screen.

Library Partitions

Note – Library partitioning is an optional feature which must be enabled by your Sun service representative. This feature is available starting with SL8500 firmware version 3.7x and SL Console version 3.25. See [“System Requirements for Library Partitioning” on page 88](#) for complete details.

Library partitioning allows SL8500 rails (LSMs) to be partitioned for exclusive use by separate hosts. For example, you can configure some rails to be used only by an HSC host and others to be used only by an ACSLS host. This allows you to configure an SL8500 library for applications running on multiple operating systems.

Following are important features and restrictions of library partitioning.

Partition Features and Restrictions

Only a single library can be partitioned. All pass-thru ports (PTPs) must be disabled before partitioning can be enabled. A library complex with functional PTPs cannot be partitioned (see [“Library Complex” on page 19](#) for details about library complexes).

The smallest unit of measure for a partition is a rail, and a partition can consist of one to four rails. Rails in the partition must be adjacent – for example, a partition can consist of rails 1, 2, and 3, or rails 2 and 3, but not rails 1 and 3 only.

Each rail can be assigned to only one partition.

System Requirements for Library Partitioning

Note – Library partitioning is an optional feature which must be enabled by your Sun service representative.

Following are minimum system requirements for library partitioning:

- SL8500 firmware version 3.7x
- StorageTek Library Console version 3.25
- ACSLS version 7.1/7.1.1 with PUT 0701 (Solaris on SPARC)
- ACSLS HA 2.0 with PTF6514766
- HSC 6.1 with current PTFs
- NCS, ExPR, VTCS versions 6.1
- ExLM version 6.0
- VSM version 4 and 5

Hosts and Partitions

Each partition is assigned exclusively to one of the following:

- A single ACSLS host
- A single HSC host
- A group of up to 16 HSC hosts sharing a common control dataset (CDS)

Each partition appears to the host as a separate ACS. An ACSLS server can control one or more partitions in a library, whereas an HSC system can control only one partition in a library.

Rails assigned to one partition are reported to all other partition owners as “unallocated.” Partition owners cannot access or display information about any of the drives, storage slots, or cartridges within partitions assigned to other hosts.

Library Resources and Partitions

All drives, storage slots, and cartridges within a partition are owned exclusively by the assigned host. For example, if rails 1 and 2 are configured for an HSC host, only HSC-designated drives and cartridges can be installed at those rail positions.

All HandBots and CAPs in the library are shared resources which cannot be assigned exclusively to one partition.

Each host must reserve a CAP to use it, and when done, must release the reservation to make the CAP available to other hosts. See [“CAPs and Partitions” on page 93](#) for complete details about using CAPs in partitioned libraries.

Planning Library Partition Configurations

Library partitioning requires careful planning, a thorough knowledge of library wall and slot mapping, and expertise in configuring and administering ACSLS and HSC host software applications. There must be clear communication among all parties involved, including system programmers and administrators, library operators, and your Sun service representative.

See [“Partition Features and Restrictions” on page 87](#) for details about library partitioning features and requirements.

Before creating partitions, you must verify that all tape drives and cartridges have been moved to the proper location, according to the planned host/rail assignments. For example, if rails 1 and 2 will be owned by an ACSLS host, only ACSLS-compatible drives can be installed at those rail positions, and all cartridges containing data for the ACSLS host must be migrated to those rails.

See the *SL8500 Modular Library System Best Practices Guide* for complete information about partition planning.

Partitioning Examples

Following are examples of valid library partition configurations.

Example 1: one-partition library

Rail	Library A
1	Partition 1, Host A (HSC)
2	
3	
4	

- Partition 1 is owned by an HSC host.

Example 2: two-partition library

Rail	Library B
1	Partition 1, Host A (HSC)
2	
3	Partition 2, Host B (ACSL)
4	

- Partition 1 is controlled by an HSC host.
- Partition 2 is controlled by an ACSL host.
- Rail 4 is unassigned and therefore not available for use.

Example 3: two-partition library

Rail	Library C
1	
2	Partition 2, Host A (HSC)
3	
4	Partition 3, Host B (HSC)

- Partition 2 is controlled by an HSC host.
- Partition 3 is controlled by a second HSC host.
- Rails 1 and 3 are unassigned and therefore not available for use.

Example 4: three-partition library

Rail	Library D
1	Partition 2, Host A (ACSL)
2	
3	Partition 3, Host A (ACSL)
4	Partition 4, Host B (ACSL)

- Partitions 2 and 3 are owned by the same ACSL host. Each partition appears to the ACSL host as a separate ACS.
- Partition 4 is owned by a second ACSL host.

Example 5: three-partition library

Rail	Library E
1	Partition 1, Host A (ACSL)
2	Partition 2, Host B (HSC)
3	Partition 3, Host C (HSC)
4	

- Partition 1 is controlled by an ACSLS host.
- Partition 2 is controlled by an HSC host.
- Partition 3 is controlled by a second HSC host.

Example 6: four-partition library

Rail	Library E
1	Partition 1, Host A (ACSL)
2	Partition 2, Host B (HSC)
3	Partition 3, Host C (HSC)
4	Partition 4, Host D (ACSL)

- Partition 1 is controlled by an ACSLS host.
- Partition 2 is controlled by an HSC host.
- Partition 3 is controlled by a second HSC host.
- Partition 4 is controlled by a second ACSLS host.

Capacities for Partitions

Table 4-1 shows the data cartridge capacities per rail in a partitioned library.

TABLE 4-1 Partition Data Cartridge Capacities

	Module Type	Total Cartridge Capacity Per Rail
Basic Library	Drive and Electronics¹	0
	Robotic Interface	200
	Customer Interface	162
	Basic library total	362
Each rail in an expansion module provides 432 additional data cartridge slots.		
Expansion Modules	First storage expansion module	794
	Second storage expansion module	1226
	Third storage expansion module	1658
	Fourth storage expansion module	2090
	Fifth storage expansion module	2522
¹ There are no cartridge storage locations in the Drive and Electronics Module.		

CAPs and Partitions

A CAP is a shared library resource – that is, it can be used by all partitions in the library. However, a CAP can be used by only one partition at a time, so when entering or ejecting cartridges, a host reserves the CAP for its exclusive use.

In order for a host to reserve a CAP, all of the following conditions must be met:

- The CAP must be available – that is, not reserved by any other partition.
- The CAP must be empty.
- The CAP must be closed and locked.

When a host reserves a CAP, the library sends “CAP opened” and “CAP closed” messages only to the host holding the reservation.

When a host attempts to reserve a CAP already reserved by another partition, the library sends a message to the requesting host identifying the partition ID and host ID holding the reservation.

Since CAPs are shared resources, automatic CAPs – that is, the ability for a library operator to open a CAP without first issuing an explicit enter request – are not supported in partitioned libraries. The commands to enable CAP auto mode are disabled to ACSLS and HSC for a partitioned library.

CAP Reservations

HLI host applications use a strict reservation scheme to manage CAP usage among host clients, and therefore always reserve a CAP before unlocking it or moving a cartridge to it. When the operation is finished, the host application must release the reservation to make the CAP available to other partitions.

No other partitions can access the CAP until the first one has terminated the operation and released the reservation. If an HLI host application attempts to reserve a CAP already reserved by another partition, the library controller sends a message to the requesting host identifying the partition ID and host ID holding the reservation.

Releasing CAP Reservations

In normal operations, a CAP reservation for an ACSLS or HSC host is released in the following ways:

- Enter operations – After all cartridges have been successfully entered into the library, the requestor must explicitly terminate the enter command. The library releases the CAP after verifying that the CAP is closed and empty.
- Eject operations – After all cartridges have been successfully ejected, the host automatically terminates the eject operation. The library controller releases the CAP after verifying that the CAP is closed and empty.

If for some reason a CAP reservation is not released as described above, the CAP will be unavailable to other all partitions, and cartridges belonging to the first partition may remain in the CAP. In this case, it is recommended that you identify the partition holding the CAP reservation and then terminate the enter or eject from that host. This ensures a normal release of the CAP reservation.

Note – See the ACSLS or HSC documentation for details about terminating enters and ejects.

Overriding CAP Reservations

In some cases, you may not be able to access the host holding a reservation and therefore cannot perform a normal release of the CAP. This may be because the host has terminated or because you lack physical access or security authorization to issue commands to the host. In these cases, you can use the SL Console to override the CAP reservation (unreserve). See [“Override a CAP Reservation” on page 106](#) for the detailed procedure.

Note – Use extreme care when using the SL Console to override a CAP reservation. If you do not complete the procedure, the CAP could be left unavailable to all partitions, and/or cartridges assigned to one partition could be entered into another partition.

Note – You can use the SL Console to override a CAP reservation only in a partitioned library. If a library is not partitioned, CAP reservations must always be released through ACSLS or HSC.

CAP Release and Override Scenarios

The following scenarios describe in detail the interactions between the SL Console, the library, and the attached hosts when a CAP in a partitioned library is used to enter or eject cartridges.

Scenario 1 – CAP reservation released by the ACSLS host

Note – This illustrates how a CAP reservation is released by the host in normal operations.

1. **Partition 1, Host 1 (ACSL) is ejecting cartridges through CAP A.**
 - CAP A is reserved to Partition 1, Host 1.
 - Cartridges belonging to Partition 1, Host 1 are contained in CAP A.
2. **Partition 2, Host 2 requests to enter cartridges. The library rejects the request with a message indicating that the CAP is reserved by Partition 1, Host 1.**
3. **All cartridges are successfully ejected. The ACSLS host automatically terminates the eject request.**

4. **The library operator verifies that the CAP is empty, and then closes the CAP.**
 - The library locks the CAP and audits it to verify that it is empty.
 - The library releases the CAP reservation. The CAP is available to all partitions.
5. **Host B must resubmit the enter request.**
 - CAP A is reserved to Partition 2, Host 2.

Scenario 2 – CAP reservation overridden successfully

Note – This illustrates an exceptional situation, where a CAP reservation must be overridden (unreserved) by the library operator.

1. **Partition 1, Host 1 (ACSL) is entering cartridges through CAP A.**
 - CAP A is reserved to Partition 1, Host 1.
 - Cartridges belonging to Partition 1, Host 1 are contained in CAP A.
2. **Partition 2, Host 2 requests to enter cartridges through CAP A. The library rejects the request with a message indicating that the CAP is reserved by Partition 1, Host 1.**
3. **All cartridges are successfully entered, but the requestor does not explicitly terminate the enter request through the ACSLS host.**
 - CAP A remains unlocked and reserved to Partition 1, Host 1.

Note – The enter operation must always be explicitly terminated from the host.

4. **The library operator is unable to access the ACSLS console to terminate the enter. The operator uses the SL Console to override the reservation on CAP A.**
 - The library removes the CAP reservation and sets the CAP user to “default.” The CAP is unavailable to all partitions.
 - The library sends a message to Partition 1, Host 1, indicating that the reservation on CAP A has been overridden.
5. **The library operator uses the SL Console to unlock the CAP.**
6. **The library operator opens the CAP, verifies that it is empty, and then closes the CAP.**
 - The library locks the CAP and audits it to verify that it is empty.
 - The library releases the CAP reservation. The CAP is available to all partitions.
7. **Partition 2, Host 2 must resubmit the enter request.**
 - CAP A is reserved to Partition 2, Host 2.

Library Partitioning Tasks

Task	Page
Create Partitions	97
Remove Partitions	101

▼ Create Partitions

Note – It is recommended that you quiesce the library to all hosts before beginning this procedure. See the ACSLS and HSC documentation for details.

1. **Select Tools > Partitions.**

The **Partitions** screen appears.

The screenshot shows the 'Partitions' screen with a menu bar (Tools, Help, Partitions) and buttons for Apply, Refresh, and a help icon. The main area is a grid with 'PARTITION ID' as the header. The columns are labeled 1, 2, 3, 4, and Unassigned. The rows are labeled Rail 1, Rail 2, Rail 3, and Rail 4. Each cell in the grid contains a blue button. The 'Unassigned' column buttons contain an 'X'. A 'Disable ALL Partitions' button is located at the bottom right.

	PARTITION ID				
	1	2	3	4	Unassigned
Rail 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X
Rail 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X
Rail 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X
Rail 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X

Disable ALL Partitions

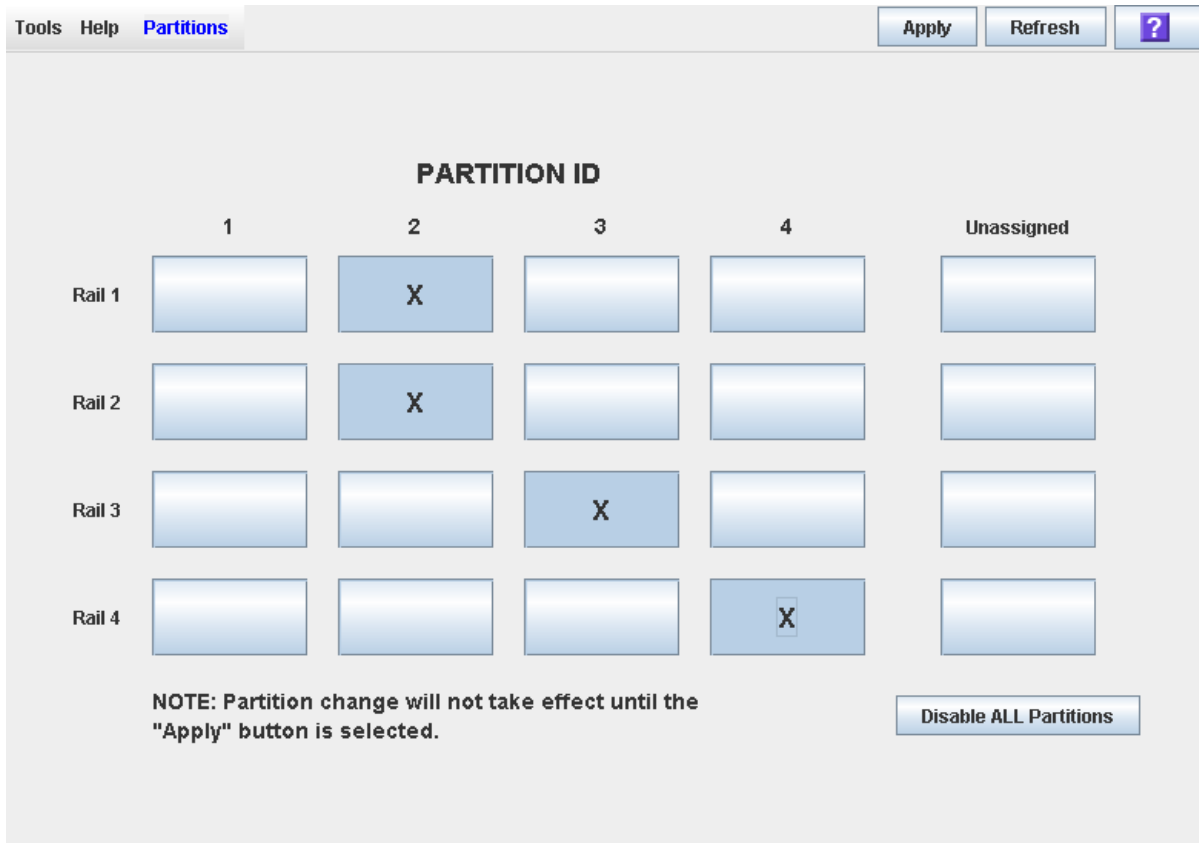
2. **In the Partition ID column of the partition you want to create, click the rails that you want to include. For example, to include rails 1 and 2 in Partition 2 click Rail 1 and Rail 2 under the Partition ID 2 column.**

Note – Partition IDs do not need to be contiguous. For example, you can create Partition 2 and Partition 4, with no Partition 1 or 3.

Note – Rails within a partition must be adjacent to one another. For example, you can create a partition that includes rails 3 and 4, or rails 2, 3, and 4, but not rails 2 and 4 only.

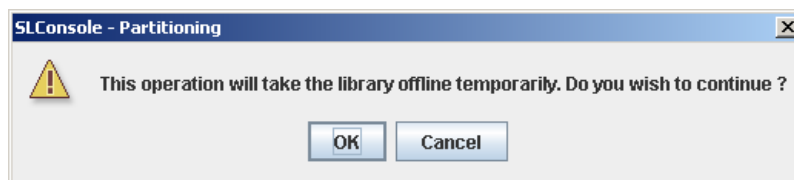
Note – Each rail corresponds to an LSM, with the ID of each offset by one. Rail 1 = LSM 0, Rail 2 = LSM 1, etc.

You can restore the original screen settings at any time by clicking **Refresh**..



3. Click **Apply** to apply the updates.

The **Partitioning** confirmation popup appears.



4. Click OK to update the library controller database.

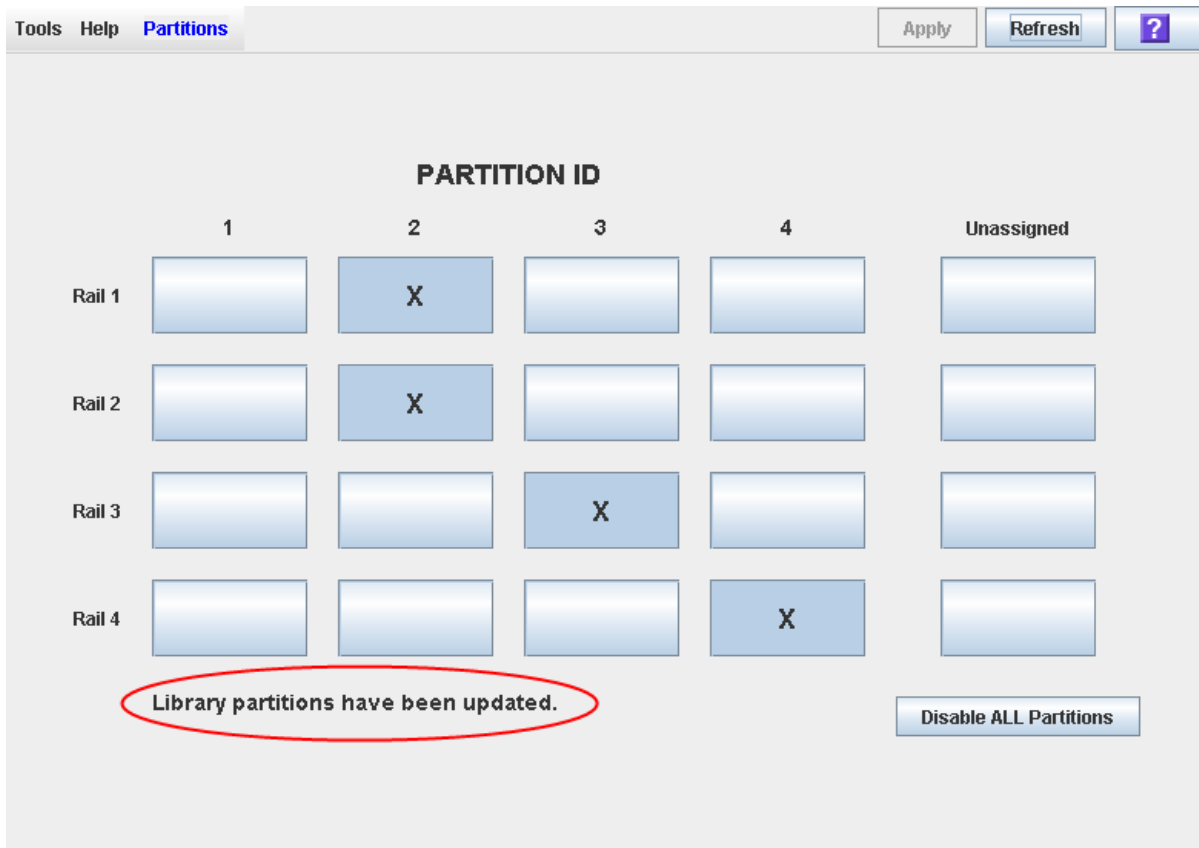
The library goes offline and all host connections are dropped while the updates are made. The screen indicates that the updates are in progress.

The screenshot shows a software interface for managing partitions. At the top, there is a menu bar with 'Tools', 'Help', and 'Partitions'. To the right of the menu are three buttons: 'Apply', 'Refresh', and a help icon (question mark). Below the menu is a grid with the following structure:

	PARTITION ID				
	1	2	3	4	Unassigned
Rail 1		X			
Rail 2		X			
Rail 3			X		
Rail 4				X	

Below the grid, the text 'Library updating partitions.' is circled in red. To the right of this text is a button labeled 'Disable ALL Partitions'.

5. The screen indicates when the updates have completed.



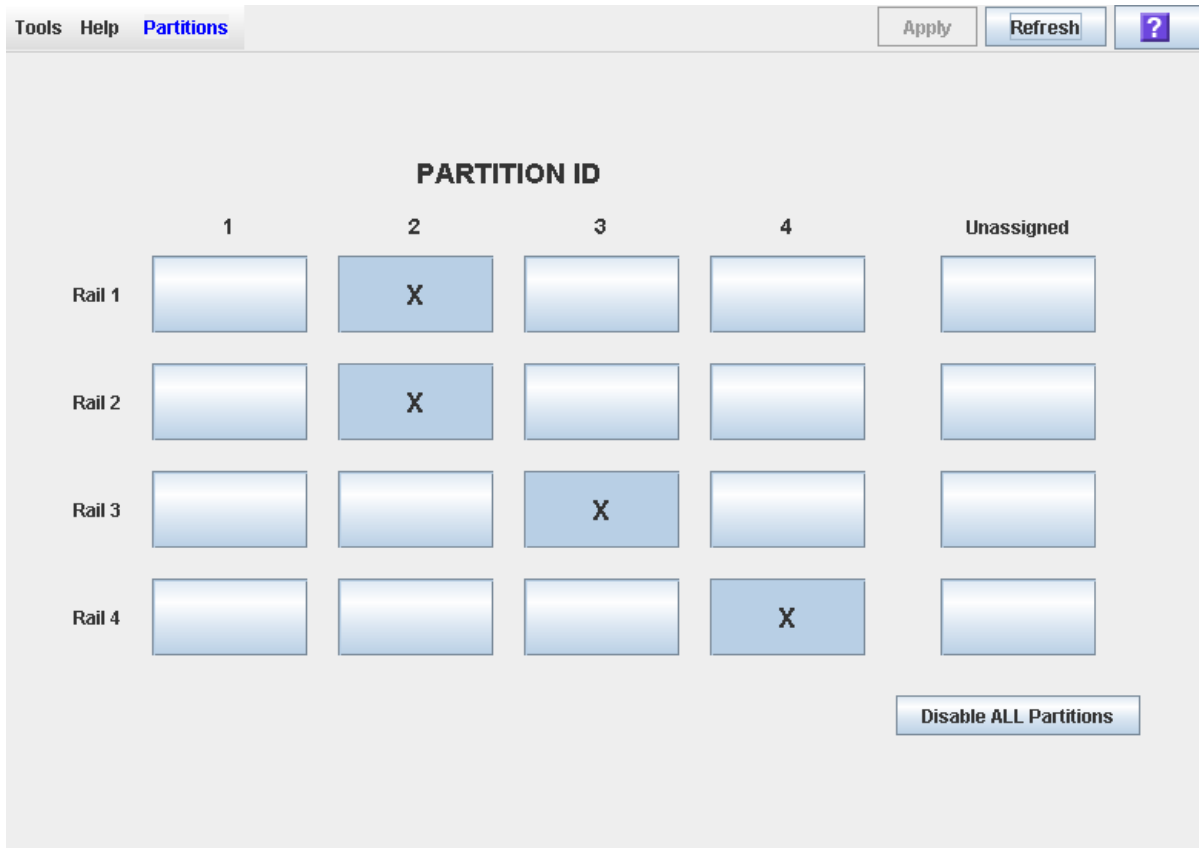
6. All library hosts must be configured to activate these updates. See the ACSLS and HSC documentation for details.

▼ Remove Partitions

Note – It is recommended that you quiesce the library to all hosts before beginning this procedure. See the ACSLS and HSC documentation for details.

1. **Select Tools > Partitions.**

The **Partitions** screen appears.



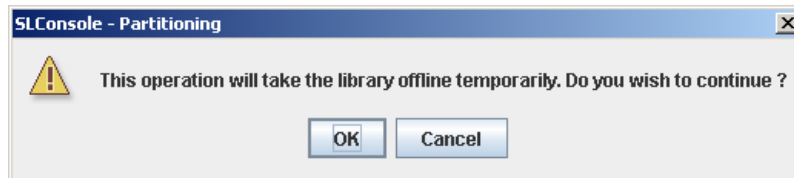
2. Click Unassigned for each rail you want to remove from a partition, or click Disable ALL Partitions to remove all rails from all partitions.

	PARTITION ID				
	1	2	3	4	Unassigned
Rail 1		X			
Rail 2					X
Rail 3			X		
Rail 4					X

NOTE: Partition change will not take effect until the "Apply" button is selected.

Disable ALL Partitions

3. Click Apply to apply the updates.
The Partitioning confirmation popup appears.



4. Click OK to update the library controller database.

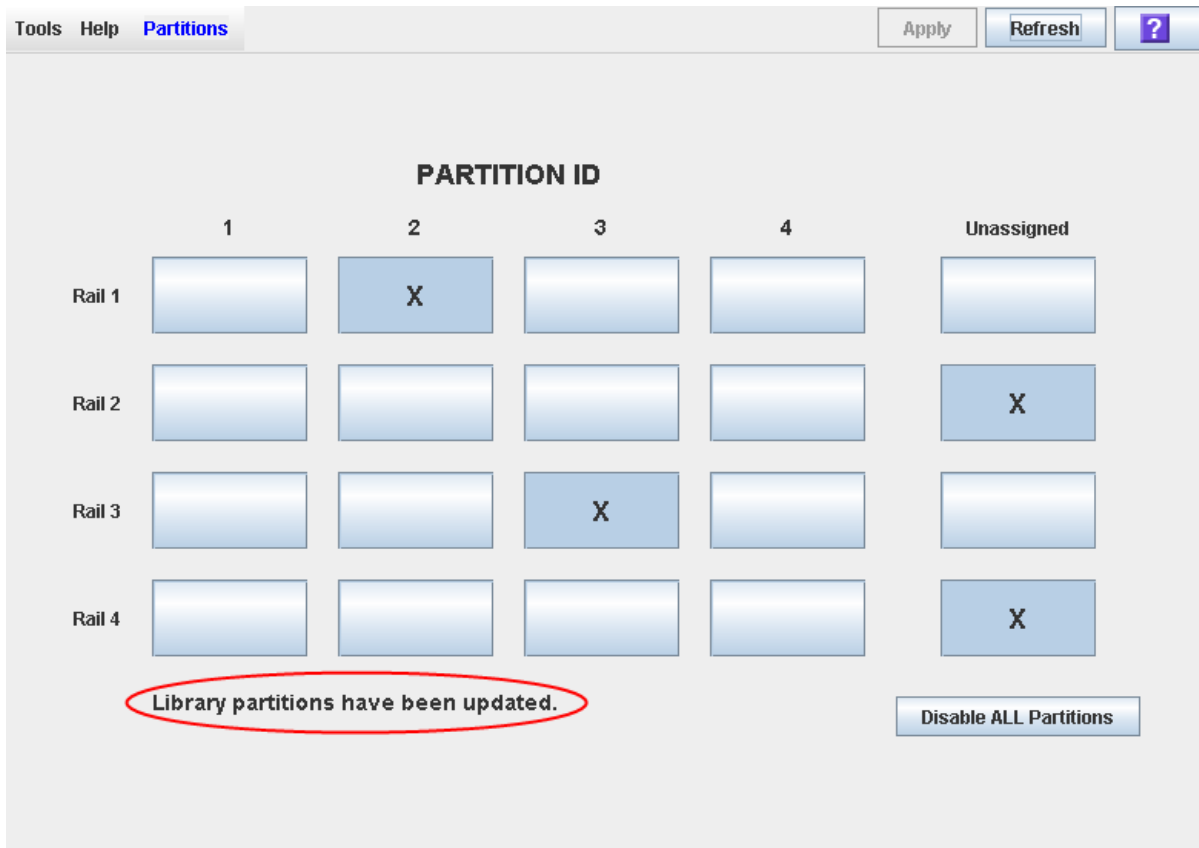
The library goes offline and all host connections are dropped while the updates are made. The screen indicates that the updates are in progress.

Tools Help **Partitions** Apply Refresh ?

	PARTITION ID				
	1	2	3	4	Unassigned
Rail 1		X			
Rail 2					X
Rail 3			X		
Rail 4					X

Library updating partitions. Disable ALL Partitions

5. The screen indicates when the updates have completed.



6. All library hosts must be configured to activate these updates. See the ACSLS and HSC documentation for details.

CAP Operation Tasks

Task	Page
Override a CAP Reservation	106

▼ Override a CAP Reservation

Note – You must follow all steps in this procedure. If you do not complete the procedure, the CAP could be left unavailable to all partitions, and/or cartridges assigned to one partition could be entered into another partition.

1. **Select Tools > Diagnostics.**
 2. **Expand the CAP Folder, and click the CAP whose reservation you want to override (unreserve).**
 3. **Click the Unreserve tab.**

The **Unreserve** screen appears, identifying the partition (hli1, hli2, hli3, hli4, or default) that has reserved the CAP.
 4. **Click Apply to override the reservation.**
 5. **The screen displays the dialog, “This will remove the reservation from the designated host...”**
 - Select **OK** to continue with the override operation. The library removes the CAP reservation and sets the CAP user to “default,” which makes the CAP unavailable to all partitions.
 - Select **Cancel** to cancel the override operation and return to [Step 4](#).
 6. **If the CAP is locked, unlock it at the SL Console.**
 7. **Open the CAP.**
 - If it is empty, proceed to [Step 9](#).
 - If it contains cartridges, remove them all.
 8. **Label the cartridges with the partition ID displayed in [Step 2](#).**
 9. **Close the CAP. It locks automatically.**

The library locks and audits the CAP to verify that it is empty. It then sets the CAP status to “unreserved,” which makes the CAP available to all partitions.
-
- Note** – You might need to refresh the CAP display to see the new CAP status.
-

10. **Contact a person responsible for managing the removed cartridges to determine their disposition. If they are to be re-entered into the library, they must be entered to the correct partition.**

Library Management

Automated Mode of Operation

When in automated mode of operation, the library or library complex automatically mounts and dismounts cartridges without physical intervention by a person.

Automated operations include the following activities:

- Mounting and dismounting cartridges
- Entering and ejecting cartridges through a CAP
- Pass-thru port (PTP) activities
- Logging library events
- Drive cleaning

Cartridge Mount and Dismount Activities

The primary function of the library is the automated mounting and dismounting of cartridges. Host mount and dismount commands are accepted by the library controller and translated into robotic commands that are performed by the Robots.

Mount Sequence

A simplified mount sequence involves the following steps:

1. A host requests that a specific volume serial number (VOLID or volser) be mounted in a drive.
2. The library controller transmits to the host that the VOLID is located within the library and a drive is available to satisfy the mount request.
3. The library assumes responsibility for the mount.
4. The host command is translated by the library controller into motion commands for the Robot.
5. The cartridge is taken from its storage cell and placed in the drive.
6. The library returns status to the host that the mount operation is completed.

7. The drive performs the read/write activity directed by the host.

Dismount Sequence

A simplified dismount sequence involves the following steps:

1. A host requests that a specific VOLID be dismounted from a drive.
2. The library controller transmits to the host that the VOLID is located in the drive and the library is available to satisfy the dismount request.
3. The library assumes responsibility for the dismount.
4. The host command is translated by the library controller into mechanical commands for the Robot.
5. The cartridge is taken from the drive and placed into its home cell.
6. The library returns status to the host that the dismount operation is completed.

Determining When the Library is Not in Automated Mode

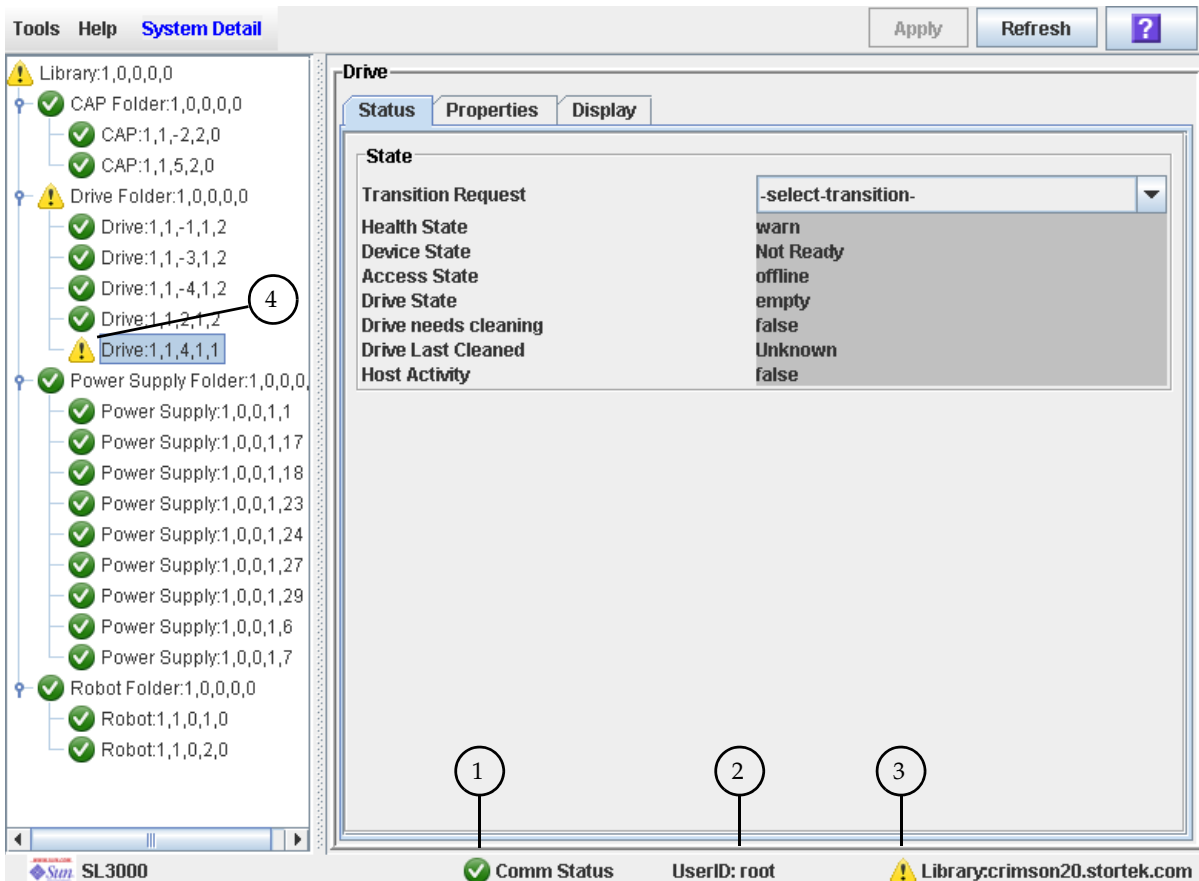
The library is not in automated mode when it is not able to accept host requests. The following conditions indicate that the library is not in automated mode:

- A library main access door is open.
- The Robot does not automatically mount and dismount cartridges.
- The device tree in the SL Console indicates that there is a problem with the library.

Library and Device Status





The SL Console screen displays health indicators for each of the following devices:

- Library
- CAPs
- Drives
- Power supplies
- Robots(s)



The following table describes the health monitor indicators.

Indicator	Description
1	<p>Comm Status</p> <p>Current status of the communication channel between the SL Console and the library controller. Possible icons are:</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> <p>Normal communications. The heartbeat monitor flashes periodically when the SL Console is communicating normally with the library controller.</p> </div> <div style="display: flex; align-items: center;"> <p>A warning. This icon appears when the server response takes longer than 10 seconds.</p> </div> </div>

	Indicator	Description
		An error. This icon appears when the server response takes longer than 30 seconds.
2	Userid	Userid currently logged in to the SL Console.
3	Library	Library to which the SL Console is connected, and a graphical representation of the current health of the library and its devices. Possible icons are:
		All library devices are functioning normally.
		A warning. One or more devices in the library is offline or operating in a degraded state.
		An error. One or more devices in the library has experienced a failure.
4	Device health icon	Current status of the indicated device. If a device type indicator is yellow or red, you can expand the device folder to display the individual device health icons and then display details on the specific devices that are experiencing abnormal conditions.

The library health indicator (3) also reflects status alerts, which are messages about significant issues with the library firmware or configuration status. These messages can be displayed and managed on the **Status Module** screen, if the Service hardware activation key is active on the library. See [“Status Alert Messages” on page 111](#) for details.

If there are multiple problems with a device or status alert conditions, the health indicator reflects the one that is most severe. For example, if the library has been varied offline (a “yellow” condition) and a CAP has experienced a failure (a “red” condition), the library health indicator will be red. Fixing the CAP problem will cause the library health indicator to change to yellow. The indicator will not return to green until the library has also been varied online.

Communications Failures

If the SL Console loses communication with the library controller, after about 30–60 seconds, the heartbeat monitor turns gray, then red, and the following error message appears:

Heartbeat message not received from the library controller.

You must log off from the SL Console and then log on again to restore communication.

Status Alert Messages

Note – This feature is available only if the Service activation key is active on the library.

The library Status Module provides a centralized mechanism for displaying and managing library status alerts, which are messages about significant issues with the library firmware or configuration. Status alerts also appear in the library Event Log, but they may become “buried” in the volume of messages there. The **Status Module** screen highlights significant messages, making it easier for you to identify and resolve certain problems.

Following are examples of status alert messages that may appear on the Status Module screen:

- Redundant robots have been installed, but the Dual Robot hardware activation key is not active
- The Service activation key is due to expire
- An invalid partition configuration has been detected

The **Status Module** screen does not include messages about device issues, because details about them are displayed in the respective device status screens (**CAP Status**, **Drive Status**, etc.)

A status alert message also causes the library health indicator to change to yellow or red, depending on the severity of the issue. See [“Library and Device Status” on page 109](#) for details.

Related Procedures

See the following procedures for details about managing status alert messages:

- [“Display Library Status Alerts” on page 115](#)
- [“Clear Library Status Alerts” on page 117](#)

Library Management Tasks

Task	Page
Display Library Status	113
Display Library Complex Status	114
Display Library Status Alerts	115
Clear Library Status Alerts	117
Display HLI Port Status	119
Display Library Configuration Information	120
Display Library Complex IP Addresses	121
Display Library Controller Properties	122
Display Drive Controller Properties	123

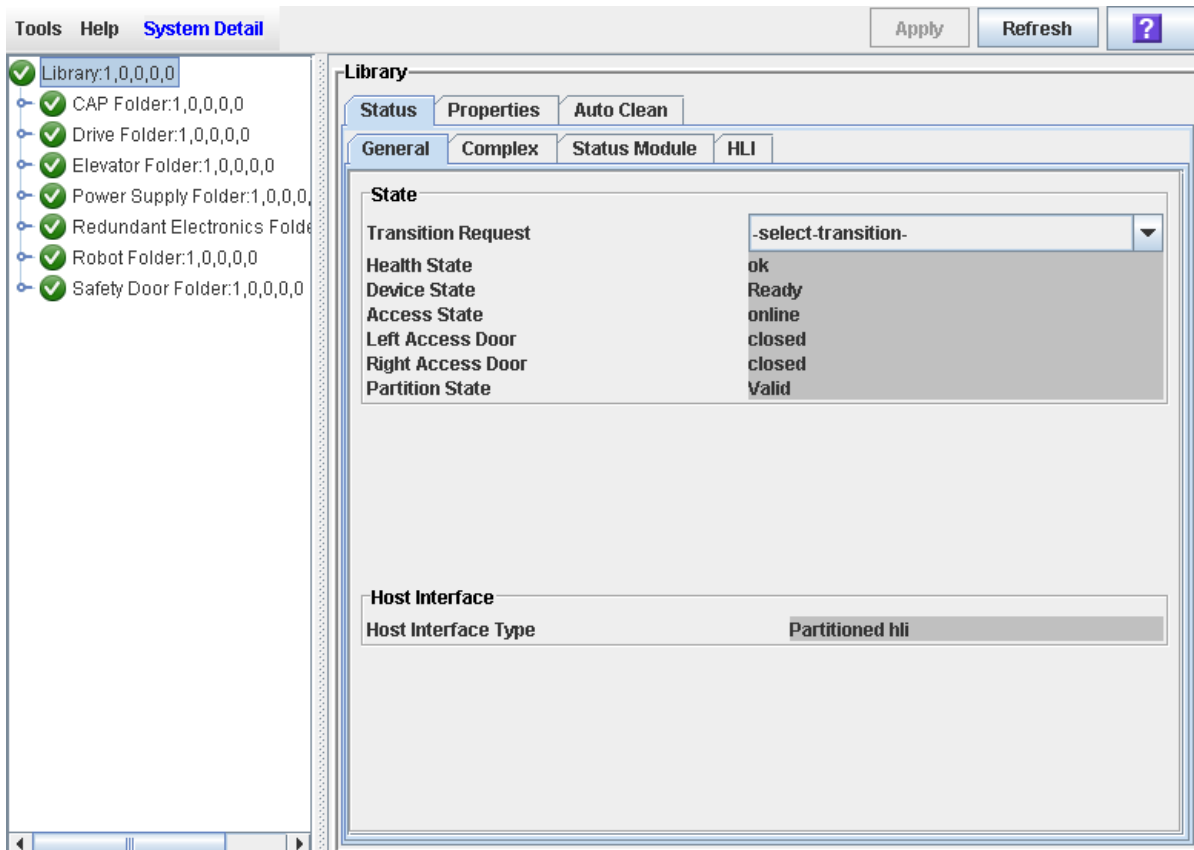
▼ Display Library Status

Use this procedure to view the current operational state of the library. These values are updated whenever there is host activity, background operations, or operator activity.

Note – This information is also available through **Reports > Library Details**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Status** tab, and then the **General** tab.

The screen displays the current status of the library.



▼ Display Library Complex Status

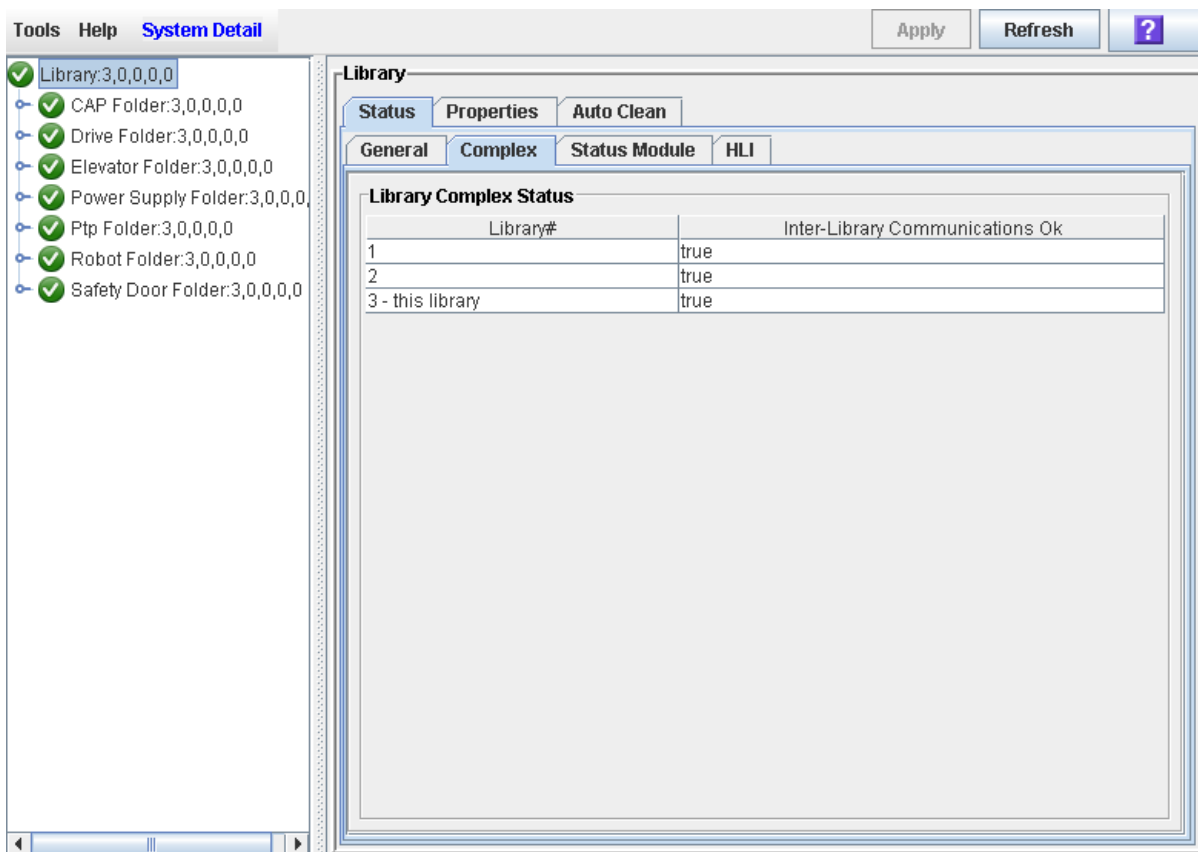
View the current operational state of a library complex.

Note – This procedure is applicable only if your installation includes a library complex.

Note – This information is also available through **Reports > Library Details**. See [“Display a Library Report” on page 62](#) for detailed instructions.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Status** tab, and then the **Complex** tab.

The screen displays the current status of the library complex.



▼ Display Library Status Alerts

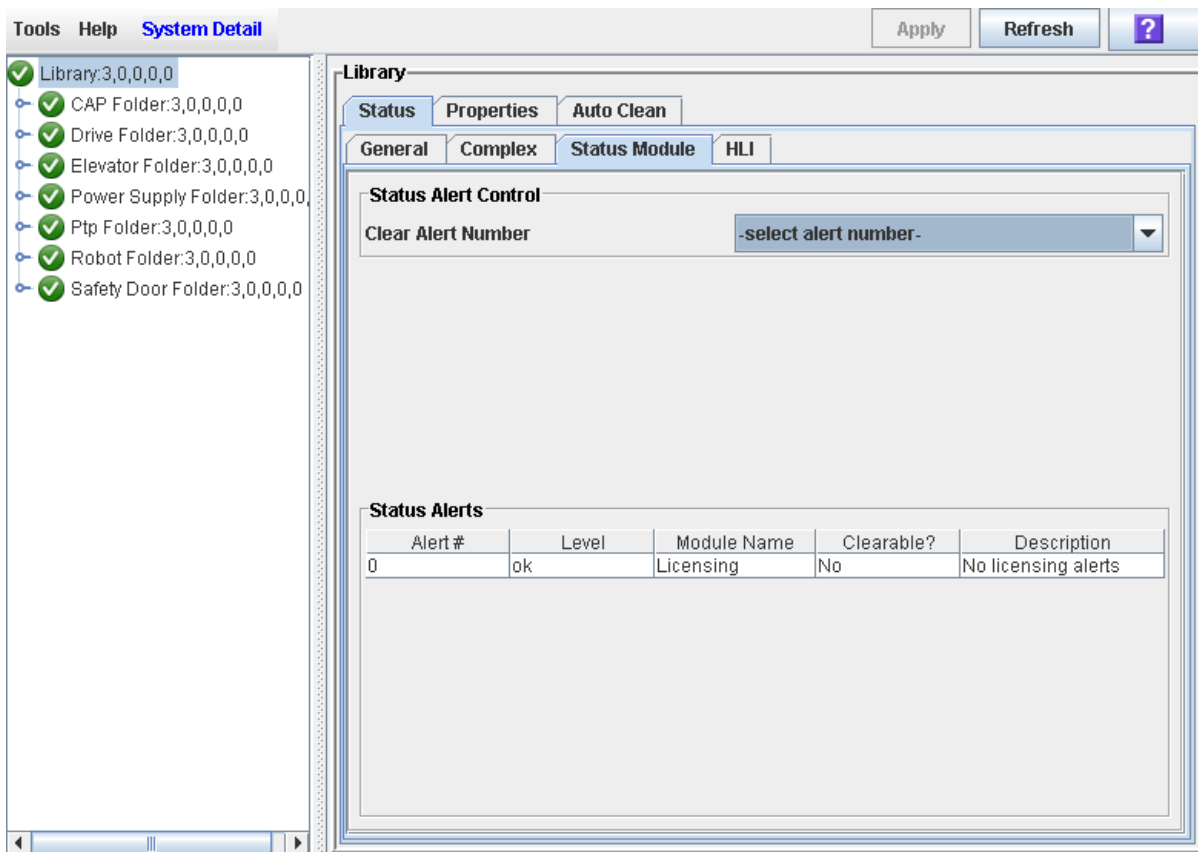
Note – This feature is available only if the Service hardware activation key is active on the library.

Note – If the Service activation key is not active on the library, then this screen will be blank except for a message indicating that the “Service activation is not valid.”

Use this procedure to display library status alerts, which can help you to identify whether there are any current or pending issues with the library firmware or configuration. You might perform this procedure whenever the library health indicator has changed from green, to yellow or red, indicating a warning or error.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Status** tab, and then the **Status Module** tab.

The screen displays all library status alerts.



Screen Fields

Clear Alert Number

Optional.

Status alert message you want to clear from the display.

The pull-down displays numbers 0–20. Although you can select any one of these, only the numbers that correspond to clearable alert messages shown in the display will actually cause a message to be cleared.

Alert #

Display only.

Sequential number assigned to the status alert message.

Level

Display only.

Severity level of the status alert message. Options are:

- OK – The firmware module is functioning normally.
- Information – Information message; the firmware module is functioning normally.
- Warning – The firmware module is operating in a degraded state; may indicate a future failure is possible.
- Error – The firmware module has experienced a failure.

Module Name

Display only.

Library controller firmware module that is affected by the message.

Clearable?

Display only.

Indicates whether the status alert message can be manually cleared from the display.

Options are:

- Yes – Message can be cleared, and the firmware module status will be returned to OK.
- No – Message cannot be cleared. Generally, OK and Information messages cannot be cleared.

Description

Display only.

Full description of the status alert message.

Buttons**Apply**

Click to clear the selected alert message from the Status Module display. The firmware module status is returned to OK, and the library health indicator is updated.

Note – If the alert message is updated periodically, it will reappear with the next update cycle.

Refresh

Click to refresh the display with current data from the library controller database.

▼ Clear Library Status Alerts

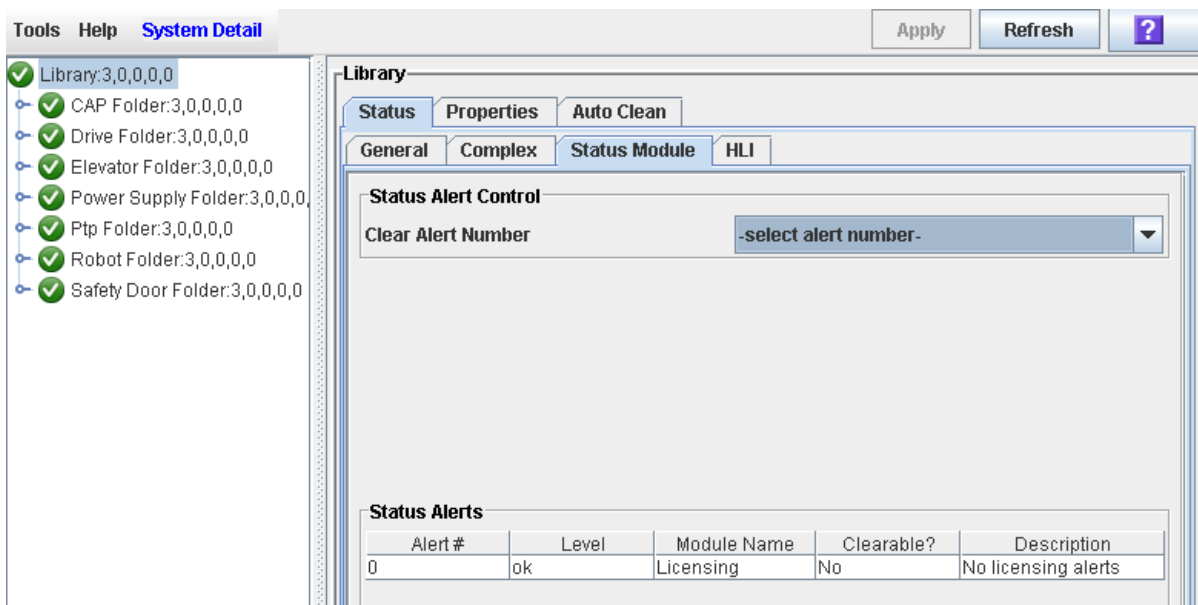
Note – This feature is available only if the Service activation key is active on the library.

Use this procedure to clear a library firmware status alert. Not all alerts can be cleared.

Note – Clearing an alert only removes it from this screen display. It does not resolve the underlying issue.

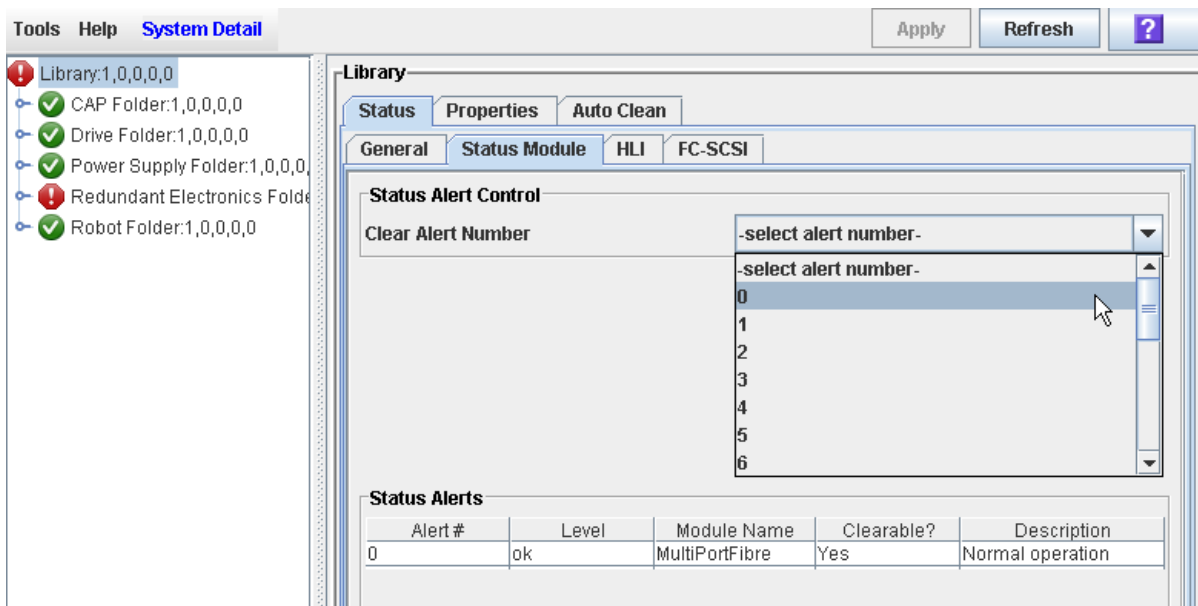
1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Status** tab, and then the **Status Module** tab.

The screen displays all library status alerts.



3. On the **Clear Alert Number** pull-down, select the alert number that you want to clear from the display, and Click **Apply**.

Note – Although you can select any alert number, only alerts marked as “Clearable” can actually be cleared.



The alert is removed from the Status Module display. The library health indicator returns to green if there are no other device or status alerts.

Note – If the alert is subject to periodic updates, it will reappear at the next update cycle.

▼ Display HLI Port Status

Use this procedure to display the current status of all host LMU (library management unit) HLI interface ports on the library. Information includes the local TCP/IP socket, local IP, connection status, port status, transmission sent and received from the time of connection.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Status** tab, and then the **HLI** tab.

The screen displays the current status and activity of all HLI ports on the library.

The screenshot shows a software interface with a menu bar (Tools, Help, System Detail) and buttons for Apply, Refresh, and a help icon. A tree view on the left shows the Library folder selected. The main window has tabs for Status, Properties, and Auto Clean. Under the Status tab, there are sub-tabs for General, Complex, Status Module, and HLI. The HLI tab is active, displaying the HLI Port Status table.

Partition ID	Local Port	Local IP	Connection Status	Port Status	Transmissions rcvcd	Transmissions sent
0	50016	10.80.104.84	not joined	connected/129.147.219.137	3	3
0	50010	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50015	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50012	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50006	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50007	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50014	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50002	10.80.104.84	not joined	connected/129.147.219.137	12	12
0	50001	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50004	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50008	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50011	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50005	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50009	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50013	10.80.104.84	not joined	connected/129.147.219.137	9	9
0	50003	10.80.104.84	not joined	connected/129.147.219.137	9	9

▼ Display Library Configuration Information

Use this procedure to display the physical, mechanical, and logical configuration of the library. Some of the information can be set up automatically during library initialization, while other information can be defined by the user.

This screen also displays the host interface TCP/IP 2B and 2A details such as the library DNS domain name, IP address, netmask, and MAC address.

Note – This information is also available through **Reports > Library Information**. See [“Display a Library Report” on page 62](#) for detailed instructions.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Properties** tab, and then the **General** tab.

The screen displays detailed information about the library.

The screenshot shows a software interface with a menu bar (Tools, Help, System Detail) and buttons for Apply, Refresh, and a help icon. A tree view on the left shows a hierarchy of folders: Library:1,0,0,0,0 (selected), CAP Folder:1,0,0,0,0, Drive Folder:1,0,0,0,0, Elevator Folder:1,0,0,0,0, Power Supply Folder:1,0,0,0,0, and Robot Folder:1,0,0,0,0. The main window displays the 'Library' configuration details under the 'Properties' tab, with the 'General' sub-tab selected. The information is organized into three sections: Physical, Host Interface TCP/IP 2B, and Host Interface TCP/IP 2A.

Physical	
Vendor	STK
Frame Serial Number	51600000443
Library Base WWN	50:01:04:F0:00:79:1C:CB
Expansion Module Count	2
Total Slot Count	4904
Empty Slot Count	3618
Physical PTP Count	0
Drive Count	64
Robot Count	8
Cap Count	1
Elevator Count	2
Drive Power Supply Count	10
Hardware Power Supply Count	11

Host Interface TCP/IP 2B	
DNS Domain Name	elib5
IP Address	192.168.25.4
NetMask	255.255.255.0
MAC Address	00:10:4F:02:AC:68

Host Interface TCP/IP 2A	
IP Address	10.80.104.85
NetMask	255.255.254.0
MAC Address	00:10:4F:02:AC:69

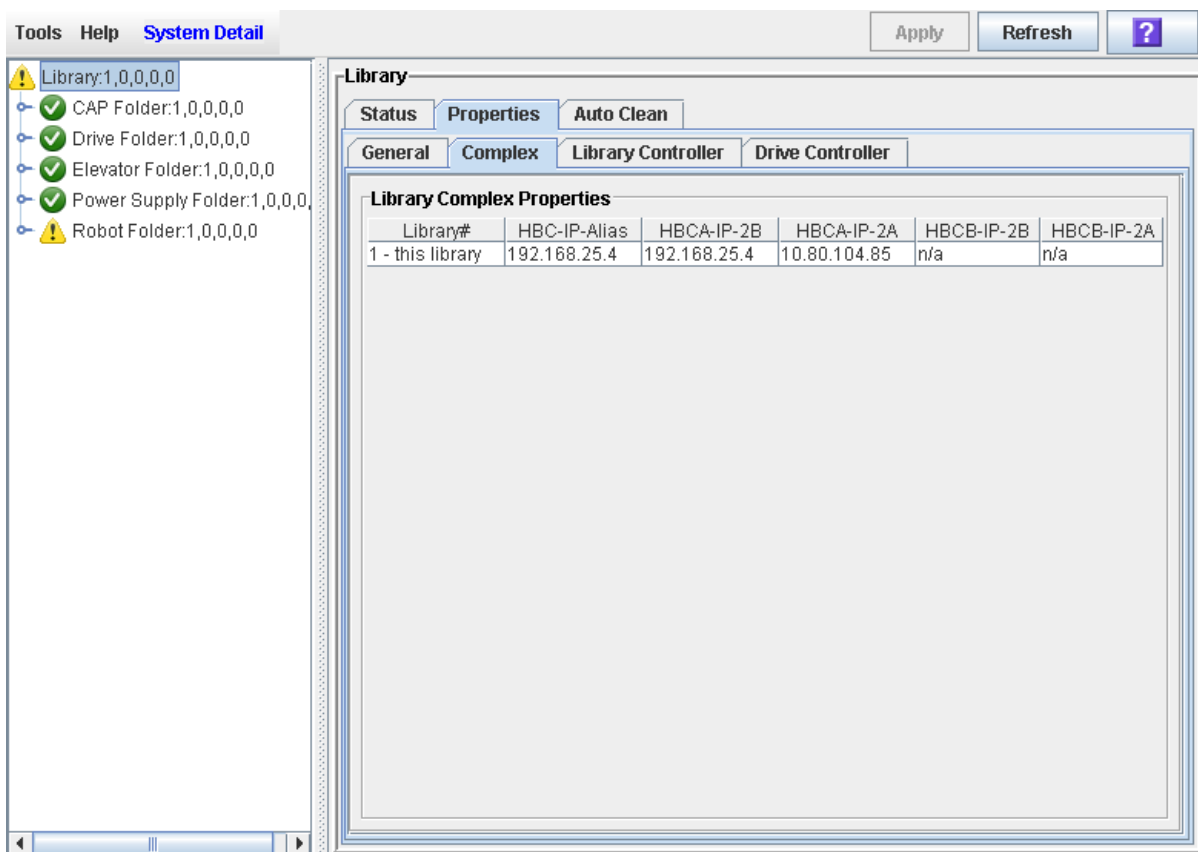
▼ Display Library Complex IP Addresses

Use this procedure to view IP address information for a library complex.

Note – This procedure is applicable only if your installation includes a library complex.

Note – This information is also available through **Reports > Library Information**. See [“Display a Library Report” on page 62](#) for detailed instructions.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Properties** tab, and then the **Complex** tab.



The screenshot shows the 'System Detail' window with the 'Library' folder selected in the left-hand tree. The 'Properties' tab is active, and the 'Complex' sub-tab is selected. The 'Library Complex Properties' table is displayed with the following data:

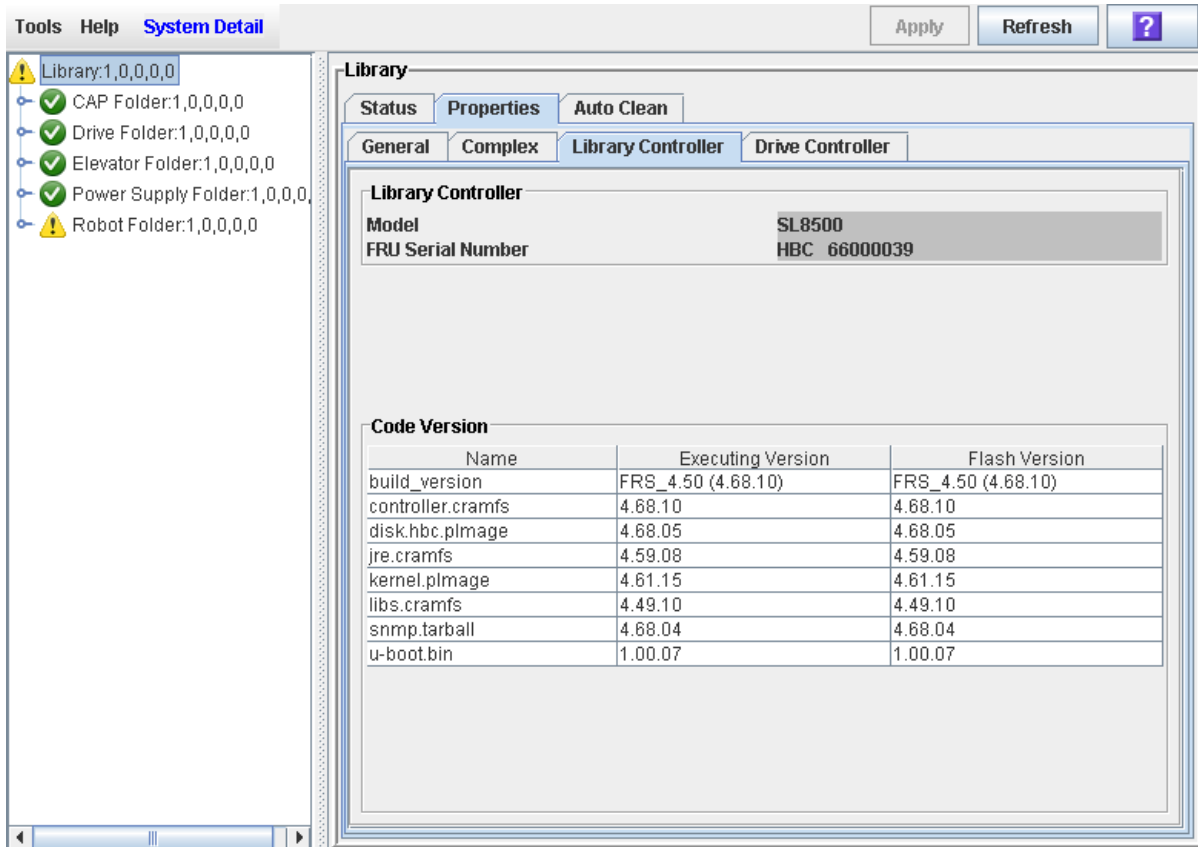
Library#	HBC-IP-Alias	HBCA-IP-2B	HBCA-IP-2A	HBCB-IP-2B	HBCB-IP-2A
1 - this library	192.168.25.4	192.168.25.4	10.80.104.85	n/a	n/a

▼ Display Library Controller Properties

View details of the library controller, including the serial number and firmware versions.

Note – This information is also available through **Reports > Library Information**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Properties** tab, and then the **Library Controller** tab.



The screenshot shows a software interface with a menu bar (Tools, Help, System Detail) and buttons for Apply, Refresh, and a help icon. On the left is a tree view with folders: Library:1,0,0,0,0 (warning icon), CAP Folder:1,0,0,0,0 (checkmark), Drive Folder:1,0,0,0,0 (checkmark), Elevator Folder:1,0,0,0,0 (checkmark), Power Supply Folder:1,0,0,0,0 (checkmark), and Robot Folder:1,0,0,0,0 (warning icon). The main area is titled 'Library' and has tabs for Status, Properties, and Auto Clean. Under Properties, there are sub-tabs for General, Complex, Library Controller, and Drive Controller. The Library Controller tab is active, showing:

Library Controller

Model: SL8500
FRU Serial Number: HBC 66000039

Code Version

Name	Executing Version	Flash Version
build_version	FRS_4.50 (4.68.10)	FRS_4.50 (4.68.10)
controller.cramfs	4.68.10	4.68.10
disk.hbc.plmage	4.68.05	4.68.05
jre.cramfs	4.59.08	4.59.08
kernel.plmage	4.61.15	4.61.15
libs.cramfs	4.49.10	4.49.10
snmp.tarball	4.68.04	4.68.04
u-boot.bin	1.00.07	1.00.07

▼ Display Drive Controller Properties

View details of the drive controller, including the serial number and current firmware versions.

Note – This information is also available through **Reports > Library Information**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**, and click the **Library** folder.
2. Click the **Properties** tab, and then the **Drive Controller** tab.

The Drive Controller screen appears.

The screenshot shows a software interface with a menu bar (Tools, Help, System Detail) and buttons for Apply, Refresh, and a help icon. On the left is a tree view under 'Library' with sub-items: CAP Folder:1,0,0,0,0, Drive Folder:1,0,0,0,0, Elevator Folder:1,0,0,0,0, Power Supply Folder:1,0,0,0,0, and Robot Folder:1,0,0,0,0. The main area has tabs for Status, Properties, and Auto Clean. Under Properties, there are sub-tabs for General, Complex, Library Controller, and Drive Controller. The Drive Controller tab is active, showing 'Drive Controller Properties' with the FRU Serial Number HBT###66000273. Below this is a 'Code Version' table.

Name	Executing Version	Flash Version
disk.hbt.plmage	4.68.05	4.68.05
drive.cramfs	4.68.04	4.68.04
kernel.plmage	4.61.15	4.61.15
libs.cramfs	4.49.10	4.49.10
u-boot.bin	1.00.07	1.00.07

Redundant Electronics Management

Note – The information in this chapter applies only to libraries in which the Redundant Electronics feature has been installed and activated.

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

The optional SL8500 Redundant Electronics feature provides failover protection in HLI libraries. If the library controller experiences errors, it automatically switches operations to an alternate library controller, with minimal disruption to library and host operations. This allows your Oracle support representative to replace the faulty card while the library continues normal operations.

The Redundant Electronics feature also provides minimal disruption of library operations during firmware upgrades.

Note – The SL8500 offers redundancy in a variety of components, including Robots and power systems. The term “Redundant Electronics” refers specifically to redundancy in the library and drive controller components.

Activating Redundant Electronics

The Redundant Electronics feature requires all of the following hardware components:

- Active library controller (HBC) card
- Alternate library controller (HBC) card
- Active drive controller (HBT) card
- Alternate drive controller (HBT) card

Your Oracle support representative must install the necessary hardware. In addition, you must activate the Redundant Electronics feature through the SL8500 hardware activation utility. See [Chapter 3, “Hardware Activation Files”](#) on page 81 for details.

Redundant Electronics Operations

The library controller (HBC) and drive controller (HBT) cards installed on the same side of the card cage are partnered with one another into a “cardset”. Each HBC card determines its role whenever the card is reset or rebooted. If the HBC card is the active controller and its partner HBT card is installed, the controller loads active code and assumes the role of active controller. If the HBC card is the alternate and its partner HBT card is installed, it loads standby code. The HBT card assumes the same role – active or alternate – as its partner HBC card.

Role of the Active Controller

The active library controller behaves for the most part like the library controller in a non-redundant library. It accepts connections and processes requests from HLI hosts and the SL Console and command line interface (CLI).

In addition to these functions, the active library controller in a library with Redundant Electronics continually monitors the status of the alternate library controller. If the active controller determines that the alternate is not healthy and able to become active, then it will not allow an automated or manual failover.

Role of the Alternate Controller

The alternate library controller accepts HLI host connections, but processes only the `set path group` and `force switchover` requests; all other requests will fail.

The alternate controller continually monitors the status of the active controller. If the alternate controller determines that the active one is not functioning normally, it initiates an automatic failover. See [“Automatic Failover Initiation” on page 129](#) for details.

Role of the Drive Controllers

The two drive controller cards (HBTA and HBTB) are partnered with the library controller cards installed on the same side of the card cage. The active drive controller communicates with the library drives. The alternate drive controller does not run until its partner library controller card becomes the active controller.

IP Addresses

Each library controller card requires its own unique IP address. If the the Dual TCP/IP feature is active on the library, then each card requires two unique IP addresses: one for the primary port (2B) and one for the secondary (2B).

When you use the SL Console to log into a library, you need to connect to the primary port on the active controller. The SL Console does not allow you to connect to the alternate controller, and if you attempt to do so an error message is displayed.

After an automatic failover or manual switch, the IP address or DNS alias you need to specify changes because the previously active controller is now the alternate, and vice versa.

How Failover Works

In a failover, control of the library is switched from the current active controller to the alternate. The alternate library and drive controller cards become active, and the active ones become alternate. Each library controller and its partnered drive controller are always switched as a pair.

A failover can be initiated either automatically or manually. This section describes characteristics of all failovers. See the following sections for additional details specific to the automatic and manual processes:

- [“Automatic Failover Initiation” on page 129](#)
- [“Manual Switch” on page 129](#)

Failover Process

The failover process is minimally disruptive to library operations, usually taking only a few minutes. The process is summarized as follows:

1. Failover is initiated automatically or manually.
2. The status of the alternate controllers is checked. The alternate library and drive controllers must be operating normally in order for failover to proceed. If any of the following conditions exist, then the failover cannot proceed:
 - The alternate library or drive controller is in a fault state.
 - The alternate library or drive controller card is in the eject state.
 - The standby code is not running on the alternate library or drive controller cards.
 - A firmware download is in progress.
 - A card initialization is in progress.
3. If functional, the active library controller attempts to complete all in-process jobs and copy the cartridge database to the alternate controller card.
4. Once all in-process jobs have completed or timed out, the card roles are switched.
5. Active software is brought up on the alternate controller, and this controller becomes the active one.
6. Standby software is brought up on the previously active controller, and this controller becomes the alternate.

What Happens to Connections

The failover process is minimally disruptive to host operations. The following changes occur to various connections:

- Tape management software (ACSL or HSC) users do not see an interruption.
- HLI host applications do see a failure, and their connections are terminated. Since HLI host requests are retried for 10 minutes, if the controller is able to come up within that time, the hosts should not have to resubmit any jobs. Jobs will be slower than normal during this time.

- SL Console and CLI connections are terminated. Users must re-establish connections to the library using the IP address of the new active library controller (the former alternate controller). See [“Log In to the Library After a Failover”](#) on page 142 for detailed instructions.

Audits

The cartridge location database resides on the active controller only and is not mirrored on the alternate. If the database can be copied to the alternate prior to the failover, then a cartridge audit is not necessary afterwards. Usually it is possible to copy the database in the following circumstances:

- A manual switch
- The active drive controller (HBTA) card is pulled or failed

Usually it is not possible to copy the database if there is a sudden hard failure in the active library controller.

If an audit must be done after the failover, it is done in the background, while other jobs are processed. As a result, you may notice that library operations take slightly longer to perform until the audit is complete. In addition, if a particular request requires information about a location that has not yet been audited, the location will be audited first, causing a slight delay in processing the request.

Automatic Failover Initiation

An automatic failover can be initiated by either the active or alternate library controller.

The active library controller initiates an automatic failover in any of the following situations:

- It determines that its partner drive controller (HBTA) card is not installed.
- It does not receive communication from its partner drive controller (HBTA) card within a defined time-out period.
- It detects a catastrophic internal software error.
- Firmware activation is requested through the SL Console; an automatic failover is part of the normal firmware activation process. See [“Redundant Electronics and Firmware Upgrades”](#) on page 133 for details.

The alternate library controller initiates an automatic failover if it determines that the active controller is not responsive.

Manual Switch

You may want to perform a manual switch in the following circumstances, in order to verify that the alternate cards are functioning normally:

- After initial installation of the alternate library and drive controller cards
- After a firmware upgrade
- Periodically (once a month or once a quarter, for example)

Each library controller and its partnered drive controller are always switched as a pair. It is not possible to manually switch only the library controllers and not the drive controllers, for example.

Manual Switch Initiation

A manual switch can be initiated through any of the following connections:

- Host tape management (ACSLs or HSC) console – From either the active or alternate library controller.
- Remote SL Console – From the active library controller only. Since the SL Console cannot log into the alternate library controller, you cannot use the SL Console to initiate a manual switch from the alternate. Also, the manual switch function is not available from the local operator panel.
- CLI – From either the active or alternate library controller. This function is available to your Oracle support representative only.

Before initiating a manual switch, you should verify that the alternate library and drive controllers are running normally. See the following topics for additional information on card status:

- [“SL Console Displays” on page 131](#)
- [“Display Redundant Electronics Detail” on page 137](#)

See [“Manually Switch Redundant Electronics Cards” on page 140](#) for detailed instructions on initiating a manual switch from the SL Console.

Monitoring Status of the Controllers

LEDs and Controls

The LEDs and controls are the same on all four cards. Following are descriptions.

LED	Color	Definition
Active	Green	Card is functioning as the active, running active code.
Standby	Amber	Card is functioning as the alternate, running standby code.
Fault	Red	Card has experienced a serious error.
Eject OK	Blue	Card can be safely removed. Your Oracle support representative can initiate a card eject through the CLI.

SL Console Displays

You can display the status of all four controller cards through the SL Console.

Card Positions

Some SL Console displays identify the individual library controller cards as HBCA and HBCB and the drive controller cards as HBTA and HBTB. For both types of cards, the A or B suffix indicates the card's position within the card cage, as viewed from the back of the machine, as follows:

- A – Left card slot
- B – Right card slot

Card Statuses

The possible statuses of the controller cards are described below.

Status	Applies to	Definition
Duplex: software ready; switch possible	Active library controller only	Card is functioning normally.
Not installed	All cards	Card is not installed in the machine.

Status	Applies to	Definition
ok	Active or alternate drive controller	Card is functioning normally.
Pre-standby: software not ready	Alternate library controller only	Card is loading standby code and is not ready to be used in an automatic failover or manual switch.
Standby: software ready	Alternate library controller only	Card is functioning normally and can be used in the event of an automatic failover or manual switch.

See the following topics for additional details:

- [“Display Redundant Electronics Summary Information” on page 135](#)
- [“Display Redundant Electronics Detail” on page 137](#)

Event Log Entries

Significant library and drive controller activities, such as deteriorated health, errors, failovers, and card ejects are logged to the Event Log. Routine activities, such as a card monitoring the status of its partner, are not.

Redundant Electronics and Firmware Upgrades

Firmware upgrades for libraries with the Redundant Electronics feature are minimally disruptive to library operations. New code is loaded and activated on the alternate controller first, then an automatic failover is performed, and then the other library controller card is upgraded. This allows you to perform a firmware upgrade while the library continues normal operations, with only a brief interruption for the failover process. Individual devices do not need to be re-initialized.

Firmware Upgrade Process

Following is the process for firmware upgrades on libraries with the Redundant Electronics feature.

Note – For complexes, this process is performed concurrently on all libraries with the Redundant Electronics feature.

1. The new code is loaded on the alternate library controller. See [“Library Firmware Upgrades” on page 245](#) for complete details on this process.
2. An automatic failover is performed and the library controller with the new code becomes active. See [“How Failover Works” on page 128](#) for full details on this process.
3. The new code is loaded on the previously active, now alternate, controller.

Redundant Electronics Management Tasks

Task	Page
Display Redundant Electronics Summary Information	135
Display Redundant Electronics Detail	135
Manually Switch Redundant Electronics Cards	135
Log In to the Library After a Failover	142

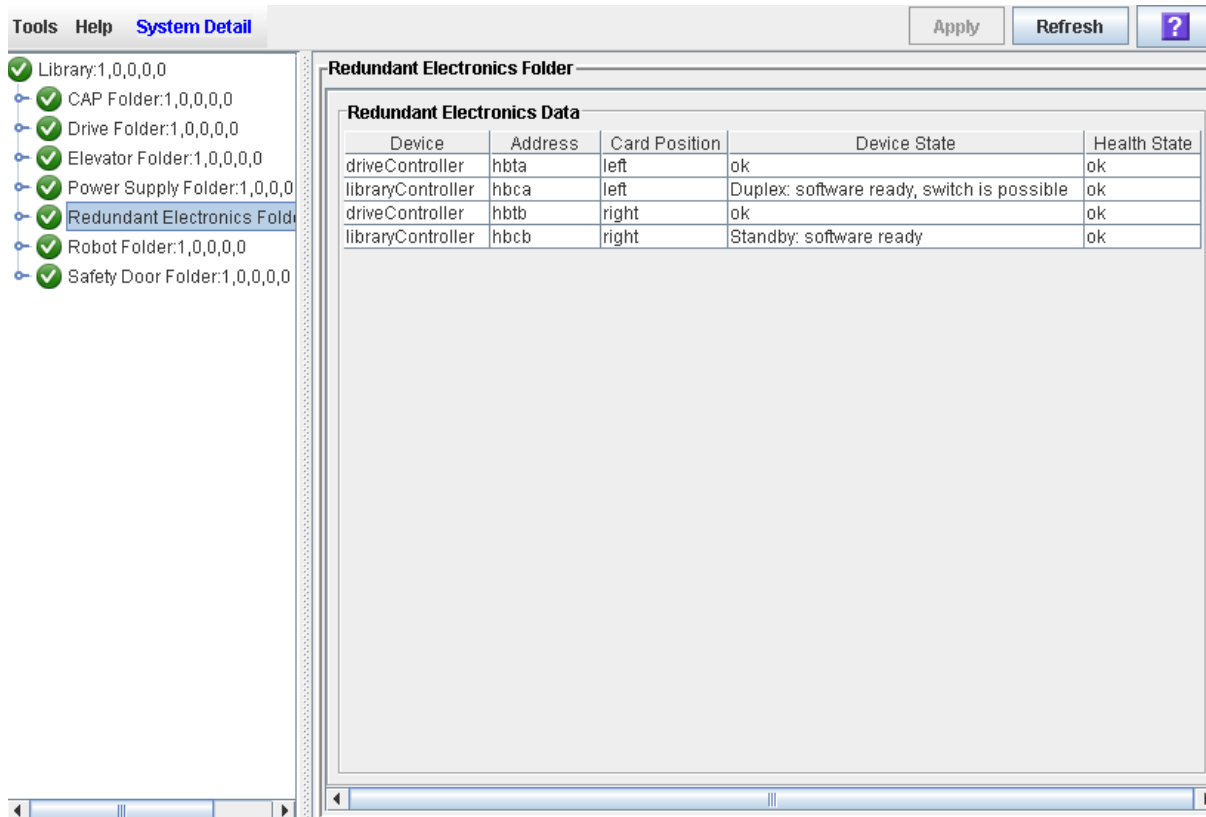
▼ Display Redundant Electronics Summary Information

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

Use this procedure to display summary information about all Redundant Electronics cards in the library.

1. **Select Tools > System Detail, and click the Redundant Electronics folder.**

The **Redundant Electronics Summary** screen appears.



Screen Fields

Device

Options are:

Type of card. Options are:

- libraryController – Library controller card
- driveController – Drive controller card

Address

The card's address within the library. Options are:

- 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 Position

Position of the card within the card cage, as viewed from the back of the machine. Options are:

- Left – Left card slot; also referred to as the A slot
- Right – Right card slot; also referred to as the B slot
- Top – Top card slot
- Bottom – Bottom card slot

Device State

Current operating state of the card. Options are:

- Duplex: software ready; switch possible – Card is functioning normally. Used only for an active HBC card in a library with Redundant Electronics.
- Initializing State 0 – Internal hardware manager state which may be seen during initialization.
- Initializing State 1 – Internal hardware manager state which may be seen during initialization.
- Not installed – Card is not installed in the machine. The library has the Redundant Electronics feature activated, but the alternate HBC or HBT card is not installed.
- ok – Card is functioning normally. Used only for HBT cards.
- Pre-simplex: software not ready – Card is loading code. Used only for an HBC card in a library without Redundant Electronics.
- Pre-standby: software not ready – Card is loading standby code and is not ready to be used in the event of an automatic failover or manual switch. Used only for an alternate HBC card in a library with Redundant Electronics.
- Simplex: software ready – Card is functioning normally. Used only for an HBC card in a library without Redundant Electronics.
- Standby: software ready – Card is functioning normally and can be used in the event of an automatic failover or manual switch. Used only for an alternate HBC card in a library with Redundant Electronics.
- Unknown: unknown value – The active HBC card cannot communicate with the alternate and does not have any information about the alternate's status.

Health State

Current health of the card. Options are:

- error – Card has experienced a fault, such as it is in the Not Installed state.
- warn – Card is in a degraded state, such as the card has been ejected or its alternate is not yet in the Standby state.
- ok – Card is functioning normally

▼ Display Redundant Electronics Detail

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

Use this procedure to display detailed status information for the active and alternate library controller and drive controller cards.

Note – If Redundant Electronics is not enabled on this library, the display shows as much detail as is applicable.

1. Select **Tools > System Detail**.
2. Expand the **Redundant Electronics** folder, and click the card you want to display.
Cards are as follows:
 - hbca – Library controller, A (left) slot
 - hbcb – Library controller, B (right) slot
 - hbta – Drive controller, A (left) slot
 - hbtb – Drive controller, B (right) slot

The screen displays the current status of the selected card.

The screenshot shows the SL Console interface with the 'System Detail' window open. The left sidebar lists various system components, with 'Redundant Electronics' expanded. The main window displays the status for a selected card (hbca).

Redundant Electronics Status	
Device	libraryController
Card Type	hbca
IP Address:2B	10.80.104.99
IP Address:2A	10.1.10.19
Position	left
Device State	Duplex: software ready, switch is possible
Health State	ok

Alternate Card Status	
Alternate HBC Communicating	true

Screen Fields

Device

Type of card. Options are:

- libraryController – Library controller card
- driveController – Drive controller card

Card Type

The card's address within the library. Options are:

- hbca – Library controller, A (left) slot
- hbcb – Library controller, B (right) slot
- hbta – Drive controller, A (left) slot
- hbtb – Drive controller, B (right) slot

IP Address: 2B

IP address of the 2B port on the selected library controller card. The 2B port is the primary port for host communications.

If no card is installed, this field displays N/A.

Note – This field applies only to library controller (HBC) cards. Drive controller (HBT) cards do not have a 2B or 2A port and therefore always display N/A.

IP Address: 2A

IP address of the 2A port on the specified HBC card. The 2A port is the secondary port for host communications.

If no card is installed, this field displays N/A.

Note – This field applies only to library controller (HBC) cards. Drive controller (HBT) cards do not have a 2B or 2A port and therefore always display N/A.

Position

Position of the card within the card cage, as viewed from the back of the machine. Options are:

- Left – Left card slot; also referred to as the A side
- Right – Right card slot; also referred to as the B side
- Top – Top card slot
- Bottom – Bottom card slot

Device State

Current operating state of the card. Options are:

- Duplex: software ready; switch possible – Card is functioning normally. Used only for an active HBC card in a library with Redundant Electronics.
- Initializing State 0 – Internal hardware manager state which may be seen during initialization.
- Initializing State 1 – Internal hardware manager state which may be seen during initialization.

- Not installed – Card is not installed in the machine. The library has the Redundant Electronics feature activated, but the alternate HBC or HBT card is not installed.
- ok – Card is functioning normally. Used only for HBT cards.
- Pre-simplex: software not ready – Card is loading code. Used only for an HBC card in a library without Redundant Electronics.
- Pre-standby: software not ready – Card is loading standby code and is not ready to be used in the event of an automatic failover or manual switch. Used only for an alternate HBC card in a library with Redundant Electronics.
- Simplex: software ready – Card is functioning normally. Used only for an HBC card in a library without Redundant Electronics.
- Standby: software ready – Card is functioning normally and can be used in the event of an automatic failover or manual switch. Used only for an alternate HBC card in a library with Redundant Electronics.
- Unknown: unknown value – The active HBC card cannot communicate with the alternate and does not have any information about the alternate’s status.

Health State

Current health of the card. Options are:

- error – Card has experienced a fault, such as it is in the Not Installed state.
- warn – Card is in a degraded state, such as the card has been ejected or its alternate is not yet in the Standby state.
- ok – Card is functioning normally

Alternate HBC Communicating

Current communications status of the alternate library controller (HBCB) card. Options are:

- true – Alternate HBC card is successfully communicating with the active card.
- false – Alternate HBC card is not communicating with the active card.
- N/A – Alternate HBC card is not installed; or the selected card is not a library controller.

Software Switch Allowed

Indicator of whether an automatic failover or manual switch is possible, given the current status of the alternate library and drive controller cards. Options are:

- true – Automatic failover or manual switch is possible.
- false – Automatic failover or manual switch is not possible.
- N/A – Alternate HBC card is not installed; or the selected card is not a library controller

▼ Manually Switch Redundant Electronics Cards

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

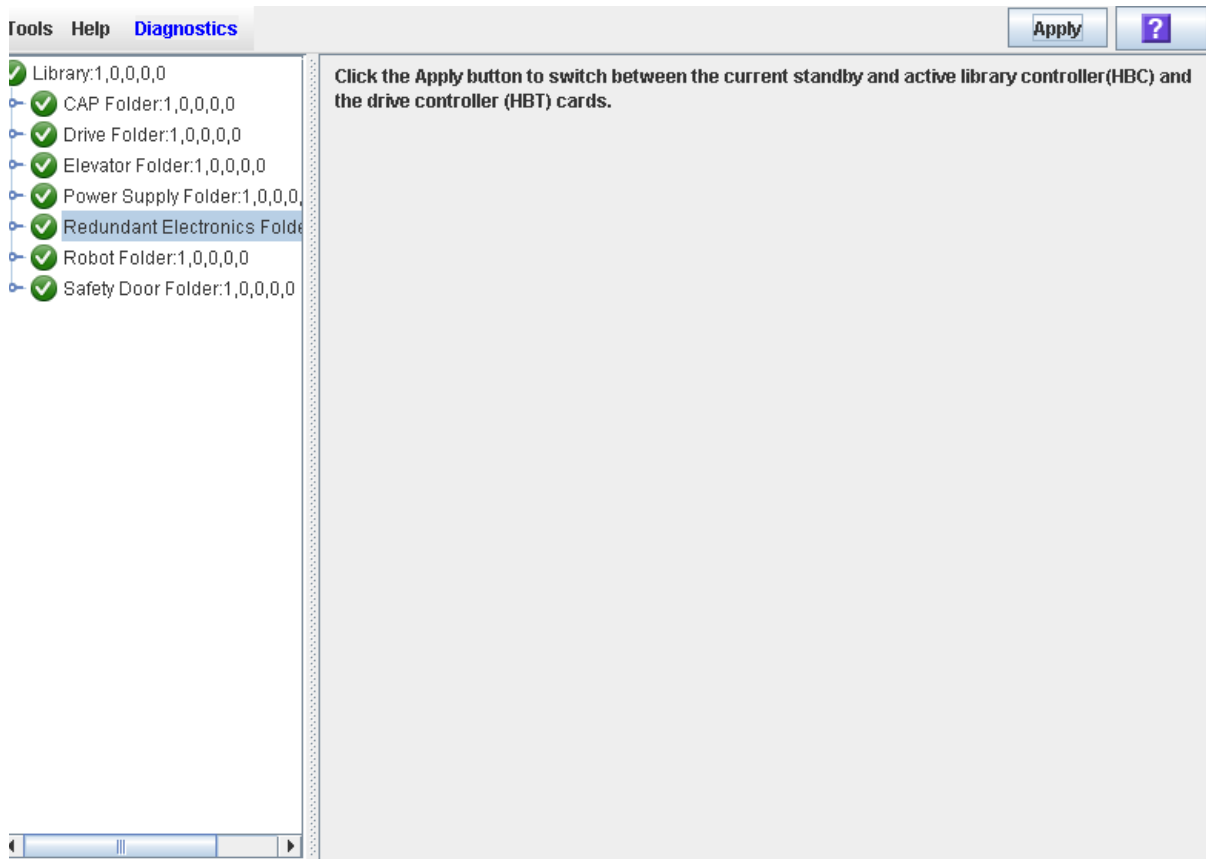
Use this procedure to switch the active and alternate controller cards. Each library controller and its partnered drive controller are always switched as a pair. The current alternate library and drive controller cards become active, and the active ones become alternate.

Before performing this procedure you should verify that the **Software Switch Allowed** indicator on the Redundant Electronics Status Detail screen is “true”. See [“Display Redundant Electronics Detail” on page 137](#) for detailed instructions.

Note – You will be logged off the library as part of this procedure. Once the switch completes, in order to log back into the library, you must specify the IP address or DNS alias of the new active library controller card.

1. Select Tools > Diagnostics and select Redundant Electronics.

The Redundant Electronics Switch screen appears.



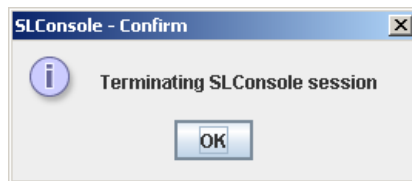
2. Click Apply to begin the switch process.

- If the alternate library and drive controller cards are operating normally, the **Confirm** dialog appears, prompting you to confirm that you want to proceed with the switch.



- If there is a problem with the alternate library and drive controller cards, an error message is displayed and you are not allowed to continue with the switch.
3. **Click Yes to begin the switch process.**

The switch process begins, and a popup appears indicating that your SL Console session will be terminated.



4. **Click OK to dismiss the message and log off the SL Console.**
5. **Wait until the switch is complete before logging back into the library. In addition, you must specify the IP address or DNS alias of the new active controller in order to log in. See ["Log In to the Library After a Failover"](#) on page 142 for detailed instructions.**

▼ Log In to the Library After a Failover

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

Use this procedure to log in to the library after an automatic failover or manual switch. You need to log in by connecting to the library controller that was the alternate prior to the failover or switch.

1. Obtain the IP address or DNS alias of the new active library controller.

This was the alternate library controller prior to the failover or switch.

2. Bring up the SL Console. See “General SL Console Usage Tasks” on page 46 for a list of procedures to do this.

The SL Console Login screen appears.



The screenshot shows the login interface for the Sun Storagetek Library Console. At the top left is the Sun logo with 'ORACLE' underneath. To the right of the logo is the text 'STORAGETEK LIBRARY CONSOLE'. Below this, there are three input fields: 'User ID' (a text box), 'Password' (a text box), and 'Library' (a dropdown menu). At the bottom of the form are four buttons: 'Log on', 'Help', 'About', and 'Exit'.

3. Enter your login information, and click Log on.

User ID: *SLC_login*

Password: *password*

Library: *library_ID*

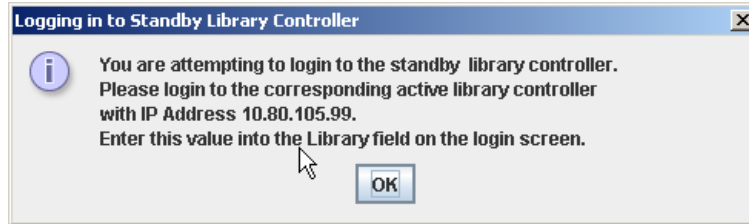
where:

- *SLC_login* is the SL Console user ID.
- *password* is the password assigned to this user ID.

- *library_ID* is the library to which you want to connect, expressed in either of the following ways:
 - IP address of the library, in dotted decimal notation (*nnn . nnn . nnn . nnn*)
 - DNS alias of the library

Note – The user ID you use determines the screens you can access. See “[SL Console Security](#)” on page 34.

4. If you are attempting to log into the wrong controller, then the following dialog appears. You cannot use the SL Console to log into the alternate controller.



Click **OK** and return to [Step 3](#), this time entering the information for the correct controller.

CAP Management

CAP Operations

CAPs (cartridge access ports) allow a library operator to enter or eject cartridges to or from the library. You can use the CAPs only when the library is in automated mode.

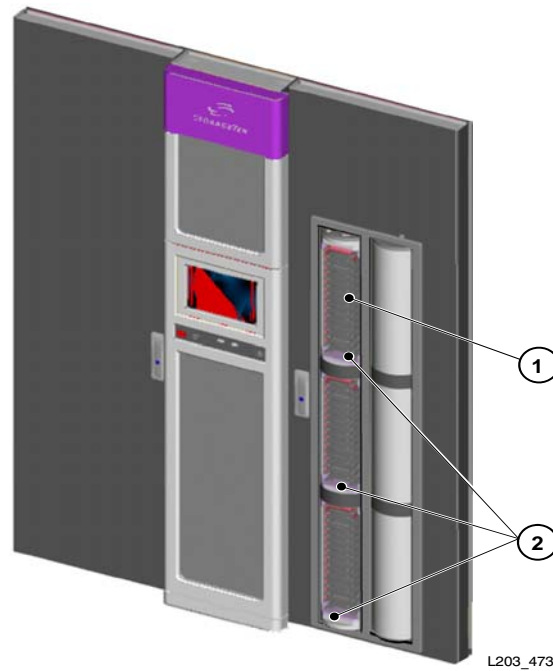
Note – This section includes general information about CAPs. For details about using CAPs in partitioned libraries, see [“CAPs and Partitions” on page 93](#).

The library includes one standard CAP A (on the left, as viewed from the front of the library). An optional CAP B (on the right, as viewed from the front) is also available.

Each CAP contains three cartridge magazines. Each magazine contains 13 cells, allowing import/export of up to 39 cartridges at a time. The magazines can be removed from the CAP to load cartridges in a batch mode.

The CAP magazines span only the lower three rails on the right side of the library. To import or export a cartridge from the top rail on the right side, a HandBot places the cartridge in an elevator slot to accomplish the move.

FIGURE 7-1 CAP A Unlocked



1. CAP slot

2. Three magazines with 13 slots each

Cartridge Slot Locations

Slot locations within the CAPs have the following addressing:

- **Library number** (within a library complex)
- **Rail number** – Rails are numbered 1 through 4, rail 1 is the topmost rail.

Note – CAP slots begin numbering at rail 2.

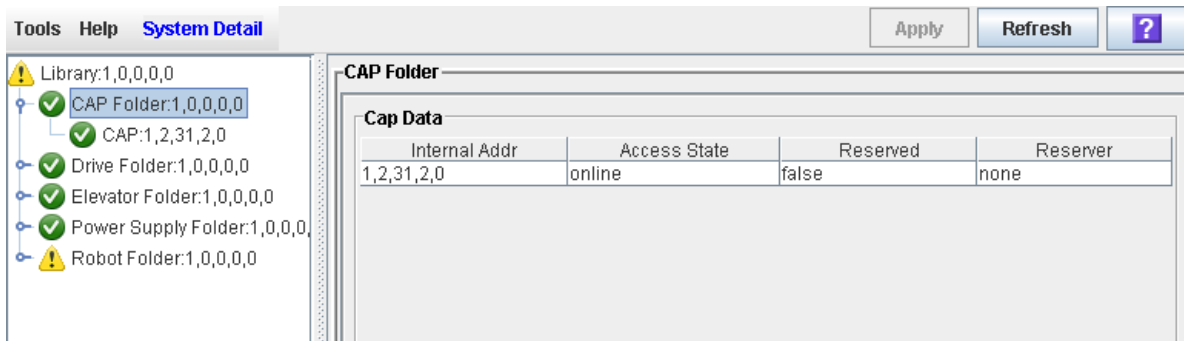
- **Column number** – Columns are “signed” numbers as seen from the front of the library, where +1 is right of the drive bays and -1 is to the left of the drive bays.
- **Side number** – Outer wall = 1, Inner wall = 2

Note – For CAPs, side number -1 = CAP A and side number +1 = CAP B.

- **Row number** – Numbered consecutively, from the top down

Note – CAP slots begin with row number 0, which is the magazine handle. CAP slots are not considered as storage slots.

An example of how this notation appears on the SL Console is shown below.



CAP Auto Enter Mode

Note – CAP auto enter mode applies only to HLI libraries; it is not supported in FC-SCSI libraries.

Note – CAP auto enter mode is not supported in partitioned libraries.

CAP auto enter mode allows a library operator to open a CAP and initiate an enter operation without issuing an explicit enter request and without an explicit reservation from a host application. When in auto mode, a CAP is left unlocked and its LED is lit. The CAP is locked only during cartridge enter, eject, or audit operations.

Auto enter mode is managed by the host applications. See the appropriate tape management software documentation for details. To place a CAP in auto enter mode, you must enter the appropriate tape management command to unlock the CAP.

To initiate an enter operation using an automatic CAP, you only need to press the **CAP Open** button on the key pad. Auto enter mode does not affect CAP operations for ejecting cartridges, so you must always issue an explicit eject command to eject cartridges through the CAP.

Manual CAP Mode

Manual mode is the most secure method of CAP operations.

When in manual mode, a CAP is locked by default and its LED is not lit. To initiate an enter or eject operation using a manual CAP, you must enter an explicit enter or eject request before pressing the CAP Open button on the key pad.

CAP Management Tasks

Task	Page
Display CAP Summary Information	149
Display Current CAP Status	150
Display CAP Properties	151
Unlock a CAP	152
Lock a CAP	154

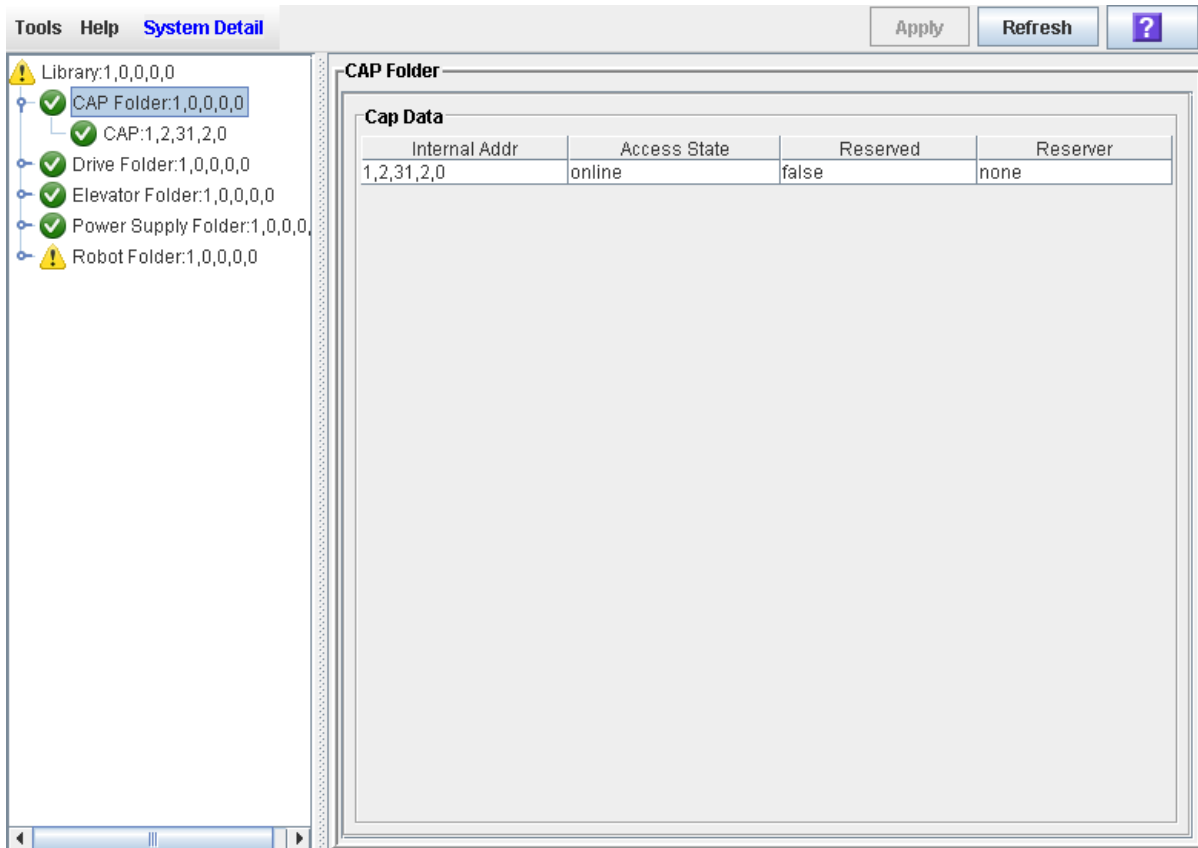
▼ Display CAP Summary Information

Use this procedure to display summary information for all CAPs in the library.

Note – This information is also available through **Reports > CAP Summary**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**, and click the **CAP folder**.

The screen lists all the library CAPs and their locations.



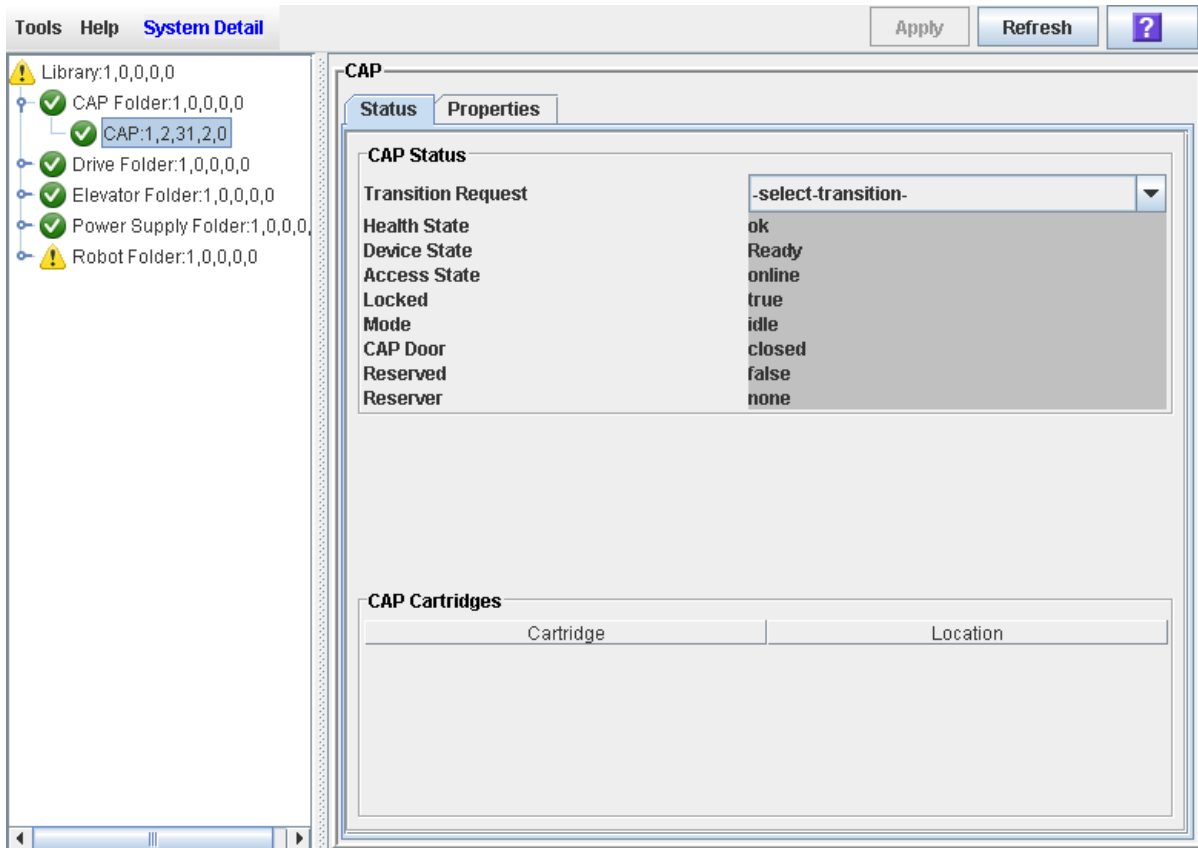
▼ Display Current CAP Status

Use this procedure to display the current operational state of a CAP.

Note – This information is also available on the **CAP Details** report. See [“Display a Library Report” on page 62](#) for detailed instructions.

1. Select **Tools > System Detail**.
2. Expand the **CAP Folder**, and click the **CAP** you want to display.
3. Click **Status**.

The screen displays the current status of the selected CAP.



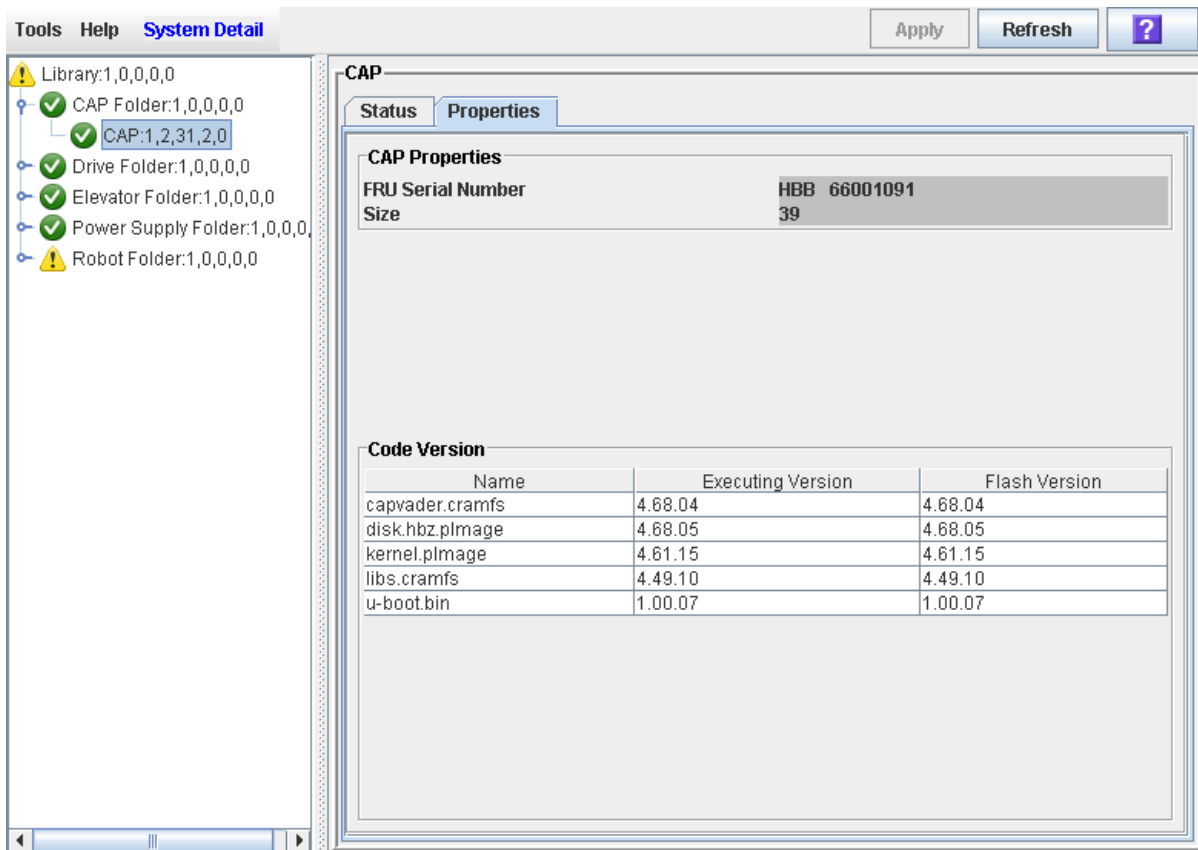
▼ Display CAP Properties

Use this procedure to display static information for a CAP, including the serial number and number of cells.

Note – This information is also available through **Reports > CAP Details**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**.
2. Expand the **CAP Folder**, and click the **CAP** you want to display.
3. Click **Properties**.

The **CAP Properties** screen appears.



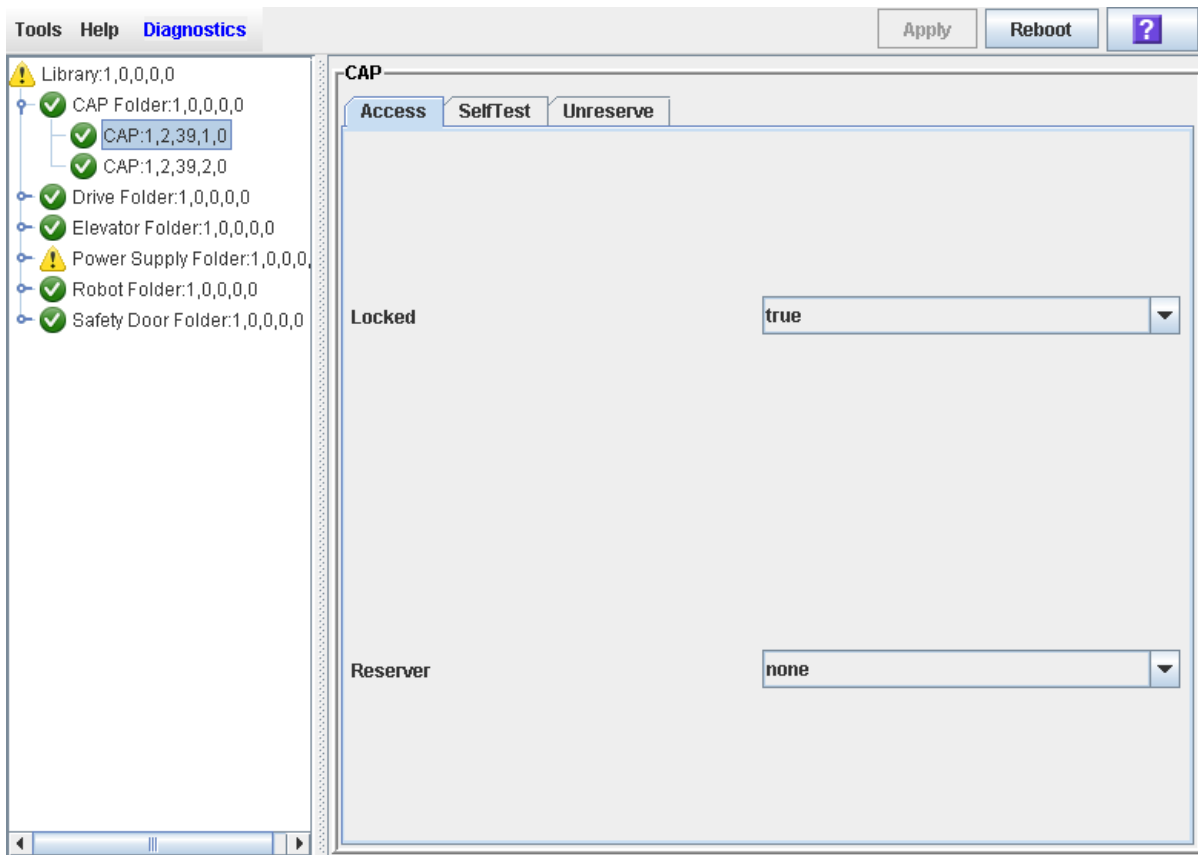
▼ Unlock a CAP

Normally a CAP is unlocked from a host. Use this procedure when you need to perform the unlock operation manually at the SL Console.

Note – If the CAP is reserved by a host, the host must release the CAP reservation before you can use this procedure.

1. Select **Tools > Diagnostics**.
2. Expand the **CAP Folder**, and click the **CAP** you want to modify.
3. Click the **Access** tab.

The **Access** screen appears.



4. In the **Locked** pull-down, click **false**. Click the **Apply** button.

The **Confirm** popup appears.



5. Click **OK**.

The CAP door unlocks, and the CAP button light turns on.

Note – The CAP status changes to “unlocked” in the host library management software.

Note – The CAP is reserved by the library and inaccessible to all library hosts until you close and lock the CAP or AEM access door. See [“Lock a CAP” on page 154](#) for details.

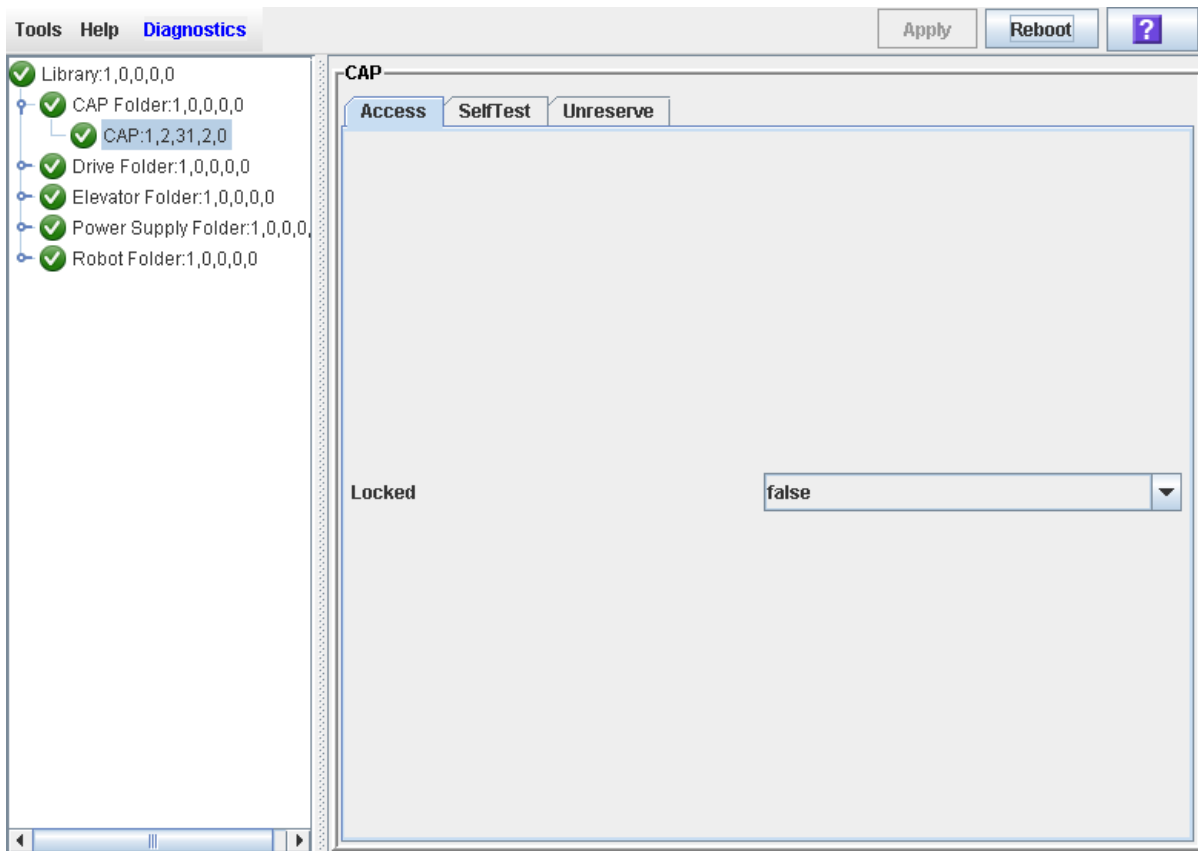
▼ Lock a CAP

Normally a CAP is locked from a host. Use this procedure when you need to perform the lock operation manually at the SL Console.

Note – If you unlock a CAP(see [“Unlock a CAP”](#) on page 152 for details.), the CAP is reserved by the library and unavailable to all hosts until you perform this procedure.

1. Select **Tools > Diagnostics**.
2. Expand the **CAP Folder**, and click the **CAP** you want to modify.
3. Click the **Access** tab.

The **Access** screen appears.



4. In the **Locked** field, click **True**. Click the **Apply** button.

The CAP locks, and the CAP button light turns off.

Drive Management

Each SL8500 library supports from 1 to 64 drives. The interface to these drives is fiber optic based; meaning Fibre Channel, FICON¹, or ESCON² attachments.

Drive States

A drive can be in either of the following states:

- Online – The drive is available for read/write operations.
- Offline – The drive is not available for read/write operations.

1. Short for Fiber Connection, or Fiber Connectivity – IBM's fiber optic channel technology that extends the capabilities ESCON. FICON supports full duplex data transfers over longer distances.

2. Short for Enterprise Systems Connection, or Enterprise Systems Connectivity – an IBM fiber optic channel technology that supports half duplex data transfers up to 200 Mb/s.

Drive Management Tasks

Task	Page
Display Drive Summary Information	157
Display Drive Status	159
Display Drive Properties	160
Display Drive VOP	161
Display Drive VOP	161
Display Drive LED Status	163
Display Drive Tray Status	164
Display the Drive Events Report	165
Display the Drive Media Events Report	167

▼ Display Drive Summary Information

Use this procedure to display summary information for all drives in the library.

If you need to perform a manual mount to a drive, this procedure displays a mapping of all addresses for each library drive:

- Firmware (internal address)
- Host software (HLI-PRC address)
- Hardware (drive bay)

The following information is also displayed:

- Access State – online, offline
- Drive State:
 - Empty
 - Unloaded – cartridge is present
 - Ready – cartridge is loaded
 - NotCommunicating
 - rewindUnload –drive is busy rewinding and unloading
- Drive Type
- Drive serial number
- Current code version
- Drive interface type

Note – This information is also available through **Reports > Drive Summary**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select Tools > System Detail, and click the Drive folder.

The screen lists the library drives and displays their locations.

Internal Addr	HLI-PRC Addr	Bay	Access State	Drive Type	Drive S/N	Code Ver	I/F Type
1,1,-1,1,1	0,1,4,0	63	online	Stk9840a-3590	331001017052	1.35.105/4.06	Escon
1,1,-1,1,2	0,1,5,0	59	online	Stk9840a	331000031293	1.35.105/4.06	Escon
1,1,-1,1,3	0,1,6,0	55	online	Stk9840a	331001012234	1.35.105/4.06	Escon
1,1,-1,1,4	0,1,7,0	51	online	Stk9840a	331002021933	1.35.105/4.06	Escon
1,1,-2,1,1	0,1,0,0	64	online	Stk9840a	331002015769	1.35.102/4.06	Escon
1,1,-2,1,2	0,1,1,0	60	online	Stk9840a	331002028508	1.35.105/4.06	Escon
1,1,-2,1,4	0,1,3,0	52	online	Stk9840c-3590	500000007595	1.40.001/5.10	Fibre
1,1,1,1,3	0,1,10,0	54	online	Stk9840a-3590	331001011072	1.35.105/4.06	Escon
1,1,1,1,4	0,1,11,0	50	online	Stk9840a	331002039768	1.35.105/4.06	Escon
1,1,2,1,3	0,1,14,0	53	online	Stk9840a	331000027514	1.35.105/4.06	Escon
1,1,2,1,4	0,1,15,0	49	online	T10000a	531001001178	1.38.109/5.10	Fibre
1,2,-1,1,1	1,1,4,0	47	online	Stk9840a	331001015084	1.35.105/4.06	Escon
1,2,-1,1,2	1,1,5,0	43	online	Stk9840a	331000031627	1.35.105/4.06	Escon
1,2,-2,1,1	1,1,0,0	48	online	Stk9840a	331000055376	1.35.105/4.06	Escon
1,2,-2,1,2	1,1,1,0	44	online	Stk9840a	331000023533	1.35.102/4.06	Escon
1,2,1,1,2	1,1,9,0	42	online	Stk9840a	331002024023	1.35.105/4.06	Escon
1,2,1,1,4	1,1,11,0	34	online	Stk9840a	331002046122	1.35.105/4.06	Escon
1,2,2,1,1	1,1,12,0	45	online	Stk9840a	331001011212	1.35.105/4.06	Escon
1,2,2,1,2	1,1,13,0	41	online	Stk9840a	331002010779	1.35.105/4.06	Escon
1,2,2,1,3	1,1,14,0	37	online	T10000a	531002002915	1.38.109/5.10	Fibre
1,2,2,1,4	1,1,15,0	33	online	Stk9840a	331000020858	1.35.102/4.06	Escon
1,3,-1,1,2	2,1,5,0	27	online	Stk9840a	331002044134	1.35.105/4.06	Escon
1,3,-1,1,4	2,1,7,0	19	online	Stk9840a	331000055418	1.35.105/4.06	Escon
1,3,-2,1,1	2,1,0,0	32	online	Stk9840a	331001015064	1.35.105/4.06	Escon
1,3,-2,1,2	2,1,1,0	28	online	Stk9840a	331002016241	1.35.105/4.06	Escon
1,3,-2,1,4	2,1,3,0	20	online	T10000a	531001001189	1.38.109/5.10	Fibre
1,3,1,1,1	2,1,8,0	30	online	Stk9840a	331000054155	1.35.105/4.06	Escon

▼ Display Drive Status

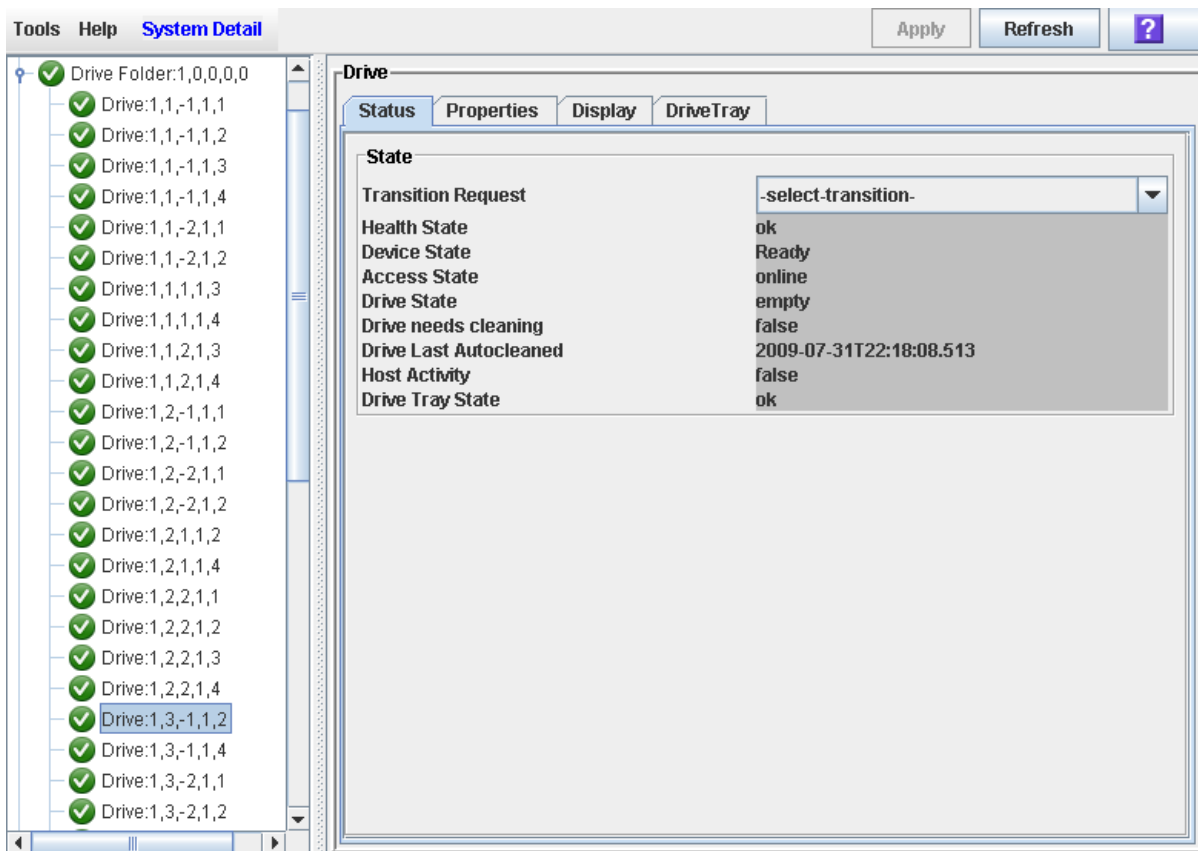
Use this procedure to display the current operational state of a drive. The information includes:

- Current drive and drive tray status information
- Whether the drive is loaded
- Cartridge VOLID if the drive is loaded
- Drive cleaning information
- Host activity

Note – This information is also available through **Reports > Drive Details**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**
2. Expand the **Drive Folder**, and click the drive you want to display.
3. Click **Status**.

The screen displays the current status of the selected drive.



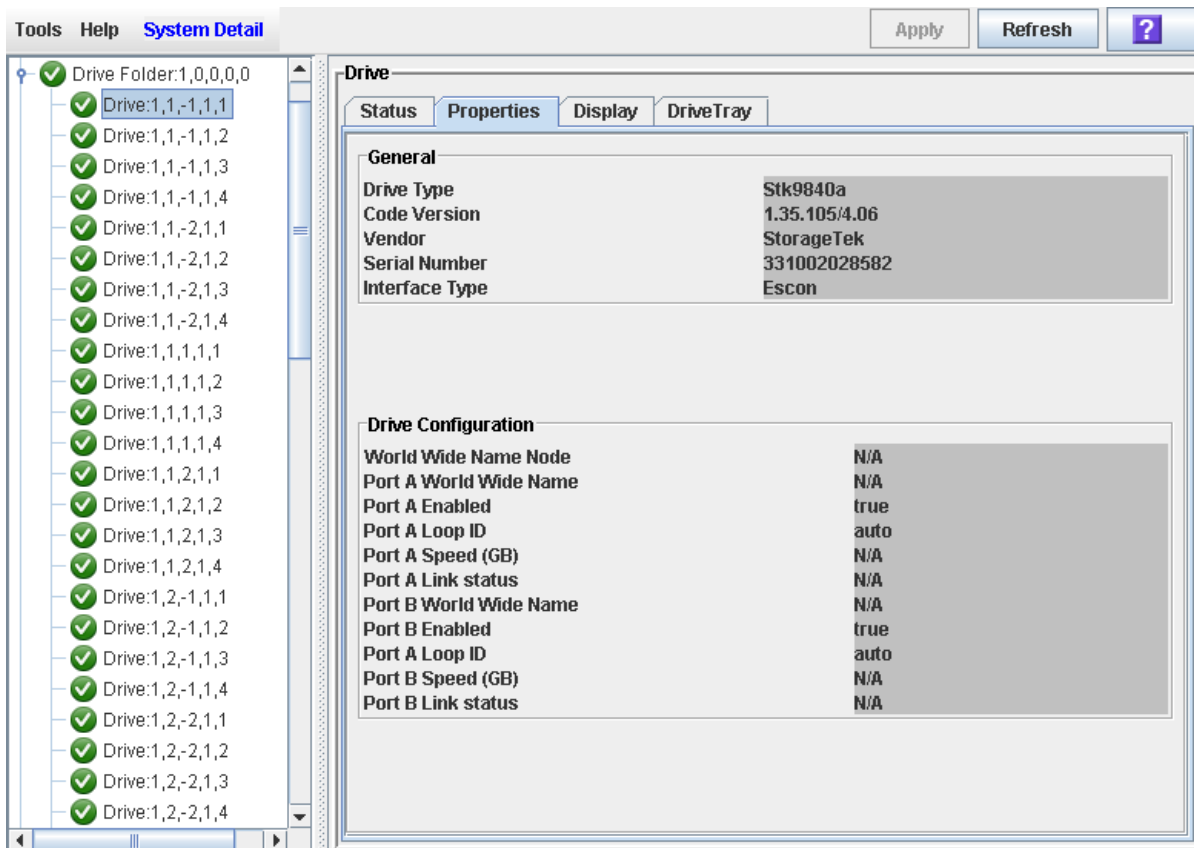
▼ Display Drive Properties

View detailed drive configuration information, including the drive type and serial number and port configuration.

Note – This information is also available through **Reports > Drive Details**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and click the drive you want to display.
3. Click **Properties**.

The **Drive Properties** screen appears.



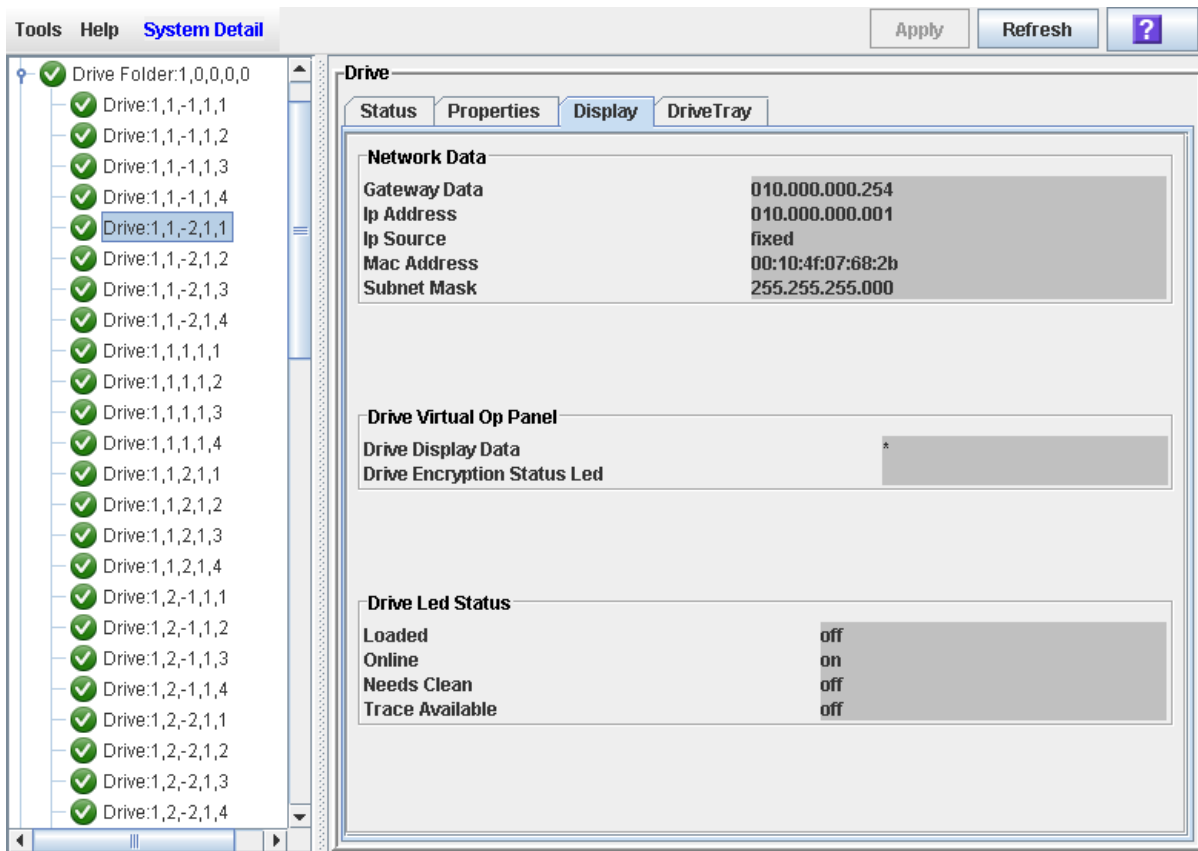
▼ Display Drive VOP

Note – This procedure is for Oracle StorageTek T10000 drives only.

Use this procedure to display the Virtual Operator Panel (VOP) for T10000 drives.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and click the drive you want to display.
3. Click **Display**.

The drive VOP information appears in the Drive Virtual Op Panel section.

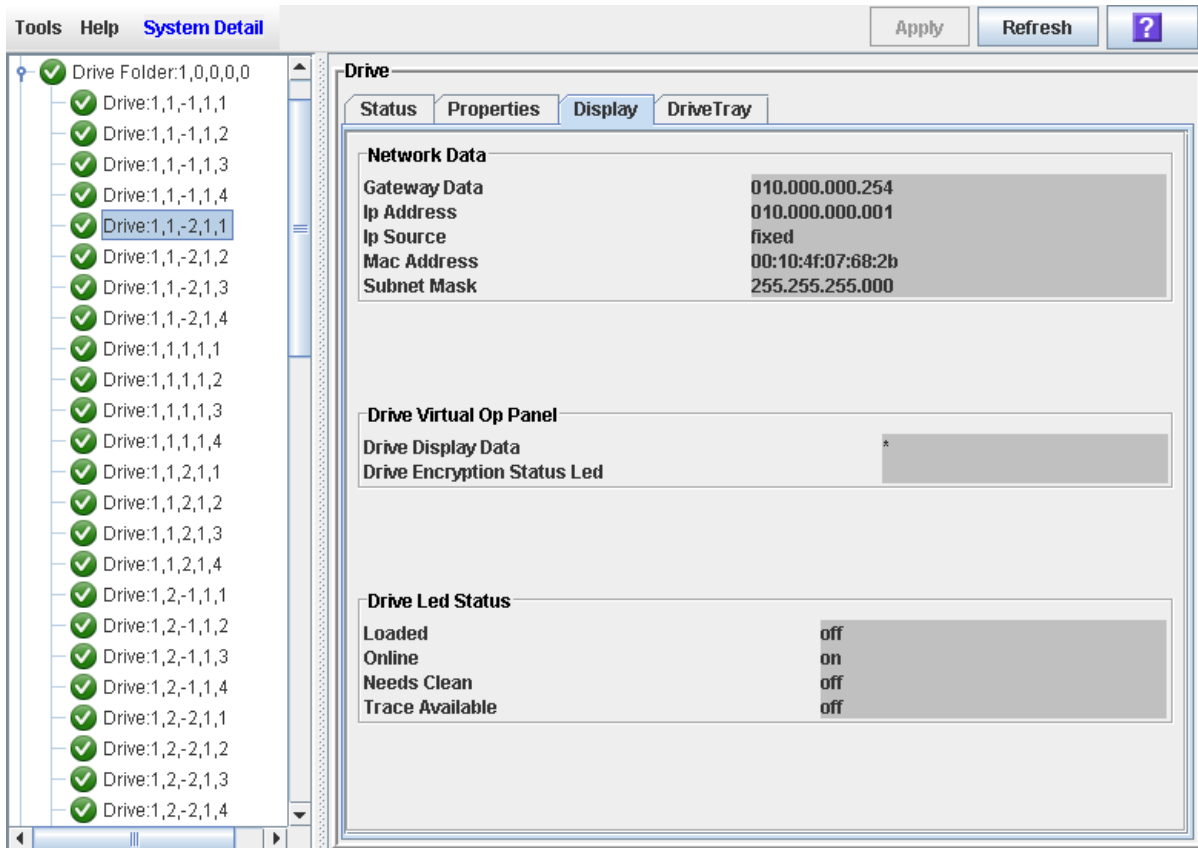


▼ Display Drive Network Data

Use this procedure to display IP and MAC address data for a library drive.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and click the drive you want to display.
3. Click **Display**.

The data appears in the Network Data section.

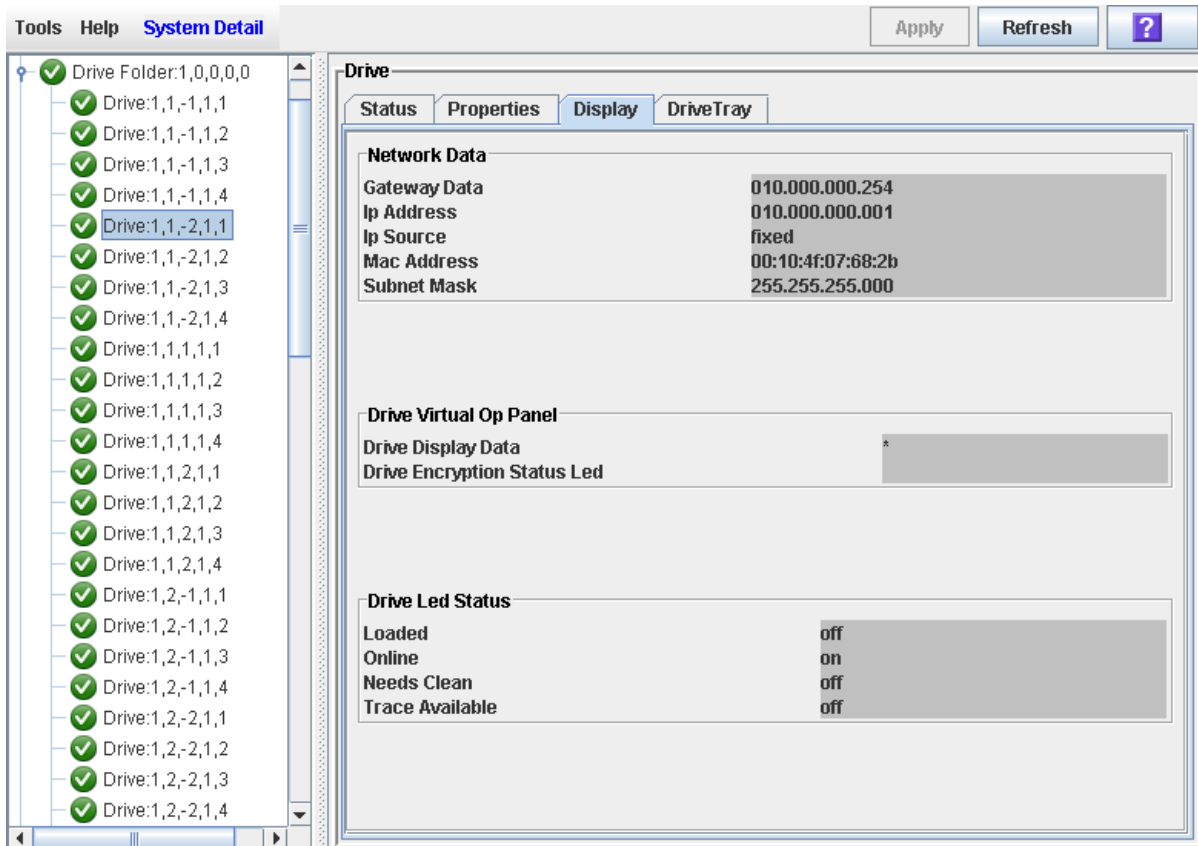


▼ Display Drive LED Status

Use this procedure to display current statuses of a selected drive's LEDs, including loaded, online, cleaning, and trace available statuses.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and click the drive you want to display.
3. Click **Display**.

The data appears in the Drive Led Status section.

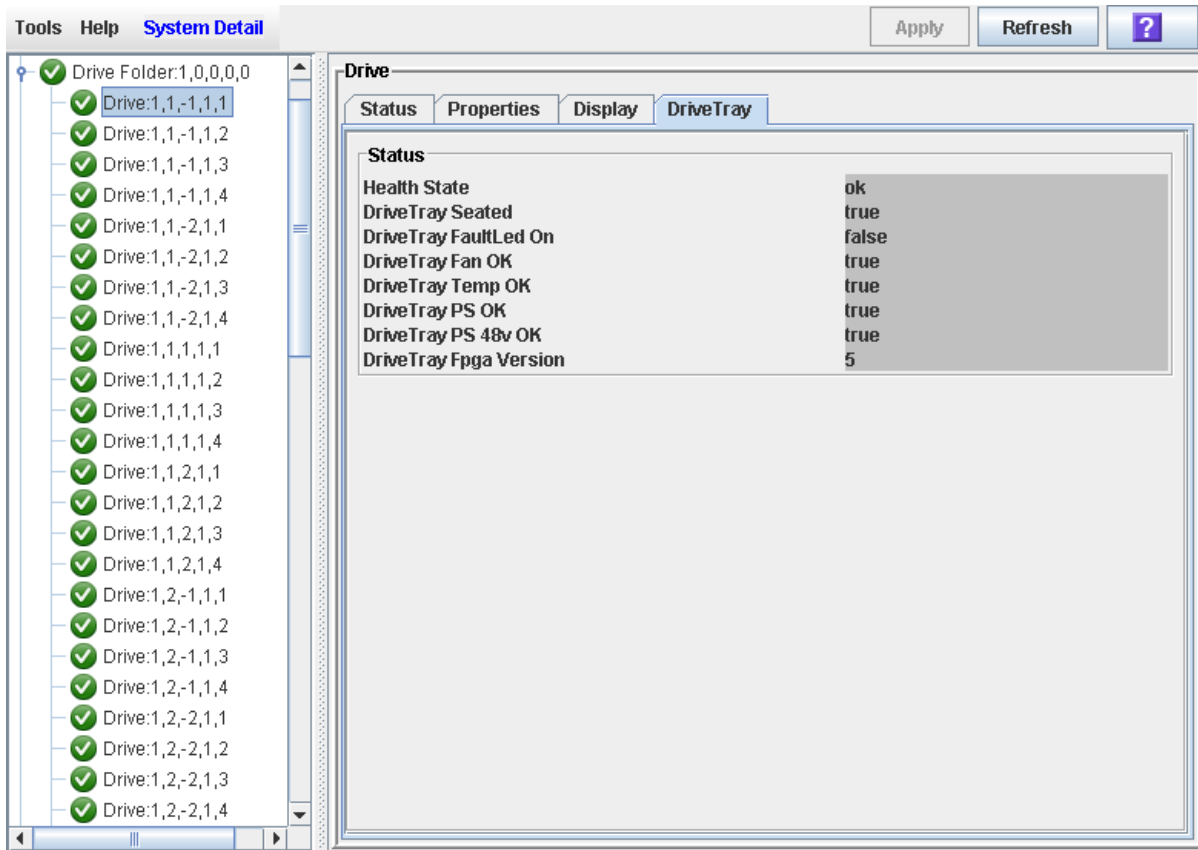


▼ Display Drive Tray Status

Use this procedure to display the current status of a drive tray.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and click the drive you want to display.
3. Click **DriveTray**.

The **Status** screen appears.



▼ Display the Drive Events Report

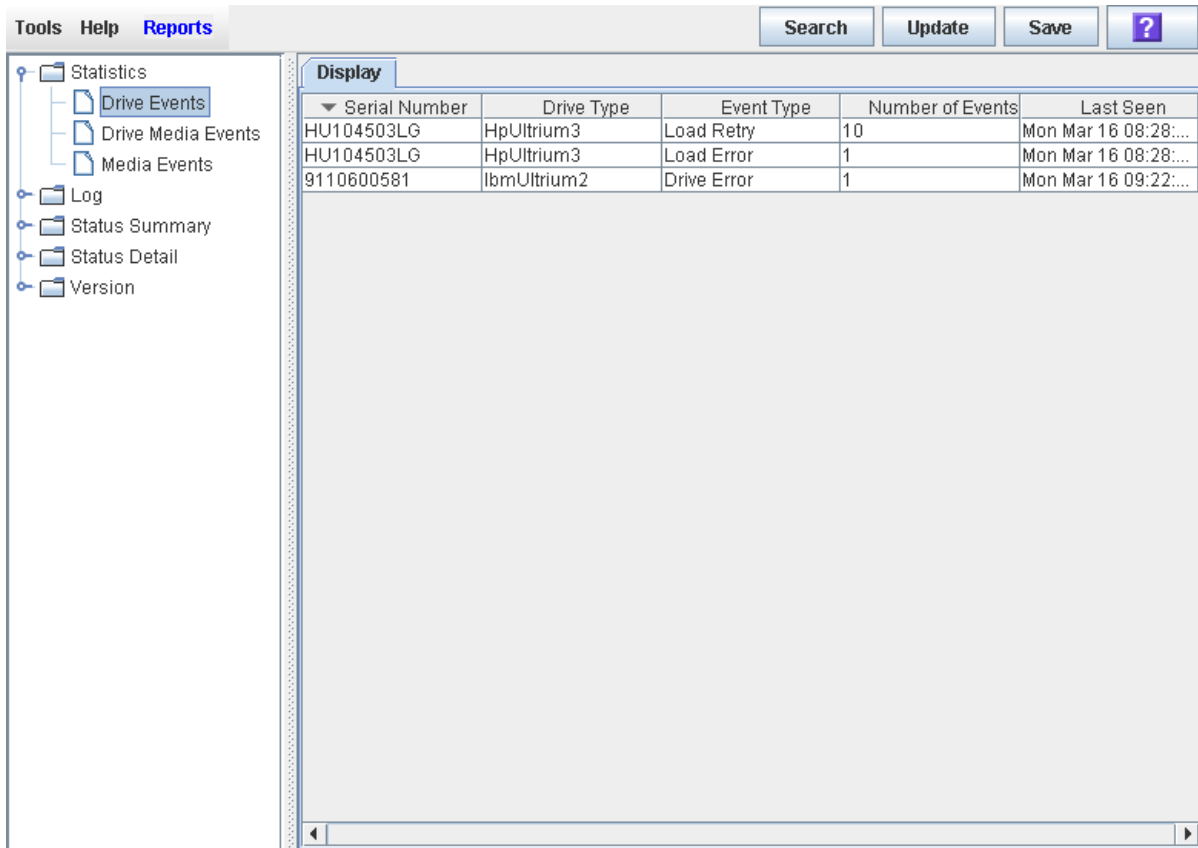
The Drive Events Report summarizes drive events and errors that have occurred on library drives. The report is updated whenever there is a drive event not related to media. You can use the report to help identify and diagnose faulty drives.

For each drive that has experienced events, the report lists the type of drive, type of error, the number of occurrences, and the date and time of the last such event. The report can display up to 70 entries.

By default, the report is sorted in drive serial number order. Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 34](#).

Note – For media errors associated with drives, see [“Display the Drive Media Events Report” on page 167](#).

1. Select **Tools > Reports**.
2. Expand the **Statistics** folder, and click **Drive Events**.



Serial Number	Drive Type	Event Type	Number of Events	Last Seen
HU104503LG	HpUltrium3	Load Retry	10	Mon Mar 16 08:28:...
HU104503LG	HpUltrium3	Load Error	1	Mon Mar 16 08:28:...
9110600581	IbmUltrium2	Drive Error	1	Mon Mar 16 09:22:...

Screen Fields

Serial Number

Serial number of the drive.

Drive Type

Brand and model of the drive.

Event Type

Type of event being tracked. All of these events indicate problems with the drive, not the media. Options are:

- Drive Error – Drive had a general problem.
- Load Error – Drive was unable to load the cartridge.
- Load Retry – Drive required retries to load the cartridge.

Number of Events

Total number of events of this type that have been recorded for this drive.

Last Seen

Date and time of the most recent occurrence of the error.

▼ Display the Drive Media Events Report

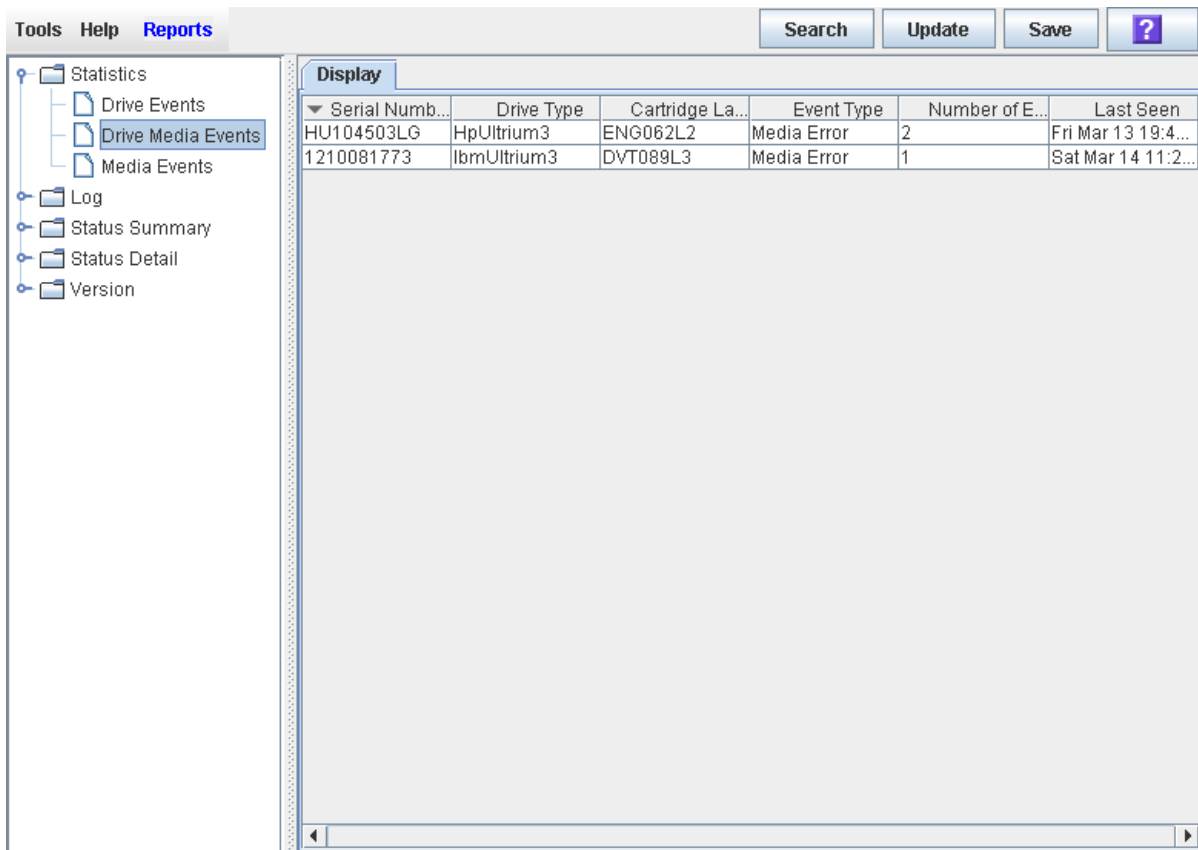
The Drive Media Events Report summarizes media events that have occurred on library drives. The report is updated whenever a media event or error occurs. You can use the report to help identify and diagnose faulty drives or cartridges.

For each drive that has experienced media events, the report lists the VOLID of the cartridge, the type of event, the number of occurrences, and the date and time of the last such event. The report can display up to 500 entries.

By default, the report is sorted in drive serial number order. Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 34](#).

Note – For cartridge errors not necessarily associated with drives, see [“Display the Media Events Report” on page 200](#).

1. Select **Tools > Reports**.
2. Expand the **Statistics** folder, and click **Drive Media Events**.



Screen Fields

Serial Number

Serial number of the drive.

Drive Type

Brand and model of the drive.

Cartridge Label

VOLID of the cartridge that has experienced an event.

Event Type

Type of media event being tracked. Options are:

- Media Error – The drive indicated there was a problem with the media; this could possibly also indicate a problem with the drive.

Number of Events

Total number of events of this type that have been recorded for this cartridge on this drive.

Last Seen

Date and time of the most recent occurrence of the event.

Cartridge Management

All library cartridges must have a readable external label. See [Appendix C, “Cartridge Handling”](#) for details.

The HSC and ACSLS host software applications do not support unlabeled cartridges and will not allow them to be entered through the CAP. If you place an unlabeled cartridge in a CAP, the host leaves it there and you must remove it from the CAP.

If you place an unlabeled cartridge into a storage cell manually, the Robot leaves it there during a hardware audit and does not attempt to place another cartridge into the slot. During an ACSLS or HSC audit, however, the host moves the cartridge to the CAP for ejection from the library.

The library controller will not allow you to mount an unlabeled or unknown type cartridge into any tape drive.

Importing Cartridges

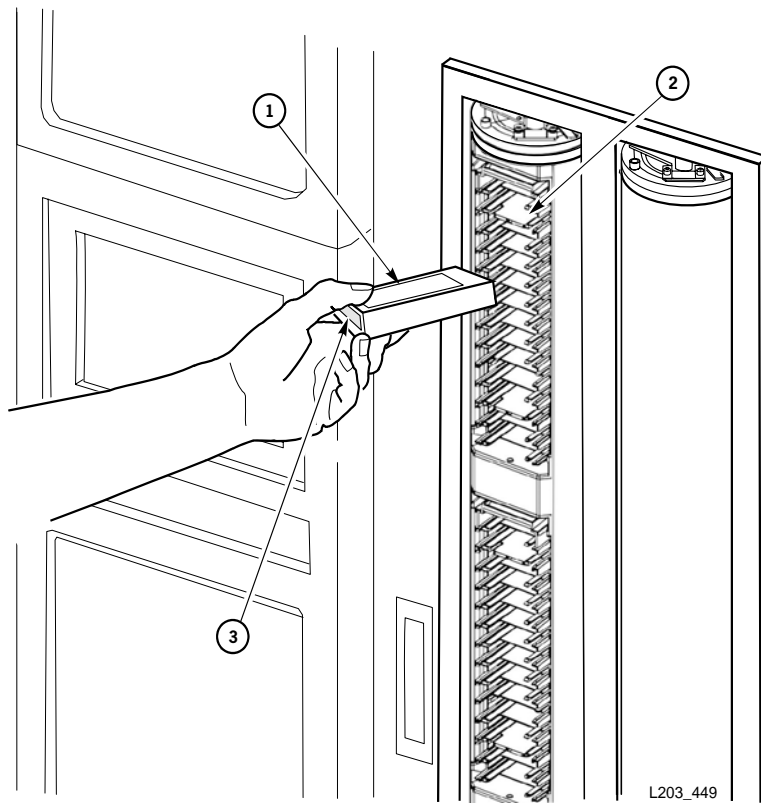
You can enter up to 39 cartridges one time through each CAP.

Before entering a cartridge into the library, you must verify that it is labeled properly. Insert each cartridge in a CAP slot so that the customer label (if present) is facing you, the hub gear is facing down, and the cartridge label is facing you. Cartridges may be placed in any CAP slot, in any order; the Robot audits all CAP slots when the CAP door is closed.

When a cartridge is imported, the cartridge label is read by the HandBot hand's barcode line scanner and the cartridge is assigned a home cell by the library controller or mounted on a drive, depending upon the purpose for which it was imported. The

location of a stored cartridge is recorded in library memory, formatted as library number, rail, column, side, and row (see [Appendix A, "Cartridge Slot Locations"](#)). The location is also transmitted to the host and stored in its cartridge database.

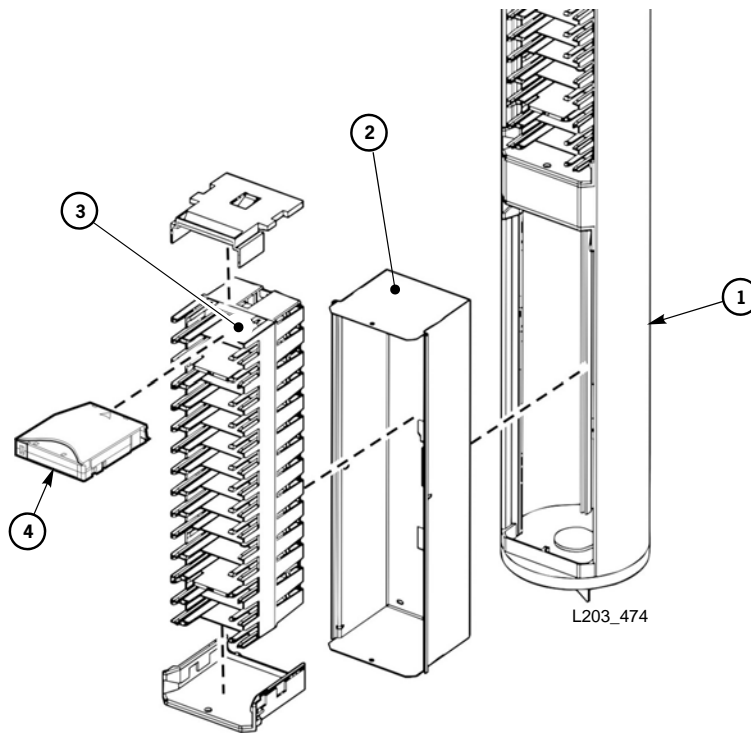
FIGURE 9-1 Placement of Cartridges with the Magazine Inside the CAP



1. Customer label (9x40 only)
2. Magazine slots

3. Volume serial number label

FIGURE 9-2 Placement of Cartridges with the Magazine Outside the CAP



1. CAP

2. CAP magazine removed

3. Magazine slots

4. Inserting cartridge with hub down

Exporting Cartridges

When a cartridge is exported, you must specify the VOLIDs of the cartridge you wish to remove from the library. The VOLID location is then retrieved from the library's memory, the HandBot moves to the cartridge, removes it from its slot, and the cartridge is placed into the CAP slot. A total of 39 cartridges may be exported at one time through each CAP.

After the CAP is opened, the location of the cartridge is erased from the library controller database and the host database. This is especially important when exporting cleaning cartridges from a library; if the cleaning cartridge is not removed from the CAP and the CAP is closed, the library treats the cartridge as "new" and the expired cleaning cartridge is used again.

Locating Cartridges

The SL Console allows you to display the library internal address of any cartridge. You can locate a cartridge based on any of the following criteria:

- VOLID – See ["Locate a Cartridge by VOLID"](#) on page 182 for details.

- Library internal address – See [“Locate a Cartridge by Address” on page 184](#) for details.
- Host address (HLI) – See [“Locate a Cartridge by Address” on page 184](#) for details.

This utility is especially useful when you need to perform a manual mount of a cartridge. The library management software (HSC or ACSLS) provides the VOLID and the HLI-PRC or FC-SCSI address of the cartridge and the drive bay address of an available drive. Before you enter the library, write down the VOLID, cartridge location, and the drive slot location.

Note – If the library is in a complex, make sure you enter the correct library number (for the internal firmware address search) or the LSM number (for the HLI-PRC address search). For more information see [“PTP Addressing Scheme” on page 234](#).

Recovery Moves

Using the recovery move diagnostic function, you can move a cartridge from one location to another. For example:

- You can return a cartridge to its original location from a CAP cell, drive, or another storage cell location.
- You might decide to group cartridges by data type or to move them closer to their assigned drives.
- You can eject a cleaning or diagnostic cartridge that has expired.
- You can enter a new cleaning or diagnostic cartridge and move it to a reserved storage cell.

A cartridge currently in a storage cell can be moved only to a CAP, a reserved cell, or another storage cell, not to a drive. A cartridge currently in a drive, CAP, or reserved cell can be moved to any other unoccupied location in the library. See the following procedures for complete details:

- [“Move a Specified Cartridge by VOLID” on page 189](#)
- [“Move a Cartridge From a Specified Location” on page 195](#)

Before moving any cartridge, it is helpful to display or print a report showing where cartridges are currently located and which storage cells are unoccupied. See one of the following procedures for detailed instructions:

- [“Display Library Cartridge Information in Tabular Format” on page 176](#)
- [“List Library Cartridges” on page 179](#)

Cartridge Management Tasks

Task	Page
Enter Cartridges Through a CAP	174
Eject Cartridges Through a CAP	175
Display Library Cartridge Information in Tabular Format	176
List Library Cartridges	179
Locate a Cartridge by VOLID	182
Locate a Cartridge by Address	184
Move a Specified Cartridge by VOLID	189
Move a Cartridge From a Specified Location	195
Display the Media Events Report	200

▼ Enter Cartridges Through a CAP

Use this procedure to enter cartridges to the library through a CAP.

1. **Initiate the enter operation at the host. See the appropriate tape management software documentation for the procedures and commands.**

Note – If the CAP is in auto enter mode, you can skip this step and proceed directly to [Step 2](#).

2. **Press the appropriate CAP Unlocked button (CAP A or CAP B) on the operator key pad.**

The CAP door opens, and the CAP button light turns ON.

Caution – *Possible Equipment Damage*. DO NOT force the CAP to open or close.

3. **Place the cartridges in the CAP.**

Insert the cartridges so that the customer label (if present) is facing up, the hub gear is facing down, and the cartridge label is facing you.

You can enter the cartridges directly into the magazines while the magazines are in the CAP; or you can remove the magazines from the CAP, insert cartridges into the magazines, and then replace the cartridge-filled magazines into the CAP.

Note – Cartridges may be placed in any CAP slot, in any order; the Robot audits all CAP slots when the CAP door closes.

Caution – *Possible Media Damage*. While cartridges that do not contain external labels or are placed upside-down can be entered, this is not advisable. It presents problems when an audit is performed. Likewise, cartridges that contain unreadable or damaged labels should not be entered.

4. **Press the appropriate CAP Unlocked button (CAP A or CAP B) on the operator key pad.**

The CAP closes and locks automatically, and the CAP button light turns OFF.

Caution – *Possible Equipment Damage*. DO NOT force the CAP to open or close.

5. **The HandBot audits the CAP and then moves the cartridges from the CAP to storage cells.**

When all cartridges have been moved from the CAP, the library recognizes that the CAP is empty and the CAP is returned to its default state.

▼ Eject Cartridges Through a CAP

Use this procedure to eject cartridges from the library through a CAP.

When a cartridge is exported, you must specify the VOLIDs of the cartridge you wish to remove from the library. The VOLID location is then retrieved from the library controller database, the Robot moves to the cartridge, removes it from its slot, and the cartridge is placed into the CAP slot. A total of 39 cartridges may be exported at one time through each CAP.

1. **Initiate the eject operation at the host. See the appropriate tape management software documentation for the procedures and commands.**

You must specify the VOLIDs of the cartridges you want to remove from the library.

2. **The HandBot places the cartridges into one or more available CAPs. Refer to your library management software publication for the console messages.**
3. **Press the appropriate CAP Unlocked button (CAP A or CAP B) on the operator key pad.**

The CAP door opens, and the CAP button light turns ON.

Caution – *Possible Equipment Damage.* DO NOT force the CAP to open or close.

4. **Remove the cartridges from the CAP.**

You can remove the cartridges directly from the magazines while the magazines are in the CAP; or you can take the magazines out of the CAP, remove the cartridges from the magazines, and then replace the empty magazines in the CAP.

5. **Push the CAP button to close the CAP.**

The CAP closes and locks automatically, and the CAP button light turns OFF.

Caution – *Possible Equipment Damage.* DO NOT force the CAP to open or close.

If more cartridges need to be exported, the Robot continues filling the CAP. Wait until the CAP door is unlocked and repeat [Step 3](#) through [Step 5](#).

The eject operation ends automatically when all specified cartridges have been ejected.

6. **The TallBot audits the CAP to verify that it is empty.**

The CAP is then returned to its default state.

▼ Display Library Cartridge Information in Tabular Format

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

Use this procedure to display detailed information about all library cartridges in a sortable, tabular format. Information includes the cartridge VOLIDs, locations, and media types. You can use this report for a variety of purposes, such as:

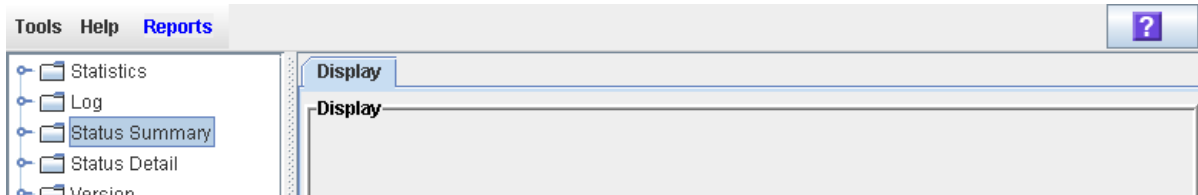
- Locate cartridges by library internal address
- Verify that all cartridges in the library have valid, readable barcode labels
- Identify cleaning and diagnostic cartridges
- Identify cartridge media types in a mixed-media library

Note – You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 34](#) for details.

Note – To display most of the same data in a straight text format, see [“List Library Cartridges” on page 179](#).

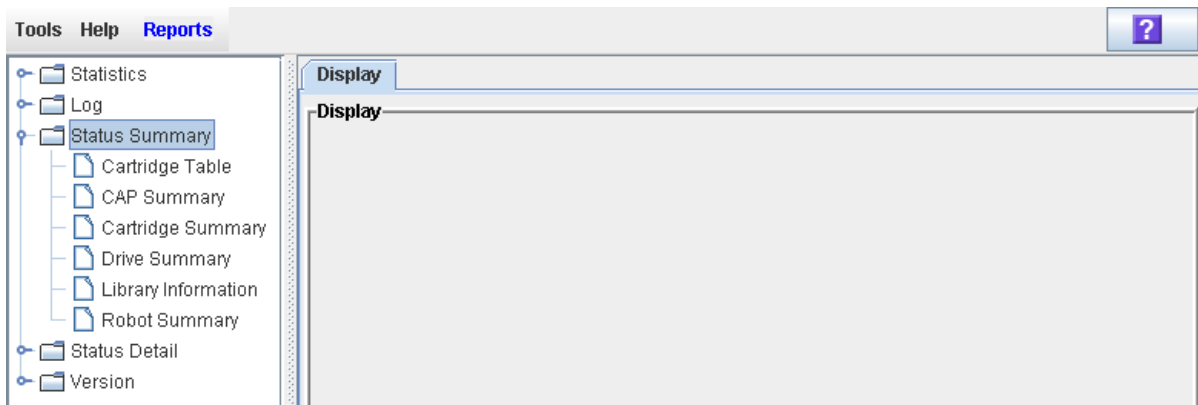
1. Select Tools > Reports.

All library report options are listed in the navigation bar.



2. Expand the Status Summary folder.

All Status Summary reports are listed.



3. Click Cartridge Table.

The Cartridge Table Report is displayed. See “Screen Fields” below for a detailed description of each screen field.

lib	rail	col	side	row	Location Type	Media Type	Type	Label	Custom Label
1	2	-36	1	1	sysCell	unknown	data	#UREAD..	SUNTST0025L4
1	2	-36	1	2	sysCell	unknown	data	#UREAD..	SUN00005L1
1	2	-36	1	3	sysCell	unknown	data	#UREAD..	SUNTST0026L4
1	2	-36	1	4	sysCell	unknown	data	#UREAD..	SUN00006L1
1	2	-36	1	9	sysCell	unknown	data	#UREAD..	ELEVEN0010S
1	2	-36	1	10	sysCell	unknown	data	#UREAD..	ELEVEN0020S
1	2	33	2	13	cell	unknown	data	#UREAD..	NINE0020S
1	3	-33	1	6	cell	unknown	data	#UREAD..	#UREAD..
1	3	18	1	5	cell	unknown	data	#UREAD..	SUN00015L1
1	3	33	2	12	cell	unknown	data	#UREAD..	NINE0040S
1	4	11	1	4	cell	unknown	data	#UREAD..	ELEVEN0030S
1	2	-32	2	12	cell	LtoGen1_100GB	data	000003L1	
1	4	-25	2	4	cell	LtoGen1_100GB	data	000006L1	
1	3	-5	1	3	cell	LtoGen1_100GB	data	000007L1	
1	1	-17	1	10	cell	LtoGen1_100GB	data	000011L1	
1	3	12	2	10	cell	LtoGen1_100GB	data	000016L1	
1	2	12	1	5	cell	9940	data	0000180P	
1	1	10	1	3	cell	LtoGen1_100GB	data	000019L1	
1	1	22	2	4	cell	LtoGen1_100GB	data	000019L1	
1	2	17	1	5	cell	LtoGen2_200GB	data	000020L2	
1	2	18	2	2	cell	9940	data	0000230P	
1	1	33	1	7	cell	LtoGen2_200GB	data	000024L2	
1	1	-20	1	7	cell	9840_R	data	0000370R	
1	3	11	2	4	cell	9940	data	0000380P	
1	2	20	1	9	cell	LtoGen2_200GB	data	000038L2	
1	4	32	1	8	cell	9940	data	0000390P	
1	1	11	1	7	cell	9940	data	0000400P	
1	2	34	2	10	cell	LtoGen2_200GB	data	000040L2	
1	2	-22	1	5	cell	9940	data	0000410P	

4. If you want to search the report data or save it to a file, see the following procedures:

- “Search a Library Report” on page 64
- “Save Library Report Data to a File” on page 66

Screen Fields

lib, rail, col, side, row

Library, rail, column, side, and row. Together these values identify the library internal address where the cartridge is located.

For a detailed description of the library internal address format, see “Library Internal Address” on page 227 “Internal Address” on page 340.

Location Type

Type of library location where the cartridge is located. Options are:

- CAP – CAP cell
- cell – Regular storage cell
- drive – Loaded in a tape drive
- sysCell – System (reserved) cell; cleaning or diagnostic cartridges are typically stored in these cells

Media Type

Type of media in the cartridge. For example, Lto Gen2_200GB, SDLT-2, 9840_R.

Type

Domain, or usage type, of the cartridge. Options are:

- clean – Cleaning cartridge
- data – Data cartridge
- diagnostic – Diagnostic cartridge

Label

Unique VOLID of the cartridge. Standard VOLIDs are eight characters in length.

A value of #UREAD indicates the barcode label is unreadable. Possible reasons for this are as follows:

- The label is missing, damaged, or upside-down. In this case, the **Custom Label** field also indicates #UREAD.
- The label has a non-standard format, such as a ten-character VOLID, or an unrecognized cartridge domain or media type indicator. In this case, the non-standard VOLID is displayed in the **Custom Label** field.

The library controller does not allow you to mount an unlabeled or unknown type cartridge into any tape drive.

Custom Label

Non-standard VOLID of the cartridge, if applicable. Possible entries for this field are as follows:

- Blank – The cartridge has a readable, standard eight-character VOLID cartridge label, as indicated in the **Label** field.
- #UREAD – The cartridge label is truly not readable, possibly because it is missing, damaged, or upside-down.
- Any other value – Indicates the non-standard VOLID of the cartridge.

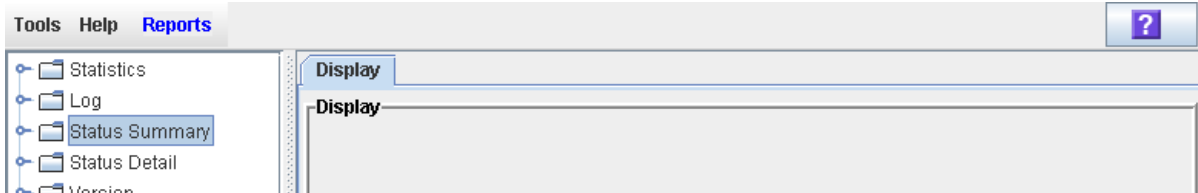
▼ List Library Cartridges

Use this procedure to display information about all library cartridges, including their VOLIDs, locations, and media types.

Note – To display the same data in a tabular format, see [“Display Library Cartridge Information in Tabular Format”](#) on page 176

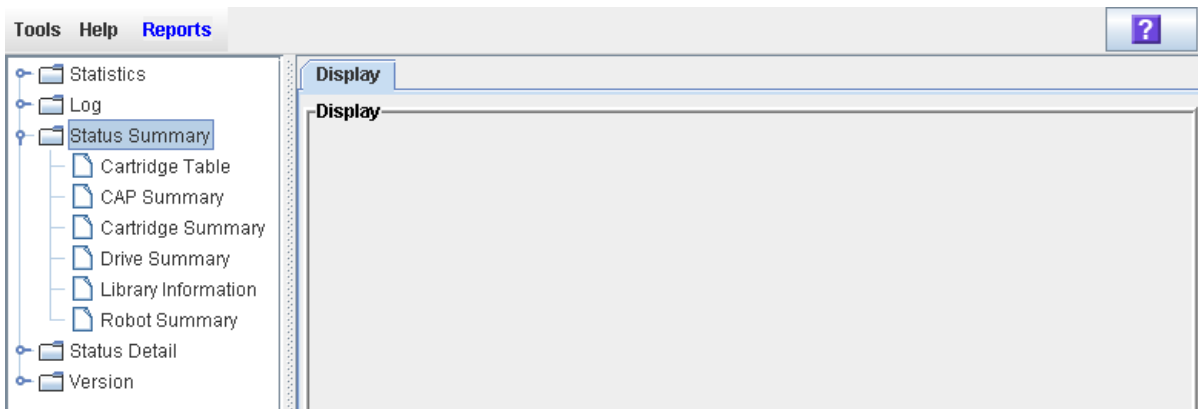
1. Select Tools > Reports.

All library report options are listed in the navigation bar.



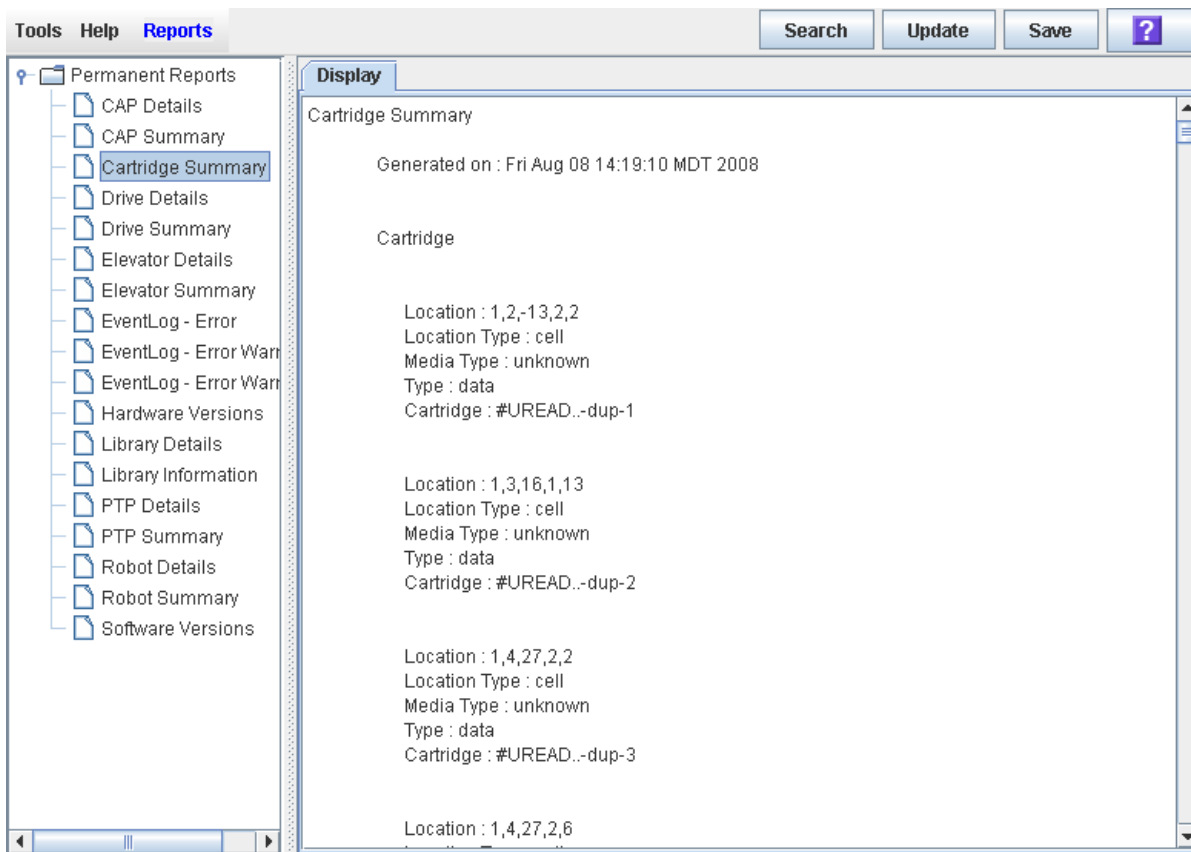
2. Expand the Status Summary folder.

All Status Summary reports are listed.



3. Click Cartridge Summary.

The Cartridge Summary Report is displayed. See [“Screen Fields”](#) below for a detailed description of each screen field.



4. If you want to search the report data or save it to a file, see the following procedures:

- [“Display a Library Report”](#) on page 62
- [“Save Library Report Data to a File”](#) on page 66

Screen Fields

Location

Library, rail, column, side, and row. Together these values identify the library internal address where the cartridge is located.

For a detailed description of the library internal address format, see [“Library Internal Address”](#) on page 227/“Internal Address” on page 340.

Location Type

Type of library location where the cartridge is located. Options are:

- CAP – CAP cell
- cell – Regular storage cell
- drive – Loaded in a tape drive
- sysCell – System (reserved) cell; cleaning or diagnostic cartridges are typically stored in these cells

Media Type

Type of media in the cartridge. For example, Lto Gen2_200GB, SDLT-2, 9840_R.

Type

Domain, or usage type, of the cartridge. Options are:

- clean – Cleaning cartridge
- data – Data cartridge
- diagnostic – Diagnostic cartridge

Cartridge

Unique VOLID of the cartridge. Standard VOLIDs are eight characters in length.

A value of #UREAD indicates the barcode label is unreadable. Possible reasons for this are as follows:

- The label is missing or damaged.
- The label has a non-standard format, such as a ten-character VOLID, or an unrecognized cartridge domain type or media type indicator.

The library controller does not allow you to mount an unlabeled or unknown type cartridge into any tape drive.

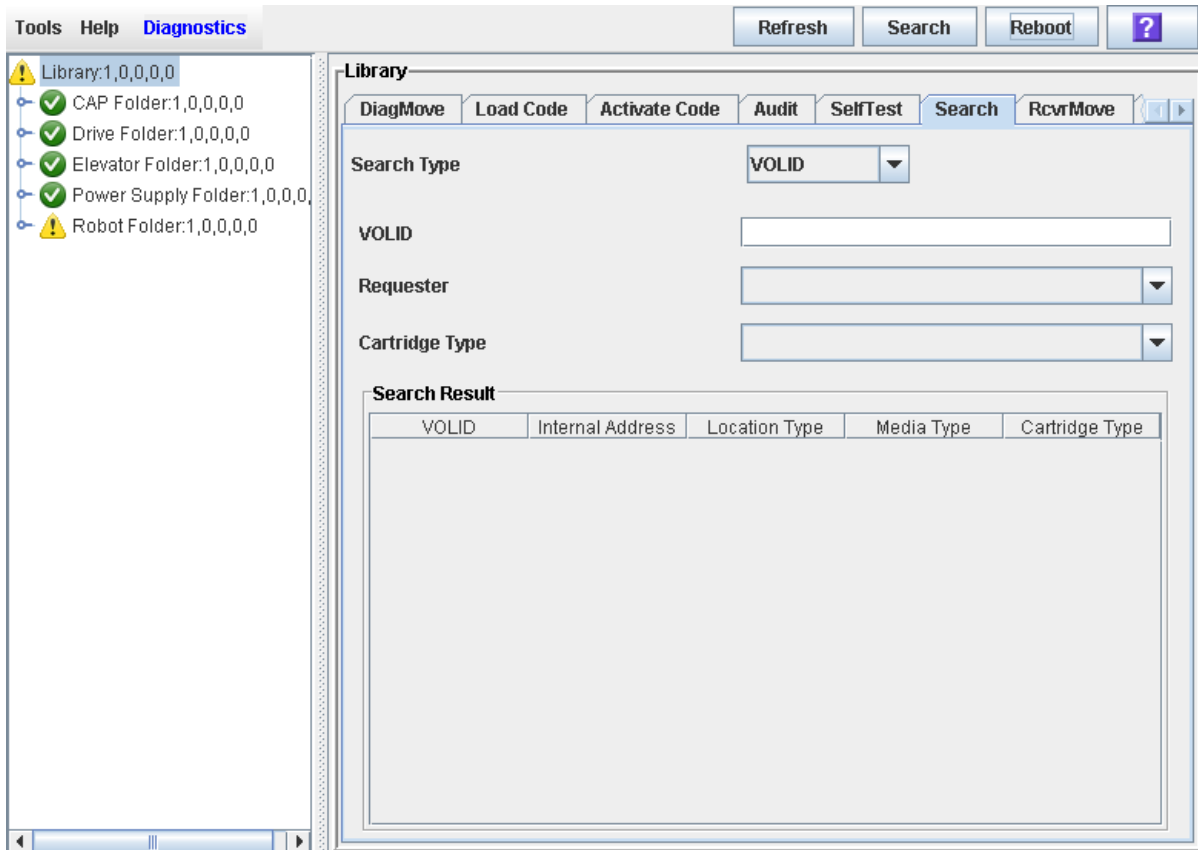
▼ Locate a Cartridge by VOLID

Use this procedure to display the current location of a cartridge with a specified volume ID. The location can be displayed in one of the following formats:

- Library internal address
- HLI-PRC address (HLI hosts only)

1. Select **Tools > Diagnostics**, and click the **Library** folder.
2. Click the **Search** tab.

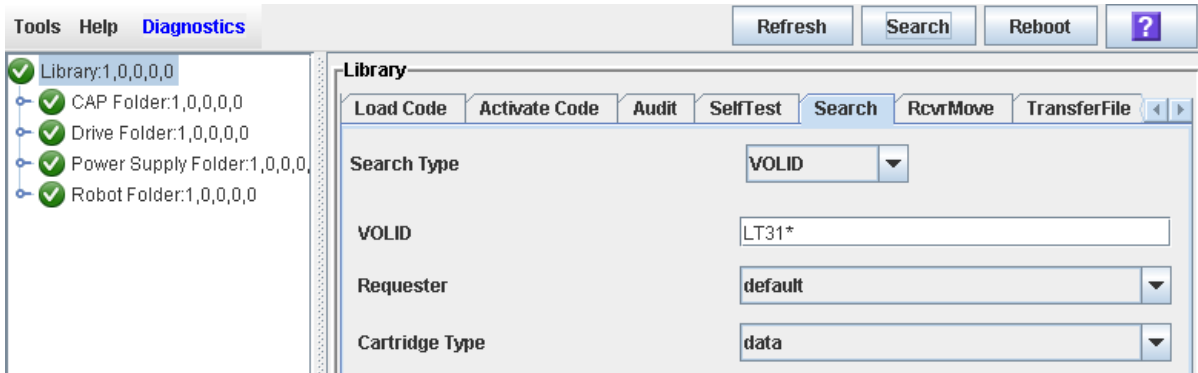
The **Library Search** screen appears.



The **Requester** field controls the address format that will be displayed for the cartridge location.

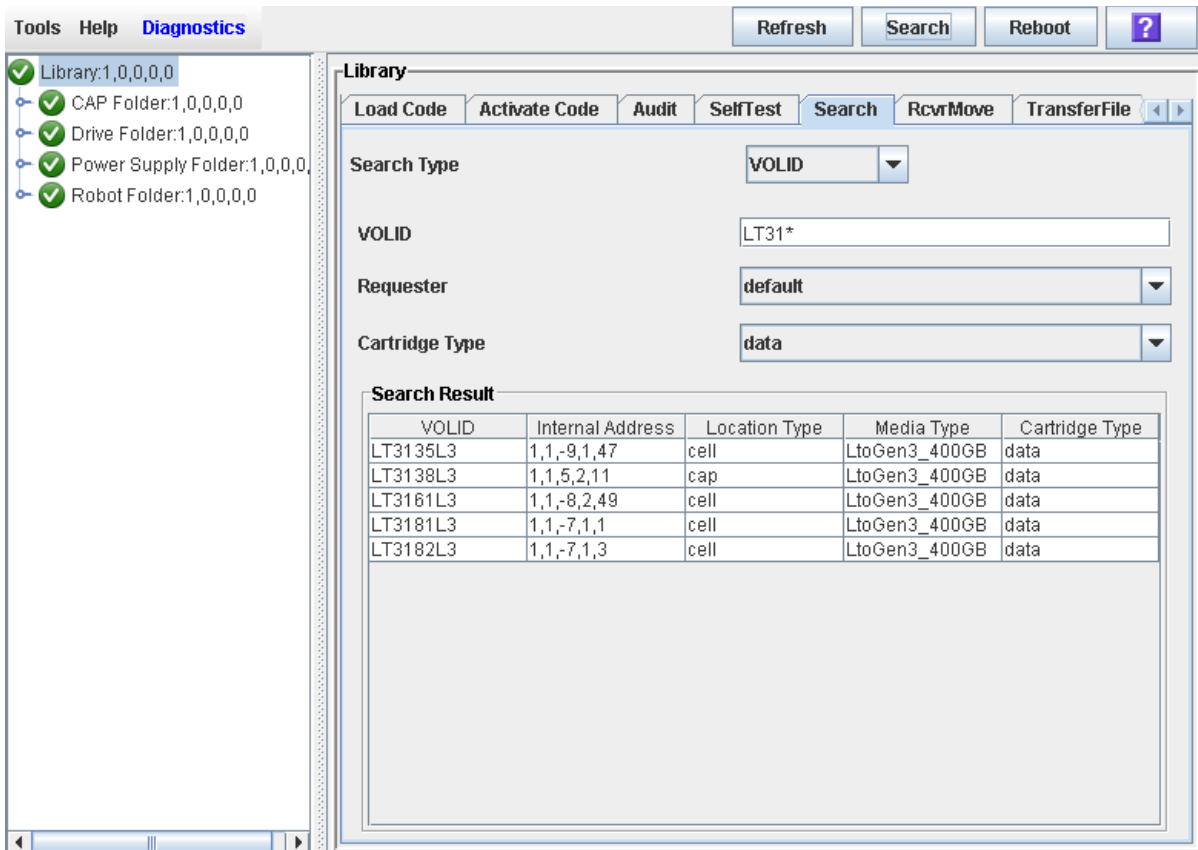
- To display the library internal address, click **default**.

- To display the HLI-PRC address, click h1i0 or h1i1.



3. Click Search.

The screen displays all cartridges meeting the search criteria.



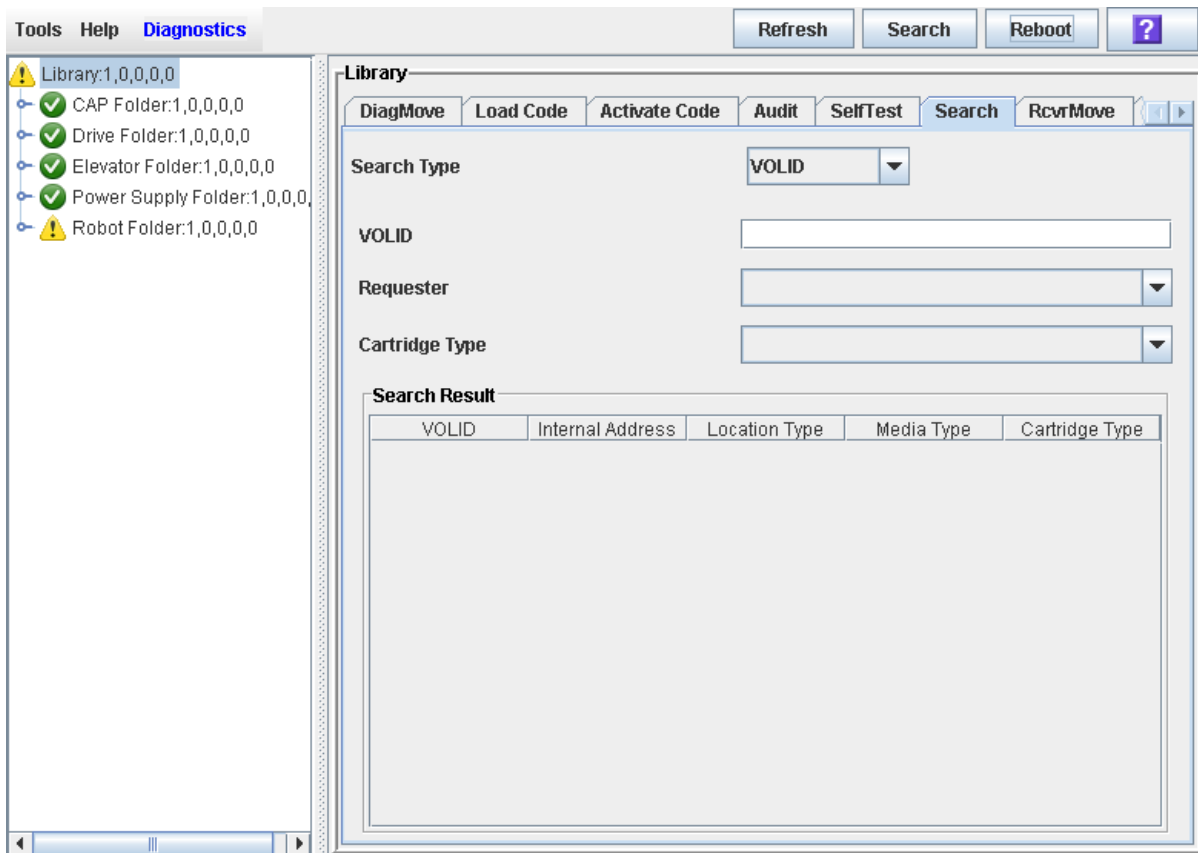
▼ Locate a Cartridge by Address

Use this procedure to display detailed information for cartridges with a specified location. Wildcards allow you to display all cartridges in a specified general area (for example, in a specified panel, row, or column). You can specify the location using one of the following formats:

- Library internal address
- HLI-PRC address (HLI hosts only)

1. Select **Tools > Diagnostics**, and click the **Library** folder.
2. Click the **Search** tab.

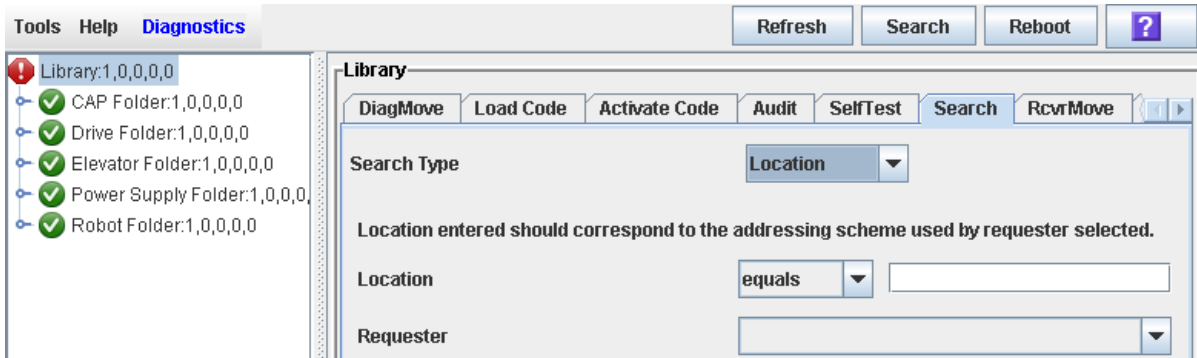
The **Library Search** screen appears.



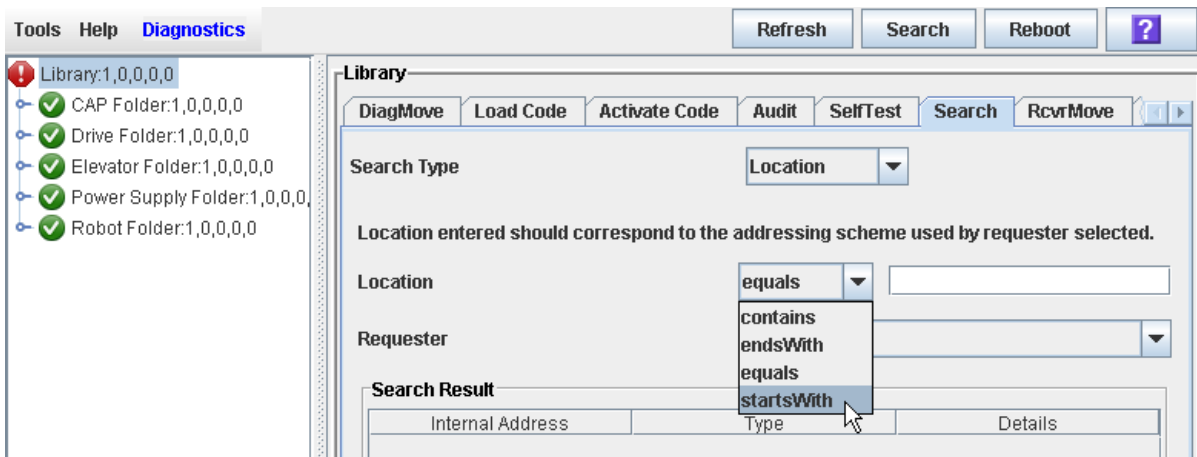
3. In the **Search Type** pull-down, click **Location**.

Note – The default Search Type is VOLID.

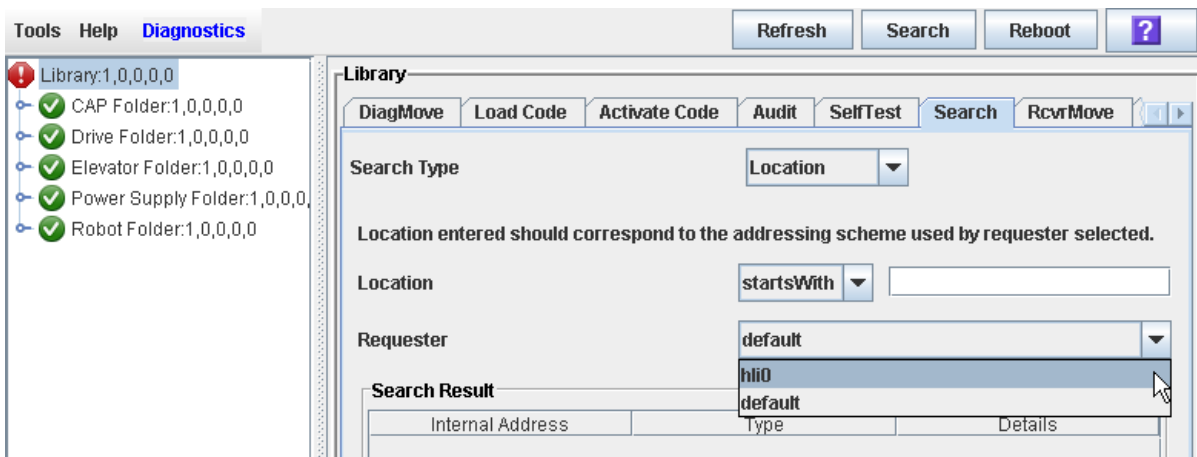
The screen is updated to display fields allowing you to search by location.



4. In the Location pull-down, select the type of match you want to perform in the search.



5. In the Requester pull-down, select the type of address format you want to use for the search.



6. In the Location field, enter the parameters for the search.

The format you use must correspond to the **Requester** you have specified. For example:

- Use the library internal address format if **Requester** is “default”.
- Use the HLI-PRC address if **Requester** is an HLI host.

Note – You cannot use wildcards in this field.

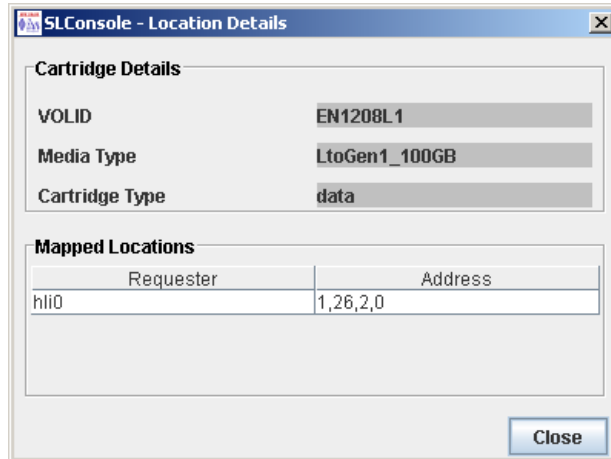
The image displays two screenshots of a diagnostic software interface, likely for a robotic system. The interface includes a menu bar with 'Tools', 'Help', and 'Diagnostics', and buttons for 'Refresh', 'Search', 'Reboot', and a help icon. On the left, a tree view shows the 'Library' structure with various folders like 'CAP Folder', 'Drive Folder', 'Elevator Folder', 'Power Supply Folder', and 'Robot Folder', each with a status indicator (red exclamation mark or green checkmark).

The main window is titled 'Library' and has tabs for 'DiagMove', 'Load Code', 'Activate Code', 'Audit', 'SelfTest', 'Search', and 'RcvrMove'. The 'Search' tab is active. The search configuration is as follows:

- Search Type:** Location
- Location:** startsWith 1,26
- Requester:** hli0

The search results are displayed in a table with the following columns: Internal Address, Type, and Details. The top screenshot shows an empty table, while the bottom screenshot shows a table with 15 rows of data.

Internal Address	Type	Details
1,2-27,1,1	cell	...
1,2-27,1,2	cell	...
1,2-27,1,3	cell	...
1,2-27,1,4	cell	...
1,2-27,1,5	cell	...
1,2-27,1,6	cell	...
1,2-27,1,7	cell	...
1,2-27,1,8	cell	...
1,2-27,1,9	cell	...
1,2-27,1,10	cell	...
1,2-27,1,11	cell	...
1,2-27,1,12	cell	...
1,2-27,1,13	cell	...
1,2-27,2,1	cell	...
1,2-27,2,2	cell	...
1,2-27,2,3	cell	...



▼ Move a Specified Cartridge by VOLID

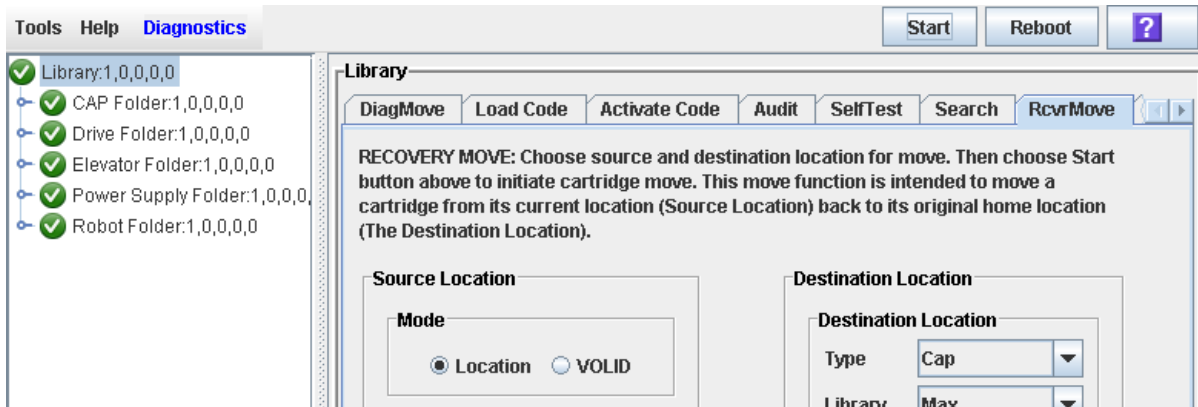
Use this procedure to move a cartridge with a specified VOLID to a specified location within the library.

Note – This procedure updates the cartridge’s location in the library controller database, but not in the host database. Therefore after performing this procedure, you must perform an audit from the host software to update the host database. Failure to do so will cause future mount requests from the host software to fail.

Caution – Use caution when performing this procedure in partitioned libraries. You could inadvertently move a cartridge from one partition to another, allowing the new partition to overwrite data on the cartridge.

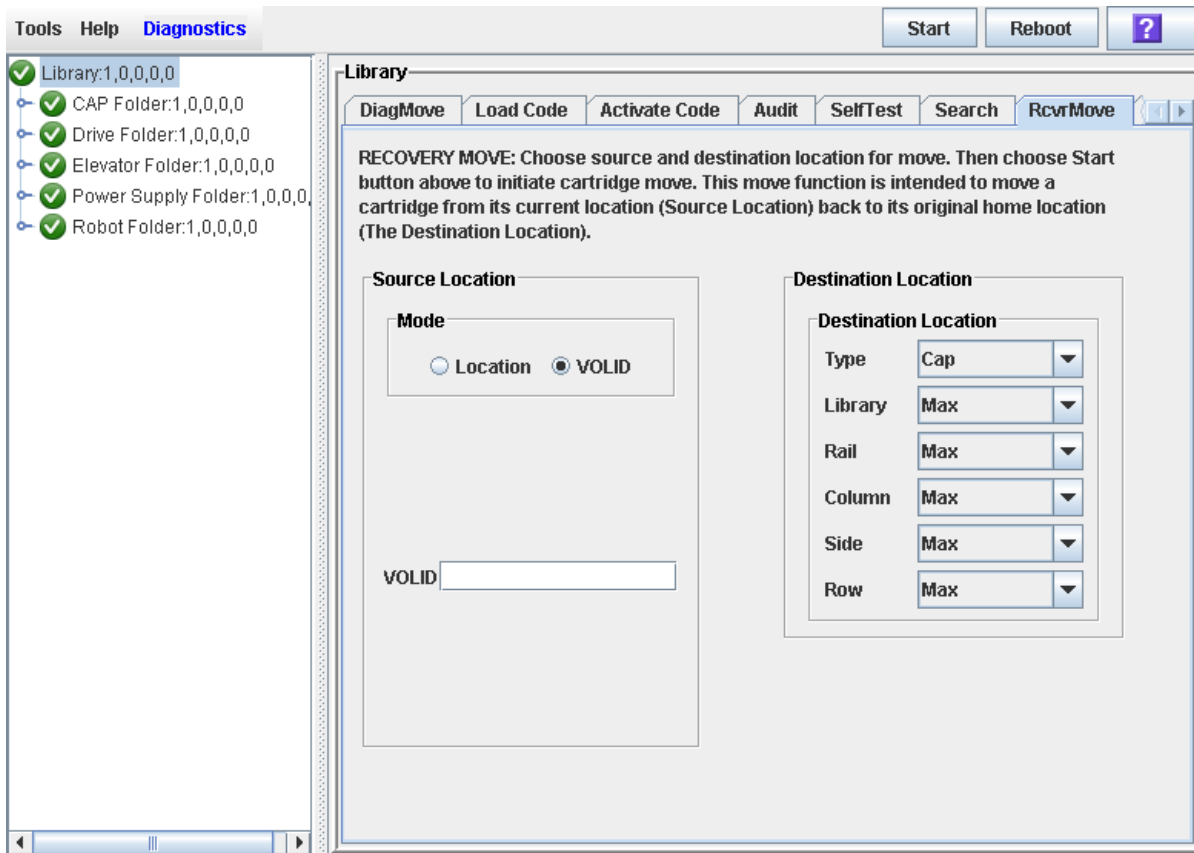
1. Select Tools > Diagnostics, and click the Library folder.
2. Click the RcvrMove tab.

The Recovery Move screen appears.

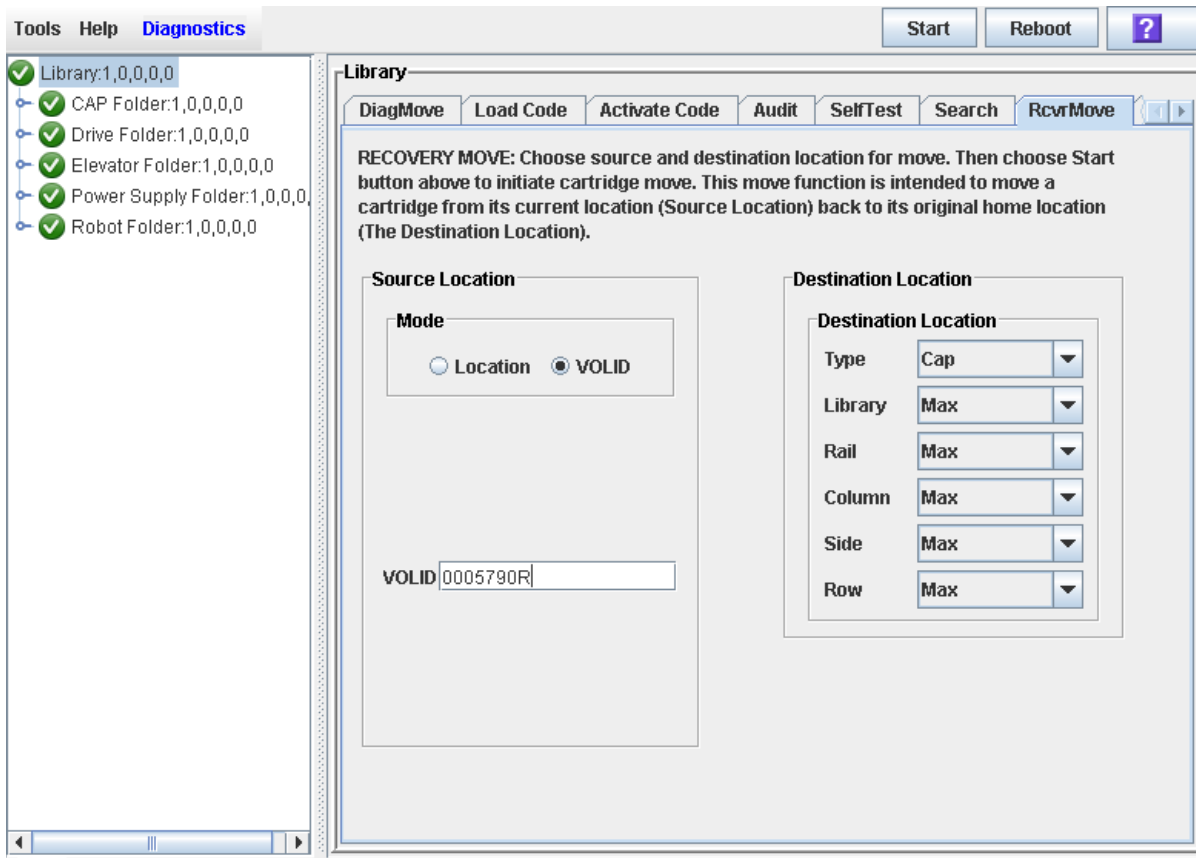


3. In the Source Location Mode field, click VOLID.

The screen is updated with the appropriate Source Location fields.



4. In the VOLID field, specify the VOLID of the cartridge you want to move.



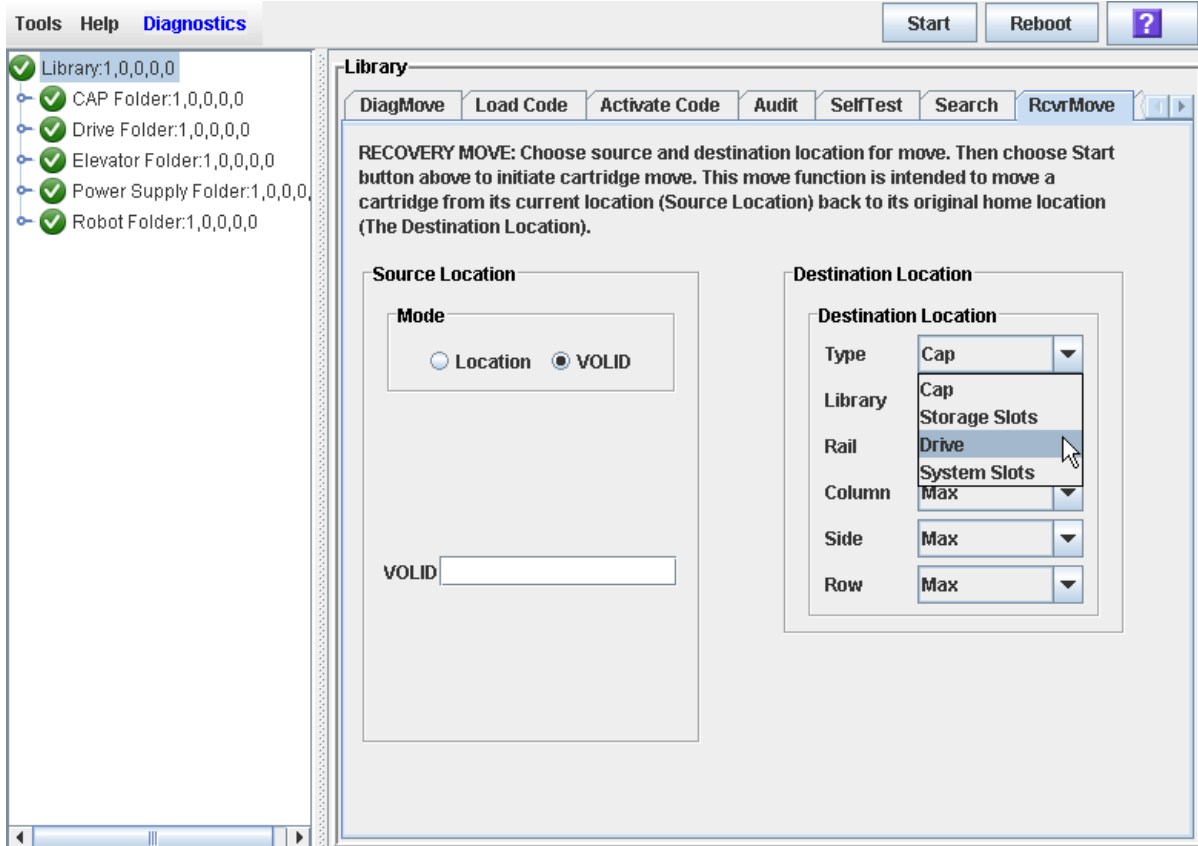
5. In the Destination Location Type pull-down menu, select the type of location where you want to move the cartridge to. Options are:

- CAP
- Storage Slots
- Drive
- Reserved Slots

The following restrictions apply:

- The destination can be a drive only if the source is a CAP or reserved slot.
- For you to move a cartridge to a drive, the cartridge media type must be compatible with the drive type.
- You cannot move a cartridge to a location that is already occupied.

- Although not strictly enforced, it is recommended that only diagnostic or cleaning cartridges be moved to reserved slots.



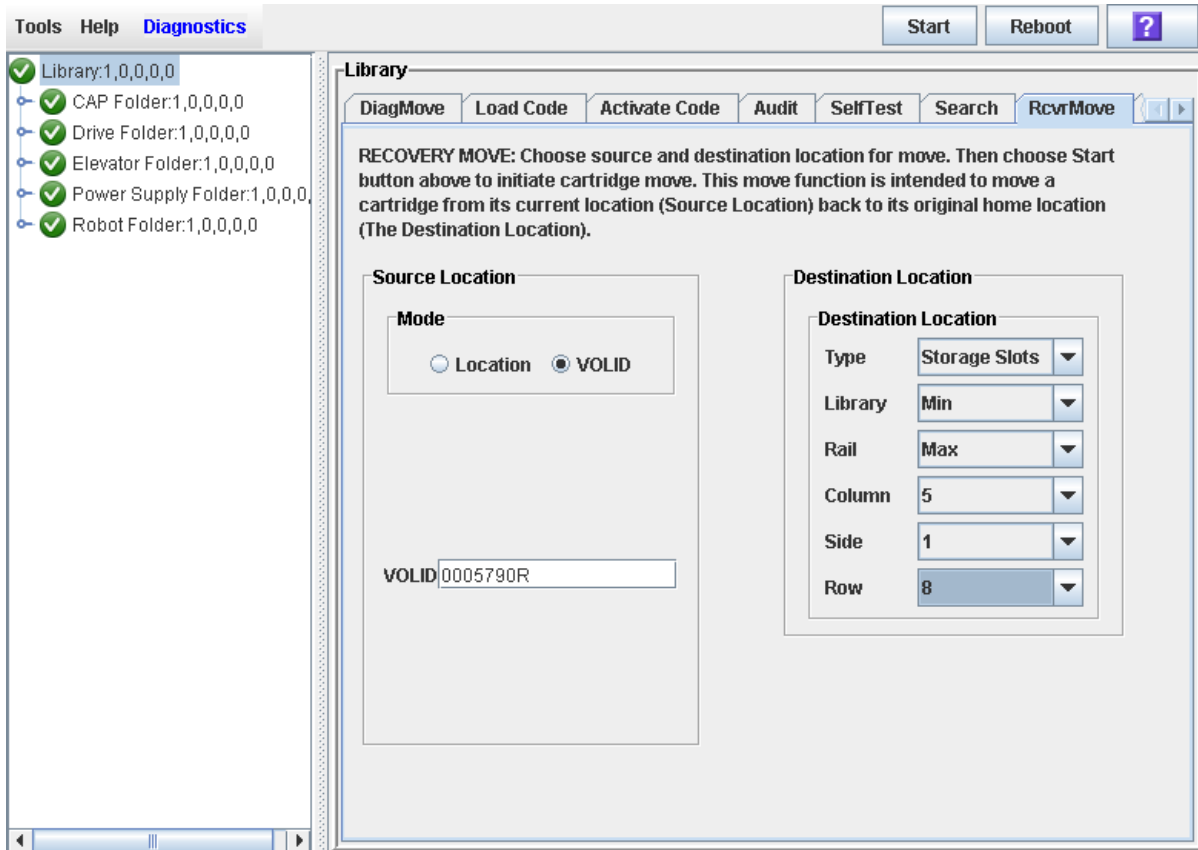
6. In the Destination Location table, specify the library internal address of the destination location by making the appropriate selections in the following pull-down menus:

- Library
- Rail
- Column
- Side
- Row

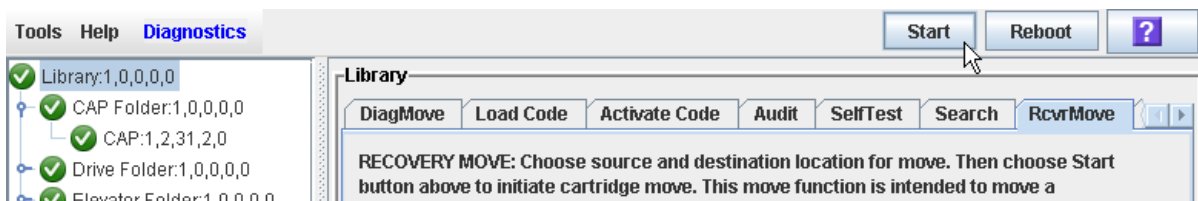
The following special selections are available on the pull-down menus:

- Min—First element of that location type—library, rail, column, side, row—in the library
- Max—Last element of that location type—library, rail, column, side, row—in the library

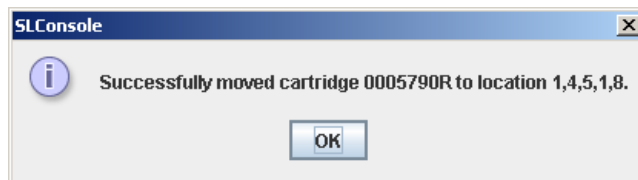
Caution – If the library is partitioned, make sure to keep the cartridge in the same partition it is currently allocated to. Moving a cartridge to a cell allocated to a different partition could result in a host treating the cartridge as scratch and overwriting the data. Moving the cartridge to an unallocated cell will result in the cartridge being inaccessible to all hosts.



7. Click the Start button in the Options Bar.

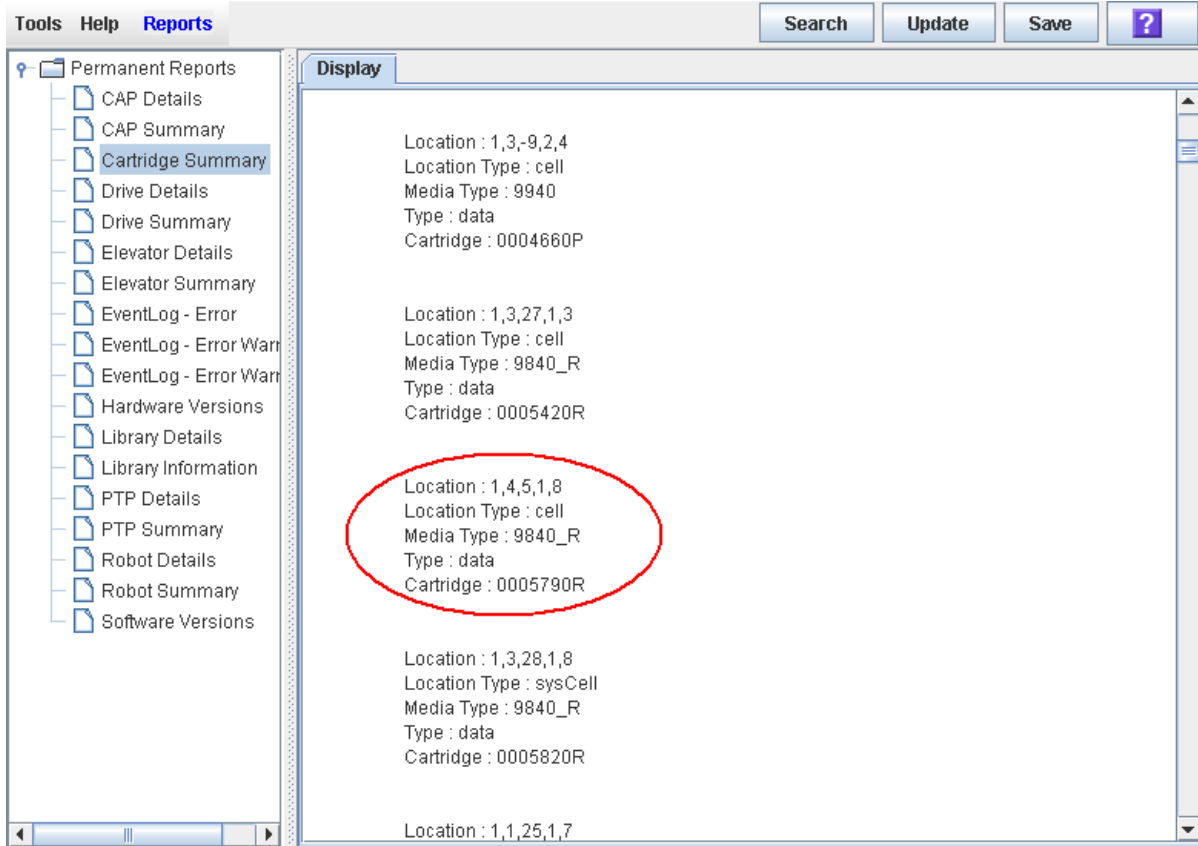


The robot moves the cartridge. A success message popup appears when the operation is complete.



8. Click OK.

9. To verify the new location, you can display a Cartridge Summary Report. See “List Library Cartridges” on page 179 for details. For example:



10. To update the new cartridge location in the host database, initiate a library audit from the host software. See the appropriate tape management software documentation for the procedures and commands.

▼ Move a Cartridge From a Specified Location

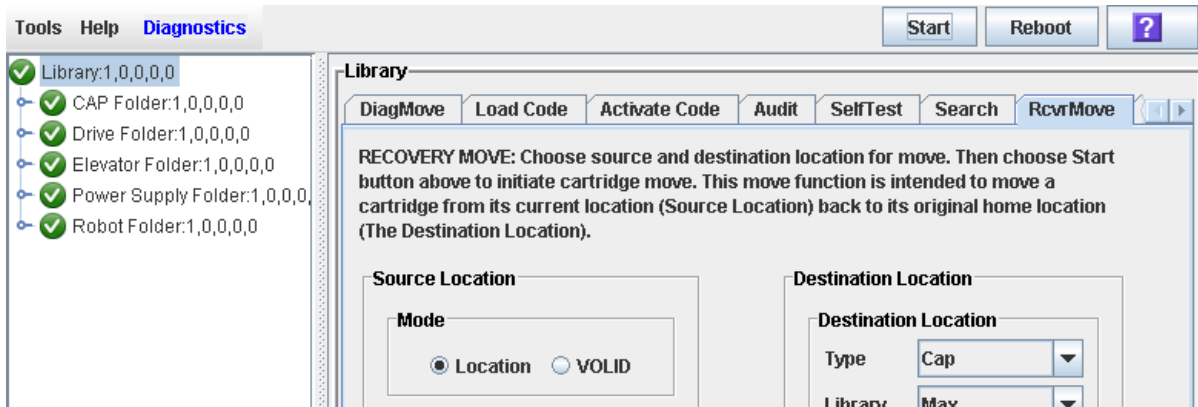
Use this procedure to move a cartridge from one specified location to another within the library.

Note – This procedure updates the cartridge’s location in the library controller database, but not in the host database. Therefore after performing this procedure, you must perform an audit from the host software to update the host database. Failure to do so will cause future mount requests from the host software to fail.

Caution – Use caution when performing this procedure in partitioned libraries. You could inadvertently move a cartridge from one partition to another, allowing the new partition to overwrite data on the cartridge.

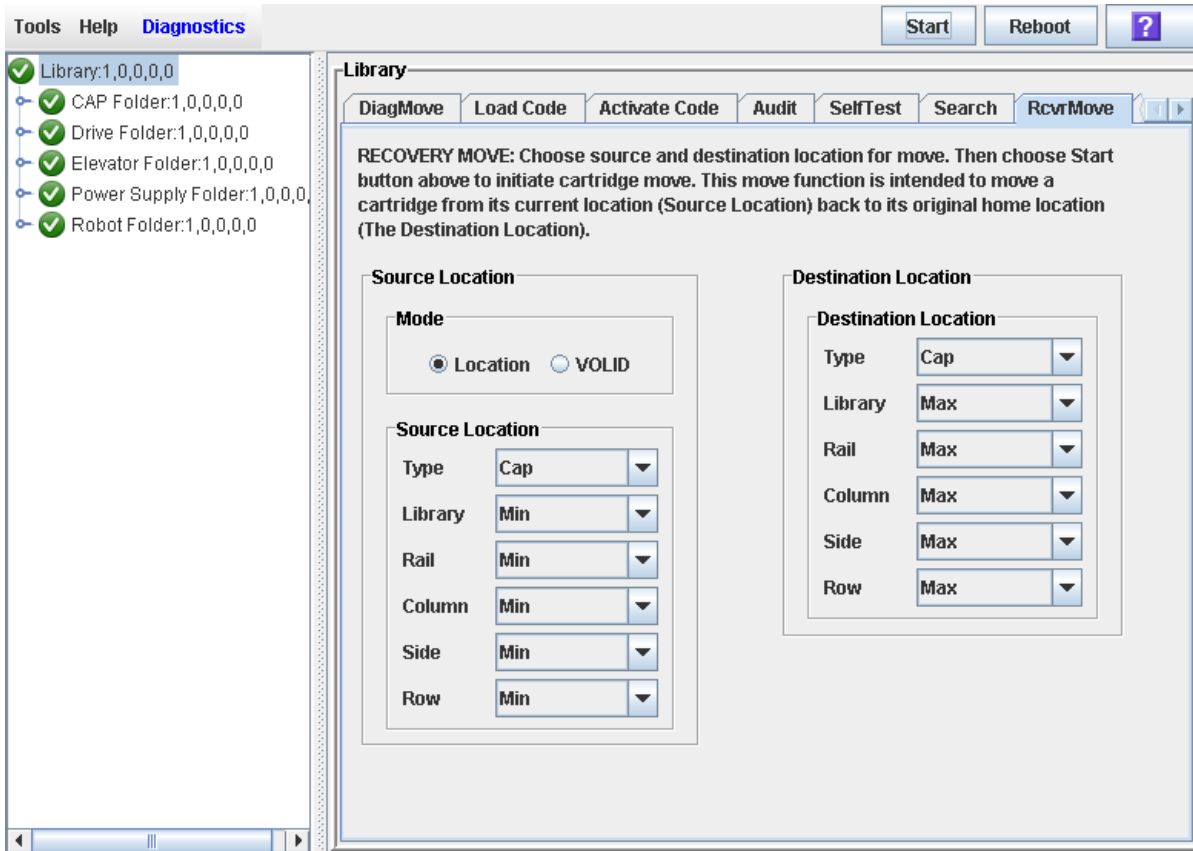
1. Select Tools > Diagnostics, and click the Library folder.
2. Click the RcvrMove tab.

The Recovery Move screen appears.



3. In the Source Location Mode field, click Location.

The screen is updated with the appropriate Source Location fields.



4. In the Source Location Type pull-down menu, select the cartridge's current location type. Options are:

- CAP
- Slot
- Drive
- Reserved Slots

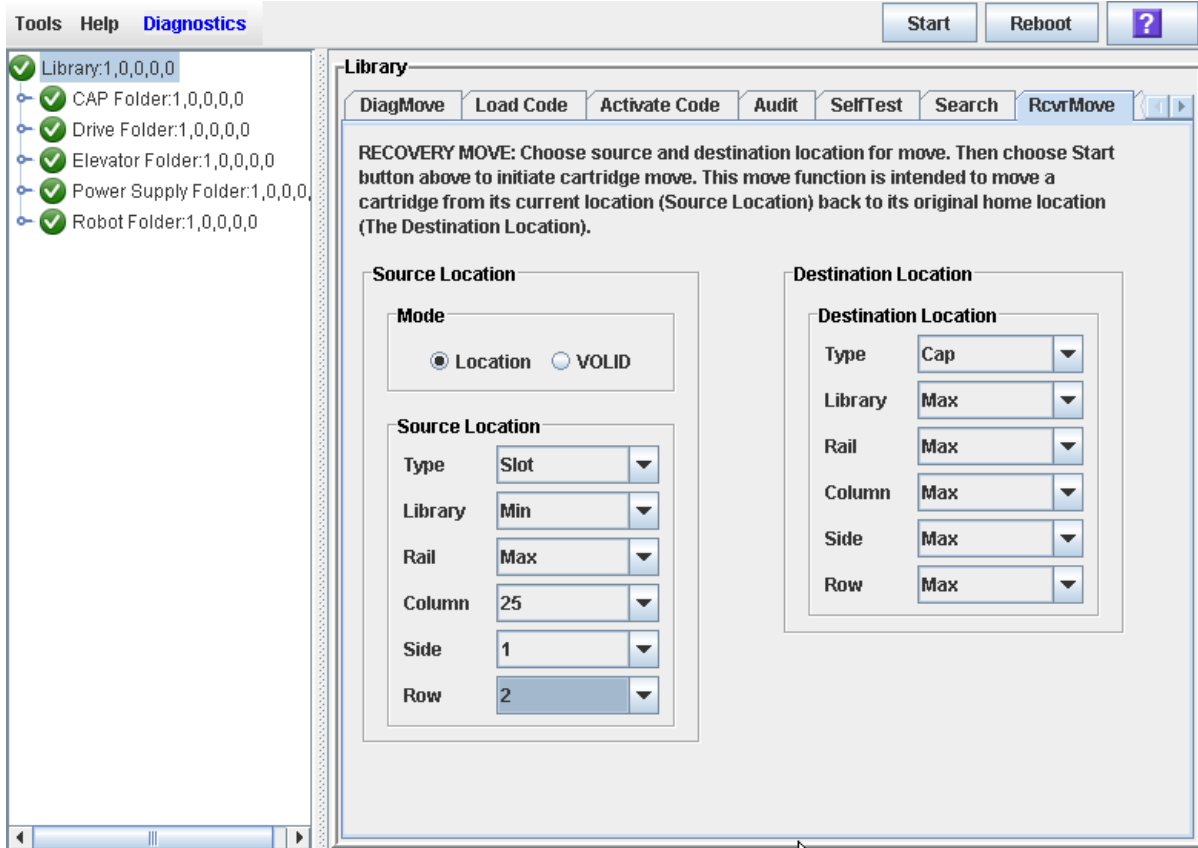
5. In the Source Location table, specify the library internal address of the source location by making the appropriate selections in the following pull-down menus:

- Library
- Rail
- Column
- Side
- Row

The following special selections are available on the pull-down menus:

- Min—First element of that location type—library, rail, column, side, row—in the library

- Max—Last element of that location type—library, rail, column, side, row—in the library



6. In the Destination Location Type pull-down menu, select the type of location where you want to move the cartridge to. Options are:

- CAP
- Storage Slots
- Drive
- Reserved Slots

The following restrictions apply:

- The destination location can be a drive only if the source is a CAP or reserved slot.
- For you to move a cartridge to a drive, the cartridge media type must be compatible with the drive type.
- You cannot move a cartridge to a location that is already occupied.
- Although not strictly enforced, it is recommended that only diagnostic or cleaning cartridges be moved to reserved slots.

7. In the Destination Location table, specify the library internal address of the destination location by making the appropriate selections in the following pull-down menus:

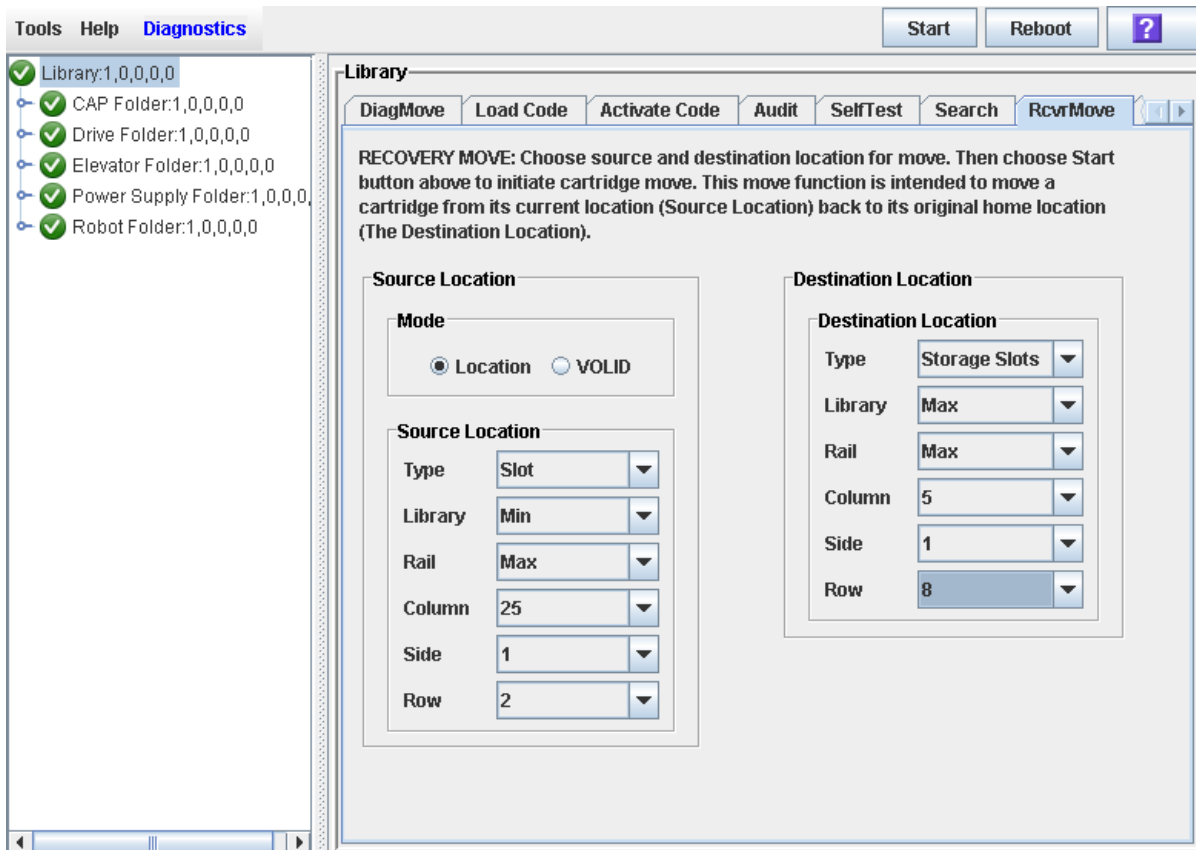
- Library
- Rail
- Column
- Side

- Row

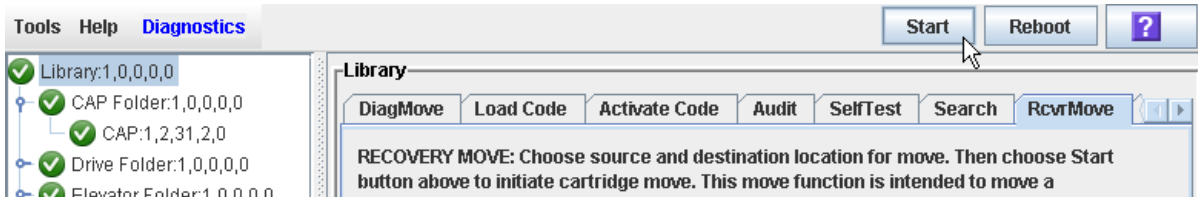
The following special selections are available on the pull-down menus:

- Min—First element of that location type—library, rail, column, side, row—in the library
- Max—Last element of that location type—library, rail, column, side, row—in the library

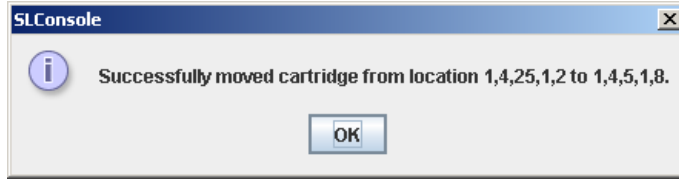
Caution – If the library is partitioned, make sure to keep the cartridge in the same partition it is currently allocated to. Moving a cartridge to a cell allocated to a different partition could result in a host treating the cartridge as scratch and overwriting the data. Moving the cartridge to an unallocated cell will result in the cartridge being inaccessible to all hosts.



8. Click the Start button in the Options Bar.

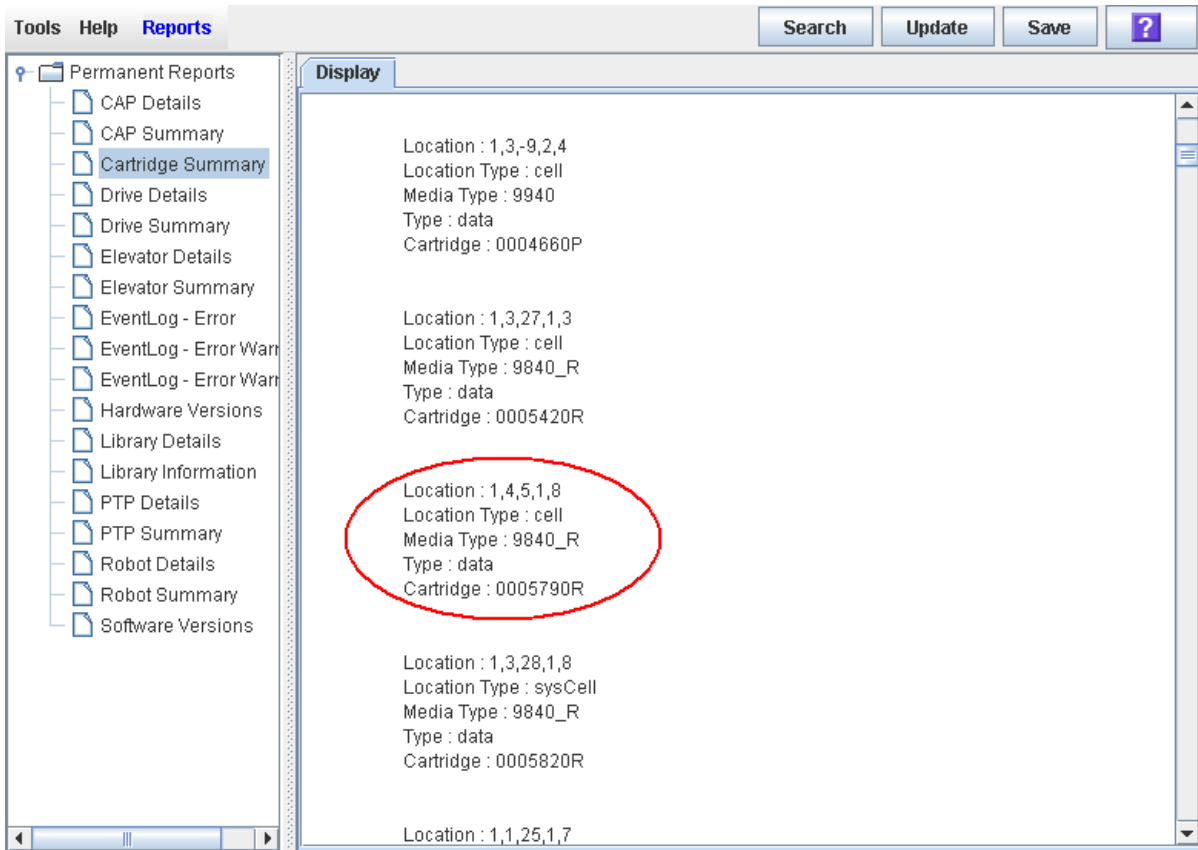


The robot moves the cartridge, and then a success message popup appears.



9. Click OK.

10. To verify the new location, you can display a Cartridge Summary Report. See [“List Library Cartridges”](#) on page 179 for details. For example:



11. To update the new cartridge location in the host database, initiate a library audit from the host software. See the appropriate tape management software documentation for the procedures and commands.

▼ Display the Media Events Report

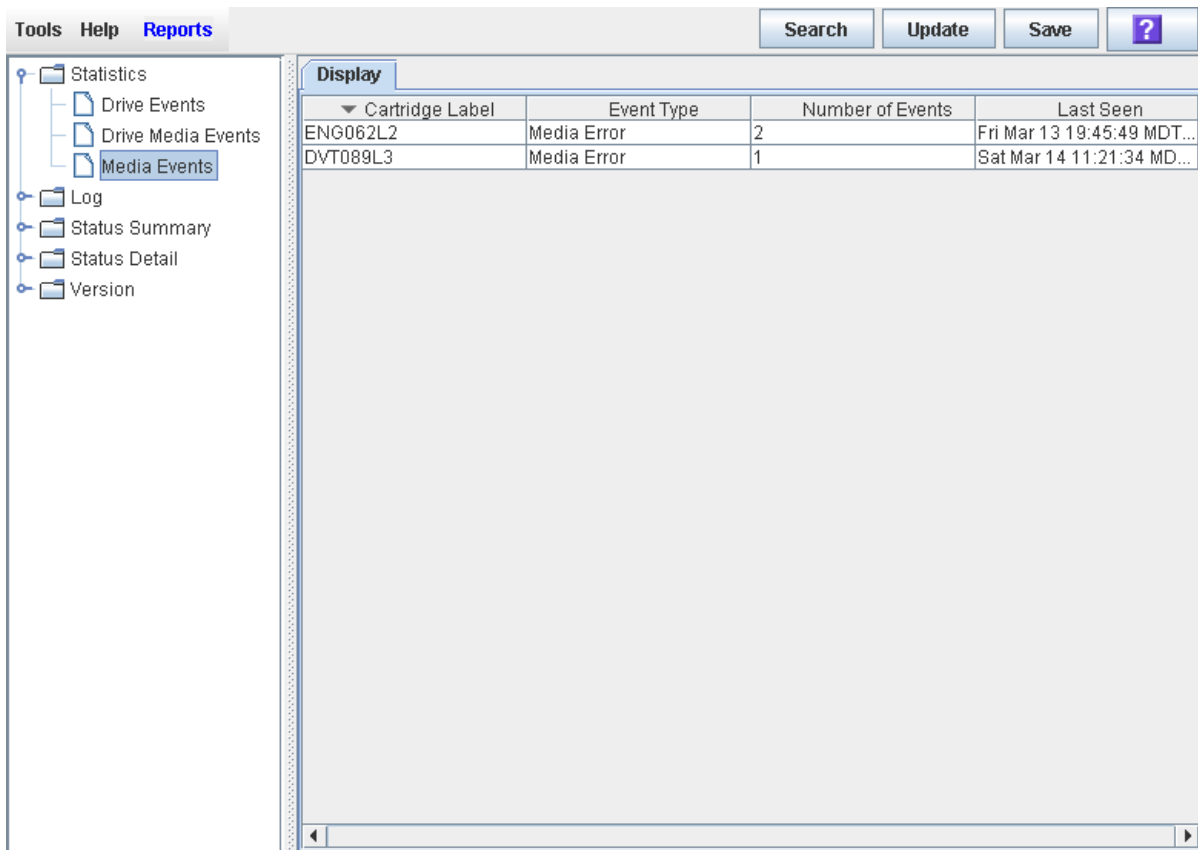
The Media Events Report summarizes library cartridge media events. The report is updated whenever a media event or error occurs on any drive. You can use the report to help identify and diagnose faulty cartridges.

For each cartridge that has experienced media events, the report lists the VOLID of the cartridge, the type of event, the number of occurrences, and the date and time of the last such event. The report can display up to 2000 entries.

By default, the report is sorted in VOLID order. Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 34](#).

Note – For cartridge events associated with particular drives, see [“Display the Drive Media Events Report” on page 167](#).

1. Select **Tools > Reports**.
2. Expand the **Statistics** folder, and click **Media Events**.



Screen Fields

Cartridge Label

VOLID of the cartridge that has experienced an event.

Event Type

Type of media event being tracked. Options are:

- Media Error – The drive indicated there was a problem with the media; this could possibly also indicate a problem with the drive.
- Misbuckle Error – The drive was unable to grab the buckle of the media and could not thread the tape. The media is likely damaged.

Number of Events

Total number of events of this type that have been recorded for this cartridge.

Last Seen

Date and time of the most recent occurrence of the event.

Drive Cleaning

The library tape drives require periodic cleaning to prevent read and write errors. The library supports two methods of drive cleaning:

- [Managing Automatic Cleaning Through the SL Console](#)
- [Manual Cleaning](#)

Cleaning Cartridges

Note – You must use cleaning cartridges whose media types are compatible with the drive types in the library.

Cleaning cartridges have a limited life span. Refer to your tape drive publications to determine the maximum usage count, or threshold, for each type of cleaning cartridge.

When you enter a cleaning cartridge into the library, the library controller considers the cartridge to be new and sets the usage count to zero. It is therefore important to enter only new cleaning cartridges into the library.

Whenever a cleaning cartridge is used to clean a drive, its usage count is incremented. When a cleaning cartridge's usage count exceeds its threshold, the cartridge must be replaced.

You can use the SL Console to display the status of a cleaning cartridge at any time. The following statuses are possible:

- OK – The cartridge is still within the threshold.
- Warning – The cartridge has reached the threshold.
- Expired – The cartridge has exceeded the threshold.

Ejecting Expired Cleaning Cartridges

You must use care when ejecting expired cleaning cartridges from the library. If you move an expired cleaning cartridge to a CAP, it will remain there until you open the CAP and remove the cartridge. If you leave the cartridge in the CAP, it could inadvertently be re-entered into the library by another user.

Managing Automatic Cleaning Through the SL Console

For SL8500 libraries, automatic cleaning is always managed through the ACSLS or HSC tape management software. Therefore, you should always disable the SL8500 automatic cleaning function in the SL Console. See [“Configure Drive Auto Clean” on page 206](#) for details.

Note – ACSLS and HSC cannot access the reserved slots in the Customer Interface Module. So, for any ACSLS or HSC managed cleaning, the cartridges must be placed in the customer usable slots and not in the reserved slots.

Manual Cleaning

Note – Manual drive cleaning is initiated through the library management software. Refer to the ACSLS or HSC documentation for command syntax.

If auto clean is disabled, you must initiate drive clean operations manually. To verify whether a drive needs cleaning, you can use the SL Console to display a drive’s cleaning status and the date when it was last cleaned.

To locate the correct type of cleaning cartridge for a particular drive, you can use the SL Console to generate a cartridge summary and drive details report.

Drive Cleaning Tasks

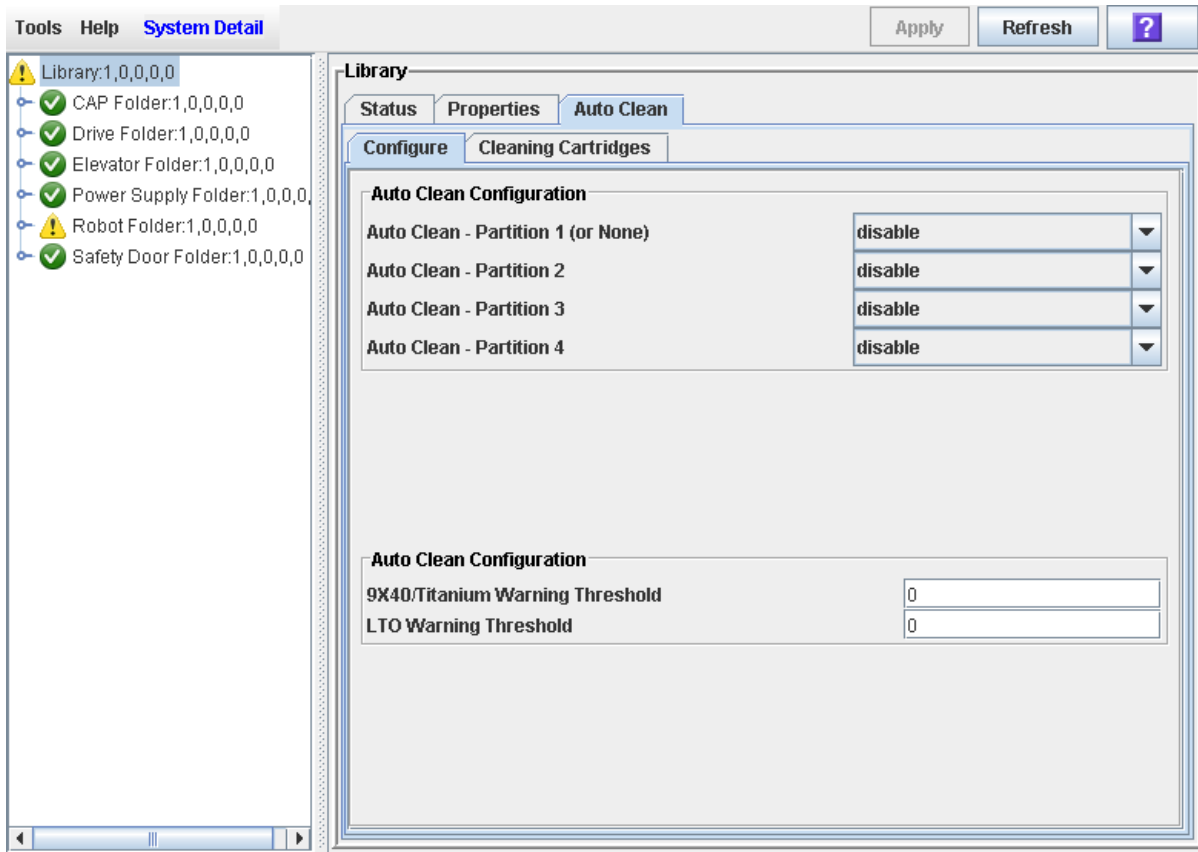
Task	Page
Configure Drive Auto Clean	206
Enter Cleaning or Diagnostic Cartridges	207
Eject Cleaning or Diagnostic Cartridges	209
Display Cleaning Cartridges	211
Display Drive Cleaning Status	212
Clean a Drive Manually	213

▼ Configure Drive Auto Clean

Use this procedure to enable or disable the drive auto clean feature. If the library is partitioned, auto clean can be enabled or disabled for individual partitions.

1. Select **Tools > System Detail**, and select the library folder on the device tree.
2. Click **Auto Clean** and then **Configure**.

The **Configure Auto Clean** screen appears.



3. Complete the **Auto Clean Configuration** section as follows:

- For SL8500 partitions or whole libraries, automatic cleaning should always be disabled on this screen. Automatic cleaning is always managed through the ACSLS or HSC tape management software. See the ACSLS or HSC documentation for details.
- If the library is partitioned, you can use the individual pull-downs to enable or disable auto-cleaning separately for each partition. If the library is not partitioned, you only need to set the first pull-down (**Partition 1 (Or None)**); the other pull-downs will be ignored.

4. In the **Auto Clean Configuration** section, specify the warning thresholds for each cartridge type.
5. Click **Apply**.

▼ Enter Cleaning or Diagnostic Cartridges

Use this procedure to enter new cleaning or diagnostic cartridges to the library through a CAP.

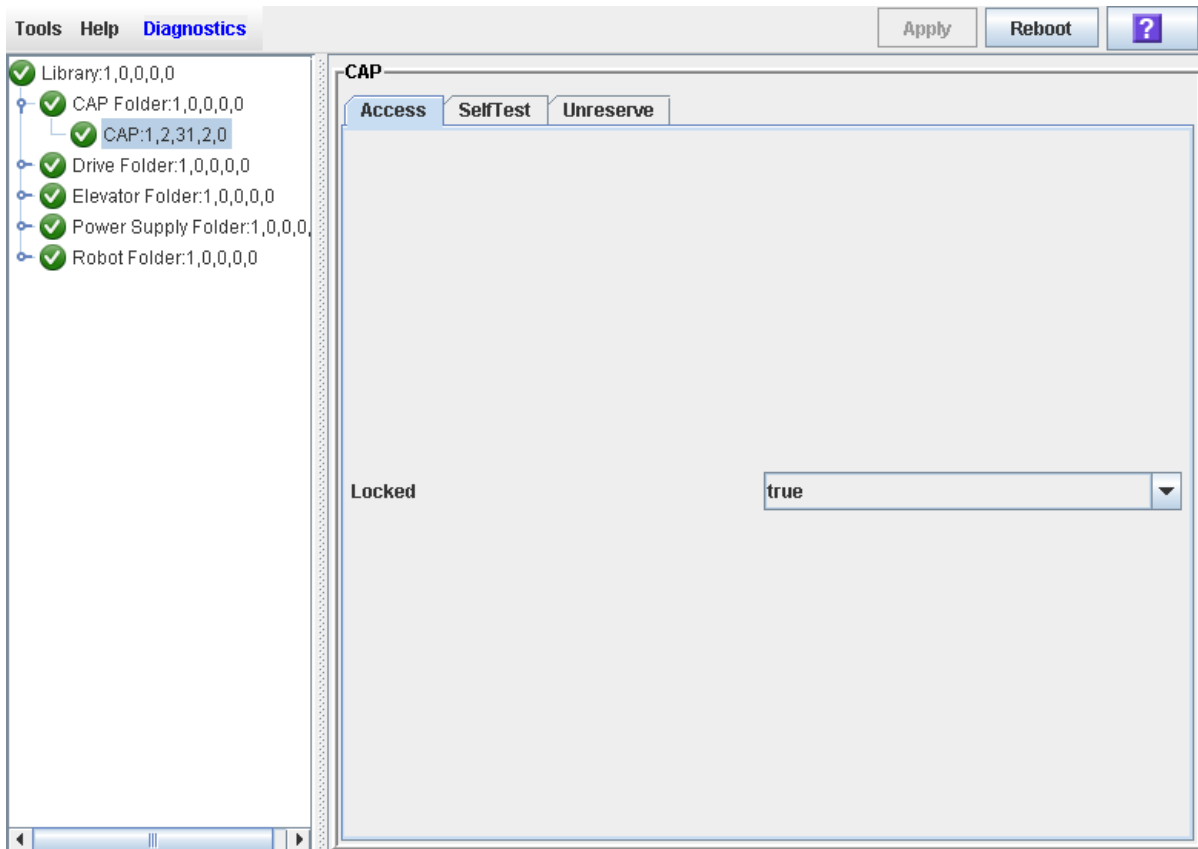
Note – This procedure applies to non-partitioned libraries only.

Before beginning this procedure, verify that all the following conditions are met:

- The required number of reserved cells are empty.
- The CAP does not contain any data cartridges.

Note – If the CAP is in auto enter mode, you can proceed directly to [Step 5](#).

1. Select **Tools > Diagnostics**.
2. Expand the **CAP Folder**, click the CAP you want to use, and click the **Access** tab.
The **Access** screen appears.



3. In the Locked pull-down, click false. Click the Apply button.

The Confirm popup appears.



4. Click OK.

The library controller unlocks the CAP door.

5. Press the appropriate CAP Unlocked button (CAP A or CAP B) on the operator key pad.

The CAP door opens, and the CAP button light turns ON.

Caution – Possible Equipment Damage. DO NOT force the CAP to open or close.

6. Place the cleaning or diagnostic cartridges in the CAP.

7. Press the appropriate CAP Unlocked button (CAP A or CAP B) on the operator key pad.

The CAP closes and locks automatically, and the CAP button light turns OFF.

Caution – Possible Equipment Damage. DO NOT force the CAP to open or close.

8. Manually move each cartridge to a reserved cell. See [“Move a Cartridge From a Specified Location”](#) on page 195 for detailed instructions.

When all cartridges have been moved from the CAP, the library recognizes that the CAP is empty and the CAP is returned to its default state.

Note – To display a list of cleaning and diagnostic cartridges in the reserved slots, see [“Display Cleaning Cartridges”](#) on page 211.

▼ Eject Cleaning or Diagnostic Cartridges

Use this procedure to eject expired cleaning or diagnostic cartridges through the CAP.

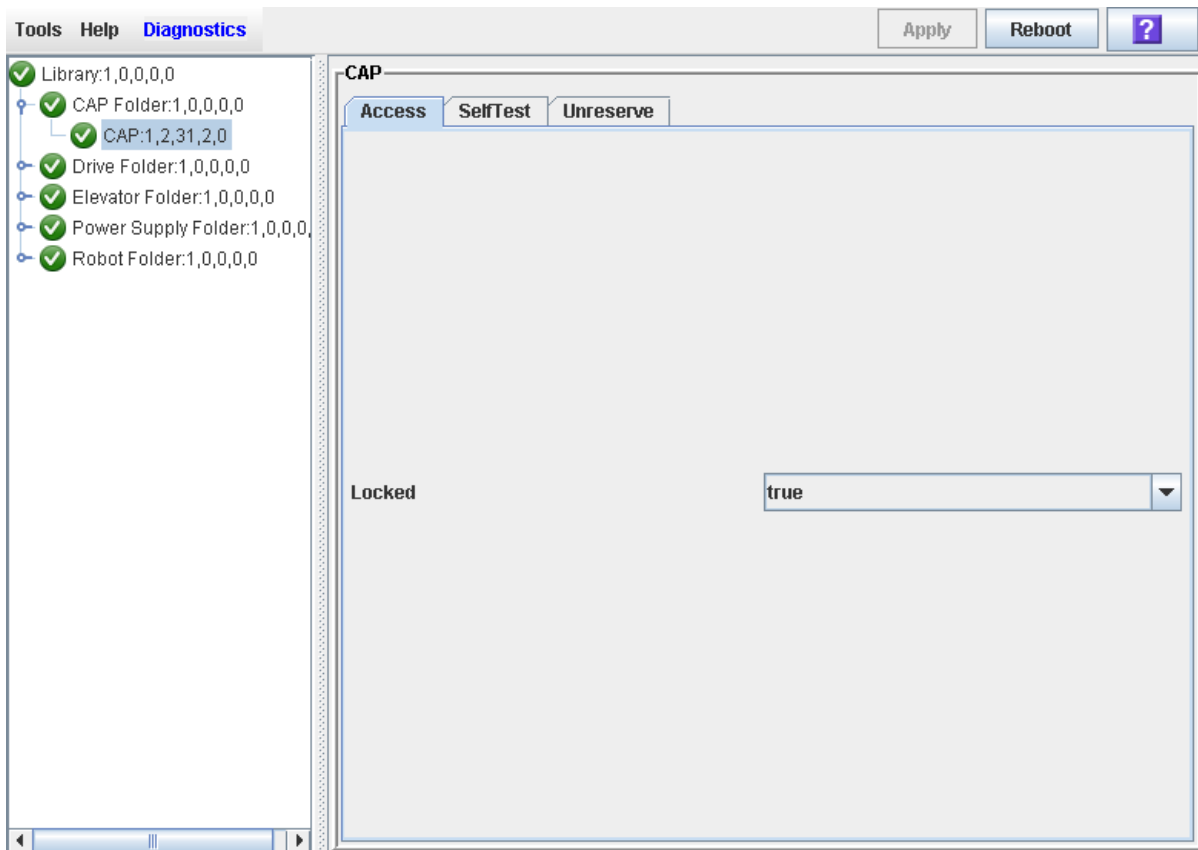
Note – This procedure applies to non-partitioned libraries only.

Note – Before beginning this procedure, verify that all slots are empty in the CAP you want to use.

1. Manually move each diagnostic or cleaning cartridge you want to eject, from a reserved cell to a CAP. See [“Move a Cartridge From a Specified Location”](#) on page 195 for detailed instructions.

Note – To display a list of cleaning and diagnostic cartridges in the reserved slots, see [“Display Cleaning Cartridges”](#) on page 211.

2. Select **Tools > Diagnostics**.
3. Expand the **CAP Folder**, click the CAP you want to use, and click the **Access** tab. The **Access** screen appears.



4. In the Locked pull-down, click false. Click the Apply button.

The Confirm popup appears.



5. Click OK.

The library controller unlocks the CAP door and the CAP Open LED is turned on.

6. Press the appropriate CAP Unlocked button (CAP A or CAP B) on the operator key pad.

The CAP door opens, and the CAP button light turns ON.

Caution – *Possible Equipment Damage.* DO NOT force the CAP to open or close.

7. Remove all the cartridges from the CAP.

8. Push the CAP button to close the CAP.

The CAP closes and locks automatically, and the CAP button light turns OFF.

Caution – *Possible Equipment Damage.* DO NOT force the CAP to open or close.

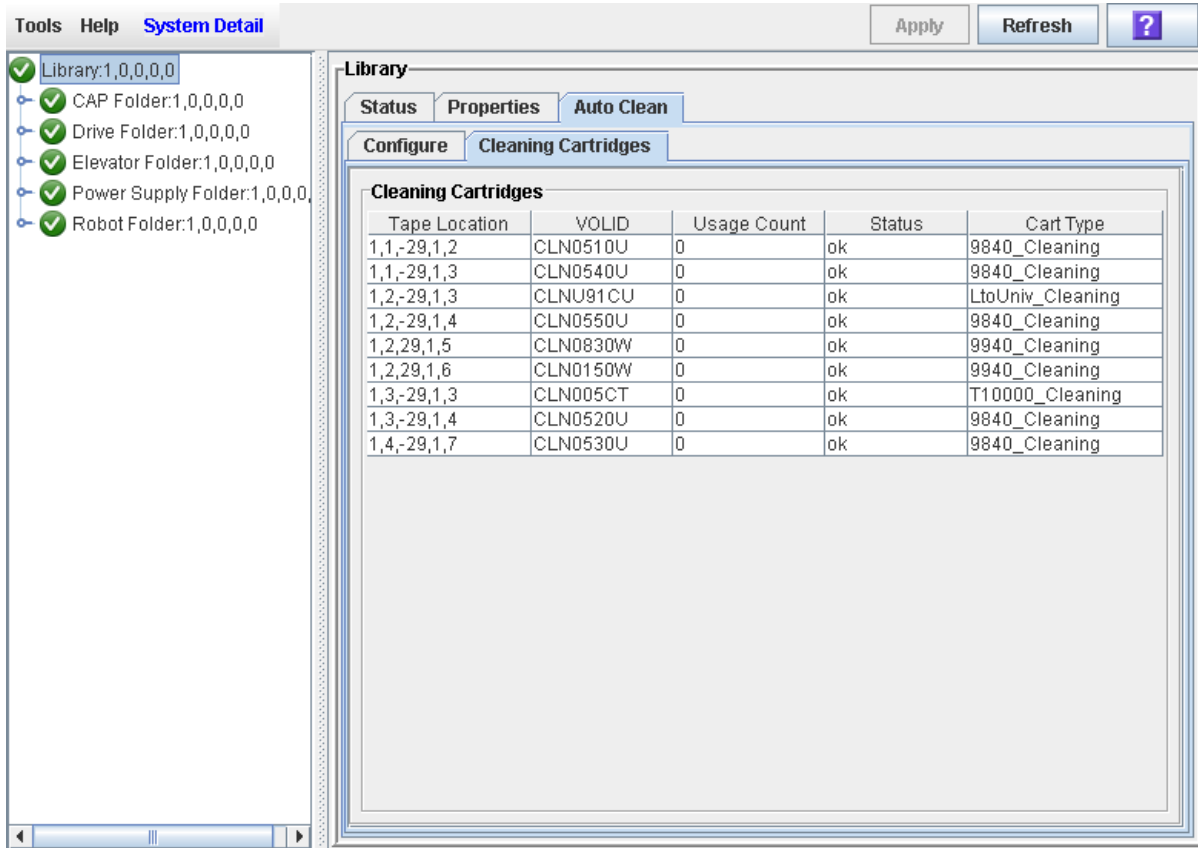
9. The TallBot audits the CAP to verify that it is empty.

The CAP is then returned to its default state.

▼ Display Cleaning Cartridges

1. Select **Tools > System Detail**, and select the library folder on the device tree.
2. Click **Auto Clean** and then **Cleaning Cartridges**.

The Library Cleaning Cartridges screen appears.



The list displays the following details for each cleaning cartridge:

- Cartridge location (reserved cells)
- VOLID
- Usage Count
- Status (OK, warning, expired)
- Cartridge Type (for example, LTO, SDLT)

▼ Display Drive Cleaning Status

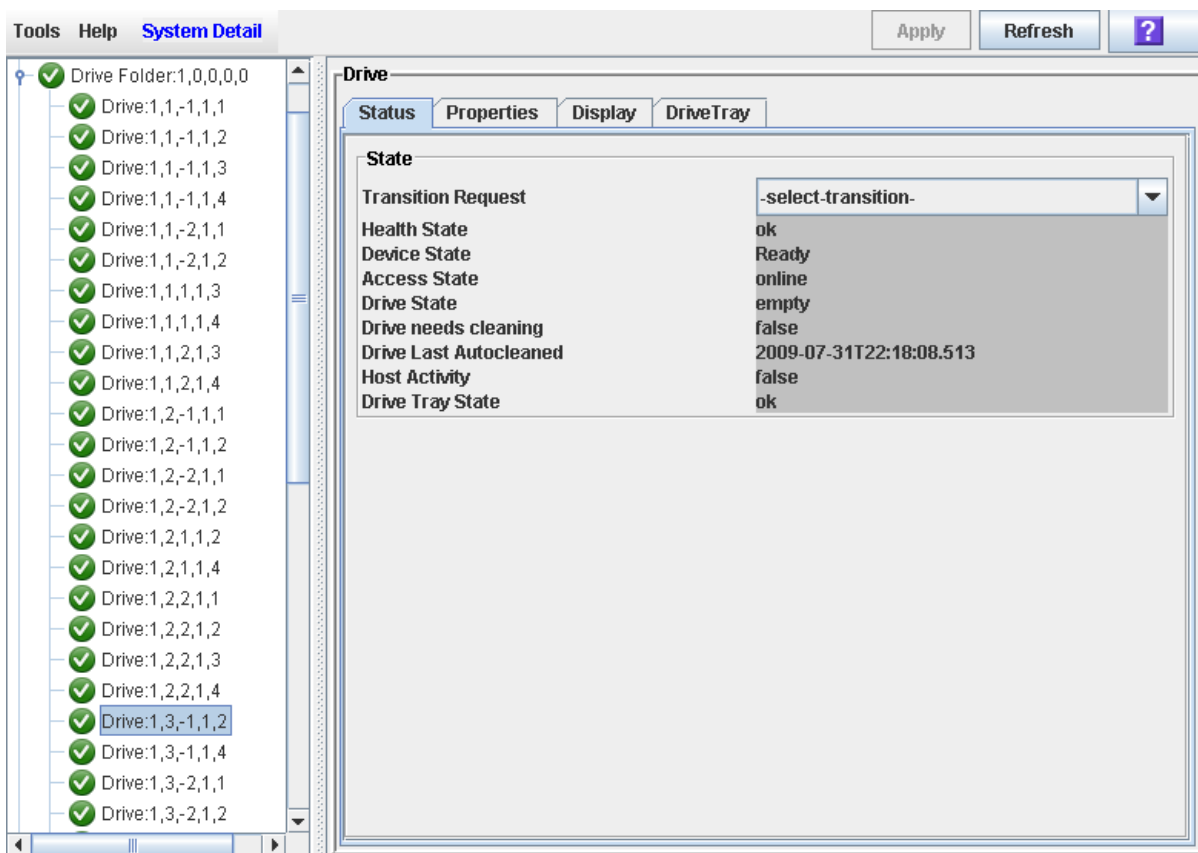
Use this procedure to display the current cleaning status of a drive.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and select the drive you want to display.
3. Click **Status**.

The screen displays the following cleaning details:

- Drive needs cleaning
- Drive Last Cleaned or Drive Last Autocleaned

Note – You can schedule manual drive cleaning by monitoring the “Drive needs cleaning” status.



▼ Clean a Drive Manually

Use this procedure to clean a drive. The SL8500 does not offer a dedicated manual drive cleaning function. Essentially, you must perform a manual mount of a cleaning cartridge on the drive.

You can initiate a manual clean at any time, even if the drive is not due for cleaning.

1. **Display a list of cleaning cartridges.** See [“Display Cleaning Cartridges” on page 211](#) for detailed instructions.

Your library could contain more than one type of drive. So verify that the reserved cells have the appropriate cleaning cartridges for the drive being cleaned.

2. **Manually move a cleaning cartridge from a reserved cell to the drive that needs cleaning.** See [“Move a Cartridge From a Specified Location” on page 195](#) for detailed instructions.
3. **Display the status of the cleaning operation on the Drive Clean Status Console.** See [“Display Drive Cleaning Status” on page 212](#) for detailed instructions.
4. **When the cleaning operation is complete, move the cleaning cartridge from the drive back to a reserved cell.** See [“Move a Cartridge From a Specified Location” on page 195](#) for detailed instructions.

Robot, Safety Door, and Power Supply Management

Robots

The robots move cartridges between storage slots, tape drives, and the CAPs. Each robot can service up to 16 tape drives.

Note – Because of the four individual rails, each robotic assembly is considered a library storage module (LSM). So the architecture of the SL8500 provides four separate and unique LSMs within a single library.

FastLoad Feature

To optimize system performance, the Robots automatically implement the Fast Load capability. Once a Robot successfully inserts a cartridge into a drive, it is immediately available for the next request and does not wait until the drive reports that the cartridge has been loaded. The SL8500 library control electronics waits to return the response to the mount request until it detects that the tape drive has successfully loaded the cartridge tape.

Redundant Robots

Two Robots can service a single rail section within the library, providing redundancy. Each Robot has two motors, if one fails, the other motor is powerful enough to move the defective Robot into the forward service area. If both the motors fail for a Robot, then the redundant Robot moves the defective Robot into the forward service area thus continuing Robot operations.

Your Oracle support representative completes the following steps in order to install redundant Robots :

1. Install the Service Safety Door

2. Upgrade the Robot assemblies
3. Upgrade the library firmware (FRS 2.50 or later)
4. Upgrade the HBS assemblies; these have an "X" on the upper left of the assembly
5. Upgrade the HBN card
6. HBQ rail terminator cards
7. ENDSTOP bar code inserts in the three-cell arrays at the ends of all rails
8. Additional DC power supplies

Robot Initialization

When power is applied to the library, each Robot begins its initialization routine. The sequence for initialization is in the following order:

Note – If there are multiple Robots, each Robot attempts initialization through the following sequence. If a failure is encountered in one Robot, that Robot is flagged as defective. Initialization continues for the other Robots and, after they are successfully initialized, the defective Robot is pushed into the maintenance area for replacement.

1. Logic/controller cards initialize (HBC, HBB).
2. Rail communication is established with the Robots: this is accomplished through the Robot's electrically conductive brushes that contact the rail. Robots are identified by number and hand address:
 - a. Number: the Robot that encounters the left stop (referenced from the front of the customer interface module) is Robot number "1," the one encountering the right stop is Robot number "2."
 - b. Hand address: according to their rail location (numbered 1 – 4, from the top, down). See ["Robot Numbering" on page 217](#) for more information.
3. If a service safety door is installed, the HBC card checks that:
 - a. Both maintenance keys are in the vertical (OFF) positions
 - b. The door is in the center (disengaged) position. If the door is not in the correct position, the HBC card will issue the command to move it into its center position.
4. Robots move vertically (this is the only Robot motion that is controlled by the microcode within the Robot's HBB card – all other motions are controlled by the HBC card)
5. The gripper sensors are checked.
6. The hand retracts – this protects:
 - a. Hand components – if the hand's "reach safe" sensor cannot be detected, initialization stops.
 - b. A customer cartridge that may have been left in the gripper during a power failure. If this is the case, the "cartridge present" sensor activates and the hand holds the cartridge in the retracted position.

7. Belt-driven wrist moves counterclockwise.
8. For libraries without redundant Robots, each Robot moves to both the left and right end stops.
9. For redundant Robots:
 - a. Both Robots move to their respective end stops
 - b. Both Robots initialize.
 - c. The right Robot remains at its end stop.
 - d. The left Robot moves around the track to meet the right Robot. This distance is calculated by the HBC card as the absolute track distance
 - e. The left Robot moves to the end of its track
10. Robots move to an empty slot detection area (the slot under the bar code insert, in the 3-cell array at the front of the customer interface module) to verify proximity sensor accuracy. During normal operation, if an empty slot is detected, the “empty slot detector” sensor is activated; non-labeled cartridges are also detected.
11. Belt-driven reach mechanism initializes by a wrist motion, pointing the hand to an aisle position, and reach components are then verified.
12. Gripper, reach, and scanner initialization is accomplished at the three cell array section:
 - a. If there is no cartridge in the gripper, the initialization continues.
 - b. If a cartridge is in the hand, the hand moves to the drop-off slot, the cartridge is placed in the slot, and gripper initialization continues.

Note – Cartridge drop-off slots are the bottom slots in the 3-cell arrays and the top fixed array slots under the PTP locations leading to a total of 16.

13. Hand points toward the rear of the library.
14. End status sent to HBC card.

Note – If any hand or robotic error cannot be resolved by error recovery routines, the entire Robot must be replaced.

Robot Numbering

Rails are numbered from 1 (top rail) to 4 (bottom rail). They are also designated as separate library storage modules (LSMs) within a library. For example:

- Rails 1 and 2 can be designated LSMs for HSC, while rails number 3 and 4 can be designated LSMs for ACSLS.
- If only one host exists, all rails become separate LSMs for that host.

See [Appendix A, “Cartridge Slot Locations”](#) for more details.

Robots have the following numbering:

1. Library number (within a library complex)
2. Rail number – Rails are numbered 1 through 4, rail 1 is the top rail
3. Column number – Columns are “signed” numbers referenced from the customer interface module, where +1 is right of the center of the drive bays and -1 is to the left of the drive bays
4. Side number – Outer wall = 1, Inner wall = 2

Note – Side numbers for Robots are numbered according to their end stops: 1 (left Robot stop) and 2 (right Robot stop).

5. Row number – Numbered consecutively, from the top down

Note – Because Robot hands are not storage slots, their row numbering is 0.

Robot Numbering Examples

- Location 1, 1, 0, 1, 0 = the Robot on rail 1 (top rail) that encounters the stop on the left side of the customer interface module
- Location 1, 1, 0, 2, 0 = the Robot on rail 1 (top rail) that encounters the stop on the right side of the customer interface module
- Location 1, 2, 0, 1, 0 = the Robot on rail 2 (next rail down) that encounters the stop on the left side of the customer interface module

Robot Procedures

For detailed Robot management procedures, see [“Robot Monitoring Tasks” on page 221](#).

Service Safety Door

SL8500 libraries with the redundant Robots are equipped with an internal service safety door that allows your Oracle CSE to safely perform maintenance and service on one Robot while the other Robot continues normal operations

The safety door is a sliding barrier that closes off the left or right maintenance area from the operational portion of the library. The maintenance area is the space between the two front doors and the rear of the elevator/turntable assembly. A defective Robot automatically moves into the maintenance area for service.

The safety door is activated only by your Oracle CSE using a maintenance key. However, you can use the SL Console to monitor the status of the safety door.

Safety Door Procedures

See the following sections for detailed information about monitoring and using the safety doors:

- [“Safety Door Monitoring Tasks” on page 225.](#)
- [“Service Safety Door Operation” on page 337.](#)

Power Supplies

N+1 Base Power Configuration

The base power configuration contains one system power distribution unit (PDU) and one N+1 PDU.

- The system PDU, connected directly to the branch circuit, provides AC power to three DC power grids and the electronics control module.
- The N+1 PDU supplies added +48 VDC load sharing power to each of the three DC power grids and an extra AC-to-DC power supply for the electronics control module.

The base power configuration provides power to the:

- Tape drive power supplies
- Robotic rail power supplies
- Customer Interface Module power supplies
- Touch screen operator control panel
- Electronics control module power supplies

Note – The base power configuration does not offer redundant AC power.

2N Power Configuration

The 2N power configuration contains the base power configuration (PDU 1) and a second PDU, PDU number 2.

This configuration provides power to the same components as N+1, plus power for:

- Optional, redundant load sharing power supplies
- Two additional accessory racks for customer components
- Redundant library controller cards

Note – The 2N PDU is required for the 2N drive power, 2N robotic power, and also for the additional rack installed.

Power Supply Procedures

For detailed power supply procedures, see [“Power Supply Monitoring Tasks”](#) on page 229.

Robot Monitoring Tasks

Task	Page
Display Robot Summary Information	222
Display Robot Status	223
Display Safety Door Properties	228

▼ Display Robot Summary Information

Use this procedure to display summary information for the library Robots.

Note – This information is also available through **Reports > Robot Summary**. See [“Display a Library Report” on page 62](#) for detailed instructions.

1. **Select Tools > System Detail.**
2. **Click the Robot folder on the device tree.**

The **Robot Data** screen appears.

▼ Display Robot Status

Use this procedure to display the current operational state of a Robot.

Note – This information is also available through **Reports > Robot Details**. See [“Display a Library Report” on page 62](#) for detailed instructions.

1. **Select Tools > System Detail.**
2. **Expand the Robot Folder, and click the robot you want to display.**
3. **Click Status.**

The screen displays the current status of the selected Robot.

▼ Display Robot Properties

Use this procedure to display detailed Robot configuration information, including the serial number and current firmware levels.

Note – This information is also available through **Reports > Robot Details**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**.
2. Expand the **Robot Folder**, and click the robot you want to display.
3. Click **Properties**.

The **Robot Properties** screen appears.

The screenshot shows the 'System Detail' window with the 'Robot' folder expanded. The 'Robot Properties' dialog box is open, displaying the FRU Serial Number and a table of Code Versions.

Robot Properties

FRU Serial Number: HBB 74003878

Code Version

Name	Executing Version	Flash Version
disk.hbb.plmage	4.94.24	4.94.24
kernel.plmage	4.75.15	4.75.15
libs.cramfs	4.87.10	4.87.10
robot.cramfs	4.94.32	4.94.32
u-boot.bin	1.00.10	1.00.10

Safety Door Monitoring Tasks

Task

Display Safety Door Summary Information	226
Display Safety Door Status	227
Display Safety Door Properties	228

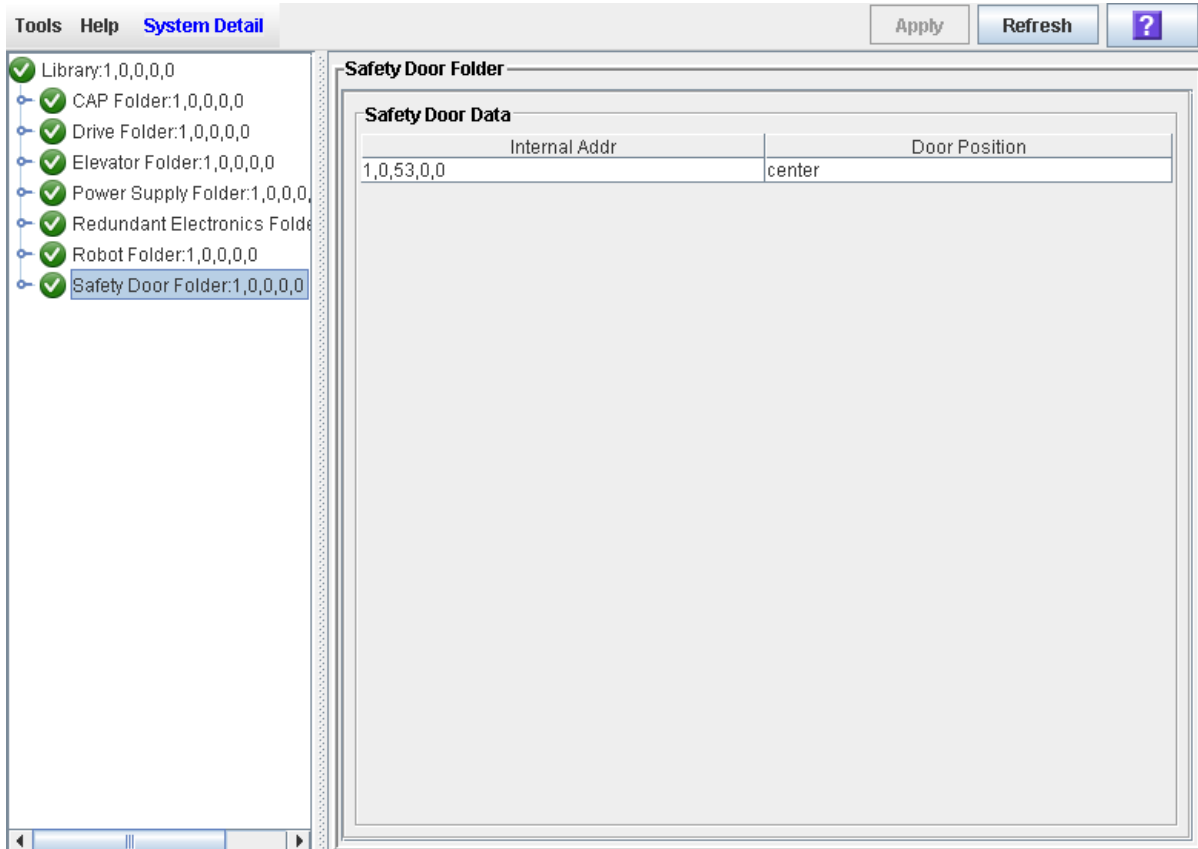
▼ Display Safety Door Summary Information

Use this procedure to display summary information for the safety doors.

Note – The safety door is available only for libraries with the Dual Robot feature.

1. Select **Tools > System Detail**.
2. Click the **Safety Door** folder on the device tree.

The **Safety Door Data** screen appears.



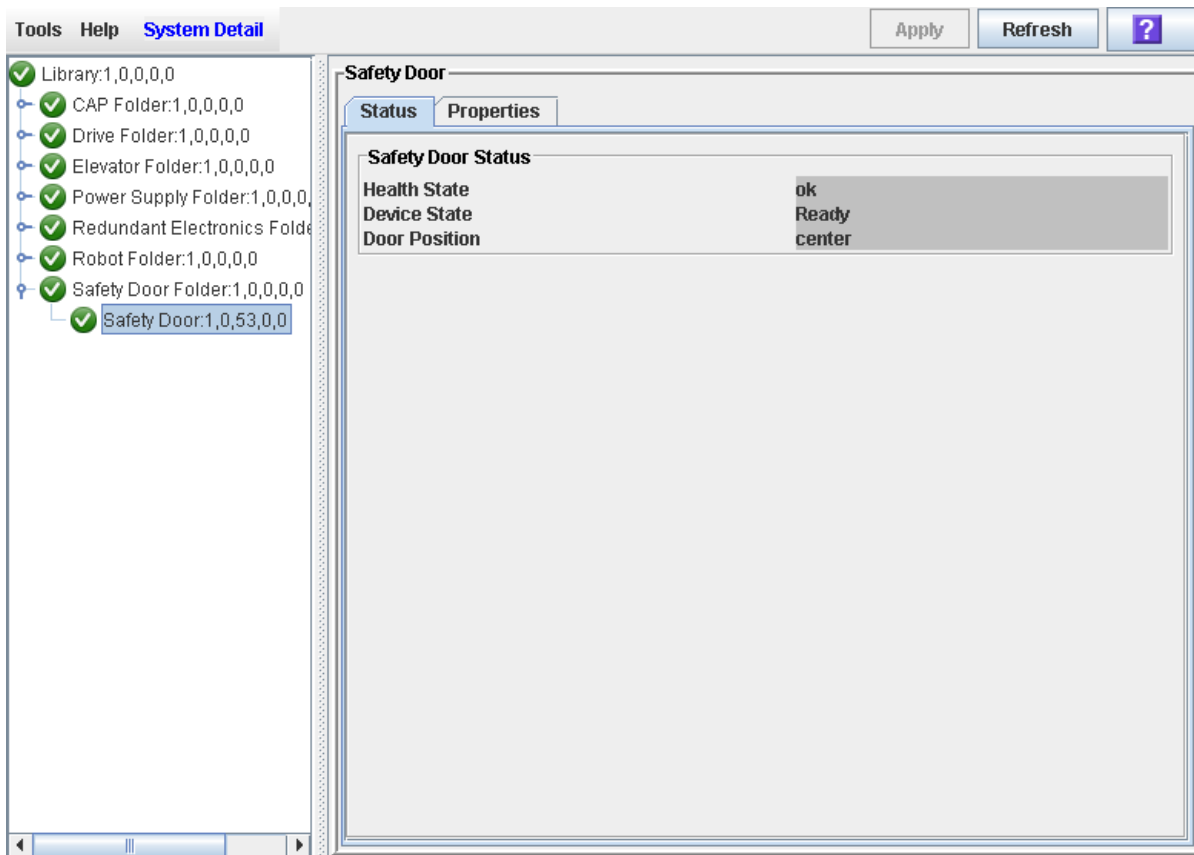
▼ Display Safety Door Status

Use this procedure to display the current operational state of the safety door.

Note – The safety door is available only for libraries with the Dual Robot feature.

1. Select **Tools > System Detail**.
2. Expand the **Safety Door Folder**, and click the safety door.
3. Click **Status**.

The screen displays the current status of the safety door.



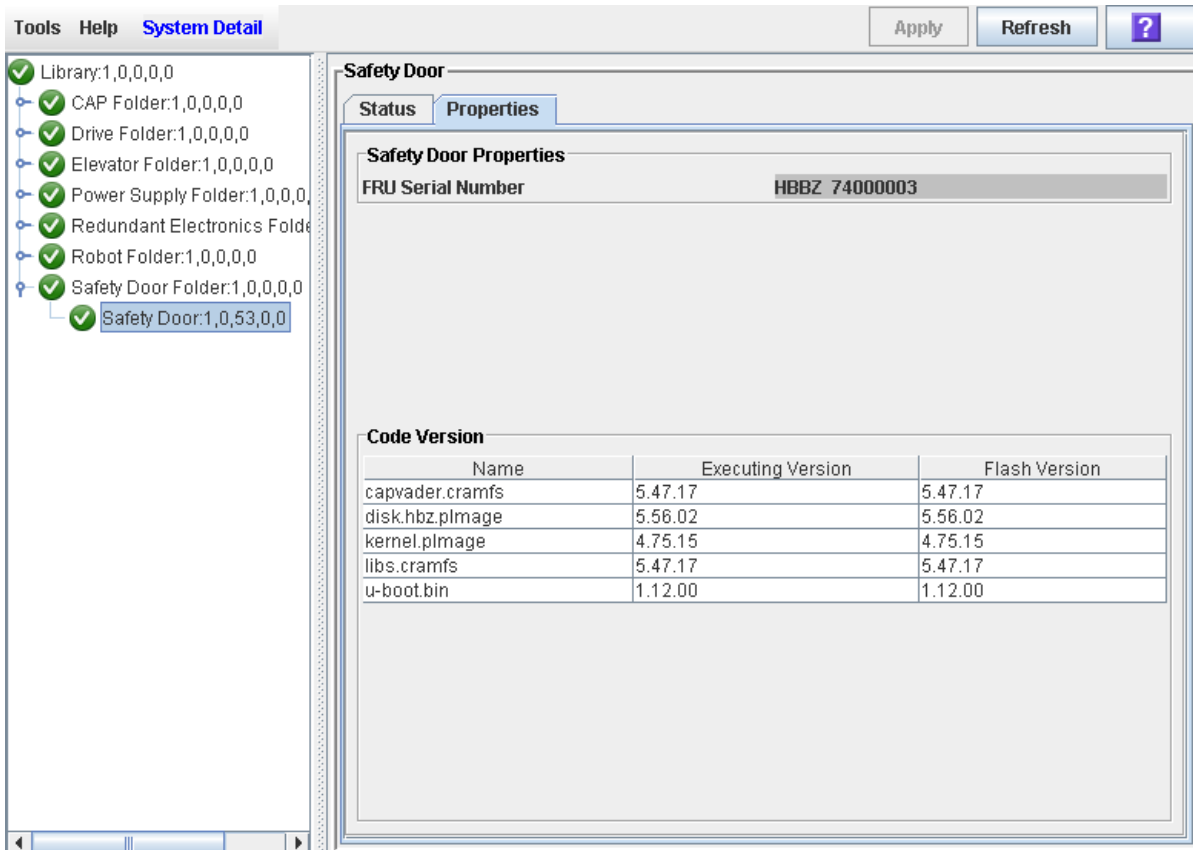
▼ Display Safety Door Properties

Use this procedure to display detailed safety door configuration information, including the serial number and current firmware levels.

Note – The safety door is available only for libraries with the Dual Robot feature.

1. Select **Tools > System Detail**.
2. Expand the **Safety Door Folder**, and click the safety door.
3. Click **Properties**.

The **Safety Door Properties** screen appears.



Power Supply Monitoring Tasks

Task	Page
Display Power Supply Summary Information	230
Display Power Supply Detail	231

▼ Display Power Supply Summary Information

The Power Supply Data screen displays summary information for all power supplies in the library. You can use this screen to monitor the status of the power supplies.

By default, the display is sorted by power supply internal address. Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout”](#) on page 34.

1. Select **Tools > System Detail**.
2. On the **Library tree**, click the **Power Supply Folder**.
3. The **Power Supply Data** screen is displayed.

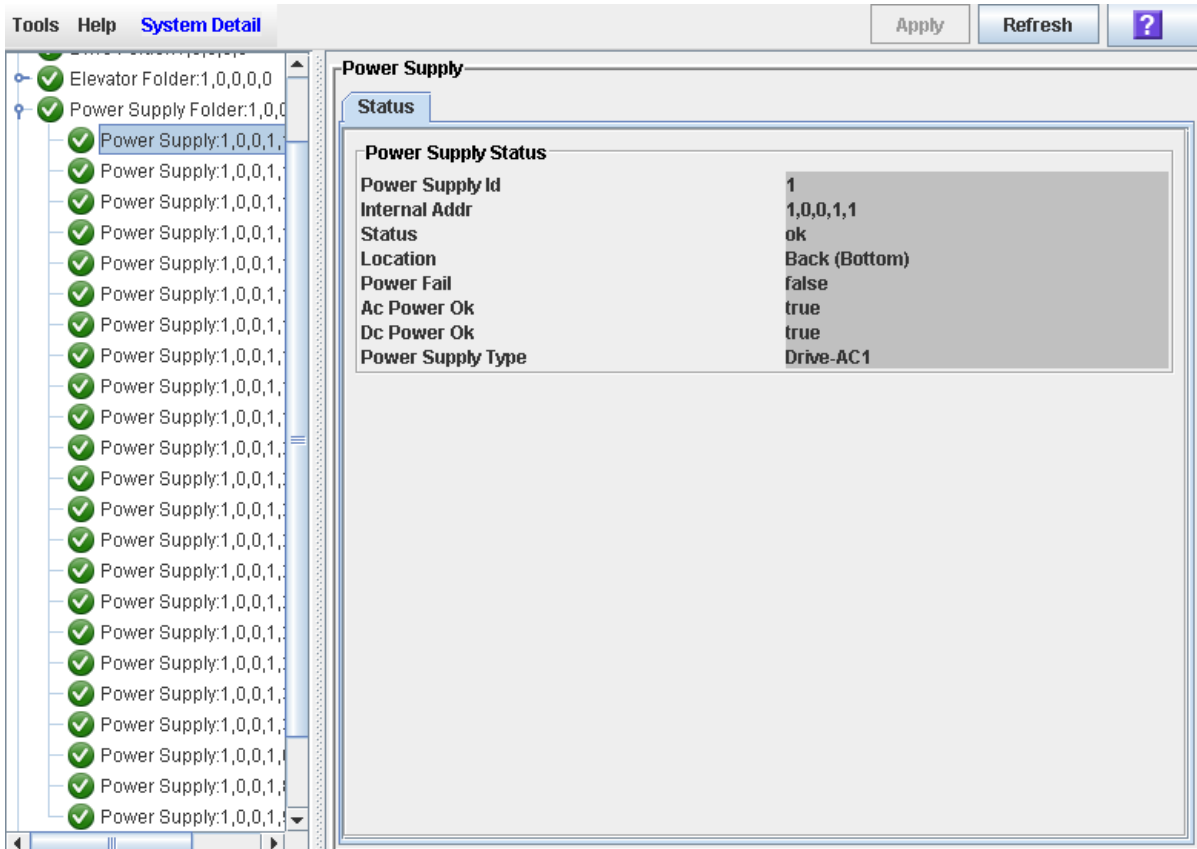
Power Supply Folder

Power Supply Data				
Internal Addr	Power Supply Id	Location	Health State	Power Supply Type
1,0,0,1,1	1	Back (Bottom)	ok	Drive-AC1
1,0,0,1,2	2	Back	ok	Drive-AC1
1,0,0,1,3	3	Back	ok	Drive-AC2N+1
1,0,0,1,6	6	Back	ok	Rail-AC1
1,0,0,1,8	8	Back	ok	Drive-AC1
1,0,0,1,9	9	Back	ok	Drive-AC2
1,0,0,1,10	10	Back	ok	Drive-AC2
1,0,0,1,11	11	Back	ok	Rail-AC1
1,0,0,1,12	12	Back	ok	Rail-AC1
1,0,0,1,13	13	Back	ok	Drive-AC1
1,0,0,1,14	14	Back	ok	Drive-AC1
1,0,0,1,15	15	Back	ok	Drive-AC2
1,0,0,1,16	16	Back	ok	Drive-AC2
1,0,0,1,17	17	Back	ok	Rail-AC2N+1
1,0,0,1,19	19	Back	ok	Drive-AC1
1,0,0,1,20	20	Back	ok	Drive-AC1
1,0,0,1,24	24	Back (Top)	ok	Rail-AC2
1,0,0,1,25	25	Front	ok	HBZ-25
1,0,0,1,26	26	Front (Top)	ok	HBZ-26
1,0,0,1,27	27	Back (Lower)	ok	ECM-PS1-AC1
1,0,0,1,28	28	Back (Upper)	ok	ECM-PS2-AC2
1,0,0,1,29	29	Back	ok	PDU1-AC1
1,0,0,1,30	30	Back	ok	PDU2-AC2

▼ Display Power Supply Detail

The Power Supply Status screen displays detailed information for a selected power supply. You can use this screen to determine whether the power supply is in need of maintenance or replacement.

1. Select **Tools > System Detail**.
2. On the **Library tree**, expand the **Power Supply Folder**.
3. Click the power supply you want to display.
4. The **Power Supply Status** screen is displayed.



Elevator and Pass-Thru Port Management

PTP Configuration

The preferred method of adding a PTP is by installing the PTP and second library to the left side (as viewed from the front of the existing library). This will make the existing library a home library. This method does not require system reconfiguration.

If a PTP and second library are added to the right side (as viewed from the front of the existing library), this would make the existing library an away library and reconfiguration is required.

FIGURE 14-8 “Adding a PTP to an Existing Library Complex” on page 336 illustrates the concept of home and away libraries.

Nondisruptive Installation

Installing PTPs from right to left has several advantages:

- Existing libraries can remain operational while the PTP frame is attached to them during the installation of the adjacent library.
- No rebooting of HSC or ACSLS is required.
- Mount requests continue as normal in the first library (or existing library complex).
- If cartridges are placed into the new SL8500, an ACSLS or HSC audit must be run to add these cartridges to the database. The pre-existing LSMs can remain online during the audit.

The numbering process proceeds sequentially from right-to-left as shown in **TABLE 12-1**.

TABLE 12-1 Adding a Library to the Left

New Library	Existing Libraries	
Library C	Library B	Library A
LSMs 8-11	LSMs 4-7	LSMs 0-3

Disruptive Installation

Growing the library complex from left to the right requires:

- Varying the libraries offline
- Renumbering the LSMs
- Auditing the new and existing libraries to update volume locations

This type of installation is therefore highly disruptive to the library operations. See [“Perform a Disruptive PTP Installation – for ACSLS or HSC” on page 335](#) for detailed instructions.

PTP Addressing Scheme

The following terms and definitions apply to PTP operations:

Home Library: For two libraries connected by PTPs, the home library is the library supplying power and signals to the PTP through the left side of the Drive and Electronics Module, as viewed from the front of both libraries.

Away Library: For two libraries connected by PTPs, the away library is the library on the left side of the home library as viewed from the front of both libraries.

The PTP addressing scheme is the same five-digit value as the other SL8500 devices and locations (see [“Internal Address” on page 340](#)).

PTP numbering for the *home* library is:

- Library number
- Rail number (1-4 [internal firmware] or 0-3 [host])
- -6 (Column number)
- 1 (Side number)
- 0 (Row number)

PTP numbering for the *away* library would be:

- Library number
- Rail (LSM) number (1-4 [hardware] or 0-3 [host])
- +6 (Column number)
- 1 (Side number)
- 0 (Row number)

Note – Columns +6 and -6 are the PTP areas for a library. Column +6 in a library firmware address refers to libraries connected to the right, -6 indicates libraries connected to the left.

However, the host software (ACSLs and HSC) consider Panel 1 as the PTP area, whereas elevators are Panel 0. The first library installed in the complex is 1 and each additional library added to the complex increments by 1.

Home and away designations are always referenced from a PTP perspective of the library it is connected to. When more than two libraries are connected in a complex, every library that has two neighbors is both a home and away library, depending on the perspective of the PTP devices. For example, the middle library in a set of three is the home library for the PTP's on its left and the away library for the PTP's on its right.

Pass-Thru Port Procedures

For detailed power supply procedures, see [“Elevator and Pass-Thru Port Tasks”](#) on page 236.

Elevator and Pass-Thru Port Tasks

Task	Page
Display Elevator Summary Information	237
Display Elevator Status	238
Display Elevator Properties	239
Display Pass-Thru Port Summary Information	240
Display Pass-Thru Port Status	241
Display Pass-Thru Port Properties	242

▼ Display Elevator Summary Information

Use this procedure to display summary information for all library elevators.

Note – This information is also available through **Reports > Status Summary > Library Information**. See [“Display a Library Report”](#) on page 62 for detailed instructions.

1. Select **Tools > System Detail**.
2. Click the **Elevator folder** on the device tree.

The **Elevator Data** screen appears.

The screenshot displays the Sun SL8500 System Detail interface. On the left, a device tree shows various folders, with 'Elevator Folder:3,0,0,0,0' selected. The main area shows the 'Elevator Data' screen with a table of internal addresses and their access states.

Internal Addr	Access State
3,0,-14,2,0	online
3,0,14,2,0	online

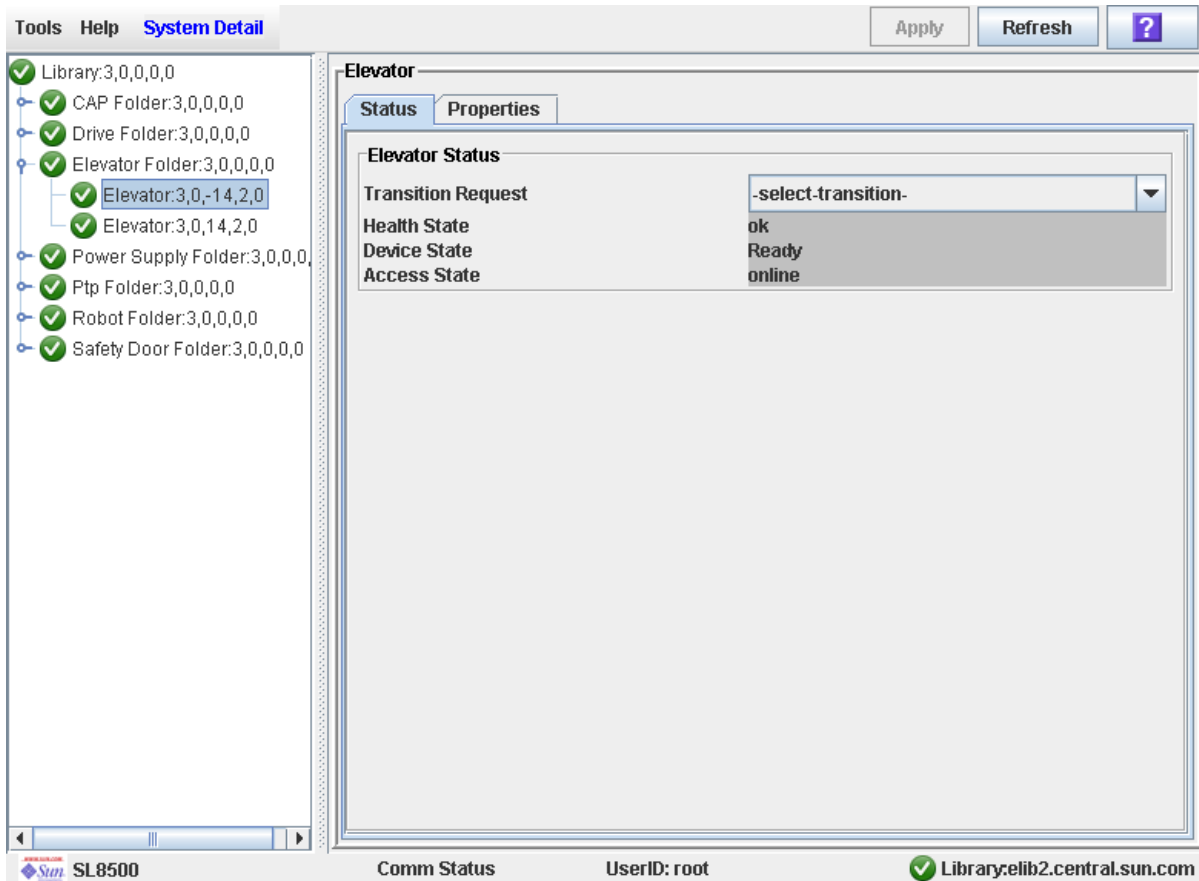
The interface also includes a status bar at the bottom with 'Comm Status', 'UserID: root', and 'Library:elib2.central.sun.com'.

▼ Display Elevator Status

Use this procedure to display the current operational state of an elevator.

1. Select **Tools > System Detail**.
2. Expand the **Elevator Folder**, and click the elevator you want to display.
3. Click **Status**.

The screen displays the current status of the selected elevator.



▼ Display Elevator Properties

Use this procedure to display detailed elevator configuration information, including the serial number and current firmware levels.

1. Select **Tools > System Detail**.
2. Expand the **Elevator Folder**, and click the elevator you want to display.
3. Click **Properties**.

The **Elevator Properties** screen appears.

The screenshot shows a management console window titled "System Detail". The left sidebar contains a tree view of system components, with "Elevator:3,0,-14,2,0" selected. The main panel displays the "Elevator Properties" for the selected component. The "FRU Serial Number" is HBB 66004063. Below this is a "Code Version" table with the following data:

Name	Executing Version	Flash Version
capvader.cramfs	4.94.32	4.94.32
disk.hbz.plmage	4.94.24	4.94.24
kernel.plmage	4.75.15	4.75.15
libs.cramfs	4.87.10	4.87.10
u-boot.bin	1.00.10	1.00.10

The bottom status bar shows "Comm Status" (checked), "UserID: root", and "Library:elib2.central.sun.com" (checked).

▼ Display Pass-Thru Port Summary Information

Use this procedure to display summary information for all library pass-thru ports (PTPs).

Note – This procedure is applicable only if your installation includes a library complex.

1. Select **Tools > System Detail**.
2. Click the **PTP folder** on the device tree.

The **PTP Data** screen appears.

The screenshot shows the Sun SL8500 System Detail interface. The left pane displays a device tree with the following folders: Library:3,0,0,0,0; CAP Folder:3,0,0,0,0; Drive Folder:3,0,0,0,0; Elevator Folder:3,0,0,0,0; Power Supply Folder:3,0,0,0,0; Ptp Folder:3,0,0,0,0 (highlighted); Robot Folder:3,0,0,0,0; and Safety Door Folder:3,0,0,0,0. The right pane, titled 'Ptp Folder', displays a table of PTP Data with the following columns: Internal Addr and Access State. The table contains four rows of data, all with an 'online' access state. The status bar at the bottom shows 'Comm Status' (checked), 'UserID: root', and 'Library:elib2.central.sun.com' (checked).

Internal Addr	Access State
3,1,6,1,0	online
3,2,6,1,0	online
3,3,6,1,0	online
3,4,6,1,0	online

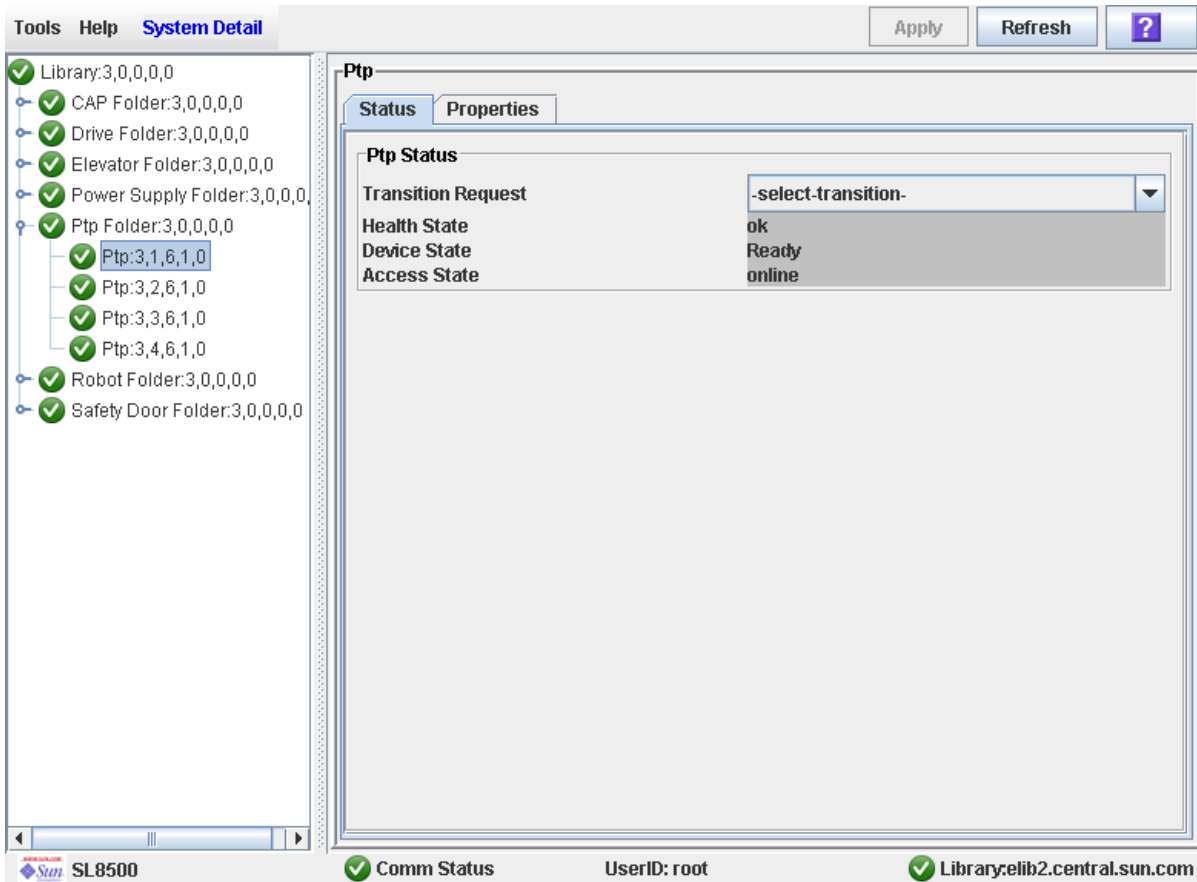
▼ Display Pass-Thru Port Status

Use this procedure to display the current operational state of a pass-thru port (PTP).

Note – This procedure is applicable only if your installation includes a library complex.

1. Select **Tools > System Detail**.
2. Expand the **PTP Folder**, and click the pass-thru port you want to display.
3. Click **Status**.

The screen displays the current status of the selected pass-thru port.



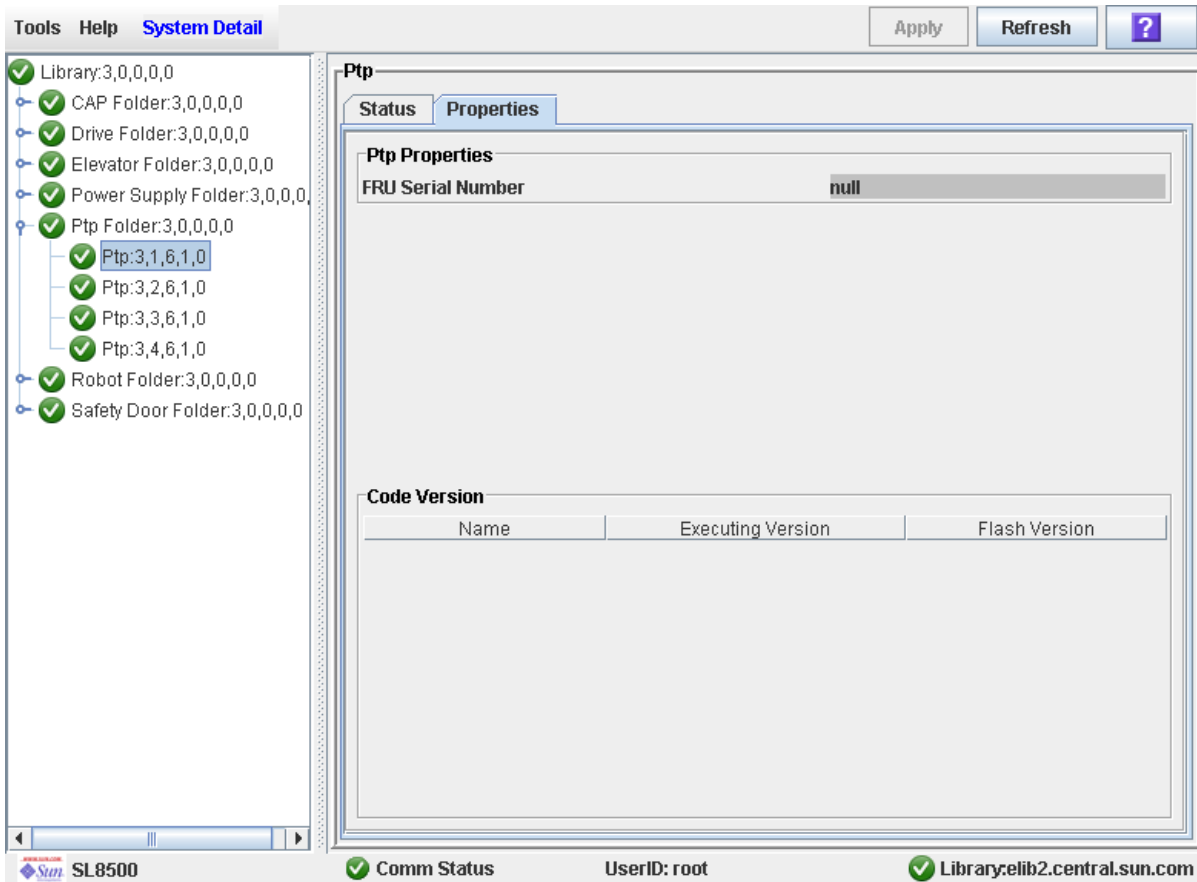
▼ Display Pass-Thru Port Properties

Use this procedure to display detailed pass-thru port (PTP) configuration information, including the serial number and current firmware levels.

Note – This procedure is applicable only if your installation includes a library complex.

1. Select **Tools > System Detail**.
2. Expand the **PTP Folder**, and click the pass-thru port you want to display.
3. Click **Properties**.

The **PTP Properties** screen appears.



SL Console Diagnostics and Utilities

Library Events

The library controller continually monitors library operations and logs all events. Events are stored under three headings:

- Communication events – Includes host-to-library, library-to-library, and library-to-drive communications.
- Error event – Each error event is assigned a four-digit (hexadecimal) action code.
- Warning events – Indicate a loss of performance or conditions that may be indicative of future, fatal errors.

Event Monitors

You or your Oracle support representative can use the SL Console monitors to review library events. You can spool the event monitor information to a text file.

The following information can help to diagnose the cause of the event:

- Date/time stamp – Identifies when the event occurred.
- Action codes – Identifies the command that was issued, such as “load drive”.
- Result codes – Identifies the result of the requested action. See [“List a Result Code” on page 262](#) to look up a result code.
- Known service plan (KSP) diagnosis – Identifies the mechanism or component responsible for the task or fault.

Note – There is no option to clear the event log.

Note – Using the SL Console you can spool event data to a file.

Library Self-Tests

The self-test diagnostic utility is intended to help diagnose basic problems with the library. A self-test is typically run after the library is installed. It can be run whenever necessary.

The library self-test routines can be run in either non-disruptive or disruptive mode. In non-disruptive mode, all cartridges used in the test are returned to their original locations. Disruptive mode may leave cartridges in a different location from where they started.

Library self-tests involve the following process:

1. Checks the communication path between the library controller, drives, elevators, and Robots.
2. Performs get and put operations to check the health of the Robots, elevators, and CAPs. This includes get and put operations from a reserved cell to a random empty:
 - Storage cell
 - CAP cell
3. Performs a full library audit.
4. Performs mounts and dismounts of diagnostic cartridges for all the drives installed in the library.

Note – The self-test will not start unless a diagnostic cartridge is found in the reserved cells.

Note – The self-test is repeated for each drive type if a compatible diagnostic cartridge is found in the reserved cells. If a diagnostic cartridge is not found for a drive type, the mount/dismount operation is skipped for the drive.

Library Firmware Upgrades

The library firmware resides on the library controller. The initial firmware is installed at the factory. When new firmware is released, you must use the code load utility to upgrade the firmware on the library and associated devices (CAP and Robot).

Note – Library firmware does not contain drive code upgrades.

Firmware Upgrade Process

The process for loading firmware code on the library controller is as follows:

1. Locate the firmware upgrade package (.jar file) on the Oracle download site. See [“Firmware Download Site” on page 245](#).
2. Download the code to a folder on your local PC or workstation.
3. Download the firmware package from your PC or workstation to the library controller. This process also unpacks the package after downloading to make it ready for activation. See [“Download Code to the Library Controller” on page 271](#).
4. Activate the downloaded code on the library controller. See [“Activate Code on the Library Controller” on page 278](#).
5. Reboot the library to make the code operational. See [“Reboot the Library” on page 270](#).

Firmware Download Site

The SL8500 library firmware package is a .jar (Java Archive) file. The file is available at the following download site:

<http://www.sun.com/download/index.jsp>

Note – You must have a valid login ID and password for the download site you are using. Contact your Oracle support representative for assistance.

Multiple Versions of Firmware

You can store up to two versions of the SL8500 firmware in the library controller flash memory. This provides the following advantages:

- It allows the library to continue normal operations, running one version of firmware, while you download and unpack an upgrade package. Then you can activate the upgrade at a time that is convenient for library users.
- It allows you to revert to a previous version of firmware without having to download and unpack the code package again.

Concurrent Upgrades on All Libraries in a Complex

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

For library complexes, you can conduct firmware upgrades for all libraries in the complex from a single SL Console session. During the firmware download, the new code is automatically distributed and unpacked on all libraries in the complex concurrently. During the firmware activation, the new code is activated, and all libraries in the complex are rebooted, concurrently. As a result, a firmware upgrade for a library complex takes only about as much time as for a single library.

Upgrades and Redundant Electronics

Note – This feature is available starting with SL8500 firmware version FRS_6.00 and SL Console version FRS_4.65.

For libraries with the Redundant Electronics feature, the code is loaded on the alternate controller first and then an automatic failover is performed. This allows you to perform a firmware upgrade while the library continues normal operations with only a brief interruption for the failover process. Individual devices do not need to be re-initialized.

Related Procedures

For detailed firmware upgrade procedures, see [“Library Utility Tasks” on page 263](#).

Audits

An audit is the process of reading and cataloging cartridges within a library, verifying the locations of cartridges, or validating a range of slot locations. The library controller maintains a cartridge database that contains the following information for all the cartridges in the library:

- Volume ID (VOLID or volser)
- Current location (in library internal address format)
- Verified status (true or false)

During library initialization, the library audits the location and VOLID of all cartridges in the storage and reserve slots. The library audits all cartridge locations in the storage and reserved areas at the following times:

- After one or both access doors have been opened and closed.
- An audit request is made through the SL Console.
- A host request to audit the library is entered.

You can use the SL Console to perform the following types of audits:

- [Physical Audit](#)
- [Verified Audit](#)

Caution – System-level problems may occur if a host’s cartridge record does not match what is in the library controller cartridge database.

Physical Audit

In a physical audit, the Robot visits cartridge locations and verifies the VOLID of resident cartridges, and the library controller updates the cartridge database. This audit changes the “verified” status of the cartridge locations to “True.” Audit times vary according to the size of the library, the number of HandBots, and the speed of the scan engine for the barcode scanner.

The library performs a physical audit at the following times.

- At library power-up, or when a library access door has been opened and closed. This is always a full audit of the entire library.
- When initiated manually from the SL Console. There are two types of manually initiated physical audits:
 - Entire library audit – The Robot visits all cells (storage, CAP, and drive), catalogs the VOLIDs and locations, and updates the library controller cartridge database. This audit is a background process and so does not interrupt online library operations. See [“Audit the Entire Library” on page 290](#) for details. The estimated time for a physical audit of an entire library is from less than 10 minutes for a 1,448 cartridge library to 45 minutes for 6,632 cartridge library.
 - Specific range audit – The Robot visits only a specific range of cells (storage, CAP, and drive) and updates the library controller cartridge database. The audit information is displayed on the SL Console while the audit is performed. See [“Audit a Range of Cells” on page 291](#) for details.

Verified Audit

A verified audit validates the status of a specific cartridge location or range of locations (including CAPs and drives) in the cartridge database. If a cartridge address has a verified status of “false” then a physical audit of that location is performed and the cartridge database is updated. The progress of the audit is displayed in the Audit Console section of the SL Console. See [“Perform a Verified Audit” on page 292](#) for details.

Virtual Audit

A virtual audit displays a report listing the contents of the cartridge database.

Robot Diagnostic Moves

Diagnostic moves are used to monitor or diagnose a problem with a Robot. The move can be performed with or without cartridges.

Successful diagnostic moves do not rearrange the cartridges in the storage cells; cartridges are returned to their original locations after the diagnostic move is completed. However, some diagnostic move failures can cause cartridges to be left in new locations.

A diagnostic move involves the following elements:

- [Target Address Range](#)
- [Pool Address Range](#)
- [Move Access Order](#)
- [Robot Selection](#)

Target Address Range

The target address range defines the location parameters in a library within which the get operation is performed in a diagnostic move. There are two types of access orders for a target address:

- [“Sequential Access Order” on page 250](#)
- [“Random Access Order” on page 250](#)

Following are valid target address types:

- Storage cells – Reserves storage locations as the target/pool range
- CAP – Reserves cells in a CAP as the target/pool range.
- Drive and Storage cells – Reserves drives and storage cells as the target/pool range.
- Reserved cells – Reserves reserved (system) cells, which contain cleaning or diagnostic cartridges, as the target/pool range.
- All – Reserves storage cells, reserved cells, CAP cells and drives as the target/pool range.

Note – Selecting the Storage, CAP, drive, system, or All option does reserve all the associated locations as the target range. However, only the location currently being accessed by the Robot for a get/put operation is unavailable to the host.

Pool Address Range

The pool address range locations are used to supply cartridges required for diagnostic moves to and from the target address range. A pool address is also used in a get operation if a target address does not contain a cartridge. There is no specified access order within the pool address range. The pool address ranges does not include drive locations.

Note – The pool address ranges cannot contain drive locations.

Move Access Order

Sequential Access Order

In a sequential access order diagnostic move, the Robot performs a get operation starting with the first location in the target address ranges and then continues visiting the locations sequentially through the range until it completes the requested number of moves.

Note – If you choose not to move cartridges the get/put operations are not performed. The Robot just positions itself at the target and pool addresses.

Random Access Order

In a random access order diagnostic move, the 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. The random access routine ends after the requested number of moves is complete.

If you choose not to move cartridges the get/put operations are not performed. The Robot just positions itself at the target and pool addresses.

Robot Selection

The Robot for the diagnostic move is selected based on the minimum and maximum ranges you set for the target and pool addresses. Multiple robots maybe selected if the address range requires it.

Diagnostic Move Control Functions

The following options are available to manage the moves currently open:

To	Select Menu Option	Notes
Start	File > Start Sequence	
Pause	File > Pause Sequence	Stops all diagnostic moves, but maintains the current location in the access order.
Stop	File > Stop Sequence	Stops a running or paused exerciser.

To	Select Menu Option	Notes
Resume	File > Start Sequence	Resumes a paused exerciser starting with the last known location in the target address range.
Clear the messages displayed in the monitor window	File > Clear Output Window	Erases the previous message lines and continues to fill the screen with new messages.
Spool	Spool File > Start Spooling	Directs the move output to a file.
Stop spooling the exerciser output to a file	Spool File > Stop Spooling	Stops directing the move output to the spool file.

Note – If multiple diagnostic moves are open, then each move has its own monitor screen.

Troubleshooting

Before you run diagnostic tests, check the following areas of the library using the troubleshooting tips in the following table:

TABLE 13-1 Troubleshooting Table

Problem	What to do
Service Required (amber) LED is constantly on.	<p>Perform the following procedure:</p> <p>Using the SL Console, check the health of the library and the attached devices (drives, CAPs, and Robots). See “StorageTek Library Console” on page 31 for more details about operations.</p> <p>To perform a health check:</p> <ol style="list-style-type: none">1. Log in to the SL Console application.2. Access the System Detail module, View > System Detail.3. Check the device tree for the following indicators:<ul style="list-style-type: none">■ Device Healthy■ Device Error <p>The Status (for example, online/offline) and Statistics (for example, uptime, downtime, errors and warnings) tabs provide more information on the health of the library and devices.</p> <p>Other checks:</p> <ul style="list-style-type: none">■ Make sure that cartridges are fully seated and properly oriented in their storage cells.■ Inspect the X table for any foreign objects or debris; remove them if found.
CAP Open LED is on and blinking.	Open the CAP and make sure that the cartridges in the CAP cells are properly seated.
The SL Console does not display modified data or information remains static.	Check the SL Console Heartbeat icon.
Robot Fault or Library Fault Amber LED is constantly on.	<ol style="list-style-type: none">1. Check the SL Console 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. Make sure that cartridges are fully seated and properly oriented in their storage cells.4. Make sure that packing materials have been removed.5. Inspect the library floor for any objects or debris; remove them.6. Check the status of the tape drives.7. Close the front door.8. Make sure that 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 reseating and locking down.
Tape drive is unable to eject a cartridge.	Manually remove the cartridge from the tape drive. “Remove a Cartridge from a Tape Drive” on page 355 .

TABLE 13-1 Troubleshooting Table (Continued)

Problem	What to do
The client computer cannot communicate with the library or tape drives.	<ol style="list-style-type: none"> 1. Make sure that cables are securely attached to their connectors on the rear of the library, the tape drives, and the client computer. 2. Make sure that each SCSI device on the same bus has a unique address and that the last device is properly terminated.
The library is unable to communicate with the drives. Drive status on the SL Console displays Not communicating.	<ol style="list-style-type: none"> 1. Make sure that cables are securely attached to their connectors on the rear of the library, the drives, and the client computer. 2. Make sure that each SCSI device on a bus has a unique address and that the last device is properly terminated.
Repeated or excessive drive cleanings or cleaning messages.	<ol style="list-style-type: none"> 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.

Diagnostic Support Files

The following diagnostic support files are maintained on the library in order to aid in troubleshooting and diagnosing problems:

- [MIB File](#)
- [Library Log Snapshot File](#)

Depending on circumstances, your Oracle support representative may request you to transfer one or both of these files to Oracle for further evaluation, or he or she may do this him or herself.

MIB File

The management information base (MIB) file is a small network management protocol (SNMP) database used to manage your library devices. This file can be saved as a text file. See [“Transfer the Library MIB File” on page 284](#) for detailed instructions.

Library Log Snapshot File

Your Oracle support representative can use privileged CLI commands to generate an encrypted snapshot of the library event log. You cannot view or edit this file. This file is available for only 15 minutes from the time it is generated. See [“Transfer the Library Log Snapshot File” on page 286](#) for detailed instructions.

Diagnostic and Utility Tasks

Library diagnostic and utility tasks are divided into the following categories:

- [“Event Monitor Tasks” on page 256](#)
- [“Library Utility Tasks” on page 263](#)
- [“Audit Tasks” on page 289](#)
- [“Drive Utility Tasks” on page 299](#)
- [“Robot Utility Tasks” on page 303](#)

Event Monitor Tasks

Task	Page
Display an Event Monitor	257
Spool Event Monitor Data to a File	258
Display Multiple Monitors	259
List a Device Status Code	260
List a Result Code	262

▼ Display an Event Monitor

Event monitor information is dynamically updated depending upon occurrence of the selected events. The information sent during an e-mail, print, save, or spool operation reflects the data (and format) shown on-screen at the time the operation is requested.

Note – Event monitors are useful tools for root cause analysis of errors. If the library is experiencing reproducible errors, you can open an event monitor and spool all events to a file to capture the data. Later, you can send the file to your Oracle support representative for analysis.

Note – To monitor multiple events, see [“Display Multiple Monitors” on page 259](#).

1. **Select Tools > Monitors.**
2. **Expand the Permanent Monitors folder.**
The library monitors you have access to are displayed.
3. **Click the event monitor you want to use, and then click Open from the Options Bar.**
The system displays the associated data collected for the event.
4. **Use these options to manage the information displayed on the screen for the event selected:**

Select	To
Monitor > Pause	Pause the continuous display of data related to the event selected
Monitor > Resume	Resume displaying the events
Monitor > Stop	Permanently stop the continuous display of data related to the event selected
Monitor > Clear	Clear the event monitor display

5. **To close a monitor, click the X in the upper right corner of the window.**

▼ Spool Event Monitor Data to a File

Use this procedure to spool and save event monitor data to a file. You can send the file to your Oracle support representative to assist in diagnosing problems.

1. Select Tools > Monitors.

2. Expand the Permanent Monitors folder.

The library monitors you have access to are displayed.

3. Click the event monitor you want to use, and then click Open from the Options Bar.

The system displays the an event monitor window.

4. In the event monitor window, select Spool File > Start Spooling.

The **Save** popup appears.

5. Browse to the directory where you want to save the file. In the File Name field, enter the file name, and click Save.

All event data is spooled to the specified file.

6. To stop spooling, select Monitor > Stop Spooling.

Following is a sample of the spool file:

```
2008-05-29T11:23:27.448 0,1,0,0    root default      internal      281    warn
0 rb_Reboot::reboot(): Resetting drive [0,3,4,9]
2008-05-29T11:23:27.760 0,1,0,0    root default      internal      281    info
0 Service Beacon is ACTIVE: Current Health Event indicates Drive 04 in Module 03 is
not operational
2008-05-29T11:23:53.211 0,1,0,0    root default      internal      281    info
0 Service Beacon is ACTIVE: Current Health Event indicates Drive 04 in Module 03 is
operational
```

▼ Display Multiple Monitors

You can open and manage multiple event monitors using these selections from the Options Bar:

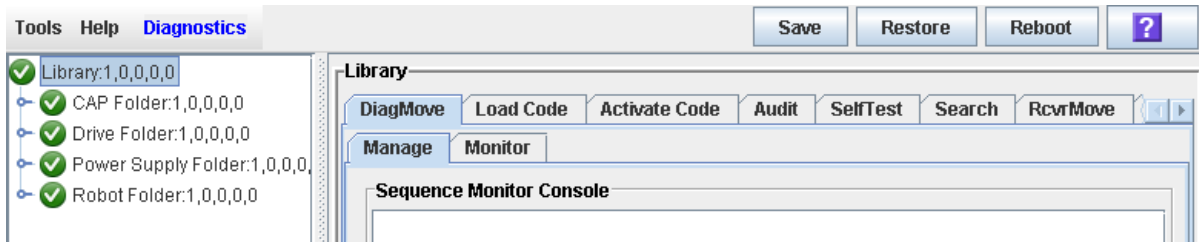
To	Select
Custom arrange the open monitors on screen	Window > Arrange
Arrange the event monitor windows horizontally	Window > Tile Horizontal
Arrange the event monitor windows vertically	Window > Tile Vertical
Stack the event monitors	Window > Cascade

▼ List a Device Status Code

Use this procedure to list device status codes and their descriptions.

1. Select **Tools > Diagnostics**.
2. Click the **Library** folder on the device tree.

The **Library** screen appears.



3. Click the **Search** tab.
The **Library Search** screen appears.
4. In the **Search Type** pull-down, click **Device Status**.
5. Complete the **Device Status** field, as follows:
 - To search for a specific device status code, enter the complete code; wildcards or partial codes are not accepted.
 - To list all device status codes, click the **List All** checkbox.

6. Click Search in the Options Bar.

The screen lists the specified device status codes and their descriptions.

The screenshot shows a software interface with a menu bar (Tools, Help, Diagnostics) and buttons for Search, Reboot, and a help icon. A tree view on the left lists folders and drives, all with green checkmarks. The main window has tabs for DiagMove, Load Code, Activate Code, Audit, SelfTest, Search, and RcvrMove. The Search tab is active, showing a search type dropdown set to 'Device Status', an empty search input field, and a checked 'List All' checkbox. Below is a table of search results.

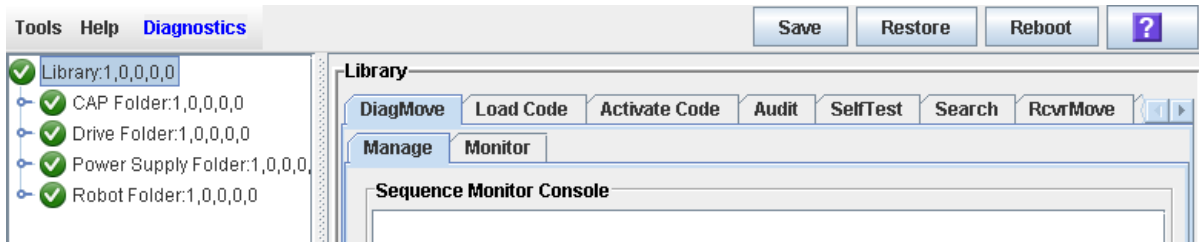
Device Status	Description
000	Ok
001	Invalid Request
501	Can not move on rail
502	Can not find target
503	Can not complete reach operation
504	Cartridge stuck in location
505	Location empty
506	Reach not safe
507	Label miscompare
508	Location unusable
509	Can not move wrist
510	Location full/obstructed
511	Vision inoperative
512	Can not be operative
513	Hit an obstruction on rail
514	Needs to be reset
515	No cartridge in hand
516	Hand is full
601	Drive not unloaded
602	Drive empty
603	Cartridge present in drive
604	Drive not functional
605	Media error
606	Read-only not supported

▼ List a Result Code

Use this procedure to list result codes and their descriptions.

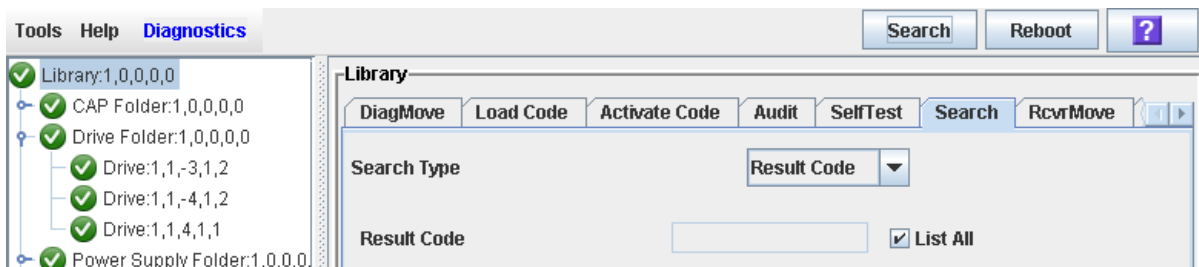
1. Select **Tools > Diagnostics**.
2. Click the **Library** folder on the device tree.

The **Library** screen appears.



3. Click the **Search** tab.

The **Library Search** screen appears.



4. In the **Search Type** pull-down, click **Result Code**.
5. Complete the **Result Code** field, as follows:
 - To search for a code, enter the complete code; wildcards or partial codes are not accepted.
 - To list all codes, click the **List All** checkbox.

Library Utility Tasks

	Task	Page
	Perform a Non-Disruptive Library Self-Test	264
	Perform a Disruptive Library Self-Test	267
	Reboot the Library	270
	Download Code to the Library Controller	271
	Activate Code on the Library Controller	278
	Transfer the Library MIB File	284
	Transfer the Library Log Snapshot File	286

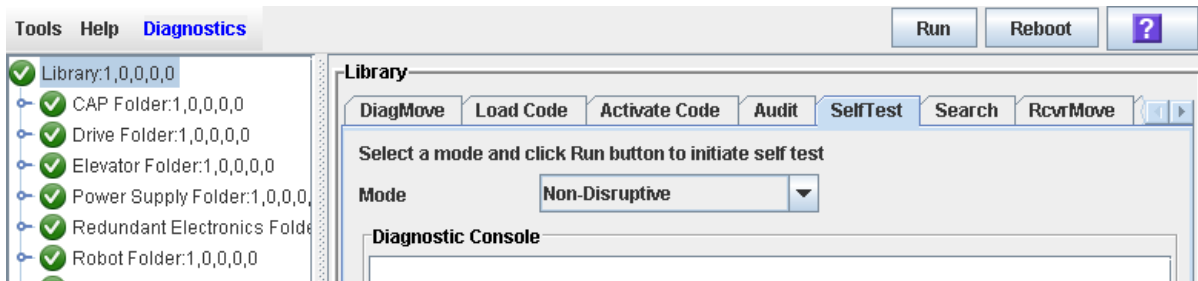
▼ Perform a Non-Disruptive Library Self-Test

Use this procedure to perform a non-disruptive library self-test, which can be used to help diagnose operational problems with the library.

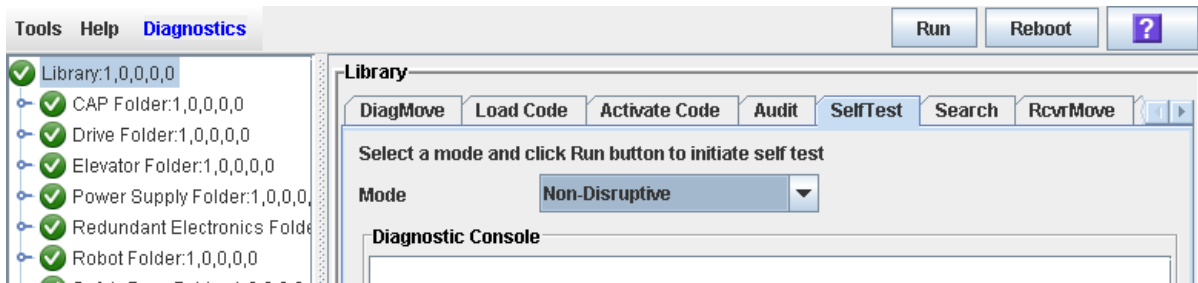
In order for the test to run completely, the proper diagnostic cartridges for library drives must be present in the library. To verify this, see [“List Library Cartridges”](#) on page 179.

1. Select **Tools > Diagnostics**, and click the **Library** folder.
2. Click the **SelfTest** tab.

The **Self Test** screen appears.

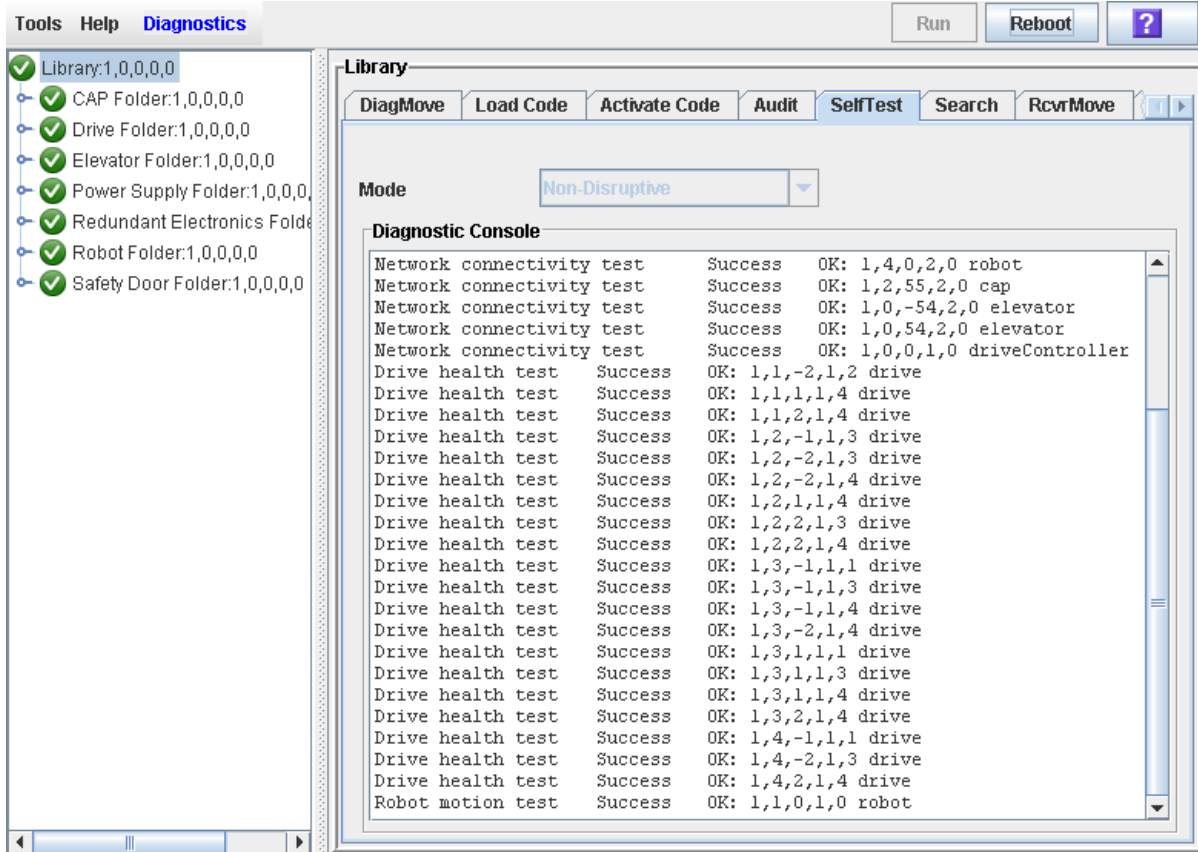


3. In the **Mode** pull-down, select **Non-Disruptive**.

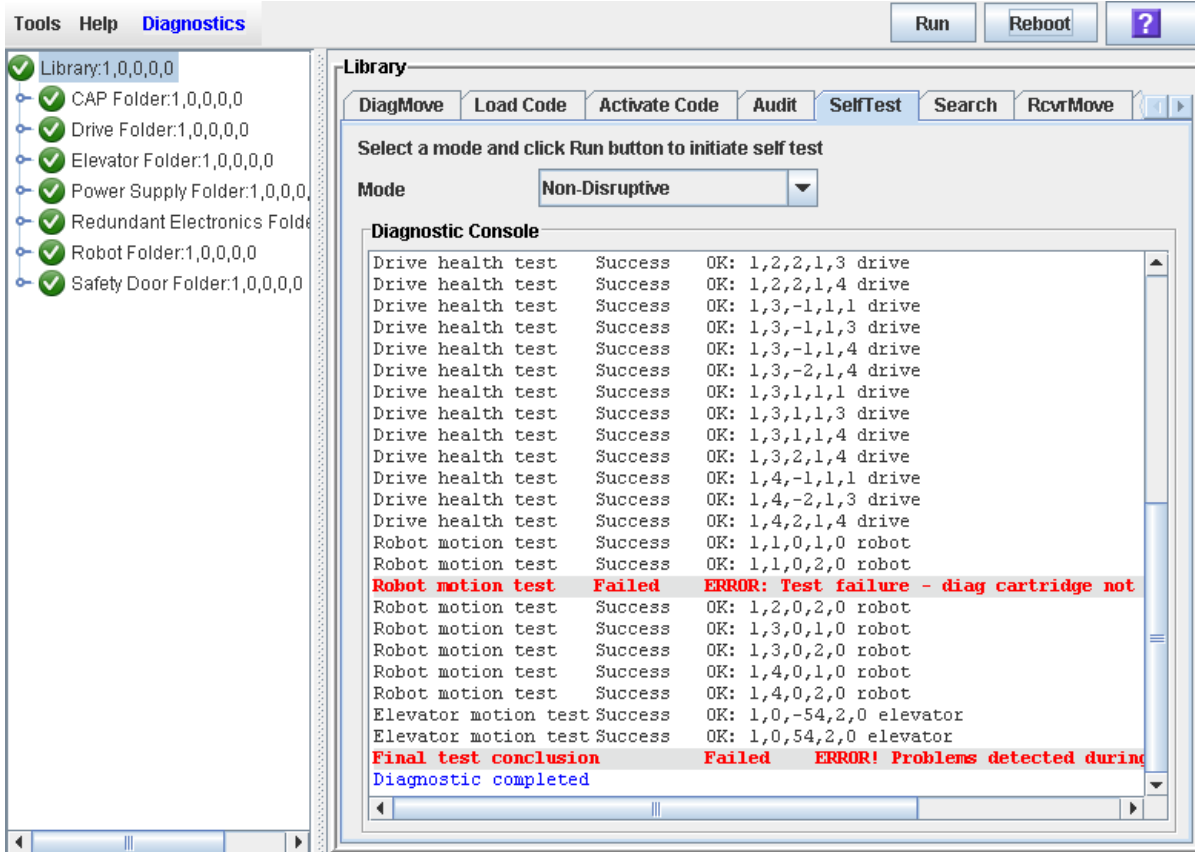


4. Click **Run** to start the test.

The test begins, and the Diagnostic Console section of the screen displays the status of the various diagnostic tests as they are performed.



5. When the test completes, the results of the test are displayed in the Diagnostic Console.



▼ Perform a Disruptive Library Self-Test

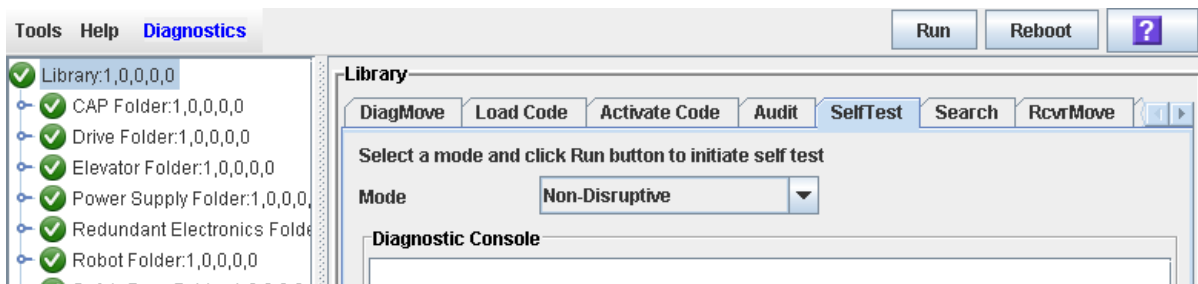
Use this procedure to perform a disruptive library self-test, which can be used to help diagnose operational problems with the library.

In order for the test to run completely, the proper diagnostic cartridges for library drives must be present in the library. To verify this, see [“List Library Cartridges”](#) on page 179.

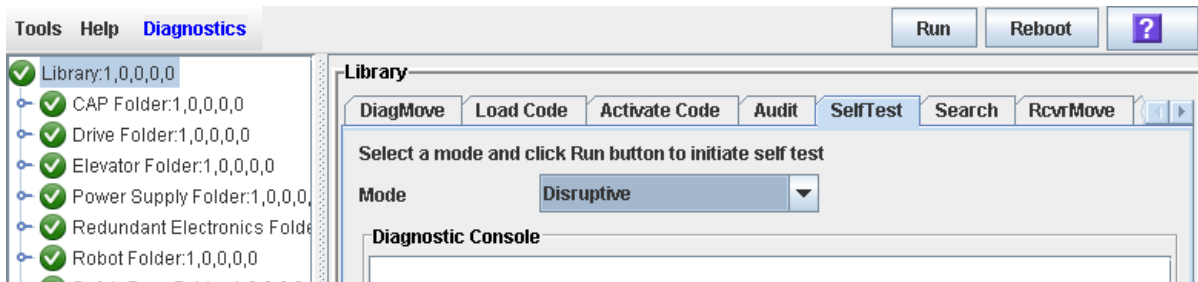
Prior to performing this procedure, the library must be varied offline to all hosts. See [“Bring the Library Online”](#) on page 321 for detailed instructions.

1. Select Tools > Diagnostics, and click the Library folder.
2. Click the Self Test tab.

The Self Test screen appears.

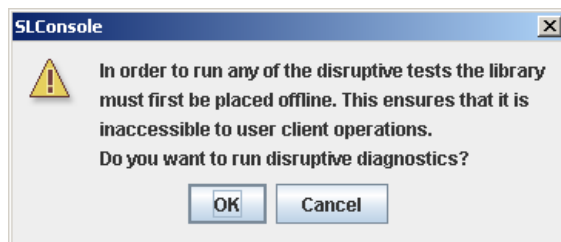


3. In the Mode pull-down, select Disruptive.



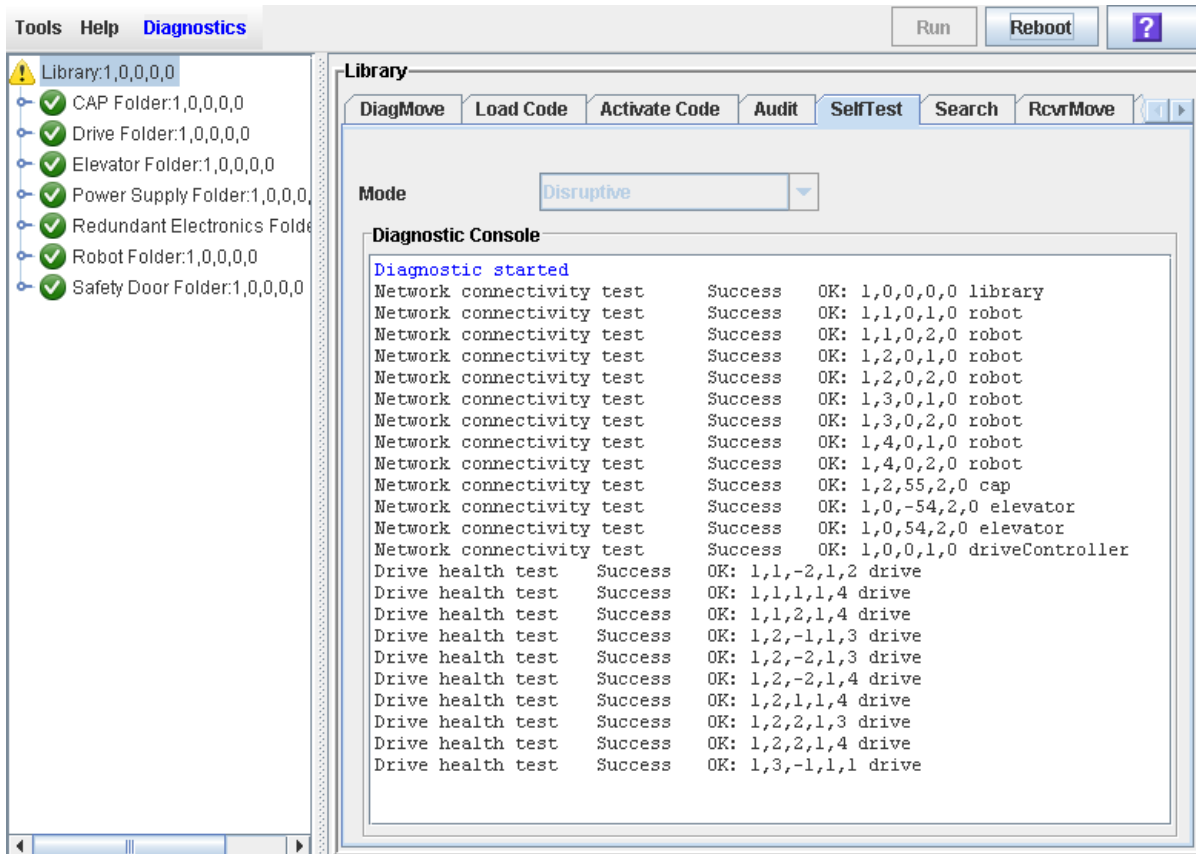
4. Click Run.

A popup appears to confirm that you have already varied the library offline to all hosts.

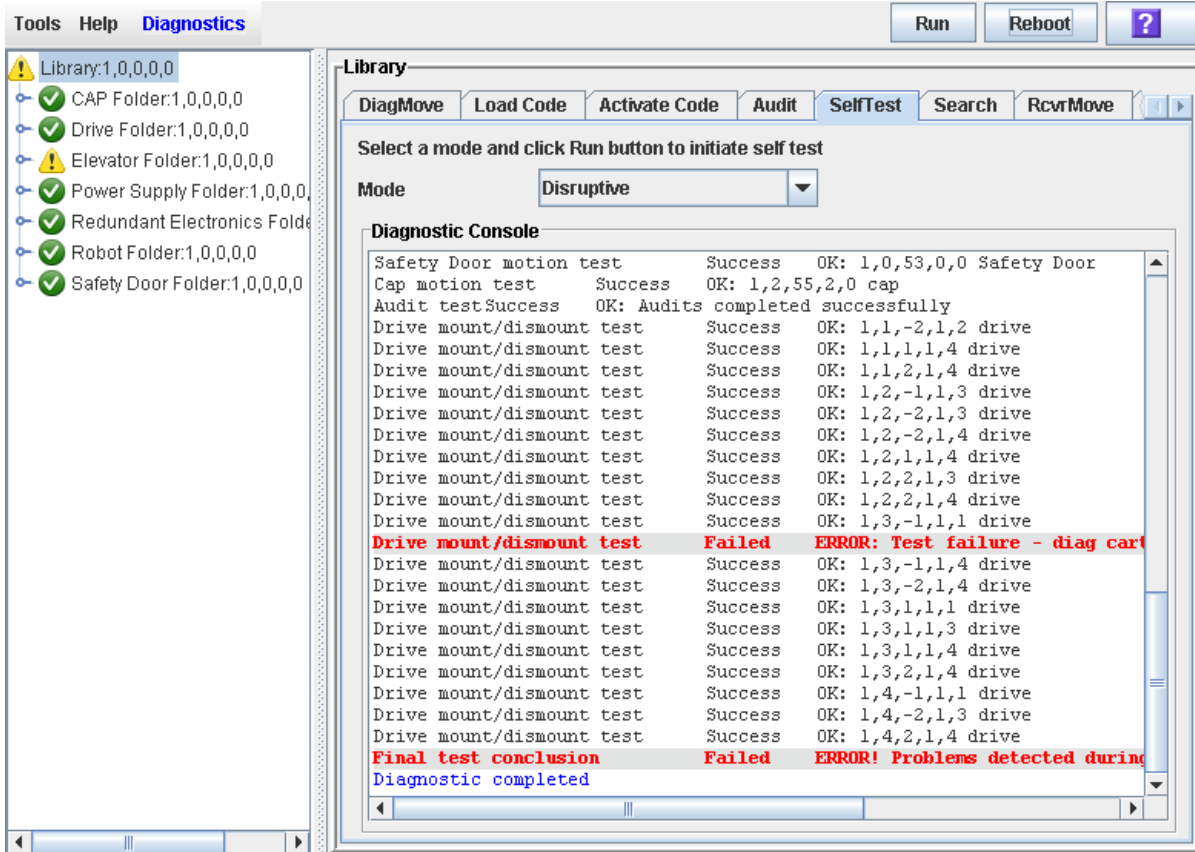


5. Click OK to begin the test.

The test begins, and the Diagnostic Console section of the screen displays the status of the various diagnostic tests as they are performed.



6. When the test completes, the results of the test are displayed in the Diagnostic Console.



7. Vary the library online to resume normal operations.

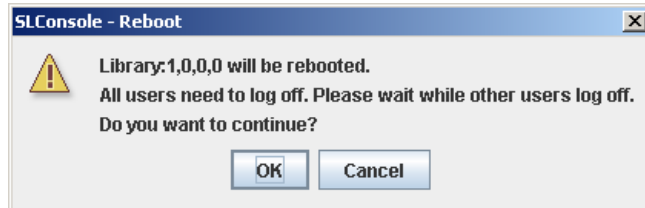
See "Place the Library Offline" on page 319 "Place the Library Offline" on page 319 for detailed instructions.

▼ Reboot the Library

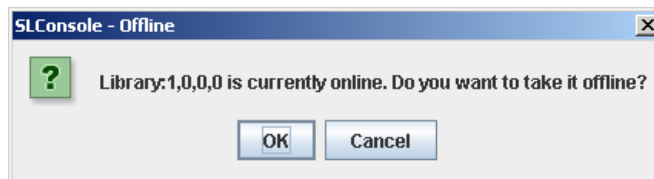
Use this procedure to reboot the library. This process involves reloading the firmware from flash memory and restarting the library controller.

1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the device tree.**
The **Library** screen appears.

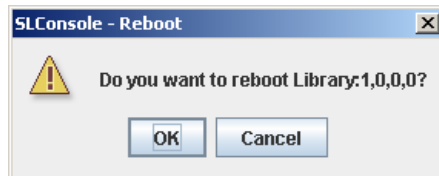
3. **Click Reboot in the Options Bar.**
The **Reboot** confirmation popup appears.



4. **Click OK to continue.**
If the library is online, the **Offline** confirmation popup appears.



5. **Click OK to vary the library offline.**
The **Reboot** confirmation popup appears



6. **Click OK to continue.**
The SL Console termination popup appears.
7. **Click OK to terminate this SL Console session.**
You are logged off the SL Console.
The library controller reboots the library. This may take several minutes.

Note – You will not be able to log back in to the SL Console until the library has fully initialized.

▼ Download Code to the Library Controller

Use this procedure to download and unpack library firmware upgrades on the library controller.

After completing this procedure, you can choose a convenient time to activate the code on the library. See [“Activate Code on the Library Controller” on page 278](#) for detailed instructions.

Note – This procedure is not used for downloading drive firmware updates.

Note – You can perform this procedure from the standalone SL Console or Web-launched SL Console only. It is not available at the local operator panel.

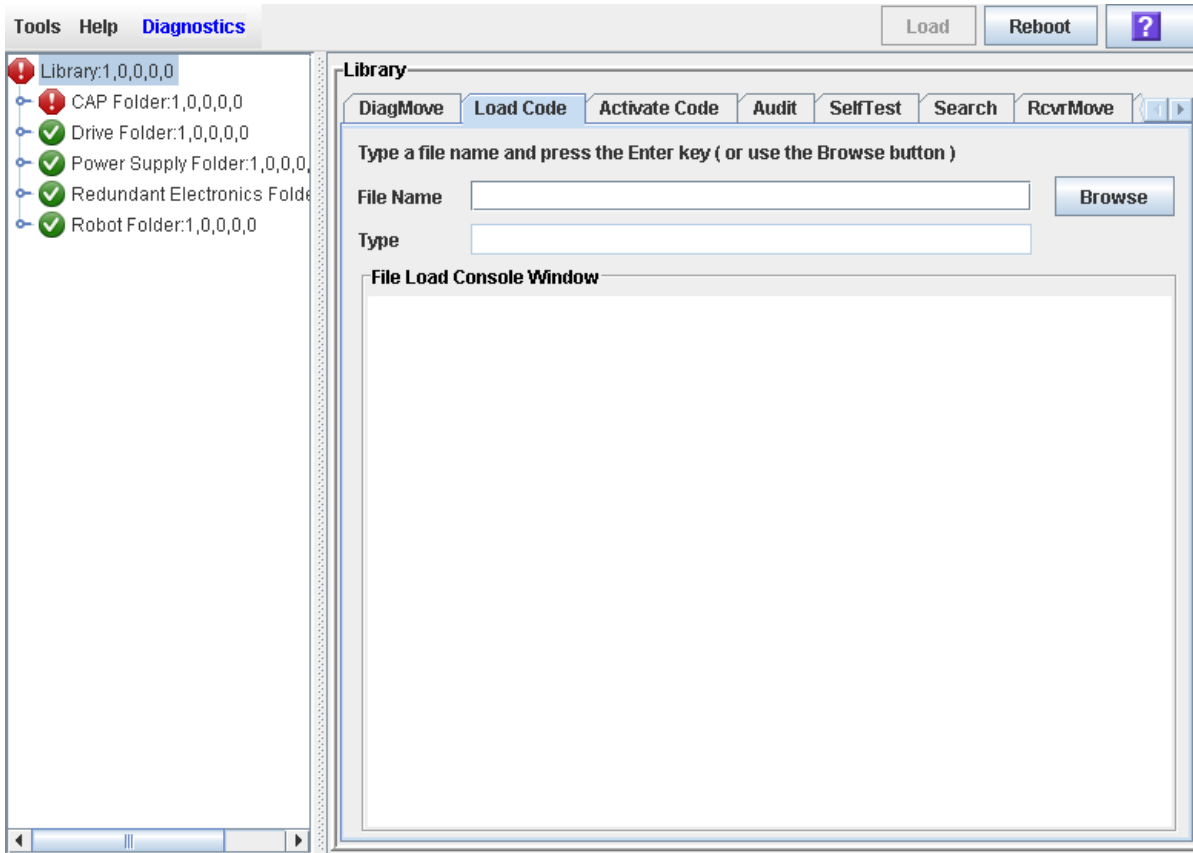
1. **Locate the firmware upgrade package (.jar file) on the Oracle download site. See [“Firmware Download Site” on page 245](#).**
2. **Download the code to a folder on your local PC or workstation.**
3. **Log into the SL Console.**

Note – If you are upgrading an SL8500 complex, you can connect to any library in the complex. The upgrade will be downloaded simultaneously to all libraries in the complex from the single SL Console session.

4. **Select Tools > Diagnostics, and click the Library folder.**

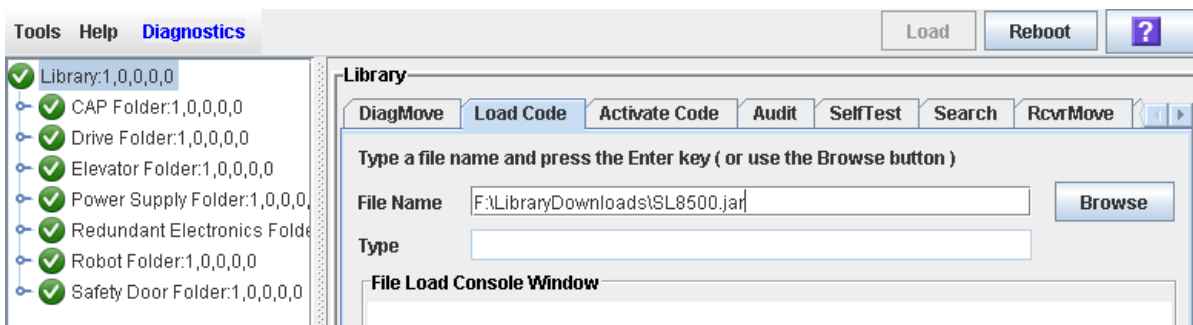
5. Click the Load Code tab.

The Load Code screen appears.

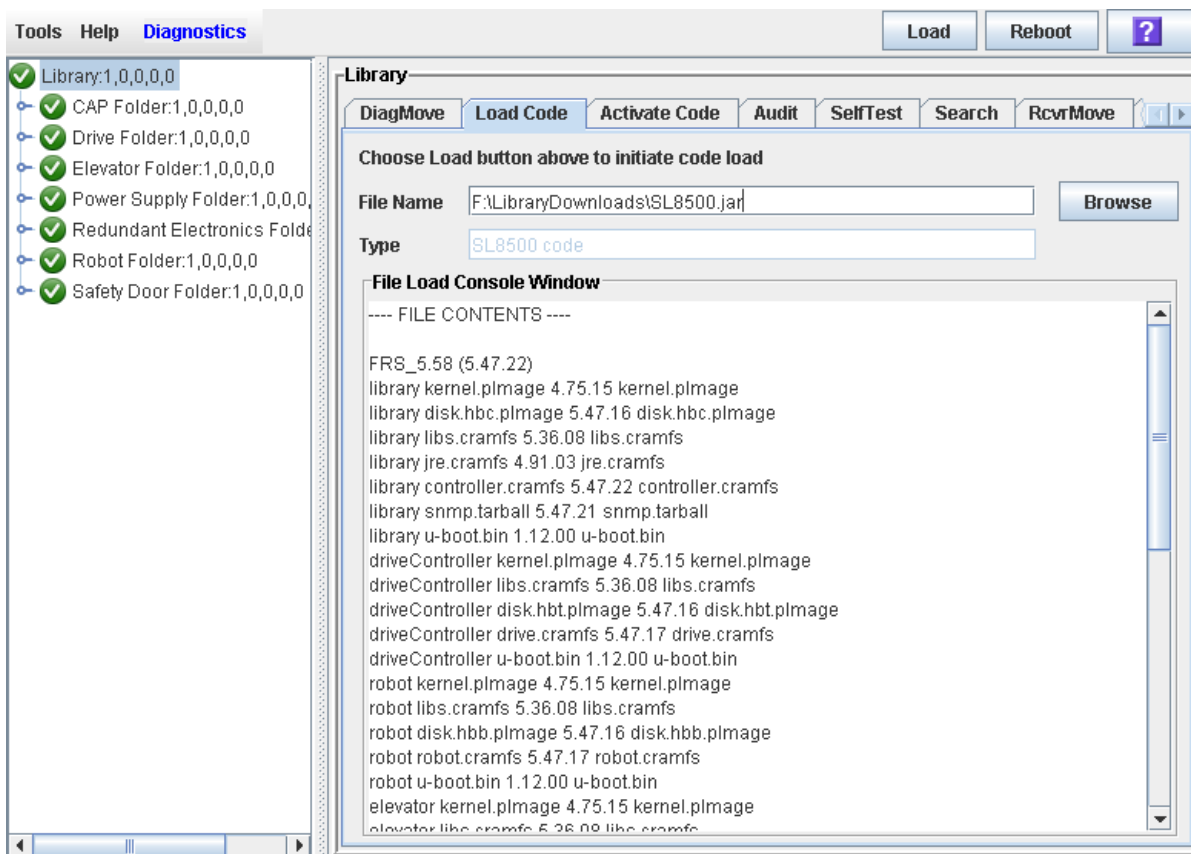


6. In the File Name field, enter the full path of the firmware package you want to download, and press Enter. Optionally, you can click Browse and navigate to the file location on your local PC or workstation.

The SL8500 library firmware package is a .jar (Java Archive) file.

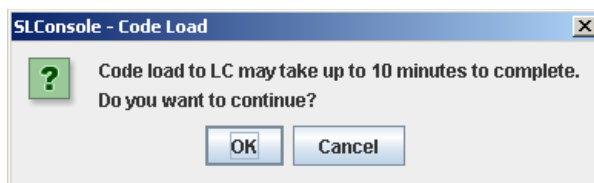


7. The contents of the file is displayed. Review the contents and file name to verify that you have specified the correct firmware package.



8. Click the Load button on the Options Bar.

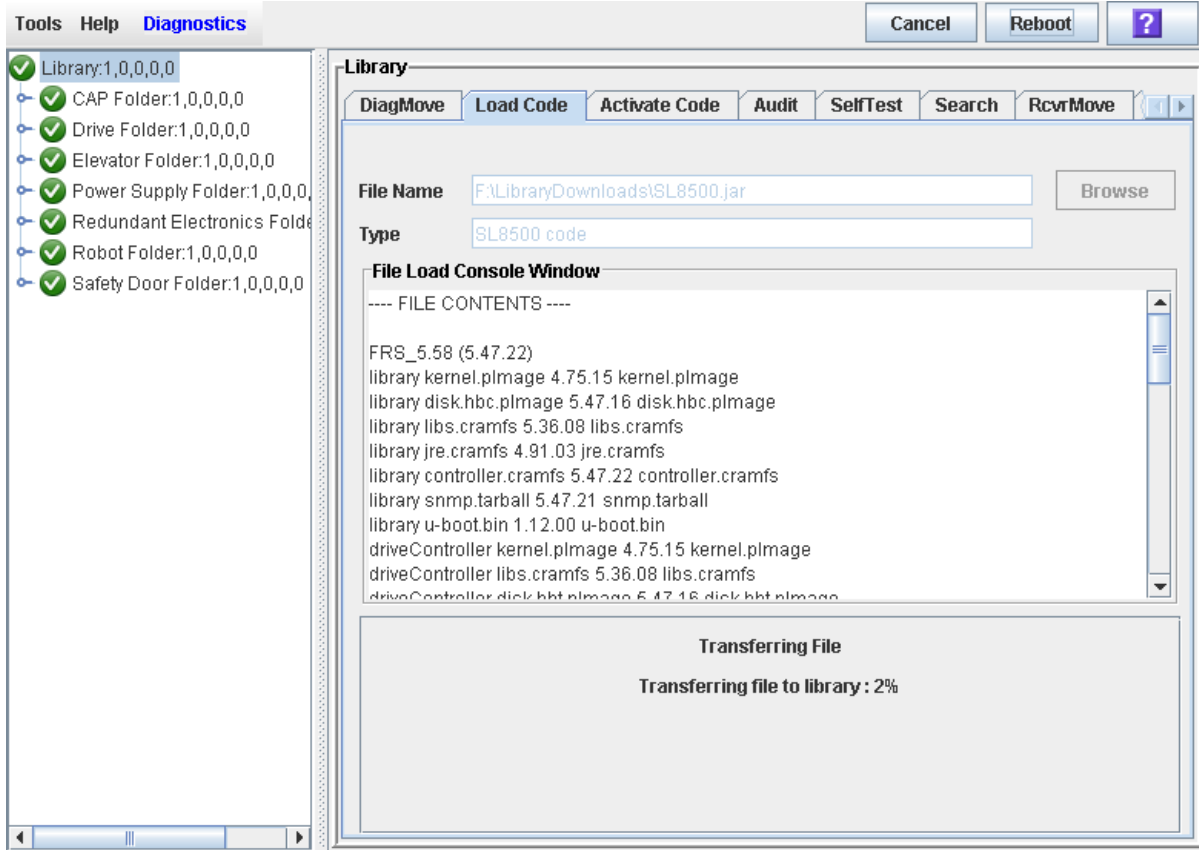
The Code Load confirmation appears.



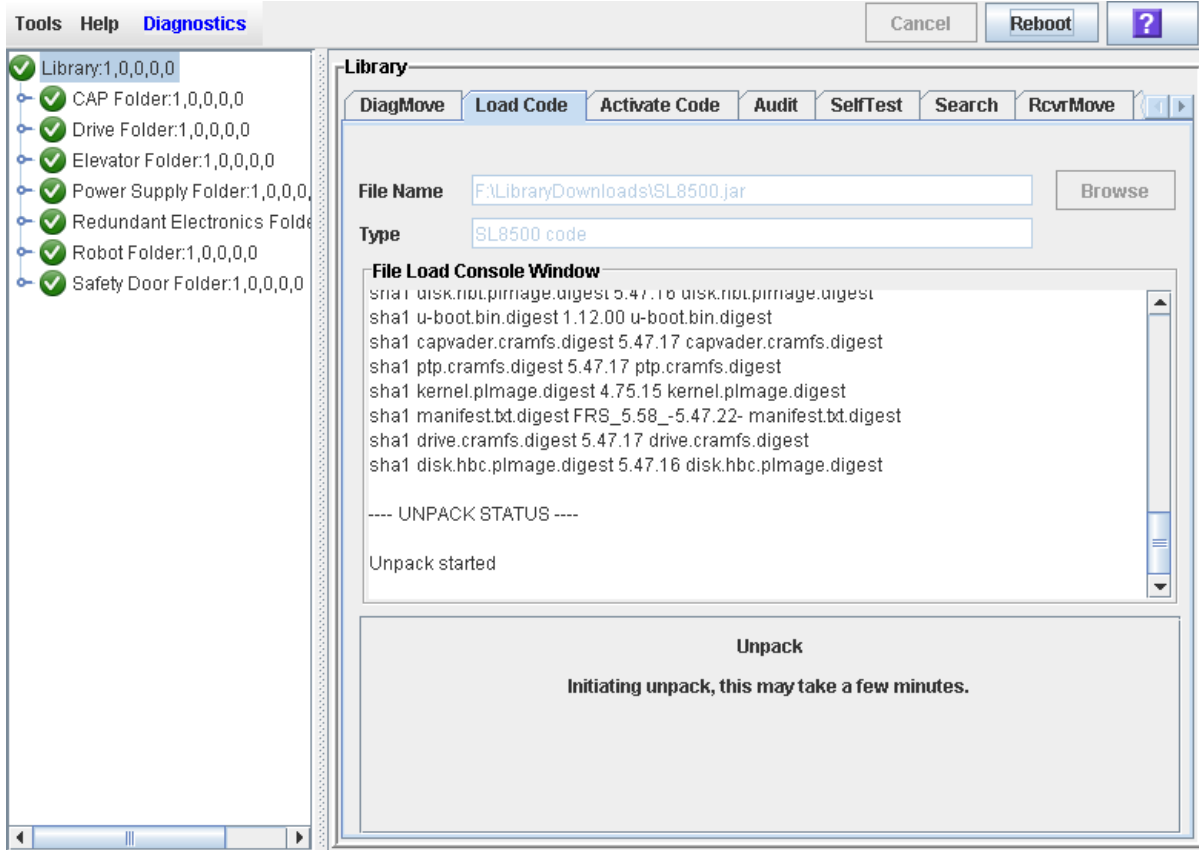
9. Click OK to confirm the download.

Note – The download process could take up to ten minutes.

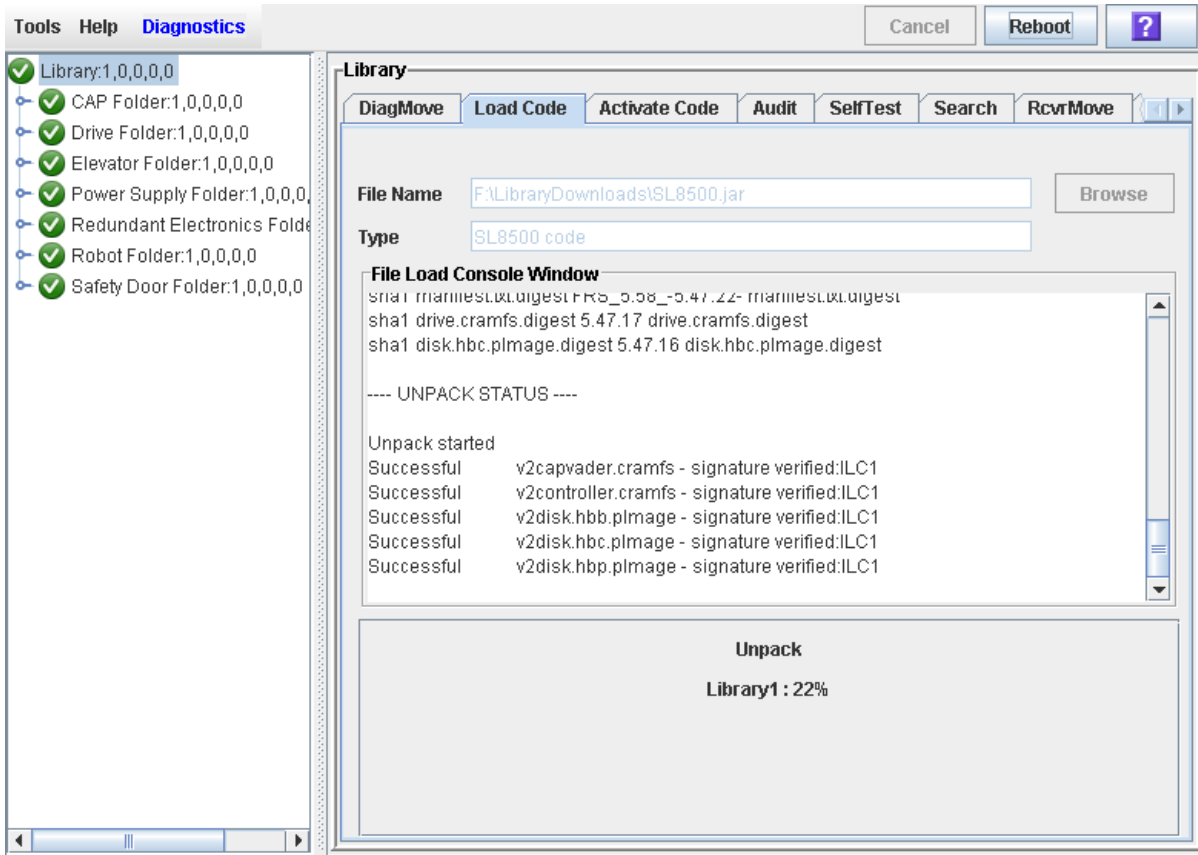
10. The system begins downloading the code to the library controller. The File Load Console Window section of the screen indicates the progress of the file transfer.



11. When the code is fully transferred to the library controller, the code unpack process begins.

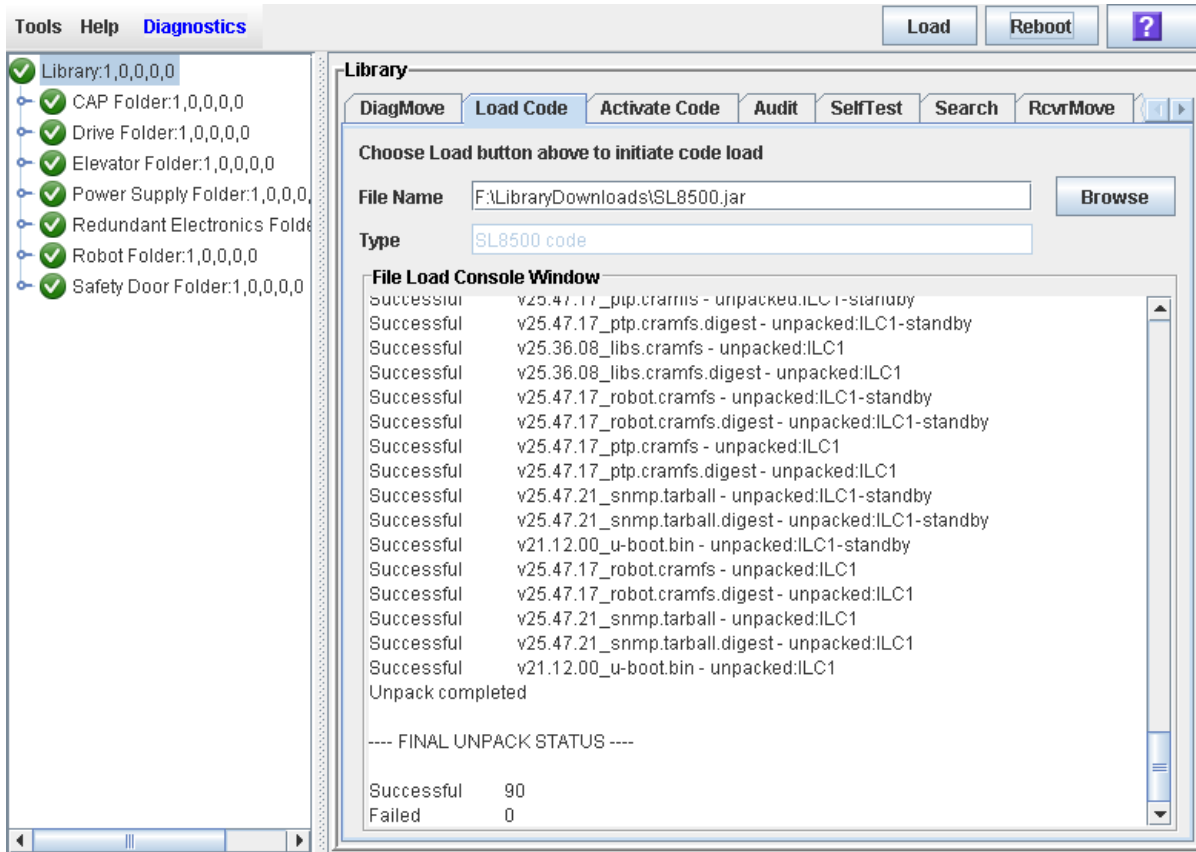


12.The screen indicates the progress of the unpack.



13. The screen indicates when the unpack process is complete.

In the **Failed** field, you should see 0. If there are any failures indicated, contact your Oracle support representative for assistance.



14. After the package is successfully unpacked, you can activate the code immediately or wait until a later time. See “Activate Code on the Library Controller” on page 278 for detailed instructions.

▼ Activate Code on the Library Controller

Use this procedure to activate a version of library firmware currently residing in the library controller flash memory. Up to two versions of firmware can be resident in memory at one time, but only one can be active. The active version is identified as “running”.

Prior to performing this procedure you must download and unpack the code you want to activate. See [“Download Code to the Library Controller” on page 271](#) for detailed instructions.

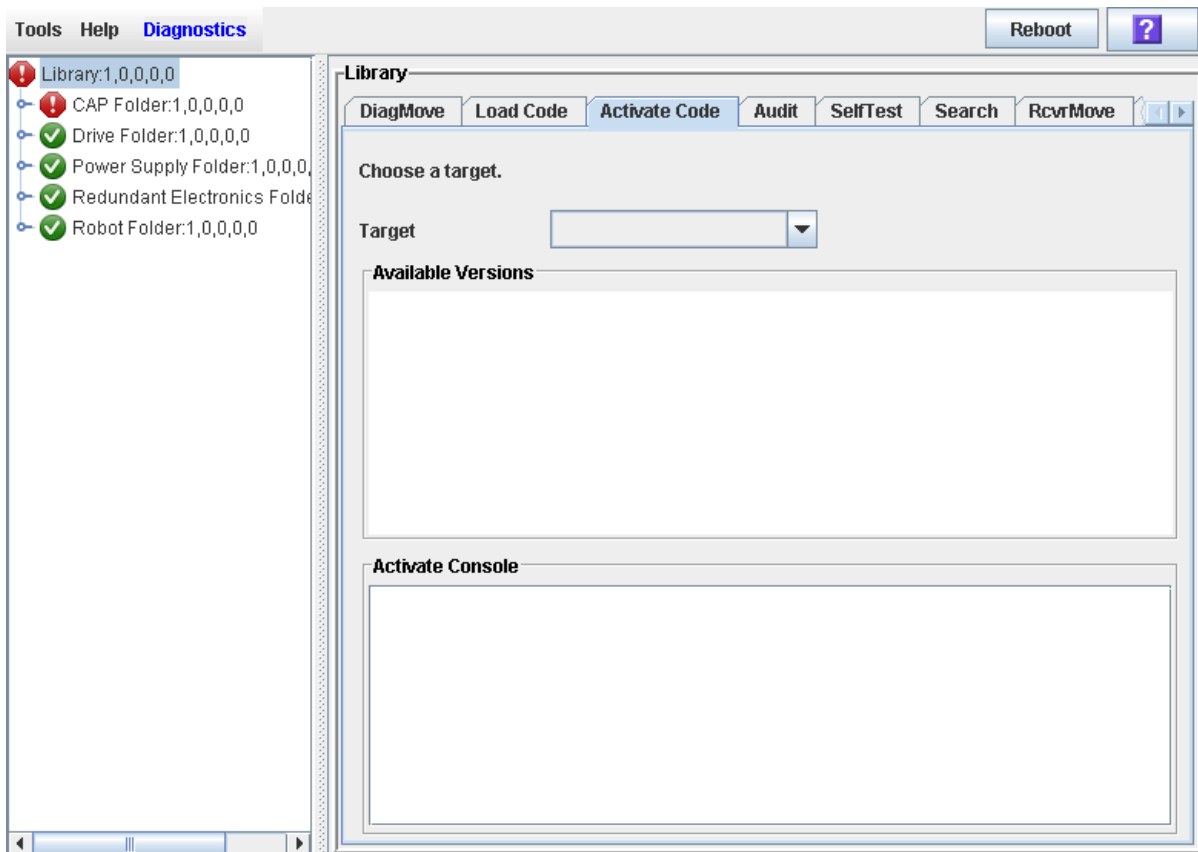
This procedure involves a reboot of the library. You should schedule it for a time that is convenient for users.

You can restore the earlier firmware version if required.

Note – You can perform this procedure from the standalone SL Console or Web-launched SL Console only. It is not available at the local operator panel.

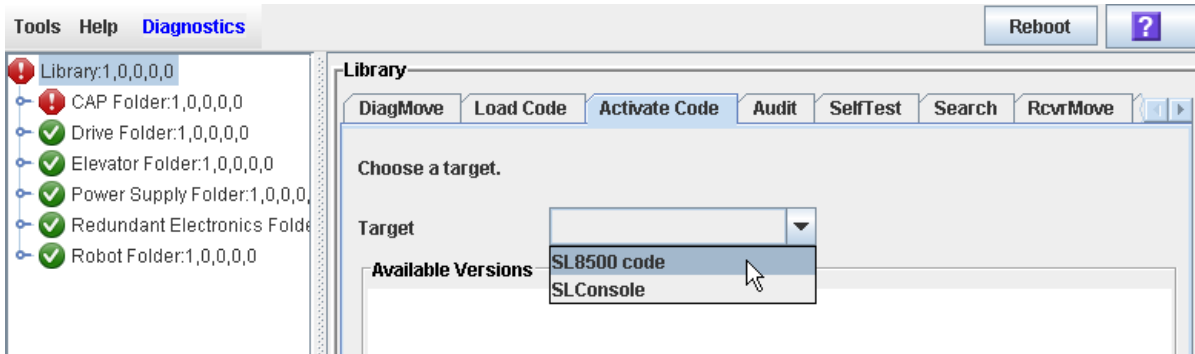
1. Select **Tools > Diagnostics**, and click the **Library** folder.
2. Click the **Activate Code** tab.

The **Activate Code** screen appears.



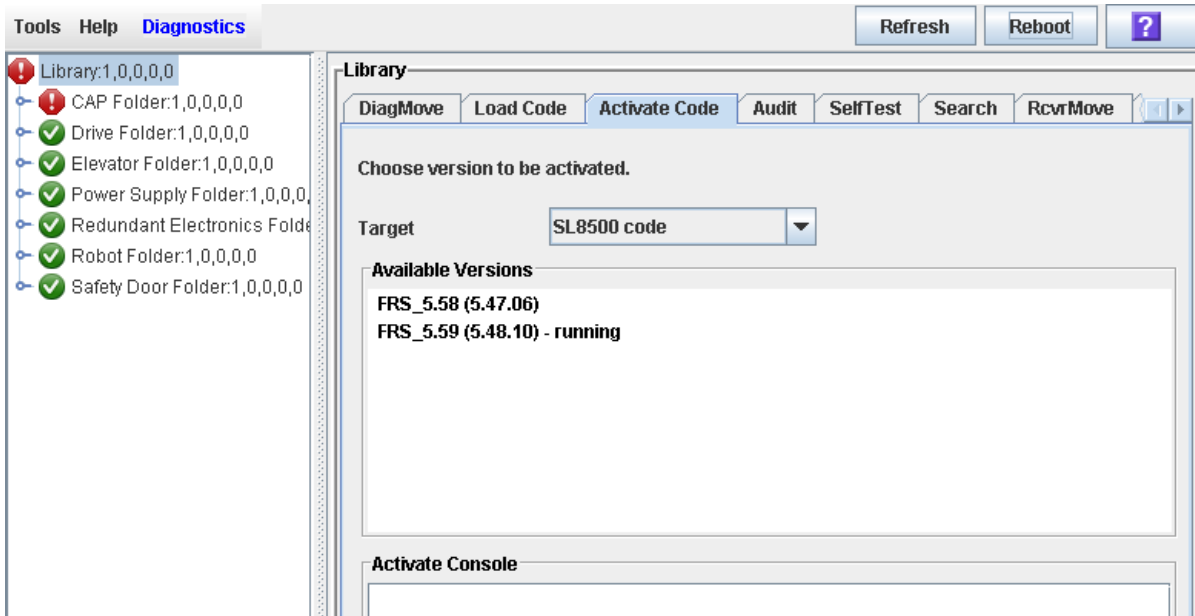
3. In the Target pull-down, select the code package you want to activate.

The pull-down may display a library firmware package and an SL Console package. For this procedure, select the firmware package (SL8500 Code).

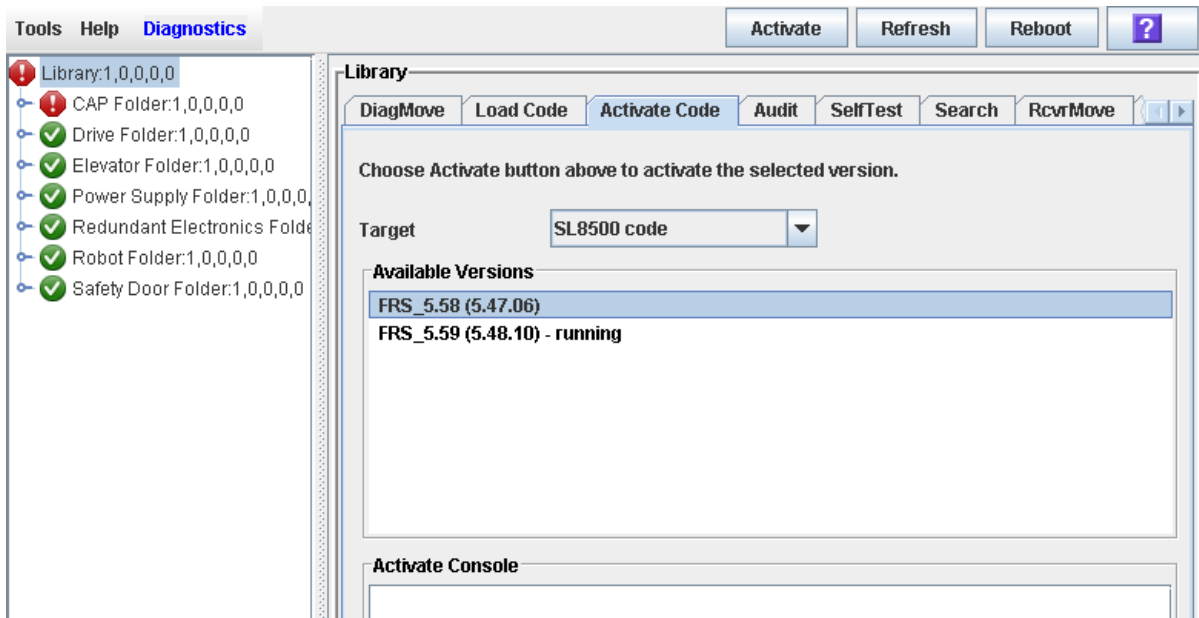


4. The Available Versions section of the screen displays the versions currently residing in flash memory.

The version identified as “running” is the currently active code. You cannot select this version again to activate.

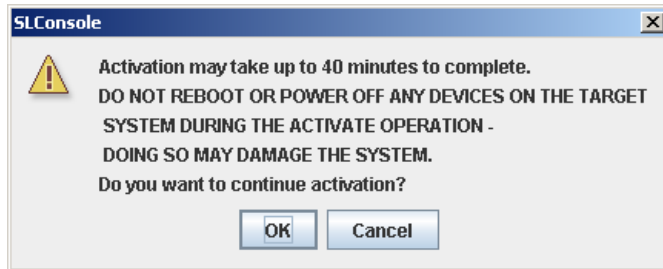


5. Select the code version you want to activate.



6. Click the Activate button in the Options Bar.

The **Activation Confirmation** dialog appears, verifying that you want to continue with the process.

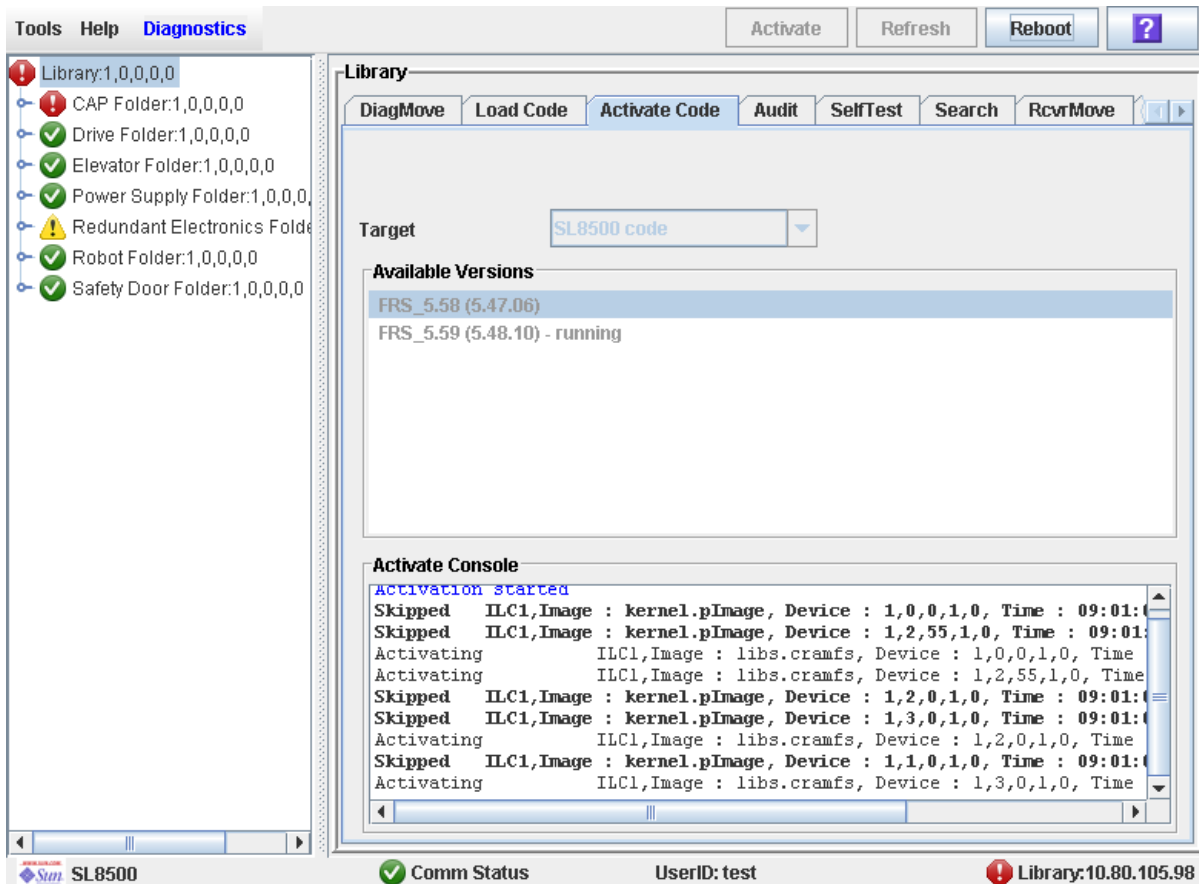


7. Click OK to begin the activation.

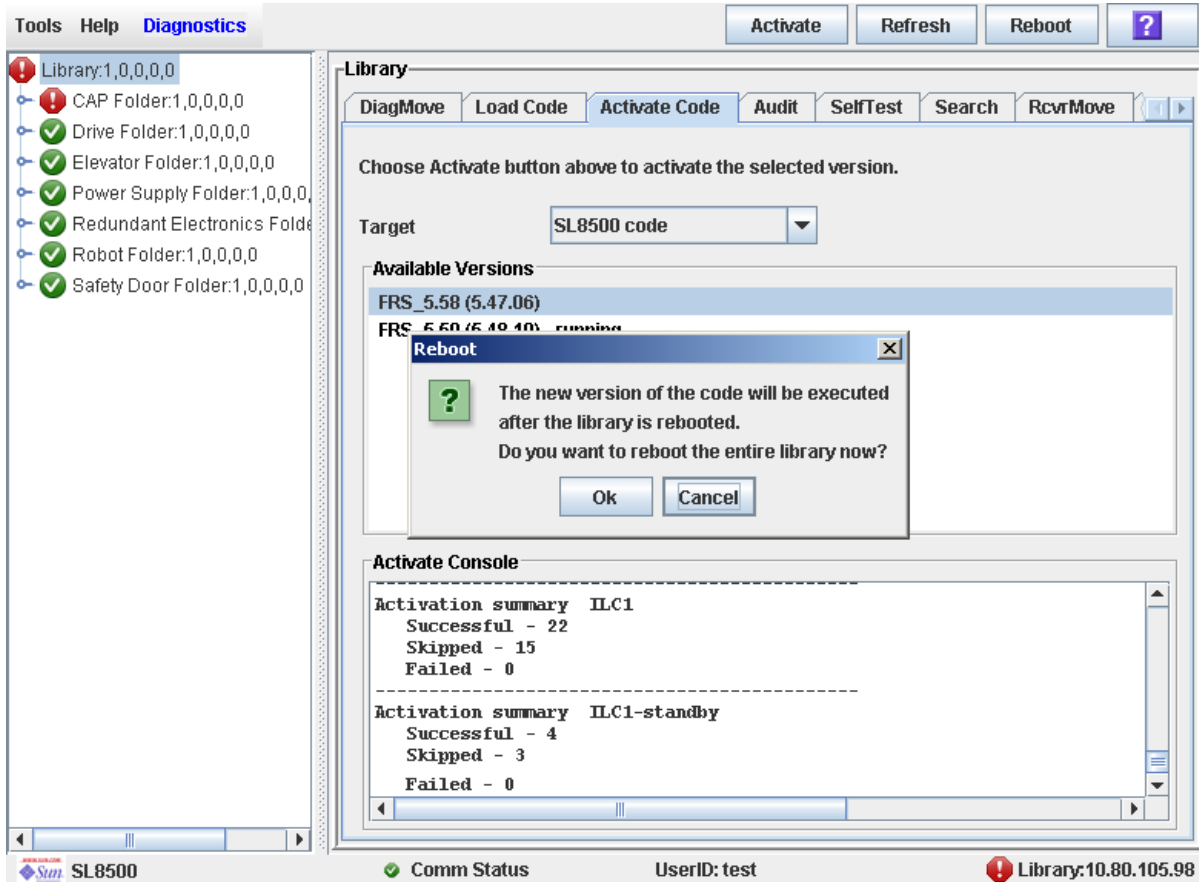
If you click **Cancel**, the process terminates and returns to [Step 5](#).

The code activation process begins, and the **Activate Console** section of the screen displays the status of the process.

Caution – POTENTIAL INTERNAL FILE CORRUPTION. Do not reboot any devices in the library or execute any operations on the library while code is being activated.



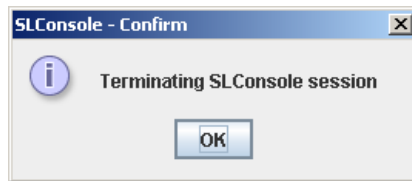
8. When the activation process is finished, a dialog appears, prompting you to reboot the library.



9. Click OK to reboot the library.

If you click **Cancel**, the process terminates; you will need to reboot the library at a later time. See [“Reboot the Library” on page 270](#) for detailed instructions.

The reboot process begins, and a popup appears indicating that your SL Console session will be terminated.



10. Click OK to terminate the SL Console session.

You are logged off the library.

11. When the library initialization has completed, you can log in again to the library through the SL Console login screen.

The SL Console gets all library configuration data from the library controller. Therefore, you should be careful when logging in to the SL Console before the library has fully initialized. You may see warnings that configuration data is not yet available, in which

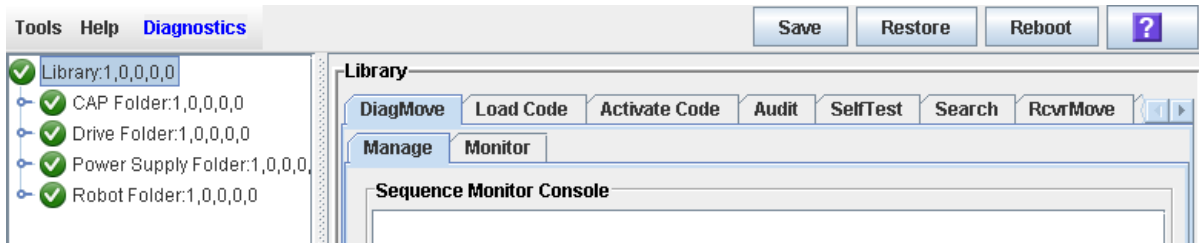
case you need to exit and log in again at a later time. Additionally, if a library audit is performed as part of initialization, until the audit is complete, any configuration data displayed may not be completely up-to-date and accurate.

▼ Transfer the Library MIB File

Use this procedure to copy the public SNMP management information base (MIB) file to a specified location on your local PC or workstation. The file is saved as a text file. You can e-mail the file to your Oracle support representative to help diagnose problems with the library.

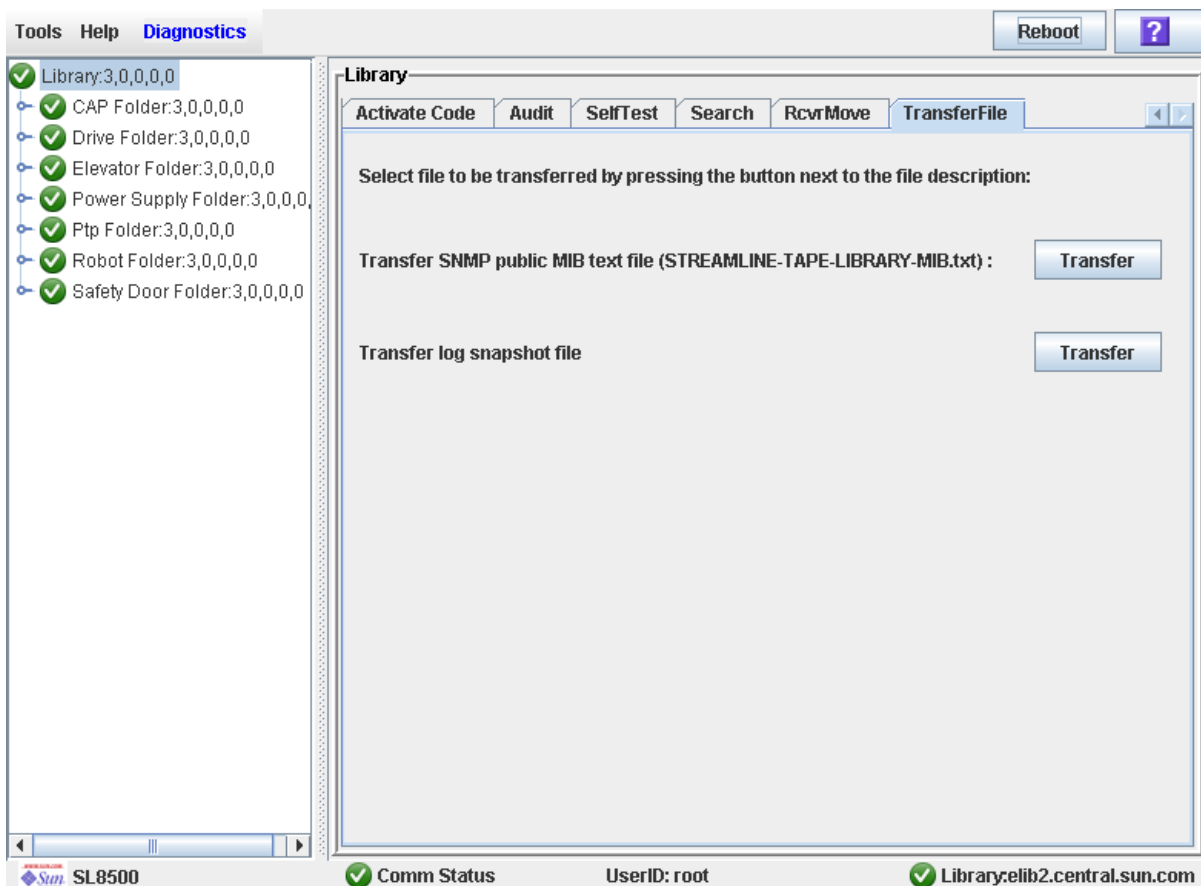
1. Select **Tools > Diagnostics**,
2. Click the **Library** folder on the device tree.

The **Library** screen appears.



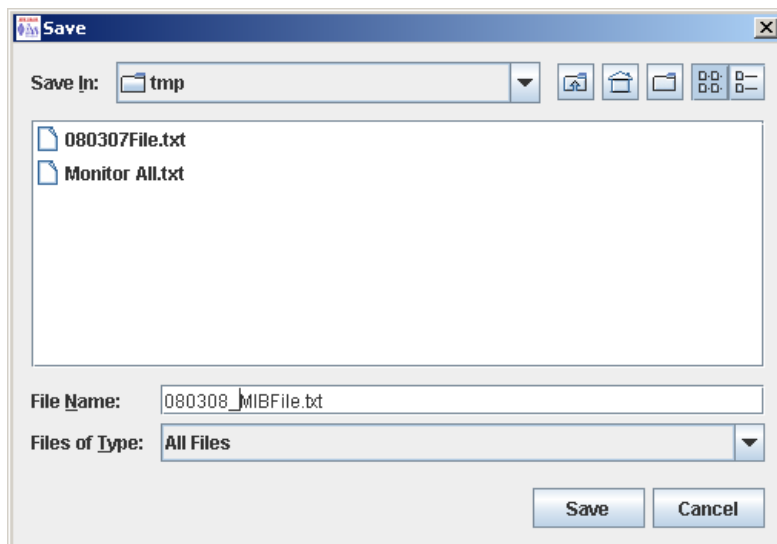
3. Click the **TransferFile** tab.

The file transfer screen appears.



4. In the Transfer SNMP public MIB text file field, click the Transfer button.

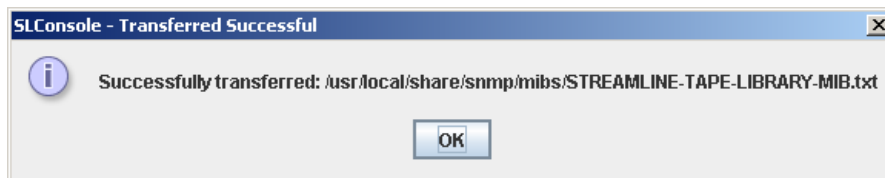
The Save popup appears.



5. Browse to the directory where you want to save the file, and enter the file name in the File Name field. Be sure to give it a .txt suffix.

6. Click Save.

The data is saved to the specified file, and the Transferred Successful popup appears.



7. Click OK to dismiss the popup.

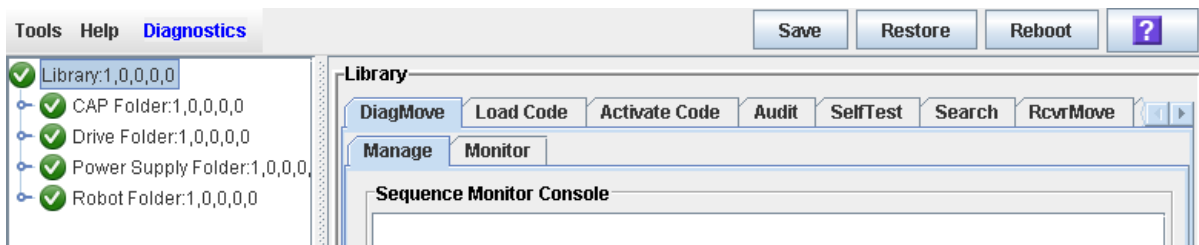
▼ Transfer the Library Log Snapshot File

Note – Use this procedure only under the direction of your Oracle support representative. Your Oracle support representative must have generated a library log snapshot file within the previous 15 minutes.

Use this procedure to copy the library log snapshot file to a specified location on your local PC or workstation. The file is saved in an encrypted format, and you cannot view or edit it. You can e-mail the file to your Oracle support representative to help diagnose problems with the library.

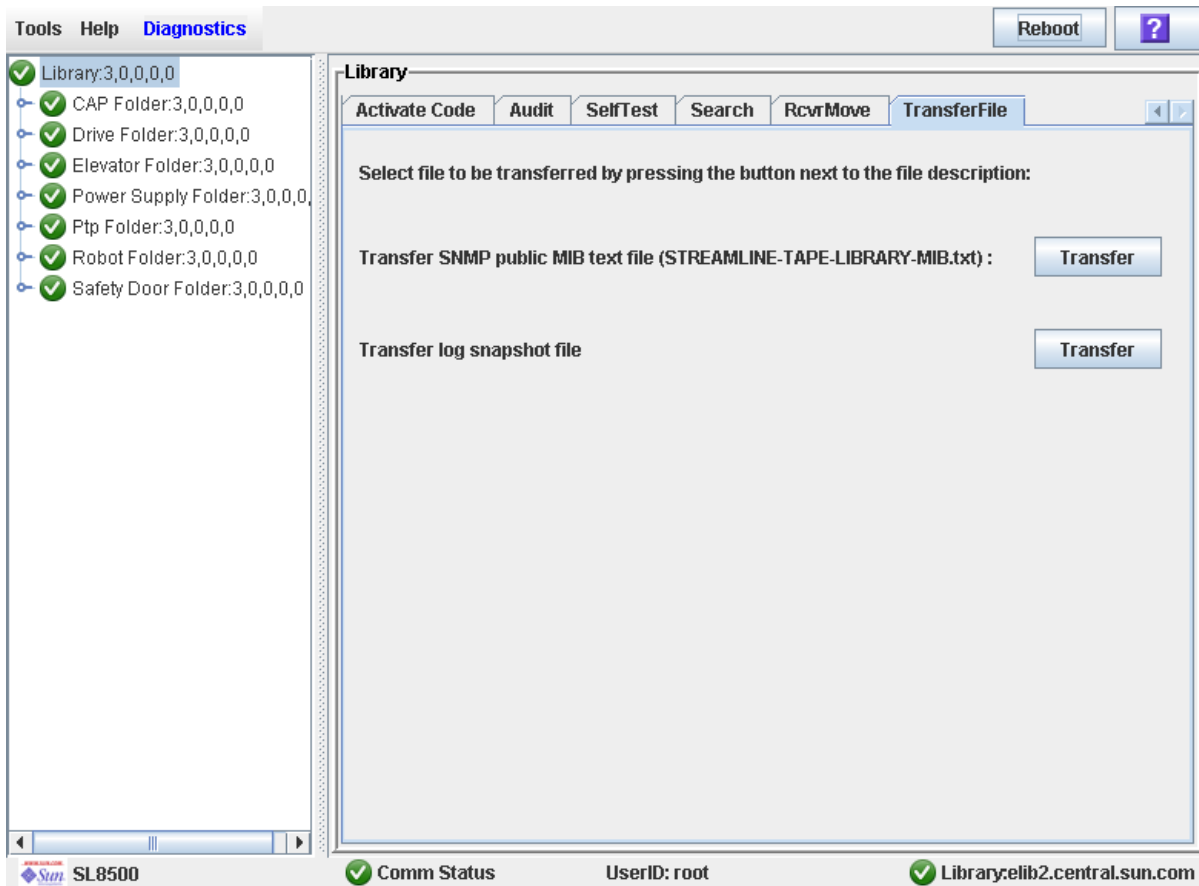
1. Select **Tools > Diagnostics**,
2. Click the **Library** folder on the device tree.

The **Library** screen appears.



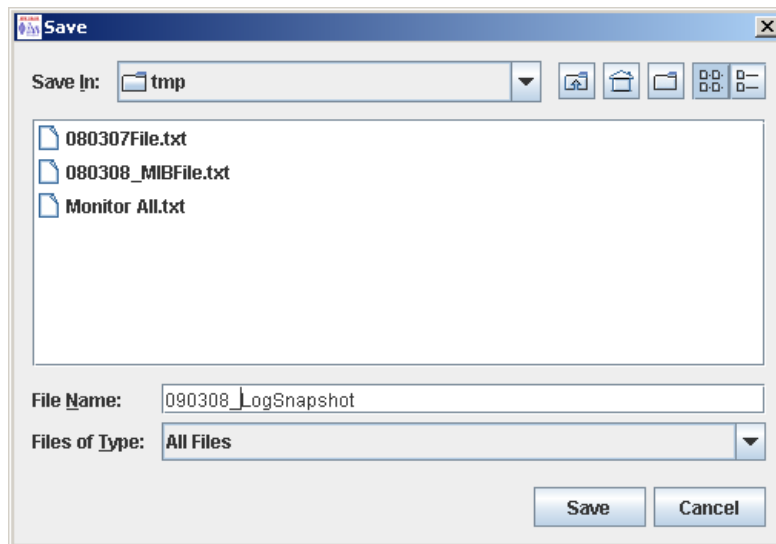
3. Click the TransferFile tab.

The file transfer screen appears.



4. In the Transfer log snapshot file field, click the Transfer button.

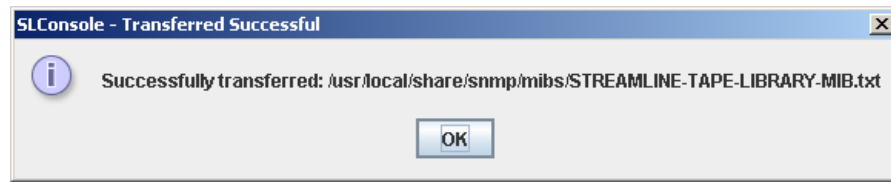
The Save popup appears.



5. Browse to the directory where you want to save the file, and enter the file name in the File Name field.

6. Click Save.

The data is saved to the specified file, and the **Transferred Successful** popup appears.



7. Click OK to dismiss the popup.

Audit Tasks

Task	Page
Audit the Entire Library	290
Audit a Range of Cells	291
Perform a Verified Audit	292

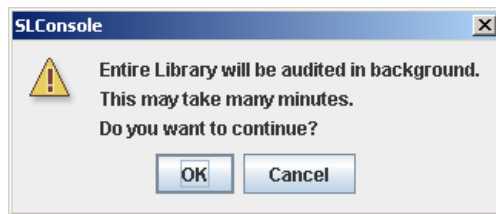
▼ Audit the Entire Library

During this audit the Robot visits all the storage cells, catalogs the VOLIDs and locations, and updates the library controller database.

Note – Although this audit is a background process and does not interrupt library operations, it does require sharing of Robot resources. Therefore, it is not recommended that you run this audit during peak activity periods.

Note – You cannot stop this audit once it has initiated. The audit will take approximately 1/2 second per cartridge slot.

1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the device tree.**
The **Library** screen appears.
3. **Click the Audit tab.**
The **Library Audit** screen appears.
4. **In the Entire Library field, click Yes. Then click the Audit button in the Options Bar.**
A confirmation popup appears.



5. **Click OK to perform the audit as a background process or Cancel to cancel the audit.**

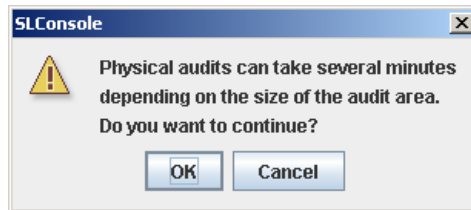
Note – Once you click **OK**, you cannot stop the audit; it will run until completion.

6. **You can view the Cartridge Summary report after a few hours for the latest cartridge locations and VOLIDs. See [“Display a Library Report”](#) on page 62 for details.**

▼ Audit a Range of Cells

During this audit the Robot visits only a specific range of storage cells (including the cap and drives) and updates the library controller database.

1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the device tree.**
The Library screen appears.
3. **Click the Audit tab.**
The Library Audit screen appears.
4. **In the Entire Library field, click No. In the Physical Audit field, click Yes. In the Verified Audit field, click No.**
5. **In the Start Address and End Address fields, select the device types you want to audit and the starting and ending library internal address locations.**
6. **Click the Audit button in the Options Bar.**
A confirmation popup appears.



7. **Click OK to perform the audit as a background process or Cancel to cancel the audit.**

Note – Once you click **OK**, you cannot stop the audit; it will run until completion.

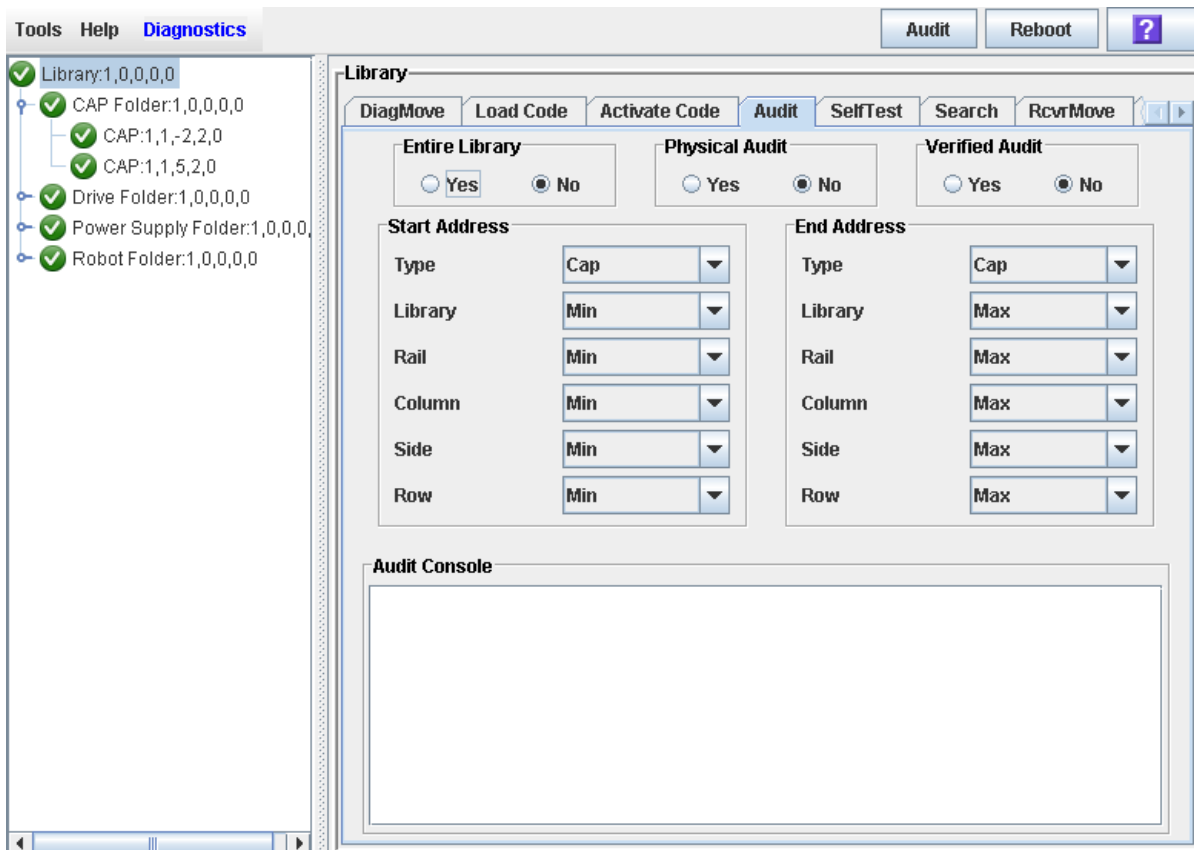
8. **The Audit Console section displays the progress of the audit.**

Note – You can also view the Cartridge Summary report for the latest cartridge locations and VOLIDs. See [“Display a Library Report” on page 62](#) for details.

▼ Perform a Verified Audit

A verified audit validates the status of a specific cartridge location or a range of locations (including CAPs and drives) in the library controller database. If a cartridge address has a verified status of “false” then a physical audit of that location is performed and the library controller database is updated.

1. Select **Tools > Diagnostics**.
2. Click the **Library** folder on the device tree.
The **Library** screen appears.
3. Click the **Audit** tab.
The **Library Audit** screen appears.



4. In the **Entire Library** field, click **No**. In the **Physical Audit** field, click **No**. In the **Verified Audit** field, click **Yes**.
5. In the **Start Address** and **End Address** fields, select the device types you want to audit and the starting and ending library internal address locations.
6. Click the **Audit** button in the **Options Bar**.

The **Audit Console** section displays the progress of the audit.

CAP Utility Tasks

Task	Page
Perform a Self-Test on a CAP	294
Vary a CAP Offline	295
Vary a CAP Online	297

▼ Perform a Self-Test on a CAP

Note – At present, the CAP self-tests perform the same routines as the library self-test. Specific CAP self-tests will be available at a later date.

1. **Select Tools > Diagnostics.**
2. **Expand the CAP folder, and click the CAP you want to test.**
3. **Click the SelfTest tab.**
4. **In the Mode pull-down menu, click Non-Disruptive.**
5. **Click the Run button from the Options Bar.**

Status messages are displayed as the self-test is run. A Diagnostic completed message appears when the test finishes.

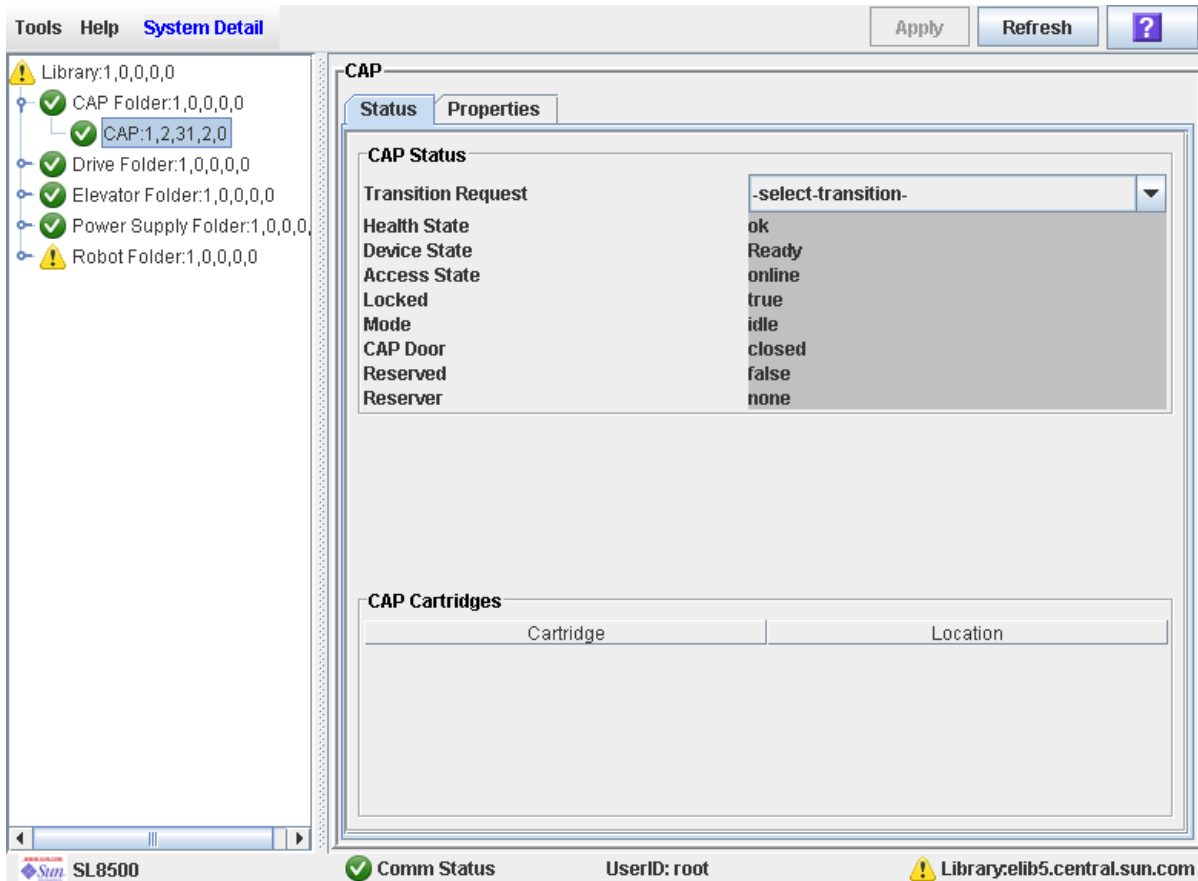
▼ Vary a CAP Offline

Use this procedure to vary a CAP offline through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

1. Select **Tools > System Detail**.
2. Expand the **CAP Folder**, and click the CAP you want to modify.
3. Click the **Status** tab.

The screen displays the current status of the CAP.



4. In the **Transition Request** field, click **Take Offline**. Click **Apply**.

All outstanding jobs for the CAP are completed, and then the CAP status is changed, as follows:

- Health State: Warn
- Device State: Not accessible (HLI host connections)

- Access State: Offline

▼ Vary a CAP Online

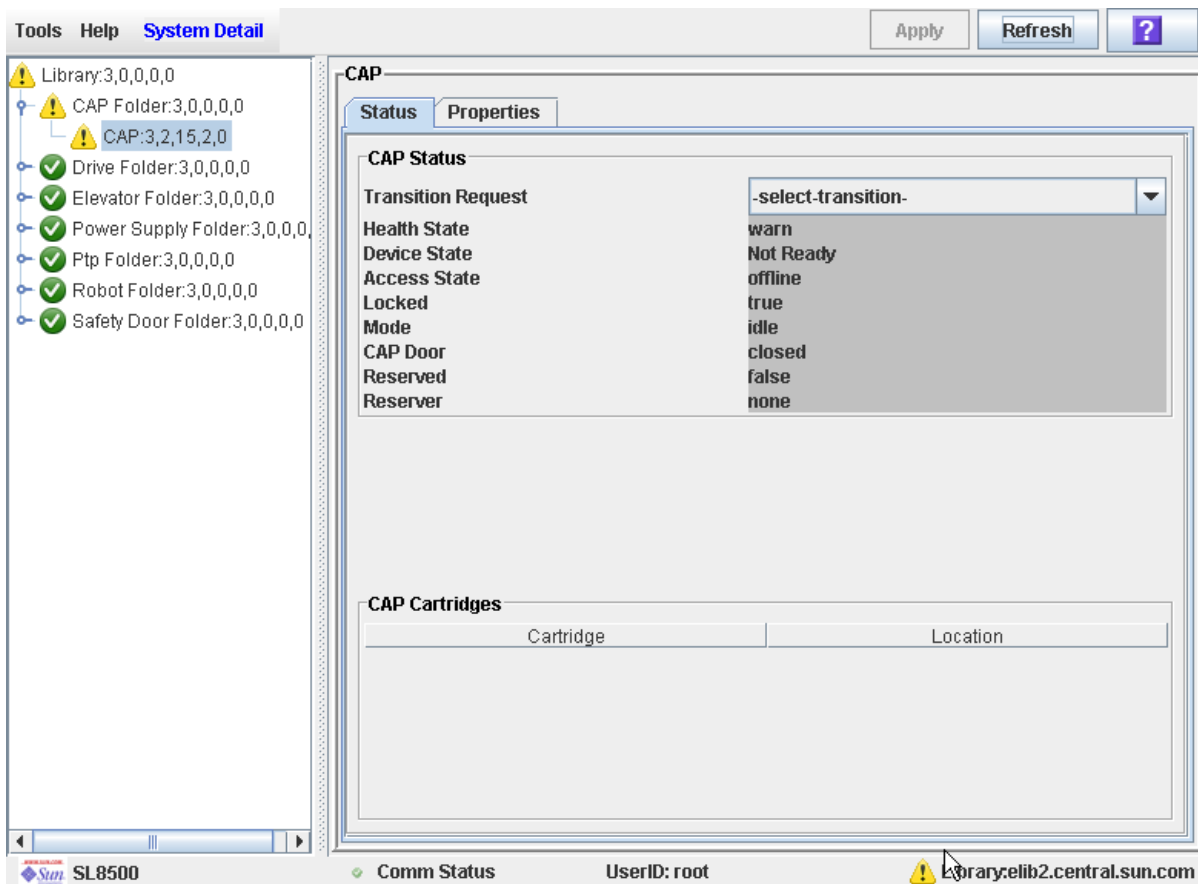
Use this procedure to vary a CAP online through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

Note – Library devices that are offline in an error state cannot go online; the error condition must be cleared first.

1. Select **Tools > System Detail**.
2. Expand the **CAP Folder**, and click the **CAP** you want to modify.
3. Click the **Status** tab.

The screen displays the current status of the CAP.



4. In the **Transition Request** field, click **Bring online**. Click **Apply**.

The CAP status is updated, as follows:

- Health State: ok
- Device State: Ready
- Access State: Online

Drive Utility Tasks

Task	Page
Perform a Drive Self-Test	300
Vary a Drive Offline	301
Vary a Drive Online	302

▼ Perform a Drive Self-Test

1. **Select Tools > Diagnostics.**
2. **Expand the Drive Folder, and click the drive you want to test.**
3. **Click the SelfTest tab.**
4. **In the Mode pull-down, click Non-Disruptive.**
5. **Click the Run button from the Options Bar.**

Status messages are displayed as the self-test is run. A Diagnostic completed message appears when the test finishes.

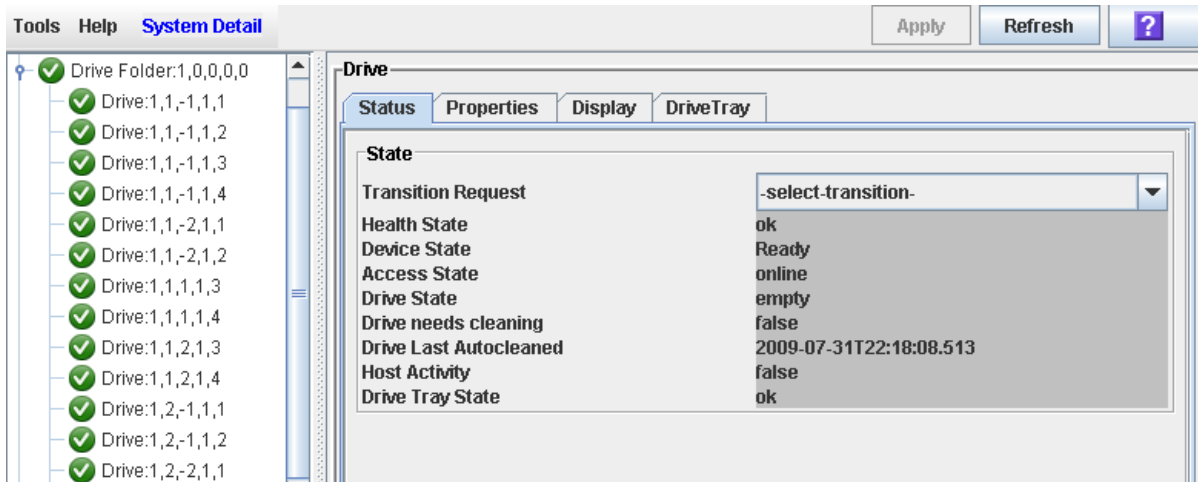
▼ Vary a Drive Offline

Use this procedure to vary a drive offline through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and click the drive you want to modify.
3. Click the **Status** tab.

The screen displays the current status of the drive.



4. In the **Transition Request** field, click **Take Offline**. Click **Apply**.

All outstanding jobs for the drive are completed, and then the drive status is changed, as follows:

- Health State: Warn
- Device State: Not accessible (HLI host connections)
- Access State: Offline

▼ Vary a Drive Online

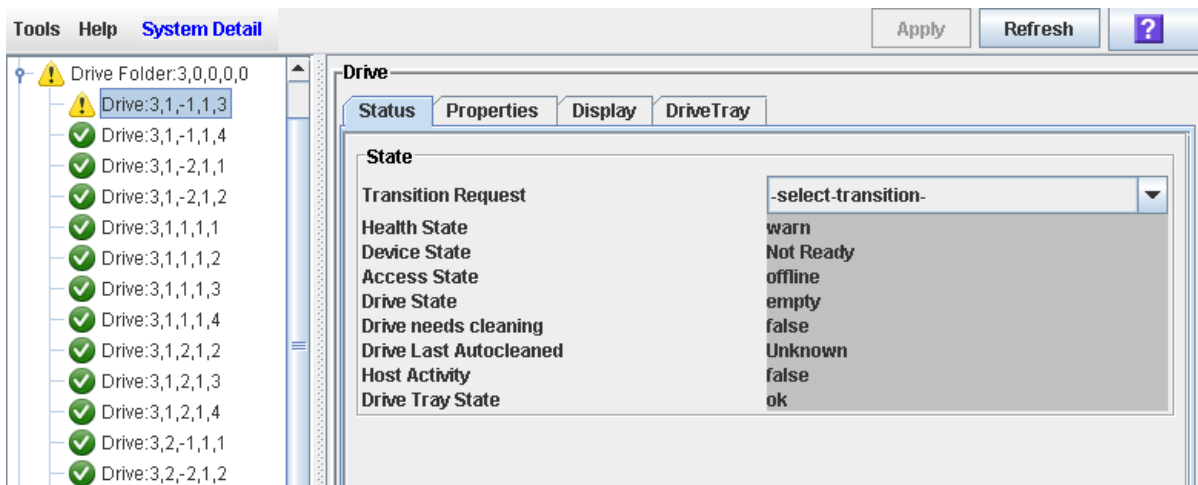
Use this procedure to vary a drive online through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

Note – Library devices that are offline in an error state cannot go online; the error condition must be cleared first.

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder**, and click the drive you want to modify.
3. Click the **Status** tab.

The screen displays the current status of the drive.



4. In the **Transition Request** field, click **Bring online**. Click **Apply**.

The drive status is updated, as follows:

- Health State: ok
- Device State: Ready
- Access State: Online

Robot Utility Tasks

Task	Page
Perform a Robot Self-Test	304
Vary a Robot Offline	305
Vary a Robot Online	306
Define a Diagnostic Move	307
Manage Diagnostic Move Definitions	309
Save a Diagnostic Move to a File	310
Start a Diagnostic Move	312
Monitor and Control Open Diagnostic Moves	313

▼ Perform a Robot Self-Test

Note – To perform a Robot self-test, diagnostic cartridges must be available in the library.

1. **Select Tools > Diagnostics.**
2. **Expand the Robot Folder, and click the robot you want to test.**
3. **Click the SelfTest tab.**
4. **In the Mode pull-down, click Non-Disruptive.**
5. **Click the Run button from the Options Bar.**

Status messages are displayed as the self-test is run. A Diagnostic completed message appears when the test finishes.

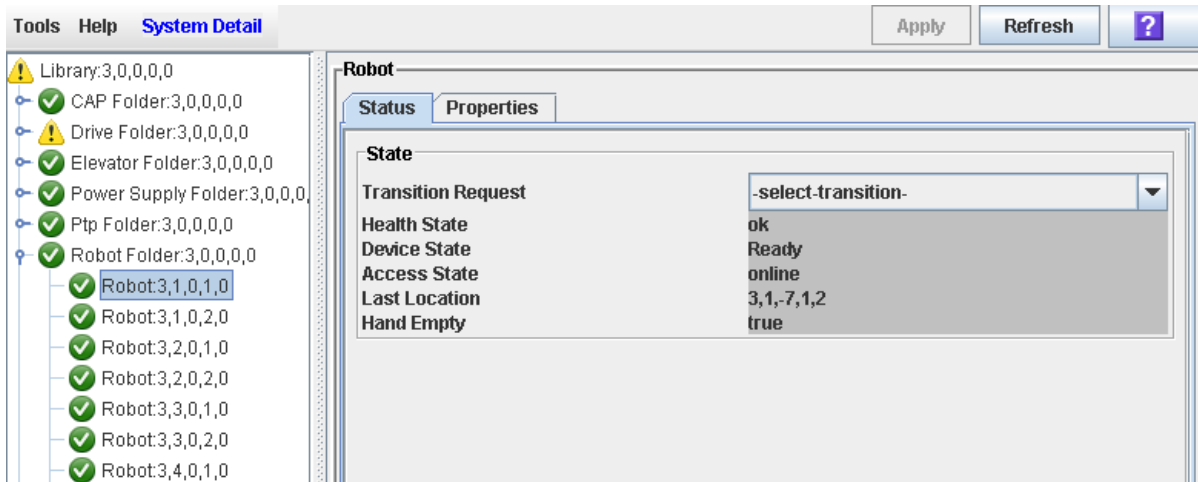
▼ Vary a Robot Offline

Use this procedure to vary a Robot offline through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

1. Select **Tools > System Detail**.
2. Expand the **Robot Folder**, and click the **Robot** you want to modify.
3. Click the **Status** tab.

The screen displays the current status of the Robot.



4. In the **Transition Request** field, click **Take Offline**. Click **Apply**.

All outstanding jobs for the Robot are completed, and then the Robot status is changed, as follows:

- Health State: Warn
 - Device State: Not accessible (HLI host connections)
 - Access State: Offline
5. The Robot is moved to the end of the rail and is not usable by the library. If the library is using the redundant Robot feature, the second Robot will take all requests.

▼ Vary a Robot Online

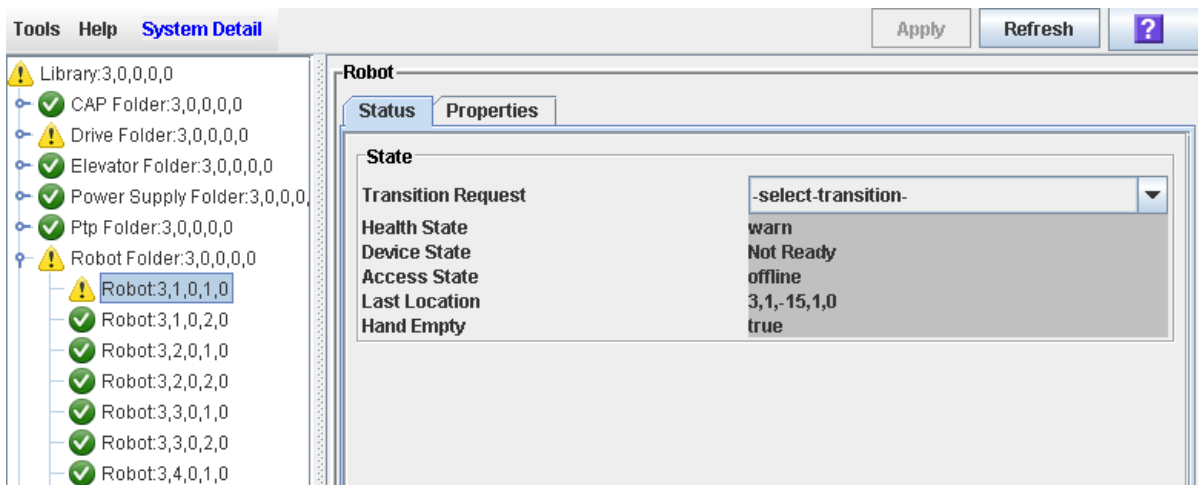
Use this procedure to vary a Robot online through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

Note – Library devices that are offline in an error state cannot go online; the error condition must be cleared first.

1. Select **Tools > System Detail**.
2. Expand the **Robot Folder**, and click the **Robot** you want to modify.
3. Click the **Status** tab.

The screen displays the current status of the Robot.



4. In the **Transition Request** field, click **Bring Online**. Click **Apply**.

The Robot status is updated, as follows:

- Health State: ok
- Device State: Ready
- Access State: Online

▼ Define a Diagnostic Move

Multiple diagnostic move routines can be set up and run simultaneously, as long as the target and pool address ranges do not overlap.

Note – This procedure requires sharing of Robot resources; therefore, it is not recommended that you run it during peak activity periods.

1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the device tree.**
The **Library** screen appears.
3. **Click the DiagMove tab and then the Manage tab.**
The **Diagnostic Move Manage** screen appears.
4. **In the Defined Sequence section, click Add.**
The **TARGET** screen appears.
5. **Complete the TARGET screen as follows. See “Target Address Range” on page 249 for details.**
 - In the **Selection Mode** field, click the type of cells you want to diagnose.
 - In the **Minimum Address** and **Maximum Address** fields, select the library internal address of the starting and ending locations of the cells you want to diagnose.
6. **Click Next.**
The **SOURCE** screen appears.
7. **Complete the SOURCE screen as follows. See “Pool Address Range” on page 249 for details.**
 - In the **Selection Mode** field, click the appropriate cartridge pool address type.
 - In the **Minimum Address** and **Maximum Address** fields, select the library internal addresses of the starting and ending locations of the cartridge pool you want to use.

8. Click Next.

The **Sequence** screen appears.

SLConsole - Sequence

Name: DM_0

Move Count: 10

Access Order: Sequential

Move Type: Robot & Cartridge Robot Only

Disable pre-move cartridge compatibility check (faster):

< Previous Finish Cancel

9. Complete the Sequence screen as follows. See [“Move Access Order”](#) on page 250 for details.

- Name of the diagnostic move
- Move Count (specify a number between 1 and 5000)
- Access order (Sequential or Random)
- Move Type (Robot and Cartridge or Robot Only)
- Disable pre move cartridge compatibility check

10. Click **Finish** to complete the setup.

The **Diagnostic Move Manage** screen appears. The diagnostic sequence you have just defined is listed in the **Defined Sequences** section.

▼ Manage Diagnostic Move Definitions

Use this procedure to manage diagnostic move sequence definitions.

1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the device tree.**
The **Library** screen appears.
3. **Click the DiagMove tab and then the Manage tab.**
The **Diagnostic Move Manage** screen appears.
4. **From the Defined Sequences section, select any of the following options:**

Select Option	To	Notes
Add	Define a diagnostic move	
Open	Start a diagnostic move	Multiple diagnostic moves may be open at a time, so long as the target and pool address ranges setup for the moves do not overlap.
Modify	Modify options for a diagnostic move	This diagnostic move routine must not be open or if open must be in a "Stopped" state.
Remove	Remove a diagnostic move	This diagnostic move routine must not be open.
Copy	Copy an existing diagnostic move	Copy a diagnostic move definition, make changes if necessary, and assign a different name.

5. **To manage the diagnostic moves currently open, see ["Monitor and Control Open Diagnostic Moves"](#) on page 313.**

▼ Save a Diagnostic Move to a File

Use this procedure to save a defined diagnostic move to a local file on your workstation or PC. The file is saved as a JavaBean component represented as an XML 1.0 document (.xml).

Possible uses for the saved file are:

- Can be used to restore a move that has been deleted from the library.
- Can be copied to a different library for use there.

1. **Select Tools > Diagnostics.**

2. **Click the Library folder on the device tree.**

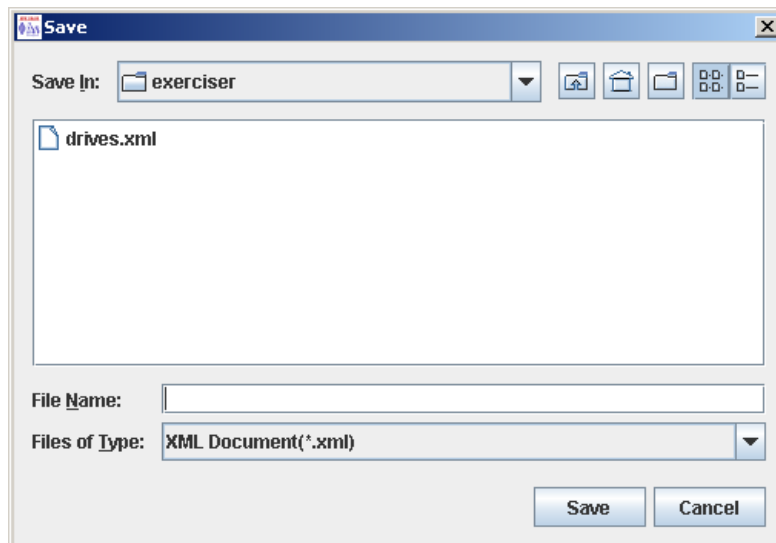
The **Library** screen appears.

3. **Click the DiagMove tab and then the Manage tab.**

The **Diagnostic Move Manage** screen appears.

4. **Click the diagnostic move you want to save, and then click the Save button in the Options Bar.**

The **Save** popup appears.



5. **Browse to the directory where you want to save the file. In the File Name field, enter the file name.**

6. **Click Save.**

The data is saved to the specified file. Following is a sample excerpt:

```
<?xml version="1.0" encoding="UTF-8"?>
<java version="1.5.0_11" class="java.beans.XMLDecoder">
  <object class="com.stortek.ats.elib.opel.model.SequenceBeanList">
    <string>FRS_4.10</string>
    <string>SL500</string>
    <void method="add">
      <object class=
"com.stortek.ats.elib.opel.model.SequenceBeanList$SequenceBean">
        <void property="accessOrder">
```



```
    <string>Sequential</string>
  </void>
  <void property="moveCartridge">
    <boolean>true</boolean>
  </void>
  <void property="moveCount">
    <int>10</int>
  </void>
  <void property="name">
    <string>DriveDiagMove1</string>
  </void>
  . . .
  <void property="targetType">
    <string>Drive</string>
  </void>
</object>
</void>
</object>
</java>
```

▼ Start a Diagnostic Move

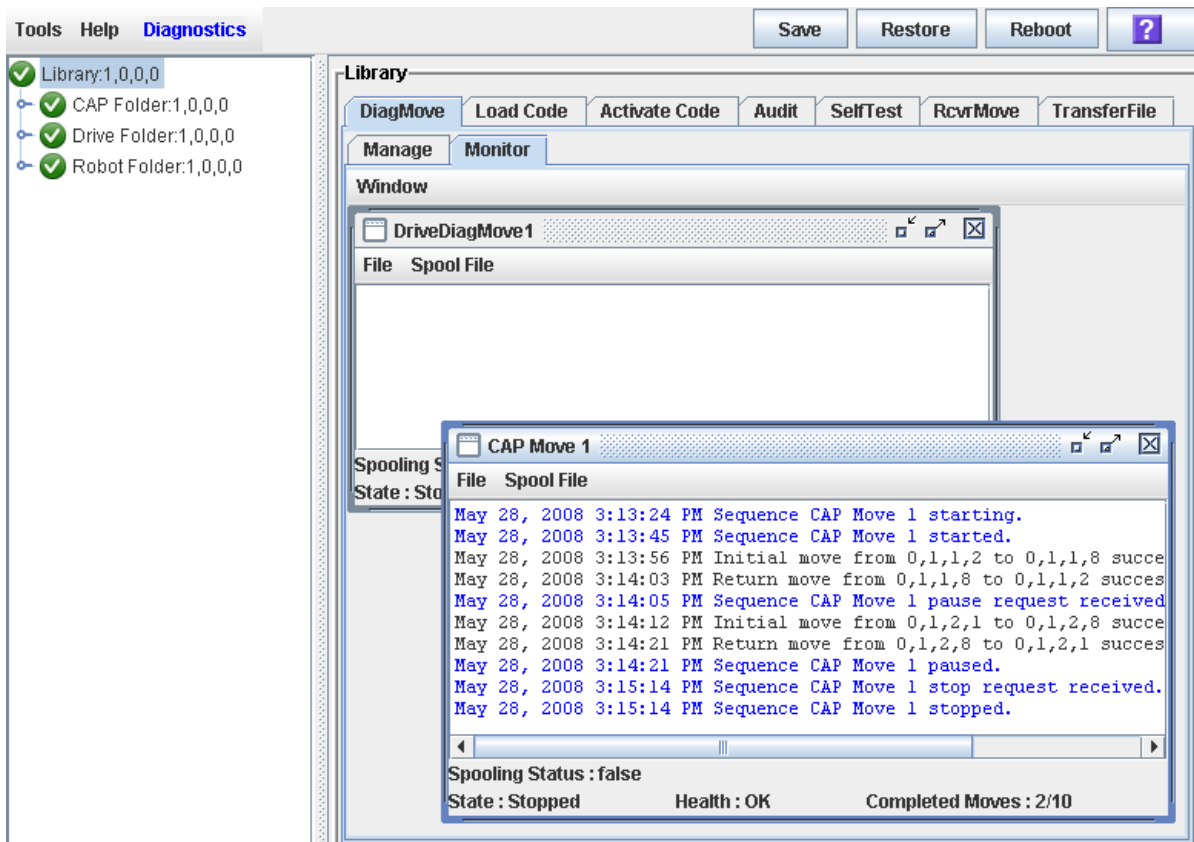
1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the device tree.**
The **Library** screen appears.
3. **Click the DiagMove tab and then the Manage tab.**
The **Diagnostic Move Manage** screen appears.
4. **From the Defined Sequences section click a diagnostic move and then click Open.**
The **Monitor** window is activated.
You can repeat this step to open multiple moves, as long as the target and pool address ranges for the moves do not overlap.
A monitor window is displayed for each move you open.
5. **From each monitor window, select File > Start Sequence to start the move.**

▼ Monitor and Control Open Diagnostic Moves

Use this procedure to control and monitor the status of one or more open diagnostic moves.

1. See “Start a Diagnostic Move” on page 312 for instructions on starting one or more diagnostic moves.
2. Click the Monitor tab.

The Monitor screen appears, with one monitor window for each open move.



Each monitor window has the following status indicators:

Status Indicators	Description	Valid Values
Spooling Status	Indicates if the move output is being spooled to a file	True, False
State	Current execution state of the move	Running, pausing, paused, stopping, stopped
Health	Current health state of the move	OK, warning, error
Completed moves	Number of moves completed in the requested move count	

3. Use the File menu in each Monitor window to perform any of the following functions:

Select Option	To	Notes
File > Start Sequence	Start	
File > Pause Sequence	Pause	Stops all diagnostic moves, but maintains the current location in the access order.
File > Stop Sequence	Stop	Stops a running or paused move.
File > Start Sequence	Resume	Resumes a paused move starting with the last known location in the target address range.
File > Clear Output Window	Clear the messages displayed in the monitor window	Erases the previous message lines and continues to fill the screen with new messages.
Spool File > Start Spooling	Spool	Directs the move output to a file.
Spool File > Stop Spooling	Stop spooling the move output to a file	Stops directing the move output to the spool file.

Manual Operations

When in manual mode of operation, the library or library complex is unavailable for host access. This may be because the library has experienced an unrecoverable error or a library component requires service or installation. When the library is in this mode, cartridge mounts and dismounts require human intervention.

In the case of a failure of a non-redundant component (for example, a single HBC controller card for the entire library), the library is said to be “unavailable” to the system. In this case, the entire library must be placed offline until the repair is accomplished.

A library’s inability to automatically perform cartridge mounts/dismounts does not, however, stop cartridge tape activity – mount and dismount requests by the host continue to be generated.

To perform the cartridge activities, someone might be required to physically enter the library and manually perform the mount/dismount activities previously done by the robot. The location of the cartridge to be mounted is supplied by the software and the slot location must be determined by the coordinates shown in [Appendix A, “Cartridge Slot Locations”](#).

Determining When the Library is Not in Automatic Mode

The following conditions indicate that the library is not functioning in automatic mode:

- One or both the library access doors are open.
- The robot does not automatically mount and dismount cartridges.
- The device tree in the SL Console indicates that there is a problem with the library.

Library Safety

General Safety Precautions

When you enter a library to manually mount and dismount cartridges, you must strictly observe safety precautions and pay attention to the physical space restrictions.

Warning – Possible Physical Injury. To prevent accidental closure of the access door while someone is in the library, it is recommended that when you unlock the access door, you lock it open and retain the key on your person.

To prevent personal injury, follow these precautions:

- Make sure the library is offline (see [“Place the Library Offline”](#) on page 319).
- Do not attempt to override any of the electrical or mechanical safety devices in the library.
- Do not enter the library without informing someone in the immediate area.
- Leave both the front access doors open whenever you work inside the library. There are switches on each door frame that disconnect DC power and signal lines to the library’s robotic motors when either access door is opened.
- Know the physical restrictions. See [“Physical Restrictions”](#) on page 317.

Note – In the unlikely event that someone becomes locked inside the library and the system begins to start up, 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 on the CAP door ([FIGURE 14-1](#)). This actions stops any further robotic movement.

FIGURE 14-1 Emergency Robotic Stop Switch



1. Emergency robotics stop switch

Physical Restrictions

The library design is optimized for high density, so there is not much free room for movement. Be careful not to:

- Snag your clothing on the arrays that house the cartridges (only 0.4 m [18 in.] of aisle clearance).
- Bump your head or body against the arrays.

You might also have to move a robot to gain access to a cartridge, in which case, you must avoid damaging the robot's mechanical or electronic components. See ["Move a Robot" on page 328](#)).

If you are manually loading or unloading a cartridge, your hands must remain clear of the drive's mechanical and electronic load components.

Manual Operation Tasks

Task	Page
Place the Library Offline	319
Bring the Drives Online	320
Bring the Library Online	321
Power Off the Library	322
Power On the Library	324
Enter the Library	325
Exit the Library	327
Move a Robot	328
Locate a Cartridge	330
Locate a Drive	331
Mount a Cartridge in a Drive	332
Dismount a Cartridge from a Drive	334
Perform a Disruptive PTP Installation – for ACSLS or HSC	335

▼ Place the Library Offline

Use this procedure to place the library offline through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

You may need to use this procedure at the following times:

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

1. Vary all library drives offline.

See [“Vary a Drive Offline” on page 301](#) for details.

2. Select Tools > System Detail.

3. Click the Library folder on the device tree.

4. Click the Status tab, and then the General tab.

The current status of the library is displayed.

5. In the Transition Request field, click Take offline. Click Apply.

All outstanding library jobs are completed, and then the library status is changed, as follows:

- Health State: Warn
- Device State: Not accessible (HLI host connections); Not ready (SCSI host connections)
- Access State: Offline

Wait for the message confirming the library is offline. If the library does not come offline, enter the command to display the status of the library.

6. The library remains offline until you explicitly place it online.

▼ Bring the Drives Online

The following pages describe how to bring the drives online:

T9840/T9940 Drive Display

To verify that the T9840/T9940 drives are ready and online, press the MENU switch – the display should now read Online.

If the drive displays Offline, press the SELECT switch once to bring it online.

- If the drive message indicates Online, the transition to online completed.
- If the Onl Pend message appears, the online state is pending due to completion of diagnostic tests.
- If other messages appear, refer to either the *T9840/T9840 Tape Drive User's Reference Manual*, PN 95739, or *T9940 Tape Drive Operator's Guide*, PN 95989.

LTO Ultrium Drives

LTO Ultrium drives are automatically brought online when you bring the library online.

▼ Bring the Library Online

Use this procedure to bring the library online through the SL Console.

Note – You should use this procedure only if you are not using ACSLS or HSC tape management software, or if their servers are not able to communicate with the library. ACSLS and HSC are not notified when the state of the library or its components are changed through the SL Console, possibly leading to disruption in library operations. For instructions on changing the state of the library and its components through ACSLS or HSC, see the appropriate tape management software documentation.

Note – LTO Ultrium drives are automatically brought online when you bring the library online.

1. **Select Tools > System Detail.**
2. **Click the Library folder on the device tree.**
3. **Click the Status tab, and then the General tab.**
The screen displays the current status of the library.
4. **In the Transition Request field, click Bring online.**
5. **Click Apply.**
The library status is updated, as follows:
 - Health State: ok
 - Device State: Ready
 - Access State: Online
6. **If applicable, vary the library online to ACSLS and HSC hosts. See the ACSLS and HSC documentation for detailed procedures.**

▼ Power Off the Library

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

1. Make sure that all jobs have completed processing.
2. Quiesce the library to make sure the library and tape drives are not in use.
3. Vary the library and the drives offline.

Note – Refer to your library management software publication for commands and syntax for [Step 2](#) and [Step 3](#).

4. Make sure that the drives are empty by verifying the drive state using the SL Console.

Note – Refer to the online help documentation accessible through the SL Console application.

5. Open the rear doors of the library.
6. Locate the power distribution unit (PDU) and move the system power-off/on switch to the OFF position (0).

Note – If the library has a 2N power configuration, you must switch off the system power on both the PDUs.

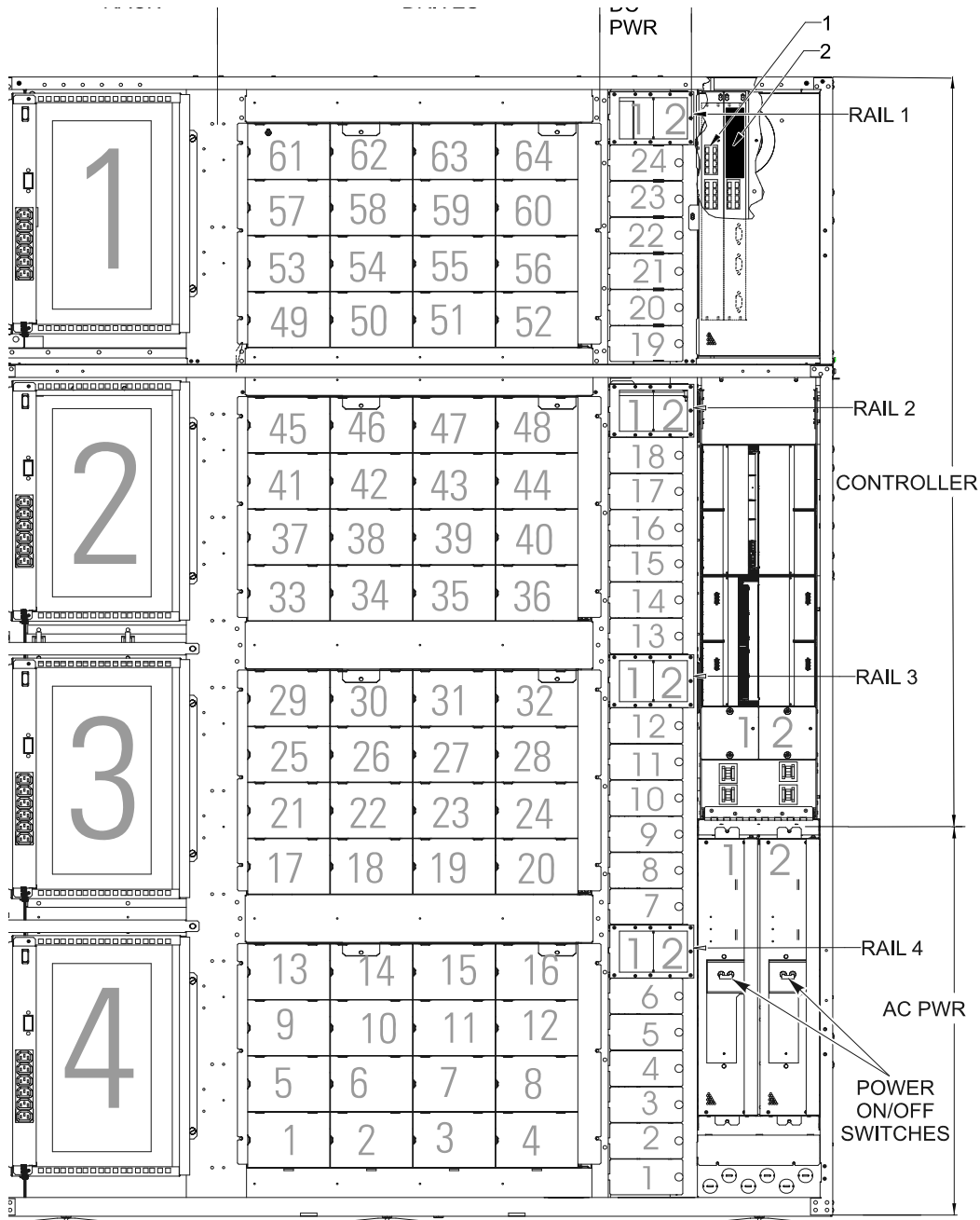
An AC PDU is shown in [FIGURE 14-2](#).

FIGURE 14-2 AC PDU



Figure 20 illustrates the locations of all power supplies (except for the Customer Interface Module's front frame area).

FIGURE 14-3 AC PDU and DC Power Supply Locations



From left to right:

1. Optional switches or hubs (1 – 4)
2. Drive locations/numbering (1 – 64)
3. DC power supplies (1 – 24)
4. Rail Power enable breakers (numbered 1 and 2, above DC supplies)
5. Far right: AC PDUs (bottom) and the logic gate sections they supply (top)

▼ Power On the Library

1. **Close and lock the front access door if the doors are open.**

Note – If you DO NOT want to power-on the robots, CAPs, and the elevators, leave the doors open.

2. **Move the system power-off/on switch to ON (1) position.**

Note – If the library has a 2N power configuration, you must switch on the system power on both the PDUs.

See [FIGURE 14-2 on page 322](#) and [FIGURE 14-3 on page 323](#) for detailed illustrations.

▼ Enter the Library

Use this procedure to open the main doors of the library.

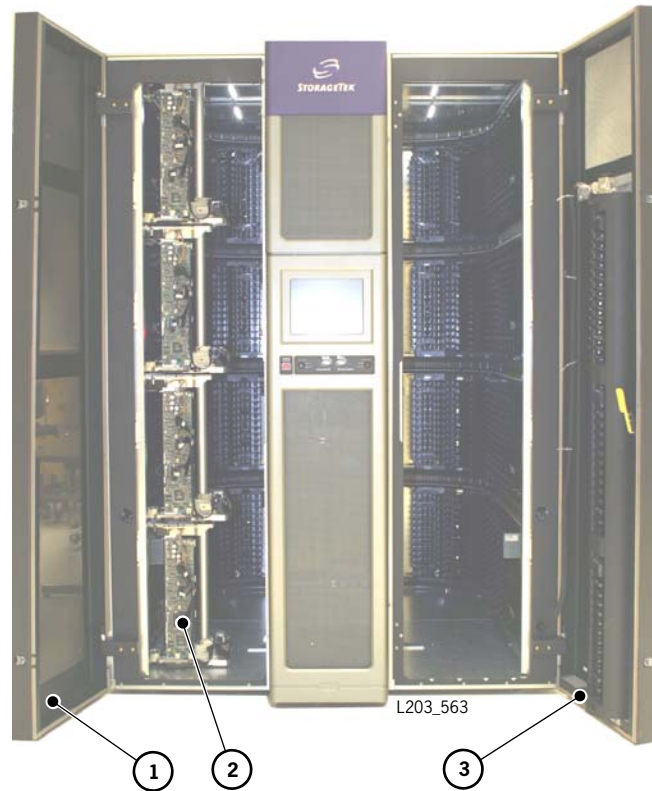
Warning – Possible Physical Injury. *Physical Injury.* You can be injured if you do not follow the correct procedure to enter the library. Be sure to review all safety precautions before performing this procedure. See [“General Safety Precautions” on page 316.](#)

Warning – Possible Physical Injury. If all four HandBots are parked near each other, before you enter the library, move the HandBots out of your way one at a time starting at the lowest rail. You could trip over the HandBots on the lower rails or injure your head with the HandBots on the upper rails. See [“Move a Robot” on page 328](#) for details.

1. Place the library offline. See [“Place the Library Offline” on page 319](#) for details.
2. Insert the key and unlock the access door.
3. Pull the paddle handle to activate the opening mechanism and open the access door. Opening the access door activates a switch, which automatically causes a software interrupt and stops the robot.

4. Turn the key in the lock, to lock the door open, and then remove the key from the lock and keep it with you. This will prevent the door from being closed while you are in the library.

FIGURE 14-4 Library Front View (Access Doors Open)



1. Left access door
 2. Robots
 3. Right access door
-

▼ Exit the Library

Use this procedure to close and lock the main doors of the library.

Note – Before you leave the library, make sure that no tools or foreign objects are left, and no cartridges are outside the cartridge slots.

1. Return the cartridges that you removed to do a manual mount/dismount to their slots.
2. Step outside the library.

Warning – Possible Physical Injury. Before you close the library access door, look inside the library and ask in a loud voice if anyone is inside the library.

3. Close the front access door.

Caution – *Equipment/Media Damage.* Do not slam the door. You could damage the door or cause cartridges to fall onto the floor. The robot cannot recover cartridges that fall onto the floor.

4. Insert the key and lock the access door. Keep the key in a safe place.

▼ Move a Robot

You might have to move a robot to:

- Locate the cartridge from the slots.
- Access the drive panel and identify the drive to perform a manual mount/dismount.

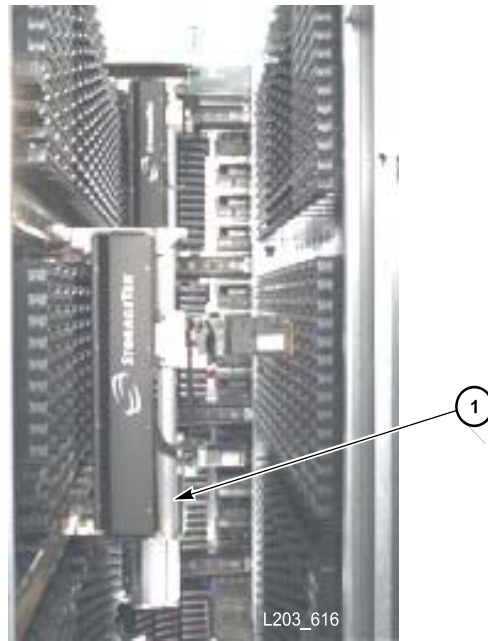
Warning – Possible Physical Injury. To prevent physical injury and damage to components, follow the instructions carefully.

When moving a robot, follow these precautions:

- Do not enter the library or move any of the HandBot mechanisms if you have any reason to suspect they are enabled.
- Do not touch any shiny polished surfaces. Body oils can destroy the lubrication on these surfaces.
- Do not touch any lubricated parts.
- Hold the HandBot carriage handle to push or pull as shown in [FIGURE 14-5 on page 329](#).
- The HandBot should move freely. Do not force the HandBot if movement is restricted. Before you close the library access doors, look inside the library and ask in a loud voice if anyone is inside the library.
- Leave the library only when you are certain that the HandBots can move freely in all directions.

Caution – Damage to Robot. Make sure no extra material (manuals, eyeglasses, tools) are left inside. These objects would cause the robot to stop and could damage it.

FIGURE 14-5 Moving the HandBot



1. HandBot handle (hold the handle to move the HandBot)
-

▼ Locate a Cartridge

The library management software provides the location and the VOLID of the cartridge and also the drive bay address available for the manual mount. Before you enter the library, write down the VOLID, cartridge location, and the drive bay location.

1. **Select Tools > Utilities and then select the Search tab.**
2. **From the pull-down menu select Cartridge Location as the Search Type.**
3. **Enter the VOLID of the cartridge you are trying to locate.**
4. **Select the Requester (see notes below) as the default from the pull-down menu.**
5. **Select the Cartridge Type (data, clean, unreadable label, duplicate label).**
6. **Select Search button from the top right corner.**

See [FIGURE A-1 on page 341](#) through [FIGURE 0-1 on page 348](#) for pictorial maps of the cartridge locations.

Notes:

- You can look up a cartridge location either in the internal library firmware format or the HLI-PRC format based on the library management software (see [“Internal Address” on page 340](#) and [“HLI-PRC Address” on page 351](#)).
- If the library is in a complex, make sure you enter the correct library number (for the internal firmware address search) or the LSM number (for the HLI-PRC address search). For more information see [“PTP Addressing Scheme” on page 234](#).

▼ Locate a Drive

If you need to perform a manual mount to a drive, the SL Console provides mapping of the hardware, firmware, and software mapping for all the drives attached to a library.

1. Select Tools > System Detail.

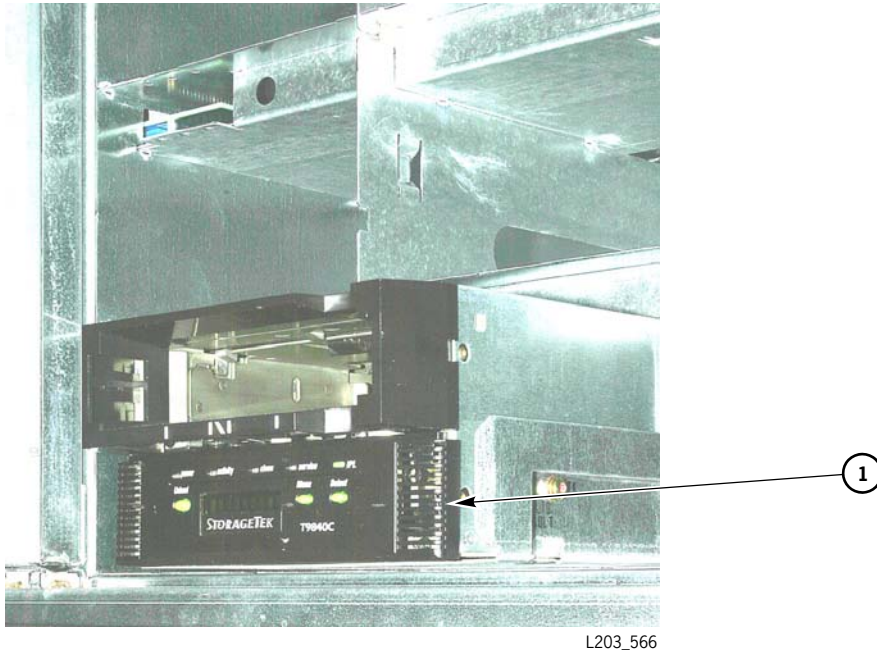
2. From the device tree, select the Drive folder.

Note – The device tree is the left panel that provides a list of devices attached to the library (drives, CAP, robots, elevator)

The status screen displays the SL8500 address, the corresponding drive bay, and the HLI-PRC addresses.

▼ Mount a Cartridge in a Drive

FIGURE 14-6 Drive Panel



1. Drive bay

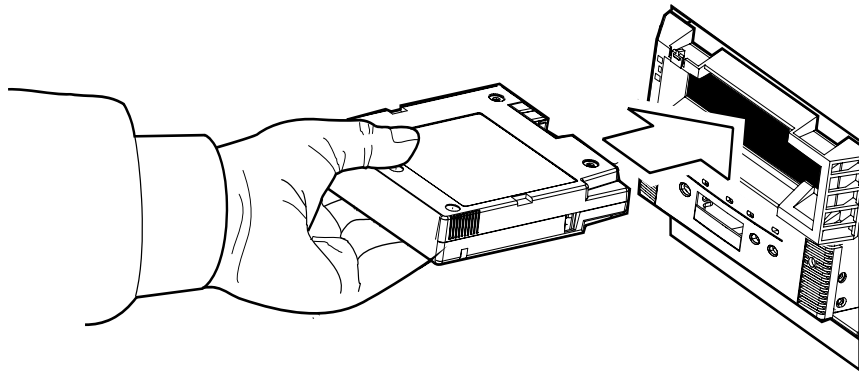
1. When you manually insert a cartridge, the VOLID label must be facing you, with the numeric characters above the bar code.

Notes:

- Do not force the cartridge into the tape drive. If you feel some resistance as you insert the cartridge, make sure you are installing the cartridge into the appropriate tape drive.
- T9840 and T9940 tape drives look very similar, but you cannot put 9840 cartridges in a T9940 tape drive, nor put 9940 cartridges in T9840 tape drive.
- Never attempt to insert an LTO Ultrium cartridge in a T9x40 tape drive. However, you can insert an LTO Ultrium cartridges in either an IBM or HP Ultrium tape drive.

FIGURE 14-7 shows manual insertion of a T9840 cartridge.

FIGURE 14-7 Manually Inserting a Cartridge



L203_472

For more information on manually mounting a cartridge into a drive, refer to the relevant tape drive publication.

▼ Dismount a Cartridge from a Drive

All T9x40 and LTO Ultrium tape drives have a unload button on the operator panel.

1. **Make sure that the tape drive is not in use by the system.**
2. **Press the UNLOAD switch. One of the following conditions occurs:**
 - After the tape rewinds, the cartridge is ejected from the drive. Remove the cartridge from the drive.
 - The cartridge is not ejected after the tape rewinds. Refer to your drive documentation for more information.

For more information on manually dismounting a cartridge from a drive, refer to the relevant tape drive publication.

▼ Perform a Disruptive PTP Installation – for ACSLS or HSC

1. Vary the LSMs offline.
2. Dynamically update the HSC or ACSLS configurations.
3. Because the LSMs are being renumbered, run an audit of the existing libraries and the new one added to update the cartridge locations. Vary the LSMs in the complex online.

Refer to your library management software publication for more information.

Failure to reconfigure and audit of the libraries in the new complex will result in:

- Mount failures because cartridges cannot be found in their new, correct locations.
- Cartridge collisions because enters of new cartridges could collide with existing cartridges currently occupying the slots.

Perform audits in a specific sequence to avoid loss or mismatch of VOLIDs. first audit the library with the *highest numbered LSMs*. The audit process must proceed sequentially from left-to-right, as shown in [TABLE 14-1](#). Audit the newly added library (lowest numbered LSM) last.

TABLE 14-1 Adding a Library to the Right

Exiting Libraries		New Library
First Audit Library A	Second Audit Library B	Last Audit Library C
Renumbers LSMs 4-7 to 8-11	Renumbers LSMs 0-3 to 4-7	Assigns LSM numbers 0-3

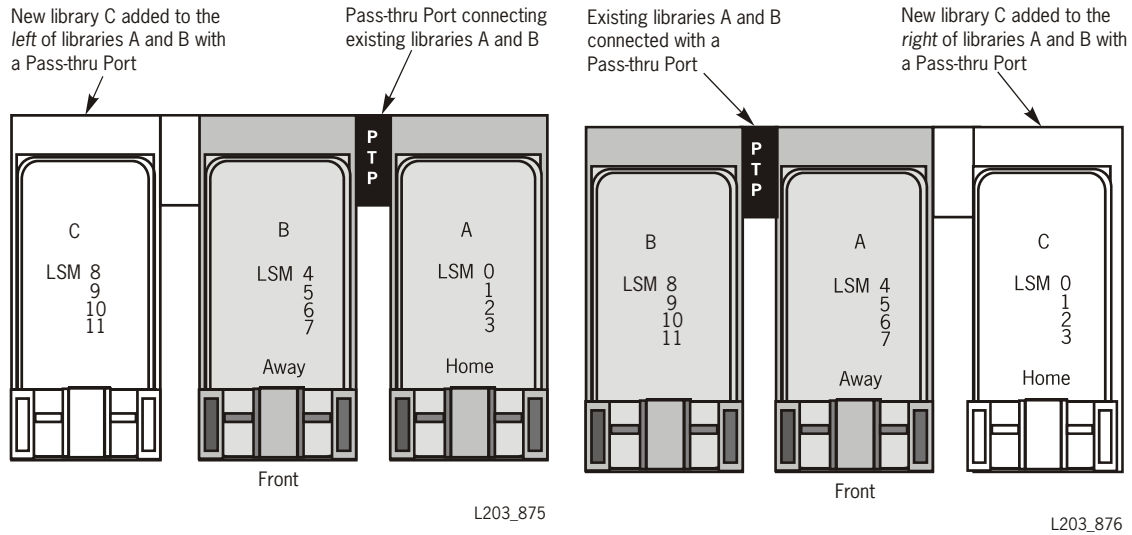
FIGURE 14-8 shows how the libraries are configured when adding a PTP to an exiting library complex.

FIGURE 14-8 Adding a PTP to an Existing Library Complex

An existing Library complex has two libraries (A and B), connected with a PTP.

A = The home library contains LSMs 0 – 3.

B = The away library contains LSMs 4 – 7



In this example, adding another library (C) to the left of the library complex increases the LSM numbering sequentially. This is the preferred method.

In this example, adding another library (C) to the right of the library complex requires a reconfiguration of LSM numbering.

Maintenance Mode of Operation

Maintenance mode is active when a service representative enters the access door to perform maintenance or to replace a component.

An example of this would be the replacement of a defective HandBot when a redundant or operational HandBot is available. Each HandBot has two motors, if one fails, the other motor is powerful enough to move the defective HandBot into the forward service area. If both the motors fail for a HandBot, then the redundant HandBot moves the defective HandBot into the forward service area thus continuing HandBot operations. The service representative then requests that the library be made available for maintenance entry on the side where the HandBot is positioned. The maintenance key (available only to a service representative) is inserted, a service safety door moves to the side selected (partitioning the service area from operational library activity) and the HandBot is replaced.

Note – The service safety door is not parallel to the front of the library; its right side is angled toward the rear of the library (see [FIGURE 1-2 on page 4](#)).

See “[Safety Door Monitoring Tasks](#)” on [page 225](#) for details about monitoring the service safety door.

Service Safety Door Operation

During the replacement, the library continues to function. Because there are cartridge arrays in the forward portion of the Customer Interface Module, these slots are reserved for diagnostic and cleaning cartridges only. A mount request for a cartridge in the slot closer to the side (left or right) where the service safety door is engaged may be inhibited until the maintenance activity is completed. The reserved slots on the other side of the service area may still be accessed if the service safety door is not engaged on that side as well.

After the maintenance activity is completed, the access door is closed and locked and the service safety door moves to the center, clearing the area for HandBot operations. The HandBots then resume their full service.

Left Maintenance Area

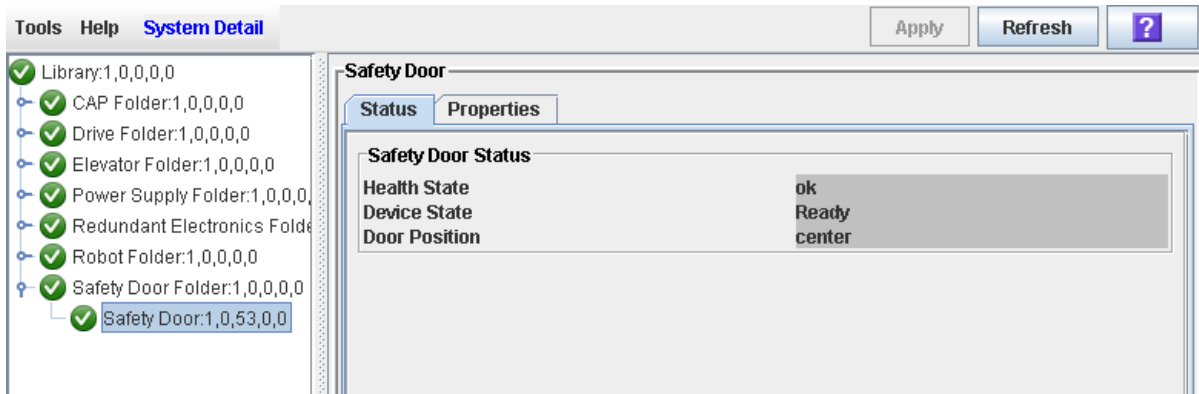
During normal operation, vary the left elevator offline to the library management software using the SL Console *before* the service representative activates the service safety door. After the maintenance activity is complete vary the left elevator online through SL Console.

Right Maintenance Area

During normal operation, vary the CAPs offline to the to the library management software *and also* vary the right elevator offline using SL Console before the service representative activates the service safety door to the right side of the library.

After the maintenance activity is complete vary the CAPs and the right elevator online to the system through SL Console.

The following sample screen is an example of the SL Console displaying the service safety door feature.



Cartridge Slot Locations

Library Walls

The SL8500 library has two walls:

The *Inner walls* has 14 slot arrays.

The *Outer walls* use various sizes of arrays consisting of:

- 13 cartridge slots (allowing space for the robotic rails)
- 8-slot arrays placed within the future PTP areas and underneath the stop brackets for the service safety door
- 4-slot arrays used on sections that are cutout for each future PTP
- 3-slot arrays at the ends of all rails; these slots are reserved for robotic end stop labels (top slot), proximity calibration (middle slot), and drop-off slot (bottom slot)

There are also 4-slot arrays for each elevator.

Service areas are located on each, front side of the customer interface module; these areas are reserved for non-functioning HandBots and do not interfere with cartridge GET or PUT operations by the functioning HandBots. Currently, arrays installed within the service areas (198 slots) are reserved for diagnostic and cleaning cartridges only.

Cartridges placed in arrays lie flat, hub down, and parallel to the floor. To prevent slippage, cartridges are held in their slot by internal retainer clips. Each array has *two targets* centered vertically to accommodate the different sizes and depths of cartridges.

Aisle space between arrays is limited to 0.5 m (18 in.). Due to the built-in redundancy of components, entry into the library beyond the maintenance area should be infrequent.

Reserved Slots

There are a total of 230 slots within the library that are reserved (that is, not to be used for data cartridge storage); these are listed in [TABLE A-1](#).

TABLE A-1 Reserved Slots

Number of Slots	Use for	Location
198	Diagnostic or Cleaning Cartridges	Front section of Customer Interface Module (separated from data cartridge cells by the Service Safety Door area)
24	3-cell arrays: endstop label (top) proximity sensing (middle) drop-off slot for single HandBot (bottom)	Front section of Customer Interface Module
8	Drop-off slot for second HandBot	Top cell under the PTP area
Total = 230		

Cartridge Address

You have to understand two types of addressing scheme to manually locate a cartridge:

- Internal firmware address
- HLI-PRC (Host LMU Interface - Panel, Row, Column) address

Internal Address

The internal library firmware designates cartridge locations with a five-digit number as viewed from the front of the library, Library, Rail, Column, Side, and Row represented as L,R,C,S,W.

Library number: The number within a library or library complex

Rail number: Rails are numbered 1 through 4; Rail 1 is the top rail

Column number: Columns are “signed” numbers referenced from the customer interface module, where +1 is right of the center of the drive bays and -1 is to the left of the drive bays

Side number: Outer walls = 1, inner walls = 2

Row number: Numbered consecutively, from the top (1) down

FIGURE A-1 Cartridge and Drive Locations – Internal Firmware (1 of 8) (L203_090)

Outer and Inner Wall Cell Layout Map

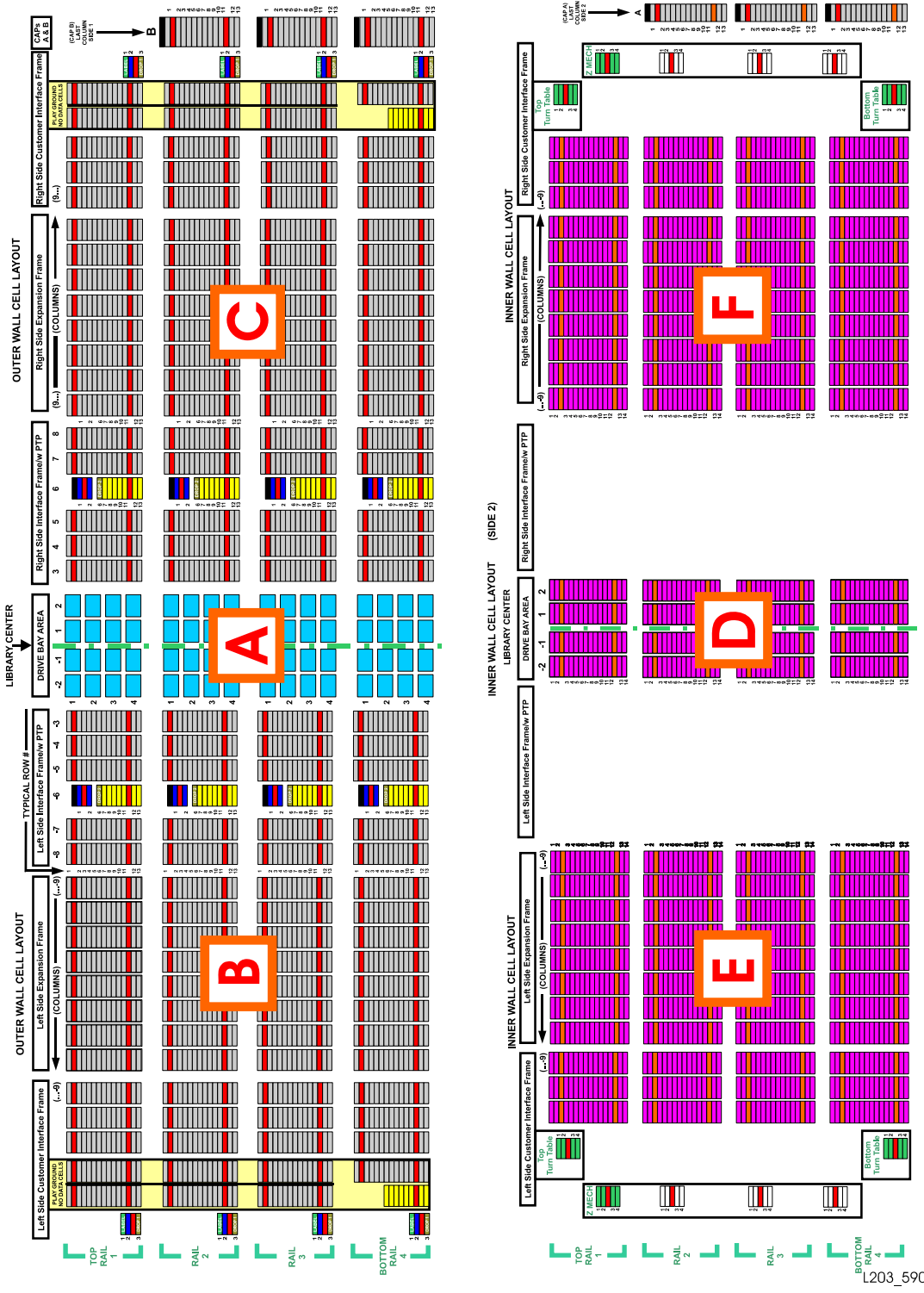


FIGURE A-2 Cartridge and Drive Locations – Internal Firmware (2 of 8)(L203_591)

LIBRARY ADDRESSES

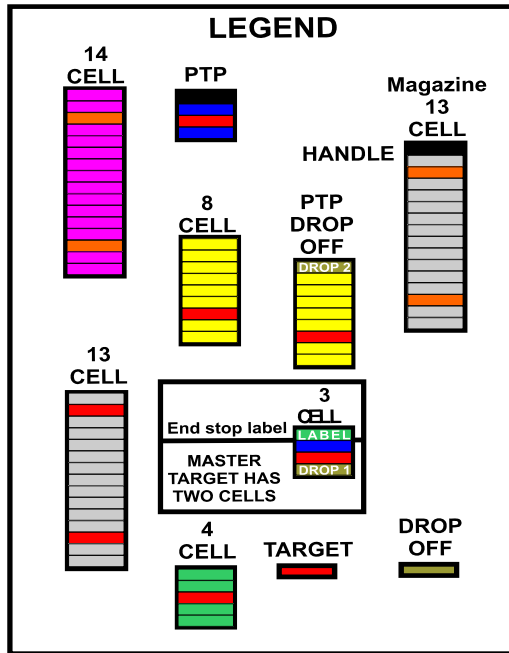
Addresses are written as 5 integer digits separated by 4 comma characters. The integers represent: <LSM within a library complex>, <rail within a LSM>, <column>, <side>, <row>.

The rails in this library frame are numbered 1,2,3, and 4 with 1 being the top and 4 being the bottom.

The column in this library is represented by a signed number where -1 is just to the left of center, +1 is just to the right of center (middle of drive bay is center and there is no #0).

The sides in this library are 1= outside, 2 inside, where inside refers to the storage cells on the inner or central panels.

Rows begin numbering with 1, the Top row.
 Drop 1 cells are drop-off cells for single HandBots.
 Drop 2 cells are drop-off cells for dual HandBots.



L203_591

FIGURE A-3 Cartridge and Drive Locations – Internal Firmware (3 of 8)(L203_592)

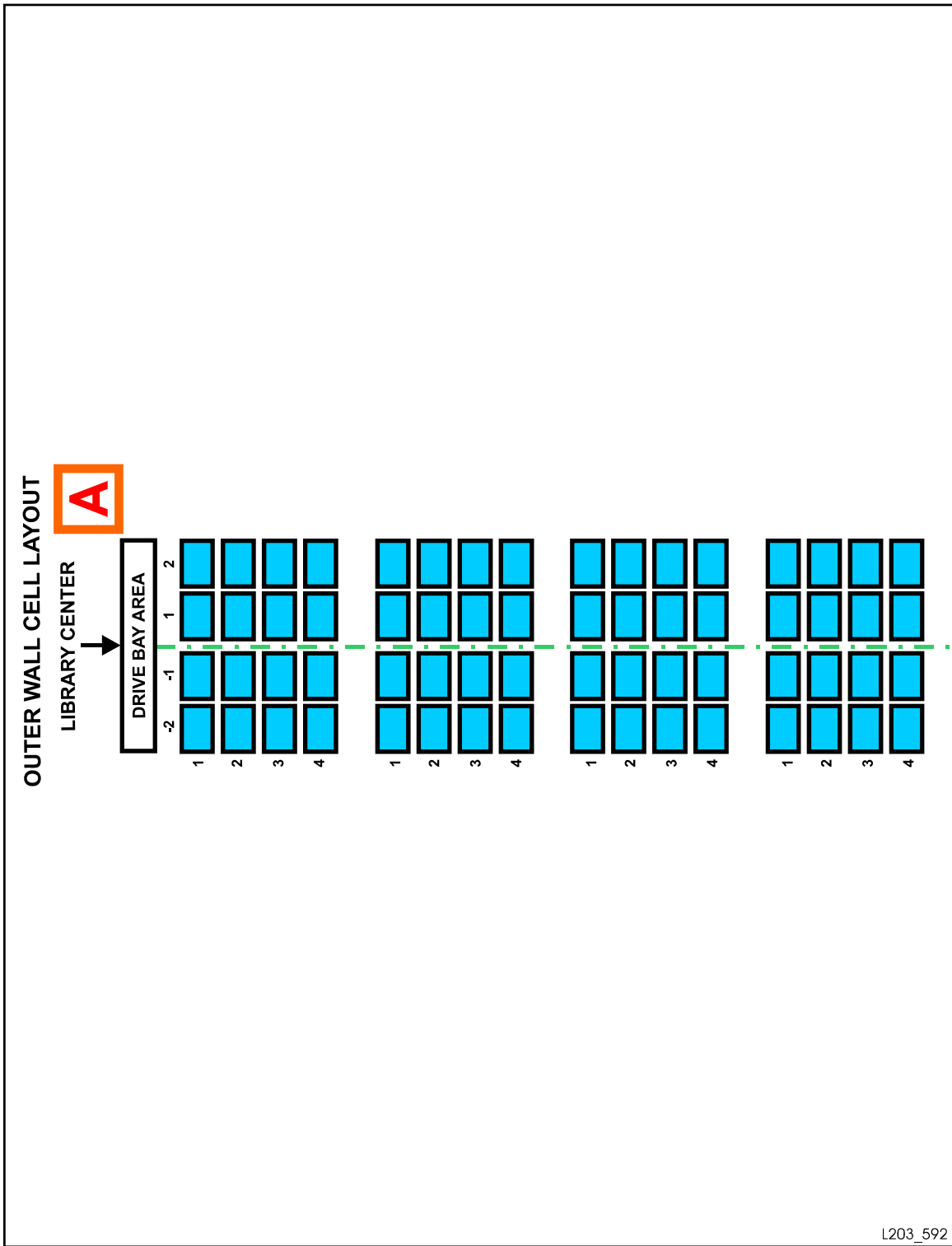


FIGURE A-4 Cartridge and Drive Locations – Internal Firmware (4 of 8)(L203_593)

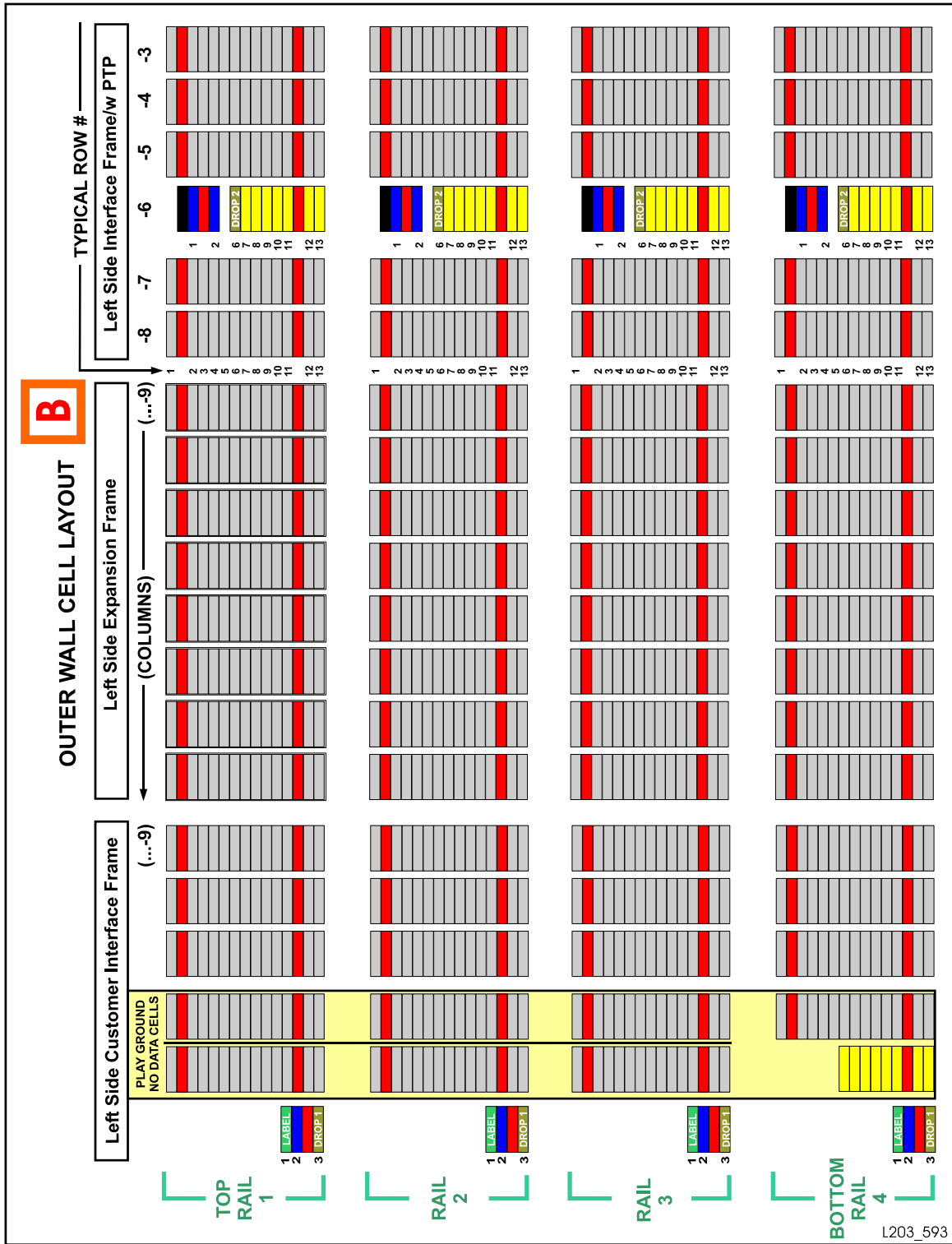


FIGURE A-5 Cartridge and Drive Locations – Internal Firmware (5 of 8)(L203_594)

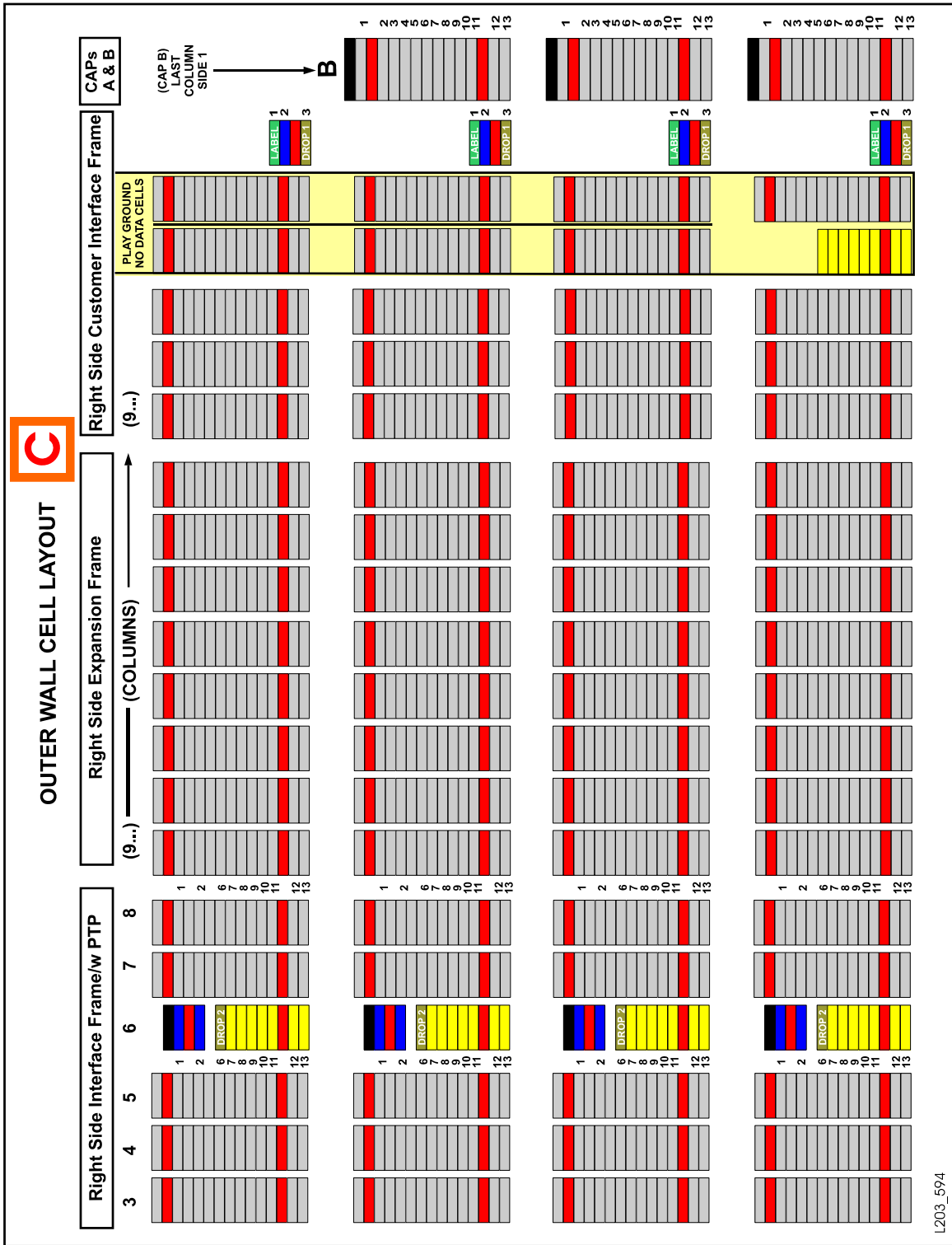
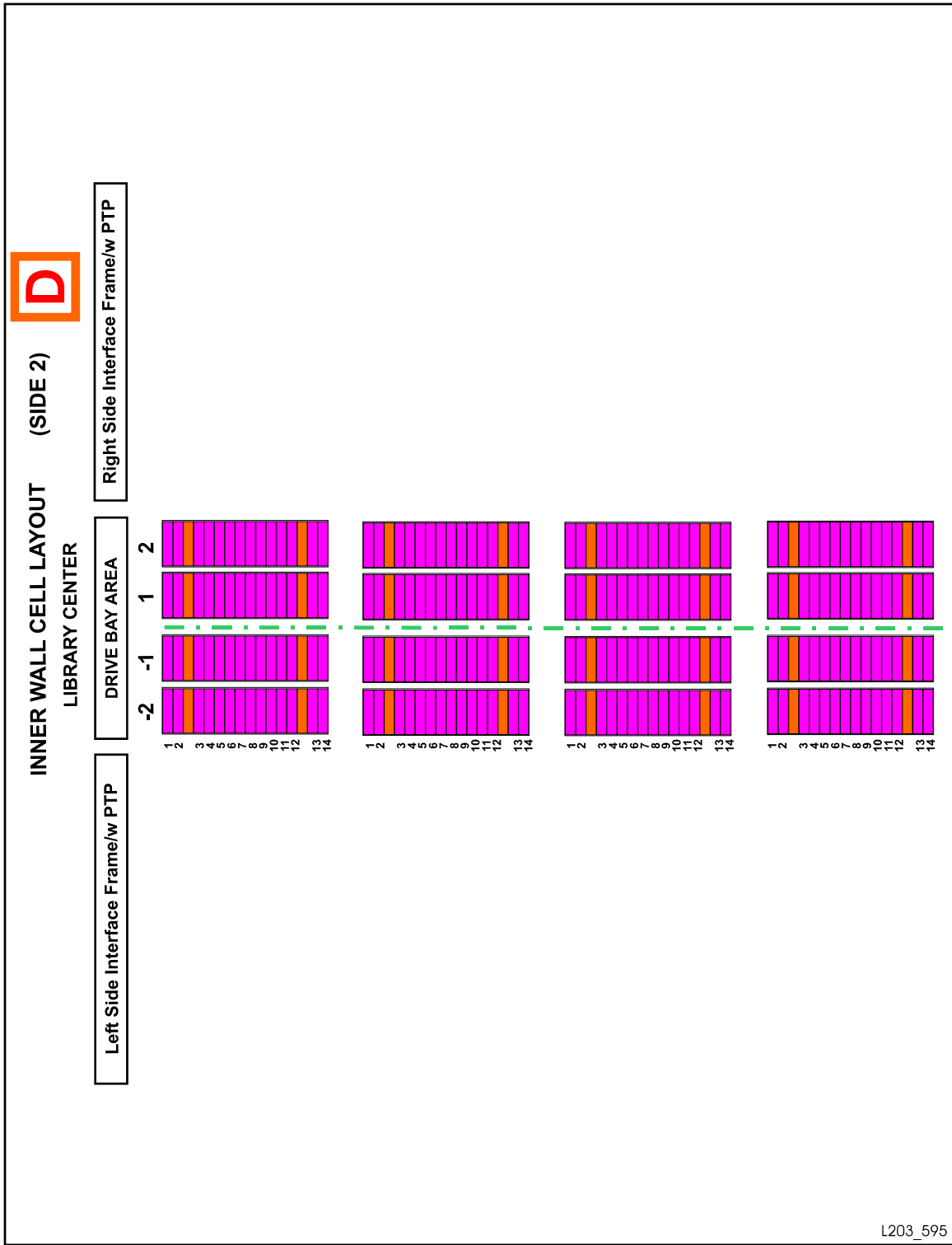


FIGURE A-6 Cartridge and Drive Locations – Internal Firmware (6 of 8)(L203_595)



L203_595

FIGURE A-7 Cartridge and Drive Locations – Internal Firmware (7 of 8)(L203_596)

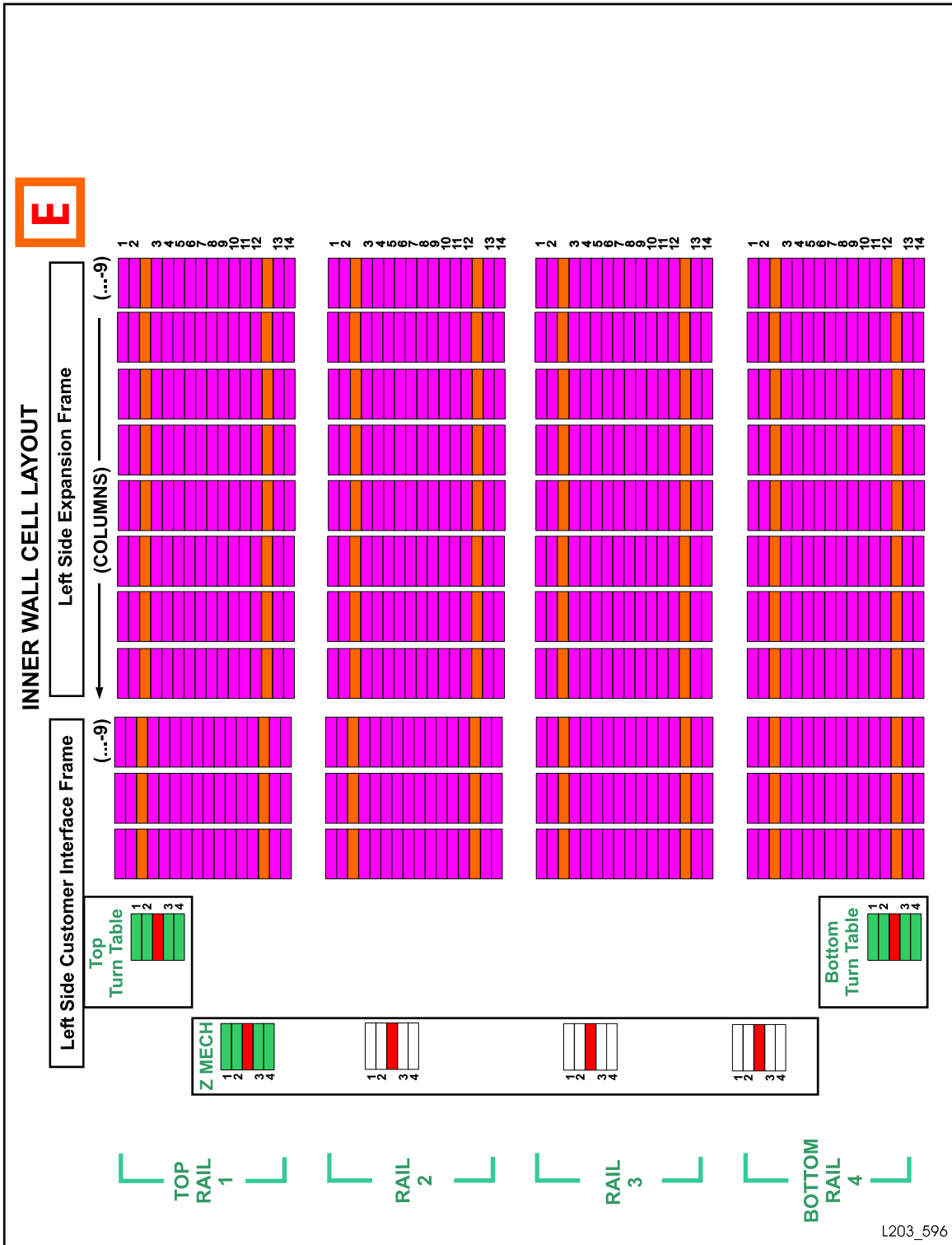


FIGURE 0-1 Cartridge and Drive Locations – Internal Firmware (8 of 8)(L203_597)

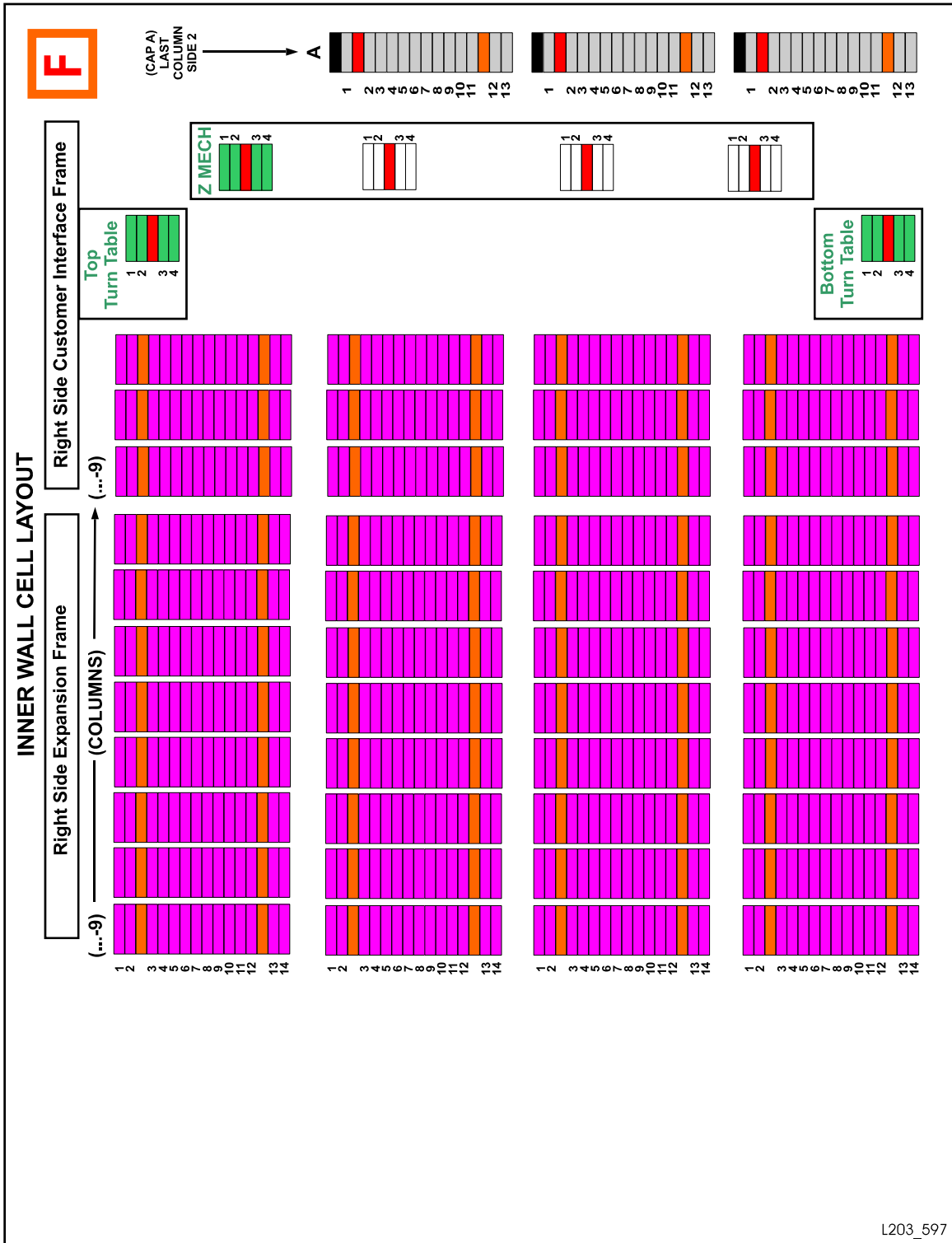


TABLE A-2 Cartridge Locations (1 of 3)

Left Outer Wall (1)												
Rail	Row	Customer Module			Robotics Module						Left Drive Module	
Columns												
		-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1
Rail 1	Rows	1	1	1	1	1	6	1	1	1	1	1
		13	13	13	13	13	13	13	13	13	4	4
Rail 2	Rows	1	1	1	1	1	6	1	1	1	1	1
		13	13	13	13	13	13	13	13	13	4	4
Rail 3	Rows	1	1	1	1	1	6	1	1	1	1	1
		13	13	13	13	13	13	13	13	13	4	4
Rail 4	Rows	1	1	1	1	1	6	1	1	1	1	1
		13	13	13	13	13	13	13	13	13	4	4
Notes:												
Negative numbering starts from the left, center column of drives within the drive module. If an expansion module is added, numbering will be consecutive, starting with column -9 for the expansion module.												
Column -6 is a PTP area and therefore contains 8-cell arrays, numbered 6 – 13. Slot 6 is designated a drop-off slot.												
If an storage expansion module is added, column numbering will be consecutive, starting from column -9.												

TABLE A-3 Cartridge Locations (2 of 3)

Right Outer Wall (1)												
Rail	Row	Right Drive Module		Robotics Module						Customer Module		
Columns												
		+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11
Rail 1	Rows	1	1	1	1	6	1	1	1	1	1	1
		4	4	13	13	13	13	13	13	13	13	13
Rail 2	Rows	1	1	1	1	1	6	1	1	1	1	1
		4	4	13	13	13	13	13	13	13	13	13
Rail 3	Rows	1	1	1	1	1	6	1	1	1	1	1
		4	4	13	13	13	13	13	13	13	13	13
Rail 4	Rows	1	1	1	1	1	6	1	1	1	1	1
		4	4	13	13	13	13	13	13	13	13	13

TABLE A-3 Cartridge Locations (2 of 3)

Right Outer Wall (1)	
Notes: The positive numbering starts from the right, center column of drives within the drive module. If an expansion module is added, numbering will be consecutive, starting from Column +9 for the next expansion module. Column +6 is a PTP area and therefore contains 8-cell arrays, numbered 6 – 13. Slot 6 is designated a drop-off slot. If an storage expansion module is added, column numbering will be consecutive, starting from Column +9.	

TABLE A-4 Cartridge Locations (3 of 3)

Inner Walls (2)											
Rail	Row	Left Side (Customer Module)			Wall Opposite Drive Module				Right Side (Customer Module)		
Columns											
		-11	-10	-9	-2	-1	+1	+2	+9	+10	+11
Rail 1	Rows	1	1	1	1	1	1	1	1	1	1
		14	14	14	14	14	14	14	14	14	14
Rail 2	Rows	1	1	1	1	1	1	1	1	1	1
		14	14	14	14	14	14	14	14	14	14
Rail 3	Rows	1	1	1	1	1	1	1	1	1	1
		14	14	14	14	14	14	14	14	14	14
Rail 4	Rows	1	1	1	1	1	1	1	1	1	1
		14	14	14	14	14	14	14	14	14	14
Notes: Inner walls begin their numbering from -9 on the left, and +9 on the right. If a storage expansion module is added, column numbering will be consecutive, starting from column -3 on the left and +3 on the right.											

Example One:

As viewed from the front of the library, cartridge location 1, 4, -3, 1, 13 would be the slot next to drive number one (lower left drive). Listing this location breaks down as follows:

- 1 = Library number
- 4 = Bottom rail
- 3 = The first cartridge column to the left of the drive bay area
- 1 = Side number (*outer* wall)
- 13 = Bottom row, next to the bottom, left drive

Example Two:

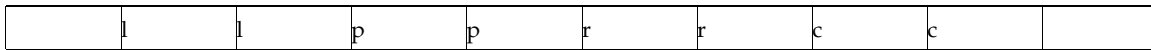
Cartridge location 1, 1, 3, 1, 1 would be the slot next to drive number 61 (top, left drive):

- 1 = Library number
- 1 = Top rail
- 3 = The first cartridge column to the right of the drive bay area
- 1 = Side number (*outer* wall)
- 1 = Top row, opposite the top, right drive

HLI-PRC Address

HLI-PRC (Host LMU Interface - Panel, Row, Column) address is a four digit comma-separated value (L,P,R,C) representing LSM, Panel, Row, Column. This addressing scheme is used by HLI (Host LMU Interface) clients, including ACSLS and HSC, to represent library components accessible to those HLI clients.

The slot location appears in the following format:



where:

- ll: LSM number (0-3)
- pp: Panel
- rr: Row in the panel
- cc: Column in the row

Although the library management software follows a five digit numbering scheme as that of the SL8500 address there are significant differences in slot designations, CAP behavior, and other operational considerations as described below (see also [“PTP Addressing Scheme” on page 234](#)).

Library Storage Module (LSM)

The SL8500 library has four rails on which robots travel. The host software considers each SL8500 rail as a separate LSM. From top to bottom, SL8500 rails are numbered from 1 - 4 while the host LSMs are numbered from 0 - 3. For example, SL8500 rail 1 is Host LSM 0.

TABLE A-5 Rail Numbering

Host	Internal Firmware
LSM 0	Rail 1
LSM 1	Rail 2
LSM 2	Rail 3
LSM 3	Rail 4

Panel Designations

- Panel 0 = cartridge access port (CAP)
- Panel 1 = drive panel
- The data cartridge slots start their numbering after the drive bay (Panel 1) forward.

Row

Within each LSM (rail) rows are numbered consecutively from the top down. These start with 1 for the SL8500 and 0 for host.

Column

SL8500 column numbers are referenced from the customer interface module, where +1 is right of the center of the drive bays and -1 is to the left of the drive bays. The host software reports two columns for each cell storage panel (column 0 and 1)

CAP

The CAP behavior controlled by host software is as follows:

- The CAPs service all the LSMs in the library.
- CAPs span across three LSMs (1-3).
- Each CAP has three magazines with 13 slots each. Each magazine is adjacent to a separate rail, and can only be accessed by robots on that rail. There is no adjacent section in the CAP for the top LSM (0), which requires pass-thru operations with the elevator.
- When loading cartridges in the CAP, slots can be skipped or magazines missing.
- There is no adjacent magazine section in the CAP for rail 1 (LSM 0), which requires pass-thru operations with the elevator.
- The CAP is treated as an independent component, and does not belong to any one rail.

Examples of CAP Behavior:

- A CAP can be online and operational even though the LSM (rail) identified in the CAP ID is offline or not operational.
- If an LSM is offline, the associated CAPs are not automatically offline.
- If an LSM is online, the associated CAP is not automatically placed online.
- Even if LSMs 1 through 3 are offline, CAPs can be used to enter/eject cartridges for LSM 0.

Elevators

Elevators are considered a type of pass-thru port. Each elevator has three logical pass-thru connections per rail. Each rail can pass-thru to the other three rails.

Operational Considerations

To optimize HandBot operations:

- Mount scratch tapes- selects cartridges based on the LSM (rail)
- Enter cartridges from the CAP to the closest LSM with free slots
- The software tries to enter the cartridge to an LSM (rail) adjacent to the CAP.
- The software also tries to eject the cartridge to the CAP adjacent to the LSM.

Note – When HandBot optimization is not possible by the host, the library controller manages the moving of cartridges using a pass-thru operation (elevator).

Drive Bay Locations

The SL8500 library features automatic detection of drives that are added or replaced.

There are four types of addressing schemes for drives:

- Bay address (the physical location)
- Internal address (assigned by the library firmware)
- HLI-PRC (Host LMU Interface - panel, row, column address assigned by the host software)
- System addresses (assigned by the operating system)

Bay Address

The drive bay address is a two-digit number (01-64) representing the physical locations into which drive tray assemblies are inserted. The bay number of a drive is strictly internal to the library, defined by a drive’s position within a drive array. A drive is automatically assigned a number from 1– 64 by the library controller after the drive is installed and the library is re-initialized.

A decal on the rear of the Drive and Electronics Module depicts the bay numbers, as shown in [TABLE B-1 on page 355](#). The bay numbers indicate the physical location of drives. You have to be familiar with the bay numbers to locate a drive to perform a manual mount (see [“Mount a Cartridge in a Drive” on page 332](#)).

TABLE B-1 Drive Bay Address

Rail Number	Drive Bay Assembly Number 4			
1	Drive 61	Drive 62	Drive 63	Drive 64
	Drive 57	Drive 58	Drive 59	Drive 60
	Drive 53	Drive 54	Drive 55	Drive 56
	Drive 49	Drive 50	Drive 51	Drive 52
Rail Number	Drive Bay Assembly Number 3			

TABLE B-1 Drive Bay Address (Continued)

2	Drive 45	Drive 46	Drive 47	Drive 48
	Drive 41	Drive 42	Drive 43	Drive 44
	Drive 37	Drive 38	Drive 39	Drive 40
	Drive 33	Drive 34	Drive 35	Drive 36
Rail Number	Drive Bay Assembly Number 2			
3	Drive 29	Drive 30	Drive 31	Drive 32
	Drive 25	Drive 26	Drive 27	Drive 28
	Drive 21	Drive 22	Drive 23	Drive 24
	Drive 17	Drive 18	Drive 19	Drive 20
Rail Number	Drive Bay Assembly Number 1			
4	Drive 13	Drive 14	Drive 15	Drive 16
	Drive 9	Drive 10	Drive 11	Drive 12
	Drive 5	Drive 6	Drive 7	Drive 8
	Drive 1	Drive 2	Drive 3	Drive 4

Note – sNumbers shown are referenced from the rear of the tape drive and electronics module.

Internal Address

The internal address is a five-digit comma-separated value (L,R,C,S,W) representing Library, Rail, Column, Side, Row, *viewed from inside the library facing the drive bays*. This addressing scheme is used by the firmware and internal communications to represent all devices and locations within the library.

Library number (within a library complex)

Rail number: Rails are numbered 1 through 4, rail 1 is the top rail

Column number: Columns, where +1 is right of the center of the drive bays and -1 is left of the center of the drive bays

Side number: Outer walls = 1, inner walls = 2 (all drives are side 1, the outer walls)

Row number: Numbered consecutively, from the top (1) down

Firmware numbering is listed in [TABLE B-2](#).

TABLE B-2 Firmware Drive Address

		Drive Column -2	Drive Column -1	Drive Column 1	Drive Column 2
Rail Number	Row Number	Drive Number	Drive Number	Drive Number	Drive Number
1	1	x, 1, -2, 1, 1	x, 1, -1, 1, 1	x, 1, 1, 1, 1	x, 1, 2, 1, 1
	2	x, 1, -2, 1, 2	x, 1, -1, 1, 2	x, 1, 1, 1, 2	x, 1, 2, 1, 2
	3	x, 1, -2, 1, 3	x, 1, -1, 1, 3	x, 1, 1, 1, 3	x, 1, 2, 1, 3
	4	x, 1, -2, 1, 4	x, 1, -1, 1, 4	x, 1, 1, 1, 4	x, 1, 2, 1, 4
2	1	x, 2, -2, 1, 1	x, 2, -1, 1, 1	x, 2, 1, 1, 1	x, 2, 2, 1, 1
	2	x, 2, -2, 1, 2	x, 2, -1, 1, 2	x, 2, 1, 1, 2	x, 2, 2, 1, 2
	3	x, 2, -2, 1, 3	x, 2, -1, 1, 3	x, 2, 1, 1, 3	x, 2, 2, 1, 3
	4	x, 2, -2, 1, 4	x, 2, -1, 1, 4	x, 2, 1, 1, 4	x, 2, 2, 1, 4
3	1	x, 3, -2, 1, 1	x, 3, -1, 1, 1	x, 3, 1, 1, 1	x, 3, 2, 1, 1
	2	x, 3, -2, 1, 2	x, 3, -1, 1, 2	x, 3, 1, 1, 2	x, 3, 2, 1, 2
	3	x, 3, -2, 1, 3	x, 3, -1, 1, 3	x, 3, 1, 1, 3	x, 3, 2, 1, 3
	4	x, 3, -2, 1, 4	x, 3, -1, 1, 4	x, 3, 1, 1, 4	x, 3, 2, 1, 4
4	1	x, 4, -2, 1, 1	x, 4, -1, 1, 1	x, 4, 1, 1, 1	x, 4, 2, 1, 1
	2	x, 4, -2, 1, 2	x, 4, -1, 1, 2	x, 4, 1, 1, 2	x, 4, 2, 1, 2
	3	x, 4, -2, 1, 3	x, 4, -1, 1, 3	x, 4, 1, 1, 3	x, 4, 2, 1, 3
	4	x, 4, -2, 1, 4	x, 4, -1, 1, 4	x, 4, 1, 1, 4	x, 4, 2, 1, 4

Note – Perspective is from the *front* of the Customer Interface Module. “x” = library #

As examples:

- Drive firmware number 1, 4, -2, 1, 4 is the bottom, left drive in rail 1, as viewed from inside *the library looking at the drive bays*.
- Drive firmware number 1, 1, 2, 1, 1 is the top, right drive in rail 1, as viewed from inside *the library looking at the drive bays*.

HLI-PRC Address

The HLI-PRC addressing is a four-digit comma-separated value (L,P,R,C) representing Library, Panel, Row, and Column. The HLI (Host LMU Interface) clients (ACSLs, HSC) use this addressing scheme to represent library components accessible to the host.

The tape drives are associated with and belong to each LSM (numbered 0-3). Each LSM is assigned 16 drives (0-15). Panel 1 is designated as the drive panel. To mount a cartridge tape in a different LSM, the cartridge must go through an internal pass-thru port (the elevator) to the drive.

TABLE B-3 Host Software Drive Address

LSM Number	Host Software Number			
0	Drive 0	Drive 4	Drive 8	Drive 12
	Drive 1	Drive 5	Drive 9	Drive 13
	Drive 2	Drive 6	Drive 10	Drive 14
	Drive 3	Drive 7	Drive 11	Drive 15
1	Drive 0	Drive 4	Drive 8	Drive 12
	Drive 1	Drive 5	Drive 9	Drive 13
	Drive 2	Drive 6	Drive 10	Drive 14
	Drive 3	Drive 7	Drive 11	Drive 15
2	Drive 0	Drive 4	Drive 8	Drive 12
	Drive 1	Drive 5	Drive 9	Drive 13
	Drive 2	Drive 6	Drive 10	Drive 14
	Drive 3	Drive 7	Drive 11	Drive 15
3	Drive 0	Drive 4	Drive 8	Drive 12
	Drive 1	Drive 5	Drive 9	Drive 13
	Drive 2	Drive 6	Drive 10	Drive 14
	Drive 3	Drive 7	Drive 11	Drive 15

System Address

The operating system also assigns system addresses to drives. Because Fibre Channel is the operating mode for drives within a SL8500 library, you can minimize a network re-configuration resulting from the replacement of a defective drive by enabling dynamic World Wide Name (dWWN) through the library configuration process. See [“Dynamic World Wide Name” on page 25](#). A system address, once assigned, is automatically re-assigned when a drive is replaced.

Cartridge Handling

This appendix provides information on labeling and handling tape cartridges used in Oracle StorageTek libraries.

Cartridge Requirements

Library cartridges must meet specifications defined in *American National Standard Magnetic Tape and Cartridge for Information Interchange*. Refer to your drive vendor's publication and Web site for specific cartridge requirements and specifications.

Colored cartridges are approved only if the measured reflection density is greater than 0.1 as measured by an X-rite 404G color reflection densitometer. For more information about colored cartridges, contact your Oracle StorageTek representative.

Colored measurements are:

Bandwidth	ANSI Status T Wide band (380 to 780 nm)
Measuring range	Density (0.00 to 2.50) D
Accuracy	±0.02 D
Repeatability	±0.01 D
Aperture diameter	3.4 mm (0.13in.)

For more information about colored cartridges, contact your Sun StorageTek representative.

Valid Cartridge Labels

Library cartridges must be labeled with a valid external label. Several standard Code 39 bar code labels are supported by the library.

Notes:

- Unlabeled cartridges are not supported. See [“Unlabeled Cartridges” on page 363](#).

Pre-labeled cartridges are available from Sun StorageTek. For information on ordering these cartridges, see [“Ordering Cartridges and Labels” on page 365](#).

If you do not order pre-labeled cartridges, see [“Apply the Label on a Cartridge” on page 366](#) for detailed instructions on labeling the cartridges correctly. Sun StorageTek does not supply cartridge labels. For a supplier of labels only, see [“Ordering Cartridges and Labels” on page 365](#).

To display detailed cartridge information, see the following procedures:

- [“Display Library Cartridge Information in Tabular Format” on page 176](#)
- [“List Library Cartridges” on page 179](#)

Media Domain and Media ID

The media domain and media ID together identify a cartridge’s media and usage to the library. They allow you to mix tape drive types and media types in a single library or library complex. The media ID label corresponds to the tape drive or transport capable of using the cartridge. The media domain reflects the cartridge usage: data, cleaning, diagnostic.

Cleaning and Diagnostic Cartridges

Cleaning cartridges have CLN in the VOLID; diagnostic cartridges have DG in the VOLID

Each cleaning and diagnostic kit includes one labeled cleaning cartridge and one labeled diagnostic cartridge, with a volume serial number of 0 (zero) for each. Extra cleaning and diagnostic labels are sent with each library.

Cleaning and diagnostic cartridges cannot be used as scratch cartridges or initialized by software utilities.

Caution – PROCEDURE ERROR: When you enter a cleaning cartridge, the software considers it to be new, and sets the usage counter to zero. DO NOT RE-ENTER A CLEANING CARTRIDGE THAT LIBRARY EJECTS THROUGH THE CAP.

Cartridge Codes

The SL8500 library supports three types of barcode labels:

- For T9x40 drives, 1/2-inch labels supplied by Trioptic (Engineered Data Products/Colorflex) or Tricode (American Eagle/Writeline). Both versions require a separate Media ID Type, which is one character.
- For T10000 drives, labels with eight characters, the last two of which are the required Media ID Domain and the Media ID Type characters.
- For LTO drives, labels with eight characters, the last two of which are the required Media ID Domain and the Media ID Type characters.
- For SDLT drives, labels with seven characters, the last of which is the required Media ID character.

Oracle StorageTek Tape Drives and Cartridges

Cartridge labels for Oracle StorageTek T9840 (models C and D) and T10000 tape drives are listed in [TABLE C-1](#). These tape drives also support encryption.

TABLE C-1 Oracle StorageTek Cartridge Codes

Media ID	Type of Cartridge
VOLID + R	T9840 data cartridge
VOLID + R (Green background)	T9840C VolSafe data cartridge
VOLID + R (Purple background)	T9840D VolSafe data cartridge
CLN (blank space) VOLID + U	T9840 cleaning cartridge
CLN (blank space) VOLID + Y	T9840D cleaning cartridge (Note: The T9840D has a unique cleaning cartridge.)
DG (blank space) VOLID + R	T9840 diagnostic cartridge
VOLID + T1	T10000 data cartridge
DG (blank space) VOLID + T1	T10000 diagnostic cartridge
CLN (blank space) VOLID + CT	T10000 cleaning cartridge
VOLID + TS	T10000 (sport) data cartridge
DG (blank space) VOLID + TS	T10000 (sport) diagnostic cartridge
CLN (blank space) VOLID + CT	T10000 (sport) cleaning cartridge

LTO Tape Drives and Cartridges

Note – LTO technology was initially developed by IBM, Hewlett-Packard, and Quantum. LTO is an “open format” technology, which means that users have multiple sources of product and media.

LTO cartridge labels have eight characters. The last two characters are the media ID (L3, L4, L5, LT, LU, or LV). CLN or DG are the first characters on the cleaning or diagnostic labels. LTO4 and LTO5 tape drives also support encryption.

TABLE C-2 LTO Cartridge Codes

Media ID	Type of Cartridge
L3	Generation 3 data cartridge
L4	Generation 4 data cartridge
L5	Generation 5 data cartridges
LT	Write once read many times (WORM), 400 GB This feature prevents the user from altering or erasing information from the tape. For more information, go to your vendor Web site and do a search on WORM.

TABLE C-2 LTO Cartridge Codes (Continued)

Media ID	Type of Cartridge
LU	Write once read many times (WORM), 800GB
LV	Write once read many times (WORM), 1500GB.
CLN (blank space) + CU	Universal cleaning cartridge Oracle recommends using the CLN + CU universal label instead of a vendor-unique label (CLN + C1 for Hewlett-Packard or CLN + C2 for IBM).
DG (blank space) + VOLID	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for library diagnostic tests)

Handling Cartridges

Improper handling of cartridges can result in a loss of data or damage to a library component. To handle a cartridge correctly:

- Do not carry several cartridges loosely in a container. The leader blocks can snag on other cartridges and become unlatched.

Note – T9940 and LTO Ultrium cartridges have leader blocks. T9840 cartridges do not.

- Make sure that the leader block is latched every time you pick up a cartridge.
- Keep cartridges clean.
- Inspect a cartridge before each use and never put a damaged cartridge into a drive or library.
- Never release a leader block and pull tape from a cartridge.
- Never open a cartridge.
- Do not handle tape that is outside the cartridge; the tape edge might be damaged.
- Do not expose the tape or cartridge to direct sunlight or moisture.
- Do not expose a recorded cartridge to magnetic fields; this might destroy data on the tape.

Inserting a Cartridge in a Drive or Cell

A defective or dirty cartridge can damage a drive. Always inspect a cartridge before you insert it into a drive or into a tape library. Look for:

- Cracked or broken cartridge
- Broken leader
- Broken tape access door

- Damaged file-protect selector or write-protect switch
- Liquid in the cartridge
- Labels not firmly attached or extending over the cartridge edge
- Any other obvious damage

A cartridge must be inserted in a storage cell, CAP cell, or drive with the bar code on the bottom, and the VOLID readable from right to left. The cartridge hub must always be down.

Unreadable Cartridges

Cartridges may be identified as unreadable for the following reasons:

- [Unlabeled Cartridges](#)
- [Upside-Down Cartridges](#)

HSC and ACSLS automatically eject unreadable cartridges from the library. FC-SCSI hosts may not; an unreadable cartridge may be moved automatically to a CAP during library initialization.

Note – If a large number of cartridges are reported as unreadable, you may suspect a faulty Robot camera or scanner. This could result in a large number of cartridges mistakenly ejected from the library.

Unlabeled Cartridges

Cartridges without external labels are not fully supported in the SL3000. Unlabeled cartridges will not be mounted on drives; however, they can be moved between CAPs and storage cells.

- If an unlabeled cartridge is placed in a CAP, the Robot will leave the cartridge there. The cartridge's disposition depends on the host software.
- If an unlabeled cartridge is placed in a library storage cell, during an audit the cartridge will be reported as "unreadable, invalid media type." Depending on the host software, the cartridge may not be recognized by the host, or it may be ejected through the CAP.

Upside-Down Cartridges

Insertion of upside-down cartridges should never be attempted, especially for Oracle StorageTek cartridges. How the library handles this situation depends upon the cartridge type.

Oracle StorageTek Cartridges

Caution – Upside-down Oracle StorageTek cartridges do not fit in library storage cells and may cause damage to the cartridge and the TallBot.

- If a Oracle StorageTek cartridge is placed upside-down in a CAP magazine, the CAP will not be able to close.
- If a Oracle StorageTek cartridge is placed upside-down in a library storage cell, the cartridge will extend from the storage cell may and damage the TallBot.

LTO Cartridges

- If an LTO cartridge is placed upside-down in a CAP magazine, the Robot will leave the cartridge there. The cartridge's disposition depends on the host software.
- If an LTO cartridge is placed upside-down in a library storage cell, during an audit the cartridge will be reported as "unreadable, invalid media type." Depending on the host software, the cartridge may not be recognized by the host, or it may be ejected through the CAP.

Maintaining Cartridges

The following section describes general maintenance guidelines for cartridges.

Cleaning the Cartridge Exterior

Caution – CARTRIDGE DAMAGE: Certain solvents can damage the cartridges. DO NOT USE ACETONE, TRICHLOROETHANE, TOLUENE, XYLENE, BENZENE, KETONE, METHYL ETHYL KETONE, METHYLENE CHLORIDE, ETHYLDICHLORIDE, ESTERS, ETHYL ACETATE, OR SIMILAR CHEMICALS TO REMOVE LABELS OR TO CLEAN CARTRIDGES.

Wipe all dust, dirt, and moisture from the cartridge with a lint-free cloth.

Use StorageTek Tape Cleaner Wipes, PN 4046289-01 to clean the cartridges. These wipes are saturated with isopropyl alcohol. Do not let any solution touch the tape or get inside the cartridge.

Repairing a Detached Leader Block

When a T9940 or LTO Ultrium cartridge tape is damaged, use a backup tape if possible. If a cartridge leader block is detached, there is no backup tape, and the cartridge or tape has no obvious damage, you may repair the leader block using a repair kit provided by the tape supplier. You can use the tape one time to copy the data onto another tape.

Storing Cartridges

Following are guidelines for cartridge storage:

- 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.
- Store cartridges in a clean environment that duplicates the conditions of the room in which they are used.
- Before using a cartridge, make sure that it has been in its operating environment for at least 24 hours.
- Archival storage is 1 to 10 years for 9x40 cartridge tapes and 15 to 30 years for LTO Ultrium cartridge tapes.

Ordering Cartridges and Labels

Contact your authorized Sun StorageTek Selling Agent for labeled cartridges.

For cartridge labels, contact EDP/Colorflex at:

- Phone: 1.888.438.8362 (domestic and international)
- Web site: <http://www.colorflex.com>

For technical questions, contact Sun StorageTek Sales Support at:

- Phone: 1.800.275.4785
- E-mail: sales_support@storagetek.com

▼ Apply the Label on a Cartridge

1. Make sure that the cartridge has been at room temperature for at least 24 hours.
2. Clean the surface where the label will be placed using a cleaning solution made for this purpose. See [“Cleaning the Cartridge Exterior” on page 364](#).
3. Peel the backing from the cartridge label.
4. Lay the cartridge flat, in the position you would use to insert the cartridge in a tape drive.
5. Position the cartridge label with the bar-code characters *below* the alphanumeric characters. Press it into place.

Note – On LTO Ultrium cartridge labels, the alphanumeric characters can be either vertical or horizontal.

6. If the cartridge has a customer label, place the label in the area and press it into place.
7. Repeat Steps 2 through 5 for the media ID label.
8. The label must be within the indented area of the cartridge so that the edges of the label are parallel to the edges of the cartridge. The label should be close to the inside edge of the indented area but must *never* overlap the edge of this area.

Notes:

- Make sure that the label is not placed elsewhere on the cartridge surface.
- Make sure that the edges of the label do not curl up; curling causes the cartridge to stick in the drive loader.
- Use labels that do not leave a residue when they are removed.
- Make sure that the label contains a VOLID.

Web-launched SL Console Server

The Web-launched SL Console is a standard feature of the SL8500 and is included on a CD shipped with each library. It enables the SL Console to be installed on a centralized Web server. Individual clients can then use a supported Web browser to download and log in to the Web-launched SL Console.

The Web-launched SL Console is deployed as a Java WebARchive (.war) file.

Security Considerations

The customer is responsible for implementing all appropriate security systems, including firewalls, user access, etc.

Server Requirements

You can deploy the Web-launched SL Console on any Web server that is compliant with the J2EE (Java 2 Platform, Enterprise Edition) platform. It is recommended that you use the Java System Web Server.

Note – All procedures in this document assume you are using the Java System Web Server.

Server Installation and Management

Installation and management of the Web-launched SL Console server involves the following procedures:

- “Download the Java System Web Server” on page 368
- “Install the Sun Java System Web Server” on page 372
- “Log in to the Java System Web Server Administration Console” on page 376
- “Install and Deploy the Web-launched SL Console” on page 379
- “Start the Web-launched SL Console” on page 385
- “Update the Web-launched SL Console” on page 387

▼ Download the Java System Web Server

Use this procedure to download the Java System Web Server, if it is not already installed on your server.

Note – This procedure requires you to have an Oracle Online Account username and password.

1. Open a Web browser, and in the Location Bar or Address field enter the URL of the Oracle Web Servers page:

<http://www.sun.com/download/index.jsp?cat=Web%20%26%20Proxy%20Servers&tab=3&subcat=Web%20Servers>

2. On the Web Servers page, click the Web Server link that corresponds to your server platform.

	native NSAPI library form as well as the popular FastCGI form. An installer is provided to ease installation and setup .	
» Web Server 7.0 Update 1	This is a full multi-language product installation with performance and stability improvements; out-of-box Java support for Servlets 2.5, JSP 2.1, JSF 1.2, and more; support for Java SE 5.0 and 6, plus NetBeans IDE 5.0, 5.5, and 5.5.1; and administration interface support for FastCGI.	Download
» Web Server FastCGI Add-On 6.1 Service Pack 4	This software provides support for the FastCGI protocol. This allows third-party applications that do not support the Web Server's native API (NSAPI) or may have thread safety issues to be safely used without a significant	Download

3. On the Sun Java System Web Server screen (this will vary according to your selection in the previous step), scroll down to verify the list of supported platforms, and click **Download**.

Sun Microsystems Products Downloads Services & Solutions Support Training Developer Search

Sun Java System Web Server 7.0 Update 1

Sun Java(TM) System Web Server 7.0 Update 1 is a full multi-language product installation. For platform and patch requirements, features, localizations, and other important information please read the [Release Notes](#).

New in Java System Web Server 7.0 Update 1:

- Performance and stability improvements
- Out-of-box Java support for Servlets 2.5, JSP 2.1, JSF 1.2, and more
- Support for Java SE 5.0 and 6
- Support for NetBeans IDE 5.0, 5.5, and 5.5.1
- Administration interface support for FastCGI
- More

Java System Web Server 7.0 introduced:

- Solaris AMD-64 and SPARC 64-bit platform support
- Redesigned administration framework featuring
 - Cluster management
 - Easy access to frequently utilized activities
 - Wizards to assist with difficult tasks
 - Full featured and scriptable Command Line Interface
 - Simplified management of SSL certificates
 - Fully localized browser based Graphical Interface

Language	Platform
Multi-language	Red Hat Enterprise Linux 4
Multi-language	Windows Server 2003, Enterprise Edition
Multi-language	Solaris 9/10, x86
Multi-language	Windows XP Professional
Multi-language	Red Hat Enterprise Linux 3 U4
Multi-language	SUSE Linux Enterprise Server 9 (x86)
Multi-language	HP-UX 11i
Multi-language	Solaris 8/9/10, SPARC
Multi-language	Windows 2000 Advanced Server SP4
Multi-language	Solaris 10 OS, AMD x64

Price: Free **Download**

Did you find what you were looking for today? Select Answer --> Submit

Contact | About Sun | News & Events | Employment | Site Map | Privacy | Terms of Use | Trademarks | Copyright 1994-2007 Sun Microsystems, Inc.

4. In the Oracle Download Center Login screen, enter your Username and Password, and click **Login**.

Note – If you do not already have an account, click **Register Now** and follow the instructions to create one.

Home > Download Center >

Login

Username

Password

Login >>

- » [Forgot Username or Password?](#)
- » [Register Now](#)
- » [Why Register?](#)

Your Selection:

Sun Java System Web Server 7.0 Update 1, Multi-Platform, English, Download

To continue, please log in with your Sun Online Account (Download Center, MySun, SunSolve, etc.). If you don't have an account, please [Register](#).

Download Center

- » [FAQ](#)
- » [Purchase & Shipping Policies](#)

[Contact](#) | [About Sun](#) | [News](#) | [Employment](#) | [Privacy](#) | [Terms of Use](#) | [Trademarks](#) | Copyright 1994-2007 Sun Microsystems, Inc.

5. In the Oracle Download Center screen, make the following selections:

- Click the **Accept License Agreement** radio button.

- Click the **Sun Java System Web Server** link that corresponds to your server platform.

Sun Downloads

Home > Download Center >

Download

Download Center

- > FAQ
- > Purchase & Shipping Policies
- > Update Account
- > Log Out

Sun Java System Web Server 7.0 Update 1
Sun Java System Web Server 7.0 Update 1 is a secure, massively scalable and stable platform for the most demanding web sites. It features out-of-box support for Java technologies, SSL, clusters, an integrated search engine, and much more.

NOTE: This page offers files for different platforms - please be sure to download the proper file(s) for your platform. We highly recommend using [Sun Download Manager \(SDM\)](#), as it lets you pause, resume, and restart your download while ensuring a successful download experience. Just select the files you want to download, then click the "Download Selected with Sun Download Manager" button to automatically install and start SDM. Alternately, click directly on the links in the file list to download through your browser.

For any download problems or questions, please see the [Download Center FAQ](#).
[How long will the download take?](#)

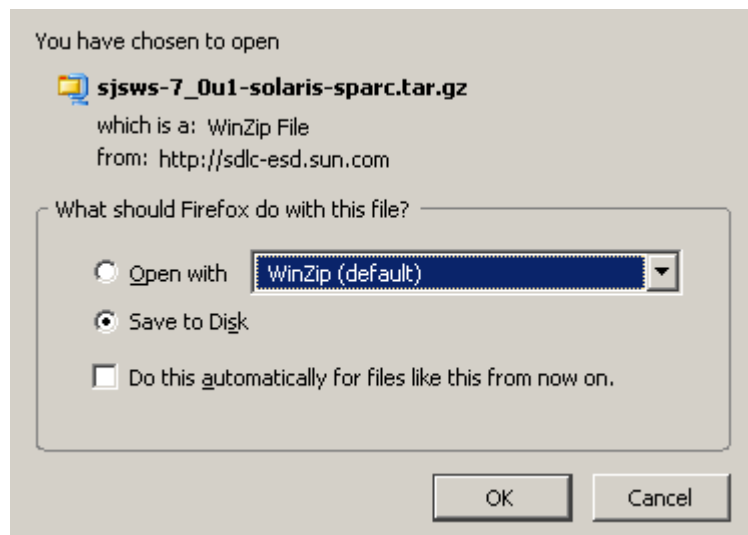
Download selected with Sun Download Manager Easily manage your downloads (pause, resume, restart, verify). » [Learn more](#)

Solaris 10 OS, AMD x64/Solaris 9/9/10, SPARC/Solaris 9/10, x86 Platform - Sun Java System Web Server 7.0 Update 1			
<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	↓ Sun Java Web Server 7.0 Update 1 - Sparc, Multi-language	sjsws-7_0u1-solaris-sparc.tar.gz	144.09 MB
<input type="checkbox"/>	↓ Sun Java Web Server 7.0 Update 1 - AMD x64/x86, Multi-language	sjsws-7_0u1-solaris-amd64.tar.gz	130.84 MB

Red Hat Enterprise Linux 3 U4/Red Hat Enterprise Linux 4/SUSE Linux Enterprise Server 9 (x86) Platform - Sun Java System Web Server 7.0 Update 1			
<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	↓ Sun Java System Web Server 7.0 Update 1 - Linux, Multi-language	sjsws-7_0u1-linux-i586.tar.gz	113.50 MB

6. In the popup, click **Save to Disk**, to save the compressed archive file to a directory of your choice, and click **OK**.

Note – This process may take several minutes.



7. Use the appropriate extraction utility (for example, `gunzip`, `pkunzip`) to extract the Sun Java System Web Server files to a directory of your choice.

▼ Install the Sun Java System Web Server

Use this procedure to install the Java System Web Server, if it is not already installed on your server.

1. **In the directory where you have extracted the Sun Java System Web Server files, double-click or execute from a command line the setup file (setup or setup.exe, depending on your platform).**

If you are installing on a Solaris platform, you may need to invoke `root` or `sudo` permissions, depending on the directory you are installing to. If so, use the following steps:

- a. `cd extraction_directory`

where *extraction_directory* is the directory to which you extracted the compressed Java Web Server files.

- b. `xhost +`

- c. `sudo ./setup`

2. **On the Welcome screen, click Next.**



3. On the Software License Agreement screen, click the Yes radio button, and click Next.

Software License Agreement

Sun Microsystems, Inc. ("Sun") SOFTWARE LICENSE AGREEMENT ("SLA") and ENTITLEMENT for SOFTWARE

A. ENTITLEMENT for SOFTWARE. Capitalized terms not defined in this Entitlement have the meanings ascribed to them in the SLA (attached below as Section B). These terms will supersede any inconsistent or conflicting terms in the SLA.

Licensee ("You"): The entity receiving the Software from Sun.

Effective Date: Date You receive the Software.

Software: Solaris Enterprise System, which may include the following:

Do you agree with the terms of this license?

Yes

No

Back Next Cancel Help

4. On the Select Installation Directory screen, specify the directory where you want the Web Server installed, and click Next.

Select Installation Directory

Installation Directory:

C:\Program Files\Sun\WebServer7

Browse...

Back Next Cancel Help

5. On the Type of Installation screen, click Express, and click Next.

Select the Type of Installation

Select the type of installation you want to perform, then click **Next**.

Express
The easiest installation, with standard options installed automatically.

Custom
Custom installation based on user choices.

Navigation buttons: < Back, Next >, Cancel, Help

6. On the Administration Server Settings screen, specify a secure password for the admin user, and click Next.

Administration Server Settings

Choose a user name and password. You must remember this user name and password to administer the Web Server after installation.

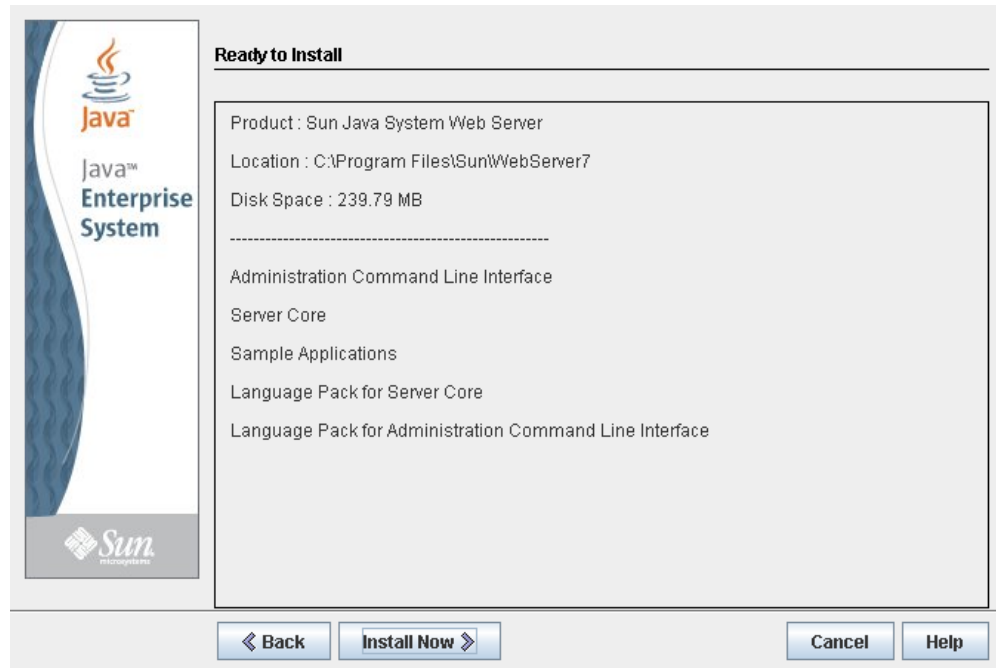
Administrator User Name:

Administrator Password:

Retype Password:

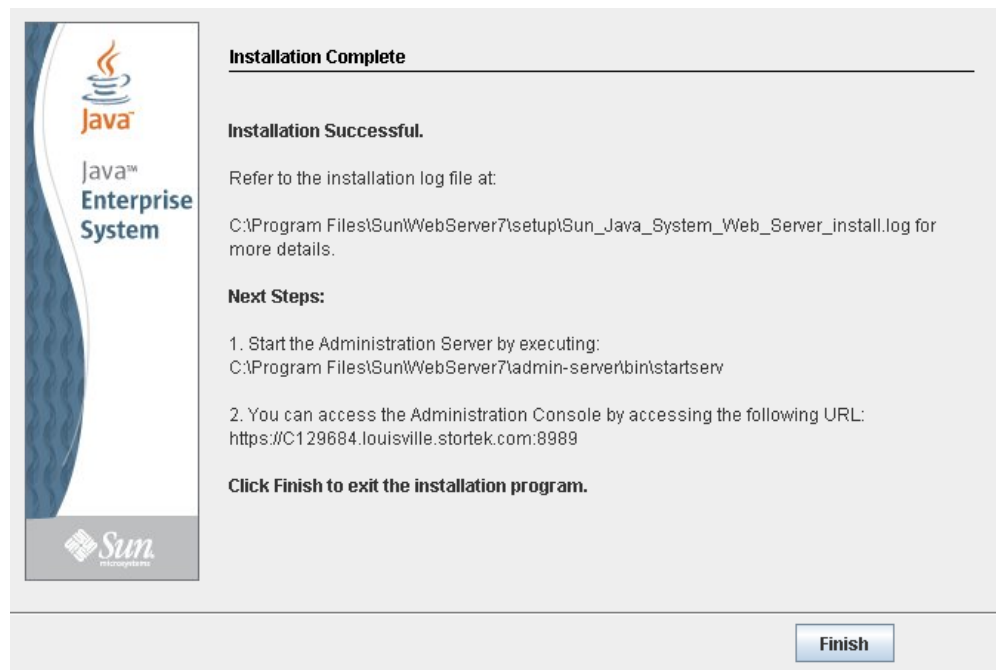
Navigation buttons: < Back, Next >, Cancel, Help

7. On the Ready to Install screen, review the installation information and click Install Now.



The installation begins, and screen with a progress bar is displayed.

8. On the Installation Complete screen, review the information and write down the Administration Console URL specified in #2 under "Next Steps. You will need this in the next procedure.



9. Click Finish to exit the setup program.

▼ Log in to the Java System Web Server Administration Console

1. Start the Sun Java System Web Server, if it is not already running:
 - On Windows – Click **Start > All Programs > Sun Microsystems > Web Server 7.0 > Start Administration Server**.
 - On Solaris – Open a terminal window, and type the following:

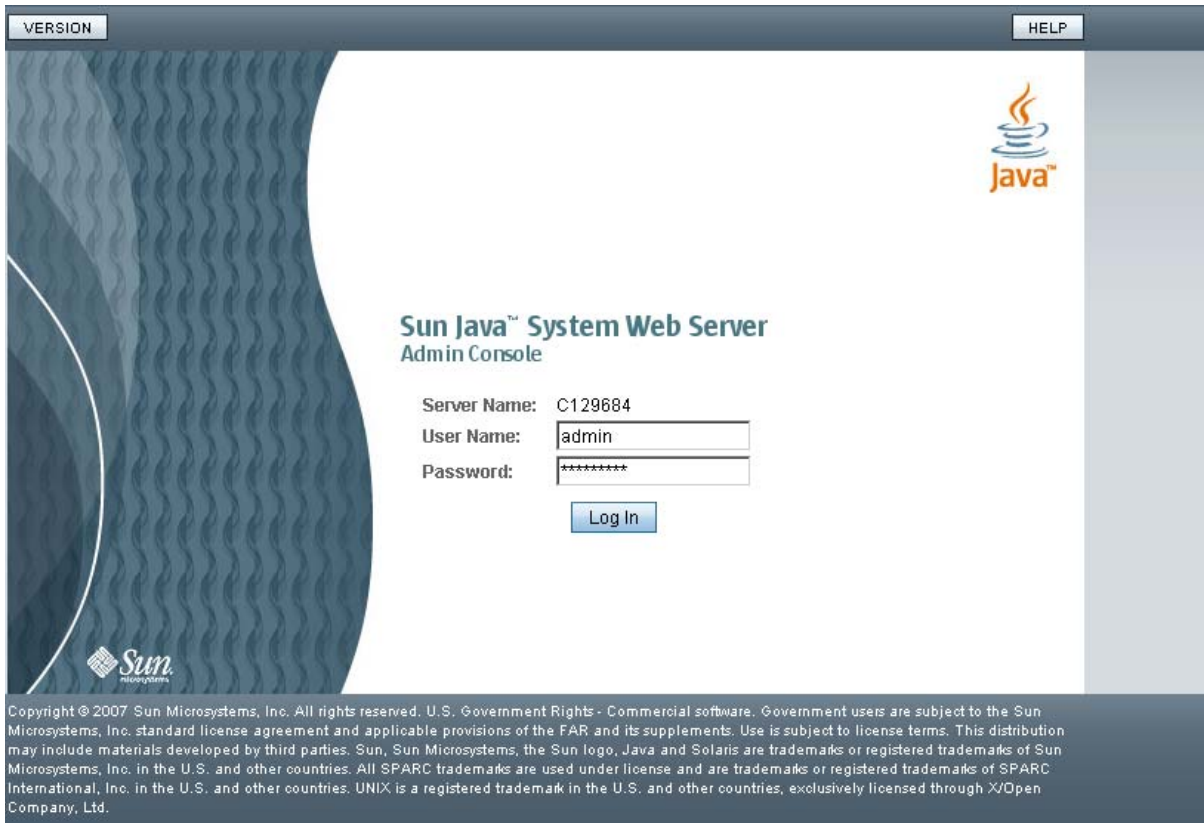
```
sudo /opt/webserver7/admin-server/bin/startserv
```

Note – Wait several minutes for the server to start.

2. Open a Web browser, and in the Location Bar or Address field enter the URL you wrote down at the end of the previous procedure (“[Install the Sun Java System Web Server](#)”). This will start the Admin Console.
3. In the popup, accept the server certificate, and click OK.




4. In the Web browser where you opened the Admin Console URL, enter the admin User Name and Password, and click Log in.



The screenshot shows the Sun Java System Web Server Admin Console login interface. At the top, there are two buttons: 'VERSION' on the left and 'HELP' on the right. The main content area features the Java logo in the top right corner. The title 'Sun Java™ System Web Server Admin Console' is centered. Below the title, the 'Server Name' is displayed as 'C129684'. The 'User Name' field contains 'admin', and the 'Password' field is masked with asterisks. A 'Log In' button is positioned below the password field. The Sun Microsystems logo is located in the bottom left corner. A copyright notice is visible at the bottom of the page.

VERSION HELP




Sun Java™ System Web Server
Admin Console

Server Name: C129684

User Name:

Password:



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5. The Common Tasks screen appears.

The screenshot shows the Sun Java System Web Server administration interface. At the top, there is a navigation bar with buttons for HOME, REFRESH, and LOG OUT. Below this, the user information 'User: admin Server: C129684' and the title 'Sun Java™ System Web Server' are displayed. A secondary navigation bar contains tabs for Common Tasks, Configurations, Nodes, Server Certificates, and Monitoring. The 'Common Tasks' tab is active, showing a sub-header 'Common Tasks' and a help link. The main content area is divided into three sections: 'Configuration Tasks', 'Virtual Server Tasks', and 'Documentation'. Each section contains a list of tasks with an information icon. The 'Add Web Application' task under 'Virtual Server Tasks' is highlighted.

VERSION

HOME REFRESH LOG OUT

User: admin Server: C129684

Sun Java™ System Web Server

Common Tasks Configurations Nodes Server Certificates Monitoring

Common Tasks

To access information about a task, select the "i" info button. To understand the terminology, [click here](#).

Configuration Tasks

Select Configuration: C129684.louisville.stortek.com

- Edit Configuration
- New Instance
- Start/Stop Instances
- Edit Java Settings
- Request Server Certificate
- Install Server Certificate
- View Summary
- New Configuration
- Migrate
- View Logs

Virtual Server Tasks

Select Virtual Server: C129684.louisville.stortek.com

- Edit Virtual Server
- Add Web Application
- Document Directories
- CGI Directories
- URL Redirects
- View Summary
- New Virtual Server

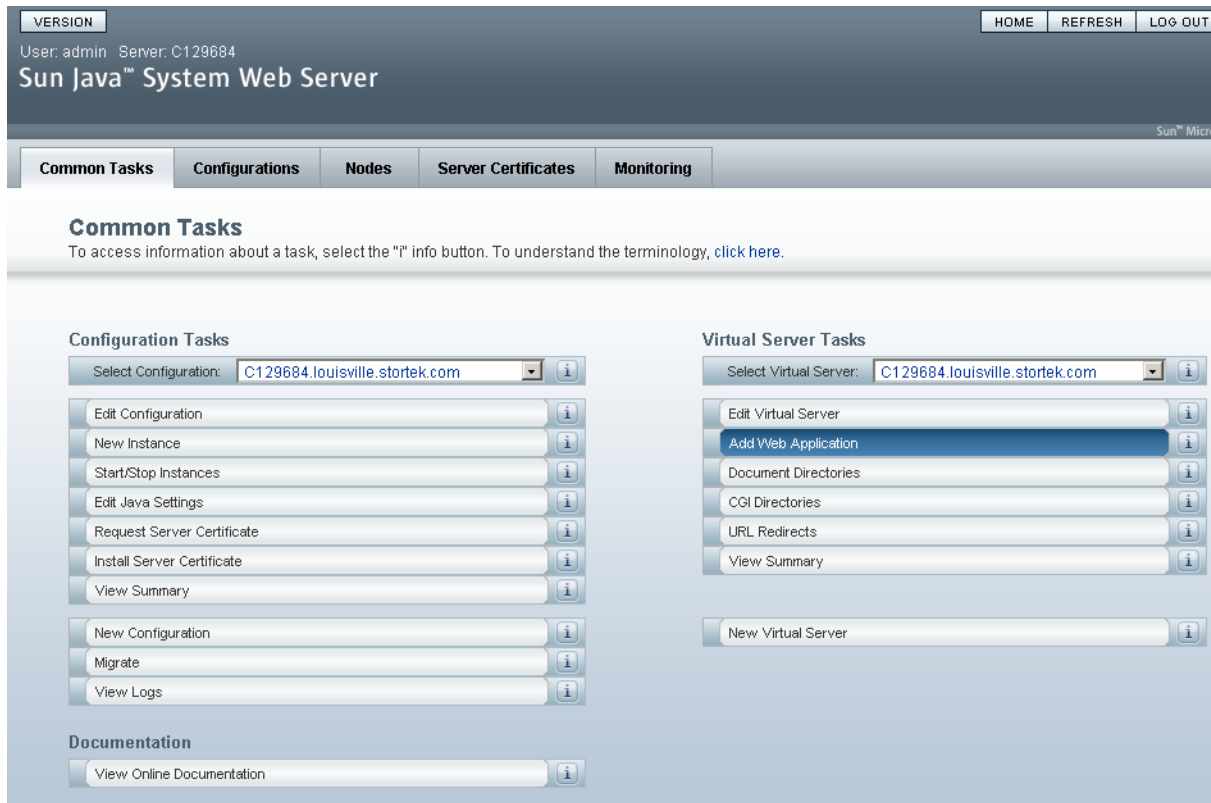
Documentation

- View Online Documentation

▼ Install and Deploy the Web-launched SL Console

Note – Before you perform this activity, you must obtain the Web-launched SL Console installation CD.

1. On the server, insert the Web-launched SL Console installation CD in the CD drive.
2. Log in to the Sun Java System Web Server administration console. See “Log in to the Java System Web Server Administration Console” on page 376 for details.
3. On the Common Tasks screen, click Add Web Application.



4. On the Add Web Application screen, make the following entries:
 - **Web Application Location:** Click the **Browse** button and browse to the location of the `opel.war` file on the installation CD.
 - **URI:** Type `/opel`
 - Leave all other fields as the defaults.

- Click OK.

Sun Java™ System Web Server

Add Web Application

Add Web Application from this page. You can add a web application archive (.war file) or specify the web application path in the server.

* Indicates required field

Virtual Server:	C129684.louisville.stortek.com
Web Application Location:	<input checked="" type="radio"/> Specify a package file to upload to the Web Server. <input type="text" value="C:\SLC_WebLaunch\opel.war"/> <input type="button" value="Browse..."/>
	<input type="radio"/> Specify a package file or a directory path that must be accessible from the server. <input type="text"/>
* URI:	<input type="text" value="/opel"/> Specify the URI for your web application. This will be the application's context root and is relative to the server host
Target Directory:	<input checked="" type="radio"/> Default <input type="radio"/> This directory <input type="text"/> Directory to deploy the web application
Description:	<input type="text"/> Provide a short description about the application
JSP Pre-compilation:	<input type="checkbox"/> Enabled Enabling this directive will allow all the JSPs present in the web application to be pre-compiled to improve performance

5. On the Web Applications screen, click Save.

Configurations > C129684.louisville.stortek.com > Virtual Servers > C129684.louisville.stortek.com

Server Settings **Web Applications** Content Handling WebDAV Search Access Control Summary

C129684.louisville.stortek.com - Virtual Server Web Applications

Save

This page lets you add web applications to the virtual server. Web applications are added as web archive (.war) files. After adding the web application you need to deploy the configuration to propagate the added web applications to the instances. The page also allows you to set single signon properties.

Single Signon Web Applications

Single Signon

Single Signon: Enabled

Session Idle Timeout: seconds (0.001 - 3600)

Timeout after which user's single sign-on records becomes eligible for purging if no activity is seen (Use -1 for no timeout)

[Back to top](#)

Web Applications

Web Applications (1)			
URI	Enabled	Deployed Path	Description
<input checked="" type="checkbox"/> /opel	true	..web-app/C129684.louisville.stortek.com/opel	

[Back to top](#)

Save

- On the updated Web Applications screen, click the Deployment Pending link in the upper-right corner.

VERSION

User: admin Server: C129684

Sun Java™ System Web Server

HOME REFRESH LOG OUT HELP

Deployment Pending
Instance(s) Running 0
Instance(s) Stopped 1

Java

Sun Microsystems, Inc.

Configurations > C129684.louisville.stortek.com > Virtual Servers > C129684.louisville.stortek.com

Server Settings Web Applications Content Handling WebDAV Search Access Control Summary

Web Application Properties Saved Successfully

C129684.louisville.stortek.com - Virtual Server Web Applications

Save

This page lets you add web applications to the virtual server. Web applications are added as web archive (.war) files. After adding the web application you need to deploy the configuration to propagate the added web applications to the instances. The page also allows you to set single signon properties.

Single Signon Web Applications

Single Signon

Single Signon: Enabled

Session Idle Timeout: seconds (0.001 - 3600)

Timeout after which user's single sign-on records becomes eligible for purging if no activity is seen. (Use -1 for no timeout)

Back to top

Web Applications

Web Applications (1)			
	URI	Enabled	Deployed Path
<input type="checkbox"/>	/opel	true	..web-app/C129684.louisville.stortek.com/opel

- On the Configuration Deployment screen, click Deploy.



Configuration Deployment

Deploying configuration to all instances.


Deployment Pending
The configuration C129684.louisville.stortek.com has changed locally. Click on "Deploy..." to propagate the changes to all instances

Deploy... Cancel

8. On the Results screen, click Close.

Sun Java™ System Web Server

Results

 The configuration has been deployed successfully to all available nodes.

Close

9. The Web Applications screen displays a message that the application has been added successfully.

VERSION HOME REFRESH LOG OUT HELP

User: admin Server: C129684

Sun Java™ System Web Server

Instance(s) Running 0
Instance(s) Stopped 1

Sun™ Microsystems, Inc.

Configurations > C129684.louisville.stortek.com > Virtual Servers > C129684.louisville.stortek.com

Server Settings **Web Applications** Content Handling WebDAV Search Access Control Summary

Web Application Added Successfully

C129684.louisville.stortek.com - Virtual Server Web Applications

Save

This page lets you add web applications to the virtual server. Web applications are added as web archive (.war) files. After adding the web application you need to deploy the configuration to propagate the added web applications to the instances. The page also allows you to set single signon properties.

Single Signon Web Applications

Single Signon

Single Signon: Enabled

Session Idle Timeout: seconds (0.001 - 3600)

Timeout after which user's single sign-on records becomes eligible for purging if no activity is seen (Use -1 for no timeout)

[Back to top](#)

Web Applications

Web Applications (1)				
New... Enable Disable Update... Delete				
<input checked="" type="checkbox"/>	URI	Enabled	Deployed Path	Description
<input type="checkbox"/>	/opel	true	..web-app/C129684.louisville.stortek.com/opel	

You can click the **Home** button in the upper-right corner to return to the Common Tasks screen.

▼ Start the Web-launched SL Console

1. Log in to the Sun Java System Web Server administration console. See [“Log in to the Java System Web Server Administration Console”](#) on page 376 for details.
2. On the Common Tasks screen, click Start/Stop Instances.

The screenshot shows the Sun Java System Web Server administration console. At the top, there is a navigation bar with tabs for 'Common Tasks', 'Configurations', 'Nodes', 'Server Certificates', and 'Monitoring'. The 'Common Tasks' tab is selected. Below the navigation bar, the 'Common Tasks' section is displayed. It includes a header with the text 'Common Tasks' and a sub-header 'To access information about a task, select the "i" info button. To understand the terminology, [click here](#).' The main content area is divided into three sections: 'Configuration Tasks', 'Virtual Server Tasks', and 'Documentation'. Each section contains a list of tasks, each with an 'i' info button. The 'Start/Stop Instances' task in the 'Configuration Tasks' section is highlighted. The 'Documentation' section contains a single task 'View Online Documentation'.

VERSION

HOME REFRESH LOG OUT HELP

User: admin Server: C129684

Sun Java™ System Web Server

Sun™ Microsystems, Inc.

Common Tasks Configurations Nodes Server Certificates Monitoring

Common Tasks

To access information about a task, select the "i" info button. To understand the terminology, [click here](#).

Configuration Tasks

Select Configuration: C129684.louisville.stortek.com

- Edit Configuration
- New Instance
- Start/Stop Instances**
- Edit Java Settings
- Request Server Certificate
- Install Server Certificate
- View Summary
- New Configuration
- Migrate
- View Logs

Virtual Server Tasks

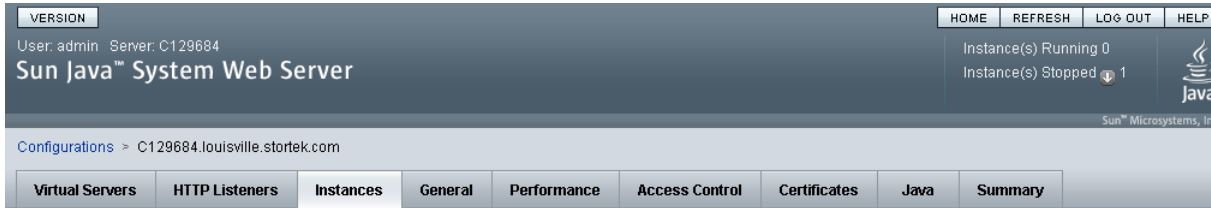
Select Virtual Server: C129684.louisville.stortek.com

- Edit Virtual Server
- Add Web Application
- Document Directories
- CGI Directories
- URL Redirects
- View Summary
- New Virtual Server

Documentation

- View Online Documentation

3. On the Configuration Instances screen, click the checkbox next to the local instance of the Web-launched SL Console server, and click Start.



The screenshot shows the Sun Java System Web Server configuration interface. At the top, it displays 'VERSION', 'User: admin', and 'Server: C129684'. The main title is 'Sun Java™ System Web Server'. On the right, there are navigation buttons: HOME, REFRESH, LOG OUT, and HELP. Below these, it shows 'Instance(s) Running 0' and 'Instance(s) Stopped 1'. A breadcrumb trail indicates 'Configurations > C129684.louisville.stortek.com'. A horizontal menu contains tabs for Virtual Servers, HTTP Listeners, Instances, General, Performance, Access Control, Certificates, Java, and Summary.

C129684.louisville.stortek.com - Configuration Instances

[View Logs...](#)

Instance refers to the environment of a web server daemon on a given node, including its configuration, log files and other runtime artifacts such as lock databases, caches and temporary files. An instance can be started, stopped, dynamically re-configured or deleted. You can perform all these actions from this page. The View Server Logs button brings up a popup that displays the logs for the instances on various nodes. If there are no instances, then the button is disabled.

Instances (1)		
Instance	Node	Instance State
<input checked="" type="checkbox"/> https-C129684.louisville.stortek.com	c129684.louisville.stortek.com	Not Running

The Web-launched SL Console application instances are started, and screen with a progress bar is displayed.

4. On the Results screen, click Close.



Results

i Instance(s) Started Successfully

Close

▼ Update the Web-launched SL Console

You can update the Web-launched SL Console while it is running. Updates are automatically propagated to the clients when they retrieve the Web-launched SL Console application from the server.

Note – Before you perform this activity, you must obtain the Web-launched SL Console update CD.

1. On the server, insert the Web-launched SL Console update CD in the CD drive.
2. Log in to the Sun Java System Web Server administration console. See “[Log in to the Java System Web Server Administration Console](#)” on page 376 for details.
3. On the Common Tasks screen, click **Edit Virtual Server**.

The screenshot displays the Sun Java System Web Server administration console interface. At the top, there is a navigation bar with buttons for HOME, REFRESH, and LOG OUT. Below this, the user information 'User: admin Server: C129684' and the title 'Sun Java™ System Web Server' are visible. A secondary navigation bar contains tabs for Common Tasks, Configurations, Nodes, Server Certificates, and Monitoring. The main content area is titled 'Common Tasks' and includes a sub-header: 'To access information about a task, select the "i" info button. To understand the terminology, [click here](#).' The interface is divided into two columns: 'Configuration Tasks' and 'Virtual Server Tasks'. The 'Configuration Tasks' column lists: Edit Configuration, New Instance, Start/Stop Instances, Edit Java Settings, Request Server Certificate, Install Server Certificate, View Summary, New Configuration, Migrate, and View Logs. The 'Virtual Server Tasks' column lists: Edit Virtual Server (highlighted), Add Web Application, Document Directories, CGI Directories, URL Redirects, View Summary, and New Virtual Server. Each task item has an information icon (i) to its right. At the bottom, there is a 'Documentation' section with a 'View Online Documentation' link.

4. On the General Properties screen, click the Web Applications tab.

The screenshot shows the Sun Java System Web Server Administration Console. At the top, it displays the user 'admin' and server 'C129684'. The main title is 'Sun Java™ System Web Server'. On the right, there are buttons for 'HOME', 'REFRESH', 'LOG OUT', and 'HELP', along with status indicators for 'Instance(s) Running 1' and 'Instance(s) Stopped 0'. Below the title bar, a breadcrumb trail reads 'Configurations > C129684.louisville.stortek.com > Virtual Servers > C129684.louisville.stortek.com'. A navigation menu includes 'Server Settings', 'Web Applications', 'Content Handling', 'WebDAV', 'Search', 'Access Control', and 'Summary'. Under 'Server Settings', there are sub-tabs for 'General', 'Log Preferences', 'Monitoring Settings', and 'Request Limits'. The main content area is titled 'C129684.louisville.stortek.com - Virtual Server General Properties' and includes a 'Save' button. A descriptive paragraph explains that virtual servers have one or more HTTP Listeners. Below this are expandable sections for 'General', 'Quality of Service', 'P3P Settings', 'HTTP Listeners', 'Localization', and 'Variables'. The 'General' section is expanded, showing fields for 'Name' (C129684.louisville.stortek.com), 'Virtual Server' (checked 'Enabled'), 'Document Root' (./docs), and 'Hosts' (C129684.louisville.stortek.com). A 'Back to top' link is at the bottom.

5. On the Web Applications screen, click the checkbox next to the /opel URI, and click Update.

The screenshot shows the Sun Java System Web Server Administration Console with the 'Web Applications' tab selected. The breadcrumb trail is 'Configurations > C129684.louisville.stortek.com > Virtual Servers > C129684.louisville.stortek.com'. The navigation menu is the same as in the previous screenshot. The main content area is titled 'C129684.louisville.stortek.com - Virtual Server Web Applications' and includes a 'Save' button. A descriptive paragraph explains that this page is used to add web applications to the virtual server. Below this are expandable sections for 'Single Signon' and 'Web Applications'. The 'Web Applications' section is expanded, showing a table with one entry. The table has columns for 'URI', 'Enabled', 'Deployed Path', and 'Description'. The entry for '/opel' has a checked checkbox in the 'URI' column and 'true' in the 'Enabled' column. A 'Back to top' link is at the bottom.

6. On the Update Web Application screen, make the following entries:

- **Web Application Location:** Click the **Browse** button and browse to the location of the `opel.war` file on the update CD.
- Leave all other fields as the defaults.
- Click **OK**.

Sun Java™ System Web Server

Update Web Application

Update Web Application from this page. You can specify a new web application archive(.war file).

Virtual Server:	C129684.louisville.stortek.com
URI:	/opel
Target Directory:	..web-app/C129684.louisville.stortek.com/opel
Web Application Location:	<input checked="" type="radio"/> Specify a package file to upload to the Web Server. <input type="text" value="C:\SLC_WebLaunch\opel.war"/> <input type="button" value="Browse..."/> <input type="radio"/> Specify a package file that must be accessible from the server. <input type="text"/>
JSP Pre-compilation:	<input type="checkbox"/> Enabled Enabling this directive will allow all the JSPs present in the web application to be pre-compiled to improve performance

The server update begins, and screen with a progress bar is displayed.

7. On the Web Applications screen, click the Deployment Pending link in the upper right corner.

The screenshot shows the Sun Java System Web Server administration interface. At the top, there is a navigation bar with 'HOME', 'REFRESH', 'LOG OUT', and 'HELP' buttons. Below this, the user is identified as 'admin' on server 'C129684'. The main title is 'Sun Java™ System Web Server'. On the right, there is a status section showing 'Deployment Pending' with a warning icon, 'Instance(s) Running 1', and 'Instance(s) Stopped 0'. Below the navigation bar, there are tabs for 'Server Settings', 'Web Applications', 'Content Handling', 'WebDAV', 'Search', 'Access Control', and 'Summary'. A yellow message box in the center reads 'Web Application Updated Successfully'. Below this, the page title is 'C129684.louisville.stortek.com - Virtual Server Web Applications' with a 'Save' button. The main content area has a breadcrumb trail: 'Single Signon > Web Applications'. Under 'Single Signon', there is a checkbox for 'Single Signon' which is currently unchecked, and a 'Session Idle Timeout' of '300' seconds. Below this is a 'Web Applications' section with a table header 'Web Applications (1)' and buttons for 'New', 'Enable', 'Disable', 'Update', and 'Delete'.

8. On the Configuration Deployment screen, click Deploy.


The screenshot shows the 'Configuration Deployment' screen. At the top, there is a dark header with 'Sun Java™ System Web Server'. Below this, the title is 'Configuration Deployment' with the subtitle 'Deploying configuration to all instances.' A yellow message box in the center contains a warning icon and the text 'Deployment Pending' followed by 'The configuration C129684.louisville.stortek.com has changed locally. Click on "Deploy..." to propagate the changes to all instances'. At the bottom right, there are two buttons: 'Deploy...' and 'Cancel'.

The deployment begins, and screen with a progress bar is displayed.

9. In the Results screen, click Close to return to the Web Applications screen.

Sun Java™ System Web Server

Results

 The configuration has been deployed successfully to all available nodes.

Close

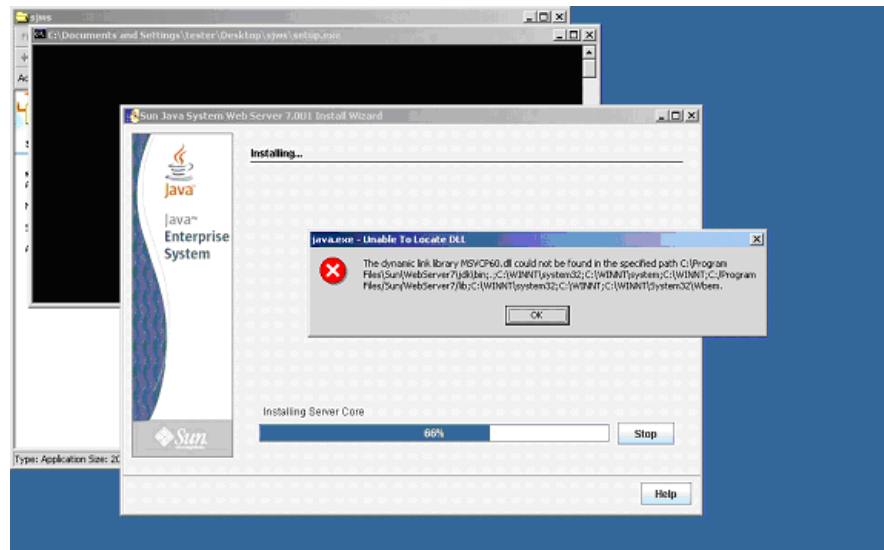
Common Problems and Solutions

This section describes solutions to some common problems with the installation and maintenance of the Java System Web Server.

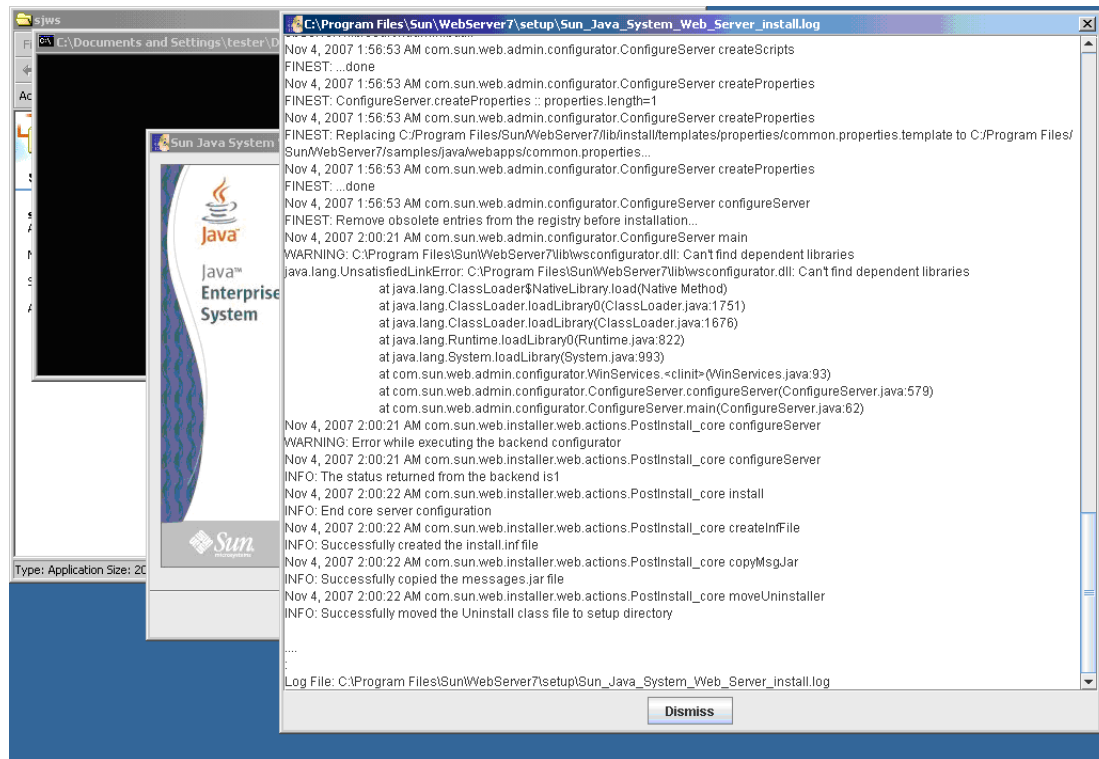
Windows 2000 Sun Java System Web Server Installation Errors

Windows MSVCP60.dll Error

If you are installing on a Windows 2000 platform that does not include the Microsoft Visual C v6 runtime DLL, MSVCP60 . dll, during installation you will see errors similar to the following:



The Web server installation log will include errors similar to the following:



▼ Remedy for Windows MSVCP60.dll Error

Use this procedure to solve the Windows MSVCP60.dll error.

1. Perform a Web search for the following string:

msvc60.dll download

2. Download the DLL file to the /winnt/system32 directory.

3. Delete the directory where you partially installed the Java System Web Server on the failed installation.

4. Repeat the Java System Web Server installation from the beginning.

The installation should complete successfully with no recurrence of the error.

▼ Solaris 9 & 10 Sun Java System Web Server Installation Errors

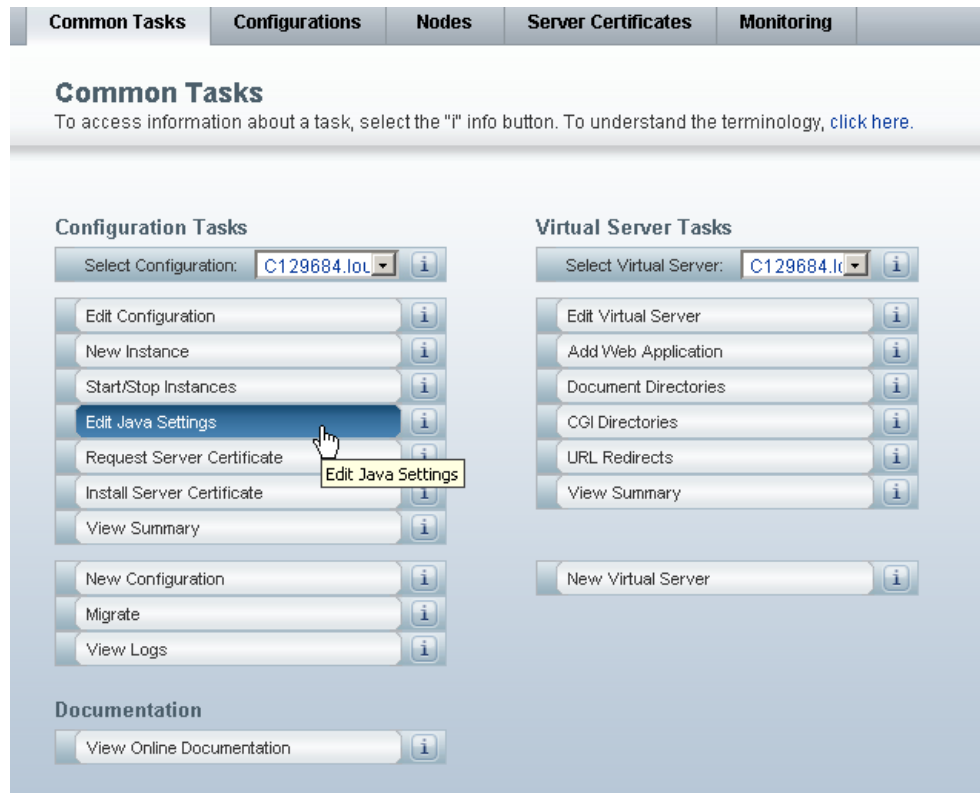
Java Home Error

If you cannot start the server instance and you see errors claiming your HotSpot start failed and your JVM could not be found, you need to change the Java Home configuration of your Sun Java System Web Server.

▼ Remedy for Solaris Java Home Error

Use this procedure to solve the Java Home error.

1. Log in to the Sun Java System Web Server administration console. See [“Log in to the Java System Web Server Administration Console”](#) on page 376 for details.
2. Select Home > Common Tasks.
3. Under Configuration Tasks, click Edit Java Settings.



4. In Java Home, enter the directory where your JDK/JRE is installed. For example:

`/usr/java`

The screenshot shows the Sun Java System Web Server administration interface. At the top, there's a header with 'VERSION', 'HOME', 'REFRESH', 'LOG OUT', and 'HELP' buttons. Below that, it displays 'User: admin Server: C129684' and 'Sun Java™ System Web Server'. On the right, it shows 'Instance(s) Running 0' and 'Instance(s) Stopped 1' with a dropdown arrow. The Java logo and 'Sun™ Microsystems, Inc.' are also present. The main navigation area includes tabs for 'Virtual Servers', 'HTTP Listeners', 'Instances', 'General', 'Performance', 'Access Control', 'Certificates', 'Java', and 'Summary'. Under the 'Java' tab, there are sub-tabs for 'General', 'JVM Settings', 'Resources', 'Lifecycle Modules', 'Authentication', 'Servlet Container', and 'Session Replication'. The current page is titled 'C129684.louisville.stortek.com - JVM General Settings' and has a 'Save' button.

C129684.louisville.stortek.com - JVM General Settings

Save

Enable Java for the selected configuration and view the server class path settings from this page.

General Path Settings

* Indicates required field

General

Enable Java: Enabled

* Java Home:

Location of the JDK

Sticky Attach: Enabled

Whether the server attaches each HTTP request processing thread to the JVM only once

Note – You may also need to change permissions on the top-level directory where you installed the Sun Java System Web Server. In order for a non-root user to start a server instance, the user must be able to write to the server directory. For example, if you installed the server to the top-level directory `/opt/webserver7`, the user starting the server instance must be able to write to this directory and the `https-server_name` directory beneath it. For additional information see the Sun Java System Web Server site.

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