

# StorageTek SL500 Modular Library System

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User's Guide

E21059-04

**ORACLE**

Part Number: E21059-04  
November 2012

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# Contents

<b>Contents</b> .....	i
<b>List of Figures</b> .....	xi
<b>List of Tables</b> .....	xiii
<b>Summary of Changes</b> .....	xv
Current Version: E21059-04, November 2012 .....	xv
Revision History .....	xv
Older Revisions .....	xvii
<b>Preface</b> .....	1
Audience .....	1
Access to Oracle Support .....	1
Obtaining Customer Documentation .....	1
<b>1 SL500 Introduction</b> .....	1
SL500 Features .....	2
Hardware Component Views and Locations .....	3
Library Interfaces and Controls .....	5
Host Interfaces .....	5
Library Management Interfaces .....	6
Mechanical Controls and Indicators .....	8
Drives, Cartridges, and Related Features .....	10
LTO Supported Tape Drives .....	10
SL500 Drive Trays .....	10
Hot Swapping .....	10
Library Configurations and Capacities .....	11
LTO Library Configurations .....	11
Mixed-Media Library Configurations .....	14
Library Components .....	17
Cartridge Access Ports .....	17
Robotics .....	17
Power Supplies .....	19
Cooling Fans .....	19
Library Controller Card (RLC) .....	20
Single-Port Fibre Channel Interface Card (MPU2) .....	21
Dual-Port Fibre Channel Interface Card (PUA2) .....	21
Parallel SCSI Interface Card (RLW) .....	21
Safety Features .....	22
Tape Management Software .....	22

<b>2</b>	<b>StorageTek Library Console</b>	23
	Using the SL Console	23
	SL Console Modes	24
	SL Console Security	24
	User IDs	24
	Activation Password	24
	Automatic Logout	25
	SL Console Screen Display	25
	Modifying the Screen Layout	27
	Synchronizing the Display With the Controller Database	27
	SL Console Reports	28
	Report Types	28
	Report Options Bar	29
	Report Procedures	29
	SL Console Help	30
	Navigating Help	30
	Tips for Using the SL Console Help	32
	Web-launched SL Console	33
	Security Considerations	33
	Client Requirements	33
	Web-launched SL Console Updates	33
	Starting the Web-launched SL Console on a Client	34
	Standalone SL Console	34
	Security Considerations	34
	Installation Requirements	34
	Standalone SL Console Updates	35
	SL Console Task Summary	36
	General SL Console Usage Tasks	37
	Log in to the Web-launched SL Console	38
	Log in to the Web-launched SL Console Using an Icon	41
	Log in to the Standalone SL Console	43
	Log Off the SL Console	44
	Change a User Password	45
	General SL Console Report Tasks	46
	Display a Library Report	47
	Search a Library Report	48
	Save Library Report Data to a File	49
	Standalone SL Console Installation Tasks	50
	Download the Standalone SL Console Media Pack	51
	Install the Standalone SL Console	52
<b>3</b>	<b>Capacity on Demand</b>	55
	Capacity on Demand Features and Restrictions	55
	Planning Library Capacity	56
	Cell Assignment Rules	57
	Orphaned Cartridges in Non-Partitioned Libraries	58
	Implementing Changes to Activated Capacity	58
	Increasing Activated Capacity	58

Decreasing Activated Capacity .....	58
Host Notification of Capacity Changes .....	59
<b>4 Hardware Activation Files .....</b>	<b>61</b>
Customer-Activated Features .....	61
Oracle Hardware Activation Files .....	61
Downloading Oracle Hardware Activation Files .....	62
Legacy Hardware Activation Files .....	62
Hardware Activation File Installation Process .....	63
Hardware Activation Tasks.....	64
Download a New Hardware Activation File .....	65
Install a New Hardware Activation File on the Target Library .....	67
Display Current Hardware Activation Files .....	69
Delete a Hardware Activation File .....	70
Display the Feature Audit Log .....	72
Hardware Activation Screen Reference .....	73
Hardware Activation > Current Hardware Activation Keys .....	74
Hardware Activation > Install Hardware Activation Keys .....	77
Reports > Feature Audit Log .....	80
<b>5 Library Partitioning .....</b>	<b>83</b>
Benefits of Partitioning.....	84
Partitioning Concepts and Features .....	84
Allocation .....	84
Partitions Available .....	84
Smallest Partition Unit .....	85
Host Control of Partitions .....	85
Sharing CAPs Between Hosts/Partitions .....	85
Allocating Storage Cells and Drives to a Partition .....	86
Allocating CAPs to Partitions .....	86
Orphaned Cartridges in Partitioned Libraries .....	87
Planning for Partitioning .....	87
Allocated Storage Capacity .....	88
Partition Configurations .....	88
Preparing the Library for Partitioning.....	92
Activating the Partitioning Feature .....	92
Enabling and Disabling the Partitioning Feature .....	92
Deleting the Partitioning Feature .....	92
Library Resource Addresses .....	93
Library Internal Address .....	93
Host SCSI Element Address .....	93
Partition Process Overview .....	95
SL Console Partition Workspace .....	95
Partitioning Task Categories .....	97
Partition Configuration Tasks .....	98
Review Partitioning Instructions .....	99
Add a Partition .....	100
Add a Host Connection (Unbridged Libraries Only) .....	101
Design a Partition .....	102
Verify Partition Configurations .....	107

Resolve Orphaned Cartridges .....	110
Commit Partition Configuration Changes .....	111
Partition Management Tasks .....	114
Modify Partition Summary Information .....	115
Delete a Partition .....	116
Modify FC-SCSI Host-Partition Connection Detail (Unbridged Libraries Only) .....	117
Delete a FC-SCSI Host Connection (Unbridged Libraries Only) .....	119
Refresh the SL Console Partition Workspace .....	121
Reallocate Library Resources .....	122
Make a Hardware Change to a Partitioned Library .....	123
Partition Report Tasks.....	124
Display a Partition Report .....	125
Print Partition Report Data .....	127
Save Partition Report Data .....	128
CAP Operation Tasks.....	129
Enter Cartridges Into a Partitioned Library .....	130
Eject Cartridges From a Partitioned Library .....	133
Partition Screen Reference.....	136
Partition Summary Screens .....	137
Partitions—Instructions (Step 1) .....	138
Partitions—Summary (Step 2) .....	140
Partitions—Summary (Step 2)—Add Connection (Unbridged Libraries Only) .....	146
Partitions—Summary (Step 2)—Delete Connection (Unbridged Libraries Only) .....	148
Partitions—Summary (Step 2)—Modify Connection (Unbridged Libraries Only) .....	150
Partitions—Summary (Step 2)—Add Partition .....	152
Partitions—Summary (Step 2)—Delete Partition .....	154
Partitions—Summary (Step 2)—Modify Partition .....	156
Partition Design and Commit Screens .....	158
Partitions—Design (Step 3) .....	159
Partitions—Design (Step 3)—Verify Results .....	165
Partitions—Commit (Step 4) .....	168
Partitions—Commit (Step 4)—Confirm Apply .....	170
Partition Report Screens.....	173
Partitions—Reports .....	174
Partitions—Reports—Cartridge Cell and Media Summary .....	176
Partitions—Reports—Host Connections Summary .....	179
Partitions—Reports—Orphaned Cartridge Report .....	184
Partitions—Reports—Partition Details .....	186
Partitions—Reports—Partition Summary .....	189
Partition CAP Operation Screens .....	193
Diagnostics > CAP—Assign CAP Button .....	194
<b>6 Library Management .....</b>	<b>197</b>
Automated Mode of Operation .....	197
Cartridge Mount and Dismount Activities .....	197
Determining When the Library is Not in Automated Mode .....	198
Library and Device Status .....	199
Communications Failures .....	200
Library Management Tasks.....	201
Display Library Status .....	202

Display Library Configuration Properties .....	203
Set Up an FC Control Path on an Unbridged Library .....	207
Display Library Controller Properties .....	208
Display Library Physical Configuration .....	209
Display Library SCSI Configuration .....	210
Display Library Statistics .....	213
Display the Library Utilization Reports .....	214
<b>7 Configuring Bridging Without Partitioning .....</b>	<b>217</b>
Designated Bridge Drive .....	217
Select a Bridge Drive .....	218
Bridging Configuration Screen Reference .....	220
Bridging—Instructions .....	221
Bridging—Bridge Drive Selection .....	222
<b>8 CAP Management .....</b>	<b>225</b>
CAPs .....	225
Additional CAP Information .....	225
CAP Management Tasks .....	226
Display CAP Summary Information .....	227
Display Current CAP Status .....	228
Display CAP Properties .....	229
<b>9 Drive Management .....</b>	<b>231</b>
Maximum Drive Capacity .....	231
Drive Identification .....	231
Drive States .....	231
Drive Management Tasks .....	232
Display Drive Summary Information .....	233
Display Drive Status .....	234
Display Drive Properties .....	235
Enable or Disable a Drive Port .....	237
Display Current Drive Mappings .....	238
Display Drive Mapping History .....	240
Display the Media Drive Events Report .....	242
Display the Drive Distribution Reports .....	244
Display the Drive Utilization Reports .....	246
Add or Edit Drive Tray Serial Number .....	248
<b>10 Cartridge Management .....</b>	<b>249</b>
Cartridge Labels .....	249
Entering Cartridges .....	249
Ejecting Cartridges .....	250
Locating Cartridges .....	250
Recovery Moves .....	250
Cartridge Management Tasks .....	252
Enter Cartridges Through the CAP .....	253
Eject Cartridges Through the CAP .....	255
List Library Cartridges .....	256
Move a Specified Cartridge by vol-id .....	258
Move a Cartridge From a Specified Location .....	260
<b>11 Drive Cleaning .....</b>	<b>263</b>

Library Auto Clean .....	263
Library Auto Clean Process Summary .....	263
Library Auto Clean Special Considerations .....	264
Cleaning Cartridge Management .....	265
Importing and Exporting Cleaning Cartridges .....	265
Cartridge Usage Count .....	265
Cleaning Cartridge Expiration .....	265
Manual Cleaning .....	266
Drive Cleaning Tasks .....	267
Configure Drive Auto Clean .....	268
Import Cleaning or Diagnostic Cartridges .....	269
Export Cleaning or Diagnostic Cartridges .....	271
Display Cleaning Cartridges .....	273
Display Drive Cleaning Status .....	275
Clean a Drive Manually .....	277
<b>12 Robot Management .....</b>	<b>279</b>
Parked Robot .....	279
Robot Procedures .....	279
Robot Monitoring Tasks .....	280
Display Robot Summary Information .....	281
Display Robot Status .....	282
Display Robot Statistics .....	283
<b>13 SL Console Diagnostics and Utilities .....</b>	<b>285</b>
Library Events .....	285
Event Monitors .....	285
Event Codes .....	287
Library Firmware Upgrades .....	289
Firmware Upgrade Process .....	289
Firmware Download Site .....	289
Multiple Versions of Firmware .....	289
Related Procedures .....	289
Library Self-Tests .....	290
Related Procedures .....	290
Diagnostic Cartridge Management .....	291
Audits .....	292
Audit Indicator .....	292
Physical Audit .....	292
Verified Audit .....	293
Related Procedures .....	293
Robot Diagnostic Moves .....	294
Target Address Range .....	294
Pool Address Range .....	294
Move Access Order .....	295
Diagnostic Move Control Functions .....	296
Related Procedures .....	296
Troubleshooting .....	297
Related Procedures .....	298

Diagnostic and Utility Tasks .....	299
Event Monitor Tasks .....	300
Display an Event Monitor .....	301
Spool Event Monitor Data to a File .....	302
Display Multiple Monitors .....	303
Library Utility Tasks .....	304
Download Code to the Library Controller .....	305
Activate Code on the Library Controller .....	306
Reboot the Library .....	308
Transfer the Library MIB File .....	309
Generate and Transfer the Library Log Snapshot File .....	311
Perform a Non-Disruptive Library Self-Test .....	313
Perform a Disruptive Library Self-Test .....	315
Audit Tasks .....	317
Audit the Entire Library .....	318
Audit a Range of Cells .....	320
Perform a Verified Audit .....	322
Drive Utility Tasks.....	324
Perform a Drive Self Test .....	325
Reboot a Drive .....	326
Robot Utility Tasks .....	327
Define a Diagnostic Move .....	328
Manage Diagnostic Move Definitions .....	333
Save a Diagnostic Move to a File .....	335
Start a Diagnostic Move .....	338
Monitor and Control Open Diagnostic Moves .....	340
<b>14 SNMP Configuration with SL Console .....</b>	<b>343</b>
Supported Versions of SNMP .....	343
SNMP Configuration Requirements .....	343
Trap Numbering/Levels .....	343
Port Control .....	344
Access Control .....	345
SNMP Configuration and Usage Tasks.....	346
Add SNMP Users .....	347
Delete SNMP Users .....	349
Add Trap Recipients .....	350
Delete Trap Recipients .....	352
Set Up Port Control .....	353
<b>15 Manual Operations .....</b>	<b>355</b>
Library Safety .....	355
Cards and Power Supply .....	355
Robotics .....	355
Front Door .....	355
Manual Operation Tasks .....	356
General Library Operation Tasks .....	357
Power Off the Library .....	358
Power On the Library .....	359
Return the Library to Ready Status .....	360
Open the Front Door (With Power) .....	361
Open the Front Door (Without Power) .....	362
Secure the Front Door (With Power) .....	364

Secure the Front Door (Without Power) .....	364
Cartridge Handling Tasks .....	365
Locate and Remove a Cartridge .....	366
Insert Cartridges into Storage Cells .....	367
Insert a Cartridge into a Tape Drive .....	368
Remove a Cartridge from a Tape Drive .....	369
Remove a Cartridge from the Gripper Assembly .....	370
Replace a Cleaning Cartridge .....	372
<b>A SL500 Wall Diagrams and Specifications .....</b>	<b>373</b>
LTO Configurations .....	374
Mixed-Media Configurations .....	379
Specifications .....	382
Power Specifications .....	385
<b>B Cartridge Handling .....</b>	<b>387</b>
Software Support for Cartridges .....	387
Barcode Label Standard .....	387
Cartridge Types .....	388
Cleaning and Diagnostic Cartridges .....	388
Supported Labels .....	388
Labels for LTO Cartridges .....	389
Labels for DLT and SDLT Cartridges .....	389
Handling Cartridges .....	390
Inspecting a Cartridge .....	390
Inserting a Cartridge in a Drive or Cell .....	391
Cleaning the Cartridge Exterior .....	391
Storing Cartridges .....	391
Cartridge Handling Tasks .....	392
Apply a Label to a Cartridge .....	393
<b>C Web-launched SL Console Server .....</b>	<b>395</b>
Security Considerations .....	395
Updating the Web-launched SL Console Server .....	395
Download the SL Console Media Pack .....	396
<b>D Controlling Contaminants .....</b>	<b>401</b>
Environmental Contaminants .....	401
Required Air Quality Levels .....	401
Contaminant Properties and Sources .....	402
Operator Activity .....	403
Hardware Movement .....	403
Outside Air .....	403
Stored Items .....	403
Outside Influences .....	403
Cleaning Activity .....	404
Contaminant Effects .....	404
Physical Interference .....	404
Corrosive Failure .....	404
Shorts .....	405

Thermal Failure .....	405
Room Conditions .....	405
Exposure Points .....	406
Filtration .....	407
Positive Pressurization and Ventilation .....	408
Cleaning Procedures and Equipment .....	408
Daily Tasks .....	409
Weekly Tasks .....	409
Quarterly Tasks .....	410
Bi-Annual Tasks .....	410
Activity and Processes .....	411
<b>Index</b> .....	<b>413</b>



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## List of Figures

<b>FIGURE 1-1</b>	Front View of Library Hardware Components .....	3
<b>FIGURE 1-2</b>	Back View of Library Hardware Components .....	4
<b>FIGURE 1-3</b>	RLC Controller Card Faceplate .....	7
<b>FIGURE 1-4</b>	Buttons and Indicators .....	9
<b>FIGURE 1-5</b>	Robotics Components .....	18
<b>FIGURE 1-6</b>	Hand Assembly .....	19
<b>FIGURE 1-7</b>	RLC Library Controller Card LED Indicators .....	20
<b>FIGURE 1-8</b>	The MPU2 Fibre Channel Interface Card Below the RLC .....	21
<b>FIGURE 1-9</b>	PUA2 Dual-Path Fibre Channel Interface Card .....	21
<b>FIGURE 1-10</b>	The RLW (MPW) SCSI Interface Card Below the RLC .....	21
<b>FIGURE 2-11</b>	SL Console Session Time Out Dialog Box .....	25
<b>FIGURE 2-12</b>	SL Console Login Retry Message .....	25
<b>FIGURE 2-13</b>	SL Console Screen Display .....	26
<b>FIGURE 2-14</b>	SL Console Help, Sample Screen .....	30
<b>FIGURE 2-15</b>	SL Console Help Navigation Buttons .....	31
<b>FIGURE 2-16</b>	Management Menu for Favorite Help Topics .....	32
<b>FIGURE 5-1</b>	Library Partition Example .....	90
<b>FIGURE 6-1</b>	SL Console Health Status Indicators .....	199
<b>FIGURE 10-1</b>	Sliding a Magazine into the CAP .....	253
<b>FIGURE 10-2</b>	Base Module Magazine Comparison .....	254
<b>FIGURE 15-1</b>	Robotics Park Lever Not in Parked Position .....	362
<b>FIGURE 15-2</b>	Opening the Front Door Without Power .....	363
<b>FIGURE 15-3</b>	Closing the Front Door Without Power .....	364
<b>FIGURE 15-4</b>	Inserting Mixed Media Cartridges into Arrays .....	367
<b>FIGURE 15-5</b>	Inserting SDLT and LTO Cartridges into Drives .....	368
<b>FIGURE 15-6</b>	Unload Button on IBM and HP LTO Tape Drives .....	369
<b>FIGURE 15-7</b>	Unload Button on SDLT Tape Drive .....	369
<b>FIGURE 15-8</b>	Removing Cartridge from Gripper Assembly .....	371
<b>FIGURE A-1</b>	Base Module LTO Cells .....	374
<b>FIGURE A-2</b>	LTO Cell Locations for Firmware Site Mapping .....	375
<b>FIGURE A-3</b>	LTO Cell Locations for SCSI Element Numbering Mapping .....	376
<b>FIGURE A-4</b>	LTO Cell Locations for SCSI Element Numbering Mapping .....	377
<b>FIGURE A-5</b>	LTO Cells for Back Wall of Cartridge Expansion Module .....	378
<b>FIGURE A-6</b>	Base Module Mixed-Media Cells .....	379
<b>FIGURE A-7</b>	Mixed-Media Firmware Cell Mapping .....	380
<b>FIGURE A-8</b>	Mixed-Media Cells for Back Wall of Cartridge Expansion Module .....	381
<b>FIGURE A-9</b>	Library and Rack Dimensions .....	383
<b>FIGURE A-10</b>	Library and Rack Clearances .....	384



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## List of Tables

<b>TABLE 1-1</b>	Description of Keypad Buttons and Indicators.....	9
<b>TABLE 1-2</b>	Physical LTO Storage Cell and Tape Drive Capacities .....	13
<b>TABLE 1-3</b>	Physical Mixed-Media Storage Cell and Tape Drive Capacities .....	15
<b>TABLE 1-4</b>	CAP Conditions .....	17
<b>TABLE 1-5</b>	RLC LED Indicator Descriptions .....	20
<b>TABLE 2-6</b>	SL Console Component Description .....	26
<b>TABLE 2-7</b>	SL Console Display Options .....	27
<b>TABLE 2-8</b>	SL Console Help, Navigation Buttons.....	31
<b>TABLE 2-9</b>	Web-launched SL Console Requirements .....	33
<b>TABLE 2-10</b>	Standalone SL Console Requirements.....	34
<b>TABLE 3-1</b>	LTO Activated Capacity by Module .....	56
<b>TABLE 3-2</b>	Mixed Media-Activated Capacity by Module .....	57
<b>TABLE 5-1</b>	Partition Example – Resource Description .....	91
<b>TABLE 13-1</b>	Event Codes.....	287
<b>TABLE 13-2</b>	Menu Options for Open Diagnostic Moves.....	296
<b>TABLE 13-3</b>	Troubleshooting Tips Prior to Running Diagnostic Tests .....	297
<b>TABLE 13-4</b>	Options for Managing Event Monitor Information .....	301
<b>TABLE 13-5</b>	Options for Opening and Managing Multiple Event Monitors .....	303
<b>TABLE 13-6</b>	Options for Defining Diagnostic Moves.....	334
<b>TABLE 13-7</b>	Diagnostic Status Indicators of Monitor Windows .....	341
<b>TABLE 13-8</b>	Functions Available in Diagnostic Monitor Windows .....	342
<b>TABLE 14-1</b>	SNMP Trap Levels .....	344
<b>TABLE A-1</b>	Cell Figure Legend.....	373
<b>TABLE A-2</b>	Power for Library Without Tape Drives.....	385
<b>TABLE A-3</b>	Power for Base Unit and Two LTO Tape Drives .....	385
<b>TABLE A-4</b>	Power for Drive Expansion Module and Four LTO Tape Drives .....	385
<b>TABLE B-1</b>	Labels for LTO Cartridges.....	389
<b>TABLE B-2</b>	Labels for DLT and SDLT Cartridges.....	390



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# Summary of Changes

## Current Version: E21059-04, November 2012

Update made to include changes for SL500 firmware 1283 and SL Console 6.0:

- Addition of drive tray serial number (see [“Add or Edit Drive Tray Serial Number” on page 248](#))
- Automatic time out of SL Console login after 6 hours beginning with SL Console 5.8 and FRS\_8.0 (see [“Automatic Logout” on page 25](#))
- Updated chapter on contaminants to include warning regarding use of chlorine and other chemicals (see [“Controlling Contaminants” on page 401](#))

## Revision History

### E21059-03 April 2012

Update made to mention use of the CLI by customers using StorageTek Tape Analytics.

### E21059-02, February 2012

Updates were made to support the new feature Generate Log Snapshot.

Other updates include:

- Moved the Transfer MIB File from the SNMP chapter to the SL Console Diagnostics chapter.
- Added screen captures to SNMP tasks.
- Added SL Console password limitations from 5-8 characters as of 4.50.
- Added a glossary.
- Edited the Partitioning chapter.
- Added section on finding customer documentation.

### Revision E21059-01, June 2011

Assigned a new Oracle document part number and revision number, E21059-01. Sun part number 96116 has been retired.

Updates:

- A revised and reorganized “SL500 Introduction” chapter includes updated specifications and descriptions of new features like the “Dual-Port Fiber Channel Interface Card (PUA2).
- New chapters “Capacity on Demand” and “Hardware Activation Files” explain new capacity management features.
- Download procedures have been revised for the Oracle E-Delivery website.
- The new “Library Partitioning” chapter explains how Partitioning is implemented.
- The new ADI bridging feature is described in the chapters “Configuring Bridging without Partitioning and Library Partitioning.
- A new appendix “Controlling Contaminants” explains the importance of minimizing airborne particulates and certain gases in areas where Oracle products are installed.

### **Revision KB, April 2010 (Sun Document Part Number: 96116)**

- Described new reports.
- Separated former Chapter 3, “SL500 Automated Library Operations” into multiple chapters on library management, CAP management, drive management, cartridge management, drive cleaning, and robot management.
- Updated company and product names.
- Nomenclature changes for “hardware activation files”.

### **Revision KA, July 2008**

Updated the following chapters for new License Management and Capacity on Demand features.

- Chapter 3, “Licensing” (new chapter)
- Chapter 4, “Capacity on Demand” (new chapter)
- Chapter 5, “Library Partitioning”

Major reorganization and enhancement of remaining chapters.

### **Revision K, February 2008**

Added information regarding the Library Partitioning feature:

- Chapter 1, “General Information”—Summary of library partitioning.
- Chapter 5, “Library Partitioning”—Detailed descriptions of the concepts, tasks, and SLC screens involved in library partitioning.

Added information regarding the Web-launched SL Console feature:

- Chapter 2, “StorageTek Library Console”—Detailed instructions for installing and using the Web-launched SL Console client.
- Appendix C, “Web-launched SL Console Server”—Detailed instructions for installing and managing the Web-launched SL Console server.

### **Revision J, May 2007**

Chapters 1 and 6: Added information regarding Quantum DLT-S4 drives/media and LTO Gen 4 drives/media. Library firmware must be version 1126 or later for support of these drives.

Appendix A:

- Revised Sun Support telephone numbers for U.S. and Canada.
- Added Web link to obtain telephone numbers for international Sun Support locations.

## Older Revisions

Refer to the edition for a description of the changes.

- Revision H, October 2006
- Revision G, July 2006
- Revision F, April 2006
- Revision E, December 2005
- Revision D, May 2005
- Revision C, January 2005
- Revision B, October 2004
- Revision A, September 2004 – Initial release.



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# Preface

This book is about Oracle's StorageTek SL500 modular library system hardware, StorageTek Library Console management software, and related operations. For specific drive information or for client application software commands, see the appropriate drive or software documentation.

## Audience

This guide is intended primarily for administrators and operators of Oracle's StorageTek SL500 modular library system. It can also be used by Oracle partners and support representatives.

## Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/support/contact.html> or visit <http://www.oracle.com/accessibility/support.html> if you are hearing impaired.

## Obtaining Customer Documentation

To access current product documentation for Tape Storage:

1. **Use Web browser to go to the following Web page:**  
<http://www.oracle.com/technetwork/documentation/tape-storage-curr-187744.html>  
The Tape Storage Products page opens.
2. **Find the appropriate section and its list of products.**
3. **To view a list of documents for a product, click "View Library."**  
A new page opens with a listing of all documents related to the product.
4. **To download the entire suite of documents for the product, click "Download."**  
A compressed archive file will download that contains the entire suite of documents for that product.
5. **To download a compressed archive file that contains the *entire suite* of documents, click the "Download" link.**



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## SL500 Introduction

This chapter provides an overview of the major hardware components of Oracle's StorageTek SL500 tape library and library specifications. The SL500 library provides a highly adaptable storage platform made to specifically consolidate, protect and retain customer information. The library protects a customer's investments by providing a cost-effective entry point and makes it easy to grow the library with expansion modules. Whether customers have a small remote site or a corporate data center, they can feel secure that the library can accommodate all of their current and future data storage needs.

The SL500 library is a self-contained, fully automated tape cartridge storage system that is scalable and mounts into a standard 483 mm (19 in.) rack. It is also available as a desk-top unit.

This chapter introduces you to the SL500 library and its components and configurations. This chapter includes the following topics:

- [“Library Interfaces and Controls” on page 5](#)
- [“Drives, Cartridges, and Related Features” on page 10](#)
- [“Library Configurations and Capacities” on page 11](#)
- [“Library Components” on page 17](#)
- [“Safety Features” on page 22](#)
- [“Tape Management Software” on page 22](#)

## SL500 Features

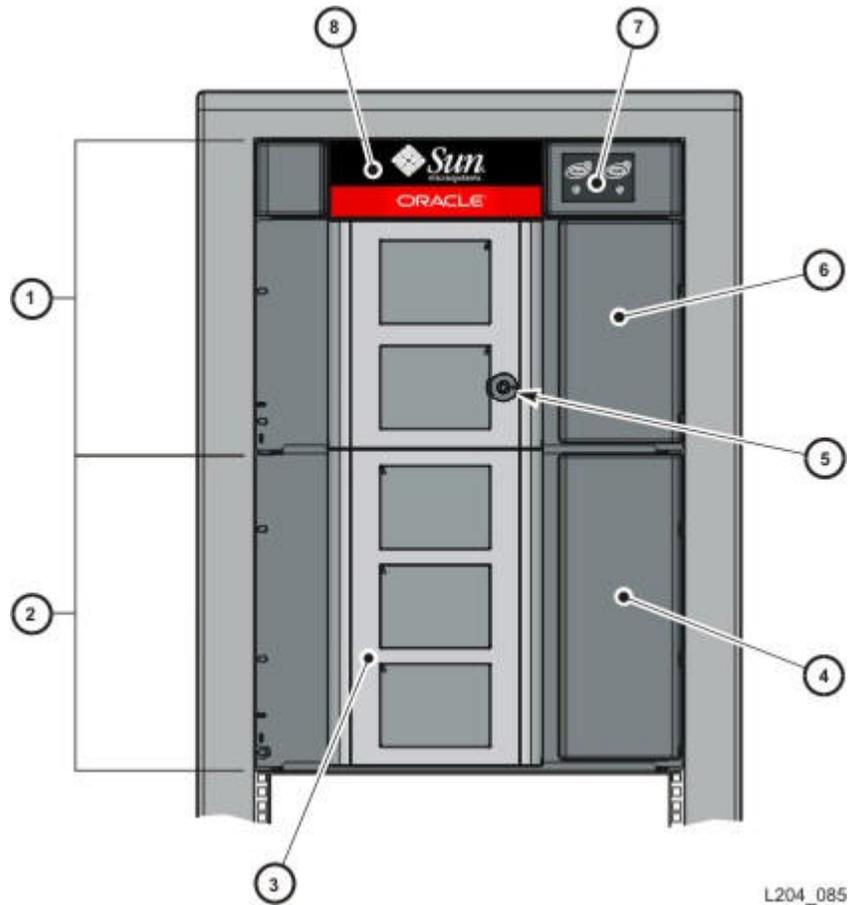
The SL500 library offers the following features and capabilities:

- Scalable storage capacity from 30 to 575 storage cells, in 30-cell increments
- Scalable performance using from 1 to 18 tape drives
- Support for LTO and SDLT tape drives with Serial Attached SCSI (SAS), Fibre Channel (FC), or parallel SCSI interfaces
- Oracle's StorageTek Any Cartridge, Any Slot support for mixed-media
- Optional [Library Partitioning](#)
- Optional host interfaces: Either [Dedicated Storage-Control Interface cards](#) that separate control and data paths or ADI [Bridging](#) for a combined control/data path
- Optional single- or dual path [Dedicated Storage-Control Interface cards](#)
- Comprehensive [Library Management Interfaces](#), including the [StorageTek Library \(SL\) Console](#), a [Command Line Interface](#), and support for the [Simple Network Management Protocol \(SNMP\)](#)
- Heterogeneous attachments using standard interfaces

# Hardware Component Views and Locations

FIGURE 1-1 shows the front view of the SL500 library and its components.  
 FIGURE 1-2 shows the back view of the library.

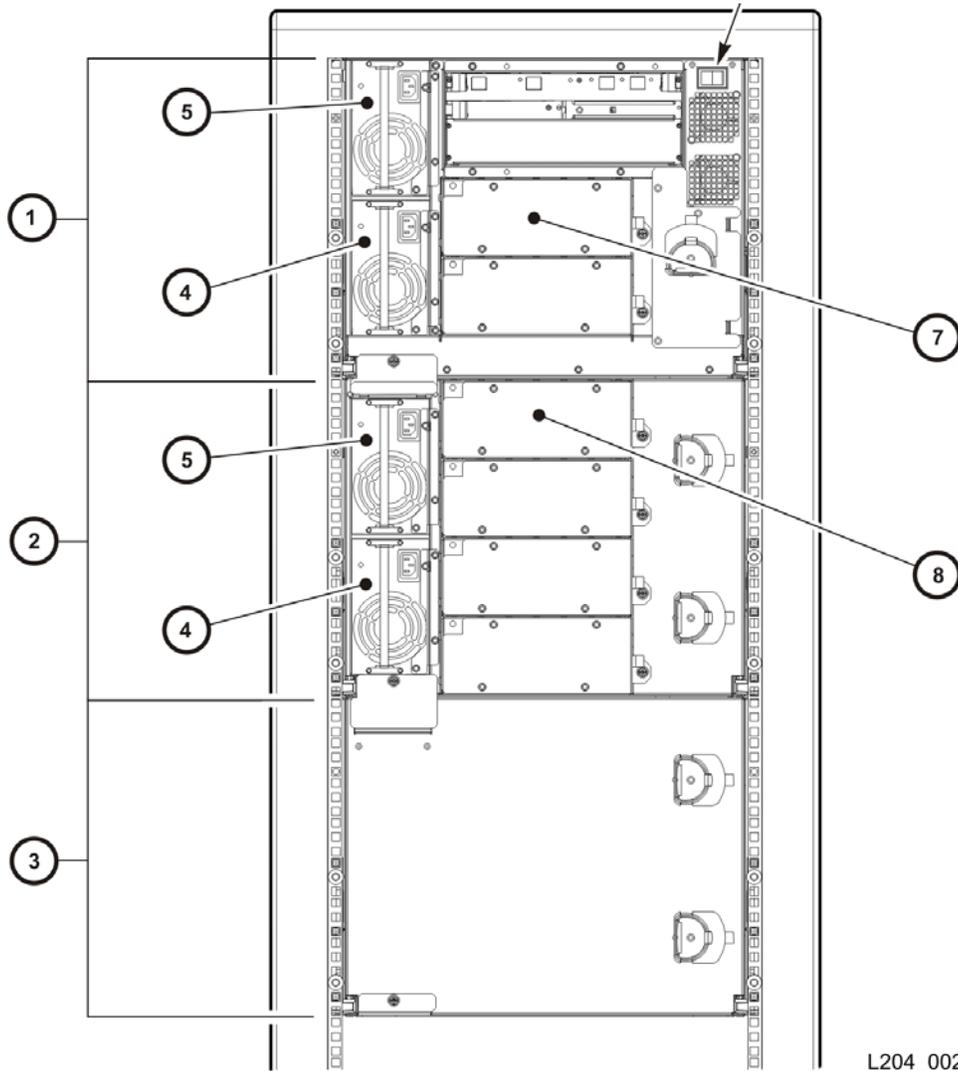
FIGURE 1-1 Front View of Library Hardware Components



L204\_085

1. Base Module
2. Drive Expansion Module (DEM)
3. Library door
4. DEM, Cartridge Access Port (CAP)
5. Library door lock
6. Base Module, Cartridge Access Port (CAP)
7. Keypad assembly
8. Robotics unit

**FIGURE 1-2** Back View of Library Hardware Components



L204\_002

1. Base Module
2. Drive Expansion Module (DEM)
3. Cartridge Expansion Module (CEM)
4. Standard power supplies (if a corresponding redundant power supply is installed)
5. Redundant power supplies (if installed) or standard power supplies
6. Library power switch
7. Base Module, host drive 1 (SCSI drive 0119)
8. DEM, host drive 1 (SCSI drive 0219)

# Library Interfaces and Controls

- [“Host Interfaces” on page 5](#)
- [“Library Management Interfaces” on page 6](#)
- [“Mechanical Controls and Indicators” on page 8](#)

## Host Interfaces

Host systems and tape storage subsystems exchange two distinct kinds of information:

- **Storage-system commands:** The host sends instructions that position robotics, mount and unmount volumes, clean drives, query the status of components, etc. The library sends the result of the command or the status of the queried component.
- **User data:** The host transfers user or application data to a tape drive in the library.

SL500 tape libraries can provide host interfaces by means of either:

- [Dedicated Storage-Control Interface cards](#) that maintain separate data and control paths
- The [Bridging](#) feature, using a single, combined control/data path

### Dedicated Storage-Control Interface cards

When a dedicated SCSI over Fibre Channel interface card (MPU2 or PUA2) or a Parallel Low-Voltage Differential SCSI interface card (RLW) is installed, these two kinds of information reach the SL500 library by separate data and control paths:

- **Data:** Data travels directly to the data interface on the tape drive (see [“Drives, Cartridges, and Related Features” on page 10](#) for further information on supported tape drives and interface types).
- **Control:** Command and control signals travel to the library controller through the MPU2, PUA2, or RLW interface card. The library controller sends commands to the drives through an internal connection.

### Bridging

When supported LTO-5 tape drives are installed but dedicated storage-control interface cards are not, command and control information is sent with the data in a single control/data path. When an SL500 library does not detect an Oracle StorageTek MPU2 Fibre Channel or RLW parallel SCSI interface card at start up, the library adopts a bridged configuration by default.

Data and command/control signals travel directly to the Serial Attached SCSI (SAS) or Fibre Channel data interface on the LTO-5 tape drive. The Automation Device Interface (ADI) on a designated LTO-5 bridge drive handles all control communications for the library or library partition. The ADI passes command and control signals to the library controller.

If a bridge drive has not been previously selected, the library selects the first bridge-capable drive that it can find, starting from the top of the library. An unpartitioned bridged library must have one bridge drive. A partitioned bridged library must have a bridge drive for each partition.

Currently, the SL500 library bridging feature is supported on HP LTO-5 Serial Attached SCSI (SAS) and Fibre Channel tape drives.

### Library Addressing Schemes

Library addressing depends on the control-path interface used. For example, FC-SCSI hosts use sequential element numbering, with each element type (storage cell, tape drive, and CAP) having its own sequential range. See [“SL500 Wall Diagrams and Specifications” on page 373](#) for full details.

### Host Interfaces and Partitioning

SL500 libraries support one host interface per library or partition. Therefore, a non-partitioned library can use only one host and one kind of host interface (SCSI-FC, Parallel LVD SCSI, etc.). But each partition in a partitioned library can connect to a separate host using a separate interface. See [“Library Partitioning” on page 103](#) for details.

Both bridged and unbridged SL500 libraries support partitioning. In an unbridged library, the MPU2, PUA2 or RLW interface card manages the control path for all partitions in the library. In a bridged library, each partition contains an LTO-5 bridge drive that handles control communications for the containing partition alone.

You cannot mix bridged and unbridged partitions in a single library. Physically, each SL500 library is, as a whole, either bridged or unbridged. A library that contains an MPU2, PUA2, or RLW interface card is unbridged. Such a library cannot include bridged partitions, even if otherwise bridge-capable drives are part of the configuration. Conversely, if an interface card is not present, there is obviously no way to configure an unbridged partition. All partitions must be bridged and must contain bridge drives.

## Library Management Interfaces

System administrators and service personnel interact with the library in one or more of the following ways:

- [StorageTek Library \(SL\) Console](#)
- [Command Line Interface](#)
- [Simple Network Management Protocol](#)

### StorageTek Library (SL) Console

The StorageTek Library Console graphical user interface (GUI) is the primary tool for monitoring and administering SL500 libraries. SL Console is a standalone, Java-based or hosted, browser-based software application that enables you to control the library remotely over a TCP/IP local area network.

The network connects to the library through the **PUBLIC** Ethernet port located near the middle of the RLC controller card faceplate, as shown in [FIGURE 1-3](#). (See [“Library Controller Card \(RLC\)”](#) on page 20 for more information about the LED indicators on the RLC card.)

**FIGURE 1-3** RLC Controller Card Faceplate



See [“StorageTek Library Console”](#) on page 19 for complete details.

### Command Line Interface

Through the command line interface (CLI), Oracle support representatives can service the library through a serial connection to the **CLI** port at right side of the RLC controller card faceplate. See [FIGURE 1-3](#) on page 7.

The CLI interface is reserved for authorized service personnel only, except for customers who use the StorageTek Tape Analytics (STA) server. For CLI commands related to the STA server, see the *StorageTek Tape Analytics Installation and Administration Guide*.

### Simple Network Management Protocol

System administrators use Simple Network Management Protocol (SNMP) and standards-compliant management applications to monitor the SL500 library remotely over a TCP/IP local area network. SNMP can provide the following kinds of information:

- The operational state of the library (firmware level, serial number, online/offline)
- The status of the CAPs (open, closed, etc.)
- Number of library elements (robots, drives, storage cells, CAPs, etc.)
- Media and drive types

For more information, see [“SNMP Configuration with SL Console”](#) on page 395.

### Supported Versions

The SL500 supports two versions of SNMP:

- SNMPv2c can be used for routine machine status queries but is not secure. Data is completely accessible from the local network.
- SNMPv3 is preferred because it supports encryption and strong user authentication. Oracle requires SNMPv3 for transmission of confidential proprietary information.

### **Activation of SNMP**

The SL500 SNMP agent is disabled by default. An Oracle support representative can enable it for you to use the command line interface.

## **Mechanical Controls and Indicators**

This section describes the controls and indicators that you can use to monitor and troubleshoot the library. For tape drive controls and indicators, refer to vendor publications.

### **Power Switch**

When the switch (see [FIGURE 1-4 on page 9](#)) is in the ON position (1) the library and tape drives are powered-on. When the switch is in the OFF position (0), the library and tape drives are powered-off.

Note that, in older libraries, the power supplies each have individual power switches. More recent libraries have a single power switch for all power supplies in the rack.

### **Power Supply LED**

The power supply LED (Light Emitting Diode) indicates the condition of the power supply and warns you when corrective action is necessary. When the LED is ON (lighted), the power supply is working normally. When the LED is OFF (no light), the power supply is not getting power or has failed. A service technician can check connections and supply voltages and, if necessary, replace the power supply.

### **Drive Tray LED**

The drive tray LED alerts you to fan failure and potentially excessive drive temperatures. When the LED is ON and remains steadily lit, the fan is not cooling the drive assembly. Have a service technician check and, if necessary, replace the fan.

### **Keypad**

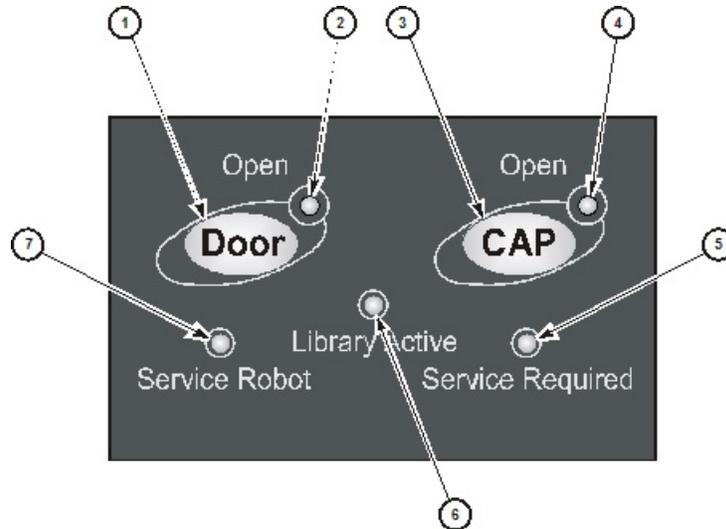
The keypad holds both the buttons that open the door and Cartridge Access Ports (CAPs) and the LEDs that indicate normal functioning or alert you when service is needed. This section describes the behavior of keypad components under varying conditions.

As the library starts, the keypad LEDs indicate the progress of initialization:

1. When the library is first powered ON, all keypad LEDs turn ON and stay ON.
2. As library applications start, all keypad LEDs turn OFF.
3. **Library Active** LED flashes ON and OFF until the audit is complete, then turns OFF.
4. The **Library Active** LED turns ON at the start of each command, then turns OFF as each command is completed.

After the library is fully operational, the **Library Active** LED flashes ON and OFF whenever the library is active. **FIGURE 1-4** shows the keypad components, and **TABLE 1-1** provides details of their meanings and functions.

**FIGURE 1-4** Buttons and Indicators



**TABLE 1-1** Description of Keypad Buttons and Indicators

Callout	Object	State	Indicated Conditions and/or Actions
1	Open Door button	PRESSED	The software lets the current job finish and then retracts the robot into the robotics unit so that it is not damaged when the door opens.
2	Open Door LED	ON	The robot is parked in the robotics unit.
		FLASHING	The <b>Open Door</b> button has been pressed. Initialization and audit are underway.
		OFF	The library is ready for use.
3	Open CAP button	PRESSED	The software opens all CAP doors.
4	Open CAP LED	ON	One or more CAP doors is open.
		OFF	All CAP doors are shut.
5	Service Required LED	ON	A non-redundant component has failed. The library is not operational and needs service.
		FLASHING	The door is open. Close and lock the door to resume operations.
			Diagnostics are running.
			Diagnostics failed, and a service representative has to check the issue.
		OFF	The library is operational, but a redundant component has failed. A service technician needs to replace it to restore redundancy.
6	Library Active LED	FLASHING	The library is active.
		OFF	The library is functioning normally. Service is not necessary.
7	Service Robot LED	ON	The robot is not working. Service may be needed.
		OFF	The robot is functioning normally.

## Library Controller Card Indicators

The LED indicators of the library controller card are explained in the [“Library Controller Card \(RLC\)” on page 20](#) section.

# Drives, Cartridges, and Related Features

This section provides a general overview of supported drives, media, and related features. It covers the following topics:

- [“LTO Supported Tape Drives” on page 10](#)
- [“SL500 Drive Trays” on page 10](#)

## LTO Supported Tape Drives

The SL500 library supports the following drives:

- Hewlett-Packard and IBM LTO Generation 2, 3, 4 parallel SCSI Low-Voltage Differential (LVD) in an unbridged library or as data drives in a bridged library.
- Hewlett-Packard and IBM LTO Generation 2, 3, 4 Fibre Channel drives in an unbridged library or as data drives in a bridged library.
- Hewlett-Packard LTO-5 Serial Attached SCSI (SAS) as a data drive or as a bridged drive.
- Hewlett-Packard LTO-6 Fibre Channel as a data drive or as a bridged drive.

## SL500 Drive Trays

All tape drives are mounted on SL500-unique tray assemblies. Each assembly contains the:

- Tape drive
- +5 VDC fan
- RLD tape drive interface card

Drive tray assemblies are installed in slots (also called bays), accessible from the back of the library. When you insert a tape drive into the assigned slot, it connects to the RLD card by way of a cable. The RLD card connects directly to the RLM or RLE (Drive Expansion Module) backplane through a blind-mate connector.

**Note** – If a slot does not contain a tape drive, a vacancy plate must be installed over the slot.

## Hot Swapping

Tape drives are hot-swappable. You can replace a drive without removing power from the library, as long you proceed as follows:

1. Back up the server before removing the tape drive.
2. Before disconnecting the tape drives: If the tape drives are daisy-chained, stop all data processing on the channel to which the tape drives are connected.

3. Before disconnecting the external SCSI cables: Make sure there is no activity on the SCSI bus. Stop all processes on the host.
4. Make sure that all signals are terminated at each end of the SCSI bus.
5. If your external data cables are long enough that they do not interfere with removing and replacing the tape drives, you can swap tape drives without disconnecting the external data cables. If so, disregard the steps to remove those cables.

**Caution – Possible data loss or system problem.** If you must disconnect the external data cables, make sure that you quiesce the system first (for example, stop all processes that access tape drives on the SCSI bus where you are replacing a tape drive).

## Library Configurations and Capacities

SL500 modular libraries are assembled from the top of the rack down, starting with the base module. Optional Drive Expansion Modules (DEMs) and Cartridge Expansion Modules (CEMs) are then added until the desired capacity and configuration are reached. The library base module contains the robotics unit, robotic components, and the keypad as well as a base unit with storage cells and drive bays. Cartridge Expansion Modules and Drive Expansion Modules provide additional space for cartridges. Drive Expansion Modules provide additional space for drives.

This section describes possible configurations of SL500 library modules and compatible tape drives. It starts with [“LTO Library Configurations” on page 11](#) and concludes with [“Mixed-Media Library Configurations” on page 14](#).

**Caution – Firmware problems:** You can not mix LTO and mixed-media arrays within the same library. If you add expansion modules, the new modules must have the same type arrays as the existing modules.

## LTO Library Configurations

This section explains [“Internal Addressing in LTO Libraries” on page 11](#) and [“LTO Library Configuration and Physical Capacity” on page 12](#).

### Internal Addressing in LTO Libraries

Addressing is by library, module, row, and column, viewed from the front of the library. Each address consists of four integers, **L,M,R,C**, where:

- The first digit, the **Library** number, is always **0**.
- The second digit, the **SL500 Module** number, falls in the range **[1-5]**, with **1** being the top-most module and **5** being the bottom-most.
- The third digit, the **Row** number, falls in the range **[1-9]** (for a base module) or **[1-12]** (for a Drive or Cartridge Expansion Module).
- The fourth digit, the **Column** number, falls in the range **[1-9]** (for a base module or Drive Expansion Module) or **[1-11]** (for a Cartridge Expansion Module).

## LTO Library Configuration and Physical Capacity

With Linear Tape Open (LTO) tape drives, the SL500 base module can store up to 50 cartridges, one or two tape drives, and a five-cell cartridge access port (CAP) that can also store cartridges. You increase this starting number of storage cells by adding Drive Expansion Modules (DEMs) and Cartridge Expansion Modules (CEMs). The total physical capacity of the library depends on the number and type of modules installed and on the arrangement of the modules relative to the base and the other modules. This section outlines these relationships.

**Note –** *Physical capacity* is not necessarily the same as *usable capacity*. The usable capacity of an SL500 library is the same as the *activated capacity*, the number of storage cells that your Hardware Activation Files make available. See [“Capacity on Demand” on page 55](#) and [“Hardware Activation Files” on page 97](#) for a full explanation.

### ***Extending Capacity***

To extend the 50-cell base capacity, you add Drive Expansion Modules and Cartridge Expansion Modules to the standard rack until the desired number of storage cells and tape drives is reached. Each module type accommodates a different number of storage cells, drive bays, and CAP cells. The arrangement of the modules changes the internal geometry of the library and, consequently, the accessibility of storage cells.

### ***Loss of Active Cells***

The lowest module in the library always has less capacity than an equivalent module placed higher in the rack. The library floor limits the robot’s range of motion and leaves the bottom-most cells inaccessible. In a basic library that includes only the base module, 16 cells are inaccessible. When a Drive Expansion Module is installed in the lowest position, seven cells become inaccessible. A similarly placed Cartridge Expansion Module loses 16 cells when it is immediately below a base module or a Drive Expansion Module. But when the same Cartridge Expansion Module is immediately beneath another Cartridge Expansion Module, both modules lose capacity. The upper Cartridge Expansion Module loses six cells and the lower loses 10, for a total of 16 inaccessible cells.

Tape drives can also keep the robot from reaching storage cells in some configurations. For example, when a Cartridge Expansion Module is installed below a base module or a Drive Expansion Module, the top two rows on columns nine, 10, and 11 of the Cartridge Expansion Module (six storage cells) become inaccessible.

### ***Increased Number of Active Cells***

For the same reason, when you add an expansion module under an existing module, you increase the capacity of the existing module. For example, when you install a Cartridge Expansion Module or Drive Expansion Module under a base module, the robot can reach the very bottom of the module, so the base module gains 16 previously inaccessible cells. Similarly, when you install a Cartridge Expansion Module under an existing Cartridge Expansion Module, the existing module gains 10 storage cells. When you install a Drive Expansion Module under an existing Drive Expansion Module, the existing module gains seven cells. (Oracle does not

recommend installing DEMs under Cartridge Expansion Modules. Drive Expansion Modules should be installed above all of the Cartridge Expansion Modules in the stack).

### **Number of CAPs**

The type and arrangement of installed modules also determines the number of Cartridge Access Ports (CAPs) in the library and, therefore, the available storage capacity. A base module comes with five CAP cells (one magazine). Each Drive Expansion Module or Cartridge Expansion Module adds 10 CAP cells (two magazines). These CAP cells can store additional cartridges.

### **Real-World Capacity**

Physical accessibility is not the only factor in determining the working capacity of a library. Real-world working capacity depends on the software that manages library operations. Different software applications have different capabilities and impose different limitations. Refer to your software documentation for specifics.

[TABLE 1-2 on page 13](#) provides details on the number of cartridge and tape drive slots available with various combinations of SL500 modules. [“SL500 Wall Diagrams and Specifications” on page 373](#) provides detailed diagrams and dimensions for various configurations.

**TABLE 1-2** Physical LTO Storage Cell and Tape Drive Capacities

Configuration	DEMs	CEMs	Tape Drives	Storage Cells	CAP Cells	Total Cells
<b>Base</b>	0	0	2	50	5	55
<b>One expansion module</b>	1	0	6	143	15	158
	0	1	2	170	15	185
<b>Two expansion modules</b>	2	0	10	227	25	252
	1	1	6	254	25	279
	0	2	2	290	25	315
<b>Three expansion modules</b>	3	0	14	311	35	346
	2	1	10	338	35	373
	1	2	6	374	35	409
	0	3	2	410	35	445
<b>Four expansion modules</b>	4	0	18	395	45	440
	3	1	14	422	45	467
	2	2	10	458	45	503
	1	3	6	494	45	539
	0	4	2	530	45	575

## Mixed-Media Library Configurations

This section describes [“Internal Addressing in Mixed-Media Libraries”](#) on page 14 and [“Mixed-Media Library Configuration and Capacity”](#) on page 14

**Note** – Your robotics unit must be part number 314558705 or higher to read SDLT cartridge labels.

### Internal Addressing in Mixed-Media Libraries

Addressing is by library, module, row, and column, viewed from the front of the library. Each address consists of four integers, **L,M,R,C**, where:

- The first digit, the **Library** number, is always **0**.
- The second digit, the **SL500 Module** number, falls in the range **[1-5]**, with **1** being the top-most module and **5** being the bottom-most.
- The third digit, the **Row** number, falls in the range **[1-8]** (for a base module) or **[1-10]** (for a Drive or Cartridge Expansion Module).
- The fourth digit, the **Column** number, falls in the range **[1-9]** (for a base module or Drive Expansion Module) or **[1-11]** (for a Cartridge Expansion Module).

### Mixed-Media Library Configuration and Capacity

In a mixed-media configuration, the SL500 base module can store up to 42 cartridges, one or two tape drives, and a four-cell cartridge access port (CAP) that can also store cartridges. You increase this starting number of storage cells by adding Drive Expansion Modules and Cartridge Expansion Modules. The total physical capacity of the library depends on the number and type of modules installed and on the arrangement of the modules relative to the base and the other modules. This section outlines these relationships.

**Note** – *Physical capacity* is not necessarily the same as *usable capacity*. The usable capacity of an SL500 library is the same as the *activated capacity*, the number of storage cells that your Hardware Activation Files make available. See [“Capacity on Demand”](#) on page 55 and [“Hardware Activation Files”](#) on page 97 for a full explanation.

#### ***Extending Capacity***

To extend this base, 42-cell capacity, you add Drive Expansion Modules and Cartridge Expansion Modules to the standard rack until the desired number of storage cells and tape drives is reached. The available physical capacity of a given library depends on the exact configuration chosen. Each module type accommodates a different number of storage cells, drive bays, and CAP cells. So the arrangement of the modules changes the internal geometry of the library and, consequently, the accessibility of storage cells.

#### ***Loss of Active Cells***

The lowest module in the library always has less capacity than an equivalent module placed higher in the rack. The library floor limits the robot’s range of motion and leaves the bottom-most cells inaccessible. In a basic library that includes only the base

module, 14 cells are inaccessible. When a Drive Expansion Module is installed in the lowest position, 7 cells become inaccessible. A similarly placed Cartridge Expansion Module loses 16 cells when it is immediately below a base module or a Drive Expansion Module. But when the same Cartridge Expansion Module is immediately beneath another Cartridge Expansion Module, both modules lose capacity. The upper module loses 6 cells and the lower loses 10, for a total of 16 inaccessible cells.

Tape drives can also keep the robot from reaching storage cells in some configurations. So for instance, when a Cartridge Expansion Module is installed below a base module or a Drive Expansion Module, the top two rows on columns 9, 10, and 11 of the Cartridge Expansion Module (6 storage cells) become inaccessible.

### ***Increased Number of Active Cells***

For the same reason, when you add an expansion module under an existing module, you increase the capacity of the existing module. For example, when you install a Cartridge Expansion Module or Drive Expansion Module under a base module, the robot can reach the very bottom the module, so the base module gains 14 previously inaccessible cells. Similarly, when you install a Cartridge Expansion Module under an existing Cartridge Expansion Module, the existing module gains 10 storage cells. When you install a Drive Expansion Module under an existing Drive Expansion Module, the existing module gains 7 cells. (Oracle does not recommend installing Drive Expansion Modules under Cartridge Expansion Modules. Drive Expansion Modules should be installed above all the Cartridge Expansion Modules in the stack).

### ***Number of CAPs***

The type and arrangement of installed modules also determines the number of Cartridge Access Ports (CAPs) in the library and, thus, the available storage capacity. A base module comes with 4 CAP cells (one magazine). Each Drive Expansion Module or CEM adds 8 CAP cells (two magazines). These CAP cells can store additional cartridges.

### ***Real-World Capacity***

Physical accessibility is not the only factor in determining the working capacity of a library. Real-world working capacity depends on the software that manages library operations. Different software applications have different capabilities and impose different limitations. Refer to your software documentation for specifics.

[TABLE 1-3 on page 15](#) details the number of cartridge and tape drive slots available with various combinations of SL500 modules. “[SL500 Wall Diagrams and Specifications](#)” on [page 373 on page 373](#), contains detailed diagrams and dimensions for various configurations.

**TABLE 1-3** Physical Mixed-Media Storage Cell and Tape Drive Capacities

Configuration	DEMs	CEMs	Tape Drives	Storage Cells	CAP Cells	Total Cells
Base	0	0	2	42	4	46
One expansion module	1	0	6	119	12	131
	0	1	2	140	12	152

**TABLE 1-3** Physical Mixed-Media Storage Cell and Tape Drive Capacities

<b>Configuration</b>	<b>DEMs</b>	<b>CEMs</b>	<b>Tape Drives</b>	<b>Storage Cells</b>	<b>CAP Cells</b>	<b>Total Cells</b>
<b>Two expansion modules</b>	2	0	10	189	20	209
	1	1	6	210	20	230
	0	2	2	240	20	260
<b>Three expansion modules</b>	3	0	14	259	28	287
	2	1	10	280	28	308
	1	2	6	310	28	338
	0	3	2	340	28	368
<b>Four expansion modules</b>	4	0	18	329	36	365
	3	1	14	350	36	386
	2	2	10	380	36	416
	1	3	6	410	36	446
	0	4	2	440	36	476

# Library Components

This section describes the following components in greater detail:

- [“Cartridge Access Ports” on page 17](#)
- [“Robotics” on page 17](#)
- [“Power Supplies” on page 19](#)
- [“Cooling Fans” on page 19](#)
- [“Library Controller Card \(RLC\)” on page 20](#)
- [“Single-Port Fibre Channel Interface Card \(MPU2\)” on page 21](#)
- [“Parallel SCSI Interface Card \(RLW\)” on page 21](#)

## Cartridge Access Ports

Using the cartridge access ports (CAPs), you can add or remove cartridges without interrupting normal robotic operation.

Although the CAPs are not physically connected, they are logically connected. If any of the CAPs are open, the CAP LED on the keypad is ON. This light indicates the CAP needs to be closed. If all of the CAPs are closed, the CAP LED is OFF.

Use the keypad on the robotics unit to issue to unlock the CAP.

The CAP has two settings, ALLOW and PREVENT. ALLOW is the default setting after you power-on or reset the library. [TABLE 1-4](#) shows how these settings affect the CAPs. For CAP LED indicator information see [“Library Components” on page 17](#).

**TABLE 1-4** CAP Conditions

CAP Condition	ALLOW	PREVENT
All CAPs are closed	When you press the CAP button all of the CAPs in the rack open. The library firmware turns on the CAP LED.	When you press the CAP button, the action is ignored and all the CAPs remain closed.
A CAP is open	When you press the CAP button, any CAP that is not open in the rack opens.	When you press the CAP button, the action is ignored and all the CAPs remain in their individual current state, open or closed.

## Robotics

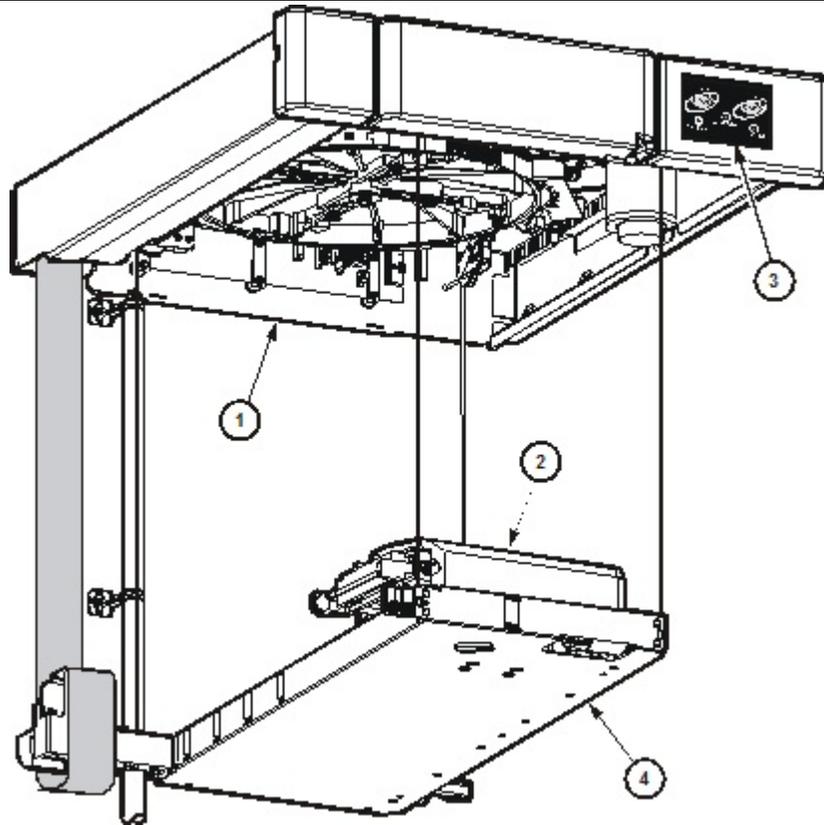
The robotics unit moves cartridges between storage cells, tape drives, and cartridge access ports (CAPs). [FIGURE 1-5 on page 18](#) shows the three main robotic components:

- The Z drive assembly
- The X table assembly

- The hand assembly

A pulley in the Z drive assembly moves the X table up and down until the table is positioned by the desired storage cell or tape drive. The X carriage assembly then moves the hand assembly back and forth as needed.

**FIGURE 1-5** Robotics Components

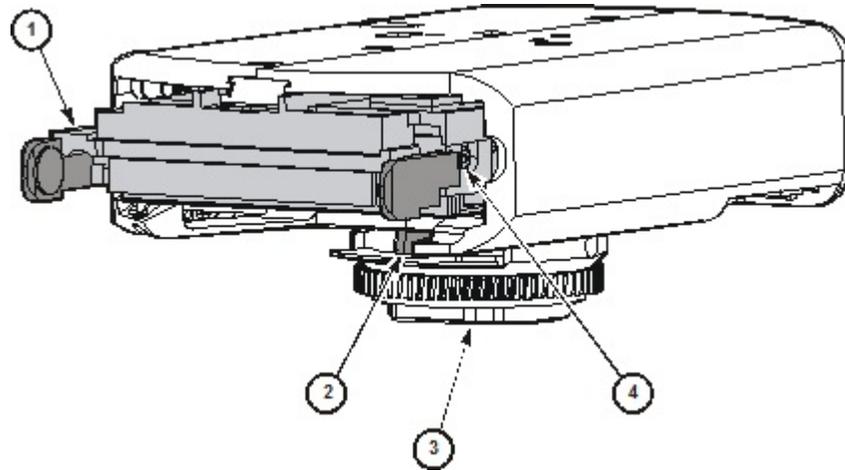


1. Z drive assembly
2. Hand assembly
3. Keypad assembly
4. X table assembly

The [Hand Assembly](#) (FIGURE 1-6) contains the wrist hub, gripper, and bar-code scanner. Fingers on the gripper assembly grasp the sides of cartridges.

If the library loses power while a cartridge is between the fingers, an operator can manually retrieve the cartridge by using a worm gear to rotate the hand and a manual release screw to release the cartridge.

**FIGURE 1-6** Hand Assembly



1. Gripper
2. Bar-code scanner
3. Wrist hub
4. Finger release screw

When the front door is open or the keypad's **Open Door** button is pressed, the library retracts the robotics assembly into the robotics unit at the top of the library and parks it until the library door is closed. This prevents damage to the robot.

To verify the robot is parked, look at the lever in the cutout beneath the facade and to the bottom left of the keypad. When the lever is on the left, the robot is safely parked.

The robotics unit can be accessed from the front of the rack.

## Power Supplies

The base unit has one standard power supply. A second supply can be ordered and installed to provide redundant power to the module components. Each supply should be plugged into a separate circuit and powered-on to provide redundant power. If one supply fails, the second supply automatically provides power.

A single power switch on the back of the library is used to power-on or power-off all the power supplies in the rack:

- The ON position is **1**.
- The OFF position is **0**.

## Cooling Fans

The fans provide cooling for the library electronics. The tape drives and power supplies contain their own fans.

## Library Controller Card (RLC)

The library controller card (RLC):

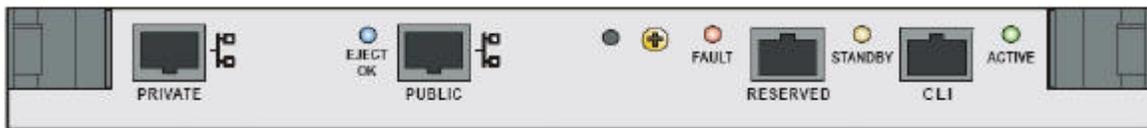
- Stores library capacity information and tape volume serial numbers (VOLIDs)
- Manages the robotics
- Monitors fan performance, card temperatures, and the status of power supplies and tape drives

The face plate of the RLC card has a plastic thumb latch on each side with management interface connectors and indicator LEDs (Light-Emitting Diodes) in between. The interface connectors include the following, starting from the right side of the face plate:

- RS232 serial port for the library CLI (Command Line Interface)
- Reserved port (for future use)
- Public Ethernet (TCP/IP) port for connecting with the SL Console host, an SNMP management station, and so on
- Private Ethernet (TCP/IP) port (also reserved for future use)

The library controller (RLC) card has the LED indicators shown in [FIGURE 1-7](#) and listed in [TABLE 1-5](#) on page 20.

**FIGURE 1-7** RLC Library Controller Card LED Indicators



**TABLE 1-5** RLC LED Indicator Descriptions

LED	Color	LED State	Indicated Condition
EJECT OK	Red	On	The RLC card can be removed if the library supports redundant, hot-swappable RLC cards.
FAULT	Red	Flashing	The controller has detected a problem.
STANDBY	Yellow	On	This redundant, hot-swappable RLC card is not actively controlling a library that supports redundant, hot-swappable RLC cards.
ACTIVE	Green	On	This RLC card is controlling the library.

## Single-Port Fibre Channel Interface Card (MPU2)

The single-path MPU2 card provides a single Fibre Channel (FC) host interface adjacent to the thumb latch on the left side of the faceplate. [FIGURE 1-8](#) shows the MPU2 card below the RLC.

**FIGURE 1-8** The MPU2 Fibre Channel Interface Card Below the RLC



## Dual-Port Fibre Channel Interface Card (PUA2)

The PUA2 card shown in [FIGURE 1-9](#) provides two Fibre Channel host interfaces on the right half of the card, between the **FAULT** and **EJECT OK** indicator LEDs. When the dual-path Fibre Channel option is activated, the additional interface can be used for increasing bandwidth or for redundancy. Failover requires suitable host software. Failover is not automatic.

**FIGURE 1-9** PUA2 Dual-Path Fibre Channel Interface Card



## Parallel SCSI Interface Card (RLW)

The RLW card (MPW on older libraries) provides a SCSI host interface adjacent to the thumb latch on the left side of the faceplate, below the RLC card as shown in [FIGURE 1-10](#).

**FIGURE 1-10** The RLW (MPW) SCSI Interface Card Below the RLC



## Safety Features

The SL500 library has the following safety features:

- The RLC card, the SCSI (MPW/RLW) or Fibre Channel (MPU2 or PUA2) interface card, and the power supply are housed inside protective modules to prevent you from coming into contact with hazardous voltages and sensitive electronics.
- Before opening the front door, library software protects the robot from damage by retracting it into the robotics unit and powering it off. Whenever the door is not fully closed, a sensor alerts the software so that the robot remains powered off.
- The front door is physically secured by lock and key to protect data.

## Tape Management Software

The tape management software controls tape read and write operations and robotic move operations. When the library is in automated mode, these operations occur without manual intervention. The software determines where the cartridge is located by accessing audit data uploaded from the library. The software then allocates the tape drive to receive the cartridge.

For command descriptions and instructions, refer to your software publications.

---

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## StorageTek Library Console

Oracle's StorageTek Library Console (SL Console) is a Java-based software application that provides a graphical user interface (GUI) for monitoring and managing the StorageTek SL500 library.

This chapter contains the following topics:

- [“Using the SL Console” on page 23](#)
- [“SL Console Modes” on page 24](#)
- [“SL Console Security” on page 24](#)
- [“SL Console Reports” on page 28](#)
- [“Web-launched SL Console” on page 33](#)
- [“Standalone SL Console” on page 34](#)

### Using the SL Console

You can perform activities with the SL Console such as:

- Manage and configure library partitions (optional feature)
- View and modify status and properties of the library and associated devices (drives, CAP, robot)
- 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:

- [“Web-launched SL Console” on page 33](#)
- [“Standalone SL Console” on page 34](#)

## 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, 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.

**Note** – Beginning with SL Console 4.50, passwords are limited to 5 - 8 characters.

## 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 support representative
- `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.

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” user ID 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.

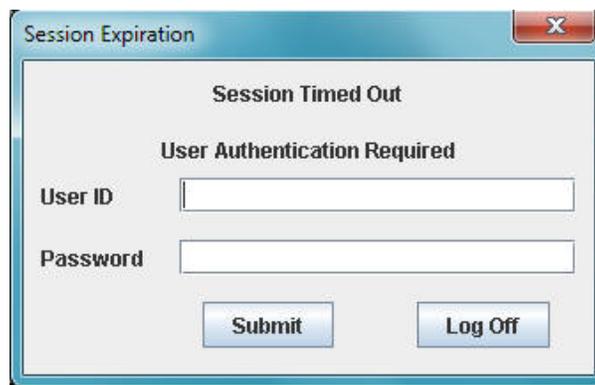
**Note** – Beginning with SL Console 4.50, your password must be limited from 5 - 8 characters. Enter the first 8 characters of the initially assigned password. After initial login, you can change the password.

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

## Automatic Logout

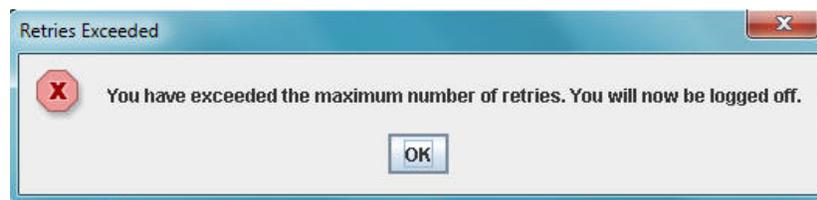
Beginning with SL Console 5.8, after you have been logged in to the SL Console for six hour, your session will expire. The system then displays a dialog box where you can either log back in or log off.

**FIGURE 2-11** SL Console Session Time Out Dialog Box



You are allowed four attempts to login. If you are unable to login after four attempts, the system logs you out and displays the following message.

**FIGURE 2-12** SL Console Login Retry Message

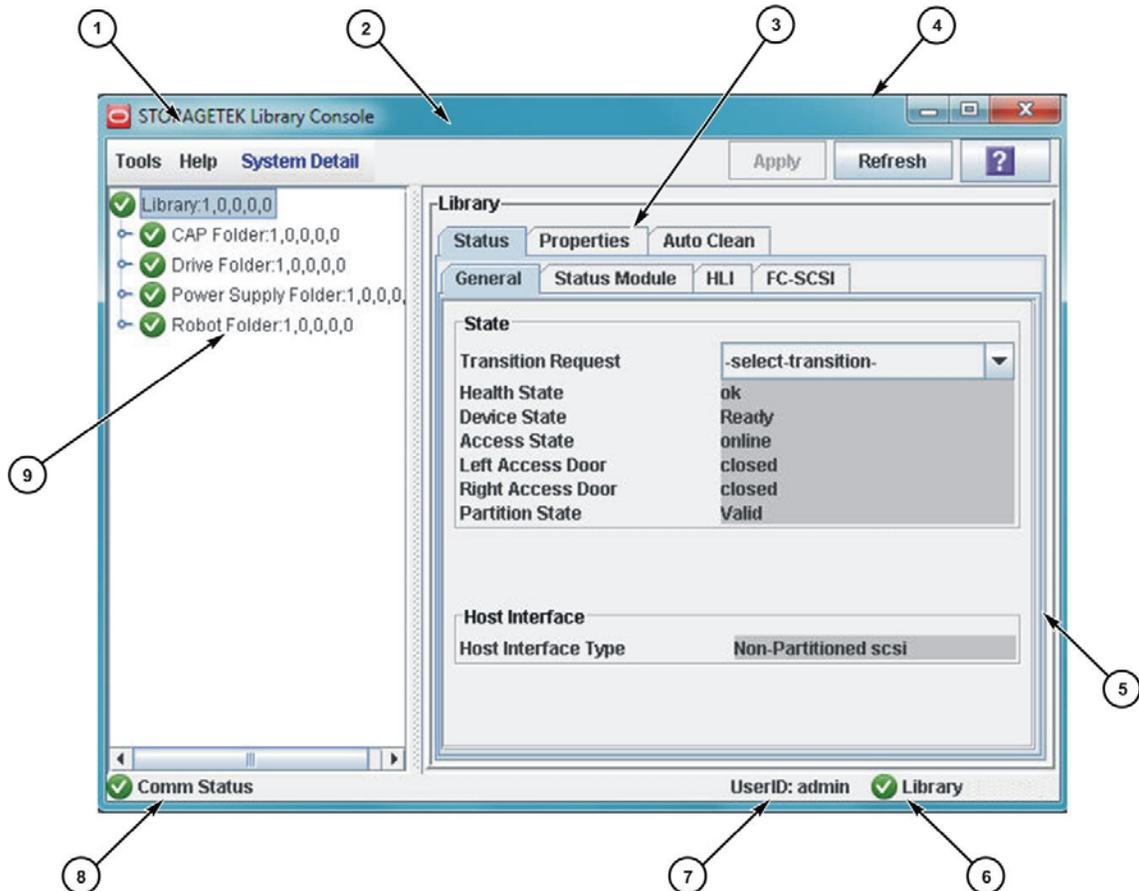


To log in, return to the main login screen.

## SL Console Screen Display

The following [TABLE 2-6](#) explain the components of the SL Console screen shown in [FIGURE 2-13](#).

**FIGURE 2-13** SL Console Screen Display



See [TABLE 2-6 on page 26](#) for details.

**TABLE 2-6** SL Console Component Description

	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, <b>Apply</b> , <b>Refresh</b> , <b>Print</b> ). Always includes the SL Console <b>Help</b> button (?). See <a href="#">“Synchronizing the Display With the Controller Database” on page 27</a> for details on using the <b>Apply</b> and <b>Refresh</b> buttons.
5	Work area	Location of the screen data

**TABLE 2-6** SL Console Component Description

	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	Navigation tree	Lists the devices included in the library

## Modifying the Screen Layout

**Note –** This feature is available starting with SL Console version 3.30. It is available on selected screens only.

You can modify the layout and display of selected SL Console screens as listed in [TABLE 2-7](#).

**TABLE 2-7** SL Console Display Options

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, 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 such a case, you must 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.

### 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 have changed the configuration in some way (such as taking a drive offline, or removing or adding a cartridge), it is important that you synchronize the status of the library with the SL Console screen.

If you are making major modifications to the library configuration (such as adding modules, defining partitions, etc.), you should coordinate these changes with other library users. Failure to do so could result in conflicts within the controller database.

### **Apply Button**

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 or command line interface to make changes. Various host applications can also access the library to make their own changes to the library contents and configuration.

### **Refresh Button**

If other users make changes and apply them to the controller database, you will not see these changes until you click the **Refresh** button on your screen. If you have made changes to the library (such as removing a cartridge or taking a drive offline), the status of the library and its components will not be updated to the SL Console until you click **Refresh**. Using **Refresh**, you can select all of the library for synchronizing or one or more library components.

## **SL Console Reports**

The SL Console library reports provide information on the library and its associated devices (for example, drives, robot, 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 robot
- **Status Summary:** Summary information on the status of the library and associated devices

- Version: Details about library hardware and software versions
- Drive Distribution: Statistical summary of cartridge mount activity for a selected time period
- Drive Utilization: Statistical summary of cartridge mount activity for a selected time period, broken into regular time intervals
- Library Utilization: Statistical summary of library activity for a selected time period

## Report Options Bar

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

- [“Search a Library Report” on page 48.](#)
- Update the report with current data.
- [“Save Library Report Data to a File” on page 49.](#)

## Report Procedures

For report procedures, see [“General SL Console Report Tasks” on page 46.](#)

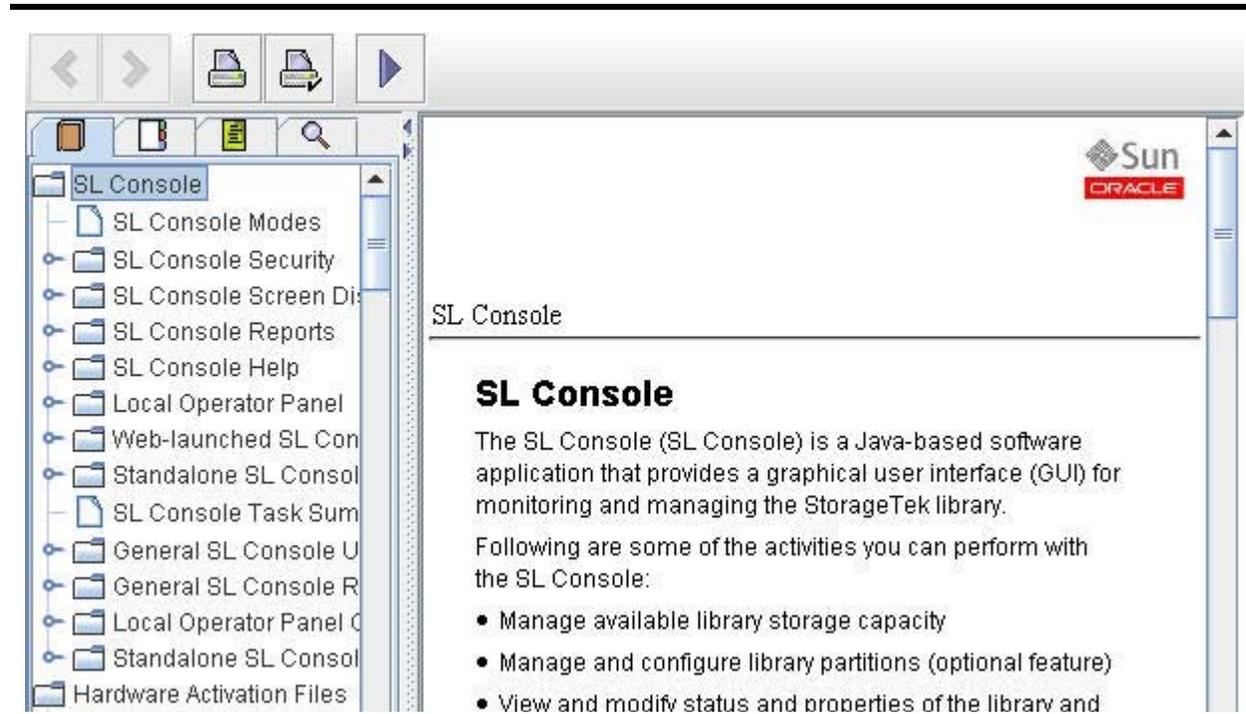
## SL Console Help

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

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

FIGURE 2-14 shows a sample SL Console Help screen.

FIGURE 2-14 SL Console Help, Sample Screen



To 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.

## Navigating Help

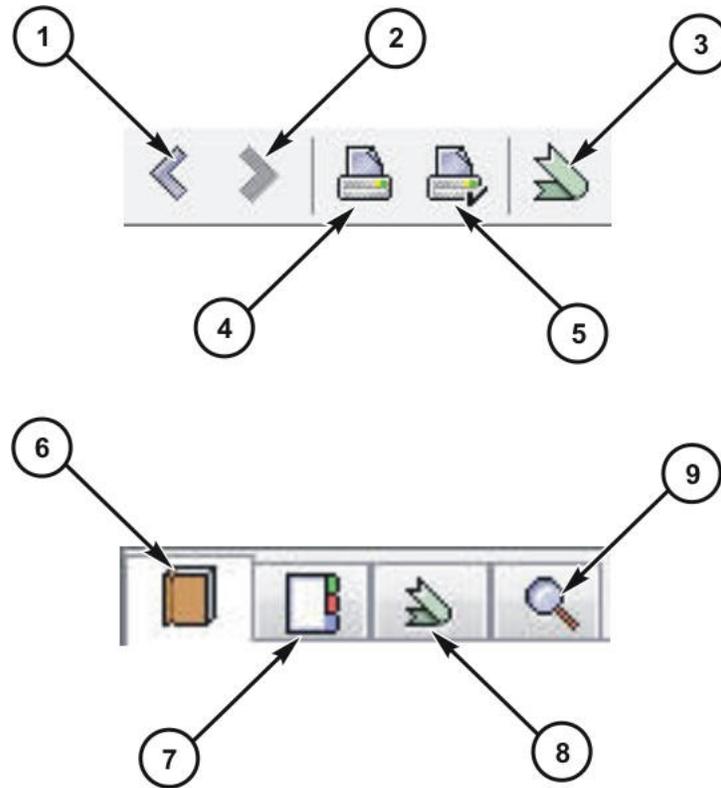
The left panel of the SL Console Help screen displays either of the following:

- 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 window includes the navigation buttons shown in [FIGURE 2-15](#) and described in [TABLE 2-8](#) on page 31.

**FIGURE 2-15** SL Console Help Navigation Buttons



See [TABLE 2-8](#) for details.

**TABLE 2-8** SL Console Help, Navigation Buttons

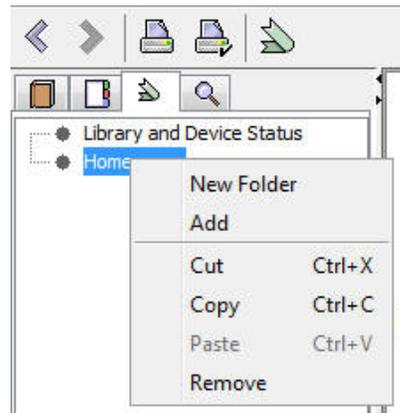
Button	Meaning	Action
1	Back	Retraces your steps, going backward one topic at a time
2	Forward	Retraces your steps, going forward one topic at a time
3	Print	Displays the <b>Print</b> dialog box, which allows you to print one or more topics: <ul style="list-style-type: none"> <li>To print the current topic, click the <b>Print</b> button.</li> <li>To print a different topic, click the topic title in the SL Console Help table of contents, and click the <b>Print</b> button.</li> <li>To print more than one topic, highlight the topics in the SL Console Help table of contents by pressing <b>Shift-Click</b> or <b>Ctrl-Click</b>, and then click the <b>Print</b> button.</li> </ul>

**TABLE 2-8** SL Console Help, Navigation Buttons

Button	Meaning	Action
4	Print Setup	Displays the <b>Page Setup</b> dialog box, which allows you to modify your print page layout
5	Add Favorite	Saves the currently displayed topic as a favorite topic. See the following <a href="#">“Managing Favorite Topics” on page 32</a> for more information.
6	TOC	Displays the SL Console Help table of contents
7	Index	Displays the SL Console Help index
8	Favorites List	Displays list of favorite topics
9	Search	Allows you to enter a term and search the contents for that term

## Managing Favorite Topics

To save favorite topics, navigate to the topic you want to save. Click the **Add to Favorites** button shown in [FIGURE 2-16](#). The topic will then display in the left-hand column as a topic. To delete a topic, select it. Then right-click to display the menu, and click **Remove**.

**FIGURE 2-16** Management Menu for Favorite Help Topics

## 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.

## 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.

You are 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 requirements listed in the following [TABLE 2-9](#).

**TABLE 2-9** Web-launched SL Console Requirements

<b>Platform</b>	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)
<b>Other</b>	<ul style="list-style-type: none"> <li>• Java 1.5 Plug-in (the browser will install this automatically if it is not present already)</li> <li>• Ethernet connection to the library</li> <li>• Ethernet connection to the Web-launched SL Console server</li> </ul>

## Web-launched SL Console Updates

Updates to the Web-launched SL Console only need to be installed on the centralized Web server. After 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” on page 38.
- By double-clicking the `slc.jnlp` icon on your client. 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 41.

## Standalone SL Console

The standalone SL Console is a standard feature of the StorageTek SL500 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 secure sockets layer (SSL). SSL provides a secure communication path between the library and the customer’s SL Console session. This security prevents an unauthorized network user from monitoring library activity.

## Installation Requirements

You can install the standalone SL Console on a computer meeting the requirements listed in the following [TABLE 2-10](#):

**TABLE 2-10** Standalone SL Console Requirements

<b>Platform</b>	Solaris 9: SPARC Solaris 10: SPARC Windows 2000 Server: 32 bit Windows XP Client: 32 bit Windows Vista: 32 bit
<b>Other</b>	Ethernet connection to the library

The standalone SL Console software is available for download at the Oracle Software Delivery Cloud, available at:

<http://edelivery.oracle.com/>

## 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.

After 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 Media Pack” on page 51](#)
- [“Install the Standalone SL Console” on page 52](#)

## SL Console Task Summary

SL Console tasks are divided into the following categories:

- [“General SL Console Usage Tasks” on page 37](#)
- [“General SL Console Report Tasks” on page 46](#)
- [“Standalone SL Console Installation Tasks” on page 50](#)

## General SL Console Usage Tasks

- [“Log in to the Web-launched SL Console” on page 38](#)
- [“Log in to the Web-launched SL Console Using an Icon” on page 41](#)
- [“Log in to the Standalone SL Console” on page 43](#)
- [“Log Off the SL Console” on page 44](#)
- [“Change a User Password” on page 45](#)

## ▼ Log in to the Web-launched SL Console

### Task Tool

This procedure can be performed at either of the following:

- Web browser
- Command line

### Task Purpose

Log in to the SL Console.

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](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](http://www.mozilla.com)

**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.

### Task Steps

**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*: Either of the following:
  - IP address of the SL Console server
  - DNS alias of the SL Console server
- *port\_ID*: Port ID of the SL Console application, typically 8080
- *opel*: 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 33](#) 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*: Either of the following:
  - IP address of the SL Console server
  - DNS alias of the SL Console server
- *port\_ID*: Port ID of the SL Console application, typically 8080
- *opel*: 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 download automatically.

The **Opening slc.jnlp** dialog box appears.

5. **Complete the dialog box 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 41](#) for login instructions.

- b. **Optionally click the “Do this automatically for files like this from now on” check box. If you make this selection, this message 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 dialog box appears.

6. **Complete the dialog box as follows:**

- a. **Verify the Publisher.**

- b. **Optionally click the “Always trust content from the publisher” check box. If you make this selection, this dialog box will not appear during future logins.**

- c. **Click Run.**

The **SL Console Login** screen appears.

## 7. Enter your login information, and click Log on.

User ID: *SLC\_login*

Password: *password*

Library: *library\_ID*

where:

- *SLC\_login*: SL Console user ID.
- *password*: Password assigned to this user ID. (Password must be between 5-8 characters.)
- *library\_ID*: Library to which you want to connect, expressed in either of the following ways:
  - IP address of the library
  - DNS alias of the library

**Note** – Beginning with SL Console 4.50, your password must be limited from 5 - 8 characters. Enter the first 8 characters of the initially assigned password. After initial login, you can change the password.

**Note** – The user ID you use determines the screens you can access. See [“SL Console Security” on page 24](#).

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

### Task Tool

This procedure can be performed at your client.

### Task Purpose

Log in to the SL Console.

**Note** – 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” on page 38](#) for details.

### Task Steps

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 download automatically.

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

3. **Complete the dialog box as follows:**
  - a. **Verify the Publisher is Oracle Corporation.**
  - b. **Optionally click the “Always trust content from the publisher” check box. If you make this selection, this dialog box will not appear during future logins.**
  - c. **Click Run.**

The **SL Console Login** screen appears.

4. **Enter your login information, and click Log on.**

User ID: *SLC\_login*  
Password: *password*  
Library: *library\_ID*

where:

- *SLC\_login*: SL Console user ID.
- *password*: Password assigned to this user ID. (Password must be between 5-8 characters.)
- *library\_ID*: Library to which you want to connect, expressed in either of the following ways:
  - IP address of the library
  - DNS alias of the library

**Note** – Beginning with SL Console 4.50, your password must be limited from 5 - 8 characters.

**Note** – The user ID you use determines the screens you can access. See [“SL Console Security” on page 24](#).

## ▼ Log in to the Standalone SL Console

### Task Tool

This procedure can be performed at your client.

### Task Purpose

Log in to the SL Console.

### Task Steps

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*: SL Console user ID.
- *password*: Password assigned to this user ID. (Password must be between 5-8 characters.)
- *library\_ID*: Library to which you want to connect, expressed in either of the following ways:
  - IP address of the library
  - DNS alias of the library

**Note** – Beginning with SL Console 4.50, your password must be limited from 5 - 8 characters.

**Note** – The user ID you use determines the screens you can access. See [“SL Console Security” on page 24](#).

3. **Click Log on.**

## ▼ Log Off the SL Console

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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).

### Task Steps

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

The **Confirm** message 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

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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

### Task Steps

1. **Log in to the SL Console using any of the modes available to you (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** page appears.

3. **On the navigation tree, expand the Permanent folder, and select 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 updates.

## General SL Console Report Tasks

- [“Display a Library Report” on page 47](#)
- [“Search a Library Report” on page 48](#)
- [“Save Library Report Data to a File” on page 49](#)

## ▼ Display a Library Report

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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 in the upper right corner.

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

- [“Search a Library Report” on page 48](#)
- [“Save Library Report Data to a File” on page 49](#)

Additional reports are available from the following menus:

- **Tools > Partitions**

### Task Steps

1. **Select Tools > Reports.**

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

2. **In the navigation tree, expand a report category to see the report options.**
3. **Click the report you want to display.**

The selected report displays.

## ▼ Search a Library Report

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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.

### Task Steps

1. **Select Tools > Reports.**

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

2. **In the navigation tree, expand a report category to see the report options.**
3. **Click the report you want to display.**

The specified report displays. All report screens include the **Search** button.

4. **Click Search.**

The **Search Text** dialog box 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 message 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 message.**

## ▼ Save Library Report Data to a File

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to display a library report and save the data to a file. This procedure can be performed from any of the library report screens.

After 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.

### Task Steps

**1. Select Tools > Reports.**

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

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

**3. Click the report you want to display.**

The specified report displays. All report screens include the **Save** button.

**4. Click Save.**

The **Save** dialog box 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 list, 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 message appears to prompt you whether you want to replace the file.

## Standalone SL Console Installation Tasks

- [“Download the Standalone SL Console Media Pack” on page 51](#)
- [“Install the Standalone SL Console” on page 52](#)

## ▼ Download the Standalone SL Console Media Pack

### Task Tool

This procedure can be performed at the Web browser.

### Task Purpose

Use this procedure to download and extract the current SL Console Media Pack from the Oracle Software Delivery Cloud. The Media Pack includes the Web-launched SL Console server, as well as the Web-launched SL Console client and the standalone SL Console.

**Note** – Your Oracle support representative may have performed this procedure for you during library installation.

### Task Steps

1. **Launch a Web browser on your PC or workstation and navigate to the Oracle Software Delivery Cloud at the following URL:**  
<http://edelivery.oracle.com/>
2. **Click Continue.**
3. **On the Export Validation screen, make the following entries:**
  - Enter your contact information.
  - Read the License Agreement and Export Restrictions, and click the check boxes to indicate your acceptance.
  - Click **Continue**.
4. **On the Media Pack Search screen, make the following selections:**
  - In the **Select a Product Pack** list, select **Oracle StorageTek Products**.
  - In the **Platform** list, select **Generic Platform**.
  - Click **Go**.
5. **All media packs meeting your selection criteria are displayed in the Results section of the screen. Select the SL Console version you want to download. Click Continue.**
6. **On the specific media pack screen, review the information to verify that you have selected the correct media pack. Click Download.**
7. **In the dialog box, click Save File to save the media pack to your PC or workstation. Click OK.**

**Note** – This process may take several minutes.

8. **To complete the installation, see “[Install the Standalone SL Console](#)” on page 52.**

## ▼ Install the Standalone SL Console

### Task Tool

This procedure can be performed at the client.

### Task Purpose

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

**Note** – Your Oracle support representative may have performed this procedure for you during library installation.

**Note** – Prior to using this procedure, you must have downloaded and extracted the standalone SL Console media pack to your PC or workstation. See [“Download the Standalone SL Console Media Pack” on page 51](#).

### Task Steps

1. **On your PC or workstation, change to the directory where you saved the standalone SL Console media pack and expand the archive file.**
2. **Open the Install folder.**
3. **Open the SL Console installer file that is appropriate for your operating system.**

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.

4. **Review the information, and click Next.**
5. **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.

6. **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.**

On Solaris, the default location for shortcuts is the user's home directory. However, shortcuts cannot be created in the root directory (/), 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, we recommend that you choose /usr/bin or a similar location.

When you click **Next**, the **Pre-Installation Summary** screen appears.

7. **Review the information and verify that it is all correct. Click Install to continue.**

The installation begins, and the **Installing SL Console** screen appears.

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

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



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## Capacity on Demand

The SL500 library includes the Capacity on Demand feature. Capacity on Demand separates physical capacity from activated capacity, and allows you to pay only for the capacity you need.

Physical storage capacity is the amount of storage cell hardware installed.

Activated capacity is the number of storage cells that have been activated for use. This cannot exceed the physical capacity.

As your needs grow, you can add modules and activate the portion that you need. To expand capacity within a module, you need only purchase and install a hardware activation file for the new capacity, and then reboot the library.

**Note** – Starting with SL500 firmware version 1300 and SL Console version 4.00, storage capacity upgrades must be installed through the SL500 hardware activation utility. See [“Hardware Activation Files” on page 61](#) for details.

**Note** – This feature controls cartridge storage cells only. All installed tape drives are available by default. All cells in CAPs configured for enter and eject operations are available if the module containing the CAP has any activated storage cells

## Capacity on Demand Features and Restrictions

This section describes important features and restrictions of Capacity on Demand that will help you to plan for and use the feature in your SL500 library.

- Only activated storage cells can be used for tape cartridge storage. Unactivated storage cells cannot be used for cartridge storage, nor can they be accessed by any hosts.
- The minimum activated capacity is 30 storage cells for LTO-only libraries, and 24 storage cells for mixed-media libraries. This is identified as a LimitedBase activation key.
- You can purchase additional activated capacity in the following increments:
  - FullBase: Activates all storage cells in the Base Module.
  - FullDEM: Activates all storage cells in a Drive Expansion Module (DEM).
  - ThirdDEM: Activates one-third of the storage cells in a DEM. To activate two-thirds of a DEM, you would install two ThirdDEM hardware activation files. To activate all of a DEM, you could install three ThirdDEM hardware activation files or one FullDEM activation file.
  - FullCEM: Activates all storage cells in a Cartridge Expansion Module (CEM).

- After installing additional activated capacity, you need to reboot the library. Once verified by the library controller, the additional storage cells are available for use.
- Storage capacity is incremental. Total activated capacity is equal to the sum of the capacities specified in each hardware activation file installed and activated on the library.
- The order that capacity activation files are installed is not significant (that is, it does not need to match the order of the modules in the SL500 frame).

## Planning Library Capacity

The SL500 does not support gaps in activated capacity; all storage cells must be contiguous. You can begin adding activated capacity to a module only if the module directly above it is activated at full capacity.

**Example:** Base Module + DEM

The Base Module must be activated at full capacity before you can begin adding activated capacity to the DEM.

Deleting a Capacity activate for a module in the middle of a library will cause the modules below it to be unavailable.

**Example:** Base Module + DEM + CEM + CEM

Removing any portion of the DEM capacity will make both CEMs unavailable.

**Note –** CEMs must be at the bottom of any SL500 configuration. A CEM cannot be installed between a Base Module and a DEM.

### LTO-Activated Capacity by Module

The following table shows capacity of different configurations for LTO. All capacities assume no reserved cells and all CAPs are configured for enter and eject operations.

**TABLE 3-1** LTO Activated Capacity by Module

Module	Configuration	Hardware Activation Key	Module-Activated Capacity
Base	Shipped standard	LimitedBase	30
	At last module	FullBase	50
	With any module underneath	FullBase	66
DEM	As last module	ThirdDem (increments of 26, 26, 25)	77
	With any module underneath	ThirdDem (increments of 28, 28, 28)	84

**TABLE 3-1** LTO Activated Capacity by Module

Module	Configuration	Hardware Activation Key	Module-Activated Capacity
CEM after Base Module or DEM	As last module	FULLCEM	104
	With any module underneath	FULLCEM	114
CEM after CEM	As last module	FULLCEM	110
	With any module underneath	FULLCEM	120

### Mixed Media-Activated Capacity by Module

The following table shows capacity of different configurations for mixed media. All capacities assume no reserved cells and all CAPs are configured for enter and eject operations.

**TABLE 3-2** Mixed Media-Activated Capacity by Module

Module	Configuration	Hardware Activation Key	Module-Activated Capacity
Base	Shipped standard	LimitedBase	24
	At last module	FullBase	42
	With any module underneath	FullBase	56
DEM	As last module	ThirdDem (increments of 21, 21, 21)	63
	With any module underneath	ThirdDem (increments of 24, 23, 23)	70
CEM after Base Module or DEM	As last module	FULLCEM	84
	With any module underneath	FULLCEM	94
CEM after CEM	As last module	FULLCEM	90
	With any module underneath	FULLCEM	110

### Cell Assignment Rules

The library controller uses the following rules when filling activated storage cells with cartridges:

- All cells in column 1 are filled first, then the cells in column 2, then 3, and so on.
- Cells within each column are filled from top to bottom, starting with the first row after any reserved cells. For example, if the top three cells in a column are reserved, cell assignment within the column starts with row 4.
- Once all cells within a module are filled, cell assignment moves to the next module, using the same top-to-bottom, column by column approach.

In partitioned libraries, the library controller applies these rules separately to each partition.

## Orphaned Cartridges in Non-Partitioned Libraries

**Note** – For a discussion of orphaned cartridges in partitioned libraries, see [“Orphaned Cartridges in Partitioned Libraries” on page 107](#).

In non-partitioned libraries, an orphaned cartridge is a cartridge located in an unactivated storage cell. Orphaned cartridges are inaccessible to all hosts.

A cartridge can become orphaned for a variety of reasons. Following are some possible causes:

- Activated storage capacity has been reduced.
- The cartridge has been moved to an unactivated or inaccessible cell through manual intervention.

## Implementing Changes to Activated Capacity

### Increasing Activated Capacity

The following are special considerations for installing new activated storage capacity.

- See [“Hardware Activation File Installation Process” on page 63](#) for details on purchasing and installing a Capacity activation file.
- If the new activated capacity exceeds the physical capacity, no corrective action is necessary. Physical cells that cannot be activated due to capacity limits will be activated later whenever additional capacity activation files are installed.
- You must configure all affected library host applications to recognize the new activated storage cells. See [“Host Notification of Capacity Changes” on page 59](#) for details.
- In non-partitioned libraries, all newly activated cells are immediately available for use.
- In partitioned libraries, all newly activated cells are added as “unallocated,” and are therefore not available for use. You must manually allocate the new cells to partitions before the cells can be used for cartridge storage. See [“Partition Configuration Tasks” on page 116](#) for detailed instructions.

### Decreasing Activated Capacity

Following are special considerations for deleting activated storage capacity.

**Caution** – Deleting activated capacity is an exceptional situation; use caution when doing so.

- See [“Delete a Hardware Activation File” on page 76](#) for details on deleting activated capacity.
- Storage cells corresponding to the reduced capacity will become inaccessible, and any cartridges within those cells will be orphaned. No checks are made to identify cartridges that will be orphaned. See [“Orphaned Cartridges in Non-Partitioned Libraries” on page 58](#) for details.
- You must configure all affected library host applications to recognize the activated storage cell changes. See [“Host Notification of Capacity Changes” on page 59](#) for details.
- For partitioned libraries:
  - The total number of storage cells allocated to all library partitions cannot exceed the activated capacity of the library.

**Caution** – You must manually de-allocate cells from partitions so the total allocation does not exceed the new activated capacity.

- If, after capacity has been decreased, the total number of cells allocated to all partitions is still less than the new activated capacity, you do not need to reconfigure the partitions.

## Host Notification of Capacity Changes

When storage capacity is added or removed, the library controller notifies all affected hosts according to their interface requirements. SCSI hosts are notified by a “Mode Parameters Changed” unit attention. The host must re-audit the library to determine the specific configuration changes. See the appropriate tape management software documentation for detailed procedures and commands.



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## Hardware Activation Files

**Note** – This feature is available starting with SL500 firmware version 1409 and SL Console version 4.75.

This chapter explains how to activate optional features on the SL500 tape library. It begins with a brief list of the [“Customer-Activated Features” on page 61](#) and an overview of [“Oracle Hardware Activation Files” on page 61](#). It then provides:

- An overview of the [“Hardware Activation File Installation Process” on page 63](#)
- [“Hardware Activation Tasks” on page 64](#)
- A [“Hardware Activation Screen Reference” on page 73](#)

### Customer-Activated Features

The hardware activation utility enables you to activate and monitor selected optional features on the SL500 library. Some library features are activated by the customer, while other must be installed and enabled by an Oracle support representative. Features you can activate include:

- Capacity Upgrades (Full Base, Full DEM, Third DEM, Full CEM)
- Multi Port Fibre Channel (MultiPortFibre)
- Partitioning

The functions described in this chapter can be performed from the standalone SL Console or Web-launched SL Console only.

### Oracle Hardware Activation Files

Selected SL500 features are activated through an Oracle hardware activation file. This activation file is a digitally signed image (.img) file containing a feature activation key. You install one hardware activation file for each feature you have purchased. When you install a new hardware activation file, the included feature is added to the ones already activated on the library. SL500 activation keys do not expire.

## Downloading Oracle Hardware Activation Files

Download Oracle hardware activation files from the Oracle Software Delivery Cloud at:

<http://edelivery.oracle.com>

## Legacy Hardware Activation Files

For SL500 libraries prior to version 1409, hardware activation files were delivered via e-mail from Oracle Corporation. This distribution system has been replaced by the Oracle hardware activation files described in this chapter. When you upgrade to SL500 firmware version 1409, all features that have already been activated on the library are retained.

After the library is upgraded to SL500 firmware version 1409, use the processes described in this chapter to activate any new features. See “[Hardware Activation File Installation Process](#)” on page 63 for a summary of the process.

**Note** – If your SL500 library is running firmware prior to version 1409, features are still delivered to you by e-mail from Oracle Corporation.

Legacy hardware activation files are assigned a unique sequence number to ensure that only one instance of a hardware activation file can be installed on a library at a time.

# Hardware Activation File Installation Process

To activate library features, perform the following tasks.

1. Purchase a feature for an Oracle StorageTek library from Oracle Corporation.
2. Locate the hardware activation file for the feature on the Oracle Software Delivery Cloud and download it to a system accessible to your StorageTek Library Console (SL Console) session.
3. Download the code using the SL Console.
4. Reboot the library to activate the new features.
5. Use the SL Console to display and verify the features on the target library.
6. To configure newly activated capacity or partitioning, see the following:
  - For partitioned libraries, see [“Library Partitioning” on page 83](#)
  - For non-partitioned libraries, see:
    - [“Capacity on Demand” on page 55](#)
    - [“Configuring Bridging Without Partitioning” on page 217](#)

**Note** – The functions described in this chapter can be performed from the standalone SL Console or Web-launched SL Console only.

## Hardware Activation Tasks

- [“Download a New Hardware Activation File” on page 65](#)
- [“Install a New Hardware Activation File on the Target Library” on page 67](#)
- [“Display Current Hardware Activation Files” on page 69](#)
- [“Delete a Hardware Activation File” on page 70](#)
- [“Display the Feature Audit Log” on page 72](#)

## ▼ Download a New Hardware Activation File

### Task Tool

This procedure can be performed at a Web browser.

### Task Purpose

Use this procedure to download a new hardware activation file for the library.

### Task Steps

1. Start a Web browser on your PC or workstation, and navigate to the Oracle Software Delivery Cloud at the following URL:  
<http://edelivery.oracle.com/>
2. Click Sign In / Register.
3. When the Export Validation screen appears, read the instructions.
4. On the Export Validation screen, enter your full name, company name, and e-mail address in the text fields. Select a country from the list.
5. While still on the Export Validation screen, read the Notice.
6. In the Electronic Delivery Trial License Agreement section, read the agreement and terms. Then check the YES check box to agree to the terms of your license.
7. While still on the Export Validation screen, read the Export Restrictions. Check the corresponding YES check box to accept the restrictions.
8. Click the Continue button to move from the Export Validation screen to the Media Pack Search screen.
9. In the Select a Product Pack list of the Media Pack Search screen, select Oracle StorageTek Products.
10. Click Go.  
The Media Pack Search screen refreshes. In the Results section of the screen, a list of media packs meeting your selection criteria replaces the \*\*\* No search conducted \*\*\* notice.
11. In the Select a Product Pack list of the Media Pack Search screen, use the Platform list, and select Generic Platform.
12. Click the Select radio button that corresponds to the SL500 media pack that you want to download, and click the Continue button.
13. When download screen for the selected media pack appears, review the information to verify that you have selected the correct media pack. Click the Readme button to review the readme file.
14. If this is not the correct software, use the Back and/or Search Again buttons to return to the search screen.
15. After verifying you have chosen the correct software, click the Download button beside each desired feature.

16. The actual number, names, part numbers, and file sizes for SL500 Hardware Activation files may differ from the values shown in these examples.
17. When the download dialog appears, select the Save File radio button, and click OK.
18. When the Enter name of file to save to dialog appears, browse to the local directory that will hold the download file, and click Save.

The file is large and may take some time to download, depending on your connection speed.

19. On the download screen for the media pack, click View Digest to view the MD5 and/or SHA-1 digests of the download files.

Files can be corrupted during long downloads over a network. A digest is a hexadecimal number that represents the contents of the file and enables you to verify the integrity of the download.

20. Compute your own digest of the downloaded media pack using the appropriate commandline utility.

For example, on Oracle's Solaris, you could use the **digest** command:

```
# /usr/bin/digest -a sha1 download.zip
9498a4f5303d056ad3ecae826b59f41448d63790
```

21. To verify the integrity of your download, compare your computed digest with the digest displayed by the View Digest button on the download page. They should be identical.
22. If the digest values are not identical, the download file has been corrupted during download. Discard it and repeat the download process.
23. If the digests match, use the extraction utility appropriate for your operating system (gunzip, pkunzip, etc.) to extract the media pack to a location that you can reach from a StorageTek Library Console (SL Console) session.

## ▼ Install a New Hardware Activation File on the Target Library

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

To install a new hardware activation file on a target library, follow this procedure using the StorageTek Library Console (SL Console).

Before performing this procedure, download a new hardware activation file to a system accessible to the SL Console session. See [“Download a New Hardware Activation File” on page 65](#).

### Task Steps

1. **Use the SL Console to log in to the target library.**

See [“General SL Console Usage Tasks” on page 37](#) for details.

2. **Select Tools > Hardware Activation, and select the Install Hardware Activation Keys tab.**

The Install Hardware Activation Keys page appears.

3. **In the File Name field, enter the full path of the hardware activation file you want to install, and click Enter. Optionally, click Browse and navigate to the file location.**

The Hardware Activation File Details display in the lower part of the page.

4. **Review the hardware activation file details, and then click the Install... button in the upper right corner.**

The Activation File Installation Confirmation message appears.

5. **Click Yes to begin installing the activation file on the target library.**

The library controller installs the hardware activation file, and a confirmation message appears.

6. **Click OK to dismiss the message.**

7. **Reboot the library to activate the new activation file features. Click Reboot in the upper right corner.**

See [“Download Code to the Library Controller” on page 344](#) for detailed instructions.

8. **You can verify that the activation file has been installed and activated successfully by displaying the current activation files. See [“Display Current Hardware Activation Files” on page 69](#) for details.**

Depending on the features included in the hardware activation file, you may need to perform additional tasks to use the new features.

## Hardware Activation Tasks

- See [“Increasing Activated Capacity” on page 58](#) and [“Decreasing Activated Capacity” on page 58](#) for special considerations that apply when you install a hardware activation file that adds activated capacity to the library.

## ▼ Display Current Hardware Activation Files

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

To display the features currently activated on a target library, perform this procedure using the StorageTek Library Console (SL Console).

### Task Steps

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

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

**Note** – If a feature has been installed but the library has not yet been rebooted, the **Enabled** column will indicate “No.” The library must be rebooted for the feature to be activated.

See [“Hardware Activation > Current Hardware Activation Keys”](#) on page 74 for detailed information about the fields.

## ▼ Delete a Hardware Activation File

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

To delete a hardware activation file from a target library, complete this procedure using the StorageTek Library Console (SL Console).

**Caution –** Deleting a hardware activation file is an exceptional situation. Be sure you want to do this before you begin this procedure. Having extra hardware activation files installed on a library does not present any problems (for example, capacity activation files that exceed the physical capacity of the library). The extra activation files are simply not used.

**Caution –** *Capacity reduction.* Deleting a capacity hardware activation file reduces the activated capacity of the affected library module. This can result in orphaned cartridges. See [“Decreasing Activated Capacity” on page 58](#) and [“Orphaned Cartridges in Non-Partitioned Libraries” on page 58](#) for details.

**Caution –** *Partitioning feature removal.* Deleting a partitioning hardware activation file deletes the partitioning feature from the library. See [“Delete a Partition” on page 148](#) for details about the effects on the library configuration.

### Task Steps

1. Use the SL Console to log in to the target library.

See [“General SL Console Usage Tasks” on page 34](#) for details.

2. Select **Tools > Hardware Activation**, and click the **Current Hardware Activation Keys** tab.
3. Click the activation file you want to delete.

**Note –** Sequence numbers 99000 and above indicate legacy hardware activation files that are permanently retained and cannot be deleted from the library.

The **Delete...** button activates.

4. Verify you have selected the correct activation file, and click the **Delete** button.  
A **Delete Confirmation** message appears.
5. Click **Yes** to begin the deletion.

The hardware activation file is deleted from the library, and the **Current Hardware Activation Keys Summary** section updates.

6. Reboot the library in order for the activation file deletion to take effect. See [“Download Code to the Library Controller” on page 344](#) for detailed instructions.
7. Depending on the feature included in the hardware activation file, you may need to perform additional tasks after deleting the key.
  - See [“Decreasing Activated Capacity” on page 58](#) for special considerations that apply when you delete a capacity hardware activation file.
  - See [“Delete a Partition” on page 148](#) for special considerations that apply when you delete a Partitioning hardware activation file.

## ▼ Display the Feature Audit Log

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to display a list of all feature activation activity that has occurred over the life of the library. You can use this log to verify the validity of all features installed on the library.

**Note** – This feature is available starting with SL500 firmware version 1409 and SL Console version 4.75.

By default, the report is sorted in chronological order. Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 27](#).

### Task Steps

1. **Select Tools > Reports.**
2. **Expand the Hardware Activation Audit Log folder, and click the Hardware Activation Audit Log tab.**

The **Feature Audit Log** appears.

See [“Reports > Feature Audit Log” on page 80](#) for detailed information about the fields

# Hardware Activation Screen Reference

This section includes detailed descriptions of all SL Console hardware activation file screens, arranged by screen navigation path.

For example, **Hardware Activation > Install Hardware Activation Keys**: indicates the screen accessed by clicking:

1. **Tools**
2. **Hardware Activation** tab
3. **Install Hardware Activation Keys** tab

## Screens

- [“Hardware Activation > Current Hardware Activation Keys”](#) on page 74
- [“Hardware Activation > Install Hardware Activation Keys”](#) on page 77
- [“Reports > Feature Audit Log”](#) on page 80

## Hardware Activation > Current Hardware Activation Keys

### Sample Screen

Tools Help **Hardware Activation** Reboot... Delete... Refresh ?

**Current Hardware Activation Keys** Install Hardware Activation Keys Delete Hardware Activation Files

**Current Hardware Activation Keys Summary**

Feature	Sequence Number	Value	Enabled
Capacity	1001	FullCEM	No
Partitioning	99001	None	Yes
Capacity	99002	LimitedBase	Yes
Capacity	99003	FullBase	Yes
Capacity	99004	FullIDEM	Yes

**Associated Module Capacity Activation Detail**

Module Number	Capacity	Sequence Number
1	Full Capacity	<b>99002, 99003</b>
2	Full Capacity	<b>99004</b>
3	None	<b>000</b>
4	None	<b>000</b>
5	None	<b>000</b>

Cells Activated 90  
Cells Not Activated 8  
Total Numbers of Cells 98

### Description

Displays the contents of all hardware activation files currently installed on the library you are logged in to.

You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 27](#) for details.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

## Screen Fields

### ***Current Hardware Activation Keys Summary***

#### **Feature**

Name of the feature activated on the library.

#### **Sequence Number**

Unique sequence number assigned to a legacy hardware activation file.

**Note** – Sequence numbers 99000 and above indicate legacy hardware activation files that are permanently retained and cannot be deleted from the library.

#### **Value**

Qualification for the feature, if applicable. For example, for the Capacity feature, this field displays the capacity the activation file provides, such as full CEM, one-third DEM, etc. Depending on the feature, the field may be blank or indicate “None.”

#### **Enabled**

Indicates whether the feature is currently activated on the library. Options are:

- Yes: Feature has been activated.
- No: Feature has been installed, but not activated. You must reboot the library in order for the feature to be activated.

### ***Associated Module Capacity Activation Detail***

#### **Module Number**

Numeric module ID. Possible values are 1–5.

#### **Capacity**

Total module capacity that has been activated for use. Possible values are:

- Full Capacity: All storage cells in the module are activated for use.
- None: No storage cells in the module have been activated for use. May also indicate that the module is not installed in the library.
- 1/3 Capacity: One-third of the storage cells in the module have been activated. Applies only to the DEM.
- 2/3 Capacity: Two-thirds of the storage cells in the module have been activated. Applies only to the DEM.

#### **Sequence Number**

**Note** – This field applies to legacy hardware activation files only.

Hardware activation file sequence numbers used in providing the indicated capacity. If more than one hardware activation file is involved, the sequence numbers are separated by commas.

The numbers 000 indicate no hardware activation file has been installed for the module.

**Cells Activated**

Total number of storage cells in the library that have been activated for use. This cannot be greater than the physical capacity of the library.

**Cells Not Activated**

Total number of storage cells in the library that have not been activated for use.

**Total Number Of Cells**

Total physical capacity of the library.

**Buttons**

**Reboot**

Click to reboot the library.

**Delete**

Click to delete the selected hardware activation file from 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.

**See Also**

[“Hardware Activation > Install Hardware Activation Keys” on page 77](#)

## Hardware Activation > Install Hardware Activation Keys

### Sample Screen

Tools Help **Hardware Activation** Reboot... Install... ?

Current Hardware Activation Keys **Install Hardware Activation Keys** Delete Hardware Activation Files

Choose Install button above to initiate Hardware Activation.

File Name  Browse...

Product: SL500  
 Serial Number:  
 Sequence Number:  
 Key Type: Sun Hardware Activation File  
 Comment Line 1: Oracle Copyright 2010  
 Comment Line 2: E-Distribution hardware activation key

**Hardware Activation File Details**

Feature	Expiration	Value
Capacity	N/A	FullCEM

### Description

Enables you to display the contents of a new hardware activation file and install it on the library.

You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 27](#) for details.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### File Name

Required.

Enter the full path of the hardware activation file you want to install on the library. Optionally, you can click **Browse** and navigate to the file location. The file must be located on a system accessible to the SL Console session.

**Product**

Display only.

Type of library. For example, SL8500, SL3000 or SL500.

**Serial Number**

Display only.

Serial number of the library the hardware activation file is for. This entry applies only to legacy hardware activation files. See [“Legacy Hardware Activation Files” on page 62](#) for details.

**Key Type**

Display only.

Type of hardware. Options are:

- Oracle Hardware Activation File: File downloaded from the Oracle Software Delivery Cloud.
- Sun Hardware Activation File: Legacy file. See [“Legacy Hardware Activation Files” on page 62](#) for details.

**Sequence #**

Display only.

Unique sequence number assigned to a legacy hardware activation file.

**Note** – Sequence numbers 99000 and above indicate legacy hardware activation files that are permanently retained and cannot be deleted from the library.

**Comment Line 1**

Display only.

Optional comment concerning the hardware activation file, from Oracle Corporation

**Comment Line 2**

Display only.

Optional comment concerning the hardware activation file, from Oracle Corporation

## **Hardware Activation File Details**

### **Feature**

Display only.

Name of a feature included in the hardware activation file.

### **Expiration**

Display only.

Number of days until the feature is due to expire. Because SL500 library features do not expire, the value for this field is always "N/A."

### **Value**

Display only.

Qualification for the feature, if applicable. For example, for the Capacity feature, this field displays the amount of storage capacity the activation file provides. Depending on the feature, the field may be blank.

## **Buttons**

### **Install**

Click to install the displayed hardware activation file on the library you are logged in to.

### **Browse**

Click to navigate to the hardware activation file you want to display and install.

### **? (Help)**

Click to display online help for the screen.

## **See Also**

- ["Hardware Activation > Current Hardware Activation Keys" on page 74](#)

## Reports > Feature Audit Log

### Sample Screen

Feature Name	Feature Value	Feature Action	Action Date
SL3000	SN	57100000004	12/8/10 2:07 PM
RedundantElectronics	none	enabled	10/27/10 2:51 PM
RedundantElectronics	none	disabled	11/9/10 1:55 PM
Capacity	200	installed	11/9/10 4:44 PM
Partitioning	none	enabled	11/9/10 4:44 PM
DualPort	none	deleted	11/9/10 4:46 PM
DualPort	none	deleted	11/9/10 4:46 PM
Capacity	200	installed	11/9/10 4:47 PM
Partitioning	none	enabled	11/9/10 4:47 PM
Capacity	200	deleted	11/9/10 4:48 PM
DualPort	none	deleted	11/9/10 4:48 PM
Capacity	200	deleted	11/9/10 4:48 PM
Capacity	400	deleted	11/9/10 4:49 PM
Capacity	400	deleted	11/9/10 4:49 PM
Capacity	200	installed	11/9/10 4:49 PM
Capacity	100	installed	11/10/10 9:40 AM
Capacity	100	installed	11/10/10 11:23 AM
Capacity	3400	Summary	12/8/10 2:07 PM
Service	none	Summary	12/8/10 2:07 PM
DualRobot	none	Summary	12/8/10 2:07 PM
Partitioning	none	Summary	12/8/10 2:07 PM
OpenVolser	none	Summary	12/8/10 2:07 PM

### Description

Displays a list of all feature activation activity that has occurred over the life of the library. You can use this log to verify the validity of all features installed on the library.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### Feature Name

Name of the feature.

The first line of the display is the type of library.

**Feature Value**

Special attributes of the feature. Options are:

- SN: Indicates that the serial number of the library is displayed in the Feature Action field. Appears on the first line of the display.
- *nnnn*: For capacity hardware activation files, the number of cells added or removed.
- none: Appears for all other features.

**Feature Action**

Action that was performed. Options are:

- *nnnnnnnn*: Serial number of the library. Appears on the first line of the display.
- deleted: The hardware activation file for the feature was deleted.
- disabled: The feature was disabled by an Oracle support representative.
- enabled: The feature was enabled by an Oracle support representative.
- installed: The hardware activation file for the feature was installed.
- Summary: The feature is active on the library.

**Action Date**

Date and time when the action was performed.

**Buttons****Search**

Click to search a library report for a specified text string.

**Update**

Click to update the report with current data.

**Save**

Click to save the report to a designated comma-separated text file (.csv extension). Comma-separated files can be opened by a variety of spreadsheet and database programs.

**? (Help)**

Click to display online help for the screen.

**See Also**

- [“Hardware Activation > Current Hardware Activation Keys”](#) on page 74



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## Library Partitioning

**Note** – Starting with SL500 firmware version 1300 and SL Console version 4.00, library partitioning upgrades must be installed through the SL500 hardware activation utility. Partitioning established on a library prior to version 1300 is retained permanently. See [“Hardware Activation Files” on page 61](#) for details.

By using library partitioning, you can assign logical groups of storage cells and tape drives of the SL500 library for exclusive use by specified hosts. For example, you can configure one group of storage cells and drives to be used only for Symantec operations, and another group only for Tivoli operations. This enables you to configure an SL500 library for applications running on multiple hosts and operating systems.

You can use the standalone SL Console or Web-launched SL Console to configure library partitions.

This chapter covers the following:

- [“Benefits of Partitioning” on page 84](#)
- [“Partitioning Concepts and Features” on page 84](#)
- [“Allocating Storage Cells and Drives to a Partition” on page 86](#)
- [“Allocating CAPs to Partitions” on page 86](#)
- [“Orphaned Cartridges in Partitioned Libraries” on page 87](#)
- [“Planning for Partitioning” on page 87](#)
- [“Preparing the Library for Partitioning” on page 92](#)
- [“Partition Process Overview” on page 95](#)
- [“Library Resource Addresses” on page 93](#)
- [“Partition Configuration Tasks” on page 98](#)
- [“Partition Screen Reference” on page 136](#)

## Benefits of Partitioning

By partitioning the SL500 library, you can have:

- More than one operating system and application manage the library
- An improvement in the protection or isolation of files
- An increase in system and library performance
- A higher level of data organization
- An increase in user efficiency

Partitions can be customized to fit different requirements, for example:

- Allowing for special partitions to protect or archive data
- Enabling multiple organizations, companies, or departments access
- Isolating clients (such as for service centers)
- Separating different encryption key groups
- Dedicating partitions as test systems for new technologies or data migration to new tape drives

## Partitioning Concepts and Features

This section applies to partitioning an SL500 library and covers:

- [“Allocation” on page 84](#)
- [“Partitions Available” on page 84](#)
- [“Smallest Partition Unit” on page 85](#)
- [“Host Control of Partitions” on page 85](#)
- [“Sharing CAPs Between Hosts/Partitions” on page 85](#)

### Allocation

Library resources (cells, drives, and CAPs) are allocated to a partition for exclusive use by that partition.

Storage cells and tape drives allocated to a partition can be used only by the hosts assigned to that partition. See [“Allocating Storage Cells and Drives to a Partition” on page 86](#) and [“Allocating CAPs to Partitions” on page 86](#).

Storage cells and drives not allocated to, reserved for or associated with any partition cannot be accessed by any hosts. For example, you might leave an area of cells unallocated, in preparation for future partitioning.

### Partitions Available

You can configure up to eight partitions within an SL500 library.

## Smallest Partition Unit

A partition can be as small as a single storage cell, CAP cell, or tape drive. Cells and drives within a partition do not need to be adjacent.

## Host Control of Partitions

Host-partition connections identify the hosts that are able to access a partition.

Each partition appears to the host as a separate library. A host can control one or more partitions. In addition, it is possible for more than one host to control a single FC-SCSI partition, but it is recommended that you exercise caution in implementing this configuration, as some host applications may not allow for resource sharing.

Oracle's StorageTek ACSLS software does not support partitioning on the SL500 library.

## Sharing the Entire Library

Up to eight hosts can share a single SL500 library.

## Host Accessibility to Resources

The host assigned to SL500 library's partition has full-time, exclusive access to all available storage resources allocated to that partition. The host "owns" all tape drives, storage slots, and cartridges in the partition, just as it would if these resources were located in a freestanding, unpartitioned library. A host has no access to the resources of partitions not assigned to it.

## Sharing CAPs Between Hosts/Partitions

HandBots in the library are shared resources which you cannot assign exclusively to one partition. However, CAPs can be "owned" by a partition.

### ***Sharing a Common CAP***

A common (or unassigned) CAP is a shared library resource that has no cells allocated to a partition. See ["Common CAP: Not Allocated to Partitions" on page 86](#).

### ***Dedicating an Entire CAP or CAP Cells***

All the cells in a CAP can be allocated for exclusive use by (or dedicated to) only one partition. See ["Allocating CAPs to Partitions" on page 86](#) for details.

A CAP can have its cells allocated to different partitions. See ["Split CAP: Allocating CAP Cells to Partitions" on page 86](#).

### ***Assigning Partitions to CAP Open Button***

You can assign partitions to the **CAP Open** button so that only CAPs containing cells accessible to those partitions will open. See ["Assigning Partitions to the CAP Open Button" on page 87](#).

## Allocating Storage Cells and Drives to a Partition

After resources (storage cells, tape drives, and cartridges) are allocated to a partition, only host connections that are also assigned to the partition can access the partition's resources. For example, if a group of tape drives is allocated to a partition, only the hosts assigned to that partition can use those drives.

Storage cells and drives that are not allocated to any partition cannot be accessed at all. For example, you can leave an area of cells non-allocated in preparation for a planned future partition.

On the SL Console screens and reports, storage cells and drives appear in one of the following states:

- Unassigned: Not allocated to any partition, therefore, available to be assigned to the current partition.
- Assigned: Allocated to the current partition.
- Unavailable: Assigned to another partition.

## Allocating CAPs to Partitions

The cells within each CAP can be individually allocated or non-allocated to partitions.

### Common CAP: Not Allocated to Partitions

In a common, or non-allocated CAP, all cells in the CAP are left non-allocated and can be used by any partition that does not have any CAP cells allocated to it. CAP cells are common by default. Any CAP cells that are not explicitly allocated to a partition are treated as common.

A common CAP is a shared library resource. Each host must select a common CAP to use it and must release the CAP when done, to make it available to other hosts. No other host can access the CAP until the first host has completed the operation and released the CAP. For additional details, see [“Assigning Partitions to the CAP Open Button” on page 87](#).

### Split CAP: Allocating CAP Cells to Partitions

In a split CAP, the cells in the CAP are allocated to one or more partitions. Each individual CAP cell can be allocated to one partition only. Cells in a split CAP can be allocated in any of the following ways:

- All cells can be allocated to one partition.
- All cells can be distributed among multiple partitions. For example, in an eight-cell CAP, two cells could be allocated to Partition 1, one cell to Partition 2, and the remaining cells to Partition 3.
- You can split cells in a CAP between partitions. Some cells can be allocated to one partition and the remainder left unallocated, or common. For example, in an eight-cell CAP, five cells could be allocated to Partition 3, and the remaining cells left common.

When configuring a split CAP, you must plan carefully for anticipated CAP usage. A partition with allocated CAP cells can use the cells allocated to it only. It cannot use CAP cells allocated to other partitions, nor can it use common CAP cells.

### Assigning Partitions to the CAP Open Button

In a partitioned library, it is recommended that you assign partitions to the **CAP Open** button on the library control panel prior to pressing the button to open the CAPs.

Once you have assigned partitions to the **CAP Open** button, only CAPs containing cells that are accessible to those partitions will open. Depending on how your library's CAPs are configured, this operation may expose CAP cells that are not accessible to the selected partitions. As a safeguard, however, CAPs that contain only inaccessible cells and CAPs with cartridges in inaccessible cells do not open.

For detailed instructions, see [“Enter Cartridges Into a Partitioned Library” on page 130](#) and [“Eject Cartridges From a Partitioned Library” on page 133](#).

## Orphaned Cartridges in Partitioned Libraries

**Note** – For a discussion of orphaned cartridges in non-partitioned libraries, see [“Orphaned Cartridges in Non-Partitioned Libraries” on page 58](#).

In partitioned libraries, an orphaned cartridge is a cartridge located in an unallocated cell or drive (that is, a cell or drive not allocated to any defined partition).

**Caution** – If a host encounters an orphaned cartridge it might treat the cartridge as scratch and overwrite the data. Therefore, it is very important to disposition orphaned cartridges properly.

A cartridge can become orphaned for a variety of reasons, including:

- Partition boundaries have changed.
- A partition has been deleted.
- The cartridge has been moved to a non-allocated or inaccessible cell through manual intervention.

If the SL Console identifies an orphaned cartridge, it displays a warning message. You can then place the cartridge in the correct partition with a recovery move. For detailed instructions on checking for and resolving orphaned cartridges, see the following:

- [“Verify Partition Configurations” on page 107](#)
- [“Resolve Orphaned Cartridges” on page 110](#)
- [“Commit Partition Configuration Changes” on page 111](#)

## Planning for Partitioning

Library partitioning requires:

- A thorough knowledge of library wall and slot mapping

- Clear communication among all parties involved, including system programmers and administrators, library operators, and your Oracle service representative
- For a bridged library, an available, bridge-capable drive in each proposed partition
- Verification that all tape drives and cartridges have been moved to the proper locations, according to the planned host/storage cell and host/tape drive assignments

Plan the storage area needed for resident tape cartridges, and anticipate the number of required free cells. Understand the boundaries of each partition you want to create and the host assignments to those partitions.

## Allocated Storage Capacity

In partitioned libraries:

- The total number of storage cells allocated to all library partitions cannot exceed the activated capacity of the library.
- There is no default active storage region.

You must explicitly assign storage cells to partitions, which configures the active storage regions for each partition. See [“Partition Process Overview” on page 95](#) for details. Note that the total number of storage cells allocated to all library partitions cannot exceed the activated capacity of the library.

## Partition Configurations

To configure a partition, you must define the following:

- [“Partition Summary Information” on page 88](#)
- [“Host-Partition Connections” on page 88](#)
- [“Partition Boundaries” on page 89](#)

For detailed instructions on defining library partitions, see [“Partition Process Overview” on page 95](#).

### Partition Summary Information

Partition summary information includes the partition ID, optional name, and the barcode format to be used on cartridge labels. Partition IDs must be unique and can range from 1–8.

### Host-Partition Connections

Host-partition connections identify the hosts that are able to access a partition. Each partition appears to the host as a separate library module.

A host can control one or more partitions. In addition, it is possible for more than one host to control a single FC-SCSI partition, but it is recommended that you exercise caution in implementing this configuration, as some host applications may not allow for resource sharing.

### ***Host-Partition Connections in Bridged Libraries***

In a bridged SL500 library, you automatically define the host-partition connection when you connect the host bus adapter (HBA) to the bridge drive that manages the control path for the partition.

### ***Host-Partition Connections in Unbridged Libraries***

In an unbridged library, you must separately define the host-partition connections.

A partition can have one or more host-partition connections. The host-partition connection configuration is user-defined and consists of the following information:

- World Wide Port Name of the host bus adapter
- Logical unit number (LUN) of the partition as seen from the host.

See [“Add a Host Connection \(Unbridged Libraries Only\)” on page 101](#) for detailed instructions on defining this information.

## **Partition Boundaries**

Partition boundaries identify the storage cells, drives, and CAP cells that are part of each partition. Only non-allocated cells can be added to a partition, and only allocated cells can be removed.

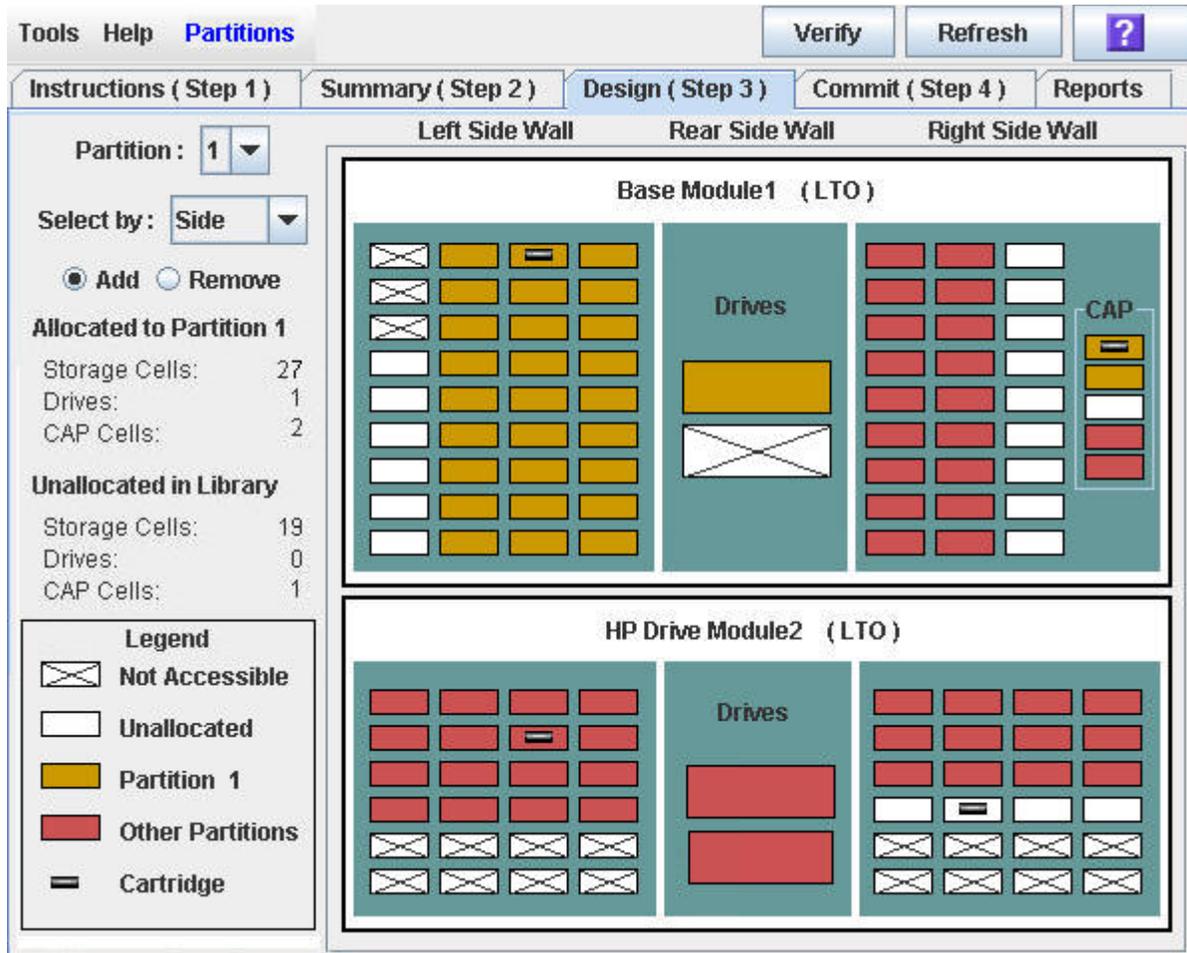
You can define partition boundaries in any of the following ways:

- Select individual cells or rectangular groups of cells to add or remove from a partition. Cells or cell groups do not have to be contiguous.
- Select an entire module side to add or remove from a partition. Sides do not have to be contiguous.
- Select an entire module to add or remove from a partition. Modules do not have to be contiguous.

### Sample Partition Configuration

FIGURE 5-1 shows a sample SL500 library partition configuration. In this example, there are three defined partitions: Partition 1, Partition 2, and Partition 6.

FIGURE 5-1 Library Partition Example



The screen example is from the perspective of Partition 1, therefore the resources allocated to Partition 1 are shown in gold, and the resources allocated to Partition 2 and Partition 6 are shown in red. [TABLE 5-1](#) describes the resource allocation in detail.

**TABLE 5-1** Partition Example – Resource Description

<b>Resource Group</b>	<b>Included Resources</b>
Partition 1	All resources are shown in gold. Includes the following: <ul style="list-style-type: none"> <li>• Tape drive in the base module</li> <li>• Storage cells in the left side of the base module</li> <li>• Top two CAP cells in the base module</li> </ul>
Partition 2	All resources are shown in red. Includes the following: <ul style="list-style-type: none"> <li>• Top tape drive in the Drive Module</li> <li>• Storage cells in the right side of the base module</li> <li>• No allocated CAP cells</li> </ul>
Partition 6	All resources are shown in red. Includes the following: <ul style="list-style-type: none"> <li>• Bottom tape drive in the Drive Module</li> <li>• Storage cells in the Drive Module</li> <li>• Bottom two CAP cells in the base module</li> </ul>
Common CAP cell	Middle CAP cell in the base module
Unassigned	All resources shown in white
Not Accessible	All resources shown x'ed out
Orphaned cartridge	Cartridge in unallocated (white) storage cell in the base module

## Preparing the Library for Partitioning

Before you can partition a library, you must install, activate, and enable the partitioning feature.

The following special considerations apply after you successfully install the partitioning feature on a previously non-partitioned library.

- You must reboot the library after installing the partitioning activation file.
- Until you create at least one partition, the library remains in a non-partitioned state. That is, all activated storage cells, drives, and CAPs are accessible to all hosts.

## Activating the Partitioning Feature

Starting with SL500 firmware version 1300 and SL Console version 4.00, library partitioning upgrades must be installed through the SL500 hardware activation utility. Partitioning established on a library prior to version 1300 is retained permanently. See [“Oracle Hardware Activation Files” on page 61](#) for details.

## Enabling and Disabling the Partitioning Feature

The partition feature can be installed and enabled through the [“Hardware Activation File Installation Process” on page 63](#).

A library with partitioning enabled can be in either of the following states:

- **Partitioned:** The library has at least one user-defined partition with a valid partition ID.
- **Non-partitioned:** The library has no user-defined partitions. A non-partitioned library behaves in the same manner as a library that does not have partitioning enabled. That is all storage cells, drives, and CAPs are accessible to all hosts.

To disable partitioning on a library, you must first delete all partitions. The library state will then change to “non-partitioned.”

## Deleting the Partitioning Feature

You can delete the partitioning feature by deleting the partitioning hardware activation file from the library. See [“Delete a Hardware Activation File” on page 108](#) for detailed instructions. You must reboot the library after deleting the partitioning activation file for the deletion to take effect.

**Note** – Deleting the partitioning feature is an exceptional situation. Be sure this is what you want to do. The partitioning feature cannot be deleted if it was activated by a legacy hardware activation file prior to SL500 firmware version 3.0.

Deleting the partitioning feature has the following effects on the library configuration:

- Changes the library state to “non-partitioned.”
- Makes all activated storage cells, drives, and CAPs accessible to hosts.

- All existing partition summary information and resource allocations are retained, but not usable. If the partitioning activation file is later re-installed, the partition allocations are restored.

## Library Resource Addresses

Resource addresses uniquely identify each resource (storage cells, drives, and CAP cells) within the library. The SL500 library and attached hosts use the following addressing schemes:

- [“Library Internal Address” on page 93](#)

Each partition appears to a host as a separate library. This is reflected in the partition address.

## Library Internal Address

The library internal address is used by the SL500 library controller and the SL Console device tree to identify the physical location of each resource. The addressing scheme used by the SL500 is a four-digit, comma-separated value, specifying the library, module, row, and column, as viewed from inside the library, facing the drive bays. This addressing scheme is commonly referred to as the LMRC address.

The format of the SL500 LMRC address is  $l,m,r,c$  where:

- $l$  = library or partition number. In partitioned libraries,  $l$  is the partition ID (1–8). In non-partitioned libraries,  $l$  is always “0.”
- $m$  = module number (1–5). The base module is 1, additional drive expansion and storage expansion modules are 2–5.
- $r$  = row number. Numbered consecutively from the top, down, with row 1 at the top.
- $c$  = column number

Column numbers for the base module are 1-4 (left side of library) and 5-8 (right side of library). The column number for the DEM (Drive Expansion Module) drive column (rear of library) is 9. The column numbers for the CEM (Cartridge Expansion Module) columns (rear of library) are 9–11.

Some examples of internal addresses are listed below:

- If the entire base module is allocated to Partition 1, the internal address for a cartridge in row 8, column 1 in the base module is: 1, 1, 8, 1.
- If the entire CEM is allocated to Partition 2, the internal address for a cartridge in row 10, column 1 is: 2, 2, 10, 1.

## Host SCSI Element Address

SCSI element addresses are used by hosts with a FC-SCSI connection to the SL500 library. Each library resource available to a host is identified by a unique SCSI element address.

Following are rules for SCSI element numbering within partitioned libraries:

- Each SCSI element address is a single integer, up to four digits in length.
- SCSI element addresses for each library resource type fall within a distinctive range: 10-999 for CAPs, 1000-1999 for drives, and 2000+ for storage cells.
- SCSI element numbering restarts for each partition. For example, storage cell numbering starts with 2000 for each partition within a given library.
- Numbering starts at the upper-left back of the library, as viewed from the front of the library. Numbering continues to the lower-right front by frame module.
- SCSI element addresses for a partition start at the lowest module, row, and column within the partition, then proceed by row until the end of the column, then increment by column until the end of the module.
- SCSI element numbering is continuous within each partition, even if cell locations for the partition are not adjacent.
- When additional resources are allocated to an existing FC-SCSI partition, the original resources are not renumbered. This helps to minimize disruption to the FC-SCSI host.
- Drive element numbering includes occupied drive slots only. Empty drive slots are not assigned a SCSI element address.

For example, if a library's base and storage expansion modules are allocated to Partition 1 and the Drive Module is allocated to Partition 2, then SCSI element numbering is as follows:

- For Partition 1, the first available storage cell in the base module is assigned element address "2000." Numbering continues sequentially through the last available cell in the storage module, running from top-left through bottom-right. Installed drives in the base module are assigned sequential element addresses, starting with "1000" for the top left drive.
- For Partition 2, the first available storage cell in the Drive Module is assigned element address "2000." Numbering continues sequentially through the last available cell in the Drive Module, running from top-left through bottom-right. Installed drives in the Drives Module are assigned sequential element addresses, starting with "1000" for the top left drive.

### SCSI Element Address Examples

A library's Base and storage expansion modules are allocated to Partition 1, and the Drive Module is allocated to Partition 2. SCSI element numbering is as follows:

- For Partition 1, the first available storage cell in the base module is assigned element address "2000." Numbering continues sequentially through the last available cell in the storage module, running from top-left through bottom-right. Installed drives in the Base Module are assigned sequential element addresses, starting with "1000" for the top left drive.
- For Partition 2, the first available storage cell in the drive module is assigned element address "2000." Numbering continues sequentially through the last available cell in the Drive Module, running from top-left through bottom-right. Installed drives in the Drives Module are assigned sequential element addresses, starting with "1000" for the top left drive.

# Partition Process Overview

**Note** – Starting with SL500 firmware version 1300 and SL Console version 4.00, library partitioning upgrades must be installed through the SL500 hardware activation utility. Partitioning established on a library prior to version 1300 is retained permanently. See [“Hardware Activation Files” on page 61](#) for details.

The high level process for creating a partition for the first time is explained below.

1. Review summary instructions for the partition configuration process at the **Instructions (Step 1)** tab. See [“Review Partitioning Instructions” on page 99](#).

2. At the **Summary (Step 2)** tab, add a partition by:

- Assigning the partition a partition ID
- Giving the partition a name (optional)

See [“Add a Partition” on page 100](#) and [“Add a Host Connection \(Unbridged Libraries Only\)” on page 101](#).

3. Design the partition:

- At the **Design (Step 3)** tab, allocate library resources to the partition and verify the partition assignments.

**Note** – The partition you have just designed is not applied to the library until you commit the configuration in Step 4.

See [“Design a Partition” on page 102](#).

4. At the **Commit (Step 4)** tab, commit the partition to the library.

See [“Commit Partition Configuration Changes” on page 111](#).

## SL Console Partition Workspace

The partition **Summary (Step 2)** and **Design (Step 3)** screens, and all associated dialog boxes, give you a dynamic workspace to design your library partitions.

All partition configuration information is automatically saved to the partition workspace in SL Console memory and retained for the duration of your SL Console session. This enables you to switch among partition views and leave and return to the partition screens any number of times without losing your configuration changes.

Information in the SL Console partition workspace is committed to the library controller database only through the **Commit (Step 4)** screen. The information is lost if any one of the following occurs before you have committed your updates:

- You actively log off the SL Console session.
- The SL Console session times out or the connection to the library is lost.
- You actively refresh the SL Console workspace from the current library controller database. This is done through the **Refresh** button on the **Summary (Step 2)** and **Design (Step 3)** screens.

**Caution** – Although partition changes are not disruptive to library hosts, it is recommended that you make the library unavailable to other users before committing your partition workspace changes. Because the SL Console does not validate partition boundaries against the library controller database in real-time, configuration conflicts may arise if you change partition boundaries while other users are performing cartridge movements or library configuration changes. See [“Synchronizing the Display With the Controller Database”](#) on page 23 for details.

## ▼ Partitioning Task Categories

Partitioning tasks are divided into the following categories:

- [“Partition Configuration Tasks” on page 98](#)
- [“Partition Management Tasks” on page 114](#)
- [“Partition Report Tasks” on page 124](#)
- [“CAP Operation Tasks” on page 129](#)

## Partition Configuration Tasks

- [“Review Partitioning Instructions” on page 99](#)
- [“Add a Partition” on page 100](#)
- [“Add a Host Connection \(Unbridged Libraries Only\)” on page 101](#)
- [“Design a Partition” on page 102](#)
- [“Verify Partition Configurations” on page 107](#)
- [“Resolve Orphaned Cartridges” on page 110](#)
- [“Commit Partition Configuration Changes” on page 111](#)

## ▼ Review Partitioning Instructions

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to review the partitioning process prior to any other partitioning tasks.

### Task Steps

1. **Select Tools > Partitions.**

The first time you make this selection during an SL Console login session, the **Instructions (Step 1)** page appears automatically.

2. **Review the instructions on the page before proceeding with other partitioning tasks.**

## ▼ Add a Partition

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to create a new library partition and assign its storage capacity. You can create up to eight partitions, with IDs from 1–8.

### Task Steps

1. **Select Tools > Partitions, and click the Summary (Step 2) tab. The Summary (Step 2) page appears.**

The exact appearance of the page depends on whether you are configuring an unbridged library or a bridged library:

- For an unbridged library, the interface includes a four-column table in the **Partition Summary** and a section showing **Details for Partition *n***, where *n* is the ID number of the selected partition.
- For a bridged library, the interface includes a five-column table in the **Partition Summary** section (the fifth column is labeled **Bridge Drive**) and does not include a **Details for Partition** section.

2. **Click Add Partition.**

The **Add Partition** dialog box appears.

3. **Select the Partition ID you want to add, and enter the Name, and Barcode Presentation.**

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

4. **Click OK.**

Your partition configuration changes are saved to the SL Console partition workspace for the duration of this login session.

To update the library controller database with all changes from this SL Console login session, see [“Verify Partition Configurations” on page 107](#) and [“Commit Partition Configuration Changes” on page 111](#).

## ▼ Add a Host Connection (Unbridged Libraries Only)

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to set up the connection between a host and a selected partition in an unbridged library. You must perform this procedure in order for the partition to be accessible by the host.

Each partition can have up to nine host connections. Also, each host can connect to multiple partitions.

**Note** – This procedure applies to FC-SCSI host-partition connections only.

### Task Steps

1. Select **Tools > Partitions**, and click the **Summary (Step 2)** tab.
2. Click **Add Connection**.

**Note** – Each initiator connected to the library must have one library partition assigned to LUN 0. When you verify or commit partition configuration changes, the SL Console will notify you if an initiator does not meet this requirement.

3. Click **OK**.

## ▼ Design a Partition

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to allocate library resources (storage cells, tape drives, and CAP cells) to a partition.

Note that library resources can be allocated to only one partition at a time. If you want to add resources to a partition but the resources are already allocated to another partition, you must first remove the resources from the assigned partition, and then add them to the new partition.

### Task Steps

1. **Select Tools > Partitions.**
2. **Click the Design (Step 3) tab.**

The exact appearance of the Design (Step 3) screen varies depending on whether you are configuring an unbridged library or a bridged library. The interface for a bridged library includes an additional, Bridge Drive control and indicators for the available, bridge-capable drives.

Unbridged and bridged library examples for the Design (Step 3) page follow.

Tools Help **Partitions** Verify Refresh ?

Instructions ( Step 1 ) Summary ( Step 2 ) **Design ( Step 3 )** Commit ( Step 4 ) Reports

Left Side Wall      Rear Side Wall      Right Side Wall

Partition: 1

Select by: Side

Add  Remove

**Allocated to Partition 1**

Storage Cells: 27  
Drives: 1  
CAP Cells: 2

**Unallocated in Library**

Storage Cells: 19  
Drives: 0  
CAP Cells: 1

**Legend**

Not Accessible

Unallocated

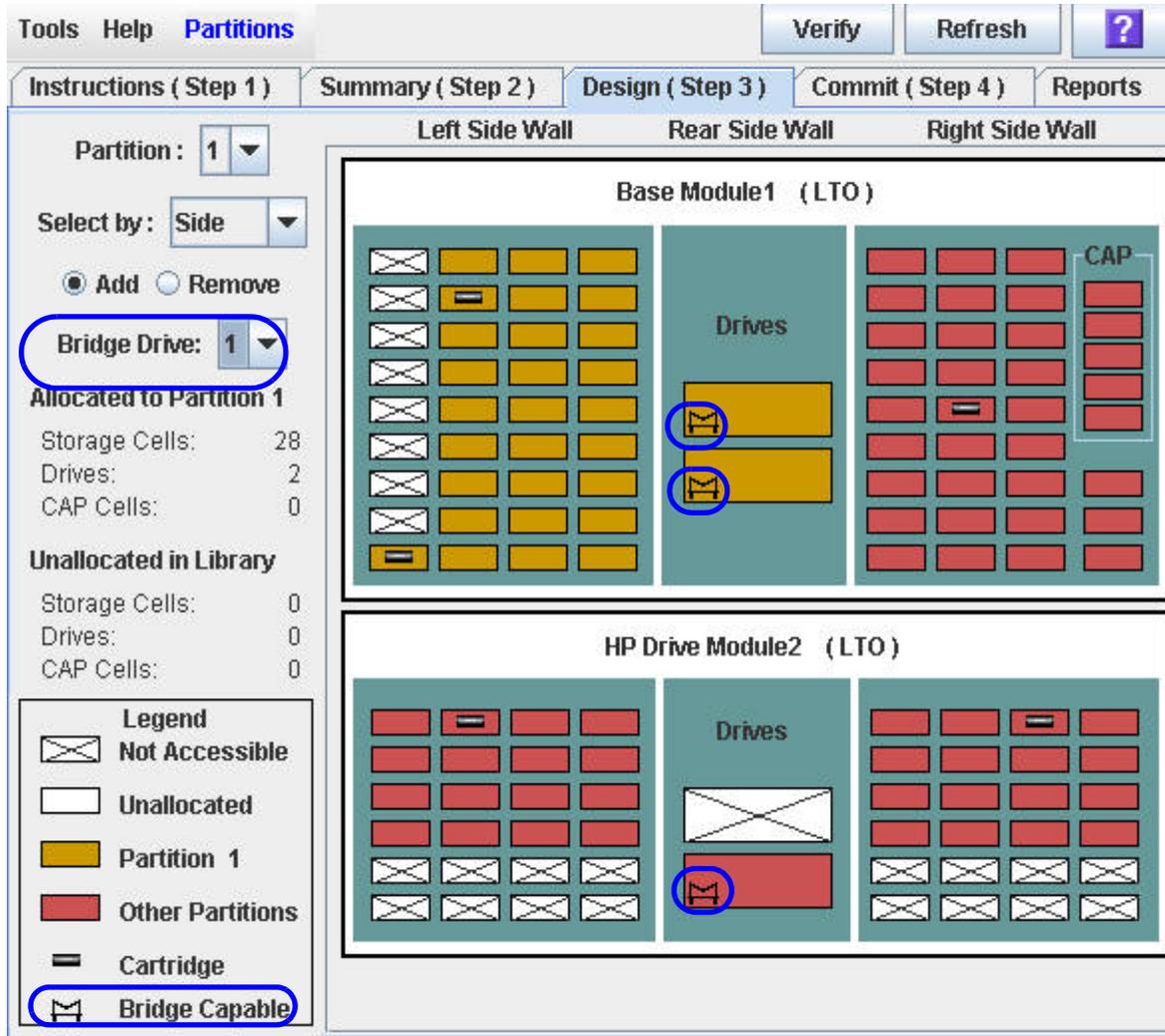
Partition 1

Other Partitions

Cartridge

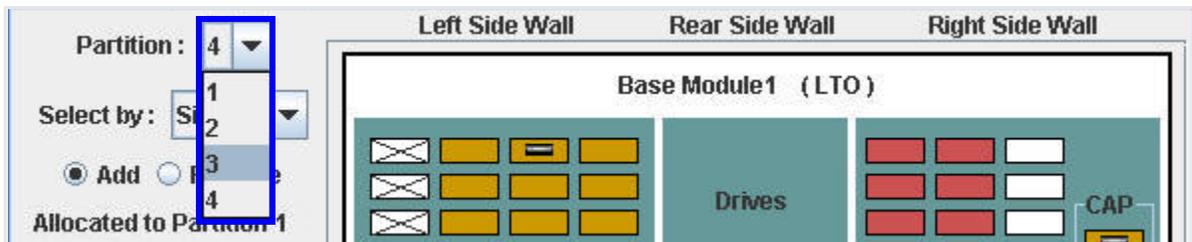
**Base Module1 (LTO)**

**HP Drive Module2 (LTO)**



3. In the Partition list, select the partition that you want to configure.

All fields update to reflect the current configuration for the selected partition.



- Choose a selection method from the Select by list control.

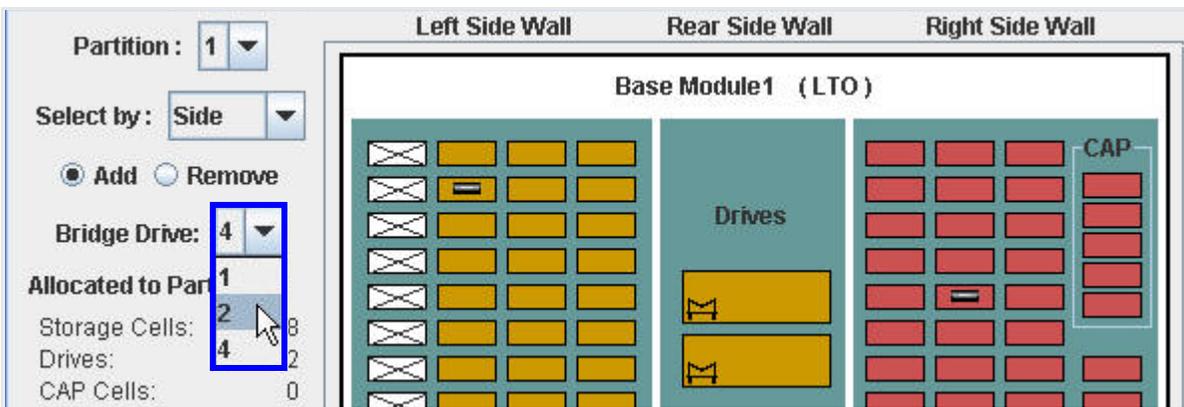


You can select by individual **Cell** (which includes drives), by module **Side**, or by complete **Module**.

- If you are configuring a bridged library, use the Bridge Drive list control to select the bridge drive for this partition.

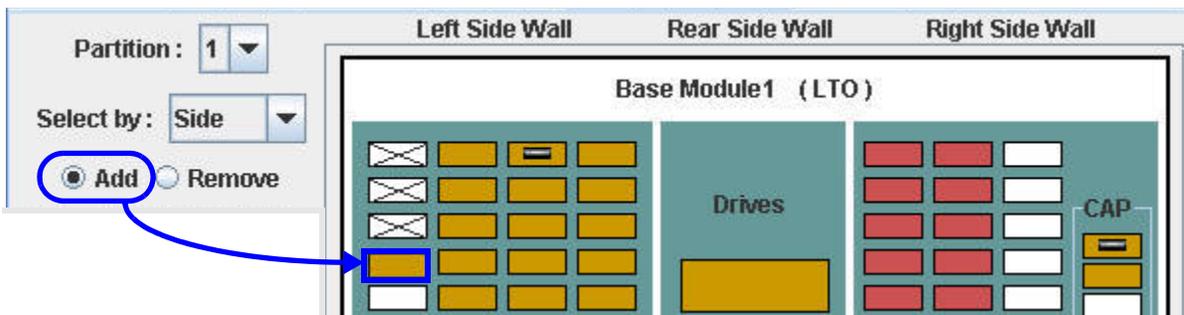
Every partition in a bridged library must have a bridge drive.

The **Bridge Drive** list control includes only the accessible, bridge-capable drives. So, for example, given an SL500 base module with bridge-capable drives installed in positions 1 and 2 and an SL500 drive module with a bridge-capable drive in position 4, you could choose drive 1, 2, or 4 for your bridge drive. Position 3 is inaccessible in this configuration, so the list control does not offer 3 as an option.



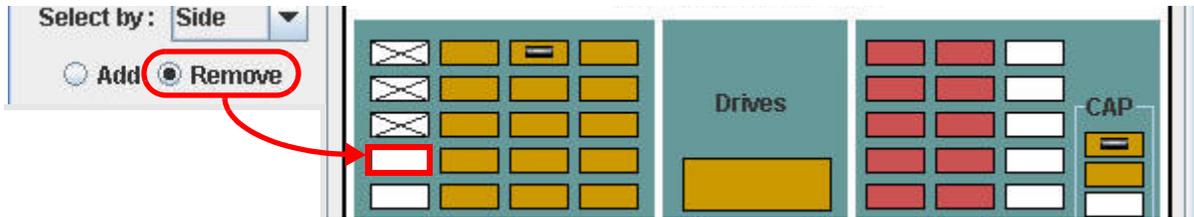
- To add a resource to the partition, select the Add radio button and click on the library-map icon for the cell/drive, side, or module that you want to add.

When you click on the resource, its color changes to gold, which indicates that the resource has been allocated to the current partition.



7. To remove a resource from the partition, select the **Remove** radio button and click on the library-map icon for the cell/drive, side, or module that you want to remove from the partition.

When you click on the resource, its color changes to white, which indicates that the resource is not allocated.



8. To update the library controller database with all changes from this SL Console login session, see [“Verify Partition Configurations” on page 107](#) and [“Commit Partition Configuration Changes” on page 111](#).

Your partition configuration changes are saved to the SL Console partition workspace for the duration of this login session.

For additional information on the design tools and library map, see [“Partitions—Design \(Step 3\)” on page 159](#).

## ▼ Verify Partition Configurations

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to verify partition configuration changes you have made during this SL Console login session. This procedure warns you of the following possible errors:

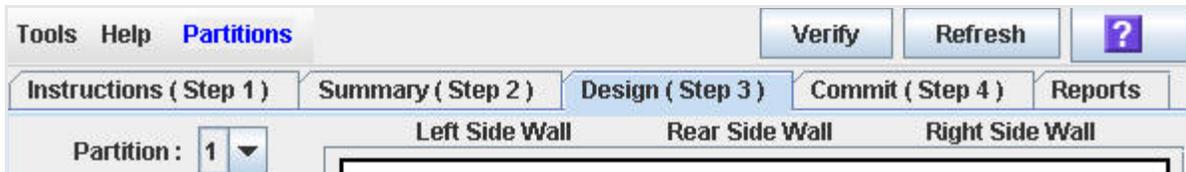
- A partition has orphaned cartridges. See [“Planning for Partitioning” on page 87](#) for details.
- Library resources have been removed from a partition.
- A host connected to the library does not have a partition assigned to LUN 0.

**Note** – This procedure verifies only one partition at a time. If you need to verify multiple partitions, you must repeat this procedure separately for each partition.

### Task Steps

1. Select Tools > Partitions.
2. Click the Design (Step 3) tab.

The **Design (Step 3)** page appears, displaying the current configuration of the library you have selected.



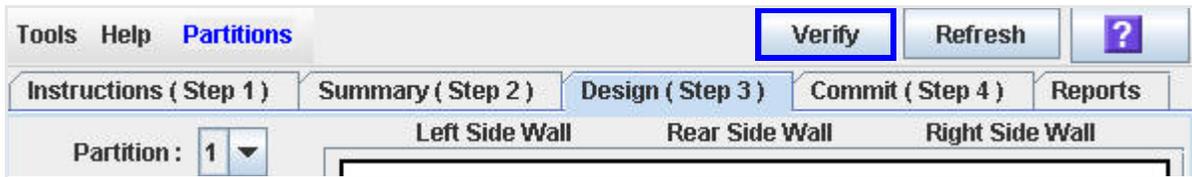
3. In the Partition list, select the partition you want to configure.

All fields update to reflect the current configuration for the selected partition.



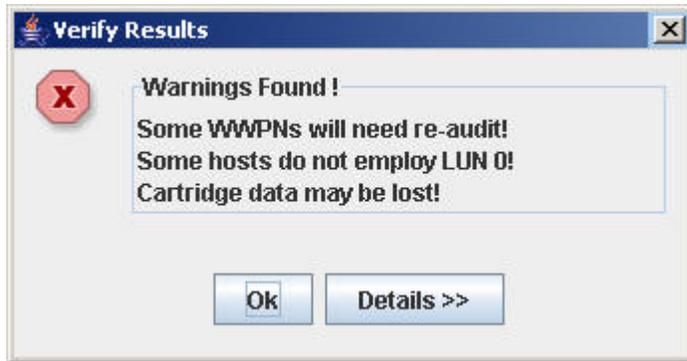
4. In the upper right corner, click **Verify**.

The boundaries of the selected partition are verified, including the locations of all tape cartridges.

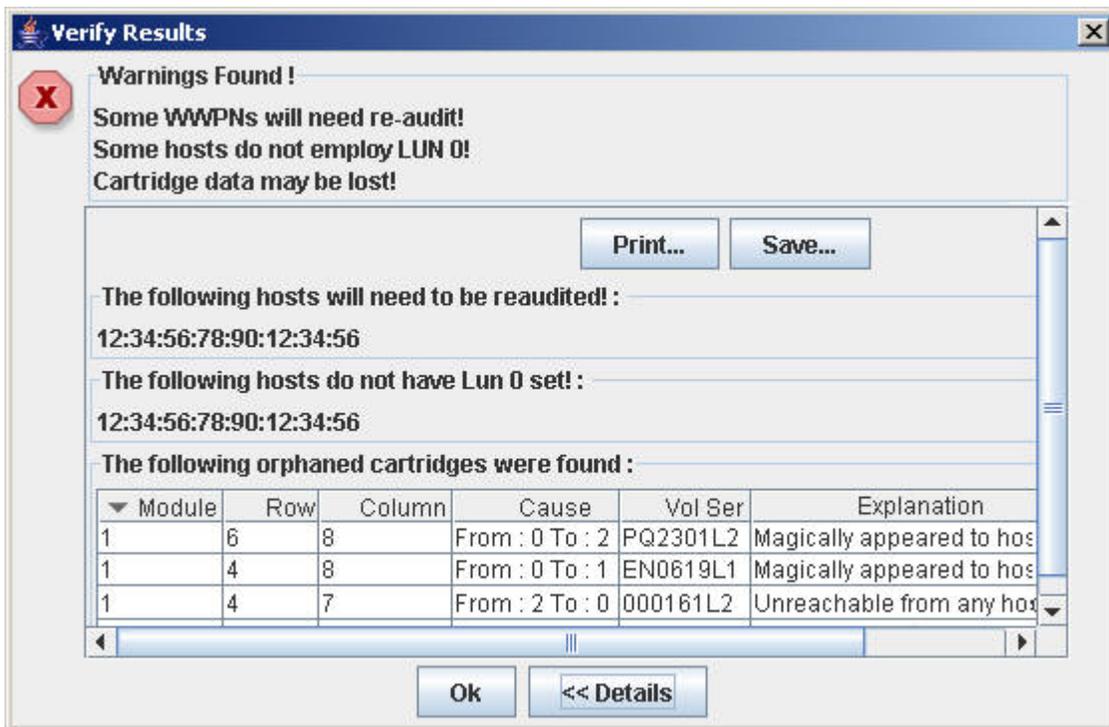


**Note** – This verification is performed on the current partition configuration in the SL Console partition workspace only. It does not verify current partition boundaries against the library controller database. Therefore, it cannot identify configuration conflicts that may arise due to other users performing cartridge movements or library configuration changes (through the command line interface, other SL Console sessions, or host applications) at the same time you have made partition changes.

5. When the **Verify Results** message appears, check for warnings (such as orphaned cartridge messages, etc.) for the current partition configuration.



6. To toggle between detailed warning messages and the summary, click Details.



7. To print the warning messages, click Print in the expanded view of the warning messages.
8. To save the warning messages in a comma-delimited text file, click Save.
9. If the warnings messages indicate that cartridges have been orphaned, see [“Resolve Orphaned Cartridges” on page 110](#) before committing your changes to the library controller database.
10. To dismiss the Verify Results message and return to the Design (Step 3) page, click OK.

## ▼ Resolve Orphaned Cartridges

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to resolve any orphaned cartridges that are displayed on the SL Console.

### Task Steps

1. If the SL Console identifies an orphaned cartridge, it displays a warning message. Perform recovery moves on all cartridges listed in the warnings (see [“Recovery Moves” on page 253](#)) before proceeding to [“Commit Partition Configuration Changes” on page 111](#).

**Caution** – *Potential data loss.* If you do not perform [“Recovery Moves” on page 250](#), host applications may find the orphans and treat them as scratch volumes. Valid data could be overwritten.

## ▼ Commit Partition Configuration Changes

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

This procedure updates the library controller database with all partition configuration changes that have made during this SL Console session. If you log out of SL Console without committing your changes, all changes are discarded.

**Caution** – Although partition changes are not disruptive to library hosts, it is recommended that you make the library unavailable to other users before committing your partition workspace changes. Because the SL Console does not validate partition boundaries against the library controller database in real-time, configuration conflicts may arise if you change partition boundaries while other users are performing cartridge movements or library configuration changes.

**Note** – Be sure to [“Resolve Orphaned Cartridges” on page 110](#) before proceeding.

### Task Steps

1. **Take the library offline to ACSLS and ELS tape management software.**

See the appropriate tape management software documentation for the procedures and commands.

2. **Select Tools > Partitions, and click the Commit (Step 4) tab.**

The **Commit (Step 4)** page appears.

3. Click the Apply button.

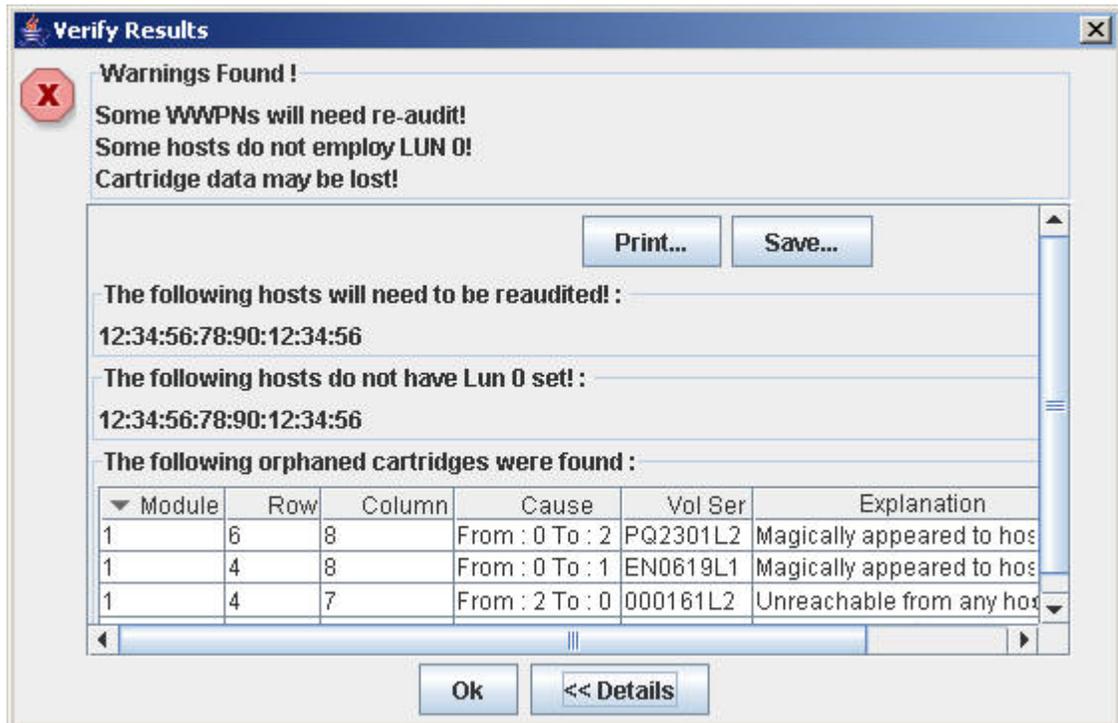


The boundaries of the selected partition are verified, including the locations of all tape cartridges.

The **Confirm Apply** message appears, indicating whether there are any orphaned cartridges or other problems in the current partition configuration.



4. To toggle between detailed warning messages and the summary, click Details.



5. To print the warning messages, click Print in the expanded view of the warning messages.

6. To save the warning messages in a comma-delimited text file, click Save.

7. **If the warnings messages indicate that cartridges have been orphaned, see [“Resolve Orphaned Cartridges”](#) on page 110 before committing your changes to the library controller database.**
8. **If you want to cancel the update without applying your changes, click No.**  
The library controller database is not updated, but all partition changes from this login session are retained in the SL Console partition workspace.
9. **Otherwise, if you want to update the library controller database and apply your changes, click Yes. When the Commit Success message appears, click OK to return to the Commit (Step 4) page.**
10. **You must now configure all affected library host applications to recognize your changes. See the appropriate tape management software documentation for the procedures and commands.**

## Partition Management Tasks

- [“Modify Partition Summary Information” on page 115](#)
- [“Delete a Partition” on page 116](#)
- [“Modify FC-SCSI Host-Partition Connection Detail \(Unbridged Libraries Only\)” on page 117](#)
- [“Delete a FC-SCSI Host Connection \(Unbridged Libraries Only\)” on page 119](#)
- [“Refresh the SL Console Partition Workspace” on page 121](#)
- [“Reallocate Library Resources” on page 122](#)
- [“Make a Hardware Change to a Partitioned Library” on page 123](#)

## ▼ Modify Partition Summary Information

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to change the name or barcode presentation format of an existing partition.

**Note** – You cannot change the partition ID. To assign a different Partition ID, you must delete the old partition and create a new one with the new ID.

### Task Steps

1. **Select Tools > Partitions, and click the Summary (Step 2) tab.**  
The **Summary (Step 2)** page appears.
2. **In the Partition Summary section, select the partition you want to modify.**
3. **Click Modify Partition.**  
The **Modify a Partition** dialog box appears.
4. **Enter the changes you want to make.**
5. **Click OK to confirm the changes.**

## ▼ Delete a Partition

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to delete a partition from the library. The following changes are made to the library partition configuration:

- All resources allocated to the partition are marked available.
- All host connections for the partition are deleted.
- The partition ID is deleted.

**Caution** – Deleting partitions can result in orphaned cartridges and data that could be lost. See [“Planning for Partitioning” on page 87](#) for details.

**Note** – Deleting all partitions from the library causes the library state to change to “non-partitioned.” All storage cells, drives, and CAPs will be accessible to all hosts.

### Task Steps

1. **Select Tools > Partitions, and click the Summary (Step 2) tab.**

The **Summary (Step 2)** page appears.

2. **In the Partition Summary section, click the partition you want to remove.**
3. **Click Delete Partition.**

A confirmation message appears.

4. **Click OK to confirm the deletion.**

The updates are made. Your partition configuration changes are saved to the SL Console partition workspace for the duration of this login session.

5. **To update the library controller database with all changes from this SL Console login session, see [“Verify Partition Configurations” on page 107](#).**

If there are no partitions remaining in the library, when you commit the updates the library state will change to “non-partitioned.”

## ▼ Modify FC-SCSI Host-Partition Connection Detail (Unbridged Libraries Only)

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to modify the host World Wide Port Name or LUN number of the library for a host-partition connection.

**Note** – You cannot modify the target port number for the library. It is always “0.”

### Task Steps

1. Select Tools > Partitions, and click the Summary (Step 2) tab.

Tools Help **Partitions** Refresh ?

Instructions ( Step 1 ) **Summary ( Step 2 )** Design ( Step 3 ) Commit ( Step 4 ) Reports

**Total Library Resources**

Storage Cells:	349
Drives:	8
CAP cells:	36

**Resources Allocated**

Storage Cells:	125
Drives:	4
CAP cells:	12

**Resources Unallocated**

Storage Cells:	224
Drives:	4
CAP cells:	24

**Partition Summary**

Partition Number	Allocated Storage Cells	Allocated Drives	Allocated CAP Cells
1	71	1	0
2	24	2	4
3	0	0	0
4	0	0	0
5	0	0	0
6	30	1	8
7	0	0	0
8	0	0	0

Add Partition Delete Partition Modify Partition

----- Details For Partition 1 -----

**Name:** Partition 1  
**Barcode Presentation:** Left 6 label characters (Default)

**Connections**

Initiator (WWPN)	LUN
20:00:00:A0:BD:08:0A:00	2

Add Connection Delete Connection Modify Connection

**2. Click OK to confirm the changes.**

Your partition configuration changes are saved to the SL Console partition workspace for the duration of this login session.

To update the library controller database with all changes from this SL Console login session, see [“Verify Partition Configurations” on page 107](#) and [“Commit Partition Configuration Changes” on page 111](#).

## ▼ Delete a FC-SCSI Host Connection (Unbridged Libraries Only)

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to delete a host-partition connection on an unbridged library. After you perform this procedure, the host will no longer be able to access the partition.

### Task Steps

1. Select Tools > Partitions, and click the Summary (Step 2) tab.

**Tools Help Partitions** Refresh ?

**Instructions ( Step 1 ) Summary ( Step 2 ) Design ( Step 3 ) Commit ( Step 4 ) Reports**

**Total Library Resources**

Storage Cells: 90  
Drives: 3  
CAP cells: 5

**Resources Allocated**

Storage Cells: 90  
Drives: 3  
CAP cells: 5

**Resources Unallocated**

Storage Cells: 0  
Drives: 0  
CAP cells: 0

**Partition Summary**

Partition Number	Allocated Storage Cells	Allocated Drives	Allocated CAP Cells
1	28	2	0
2	30	0	5
3	32	1	0

Add Partition Delete Partition Modify Partition

**----- Details For Partition 1 -----**

**Name:** Partition 1  
**Barcode Presentation:** Left 6 label characters (Default)

**Connections**

Initiator (WWPN)	LUN
20:00:00:A0:BD:08:0A:00	2

Add Connection Delete Connection Modify Connection

2. **In the Connections section, click the host-partition connection you want to delete.**
3. **Press the Delete Connection button.**  
A confirmation message appears.
4. **Click OK to confirm the deletion.**

Your partition configuration changes are saved to the SL Console partition workspace for the duration of this login session.

To update the library controller database with all changes from this SL Console login session, see [“Verify Partition Configurations” on page 107](#) and [“Commit Partition Configuration Changes” on page 111](#).

## ▼ Refresh the SL Console Partition Workspace

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

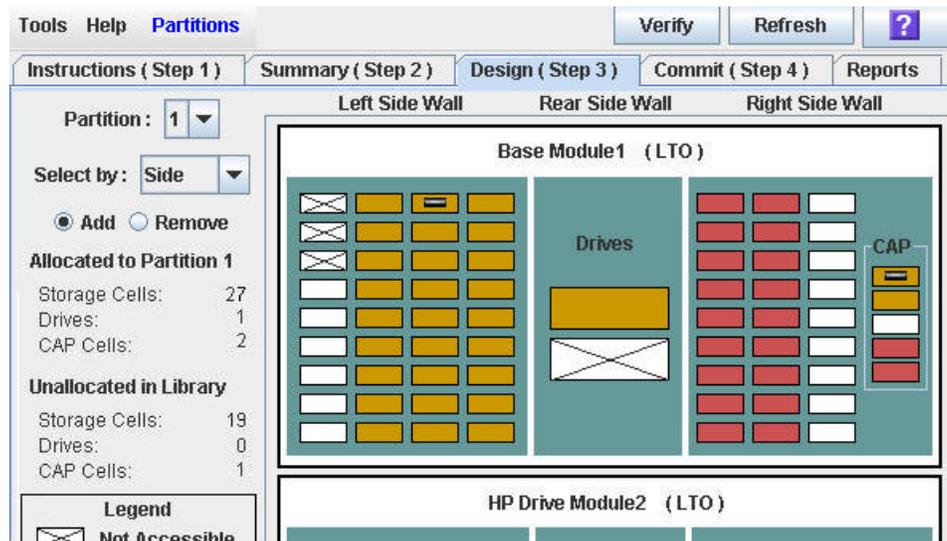
Use this procedure to refresh the SL Console partition workspace with current data from the library controller database. The current data includes all updates that other users have made to the library controller database during your login session, through the command line interface, other SL Console sessions, or host applications.

**Note** – When you complete this procedure, all uncommitted partition changes you have made during this SL Console login session are discarded.

### Task Steps

1. Select **Tools > Partitions**.
2. Click one of the following tabs:
  - **Summary (Step 2)**
  - **Design (Step 3)**

The selected page appears.



3. In the upper right corner, click **Refresh**.

The **Partition Refresh** message appears.

4. Click **Yes** to confirm the refresh.

All partition data updates with current data from the library controller database.

## ▼ Reallocate Library Resources

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Reallocate library resources (storage cells, tape drives, CAP cells, or cartridges) from one partition to another.

### Task Steps

You must use the following two-step process:

1. **Remove the resource from the partition it is currently allocated to.**
2. **Allocate the resource to a different partition.**

See [“Design a Partition” on page 102](#) for detailed instructions.

**Caution** – Reallocating resources can result in orphaned cartridges and data that could be lost. See [“Planning for Partitioning” on page 87](#) for details.

## ▼ Make a Hardware Change to a Partitioned Library

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Some library hardware changes, such as adding expansion modules or adding CAP cells, may require the removal of all or part of an existing partitioned module. Use the following process to make such hardware changes without losing partitioning information for the sections of the library that are unchanged.

**Caution** – Failure to follow this procedure could result in the loss of library partition configuration information after a hardware change.

### Task Steps

1. **De-allocate all library resources (storage cells, CAPs, and drives) that will be removed as part of the hardware change from the partitions they are currently allocated to.**

See [“Design a Partition” on page 102](#) for detailed instructions.

2. **Power down the library.**

See [“Power Down the Library” on page 615](#) [“Power Off the Library” on page 358](#) for detailed instructions.

3. **Install the hardware change.**

4. **Power up the library.**

See [“Power Up the Library” on page 616](#) for detailed instructions.

All partition allocations for the unchanged parts of the library remain in effect.

5. **Allocate the library resources that have been added due to the hardware change.**

See [“Design a Partition” on page 102](#) for detailed instructions.

**Caution** – Reallocating resources can result in orphaned cartridges and data that could be lost. See [“Planning for Partitioning” on page 87](#) for details.

## Partition Report Tasks

- [“Display a Partition Report” on page 125](#)
- [“Print Partition Report Data” on page 127](#)
- [“Save Partition Report Data” on page 128](#)

## ▼ Display a Partition Report

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to display any of the following partition reports:

- Cartridge Cell and Media Summary: Displays a detailed list of all resource partition assignments.
- Host Connections Summary: Displays detailed host-partition connection information for all partitions.
- Orphaned Cartridge Report: Displays a detailed list of all orphaned cartridges.
- Partition Details: Displays detailed information for a selected partition.
- Partition Summary: Displays summary information for all partitions.

**Note** – The partition reports display data saved to the library controller database. If you have made partition configuration changes without committing the changes to the library controller through the **Commit (Step 4)** screen, the data in these reports will differ from data shown on the partition **Summary (Step 2)** and **Design (Step 3)** screens.

### Task Steps

1. Select **Tools > Partitions**, and click the **Reports** tab.

The **Reports** page appears.

**2. In the list, select the report you want to display.**

The page updates with current data from the library controller database.

The screenshot shows a web interface for 'Partitions'. At the top, there are tabs for 'Instructions ( Step 1 )', 'Summary ( Step 2 )', 'Design ( Step 3 )', 'Commit ( Step 4 )', and 'Reports'. Below the tabs is a note: 'NOTE: The reports in this menu reflect only the current partition definitions stored on the library. Any changes to the partition definitions made in the Design tab will be reflected in the reports only after they are committed.' A dropdown menu is set to 'Partition Summary'. Below this, it says 'Partitions as of 4/30/08 3:16 PM'. A table displays the following data:

Partition ID	Partition Name	Storage Cells	Media in Storage Cells	%Storage Cells w/ Media	Drives	CAPs	* Total Media
1	Part 1	36	7	19.44%	0	0	7
2	Part 2	35	1	2.86%	0	0	1

Below the table, a note states: '\*The Total Media column includes media currently found in CAPs, drives and storage cells'. At the bottom, there are two buttons: 'Print...' and 'Save To File...'.

**3. If you want to print the report data or save it to a file, see the following procedures:**

- [“Print Partition Report Data” on page 127](#)
- [“Save Partition Report Data” on page 128](#)

## ▼ Print Partition Report Data

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

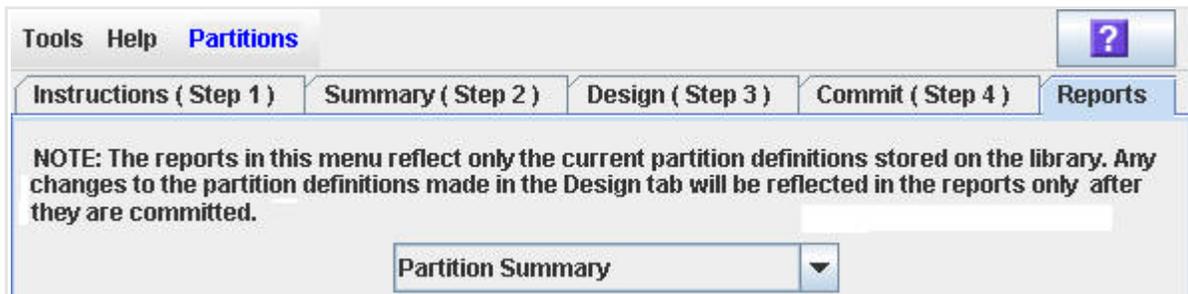
### Task Purpose

Use this procedure to print a partition report. This procedure can be performed from any of the partition report pages.

### Task Steps

1. Select **Tools > Partitions**, and click the **Reports** tab.

The **Reports** page appears.



2. In the list, select any report.

The specified report is displayed. All report pages include the **Print** and **Save to File** buttons.

3. Click **Print**.

The **Print** dialog box appears.

4. Complete the print dialog box, and click **Print**.

The report is printed to the selected printer.

## ▼ Save Partition Report Data

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

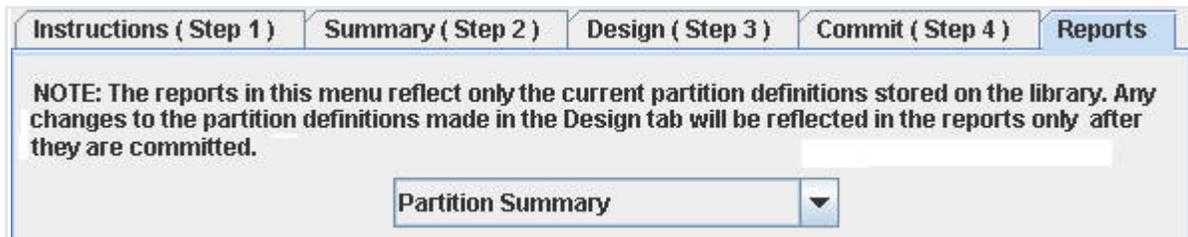
Use this procedure to save partition report data to a comma-separated file (.csv format) that is compatible with most spreadsheet applications. This procedure can be performed from any of the partition report pages.

### Task Steps

1. Select **Tools > Partitions**, and click the **Reports** tab.

The **Reports** page appears.

2. In the list, select any report.



The specified report is displayed. All report pages include the **Print** and **Save to File** buttons.



3. Click **Save to File**.

The **Save** dialog box appears.

4. Browse to the directory where you want to save the file, and enter the file name.
5. Click **Save**.

The data is saved to the specified file.

## CAP Operation Tasks

- [“Enter Cartridges Into a Partitioned Library” on page 130](#)
- [“Eject Cartridges From a Partitioned Library” on page 133](#)

## ▼ Enter Cartridges Into a Partitioned Library

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to enter cartridges into a partitioned library. Partitions with no allocated CAP cells must use common CAP cells. Partitions with allocated CAP cells must use the cells allocated to them.

**Note** – This procedure highlights aspects of CAP operations that are unique to partitioned libraries. For general enter and eject procedures, see [“Cartridge Handling Tasks” on page 392](#).

**Note** – Although it is possible to enter cartridges through a CAP without using the **Assign CAP Button** screen, it is recommended that you access the screen first to verify the partition settings. This will help prevent cartridges from being entered inadvertently into the wrong partition.

### Task Steps

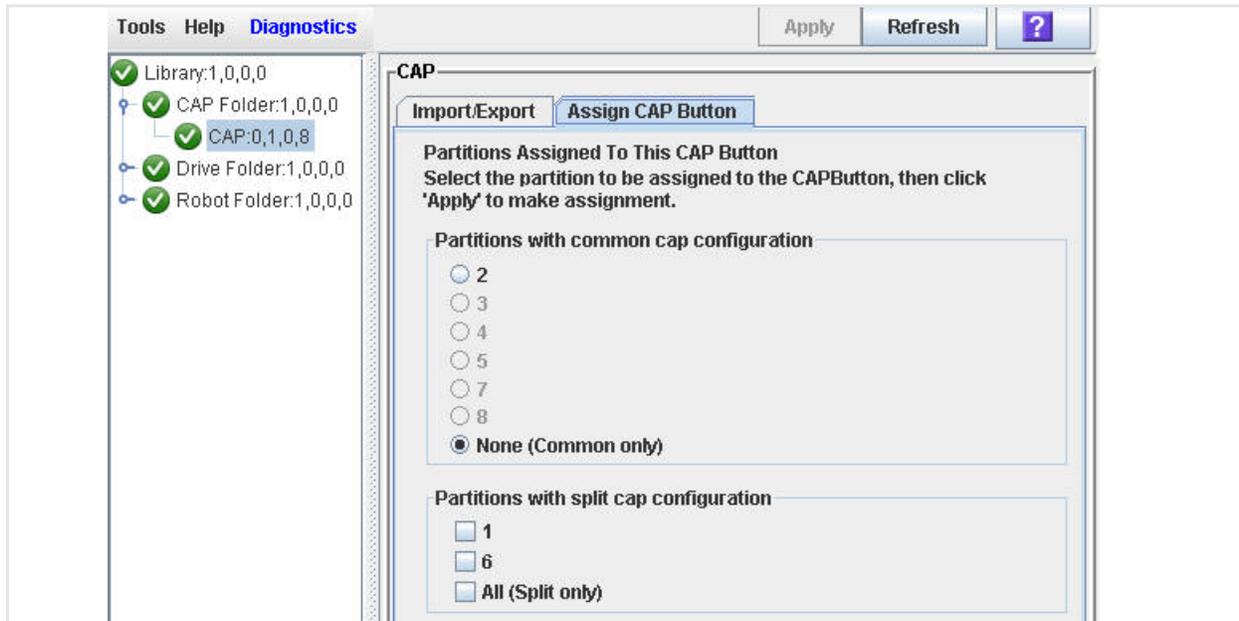
1. **Initiate the Enter operation at the host. See the appropriate tape management software documentation for the procedures and commands.**
2. **Select Tools > Diagnostics.**
3. **Expand the CAP Folder, and click the CAP you want to use.**

**Note** – In a partitioned library, only one CAP is listed in the Diagnostics CAP Folder.

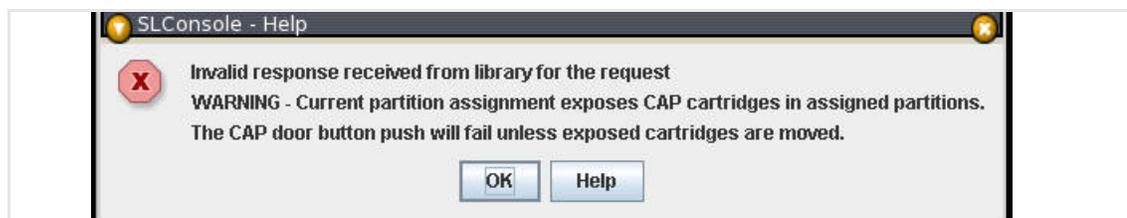
The **Import/Export** page appears.

4. Click the Assign CAP Button tab.

The Assign CAP Button page appears.



5. In the Common CAP and Split CAP tables, click the partitions into which you want to enter cartridges. See [“Diagnostics > CAP—Assign CAP Button” on page 194](#) for details on these page fields.
6. Click Apply.  
The CAP Confirm message appears.
7. Click OK.
8. Depending on how your library’s CAPs are configured, this operation may expose CAP cells that are not accessible to the requesting host’s partition. For example, because a split CAP can contain common cells or cells allocated to multiple partitions, opening the CAP door may expose cells not allocated to the selected partition. If any of the inaccessible cells contain cartridges, the CAP door will not open, and a warning message appears.



Click OK to return to the **Assign CAP Button** page. Before you can continue with this procedure, you must remove the inaccessible cartridges from the CAP.

9. On the library control panel, push the CAP Open button.

**10. The library opens the doors of all CAPs with cells accessible to the selected partition. Doors to CAPs that contain only inaccessible cells do not open.**

The library also sends CAP status messages to all hosts with access to the exposed cells. Following are examples:

- If the library opens common CAPs only, messages are sent to all hosts with access to common CAP cells.
- If the library opens a split CAP containing both allocated and common cells, messages are sent to all hosts in the assigned partitions, as well as all hosts with access to common CAP cells.

**11. Place the cartridges in any CAP cells that are accessible to the selected partition.**

**Note –** If you place cartridges in cells that are not accessible to the selected partition, the CAP door will not lock. You must move the cartridges to the appropriate CAP cells.

**12. Close the CAP. It locks automatically.**

**13. Move the cartridges from the CAP to storage cells within the selected partition. See the appropriate tape management software documentation for the procedures and commands.**

**14. Once the selected partitions are finished with the CAP, it is recommended that you restore the Assign CAP Button page to the following settings. This will help to prevent cartridges from being entered inadvertently into the wrong partition in the next CAP operation.**

- In the Common CAP table, click **None**.
- In the Split CAP table, deselect all the check boxes.

## ▼ Eject Cartridges From a Partitioned Library

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to eject cartridges from a partitioned library. Partitions with no allocated CAP cells must use common CAP cells. Partitions with allocated CAP cells must use the cells allocated to them.

**Note** – This procedure highlights aspects of CAP operations that are unique to partitioned libraries. For general enter and eject procedures, see [“Cartridge Handling Tasks” on page 392](#).

### Task Steps

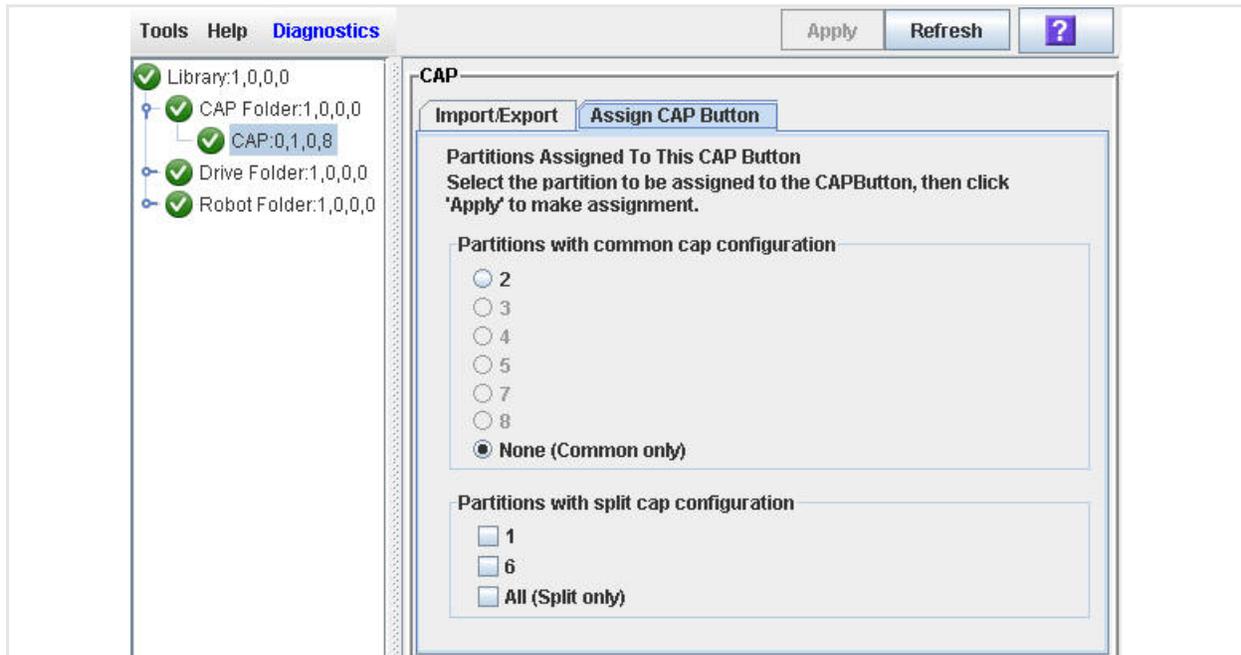
1. **Initiate the eject operation at the host. See the appropriate tape management software documentation for the procedures and commands.**
2. **The HandBot places the cartridges into CAP cells accessible to the host.**
3. **Select Tools > Diagnostics.**
4. **Expand the CAP Folder, and click the CAP you want to use.**

**Note** – In a partitioned library, only one CAP is listed in the Diagnostics CAP Folder.

The **Import/Export** page appears.

5. Click the Assign CAP Button tab.

The Assign CAP Button page appears.



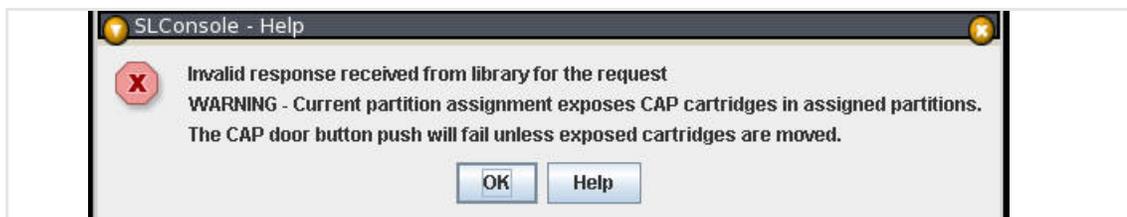
6. In the Common CAP and Split CAP tables, click the partitions from which you are ejecting cartridges. See [“Diagnostics > CAP—Assign CAP Button” on page 194](#) for details on these page fields.

7. Click Apply.

The CAP Confirm message appears.

8. Click OK.

9. Depending on how your library’s CAPs are configured, this operation may expose CAP cells that are not accessible to the requesting host’s partition. For example, because a split CAP can contain common cells or cells allocated to multiple partitions, opening the CAP door may expose cells not allocated to the selected partition. If any of the inaccessible cells contain cartridges, the CAP door will not open and a warning message appears.



Click OK to return to the Assign CAP Button page. Before you can continue with this procedure, you must remove the inaccessible cartridges from the CAP.

10. On the library control panel, push the CAP Open button.

**11. The library opens the doors of all CAPs with cells accessible to the selected partition. Doors to CAPs that contain only inaccessible cells do not open.**

The library also sends CAP status messages to all hosts with access to the exposed cells. Following are examples:

- If the library opens common CAPs only, messages are sent to all hosts with access to common CAP cells.
- If the library opens a split CAP containing both allocated and common cells, messages are sent to all hosts in the assigned partitions, as well as all hosts with access to common CAP cells.

**12. Remove the cartridges from the CAP cells.**

**13. Close the CAP. It locks automatically.**

**14. Once the selected partitions are finished with the CAP, it is recommended that you restore the Assign CAP Button page to the following settings. This will help to prevent cartridges from being entered inadvertently into the wrong partition in the next CAP operation.**

- In the Common CAP table, click **None**.
- In the Split CAP table, deselect all the check boxes.

## Partition Screen Reference

This section includes detailed descriptions of all SL Console partition screens, arranged by screen navigation path. For example, **Partitions—Summary (Step 2)—Add Connection** indicates the screen accessed by clicking **Tools** and then **Partitions** from the Menu Bar, and then clicking the **Summary (Step 2)** tab, and then the **Add Connection** button.

Partition Screens are organized into the following categories:

- [“Partition Summary Screens” on page 137](#)
- [“Partition Design and Commit Screens” on page 158](#)
- [“Partition Report Screens” on page 173](#)
- [“Partition CAP Operation Screens” on page 193](#)

**Note** – The partition **Summary (Step 2)** and **Design (Step 3)** screens, and all associated messages, give you a dynamic workspace to design your library partitions. All partition configuration information is automatically saved to the partition workspace in SL Console memory and retained for the duration of your SL Console session. This allows you to switch among partition views and leave and return to the partition screens any number of times without losing your configuration changes.

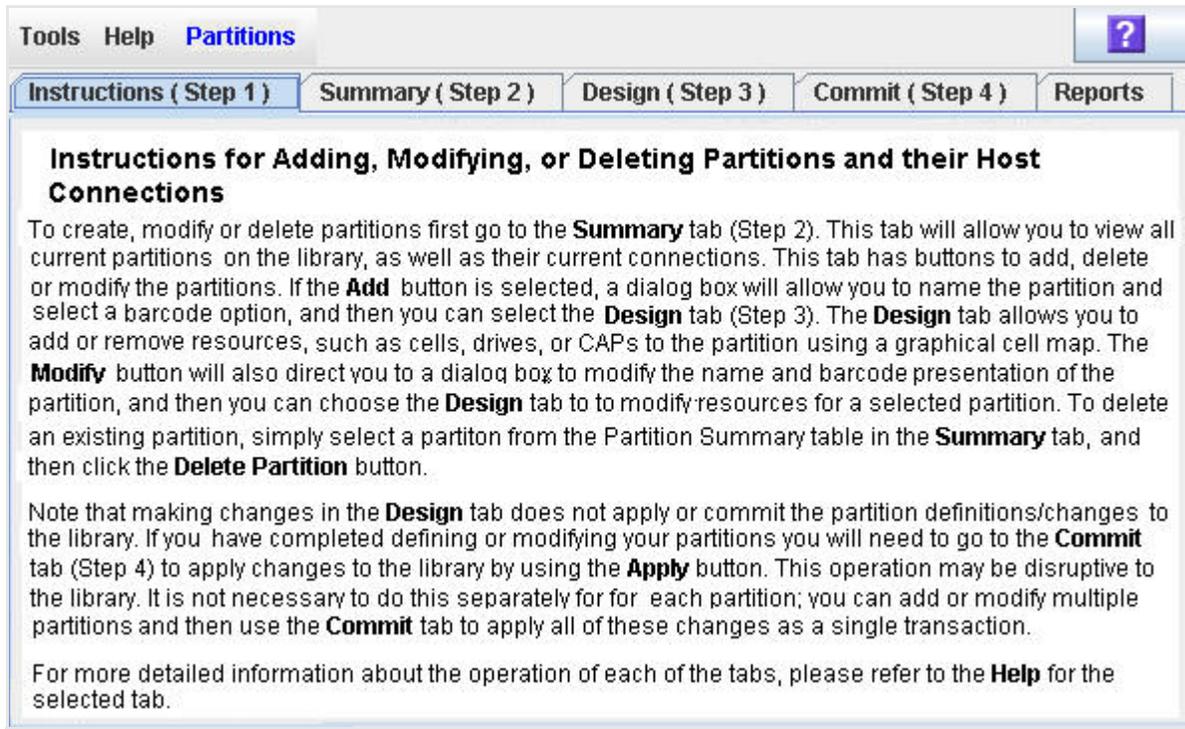
**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

## Partition Summary Screens

- [“Partitions—Instructions \(Step 1\)” on page 138](#)
- [“Partitions—Summary \(Step 2\)” on page 140](#)
- [“Partitions—Summary \(Step 2\)—Modify Connection \(Unbridged Libraries Only\)” on page 150](#)
- [“Partitions—Summary \(Step 2\)—Add Partition” on page 152](#)
- [“Partitions—Summary \(Step 2\)—Delete Partition” on page 154](#)
- [“Partitions—Summary \(Step 2\)—Modify Partition” on page 156](#)

## Partitions—Instructions (Step 1)

### Sample Screen



### Description

Displays instructions for using the partition screens.

**Note –** This screen appears automatically the first time you select **Tools > Partitions** during an SL Console login session.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

None

### Buttons and Controls

? (Help)

Click to display online help for the screen.

**See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)
- [“Partitions—Design \(Step 3\)” on page 159](#)
- [“Partitions—Commit \(Step 4\)” on page 168](#)
- [“Partitions—Reports” on page 174](#)

## Partitions—Summary (Step 2)

### Sample Screen (Bridged Library)

Tools Help **Partitions** Refresh ?

Instructions ( Step 1 ) **Summary ( Step 2 )** Design ( Step 3 ) Commit ( Step 4 ) Reports

**Total Library Resources**

Storage Cells: 90  
Drives: 3  
CAP cells: 5

**Resources Allocated**

Storage Cells: 90  
Drives: 3  
CAP cells: 5

**Resources Unallocated**

Storage Cells: 0  
Drives: 0  
CAP cells: 0

**Partition Summary**

Partition Number	Allocated Storage Cells	Allocated Drives	Allocated CAP Cells	Bridge Drive
<b>1</b>	<b>28</b>	<b>2</b>	<b>0</b>	<b>1</b>
<b>2</b>	<b>30</b>	<b>0</b>	<b>5</b>	<b>None</b>
<b>3</b>	<b>32</b>	<b>1</b>	<b>0</b>	<b>4</b>

Add Partition
Delete Partition
Modify Partition

## Sample Screen (Unbridged Library)

The screenshot displays the 'Partition Summary' screen. At the top, there are tabs for 'Instructions (Step 1)', 'Summary (Step 2)', 'Design (Step 3)', 'Commit (Step 4)', and 'Reports'. The 'Summary (Step 2)' tab is active. On the left, there are three sections: 'Total Library Resources', 'Resources Allocated', and 'Resources Unallocated'. The 'Total Library Resources' section shows 90 Storage Cells, 3 Drives, and 5 CAP cells. The 'Resources Allocated' section shows 90 Storage Cells, 3 Drives, and 5 CAP cells. The 'Resources Unallocated' section shows 0 Storage Cells, 0 Drives, and 0 CAP cells. The main area is titled 'Partition Summary' and contains a table with 4 columns: 'Partition Number', 'Allocated Storage Cells', 'Allocated Drives', and 'Allocated CAP Cells'. The table has 3 rows of data. Below the table are three buttons: 'Add Partition', 'Delete Partition', and 'Modify Partition'. Below this is a section titled '----- Details For Partition 1 -----'. It shows 'Name: Partition 1' and 'Barcode Presentation: Left 6 label characters (Default)'. Below this is a section titled 'Connections' with a table with 2 columns: 'Initiator (WWPN)' and 'LUN'. The table has 1 row of data. Below this are three buttons: 'Add Connection', 'Delete Connection', and 'Modify Connection'.

**Tools** Help **Partitions** Refresh ?

Instructions ( Step 1 ) **Summary ( Step 2 )** Design ( Step 3 ) Commit ( Step 4 ) Reports

**Total Library Resources**

Storage Cells: 90  
Drives: 3  
CAP cells: 5

**Resources Allocated**

Storage Cells: 90  
Drives: 3  
CAP cells: 5

**Resources Unallocated**

Storage Cells: 0  
Drives: 0  
CAP cells: 0

**Partition Summary**

Partition Number	Allocated Storage Cells	Allocated Drives	Allocated CAP Cells
1	28	2	0
2	30	0	5
3	32	1	0

Add Partition Delete Partition Modify Partition

----- Details For Partition 1 -----

**Name:** Partition 1  
**Barcode Presentation:** Left 6 label characters (Default)

**Connections**

Initiator (WWPN)	LUN
20:00:00:A0:BD:08:0A:00	2

Add Connection Delete Connection Modify Connection

### Description

Displays summary information for the library and, optionally, a selected partition.

Also includes buttons that enable you to initiate any of the following activities:

- Add a new partition
- Delete a partition from the library
- Modify partition summary information
- Add a new host-partition connection
- Delete a host-partition connection
- Modify the configuration of a host-partition connection

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console

- Web-launched SL Console

## Screen Fields

### ***Partition Summary***

#### **Partition Number**

Display only.

ID assigned to the partition. IDs can range from 1–8.

#### **Allocated Storage Cells**

Display only.

Total number of storage cells allocated to this partition.

#### **Allocated Drives Bays**

Display only.

Total number of tape drives allocated to this partition.

#### **Bridge Drive**

Bridged libraries only.

In a bridged library, the allocated drive that provides the control path for the other drives allocated to the partition.

### ***Details for Partition n***

Unbridged Libraries Only.

**Note** – The following fields display host-partition connection information for the partition currently selected in the Partition Summary table.

#### **Name**

Display only.

The optional name assigned to the selected partition.

#### **Barcode Presentation**

Display only.

The bar code format used when labeling cartridges assigned to the selected partition.

#### **Connections**

Display only.

A table of host-connection name/value pairs:

- **Initiator (WWPN):** The World Wide Port Name of the host bus adaptor (HBA).
- **LUN:** The Logical Unit Number of the library partition as seen from the host. This entry must be unique on the host.

### ***Total Library Resources***

#### **Storage Cells**

Display only.

Total physical capacity of the library.

#### **Drives**

Display only.

Total number of tape drives in the library.

#### **CAP cells**

Total number of CAP cells in the library.

Display only.

### ***Resources Allocated***

#### **Storage Cells**

Display only.

Total number of storage cells allocated to all library partitions.

#### **Drives**

Display only.

Total number of tape drives allocated to all library partitions.

#### **CAP cells**

Display only.

Total number of CAP cells allocated to all library partitions.

### ***Resources Unallocated***

#### **Storage Cells**

Display only.

Total number of storage cells in the library that are not yet allocated to a partition.

#### **Drive Bays**

Display only.

Total number of tape drives in the library that are not yet allocated to a partition.

#### CAP cells

Display only.

Total number of CAP cells in the library that are not allocated to any library partition.

## Buttons and Controls

#### Refresh

Click to refresh the SL Console partition workspace with current data from the library controller database. All uncommitted partition changes you have made during this SL Console login session will be discarded. The **Partition Refresh** message appears, prompting you to confirm the refresh.

#### ? (Help)

Click to display online help for the screen.

#### Add Partition

Click to add a new partition. The [“Partitions—Summary \(Step 2\)—Add Partition” on page 152](#) dialog box appears.

#### Delete Partition

Click to delete the currently selected partition. The [“Partitions—Summary \(Step 2\)—Delete Partition” on page 154](#) dialog box appears.

#### Modify Partition

Click to modify summary information for the currently selected partition. The [“Partitions—Summary \(Step 2\)—Modify Partition” on page 156](#) dialog box appears.

#### Add Connection

Unbridged libraries only.

Click to add a new host connection to the currently selected partition. The [“Partitions—Summary \(Step 2\)—Add Connection \(Unbridged Libraries Only\)” on page 146](#) dialog box appears.

#### Delete Connection

Unbridged libraries only.

Click to delete the currently selected host-partition connection. The [“Partitions—Summary \(Step 2\)—Delete Connection \(Unbridged Libraries Only\)” on page 148](#) dialog box appears.

### Modify Connection

Unbridged libraries only.

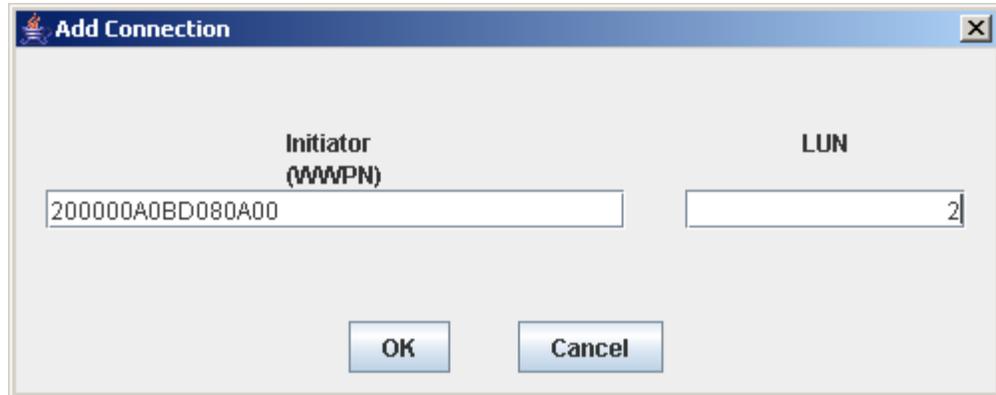
Click to modify the configuration of the currently selected host-partition connection. The [“Partitions—Summary \(Step 2\)—Modify Connection \(Unbridged Libraries Only\)” on page 150](#) dialog box appears.

### See Also

- [“Partitions—Summary \(Step 2\)” on page 140](#)
- [“Partitions—Summary \(Step 2\)—Add Partition” on page 152](#)
- [“Partitions—Summary \(Step 2\)—Delete Partition” on page 154](#)
- [“Partitions—Summary \(Step 2\)—Modify Partition” on page 156](#)
- [“Partitions—Summary \(Step 2\)—Add Connection \(Unbridged Libraries Only\)” on page 146](#)
- [“Partitions—Summary \(Step 2\)—Delete Connection \(Unbridged Libraries Only\)” on page 148](#)
- [“Partitions—Summary \(Step 2\)—Modify Connection \(Unbridged Libraries Only\)” on page 150](#)
- [“Partitions—Design \(Step 3\)” on page 159](#)
- [“Partitions—Commit \(Step 4\)” on page 168](#)
- [“Partitions—Reports” on page 174](#)

## Partitions—Summary (Step 2)—Add Connection (Unbridged Libraries Only)

### Sample Screen



The screenshot shows a dialog box titled "Add Connection". It has a standard Windows-style title bar with a close button (X) in the top right corner. The dialog contains two text input fields. The first field is labeled "Initiator (WWPN)" and contains the hexadecimal string "200000A0BD080A00". The second field is labeled "LUN" and contains the number "2". Below the input fields are two buttons: "OK" and "Cancel".

### Description

Enables you to configure the connection between a host and the selected partition of an unbridged library.

This screen is a dialog box that appears when you click **Add Connection** on the “Partitions—Summary (Step 2)” on page 140 screen.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### Initiator (WWPN)

Required.

World Wide Port Name of the host bus adapter (HBA).

Sixteen hexadecimal digits. You can enter upper- or lower-case hex digits, but the display is always shown in all upper-case.

**LUN**

Required.

Logical unit number of the library partition as seen from the host. This entry must be unique on the host. You can create up to nine unique LUNs per partition.

**Note** – Each initiator connected to the library must have one library partition assigned to LUN 0. When you verify or commit partition configuration changes, the SL Console will notify you if an initiator does not meet this requirement.

**Buttons and Controls****OK**

Click to update the SL Console partition workspace with the current screen settings and return to the previous screen.

**Note** – Clicking this button does not update the library controller database.

**Cancel**

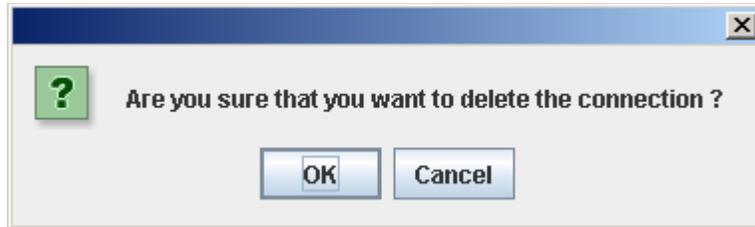
Click to discard the current screen settings and return to the previous screen.

**See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)

## Partitions—Summary (Step 2)—Delete Connection (Unbridged Libraries Only)

### Sample Screen



### Description

Enables you to delete the selected host-partition connection.

This screen is a message that appears when you click **Delete Connection** on the “Partitions—Summary (Step 2)” on page 140 screen.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

None

### Buttons and Controls

#### OK

Click to update the SL Console partition workspace with the current screen settings and return to the previous screen.

**Note** – Clicking this button does not update the library controller database.

#### Cancel

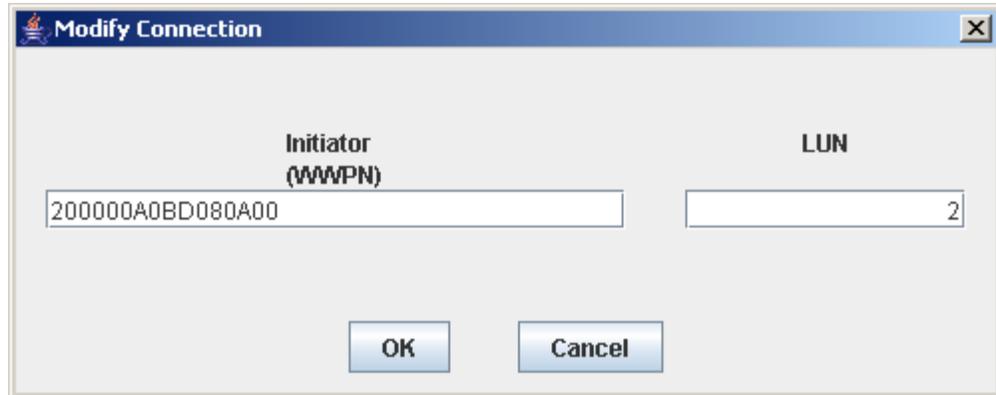
Click to discard the current screen settings and return to the previous screen.

**See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)

## Partitions—Summary (Step 2)—Modify Connection (Unbridged Libraries Only)

### Sample Screen



The screenshot shows a dialog box titled "Modify Connection". It has a standard Windows-style title bar with a close button (X) in the top right corner. The dialog contains two input fields. The first field is labeled "Initiator (WWPN)" and contains the text "200000A0BD080A00". The second field is labeled "LUN" and contains the number "2". Below these fields are two buttons: "OK" and "Cancel".

### Description

In an unbridged library, enables you to modify the configuration of the selected host-partition connection.

This screen is a dialog box that appears when you click **Modify Connection** on the [Partitions—Summary \(Step 2\)—Modify Connection \(Unbridged Libraries Only\)](#) screen.

**Caution –** Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### Initiator (WWPN)

World Wide Port Name of the FC-SCSI host bus adapter (HBA).

Sixteen hexadecimal digits. You can enter upper- or lower-case hex digits, but the display is always shown in all upper-case.

The screen displays the value assigned previously. You can leave it as is or make changes.

**LUN**

Required.

Logical unit number of the library partition on the host. This entry must be unique on the host.

**Note** – Each initiator connected to the library must have one library partition assigned to LUN 0. When you verify or commit partition configuration changes, the SL Console will notify you if an initiator does not meet this requirement.

**Buttons and Controls****OK**

Click to update the SL Console partition workspace with the current screen settings and return to the previous screen.

**Note** – Clicking this button does not update the library controller database.

**Cancel**

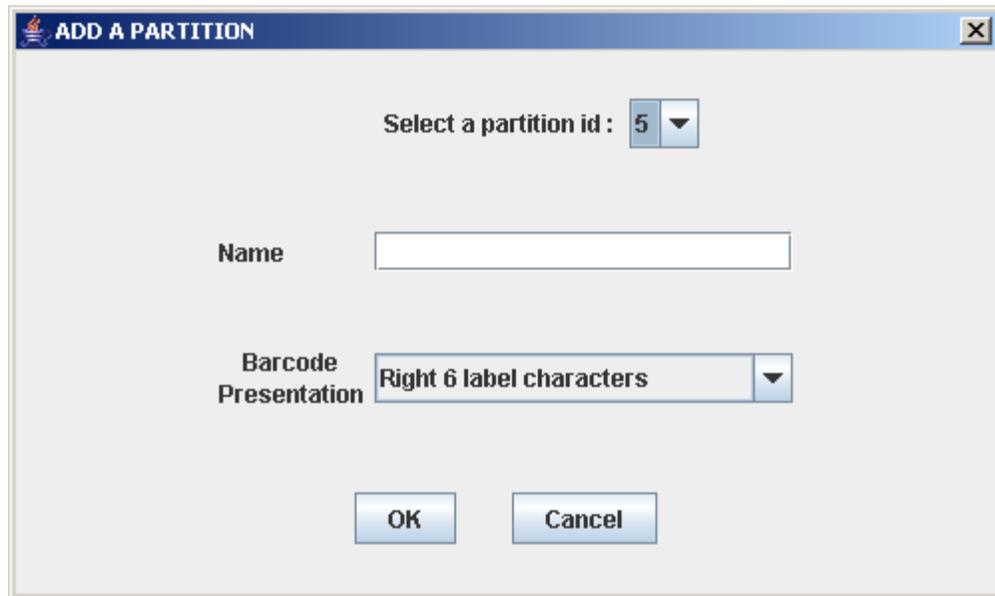
Click to discard the current screen settings and return to the previous screen.

**See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)

## Partitions—Summary (Step 2)—Add Partition

### Sample Screen



The screenshot shows a dialog box titled "ADD A PARTITION". It features a close button in the top right corner. The main content area includes a dropdown menu labeled "Select a partition id" with the value "5" selected. Below this is a text input field labeled "Name". Further down is another dropdown menu labeled "Barcode Presentation" with the value "Right 6 label characters" selected. At the bottom of the dialog are two buttons: "OK" and "Cancel".

### Description

Enables you to add a new partition. You can create up to eight partitions, with IDs ranging from 1–8.

This screen is a dialog box that appears when you click **Add Partition** on the “Partitions—Summary (Step 2)” on page 140 screen.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### Select a Partition ID

Required.

Partition ID you want to add. Options are 1–8.

The list displays all available IDs. The default is the next available ID in numerical order.

**Name**

Optional.

Name you want to assign to the partition.

0–60 ASCII characters.

**Barcode Presentation**

Required.

Tape cartridge bar code format to be used for the partition.

The drop-down menu displays all available formats previously defined by your Oracle support representative. The default is “Left 6 label characters.”

**Buttons and Controls****OK**

Click to update the SL Console partition workspace with the current screen settings and return to the previous screen.

**Note** – Clicking this button does not update the library controller database.

**Cancel**

Click to discard the current screen settings and return to the previous screen.

**See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)

## Partitions—Summary (Step 2)—Delete Partition

### Sample Screen



### Description

Enables you to confirm that you want to delete the specified partition. All information for the partition – including host-partition connections, partition boundaries, and partition ID – are deleted from the SL Console partition workspace.

This screen is a message that appears when you click **Delete Partition** on the “Partitions—Summary (Step 2)” on page 140.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

None

### Buttons and Controls

#### OK

Click to update the SL Console partition workspace with the current screen settings and return to the previous screen.

**Note** – Clicking this button does not update the library controller database.

#### Cancel

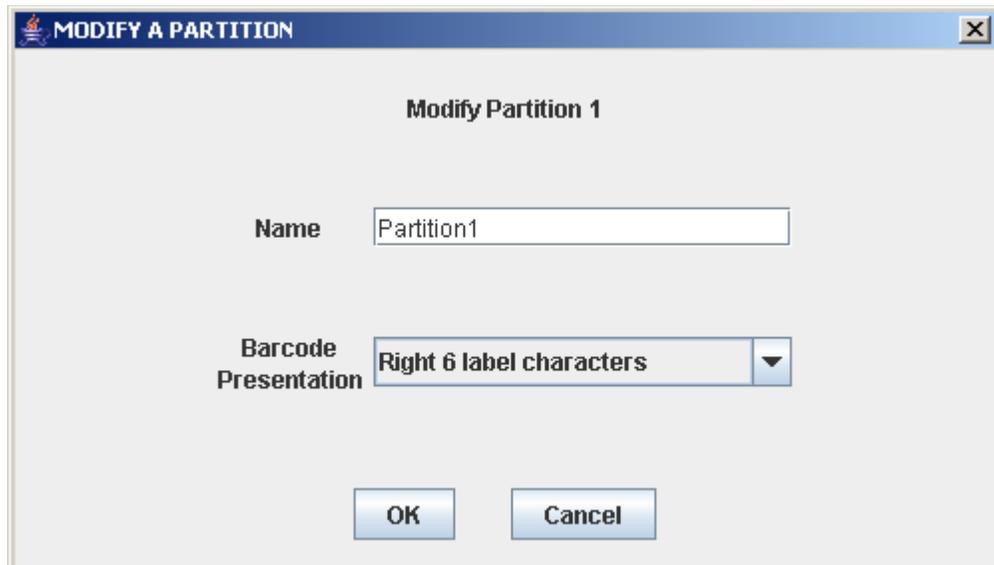
Click to discard the current screen settings and return to the previous screen.

**See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)

## Partitions—Summary (Step 2)—Modify Partition

### Sample Screen



The screenshot shows a dialog box titled "MODIFY A PARTITION". Inside the dialog, the title "Modify Partition 1" is centered. Below the title, there are two input fields. The first is labeled "Name" and contains the text "Partition1". The second is labeled "Barcode Presentation" and contains the text "Right 6 label characters". At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

### Description

Allows you to modify the name or barcode format of the selected partition.

This screen is a dialog box that appears when you click **Modify Partition** on the “Partitions—Summary (Step 2)” on page 140 screen.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### Modify Partition *n*

Display only.

ID of the partition you want to modify.

**Name**

Required.

Name you want to assign to the partition.

0–60 ASCII characters.

The screen displays the value assigned previously. You can leave it as is or make changes.

**Barcode Presentation**

Tape cartridge bar code format to be used for the partition.

The screen displays the value assigned previously. You can leave it as is or make changes.

The list displays all available formats previously defined by your Oracle support representative. The default is “Left 6 label characters.”

The screen displays the value assigned previously. You can leave it as is or make changes.

**Buttons and Controls****OK**

Click to update the SL Console partition workspace with the current screen settings and return to the previous screen.

**Note** – Clicking this button does not update the library controller database.

**Cancel**

Click to discard the current screen settings and return to the previous screen.

**See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)

## Partition Design and Commit Screens

- [“Partitions—Design \(Step 3\)” on page 159](#)
- [“Partitions—Commit \(Step 4\)” on page 168](#)
- [“Partitions—Commit \(Step 4\)—Confirm Apply” on page 170](#)

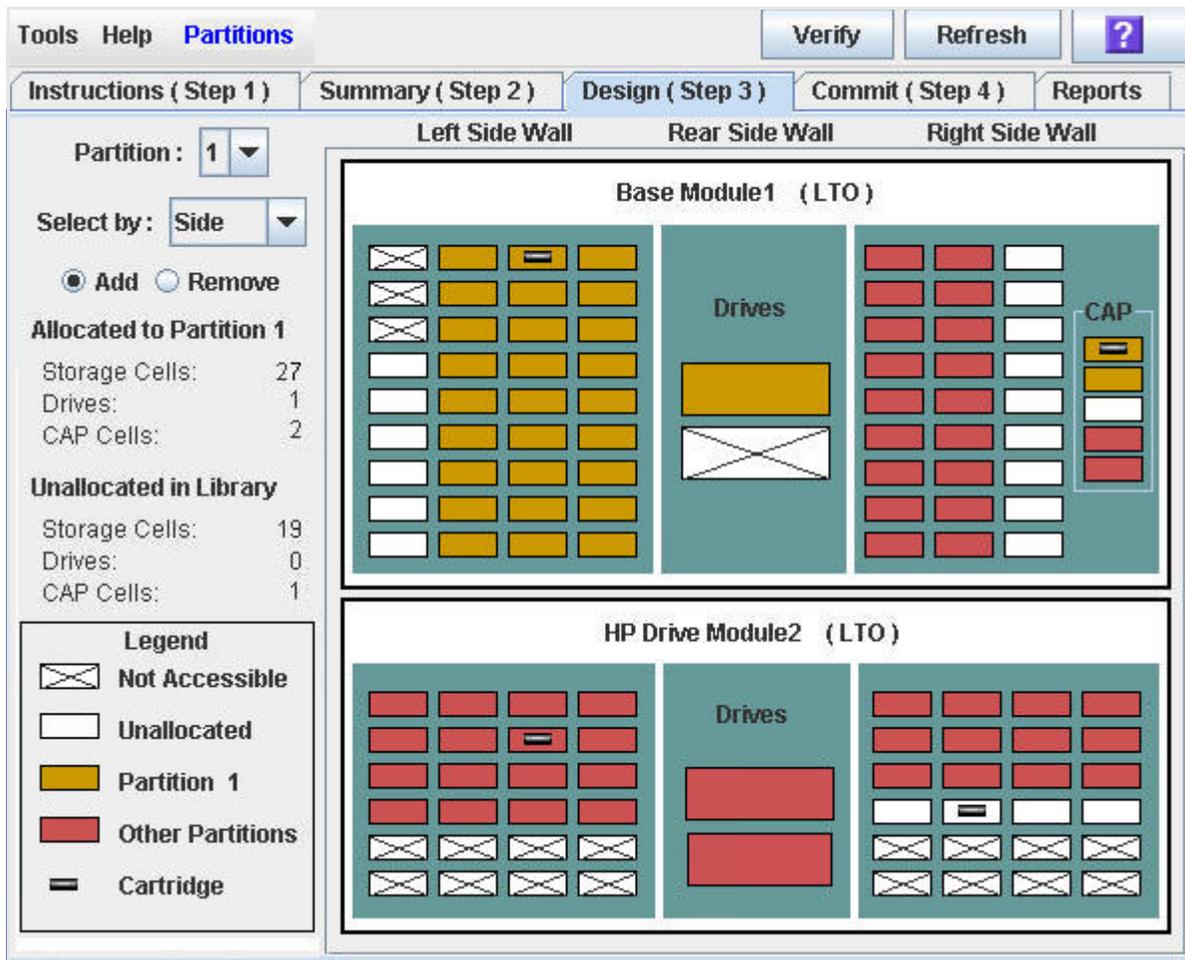
## Partitions—Design (Step 3)

### Sample Screen (Bridged Library)

The screenshot displays the Partition Design (Step 3) interface for a Bridged Library. The interface is divided into several sections:

- Top Navigation:** Tools, Help, Partitions (selected), Verify, Refresh, and a help icon.
- Step Navigation:** Instructions (Step 1), Summary (Step 2), Design (Step 3) (selected), Commit (Step 4), and Reports.
- Left Panel (Configuration):**
  - Partition: 1
  - Select by: Side
  - Buttons: Add (selected), Remove
  - Bridge Drive: 1
  - Allocated to Partition 1:
    - Storage Cells: 28
    - Drives: 2
    - CAP Cells: 0
  - Unallocated in Library:
    - Storage Cells: 0
    - Drives: 0
    - CAP Cells: 0
  - Legend:
    - Not Accessible (X icon)
    - Unallocated (White icon)
    - Partition 1 (Yellow icon)
    - Other Partitions (Red icon)
    - Cartridge (Horizontal bar icon)
    - Bridge Capable (T icon)
- Main Display Area:**
  - Base Module1 (LTO):** Divided into Left Side Wall, Rear Side Wall, and Right Side Wall. The Left Side Wall contains a 4x8 grid of yellow cells (Partition 1) with some white cells (Unallocated). The Rear Side Wall contains two drives, one yellow and one red, both with Bridge Capable icons. The Right Side Wall contains a 4x8 grid of red cells (Other Partitions) with one yellow cell (Partition 1) and one white cell (Unallocated). A CAP icon is visible on the far right.
  - HP Drive Module2 (LTO):** Divided into Left Side Wall, Rear Side Wall, and Right Side Wall. The Left Side Wall contains a 4x8 grid of red cells (Other Partitions) with one white cell (Unallocated). The Rear Side Wall contains one white cell (Unallocated) and one red cell (Other Partitions), both with Bridge Capable icons. The Right Side Wall contains a 4x8 grid of red cells (Other Partitions) with one white cell (Unallocated).

### Sample Screen (Unbridged Library)



### Description

Enables you to define partition boundaries by selecting the resources (storage cells, tape drives, or CAP cells) you want to include in the partition. You can use any of the following methods to add or remove resources from a partition (see [“Library Map \(not labeled\)” on page 162](#) for detailed instructions):

- Select individual cells or groups of cells
- Select a side within a library module
- Select an entire library module

**Caution** – Changing partition boundaries can result in orphaned cartridges and data that could be lost. See [“Planning for Partitioning” on page 87](#) for details.

- Select a bridge drive (bridged libraries only)

**Note** – The partition **Summary (Step 2)** and **Design (Step 3)** screens, and all associated messages, give you a dynamic workspace to design your library partitions. All partition configuration information is automatically saved to the partition workspace in SL Console memory and retained for the duration of your SL Console session. This allows you to switch among partition views and leave and return to the partition screens any number of times without losing your configuration changes.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

## Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

## Screen Fields

### Allocated to Partition [1-8]

**Note** – The data in these fields is automatically updated from the SL Console partition workspace when you select a partition.

Display only.

Total numbers of **Storage Cells**, tape **Drives**, and **CAP Cells** allocated to the selected partition, based on the currently defined partition boundaries.

### Unallocated in Library

**Note** – The data in these fields is automatically updated from the SL Console partition workspace when you select a partition.

Display only.

Total numbers of **Storage Cells**, tape **Drives**, and **CAP Cells** in the library that are not yet allocated to a partition.

## Legend

Legend for the library map. The state of each library resource (storage cell, tape drive, or CAP cell) is indicated as follows:

- **Not Accessible** (white and x-ed out). Resource is not accessible to any partition, possibly because storage cells have been configured for diagnostic cartridges.

- **Available** (white). Resource is currently not allocated to any partition and therefore available to the selected partition.
- **Partition  $n$**  (gold). Resource is allocated to the selected partition, partition  $n$ .
- **Other Partitions** (red). Resource is allocated to another partition and therefore NOT available to the selected partition.
- **Cartridge** (cartridge icon). Resource contains a tape cartridge.
- **Bridge capable** (bridge icon, bridged libraries only). When allocated to a partition, the drive can carry the control path for the other allocated drives.

#### Library Map (not labeled)

Graphical representation of the current library configuration. Initial display for the current SL Console login session is from the library controller database, and then the display reflects data from the SL Console partition workspace as you modify partition configurations. The display includes the following information:

- Types of modules installed in the library (base module, drive module, storage module)
- Numeric module ID (1–5)
- Media configuration for each module (mixed media or LTO only)
- Location of all resources (storage cells, tape drives, CAP cells) within the library

**Note** – Move the cursor over any resource to display a tooltip of detailed information about the cell or drive, its partition assignment, and the identity of any resident cartridge.

**Note** – If no partition IDs have been defined, the library map is display only.

Use the library map to modify the boundaries of the selected partition. Depending on whether you have clicked the **Add** or **Remove** radio button, all selected resources are either added to or removed from the partition.

Depending on your choice in the **Select by** field, you can perform any of the following actions.

- **Select by cell:** Select individual or groups of resources. Resources in a partition do not need to be adjacent to one another.
  - To select an individual resource, double-click it.
  - To select a rectangular group of resources, click the cell or drive at one corner of the rectangle, and then click the cell or drive diagonally opposite.
- **Select by side:** Select an entire side within a module, except the CAP. Sides in a partition do not need to be adjacent to one another. To select one side of a library module, click any resource in that side.
- **Select by module:** Select an entire module, except the CAP. Modules in a partition do not have to be adjacent to one another. To select a library module, click any resource in that module.

## Buttons and Controls

### Partition

Required.

Selectable list of available partitions.

Select the partition for which you want to assign resources (storage cells, tape drives, or CAP cells).

The list displays all valid partition IDs for the library. If no partition IDs have been defined, the menu is blank.

**Note** – When you select a partition, the screen is automatically updated to display data for that partition from the SL Console partition workspace.

### Select by

Required.

Selectable list containing **Cell**, **Side**, and **Module**.

Define partition boundaries as follows:

- Select **Cell** to select individual or rectangular groups of resources.
- Select **Side** to select all resources, except the CAP, on one side of a library module.
- Select **Module** to select all resources, except the CAP, within a library module.

### Add | Remove

Required.

Radio button.

Click **Add** to select unallocated library map resources that you want to add to the partition design.

Click **Remove** to select currently allocated library map resources that you want to remove from the partition design.

### Bridge Drive (Bridged Libraries Only)

Required.

Selectable list of the drives in the partition that can be bridge drives. Bridge drives handle the control path for the other drives in the partition.

Select a drive to designate it as the bridge drive for the partition.

### Verify Results

Button.

Press **Verify Results** to verify changes that you have made to the partition configuration before committing them to the library controller database. The **Tools > Partitions—Design (Step 3)—Verify Results** dialog box appears, indicating whether there are any orphaned cartridges or other errors in the current partition configuration.

**Note –** This procedure verifies only one partition at a time. If you need to verify multiple partitions, you must repeat this procedure separately for each partition.

**Note –** This verification is performed on the current partition configuration in the SL Console partition workspace only. It does not verify current partition boundaries against the library controller database. Therefore, it cannot identify configuration conflicts that may arise due to other users performing cartridge movements or library configuration changes (through the command line interface, other SL Console sessions, or host applications) at the same time you have made partition changes.

#### **Refresh**

Button.

Press to refresh the SL Console partition workspace with current data from the library controller database. All uncommitted partition changes you have made during this SL Console login session will be discarded. The **Partition Refresh** message appears, prompting you to confirm the refresh.

#### **? (Help)**

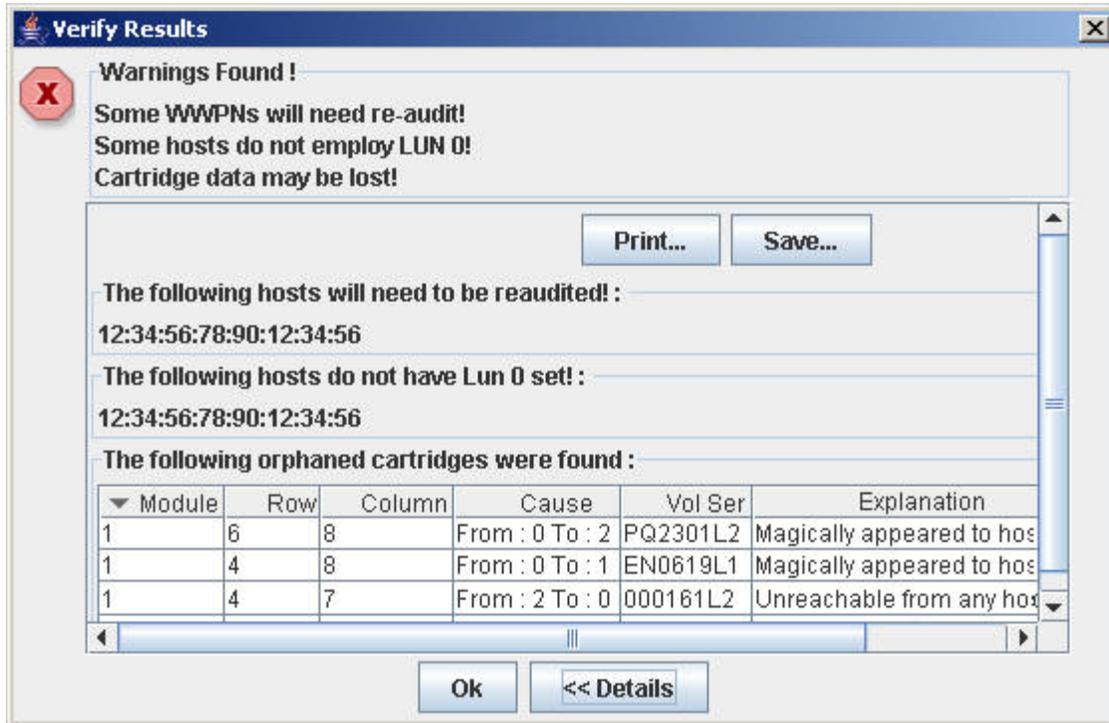
Click to display online help for the screen.

#### **See Also**

- [“Partitions—Summary \(Step 2\)” on page 140](#)
- [“Partitions—Commit \(Step 4\)” on page 168](#)
- [“Partitions—Reports” on page 174](#)

## Partitions—Design (Step 3)—Verify Results

### Sample Screen



### Description

Displays a list of configuration errors in the current SL Console partition workspace.

This screen is a message that appears when you click **Verify Results** on the “Partitions—Design (Step 3)” on page 159 screen.

Possible errors include:

- A partition has orphaned cartridges. See “Resolve Orphaned Cartridges” on page 110 for details.
- Library resources have been removed from a partition.
- A host-partition connection does not have a partition assigned to LUN 0 (applies to FC-SCSI connections only).

If any of these error conditions are present, the screen initially displays summary warning messages. You can view detailed messages by clicking the **Details** button.

It is recommended that you resolve all errors before committing the data to the library controller database.

Optionally, you can print the screen data or save it to a comma-separated file.

**Note** – The partition **Summary (Step 2)** and **Design (Step 3)** screens, and all associated messages, give you a dynamic workspace to design your library partitions. All partition configuration information is automatically saved to the partition workspace in SL Console memory and retained for the duration of your SL Console session. This allows you to switch among partition views and leave and return to the partition screens any number of times without losing your configuration changes.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

## Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

## Screen Fields

**Note** – The screen fields are the same as those displayed in the [“Partitions—Commit \(Step 4\)—Confirm Apply”](#) on page 170 message.

### Warnings found

Display only.

Summary error messages regarding the partition configuration.

### The following hosts will need re-audited

Display only.

World Wide Port Names (WWPNs) of any hosts that should re-audit their library partition. This may be because library resources have been deleted from the partition.

### The following hosts do not have Lun 0 set

Display only.

World Wide Port Names (WWPNs) of any hosts that have not defined any library partitions as LUN 0 on the host.

### The following orphaned cartridges were found

Display only.

Detailed information regarding all orphaned cartridges in the current partition configuration. Includes library, rail, column, side, and row location of the cartridge, cartridge volume serial number (VOLID), and probable causes and explanations why the cartridge is orphaned.

## Buttons and Controls

### Print

Click to print the report on a selected printer.

### Save

Click to save the report to a designated comma-separated text file (.csv extension). Comma-separated files can be opened by a variety of spreadsheet and database programs.

### OK

Click to cancel the update. The library controller database is not updated, but all partition changes from this login session are retained in the SL Console partition workspace.

### Details

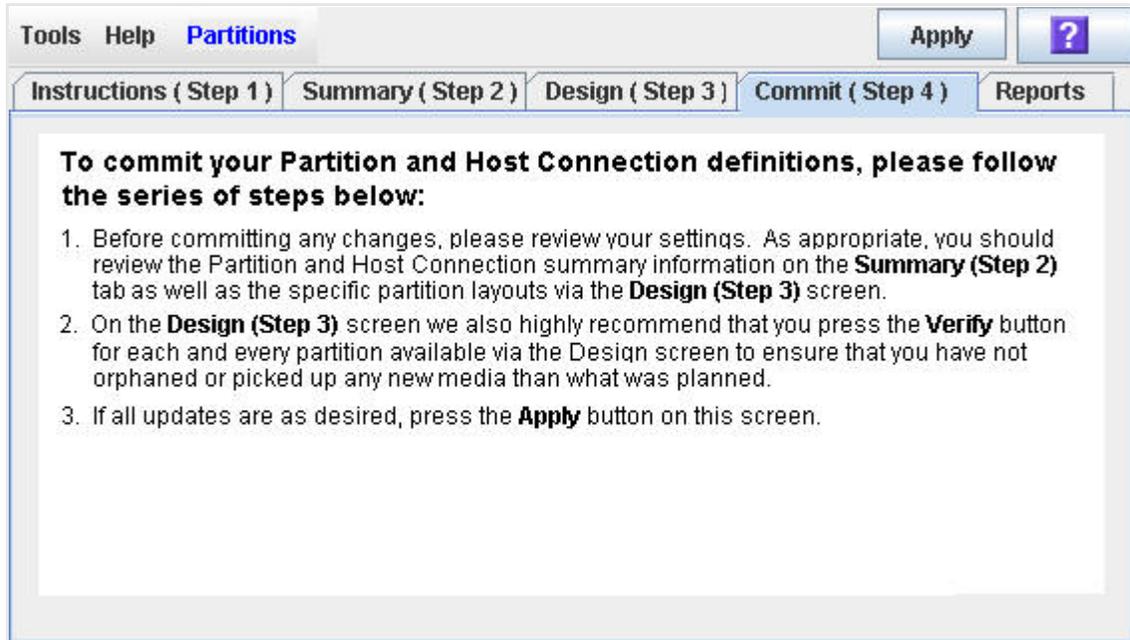
Click to toggle between the expanded and collapsed views of the warning message display.

## See Also

- [“Partitions—Design \(Step 3\)” on page 159](#)
- [“Partitions—Commit \(Step 4\)—Confirm Apply” on page 170](#)

## Partitions—Commit (Step 4)

### Sample Screen



### Description

Commits the changes made in the current SL Console partition workspace to the library controller database and alters the partitioning of the library.

**Caution** – Although partition changes are not disruptive to library hosts, it is recommended that you make the library unavailable to other users before committing your partition workspace changes. Because the SL Console does not validate partition boundaries against the library controller database in real-time, configuration conflicts may arise if you change partition boundaries while other users are performing cartridge movements or library configuration changes.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

**Caution** – It is recommended that you follow the procedure [“Resolve Orphaned Cartridges” on page 110](#) before using this screen.

**Caution –** The **Apply** button on this screen updates the library controller database with all partition configuration changes you have made during this SL Console session. Failure apply changes before logging out of the current SL Console session will cause all your library configuration changes to be lost.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

None

### Buttons and Controls

#### Apply

Click to update the library controller database with the current settings from the SL Console partition workspace. The **Tools > Partitions—Commit (Step 4)—Confirm Apply** message appears, indicating whether there are any orphaned cartridges or other errors in the current partition configuration.

**Note –** This button is grayed out if you have not made any changes to the SL Console partition workspace since the last commit.

#### ? (Help)

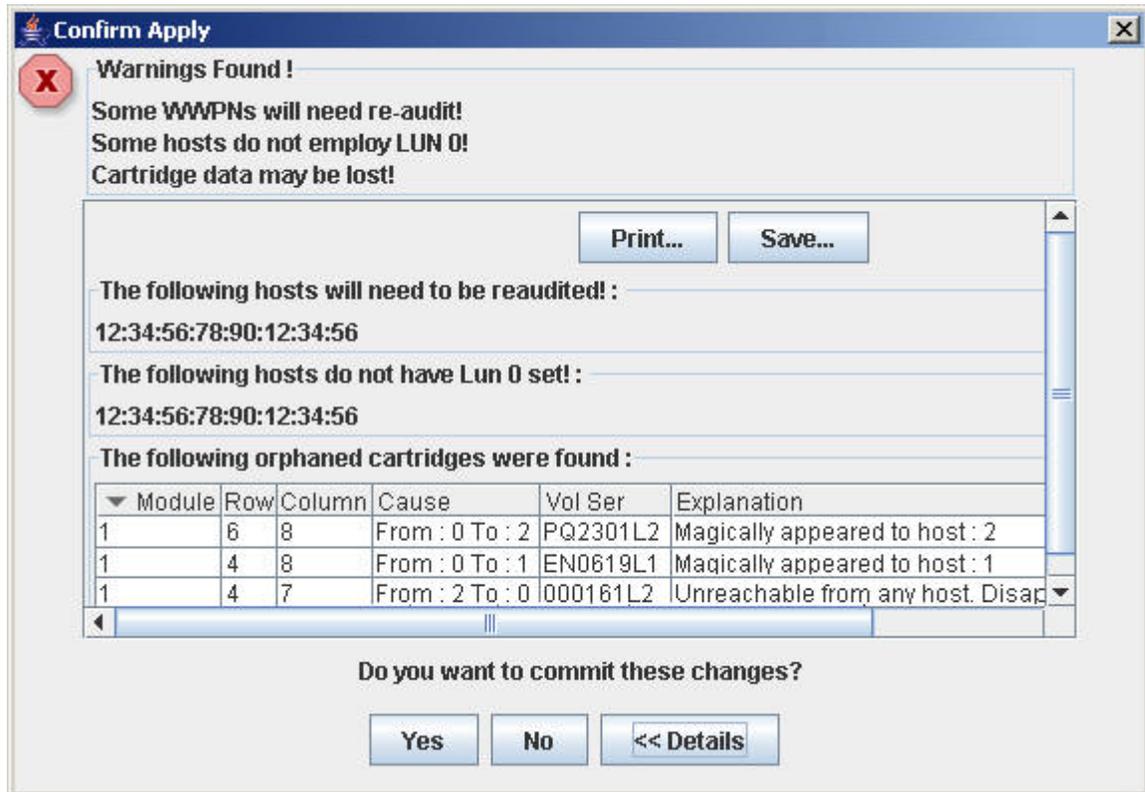
Click to display online help for the screen.

### See Also

- [“Partitions—Summary \(Step 2\)” on page 140](#)
- [“Partitions—Design \(Step 3\)” on page 159](#)
- [“Partitions—Commit \(Step 4\)—Confirm Apply” on page 170](#)
- [“Partitions—Reports” on page 174](#)

## Partitions—Commit (Step 4)—Confirm Apply

### Sample Screen



### Description

Displays a list of configuration errors in the current SL Console partition workspace. This screen is a message that appears when you click **Apply** on the “Partitions—Commit (Step 4)” on page 168 screen.

After viewing the error messages, you can commit all data in the SL Console partition workspace to the library controller database by clicking the **Yes** button.

Possible errors include:

- A partition has orphaned cartridges. See “Resolve Orphaned Cartridges” on page 110 for details.
- Library resources have been removed from a partition.
- A host-partition connection does not have a partition assigned to LUN 0 (applies to FC-SCSI connections only).

If any of these error conditions are present, the screen initially displays summary warning messages. You can view detailed messages by clicking the **Details** button.

It is recommended that you resolve all errors before committing the data to the library controller database.

Optionally, you can print the screen data or save it to a comma-separated file.

**Caution** – Information in the SL Console partition workspace is saved to the library controller database only through the **Commit (Step 4)** screen. If your SL Console session ends or you refresh the workspace data before you have committed your updates through the **Commit (Step 4)** screen, you will lose any partition changes you have made through the **Summary (Step 2)** and **Design (Step 3)** screens and all associated messages.

## Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

## Screen Fields

### Warnings found

Display only.

Summary error messages regarding the partition configuration.

### The following hosts will need re-audited

Display only.

World Wide Port Names (WWPNs) of any hosts that should re-audit their library partition. This may be because library resources have been deleted from the partition.

### The following hosts do not have Lun 0 set

Display only.

World Wide Port Names (WWPNs) of any hosts that have not defined any library partitions as LUN 0 on the host.

### The following orphaned cartridges were found

Display only.

Detailed information regarding all orphaned cartridges in the current partition configuration. Includes library, rail, column, side, and row location of the cartridge, cartridge volume serial number (VOLID), and probable causes and explanations why the cartridge is orphaned.

## Buttons and Controls

### Print

Click to print the report on a selected printer.

**Save**

Click to save the report to a designated comma-separated text file (.csv extension). Comma-separated files can be opened by a variety of spreadsheet and database programs.

**Yes**

Click to confirm that you want to update the library controller database with the current settings from the SL Console workspace.

**No**

Click to cancel the update. The library controller database is not updated, but all partition changes from this login session are retained in the SL Console partition workspace.

**Details**

Click to toggle between the expanded and collapsed views of the warning message display.

**See Also**

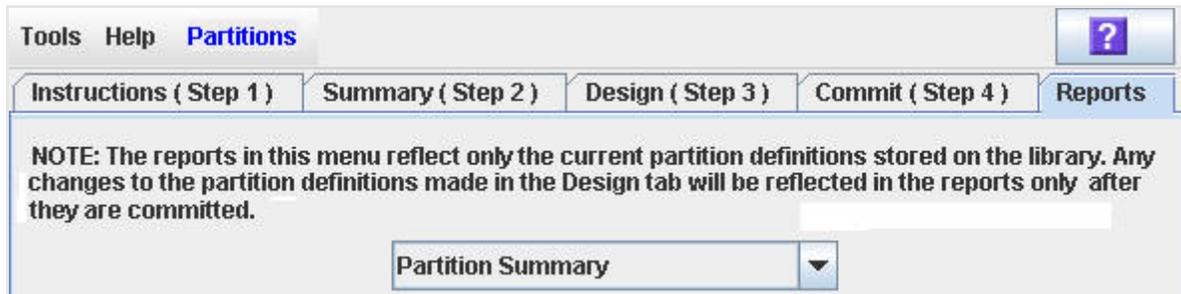
- [“Partitions—Commit \(Step 4\)” on page 168](#)
- [“Partitions—Design \(Step 3\)—Verify Results” on page 165](#)

## Partition Report Screens

- [“Partitions—Reports” on page 174](#)
- [“Partitions—Reports—Cartridge Cell and Media Summary” on page 176](#)
- [“Partitions—Reports—Host Connections Summary” on page 179](#)
- [“Partitions—Reports—Orphaned Cartridge Report” on page 184](#)
- [“Partitions—Reports—Partition Details” on page 186](#)
- [“Partitions—Reports—Partition Summary” on page 189](#)

## Partitions—Reports

### Sample Screen



### Description

Enables you to generate library partition reports for the most recently committed configuration.

**Note –** The partition reports display data saved to the library controller database. If you have made partition configuration changes without committing the changes to the library controller through the **Commit (Step 4)** screen, the data in these reports will differ from data shown on the partition **Summary (Step 2)** and **Design (Step 3)** screens.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

Please select a report to display

Required.

Selectable list of **Cartridge Cell** and **Media Summary**, **Host Connections Summary**, **Orphaned Cartridge Report**, **Partition Details**, and **Partition Summary**.

Select the report that you want to display.

### Buttons and Controls

? (Help)

Click to display online help for the screen.

### See Also

- [“Partitions—Summary \(Step 2\)” on page 140](#)

- “Partitions—Design (Step 3)” on page 159
- “Partitions—Commit (Step 4)” on page 168
- “Partitions—Reports—Cartridge Cell and Media Summary” on page 176
- “Partitions—Reports—Host Connections Summary” on page 179
- “Partitions—Reports—Orphaned Cartridge Report” on page 184
- “Partitions—Reports—Partition Details” on page 186
- “Partitions—Reports—Partition Summary” on page 189

## Partitions—Reports—Cartridge Cell and Media Summary

### Sample Screen

The screenshot shows a software interface with a menu bar (Tools, Help, Partitions), a Refresh button, and a help icon. Below the menu is a navigation bar with tabs: Instructions (Step 1), Summary (Step 2), Design (Step 3), Commit (Step 4), and Reports. The 'Reports' tab is active, displaying a dropdown menu for 'Cartridge Cell and Media Summary'. The main content area shows a table with the following data:

▼ Mod	Row	Col	Cell Status	Partition Id	Partition Name	SCSI Element	Element Type	Vol Ser
1	1	4	Assigned	1	PARTITION...	1000	CELL	
1	2	4	Assigned	1	PARTITION...	1001	CELL	
1	3	4	Assigned	1	PARTITION...	1002	CELL	
1	4	4	Assigned	1	PARTITION...	1003	CELL	
1	5	4	Assigned	1	PARTITION...	1004	CELL	
1	6	4	Assigned	1	PARTITION...	1005	CELL	
1	7	4	Assigned	1	PARTITION...	1006	CELL	
1	8	4	Assigned	1	PARTITION...	1007	CELL	

Below the table are two buttons: 'Print...' and 'Save To File...'.

### Description

Lists storage cells, CAP cells, drives, and resident cartridges.

**Note** – The partition reports display data saved to the library controller database. If you have made partition configuration changes without committing the changes to the library controller through the **Commit (Step 4)** screen, the data in these reports will differ from data shown on the partition **Summary (Step 2)** and **Design (Step 3)** screens.

**Note** – You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 27](#) for details.

Optionally, you can print the screen data or save it to a comma-separated file.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### Module

Display only.

Module where the library resource is located.

**Row**

Display only.

Row number where the library resource is located. Rows are numbered consecutively from the top down, with row 1 at the top.

**Column**

Display only.

Column number where the library resource is located. Column location is referenced from the center of the drive bays. To the right of the drive bays is +1 and to the left is -1.

**Cell Status**

Display only.

Partition status of the library resource. Options are:

- Assigned
- Unassigned

**Partition ID**

Display only.

Partition ID to which the library resource is allocated, if applicable.

**Partition Name**

Display only.

Name of the partition to which the library resource is allocated, if applicable.

**SCSI Element**

Display only.

Host SCSI element number assigned to the library resource. SCSI element numbers are continuous within a partition, even if resources are not adjacent.

**Element Type**

Display only.

Type of library resource. Options are:

- CAP
- CELL
- DRIVE

**Vol Ser**

Display only.

Volume serial number (VOLID) of the cartridge resident in the library resource, if applicable.

**Buttons and Controls**

**Print**

Button.

Click to print the report on a selected printer.

**Save to File**

Button.

Press to save the report to a comma-separated value (.csv) file compatible with many spreadsheet applications.

**? (Help)**

Click to display online help for the screen.

**See Also**

- [“Partitions—Reports—Host Connections Summary”](#) on page 179
- [“Partitions—Reports—Orphaned Cartridge Report”](#) on page 184
- [“Partitions—Reports—Partition Details”](#) on page 186
- [“Partitions—Reports—Partition Summary”](#) on page 189

## Partitions—Reports—Host Connections Summary

### Sample Screen (Bridged Library)

Tools Help **Partitions** ?

Instructions ( Step 1 ) Summary ( Step 2 ) Design ( Step 3 ) Commit ( Step 4 ) **Reports**

**NOTE:** The reports in this menu reflect only the current partition definitions stored on the library. Any changes to the partition definitions made in the Design tab will be reflected in the reports only after they are committed.

Host Connections Summary ▼

Host Connections as of 3/3/11 4:55 PM

▼ Partition ID	Partition Name	Storage Cells	Media in Storage Cells	%Storage Cells w/ Media	Drives	CAPs	* Total Media
1	Partition 1	28	2	7.14%	2	0	2
2	Partition 2	30	1	3.33%	0	5	1
3	Partition 3	32	2	6.25%	1	0	2

\*The Total Media column includes media currently found in CAPs, drives and storage cells

Host Connections

▼ Bridging Drive Slot	LUN	Partition ID
1	0	1
4	0	3

Print... Save To File...

## Sample Screen (Unbridged Library)

Tools Help **Partitions** Refresh ?

Instructions ( Step 1 ) Summary ( Step 2 ) Design ( Step 3 ) Commit ( Step 4 ) Reports

Host Connections Summary ▼

**Partitions**

▼ Partition ID	Partition Name	Cell Count	Drive Count	CAP Count	Cartridge Count	% of Cells with Media
1	PARTITION-1	27	1	2	2	3.7%
2	2Two	18	1	0	0	0%
3	3Three	0	0	0	0	0%
4	Green27--Partit...	0	0	0	0	0%
6	sixer	28	1	2	1	3.57%
7	7Seven	0	0	0	0	0%
8	Green27 -- Part...	0	0	0	0	0%

**Host Connections**

▼ Initiator WWPN	Library Controller Port	LUN	Partition ID
20:00:00:A0:BD:08:07:00	0	0	3
20:00:00:A0:BD:08:0A:00	0	0	3
20:00:00:A0:BD:08:0A:00	0	2	1
20:00:00:A0:BD:08:0A:00	0	3	4

Print... Save To File...

### Description

Displays host-partition connections for the library.

**Note** – The partition reports display data saved to the library controller database. If you have made partition configuration changes without committing the changes to the library controller through the **Commit (Step 4)** screen, the data in these reports will differ from data shown on the partition **Summary (Step 2)** and **Design (Step 3)** screens.

You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 27](#) for details.

Optionally, you can print the screen data or save it to a comma-separated file.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

## Screen Fields

### ***Partitions (Unbridged Libraries)***

**Note** – The screen fields in this section also appear on the [“Partitions—Reports—Partition Summary”](#) on page 189 report.

#### **Partition ID**

Display only.

ID of the partition (1–8).

#### **Partition Name**

Display only.

Name of the partition, if any.

#### **Cell Count**

Display only.

Total number of storage cells allocated to the partition.

#### **Drive Count**

Display only.

Total number of tape drives allocated to the partition.

#### **CAP Count**

Display only.

Total number of CAP cells allocated to the partition.

#### **Cartridge Count**

Display only.

Total number of tape cartridges resident in the partition.

#### **% of Cells with Media**

Display only.

Percentage of storage cells containing tape cartridges (**Cartridge Count** divided by **Cell Count** times 100).

### ***Partitions (Bridged Libraries)***

#### **Partition ID**

Display only.

ID of the partition (1–8).

**Partition Name**

Display only.

Name of the partition, if any.

**Storage Cells**

Display only.

Total number of storage cells allocated to the partition.

**Media in Storage Cells**

Display only.

Total number of cartridges resident in storage cells that are allocated to the partition.

**% Storage Cells w/ Media**

Display only.

The percentage of the total storage cells allocated to the partition that contains cartridges.

**Drives**

Display only.

Total number of drives allocated to the partition.

**CAPs**

Total number of Cartridge Access Ports (CAPs) allocated to the partition.

**\*Total Media**

Display only.

Total number of cartridges resident in the partition (includes media resident in allocated drives, storage cells, and CAP cells).

***Host Connections (Unbridged Libraries)***

**Initiator WWPN**

Display only.

World Wide Port Name of a host bus adapter (HBA) with a connection to the partition.

**Library Controller Port**

Display only.

The port on the SL500 library controller card that connects to this host port.

**LUN**

Display only.

Logical unit number of the library partition as seen from the host.

**Partition ID**

Display only.

Partition ID to which the host has a connection.

***Host Connections (Bridged Libraries)*****Bridging Drive Slot**

Display only.

Location of the bridge drive that provides the control path for this partition.

**LUN**

Display only.

Logical unit number of the library partition as seen from the host.

**Partition ID**

Display only.

**Buttons and Controls****Print**

Click to print the report on a selected printer.

**Save to File**

Click to save the report to a designated comma-separated text file (.csv extension). Comma-separated files can be opened by a variety of spreadsheet and database programs.

**? (Help)**

Click to display online help for the screen.

**See Also**

- [“Partitions—Reports—Cartridge Cell and Media Summary”](#) on page 176
- [“Partitions—Reports—Orphaned Cartridge Report”](#) on page 184
- [“Partitions—Reports—Partition Details”](#) on page 186
- [“Partitions—Reports—Partition Summary”](#) on page 189

## Partitions—Reports—Orphaned Cartridge Report

### Sample Screen

▼ Mod	Row	Col	Vol Ser	Explanation
3	3	1	012416L1	Unreachable from any ...
3	7	11	DG 003L2	Unreachable from any ...
3	1	7	A00008L1	Unreachable from any ...
3	1	1	EN0341L1	Unreachable from any ...

### Description

Displays the locations and volume serial numbers (VOLIDs) of all orphaned cartridges in the library. Also identifies why the cartridge is orphaned.

**Note –** The partition reports display data saved to the library controller database. If you have made partition configuration changes without committing the changes to the library controller through the **Commit (Step 4)** screen, the data in these reports will differ from data shown on the partition **Summary (Step 2)** and **Design (Step 3)** screens.

You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 27](#) for details.

Optionally, you can print the screen data or save it to a comma-separated file.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Screen Fields

#### Module

Display only.

Module number where the orphaned cartridge is located.

**Row**

Display only.

Row number where the orphaned cartridge is located. Rows are numbered consecutively from the top down, with row 1 at the top.

**Column**

Display only.

Column number where the orphaned cartridge is located. Column location is referenced from the center of the drive bays. +1 is to the right of the drive bays; -1 is to the left.

**Vol Ser**

Display only.

Volume serial number (VOLID) of the orphaned cartridge.

**Explanation**

Display only.

Explanation of why the cartridge is orphaned.

Because this report is produced from the library controller database, the only option is:

- Unreachable from any host

**Buttons and Controls****Print**

Button. Press to print the report on a selected printer.

**Save to File**

Button.

Press to save the report to a comma-separated value (.csv) file compatible with many spreadsheet applications.

**? (Help)**

Click to display online help for the screen.

**See Also**

- [“Partitions—Reports—Cartridge Cell and Media Summary”](#) on page 176
- [“Partitions—Reports—Host Connections Summary”](#) on page 179
- [“Partitions—Reports—Partition Details”](#) on page 186
- [“Partitions—Reports—Partition Summary”](#) on page 189

## Partitions—Reports—Partition Details

### Sample Screen

Tools Help **Partitions** Refresh ?

Instructions ( Step 1 ) Summary ( Step 2 ) Design ( Step 3 ) Commit ( Step 4 ) Reports

Partition Details

Partition ID: 1

Partition Details

Name	Value
Partition Name	PARTITION-1
Partition ID	1
Bar Code	Left 7 label characters
Assigned Cells	27
Available Cells	22
Occupied Cells	1
Assigned Drives	1
Available Drives	0
Occupied Drives	0
Assigned CAPs	2
Available CAPs	0
Occupied CAPs	1
Percent Slot Capacity	28.42%

Print... Save To File...

### Description

Displays a sortable table of name/value pairs for each of the properties of the selected partition.

**Note** – The partition reports display data saved to the library controller database. If you have made partition configuration changes without committing the changes to the library controller through the **Commit (Step 4)** screen, the data in these reports will differ from data shown on the partition **Summary (Step 2)** and **Design (Step 3)** screens.

You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 27](#) for details.

Optionally, you can print the screen data or save it to a comma-separated file.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console

- Web-launched SL Console

## Screen Fields

### Name

Display only.

Display only.

Name of the partition property.

### Value

Display only.

The value of the partition property.

Partition properties include:

- Partition ID  
A digit in the range [1–8].
- Bar Code  
The bar code format used on cartridges assigned to the partition.
- Assigned Cells  
The total number of storage cells allocated to the partition.
- Available Cells  
Total number of storage cells in the library available for allocation to the partition.
- Occupied Cells  
Total number of storage cells in the partition with tape cartridges present.
- Assigned Drive Bays  
Total number of drive bays allocated to the partition.
- Available Drive Bays  
Total number of drive bays in the library available for allocation to the partition.
- Occupied Drives  
Total number of installed tape drives in the partition with tape cartridges present.
- Assigned CAP cells  
Total number of CAP cells allocated to the partition through dedicated or shared CAPs.
- Available CAP cells
  - Total number of CAP cells in the library available for allocation to the partition. This number includes all CAP cells in CAPs not allocated to any partition.
  - This number excludes all cells in the CAPs allocated to this partition.
- Occupied CAP cells

Total number of CAP cells in the partition with tape cartridges present.

- Percent Slot Capacity

The percentage of storage cells in the library allocated to this partition (the number of cells allocated to the partition divided by the total physical capacity of the library)

## Buttons and Controls

### Print

Button.

Click to print the report on a selected printer.

### Save to File

Button

Press to save the report to a comma-separated value (.csv) file compatible with many spreadsheet applications.

### ? (Help)

Click to display online help for the screen.

## See Also

- [“Partitions—Reports—Cartridge Cell and Media Summary”](#) on page 176
- [“Partitions—Reports—Host Connections Summary”](#) on page 179
- [“Partitions—Reports—Orphaned Cartridge Report”](#) on page 184
- [“Partitions—Reports—Partition Summary”](#) on page 189

## Partitions—Reports—Partition Summary

### Sample Screen

Tools Help **Partitions** ?

Instructions ( Step 1 ) Summary ( Step 2 ) Design ( Step 3 ) Commit ( Step 4 ) Reports

NOTE: The reports in this menu reflect only the current partition definitions stored on the library. Any changes to the partition definitions made in the Design tab will be reflected in the reports only after they are committed.

Partition Summary

Partitions as of 4/30/08 3:16 PM

Partition ID	Partition Name	Storage Cells	Media in Storage Cells	%Storage Cells w/ Media	Drives	CAPs	* Total Media
1	Part 1	36	7	19.44%	0	0	7
2	Part 2	35	1	2.86%	0	0	1

\*The Total Media column includes media currently found in CAPs, drives and storage cells

Print... Save To File...

### Description

Displays summary information for all partitions in the library.

**Note** – The partition reports display data saved to the library controller database. If you have made partition configuration changes without committing the changes to the library controller through the **Commit (Step 4)** screen, the data in these reports will differ from data shown on the partition **Summary (Step 2)** and **Design (Step 3)** screens.

You can modify the layout and display of this screen. See [“Modifying the Screen Layout” on page 27](#) for details.

Optionally, you can print the screen data or save it to a comma-separated file.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

## Screen Fields

**Note** – These screen fields also appear on the [“Partitions—Reports—Host Connections Summary”](#) on page 179 report.

### Partition ID

Display only.

ID of the partition (1–8).

### Partition Name

Display only.

Name of the partition.

### Cell Count

Display only.

Total number of storage cells allocated to the partition.

### Drive Count

Display only.

Total number of tape drives allocated to the partition.

### CAP Count

Display only.

Total number of CAP cells allocated to the partition.

### Cartridge Count

Display only.

Total number of tape cartridges resident in the partition.

### % of Cells with Media

Display only.

Percentage of storage cells containing tape cartridges. Calculated as **Cartridge Count / Cell Count**.

### Partition ID

Display only.

A digit in the range [1–8].

### Partition Name

Display only.

The name of the partition, if any.

**Storage Cells**

Display only.

Total number of storage cells allocated to the partition.

**Media in Storage Cells**

Display only.

Total number of cartridges resident in storage cells that are allocated to the partition.

**% Storage Cells w/ Media**

Display only.

The percentage of the total storage cells allocated to the partition that contains cartridges.

**Drives**

Display only.

Total number of drives allocated to the partition.

**CAPs**

Total number of Cartridge Access Ports (CAPs) allocated to the partition.

**\*Total Media**

Display only.

Total number of cartridges resident in the partition (includes media resident in allocated drives, storage cells, and CAP cells).

**Buttons and Controls**

**Print**

Button.

Click to print the report on a selected printer.

**Save to File**

Button

Press to save the report to a comma-separated value (.csv) file compatible with many spreadsheet applications.

**? (Help)**

Click to display online help for the screen.

**See Also**

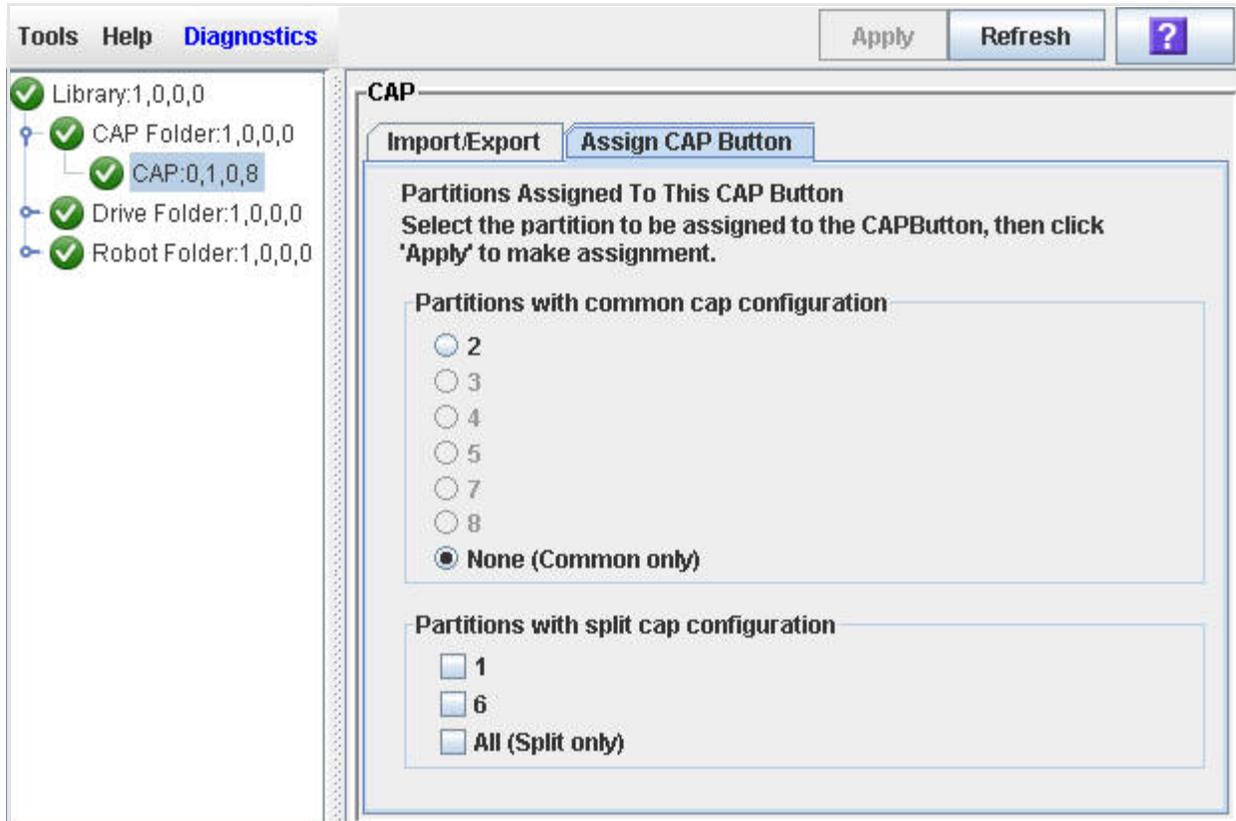
- [“Partitions—Reports—Cartridge Cell and Media Summary”](#) on page 176
- [“Partitions—Reports—Host Connections Summary”](#) on page 179
- [“Partitions—Reports—Orphaned Cartridge Report”](#) on page 184
- [“Partitions—Reports—Partition Details”](#) on page 186

## Partition CAP Operation Screens

- [“Diagnostics > CAP—Assign CAP Button” on page 194](#)

## Diagnostics > CAP—Assign CAP Button

### Sample Screen



### Description

Allows you to select the partitions to which you want to assign the **CAP Open** button on the library control panel. After using this screen, the following actions occur when you press the **CAP Open** button:

- The library opens the doors of all CAPs containing cells accessible to the partitions selected on this screen.
- The library sends CAP status messages to all hosts with access to the exposed cells.
- Doors to CAPs that contain only inaccessible cells do not open.
- Doors to CAPs with cartridges in inaccessible cells do not open.

**Note** – Depending on how your library’s CAPs are configured, this operation may expose CAP cells that are not accessible to the requesting host’s partition.

**Note** – Although it is possible to enter cartridges through a CAP without using the **Assign CAP Button** screen, it is recommended that you access the screen first to verify the partition settings. This will help prevent cartridges from being entered inadvertently into the wrong partition.

See [“Enter Cartridges Into a Partitioned Library” on page 130](#) for complete details on using this screen in conjunction with the **CAP Open** button.

## Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SL Console

## Screen Fields

### Partitions with common CAP configuration

Required.

Partitions with access to common CAP cells are displayed in this table in black type. Partitions that have not been configured are grayed out.

Select the partition for which you want to enter or eject cartridges. You can select only one partition at a time from this table. Options are:

- 1–8: Click the radio button to select the partition.
- None (Common only): Click the radio button to deselect all partitions in this table. This indicates that the enter or eject operation does not involve any partitions with access to common CAP cells.

### Partitions with split CAP configuration

All partitions with access to split CAP cells are displayed in this table.

Select the partitions for which you want to enter or eject cartridges. You can select more than one partition at a time from this table. Deselecting all check boxes indicates that the enter or eject operation does not involve any partitions with allocated CAP cells.

Options are:

- 1–8: Select the check box to select the partition. Deselect the check box to deselect the partition.
- All (Split only): Select the check box to select all partitions in this table.

## Buttons and Controls

### Apply

Click to update the library controller database with the current settings from this screen. The **CAP Confirm** message appears, prompting you to confirm the update.

### Refresh

Click to refresh the SL Console partition workspace with current data from the library controller database. All uncommitted partition changes you have made during this SL Console login session will be discarded. The **Partition Refresh** message appears, prompting you to confirm the refresh.

**? (Help)**

Click to display online help for the screen.

**See Also**

None

---

---

## Library Management

This chapter covers the management of the SL500 library, including:

- [“Automated Mode of Operation” on page 197](#)
- [“Library and Device Status” on page 199](#)
- [“Library Management Tasks” on page 201](#)

### 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 robot.

#### Mount Sequence

A simplified mount sequence involves the following steps:

1. A host requests that a specific volume serial number (vol-id or volser) be mounted in a drive.
2. The library controller transmits to the host that the vol-id 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 library controller translates the host command into motion commands for the robot.
5. The robot takes the cartridge from its storage cell and places it 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 vol-id be dismounted from a drive.
2. The library controller transmits to the host that the vol-id 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 library controller translates the host command into mechanical commands for the robot.
5. The robot takes the cartridge from its storage cell and places it in 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 navigation tree in the SL Console indicates that there is a problem with the library.

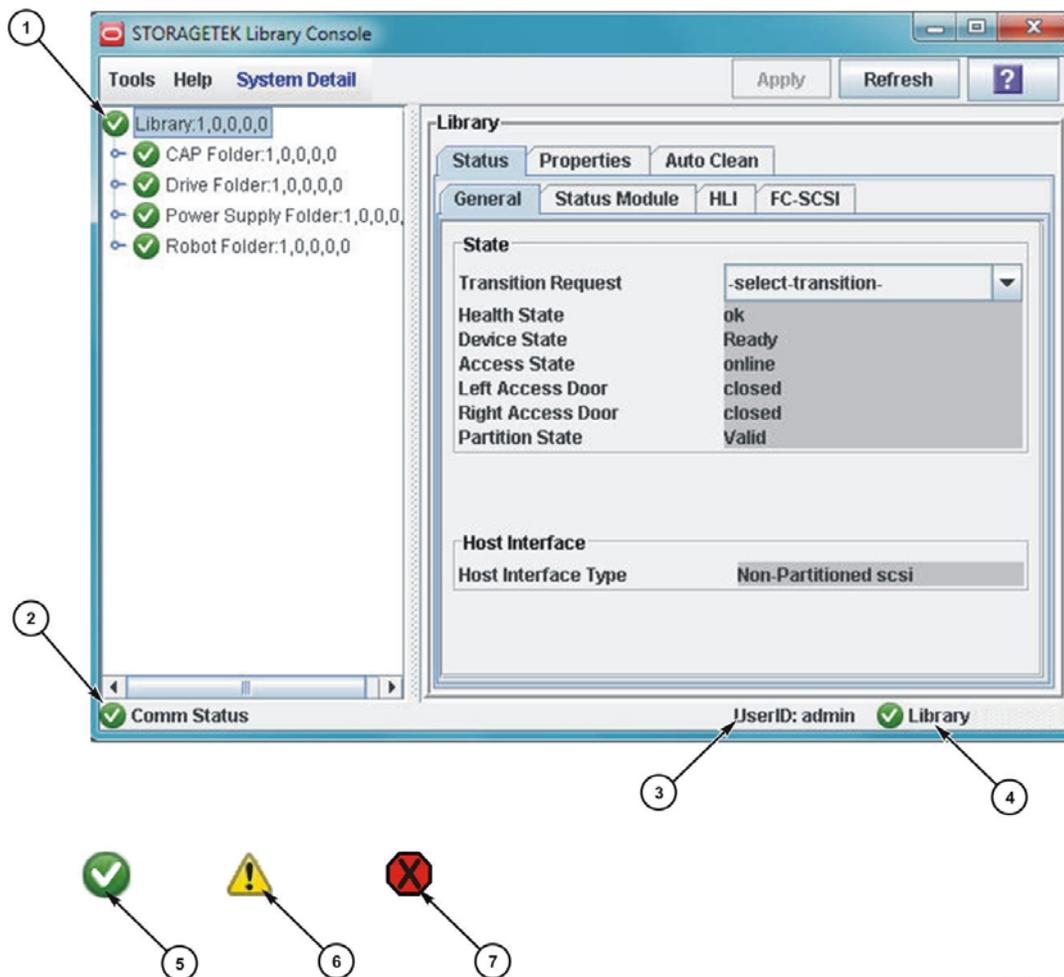
# Library and Device Status

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

- Library
- CAPs
- Drives
- Robot

FIGURE 6-1 describes the health monitor indicators.

**FIGURE 6-1** SL Console Health Status Indicators



Health status indicator and icon descriptions follow:

1: Health status by each device:

- 5: Normal. All library devices are functioning normally. (Green circle with check mark)
- 6: Warning. One or more devices in the library is offline or operating in a degraded state. (Yellow caution triangle with exclamation point)

- 7: Error. One or more devices in the library has experienced a failure. (Red stop sign shape with black X)
- 2: Communication status between SL Console and library controller
  - 5: Normal. The heartbeat monitor flashes periodically when the SL Console is communicating normally with the library controller. (Green circle with check mark)
  - 6: Warning. Appears if the server takes longer than 10 seconds to respond. (Yellow caution triangle with exclamation point)
  - 7: Error. Appears when the server response takes longer than 30 seconds. (Red stop sign shape with black X)
- 3: Userid: User ID currently logged into the SL Console
- 4: Overall health status of library and devices
  - 5: Normal. All library devices are functioning normally. (Green circle with check mark)
  - 6: Warning. One or more devices in the library is offline or operating in a degraded state. (Yellow caution triangle with exclamation point)
  - 7: Error. One or more devices in the library has experienced a failure. (Red stop sign shape with black X)

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

Log off from the SL Console, and then log on again to restore communication.

## Library Management Tasks

- [“Display Library Status” on page 202](#)
- [“Display Library Configuration Properties” on page 203](#)
- [“Set Up an FC Control Path on an Unbridged Library” on page 207](#)
- [“Display Library Controller Properties” on page 208](#)
- [“Display Library Physical Configuration” on page 209](#)
- [“Display Library SCSI Configuration” on page 210](#)
- [“Display Library Statistics” on page 213](#)
- [“Display the Library Utilization Reports” on page 214](#)

## ▼ Display Library Status

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to view the current operational state of the library. These values update 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 47](#) for detailed instructions.

### Task Steps

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

The page displays the current status of the library.

## ▼ Display Library Configuration Properties

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to display the physical, mechanical, logical, and network 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 information is also available through Reports > Library Information. See [“Display a Library Report” on page 47](#) for detailed instructions.

### Task Steps

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

The page displays the properties specific to a [Bridged library](#) or an [Unbridged library](#):

- Bridged library

The screenshot shows the SL Console interface with the 'System Detail' tab selected. The left sidebar shows a tree view with 'Library:1,0,0,0' selected. The main content area displays the 'Library' configuration page with the 'Properties' tab active. The 'General' sub-tab is selected, showing the following configuration details:

Physical	
Vendor	STK
Serial Number	559000300559
Module Count	2
Total Cell Count	90
Empty Cell Count	85
Drive Count	3
CAP Cell Count	5

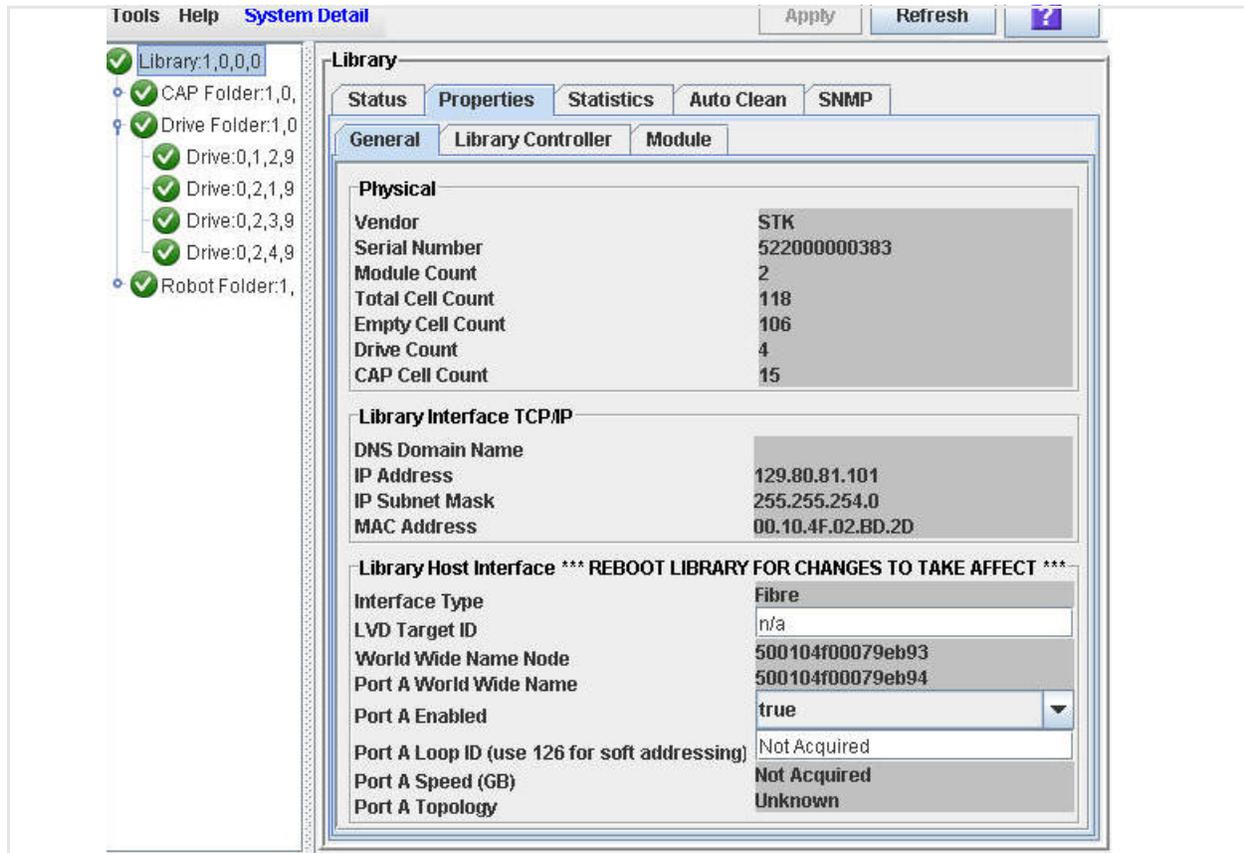
  

Library Interface TCP/IP	
DNS Domain Name	
IP Address	10.80.104.27
IP Subnet Mask	255.255.254.0
MAC Address	00.10.4F.02.BC.79

Library Host Interface	
Interface Type	Bridged

- Unbridged library



## Screen Fields

### Vendor

Vendor is STK (for Oracle StorageTek).

### Serial Number

Serial number of the library base module.

### Library Base WWN

World Wide Node Name (WWNN) for the library.

### Module Count

Total number of modules in the library.

### Total Cell Count

Total number of physical storage cells installed in the library. Includes data cartridge cells as well as reserved system cells. Not all of these cells may be enabled for use, however.

**Empty Cell Count**

Total number of unoccupied data storage cells.

**Drive Count**

Total number of drives installed.

**CAP Cell Count**

Total number of CAP (cartridge access port) cells.

***Library Interface TCP/IP***

These fields apply to the standard library TCP/IP port.

**DNS Domain Name**

DNS domain name assigned to the library.

**IP Address**

IPv4 (IP version 4) address for the port, if applicable.

**IP Subnet Mask**

Netmask defined for the subnet that the port is on.

**MAC Address**

MAC address for the port.

***Library Host Interface*****Interface Type**

Type of host-library interface. Options are:

- Bridged
- Fibre (Fibre Channel)
- LVD (parallel LVD SCSI)

**LVD Target ID (Unbridged Library Only)**

SCSI target identifier that identifies the library controller to the initiator on the host.

**World Wide Name Node (Unbridged Library Only)**

The World Wide Node Name (WWNN) that identifies the library on a Fibre Channel Storage Area Network (SAN). The WWNN is a 64-bit hardware identifier in IEEE format. It is set at the factory and cannot be changed.

**Port A World Wide Name (Unbridged Library Only)**

The World Wide Port Name (WWPN) that identifies controller port A on a Fibre Channel Storage Area Network (SAN). The WWPN is a 64-bit hardware identifier in IEEE format. It is set at the factory and cannot be changed.

**Port A Enabled (Unbridged Library Only)**

Possible values include:

- **true:** enables FC-AL static (hard) addressing
- **false:** enables FC-AL dynamic (soft) addressing

**Port A Loop ID (Unbridged Library Only)**

The identifier for controller port A when used on a Fibre Channel Arbitrated Loop (FC-AL) Storage Area Network (SAN). If static (hard) addressing is used, the Loop ID is in the range 1-125. If dynamically arbitrated (soft) addressing is used, the Loop ID is 126.

**Port A speed (Unbridged Library Only)**

The Fibre Channel data transfer rate between the host and controller port A.

**Port A topology (Unbridged Library Only)**

The Fibre Channel storage area network topology that connects controller port A to the host.

## ▼ Set Up an FC Control Path on an Unbridged Library

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

If the control path for the library is Fibre Channel (FC), you must set up the Fibre Channel port (**Port A**) on the library controller.

### Task Steps

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

The page displays detailed information about the library.

3. If you are using a **Fibre Channel Arbitrated Loop (FC-AL) topology and static (hard) addressing on the Storage Area Network**, set the **Port A Enabled** control to **true** and enter the correct **Loop ID** in the **Port A Loop ID** field.

FC-AL Loop IDs fall in the range 1-125.

4. If you are using a **Fibre Channel Arbitrated Loop (FC-AL) topology and dynamically arbitrated (soft) addressing on the Storage Area Network**, set the **Port A Enabled** control to **false** and enter **126** in the **Port A Loop ID** field.
5. Click **Apply** to save the changes.
6. **Reboot the library for the changes to take effect.**

## ▼ Display Library Controller Properties

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to 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 47](#) for detailed instructions.

### Task Steps

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

## ▼ Display Library Physical Configuration

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to view the current physical configuration of the library.

### Task Steps

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

## ▼ Display Library SCSI Configuration

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to view the configuration of the library SCSI ports.

### Task Steps

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

The interface displays the SCSI Port screen for a bridged library or an unbridged library:

- Bridged libraries display the:
  - **Partition ID** (a digit in the range [1-8] or 0 if unconfigured)
  - **Bridge Drive Slot** number
  - Bridge drive's L,M,R,C (Library, Module, Row, and Column) library address
  - **Drive Health**
  - Statuses of **Port A** and **Port B**
  - **Bridge Health**
  - Drive's **Node WWN** (World Wide Name)
  - Drive manufacturer's **Serial Number**
  - **Drive Type**
  - Drive **Interface**

- Drive's SCSI Element Address.

The screenshot shows a management console window with tabs for Status, Properties, Statistics, Auto Clean, and SNMP. The Properties tab is active, and the SCSI sub-tab is selected. Below the tabs, there are sections for Notes, SCSI Port Statuses, and a detailed drive information table.

**Notes:**

1. The library is LUN 1.
2. For detailed drive information, open Drive Folder (left), Select Drive: L,M,R,C

**SCSI Port Statuses**

Partition	Bridge Drive Slot	L,M,R,C	Drive Health	Port A	Port B	Bridge Health
0	2	0,1,2,9	OK	disabled	disabled	Available

**Drive Information Table:**

Node WWN	Serial Number	Drive Type	Interface	Element Address
50:01:04:f0:00:7a:82:fa	HU19497Y0E	HpUltrium5	SAS	501

- Unbridged libraries display the fields:
  - Port Number
  - Health State
  - Access State
  - Topology
  - Port Speed
  - Fibre Channel arbitrated Loop ID
  - FC WWN (Fibre Channel World Wide Name) Port Name and Node Name

The screenshot shows a management console window with tabs for Status, Properties, Statistics, Auto Clean, and SNMP. The Properties tab is active, and the SCSI sub-tab is selected. Below the tabs, there are sections for SCSI Ports and SCSI Port Statuses.

**SCSI Ports**

Activated Ports: 1

Maximum Available Ports: 1

**SCSI Port Statuses**

Port Number	Health State	Access State	Topology	Port Speed	Loop ID	FC WWN Port Name	FC WWN Node Name
1	Available	Unavailable	Unknown	0Gbit	Unknown	500104f0007a82ee	500104f0007a82ed

## Screen Fields

### *Bridged Libraries*

#### Partition

The partition ID, a digit in the range [1-8] or 0 if no partitions are configured.

**Bridge Drive Slot**

The slot location of the drive that handles the control path for the drives allocated to the partition.

**L,M,R,C**

Library, Module, Row, and Column. The library address of the bridge drive.

**Drive Health**

The overall condition of the drives allocated to the partition. Check the **System Details > Drive Folder** for details.

**Port A, Port B**

The status of the SCSI ports.

**Bridge Health**

The status of the control path to the library.

**Node WWN**

The Node World Wide Name of the bridge drive.

**Serial Number**

The manufacturer's serial number for the drive.

**Drive Type**

The vendor and LTO (Linear Tape Open) generation. For example, **HpUltrium5** is the HP Ultrium 5 LTO tape drive.

**Interface**

The drive interface. For example, **SAS** (Serial Attached SCSI).

**Element Address**

The SCSI element address of the drive.

## ▼ Display Library Statistics

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to view library statistics, such as the request, retry, and failure count of the robot and the library uptime.

**Note** – This information is also available through **Reports > Statistics**. See [“Display a Library Report” on page 47](#) for detailed instructions.

### Task Steps

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

The **Statistics** page appears.

## ▼ Display the Library Utilization Reports

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

The Library Utilization Reports summarize library activity that has occurred during a selected time period. robot, drive, and CAP activity is broken into regular time intervals within the time period. You can use this report to determine patterns of library activity over time and whether there are peak and low periods of usage.

By default, the report is sorted chronologically by time interval. Optionally, you can change the sort order and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 27](#).

**Note** – This feature is available starting with SL500 firmware version 1393 and SL Console version 4.50.

To create a chart from this report, save the data to a comma-separated (.csv) file, and then import the .csv file into a charting application. For details, see [“Save Library Report Data to a File” on page 49](#).

### Task Steps

1. **Select Tools > Reports.**
2. **Expand the Library Utilization folder in the navigation tree, and select the time period for which you want to display summary activity. Options are:**
  - Last 24 Hours: The previous 24 hours, divided into hourly intervals
  - Last 7 Days: The previous 7 days, divided into daily intervals
  - Last Month: The previous 31 days, divided into daily intervals
  - Last Year: The previous 52 weeks, divided into weekly intervals

The selected report displays.

### Screen Fields

#### Start Date

Display only.

Starting date and time for each interval.

#### Percent Utilization

Display only.

Percentage of time the robot was busy during the time period. This includes time spent in the following activities:

- Moving cartridges between cells
- Moving cartridges to and from CAPs
- Mounting and dismounting cartridges to and from drives
- Waiting for cartridges to load and thread in drives

This value is expressed as a percentage of total time in the interval. For example, a value of 25.70 means the robot was busy 25.7 percent of the time. The value is calculated as follows:

$$\text{Seconds busy} / \text{total seconds in time interval}$$

**Mounts**

Display only.

Total number of cartridge mounts initiated during the selected time period.

**Dismounts**

Display only.

Total number of cartridge dismounts initiated during the selected time period.

**Moves**

Display only.

Total number of cartridge moves from one storage cell to another that were initiated during the selected time period.

**CAP-Enters**

Display only.

Total number of cartridge moves from a CAP cell to a storage cell that were initiated during the selected time period.

**CAP-Ejects**

Display only.

Total number of cartridge moves from a storage cell to a CAP cell that were initiated during the selected time period.



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## Configuring Bridging Without Partitioning

**Note** – This feature is available starting with SL500 firmware version 1431 and SL Console version 5.30.

**Note** – The bridging feature enables the StorageTek SL500 library controller to communicate with tape drives without having a dedicated interface card (such as an Oracle StorageTek MPU2 or PUA2 Fibre Channel card or RLW parallel SCSI card).

### Designated Bridge Drive

In bridged libraries, the library controller communicates with the tape drives using the Automation Drive Interface (ADI) of a supported tape drive. Each library or library partition contains a designated bridge drive that passes command and control information between the library controller and the drives in the library or partition. When an SL500 library does not detect a dedicated interface card at start up, the library adopts a bridged configuration by default.

If you do not previously specify a bridge drive (the drive that performs the tasks otherwise handled by an interface card), the library starts from the top of library and selects the first bridge-capable drive it encounters. You can then decide to do one of the following:

- Partition the bridged library, as described in [“Library Partitioning” on page 83](#).
- Specify a different bridge-capable drive for the unpartitioned library. In this case, use the following procedure.

## ▼ Select a Bridge Drive

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SLC

### Task Purpose

Choose the drive for bridging.

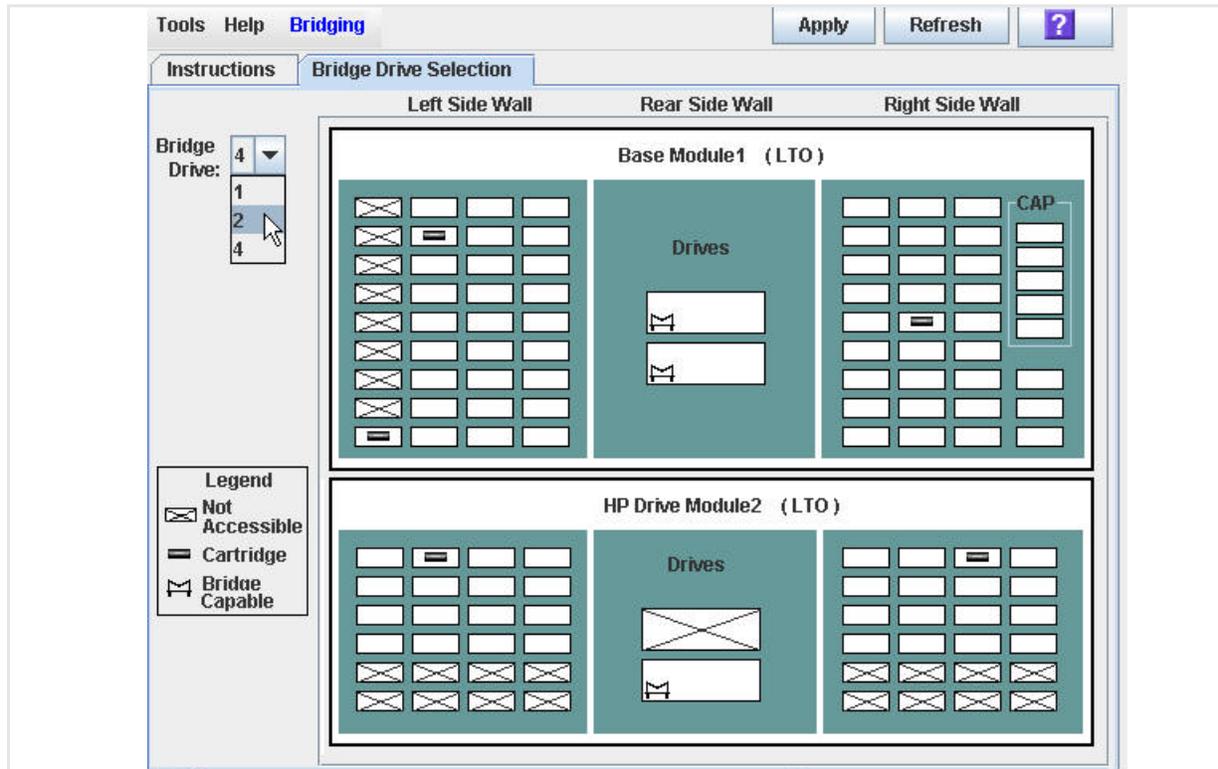
### Task Steps

1. From the SL Console main menu, select **Tools > Bridging**.
2. When the Bridging screens appear, click the **Instructions** tab and review the information provided.
3. Click the **Bridge Drive Selection** tab.

- Use the Bridge Drive list in the upper left corner of the page to select the drive you wish to use for library control functions.

The bridge drive list includes only the accessible, bridge-capable drives.

For example, given an SL500 base module with bridge-capable drives installed in positions 1 and 2 and an SL500 drive module with a bridge-capable drive in position 4, you could choose drive 1, 2, or 4 for your bridge drive. Position 3 is inaccessible in this configuration, so the list does not offer 3 as an option.



- Click the Apply button in the upper right corner.

The system enables the new bridge drive.

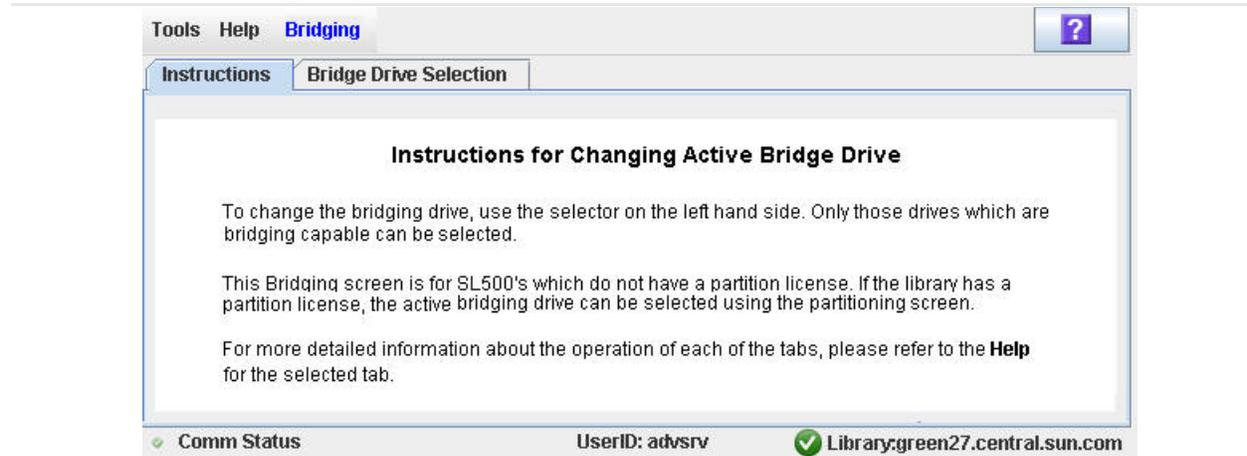
## Bridging Configuration Screen Reference

- [“Bridging—Instructions” on page 221](#)
- [“Bridging—Bridge Drive Selection” on page 222](#)

This section includes a detailed description of the SL Console bridging screens for bridged libraries.

## Bridging—Instructions

### Sample Screen



### Description

Displays instructions for using the bridging screen.

This screen appears automatically the first time you select **Tools > Partitions** during an SL Console login session.

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SLC

### Screen Fields

None

### Buttons

? (Help)

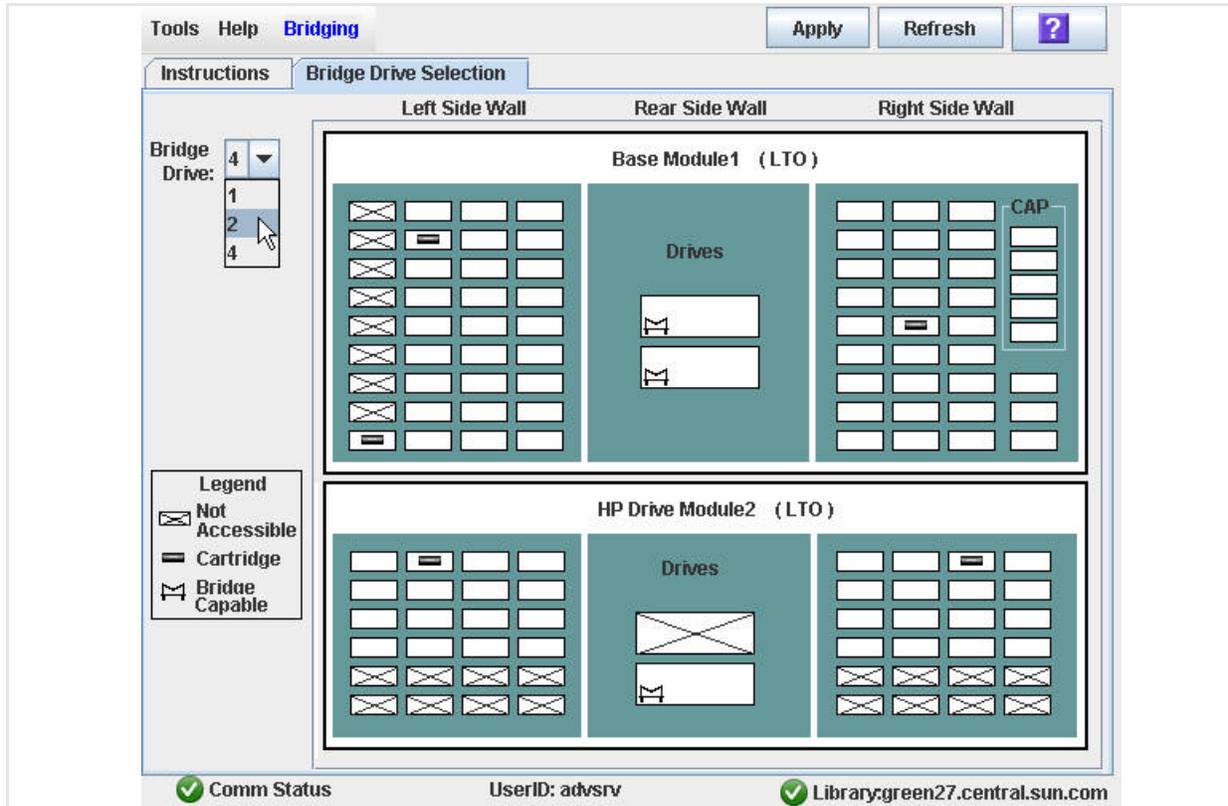
Click to display online help for the screen.

### See Also

[“Bridging—Bridge Drive Selection” on page 222](#)

## Bridging—Bridge Drive Selection

### Sample Screen



### Description

Displays a:

- Library map showing the locations of the available bridge-capable drives
- Legend listing the icons in the map
- List to select a bridge drive for the library

### Screen Access

This screen can be accessed at either of the following:

- Standalone SL Console
- Web-launched SLC

### Screen Fields

#### Legend

Lists icons for the following conditions:

- **Not Accessible:** The indicated CAP cell or storage cell is not available for use due to limited hardware activation or physical, mechanical restrictions.
- **Cartridge:** The indicated CAP cell or storage cell contains media.
- **Bridge Capable:** The indicated tape drive can be the *bridge drive* that carries the control path for the library.

## Buttons and Controls

### Bridge Drive

List of tape drives that can carry the control path for the library.

Select a drive from the list.

### Apply

Button.

Click to designate the specified drive as the bridge drive for the library.

### Refresh

Button.

Click to refresh the SL Console partition workspace with current data from the library controller database. All uncommitted partition changes you have made during this SL Console login session will be discarded. The **Partition Refresh** message appears, prompting you to confirm the refresh.

### ? (Help)

Click to display online help for the screen.

## See Also

[“Bridging—Instructions” on page 221](#)



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## CAP Management

By using cartridge access ports (CAPs), you can enter (or import) or eject (or export) cartridges to or from the library.

This chapter describes general CAP activities that apply to the SL500 library.

### CAPs

The CAP in the base module has one five-cell magazine. The CAP in the Drive Expansion Module (DEM) has two five-cell magazines. Optionally, you can configure the CAP cells for cartridge storage instead of enter and eject operations.

### Additional CAP Information

See the following for complete details about CAPs:

- Partition configuration information relating to CAPs: [“Library Partitioning” on page 83](#)

## CAP Management Tasks

- [“Display CAP Summary Information” on page 227](#)
- [“Display Current CAP Status” on page 228](#)
- [“Display CAP Properties” on page 229](#)

## ▼ Display CAP Summary Information

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

To display summary information for all CAPs in the library, complete the following steps.

**Note** – This information is also available through **Reports > CAP Summary**. See [“Display a Library Report” on page 47](#) for detailed instructions.

### Task Steps

1. **Select Tools > System Detail.**
2. **Select the CAP folder in the navigation tree.**

The system lists all the library’s CAPs and their locations.

## ▼ Display Current CAP Status

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

To display the current operational state of a CAP, complete the following steps.

**Note** – This information is also available on the **CAP Details** report. See [“Display a Library Report” on page 47](#) for detailed instructions.

### Task Steps

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

The CAP page displays the current status of the selected CAP.

## ▼ Display CAP Properties

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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 47](#) for detailed instructions.

### Task Steps

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

The CAP Properties page appears.



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## Drive Management

This chapter includes the following topics:

- [“Maximum Drive Capacity” on page 231](#)
- [“Drive Identification” on page 231](#)
- [“Drive States” on page 231](#)
- [“Drive Management Tasks” on page 232](#)

### Maximum Drive Capacity

You can install up to 18 drives within one library, as follows:

- Up to two in the base module
- Up to four in each Drive Expansion Module (DEM), with a total of four DEMs possible

See [“LTO Supported Tape Drives” on page 10](#) for a list of supported tape drives.

### Drive Identification

The library uses the following addressing schemes for each library drive:

- Library internal address: For all drives. Assigned by the library controller based on the library, rail, column, side, and row location of the drive.
- Host SCSI element address: For FC-SCSI host connections only. Assigned by host applications.
- Drive bay address: For all drives. Assigned by the library controller based on the physical slot in which the drive is installed.

### Drive States

A drive can be in one of the following states:

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

## Drive Management Tasks

- [“Display Drive Summary Information” on page 233](#)
- [“Display Drive Status” on page 234](#)
- [“Display Drive Properties” on page 235](#)
- [“Enable or Disable a Drive Port” on page 237](#)
- [“Display Current Drive Mappings” on page 238](#)
- [“Display Drive Mapping History” on page 240](#)
- [“Display the Media Drive Events Report” on page 242](#)
- [“Display the Drive Distribution Reports” on page 244](#)
- [“Display the Drive Utilization Reports” on page 246](#)
- [“Add or Edit Drive Tray Serial Number” on page 248](#)

## ▼ Display Drive Summary Information

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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

The following information displays:

- Internal address
- 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

**Note** – This information is also available through **Reports > Drive Summary**. See [“Search a Library Report” on page 48](#) for detailed instructions.

### Task Steps

1. **Select Tools > System Detail, and click the Drive folder in the navigation tree.**

The page lists the library drives and displays their locations.

**Note** – This information is read only.

## ▼ Display Drive Status

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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
- Drive cleaning information

**Note** – This information is also available through **Reports > Drive Details**. See [“Display a Library Report” on page 47](#) for detailed instructions.

### Task Steps

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

The page displays the current status of the selected drive.

## ▼ Display Drive Properties

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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 47](#) for detailed instructions.

### Task Steps

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

The **Properties** page appears.

### Screen Fields

#### Drive Type

Brand and model of drive.

#### Code Version

Version of code.

#### Vendor

Manufacturer of drive.

#### Serial Number

Serial number of drive.

#### Interface Type

Type of interface of drive.

#### Tray Serial Number

Drive tray serial number of drive.

**LVD Target ID**

LVD target identification.

**World Wide Name Node**

Brand and model of drive.

**Port A World Wide Name**

World Wide Name of node of port A.

**Port A Enabled**

Whether port A is enabled: true or false.

**Port A Loop ID (use 126 for soft addressing)**

Loop ID of port A.

**Port A Speed (GB)**

Speed of port A.

**Port A Link Status**

Link status of port A.

**Port B World Wide Name**

World Wide Name of node of port B.

**Port B Enabled**

Whether port B is enabled: true or false.

**Port B Loop ID (use 126 for soft addressing)**

Loop ID of port B.

**Port B Speed (GB)**

Speed of port B.

**Port B Link Status**

Link status of port B.

## ▼ Enable or Disable a Drive Port

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to enable or disable a physical port on a drive.

### Task Steps

1. **Select Tools > System Detail.**
2. **Expand the Drive Folder in the navigation tree, and click the drive you want to modify.**
3. **Click the Properties tab.**
4. **Set the Port A Enabled or Port B Enabled status as follows:**
  - **True:** Turns on the port
  - **False:** Turns off the port. The communication channel between the host software and the drive is disabled.

The network software automatically configures the Port (A or B) address. This is called soft mode addressing.

## ▼ Display Current Drive Mappings

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

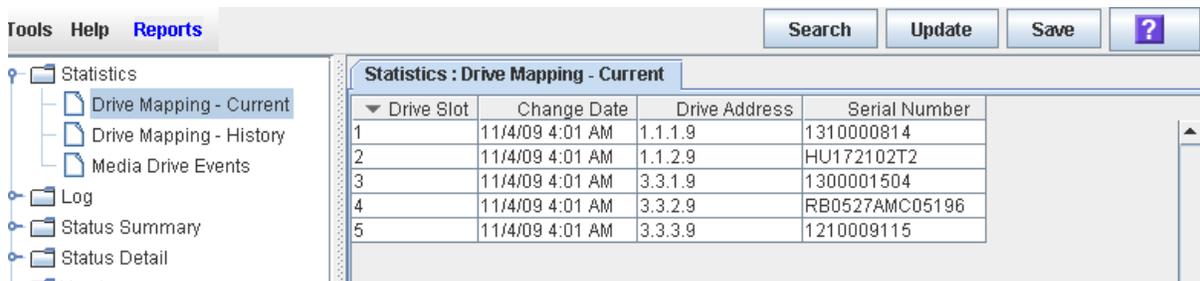
The Current Drive Mapping report lists the library internal address and drive serial number currently assigned to each physical drive slot in the library.

By default, the report is sorted in drive slot order. Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 27](#).

**Note** – This feature is available starting with SL500 firmware version 1393 and SL Console version 4.50.

### Task Steps

1. Select **Tools > Reports**.
2. Expand the **Statistics** folder in the navigation tree, and click the **Statistics: Drive Mapping - Current** tab.



Drive Slot	Change Date	Drive Address	Serial Number
1	11/4/09 4:01 AM	1.1.1.9	1310000814
2	11/4/09 4:01 AM	1.1.2.9	HU172102T2
3	11/4/09 4:01 AM	3.3.1.9	1300001504
4	11/4/09 4:01 AM	3.3.2.9	RB0527AMC05196
5	11/4/09 4:01 AM	3.3.3.9	1210009115

### Screen Fields

#### Drive Slot

Display only.

Drive slot number. Slots are numbered 1–5, from the top to the bottom of the rack.

#### Change Date

Display only.

Date and time of the most current mapping assignment.

#### Drive Address

Display only.

Library internal address of the drive slot.

Format is `l.m.r.c`, where:

- `l` = for non-partitioned libraries: This is the library ID (always 0). For partitioned libraries, this is the partition ID (1–8).
- `m` = module number: 1–5, from top to bottom of the rack.
- `r` = drive row number: 1–2 (Base Module) or 1–4 (Drive Expansion Module), from top to bottom of the module.
- `c` = column number: always 9 for drives.

**Serial Number**

Display only.

Serial number of the drive currently installed in the drive slot.

## ▼ Display Drive Mapping History

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

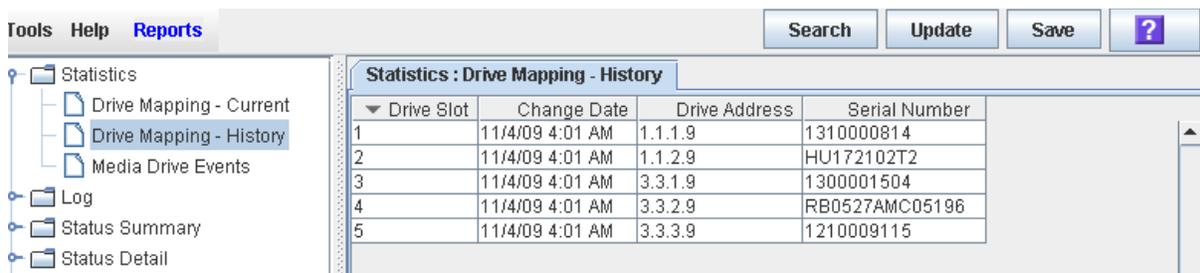
The Drive Mapping History report provides an audit trail of all drive mapping changes. Drive mappings identify the library internal address assigned to each drive slot, as well as the serial number of the drive installed in each slot. Whenever this information is modified (such as when a drive assembly is replaced or moved to a different slot), a time-stamped entry is made to the mappings.

By default, the report is sorted in drive slot order. Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 27](#).

**Note** – This feature is available starting with SL500 firmware version 1393 and SL Console version 4.50.

### Task Steps

1. Select **Tools > Reports**.
2. Expand the **Statistics** folder in the navigation tree, and select **Media Drive Events**.



Drive Slot	Change Date	Drive Address	Serial Number
1	11/4/09 4:01 AM	1.1.1.9	1310000814
2	11/4/09 4:01 AM	1.1.2.9	HU172102T2
3	11/4/09 4:01 AM	3.3.1.9	1300001504
4	11/4/09 4:01 AM	3.3.2.9	RB0527AMC05196
5	11/4/09 4:01 AM	3.3.3.9	1210009115

### Screen Fields

#### Drive Slot

Drive slot number. Slots are numbered 1–5, from top to bottom of the rack.

#### Change Date

Date and time the mapping change occurred.

#### Drive Address

Library internal address of the drive installed in the slot.

Format is l . m . r . c, where:

- $l$  = for non-partitioned libraries, the library ID (always 0). For partitioned libraries, the partition ID (1–8).
- $m$  = module number: 1–5, from top to bottom of the rack.
- $r$  = drive row number: 1–2 (Base Module) or 1–4 (Drive Expansion Module), from top to bottom of the module.
- $c$  = column number: always 9 for drives.

**Serial Number**

Serial number of the drive installed in the drive slot.

## ▼ Display the Media Drive Events Report

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

The Media Drive Events Report lists the 100 most recent library media access errors. The report updates whenever a drive is not able to perform a load, unload, read, or write operation on a cartridge. Use the report to help determine whether a particular drive or cartridge is in need of maintenance or replacement.

By default, the report is sorted in reverse chronological order (that is, by Date/Time, with the most recent entry at the top). Optionally, you can change the sort order, and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 27](#).

**Note** – This feature is available starting with SL500 firmware version 1200 and SL Console version 3.30.

### Task Steps

1. Select **Tools > Reports**.
2. Expand the **Statistics** folder in the navigation tree, and select **Media Drive Events**.

Date/Time	Drive Adr	Valid	Drive Serial Num	Drive Type	Exce
2009-10-12T09:48:11.161	0.3.3.9	EN0295L1	1210009115	IBM Ultrium3	MediaEr
2009-10-12T09:48:39.325	0.3.3.9	EN0295L1	1210009115	IBM Ultrium3	MediaEr
2009-10-12T10:49:48.750	0.3.3.9	EN0295L1	1210009115	IBM Ultrium3	MediaEr
2009-10-12T10:50:16.913	0.3.3.9	EN0295L1	1210009115	IBM Ultrium3	MediaEr
2009-10-12T10:56:30.568	0.3.3.9	EN0295L1	1210009115	IBM Ultrium3	MediaEr
2009-10-12T10:56:58.692	0.3.3.9	EN0295L1	1210009115	IBM Ultrium3	MediaEr

### Screen Fields

#### Date/Time

Date and time the error occurred.

#### Drive Adr

Location of the drive involved in the error. Format is l.m.r.c, where:

- l = library ID
- m = module ID
- r = row ID
- c = column ID

**Valid**

VOLID of the cartridge involved in the error.

**Drive Serial Num**

Serial number of the drive involved in the error.

**Drive Type**

Type of drive. For example, Hewlett-Packard LTO Ultrium 4 or Quantum SDLT 320.

**Exception**

Type of error. Options are:

- **LoadError:** The drive load failed after all retries were attempted. See LoadRetry for an explanation of the retry conditions.
- **LoadRetry:** The drive load was successful, but required one or more retries. A retry involves removing and reinserting the cartridge and reissuing a load command to the drive. The system initiates a retry if either the cartridge is not detected as sensed from the drive (except DLT drives), or the load command to the drive fails.
- **MediaError:** The drive signaled a media error during drive load or unload. IBM drives allow cartridges with media errors to be loaded, while Hewlett-Packard drives do not.
- **UnloadError:** The library could not successfully unload and remove the cartridge from the drive.

## ▼ Display the Drive Distribution Reports

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

The Drive Distribution Reports summarize cartridge mount activity that has occurred for all library drives during a selected time period. Activity is summarized by individual drive location. Use this report to determine how evenly drive workload is distributed across the library and whether some drives are utilized more or less than others.

**Note** – These reports show drive activity by location. To determine whether the drive serial number installed in a particular location has changed during the reporting period, see [“Display Drive Mapping History” on page 240](#).

By default, the reports are sorted in library internal drive address order. Optionally, you can change the sort order and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 23](#).

To create a chart from this report, save the data to a comma-separated (.csv) file, and then import the .csv file into a charting application. For details, see [“Save Library Report Data to a File” on page 53](#).

The Drive Distribution Reports and the Drive Utilization Reports display similar information, but with the following distinctions:

- The Drive Distribution Reports show aggregate drive activity for the specified time period.
- The Drive Utilization Reports show the same activity broken out into regular intervals within the time period. Depending on the length of time involved, an activity may span more than one interval.

**Note** – This feature is available starting with SL500 firmware version 1393 and SL Console version 4.50.

### Task Steps

1. **Select Tools > Reports.**
2. **Expand the Drive Distribution folder in the navigation tree, and select the time period for which you want to display summary activity. Options are:**
  - Last 24 Hours: The previous 24 hours
  - Last 7 Days: The previous 7 days
  - Last Month: The previous 31 days
  - Last Year: The previous 52 weeks

The selected report displays.

## Screen Fields

### Drive Address

Library internal address of the drive.

Format is `l . m . r . c`, where:

- `l` = for non-partitioned libraries: This is the library ID (always 0). For partitioned libraries, this is the partition ID (1–8).
- `m` = module number: 1–5, from top to bottom of the rack.
- `r` = drive row number: 1–2 (Base Module) or 1–4 (Drive Expansion Module), from top to bottom of the module.
- `c` = column number: always 9 for drives.

### Slot

Drive slot number. Slots are numbered 1–5, from top to bottom of the rack.

### Mounts

Total number of cartridge mounts initiated during the selected time period. Total mounts for all drives in the library displays at the bottom.

### Percent Utilization

Percentage of time the drive was busy during the selected time period. For example, a value of 25.70 means the drive was busy 25.7 percent of the time. The value is calculated as follows:

$$\text{Seconds busy} / \text{total seconds in time period}$$

### Percent Total Mounts

Percentage of total library mounts that occurred on this drive. For example, a value of 49.1 means that 49.1 percent of all mounts that occurred during this time interval occurred on this drive. The value is calculated as follows:

$$\text{Total mounts for this drive} / \text{Total mounts for all drives}$$

## ▼ Display the Drive Utilization Reports

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

The Drive Utilization Reports summarize cartridge mount activity that has occurred for an individual drive location during a selected time period. Activity is broken into regular time intervals within the selected time period. You can use this report to determine patterns of drive activity over time and whether there are peak and low periods of drive usage.

**Note** – These reports show drive activity by location. To determine whether the drive serial number installed in a particular location has changed during the reporting period, see [“Display Drive Mapping History” on page 240](#).

By default, the report is sorted chronologically by time interval. Optionally, you can change the sort order and rearrange and resize the columns. See [“Modifying the Screen Layout” on page 23](#).

The Drive Distribution Reports and the Drive Utilization Reports display similar information, but with the following distinctions:

- The Drive Distribution Reports show aggregate drive activity for the specified time period.
- The Drive Utilization Reports show the same activity broken out into regular intervals within the time period. Depending on the length of time involved, an activity may span more than one interval.

**Note** – This feature is available starting with SL500 firmware version 1393 and SL Console version 4.50.

### Task Steps

1. **Select Tools > Reports.**
2. **Expand the Drive Utilization folder in the navigation tree, and select the time period for which you want to display activity summaries. Options are:**
  - Last 24 Hours: The previous 24 hours, broken into hourly intervals
  - Last 7 Days: The previous 7 days, broken into daily intervals
  - Last Month: The previous 31 days, broken into daily intervals
  - Last Year: The previous 52 weeks, broken into weekly intervalsThe selected report is displayed, with the first drive location displayed by default.
3. **In the Select a drive list, select the drive location (library internal address) you want to display.**

The report displays for the selected drive location.

## Screen Fields

### Select a drive

Library internal address of the drive you want to display.

Format is `l . m . r . c`, where:

- `l` = for non-partitioned libraries: This is the library ID (always 0). For partitioned libraries, this is the partition ID (1–8).
- `m` = module number: 1–5, from top to bottom of the rack.
- `r` = drive row number: 1–2 (Base Module) or 1–4 (Drive Expansion Module), from top to bottom of the module.
- `c` = column number: always 9 for drives.

### Start Date

Starting date and time for each interval.

### Mounts

Total number of cartridge mounts initiated during the selected time period.

### Percent Utilization

Percentage of time the drive was busy during the time interval. For example, a value of 25.70 means the drive was busy 25.7 percent of the time. The value is calculated as follows:

$$\text{Seconds busy} / \text{total seconds in time period}$$

## ▼ Add or Edit Drive Tray Serial Number

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Add or edit the drive's tray serial number.

**Note** – This feature is available with FRS\_4.0 and SL Console 6.0.

### Task Steps

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

The **Properties** page appears.

4. **Click in the Tray Serial Number field and enter the drive tray serial number.**
5. **Press Enter.**

A red box displays around the field and the **Apply** button activates.

6. **Click the Apply button.**

The system saves the drive tray serial number you just entered.

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## Cartridge Management

This chapter includes the following topics:

- “Cartridge Labels” on page 249
- “Entering Cartridges” on page 249
- “Ejecting Cartridges” on page 250
- “Recovery Moves” on page 250
- “Cartridge Management Tasks” on page 252

### Cartridge Labels

All library cartridges must have a readable external label.

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.

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

### Entering Cartridges

Before entering a cartridge into the library, verify it is labeled properly. Insert each cartridge into a CAP slot with the:

- Customer label (if present) facing you
- Hub gear facing down
- Cartridge label facing you

You can place cartridges in any CAP slot in any order. The robot audits all CAP slots when the CAP door is closed.

**Note** – The CAP design prevents you from placing a T9840 or T10000 cartridge upside-down in the CAP. It does not, however, prevent you from placing an LTO cartridge upside-down in the CAP.

The robot's bar-code scanner reads cartridge labels only during enter operations. This occurs because the vol-ids are new and must be added to the library controller database. The robot does not need to read cartridge labels during ejects.

See [“Enter Cartridges Through the CAP” on page 253](#).

When the system enters a cartridge into the library, the host either assigns the cartridge a home cell or mounts it on a drive, depending on the reason why it was entered. The system records the stored cartridge's location in the library controller database, using the library internal address format.

The system also transmits the location to the host for inclusion in the host's cartridge database.

## Ejecting Cartridges

To eject a cartridge, you must specify the vol-id of the cartridge you want to remove from the library. The robot moves to the storage location indicated in the library controller database, removes the cartridge from the slot, and places the cartridge in a CAP slot.

After the CAP opens, the system deletes the cartridge and its location from the library controller database and the host database.

**Note** – The robot does not read cartridge labels during eject operations.

See [“Eject Cartridges Through the CAP” on page 255](#).

## Locating Cartridges

Each cartridge is associated with the library's internal address for the slot or drive where it is located. To locate a cartridge by the internal library address, see [“List Library Cartridges” on page 256](#).

## Recovery Moves

**Note** – This feature is available starting with SL500 firmware version 1026 and SL Console version 2.40.

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.
- Decide to group cartridges by data type or move them closer to their assigned drives.
- Eject a cleaning or diagnostic cartridge that has expired.
- 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 system cell, or another storage cell, and not to a drive. A cartridge currently in a drive, CAP, or system cell can be moved to any other unoccupied location in the library. See the following procedures for complete details:

- [“Move a Specified Cartridge by vol-id” on page 258](#)
- [“Move a Cartridge From a Specified Location” on page 260](#)

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 the following procedures for detailed instructions:

- [“List Library Cartridges” on page 256](#)

## Cartridge Management Tasks

- [“Enter Cartridges Through the CAP” on page 253](#)
- [“Enter Cartridges Through the CAP” on page 253](#)
- [“List Library Cartridges” on page 256](#)
- [“Move a Specified Cartridge by vol-id” on page 258](#)
- [“Move a Cartridge From a Specified Location” on page 260](#)

## ▼ Enter Cartridges Through the CAP

### Task Tool

This task can be performed at the CAP.

### Task Purpose

The base module CAP contains a standard four- or five-cell magazine, as shown in [FIGURE 10-1](#). The expansion module CAP has two magazines.

Use this procedure to enter a cartridge into the library through a CAP.

**Note** – Before beginning this procedure, verify that the library CAP Prevent/Allow state is set to Allow. See your SCSI reference manual for syntax.

### Task Steps

1. Press the CAP Open button on the keypad.

The robot opens the CAP door and the system turns on the CAP Open LED.

2. Grip the handle of the magazine and slide it out of the CAP and onto the door.

**Note** – Do not remove the magazine from the door. If you leave the magazine on the door rails, the magazine will slide easier into the CAP.

3. Place the cartridge into one of the magazine cells, making sure that the cartridge label is visible and the hub of the cartridge is down.
4. Grip the handle and slide the magazine back into the CAP as shown in [FIGURE 10-1](#).

**FIGURE 10-1** Sliding a Magazine into the CAP

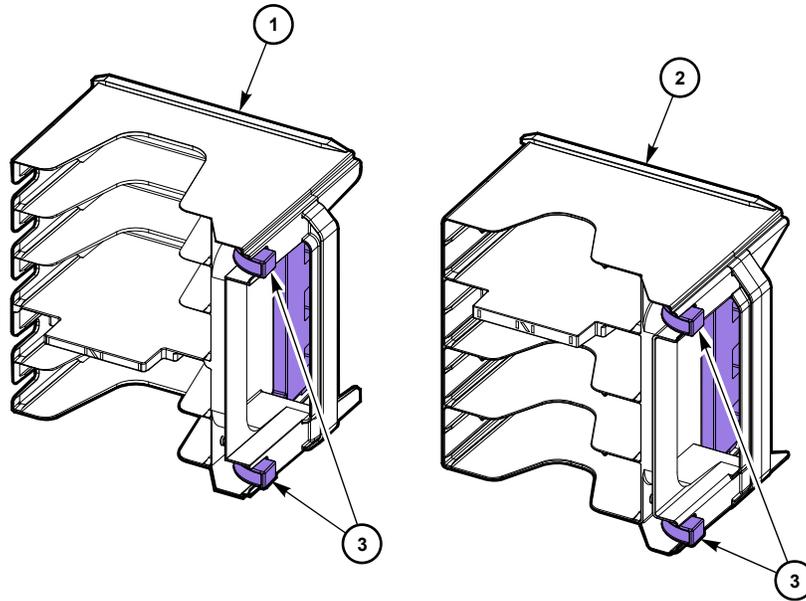


5. Close the CAP door, making sure that the door is securely latched.

6. Refer to your tape management software manual for information on how to move the cartridges from the CAP to the storage cells.

**FIGURE 10-2** Base Module Magazine Comparison

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1. Five-cell LTO magazine
  2. Four-cell mixed-media magazine
  3. Cartridge release buttons
-

## ▼ Eject Cartridges Through the CAP

### Task Tool

This task can be performed at the host and the CAP.

### Task Purpose

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

### Task Steps

1. **Type the eject command at the host console. Refer to your tape management software publication for the command syntax.**

The robot places cartridges into the CAP cells until all the specified cartridges are in the CAP.

2. **Press the CAP Open button on the keypad.**
3. **The CAP is opened, and the CAP Open LED turns on.**
4. **Remove the ejected cartridges using either of the following methods:**
  - Leave the magazine in the CAP and remove the cartridges from it directly.
  - Remove the magazine from the CAP and press the red cartridge release buttons to remove the cartridges from the magazine.
5. **If you removed the magazine from the CAP, place the magazine onto the door rails and slide it back inside the CAP.**
6. **Close the CAP doors.**

## ▼ List Library Cartridges

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to display information about all library cartridges, including their vol-ids, locations, and media types.

### Task Steps

1. **Select Tools > Reports.**

The navigation tree lists all library report options.

2. **Expand the Status Summary folder in the navigation tree.**

The **Status Summary** reports display in a list.

3. **Select Cartridge Summary.**

The **Cartridge Summary** report displays.

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 47](#)
- [“Save Library Report Data to a File” on page 49](#)

### Screen Fields

#### Location

Library or partition number, module number, row number and column number. Together, these values identify the library internal address where the cartridge is located.

#### 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.

**Type**

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

- **clean:** Cleaning cartridge
- **data:** Data cartridge
- **diagnostic:** Diagnostic cartridge

**Cartridge**

Unique vol-id of the cartridge. Standard vol-ids 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 vol-id, 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.

## ▼ Move a Specified Cartridge by vol-id

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to move a cartridge with a specified vol-id 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** – *Potential data overwrite.* Use caution when performing this procedure in partitioned libraries. You could inadvertently move a cartridge from one partition to another, which would allow the new partition to overwrite data on the cartridge.

### Task Steps

1. Select Tools > Diagnostics, and click the Library folder.
  2. Click the RcvrMove tab.
- The Recovery Move page appears.
3. In the Source Location Mode section, select VOLID.

The page updates with the appropriate Source Location choices.

4. In the VOLID field, enter the vol-id of the cartridge you want to move.

5. In the **Destination Location Type** list, 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 to your selection:

- 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 lists:

- Library
- Module
- Row
- Column

The following special selections are available on the lists:

- **Min:** First element of that location type (library, module, row, or column) in the library
- **Max:** Last element of that location type (library, module, row, or column) in the library

**Caution – Potential overwrite of data or loss of access.** If the library is partitioned, make sure to keep the cartridge in the same partition it is currently allocated to. If you move a cartridge to a cell allocated to a different partition, the host could treat the cartridge as scratch and overwrite the data. If you move the cartridge to an unallocated cell, no hosts will be able to access the cartridge.

7. **Click the Start button.**

The robot moves the cartridge. A success message appears when the operation completes.

8. **Click OK.**

9. **To verify the new location, you can display a Cartridge Summary Report. See [“List Library Cartridges” on page 256](#) for details.**

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

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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, perform an audit from the host software to update the host database. If you do not perform the audit, future mount requests from the host software will fail.

**Caution** – *Potential overwrite of data.* Use caution when performing this procedure in partitioned libraries. You could inadvertently move a cartridge from one partition to another, causing 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** page appears.

3. In the **Source Location Mode** section, select **Location**.

The page updates with the appropriate **Source Location** choices.

4. In the **Source Location Type** list, 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 lists:
- Library
  - Module
  - Row
  - Column

The following special selections are available on the lists:

- **Min:** First element of that location type (library, module, row, or column) in the library
  - **Max:** Last element of that location type (library, module, row, or column) in the library
6. In the Destination Location Type list, 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 lists:
- Library
  - Module
  - Row
  - Column

The following special selections are available on the lists:

- **Min:** First element of that location type (library, module, row, or column) in the library
- **Max:** Last element of that location type (library, module, row, or column) in the library

**Caution – Potential overwrite of data or loss of access.** If the library is partitioned, keep the cartridge in the same partition it is currently allocated to. If you move a cartridge to a cell allocated to a different partition, the host could treat the cartridge as scratch and overwrite the data. If you move the cartridge to an unallocated cell, no hosts will be able to access the cartridge.

**8. Click the Start button.**

The robot moves the cartridge, and then a success message appears.

**9. Click OK.**

**10. To verify the new location, you can display a Cartridge Summary Report. See [“List Library Cartridges” on page 256](#) for details.**

**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.**

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## Drive Cleaning

Library tape drives require periodic cleaning to prevent read/write errors. A drive cleaning occurs when the system mounts a compatible cleaning cartridge in response to a cleaning request from the drive.

This chapter includes the following topics:

- [“Library Auto Clean” on page 263](#)
- [“Drive Cleaning Tasks” on page 267](#)

### Library Auto Clean

The library auto clean feature enables the library controller to manage all drive clean functions. You can import cleaning cartridges into the library, where they are stored in reserved system cells. As soon as a drive indicates that it needs cleaning, the library controller automatically selects a compatible cleaning cartridge from the system cells and mounts it on the drive. When the cleaning activity is completed, the library controller dismounts the cartridge and returns it to a system cell.

With the auto clean feature, the library tracks cleaning cartridge usage and sends notification when cleaning cartridges have expired or have reached a user-defined usage threshold. Cleaning cartridges can be automatically exported from the library in bulk, by expiration date, or by selected cartridge volume ID (vol-id or volser).

In partitioned libraries, auto clean can be configured for the entire library or for individual library partitions.

See [“Library Auto Clean Special Considerations” on page 264](#) for additional details about library auto clean operations.

### Library Auto Clean Process Summary

The following is a summary of the actions needed to configure and use the library auto clean feature.

1. Enable library auto clean. (The auto clean feature is disabled by default on SL8500 libraries.) In partitioned libraries, you can enable or disable the feature separately for each partition. See [“Configure Drive Auto Clean” on page 268](#).
2. Import cleaning cartridges into the library. The cartridges are placed in reserved system cells.

3. Monitor status of cleaning cartridges and drives. See the following procedures for details:
    - [“Display Cleaning Cartridges” on page 273](#)
    - [“Display Drive Cleaning Status” on page 275](#)
  4. Export cleaning cartridges from the library as necessary. You can use any of the following methods:
    - Export all cartridges
    - Export expired cartridges
    - Export selected cartridges
- See [“Export Cleaning or Diagnostic Cartridges” on page 271](#) and . See [“Drive Cleaning Tasks” on page 306](#) for a list of all tasks related to drive cleaning.

## Library Auto Clean Special Considerations

The following are details and special considerations about the library auto clean feature.

### Host Interactions

With the auto clean feature, the library controller initiates a drive clean operation immediately upon receipt of a cleaning request from the drive. This request typically occurs when the drive dismounts a data cartridge. While the drive is being cleaned, the data cartridge dismount remains pending to the host. The host is not notified that the data cartridge dismount is complete until the drive clean operation has finished and the cleaning cartridge has been returned to a system cell.

While a drive is being cleaned, the system marks it as busy to all hosts. If an FC-SCSI host requests the drive while the drive is being cleaned, the request is rejected.

### Unsuccessful Cleaning Operations

If the library controller cannot locate a non-expired cleaning cartridge that is compatible with the drive, the library controller sends messages to the system Event Log and the Status Module page. See [“Library Events” on page 285](#).

After a cleaning cartridge has been mounted on a drive and the drive indicates that the cartridge is unusable, the library controller automatically returns the cartridge to a reserved system cell. The drive will not be cleaned until the next dismount, preventing a response time out on the dismount. The next clean attempt will use a non-expired cleaning cartridge if one is available.

### Use of Reserved System Cells

When cleaning cartridges are imported into the library, the library distributes the cartridges as evenly as possible among the sides of the library. Cleaning cartridges can be stored in any available system cell.

The reserved system cells are not assigned to partitions. Therefore, a cleaning cartridge can be used to clean compatible drives allocated to any library partition.

# Cleaning Cartridge Management

Ensure that the library contains a sufficient number of cleaning cartridges that are compatible with each drive type in your library. See the drive manufacturers' documentation for compatibility requirements.

The library auto clean feature requires that cleaning cartridge volume IDs (VOLIDs or volsers) be eight characters in length, with "CLN" as the first three characters. The library Import/Export function only accepts cleaning cartridges that have labels with this format.

With the library auto clean feature, cleaning cartridges are stored in reserved system cells which the library controls. These reserved cells are not accessible to library host applications. The number of system cells available for cleaning cartridge storage varies, depending on the configuration of your SL500 library.

## Importing and Exporting Cleaning Cartridges

You must enter cleaning cartridges into the library using the SL Console Import function to make the cartridges available for the library auto clean feature.

To remove cleaning cartridges from a library using the auto clean feature, use the SL Console Export function. You can choose to export all cartridges, selected cartridges, or all expired cartridges.

**Note** – The command line interface (CLI) also provides cleaning cartridge import and export commands accessible to your system administrator and Oracle support representative.

## Cartridge Usage Count

Cleaning cartridges have a limited life span. See the drive manufacturers' documentation for maximum recommended usage for each type of cleaning cartridge. For LTO cleaning cartridges, also refer to the cleaning cartridge manufacturers' documentation.

When you import a cleaning cartridge into the library, the library controller considers the cartridge to be new and sets the usage count to zero. Therefore, if you import a used cleaning cartridge, the usage count for that cartridge will not be accurate.

Each time a cleaning cartridge is mounted on a drive, the library controller increments the usage count for that cartridge. See ["Display Cleaning Cartridges" on page 273](#) to display the current usage count.

## Cleaning Cartridge Expiration

Cleaning cartridges are expired based on information from the drives. If a drive cannot use a cleaning cartridge (due to reaching the end of tape, for example), the drive sends a "cleaning cartridge expired" notification to the library controller.

The library controller:

- Dismounts the cartridge from the drive and returns it to a system cell
- Updates the cartridge's status to "expired"

- Sends messages to the system Event Log

The library controller does not use expired cleaning cartridges for cleaning operations. Replace expired cartridges as soon as possible. When you export an expired cleaning cartridge from the library, be sure to remove it from the CAP. If you leave an expired cartridge in the CAP, another user could inadvertently re-enter it into the library.

## Manual Cleaning

Normally, the library auto clean feature manages drive cleaning. However, there may be occasions when you need to perform a manual clean.

**Caution** – *Potential excess wear of drive head.* Cleaning a drive before it is due is not recommended. Excessive drive cleaning can wear out a drive head prematurely.

See the drive manufacturer's documentation for information on whether manual cleaning is allowed. Some drive types allow manual cleaning at any time, while others do not allow cleaning to be initiated unless a usage threshold has been met. If a usage threshold is not met, the library controller may allow you to mount a cleaning cartridge on a drive, but the drive will not actually perform the cleaning operation.

To verify whether a drive needs cleaning, display the drive's cleaning status and the date when it was last cleaned. See ["Display Drive Cleaning Status"](#) on page 275 for details.

## Drive Cleaning Tasks

- [“Configure Drive Auto Clean” on page 268](#)
- [“Import Cleaning or Diagnostic Cartridges” on page 269](#)
- [“Export Cleaning or Diagnostic Cartridges” on page 271](#)
- [“Display Cleaning Cartridges” on page 273](#)
- [“Display Drive Cleaning Status” on page 275](#)
- [“Clean a Drive Manually” on page 277](#)

## ▼ Configure Drive Auto Clean

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to enable or disable the library auto clean feature. If the library is partitioned, you can enable or disable library auto clean for individual partitions.

### Task Steps

1. **Select Tools > System Detail, and select the library folder on the navigation tree.**
2. **Click Auto Clean and then Configure.**  
The **Configure** page appears.
3. **Set the Auto Clean field to Enabled.**
4. **In the Threshold Configuration section, specify the warning thresholds for each cartridge type.**
5. **Click Apply.**

## ▼ Import Cleaning or Diagnostic Cartridges

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

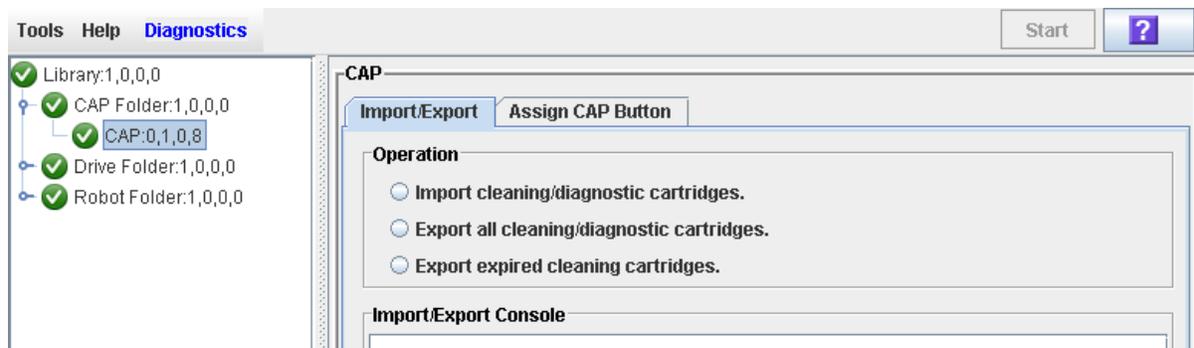
Use this procedure to import new cleaning or diagnostic cartridges to the library through a CAP. The cartridges are entered into reserved system cells.

Before beginning this procedure, verify that all the following conditions are met:

- The required number of reserved system cells are empty.
- The CAP Prevent/Allow state is set to Allow (see your *SCSI Reference Manual* for syntax).
- The CAP does not contain any data cartridges.

### Task Steps

1. Select **Tools > Diagnostics**.
2. Expand the **CAP Folder** in the navigation tree, highlight the CAP, and then click the **Import/Export** tab.



3. Select **“Import Cleaning/Diagnostic cartridges,”** and then click **Start** in the upper right-hand corner.
4. The library controller opens the CAP door, and the CAP Open LED turns on.
5. Grip the handle of the magazine, and slide it out of the CAP and onto the door.

**Note** – To help slide the magazine back into the CAP, do not remove the magazine from the door. Instead, leave the magazine on the CAP door rails.

6. Place the cartridges into the empty magazine cells, making sure that the **VOLID** label is visible and the hub of the cartridge is down.

**Caution** – *Possible damage to components.* Enter the cartridges properly. Otherwise, you could damage the robot or the drive, or cause the library to stop operating. Use only cartridges designed for the drives in your library.

7. **Grip the handle and slide the magazine back into the CAP.**

8. **Close the CAP door, making sure that the door is securely latched.**

The robot systematically moves each cleaning and diagnostic cartridge from the CAP to an empty system cell.

9. **Monitor the Import/Export Console to verify the status of the import operation.**

The “Operation completed” status indicates that the import cartridge operation is complete.

10. **After the import operation is complete, the robot audits the CAP.**

To view a list of cleaning and diagnostic cartridges in the system cells, see [“Display Cleaning Cartridges” on page 273](#).

**Note** – If you want to import cleaning and diagnostic cartridges into system cells one cartridge at a time, use the Recovery Move diagnostic utility. See [“Move a Cartridge From a Specified Location” on page 300](#).

## ▼ Export Cleaning or Diagnostic Cartridges

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

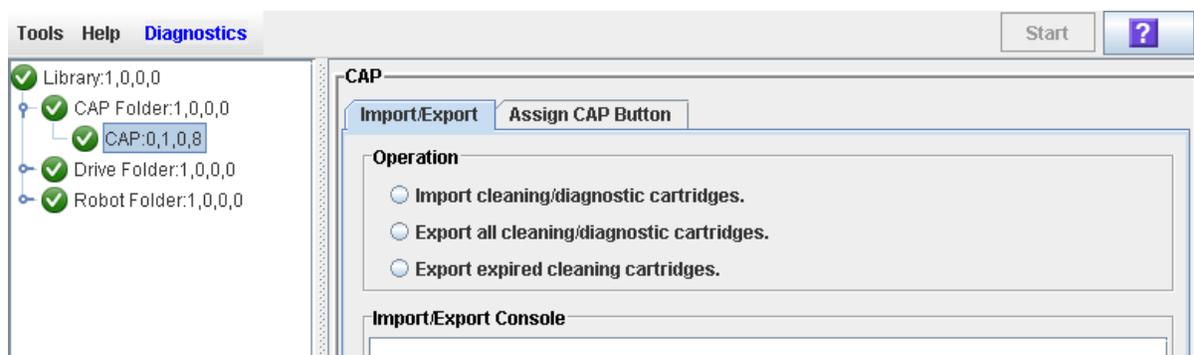
### Task Purpose

Use this procedure to export specified cleaning or diagnostic cartridges through the CAP.

**Note** – Before beginning this procedure, verify that the CAP cells are empty.

### Task Steps

1. Select **Tools > Diagnostics**.
2. Expand the **CAP Folder** in the navigation tree, highlight the **CAP**, and then click the **Import/Export** tab.



3. Do one of the following:
  - To export only the expired cleaning or diagnostic cartridges, select the “Export expired cleaning/diagnostic cartridges” option.
  - To export all cleaning and diagnostic cartridges from the reserved system cells, select the “Export all cleaning/diagnostic cartridges” option.
4. Click the **Start** button in the upper right corner of the page.

If you selected the “Export expired cleaning/diagnostic cartridges” option, the robot systematically moves all expired cleaning and diagnostic cartridges from the system cells into empty CAP cells.

If you selected the “Export all cleaning/diagnostic cartridges” option, the robot moves all cleaning and diagnostic cartridges from the system cells into empty CAP cells.

5. The library controller opens the CAP, and the CAP Open LED turns on.
6. Grip the handle of the magazine, and slide it out of the CAP and onto the door.

**Note** – To help slide the magazine back into the CAP, do not remove the magazine from the door. Instead, leave the magazine on the CAP door rails.

7. **Remove the cartridges from the magazine.**
8. **Grip the handle and slide the magazine back into the CAP.**
9. **Close the CAP door, making sure that the door is securely latched.**
10. **Monitor the Import/Export Console to verify the status of the export operation.**

The “Operation completed” status indicates that the export cartridge operation is completed.

**Note** – If you want to export cleaning or diagnostic cartridges one at a time, use the Recovery Move diagnostic utility. See [“Move a Cartridge From a Specified Location”](#) on page 300.

## ▼ Display Cleaning Cartridges

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to display detailed information about all cleaning cartridges stored in reserved system cells. In particular, you can use this procedure to monitor the status and usage count for all cleaning cartridges under library control.

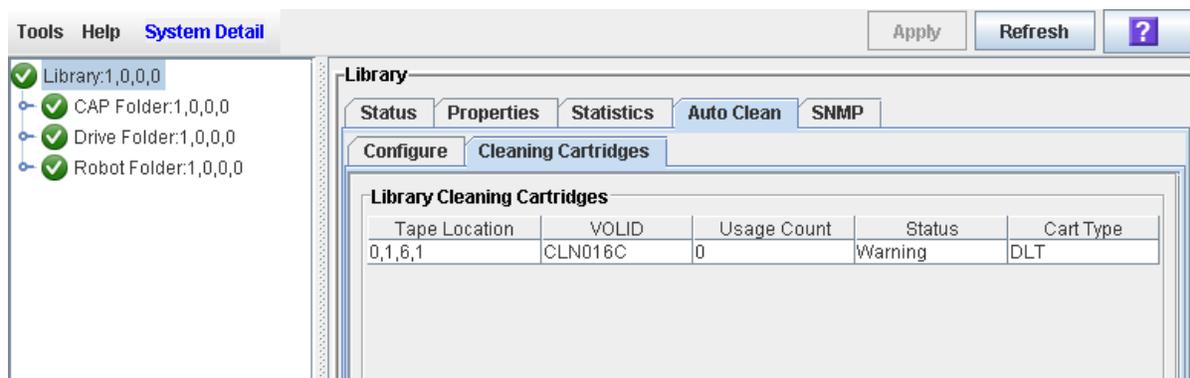
A cleaning cartridge may not appear on this page in the following cases:

- The cartridge is in use.
- The cartridge is in transit.
- The cartridge was entered into the library using the host tape management software (ACSL or ELS). See your tape management software documentation for details about managing these cartridges.

### Task Steps

1. Select **Tools > System Detail**, and select the library folder on the navigation tree.
2. Click the **Auto Clean** tab, and then the **Cleaning Cartridges** tab.

The **Library Cleaning Cartridges** page appears.



### Screen Fields

#### Tape Location

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

All cartridges in this report are located in reserved system cells.

### **VOLID**

Volume ID (VOLID or volser) of the cartridge. The first three characters are always "CLN."

### **Usage Count**

Number of times the cartridge has been used for cleaning. When a cleaning cartridge is imported into the library, its usage count is set to 0. Each time the cartridge is mounted on a drive, its usage count is incremented.

### **Status**

Current status of the cartridge. Options are:

- **expired:** The cartridge has expired, based on information from the drives. This cartridge is not usable and should be replaced as soon as possible.

This status supersedes the "warning" status. Therefore, if a cartridge is both expired and has reached or exceeded its usage count threshold, only "expired" is displayed.

- **OK:** The cartridge is usable for cleaning.
- **warning:** The usage count has reached or exceeded the warning threshold defined for this cartridge type. The cartridge can still be used for cleaning, but you may want to replace it at your earliest convenience.

### **Cart Type**

Type of cleaning cartridge. You should have an adequate supply of usable cleaning cartridges for each type of drive in the library. See the drive manufacturer's documentation for cleaning cartridge requirements.

## ▼ Display Drive Cleaning Status

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

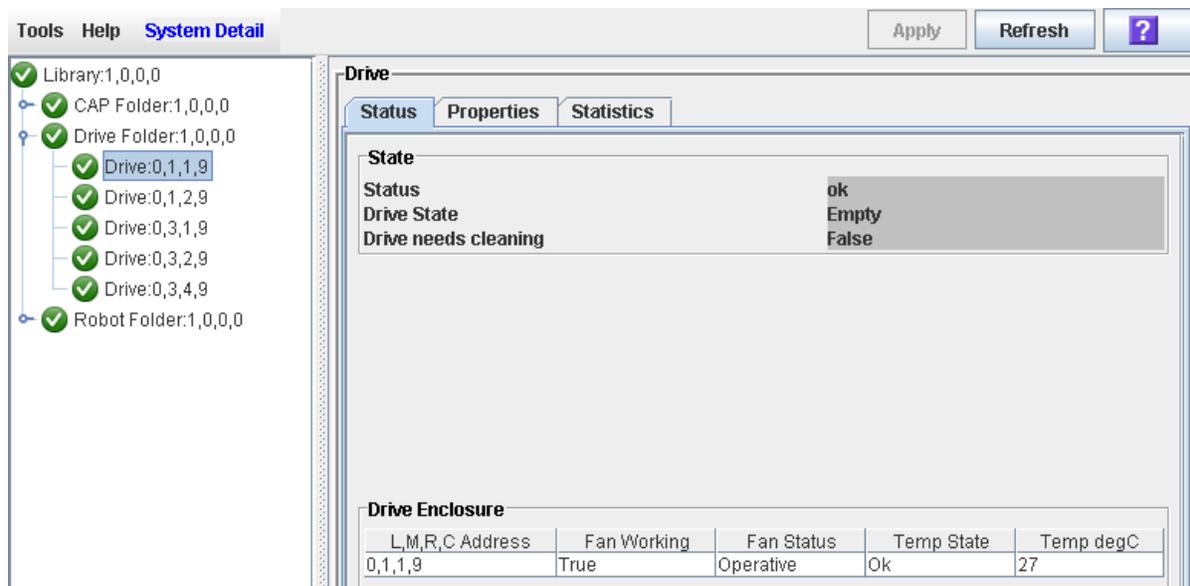
### Task Purpose

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

### Task Steps

1. Select **Tools > System Detail**.
2. Expand the **Drive Folder** in the navigation tree, and highlight the drive you want to display.

The **Drive Status** page appears.



### Screen Fields

The following fields relate to drive cleaning.

#### Drive needs cleaning

Indicates whether the drive has issued an unfulfilled cleaning request. Options are:

- **true:** Drive needs cleaning.
- **false:** Drive does not need cleaning.

**Drive Last Autocleaned**

Date and time when the drive was last cleaned using the library auto clean feature.

The field indicates “Unknown” if either of these are true:

- The library auto clean feature is not enabled.
- The drive was last cleaned using the host tape management software (ACSL or ELS).

## ▼ Clean a Drive Manually

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

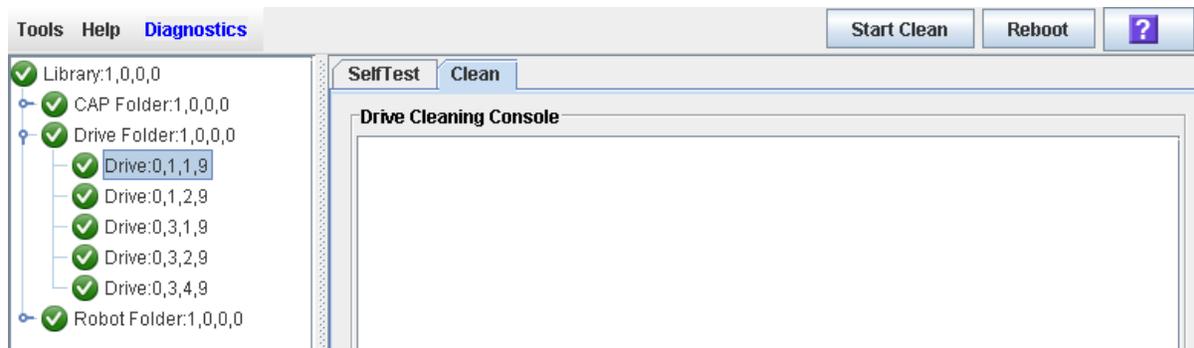
### Task Purpose

Your library could contain more than one type of drive. Before initiating a clean job, make sure system cells have the appropriate cleaning cartridges for the drives being cleaned. Generate a cartridge summary and drive details report to verify the cleaning cartridges present in the library. You can initiate a manual clean even if the “drive needs cleaning” status is “false.”

To display a list of cleaning cartridges, see [“Display Cleaning Cartridges” on page 273](#).

### Task Steps

1. Select Tools > Diagnostics.
2. Expand the Drive Folder in the navigation tree.
3. Select the drive that requires cleaning, and then click the Clean tab.



4. Click Start Clean in the upper right corner.  
A confirmation message appears.
5. Click OK.
6. The Drive Cleaning Console displays the status of the cleaning operation.

## Drive Cleaning Tasks

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## Robot Management

The robot provides movement of cartridges among the storage cells, tape drives, and cartridge access ports (CAPs).

This chapter includes the following topics:

- [“Parked Robot” on page 279](#)
- [“Robot Procedures” on page 279](#)
- [“Robot Monitoring Tasks” on page 280](#)

### Parked Robot

For safety purposes, the robot will be “parked” in the robotics unit when the front door is opened or when the `Open Door` button is pressed on the keypad. Parked means that the robotics components are fully retracted into the robotics unit at the top of the library. To verify the robot is parked, look at the lever in the cutout beneath the facade and to the bottom left of the keypad, the lever should be to the left.

### Robot Procedures

For detailed robot management procedures, see [“Robot Monitoring Tasks” on page 280](#).

## Robot Monitoring Tasks

- [“Display Robot Summary Information” on page 281](#)
- [“Display Robot Status” on page 282](#)
- [“Display Robot Statistics” on page 283](#)

## ▼ Display Robot Summary Information

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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 47](#) for detailed instructions.

### Task Steps

1. Select **Tools > System Detail**.
2. Click the **Robot** folder on the navigation tree.

The **Robot Data** page appears.

## ▼ Display Robot Status

### Task Tool

This procedure can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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 47](#) for detailed instructions.

### Task Steps

1. **Select Tools > System Detail.**
2. **Expand the Robot Folder in the navigation tree, and click the robot.**
3. **Click the Status tab.**

The page displays the current status of the selected robot.

## ▼ Display Robot Statistics

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to display robot statistics, including Get, Put, and Retry counts.

### Task Steps

1. **Select Tools > System Detail.**
2. **Expand the Robot Folder, and click the robot.**
3. **Click the Statistics tab.**

The **Statistics** page appears.



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## SL Console Diagnostics and Utilities

The StorageTek Library (SL) Console enables you to perform many diagnostic tasks, including library self-tests and firmware upgrades.

This chapter includes information on the following:

- [“Library Events” on page 285](#)
- [“Event Codes” on page 287](#)
- [“Library Self-Tests” on page 290](#)
- [“Audits” on page 292](#)
- [“Robot Diagnostic Moves” on page 294](#)
- [“Troubleshooting” on page 297](#)

### Library Events

The library controller continually monitors library operations and logs all events.

### Event Monitors

The system stores event monitors under the following 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.

You or your Oracle StorageTek support representative can use the SL Console to:

- Review library events
- Spool event data to a text file

The following information can help you 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.”

## Library Events

- Result codes: Identify the result of the requested action.
- Known service plan diagnosis: Identifies the mechanism or component responsible for the task or fault.

**Note –** Using the SL Console, you can spool event data to a file.

## Event Codes

**TABLE 13-1** Event Codes

Event Type	Description	Valid Codes
Activity Code	Activity associated with the event. For example, HLI host mount, diagnostic fetch, robot communication diagnostic.	0000: no action / no activity 0100199: common/shared activity (across devices and the controller) 0200–0299: common/shared activity (across devices - robot, drive, PTP, and so on) 0400–0499: common/shared configuration activity 1000–1999: host interface activity 2000–2999: management interface activity 3000–3999: internal server/library activity 4000–4999: partner library-initiated activity 5000–5999: robot activity 6000–6999: drive activity 7000–7999: CAP activity

**TABLE 13-1** Event Codes

Result Code	Reason for the activity. For example, Activity: HLI host mount Result: robot X cartridge fetch failure	0000: no problem / normal 0100–0199: common/shared results (across devices and the controller) 1000–1999: host interface results 2000–2999: management interface results 3000–3999: internal server/library controller results 4000–4999: partner library interface results 5000–5999: robot results 6000–6999: drive results 7000–7999: CAP results
Severity	Identifies the significance of the event from the perspective of the activity associated with the event. The severity levels also identify log activity that must persist in the system across machine power cycles from that which might be considered volatile.	Error (1): Indicates a fault occurred which prevented a request (host or diagnostic) from completing successfully. Error data is non-volatile and accumulates across machine power cycles. Warning (2): Indicates a fault occurred, but the fault has not stopped the library’s ability to complete requests (host or diagnostic). Warning data is non-volatile and accumulates across machine power cycles. Information (3): Indicates data that is not significant, but may be important to establish a history of activity around a severity 1 or 2 event. Information data is volatile. Configuration (4): Indicates change in the library’s configuration. This includes the addition and removal of drives, robot, controllers, and interface cards. This also includes changes to the software configuration. Configuration data are non-volatile resources and accumulate across machine power cycles. Diagnostic (5): Records normal diagnostic activity tracing. This is independent of the debug or trace activity when a diagnostic activity affects the availability of drives or other devices to host operations. Diagnostic data is volatile.
Request Identifier	Identifies all host interface requests. Helps track the sequence of log activity resulting from each host request.	

# Library Firmware Upgrades

**Note** – This feature is available starting with SL500 firmware version 1022.

The library firmware resides on the library controller. Initial firmware is installed at the factory. Library firmware does not contain drive code upgrades. 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).

## Firmware Upgrade Process

The steps for loading firmware code on the library controller are as follows:

1. Locate the firmware upgrade package (.img file) on the Oracle download site.
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 305](#).
4. Activate the downloaded code on the library controller. See [“Activate Code on the Library Controller” on page 306](#).
5. Reboot the library to make the code operational. See [“Download Code to the Library Controller” on page 305](#).

## Firmware Download Site

The SL500 library firmware package is an .img (image) file. The file is available at the Oracle Software Delivery Cloud at the following URL:

<http://edelivery.oracle.com/>

## Multiple Versions of Firmware

You can store up to two versions of the SL500 firmware in the library controller flash memory. By storing two versions:

- The library can continue normal operations and run 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.
- You can revert to a previous version of firmware without having to download and unpack the code package again.

## Related Procedures

For detailed firmware upgrade procedures, see [“Library Utility Tasks” on page 304](#).

## Library Self-Tests

The self-test diagnostic utility is intended to help diagnose basic problems with the library. A self-test typically runs after the library is installed. The test also can be run whenever necessary.

You can run library self-test routines 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.

When performing a self-test, the system:

1. Checks the communication path between the library controller, drives, elevators, and robots.
2. Performs a full library audit.
3. Performs mounts and dismounts of diagnostic cartridges for all the drives installed in the library. The self-test does not begin unless a diagnostic cartridge is found in the system cells. If the system finds a compatible diagnostic cartridge, the self-test repeats for each drive type. If the system does not find a diagnostic cartridge for a drive type, the system skips the mount/dismount operation for the drive.

## Related Procedures

For detailed procedures, see [“Library Utility Tasks” on page 304](#).

# Diagnostic Cartridge Management

Library self-tests and some other diagnostic activities require the use of diagnostic cartridges. Ensure the library contains a sufficient number of diagnostic cartridges for these activities.

Diagnostic cartridge volume IDs (vol-ids or volsers) must be eight characters in length, with “DG” as the first two characters. The library import/export function works only for diagnostic cartridges with labels in this format.

The system stores diagnostic cartridges in reserved system cells which the library controls. Host library applications cannot access diagnostic cartridges. The number of system cells available for diagnostic cartridge storage varies, depending on the configuration of your SL500 library.

See [“Use of Reserved System Cells” on page 264](#) for details.

## Audits

During an audit, the system reads and catalogs cartridges within a library, and verifies the locations of cartridges or validates 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 (vol-id or volser)
- Current location (in library internal address format)
- Verified status (true or false)

The library audits all cartridge locations in the storage and reserved areas at the following times:

- 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” on page 292](#)
- [“Verified Audit” on page 293](#)

**Caution** – System-level problems may occur if a host’s record of the cartridge does not match what is in the cartridge database of the library controller.

## Audit Indicator

**Note** – The audit indicator feature is available starting with SL500 firmware version 1466 and SL Console version 5.70.

The SL Console displays a spinning visual indicator and the message “Audit in progress” to indicate an audit is in progress. The audit indicator displays whenever a library access door has been opened and closed.

The indicator may also display during power up in libraries with redundant electronics or after a reboot.

When you see the audit indicator at the bottom of the screen along with the message “Audit in progress,” do not open the library access door. Otherwise, the library must start the audit process from the beginning.

**Note** – The audit indicator does not display for audits you initiate through the SL Console or the host.

## Physical Audit

In a physical audit, the robot visits cartridge locations and verifies the vol-id of resident cartridges. The library controller updates the cartridge database based on the physical audit. This audit changes the “verified” status of the cartridge locations to “True.” Audit times vary according to the size of the library.

The library performs a physical audit at the following times:

- When initiated manually from the SL Console. The following are the two types of manually initiated physical audits.
  - Entire library audit: The robot:
    - Visits all cells (storage, CAP, and drive)
    - Catalogs the vol-ids and locations
    - Updates the library controller cartridge database

This audit is a background process, meaning it does not interrupt online library operations. Estimated time for such an audit is from less than 10 minutes for a base module to 30 minutes for a maximum size library. See [“Audit the Entire Library” on page 318](#) for details.

  - 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 320](#) 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,” 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 322](#) for details.

## Related Procedures

For detailed procedures, see [“Audit Tasks” on page 317](#).

## Robot Diagnostic Moves

**Note** – This feature is available starting with SL500 firmware version 1026 and SL Console version 2.40.

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. Instead, the system returns cartridges to their original locations after the diagnostic move completes. However, some diagnostic move failures can cause cartridges to be left in new locations.

A diagnostic move involves the following elements:

- [“Target Address Range” on page 294](#)
- [“Pool Address Range” on page 294](#)
- [“Move Access Order” on page 295](#)

### Target Address Range

The system performs the get operation in a diagnostic move within a target address range of the library. There are two types of access orders for a target address:

- [“Sequential Access Order” on page 295](#)
- [“Random Access Order” on page 295](#)

Valid target address types are:

- 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
- System cells: Reserves system cells, which contain cleaning or diagnostic cartridges, as the target/pool range
- All: Reserves storage cells, system 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 system uses the pool address range locations to supply cartridges required for diagnostic moves to and from the target address range. Also, the system uses a pool address in a get operation if a target address does not contain a cartridge.

The address ranges are in the Library, Module, Row, and Column format. There is no specified access order within the pool address range. The pool address ranges do not and cannot include drive locations.

## Move Access Order

### Sequential Access Order

In a diagnostic move with a sequential access order, the robot performs a get operation starting with the first location in the target address ranges. The robot 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. In such a case, the robot positions itself at the target and pool addresses.

### Random Access Order

In a diagnostic move with a random access order, 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 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.

## Diagnostic Move Control Functions

The following [TABLE 13-2](#) lists the options available to manage moves that are currently open.

**TABLE 13-2** Menu Options for Open Diagnostic Moves

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
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, each move has its own monitor screen.

## Related Procedures

For detailed procedures, see [“Robot Utility Tasks” on page 327](#).

# Troubleshooting

Before you run diagnostic tests, check the following areas of the library by using the following troubleshooting tips in the following [TABLE 13-3](#).

**TABLE 13-3** Troubleshooting Tips Prior to Running Diagnostic Tests

Problem	What to do
Service Required (amber) LED is constantly on.	<p>Using the SL Console, check the health of the library and the attached devices (drives, CAPs, and robots). See <a href="#">“StorageTek Library Console” on page 23</a> for more details about operations.</p> <p>To perform a health check:</p> <ol style="list-style-type: none"> <li>1. Log in to the SL Console application.</li> <li>2. Access the System Detail module, View &gt; System Detail.</li> <li>3. Check the navigation tree for the following indicators: <ul style="list-style-type: none"> <li>• Device Healthy</li> <li>• Device Error</li> </ul> </li> </ol> <p>Additional checks:</p> <ul style="list-style-type: none"> <li>• Check the Status (for example, online/offline) and Statistics (for example, uptime, downtime, errors and warnings) tabs for more information on the health of the library and devices.</li> <li>• Make sure the cartridges are fully seated and properly oriented in their storage cells.</li> <li>• Inspect the X table for any foreign objects or debris and remove them if found.</li> </ul>
Library does not power-on. The SL Console does not display any messages.	<ol style="list-style-type: none"> <li>1. Check that the library power switch is in the ON position.</li> <li>2. Check all power cord connections.</li> <li>3. Replace the power cord.</li> <li>4. Make sure that there is power to the outlet.</li> </ol>
CAP Open LED is on and blinking.	Open the CAP and make sure 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.

**TABLE 13-3** Troubleshooting Tips Prior to Running Diagnostic Tests

Problem	What to do
Robot Fault or Library Fault Amber LED is constantly on.	<ol style="list-style-type: none"> <li>1. Check the SL Console for any displayed error messages. Write down the error messages reported.</li> <li>2. Open the front door. Observe and note the state of the cartridges, hand, and tape drives.</li> <li>3. Make sure cartridges are fully seated and properly oriented in their storage cells.</li> <li>4. Make sure packing materials have been removed.</li> <li>5. Inspect the library floor for any objects or debris. If there are any, remove them.</li> <li>6. Check the status of the tape drives.</li> <li>7. Close the front door.</li> <li>8. Make sure 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.</li> </ol>
Tape drive is unable to eject a cartridge.	Manually remove the cartridge from the tape drive. See <a href="#">“Remove a Cartridge from a Tape Drive” on page 369.</a>
The client computer cannot communicate with the library or tape drives.	Make sure cables are securely attached to their connectors on the rear of the library, the tape drives, and the client computer. Make sure 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.	Make sure cables are securely attached to their connectors on the rear of the library, the drives, and the client computer.
Repeated or excessive drive cleanings or cleaning messages.	<ol style="list-style-type: none"> <li>1. Replace the cleaning cartridge with a new cleaning cartridge.</li> <li>2. Run the Library Self-Test and note if errors are reported for the drive.</li> <li>3. Run any client computer-based drive diagnostic tests.</li> </ol>
Cartridge stuck in tape drive.	Manually remove the cartridge. See <a href="#">“Remove a Cartridge from a Tape Drive” on page 369.</a>
Tape drive is unable to eject a cartridge.	Manually remove the cartridge. See <a href="#">“Remove a Cartridge from a Tape Drive” on page 369.</a>

## Related Procedures

For detailed procedures, see [“Library Utility Tasks” on page 304.](#)

## Diagnostic and Utility Tasks

Library diagnostic and utility tasks are divided into the following categories:

- [“Event Monitor Tasks” on page 300](#)
- [“Library Utility Tasks” on page 304](#)
- [“Audit Tasks” on page 317](#)
- [“Drive Utility Tasks” on page 324](#)
- [“Robot Utility Tasks” on page 327](#)

## Event Monitor Tasks

- [“Display an Event Monitor” on page 301](#)
- [“Spool Event Monitor Data to a File” on page 302](#)
- [“Display Multiple Monitors” on page 303](#)

## ▼ Display an Event Monitor

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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.

Event monitor information is dynamically updated depending upon the occurrence of 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** – To monitor multiple events, see [“Display Multiple Monitors”](#) on page 303.

### Task Steps

1. **Select Tools > Monitors.**
2. **Expand the Permanent Monitors folder in the navigation tree.**  
The system displays the library monitors accessible to you.
3. **Click the event monitor you want to use, and then click the Open button in the upper right corner.**  
The system displays the associated data collected for the event.
4. **Manage the information displayed on the screen for the event selected using the appropriate options.**

The following [TABLE 13-4](#) lists the options available and how to access them.

**TABLE 13-4** Options for Managing Event Monitor Information

To	Select
Pause the continuous display of data related to the event selected	Monitor > Pause
Resume displaying the events	Monitor > Resume
Permanently stop the continuous display of data related to the event selected	Monitor > Stop
Clear the event monitor display	Monitor > Clear

5. **To close a monitor, click the X in the upper right corner of the window.**

## ▼ Spool Event Monitor Data to a File

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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.

### Task Steps

1. **Select Tools > Monitors.**
2. **Expand the Permanent Monitors folder in the navigation tree.**  
The system displays the library monitors accessible to you.
3. **Click the event monitor you want to use, and then click Open in the upper right corner.**

The system displays the event monitor window.

4. **In the event monitor window, select Spool File > Start Spooling.**

The **Save** dialog box 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 the selections from the Options Bar shown in the following [TABLE 13-5](#).

**TABLE 13-5** Options for Opening and Managing Multiple Event Monitors

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

## Library Utility Tasks

- [“Download Code to the Library Controller” on page 305](#)
- [“Activate Code on the Library Controller” on page 306](#)
- [“Reboot the Library” on page 308](#)
- [“Transfer the Library MIB File” on page 309](#)
- [“Generate and Transfer the Library Log Snapshot File” on page 311](#)
- [“Perform a Non-Disruptive Library Self-Test” on page 313](#)
- [“Perform a Disruptive Library Self-Test” on page 315](#)

## ▼ Download Code to the Library Controller

### Task Tool

This task can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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 306](#) for detailed instructions.

**Note** – This procedure is not used for downloading drive firmware updates.

**Note** – This feature is available starting with SL500 firmware version 1026 and SL Console version 2.40.

### Task Steps

1. **Locate the firmware upgrade package (.img file) on the Oracle download site. See [“Firmware Download Site” on page 289](#).**

2. **Download the code to a folder on your local PC or workstation.**

3. **Log into the SL Console.**

4. **Select Tools > Diagnostics, and click the Library folder.**

5. **Click the Load Code tab.**

The **Load Code** page appears.

The SL500 library firmware package is a .img (image) file.

6. **The contents of the file display. Review the contents and file name to verify that you have specified the correct firmware package.**

When the code is fully transferred to the library controller, the code unpack process begins.

The page indicates the progress of the unpack and when it is complete.

Next to the **Failed** label, you should see 0. If there are any failures indicated, contact your Oracle support representative for assistance.

7. **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 306](#) for detailed instructions.**

## ▼ Activate Code on the Library Controller

### Task Tool

This task can be performed at either of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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 305](#) for detailed instructions.

This procedure involves a reboot of the library. Schedule the process for a time that is convenient for users.

You can restore the earlier firmware version if required.

### Task Steps

1. **Select Tools > Diagnostics, and click the Library folder.**

2. **Click the Activate Code tab.**

The **Activate Code** page appears.

3. **In the Target list, select the code package you want to activate.**

The list may display a library firmware package and an SL Console package. For this procedure, select the firmware package (**SL500 Code**).

The **Available Versions** section of the page 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.

4. **Select the code version you want to activate.**

5. **Click the Activate button in the upper right corner.**

The **Activation Confirmation** message appears, asking whether you want to continue with the process.

6. **Click OK to begin the activation.**

If you click **Cancel**, the process terminates and returns to [Step 4](#).

The code activation process begins, and the **Activate Console** page 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.

- 7. When the activation process finishes, a dialog appears, prompting you to reboot the library.**

- 8. Click OK to reboot the library.**

If you click **Cancel**, the process terminates, and you must reboot the library at a later time. See [“Download Code to the Library Controller” on page 305](#) for detailed instructions.

The reboot process begins, and a message appears indicating that your SL Console session is terminating.

- 9. Click OK to terminate the SL Console session.**

The system logs you off the library.

- 10. 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, 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 such a case, you must 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.

## ▼ Reboot the Library

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to reboot the library. This process involves reloading the firmware from flash memory and restarting the library controller.

**Note** – This feature is available starting with SL500 firmware version 1026 and SL Console version 2.40.

### Task Steps

1. **Select Tools > Diagnostics.**

2. **Click the Library folder on the navigation tree.**

The **Library** page appears.

3. **Click Reboot in the upper right corner.**

The **Reboot** confirmation message appears.

4. **Click OK to continue.**

If the library is online, the **Offline** confirmation message appears.

5. **Click OK to take the library offline.**

The **Reboot** confirmation message appears.

6. **Click OK to continue.**

The SL Console termination message appears.

7. **Click OK to terminate this SL Console session.**

You are logged off the SL Console. The library controller reboots the library. This could take several minutes.

**Note** – You cannot log back in to the SL Console until the library has fully initialized.

## ▼ Transfer the Library MIB File

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to transfer (save) 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. E-mail the file to your Oracle support representative to help diagnose problems with the library.

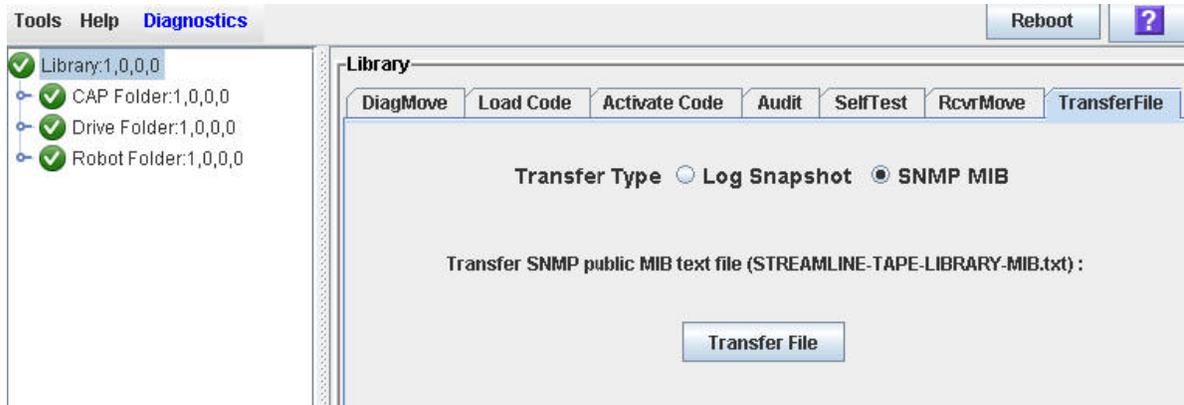
### Task Steps

1. Select **Tools > Diagnostics**.
2. Click the **Library** folder on the navigation tree.

The **Library** page appears.

3. Click the **TransferFile** tab.

The **Library TransferFile** page appears.



4. Click **Transfer File**.

The **Save** dialog box 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** message appears.

The following is a partial sample of the MIB file output.

```

-- *****
--          STREAMLINE-TAPE-LIBRARY-MIB (1.3.6.1.4.1.1211.1.15)
--
-- Copyright (c) 2005, 2010, Oracle and/or its affiliates. All rights
reserved.
--
-- *****

STREAMLINE-TAPE-LIBRARY-MIB DEFINITIONS ::= BEGIN
IMPORTS
    enterprises, Counter32, Integer32 FROM SNMPv2-SMI
    --OBJECT-TYPE FROM RFC-1212
    OBJECT-GROUP, NOTIFICATION-GROUP, MODULE-COMPLIANCE FROM SNMPv2-CONF
    TEXTUAL-CONVENTION FROM SNMPv2-TC
    OBJECT-TYPE, MODULE-IDENTITY, NOTIFICATION-TYPE FROM SNMPv2-SMI;

streamlineTapeLibrary MODULE-IDENTITY
    LAST-UPDATED "201010280000Z" -- Oct 28, 2010
    ORGANIZATION "Oracle"
    CONTACT-INFO "Please contact Oracle/Sun Support:
        http://www.sun.com/contact/support.jsp"
    DESCRIPTION "The MIB module for StreamLine Tape Library.
        Copyright (c) 2005-2010,
        Oracle. All Rights Reserved."
    ...
-- *****
--
-- Generic traps: 1-10
--
-- *****

slTrapError NOTIFICATION-TYPE
    OBJECTS
        {
            slTrapLibrarySerialNumber,
            slTrapDeviceId,
            slTrapDeviceTime,
            slTrapDeviceAddress,
            slTrapDeviceUserName,
            slTrapDeviceInterfaceName,
            slTrapDeviceActivity,
            slTrapDeviceRequestId,
            slTrapDeviceSeverity,
            slTrapDeviceResultCode,
            slTrapDeviceFreeFormText
        }
    STATUS current
    DESCRIPTION "An error trap - a device condition which is critical to
machine operation was encountered"
    ::= { slSnmplibNotifications 1 }

```

## ▼ Generate and Transfer the Library Log Snapshot File

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to generate and transfer (save) the library log snapshot file to a specified location on your local PC or workstation. The system saves the file in an encrypted format, which means you cannot view or edit it. After generating and transferring the snapshot file, e-mail it to your Oracle support representative who will use it to diagnose problems with the library.

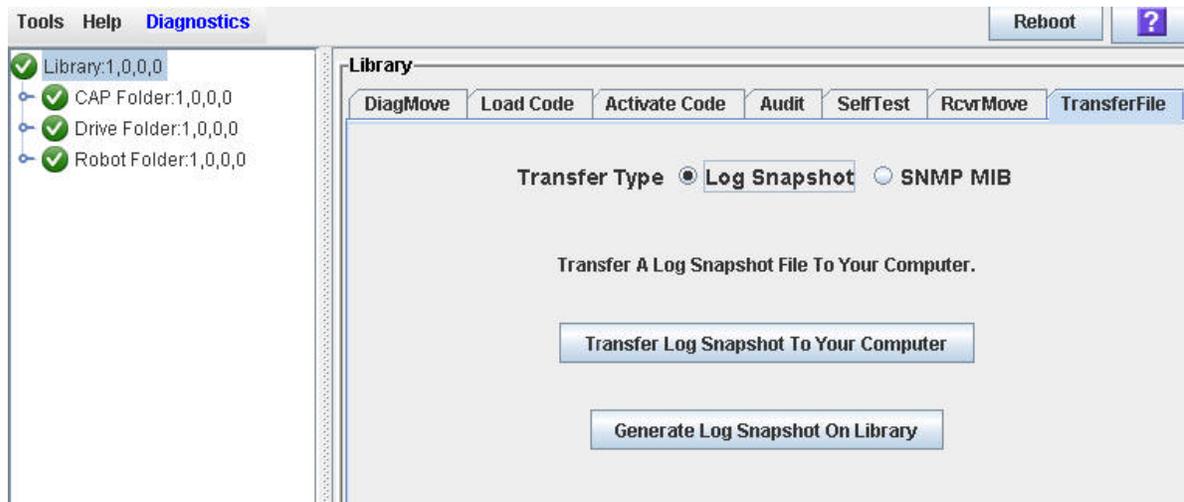
**Note** – The feature to generate a log snapshot is available starting with SL500 firmware version 1466 and SL Console version 5.70.

**Note** – Use this procedure only under the direction of your Oracle support representative. You must transfer the library log snapshot file within 15 minutes after it is generated. After 15 minutes, the generated snapshot is no longer available, and you must generate another file.

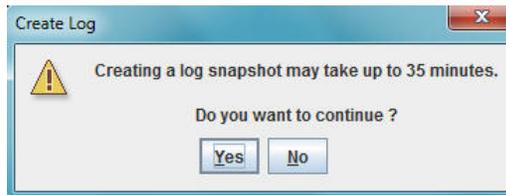
### Task Steps

1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the navigation tree.**  
The **Library** screen appears.
3. **Click the TransferFile tab.**  
The **TransferFile** page appears.
4. **Select the Log Snapshot radio button if it is not already selected.**

5. Click the button labeled **Generate Log Snapshot on Library**.



The **Create Log** confirmation message appears.



6. Click **Yes** to continue creating the log snapshot.
7. Click **OK** when the confirmation message displays.
8. **Save the snapshot within 15 minutes after generating the snapshot.**

If you do not save within this 15-minute window, you cannot save the currently generated log snapshot file. In this case, you must generate another log snapshot file.

**Click Transfer Log Snapshot To Your Computer.**

The **Save** dialog box appears.

9. If you have already created the directory where you want to save the file, browse to that directory and click **Save**.
10. If the directory you want does not exist, enter the name of the directory in the **File Name** field and click **Save**.

The **Directory Create** message appears. Click **OK** to accept the directory creation and dismiss the message. Then click **Save** at the **Save** dialog box.

The data is saved in the specified directory, and the **Transferred Successful** message appears.

11. Click **OK** to dismiss the message. The library automatically names the file. You cannot view the file because it is encrypted.

## ▼ Perform a Non-Disruptive Library Self-Test

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

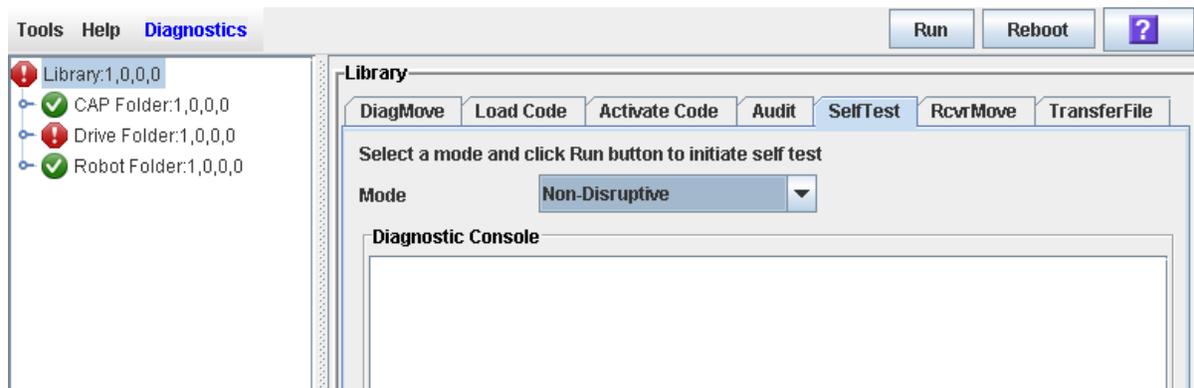
### Task Purpose

Use this procedure to perform a non-disruptive library self-test, which can be used to help diagnose operational problems with the library.

For the test to run completely, make sure the proper diagnostic cartridges for library drives are in the library. To verify this, see [“List Library Cartridges” on page 256](#).

### Task Steps

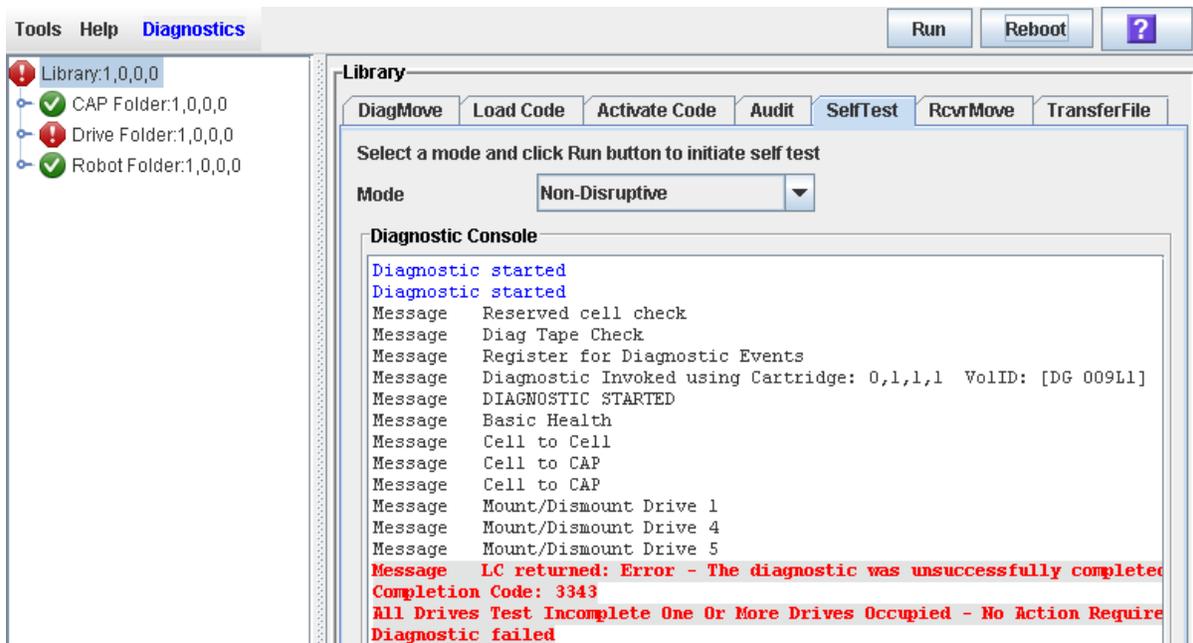
1. Select **Tools > Diagnostics**, and click the **Library** folder.
2. Click the **SelfTest** tab.  
The **Self Test** page appears.
3. In the **Mode** list, select **Non-Disruptive**.



4. Click **Run** to start the test.

The test begins. The **Diagnostic Console** section of the page displays the status of the various diagnostic tests as they are performed

When the test completes, the results of the test display.



## ▼ Perform a Disruptive Library Self-Test

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

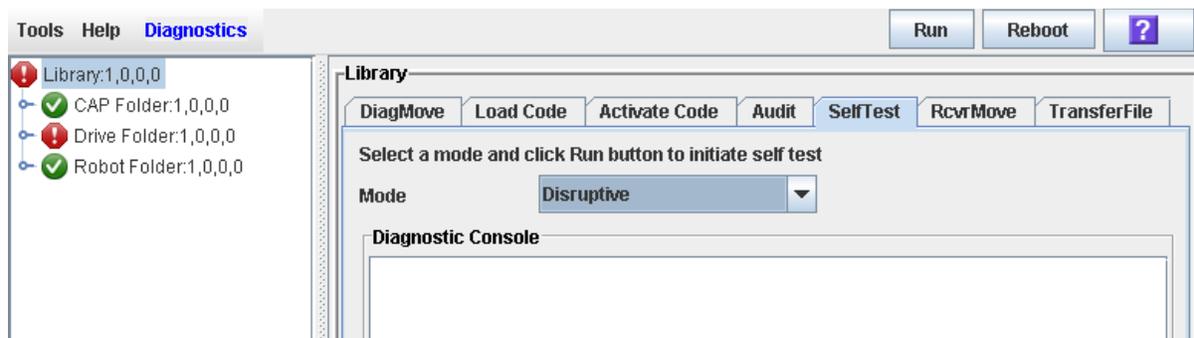
Use this procedure to perform a disruptive library self-test, which can be used to help diagnose operational problems with the library.

In order for the test to run completely, make sure the proper diagnostic cartridges for library drives are present in the library. To verify this, see [“List Library Cartridges” on page 256](#).

The library will be taken offline to all hosts while the test runs, and then brought back online when the test completes.

### Task Steps

1. Select **Tools > Diagnostics**, and click the **Library** folder.
2. Click the **Self Test** tab.  
The **Self Test** page appears.
3. In the **Mode** list, select **Disruptive**.



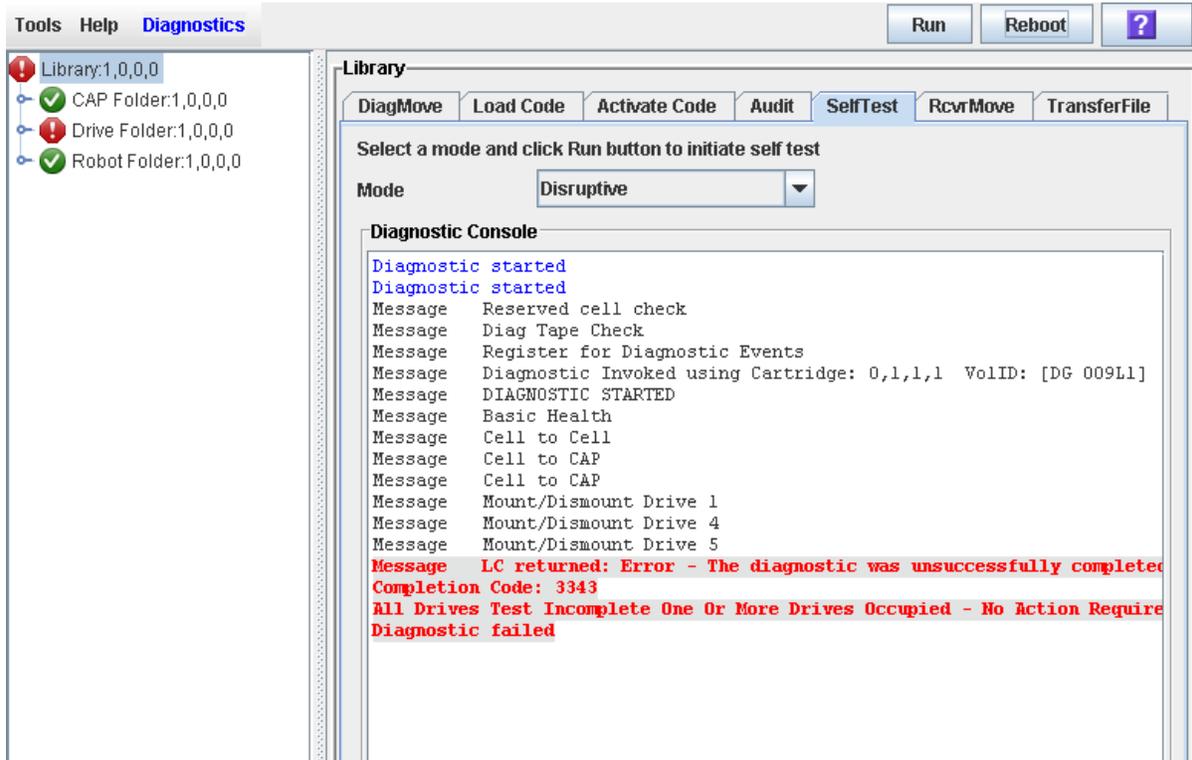
4. Click **Run**.

A message appears asking you to confirm that the library will be taken offline to all hosts.

5. Click **OK to begin the test**.

The test begins, and the **Diagnostic Console** section of the page displays the status of the various diagnostic tests as they occur.

When the test completes, the results of the test display in the **Diagnostic Console** section.



The system brings the library back online automatically so you can resume normal operations.

See [“Bring the Library Online”](#) on page 415 for detailed instructions.

## Audit Tasks

- [“Audit the Entire Library” on page 318](#)
- [“Audit a Range of Cells” on page 320](#)
- [“Perform a Verified Audit” on page 322](#)

## ▼ Audit the Entire Library

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

During this audit, the robot visits all the storage cells, catalogs the vol-ids 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 after it has initiated. The audit takes approximately 1/2 second per cartridge slot.

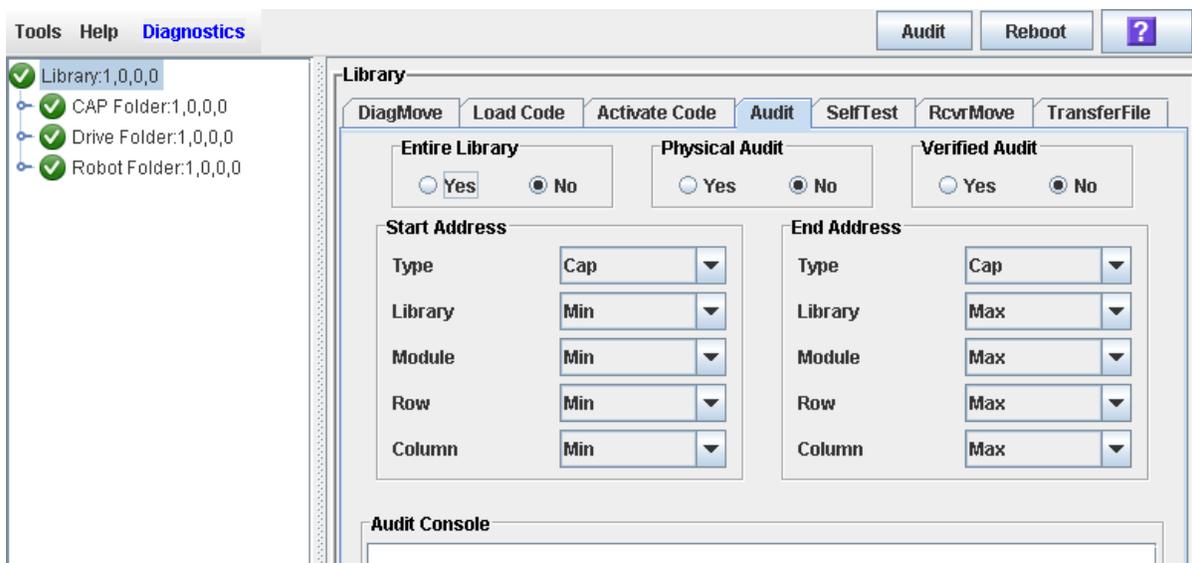
### Task Steps

1. Select Tools > Diagnostics.
2. Click the Library folder on the navigation tree.

The Library page appears.

3. Click the Audit tab.

The Audit page appears.



4. In the Entire Library section, click the Yes radio button. Then click the Audit button in the upper right corner.

A confirmation message appears.

5. Click **OK** to perform the audit as a background process or **Cancel** to cancel the audit.

**Note** – After you click **OK**, you cannot stop the audit. It runs until completion.

You can view the Cartridge Summary report after a few hours for the latest cartridge locations and vol-ids. See [“Display a Library Report” on page 47](#) for details.

## ▼ Audit a Range of Cells

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

During this audit, the robot visits only a specific range of storage cells (including the cap and drives) and updates the library controller database.

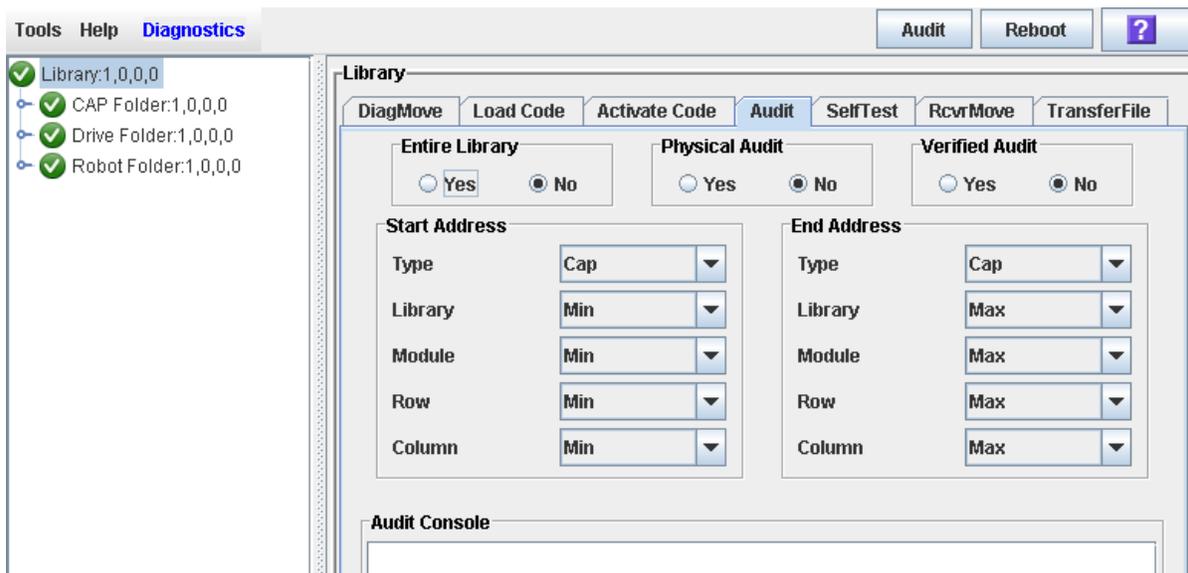
### Task Steps

1. Select Tools > Diagnostics.
2. Click the Library folder on the navigation tree.

The Library page appears.

3. Click the Audit tab.

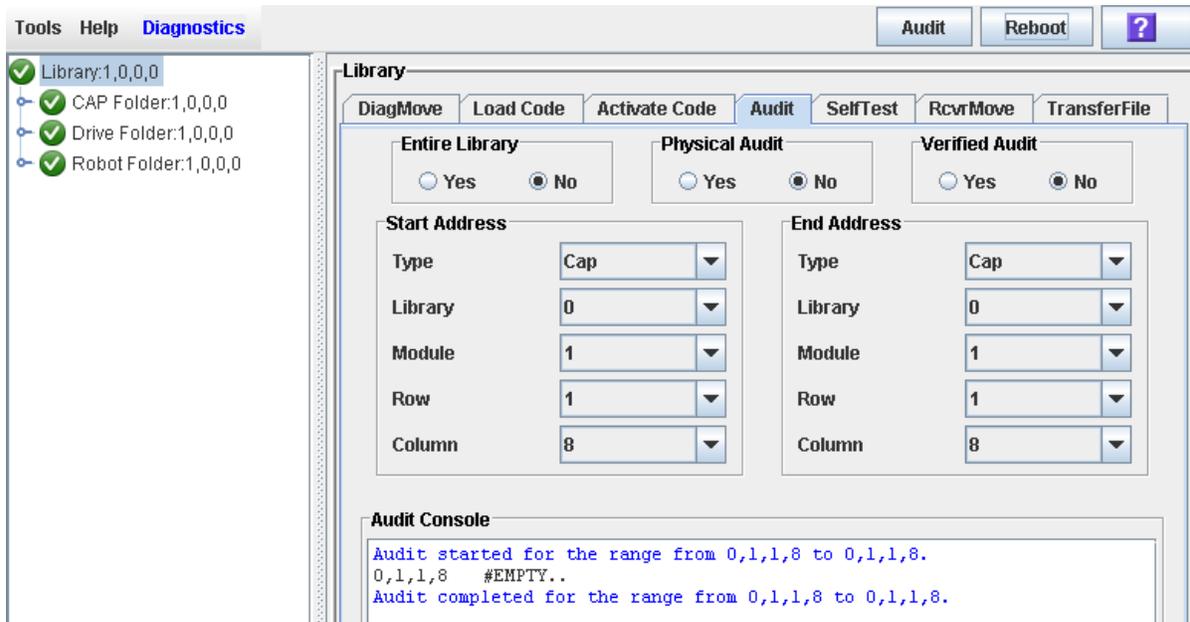
The Audit page appears.



4. In the Entire Library section, click the No radio button. In the Physical Audit section, select Yes. In the Verified Audit section, select No.
5. In the Start Address and End Address sections, select the device types you want to audit and the starting and ending library internal address locations.
6. Click the Audit button in the upper right corner.  
A confirmation message appears.
7. Click OK to perform the audit as a background process, or Cancel to cancel the audit.

**Note** – After you click **OK**, you cannot stop the audit. It runs until completion.

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 vol-ids. See [“Display a Library Report” on page 47](#) for details.

## ▼ Perform a Verified Audit

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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,” the system performs a physical audit of that location and updates the library controller database.

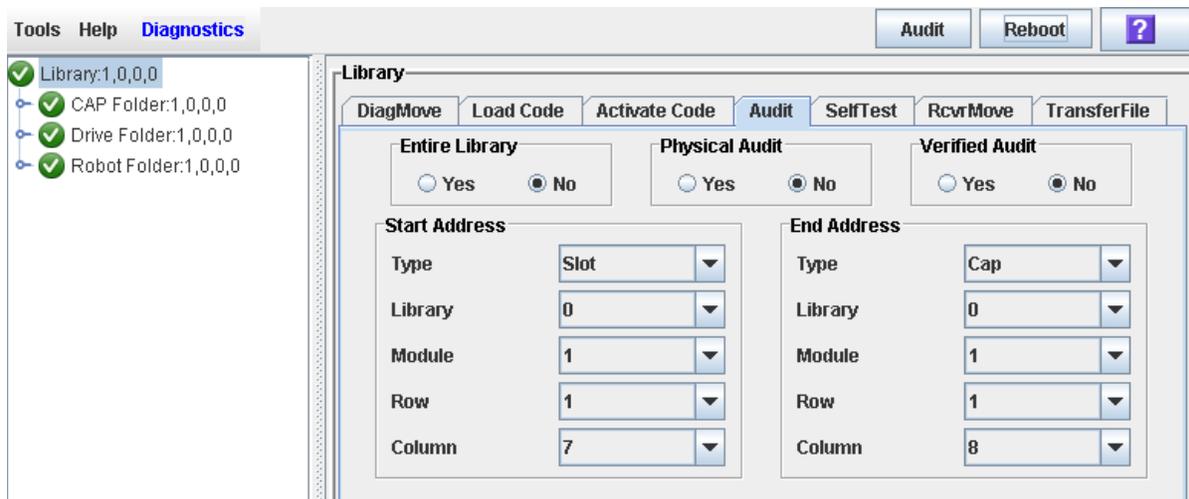
### Task Steps

1. Select Tools > Diagnostics.
2. Click the Library folder on the navigation tree.

The Library page appears.

3. Click the Audit tab.

The Audit page appears.

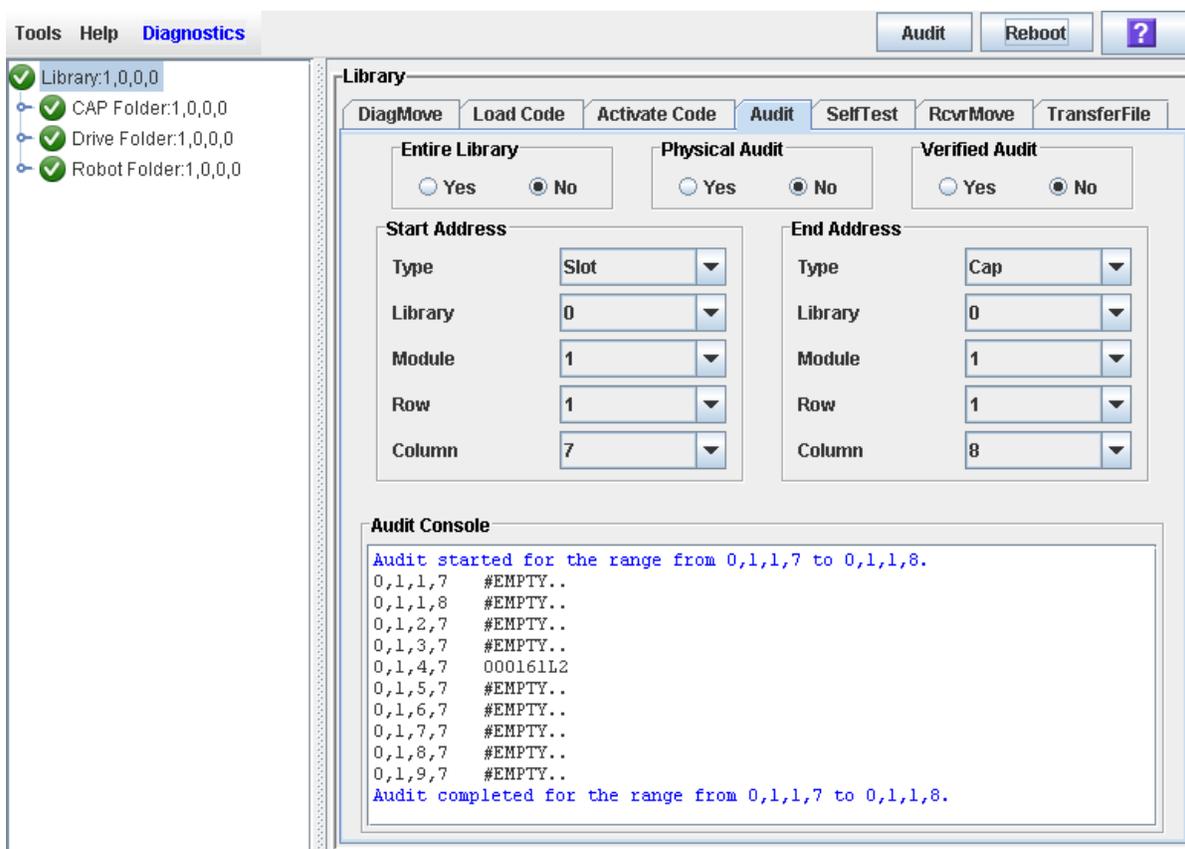


4. In the Entire Library section, select No. In the Physical Audit section, select No. In the Verified Audit section, select Yes.
5. In the Start Address and End Address sections, select the device types you want to audit and the starting and ending library internal address locations.

See “Library Internal Address” on page 624 for a detailed explanation of this address format.

6. Click the Audit button in the upper right area of the page.

The **Audit Console** section displays the progress of the audit.



## Drive Utility Tasks

- [“Perform a Drive Self Test” on page 325](#)
- [“Reboot a Drive” on page 326](#)

## ▼ Perform a Drive Self Test

### Task Tool

This task can be performed at any of the following:

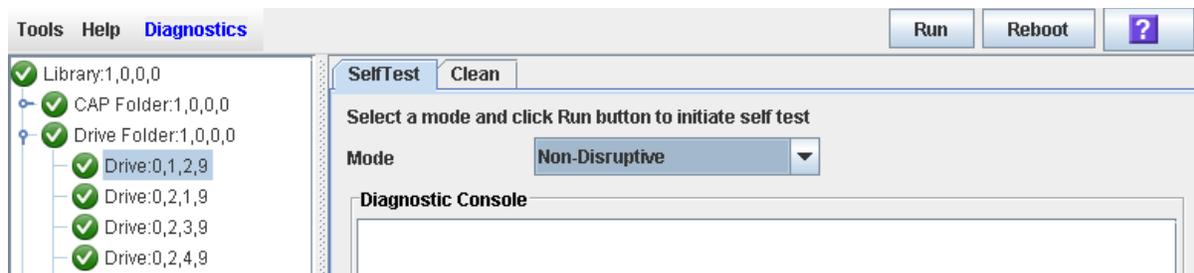
- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to perform a self test on a drive.

### Task Steps

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 list, select Non-Disruptive.



5. Click Run in the upper right area of the screen.

Status messages display as the self-test runs. After the test finishes, the system displays a message indicating the diagnostic test is complete.

**Note** – Library devices that are offline in an error state cannot go online. The error condition must be cleared first.

## ▼ Reboot a Drive

### Task Tool

This task can be performed at any of the following:

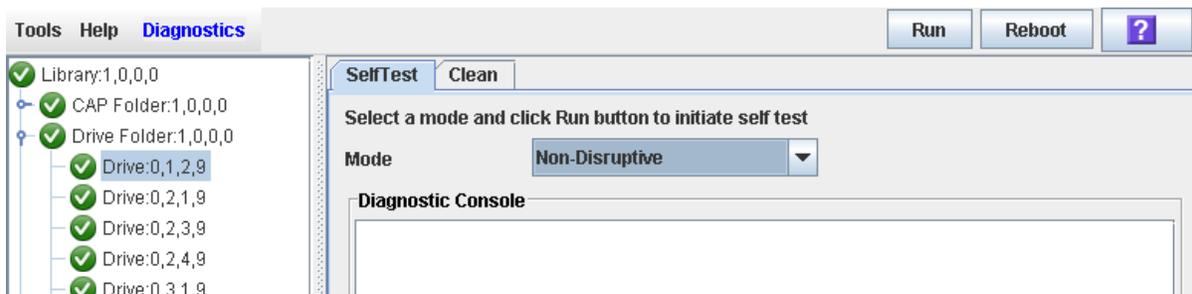
- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to reboot a drive.

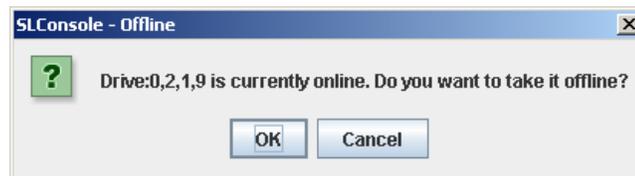
### Task Steps

1. Select **Tools > Diagnostics**.
2. Expand the **Drive Folder**, and click the drive you want to modify.



3. Click **Reboot** in the upper right corner of the screen.

If the drive is offline, the **Offline Confirm** message appears.



4. Click **OK** to take the drive offline.

The **Reboot Confirm** message appears.



5. Click **OK**.

The library controller reboots the drive, and the **Reboot Success** message appears.

6. Click **OK** to dismiss the message.

## Robot Utility Tasks

- [“Define a Diagnostic Move” on page 328](#)
- [“Manage Diagnostic Move Definitions” on page 333](#)
- [“Save a Diagnostic Move to a File” on page 335](#)
- [“Start a Diagnostic Move” on page 338](#)
- [“Monitor and Control Open Diagnostic Moves” on page 340](#)

## ▼ Define a Diagnostic Move

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

You can set up and run multiple diagnostic move routines 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.

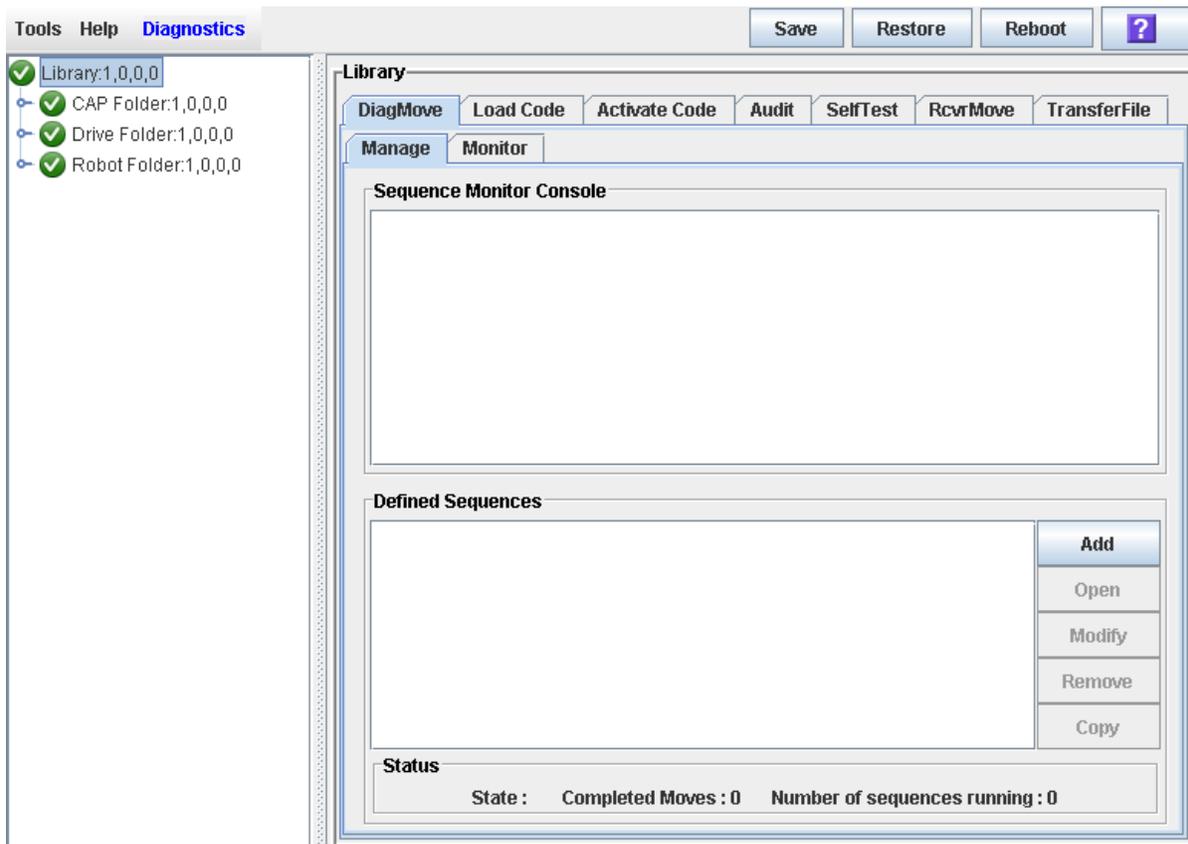
### Task Steps

1. **Select Tools > Diagnostics.**
2. **Click the Library folder in the navigation tree.**

The **Library** page appears.

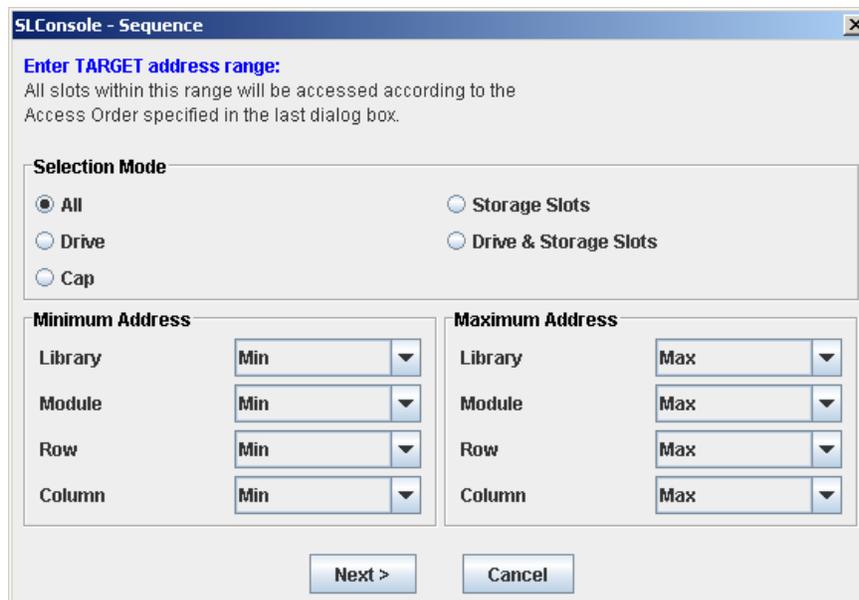
3. Click the **DiagMove** tab, and then the **Manage** tab.

The **Manage** page appears.



4. In the **Defined Sequence** section, click **Add**.

The **Sequence** dialog box appears.



5. Complete the Sequence screen as follows. See [“Target Address Range” on page 294](#) for details.

- In the **Selection Mode** section, select the type of cells you want to diagnose.
- In the **Minimum Address** and **Maximum Address** sections, select the library internal address of the starting and ending locations of the cells you want to diagnose.

6. Click Next.

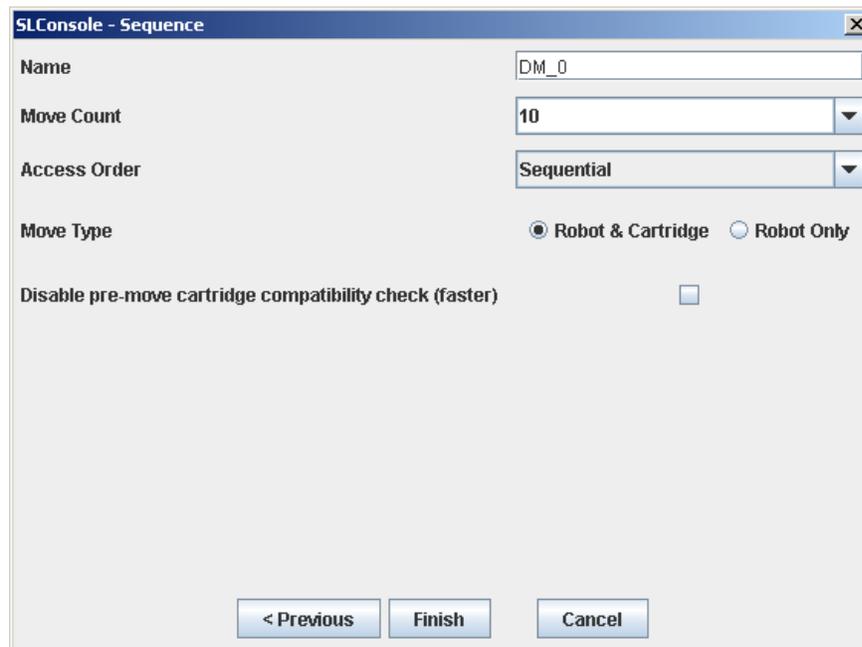
The **SOURCE** dialog box appears.

7. Complete the SOURCE screen as follows. See [“Pool Address Range” on page 294](#) for details.

- In the **Selection Mode** sections, select the appropriate cartridge pool address type.
- In the **Minimum Address** and **Maximum Address** sections, select the library internal addresses of the starting and ending locations of the cartridge pool you want to use.

**8. Click Next.**

The **Sequence** dialog box 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):

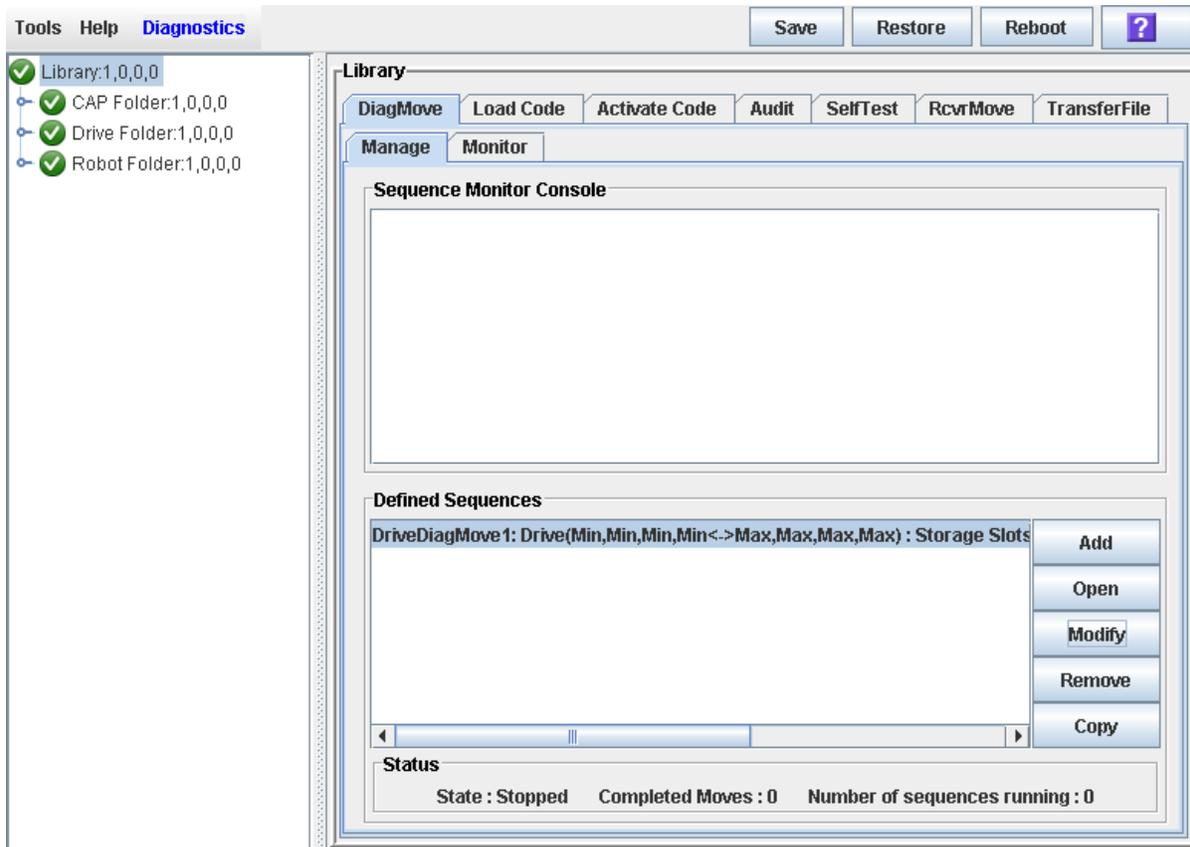
< Previous Finish Cancel

**9. Complete the Sequence screen as follows. See [“Move Access Order” on page 295](#) 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

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

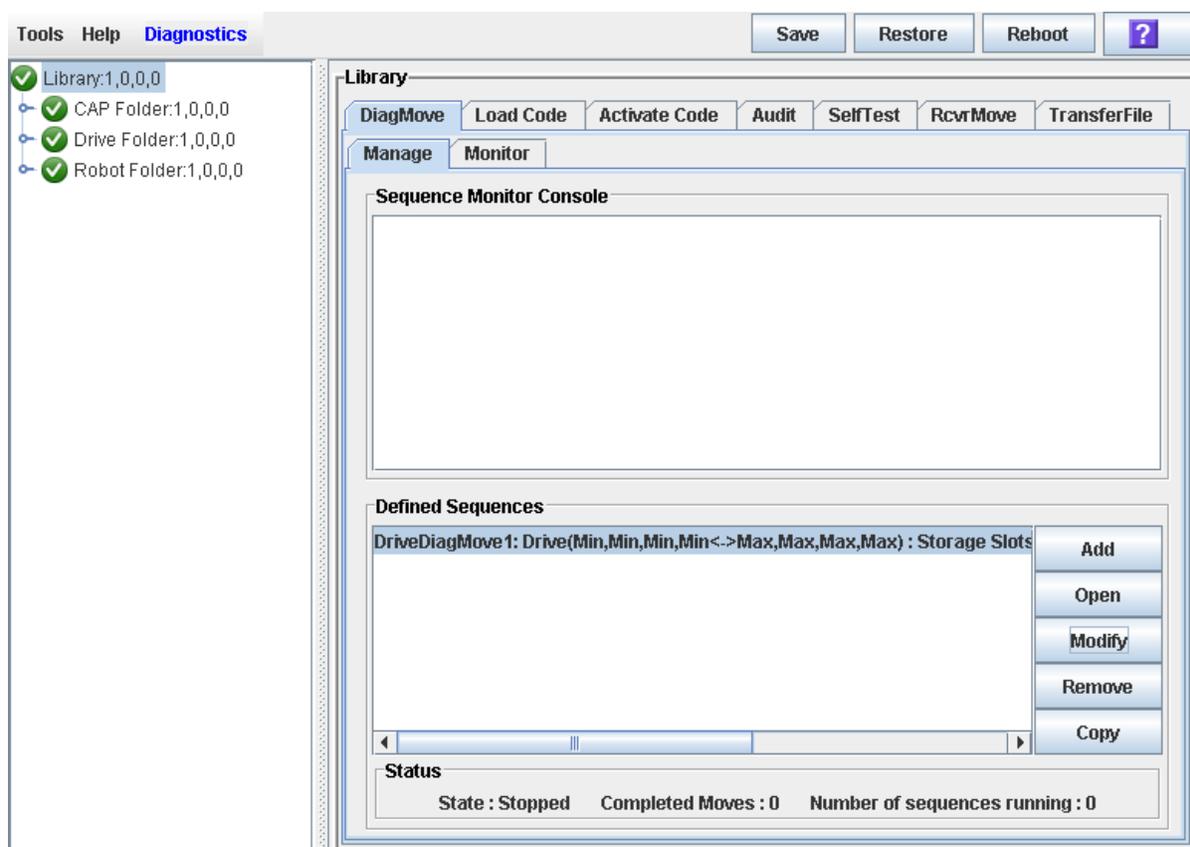
### Task Purpose

Use this procedure to manage diagnostic move sequence definitions.

### Task Steps

1. Select **Tools > Diagnostics**.
2. Click the **Library** folder on the navigation tree.  
The **Library** page appears.
3. Click the **DiagMove** tab, and then the **Manage** tab.

The **Manage** page appears.



- From the **Defined Sequences** section, select any of the following options listed in the following **TABLE 13-6**.

**TABLE 13-6** Options for Defining Diagnostic Moves

To	Select Option	Notes
Define a diagnostic move	Add	
Start a diagnostic move	Open	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 options for a diagnostic move	Modify	This diagnostic move routine must not be open or if open must be in a "Stopped" state.
Remove a diagnostic move	Remove	This diagnostic move routine must not be open.
Copy an existing diagnostic move	Copy	Copy a diagnostic move definition, make changes if necessary, and assign a different name.

- To manage the diagnostic moves currently open, see **"Monitor and Control Open Diagnostic Moves"** on page 340.

## ▼ Save a Diagnostic Move to a File

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

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).

You can use the saved file to:

- Restore a move that has been deleted from the library.
- Copy it to a different library for use there.

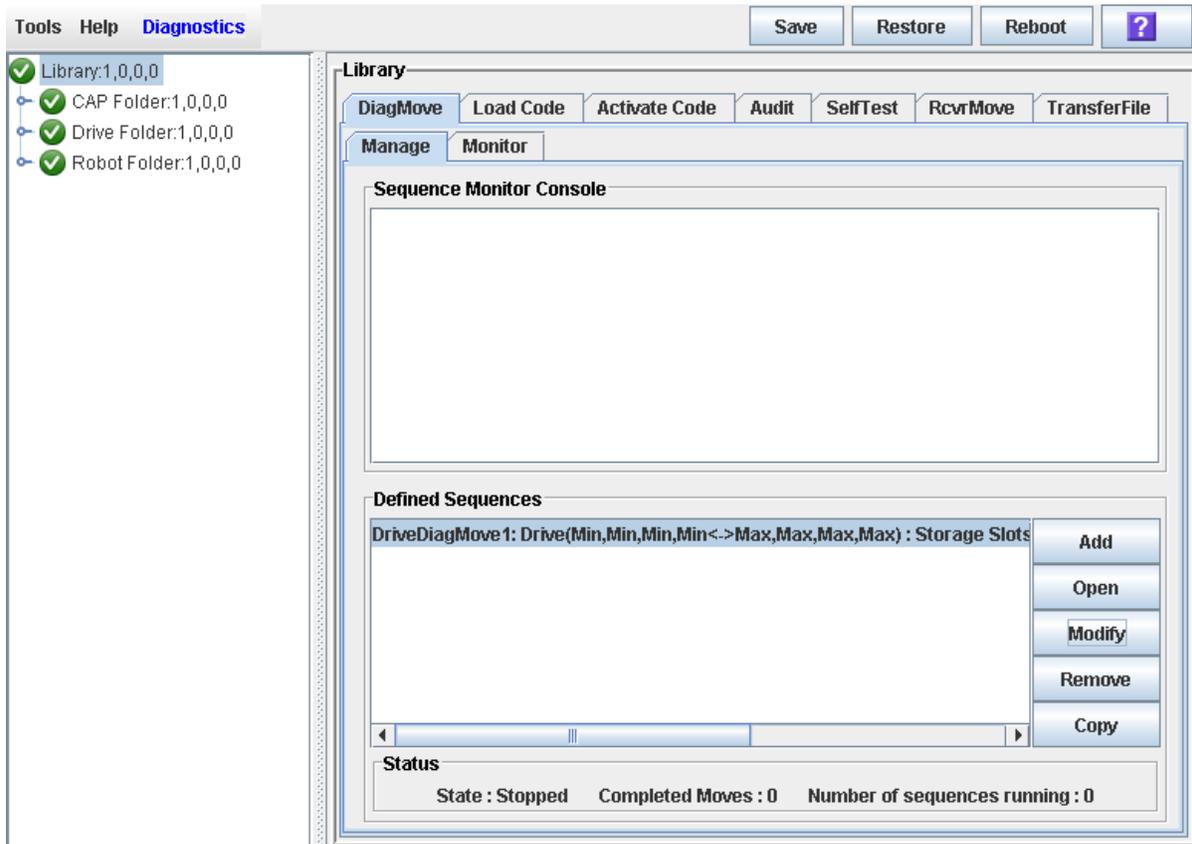
### Task Steps

1. **Select Tools > Diagnostics.**
2. **Click the Library folder on the navigation tree.**

The **Library** page appears.

3. Click the **DiagMove** tab, and then the **Manage** tab.

The **Manage** page appears.



4. Click the diagnostic move you want to save, and then click the **Save** button in the upper right area of the screen.

The **Save** dialog box 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. The 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

### Task Tool

This task can be performed at any of the following:

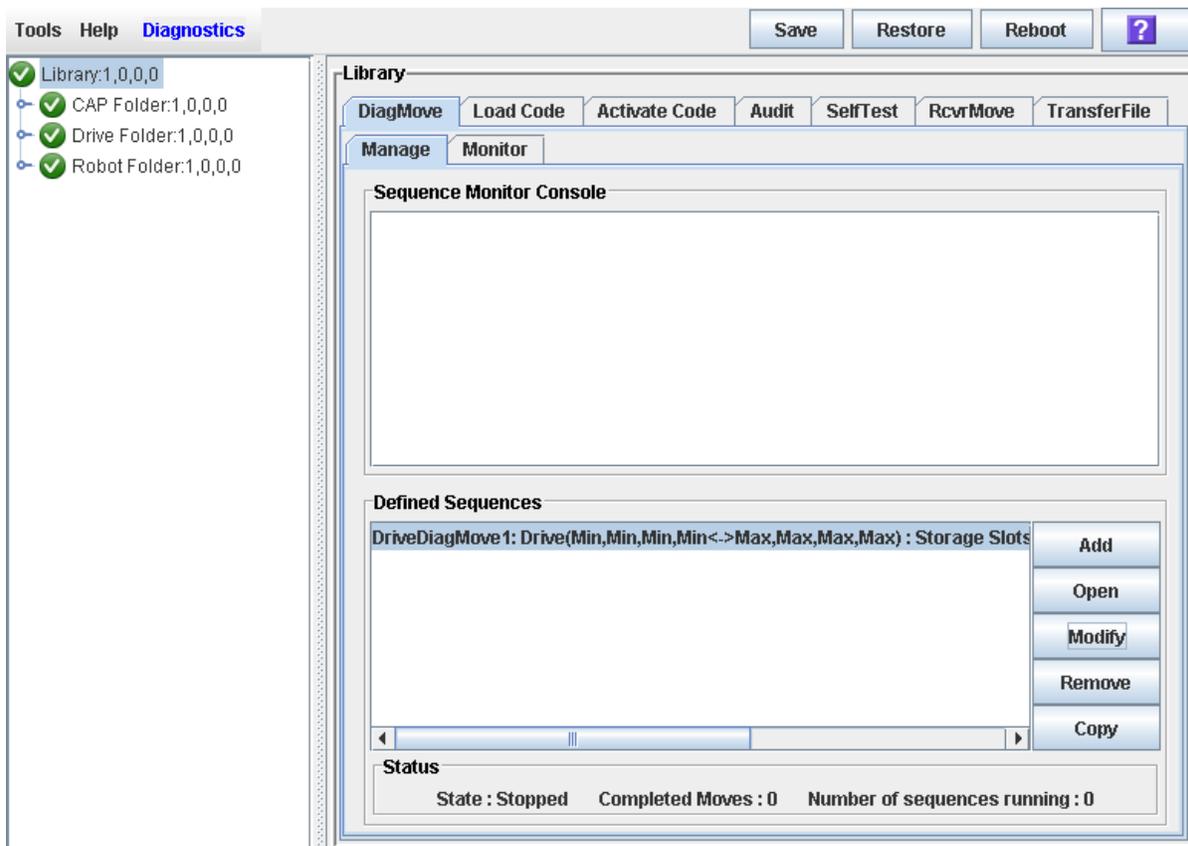
- Standalone SL Console
- Web-launched SL Console

### Task Purpose

Use this procedure to begin a diagnostic move.

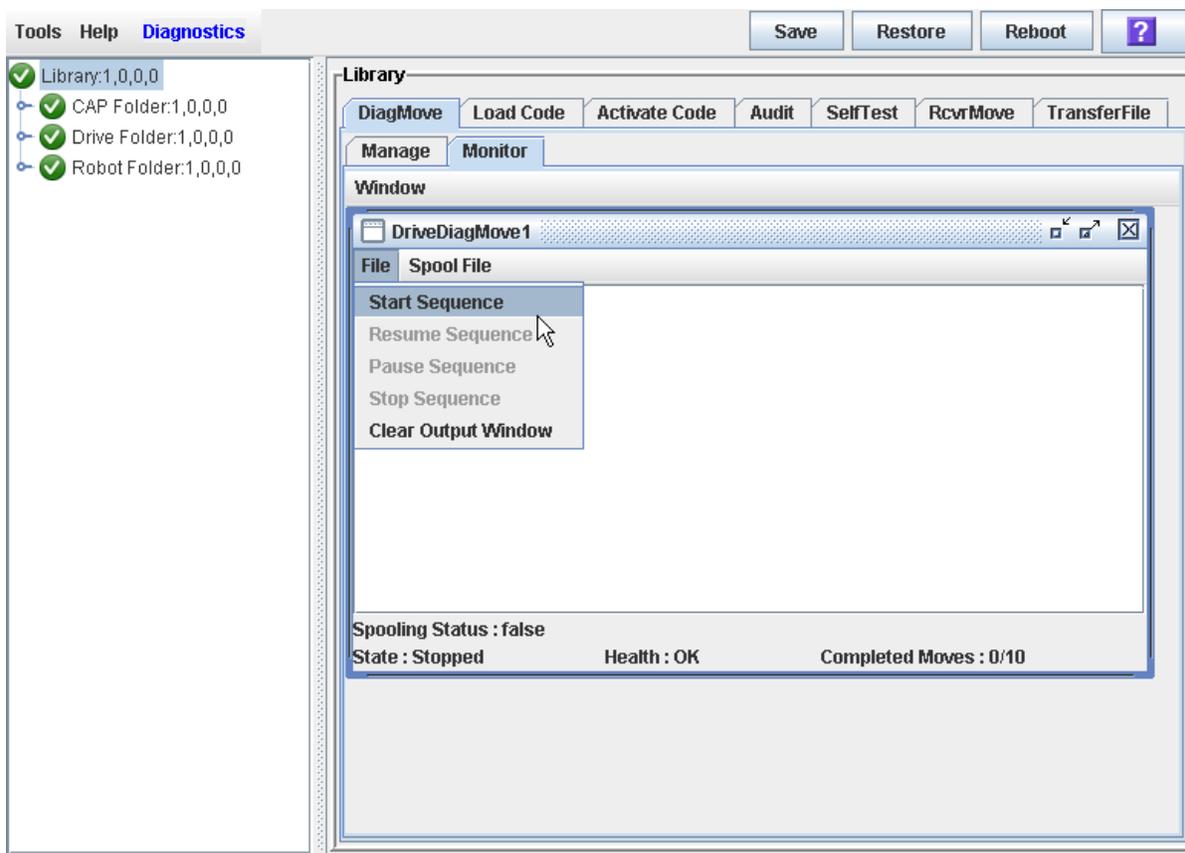
### Task Steps

1. Select **Tools > Diagnostics**.
2. Click the **Library** folder on the navigation tree.  
The **Library** page appears.
3. Click the **DiagMove** tab, and then the **Manage** tab.  
The **Manage** page appears.



- From the Defined Sequences section, click a diagnostic move, and then click Open.

The Monitor window activates.



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 displays for each move you open.

- From each monitor window, select File > Start Sequence to start the move.

## ▼ Monitor and Control Open Diagnostic Moves

### Task Tool

This task can be performed at any of the following:

- Standalone SL Console
- Web-launched SL Console

### Task Purpose

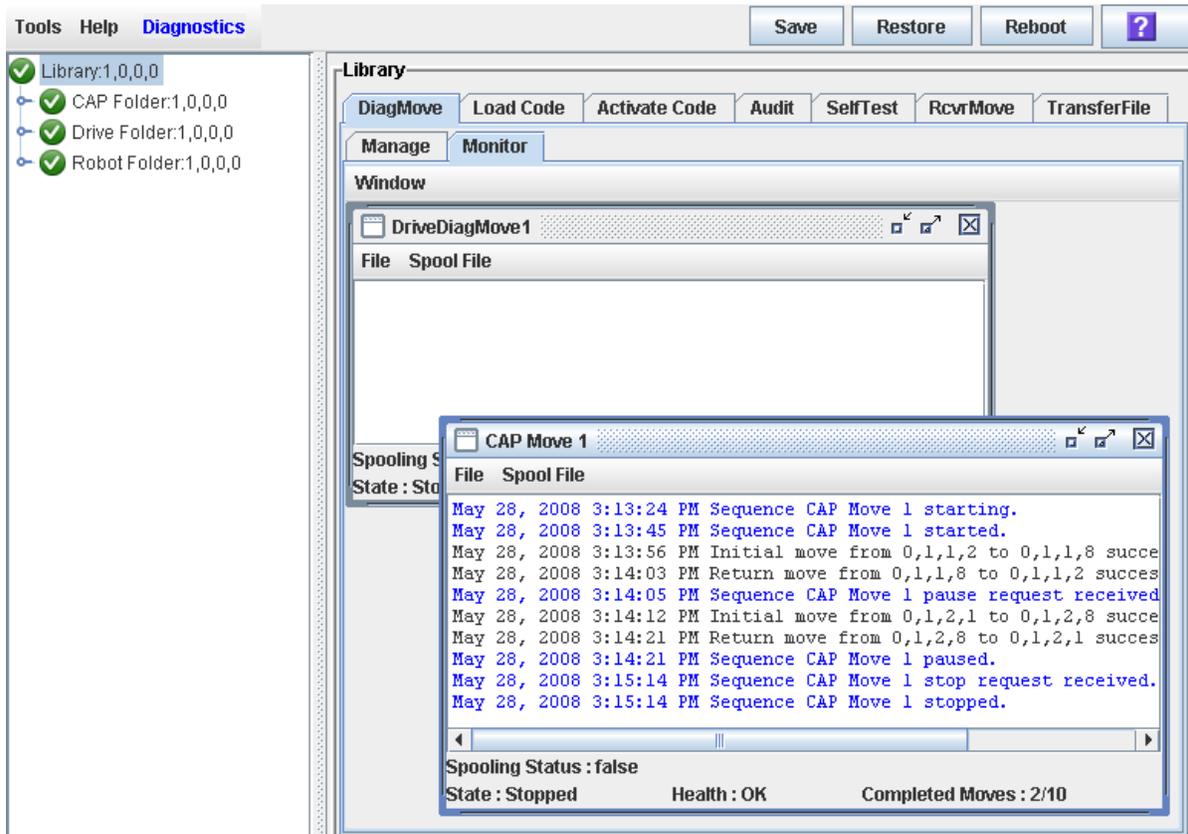
Use this procedure to control and monitor the status of one or more open diagnostic moves.

### Task Steps

1. See [“Start a Diagnostic Move” on page 338](#) for instructions on starting one or more diagnostic moves.

## 2. Click the Monitor tab.

The **Monitor** page appears, with one monitor window for each open move.



Each monitor window has the following status indicators listed in the following [TABLE 13-7](#).

**TABLE 13-7** Diagnostic Status Indicators of Monitor Windows

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 functions listed in the following **TABLE 13-8**.

**TABLE 13-8** Functions Available in Diagnostic Monitor Windows

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.

---

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## SNMP Configuration with SL Console

Simple Network Management Protocol (SNMP) is an application layer protocol that performs network management operations over an Ethernet connection using User Datagram Protocol (UDP/IP).

SNMP enables:

- Libraries to inform the systems administrator of potential problems.
- System administrators to query the library for configuration, operation, and statistical information.
- Libraries to gather information to be sent to the StorageTek Tape Analytics (STA) server, if applicable. For more information, see the *STA Installation and Administration Guide*.

### Supported Versions of SNMP

The SL500 library supports:

- SNMPv2c: Read-only support primarily for machine status queries. With this version, any information transmitted is not secure.
- SNMPv3: Both read and write support. Transmitted information is secure.

### SNMP Configuration Requirements

SNMP configuration requirements include the following:

- SL500 library firmware must be version 1067 or higher.
- SL Console software must be version 2.95 or higher.

### Trap Numbering/Levels

An SNMP trap is assigned numbers or levels that correspond to its type. An embedded SNMP agent can distinguish and filter trap recipients to include only those traps that you wish to monitor. These levels are specified when entering the trap information. Generic traps are numbered 1-10 and are generated from log entries containing:

- Severity (indications such as error or warning)

- Result codes (such as “0000 = success,” or “5010 = robotic posn error”)
- Activity string (such as “HLI move” or “CLI version print”)
- A descriptive text string
- Date and time

Other information might include:

- Device address associated with the event
- User name associated with the activity (such as “HLI host,” “advsvr”)
- The interface-specific request identifier (such as “HLI000001”)

Trap numbers 11 and higher are specific and contain distinct Object IDs (OIDs) within their messages. They are generated from events within the library rather than the log entries.

Trap or notification levels available at this time for the SL500 are listed in [TABLE 14-1](#).

**TABLE 14-1** SNMP Trap Levels

Trap Level	Number	Description
Error	1	Error/System Log entries. Errors critical to library operation. For example, Device inoperable: refers to the entire system. Failure of a redundant component is not a Category 1.
Warning	2	Warning Log entries. Conditions that require attention. For example, Device degraded: Refers to recoverable failures that may allow the system to remain in use, but only in a degraded mode.
11	11	SNMP Agent Start Up

**Note** – You can also set combinations of trap levels. For example, “1,2”, “1,11”, “1,2,11.”

## Port Control

Typically, SNMP uses user datagram protocol (UDP) ports:

- 161 for the agent
- 162 for the manager

UDP, like TCP, runs on top of IP networks and is one of the core protocols in the Internet protocol suite. UDP enables network-based devices to send short messages faster and more efficiently for many lightweight and time-sensitive applications.

The basic protocol for communications between manager and agent is as follows:

- The manager can send requests from any available port to the agent at port 161. The agent then responds to that source port, to the requesting manager.
- The agent generates traps or notifications and sends them from any available port to the manager at port 162.

## Access Control

SNMPV2c community strings are capable of providing a form of access control in SNMP. Because of this, the Oracle StorageTek embedded agent will not allow community strings to make changes to the library's configuration.

Either SNMPv2c or SNMPv3 can retrieve the MIB file. However, because SNMPv3 provides encryption capabilities and a stronger user identification, library properties can be changed only with the SNMPv3 set command.

Using an administrative password also provides access control and authorization for set command operations.

Traps, however, can be sent to recipients using either SNMPv2c or SNMPv3 by adding entries to the Trap Recipient List.

## SNMP Configuration and Usage Tasks

- [“Add SNMP Users” on page 347](#)
- [“Delete SNMP Users” on page 349](#)
- [“Add Trap Recipients” on page 350](#)
- [“Delete Trap Recipients” on page 352](#)
- [“Set Up Port Control” on page 353](#)

## ▼ Add SNMP Users

### Task Tool

This procedure can be performed at either of the following:

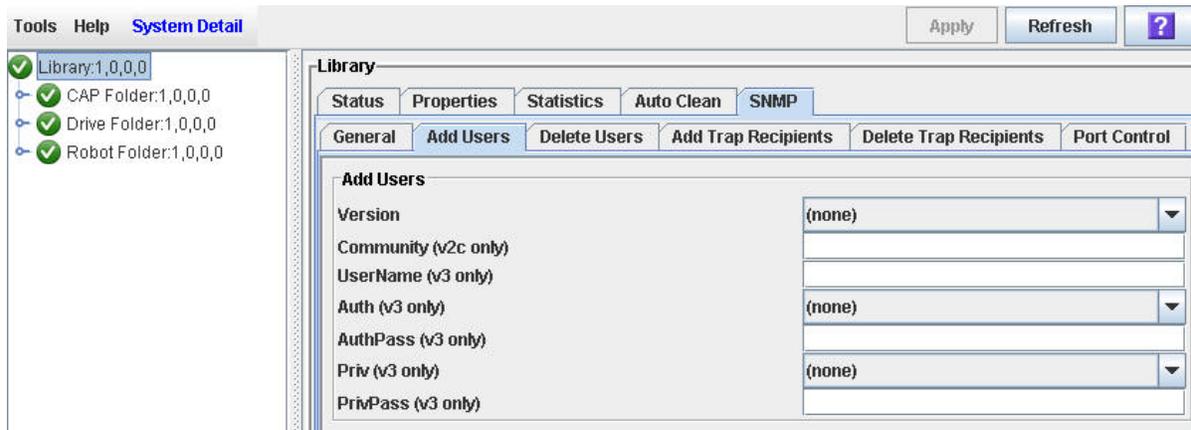
- Standalone SL Console
- Web-launched SLC

### Task Purpose

Use this procedure to add an SNMP user.

### Task Steps

1. Select Tools > System Detail.
2. Select the Library folder on the navigation tree.
3. Select SNMP > Add Users



The Add Users page appears.

4. For each user you want to add, enter information based on the following descriptions:

For SNMPV2c:

- **Version** list: Choose v2c. With this version, any information transmitted is not secure.
- **Community (v2c only)** field: Enter the community string. Applications use community strings for access control, with a maximum of 31 alphanumeric characters. The manager includes the community string in its SNMP messages to an agent. The agent consequently can accept or reject the operation.

For SNMPV3c:

- **Version (v3 only)** list: Choose v3. Because this version supports encryption and stronger user identification, it is the preferred protocol for proprietary data.
- **UserName (v3 only)** field: Enter the SNMP user ID.

- **Auth (v3 only)** field: Select the authentication protocol type (MD5 or SHA). These protocols are designed to reliably identify the integrity of the originating party.
  - **AuthPass (v3 only)** field: Enter the authentication password of the user.
  - **Priv (v3 only)** list: Choose the privacy protocol type (DES or AES). These protocols are designed to protect information within the message from disclosure.
  - **PrivPass (v3 only)** field: Enter the encryption password that is the private key for encryption.
5. **Click the Apply button.**

The indexed SNMP list of users displays in the **Users** section of the screen. A maximum of 20 user accounts are available.

## ▼ Delete SNMP Users

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SLC

### Task Purpose

Use this procedure to delete a SNMP user.

### Task Steps

1. **Select Tools > System Detail.**
2. **Select the Library folder on the navigation tree.**
3. **Select SNMP > Delete Users.**  
The **Delete Users** page appears.
4. **Review the list of SNMP users in the Users section and note the index number of the user you want to delete.**
5. **Enter the user's index number in the Index field.**
6. **Click the Apply button.**  
Review the SNMP users list and verify the user was deleted.

## ▼ Add Trap Recipients

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SLC

### Task Purpose

Use this procedure to add a trap recipient.

A recipient is a location on a manager where the SNMP agent sends traps. This location is defined by the combination of either the IP address or DNS name and the port number.

### Task Steps

1. Select **Tools > System Detail**.
2. Select the **Library** folder on the navigation tree.
3. Select **SNMP > Add Trap Recipient**.

The screenshot shows the 'Add Trap Recipients' configuration page. The navigation tree on the left includes 'AddTrapRecipients', 'Host', 'TrapLevel', 'Version', 'Community (v2c only)', 'TrapUserName (v3 only)', and 'Auth (v3 only)'. The main form area has the following fields and values:

Host	
TrapLevel	
Version	(none)
Community (v2c only)	
TrapUserName (v3 only)	
Auth (v3 only)	(none)

The **Add Trap Recipients** page displays.

4. For each trap recipient you want to add, enter information based on the following descriptions:

For SNMPV2c:

- **Host** field: Server name where the SNMP software application resides.
- **TrapLevel** field: See [“Trap Numbering/Levels” on page 343](#) for details.
- **Version** list: Version of the SNMP standard. Choose **SNMPv2c** for machine status queries. With this version, any information transmitted is not secure.
- **Community (v2c only)** field: Enter the community string. Applications use community strings for access control, with a maximum of 31 alphanumeric characters. The manager includes the community string in its SNMP messages to an agent. The agent consequently can accept or reject the operation.

For SNMPV3c:

- **Host** field: Server name where the SNMP software application resides.
- **TrapLevel** field: See [“Trap Numbering/Levels” on page 343](#) for details.

- **Version** list: Choose **SNMPv3** for proprietary information. Because this version supports encryption and stronger user identification it is the preferred protocol for proprietary data.
- **TrapName (v3 only)** field: Enter the name of the trap recipient.
- **Auth (v3 only)** field: Enter the authentication password of the user.
- **Priv (v3 only)** list: Choose the privacy protocol type (DES or AES). These protocols are designed to protect information within the message from disclosure.
- **PrivPass (v3 only)**: Enter the encryption password that is the private key for encryption.
- **EngineID (v3 only)**: Enter the engineId.

5. **Click Apply.**

The indexed trap recipients list is displayed at the bottom of the screen. This list supports up to 20 recipients with no duplicate entries. Users must add themselves to the recipients list to receive traps.

## ▼ Delete Trap Recipients

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SLC

### Task Purpose

Use this procedure to delete a trap recipient.

### Task Steps

1. Select **Tools > System Detail**.
2. Select the **Library** folder on the navigation tree.
3. Select **SNMP > Delete Trap Recipients**.



The **Delete Trap Recipients** page appears.

4. Reference the **Trap Recipients** list and note the index number of the trap recipient you want to delete.
5. At the **Index** field, enter the index number of the trap recipient to be deleted.
6. Click the **Apply** button in the upper right of the screen.
7. Verify the trap recipients list and make sure that the trap recipient is deleted.

## ▼ Set Up Port Control

### Task Tool

This procedure can be performed at either of the following:

- Standalone SL Console
- Web-launched SLC

### Task Purpose

Use this procedure to set up SNMP port control.

### Task Steps

1. Select **Tools > System Detail**.
2. Select the **Library** folder on the navigation tree.
3. Click **SNMP > Port Control**.

4. At the **Port** list, select **Port 1B**.

Port 1B is the public access port. Other ports are unavailable on this library.

5. At the **Command** list, choose one of the following options:
  - **Disable:** Agent trap requests are sent and received on LAN port.
  - **Enable:** SNMP traps are enabled and the agent responds to “gets” from the clients.

Click **Apply**.



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## Manual Operations

When in manual mode of operation, the library is unavailable for host access. This could 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.

### Library Safety

Thoroughly review the safety precautions in this section before attempting to enter the library. It is essential that you follow proper safety procedures at all times.

### Cards and Power Supply

The RLC card, SCSI (MPW/RLW) or Fibre Channel (MPU2 or PUA2) interface card, and the power supply are housed inside protective modules to prevent you from coming into contact with hazardous voltages and sensitive electronics.

### Robotics

The software parks the robot by retracting it into the robotics unit module before the front door can be opened to prevent the robot from being damaged.

When the front door is opened, power is removed from the robot.

### Front Door

The front door must be opened with a key to ensure that the data is secure. If the door is not fully closed, a sensor relays the condition to the software and the robot remains disabled.

## Manual Operation Tasks

Manual library tasks are divided into the following categories:

- [“General Library Operation Tasks” on page 357](#)
- [“Cartridge Handling Tasks” on page 365](#)

## General Library Operation Tasks

- “Power Off the Library” on page 358
- “Power On the Library” on page 359
- “Return the Library to Ready Status” on page 360
- “Open the Front Door (With Power)” on page 361
- “Open the Front Door (Without Power)” on page 362
- “Secure the Front Door (With Power)” on page 364
- “Secure the Front Door (Without Power)” on page 364

## ▼ Power Off the Library

**Caution** – *Possible equipment or cartridge damage or data loss.* 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 all jobs have completed processing.**
2. **Quiesce the library to make sure the library and tape drives are not in use.**

**Note** – Refer to your client server software publication for instructions.

3. **Move the power-on/off switch to the OFF position (0).**

## ▼ Power On the Library

To power on the library:

1. **Close and lock the front door if the door is open.**
2. **Press the power switch (on the top right corner of the back of the library) to the ON (1) position.**

## ▼ Return the Library to Ready Status

To return the library to ready status, complete the following steps:

1. **Make sure cartridges are inserted correctly in the storage cells or tape drives and that they do not block the path of the X table assembly.**
2. **Close the door and lock it by turning the key counterclockwise. Put the key in a safe place.**
3. **Make sure the power switch are set to the ON position (1).**
4. **Check the status display of the SL Console to make sure the library goes to Ready Status when initialization and audit are complete.**
5. **Enter the system command to place all tape drives online.**
6. **When all tape drives are online, enter the command to place the library online.**

## ▼ Open the Front Door (With Power)

To open the front door when library power is on:

1. **Press the Open Door button on the keypad.**

The software allows the current job to complete.

The software retracts the robot into the robotic unit to prevent the robot from being damaged and to prepare it for servicing.

2. **When the Open Door indicator turns on, use the key to open the door.**

## ▼ Open the Front Door (Without Power)

To open the front door when no library power exists, complete the following process.

**Note** – You must manually move the robotics park lever (beneath the facade and to the bottom left of the keypad) to the left position so that you can open the door with the key. Under normal conditions, the lever signifies that the robot is parked inside the robotics unit at the top of the library, and the door can be safely opened. When no power exists, the robot is not actually parked, but you will be able to open the door when you move the lever to the left.

In [FIGURE 15-1](#), the lever is **not** in the parked position.

**FIGURE 15-1** Robotics Park Lever Not in Parked Position



1. Press the power switch on the back of the library to the OFF position.
2. Remove the robotic facade from the top of the library by gently pulling the facade from side to side to pull the ball studs away from the clips. You might have to use a screwdriver to gently pry it off.

**Warning** – *Possible injury to finger.* Make sure that your finger is completely to the left in the next step. Otherwise it could be pinched when the door locking lever extends as shown in the lower picture.

3. While using one hand to move the robotics park lever to the left, use your other hand to unlock the door with the key.

**FIGURE 15-2** Opening the Front Door Without Power



## ▼ Secure the Front Door (With Power)

To secure the front door when library power exists, push it closed and use the key to lock it.

## ▼ Secure the Front Door (Without Power)

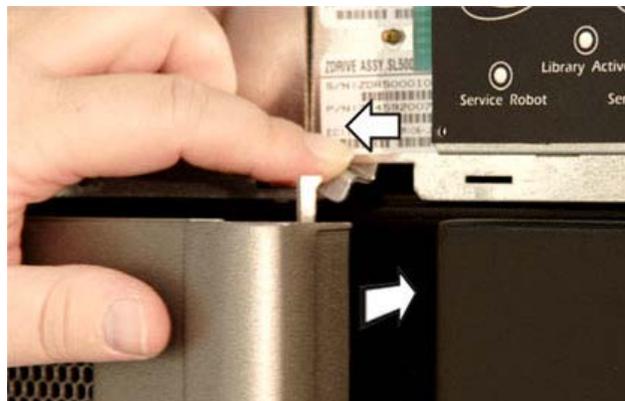
To secure the front door when no library power exists:

1. Remove the robotic facade from the top of the library by gently pulling the facade from side to side to pull the ball studs away from the clips. You might need to use a screwdriver to gently pry it off.

**Caution – Possible component damage.** Note the door locking lever protruding from the top of the door. Do not let it hit the robotics park lever when you close the door.

2. While using one hand to move the robotics park lever to the *left*, use your other hand to close the door.

**FIGURE 15-3** Closing the Front Door Without Power



3. While still holding the door shut, release the robotics park lever.
4. Use the key to lock the door.
5. The robotics lever automatically moves to the right when the door locking lever retracts.

## Cartridge Handling Tasks

- “Locate and Remove a Cartridge” on page 366
- “Insert Cartridges into Storage Cells” on page 367
- “Insert a Cartridge into a Tape Drive” on page 368
- “Remove a Cartridge from a Tape Drive” on page 369
- “Remove a Cartridge from the Gripper Assembly” on page 370
- “Replace a Cleaning Cartridge” on page 372

## ▼ Locate and Remove a Cartridge

To locate a particular cartridge inside the library:

1. **Open the door.**
2. **Locate the particular cartridge by its VOLID (volume ID) label and storage cell.**
3. **Remove the cartridge from the cell by sliding the cartridge out.**
4. **Close the library door.**

## ▼ Insert Cartridges into Storage Cells

Depending on the version and configuration of your library, some storage cells cannot be used. See [Appendix A, "SL500 Wall Diagrams and Specifications"](#) for details.

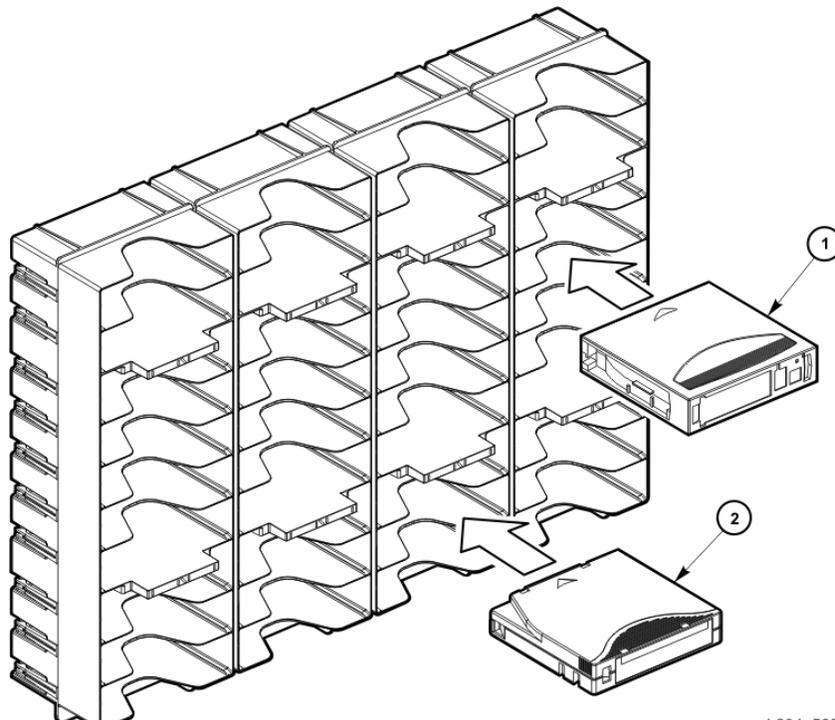
You do not have to insert a cartridge into every storage cell. The library automatically audits cartridges and empty cells as part of its initialization routine.

**Note** – You can place LTO cartridges in either LTO arrays or mixed-media arrays. SDLT/DLT-S4 cartridges can only be placed in mixed-media arrays, not LTO arrays.

**Caution** – *Potential library fail.* Cartridges inserted correctly is critical for library operation. If you do not orient the cartridges correctly or do not insert them all the way into the storage cells, the library could fail, and the SL Console might display an error message. Make sure you insert the cartridge *inside* the array, not above or beneath it. [FIGURE 15-4](#) shows the correct way to insert cartridges into the magazine.

1. Check the cartridges to make sure they are correctly labeled.
2. Insert as many cartridges into the library as you want and as your configuration allows, making sure you seat them all the way into the storage cells.

**FIGURE 15-4** Inserting Mixed Media Cartridges into Arrays



1. SDLT/DLT-S4 cartridge
2. LTO cartridge

## ▼ Insert a Cartridge into a Tape Drive

Use this procedure to manually insert a cartridge into a tape drive, as illustrated in [FIGURE 15-5](#).

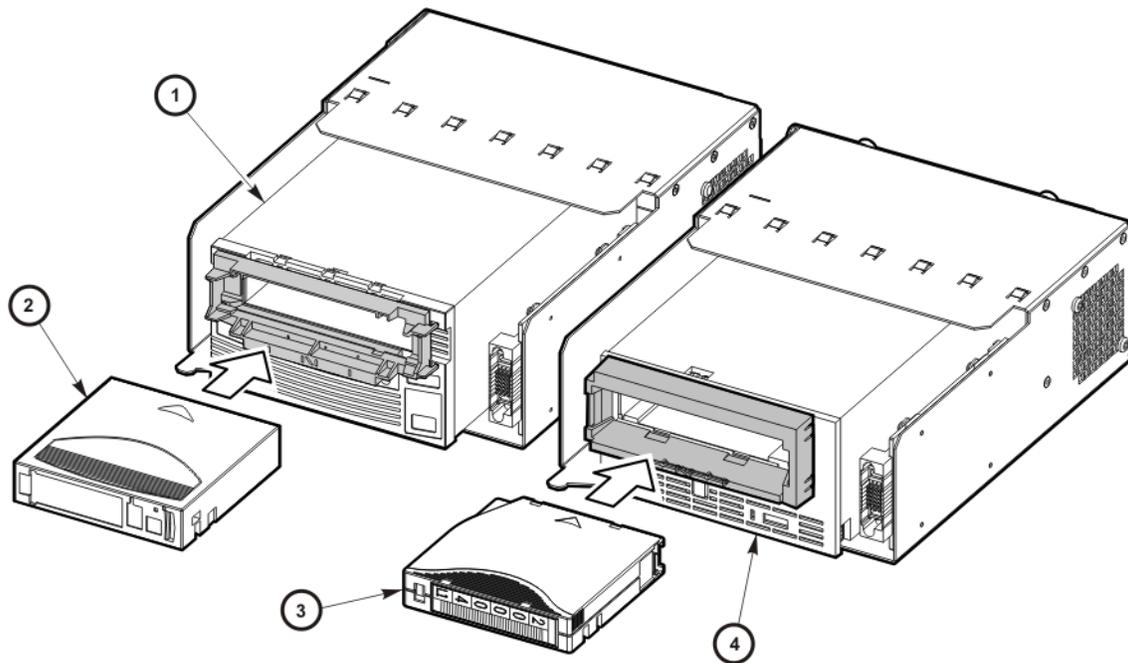
**Note** – You can place LTO cartridges in either LTO arrays or mixed-media arrays. SDLT/DLT-S4 cartridges can only be placed in mixed-media arrays, not in LTO arrays.

1. Obtain the VOLID label, location, and tape drive number from the server console.
2. Open the door.
3. Locate the cartridge (see [“Locate and Remove a Cartridge” on page 366](#)).

**Caution** – *Potential equipment damage.* You must insert the cartridge properly or you will damage the tape drive.

4. Hold the cartridge with the VOLID facing you so that it can be read from right to left.
5. Insert the cartridge into the tape drive.
6. Close the library access door.

**FIGURE 15-5** Inserting SDLT and LTO Cartridges into Drives



1. SDLT/DLT-S4 Drive
2. SDLT/DLT-S4 Cartridge
3. LTO Cartridge
4. LTO Drive

## ▼ Remove a Cartridge from a Tape Drive

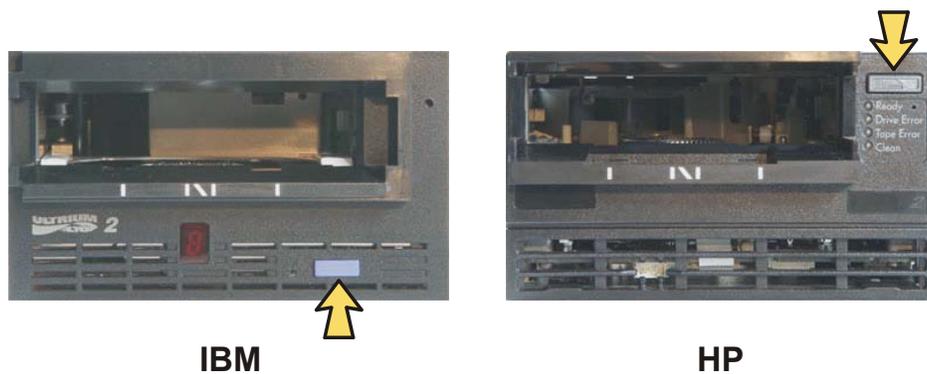
To manually remove a cartridge from a tape drive, complete the following steps:

1. Obtain the tape drive number from the server console.
2. Open the door and locate the appropriate tape drive.

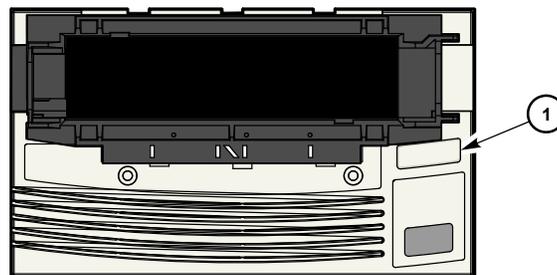
**Caution – Possible data loss.** Failure to perform the next step could result in data loss.

3. Press the Unload button on the tape drive (as shown in [FIGURE 15-6](#) and [FIGURE 15-7](#)) and wait approximately 12 seconds until the operation completes.

**FIGURE 15-6** Unload Button on IBM and HP LTO Tape Drives



**FIGURE 15-7** Unload Button on SDLT Tape Drive



**SDLT**

L204\_573

### 1. SDLT Unload Button

4. Gently pull the cartridge from the tape drive.
5. Store the cartridge in an empty storage cell or outside the library.

**Note –** If you store the cartridge in an empty storage cell, you must reinitialize the library and update the tape management's database (see [“Return the Library to Ready Status”](#) on page 360).

6. Close the library door.

## ▼ Remove a Cartridge from the Gripper Assembly

The hand assembly can be in any position when the library loses power. Before you can remove the cartridge, the hand assembly must be facing the front left arrays and aligned with an empty storage cell. [FIGURE 15-8](#) shows components involved in the removal process.

See [“Open the Front Door \(Without Power\)”](#) on page 362.

### **If the hand assembly is facing right:**

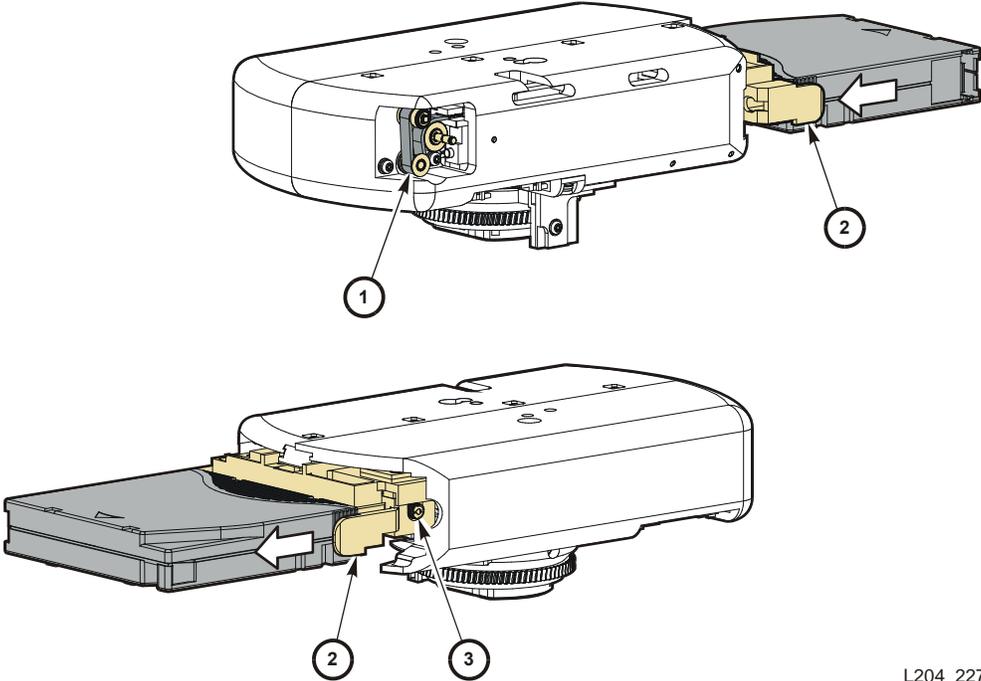
1. Gently turn the hand to the left.
2. Slide the hand assembly along the rail until the gripper is positioned across from an empty storage cell and close to you.
3. Continue with the following steps.

### **If the hand assembly is facing left:**

1. Turn the gripper belt ([FIGURE 15-8 on page 371](#)) to extend the gripper until the release screw is accessible.
2. Use a small, flat-blade screwdriver to turn the screw 1/4 turn clockwise until the cartridge is released.
3. Push the cartridge into a storage cell.
4. Gently push the gripper back into the hand.
5. Slide the hand assembly toward the back of the library.

6. Remove the cartridge from the storage cell, or leave it there.

FIGURE 15-8 Removing Cartridge from Gripper Assembly



L204\_227

- 1. Gripper belt and pulleys
- 2. Release screw
- 3. Gripper

## ▼ Replace a Cleaning Cartridge

Cleaning cartridges have a limited life span. Refer to your tape drive publication to determine how many times a cleaning cartridge should be used. When the usage count exceeds its limit, you must replace it with a new one. You can use the SL Console to eject the cleaning cartridge to the CAP.

To replace a cleaning cartridge:

1. **Open the door.**
2. **Remove the expired cleaning cartridge from its reserved cell.**
3. **Insert the new cleaning cartridge into that cell.**

**Note** – Refer to [TABLE B-1 on page 408](#) to make sure your cartridge has the correct vendor and usage label.

4. **Close the library door.**

The SL Console status display shows that initialization tests are running.

5. **Wait until the initialization tests complete before you perform another task.**

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## SL500 Wall Diagrams and Specifications

This appendix provides the following diagrams and tables:

- [“LTO Configurations” on page 374](#)
- [“Mixed-Media Configurations” on page 379](#)
- [“Specifications” on page 382](#)

Use the legend in [TABLE A-1](#) for all diagrams in this appendix.

**Note** – Your tape management software might conflict with the following information. Refer to your software publication for unique information.

**TABLE A-1** Cell Figure Legend

	Storage cells available for customer data cartridge
	Cells reserved for cleaning and diagnostic cartridges (can be configured for data cartridges)
	Cells only available when an expansion module is installed. If this is the lowest module in the rack, these cells are not available.
	Array targets
	Tape drives

# LTO Configurations

The following figures show LTO storage cell and tape drive locations.

[FIGURE A-1](#) shows a library with only a Base Module.

**FIGURE A-1** Base Module LTO Cells

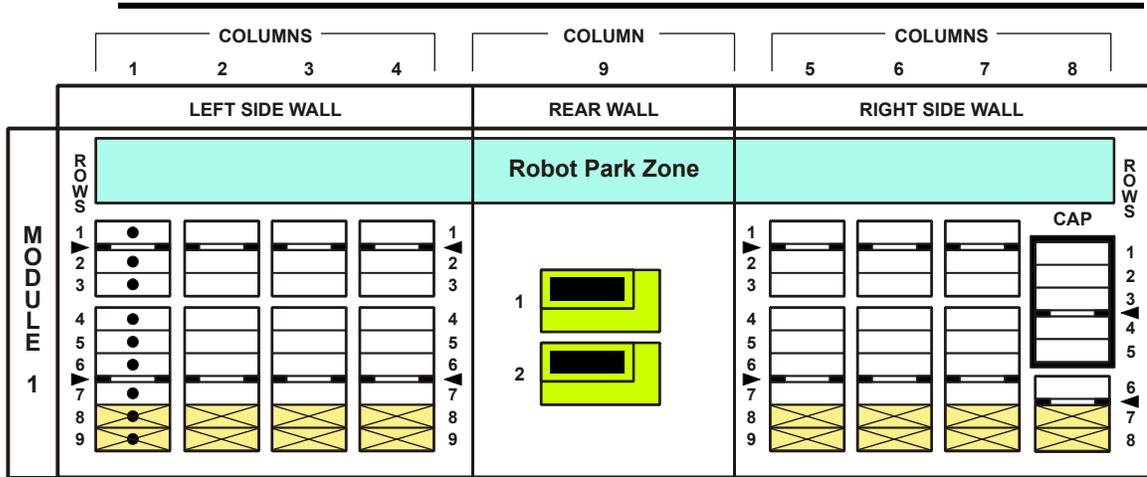
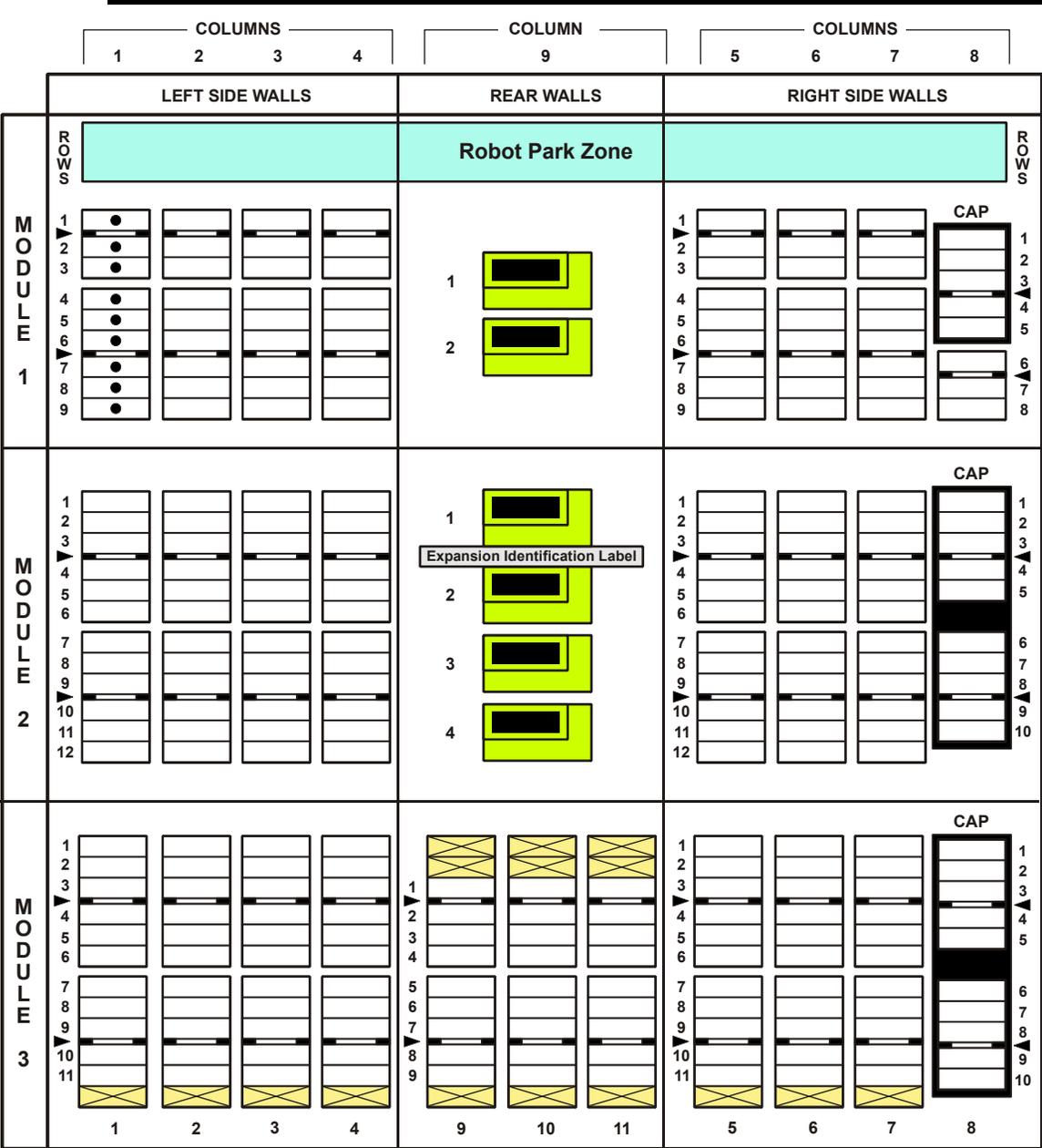


FIGURE A-2 and FIGURE A-3 show a library with a Base Module that has nine reserved cells, one Drive Expansion Module, and one Cartridge Expansion Module.

FIGURE A-2 LTO Cell Locations for Firmware Site Mapping



**FIGURE A-3** LTO Cell Locations for SCSI Element Numbering Mapping

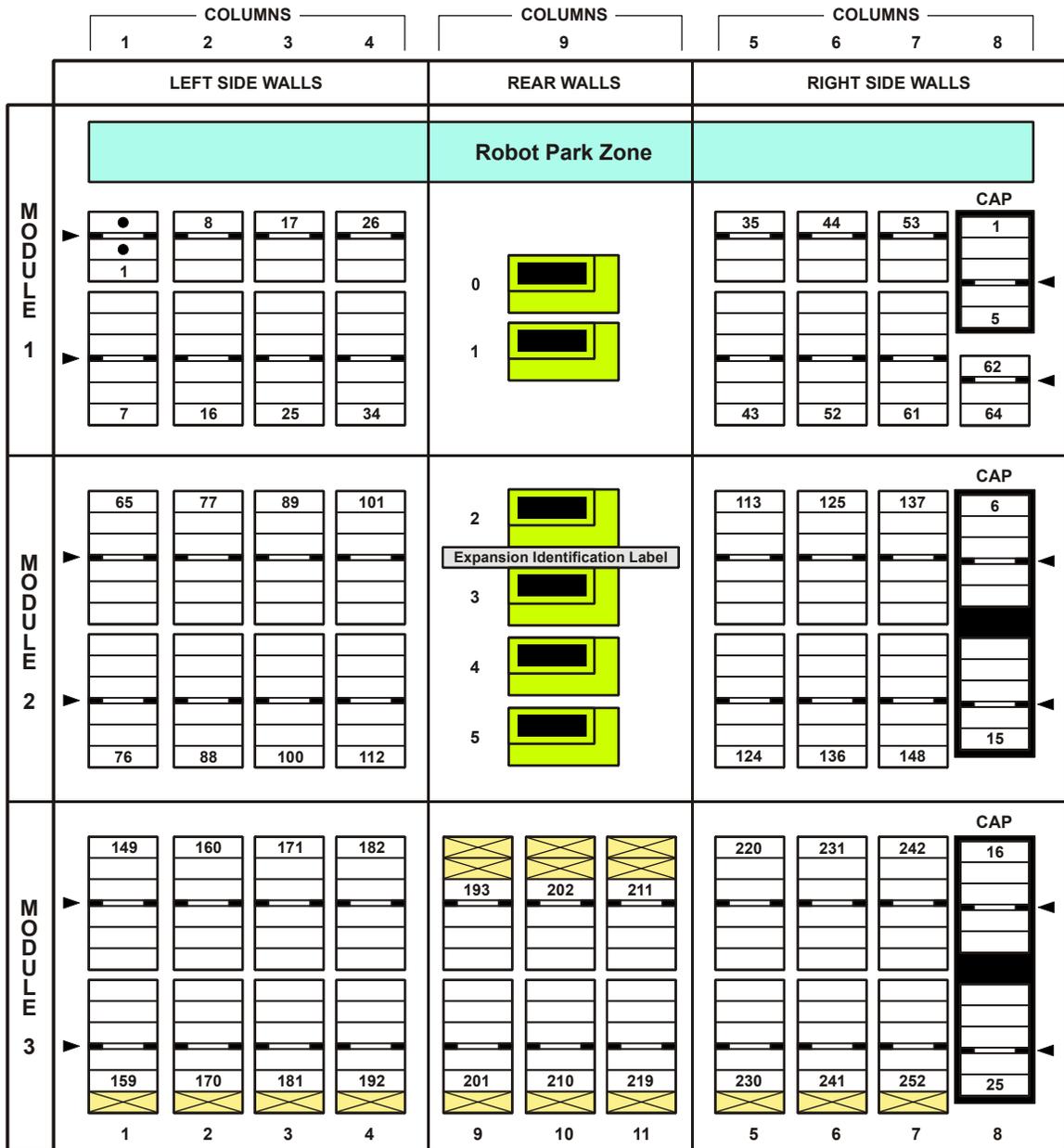


FIGURE A-4 shows a library with a Base Module that has two reserved cells, one Drive Expansion Module, and one Cartridge Expansion Module. The storage cell numbering begins with the first cell after the reserved cells in column 1. The figure shows two reserved cells, but there could be more. If the reserved cells are configured as storage cells, the top cell (row 1) would be 1.

FIGURE A-4 LTO Cell Locations for SCSI Element Numbering Mapping

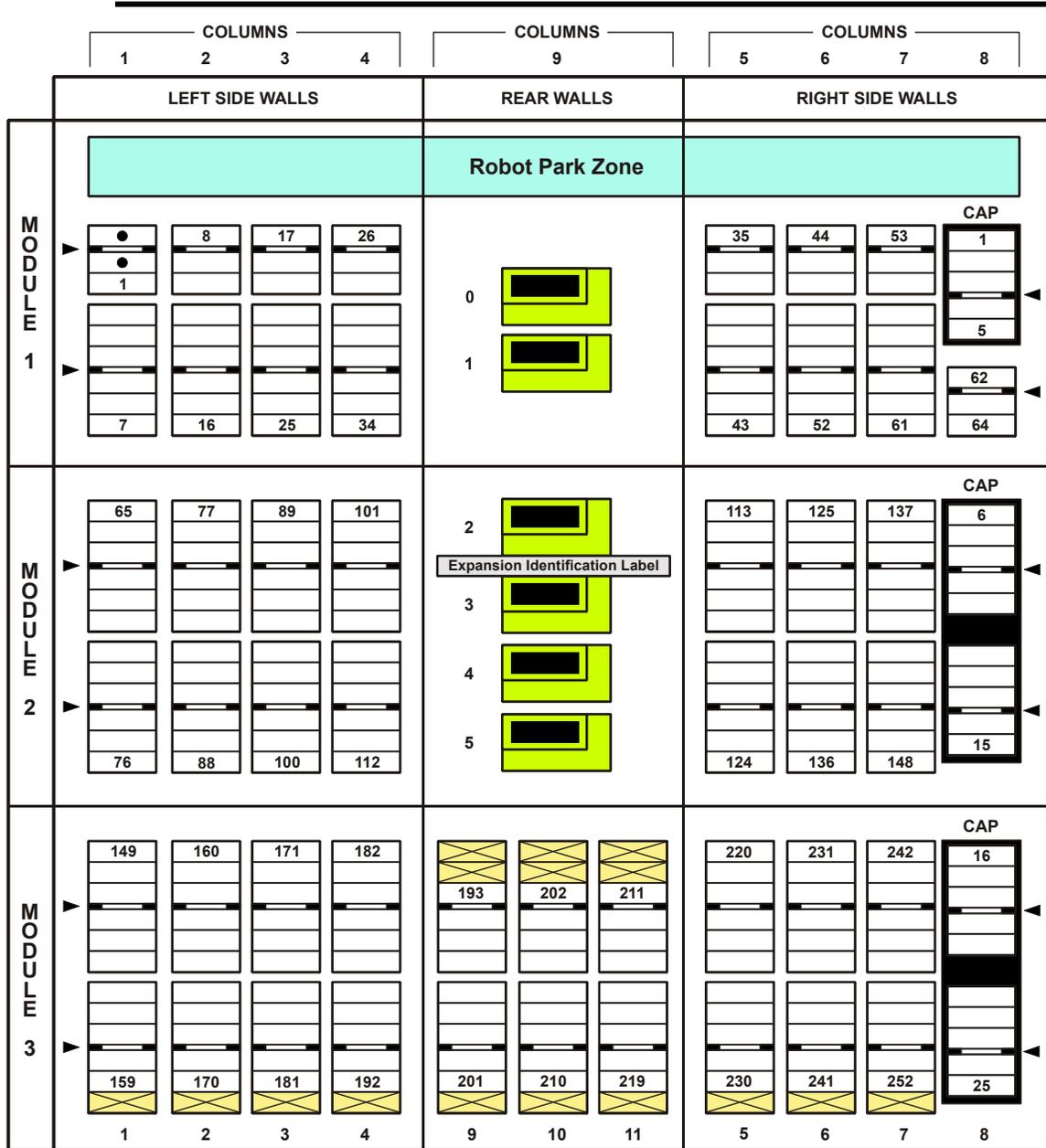


FIGURE A-5 shows the cell capacity of a Cartridge Expansion Module according to the type of module that is installed above and below it.

FIGURE A-5 LTO Cells for Back Wall of Cartridge Expansion Module





FIGURE A-7, shows a library with a Base Module that has eight reserved cells, one Drive Expansion Module, and one Cartridge Expansion Module.

FIGURE A-7 Mixed-Media Firmware Cell Mapping

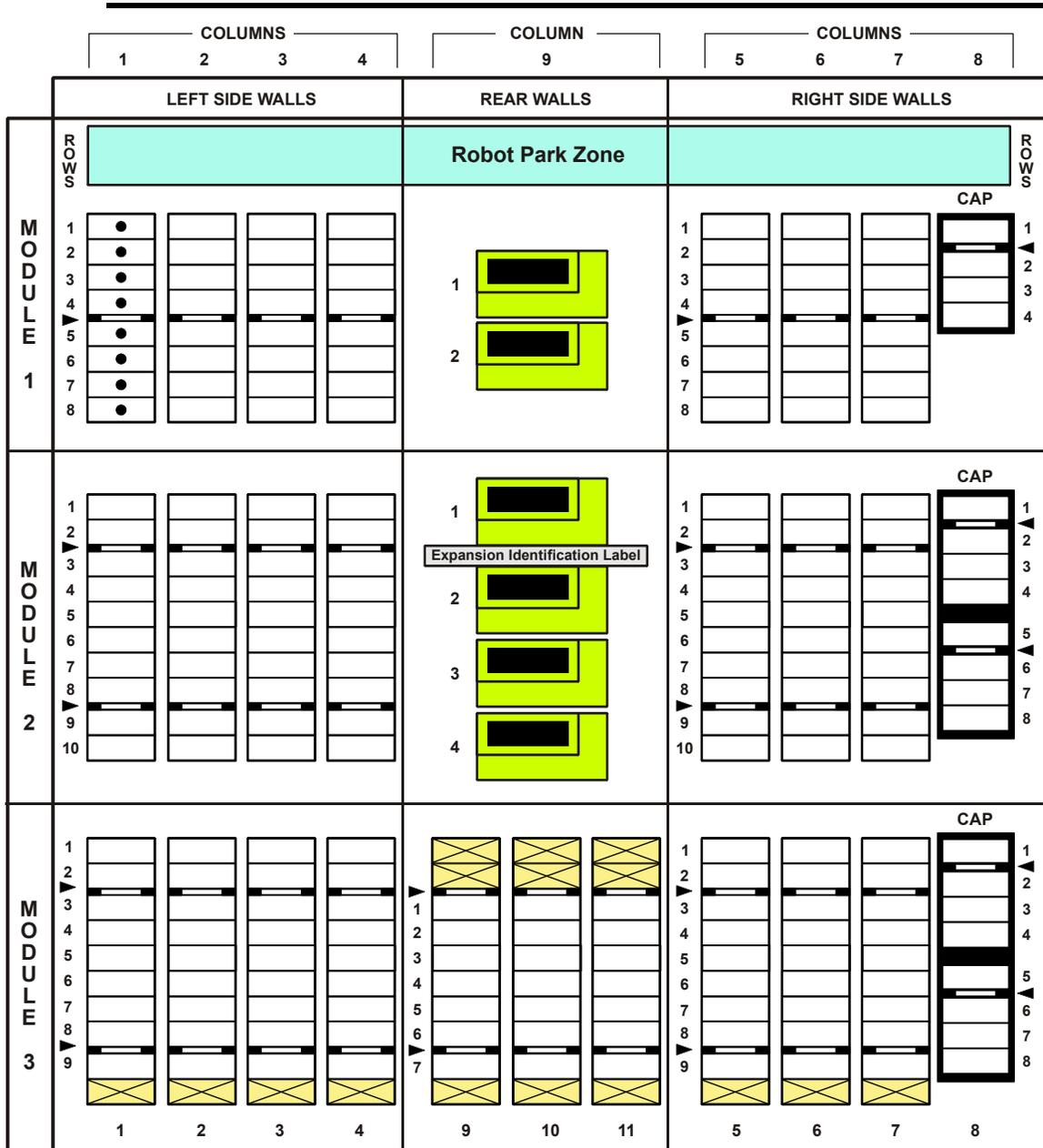
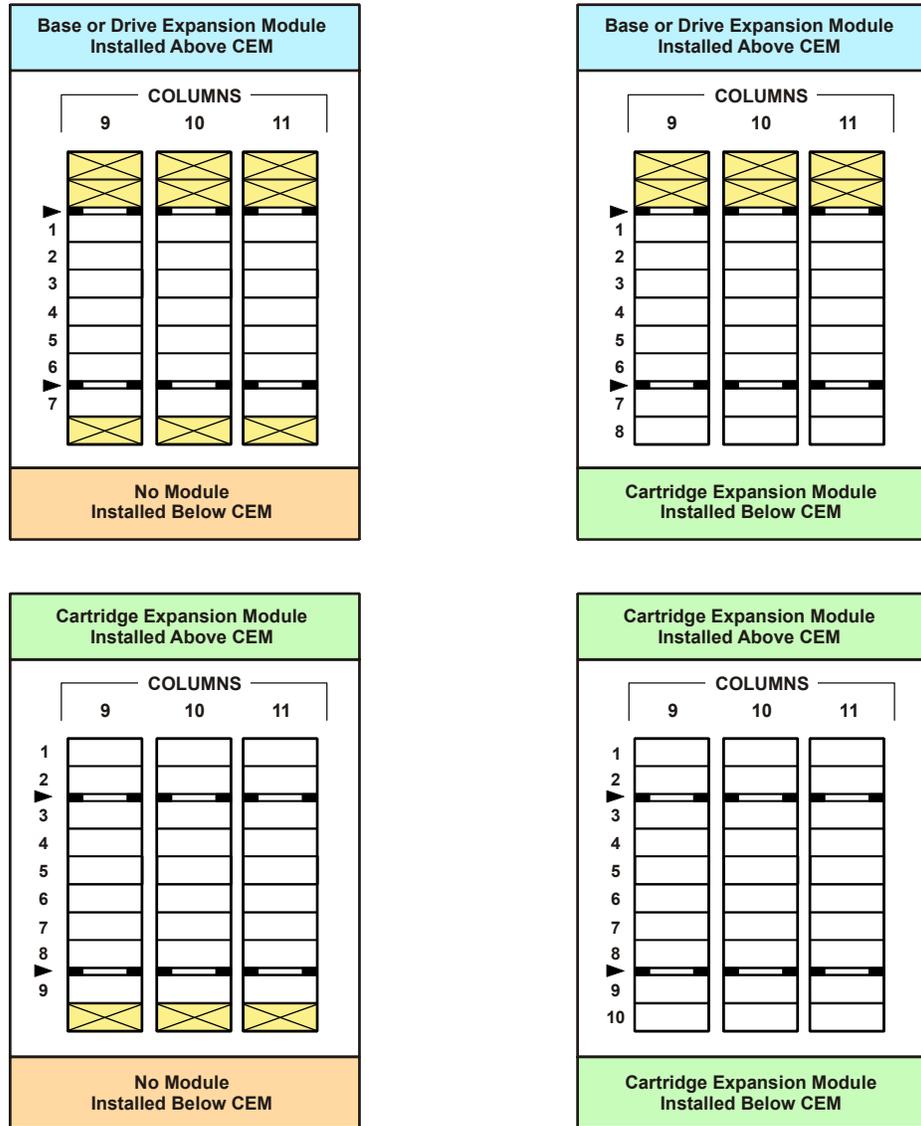


FIGURE A-8, shows the cell capacity of a Cartridge Expansion Module according to which type of module is installed above and below it.

**FIGURE A-8** Mixed-Media Cells for Back Wall of Cartridge Expansion Module

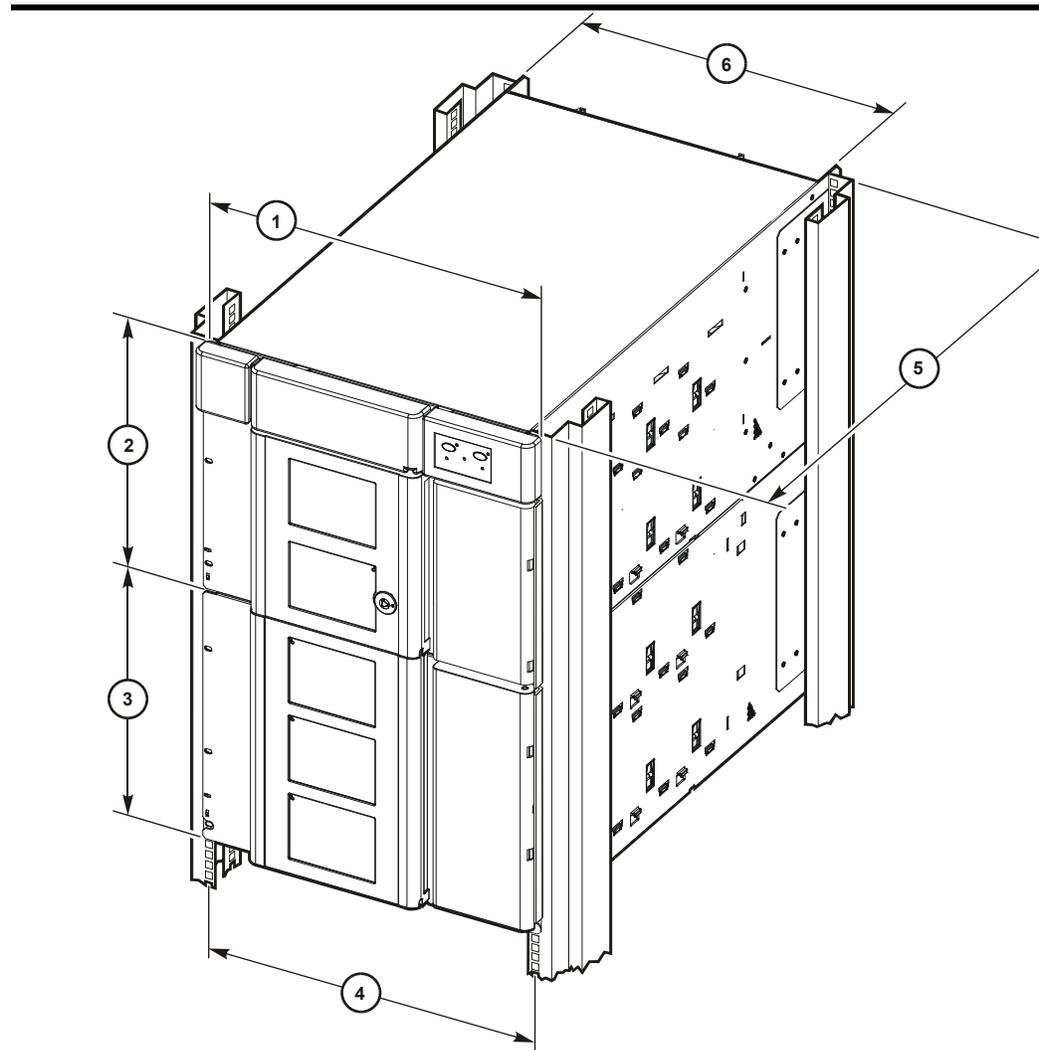


## Specifications

The following pages provide the following specifications:

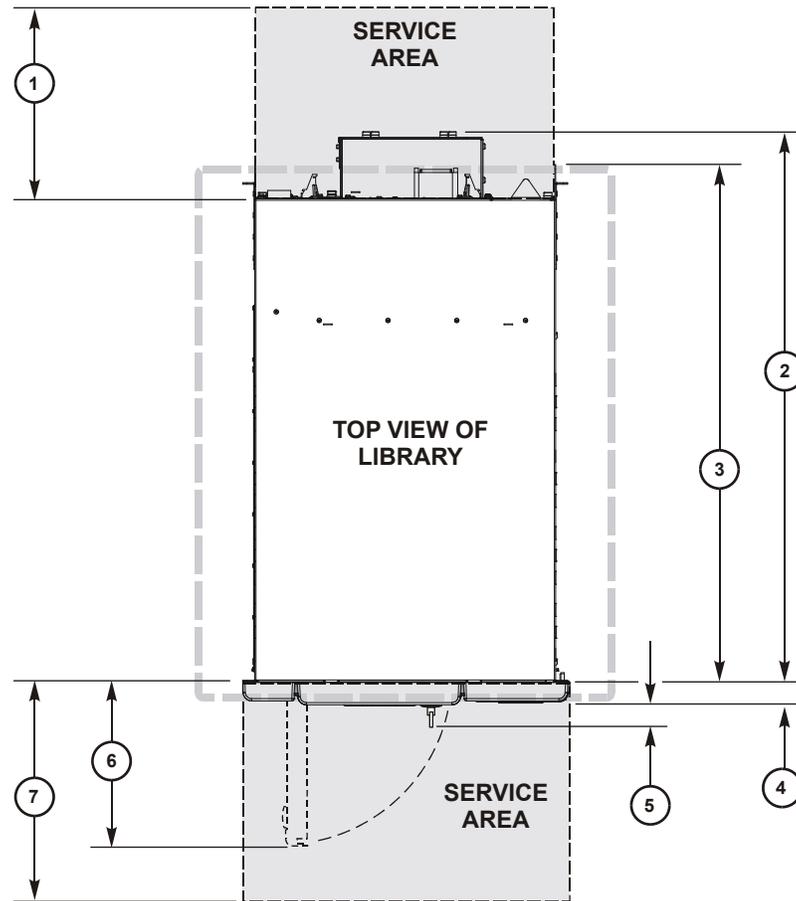
- [“Library and Rack Dimensions” on page 383](#)
- [“Library and Rack Clearances” on page 384](#)
- [“Power Specifications” on page 385](#)

For specific tape drive and cartridge information, refer to vendor documentation.

**FIGURE A-9** Library and Rack Dimensions

1. Width of front of Base Module with flange: 48.3 cm (19.0 in.)
2. Height of Base Module: 35.6 cm (14.0 in.)
3. Height of expansion modules: 35.6 cm (14.0 in.)
4. Distance between rack holes: 46.5 cm (18.3 in.)
5. Front to rear rack mounting distance:
  - Original modules: 60.9 cm (24.0 in.) to 86.4 cm (34.0 in.), optimally 74 cm (29 in.)
  - EZ install modules: 55.9 cm (22.0 in.) to 78.7 cm (31.0 in.) or up to 94 cm (37 in.) with optional extensions, optimally 66 cm (26 in.)
6. Width of back of Base Module: 44.5 cm (17.5 in.)

**FIGURE A-10** Library and Rack Clearances



1. Minimum service clearance behind the library or rack: 60.9 cm (2 ft)
2. Depth of Base Module, front mounting plane to back of drives: 81.0 cm (31.9 in.)
3. Depth of Base Module:
  - Original module: 76.2 cm (30.0 in.) depth of
  - EZ Install module: 71.4 cm (28.1 in.) or up to 94 cm (37 in.) with optional extensions
4. Depth of front door, required clearance: 3.8 cm (1.5 in.)
5. Depth of front door and unique latch hardware: 5.3 cm (2.1 in.)
6. Front door opening clearance 24.1 cm (9.5 in.)
7. Minimum front service clearance: 60.9 cm (2 ft)

## Power Specifications

TABLE A-2, TABLE A-3, and TABLE A-4 list power specifications for the modules and tape drives.

**TABLE A-2** Power for Library Without Tape Drives

<b>Input voltage</b>	<b>100–240 VAC, single phase</b>
Frequency	50/60 Hz
Maximum library power consumption	1.4 A @ 120 V 0.8 A @ 240 V
Maximum heat output	614 Btu/hr
Voltage-amperes	180 VA

**TABLE A-3** Power for Base Unit and Two LTO Tape Drives

<b>Power</b>	<b>Two LTO Tape Drives</b>
Input power	219 Watts
Input voltage-amperes	226 voltage-amperes
Input current (100 VAC)	2.3 amperes
Input current (120 VAC)	1.9 amperes
Input current (240 VAC)	0.9 amperes
Btu/hour	748 Btu/hr

**TABLE A-4** Power for Drive Expansion Module and Four LTO Tape Drives

<b>Power</b>	<b>Four LTO Tape Drives</b>
Input power	288 Watts
Input voltage-amperes	297 voltage-amperes
Input current (100 VAC)	3.0 amperes
Input current (120 VAC)	2.5 amperes
Input current (240 VAC)	1.2 amperes
Btu/hour	983 Btu/hr

## Specifications

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## Cartridge Handling

This chapter provides information on labeling and handling tape cartridges used in Oracle StorageTek libraries, and covers the following topics:

- [“Software Support for Cartridges” on page 387](#)
- [“Barcode Label Standard” on page 387](#)
- [“Cartridge Types” on page 388](#)
- [“Supported Labels” on page 388](#)
- [“Handling Cartridges” on page 390](#)
- [“Cartridge Handling Tasks” on page 392](#)

Library cartridges must meet specifications defined in *American National Standard Magnetic Tape and Cartridge for Information Interchange*.

For more information on cartridges and labels, see:

- The drive vendor’s publication and Web site for cartridge requirements and specifications
- The *System Assurance Guide* for the SL8500 library.

### Software Support for Cartridges

For the SL8500 library, the appropriate software microcode level needed is required for various tape drives. For this microcode information, see the *System Assurance Guide* for the SL8500 library.

### Barcode Label Standard

The SL8500 library uses labels based on the Code 39 barcode standard. This standard uses discrete barcodes, which means that a fixed pattern of bars represents a single character. Code 39 barcode standard supports the following characters:

- 36 unique alpha-numeric characters: Letters A through Z and the numbers 0 through 9
- Special characters, which are not part of the customer label: - . \$ / + % \*

When multiple characters are arranged together as a label or volume serial number (VOLSER), a single, narrow white bar is placed between the individual character barcodes (called the inter-character gap).

## Cartridge Types

The SL8500 library uses the following types of cartridges:

- Data cartridges store data written to them.
- Cleaning cartridges clean the tape path and read/write heads of the tape drives.
- Diagnostic cartridges are for service representatives to run read and write tests on the tape drive. In general, these tapes are standard data cartridges with a special diagnostic label.

Cartridge labels include a media domain and media ID. Together, these identify to the library the cartridge's type of media and use. IDs 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 indicates whether the cartridge is for data, cleaning, or diagnostic use.

## Cleaning and Diagnostic Cartridges

Cleaning and diagnostic cartridges require different labels to distinguish them from data cartridges. As the name implies, cleaning cartridges clean the tape path and read/write heads of the tape drives.

Diagnostic cartridges are for service representatives to run read and write tests on the tape drive. In general, these tapes are standard data cartridges with a special diagnostic label.

The first alphanumeric characters in the label sequence determine the type of cartridge being used. The vol-id (volume serial number) contains:

- CLN for cleaning cartridges
- DG for diagnostic cartridges

Each cleaning and diagnostic kit includes one labeled cleaning cartridge and one labeled diagnostic cartridge. Each of these are labeled with a volume ID of 0. Extra cleaning and diagnostic labels are sent with each library.

You cannot use cleaning and diagnostic cartridges as scratch cartridges, and software utilities cannot initialize them.

**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 THE LIBRARY EJECTS THROUGH THE CAP.

## Supported Labels

Barcode labels must match the drive type. The following labels are appropriate for the corresponding drive.

- LTO drives: Labels with eight characters. This label includes a six character customer defined volume serial number or the cartridge's function, such as diagnostic or cleaning. The other two characters identify the media domain or tape technology, and the media ID or version of that particular technology.
- DLT drives: Labels with seven characters. The seventh character is a small identifier below the sixth character for the media ID or version.

## Labels for LTO Cartridges

LTO technology was initially developed by IBM, Hewlett-Packard, and Quantum. LTO is an open format technology, meaning 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.

**Note** – Check availability for LTO Gen 4 drives and media. Library firmware must be Version 1126 or later to support LTO Gen 4 drives and media.

**TABLE B-1** Labels for LTO Cartridges

Media ID	Cartridge Type	Drive Type or Additional Information
L1	Data	Generation 1
L2	Data	Generation 2
L3	Data	400 GB, Generation 3
L4	Data	800 GB, Generation 4
L5	Data	1.5 TB, Generation 5
LT	Data	400 GB, Gen 3 only. Write once read many times (WORM).
LU	Data	800 GB, Gen 4 drive only (WORM).
LV	Data	1500 GB, Gen 5 drive only (WORM).
CU	Cleaning	Beginning characters are CLN (blank space) + VOLID. 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	Diagnostic	Beginning characters are DG (blank space) + VOLID. You can apply a DG label to a blank data cartridge to use the cartridge for library diagnostic tests.

## Labels for DLT and SDLT Cartridges

Media IDs for DLT and SDLT cartridges do not indicate the type of cartridge (data, cleaning or diagnostic). Instead, cleaning cartridges begin with CL (space), and diagnostic cartridges begin with DG (space).

**TABLE B-2** Labels for DLT and SDLT Cartridges

Media ID	Cartridge Type	Additional Information
B	Data	DLT1
C	Data	DLTtape III
D	Data	DLTtape IV
E	Data	DLTtape III-XT
S	Data	SDLT 220/320 cartridge
2	Data	SDLT 600
4 or S4	Data	DLT-S4
CLN + S	Cleaning	1500 GB, Gen 5 drive only (WORM)
DG + 2	Diagnostic	Beginning characters are CLN (blank space) + VOLID. 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 + 4	Diagnostic	Beginning characters are DG (blank space) + VOLID. You can apply a DG label to a blank data cartridge to use the cartridge for library diagnostic tests.

## Handling Cartridges

When cartridges are improperly handled, loss of data or damage to a library component can occur. To handle a cartridge correctly:

- Keep cartridges clean.
- Inspect a cartridge before each use and never put a damaged cartridge into a drive or library.
- 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.

## Inspecting a Cartridge

A defective or dirty cartridge can damage a tape drive. Always inspect a cartridge before you insert it into a tape drive or a library. Look for:

- Cracked or broken cartridge
- Damaged write-protect switch
- Liquid in the cartridge
- Labels not firmly or neatly attached or extending over the cartridge edge

- Any other obvious damage

## 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 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

Insert a cartridge 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.

## Cleaning the Cartridge Exterior

Keep your tape cartridges in good condition. A defective or dirty cartridge can damage a tape drive see [“Inspecting a Cartridge” on page 390](#).

**Caution – Potential damage to cartridges.** Do not use certain solvents to remove labels or to clean cartridges because they can damage the cartridges. Do not use acetone, trichloroethane, toluene, xylene, benzene, ketone, methylethyl ketone, methylene chloride, ethyldichloride, esters, ethyl acetate, or similar chemicals.

To clean a cartridge exterior:

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

## Storing Cartridges

When storing a cartridge:

- 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. See the user manual for the drive for details.

## Cartridge Handling Tasks

Task	Page
<a href="#">Apply a Label to a Cartridge</a>	393

## ▼ Apply a Label to a Cartridge

Cartridge labels indicate the type of cartridge media and usage. If your cartridges were not ordered with pre-applied labels, you must apply them yourself. Correctly label all cartridges for library use. Use labels that do not leave a residue when they are removed.

**Caution** – *Possible misread of volume number label.* Make sure the edges of the labels do not curl. A curled label causes the cartridge to become jammed in the tape drive loader, and the robot misreads the label.

1. **Make sure the cartridge has been at room temperature for at least 24 hours.**
2. **Clean the surface where the label will be placed. Use Oracle StorageTek Tape Cleaner Wipes to clean the cartridges.**

**Caution** – *Potential damage to cartridges.* Do not use certain solvents to remove labels or to clean cartridges because they can damage the cartridges. Do not use acetone, trichloroethane, toluene, xylene, benzene, ketone, methylethyl ketone, methylene chloride, ethyldichloride, esters, ethyl acetate, or similar chemicals.

3. **Locate the type of label you need. Make sure the label contains a vol-id.**
4. **Peel the backing from the cartridge label.**
5. **For an LTO cartridge, hold the cartridge so that the write-protect switch is toward you. For a 9840 or 9940 label, hold the cartridge so that the two recessed areas are toward you.**
6. **Attach the label to the cartridge. Press it into place.**

**Note** – On LTO Ultrium cartridge labels, the alphanumeric characters can be either vertical or horizontal.

**Note** – The label must be within the indented (recessed) 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. If the cartridge has a customer label, place the label in the area and press it into place.

7. **For 9840 and 9940 drives, repeat [Step 2](#) through [Step Note](#) – for the media ID label. Make sure the left side of both labels are aligned with each other.**



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## Web-launched SL Console Server

Oracle's Web-launched SL Console server, which is a standard feature of the SL8500, enables the SL Console to be installed on a centralized Web server. Individual clients can use a supported Web browser to download and log in to the Web-launched SL Console server.

You download the server from the Oracle Software Delivery Cloud. It is distributed as a Java WebARchive (.war) file. After you have downloaded the file, you can deploy it on the Web server of your choice. See your Web server documentation for specific deployment instructions and requirements.

### Security Considerations

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

### Updating the Web-launched SL Console Server

You can update the Web-launched SL Console server while it is running. Updates are automatically propagated to the clients when they retrieve the Web-launched SL Console application from the server.

## ▼ Download the SL Console Media Pack

Use this procedure to download and extract the current SL Console Media Pack from the Oracle Software Delivery Cloud. The Media Pack includes the Web-launched SL Console server, as well as the Web-launched SL Console client and the standalone SL Console.

After you complete this procedure, you can deploy the Web-launched SL Console server on the Web server of your choice. See your Web server documentation for specific deployment instructions and requirements.

1. **Start a Web browser on your PC or workstation, and navigate to the Oracle Software Delivery Cloud at the following URL:**

<http://edelivery.oracle.com/>

To download any Oracle product that is currently available to license, choose a language or [Continue](#) to export validation.

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Continue

2. **Click Continue.**

396 SL500 User's Guide

3. On the Export Validation screen, enter your contact information, read the License Agreement and Export Restrictions, and click the check boxes to accept.

## Export Validation

**TIP** Each time you visit this site, enter the information *exactly* the same. This will reduce the chance of long delays while processing your request. For example, if you include your middle initial one time but leave it out the next time, your name must be processed as a new user.

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**Full name (FIRST LAST) \***  ⓘ  
Example: John Doe

**Company name \***   
Example: Oracle

**E-mail address \***

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4. Click Continue to open the Media Pack screen.

**5. In the Select a Product Pack list of the Media Pack Search screen, select Oracle StorageTek Products.**

The screenshot shows the 'Media Pack Search' interface. At the top, there is a progress bar with three steps: 'Export Validation', 'Search' (which is currently active), and 'Download'. Below the progress bar, the title 'Media Pack Search' is displayed. On the left, there are 'Instructions' and a 'Results' table. On the right, there is a 'Frequently Asked Questions' section. The main area contains two dropdown menus: 'Select a Product Pack' and 'Platform'. The 'Select a Product Pack' dropdown is open, showing a list of product packs. The 'Platform' dropdown is also open, showing a list of platforms. The 'Continue' button is located to the right of the 'Platform' dropdown.

**Instructions**

1. Review the [License List](#) to determine which Product Pack or Packs you need to download.
2. Select the Product Pack and Platform and click "Go".
3. If there is only one result, you will see the download page. If there are multiple results, select one and click "Continue".

**Frequently Asked Questions**

- [What is a Media Pack?](#)
- [How do I find the Media Pack that I need?](#)
- [How do I get my license code?](#)
- [More...](#)

Select a Product Pack: - Select a product pack -

Platform: Oracle Governance Risk and Compliance, Oracle Insurance Applications, Oracle Legal Applications, Oracle Outside In Technology, Oracle Policy Automation, Oracle RDB, Oracle Retail Applications, Oracle Secure Enterprise Search, Oracle Solaris, Oracle Solaris Virtualization Products, Oracle StorageTek Products

**Results**

Select	Description	Size

Continue

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**6. In the Select a Product Pack list of the Media Pack Search screen, use the Platform list, and select Generic Platform.**

The screenshot shows the 'Media Pack Search' interface. The 'Select a Product Pack' dropdown menu is closed. The 'Platform' dropdown menu is open, showing a list of platforms. The 'Generic Platform' option is selected. The 'Go' button is located below the 'Platform' dropdown. The 'Results' table is empty, displaying '\*\*\* No search conducted \*\*\*'. The 'Back' and 'Continue' buttons are located at the bottom right of the results area.

Select a Product Pack: - Select a product pack -

Platform: - Select a platform -  
 - Select a platform -  
 Generic Platform  
 IBM AIX on POWER Systems (32-bit)

Go

**Results**

Select	Description	Release	Part Number	Updated	# Parts / Size
*** No search conducted ***					

Back Continue

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7. Click Go.

All media packs meeting your selection criteria are displayed in the Results section of the screen.

Select	Description	Release	Part Number	Updated	# Parts / Size
<input checked="" type="radio"/>	<a href="#">Oracle StorageTek Library Console (SLC) (5.1.8) Media Pack for Generic Platform</a>	5.1.8.0.0	Q98105-02	APR-29-2012	1 / 358M
<input type="radio"/>	<a href="#">Oracle StorageTek Library Console (SLC) (5.0.0) Media Pack for Generic Platform</a>	5.0.0.0.0	B63125-01	APR-07-2011	1 / 358M

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8. Click the Select radio button that corresponds to the media pack for the SL Console version that you want to download. Click Continue. When the download screen for the selected media pack appears, review the information to verify that you have selected the correct media pack. Click the Readme button to review the readme file, if desired. Use the View Digest button to verify the MD5 and/or SHA-1 digests of the download files.

Export Validation      Search      ● **Download**

## Oracle StorageTek Library Console (SLC) (5.0.0) Media Pack for Generic Platform

**TIP** View the Readme file(s) to help decide which files you need to download.

Print this page with the list of downloadable files. It contains a list of the part numbers and their corresponding description that you may need to reference during the installation process.

**Oracle StorageTek Library Console (SLC) (5.0.0) Media Pack v1 for Generic Platform**

**Frequently Asked Questions**

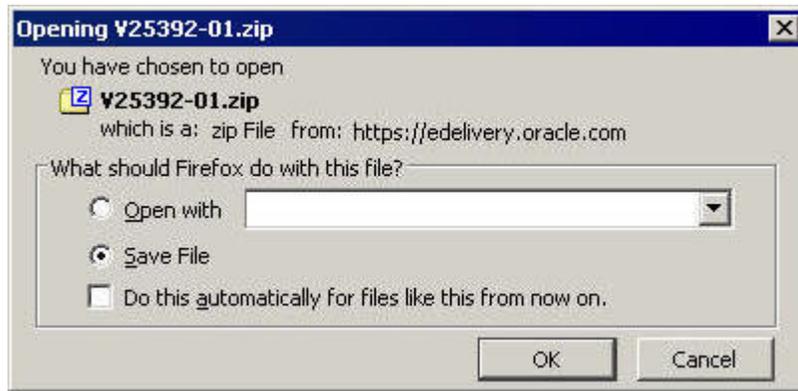
- [How do I know which files are required?](#)
- [What are the disk space requirements?](#)
- [How do I get my license code?](#)
- [More...](#)

9. If this is not the correct software, use the Back and/or Search Again buttons.

10. If the software is correct, click the Download.

Select	Name	Part Number	Size (Bytes)
<input checked="" type="button" value="Download"/>	Oracle StorageTek Library Console, (SLC) version 5.0.0	V25392-01	358M

11. When the download dialog appears, click Save File, and press the OK.



12. When the Enter name of file to save to dialog appears, browse to the local directory that will hold the download file, and press Save.

The file is large and may take some time to download, depending on your connection speed.

13. Use the appropriate extraction utility (for example, gunzip, pkunzip) to extract the media pack to the location of your choice.

The Web-launched SL Console server filename is `opel.war`, located in the `weblaunch` directory.

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## Controlling Contaminants

### Environmental Contaminants

Control over contaminant levels in a computer room is extremely important because tape libraries, tape drives, and tape media are subject to damage from airborne particulates. Most particles smaller than ten microns are not visible to the naked eye under most conditions, but these particles can be the most damaging. As a result, the operating environment must adhere to the following requirements:

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

Oracle currently requires the ISO 14644-1 standard approved in 1999, but will require any updated standards for ISO 14644-1 as they are approved by the ISO governing body. The ISO 14644-1 standard primarily focuses on the quantity and size of particulates as well as the proper measurement methodology, but does not address the overall mass of the particulates. As a result, the requirement for total mass limitations is also necessary as a computer room or data center could meet the ISO 14644-1 specification, but still damage equipment because of the specific type of particulates in the room. In addition, the ANSI/ISA 71.04-1985 specification addresses gaseous contaminations as some airborne chemicals are more hazardous. All three requirements are consistent with the requirements set by other major tape storage vendors.

### Required Air Quality Levels

Particles, gasses and other contaminants may impact the sustained operations of computer hardware. Effects can range from intermittent interference to actual component failures. The computer room must be designed to achieve a high level of cleanliness. Airborne dusts, gasses and vapors must be maintained within defined limits to help minimize their potential impact on the hardware.

Airborne particulate levels must be maintained within the limits of *ISO 14644-1 Class 8 Environment*. This standard defines air quality classes for clean zones based on airborne particulate concentrations. This standard has an order of magnitude less particles than standard air in an office environment. Particles ten microns or smaller are harmful to most data processing hardware because they tend to exist in large

numbers, and can easily circumvent many sensitive components' internal air filtration systems. When computer hardware is exposed to these submicron particles in great numbers they endanger system reliability by posing a threat to moving parts, sensitive contacts and component corrosion.

Excessive concentrations of certain gasses can also accelerate corrosion and cause failure in electronic components. Gaseous contaminants are a particular concern in a computer room both because of the sensitivity of the hardware, and because a proper computer room environment is almost entirely recirculating. Any contaminant threat in the room is compounded by the cyclical nature of the airflow patterns. Levels of exposure that might not be concerning in a well ventilated site repeatedly attack the hardware in a room with recirculating air. The isolation that prevents exposure of the computer room environment to outside influences can also multiply any detrimental influences left unaddressed in the room.

Gasses that are particularly dangerous to electronic components include chlorine compounds, ammonia and its derivatives, oxides of sulfur and petrol hydrocarbons. In the absence of appropriate hardware exposure limits, health exposure limits must be used.

While the following sections will describe some best practices for maintaining an ISO 14644-1 Class 8 Environment in detail, there are some basic precautions that must be adhered to:

- Do not allow food or drink into the area.
- Cardboard, wood, or packing materials must not be stored in the data center clean area.
- Identify a separate area for unpacking new equipment from crates and boxes.
- Do not allow construction or drilling in the data center without first isolating sensitive equipment and any air targeted specifically for the equipment. Construction generates a high level of particulates that exceed ISO 14644-1 Class 8 criteria in a localized area. Dry wall and gypsum are especially damaging to storage equipment.

## Contaminant Properties and Sources

Contaminants in the room can take many forms, and can come from numerous sources. Any mechanical process in the room can produce dangerous contaminants or agitate settled contaminants. A particle must meet two basic criteria to be considered a contaminant:

- It must have the physical properties that could potentially cause damage to the hardware.
- It must be able to migrate to areas where it can cause the physical damage.

The only differences between a potential contaminant and an actual contaminant are time and location. Particulate matter is most likely to migrate to areas where it can do damage if it is airborne. For this reason, airborne particulate concentration is a useful measurement in determining the quality of the computer room environment.

Depending on local conditions, particles as big as 1,000 microns can become airborne, but their active life is very short, and they are arrested by most filtration devices.

Submicron particulates are much more dangerous to sensitive computer hardware, because they remain airborne for a much longer period of time, and they are more apt to bypass filters.

## Operator Activity

Human movement within the computer space is probably the single greatest source of contamination in an otherwise clean computer room. Normal movement can dislodge tissue fragments, such as dander or hair, or fabric fibers from clothing. The opening and closing of drawers or hardware panels or any metal-on-metal activity can produce metal filings. Simply walking across the floor can agitate settled contamination making it airborne and potentially dangerous.

## Hardware Movement

Hardware installation or reconfiguration involves a great deal of subfloor activity, and settled contaminants can very easily be disturbed, forcing them to become airborne in the supply air stream to the room's hardware. This is particularly dangerous if the subfloor deck is unsealed. Unsealed concrete sheds fine dust particles into the airstream, and is susceptible to efflorescence -- mineral salts brought to the surface of the deck through evaporation or hydrostatic pressure.

## Outside Air

Inadequately filtered air from outside the controlled environment can introduce innumerable contaminants. Post-filtration contamination in duct work can be dislodged by air flow, and introduced into the hardware environment. This is particularly important in a downward-flow air conditioning system in which the subfloor void is used as a supply air duct. If the structural deck is contaminated, or if the concrete slab is not sealed, fine particulate matter (such as concrete dust or efflorescence) can be carried directly to the room's hardware.

## Stored Items

Storage and handling of unused hardware or supplies can also be a source of contamination. Corrugated cardboard boxes or wooden skids shed fibers when moved or handled. Stored items are not only contamination sources; their handling in the computer room controlled areas can agitate settled contamination already in the room.

## Outside Influences

A negatively pressurized environment can allow contaminants from adjoining office areas or the exterior of the building to infiltrate the computer room environment through gaps in the doors or penetrations in the walls. Ammonia and phosphates are often associated with agricultural processes, and numerous chemical agents can be produced in manufacturing areas. If such industries are present in the vicinity of the data center facility, chemical filtration may be necessary. Potential impact from automobile emissions, dusts from local quarries or masonry fabrication facilities or sea mists should also be assessed if relevant.

## Cleaning Activity

Inappropriate cleaning practices can also degrade the environment. Many chemicals used in normal or “office” cleaning applications can damage sensitive computer equipment. Potentially hazardous chemicals outlined in the “[Cleaning Procedures and Equipment](#)” section should be avoided. Out-gassing from these products or direct contact with hardware components can cause failure. Certain biocide treatments used in building air handlers are also inappropriate for use in computer rooms either because they contain chemicals, that can degrade components, or because they are not designed to be used in the airstream of a re-circulating air system. The use of push mops or inadequately filtered vacuums can also stimulate contamination.

It is essential that steps be taken to prevent air contaminants, such as metal particles, atmospheric dust, solvent vapors, corrosive gasses, soot, airborne fibers or salts from entering or being generated within the computer room environment. In the absence of hardware exposure limits, applicable human exposure limits from OSHA, NIOSH or the ACGIH should be used.

## Contaminant Effects

Destructive interactions between airborne particulate and electronic instrumentation can occur in numerous ways. The means of interference depends on the time and location of the critical incident, the physical properties of the contaminant and the environment in which the component is placed.

## Physical Interference

Hard particles with a tensile strength at least 10% greater than that of the component material can remove material from the surface of the component by grinding action or embedding. Soft particles will not damage the surface of the component, but can collect in patches that can interfere with proper functioning. If these particles are tacky they can collect other particulate matter. Even very small particles can have an impact if they collect on a tacky surface, or agglomerate as the result of electrostatic charge build-up.

## Corrosive Failure

Corrosive failure or contact intermittence due to the intrinsic composition of the particles or due to absorption of water vapor and gaseous contaminants by the particles can also cause failures. The chemical composition of the contaminant can be very important. Salts, for instance, can grow in size by absorbing water vapor from the air (nucleating). If a mineral salts deposit exists in a sensitive location, and the environment is sufficiently moist, it can grow to a size where it can physically interfere with a mechanism, or can cause damage by forming salt solutions.

## Shorts

Conductive pathways can arise through the accumulation of particles on circuit boards or other components. Many types of particulate are not inherently conductive, but can absorb significant quantities of water in high-moisture environments. Problems caused by electrically conductive particles can range from intermittent malfunctioning to actual damage to components and operational failures.

## Thermal Failure

Premature clogging of filtered devices will cause a restriction in air flow that could induce internal overheating and head crashes. Heavy layers of accumulated dust on hardware components can also form an insulative layer that can lead to heat-related failures.

## Room Conditions

All surfaces within the controlled zone of the data center should be maintained at a high level of cleanliness. All surfaces should be periodically cleaned by trained professionals on a regular basis, as outlined in the [“Cleaning Procedures and Equipment”](#) section. Particular attention should be paid to the areas beneath the hardware, and the access floor grid. Contaminants near the air intakes of the hardware can more easily be transferred to areas where they can do damage. Particulate accumulations on the access floor grid can be forced airborne when floor tiles are lifted to gain access to the sub-floor.

The subfloor void in a downward-flow air conditioning system acts as the supply air plenum. This area is pressurized by the air conditioners, and the conditioned air is then introduced into the hardware spaces through perforated floor panels. Thus, all air traveling from the air conditioners to the hardware must first pass through the subfloor void. Inappropriate conditions in the supply air plenum can have a dramatic effect on conditions in the hardware areas.

The subfloor void in a data center is often viewed solely as a convenient place to run cables and pipes. It is important to remember that this is also a duct, and that conditions below the false floor must be maintained at a high level of cleanliness. Contaminant sources can include degrading building materials, operator activity or infiltration from outside the controlled zone. Often particulate deposits are formed where cables or other subfloor items form air dams that allow particulate to settle and accumulate. When these items are moved, the particulate is re-introduced into the supply airstream, where it can be carried directly to hardware.

Damaged or inappropriately protected building materials are often sources of subfloor contamination. Unprotected concrete, masonry block, plaster or gypsum wall-board will deteriorate over time, shedding fine particulate into the air. Corrosion on post-filtration air conditioner surfaces or subfloor items can also be a concern. The subfloor void must be thoroughly and appropriately decontaminated on a regular basis to address these contaminants. Only vacuums equipped with High Efficiency Particulate Air (HEPA) filtration should be used in any decontamination procedure. Inadequately filtered vacuums will not arrest fine particles, passing them through the unit at high speeds, and forcing them airborne.

Unsealed concrete, masonry or other similar materials are subject to continued degradation. The sealants and hardeners normally used during construction are often designed to protect the deck against heavy traffic, or to prepare the deck for the application of flooring materials, and are not meant for the interior surfaces of a supply air plenum. While regular decontaminations will help address loose particulate, the surfaces will still be subject to deterioration over time, or as subfloor activity causes wear. Ideally all of the subfloor surfaces will be appropriately sealed at the time of construction. If this is not the case, special precautions will be necessary to address the surfaces in an on-line room.

It is extremely important that only appropriate materials and methodology are used in the encapsulation process. Inappropriate sealants or procedures can actually degrade the conditions they are meant to improve, impacting hardware operations and reliability. The following precautions should be taken when encapsulating the supply air plenum in an on-line room:

- Manually apply the encapsulant. Spray applications are totally inappropriate in an on-line data center. The spraying process forces the sealant airborne in the supply airstream, and is more likely to encapsulate cables to the deck.
- Use a pigmented encapsulant. The pigmentation makes the encapsulant visible in application, ensuring thorough coverage, and helps in identifying areas that are damaged or exposed over time.
- It must have a high flexibility and low porosity to effectively cover the irregular textures of the subject area, and to minimize moisture migration and water damage.
- The encapsulant must not out-gas any harmful contaminants. Many encapsulants commonly used in industry are highly ammoniated or contain other chemicals that can be harmful to hardware. It is very unlikely that this out-gassing could cause immediate, catastrophic failure, but these chemicals will often contribute to corrosion of contacts, heads or other components.

Effectively encapsulating a subfloor deck in an on-line computer room is a very sensitive and difficult task, but it can be conducted safely if appropriate procedures and materials are used. Avoid using the ceiling void as an open supply or return for the building air system. This area is typically very dirty and difficult to clean. Often the structural surfaces are coated with fibrous fire-proofing, and the ceiling tiles and insulation are also subject to shedding. Even before filtration, this is an unnecessary exposure that can adversely affect environmental conditions in the room. It is also important that the ceiling void does not become pressurized, as this will force dirty air into the computer room. Columns or cable chases with penetrations in both the subfloor and ceiling void can lead to ceiling void pressurization.

## Exposure Points

All potential exposure points in the data center should be addressed to minimize potential influences from outside the controlled zone. Positive pressurization of the computer rooms will help limit contaminant infiltration, but it is also important to minimize any breaches in the room perimeter. To ensure the environment is maintained correctly, the following should be considered:

- All doors should fit snugly in their frames.
- Gaskets and sweeps can be used to address any gaps.

- Automatic doors should be avoided in areas where they can be accidentally triggered. An alternate means of control would be to remotely locate a door trigger so that personnel pushing carts can open the doors easily. In highly sensitive areas, or where the data center is exposed to undesirable conditions, it may be advisable to design and install personnel traps. Double sets of doors with a buffer between can help limit direct exposure to outside conditions.
- Seal all penetrations between the data center and adjacent areas.
- Avoid sharing a computer room ceiling or subfloor plenum with loosely controlled adjacent areas.

## Filtration

Filtration is an effective means of addressing airborne particulate in a controlled environment. It is important that all air handlers serving the data center are adequately filtered to ensure appropriate conditions are maintained within the room. In-room process cooling is the recommended method of controlling the room environment. The in-room process coolers re-circulate room air. Air from the hardware areas is passed through the units where it is filtered and cooled, and then introduced into the subfloor plenum. The plenum is pressurized, and the conditioned air is forced into the room, through perforated tiles, which then travels back to the air conditioner for reconditioning. The airflow patterns and design associated with a typical computer room air handler have a much higher rate of air change than typical comfort cooling air conditioners so air is filtered much more often than in an office environment. Proper filtration can capture a great deal of particulates. The filters installed in the in-room, re-circulating air conditioners should have a minimum efficiency of 40% (Atmospheric Dust-Spot Efficiency, ASHRAE Standard 52.1). Low-grade pre-filters should be installed to help prolong the life of the more expensive primary filters.

Any air being introduced into the computer room controlled zone, for ventilation or positive pressurization, should first pass through high efficiency filtration. Ideally, air from sources outside the building should be filtered using High Efficiency Particulate Air (HEPA) filtration rated at 99.97% efficiency (DOP Efficiency MILSTD-282) or greater. The expensive high efficiency filters should be protected by multiple layers of pre-filters that are changed on a more frequent basis. Low-grade pre-filters, 20% ASHRAE atmospheric dust-spot efficiency, should be the primary line of defense. The next filter bank should consist of pleated or bag type filters with efficiencies between 60% and 80% ASHRAE atmospheric dust-spot efficiency.

ASHRAE 52-76 Dust spot efficiency %	Fractional Efficiencies %		
	3.0 micron	1.0 micron	0.3 micron
25-30	80	20	<5
60-65	93	50	20
80-85	99	90	50
90	>99	92	60
DOP 95	--	>99	95

Low efficiency filters are almost totally ineffective at removing sub-micron particulates from the air. It is also important that the filters used are properly sized for the air handlers. Gaps around the filter panels can allow air to bypass the filter as it passes through the air conditioner. Any gaps or openings should be filled using appropriate materials, such as stainless steel panels or custom filter assemblies.

## Positive Pressurization and Ventilation

A designed introduction of air from outside the computer room system will be necessary in order to accommodate positive pressurization and ventilation requirements. The data center should be designed to achieve positive pressurization in relation to more loosely controlled surrounding areas. Positive pressurization of the more sensitive areas is an effective means of controlling contaminant infiltration through any minor breaches in the room perimeter. Positive pressure systems are designed to apply outward air forces to doorways and other access points within the data processing center in order to minimize contaminant infiltration of the computer room. Only a minimal amount of air should be introduced into the controlled environment. In data centers with multiple rooms, the most sensitive areas should be the most highly pressurized. It is, however, extremely important that the air being used to positively pressurize the room does not adversely affect the environmental conditions in the room. It is essential that any air introduction from outside the computer room is adequately filtered and conditioned to ensure that it is within acceptable parameters. These parameters can be looser than the goal conditions for the room since the air introduction should be minimal. A precise determination of acceptable limits should be based on the amount of air being introduced and the potential impact on the environment of the data center.

Because a closed-loop, re-circulating air conditioning system is used in most data centers, it will be necessary to introduce a minimal amount of air to meet the ventilation requirements of the room occupants. Data center areas normally have a very low human population density; thus the air required for ventilation will be minimal. In most cases, the air needed to achieve positive pressurization will likely exceed that needed to accommodate the room occupants. Normally, outside air quantities of less than 5% make-up air should be sufficient (ASHRAE Handbook: Applications, Chapter 17). A volume of 15 CFM outside air per occupant or workstation should sufficiently accommodate the ventilation needs of the room.

## Cleaning Procedures and Equipment

Even a perfectly designed data center requires continued maintenance. Data centers containing design flaws or compromises may require extensive efforts to maintain conditions within desired limits. Hardware performance is an important factor contributing to the need for a high level of cleanliness in the data center.

Operator awareness is another consideration. Maintaining a fairly high level of cleanliness will raise the level of occupant awareness with respect to special requirements and restrictions while in the data center. Occupants or visitors to the data center will hold the controlled environment in high regard and are more likely to act appropriately. Any environment that is maintained to a fairly high level of cleanliness and is kept in a neat and well organized fashion will also command respect from the room's inhabitants and visitors. When potential clients visit the room they will interpret the overall appearance of the room as a reflection of an

overall commitment to excellence and quality. An effective cleaning schedule must consist of specially designed short-term and long-term actions. These can be summarized as follows:

Frequency	Task
Daily Actions	Rubbish removal
Weekly Actions	Access floor maintenance (vacuum and damp mop)
Quarterly Actions	Hardware decontamination Room surface decontamination
Bi-Annual Actions	Subfloor void decontamination Air conditioner decontamination (as necessary)

## Daily Tasks

This statement of work focuses on the removal of each day's discarded trash and rubbish from the room. In addition, daily floor vacuuming may be required in Print Rooms or rooms with a considerable amount of operator activity.

## Weekly Tasks

This statement of work focuses on the maintenance of the access floor system. During the week, the access floor becomes soiled with dust accumulations and blemishes. The entire access floor should be vacuumed and damp mopped. All vacuums used in the data center, for any purpose, should be equipped with High Efficiency Particulate Air (HEPA) filtration. Inadequately filtered equipment cannot arrest smaller particles, but rather simply agitates them, degrading the environment they were meant to improve. It is also important that mop-heads and dust wipes are of appropriate non-shedding designs.

Cleaning solutions used within the data center must not pose a threat to the hardware. Solutions that could potentially damage hardware include products that are:

- Ammoniated
- Chlorine-based
- Phosphate-based
- Bleach enriched
- Petro-chemical based
- Floor strippers or re-conditioners.

It is also important that the recommended concentrations are used, as even an appropriate agent in an inappropriate concentration can be potentially damaging. The solution should be maintained in good condition throughout the project, and excessive applications should be avoided.

## Quarterly Tasks

The quarterly statement of work involves a much more detailed and comprehensive decontamination schedule and should only be conducted by experienced computer room contamination-control professionals. These actions should be performed three to four times per year, based on the levels of activity and contamination present. All room surfaces should be thoroughly decontaminated including cupboards, ledges, racks, shelves and support equipment. High ledges and light fixtures and generally accessible areas should be treated or vacuumed as appropriate. Vertical surfaces including windows, glass partitions, doors, etc. should be thoroughly treated. Special dust cloths that are impregnated with a particle absorbent material are to be used in the surface decontamination process. Do not use generic dust rags or fabric cloths to perform these activities. Do not use any chemicals, waxes or solvents during these activities.

Settled contamination should be removed from all exterior hardware surfaces including horizontal and vertical surfaces. The unit's air inlet and outlet grilles should be treated as well. Do not wipe the unit's control surfaces as these areas can be decontaminated by the use of lightly compressed air. Special care should also be taken when cleaning keyboards and life-safety controls. Specially treated dust wipes should be used to treat all hardware surfaces. Monitors should be treated with optical cleansers and static-free cloths. No Electro-Static Discharge (ESD) dissipative chemicals should be used on the computer hardware, since these agents are caustic and harmful to most sensitive hardware. The computer hardware is sufficiently designed to permit electrostatic dissipation thus no further treatments are required. After all of the hardware and room surfaces have been thoroughly decontaminated, the access floor should be HEPA vacuumed and damp mopped as detailed in the Weekly Actions.

## Bi-Annual Tasks

The subfloor void should be decontaminated every 18 months to 24 months based on the conditions of the plenum surfaces and the degree of contaminant accumulation. Over the course of the year, the subfloor void undergoes a considerable amount of activity that creates new contamination accumulations. Although the weekly above floor cleaning activities will greatly reduce the subfloor dust accumulations, a certain amount of surface dirt will migrate into the subfloor void. It is important to maintain the subfloor to a high degree of cleanliness since this area acts as the hardware's supply air plenum. It is best to perform the subfloor decontamination treatment in a short time frame to reduce cross contamination. The personnel performing this operation should be fully trained to assess cable connectivity and priority. Each exposed area of the subfloor void should be individually inspected and assessed for possible cable handling and movement. All twist-in and plug-in connections should be checked and fully engaged before cable movement. All subfloor activities must be conducted with proper consideration for air distribution and floor loading. In an effort to maintain access floor integrity and proper psychrometric conditions, the number of floor tiles removed from the floor system should be carefully managed. In most cases, each work crew should have no more than 24 square feet (six tiles) of open access flooring at any one time. The access floor's supporting grid system should also be thoroughly decontaminated, first by vacuuming the loose debris and then by damp-sponging the accumulated residue. Rubber gaskets, if present, as the metal framework that makes up the grid system should be removed from the grid

work and cleaned with a damp sponge as well. Any unusual conditions, such as damaged floor suspension, floor tiles, cables and surfaces, within the floor void should be noted and reported.

## Activity and Processes

Isolation of the data center is an integral factor in maintaining appropriate conditions. All unnecessary activity should be avoided in the data center, and access should be limited to necessary personnel only. Periodic activity, such as tours, should be limited, and traffic should be restricted to away from the hardware so as to avoid accidental contact. All personnel working in the room, including temporary employees and janitorial personnel, should be trained in the most basic sensitivities of the hardware so as to avoid unnecessary exposure. The controlled areas of the data center should be thoroughly isolated from contaminant producing activities. Ideally, print rooms, check sorting rooms, command centers or other areas with high levels of mechanical or human activity should have no direct exposure to the data center. Paths to and from these areas should not necessitate traffic through the main data center areas.



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# Index

## A

---

activated capacity 55–59  
 cell assignment rules 57  
 decreasing 56, 58  
 for LTO libraries 56, 57  
 hardware activation file and 56  
 host notification of 59  
 increasing 58  
 minimum and maximum 55  
 orphaned cartridges and 58  
 partitioned libraries and 58, 88  
 planning 56

activated features  
 Capacity on Demand 55–59  
 display current 69  
 install 63

address  
 internal in LTO libraries 11

audits  
 audit indicator 292  
 description 292–293  
 full library 318–319  
 main access door and 292  
 physical 292, 318–319, 320–321  
 range of cells 320–321  
 tasks 317–323  
 verified 293, 322–323

auto clean (drive)  
 description 263

automated mode (library)  
 description 197  
 determine 198  
 ejecting a cartridge through the CAP 255  
 entering a cartridge through the CAP 253  
 tape management software and 22

automation drive interface 217

## B

---

Base Module  
 location 4  
 LTO wall diagrams 374

mixed-media wall diagrams 379  
 bridging 105, 140, 159, 179, 217–223  
 designated bridge drive 217  
 select a bridge drive 218

bridging screens 220  
 bridge drive selection 221  
 instructions 221

## C

---

CAP operations  
 tasks 226–229

capacity  
 activated. *See* activated capacity.  
 allocated (in partitioned libraries) 88  
 extending 12, 14  
 physical. *See* physical capacity  
 real-world 13, 15

Capacity on Demand 55–59  
 features of 55

Capacity on Demand. *See Also* activated capacity.

CAPs  
 assigning CAP open button 87  
 base module 13  
 Cartridge Expansion Module 13, 15  
 cartridges  
 entering 225  
 common 86  
 display properties 229  
 display status 228  
 display summary information 227  
 Drive Expansion Module 13, 15  
 inserting cartridges into 253  
 library partitions and 86, 129–135, 193–196  
 magazine cells 254  
 removing cartridges from 255  
 settings 17  
 split 86  
 using to eject cartridges 255  
 using to enter cartridges 253

Cartridge Expansion Module  
 location 4  
 LTO wall diagrams 378

## D

- mixed-media wall diagrams 381
- cartridges
  - applying labels 393
  - cleaning. *See* cleaning cartridges.
  - diagnostic 389
  - diagnostic. *See* diagnostic cartridges.
  - ejecting 225
  - ejecting through the CAP 255
  - ejects 250
  - entering 225
  - entering through the CAP 253
  - enters 249
  - exterior cleaning 391
  - handling 390
  - handling of 387
  - home cell 250
  - insert into a drive 368
  - insert into storage cells 367
  - inserting in a cell or drive 391
  - inserting in the CAP 249
  - inspecting 390
  - list 256
  - locate 366
  - locating by address 250
  - locating by VOLID 250
  - management tasks 252–262
  - manual operations 365–372
  - mounts and dismounts 197
  - move by VOLID 258
  - move from specified location 260
  - recovery moves 250
  - remove from the library 366
  - removing from a drive 369
  - storing 391
  - unlabeled 249
- cautions
  - reentering cleaning cartridge 388
  - solvents for cleaning a cartridge 391, 393
- cell
  - active 12
- cleaning cartridges 388
  - description 265
  - eject expired 271
  - enter 269
  - for LTO drives 389
  - list 273
  - replacing 372
- clearance specifications (library) 384
- components (library)
  - back 4
  - front 3
- controls and indicators
  - keypad 8
  - Open Door 9

- Service Required 9
- Current Drive Mappings Report 238

## D

---

- diagnostic cartridges 388
  - description 291
  - eject 271
  - enter 269
  - library self-tests and 290
- diagnostic moves (robot)
  - control functions 296
  - controlling 340
  - defining 328–332
  - description 294–296
  - managing definitions 333–334
  - monitoring 340
  - pool address range 294
  - random access order 295
  - saving 335–336
  - sequential access order 295
  - starting 338–339
  - target address range 294
- dimensions (library) 383
- disconnecting external SCSI cables 11
- dismount operations 198
- domain, media labels 388
- Door Open indicator 9
- drive cleaning
  - automatic 263
  - configure auto clean 268
  - description 263
  - display status of 275
  - eject cleaning cartridges 271
  - enter cleaning cartridges 269
  - library auto clean 263
  - manual 266, 277
  - tasks 267–277
- Drive Distribution Reports 244
- Drive Expansion Module
  - location 4
- Drive Mapping History Report 240
- drive ports
  - enable and disable 237
- drive slots
  - HLI-PRC address 231
- Drive Utilization Reports 246
- drives
  - addressing 231
  - cleaning. *See* drive cleaning.
  - display current mappings 238
  - display drive properties 235
  - display drive summary information 233
  - display mapping history 240

- display media events 242
- display status 234
- display utilization 246
- hot swapping 10
- insert cartridges into 368
- management tasks 232
- maximum 231
- power specifications 385
- rebooting 326
- removing cartridges from 369
- self-test 325
- states 231
- utility tasks 324–326

## E

---

- eject operations 250
- enabled capacity
  - partitioned libraries and 88
- enter operations 249
- event monitors
  - description 285
  - display 301
  - display multiple 303
  - spool data to a file 302
  - tasks 300

## F

---

- FC-SCSI address
  - drive 231
- front door
  - close with power 364
  - close without power 364
  - open with power 361
  - open without power 362

## H

---

- hardware activation file
  - activated capacity and 56
  - delete 70–71
  - description 61
  - display current 69
  - download 65
  - Feature Audit Log 72, 80
  - file type 61
  - install 67, 77–79
  - installing 63
  - library serial number and 67, 78
- hardware activation screen reference 73
- hardware activation tasks 63–72
- HLL-PRC address
  - drive slot 231

- host interfaces
  - partitioned libraries and 117, 146, 148, 150

## I

---

- interface
  - host 5

## L

---

- library addressing 6
  - partitioned libraries and 93
- library auto clean 263
- library components 3
- library configuration
  - bridged library properties 203
  - display 203
  - display physical configuration 209
  - display SCSI configuration 210
  - mixed media 14
  - unbridged library properties 204
- library controller
  - description 20
  - properties 208
- library controls 5, 8
- library events 285
- library events. *See Also* event monitors.
- library features 2
- library firmware upgrades 289
  - activate 306
  - download 305
- library interface
  - management 6
- library internal address
  - partitioned libraries and 93
- library internal addressing 11, 14
  - LTO locations 375
  - mixed-media locations 380
- library management tasks 201–215
- library partitions
  - activated capacity and 58
  - add 152
  - allocated capacity 88
  - assigning CAP button 87
  - boundaries of 89
  - commit changes screen 168
  - commit configuration changes 111
  - configuration tasks 98–113
  - confirm apply screen 170
  - create 100
  - delete 116, 154
  - described 83
  - design 102
  - design and commit screen reference 158–172

## M

- design screen, bridged library 159
- design screen, unbridged library 160
- designing 89
- host connections summary, bridged library 179
- host connections summary, unbridged library 180
- hosts and 84, 88, 117, 146, 148, 150
- library hardware changes and 123
- library resources and 86, 122
- modify summary information 115, 156
- orphaned cartridges in 87, 110, 184
- print reports 127
- reports 124–128, 173–192
- save report 128
- SL Console workspace and 95, 121, 168
- summary screen reference 137–157
- task summary 97
- using CAPs in 86
- verify 107
- verify screen 165
- library reboot 308
- library reports 28–29
  - displaying 47
  - saving data to a file 49
  - searching 48
- library safety features 22
- library self-tests 290
  - performing 313, 315
- library statistics
  - display 213
- library status 27, 199
  - display 202
  - using Refresh button 28
- library utility tasks 304
- Library Utilization Reports 214
- log snapshot file
  - generating process 311
  - transfer process 312
- login IDs 24
- logs
  - Feature Audit Log 72, 80
- LTO configuration
  - Base Module wall diagrams 374
  - Cartridge Expansion Module wall diagrams 378
  - library internal addressing 375
  - library SCSI addresses 376, 377

## M

---

- main access door
  - audits and 292
  - automated mode and 198

- manual cleaning (drive) 266
- manual operations
  - cartridge handling 365–372
  - close the front door, power off 364
  - close the front door, power on 364
  - general 357–364
  - open the front door, power off 362
  - open the front door, power on 361
  - power off the library 358
  - power on the library 359
  - return the library to ready status 360
  - safety precautions 355
  - tasks 356–372
- media
  - domain labels 388
  - ID labels 388
- Media Drive Events Report 242
- MIB file
  - transfer process 309
- mixed-media configuration
  - Base Module wall diagrams 379
  - Cartridge Expansion Module wall diagrams 381
  - library internal addresses 380
- mount operations 197

## O

---

- orphaned cartridges
  - non-partitioned libraries and 58
  - partitioned libraries and 87, 110, 184

## P

---

- passwords
  - activation 24
  - length 24
  - modifying 45
- physical capacity
  - LTO storage cells and drives 13, 15
- power off the library 358
- power on the library 359
- power specifications 385
- power supply
  - location 4
  - redundant 4
  - switch 19
- power switch 4

## R

---

- ready status
  - return the library to 360
- reboot
  - drive 326

- library 308
- recovery moves 250
- reports
  - cartridge summary 256
  - feature audit log 72
- robot
  - description 18
  - diagnostic moves. *See* diagnostic moves.
  - display statistics 283
  - display status of 282
  - display summary information 281
  - monitoring tasks 280–283
  - utility tasks 327–342

## S

---

- safety precautions 355
- SCSI addressing
  - LTO locations 376, 377
- SCSI properties
  - display 210
- self-tests
  - drive 325
  - library 290, 313, 315
- Service Required indicator 9
- SL Console
  - activation password 24
  - communications failures 200
  - description 6, 23
  - first-time access 24
  - logging off 44
  - login ID 24
  - modes 24
  - modifying passwords 45
  - partition workspace and 95, 121, 168
  - screen, components 25
  - screen, modifying layout 27
  - security 24
  - standalone. *See* standalone SL Console
  - synchronize with library 27
  - user ID 24
  - Web-launched. *See* Web-launched SL Console
- SL Console Help
  - description 30
  - navigation 30
- SL Console report tasks 46–49
- SL Console reports
  - Current Drive Mappings 238
  - Drive Distribution 244
  - Drive Mapping History 240
  - Drive Utilization 246
  - Library Utilization 214
  - Media Drive Events Report 242
  - Options Bar 29

- types 28
- SNMP
  - access control 345
  - adding trap recipients 350
  - adding users 347
  - community strings support 345
  - defined 343
  - deleting trap recipients 352
  - deleting users 349
  - port control 344
  - setting up port control 353
  - SL500 supported versions 343
  - tasks 346
  - transfer the library MIB file 309
  - trap levels 343
- specifications
  - drive power 385
  - library clearances 384
  - library dimensions 383
  - power 385
- standalone SL Console
  - description 34–35
  - installing 51–53
  - installing updates 35
  - logging in 43
- storage cells
  - wall diagrams 373–381

## T

---

- tape management software 22
- transferring the log snapshot file 312
- troubleshooting 297

## U

---

- User ID
  - types 24

## W

---

- wall diagrams
  - Base Module, LTO 374
  - Base Module, mixed-media 379
  - Cartridge Expansion Module, LTO 378
  - Cartridge Expansion Module, mixed-media 381
  - LTO firmware mappings 375
  - LTO SCSI mappings 376, 377
  - mixed-media firmware mappings 380
- Web-launched SL Console
  - client requirements 33
  - description 33–34
  - Java WebArchive file 395
  - logging in using a browser 38

## W

- logging in using an icon 41
- logging in using CLI 38
- security 33
- starting on a client 34
- updating on a client 33
- Web-launched SL Console server
  - description 395
  - installing 396–400
  - security 395
  - updating 395