StorageTek SL500 Modular Library System

Systems Assurance Guide

Part Number: MT9212
October 2010
Revision MD

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StorageTek SL500 Modular Library System: Systems Assurance Guide

MT9212 Revision MD

Summary of Changes

Date	Revision	Description
August 2004	A	Initial Release
January 2005	B	See this revision for details.
February 2005	C	See this revision for details.
March 2005	D	See this revision for details.
May 2005	E	See this revision for details.
August 2005	F	See this revision for details.
November 2005	G	See this revision for details.
February 2006	H	See this revision for details.
June 2006	J	See this revision for details.
August 2006	K	See this revision for details.
October 2006	L	See this revision for details.
May 2007	M	See this revision for details.
July 2008	MA	See this revision for details.
October 2008	MB	See this revision for details.
May 2010	MC	See this revision for details.
October 2010	MD	Updates to this revision include: • Updated marketing order part numbers PTO to ATO. • Updates to support the LTO5 tape drive.

Note – Change bars indicate updates to this revision.

Contents

Tables

Figures

Preface

This *Systems Assurance Guide* is intended for account executives, system engineers, professional services personnel, service engineers, marketing and sales representatives, plus anyone interested in information about Oracle's StorageTek SL500 Modular Library System—also called the SL500 library or just library throughout this guide.

This guide contains checklists that identify the customer configurations and environments. These checklists are required as part of the systems assurance process and the exchange of information to make sure that no aspects of the sale, order, or installation processes are overlooked.

Related Publications

Refer to the following publications for additional information about the SL500 Modular Library System:

Publication	Part Number
Base Module Card	96121
Cartridge Expansion Module Card	96182
Customer Orientation Checklist	96200
Diagnostics/Troubleshooting Guide (Proprietary)	96153
Drive Expansion Module Card	96178
Installation Manual (Proprietary)	96114
Interface Reference Manual	96140
Local Operator Panel Guide	96258
Principles of Operation Manual (Proprietary)	96156
User's Guide	96116

Library publications are available in portable document format (PDF) online.

Documentation, Support, and Training

Function	URL	Description
Web Site	http://www.oracle.com/index.html	General information and links.
Documentation ■ Customer: ■ Employee: ■ Partner:	 http://docs.sun.com/ http://docs.sfbay.sun.com/ https://spe.sun.com/spx/control/Login	Search for technical documentation. Download PDF/HTML documents. Order printed documents.
Downloads ■ Customer: ■ Employee:	 http://www.sun.com/download/index.jsp http://dlrequest.sfbay.sun.com:88/usr/login	Download firmware and graphical user interfaces, patches, and features.
Support	http://www.oracle.com/us/support/index.htm	Obtain and escalate support.
Training	http://www.oracle.com/education/training_formats.html	Access training resources. Learn about Oracle courses.
Online Account	https://reg.sun.com/register	Register for an Online Account.

This table is in transition and subject to change to links within Oracle.

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SL500 Modular Library System: Systems Assurance Guide PN: MT9212, Revision MD

CHAPTER 1

Introduction

Oracle's StorageTek Modular Library Systems are automated tape libraries. The product family uniquely addresses clear customer requirements for very high availability defined as near-zero:

- Near-zero scheduled downtime through dynamic additions in capacity (slots) and throughput (tape drives)
- Near-zero unscheduled downtime through improved reliability, as well as redundant and hot-swappable components

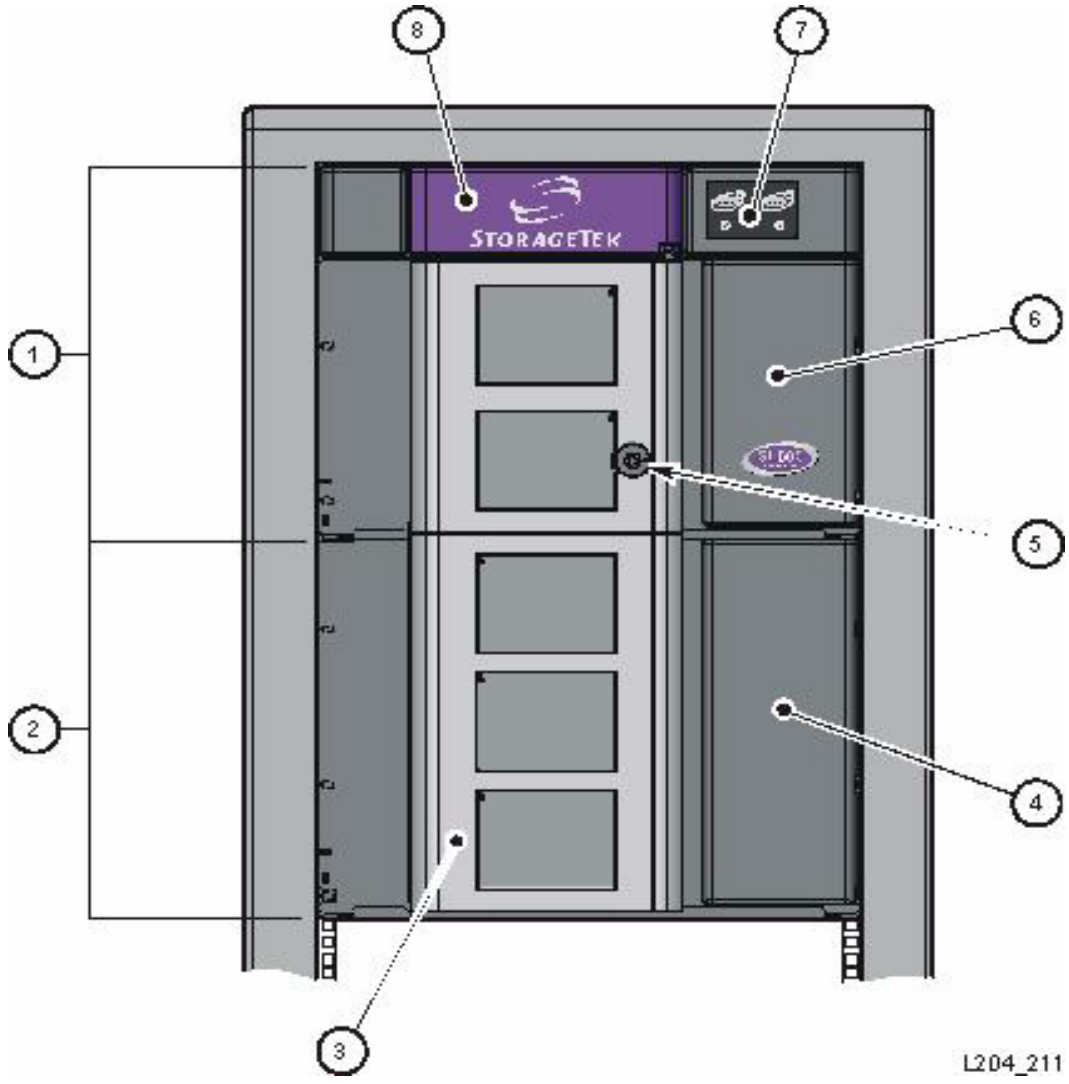
These libraries are simple to manage and easy to monitor with remote (standard) and local (*optional*) operator panels. The libraries are cost competitive with base configurations and the scalability to grow as needed by the customer. The libraries' high reliability also results in lower service costs, providing the customer with a lower total cost of ownership.

This chapter provides an overview of **Oracle's SL500 Modular Library System**, which is referred to as the SL500 library or just the "library" throughout this guide.

Library Overview

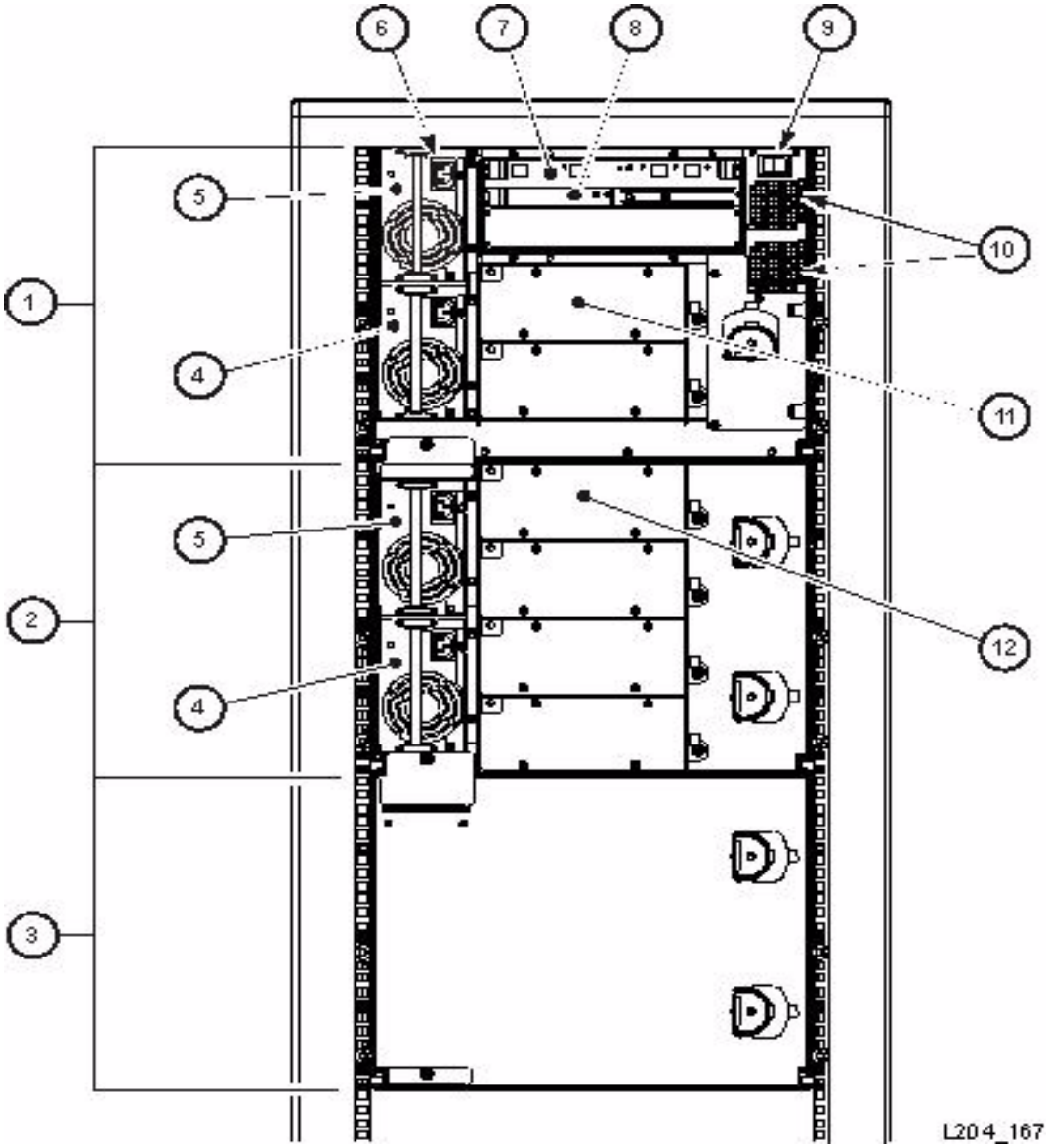
The SL500 library, shown in FIGURE 1-1 and FIGURE 1-2, is a self-contained, fully automated, cartridge tape storage system that is scalable and mounts into a standard 483 mm (19 in.) rack or cabinet. The base module is also available as a desktop version.

FIGURE 1-1 Front View of Library Components



1. Base module	5. Library door lock
2. Expansion module	6. Base unit cartridge access port (CAP)
3. Library door	7. Keypad
4. Expansion module cartridge access port	8. Robotics unit (with removable facade)

FIGURE 1-2 Rear View of Library Components



1. Base module	7. RLC controller card
2. Drive expansion module	8. MPU2 (Fibre Channel) or MPW/RLW (SCSI) PUA (Dual Port Fibre Channel-check on availability)
3. Cartridge expansion module	9. Library main power switch
4. Redundant power supply	10.Library fans
5. Standard power supply	11.Tape drive 1 in base unit
6. Power supply cord receptacle	12.Tape drive 1 in expansion module

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. Then 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 an activation key file for the new capacity, and then reboot the library.

Note – Starting with SL500 firmware version 1300 and SLConsole version FRS_4.00, storage capacity upgrades must be installed through the SL500 activation utility. 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

Important features and restrictions of Capacity on Demand that will help your customer to plan for and use the feature in your SL500 library are:

- Only activated storage cells can be used for tape cartridge storage. Inactivated cells cannot be used for cartridge storage, nor can they be accessed by any hosts.
- The minimum capacity is 30 storage cells for LTO-only libraries, and 24 storage cells for mixed-media libraries. This is identified as Limited Base hardware activation.
- Customers can purchase additional capacity in the following increments:
  - FullBase – All storage cells in the Base Module.
  - FullCEM – All storage cells in a cartridge expansion module (CEM).
  - FullDEM – All storage cells in a drive expansion module (DEM).
  - ThirdDEM – One-third of the storage cells in a DEM. For two-thirds of a DEM, you would install two ThirdDEM. For all of a DEM, you could install three ThirdDEMs or one FullDEM.
- After installing additional capacity, you must reboot the library. Once verified by the library controller, the additional storage cells are available for use.
- Storage capacity is incremental. Total capacity is equal to the sum of the capacities specified in each activation key file installed on the library.
- The order that capacity activation keys are installed is not significant (that is, it does not need to match the order of the modules in the SL500 frame).
- The SL500 does not support gaps in activated capacity; *all storage cells must be contiguous.* This has the following effects on capacity planning:
  - You can begin adding capacity to a module *only* if the module directly above it is at full capacity.
  - Deleting a Capacity key for a module in the middle of a library causes the modules below it to be unavailable. Any partitioning definitions affect will need to be re-done to account for the deleted slots.

Note – CEMs must be at the bottom of any SL500 configuration.

Hardware Activation Keys

The Hardware Activation utility allows the customer (or a service representative) to install optional features on the library. This utility begins with SL500 firmware version 1300 and Library Console version FRS_4.00.

Directions for customers to install the hardware activation keys are supplied in the *SL500 User's Guide*, part number 96116.

For SL500 hardware upgrade issues, customers should contact Technical Support and create a service request.

For SILKS issues, the Storage TSC Tape Support Team (Backline/Tier 3) should e-mail the SILKS_Help_Team@sun.com.

For SILKS IT application issues, users should create a Service Desk ticket:

Report a Problem > Software Applications > SILKS INFRA

- AMER: http://servicedesk.central
- APAC: http://servicedesk.singapore
- EMEA: http://servicedesk.uk

Two examples of major hardware activations include:

- Partitioning and
- Capacity on Demand

Activation Key File

A activation key file is delivered to the customer in an e-mail correspondence. Once received, the customer (or service representative) can perform this task.

The activation key file is installed through a session in the Library Console.

The key file is a digitally signed image (.img) file containing one or more activation keys for the features customers have purchased. In order to ensure that features are installed on the correct library, the activation key file includes the serial number of the target library and can only be installed on that library.

Each key file is assigned a unique sequence number. The sequence number ensures that only one instance of an activation key file can be installed on a library at a time.

SL500 hardware activation key files are cumulative. When you install a new key file, the included features are added to the features already installed on the library. These key files do not expire.

Library with LTO-only Cartridge Slots

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

The base module can be installed in a rack or placed on a desk, table, or similar sturdy surface. X-option number XSL500-DESKTP-KTZ contains covers, hardware, and other items to convert the base module into a desk-top version.

For each library:

- The base module contains the robotics unit and the base unit:
  - The robotics unit has the robotic components and the keypad
  - The base unit has up to 50 cartridge slots (see note), one or two tape drives, and a 5-slot cartridge access port (CAP).

Note – If the reserved slots are configured as storage slots, the numbering starts there. The CAP slots also can be configured as storage slots.

- Drive expansion modules and cartridge expansion modules can be added to a standard rack to accommodate various slot and tape drive configurations. *You must have a FullBase capacity base unit, either from the initial order or with the upgrade conversion bill, before you can order an expansion module.*
- See Chapter 5, "Ordering" for part numbers.

LTO-only Slot Physical Configurations

Note – Your software might conflict with the following information. Refer to your software publication for unique information.

The following figures and tables show cartridge slot and tape drive locations.

- FIGURE 1-3 shows a library with only a base module.
- FIGURE 1-4 shows a library with a base module that has nine reserved slots, one drive expansion module, and one cartridge expansion module.
- FIGURE 1-5 shows a library with a base module that has two reserved slots, one drive expansion module, and one cartridge expansion module. The storage slot numbering begins with the first slot after the reserved slots in column 1. The figure shows two reserved slots, but there could be more. If the reserved slots are configured as storage slots, the top slot (row 1) would be 1.
- FIGURE 1-6 shows the slot capacity of a cartridge expansion module according to which type of module is installed above and below it.

Four integers are used to represent the cartridge and tape drive slots, *as viewed from the front of the library.*

The numbering scheme uses the library, module, row and column scheme.

1. Library number (always 0)
2. Library module number 1 (top of rack) through 5 (bottom of rack)
3. Row number 1 through 9 (base module) or 1 through 12 (expansion module)
4. Column number 1 through 9 for base module and drive expansion module, 1 through 11 for cartridge expansion module

FIGURE 1-3 Base Module, LTO-only Library Slots

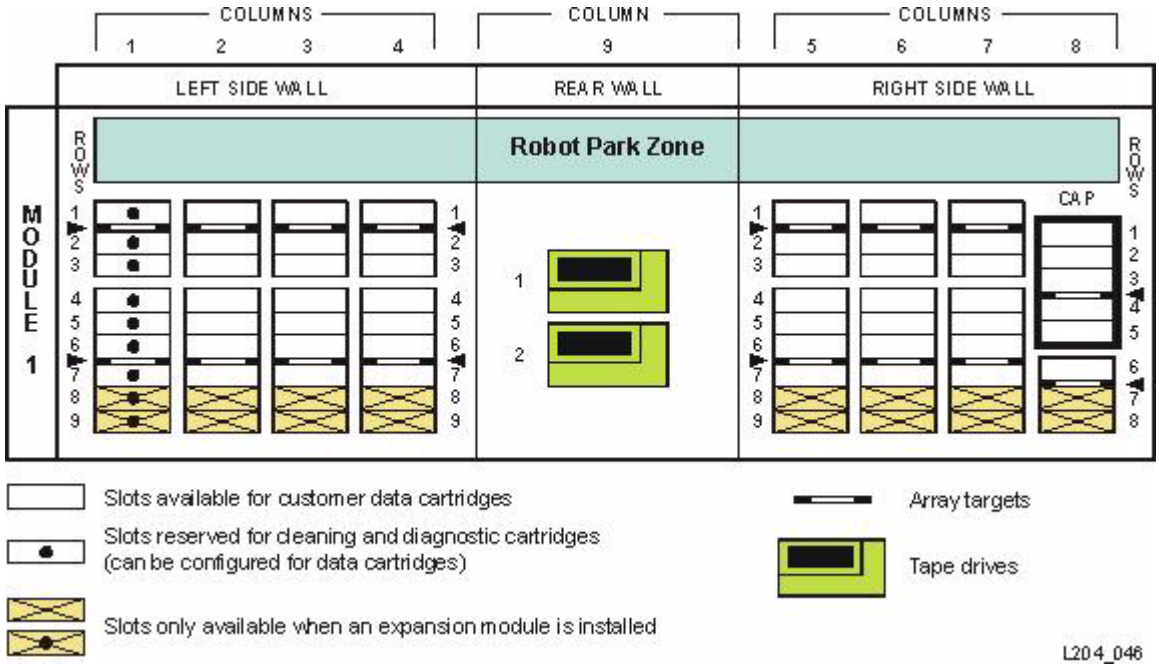


FIGURE 1-4 Firmware, LTO-only Library Slot Mapping

FIGURE 1-5 SCSI Element Numbering Mapping—LTO-only Library

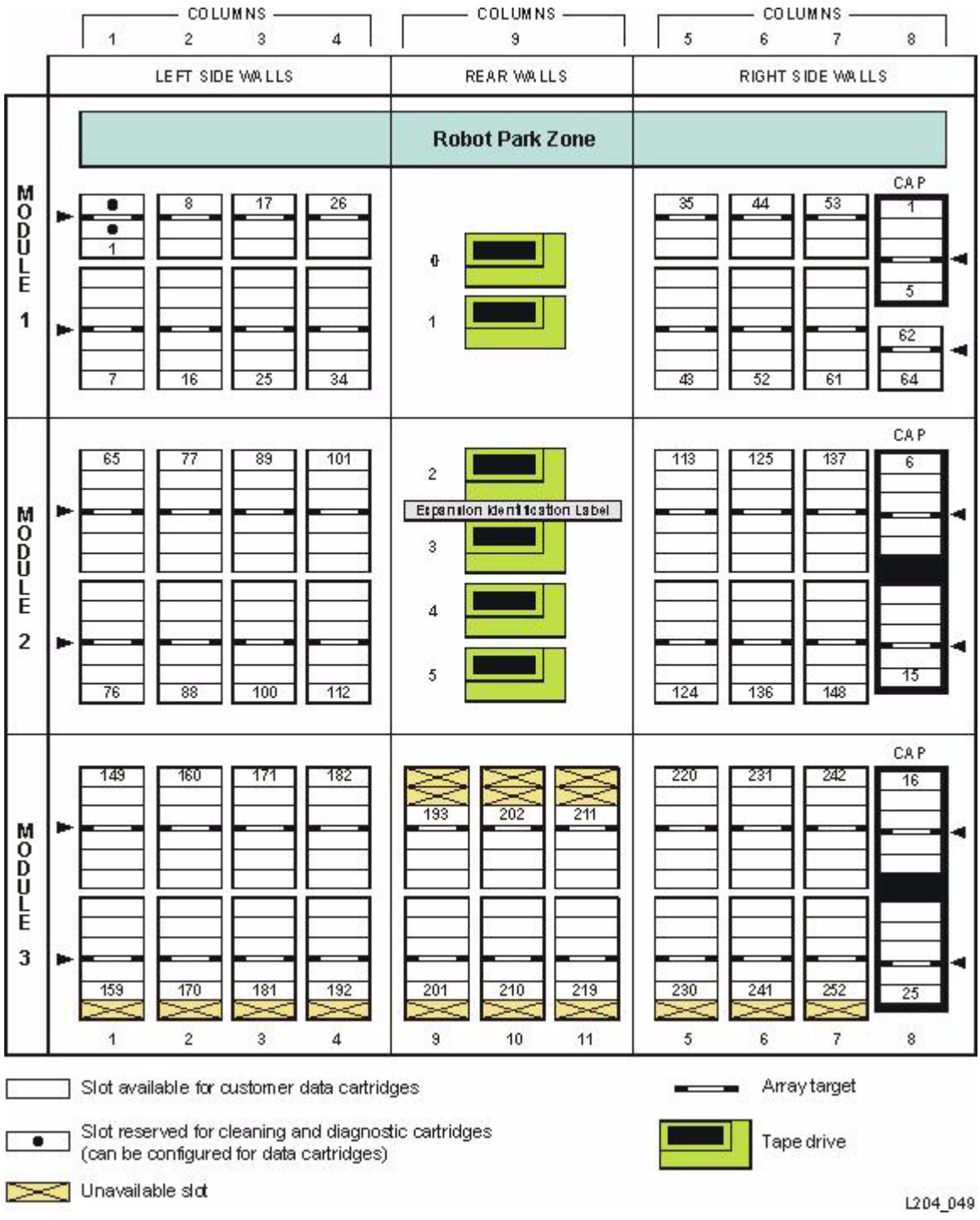
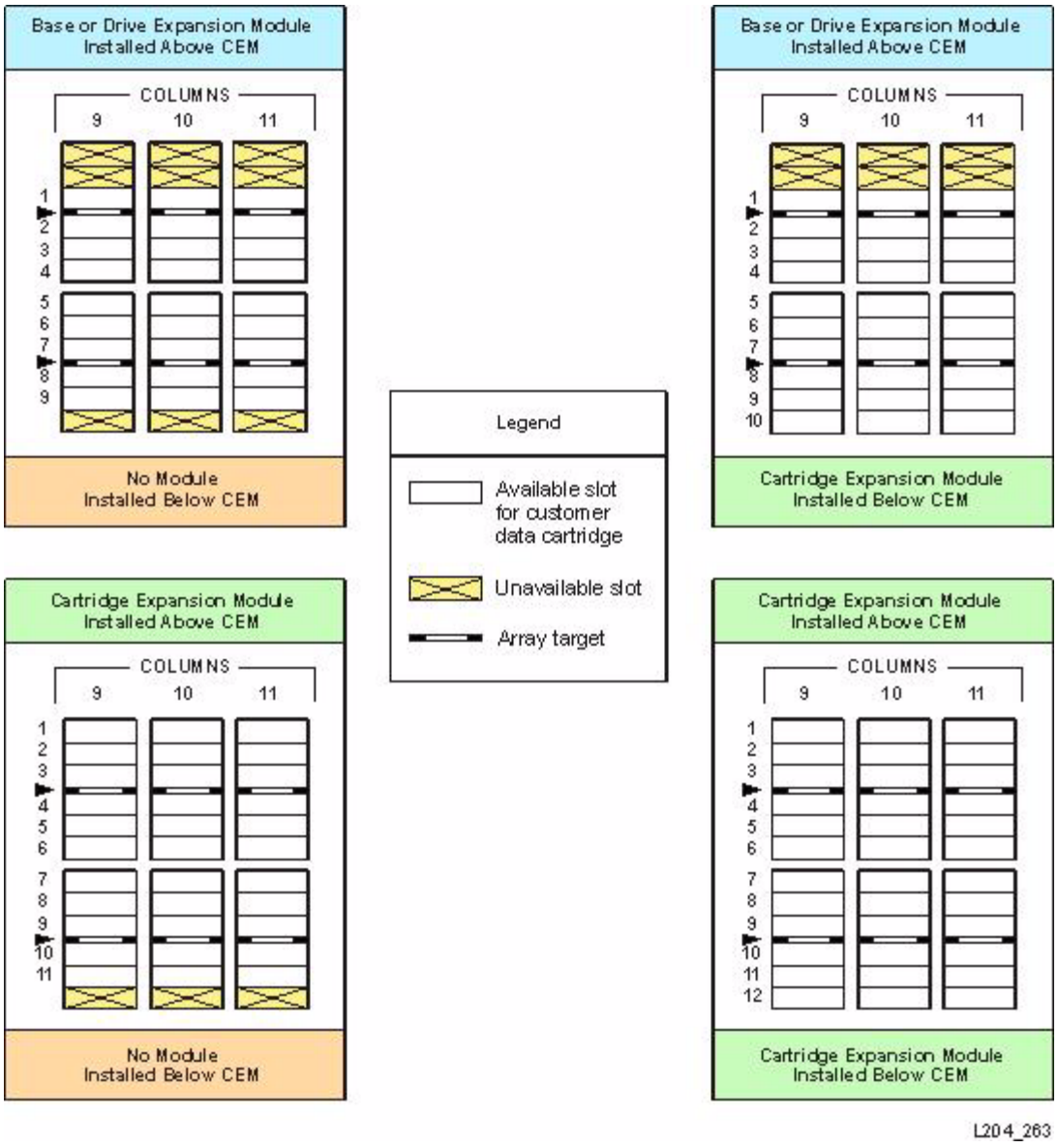


FIGURE 1-6 LTO-only Library Slots for Back Wall of Cartridge Expansion Module



LTO-only Capacity Calculations

TABLE 1-1 and TABLE 1-2 on page 11 relate to LTO-only libraries. The table assumes that, when DEMs and CEMs are installed in the same library, the DEMs are above all of the CEMs, *as preferred*.

Important:
Do not install an EZ DEM below an original CEM. This is not physically allowed.

Adding LTO slot capacity is covered in Chapter 5, "Ordering".

TABLE 1-1 LTO-only Capacity Rules

Description	Physical Capacity	...with Value
Base Module only (shipped standard)	30	LimitedBase
as last module	50	FullBase
with any module below	66	FullBase
Adding a **DEM** as the last module	77	ThirdDEM (in increments of 26, 26, 25)
with any module below	84	ThirdDEM (in increments of 28, 28, 28)
Adding a **CEM after a DEM** or **Base Module**	104	FullCEM
with any module below	114	FullCEM
CEM after CEM	110	FullCEM
with any module below	120	FullCEM

TABLE 1-2 LTO-only Capacity Example

Module	Capacity Value Installed	Sequence Number	Additional Raw Capacity Available	Additional Slots*	Library Total Count
Base Module					
Shipped standard	LimitedBase			30	30
Full capacity	FullBase	100		+20	50
Drive Expansion Module			16	+16	66
	1/3 DEM (increments of 26, 26, 25)	101	77	+26	92
	1/3 DEM (increments of 26, 26, 25)	102		+26	118
	1/3 DEM (increments of 28, 28, 28)	103		+25	143
Cartridge Expansion Module			7	+7	150
	FullCEM	104	104	114	254

Mixed Media Slot Physical Configurations

The following figures illustrate the physical configurations for mixed media libraries.

FIGURE 1-7 Base Module, Mixed-Media Library Slots

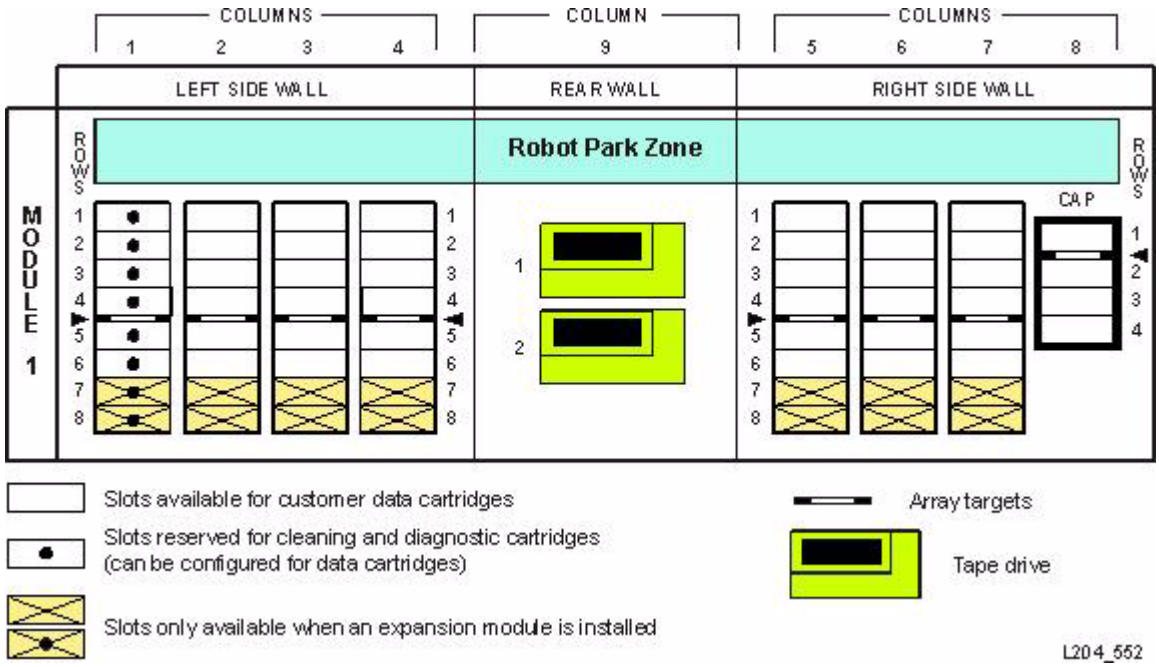
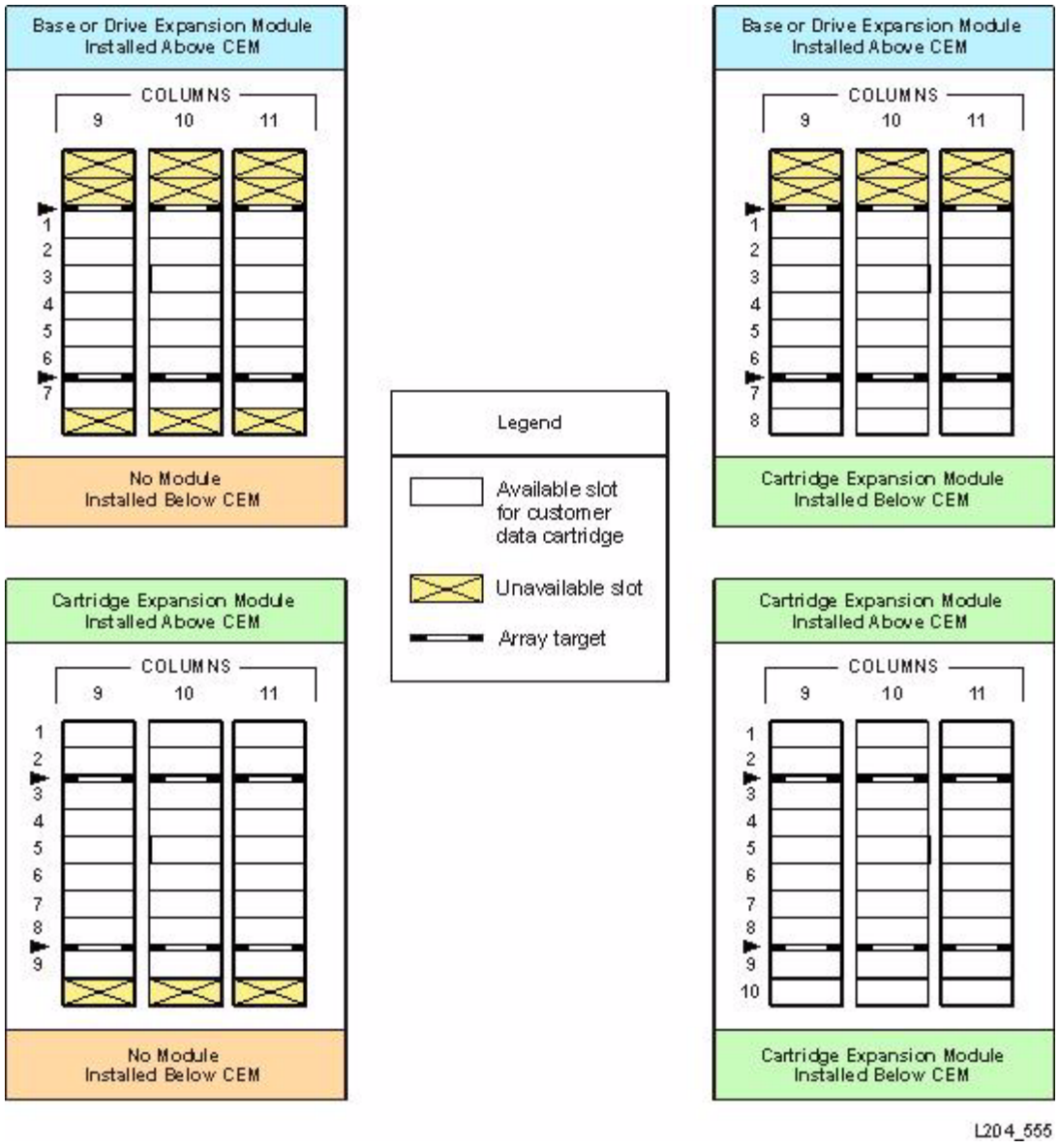


FIGURE 1-8 Firmware, Mixed-Media Library Slot Mapping

FIGURE 1-9 SCSI Mixed-Media Library Element Numbering Mapping

FIGURE 1-10 Mixed-Media Library Slots for Back Wall of Cartridge Expansion Module



Mixed Media Capacities

All capacity counts assume zero reserved slots and all CAPs are configured as I/O slots. The restricted slot count reduces the available slot capacity one-for-one. Configuring any CAP slots as storage slots within a module increases the available slots for 1/3 calculations. CAP slots outside any inactivated module—regardless if configured as I/O or storage—are not available for use.

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

The robotics unit must be PN 314558705 or higher to read SDLT cartridge labels.

Mixed Media Library Capacity Rules

TABLE 1-3 and TABLE 1-4 on page 17 relate to mixed media libraries. The table assumes that, when DEMs and CEMs are installed in the same library, the DEMs are above all of the CEMs, *as preferred*.

Important:
Do not install an EZ DEM below an original CEM. This is not physically allowed.

Adding mixed media slot capacity is covered in Chapter 5, "Ordering".

TABLE 1-3 Mixed Media Library Capacity Rules

Description	Physical Capacity	...with Value
Base Module only (shipped standard)	24	LimitedBase
as the last module	42	FullBase
with any module below	56	FullBase
Adding a **DEM** as the last module	63	ThirdDEM (in increments of 21, 21, 21)
with any module below	70	ThirdDEM (in increments of 24, 23, 23)
Adding a **CEM after a DEM** or **Base Module**	84	FullCEM
with any module below	94	FullCEM
CEM after CEM	90	FullCEM
with any module below	100	FullCEM

TABLE 1-4 Mixed Media Library Capacity Example

Module	Value	Sequence Number	Additional Raw Capacity Available	Additional Slots*	Library Total Count
Base Module	Shipped standard		24	24	24
	FullBase	100		+18	42
Drive Expansion Module	(none)		14	+14	56
	ThirdDEM (increments of 21, 21, 21)	101	63	+21	77
1st one under a base module	ThirdDEM (increments of 21, 21, 21)	102		+21	98
	ThirdDEM (increments of 21, 21, 21)	103		+21	119
Drive Expansion Module	(none)		7	+7	126
	ThirdDEM (increments of 21, 21, 21)	104	63	+21	147
2nd one under another module	ThirdDEM (increments of 21, 21, 21)	105		+21	168
	ThirdDEM (increments of 21, 21, 21)	106		70	189
Drive Expansion Module	(none)		7	+7	196
	ThirdDEM (increments of 21, 21, 21)	107	63	+21	217
3rd one under another module	ThirdDEM (increments of 21, 21, 21)	108		+21	238
	ThirdDEM (increments of 21, 21, 21)	109		+21	259
Cartridge Expansion Module					
	(none)	7	+7	+7	256
	FullCEM	110	84	+84	350

Host Notification for Capacity Changes

When storage capacity is changed, 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 discover the configuration changes. Customers must consult the appropriate tape management software documentation for detailed procedures and commands.

Partitioning Feature—Overview

The SL500 library can now be partitioned into various sections. Briefly stated, this means that instead of one library (with all its cartridge slots, tape drives and CAPs) being a single entity, the library and these components can now be divided into multiple sections (up to eight). Each partition can be accessed by one host or multiple hosts.

If your customer orders the partitioning feature, the service representative must enable the feature and work with the systems administrators who will be involved with assigning the partitions.

Partitioning is an option. Activation is required to enable the feature. See "Hardware Activation Keys" on page 5 and "Partitioning" on page 73.

Clear communication and cooperation among system programmers, network administrators and service representatives are essential. Be sure to share this information with all those involved in the partitioning effort and, if need be, correspond with other members of the service community when assistance is required.

Note – *It is best that all questions are answered before attempting to partition a library.*

Partitioning—General

Partitioning has terms associated with it that you and your customer must understand to effectively use the feature. In certain cases, these terms redefine some concepts that are familiar with users of the traditional, non-partitioned library configuration.

A "partition" is defined as the process of dividing portions of a library into discrete sections. The partitioning feature offers great flexibility for users. A partition can be as small as a single storage slot, a single CAP slot, or one tape drive if desired. A library can also contain multiple partitions. Customers could also set up a single and/or multiple partitions that are accessible by single or multiple hosts.

The key to understanding partitioning is knowing what partitions exist, their boundaries, and who has access to the specific partitions that are configured.

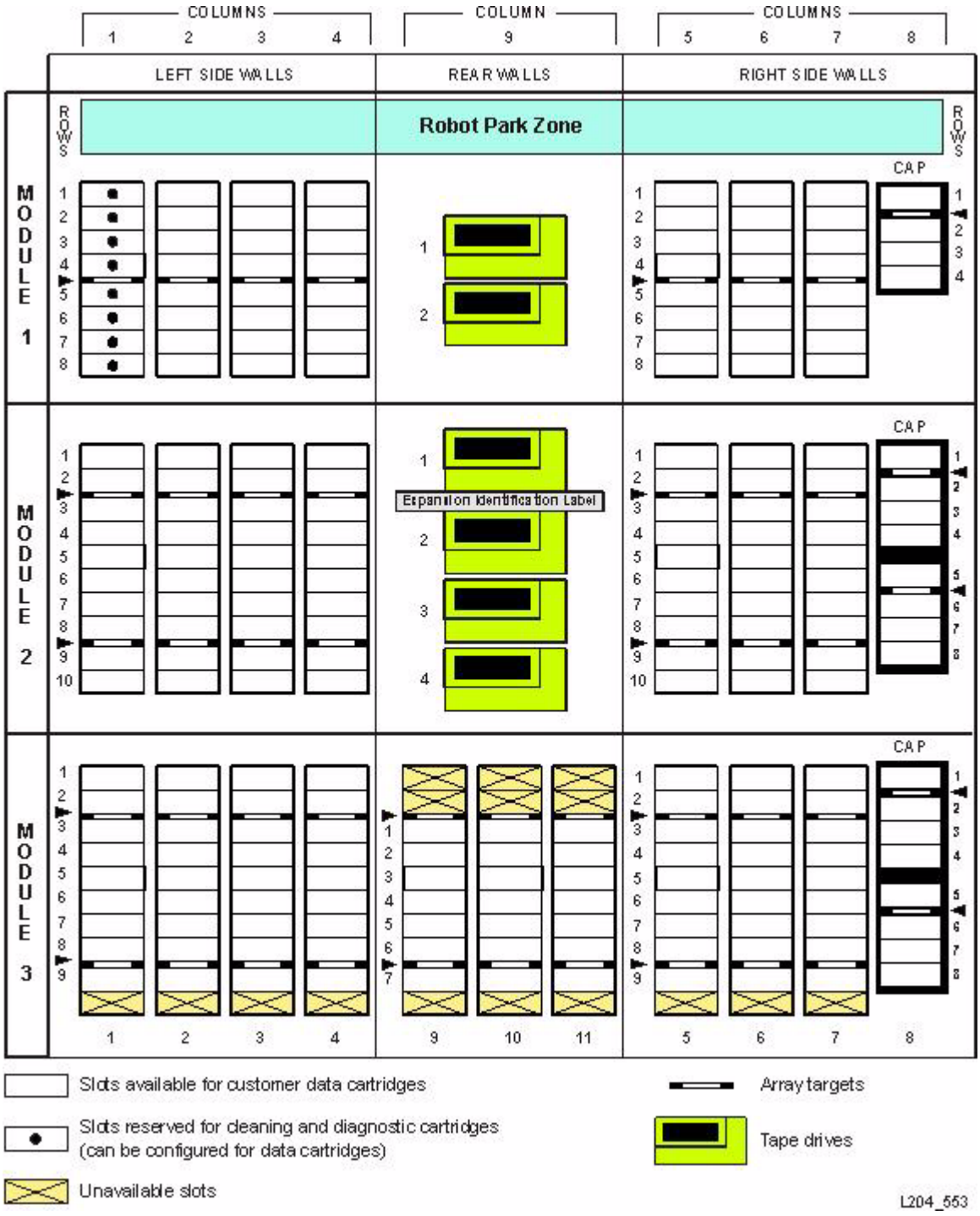
Setting up a partition requires some important considerations:

- If one partition designates several tape drives *solely* to its partition, no other partitions can use these tape drives.
- Partition users must also anticipate how much storage area is needed for their resident tape volumes and the amount of free slots required.
- CAP assignments are also critical. CAP slots can be specifically assigned to certain partitions or left open for common use. This will be discussed in detail later.

Storage slots and drives that are *not* assigned a partition within a partitioned library cannot be accessed. A customer could leave an area of slots unassigned, for example, in preparation for a planned future partition.

The SCSI element numbering within partitioned libraries is continuous for each partition, even if slot locations for each partition are non-contiguous. Using FIGURE 1-11 as an example, if one partition owns the base and cartridge expansion modules, SCSI element numbering begins at the first available slot in the base module and continues through the cartridge expansion module slots. For the partition owning the driving expansion module, the first slot in that module will begin the element numbering for that partition and continue throughout the module.

FIGURE 1-11 Partitioning a Library



Partitioning—Access Control

Host definitions are assigned to specific partitions. Customers can assign multiple host definitions to a single partition. However, they cannot assign the same host definitions to multiple partitions. For example, Partition 1 could be set up for hosts 2, 3, and 4; Partition 2 could have hosts 1 and 5 for host definitions. They could not, however, assign host 1 or 5 to *both* Partitions 1 and 2.

The host definition consists of:

- Host ID (WWN)
- Port number
- Logical unit number (LUN)

Partitioning—Location Numbering

Location numbering is composed of four digits: Library number, Module number, Row number, and Column number.

In a non-partitioned library configuration, the location number for the library always begins with the number "0." For partitioned libraries, however, the library number will change to the partition number.

If Partition 1 was composed of the entire base module, locating a cartridge in module 1, row 8, column 1 in the base module would translate into the following: 1, 1, 8, 1.

If Partition 2 was composed of the entire drive expansion module, row 10, column 1 would translate into 2, 2, 10, 1.

Partitioning—CAP Behavior

Whereas cartridge slots and drives can be partitioned, CAPs (or CAP slots) can be configured for:

- Assignment to a specific partition only (split assigned CAP)
- Common use for those partitions that do not specifically assign slots (common CAP)
- A combination of specific slots and common slots (mixed CAP)

Customers could conceivably partition two slots in an 8-slot CAP to a single partition and the remaining slots to a second partition, for example.

For partitioned libraries, these three configuration options for CAP assignments are explained below.

Split Assigned CAPs

As cartridge slots and tape drives can be partitioned, CAPs or CAP slots can be assigned to the sole use of a partition. When specific CAP slots are assigned to a *specific partition*, the split assigned CAP option is enabled

Careful planning in regard to anticipated CAP usage is required when using this option. *Only those CAP slots designated as split assigned can be used by the partition assigning them*.

Split Assigned CAPs—Example

The library (see FIGURE 1-1 on page 2) is composed of a base, drive and cartridge expansion modules. All cartridge slots, drives and CAP slots in the base module comprise Partition 1. All cartridge slots, drives and CAP slots in the drive expansion and cartridge expansion modules are assigned to Partition 2. Each partition has access to *only* the components configured for it.

If Partition 1 requests a CAP *import* operation, the procedure is:

- The operator selects Partition 1's CAP through either the local operator panel or SLConsole.
- The CAP button on the base module is pressed.
- The top CAP door is opened. All remaining CAP doors remain closed.
- The operator completes the operation.

If Partition 2 requests a CAP *import* operation, the procedure is:

- The operator selects Partition 2's CAP through either the local operator panel or SLConsole.
- The CAP button on the base module is pressed.
- The top CAP door remains closed. All remaining CAP doors open.
- The operator completes the operation.

Multiple split CAP assignments are available within a library. This is in contrast to common assigned CAPs (see below).

Note – As the default behavior, if *no* partition has selected a CAP through the operator panel or Library Console, the library will behave as if all split configured CAPs have been assigned to the CAP button. When the button is pressed, all CAP doors that are designated as split assigned will open to expose *all* split configured CAP slots, provided that no common configured CAP slot containing a cartridge is exposed.

Common (Unassigned) CAPs

The common (or unassigned) CAP configuration is present when there are no specified CAP slots designated (split assigned) to a partition or partitions. Strictly speaking, one does not "configure" or "assign" a CAP as common—any CAP slots that are not split assigned are available for mutual use among the remaining, unassigned partitions. Keep in mind that common CAPs are a single unit, shared among those partitions that have no split assigned CAPs.

Common (Unassigned) CAPs—Example

Referring to FIGURE 1-11 on page 20, Partition 1 is set up to contain all cartridge slots and drives in the base module for a single host. The remaining cartridge slots and drives are a second partition used only by a second host. However, no CAP slots are explicitly assigned for a partition—both partitions can use all CAP slots.

An example of an *import* operation sequence for a common CAP would be:

- The operator selects the CAP through either the local operator panel or SLConsole.
- An operator presses the CAP button.

- All CAP doors open.
- A cartridge is placed in any CAP slot.
- The CAP door is closed.
- The cartridge is placed into a slot within the requesting host's partition.

In a second instance, assume that Partition 2 requests a CAP *export* operation of a cartridge. Since it is a common CAP, the operation would be:

- The operator selects the CAP through either the local operator panel or SLConsole.
- The VOLSER of the cartridge to be exported is entered.
- The cartridge is placed in any CAP slot.
- All CAP doors open.
- The operator completes the operation.

For common CAPs, slots may be used by all partitions who do not specifically assign them. However, only one partition can select a CAP for operation at one time. The operation must be completed before the CAP is released to someone else through either the operator panel or SLConsole.

Mixed CAPs

A mixed CAP option is present when both split CAP and common CAP configurations are present within a library.

Mixed CAPs—Example

Referring again to FIGURE 1-1 on page 2, Partition 1 contains only the cartridge in module 1, column 5, row 1, and drive number 1 and the single CAP slot 1 in the base module. The remaining storage slots and drives are divided among partitions 2, 3, and 4. The remaining CAP slots are left unassigned. These unassigned CAP slots are usable by partitions 2, 3, and 4, but CAP slot 1 in the base module can only be used by Partition 1.

If Partition 1 requests a CAP *export* operation, the procedure is:

- The operator selects its CAP through either the local operator panel or SLConsole.
- The VOLSER of the cartridge to be exported is entered.
- The cartridge is placed into the top CAP slot of module 1's CAP.
- The top CAP door is opened. All remaining CAP doors remain closed.
- The operator completes the operation.

If Partitions 2 through 4 request an *export* operation, the procedure is:

- The operator selects a CAP through either the local operator panel or SLConsole. For this example, assume that Partition 2 has selected the top CAP for placement of the cartridge.
- The VOLSER of the cartridge to be exported is entered.
- The cartridge is placed into any module 1 CAP slot *except* the top one.
- All CAP doors open.
- The operator closes all CAP doors.

Within mixed assigned CAP environments:

- For common CAPs, one or more partitions can share those CAP slots not designated as split assigned.

- For split assigned CAPs, *several* configurations are possible. For example, the 4-slot CAP in a base module could be split assigned to Partition 1; the top four slots in the drive expansion module's CAP could be split assigned to Partition 2; the bottom four slots in the drive expansion module's CAP could be split assigned to Partition 3, and so forth. To fulfill the mixed definition, however, there must also be common CAP slots available.

The CAP Button—Its Function in Partitioned Libraries

A significant difference between a non-partitioned library's CAPs and those of a partitioned library must be noted. For a non-partitioned library, pressing the CAP button opens all CAPs that are configured as CAPs. *In a partitioned library, each partition must first have its CAP selected, using the operator panel or Library Console. This will dedicate the CAP button to the use of those partitions that selected a CAP or CAPs for operation.* After selection, pressing the CAP button will open *only* the CAP doors assigned to that partition.

If *not* selected by any partition, pressing the CAP button will open only those CAP slots that are split assigned (see the note on page 22).

An important thing to remember is that if multiple partitions are assigned to the same CAP slots (that is, common slots)—and that CAP is selected for use by one partition—the CAP import/export operation must be completed and the new partition assignment made, before another member of that partition can gain access for CAP operations.

Power System

The SL500 library comes with two power options: standard and redundant.

- The standard option has one 110–240 VAC, single phase, 50–60 Hz power supply that provides DC power to the library.
- The redundant option provides an additional power supply as an *optional feature.* To provide redundancy, each supply should be plugged into a separate branch circuit.

If something within the power supply or power source fails, the second supply provides power to the entire library until the failed power supply can be replaced or the power source is re-established.

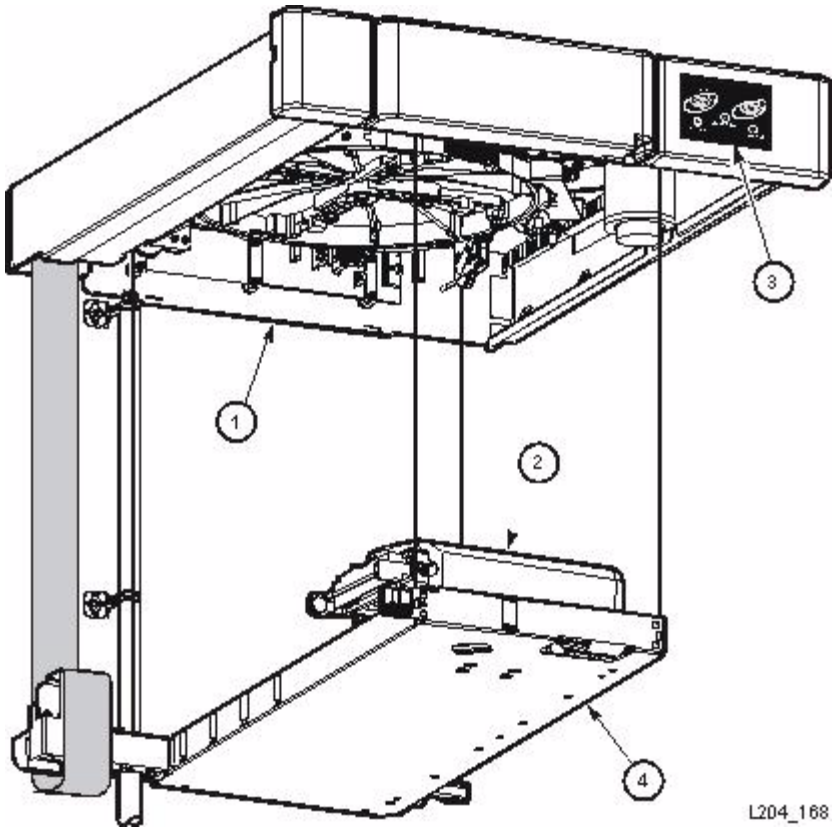
See TABLE 1-7, TABLE 1-8, and TABLE 1-9 for the power specifications.

Robotics Unit

The robotics unit (FIGURE 1-12) moves cartridges among the storage cells, tape drives, and cartridge access ports (CAPs) and is included with the base module. The three main components of the robotic unit are the:

- **Z drive assembly**—Uses a pulley system to vertically move the X table up and down
- **X table assembly**—Moves the hand horizontally across the library
- **Hand assembly**—Contains the wrist motor, gripper assembly, and bar-code scanner:
  - The wrist motor rotates the hand left and right.
  - The gripper assembly has fingers that grasp the sides of the cartridge.
  - The bar-code scanner targets and reads the volume serial numbers

FIGURE 1-12 Robotics Unit



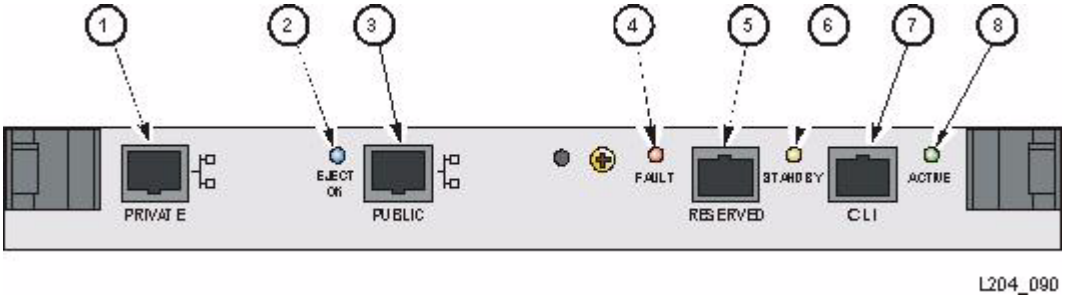
1. Z drive assembly	3. Keypad (included because of its location)
2. Hand assembly	4. X table assembly

Electronics

The electronics for the library consists of two types of cards:

- **RLC (control) card**—Contains the processor and controls the various functions of the library, such as the robotics, sensors, vision system, and the CAP. The RLC card also stores the library configuration and volume serial numbers of the cartridge tapes and their locations.
- **Interface card** — Provides the type of interface attachment to the library:
  - MPW/RLW card for a SCSI LVD interface
  - MPU2 card for a Fibre Channel interface
    (PUA Dual Port Fibre Channel; check on availability)

FIGURE 1-13 RLC Card Connectors



1. Private Ethernet port is for future use.
2. Not used
3. Public Ethernet port is for remote service access, SLConsole, and SNMP.
4. Fault LED indicates that the control card has detected an error.
5. Reserved for future use.
6. Not used
7. CLI port is an RJ-45 serial port for service representatives.
8. Active LED indicates the library controller is active.

Operator Panels

There are three ways an operator can use to access the library:

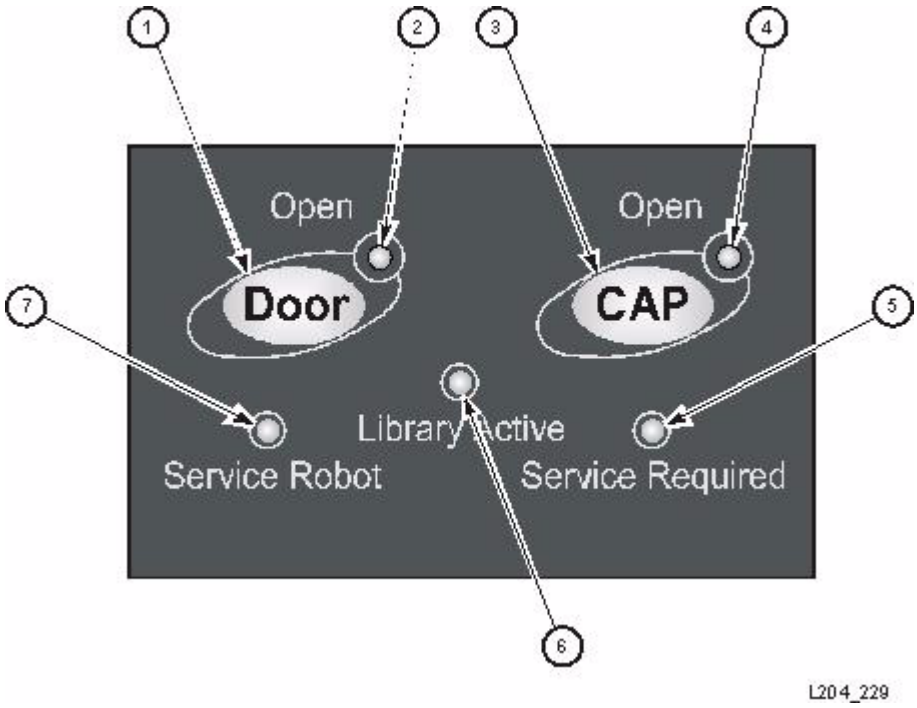
- Keypad (standard)
- Remote operator panel using the Library Console (standard)
- Local operator panel, touch screen (*optional feature*)

Keypad

FIGURE 1-14 shows the keypad, which has two buttons and five LEDs.

- The two buttons:
  - Door: calls the robot to move to the parked zone
  - CAP: opens the cartridge access port
- The five LEDs indicate library activity, service and fault status, CAP and front door status

FIGURE 1-14 Keypad



1. Open Door button
2. Open Door indicator
3. Open CAP button
4. Open CAP indicator
5. Service Required indicator
6. Library Active indicator
7. Service Robot indicator

Library Console

The SL500 uses the StorageTek Library Console (SLConsole), a Java[1] application that provides a graphical user interface (GUI) for the library.

This application is accessed from a remote PC (s*tandard feature*) that uses a TCP/IP connection to the library.

The SLConsole can be used to help diagnose problems with the library and its attached devices (tape drives, CAPs, and robot). It allows you to:

- Monitor device activity
- Load firmware
- Print reports

Local Operator Panel

The local operator panel is an optional feature that can be used to:

- View library component details (status, properties, and statistics)
- Locate a cartridge
- Move a cartridge
- Empty the hand
- Clean a tape drive

Cartridge Access Port

The cartridge access ports (CAPs) are located to the right of the front door of the library.

The base module has one standard CAP:

- The library with LTO-only arrays has one 5-slot CAP.
- The library with mixed-media arrays has one 4-slot CAP.

Each expansion module has a CAP consisting of two magazines:

- The library with LTO-only arrays has two 5-slot magazines.
- The library with mixed-media arrays has two 4-slot magazines.

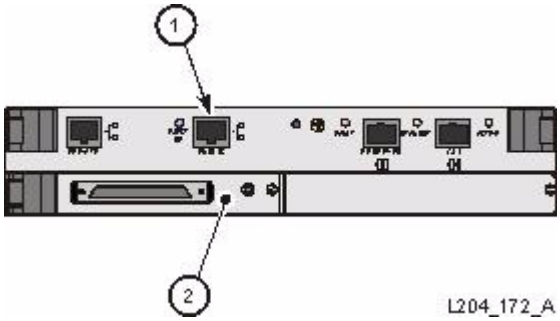
1. Java is a general purpose programming language with a number of features that make the language well suited for use on the internet and with Web browsers.

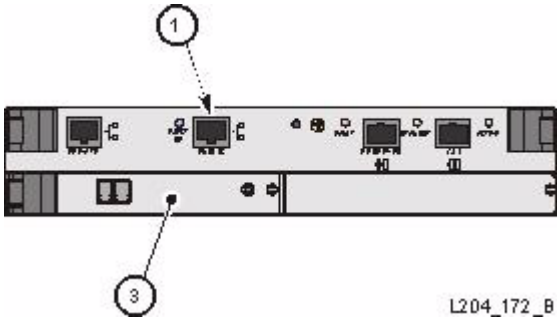
Library Interfaces

The SL500 library uses the following interface connections:

- Ethernet
- SCSI LVD
- Fibre Channel

FIGURE 1-15 Library Interfaces





1. Ethernet connection	2. SCSI LVD card (MPW/RLW)	3. Fibre Channel card (MPU2/PUA)

Ethernet

The SL500 uses standard TCP/IP over Ethernet for the Library Console and Simple Network Management Protocol connections.

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

Simple Network Management Protocol

Simple network management protocol (SNMP) is an application-layer protocol that performs network management operations over an Ethernet connection.

SNMP allows systems administrators to query the library for configuration, operation, and statistical information *plus* SNMP allows the library to alert systems administrators of potential problems.

Systems administrators and network managers can use SNMP to monitor and receive status from the library, such as:

- Operational state of the library (firmware, serial number, online/offline)
- Library elements (columns, panels, slots, CAPs)
- Number of storage slots, media types, and tape drives

The SL500 library supports SNMPv3 and Management Information Base (MIB) II or higher.

MIB is a viewable document that contains descriptions about the characteristics for a managed device. These characteristics are the functional elements for that device which can be monitored using SNMP software.

For SNMP information, refer to the *SL500 Simple Network Management Protocol Guid*e, part 316946601.

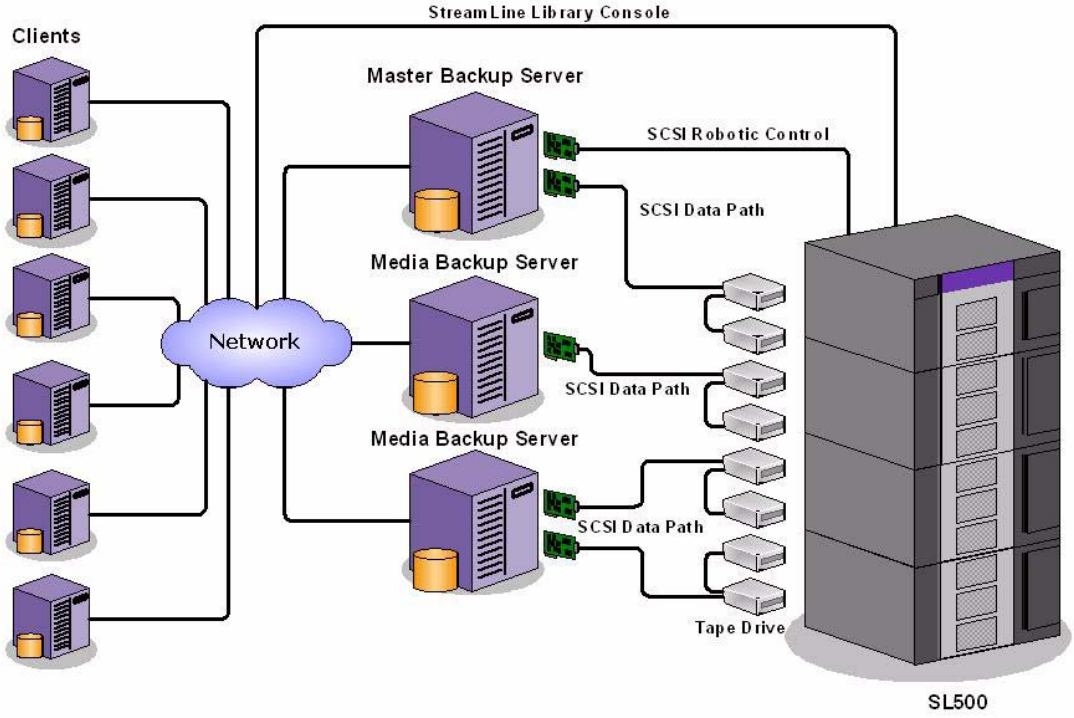
SCSI LVD

The small computer system interface (SCSI) is an ANSI standard, intelligent peripheral interface that has been in existence since the late 1970's.

The low voltage differential (LVD) implementation is the most recent development of this interface and provides a low noise, low power, low amplitude signal. This lower signal allows for faster switching and higher data transmission speeds. However, this lower signal also reduces the length of cable allowed for an LVD bus. An LVD bus can be up to 12 m (40 ft) long and can support up to 16 devices.

The SL500 library implements the SCSI-3 standard that uses a 16-bit bus, and supports data rates of up to 80 MB/s. SCSI 3 is also know as Ultra3 SCSI, Fast SCSI (Fast-80), or Ultra SCSI (Ultra160). L.

FIGURE 1-16 SCSI LVD Example



Fibre Channel

The SL500 Fibre Channel physical interface provides a native connection scheme that supports open system environments. Topologies include:

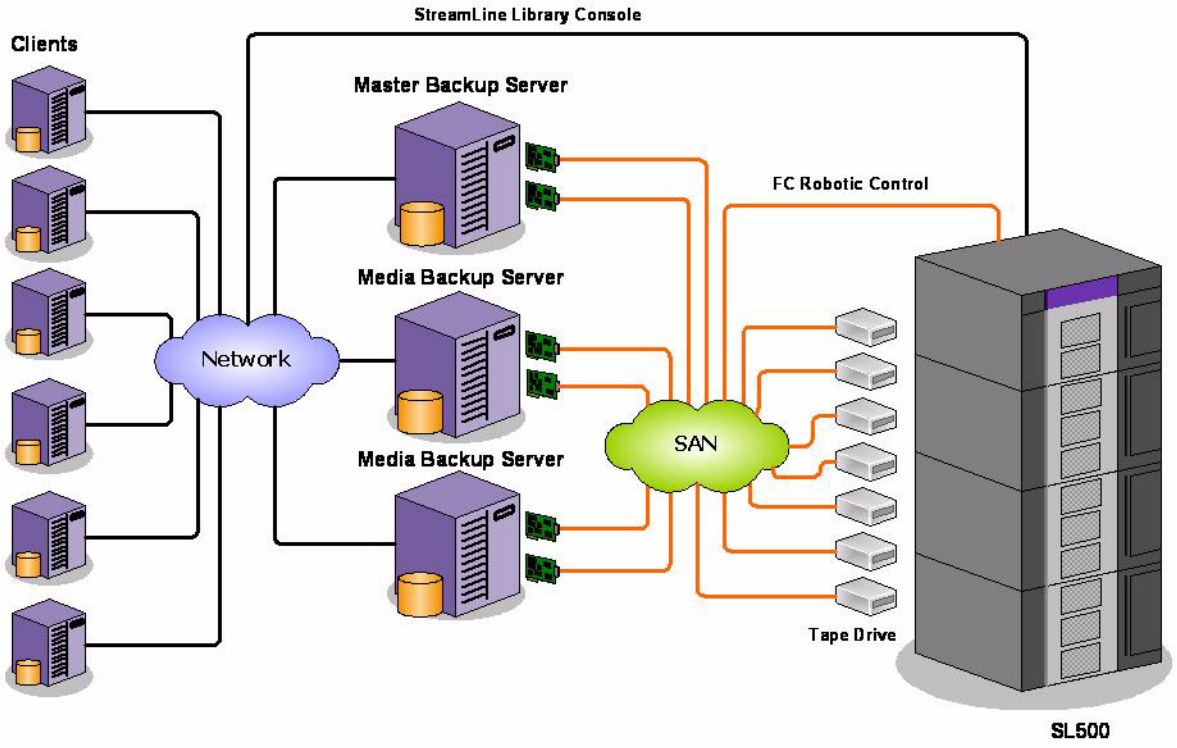
- **Switched Fabric**
  Note: *This topology is recommended for the library.*

  A switched fabric provides dynamic interconnections between nodes and multiple, simultaneous Fibre Channel connections for the network. If the library is connected to a Fibre Channel switch or fabric-capable host, the library configures itself as a switched fabric topology and can support up to 16 million ports logged into the fabric.

- **Arbitrated Loop**
  Note: *While the library supports the arbitrated loop topology, switched fabric is preferred for new or future implementations.*

  Arbitrated loops provide multiple connections for devices that share a single loop and allow only point-to-point connections between an initiator and target. An arbitrated loop can connect up to 126 ports.

FIGURE 1-17 Fibre Channel Example



Library Management Software

Library management software components control the library and manage the library database. They also retain volume location and attribute information, plus they perform activities such as mounts and dismounts, enters and ejects.

There are several software components depending on the platform, connection type, and operating system.

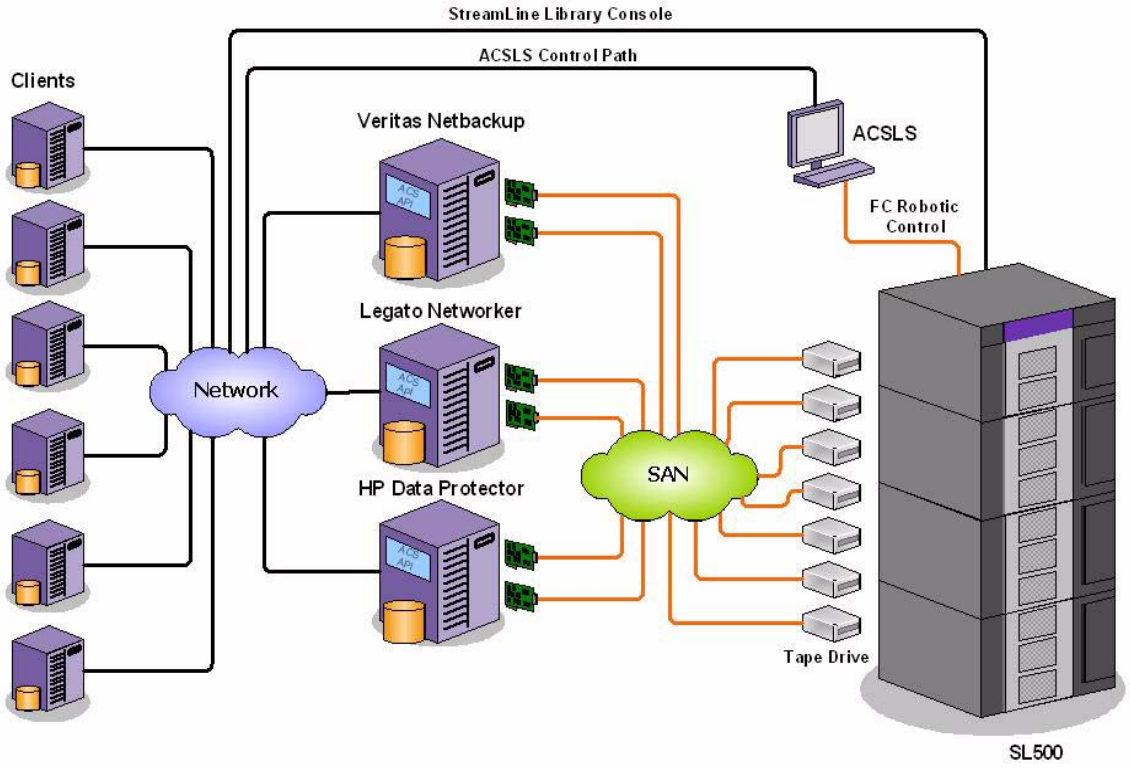
Note – The same library management software the customer currently has and is familiar with *today* can be upgraded to support the SL500 library.

Automated Cartridge System Library Software

Automated Cartridge System Library Software (ACSLS) is an open systems software package that manages library contents and controls library hardware to mount and dismount cartridges on tape drives. This application provides library management services such as cartridge tracking, pooling, reports, and library control.

Note: ACSLS 7.1.*x* or higher is required.

FIGURE 1-18 ACSLS Example



Independent Hardware and Software Vendors

For the most current list of independent hardware and software vendors:

1. Go to http://extranet.stortek.com/interop/interop?cmd=short_matrix
2. In the Disk and Library window, select STK:SL500 and any other filters.
3. Click the Get Summary button.
4. Review the Summary Report or click on the Detailed Report button for more information.

Tape Drives and Cartridges

See Appendix A or the tape drive publications for information about the tape drives.

Safety Features

The SL500 library has a combination of safety features throughout the library, which include:

- Key to open and lock front door
- Robotics retracted and in a parked position
- Protective modules for the logic cards
- Cooling fans to prevent an overheating condition

Front Door and Robotics

The robot is retracted into the park zone in the robotics unit when the front door is open. Plus, you must use a key to open the front door.

To open the front door:

1. Press the Door Open button on the keypad.
   - The software allows the current job to complete.
   - The software parks the robot by retracting it into the robotics unit.
2. When the Door Open indicator light turns on, use the key to open the door.

   The front door must be opened with a key to make sure that the data is secure. If the door is not fully closed, a sensor relays the condition to the software for security and safety reasons.

   Power is removed from the robot to prevent someone's hand from being injured.

Cards and Power Supply

The RLC card, interface card, and the power supply are housed inside protective modules to prevent you from coming into contact with hazardous voltages and sensitive electronics.

Cooling Fans

The library has two cooling fans that provide cooling for the library electronics.

The tape drives and power supplies have their own fans.

Specifications

The following tables list the specifications for the rack, library and tape drives. See FIGURE 4-1 on page 63 and FIGURE 4-2 on page 64 for library and rack dimensions.

Note – In the following table, HP is a registered trademark of Hewlett-Packard Company. IBM is a registered trademark of International Business Machines. SDLT is a trademark of Quantum Corporation.

TABLE 1-5 Library Component Weights

Component	Weight
Base module with 1 power supply, 2 tape drives, and robotics unit	44.5 kg (98.0 lb)
Drive expansion module (DEM) with 1 power supply and 4 tape drives	41.3 kg (91.0 lb)
Cartridge expansion module (CEM)	20.1 kg (44.2 lb)
Robotics unit	10.1 kg (22.2 lb)
Power supply	2.3 kg (5.1 lb)
HP® LTO Ultrium tape drive and tray assy	3.6 kg (7.9 lb)
IBM® LTO Ultrium tape drive and tray assy	4.5 kg (9.9 lb)
SDLT™ LVD tape drive and tray assy	4.2 kg (9.3 lb)
SDLT FC tape drive and tray assy	4.1 kg (9.0 lb)
DLT-S4 tape drive and tray assembly	3.92 kg (8.65 lb)
Tape drive tray assy without tape drive	1.5 kg (3.4 lb)
LTO Ultrium cartridge	221 g (7.8 oz)

TABLE 1-6 Environmental Specifications

Item	Measurements		
	Operating	Storage	Transporting
Temperature	10 to 40ºC (50 to 104ºF)	10 to 40ºC (50 to 104ºF)	-40 to +60ºC (-40 to +140ºF)
Humidity	20 to 80%	10 to 95%	10 to 95%
Wet bulb (maximum, non-condensing)	+29.2ºC (+84.5ºF)	+35ºC (+95ºF)	+35ºC (+95ºF)
Altitude	-76 to 3,048 m (-250 to 10,000 ft)		

TABLE 1-7 Library Power *without* Tape Drives

Item	Specification
Input voltage	100–240 VAC, single phase
Frequency	50/60 Hz
Maximum library power consumption	1.4 A @ 120 V *or* 0.8 A @ 240 V
Maximum heat output	614 Btu/hr
Voltage-amperes	180 VA

TABLE 1-8 Library Power *with* Two LTO Tape Drives

Item	Specification
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 1-9 Library Power *with* Four LTO Tape Drives

Item	Specification
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

Warranties

The initial warranty period for the SL500 is:

- 5-by-9 next business day service level
- Monday through Friday 8:00 a.m. to 5:00 p.m. Mountain time
- 12 months from installation

Regulatory Agencies

The following regulatory agencies have tested and certified the SL500 library.

- Certified by Underwriters Laboratories Inc. (UL) to Standard for Information Technology Equipment -- Safety -- Part 1: General Requirements
- UL 60950-1 First Edition
- CAN/CSA-C22.2 No. 60950-1-03 First Edition
- EN 60950-1 (IEC 60950-1:2001, modified)
- CB Scheme in compliance to international Certified Body Scheme requirements with all national deviations

EN60950-1:2001 Statement

The following statement pertains to products that require a ground connection at the wall outlet.

Norway:
Apparatet må tilkoples jordet stikkontakt
Finland:
Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan
Sweden:
Apparaten skall anslutas till jordat uttag
Denmark:
For tilslutning af de øvrige ledere, se medfølgende installationsvejledning.

Electromagnetic

Configuration used for verification and compliance in an SL500 Modular Library with a TCP/IP connection and 2 to 18 tape drives:

- Federal Communications Commission (FCC) in compliance to the requirements of FCC 47, Part15, Subpart B and Unintentional Radiators Class A
- Voluntary Control Council for Interference (VCCI) (Japan) in compliance to VCCI Class A (Cispr22)
- Australia/New Zealand (C-Tick Mark) in compliance to requirements of the Australia/New Zealand EMC Framework AS/NZS 3548: 1995 Class A
- European Community (CE Mark) in compliance to the requirements of Electromagnetic Compatibility Directive 89/336 (including all amendments).
- Canadian Emissions (ICES) in compliance to the requirements of Canada's Interference Causing Equipment Standard ICES-003 Class A.
- Taiwan (BSMI) in compliance to the requirements of Canada's Interference Causing Equipment Standard ICES-003 Class A.
- Korea in compliance to the requirements of Korean EMC Law.

Fiber-optic

Each fiber-optic interface in this equipment contains a laser transceiver that is a Class 1 Laser Product.

Each laser transceiver has an output of less than 70 µW.

These Class 1 Laser Products comply with EN60825-1:1994+A1+A2 and with sections 21 CFR 1040.10 and 1040.11 of the Food and Drug Administration (FDA) regulations.

Warning – Possible Physical Injury. Use of controls or adjustment or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Fiber-optic Laser Product Label

In accordance with safety regulations, a label on each StorageTek Fibre Channel product identifies the laser class of the product and the place and date of the manufacturer. The label appears on top of a Fibre Channel tape drive and near the Fibre Channel connectors on a Fibre Channel tape library.

A copy of the label is shown here:

CLASS 1 LASER PRODUCT
LASER KLASSE 1
APPAREIL A LASER DE CLASSE 1
COMPLIES WITH 21 CFR 1040.10 AND 1040.11

The following laser safety and classification translations are for users in Finland and Sweden:

CLASS 1 LASER
LUOKAN 1 LASERLAITE
KLASSE 1 LASER APPARAT

CHAPTER 2

System Assurance

The system assurance process is the exchange of information among team members to make sure that no aspects of the sale, order, installation and implementation for the SL500 Library are overlooked. This process promotes an error-free installation and contributes to the overall customer satisfaction.

The system assurance team members make sure that all aspects of the process are planned carefully and performed efficiently.

This process begins when the customer accepts the sales proposal. At this time, a StorageTek representative schedules one or more system assurance planning meetings.

System Assurance Planning Meetings

The purpose of the system assurance planning meetings are to:

- Introduce the customer to the StorageTek SL500 Library
- Explain the system assurance process and establish the team
- Identify and define the customer requirements
- Identify the configurations
- Complete the order
- Prepare for the installation and implementation

TABLE 2-1 System Assurance Task Checklist

Task	Completed?
Introduce the team to the customer.	Yes ❑ No ❑
Complete the Team Member Contact sheets in this chapter.	Yes ❑ No ❑
Review and complete Chapter 3, "Site Survey" (also in the site kit TM0001)	Yes ❑ No ❑
Review and complete Chapter 4, "Site Preparation" (also in the site kit TM0001)	Yes ❑ No ❑
Complete the ordering pages in Chapter 5, "Ordering"	Yes ❑ No ❑
Determine the installation schedule:	Yes ❑ No ❑

Customer Team Member Contact Sheet

Complete the following with information about the customer team members:

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

StorageTek Team Member Contact Sheet

Complete the following with information about the StorageTek team members:

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

CHAPTER 3

Site Survey

This chapter provides space where you can record the different platforms, applications, and hardware configurations your customer *currently* has.

The type of information you need to gather includes:

System Configuration

Use these two pages to record information about the customer's operating systems and configurations.

TABLE 3-1 Questions About the Customer's Operating Systems

Question	Answer
1. How many and what types of operating systems or platforms does the customer have? Open-Systems: ■ Windows: 2000, NT Make and model: Quantity: ■ UNIX: Solaris, AIX, HP-UX Make and model: Quantity: ■ Linux Make and model: Quantity: Main-Frame: ■ MVS Make and model: Quantity: ■ VM Make and model: Quantity: Other (Specify): ■ Make and model: Quantity:	
2. Are there plans for: ■ New purchases? ■ Future upgrades? ■ If so, what?	
3. How many systems/servers are used as: ■ Backup servers? ■ File servers? ■ Print servers? ■ Exchange servers?	

TABLE 3-2 Current System Configuration

System _____	**Processor** _____	**Processor** _____
Vendor make and model		
Operating system type		
Version number and patch level		
Number of channels		
IP address		
HBA vendor and model		
HBA firmware versions		
Switch make and model		
Switch and port numbers		

System _____	**Processor** _____	**Processor** _____
Vendor make and model		
Operating system		
Version number and patch level		
Number of channels		
IP address		
HBA vendor and model		
HBA firmware versions		
Switch make and model		
Switch and port numbers		

System _____	**Processor** _____	**Processor** _____
Vendor make and model		
Operating system		
Version number and patch level		
Number of channels		
IP address		
HBA vendor and model		
HBA firmware versions		
Switch make and model		
Switch and port numbers		

Applications

Use these two pages to record information about the customer's applications.

TABLE 3-3 Questions About the Customer's Applications

Question	Answer
1. How are backups performed, manually or automatically? 2. How many servers or systems perform backups?	
3. On what days are backups performed? 4. What types of backups are performed and when? ■ Full ■ Incremental ■ Differential 5. How many hours are available for: ■ Full backups ■ Daily Backups	
6. How much data is backed up: ■ Per day ■ Per week ■ Per month 7. What percentage of data changes daily?	
8. Are backup windows being met? 9. How long does it actually take? 10.How long should a backup take? 11.Is a different backup schedule needed?	
12.How long does the customer keep the different levels of backed up data? 13.How many copies are made, including the original? 14.How many copies are archived?	
15.How often are restores necessary? 16.Why are restores necessary? 17.What are the restore requirements? 18.What are the restore objectives?	

TABLE 3-4 Current Backup and Archive Software

Selection	Type of Backup and Archive Software	Version
❑	Veritas NetBackup	
❑	IBM Tivoli Storage Manager (TSM)	
❑	Legato NetWorker	
❑	CA Brightstor	
❑	HP Omniback	
❑	Commvault Galaxy	
❑	E-Mail Archive	
❑	ASM NT	
❑	ASM UNIX	
❑	Other (Specify)	
❑	Other (Specify)	

TABLE 3-5 Current Network Management Software

Selection	Type of Management Software	Version
❑	Veritas	
❑	IBM Tivoli NetView	
❑	HP OpenView	
❑	HP SUNNet	
❑	Horizon Library Monitor	
❑	RMS/GSM	
❑	Other (Specify)	
❑	Other (Specify)	

TABLE 3-6 Current Library Attachment Software

Selection	Type of Attachment Software	Version
❑	ACSLS	
❑	ACSLS HA	
❑	Direct SCSI	
❑	Fibre Channel	
❑	Other (Specify)	

Databases

Use this page to record information about the customer's databases.

TABLE 3-7 Questions About the Customer's Database

Question	Answer
1. How much primary storage exists? Total capacity.	
2. What type and size of disk drives does the customer have? Make: Model: Capacity: Quantity:	
Make: Model: Capacity: Quantity:	
3. What is the RAID configuration? 4. What type of failover product and version is the customer using?	
5. Does all primary storage require backup? If not, how much does? 6. Are additional storage devices needed?	
7. What database management system does the customer have? 8. What types of databases need backups? 9. What is the size of the smallest database? 10.What is the size of the largest database? 11.How often does the customer back up each database?	
12.What type of data is the customer backing up? 13.How valuable is the data in each database? 14.Do the different databases have different backup requirements?	
15.How is the customer currently protecting the databases (tape backup, mirroring, snapshot)? 16.If mirroring, how many mirrors? 17.Is mirroring installed because failover is required?	

Hardware Configurations

Use the remainder of this chapter to record any existing hardware.

- Does the customer have any existing libraries? ❑ Yes ❑ No
- Does the customer have any existing tape drives? ❑ Yes ❑ No
- Does the customer have any existing media for reuse? ❑ Yes ❑ No
- Does the customer have an existing storage area network? ❑ Yes ❑ No
- Are migration services required? ❑ Yes ❑ No

Library

- Will this library be replacing existing libraries? ❑ Yes ❑ No
- Will this library be replacing existing StorageTek libraries? ❑ Yes ❑o No
- If so, what are the module numbers? _____

TABLE 3-8 Existing Libraries

Libraries	Description	Quantity
Manufacturer		
Make and model		
Cartridge capacity		
Manufacturer		
Make and model		
Cartridge capacity		
Manufacturer		
Make and model		
Cartridge capacity		

Tape Drives

The SL500 supports LTO, SDLT, and DLT-S4 tape drives as described in Appendix A. If the customer has other types of tape drives, media migration services are required.

- Does the customer have existing StorageTek tape drives? ❑ Yes ❑ No
- Does the customer need more tape drives? ❑ Yes ❑ No
- What types of drives are needed? _____

TABLE 3-9 Existing Tape Drive Types

Tape Drive Type	Yes	No	Vendor
3480 or 3490-type devices (18/36 track)	❑	❑	
DLT 7000 or 8000	❑	❑	
StorageTek T9840 or T9940	❑	❑	
StorageTek T10000	❑	❑	
SDLT 320 or 600	❑	❑	
DLT-S4	❑	❑	
LTO Generation 1, 2, 3, 4, or 5	❑	❑	

TABLE 3-10 New Tape Drives

Tape Drives	Description	Quantity
Manufacturer		
Make and model		
Comments:		
Manufacturer		
Make and model		
Comments:		
Manufacturer		
Make and model		
Comments:		
Manufacturer		
Make and model		
Comments:		

Does the customer need to migrate from one tape drive technology to another?	❑ Yes ❑ No
Does the customer need help relocating cartridge tapes, tape drives, and racks?	❑ Yes ❑ No

See "Data Center Services" on page 58 for more information.

Cartridge Tapes

- Approximately, how many cartridge tapes does the customer have? _____
- Does the customer need more tapes? ❑ Yes ❑ No
- Data cartridges? ❑ Yes ❑ No
- Cleaning cartridges? ❑ Yes ❑ No
- Are all cartridge tapes labeled with "*approved*" labels? ❑ Yes ❑ No

TABLE 3-11 Existing Cartridge Tapes

Cartridge Tapes	Description	Quantity
Data cartridge type		
Manufacturer		
Data cartridge type		
Manufacturer		
Data cartridge type		
Manufacturer		
Data cartridge type		
Comments:		
Cleaning cartridge type		
Manufacturer		
Cleaning cartridge type		
Manufacturer		
Cleaning cartridge type		
Manufacturer		
Cleaning cartridge type		
Comments:		

Does the customer need to migrate old data or technology to LTO?	❑ Yes ❑ No
Does the customer need help relocating cartridge tapes to the new library?	❑ Yes ❑ No

See "Data Center Services" on page 58 for more information.

Network

- Does the customer have an existing storage area network? ❑ Yes ❑ No
- Are additional network devices required? ❑ Yes ❑ No
- What are they? _____
- Does the customer use *zones* in the network? ❑ Yes ❑ No
- Are there frequent reconfigurations of the network? ❑ Yes ❑ No
- Are there multiple floors involved with this network? ❑ Yes ❑ No
- Are there inter-connections of hubs and switches? ❑ Yes ❑ No
- Are there remote connections to hubs and switches? ❑ Yes ❑ No
- Is this a campus network? ❑ Yes ❑ No
- Are trunk cables used? ❑ Yes ❑ No
- Are patch panels used? ❑ Yes ❑ No

TABLE 3-12 Fibre Channel Switches

Information	Switch 1	Switch 2	Switch 3
Manufacturer			
Make and model			
Software version			
Speed			
Number of ports			
Port types			
GBIC module types			
Number of open ports			
IP addresses			
IP addresses			

TABLE 3-13 Ethernet Hubs and Switches

Information	Hub/Switch 1	Hub/Switch 2	Hub/Switch 3
Manufacturer			
Make and model			
Number of ports			
Software version			
Speed			
Duplex			
Number of open ports			
IP addresses			
IP addresses			

TABLE 3-14 Fibre Channel Switch Connections

FC Switch Information	Switch 1	Switch 2	Switch 3
Vendor			
Model number			
Port 0 connection and status			
Port 1 connection and status			
Port 2 connection and status			
Port 3 connection and status			
Port 4 connection and status			
Port 5 connection and status			
Port 6 connection and status			
Port 7 connection and status			
Port 8 connection and status			
Port 9 connection and status			
Port 10 connection and status			
Port 11 connection and status			
Port 12 connection and status			
Port 13 connection and status			
Port 14 connection and status			
Port 15 connection and status			
Port 16 connection and status			
Port 17 connection and status			
Port 18 connection and status			
Port 19 connection and status			
Port 20 connection and status			
Port 21 connection and status			
Port 22 connection and status			
Port 23 connection and status			
Port 24 connection and status			
Port 25 connection and status			
Port 26 connection and status			
Port 27 connection and status			
Port 28 connection and status			
Port 29 connection and status			
Port 30 connection and status			
Port 31 connection and status			

Cables and Connectors

Note – Plan for 1 to 2 m (3 to 7 ft) of slack cable for limited movement and routing.

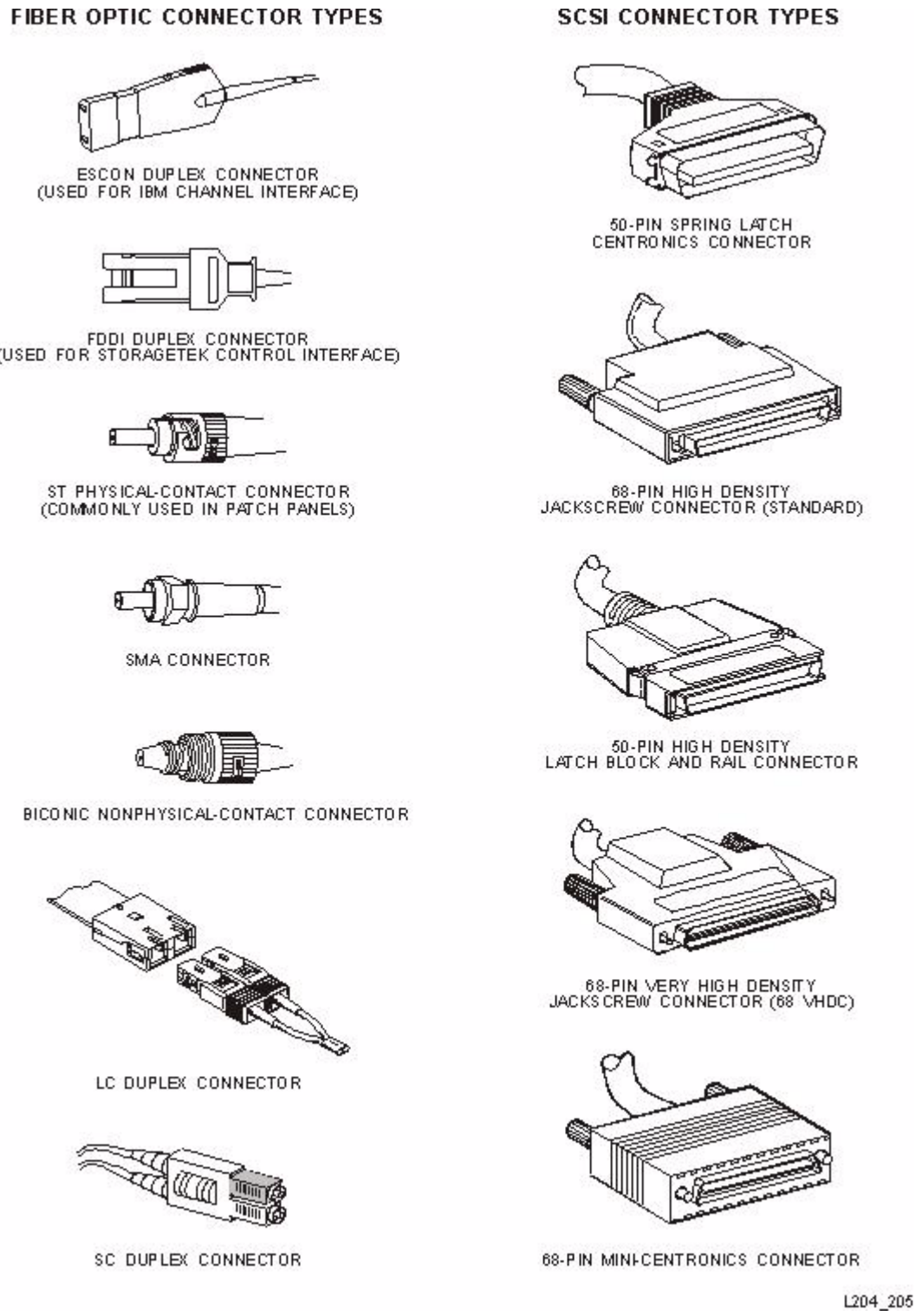
TABLE 3-15 Cables and Connectors

Type	Connector	Length	Quantity
Fibre Channel			
9 micron fiber-optic	LC-to-LC		
	LC-to-SC		
Other (specify)			
50 micron fiber-optic	LC-to-LC		
	LC-to-SC		
	LC-to-ST		
Other (specify)			
Fibre Channel copper	DB-9		
	HSSDC		
Ethernet (CAT5E)	RS-232		
Other (specify)			
SCSI (list the connector, length, and quantity)			

Note – The SL500 library and tape drives use only SCSI LVD high density connectors and Fibre Channel LC connectors. If the customer uses other types of cables and connectors, a new cable plan should be created.

FIGURE 3-1 shows several types of connectors for identification purposes only.

FIGURE 3-1 Connector Types - Identification Chart



Data Center Services

Whether your customers needs a new data center, a relocation, or an audit, Data Center Services (DCS) has the resources to analyze, plan and manage a project of any size.

In the information-gathering phase, DCS:

- Gathers information about your customer's environment and requirements from audits, network maps, equipment inventories, and staff interviews.
- Determines the scope of work and resources required.
- Validates the requirements and formally state their findings in reports, executive summaries, and project plans.
- Manages the project through completion once the scope, methods, and deliverables are agreed upon.

Data Center Services are available for customers, for both short- and long-term projects.

Offerings:

- Hardware relocation and asset swaps
- Asset management.
  Identify assets of a data center and place them into a controllable state
- Custom cabling, connectivity, conveyance, and design
  Provide cabling infrastructure to optimize performance, maintenance, and migration to emerging technologies.
- Media services.
  Relocate tapes and racks, and/or convert one form of media to another.
- Infrastructure services.
  Design, remodel and optimize existing facilities.
- Data center project management.

For more information, contact your local Professional Services and Data Center Services representative.

CHAPTER 4

Site Preparation

This chapter contains a site planning checklist to help prepare for an SL500 Library installation.

Site Planning Checklist

Make sure that the entire route of your staging will accommodate the width of the pallets, and, if applicable, the overall height of the rack and pallet jack.

TABLE 4-1 Site Planning Checklist

Question	Completed	Comments:
Delivery and Handling Factors		
Does the customer have a delivery dock? If *no*, where will the equipment be delivered?	Yes ❑ No ❑	
If a delivery dock *is* available, what are the hours of operation?	_____	
Are there street or alley limitations that may hinder delivery?	Yes ❑ No ❑	
Will people be available to handle the delivery of the library?	Yes ❑ No ❑	
Will equipment be available to handle the library (forklifts and/or pallet jacks)?	Yes ❑ No ❑	
Are the ramp angles less than 10 degrees?	Yes ❑ No ❑	
Is the dock close to the computer room where the library will be installed?	Yes ❑ No ❑	
Is an elevator available to move the library to the appropriate floor?	Yes ❑ No ❑	
Is there a staging area where the library can be placed with access to the installation site?	Yes ❑ No ❑	

TABLE 4-1 Site Planning Checklist (Continued)

Question	Completed	Comments:
Physical Placement Factors		
Does the site have raised flooring?	Yes ❑ No ❑	
Has the floor been laser-leveled or within 1 to 2 degrees level?	Yes ❑ No ❑	
If a rack was ordered, are there door height limitations to be aware of?	Yes ❑ No ❑	The rack on a pallet with a pallet jack is 210 cm (6.9 ft) high.
If a customer's rack is being used, is its depth more than 80 cm (31.5 in.) but less than 94 cm (37 in.)?	Yes ❑ No ❑	Contact Technical Support for optional rear extensions, kit number 419930101.
Can the customer's floor support the weight of the library?	Yes ❑ No ❑	
Does the customer have floor tile cutouts available for AC power, interface cables, and vented floor tiles for cooling?	Yes ❑ No ❑	Cutouts are placed at the rear of the library/rack. Vented tiles should be placed in front of the library.
Does the intended site have enough room to install and service the equipment?	Yes ❑ No ❑	Front and rear access: 61 cm (2 ft)
Are there plans for expansion? If so, when?	Yes ❑ No ❑ Date: _____	
Does the customer want to expand the: ■ Cartridge capacity? ■ Drive capacity?	 Yes ❑ No ❑ Yes ❑ No ❑	
Environmental Factors		
Does the site meet the environmental requirements: ■ Temperature? ■ Humidity? ■ Cooling? ■ Heat generated by the library?	Yes ❑ No ❑	Temperature: 10º–40ºC (50º–104ºF) Humidity: 20–80%, non-condensing
Does the site contain features and materials that guard against electrostatic discharge (ESD)?	Yes ❑ No ❑	
Are there special requirements to dispose of or recycle the packing material, pallets, and cardboard?	Yes ❑ No ❑	
Is space available for spare parts and documentation?	Yes ❑ No ❑	
Power Factors		
Does the intended site meet the power requirements for of the equipment?	Yes ❑ No ❑	100–240 VAC, single phase, 50–60 Hz
Does the site have multiple, separate circuits for power redundancy?	Yes ❑ No ❑	
Does the customer plan to use multiple branch circuits for redundancy?	Yes ❑ No ❑	
Will new electrical wiring be needed? If new electrical wiring is necessary, will it require an inspection or an approval to satisfy local codes?	Yes ❑ No ❑ Yes ❑ No ❑	

TABLE 4-1 Site Planning Checklist (Continued)

Question	Completed	Comments:
Connectivity Factors **Note:** Cabling is very important to establish a reliable network for the library and tape drives.		
Have you completed a cable plan?	Yes ❑ No ❑	
Have you determined the type and number of cables required? ■ Ethernet: host connections ■ Fibre Channel: data path and host ■ SCSI LVD: data path and host	Yes ❑ No ❑ Yes ❑ No ❑ Yes ❑ No ❑ Yes ❑ No ❑	Each tape drive needs an interface connection (data path). Quantity: _____ Quantity: _____ Quantity: _____
Is the customer prepared to supply Ethernet cables for the network?	Yes ❑ No ❑	
Can the customer provide the required number of static IP addresses?	Yes ❑ No ❑	
Will interface cables be run from outside the computer room?	Yes ❑ No ❑	Cables that run outside a raised floor computer room require a flammability rating of CL2 or CL2P.
Will the customer allow StorageTek to use remote support?	Yes ❑ No ❑	
Tape Drives		
Does the customer have the correct type and number of tape drives? Are additional tape drives required? How many?	Yes ❑ No ❑ Yes ❑ No ❑ _____	See Appendix A, "Tape Drives and Cartridges" for information about the tape drives.
Media Factors		
Does the customer have the correct type and number of cartridge tapes? ■ Are additional cartridges required? ■ Are cleaning cartridges required? ■ Are labels required?	Yes ❑ No ❑ Yes ❑ No ❑ Yes ❑ No ❑ Yes ❑ No ❑	
Human Factors		
Where will the remote operator panel be located?	Yes ❑ No ❑	
Does the customer need additional CAP magazines?	Yes ❑ No ❑	
Any Comments and/or other Concerns:		

Preparing for the Installation

Site preparation is important to make sure that no aspects of the installation and implementation are overlooked and to promote an error-free installation. Considerations that you and the customer must make before the equipment arrives are outlined in the following sections.

Personnel

To install an SL500 library, you need at least *two qualified installers* to lift some of the components from the boxes and to lift the base unit into the rack. A lifting tool is available for the original-design modules to hold the base unit in the rack so that one person can install the front and back screws.

Installation tips are supplied in the *Installation Manual*.

Tools

TABLE 4-2 lists the tools used to install the library, both standard tools found in most tool kits and special tools, with part numbers and quantity.

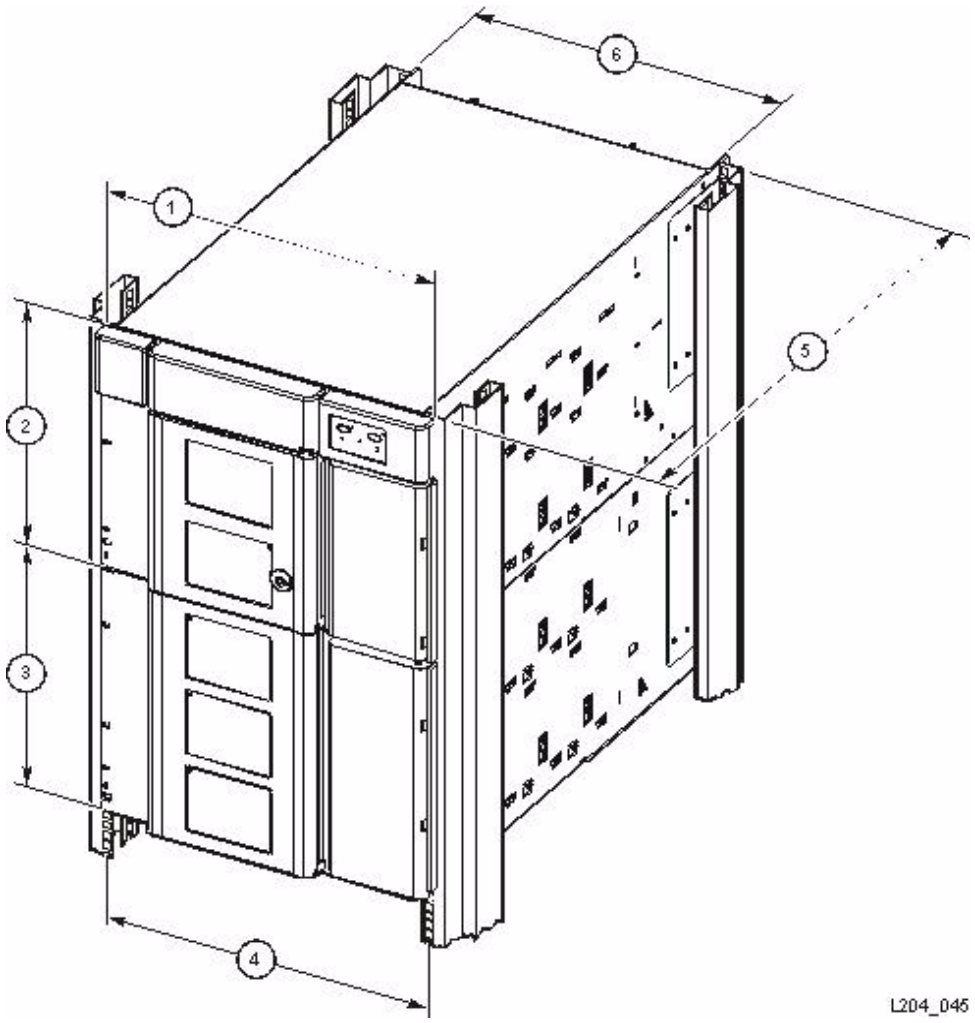
TABLE 4-2 Installation Tools

Tool	Part Number	Quantity
Standard Service Tool Bag Tools include: ■ T10, T15, T20, and T25 Torx bits and driver, ■ Standard screwdrivers ■ Phillips screwdrivers ■ 1/8 Allen wrench	24100250	1
Additional equipment ■ Step stool ■ Gloves ■ Flashlight		
Field Service Grounding Kit (ESD Kit)	4711	1
Optional SL500 install tool kit (temporarily installed in rack to support original design base unit)	314829201	A/R

Physical Planning

The following figures show the dimensions for the SL500 library.

FIGURE 4-1 Library and Rack Dimensions (Sheet 1 of 2)

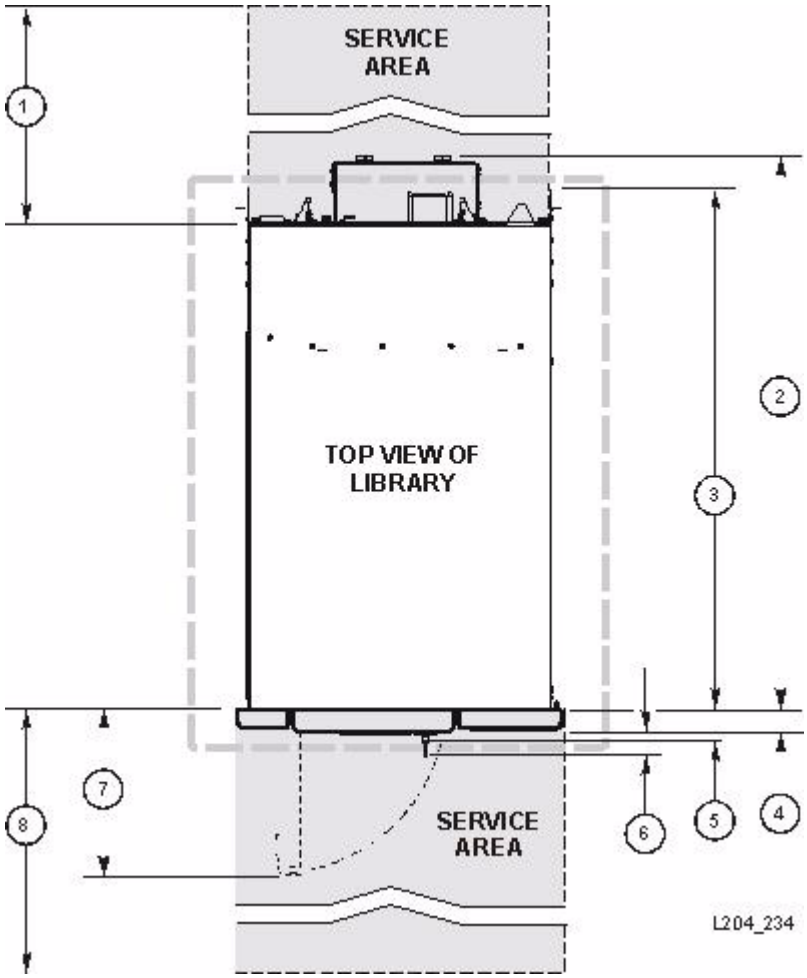


1. 48.3 cm (19.0 in.) width of front of base module with flange
2. 35.6 cm (14.0 in.) height of base module
3. 35.6 cm (14.0 in.) height of expansion module
4. 46.5 cm (18.3 in.) distance between rack holes

5. Or*iginal design modules (shown in figure):* 60.9 cm (24.0 in.) to 86.4 cm (34.0 in.), optimally 74 cm (29 in.) front to rear rack mounting distance.
   EZ install modules: 55.9 cm (22.0 in.) to 78.7 cm (31.0 in.), optimally 66 cm (26 in.) front to rear rack mounting.
   Note: Extensions (optional accessory kit part 419930101) are available for rack depths up to 94 cm (37.0 in.).

6. 44.5 cm (17.5 in.) width of back of base module

FIGURE 4-2 Library and Rack Dimensions (Sheet 2 of 2)



1. 60.9 cm (2 ft) minimum service clearance behind the library or rack
2. 81.0 cm (31.9 in.) depth of base module from front mounting plane to back of tape drives
3. 76.2 cm (30.0 in.)depth of *original design* base module
   71.4 cm (28.1 in.) depth of *EZ install* base module
4. 3.8 cm (1.5 in.) depth of front door, required clearance
5. 5.3 cm (2.1 in.) depth of front door and unique latch hardware
6. 5.9 cm (2.3 in.) key depth
7. 24.1 cm (9.5 in.) front door opening clearance
8. 60.9 cm (2 ft) minimum front service clearance

EZ Install Modules

The EZ install modules are easier to install into a rack because the arrays, doors, and front panels are already installed on the modules. The service representative installs rails and brackets into the rack and slides in the modules, then attaches them to the rack.

Caution – *Compatibility issues:* You can add the EZ install modules into a rack that has the original design modules, but you *cannot* add the original design modules into a rack with all EZ install modules. See the following rules.

Customers who purchased the original design version of the library and who want to add modules can either:

- Order original design expansion modules
- Order EZ install modules
- Once an EZ install module has been installed, *only* EZ install modules can be installed *below that module*. See the following examples:
  - Base Module (original) DEM (original) DEM (EZ) CEM (original) **No**
  - Base Module (original) DEM (original) DEM (EZ) CEM (EZ) **Yes**

Customers who purchased the EZ install version of the library and who want to add modules *must* order only EZ install modules.

As with the original designed modules, the EZ modules are not customer-installable.

AC Power Planning

Keep in mind the following power considerations:

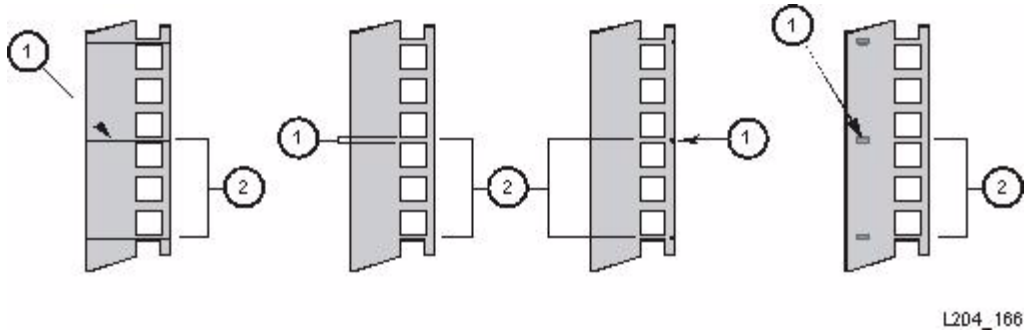
- Plan the location for a second set of power wiring even if the customer is not purchasing the redundant power supply.
- Make sure that each power source is on a separate branch circuit.
- If the rack has a power distribution unit (PDU), plug each power cable from the power supply receptacle to the PDU, and then plug the PDU cable to the wall receptacle.
- If the rack does not have a PDU, plug each power cable from the power supply receptacle to the wall receptacle.

Rack Planning

The SL500 library is a rack-mountable library that requires a standard 483-mm (19-in.) rack or cabinet for installation.

Most racks contain units of measure which are called RU's (rack units). Each RU is equal to 44.5 mm (1.75 in.) and appear as a 3-hole pattern on the frame of the rack. For instance, some racks have numbers, notches, or markings to show where the top of the RU begins (see FIGURE 4-3 for an example).

FIGURE 4-3 Rack Frames and Rack Unit Measuring Identification



1. Where the RU starts	2. The 3-hole RU pattern

The installation manual provides detailed instructions about where to install rack hardware and the adjustable brackets.

Remote Support

Service Representatives are available to assist you and the customer with hardware and software problem resolution. During the initial order and installation planning, make sure that you inform the customer about local and remote support.

Does the customer want remote support? Yes ❑ No ❑

CHAPTER 5

Ordering

This chapter describes the components and the ordering part numbers for the SL500 Modular Library System.

- Some numbers are for ordering the initial library.
- X-options (upgrades) are kits of material and instructions that allow you to add a feature or an upgrade to the library *after* the base module has been installed.

To add a module, the module above must have full capacity. For example:

- To add a drive expansion or cartridge expansion module below a base module, the base module must have 50 (LTO-only) or 42 (multi-media) available cartridge slots.
- Slots must be contiguous. Slots within a lower module will not be recognized unless the upper module is fully activated.

Hardware Activation Files

Activation files are required to enable certain features purchased for the SL500.

Any parts that contain the phrase “MUST REQUEST HARDWARE ACTIVATION FILE” in the description require an activation file to be loaded to the SL500 library.

Activation Files for New Libraries

To ensure proper hardware activation file creation and delivery:

1. Only place ONE library on any sales order or quote:

   The reason for this requirement is that we have to create the hardware activation files specific to each library. If two libraries are on the same order, we do not know which features should be applied to which library.

2. Include E-mail Addresses:

   In the footnotes section of your Webdesk quotes you need to place all the e-mail address (limit of up to three addresses) where you would like the hardware activation file sent.

   a. Proceed each e-mail address with: “HARDWARE ACTIVATION FILE”

The hardware activation file is customer-installable.

Upgrades to Existing Libraries

To ensure proper hardware activation file creation and delivery:

1. Only place ONE library's upgrade on any sales order / quote:

   The reason for this requirement is that we have to create the hardware activation files specific to each library. If two libraries are on the same order, we do not know which features should be applied to which library.

2. Include E-mail Addresses:

   In the footnotes section of your Webdesk quotes you need to place all the e-mail address (limit of three addresses) where you would like the hardware activation file sent.

   a. Proceed each e-mail address with: “HARDWARE ACTIVATION FILE”

      The hardware activation file is customer-installable

3. Include Library Serial Number:

   The library serial number must be included in the footnotes area of the Webdesk quote along with the e-mail addresses.

Library with Base Module—LTO Only

The following table lists the part numbers for the library with a base module and LTO tape drives and arrays only.

You must request an Activation File, RoHS-5, for all products.

TABLE 5-1 Base Module—LTO-only

Description	Part Number	
SCSI Interface		
SL500 base module, 30 slots, SCSI interface	SL500-30-SCSI-Z-N	❑
SL500 bundle, base module, 30 slots, SCSI, two HP LTO4 SCSI drives	SL500-30L4HPSC-Z	❑
SL500 bundle, base module, 30 slots, SCSI, two IBM LTO4 4Gb SCSI drive	SL500-30L4IBSCZ-N	❑
Fibre Channel (FC) Interface		
SL500 base module, 30 slots, Fibre Channel (FC) interface	SL500-30-FC-Z-N	❑
SL500 bundle, base module, 30 slots, FC, two HP LTO3 4Gb FC drives	SL500-2L34-30FC-Z	❑
SL500 bundle base module with 30 slots, FC, two HP LTO4 4Gb FC drives	SL500-30L4HP4GFZ-N	❑
SL500 bundle base module with 30 slots, FC, two HP LTO4 4Gb FC drives	SL500-30L4HPSC-Z-N	❑
SL500 bundle base module, 30 slots, FC, two IBM LTO4 4Gb FC drives	SL500-30L4IB4GFZ-N	❑

Upgrade (X-options)—All Libraries

The table below lists the upgrade or X-options available.

Note: *You must request an Activation File, RoHS-5, for all products.*

TABLE 5-2 Library and Module Upgrades (X-options)—All Libraries

Short Description	Long Description	X-option Number	
SL500 30-50 slots	*LTO-only:* takes base module from 30 to 50 active slots (the CAP is not counted in slot capacity and is an additional 5 slots).	XSL500KBASE30-50-N	❑
SL500 DEM w/ 1/3 slots	*LTO-only:* DEM with *first* 1/3 slots activated[1].	XSL500K-DEM-W1/3-N	❑
SL500 1/3 DEM slots	*LTO-only:* upgrade for access to second 1/3 and/or third 1/3 DEM slots[1].	X-SL500K1/3SLOTUP-N	❑
SL500 LTO CEM	*LTO-only:* cartridge expansion module (these modules do not contain drive bays).	XSL500K-LCARTEX-N	❑
Mixed Media 24-42 slots	*Mixed Media:* takes base module from 24 to 42 active slots (the CAP is not counted in slot capacity and is an additional 4 slots).	XSL500K-MM-24-42-N	❑
Mixed Media DEM 1/3	*Mixed Media:* DEM with *first* 1/3 slots access[2].	XSL500K-MM-DREXP-N	❑
Mixed Media DEM Additional 1/3 slots	*Mixed Media:* DEM upgrade for access to second 1/3 and/or third 1/3 DEM slots[2].	XSL500K-MM-1/3DEM-N	❑
Mixed Media CEM	*Mixed Media:* cartridge expansion module (these modules do not contain drive bays).	XSL500K-MM-CEM-Z-N	❑
SL500 Partitioning	Physical partitioning feature, up to 8 partitions allowed.	X-SL500K-PARTNG-N	❑
SL500 Partitioning for Legato	Maintains the Legato boundary after installing any new library hardware.	XSL500K-LEG-PARTG-N	❑

Notes:

1. Up to three 1/3 files can be ordered. If this is the last module, the first two 1/3 files add 26 slots each and the third adds 25 slots. If there is a module below, increments are 28, 28, and 28.
2. Up to three 1/3 files can be ordered. If this is the last module, slot counts increment by 21 for each 1/3 file. If there is a module below, increments are 24, 23, 23.

Power Cord Numbers and Receptacles

- The following tables list power cord part numbers by country.
- All cords are 3 m (9.81 ft). The receptacle type is listed also.
- Refer to the vendor catalog for the part number.

If your country is not listed below, use the cord that you used on past products.

TABLE 5-3 Country-specific Power Cords

Input Voltage	Country	Part Number	Receptacle Type	
100 to 127 VAC	U.S./Canada	PWRCORD10187019-Z	5-15R	❑
	Japan	PWRCORD10083243-Z	JIS C8303	❑
200 to 240 VAC	Australia	PWRCORD10083244-Z	AS 3112	❑
	Denmark	PWRCORD10083248-Z	DEMKO107/ 10-1973	❑
	Europe	PWRCORD10187018-Z	Schuko	❑
	Europe (Continental)[3]	PWRCORD10187022-Z	IEC309	❑
	Italy	PWRCORD10083245-Z	CEI 23-16/V11	❑
	Korea	PWRCORD10083657-Z	KSC 8305	❑
	South Africa	PWRCORD10083636-Z	BS546	❑
	Switzerland	PWRCORD10083246-Z	CEE 7	❑
	United Kingdom	PWRCORD10083247-Z	BS 1363	❑
	U.S./Canada	PWRCORD10187020-Z	6-15R	❑

Notes:
1. All power cords are approximately 3 m (10 ft).
2. Cabinets come equipped with two domestic or international power cords for the PDUs. However, you must order the correct number of power cables that run between each module's power supply and the PDU). For example, if your U.S./Canada library contains a Base Module and one Drive Expansion Module, order two cables (PWRCORD10187055-Z); if this is a duplicate power configuration, you must order four cables.
3. This is a harmonic no plug cord for Belgium, Denmark, Finland, France, Germany, Holland, Norway, Sweden, and Switzerland.

TABLE 5-4 Non-country-specific Power Cords

Input Voltage	Description	Part Number	
100 to 127 VAC	SJT IEC320 14AWG, 3 m, receptacle 5-15	PWRCORD10187061-Z	❑
250 VAC	SJT 16 AWG L6-15P, C13, 2.5 m, receptacle L6-15P	PWRCORD10187024-Z	❑
250 VAC	18, 3, SVT, 1mm, M/SH FRT	PWRCORD10187055-Z (for SL-RACK-42-Z rack)	❑
	3, F, IEC320 harmonized[see Note]	PWRCORD10187047-Z	❑
100 to 240 VAC	International power cord pigtail	PWRCORD10083735-Z	❑

Note: This cord has a plug on one end that attaches to the library and bare wires on the other. Buy the correct end to match your normal wall outlet and attach it to the cord.

Redundant Power Supply

The following table lists the part number to order a redundant power supply for the base module or drive expansion module.

If something within the AC power source or supply fails, the second power supply provides power to the robotics and library electronics until the problem can be fixed. For redundancy, this power supply should be connected to a separate branch circuit. Make sure that you also order additional power cables, connected between the redundant supplies and the PDU.

TABLE 5-5 Redundant Power Supply

Description	X-option	
Redundant power supply	XSL500-RED-PWR-Z-N	❑
Note: This X-option orders one redundant power supply. If, for example, you have a base module and one DEM, you would order one X-option for each module to supply full redundancy for both modules.		

Rack

You can order a rack from StorageTek or from another vendor. The following table lists the part numbers and feature codes.

TABLE 5-6 Rack Cabinet Assembly

Description	Part Number	
42 RU, 19-inch rack cabinet assembly (Model SL-RACK-42-Z)See Note 1	CBNT42U	❑
1000-38 rack with power distribution unitSee Notes 1 and 2	SRK-XRS038A-IP	❑
Filler panel kit (12 RU), optional but recommended	X6826A	❑
Domestic power cord kit, 4 pack, order quantity 1	X6828A	❑
Second power strip upgrade X-option	XSL-RACK-2STRIP-Z	❑
Notes 1. PDU specifications for both racks: Two 240 VAC PDUs, 20 A, IEC C13 receptacles, IEC C20 input with current meter, mounted at left rear of enclosure (viewed from the rear). 2. This rack offers added strength for installation of auxiliary equipment (disks, servers). The SL500 library and auxiliary equipment can be shipped installed within this cabinet.		

For cabinets or racks with a depth beyond 80.0 cm (31.5 in.) but not exceeding 94 cm (37 in.), rear support extensions for EZ Install modules are available. For *each* module, you must contact Technical Support and order an optional accessory kit part 419930101, which contains the following:

- 4 screws, part 10207301
- Right extension, part 4198851xx
- Left extension, part 4198853xx

Partitioning

The partitioning option for the SL500 library is listed below in TABLE 5-7.

When ordered, customers will receive an e-mail receipt of the feature they ordered and be referred to the *SL500 User's Guide* for installation procedures.

TABLE 5-7 Partitioning Ordering

Description	X-option	
SL500 Partitioning	X-SL500K-PARTNG-N	❑
SL500 Partitioning for Legato	X-SL500K-LEG-PARTG	❑

Library Interface Changes

The following table lists the part numbers to change the library interface.

TABLE 5-8 Library Interface Changes, SCSI and Fibre Channel

Description	X-option	
SCSI library interface to a Fibre Channel interface	XSL500-SCSI-FC-Z-N	❑
~~Fibre Channel interface to a SCSI interface~~	~~XSL500-FC-SCSI-Z-N~~	~~❑~~

Local Operator Panel

An *optional* local touch screen operator panel can be mounted on the front of the library. This is a panel-mounted personal computer with a flat screen display and touchable interface—no mouse or keyboard is needed. The panel can be installed on the door, either in the bottom section of the base module or the middle section of the top expansion module.

The following table lists the part number to order the local operator panel.

TABLE 5-9 Local Operator Panel

Description	X-option	
Local operator panel	XSL500-TSOP-Z-N	❑

Magazines

The following table lists the part numbers for the cartridge access port (CAP) magazines.

TABLE 5-10 Cartridge Access Port Magazines

Description	X-option	
Five-slot magazine for a CAP in an LTO-only library	XSL500-LTO-MAG5-N	❑
Four-slot magazine for a CAP in a mixed-media library	XSL500-MM-MAG4-Z-N	❑

Rack Mount to Desktop Base Module

The following table lists the part number to change a rack mounted base module into a desktop version.

TABLE 5-11 Rack Mount to Desktop Base Module Conversion

Description	X-option	
Converts a rackmount base module into a desktop version	XSL500-DESKTP-KTZ	❑

Ethernet Cables

The library uses Ethernet cables for TCP/IP connections.

The following table lists the cables available.

TABLE 5-12 Ethernet Cables

Description	Part Number	
Cable assembly, CAT5E, 127 cm (50 in.) 24 AWG, shielded	CABLE10187035-Z	❑
Cable assembly, CAT5E, 2.4 m (8 ft), 24 AWG, shielded	CABLE10187033-Z	❑
Cable assembly, CAT5E, 10.5 m (35 ft), 24 AWG, shielded	CABLE10187034-Z	❑

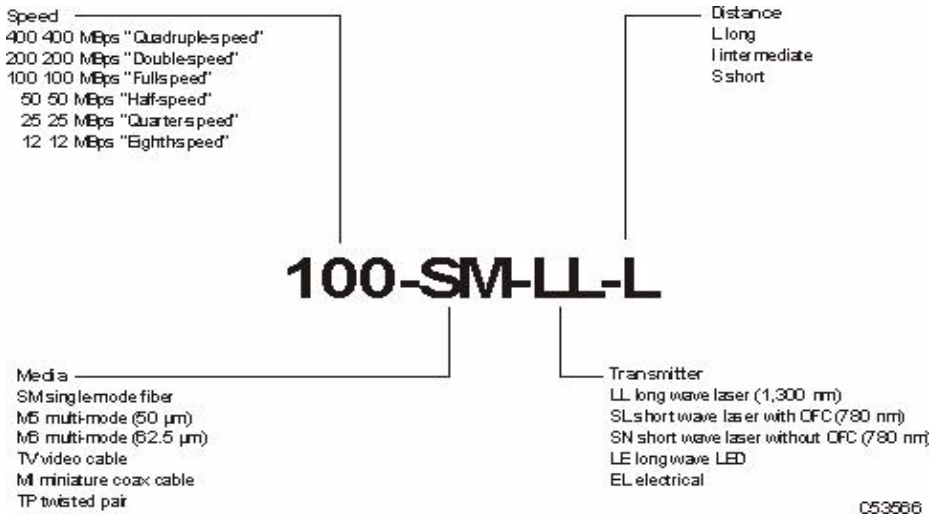
Interface Cables

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

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

Fiber-optic Cables

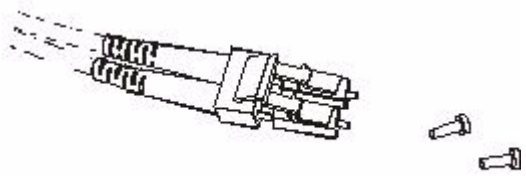
The figure below shows the classification for the technology options of a fiber-optic cable, which include speed, rated distance, mode, and type of transmitter.



Two Gigabit Fiber-Optic Cables

Two gigabit (50-micron) fiber-optic cables are orange with LC connectors. LC connectors (FIGURE 5-1) are the industry standard for all two gigabit Fibre Channel devices such as LTO tape drives. Both the library and tape drive interfaces use LC connectors. **Do not use 62.5 micron cables.**

FIGURE 5-1 LC Duplex Connector



The following table lists the part numbers for the two gigabit fibre-optic cables.

TABLE 5-13 Two Gigabit Fiber-Optic Cables

Description	Part Number	
LC to LC, 50/125 Micron		
10 m (32.8 ft) Duplex, Riser	CABLE10800310-Z	❑
50 m (164 ft) Duplex, Riser	CABLE10800311-Z	❑
100 m (328 ft) Duplex, Riser	CABLE10800312-Z	❑
10 m (32.8 ft) Duplex, Plenum	CABLE10800313-Z	❑
50 m (164 ft) Duplex, Plenum	CABLE10800314-Z	❑
100 m (328 ft) Duplex, Plenum	CABLE10800315-Z	❑
LC to SC, 50/125 Micron		
10 m (32.8 ft) Duplex, Riser	CABLE10800317-Z	❑
50 m (164 ft) Duplex, Riser	CABLE10800318-Z	❑
100 m (328 ft) Duplex, Riser	CABLE10800319-Z	❑
10 m (32.8 ft) Duplex, Plenum	CABLE10800320-Z	❑
50 m (164 ft) Duplex, Plenum	CABLE10800321-Z	❑
100 m (328 ft) Duplex, Plenum	CABLE10800322-Z	❑
LC to ST, 50/125 Micron		
10 m (32.8 ft) Duplex, Riser	CABLE10800247-Z	❑
50 m (164 ft) Duplex, Rise	CABLE10800248-Z	❑
10 m (32.8 ft) Duplex, Plenum	CABLE10800323-Z	❑
50 m (164 ft) Duplex, Plenum	CABLE10800250-Z	❑
Adapter Kit, LC to SC Cabling	CABLE315447901-Z	❑

SCSI Cables

You may choose to separate the control path and the data paths when planning for a SCSI installation.

- The control path transfers *commands* for *library robotic operations*.
- The data path transfers *data* to and from the *tape drives*.

At least one initiator (a server) and one target (a tape drive) must be on a bus. Depending on the type of SCSI implementation, you may have up to 16 devices connected to the same SCSI bus.

Important:
For the best performance, do *not* connect more than *two* tape drives on a single SCSI bus (called daisy-chaining).

The following table lists the part numbers for the SCSI universal interface cables.

TABLE 5-14 SCSI Universal Interface Cables

Description	Part Number	
SCSI, 68MD-68MD, 300 mm (11.8 in.)	CABLE10187004-Z	❑
SCSI, 68MD-68MD, 500 mm (19.7 in.)	CABLE10187005-Z	❑
SCSI, 68MD-68MD, 1 m (3.3 ft)	CABLE10187006-Z	❑
SCSI, 68MD-68MD, 3 m (9.8 ft)	CABLE10187008-Z	❑
SCSI, 68MD-68MD, 5 m (16.4 ft)	CABLE10187009-Z	❑
SCSI, 68MD-68MD, 10 m (32.8 ft)	CABLE10187010-Z	❑
SCSI, 68MD-68HD, 3 m (9.8 ft)	CABLE10187011-Z	❑
SCSI, 68MD-68VHD, 5 m (16.4 ft)	CABLE10187012-Z	❑
SCSI, 68MD-68VHD, 10 m (32.8 ft)	CABLE10187013-Z	❑
LVD daisy-chain cable 300 mm (11.8 in.)	CABLE10083685-Z	❑

SCSI Terminators

The following table lists the part numbers for the SCSI terminators.

TABLE 5-15 SCSI Terminators

Description	Part Number	
Pass-thru terminator for RLW/MPW card	CABLE10148029-Z	❑
Standard LVD/SE terminator for SCSI tape drive	CABLE10148031-Z	❑

Cartridges and Labels

Contact your authorized selling agent for approved labeled cartridges.

See "Ordering Cartridges" on page 88 for additional information.

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

You must select the volume serial number (VOLSER) range and other label options when ordering cartridges. If you choose to order additional labels, order them from any standard media vendor.

Labels used in StorageTek libraries can be made by any vendor that produces a label that meets the Label Specification. Some vendors (not all inclusive) are:

- EDP/Colorflex http://www.colorflex.com
- NetC http://www.netcllc.com
- WrightLine/American Eagle Systems http://www.americaneaglesys.com
- Dataware http://www.datawarelabels.com

These Web sites contain links to third party sites. These links are provided as a convenience to you. StorageTek is not responsible for the content of these linked Web sites and does not make any representations regarding the content or accuracy of any content on such Web sites.

For technical questions, contact the Sales Support Team.

Tape Drives

The following tables list the part numbers for the LTO, SDLT and DLT-S4 tape drives. The X-option tables list the numbers that allow you to do the following:

- Take a tape drive from a non-SL500 library and place it on the included SL500 tray.
- Convert a bundled LTO2 tape drive to an LTO3 tape drive.

See Appendix A for more information about the specific tape drives, especially tape drive and cartridge readability issues.

TABLE 5-16 LTO2 Tape Drive Part Numbers

Hewlett-Packard (HP) Tape Drive Description	**Part Number**	
HP LTO2 FC, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-HPFC-SL500Z	❑
HP LTO2 SCSI, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-HPSC-SL500Z	❑
International Business Machines (IBM) Tape Drive Description	**Part Number**	
IBM LTO2 FC, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-IBFC-SL500Z	❑
IBM LTO2 FC AS400, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-IBFCAS4-SL5Z	❑
IBM LTO2 SCSI, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-IBSC-SL500Z	❑
Note: Order the cables separately for these tape drives.		

TABLE 5-17 LTO3 Tape Drive Part Numbers

Hewlett-Packard Tape Drive Description	**Part Number**	
HP LTO3 FC, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-HP2FC-SL500Z	❑
HP LTO3 FC 4 Gbyte, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-HP4FC-SL500Z	❑
HP LTO3 SCSI, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-HPSC-SL500Z	❑
International Business Machines (IBM) Tape Drive Description	**Part Number**	
IBM LTO3 FC 4 Gbyte, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-IB4FC-SL500Z	❑
IBM LTO3 SCSI, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-IBSC-SL500Z	❑
Note: Order the cables separately for these tape drives.		

TABLE 5-18 LTO4 Tape Drive Part Numbers

Hewlett-Packard Tape Drive Description	Part Number	
HP LTO4 FC, 800 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO4-HPSC-SL500Z	❑
HP LTO4 FC 4 Gbyte, 800 Gbyte capacity, 120 Mbyte/sec transfer rate	LTO4-HP4FC-SL500Z	❑
IBM LTO4 FC 4 Gbyte, 800 Gbyte capacity, 120 Mbyte/sec transfer rate	LTO4-IB4FC-SL500Z	❑
IBM LTO4 SCSI, 800 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO4-IBSC-SL500Z	❑
Note: Order the cables separately for these tape drives.		

SL500 library and LTO5 bundles.

TABLE 5-19 LTO5 Tape Drive Bundled Part Numbers

LTO5 Tape Drive Description	Part Number	
HP LTO5 Fibre Channel (FC) interface	SL500K-30L5HPFC-Z	❑
IBM LTO5 Fibre Channel (FC) interface	SL500K-30L5IBFC-Z	❑
HP LTO5 Serial Attached SCSI (SAS) interface	SL500K-30L5HPSAS-Z	❑
IBM LTO5 Serial Attached SCSI (SAS) interface	SL500K-30L5IBSAS-Z	❑
Notes: Order cables separately for these tape drives. Check on the availability for LTO5 drives and media.		

TABLE 5-20 LTO Tape Drive X-options (converting drives from another library)

Hewett-Packard Tape Drive Description	X-option	
HP LTO2 FC L180/700 drive/tray to SL500	XLTO2-HPFC-SL5-CKZ	❑
HP LTO3 FC L180/700 drive/tray to SL500	XLTO3-HPFC-SL5-CKZ	❑
HP LTO2 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO2-HPSC-SL5-CKZ	❑
HP LTO3 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO3-HPSC-SL5-CKZ	❑
Changes a bundled HP LTO2 FC drive to an LTO3 drive *in the base module*	XSL500-L2-L3-FC-Z	❑
Converts bundled HP LTO2 SCSI drive to an LTO3 drive *in the base module*	XSL500-L2-L3-SC-Z	❑
Adds second data port to HP LTO2 or LTO3 FC drive tray assembly	XL2-3HF-SL5-DPCKZ	❑
IBM Tape Drive Description	**X-option**	
IBM LTO2 FC L180/700 drive/tray to SL500	XLTO2-IBFC-SL5-CKZ	❑
IBM LTO2 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO2-IBSC-SL5-CKZ	❑
IBM LTO3 FC L180/700 drive/tray to SL500	XLTO3-IBFC-SL5-CKZ	❑
IBM LTO3 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO3-IBSC-SL5-CKZ	❑

Note – Robotics unit must be part number 314558705 or higher to read SDLT/DLT-S4 cartridge labels.

TABLE 5-21 SDLT/DLT-S4 Tape Drive Part Numbers

SDLT 320 Tape Drive Description	**Part Number**	
SDLT 320 LVD SCSI, 160 Gbyte capacity, 16 Mbyte/sec transfer rate	SD320-SC-SL500-Z	❑
SDLT 600 Tape Drive Description	**Part Number**	
SDLT 600 FC, 300 Gbyte native capacity, 36 Mbyte/sec transfer rate	SD600-FC-SL500-Z	❑
SDLT 600 LVD SCSI, 300 Gbyte native capacity, 36 Mbyte/sec transfer rate	SD600-SC-SL500-Z	❑
DLT-S4 Tape Drive Description	**Part Number**	
DLT-S4, FC, 800 Gbyte native capacity, 4 Gbyte/sec transfer rate	DLTS4-FC4G-SL500-Z	❑
DLT-S4, LVD SCSI, 800 Gbyte native capacity, 60 Mbyte/sec transfer rate	DLTS4-SC-SL500-Z	❑
Note: Order the cables separately for these tape drives.		

TABLE 5-22 SDLT Tape Drive X-options

SDLT 320 Tape Drive Description	**X-options**	
SDLT 320 SCSI L20/40/80/ drive/tray assembly to SL500	XS32-SC-LXX-S5-CKZ	❑
SDLT 320 SCSI 180/700 drive/tray to SL500	XS3-SC-LXXX-S5-CKZ	❑
SDLT 600 Tape Drive Description	**X-options**	
SDLT 600 FC L180/700 drive/tray to SL500	XS6-FC-LXXX-S5-CKZ	❑
SDLT 600 SCSI L20/40/80 drive/tray to SL500	XS6-SC-LXX-S5-CKZ	❑
SDLT 600 SCSI L180/700 drive/tray to SL500	XS6-SC-LXXX-S5-CKZ	❑
Note: Order the cables separately for these tape drives.		

APPENDIX **A**

Tape Drives and Cartridges

This appendix provides information about the tape drives and the media used in the SL500 Modular Library. Refer to the vendor publications and Web sites for specific information not covered in this publication.

The library can have from 1 to 18 tape drives. The library supports:

- Linear Tape-Open (LTO) Ultrium tape drives:
  - Hewlett-Packard LTO Generation 2, 3, 4, and 5
  - IBM LTO Generation 2, 3, 4, and 5
- Quantum Super Digital Linear Tape (SDLT) tape drives:
  - SDLT 320
  - SDLT 600
  - DLT-S4

The interfaces supported for these tape drives include:

- Small computer system interface (SCSI) low voltage differential (LVD)
- Fibre Channel (FC) interface

LTO Tape Drives and Cartridges

This section discusses media compatibility and cartridge labels. For best results, match the cartridge type with the drive type.

TABLE A-1 lists the compatibility levels among the various LTO tape drives and cartridges.

Note – Although the SL500 library ***does not*** support LTO generation 1 tape drives, the row is listed for you to consider if you need to migrate your data from older types of cartridges to newer ones.

TABLE A-1 LTO Compatibility

Cartridge	Format	LTO5		LTO4		LTO3		LTO2	
		Write	Read	Write	Read	Write	Read	Write	Read
Data									
1500 GB WORM	LTO5	Yes	Yes	No	No	No	No	No	No
1500 GB Std		Yes	Yes	No	No	No	No	No	No
800 GB WORM	LTO4	Yes	Yes	Yes	Yes	No	No	No	No
800 GB Std		Yes	Yes	Yes	Yes	No	No	No	No
400 GB WORM	LTO3	No	Yes	Yes	Yes	Yes	Yes	No	No
400 GB Std		No	Yes	Yes	Yes	Yes	Yes	No	No
200 GB STD	LTO2	No	No	No	Yes	Yes	Yes	Yes	Yes
100 GB Std	LTO1	No	No	No	No	No	Yes	Yes	Yes
Cleaning									
Universal	n/a	Yes		Yes		Yes		Yes	
Legacy	n/a	No		No		Yes		Yes	

1) An Ultrium drive can **read** data from a cartridge in its own generation and **two** prior generations.
2) An Ultrium drive can **write** data to a cartridge in its own generation and one prior generation in the prior generation format.
For example:
- An LTO5 drive will read and write data on an LTO4 cartridge and only read data on an LTO3 drive.
- An LTO4 drive will read and write data on anLTO3 cartridge and only read data on an LTO2 drive.

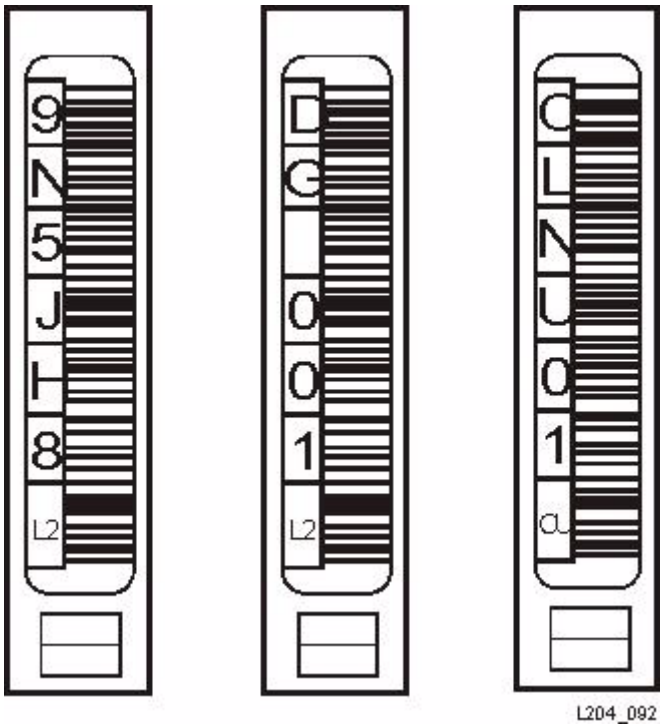
Notes – Cartridge Labels

- LTO cartridge labels have six or eight characters.
- The last two characters are the media ID—L1, L2, L3, L4, or L5.
- Write Once Read Many (WORM) cartridges use a different media ID—LT, LU, or LV
- Cleaning (CLN) or Diagnostic (DG) are the first characters on these label
- **Unlabeled cartridges are not supported.**

TABLE A-2 LTO Media Capacities

Media ID	Type	Capacity
L1	Generation 1 Type A	100 GB
L2	Generation 2 Type A	200GB
L3	Generation 3 Type A	400 GB
L4	Generation 4 Type A	800 GB
L5	Generation 5 Type A	1500 GB
LT	Generation 3 WORM	400 GB
LU	Generation 4 WORM	800 GB
LV	Generation 5 WORM	1500 GB

FIGURE A-1 LTO Cartridge Labels



SDLT/DLT-S4 Tape Drives and Cartridges

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

This section discusses media compatibility and cartridge labels. For best results:

- Use Super DLTtape 1 cartridges in SDLT 320 tape drives
- Use Super DLTtape 2 cartridges in SDLT 600 tape drives
- Use DLTtape S4 cartridges in DLT-S4 drives *(library firmware version 1126 or later required)*

The following table lists the compatibility issues among the various SDLT/DLT-S4 cartridges and tape drives. Consider the information if you need to migrate your data from older types of cartridges to newer ones.

TABLE A-3 SDLT/DLT-S4 Media/Tape Drive Compatibility

Media	SDLT 320 Drive	SDLT 600 Drive	DLT-S4 Drive
SDLT 1 media	Read and write	Read only	Read only
SDLT 2 media	No action	Read and write	Read only
DLTIV media	Read only	No action	No action
DLTtape S4 media	No action	No action	Read and write

SDLT600 tape drives with firmware major revision number 30 or greater and DLT-S4 tape *drives can accept cartridges with the WORM feature.* The WORM (write once read many times) feature prevents the user from altering or erasing information from the tape. For more information, go to the Quantum Web site and do a search on DLT*ICE*™.

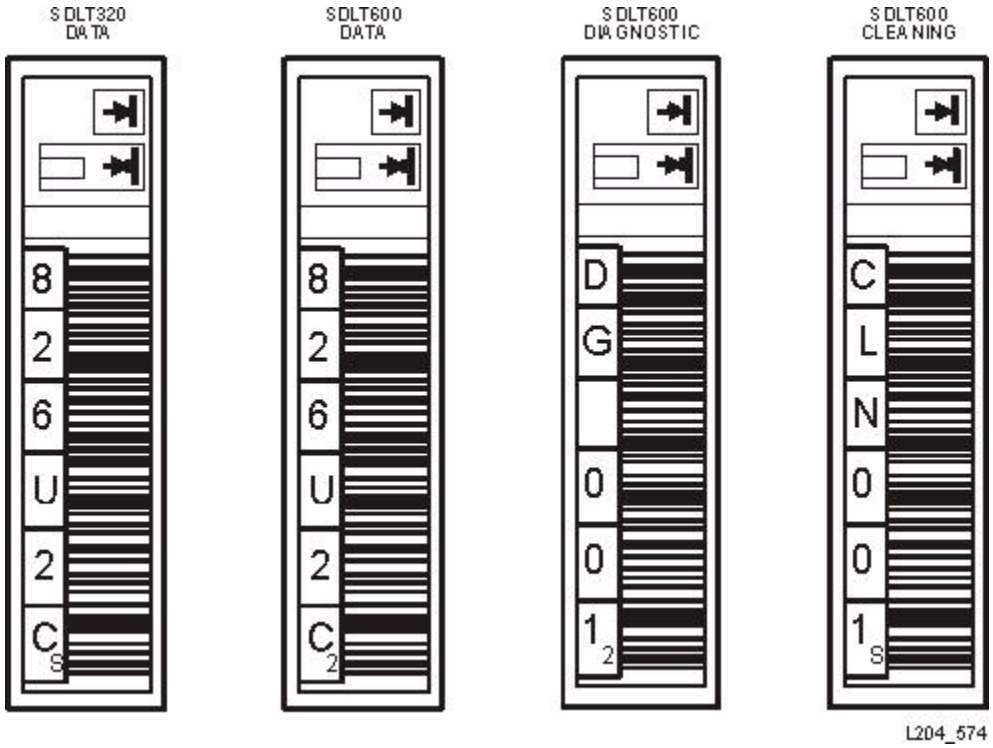
Note – The WORM feature can only be used with a cartridge that is unformatted native, blank native, or native with one filemark and an EOD.

SDLT/DLT-S4 cartridge labels have six or seven characters. The last character is the media ID (S or 2). CLN or DG are the first characters on the cleaning or diagnostic label.

TABLE A-4 SDLT/DLT-S4 Cartridge Codes

Label	Type of Cartridge
S	SDLT 220/320 data cartridge
2	SDLT 600 data cartridges
4	DLT-S4 data cartridges
CLN + S	SDLT/DLT-S4 cleaning cartridge.
DG + S	SDLT Diagnostic cartridge
DG + 4	DLT-S4 Diagnostic cartridge
Note: Apply a DG label to a blank data cartridge to be used for library diagnostic tests	

FIGURE A-2 SDLT/DLT-S4 Cartridge Labels



Notes: DLTtape S4 media labels are identified by "4."
An SDLT cleaning tape is compatible with the DLT-S4 drive.

Ordering Cartridges

Cartridges are not shipped as part of the SL500 Modular Library System; they must be ordered separately *at least* two months before the installation.

The customers can use their existing cartridges as long as they are compatible with the supported tape drives (see previous pages) and are still within their warranty period.

StorageTek Professional Services and Data Center Services offer transition support and services to help migrate media and drives.

Contact your authorized Selling Agent for StorageTek-branded labeled cartridges. You do not need to order labels separately, because the data cartridges have labels already, and the cleaning and diagnostic labels are shipped with the installation hardware. However, you must select the VOLSER range and other label options when ordering cartridges.

If you choose to order additional labels, order them from any standard media vendor.

Cartridges must meet specifications defined in *American National Standard Magnetic Tape and Cartridge for Information Interchange*, ACS X3B5.

Refer to your tape drive manufacturer's publication and Web site for specific cartridge requirements and specifications.

Color cartridges are approved only if the measured reflection density is greater than 0.1 as measured by an X-rite 404G color reflection densitometer. For more information about colored cartridges, contact your marketing representative.

Color measurements are:

Bandwidth	ANSI Status T Wide band (380 to 780 nm)
Measuring range	Density (0.00 to 2.50) D
Accuracy	±0.02 D
Repeatability	±0.01 D
Aperture diameter	3.4 mm (0.13 in.)

For technical questions, contact the Sales Support.

Media Usage:
The storage media (cartridge tapes) used in a tape drive and/or library can have a *significant* impact on the overall performance. The following is the policy regarding tape storage media:

- StorageTek warrants tape storage media that is branded "StorageTek."
- The customer is responsible for all expenses and costs related to the repair or replacement of hardware damaged by non-StorageTek branded tape storage media.
- The customer may be billed for any service provided resulting from or related to problems caused by non-StorageTek branded tape storage media.

Glossary

A

access door A door on the front of a library through which service personnel or operators can access the interior of the library. *Synonymous with* front door.

adaptor card *See* MPW card, MPU2 card, or PUA card.

array (1) A section of vertical or horizontal cartridge receptacles inside a library.

(2) A molded module that holds multiple cartridges.

B

bar-code scanner A component of the robot that is used for cartridge identification and position calibration.

base module The module in an SL500 library that contains the robotics unit and the base module. This module also houses the library backplane (RLM card), RLC card, interconnect cards, and one or two power supplies and drives.

C

cartridge A container holding magnetic tape that can be processed without separating the tape from the container.

The library uses data, diagnostic, and cleaning cartridges. These cartridges are not interchangeable.

cartridge access port (CAP) A device in the library that allows an operator to insert or remove cartridges during library operations.

cartridge expansion module An optional module that adds cartridge storage slots to an SL500 library.

cartridge tape A container holding magnetic tape that can be processed without separating the tape from the container

cleaning cartridge A cartridge that contains special material to clean the tape path in a transport or drive. LTO cleaning cartridges labels have “CLN” prefixes and media ID of CU.

D

data cartridge A term used to distinguish a cartridge onto which a tape drive may write data from a cartridge used for cleaning or diagnostic purposes.

diagnostic cartridge A data cartridge with a "DG" label that is used for diagnostic routines.

drive expansion module An optional module that adds cartridge storage slots and tape drive slots to an SL500 library

dynamic World Wide Name (dWWN) A feature that applies dynamic names to network devices rather than fixed names. When a dWWN-named device is replaced, it is assigned the same WWN as the one it replaced, preventing re-configuration of the network.

E

Ethernet A local-area, packet-switched network technology. Originally designed for coaxial cable, it is now found running over shielded, twisted-pair cable. Ethernet is a 10- or 100-megabytes-per-second LAN.

export The action in which the library places a cartridge into the cartridge access port so that the operator can remove the cartridge from the library. *Synonymous with* eject.

F

Fibre Channel A bidirectional, full-duplex, point-to-point, serial data channel structured for high performance capacity.

Fibre Channel is an interconnection of multiple communication ports, called N_Ports. These N_Ports are interconnected by a switching network, called a fabric, to a point-to-point link, or an arbitrated loop.

Fibre Channel is a generalized transport mechanism with no protocol of its own. A Fibre Channel does not have a native input/output command set, but can transport existing Upper Level Protocols (ULP) such as SCSI and IPI.

Fibre Channel operates at speeds of 200 MB per second. Fibre Channel operates over distances of up to 100 m over copper media or up to 10 km over optical links.

G

get An activity in which a robot obtains a cartridge from a slot or drive.

gripper The portion of the hand assembly that grasps and holds a cartridge.

H

hand assembly A part of the library robot whose function is to grasp cartridges and move them between storage slots and drives. A bar-code scanner on the hand assembly reads cartridge volume labels.

hot-swappable The capability that allows a component to be replaced while power to the component is maintained. This feature allows hardware maintenance actions and hardware upgrades to proceed without disrupting subsystem availability.

I

import The process of placing a cartridge into the cartridge access port so that the robot can insert it into a storage slot. *Synonymous with* enter.

interlock switch A switch that disconnects power to library mechanisms, excluding tape drives, when the front door is opened.

L

library console The customer's operator panel that interfaces with the library.

M

magazine A removable array that holds cartridges and is placed into the cartridge access port (CAP).

MPU2 card A Fibre Channel interface for the SL500 library.

MPW card A SCSI interface for the SL500 library.

O

opened Status indicating that software has made a CAP available for operator use. An LED is lit when a CAP is unlocked.

P

PUA card A Dual Port Fibre Channel interface for the SL500 library (check availability).

put An activity in which a robot places a cartridge into a slot or drive.

R

rack module (u) A standard measurement of vertical space inside a rack-mount cabinet. One U equals 44.5 mm (1.75 in.).

reach mechanism A component of the robot that moves the gripper to get or put a cartridge at a designated location.

reserved slots Configurable cartridge slots that are used only for cleaning and diagnostic cartridges.

retraction handle A handle used to manually retract the Z flex cable into its containment box.

RLC card The library controller card.

RLM card The backplane for the base module.

RLW card A SCSI interface for the SL500 library.

remote operator console *See* Library Console.

robot A mechanism that transports cartridges to and from locations in the library.

robotics unit The module that includes the robotics components and that controls the movement of the robot between storage slots, drives, and CAPs.

RU Rack unit

S

SL500 audit The process of reading and storing in SL500 library memory the VOLIDs and locations of all cartridges in the library. *See also* host audit.

slot The location in the library in which a cartridge is stored. *Synonymous with* cell.

StorageTek SL500 Modular Library System An automated tape library composed of:

- Base module
- Drive expansion module (optional)
- Cartridge expansion module (optional)

T

tape drive An electromechanical device that moves magnetic tape and includes mechanisms for writing and reading data to and from the tape.

tape drive tray assembly The mechanical structure that houses a tape drive, fan assembly, power and logic cards, cables, and connectors for data and logic cables. *Synonymous with* drive tray assembly.

tape transport interface (TTI) An interface to control/monitor tape drive operation.

V

vacancy plate A plate that covers an unused bay, such as a drive bay or power supply bay.

W

wrist A component of the hand assembly that rotates the hand horizontally.

World Wide Name (WWN) A 64-bit integer that identifies a Fibre Channel port. *See also* dynamic World Wide Name (dWWN).

Index

P

R

S

T

U

V

W

X

Z

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