Quantum

User's Guide User's Guide **User's Guide** User's Guide User's Guide

Quantum Scalar i500 Tape Library

Scalar i500

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About This Guide and Your Product

This guide contains information and instructions necessary for the normal operation and management of the Scalar® i500 library. This guide is intended for anyone interested in learning about or anyone that needs to know how to install, configure, and operate the Scalar® i500 library. Be aware that administrator level privileges are required to configure many of the features described in this guide.

Product Safety Statements

This product is designed for data storage and retrieval using magnetic tapes. Any other application is not considered the intended use. ADIC will not be held liable for damage arising from unauthorized use of the product. The user assumes all risk in this aspect.

This unit is engineered and manufactured to meet all safety and regulatory requirements. Be aware that improper use may result in bodily injury, damage to the equipment, or interference with other equipment.

WARNING BEFORE OPERATING THIS PRODUCT, READ ALL INSTRUCTIONS AND WARNINGS IN THIS DOCUMENT AND IN THE *SYSTEM, SAFETY, AND REGULATORY GUIDE*.

警告 在使用本产品之前，请先阅读本文档及系统、安全和法规信息指南中所有的说明和警告信息。

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ADVERSAL Læs alle instruktioner og advarsler i dette dokument og i *Vejledning om system-sikkerheds- og lovgivningsoplysninger*, før produktet betjenes.

AVERTISSEMENT Avant d'utiliser ce produit, lisez la totalité des instructions et avertissements de ce document et du *Guide d'informations sur le système, la sécurité et la réglementation*.

HINWIES Lesen Sie vor der Verwendung dieses Produkts alle Anweisungen und Warnhinweise in diesem Dokument und im System, Safety, and Regulatory Information Guide (Info-Handbuch: System, Sicherheit und Richtlinien).

אזהרה לפני ההפעלה של מוצר זה, קרא את כל ההוראות והאזהרות הכלולות במסמך זה וכן ב*מדריך מידע בנושאי מערכת, בטיחות ותקינה*

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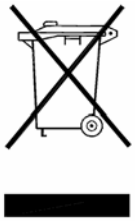
경고 이 제품을 작동하기 전에 이 문서 및 시스템, 안전, 및 규제 정보 안내서에 수록된 모든 지침과 경고 표지를 숙지하십시오.

ПРЕДУПРЕЖДЕНИЕ Перед началом эксплуатации данного устройства ознакомьтесь во всеми инструкциями и предупреждениями, приведенными в данном документе и в *Справочном руководстве по устройству, технике безопасности и действующим нормативам*.

ADVERTENCIA Antes de utilizar este producto, lea todas las instrucciones y advertencias en este documento y en la Guia informativa sobre sistema, seguridad y normas.

VARNING Läs alla anvisningar och varningar i detta dokument och i *System, säkerhet och krav från myndigheter - Informationshandbok* innan denna produkt tas i bruk.

Disposal of Electrical and Electronic Equipment



This symbol on the product or on its packaging indicates that this product should not be disposed of with your other waste. Instead, it should be handed over to a designated collection point for the recycling of electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please visit our website at qcare.quantum.com or contact your local government authority, your household waste disposal service or the business from which you purchased the product.

Product Model Number

The Scalarmodel number is as follows: i500.

Explanation of Symbols and Notes

The following symbols appear throughout this document to highlight important information.

WARNING	**INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR BODILY INJURY.**
CAUTION	**Indicates a situation that may cause possible damage to equipment, loss of data, or interference with other equipment.**
Note	Indicates important information that helps you make better use of your system.

Other Documents You Might Need

The following documents are also available for this product. These documents can be found on the product CD or at www.quantum.com/support.

- Scalar i500 Getting Started Guide (6-01741-xx)
- Quantum Intelligent Libraries SMI-S Reference Guide for the Scalar i500 and Scalar i2000 (6-01317-xx)
- Scalar i500 Unpacking Instructions (5U) (6-01385-xx)
- Scalar i500 Unpacking Instructions (14U) (6-01524-xx)
- Scalar i500 Unpacking Instructions (23U) (6-01525-xx)
- Upgrade Instructions Scalar i500 Library Firmware (6-01739-xx)
- Upgrade Instructions Scalar i500 Tape Drive Firmware (6-01740-xx)
- Customer Replaceable Unit (CRU) Instruction Sheet: SCSI and Fibre Channel Drives (6-01386-xx)
- Customer Replaceable Unit (CRU) Instruction Sheet: Library Control Blade (LCB) and LCB Flash Card (6-01456-xx)
- Customer Replaceable Unit (CRU) Instruction Sheet: Power Supply (6-01457-xx)
- Customer Replaceable Unit (CRU) Instruction Sheet: Rackmount Kit (6-01492-xx)
- Customer Replaceable Unit (CRU) Instruction Sheet: Module Communication Cable (6-01458-xx)
- Customer Replaceable Unit (CRU) Instruction Sheet: I/O Blade and I/O Fan Blade (6-01742-xx)
- System, Safety, and Regulatory Information Guide (6-00618-xx)

Note	Release Notes are also available for this product. The Release Notes describe changes to your system or firmware since the last release, provide compatibility information, and discuss any known issues and workarounds.The Release Notes can be found in the product box or at www.quantum.com/support.

Getting More Information or Help

StorageCare™, Quantum's comprehensive service approach, leverages advanced data access and diagnostics technologies with cross-environment, multi-vendor expertise to resolve backup issues faster and at lower cost.

Accelerate service issue resolution with these exclusive Quantum StorageCare services:

- **Service and Support Website** -- Register products, license software, browse Quantum Learning courses, check backup software and operating system support, and locate manuals, FAQs, firmware downloads, product updates and more in one convenient location. Benefit today at www.quantum.com/support.
- **eSupport** -- Submit online service requests, update contact information, add attachments, and receive status updates via email. Online Service accounts are free from Quantum. That account can also be used to access Quantum's Knowledgebase, a comprehensive repository of product support information. Sign up today at www.quantum.com/esupport.
- **StorageCare Guardian** -- Securely links Quantum hardware and the diagnostic data from the surrounding storage ecosystem to Quantum's Global Services Team for faster, more precise root cause diagnosis. StorageCare Guardian is simple to set up through the internet and provides secure, two-way communications with Quantum's Secure Service Center. More StorageCare Guardian information can be found at www.quantum.com/guardian.

For further assistance, or if training is desired, contact Quantum Technical Assistance Center:

North America:	+1-800-284-5101
UK, France and Germany:	00800 4 QUANTUM
EMEA:	+44 1256 848 766
For worldwide support:	www.quantum.com/contactsupport

For the most updated information on Quantum Global Services, please visit www.quantum.com/support.

2

Description

The Scalar i500 tape library automates the retrieval, storage, and management of tape cartridges. Tape cartridges are stored in the library and mounted and dismounted from tape drives using firmware running on the library or software running on the host systems.

The Scalar i500 tape library is different from other tape libraries because it is an intelligent library. The Scalar i500 tape library offers advanced management features and reliability as well as scalable performance and storage capacity. As your storage capacity and tape drive requirements change, expansion modules can be added to the library, allowing a configuration of up to a full 41 rack units (41U, where 1U = 1.75").

The Scalar i500 library is designed for ease of installation, configuration, and field upgrades. The Scalar i500 library is built upon two basic building blocks: the 5U control module and 9U expansion module.

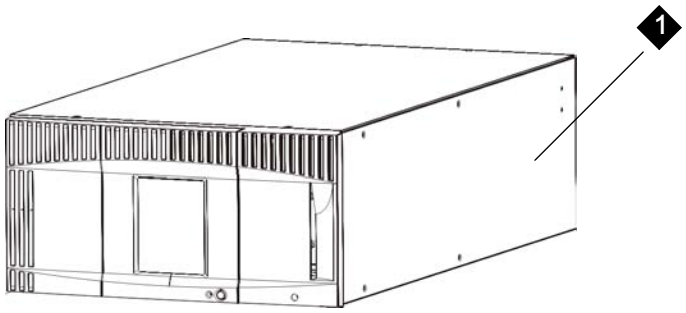
These building blocks form the basis of the following library configurations:

- A 5U library, consisting of a 5U stand-alone control module. Figure 1 shows the front view of a 5U library.
- A 14U library, consisting of one 5U control module and one 9U expansion module. Figure 2 on page 6 shows the front view of a 14U library.
- A 23U library, consisting of one 5U control module and two 9U expansion modules. Figure 3 on page 7 shows the front view of a 23U library.

The 5U, 14U, and 23U libraries are the base Scalar i500 systems. By adding 9U expansion modules, you can upgrade a base system to:

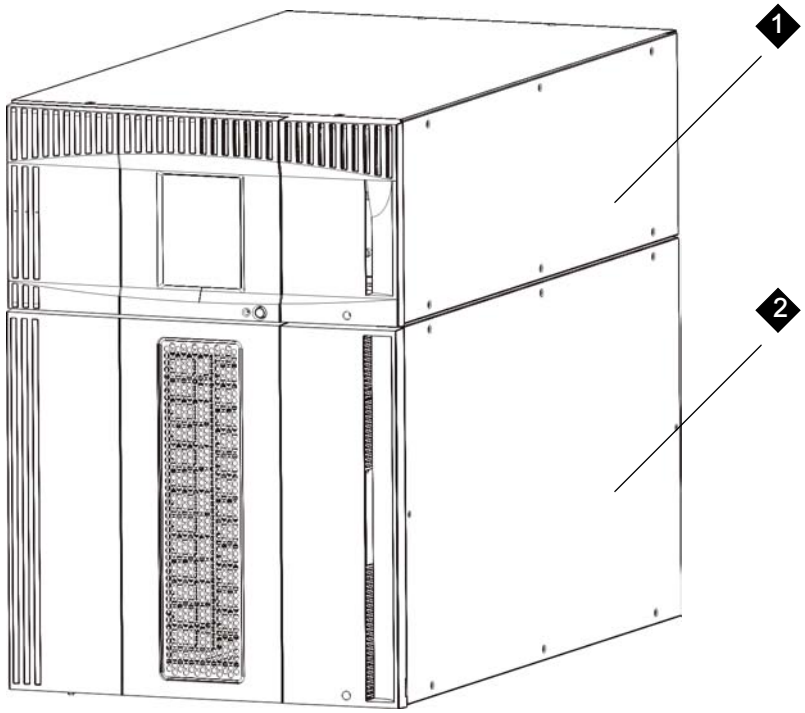
- A 32U library, consisting of one 5U control module and three 9U expansion modules
- A 41U library, consisting of one 5U control module and four 9U expansion modules

Figure 1 5U Library Configuration (Stand-Alone 5U Control Module)



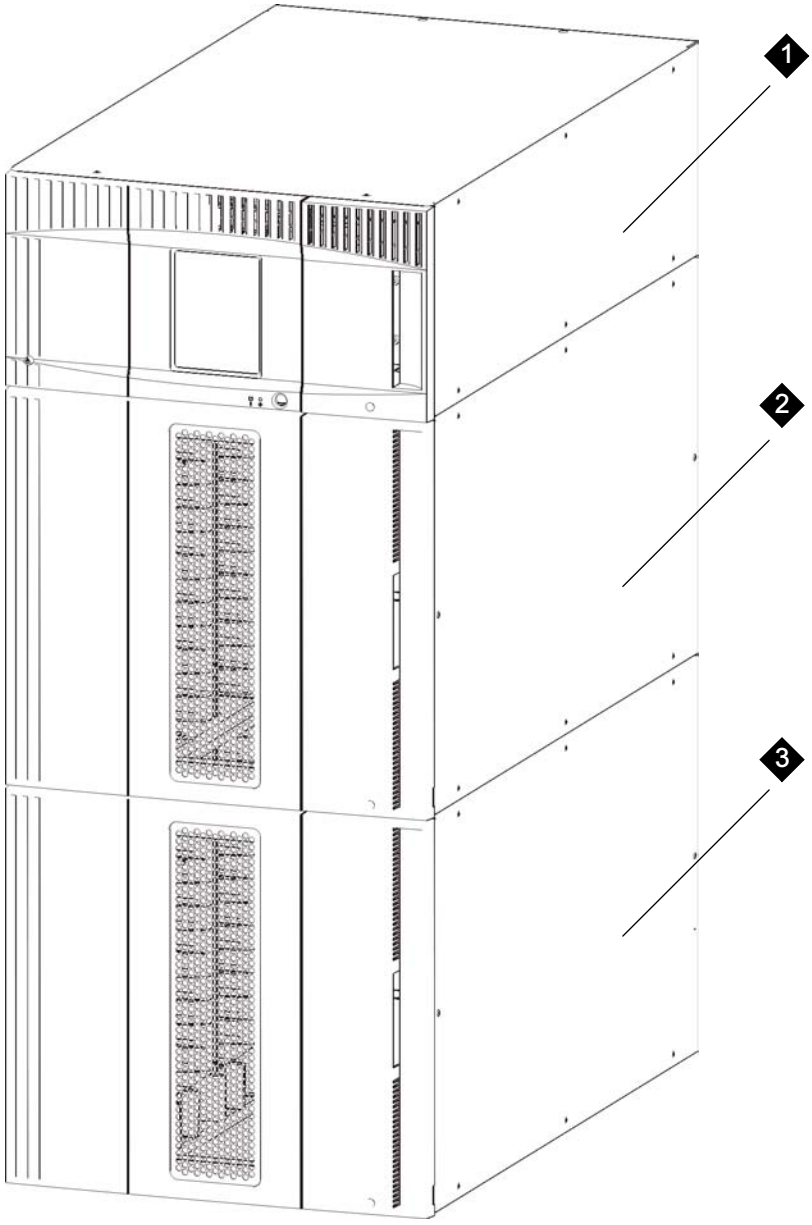
1	5U control module

Figure 2 14U Library Configuration (5U Control Module Plus One 9U Expansion Module)



1	5U control module
2	9U expansion module

Figure 3 23U Library Configuration (5U Control Module Plus Two 9U Expansion Modules)



1	5U control module
2	9U expansion module
3	9U expansion module

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

Intelligent Storage

The Scalar i500 is the intelligent library platform that gives growing midrange storage environments faster, easier, and more reliable data protection. The Scalar i500 combines modular design with continuous robotics to provide industry-leading scalability, performance, and reliability. Designed with Quantum's iPlatform architecture and iLayer management approach, the Scalar i500 makes backup easier to manage. Its proactive monitoring and remote diagnostics can reduce service calls by 50% and shorten issue resolution times by 30%. Its capacity-on-demand (COD) scalability lets it grow non-disruptively with users' data. And the Scalar i500 is designed to integrate easily with disk backup, making it the perfect library for next-generation backup architectures. With the Scalar i500, Information Technology managers can be assured they will have reliable, high-performance backup, certain restores, and effective long-term protection for years into the future, no matter how their storage needs evolve.

Modules

Scalar i500 libraries are modular, and you can increase the size at any time. The three base systems for the Scalar i500 library are as follows:

- The 5U library, consisting of a control module
- The 14U library, consisting of a 5U control module and a 9U expansion module
- The 23U library, consisting of a 5U control module and two 9U expansion modules

These configurations can be scaled up by adding 9U expansion modules to a maximum rack height of 41U.Expansion modules provide additional capacity as your storage and tape drive requirements change. See Figure 4 on page 10 for an illustration of library scalability. For information on installing, removing, and replacing modules, see Installing, Removing, and Replacing on page 101.

Each module has a specific number of fixed storage slots, I/E station slots, and tape drive slots available. Table 1 shows the specifications for all library configurations.

Note

Slot counts in this *User's Guide* do not include ten inaccessible slots in the bottom two rows of any library configuration and two inaccessible slots in the topmost module of a fully-licensed 23U, 32U, or 41U configuration. For more information about these slots, see Unused Slots on page 80 in.

Table 1 Available Library Configurations

	5U	14U	23U	32U	41U
Maximum Storage Slots Available*	36	128	218	310	402
I/E Station Slots Available	0, 6	0, 6, 12, 18	0, 6, 12, 18, 24, 30	0, 6, 12, 18, 24, 30, 42	0, 6, 12, 18, 24, 30, 54
Maximum Drive Capacity	2	6	10	14	18
Maximum Power Supplies	2	4	6	8	10
Maximum Partitions	2	6	10	14	18
Maximum FC I/O Blades	0	2	4	4	4

*Including I/E station slots

5U Control Module

The 5U control module is required in any Scalar i500 library configuration. The 5U control module contains the robotic controls, library control blade (LCB), and touch screen display. The 5U control module also contains an import/export (I/E) station, fixed storage slots, tape drives, and at least one power supply.

9U Expansion Modules

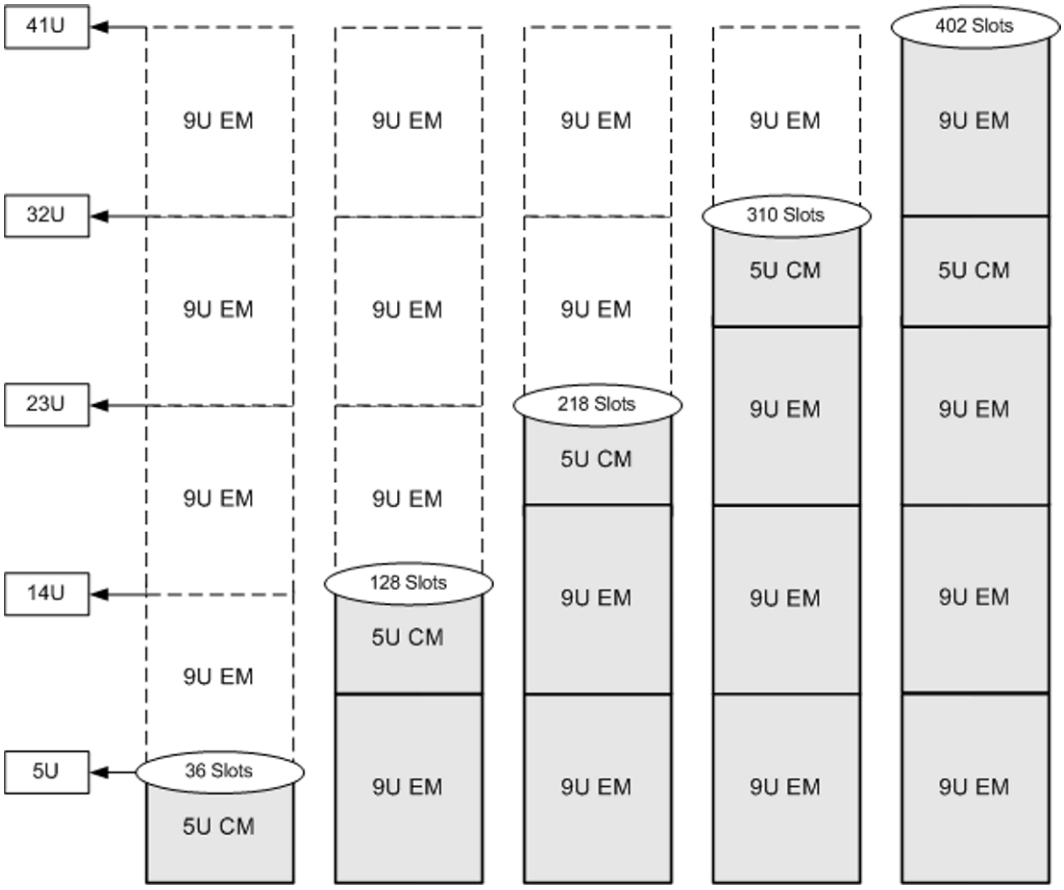
Expansion modules are supplementary modules that can be stacked above or below the 5U control module. Each expansion module contains fixed storage slots, tape drive slots, and power supply slots.The I/E stations on expansion modules are included and may be configured as storage. Expansion modules also contain bays for optional Fibre Channel (FC) Input/Output (I/O) blades, which provide FC connections for FC drives in the library.

If an expansion module is used only for storage and does not contain tape drives or FC I/O blades, it does not need a separate power supply. All power is derived from the control module.

Stackability

The maximum rack height of the library is 41U, which consists of a 5U control module and four 9U expansion modules. Figure 4 on page 10 illustrates the stackability of the library and the recommended library configurations.

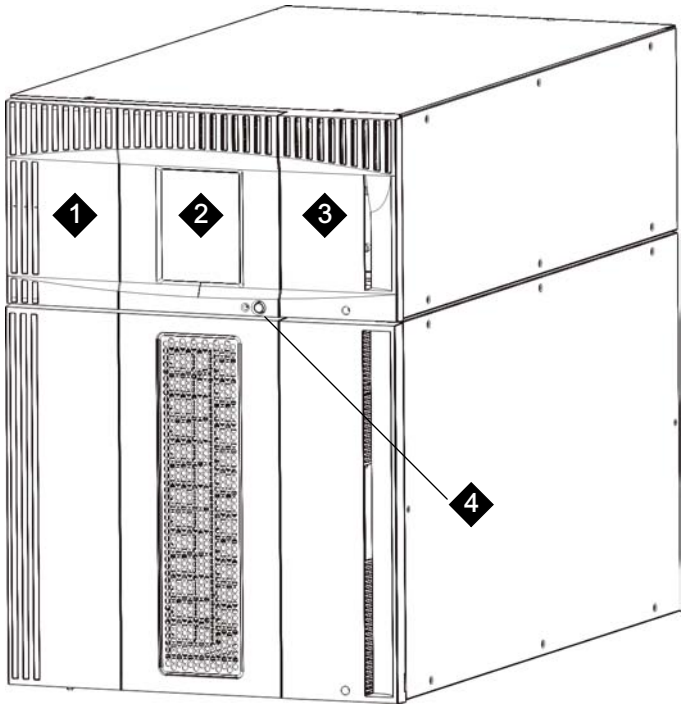
Figure 4 Base Systems Plus 9U Expansion Modules



Front Panel Components

The Scalar i500 library is made up of physical hardware components. Figure 5 shows the front panel components of the library. The paragraphs following Figure 5 describe the components in detail.

Figure 5 Front Panel Components



1	access door	3	I/E station
2	operator panel	4	front power switch

Access Door

The access door allows access to the internal components of the library. Each control module and expansion module has an access door. In most cases, you will not need to access the library through this door except when you want to bulkload or unload cartridges from the library.

The access door is locked by the I/E station door. To open the access door, you must first open the I/E station door. If you want to prohibit access to the library, which is recommended for security reasons, lock the I/E station door. This keeps unauthorized users from accessing tape cartridges.

You can lock and unlock the I/E station door using commands on the **Operations** menu.For more information, see Locking and Unlocking the I/E Stations on page 89.

If the access door is opened, the library is not available for use. When an access door (on any module) is opened, all in-progress motion commands are stopped, and the picker slowly lowers to the bottom of the library. When the access door is closed, the library returns any media in the picker to its original slot and also performs a library inventory.

CAUTION CARE SHOULD BE TAKEN TO AVOID OPENING THE ACCESS DOOR DURING ROBOTIC OPERATIONS SINCE THE ROBOT WILL STOP IMMEDIATELY AND WILL FAIL TO COMPLETE THE CURRENT OPERATION.

I/E Station

I/E stations enable importing and exporting cartridges with minimal interruption of normal library operations. I/E stations are located on the front of the control module and on the front of expansion modules. A 5U I/E station has a capacity of six cartridges within a removable magazine. A 9U I/E station has a capacity of 12 cartridges within two removable magazines.

The I/E stations can also be configured as storage as well as become part of a logical division of library resources known as a partition. The I/E station is shared among all partitions, but the I/E station slots are owned by one partition at a time. When an I/E station slot is assigned to a partition, only that partition can access that slot.

Operator Panel

The operator panel is the touch screen display device upon which the graphical user interface (GUI) appears. The operator panel is located on the access door of the control module. The library operations and service functions are performed from this screen. The GUI is also accessible through a remote web client. For more information on the library user interfaces, see Understanding the User Interface on page 23.

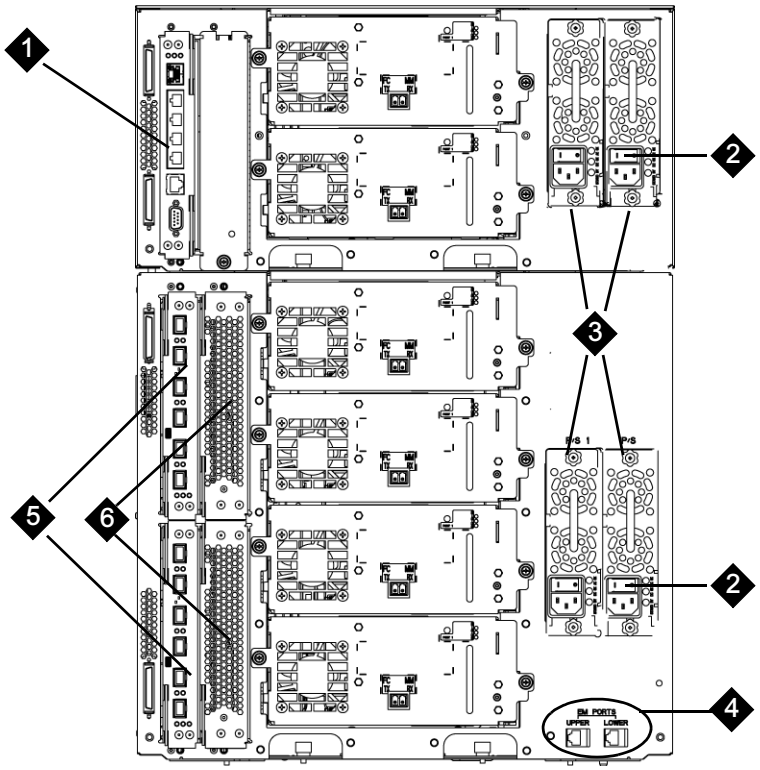
Front Power Switch

Turning off the front power switch turns off the robot and operator panel, but power still runs to the power supplies. Use the front power switch to manually reboot or shut down the library. See Shutting Down or Restarting the Library on page 90 for instructions on how to shut down or restart the library safely.

Back Panel Components

Figure 6 shows the back panel components of the library. The paragraphs following Figure 6 describe the components in detail.

Figure 6 Scalar i500 Back Panel Components



1	library control blade (LCB)	4	Upper and Lower Ethernet ports on expansion module
2	rear power switches	5	FC I/O blades (optional)
3	power supplies	6	FC I/O fan blades (required with FC I/O blades)

Rear Power Switches

Rear power switches are located on each power supply. Turning off the rear power switch on a power supply removes all power from the library. The rear power switches should be used in all emergency and service situations.

WARNING TURN OFF THE REAR POWER SWITCH WHENEVER YOU ARE SERVICING THE LIBRARY. IN THE EVENT OF DANGER TO PERSONNEL OR PROPERTY, IMMEDIATELY TURN OFF THE REAR POWER SWITCH AND REMOVE ALL POWER CORDS.

CAUTION Except in emergencies, use the shutdown procedure before switching off the rear power switch. See Shutting Down or Restarting the Library on page 90 for instructions on how to shut down the library.

Power System

The library supports single and redundant power configurations. The single power configuration has a single AC line input and single DC power supply. The redundant configuration has dual AC line input and dual DC power supplies.

If you have redundant power supplies, you can hot swap a power supply (power to the library remains on while you exchange the hardware), and you can hot add power supplies to other modules (power to the library remains on while you are adding the hardware).

WARNING THE POWER OUTLET MUST BE AVAILABLE NEAR THE LIBRARY AND MUST BE EASILY ACCESSIBLE.

CAUTION The control module and each expansion module that contains drives must have at least one power supply for every four drives. You can add a redundant power supply to each module. Installing one power supply in one module and another power supply in another module does not provide redundant power; the two power supplies must reside in the same module.

The power system consists of the following components:

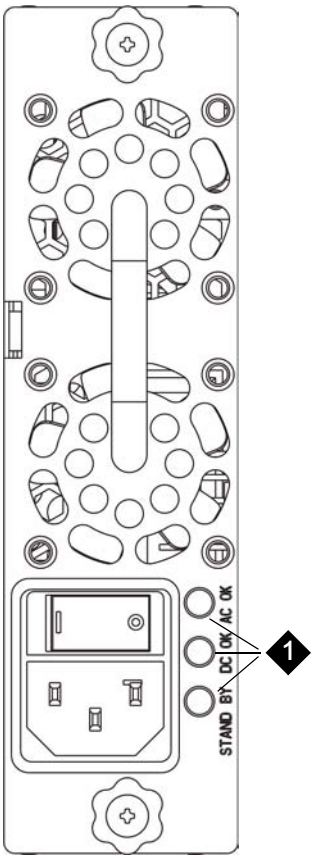
- Power supply
- AC power cord

The power supply has three light-emitting diodes (LEDs) that provide status information. These LED status indicators are green and blue in color.

- Green represents AC OK or DC OK.
- Blue represents swap-mode power status.

Figure 7 on page 15 shows the power system LEDs. For more information on the behavior of the LEDs, see Power Supply LEDs on page 218

Figure 7 Power System LEDs



1	LEDs

Library Control Blade

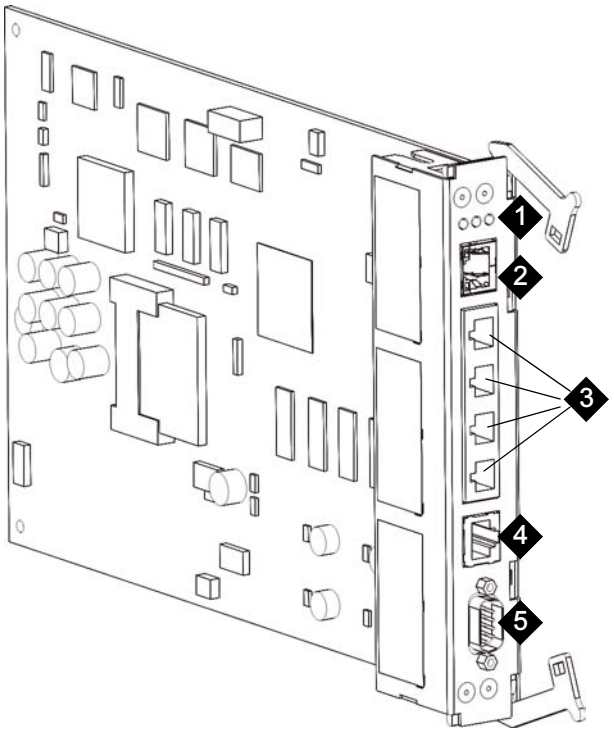
The library control blade (LCB) manages the entire library, including the operator panel and picker assembly, and is responsible for running system tests to ensure that the library is functioning properly. The LCB also provides internal communication to FC I/O blade slots. The LCB has four Ethernet ports, supporting a total of four FC I/O blades in the library.

The LCB indicates its status with three LED Reliability, Availability, and Serviceability (RAS) status indicators. These indicators are green, amber, and blue in color.

- Green represents processor status.
- Amber represents health status.
- Blue represents power-control status.

Figure 8 on page 16 shows the location of the LCB components, including LEDs. For more information on the behavior of the LCB LEDs, see LCB and FC I/O Blade LEDs on page 215.

Figure 8 Library Control Blade



1	LEDs (blue, amber, green)	4	Service Ethernet port
2	Gigabit Ethernet (external network) port	5	Service serial port
3	Ethernet I/O blade control ports (inactive if I/O blades are not installed)		

FC Input/Output Blades

Expansion modules support optional FC Input/Output (I/O) blades that provide connections for FC tape drives in the library. Each FC I/O blade has an embedded controller that provides connectivity and features that enhance the performance and reliability of tape drive operations. I/O blades also aggregate FC tape drive connections, reducing switch port and cabling requirements.

Each FC I/O blade has six auto-negotiating, 4Gb/s FC ports and backplane connections. The I/O blade provides two host communication ports and four connection ports to FC drives. Each I/O blade is cooled by a fan blade that is installed next to the I/O blade in the expansion module. I/O blades and fan blades are hot-swappable.

FC I/O blades cannot be installed in the 5U control module, so your library configuration must include at least one expansion module to include I/O blades. Any FC tape drive in the library, including drives in the control module, can be connected to an I/O blade in an expansion module. Each 9U expansion module can house up to two I/O blades. Depending on the number of installed expansion modules, the library can support from one to four I/O blades. No library configuration can contain more than four I/O blades. Any FC drive in the library, including drives in the control module, can be connected to an FC I/O blade in an expansion module.

Note

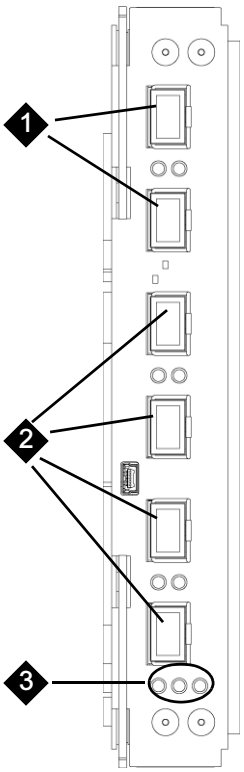
FC I/O menu commands are available for use only when FC I/O blades are installed in the library.

The FC I/O blade indicates its status with three LED status indicators. These indicators are green, amber, and blue in color.

- Green represents processor status.
- Amber represents health status.
- Blue represents power-control status.

Figure 9 shows the I/O Blade, including LEDs. For more information on the behavior of the I/O Blade LEDs, see LCB and FC I/O Blade LEDs on page 215.For information on configuring I/O blade ports, see Working With FC I/O Blades on page 62 in. See Installing, Removing, and Replacing on page 101 for information on installing and cabling FC I/O blades and FC tape drives.

Figure 9 FC I/O Blade

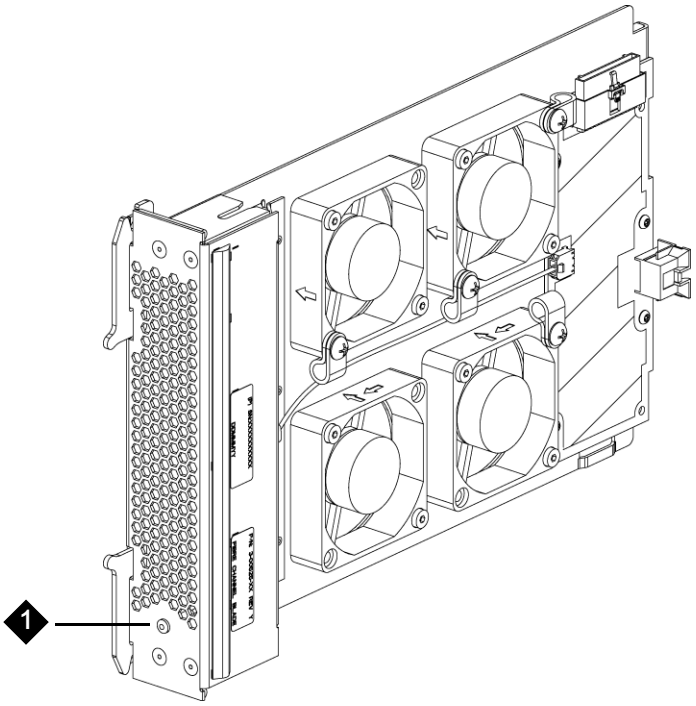


1	FC ports to host(s)
2	FC ports to drives
3	LEDs (blue, amber, green)

Each I/O blade is cooled by a fan blade that is installed next to the I/O blade in the expansion module. For information on installing the fan blade, see Adding, Removing, and Replacing the I/O Fan Blade on page 201.

Figure 10 shows the I/O fan blade, including the LED. The single amber LED represents health status. For more information on the behavior of the I/O fan blade LED, see LCB and FC I/O Blade LEDs on page 215.

Figure 10 FC I/O Fan Blade



1	LED (amber)

Robotic System and Barcode Scanner

The robotic system identifies and moves the cartridges between the storage slots, tape drives, and the I/E station. The robotic arm (picker) has picker fingers that enable it to grab tape cartridges and move them into positions along X, Y, and Z motion coordinates. The robotic system and the barcode scanner work together to identify the locations of resources within the library.

Each tape cartridge must contain a barcode that the barcode scanner reads during the inventory process. During the inventory process, the barcode scanner reads the fiducial labels to identify the types of magazines and tape drives that are installed in the library.

Every tape cartridge must have a unique machine-readable barcode attached to it. Tape cartridges cannot have duplicate barcode labels. This barcode identifies the cartridge. The library stores the physical location of the tape cartridge in an inventory database. All library or host requests typically reference the location of the tape cartridges based on this barcode number. Barcode labels are mandatory and must adhere to specific standards. For more information on barcodes, see Working With Cartridges and Barcodes on page 223.

Tape Drive Support

Scalar i500 libraries support the following tape drives:

- Linear Tape Open-GEN 2 (LTO-2) SCSI and FC tape drives. The supported LTO-2 tape drives are not compliant with the Restriction of Hazardous Substances (RoHS) directive.
- Linear Tape Open-GEN 3 (LTO-3) SCSI and FC tape drives. The supported LTO-3 tape drives are RoHS-compliant. LTO-3 FC tape drives allow FC speed configurations up to 4Gb/s
- Linear Tape Open-GEN 4 (LTO-4) SCSI, Serial Attached SCSI (SAS), and FC tape drives. The supported LTO-4 tape drives are compliant with the Restriction of Hazardous Substances (RoHS) directive. LTO-4 FC tape drives allow FC speed configurations up to 4Gb/s. A SAS tape drive's SAS address is automatically and uniquely generated based on a unique WWN that the drive receives when it is configured.

Mixed connectivity (using SCSI, SAS, and FC tape drives) is supported in Scalar i500 libraries. When you create partitions automatically, the library assigns resources proportionately among the partitions, grouping tape drives according to their interface type (SCSI, SAS, or FC). Creating partitions manually allows you more control over the assignment of the tape drives to partitions. For information on creating partitions automatically or manually, see Working With Partitions on page 40.

LTO SCSI tape drives are attached directly to the host. LTO SAS tape drives are attached directly to the host. LTO FC tape drives can be directly attached to hosts or to the Storage Area Network (SAN). LTO FC tape drives can also be attached to FC I/O blades, which manage communication between the hosts and the drives. For more information on FC I/O blades, see Working With FC I/O Blades on page 62 in "Configuring Your Library."

Details about tape drive support include:

- Every library configuration must contain at least one tape drive.
- 5U modules can hold a maximum of two tape drives.
- 9U modules can hold a maximum of four tape drives.

See Table 23 on page 227 for supported media types and Table 24 on page 228 for the number of tape drives supported by each library configuration.

Tape drives are installed into tape drive slots in the rear of the library. If a tape drive slot is empty, a filler plate covers the empty tape drive slots to prevent debris from entering the library. Tape drives are shipped filling the tape drive slots from the bottom to the top of the library, but the tape drives can be reinstalled in any available tape drive slot.

Note

Drive filler panels must be in place for the library to operate at normal speed.

For information on adding tape drives, see Adding a Tape Drive on page 194.

Library Features

This section describes several features of Scalar i500 libraries.

Licensable Features

In Scalar i500 libraries, LTO storage slots are licensed for use. The following situations may require you to enter a license key:

- During configuration of the library.
- During a feature upgrade.
- To activate additional storage slots in your current configuration.
- To replace the control module. License keys are tied to the serial number of the control module. If you replace the control module, you will need a new license key.

Details about licensable features include:

- A given license key can be used only once and cannot be transferred to another library.
- License keys do not expire.
- A given license key can encode several features.
- License keys are absolute values that can only increase licensed features. For example, if you have a 5U control module with 9U expansion module (128 slot) configuration, and you want to increase the storage capacity of the library from the 82 slots that you activated at the time of purchase up to the maximum 128 slots for the configuration, you will need a COD license key with 128 slots licensed.
- Once you install a license key, you cannot remove it without re-initializing the system. However, entering a new license key does not require re-initializing the library. See Shutting Down or Restarting the Library on page 90 for more information on re-initializing the library
- The number of licensed slots can never decrease.
- The license key is associated with the serial number of the 5U control module. If you must replace your control module for some reason, you will need to request a replacement license key from Quantum.
- The library control blade (LCB) compact flash card contains information about your library configuration. If you must replace your LCB flash card, you will need to request a replacement license key from Quantum.

CAUTION **While you are entering a license key, backup operations may be interrupted.**

Capacity-On-Demand (COD)

All Scalar i500 library configurations ship with the purchased number of slots pre-activated. At any time, the COD feature allows you to enable the inactive storage slots within a library by using COD license keys. COD license keys are available in 46-slot increments. For information on obtaining a COD license key, see Obtaining a Capacity-On-Demand License Key on page 53.

To see your library's current configuration and slot availability, you can open the **Library Configuration** report from the **Reports** menu of the web client interface. Table 8 on page 54 shows the number of licensable slots that are available in the different library configurations.

Once you receive the firmware license key, enter the key via the operator panel of the library. When the license key is entered, the total number of available slots in the library increases. An additional expansion module may be required, depending on your configuration. See Applying License Keys on page 53 for more information on activating a licensed feature.

Partitions

Partitions are virtual sections within a library that present the appearance of multiple, separate libraries for purposes of file management, access by multiple users, or dedication to one or more host applications.

Organizing the library into partitions divides the resources into virtual sections. If one of the resources is not available due to a failure or other cause, the other partitions and their assigned components are still available. Partitions can also be used to control access to portions of the library by granting permissions to user accounts to access certain partitions.

For more information on partitions, see Working With Partitions on page 40.

User Interface

The operator panel is located on the front door of the control module and allows users to work locally on the library via the user interface. The web client interface allows users to view and perform library functions from remote sites and is accessible through a browser. The operator panel and web client interface contain a similar user interface and functionality.

See Understanding the User Interface on page 23 for more information about the operator panel and the web client interface.

Control Path Modification

The control path tape drive is used to connect a partition to a host application. Only one tape drive can be selected as the control path at one time. By default, the first tape drive assigned to a partition is designated the control path. In the event that the control path connection to the host application fails, you can select a new control path for the partition.

Note — Control paths are not used in partitions that contain FC tape drives connected to host applications through FC I/O blades. For more information, see Modifying the Control Path on page 52.

Support for WORM

Scalar i500 tape libraries support WORM (write once, read many) technology in LTO-3 and LTO-4 tape drives. WORM allows non-rewriteable and non-erasable data to be written and provides extra data security by prohibiting accidental data erasure. The WORM feature is supported whenever you use WORM cartridges.

System Requirements

The Scalar i500 web client interface supports the following browsers:

- Firefox, version 1.0.6 and above
- Microsoft® Internet Explorer™ version 6.0 and above

3

Understanding the User Interface

The user interface of Scalar i500 libraries is available in two formats: the operator panel and the web client. Operations on the Scalar i500 library can be performed locally on the control module using the operator panel or remotely on your computer using the web client. Similar functionality with common elements is used for both formats.

Both the web client and operator panel user interfaces are required to operate the library. Some functionality is only available through the web client, and some functionality is only available through the operator panel. However, using the web client rather than the operator panel to perform library operations (when possible) is recommended.

You must disable web browser popup blockers to use the web client interface and the library's online Help. Add the Scalar i500's Internet Protocol (IP) address to the list of trusted/allowed sites on your Scalar i500-supported browser, so the web client pages will automatically refresh.

Common User Interface Elements

The user interface consists of four areas:

- **Header** — appears on every screen and contains the company logo, product name, and the three main navigation buttons. The main navigation buttons are:
  - **Home** — home page
  - **Help** — context-sensitive Help for the active screen
  - **Logout** — ability to log out
- **Title/Menu** — appears below the header and provides the library/partition name and access to the menu tabs on the main screen. On subsequent screens, this area is a single line and provides the screen name.
- **Main** — main content area of the screen.
- **Health/Navigation** — provides information about the "health" of the library by means of three subsystem status buttons: **Library**, **Drives**, and **Media**. See System Summary and Subsystem Status for more information on the subsystem buttons.

Note

A message in the header alerts you when the robot is not ready to perform library functions. See Troubleshooting on page 205 for more information on "Library Not Ready" messages displayed in the header.

Figure 11 and Figure 12 on page 24 show the operator panel and the web client interfaces.

Figure 11 Operator Panel User Interface

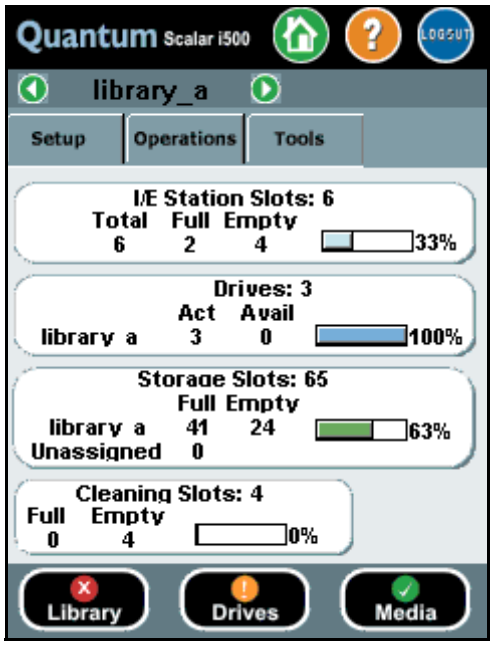
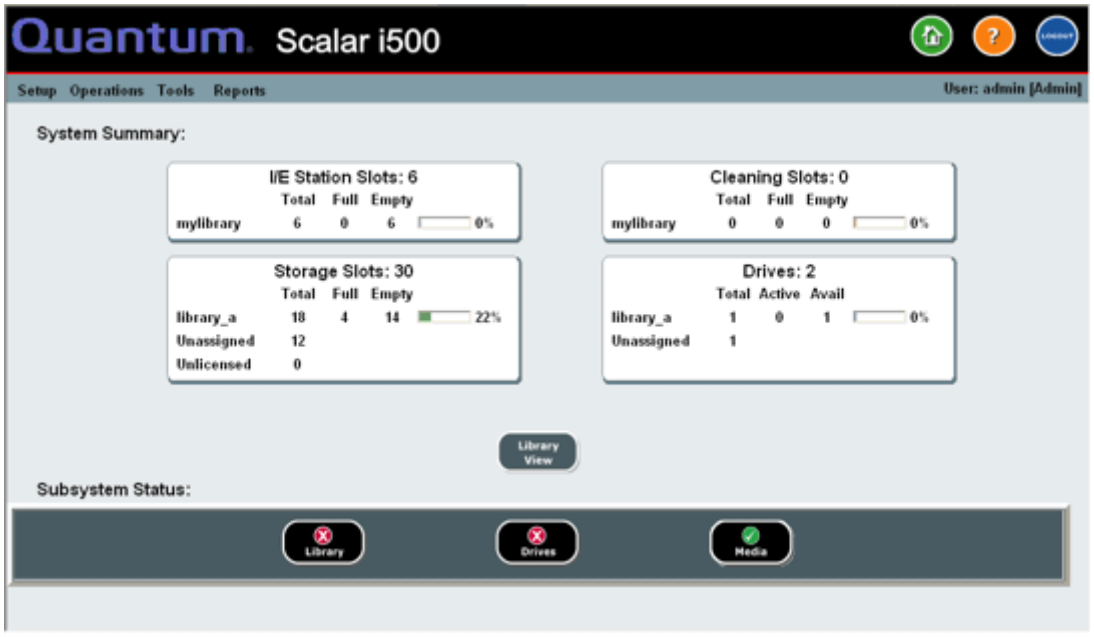


Figure 12 Web Client User Interface



System Summary and Subsystem Status

You can quickly gauge the health of the library by observing the color of the three subsystem status buttons located at the bottom of the home page. These buttons provide quick access to information about the "health" of the library for faster recovery if problems occur. You can select the buttons to view Reliability, Availability, and Serviceability (RAS) tickets that report problems in the subsystems.

The three subsystems are:

- **Library** — This subsystem represents the following: connectivity, control, cooling, power, and robotics.
- **Drives** — This subsystem represents tape drive components, such as tape drives, tape drive firmware, and tape drive sleds.
- **Media** — This subsystem represents media components, such as cartridges and barcode labels.

Each button has three states indicated by color. The three states are:

- **Green** — no RAS tickets exist or, if any tickets do exist, they have all been closed.
- **Yellow** — unopened and open low or high priority RAS tickets.
- **Red** — unopened and open urgent RAS tickets.

If the color of a subsystem button is red or yellow, you can click the button to display the **All RAS Tickets** screen. This screen lists library, drives, or media RAS tickets, depending on which button was selected. RAS tickets display in the order in which they were created, starting with the most recent.

You can also open the **All RAS Tickets** screen by selecting **Tools > All RAS Tickets**. See Troubleshooting on page 205 for more information about RAS tickets.

Home Page

The home page is common to both the operator panel and the web client interface. The web client home page provides two modes of navigation to access the user interface screens: tabs on the **Capacity View** and categorized function links on the **Library View**. The home page on the operator panel displays only the library **Capacity View**.

Capacity View

The **Capacity View** screen is the default view of the library and provides tabular data on the capacity of the library's partitions, slots, and drives. You can use the **Capacity View** to see a quick summary of the capacity of the library. The current user's login privileges determine the information that is displayed in the **Capacity View**.

Details about **Capacity View** include:

- Upon logging in, users see the first partition (in alphabetical order) to which they have access.
- On the operator panel, if users have access to more than one partition, they can navigate to other partitions using arrows next to the partition name at the top of the screen.

For more information about user privileges, see User Privileges on page 29 and Working With User Accounts on page 58.

On the web client interface, users can toggle between the **Capacity View** and the **Library View**.

Library View

Selecting the **Library View** button on the web client displays the **Library View**. The **Library View** provides a graphical representation of the library as well as another mode of navigation. Use the **Library View** to navigate through the library. The control module is labeled with “hot” areas that can be selected to access the functions for each area of the library. The **Library View** represents the actual configuration of the user’s library, including the order in which the modules are stacked. You will find the same navigation buttons on the **Library View** as on the **Capacity View**.

Operator Panel

The operator panel is physically attached to the front door of the control module. The user interface appears on the touch-screen LCD display of the operator panel for executing basic library management functions. Audible feedback, or “key click” sounds, are generated when a user presses a button on the operator panel. Users can choose to disable the audible feedback. See Configuring System Settings on page 72.

Operator Panel Keyboards

When a user touches a text box requiring data entry, a keyboard screen appears. The alpha, numeric, or month keyboard appears, depending on the type of input field touched. All alphabetic character entries are lower case. The text box appears at the top of screen, and the numbers/characters appear as they are entered. Pressing **123** opens the numeric keyboard.

Web Client

The web client HTTP interface is similar to the operator panel user interface. The web client interface is accessible from supported web browsers. See System Requirements on page 21 for information about supported browsers.

To manage the library from a remote web client interface, you must set up the library’s initial network configuration from the operator panel touch screen. See Configuring Library Security Settings on page 71 for information on setting the network configuration settings for remote use.

Menu Trees

The following four menus organize commands into logical groupings:

- The **Setup** menu consists of commands that users with administrative privileges can use to set up and configure various aspects of the library, including partitions, I/E station slots, cleaning slots, control paths, network settings, drive IDs, users, notifications, date and time, licenses, FC I/O blades, library registration, and e-mail.
- The **Operations** menu consists of commands that enable users to change the library’s mode of operations, import and export cartridges, load and unload tape drives, move media, and log off. Administrative users can also access commands to lock or unlock the I/E station and to shut the library down.
- The **Tools** menu consists of commands that you can use to maintain your library such as viewing RAS Tickets, generating diagnostic logs, identifying drives, configuring the internal network, saving and restoring the library configuration, setting system and security settings, and updating firmware.
- The **Reports** menu (web client only) consists of summaries of library information.

A hidden **Service** menu is available to service users with the appropriate login information.

The menus vary somewhat between the web client and operator panel user interfaces. Administrative users have access to all menu commands, but users' privileges are more limited.

Table 2 lists the web client menus. Some menu commands are available only to users with administrative privileges. I/O blade menu items are available for libraries that contain I/O blades.

Table 2 Web Client Menus

Setup Menu[a]	Operations Menu	Tools Menu[a]	Reports Menu
Setup Wizard	Media >Move >Import >Export	All RAS Tickets	System Information
Partitions	Cleaning Media >Import >Export	Capture Snapshot	Library Configuration
Cleaning Slots	Partitions >Change Mode	Save/Restore Configuration	Network Settings
I/E Station Slots	Drive >Load >Unload >Change Mode	Email Configuration Record	Logged in Users[a]
Drive IDs	I/E Station Lock/Unlock[a]	Identify Drives	All Slots
Control Path	System Shutdown[a]	Drive Operations	About[a] >Scalar i500 >Open Source Licenses
License	Log Out	Download SNMP MIB	
Notification >Setup >E-mail Account >Contact Information		IO Blade Info[b]	
Network Management >Network >SNMP >SNMP Trap Registrations		IO Blade Port Info[b]	
User Management >User Accounts >LDAP		Update Library Firmware	
IO Blades[b] >Port Configuration >Channel Zoning >Host Mapping >Host Management >Host Port Failover >Data Path Conditioning >Blade Control			
Date and Time			
Register Library			

[a]Administrative users only. [b]Available only when the library contains I/O blades.

Table 3 lists the operator panel menus. Some menu commands are available only to users with administrative privileges. I/O blade menu items are available for libraries that contain I/O blades.

Table 3 Operator Panel Menus

Setup Menu[a]	Operations Menu	Tools Menu
Setup Wizard	Move Media	All RAS Tickets[a]
Partition Mgmt >Create Partition >Delete Partition >Configure I/E Station Slots >Configure Cleaning Slots	Import Media	Capture Snapshot[a]
User Mgmt >Create User >Modify User >LDAP Configuration	Export Media	Drive Mgmt[a] >Create a firmware tape >Update drive firmware from tape >Erase a firmware tape >Clean drive
Drive IDs >Fibre >SCSI	Import Cleaning Media	Drive Info
Notification >Email Alerts >Email Account >Customer Contact	Export Cleaning Media	About Library >View Drive Info >Partition Info
Licenses	Change Partition Mode	Service
Date and Time >NTP Enable/Disable	Load Drive	Internal Network[a]
Network Mgmt >Network Configuration >SSL/SNMP Configuration >DNS Configuration	Unload Drive	System Settings >User session timeout (minutes)[a] >Touch screen audio >Unload assist[a] >Logical SN Addressing[a] >Manual Cartridge Assignment[a] >Disable Remote Service User[a]
Control Path	Change Drive Mode	Security[a] >Network Interface >SSH Services >ICMP >Remote UI >SNMP >SMI-S

Table 3 Operator Panel Menus

Setup Menu[a]	Operations Menu	Tools Menu
IO Blades[b] >Port Configuration >Channel Zoning >Host Mapping[c] >Host Management[c] >Host Port Failover >Data Path Conditioning >Blade Control	Lock/Unlock I/E Station[a]	Blade Info[b] >Port InfoDisplay Settings >Brightness >Contrast >Defaults
	Shutdown[a]	Library Tests[a] >Installation & Verification Tests >Library Demo >View Last Summary Log >View Last Detailed Log >E-mail Last Detailed Log
		Command History Log[ab]

[a]Administrative users only. [b]Available only when the library contains I/O blades. [c]Visible only when host mapping has been enabled.

User Privileges

User privilege levels are manually assigned to user accounts created within the library. Controlling access to screens and operations within the library preserves the integrity of the library and the data that is stored in it. See Working With User Accounts on page 58 for more information on setting user privilege levels.

Three types of users are defined in Scalar i500 libraries:

- Administrative users have access to the entire physical library and all of its partitions. The library ships with a default administrative user account. The user name for the default administrative user account is **admin** and the password is **password**. You cannot modify or delete the user name for the default administrative account, but you can modify the password. If you misplace the password for the default administrative account, contact Technical Support. For contact information, see Getting More Information or Help on page 4.
- Users have access to one or more assigned partitions and can perform functions within a partition, such as performing cartridge and tape drive operations. A user cannot perform operations that affect the physical library, such as creating or deleting partitions.
- A service user has access to the entire physical library and all of its partition as well as to a hidden **Service** menu that includes service and diagnostic tools. Each library has only one service user account.

Details on user privileges include:

- The library can contain eighteen user accounts (user or administrative or both), including the default administrative user account.
- Eighteen user (user or administrative or both) sessions can be active at one time.
- The same user can be logged in from multiple locations.
- Clicking the close button (**X**) in the upper-right corner of the web client interface closes the browser window but does not log the user or administrative user out.

- All users are logged out automatically after a configurable period of inactivity. The default timeout period is 30 minutes, but users with administrative privileges can change this to a value from 15 minutes to 480 minutes (eight hours). See Configuring System Settings on page 72.A screen saver is invoked after 10 minutes of inactivity on the operator panel. After an hour of inactivity, the screen will appear black. If the user has not been logged out for inactivity, touching the operator panel will reactivate it, returning the user to the screen last in use. (The web client interface does not use a screen saver.)
- An administrative user can disable any access to the library from the web client interface. For more information, see Configuring Library Security Settings on page 71.
- When a service user logs in, all other active users are automatically logged out.
- For security purposes, an administrative user can prevent a service user from logging on to the library remotely, from either the web client interface or over the ethernet service port. The service user will still be able to log on to the library from the operator panel interface. For more information, see Configuring System Settings on page 72 .

User Access

See Table 2 on page 27 for the web client menu tree and privilege level information. See Table 3 on page 28 for the operator panel menu tree and privilege level information.

4

Configuring Your Library

Once you have installed the hardware as described in the Getting Started Guide, you are ready to configure your library's settings. A **Setup Wizard** helps you get started configuring your library, and menu commands on both the operator panel and the web client allow you to reconfigure your library at any time.

CAUTION **Always save the library configuration after modifying configurable items. This will allow you to restore the most current settings if necessary. See** About Saving and Restoring the Configuration **on page 208.**

About the Setup Wizard

When you first power on the library, the operator panel displays the **Setup Wizard**, which walks you through the initial configuration of the library's basic operational settings, including network settings that enable you to access the library from the web client.

You must begin the **Setup Wizard** on the operator panel, but you have the option to complete the **Setup Wizard** on the web client. The **Setup Wizard** prompts you to enter the network settings that allow the web client to access the library. Once this step is complete, you must choose to either complete the wizard locally (on the operator panel) or remotely (on the web client). The on-screen instructions recommend that you choose to complete the wizard on the web client. The web client **Setup Wizard** offers more options.

While completing the **Setup Wizard** remotely is recommended, you may need to begin using the library locally immediately. In this case, you can complete the **Setup Wizard** on the operator panel or even cancel out of the **Setup Wizard** and allow the library to run on the default configuration settings.

Administrative users can always return to the **Setup Wizard** or use commands on the **Setup** and **Operations** tabs to modify all library settings, including network settings.

For additional information, see Using the Setup Wizard on page 32.

Using the Default Administrative User Account

When you power on the library for the first time, you do not need to log in to use the operator panel. You can start using the **Setup Wizard** immediately. After the initial setup session on the operator panel, however, you will need to log in to the operator panel as well as the web client.

The library ships with a default administrative user account. The user name on the account is **admin** and the password is **password**. When you see the **Login** screen on the operator panel or web client, type **admin** in the **User Name** text box and **password** in the **Password** text box. As soon as the initial setup is complete, you should change the password on the default administrative account. For information on changing passwords, see Modifying Local User Accounts on page 59.

Note — You cannot delete the default administrative user account or modify the user name. You can, however, change the password.

Note — If you misplace the password for the default administrative account, contact Technical Support. For contact information, see Getting More Information or Help on page 4.

Completing the Library Configuration With Menu Commands

The **Setup Wizard** is an aid to assist you with the initial configuration of the library. You can always return to the **Setup Wizard** by selecting it from the **Setup** tab on the operator panel or the **Setup** menu on the web client.

The **Setup Wizard**, however, contains only a subset of configuration tasks. The operator panel tabs and web client menus provide access to most configuration options that are included in the **Setup Wizard** and many that are not. Once the initial **Setup Wizard** session is complete, administrative users can choose whichever method is most convenient or necessary for modifying library settings.

The following topics cover using the **Setup Wizard** as well as **Setup** and **Operations** commands to configure the library. Paths to open the appropriate screens on both the operator panel and the web client are given for each task. For the operator panel, the paths refer to the navigation tabs at the top of the home page. For the web client, the paths refer to the menus.

For the menu trees on both the operator panel and web client, see Menu Trees on page 26.

Note — Power cycling (powering the library on and off) is not necessary to configure the library.

Using the Setup Wizard

The **Setup Wizard** simplifies the process of configuring the library. When you first power on the library, the operator panel displays the **Setup Wizard**.

The recommended procedure for using the Setup Wizard for the initial configuration is as follows:

1. Turn on the library and begin using the **Setup Wizard** on the operator panel. Be sure to configure network settings.
2. When the **Setup Wizard** screen text prompts you to choose **Local** or **Remote**, choose **Remote**.
3. Log out of the operator panel.
4. Using the default administrative account, log in to the web client. Type **admin** in the **User Name** text box and **password** in the **Password** text box.
5. Complete the **Setup Wizard** screens on the web client interface. The final **Setup Wizard** screen will prompt you to apply your settings.

When you have completed the Setup Wizard, the Library Configuration report appears on the web client. The Library Configuration report provides information on the library's tape drives, partitions, I/E stations, storage slots, cleaning slots, and loaded media. See Viewing the Library Configuration on page 91 for more information on the Library Configuration report.

Note — Depending on the size of the library, there may be a slight delay after you apply the settings in the **Setup Wizard** while the Library Configuration report page loads.

Details on using the **Setup Wizard** include:

- The only time that you do not need to log in to the library is when the **Setup Wizard** appears on the operator panel the first time the library is powered on.
- After a timeout period of one hour, the **Setup Wizard** will close, and you will be logged out of the library. Use the default administrative user account to log in on the operator panel.
- If you time out of the **Setup Wizard** or do not complete all the **Setup Wizard** screens, the library will apply the default configuration settings plus whatever modifications (if any) you made.
- You can only configure network settings on the operator panel, and you cannot log in to the library from the web client until you have configured network settings.
- You can always return to the **Setup Wizard** whenever you are logged in to either the operator panel or the web client.
- Any administrative users you create will also be able to use the **Setup Wizard** as well as **Setup** and **Operations** menu commands to reconfigure the library.
- If necessary, you can cancel out of the **Setup Wizard** on the operator panel and begin using the library locally with the default settings in place. If you accept the default network configuration settings, you will not be able to access the library remotely from the web client. You can, however, return to the **Setup Wizard** on the operator panel at any time and modify network and other settings.

  The default configuration settings are as follows:

  - **License keys:** 36 slots, minimum. The total number depends on number of pre-activated slots purchased.
  - **Network settings:** DHCP enabled
  - **Import/export (I/E) station slots:** 6
  - **Cleaning cartridge slots:** 0
  - **Partitions:** The default is one partition if your library contains only SCSI, FC, or SAS tape drives. If your library contains two tape drive types, the default is two partitions; if it contains three tape drive types, the default is three partitions. The library automatically groups tape drive by interface type into separate partition. To mix tape drive types within a partition, create partitions manually. See Manually Creating Partitions on page 42.

See also About the Setup Wizard on page 31.

Setup Wizard Tasks

As you work through the **Setup Wizard** screens, follow the on-screen instructions.

The **Setup Wizard** screens contains only a subset of all configuration options. The **Setup** and **Operations** menus contain most configuration options, including those in the **Setup Wizard**. This chapter includes detailed descriptions of the configuration tasks, including how and when to access them through the **Setup** and **Operations** menus.

- **Welcome** (operator panel) — Welcomes you to the **Setup Wizard**.

- **Hardware Installation** (operator panel) — Reminds you to install tape drives and the Ethernet cable.
- Setting the Date and Time (operator panel and web client) — Allows you to set the date and time on your library.
- Managing the Network (operator panel) — Allows you to enter your network settings for remote access using the web client.
- Choosing the Interface: Local or Remote (operator panel) — Allows you to choose to continue on the operator panel or on the web client.

  If you choose **Local**, the wizard proceeds on the operator panel. If you choose **Remote**, the wizard presents a **Confirm Remote** screen. Exit the operator panel, log in to the web client and select **Setup > Setup Wizard** to resume configuring your library.
- Applying License Keys (operator panel and web client) — Allows you to enter keys for licensed features.
- Configuring Cleaning Slots (operator panel and web client) — Allows you to configure dedicated cleaning slots. Configuring at least one cleaning slot enables the AutoClean feature. For more information about the AutoClean feature, see About Cleaning Tape Drives on page 85.
- Configuring I/E Station Slots (operator panel and web client) — Allows you to configure import/export (I/E) station slots.
- Working With Partitions (operator panel and web client) — Allows you to set the number of library partitions.
- **Confirm Settings** (operator panel and web client) — Allows you to confirm your library settings.

CAUTION **Always take a library snapshot and save the library configuration after modifying configurable items. If modifying items results in issues, the library snapshot will help Support personnel to troubleshoot the problem. Saving the library configuration will allow you to restore the most current settings if necessary. For more information on taking a library snapshot and saving and restoring the library configuration, see Troubleshooting on page 205.**

Note **Setup Wizard** operations cannot be performed concurrently by multiple administrative users logged in from different locations. You can access the screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > Setup Wizard**.
- From the operator panel, select **Setup > Setup Wizard**.

Choosing the Interface: Local or Remote

The **Setup Wizard: Local or Remote** screens are parts of the operator panel **Setup Wizard** only. Use the second **Setup Wizard: Local or Remote** screen to select whether you want to finish configuring the library using the local operator panel or the remote web client.

The **Web Client** button is grayed out if the Internet Protocol (IP) address has not been configured.

The network configuration settings are the only settings that must be configured using the operator panel. Once the IP address is set, you can access the **Setup Wizard** from the web client and configure the remaining settings.

Remote Configuration

The **Setup Wizard: Remote Configuration** screen provides the information necessary to access the web client to complete the initial configuration of the library.

The screen lists the IP address of the library. Use this IP address to access the web client using a Web browser. When typing the IP address into the Web browser, make sure to precede it with **http://**; for example, **http://123.123.123.123**.

Managing the Network

Administrative users can configure the following:

- Network settings that allow remote access to the library. For more information, see Modifying Network Settings on page 35.
- Secure Socket Layer (SSL) settings that increase data protection so that data from the library can be sent over the internet securely. For more information, see Enabling SSL on page 37.
- Simple Network Management Protocol (SNMP) settings that allow you to use an external management application to monitor the status of the library. For more information, see Configuring SNMP Settings on the Library on page 37.

CAUTION **Security settings must be enabled to allow SNMP, SMI-S, and IP address access to the library network. After applying any of the settings on the Network Management screens, verify the settings on the Security Settings screen. See Configuring Library Security Settings on page 71.**

Modifying Network Settings

The **Setup Wizard: Network Configuration** screen allows administrative users to configure network settings that allow remote access to the library from the web client. After the initial configuration, you can modify the network settings from either the operator panel or the web client.

From the web client, you can use the **Setup - Network** screen to modify the following network settings: library name, Dynamic Host Configuration Protocol (DHCP) enable/disable, IP address, subnet mask, default gateway address, and primary and secondary Domain Name Service (DNS) addresses.

From the operator panel, you can use the **Network Configuration** screen to modify the following network settings: library name, DHCP enable/disable, IP address, subnet mask, and default gateway.

In addition, when DHCP is disabled on the **Network Configuration** screen, you can use the **DNS Settings** screen to configure the primary and secondary DNS server addresses. DNS servers provide IP address resolution of fully qualified domain names. DNS settings are optional.

If you modify the IP address, you will need to type the new IP address in the **Address** field of your Web browser to access the web client.

Note

Make sure that the library is connected to the network before modifying network settings. If the Ethernet cable is not installed properly, you cannot configure the network settings. Install one end of the Ethernet cable in the top Ethernet port located at the back of the library just below the three LEDs. Make sure the other end of the Ethernet cable is installed in the appropriate LAN port on your LAN.

Details on network settings include:

- **Library Name** is the network name you want to assign to the library. The library name is limited to 12 lowercase alphanumeric characters and dashes (-).
- **DHCP** defaults to enabled. When DHCP is enabled, the library obtains an IP address automatically. If DHCP is not enabled, you must manually enter an IP address, default gateway, and subnet mask.
- IP addresses must be entered in dot notation (for example, 192.168.0.1).
- **IP Address** is the IP address of the library. This text box is available only if DHCP is disabled.
- **Default Gateway** is the IP address of the default gateway for your portion of the Ethernet network. This text box is available only if DHCP is disabled.
- **Subnet Mask** text box is available only if DHCP is disabled.
- **Primary DNS Address** (optional) must be entered as an IP address. This text box is available only if DHCP is disabled.
- **Secondary DNS Address** (optional) must be entered as an IP address. This text box is available only if DHCP is disabled.
- The **IP Address**, **Default Gateway**, **Subnet Mask, Primary DNS Address** and **Alternate DNS Address** text boxes are limited to numeric characters and do not allow values exceeding 255 for dot-separated values.

WARNING

Modifying network settings will modify network connectivity parameters, requiring remote communication configuration changes. Your current web client browser session might become invalid, requiring you to close your current browser session. Access the web client using the new network configuration settings and log in again.

Note

Be sure to add your library's IP address to the list of trusted/allowed sites on your library-supported browser, so the web client pages automatically refresh.

Note

For step-by-step network configuration instructions, see your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > Network Configuration > Network**.
- From the operator panel, select:

a. **Setup > Network Mgmt > Network Configuration** to configure library name, DHCP enable/disable, IP address, subnet mask, and default gateway.

b. **Setup > Network Mgmt > DNS Configuration** to configure DNS (when DHCP is disabled).

Enabling SSL

Administrative users can use the **SSL** tab on the operator panel **Network Management** screen to enable or disable SSL settings on the library. Enabling SSL settings encrypts all web browser connections to the web client, and it enables SSL-based authentication for SMI-S. SMI-S is the newest standard of SNMP, which makes sets of data continuously available. SMI-S is always enabled by default.

The default SSL setting is **Disabled**. Disabling SSL settings creates an unencrypted connection from a Web browser to the web client.

See the *SMI-S Reference Guide(6-01317-xx)* for further configuration and access details.

Note

On the operator panel, selecting **Apply** on the **SSL**, **Trap Registration**, or **SNMP Version** tab applies the settings on all three tabs. The HTTP service restarts when you select **Apply**. All logged-in users have to reconnect after HTTP services have been restarted.

Note

Before enabling SSL settings, make sure you enter a name for the library in the **Library Name** text box on the **Network Configuration** operator panel screen. After enabling SSL settings, use that library name to access the library. If you do not use that name, you will receive a security alert. In addition, make sure to complete all the text boxes listed on the web client **Contact Information** screen (**Setup > Notification > Contact Information**) before enabling SSL settings. This information is used to identify company information in the SSL certificate.

You cannot enable the SSL settings from the web client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Setup > Network Mgmt > SSL/SNMP Configuration**.

Configuring SNMP Settings on the Library

SNMP is a light-weight protocol designed for remote management and monitoring of infrastructure devices. The library provides SNMP support, so an external management application can be configured to receive library SNMP information. The library supports SNMP by publishing a Management Information Base (MIB) that can be queried to obtain the status of the library and many of its individual components. SNMP information can be obtained from the library using SNMP Traps and GET queries.

For more information about SNMP, see the *Basic SNMP Reference Guide (6-01370-xx)*. For information on integrating MIBs with an SNMP management application, contact your network management application vendor.

Administrative users can perform the following SNMP procedures:

- Register the IP addresses and port numbers of external management applications, enabling them to receive SNMP traps from the library. For more information, see Registering External Management Applications on page 38.
- Enable or disable support for SNMP v1 and v2c. SNMP v3 is enabled by default and cannot be disabled. For more information, see Enabling SNMP Versions on page 39.

- Modify the default Read SNMP community string, which is used as a password to authenticate GET and GET-NEXT SNMP v1 and SNMP v2c messages exchanged between the library and a remote management application. For more information, see Modifying the Read SNMP Community String on page 39.
- Enable or disable SNMP authentication traps, which are messages indicating an authentication failure. For more information, see Enabling and Disabling SNMP Authentication Traps on page 39.
- Download the library MIB, which can be used to integrate the library with an SNMP management application. For more information, see Downloading the SNMP MIB on page 39.

Registering External Management Applications

Administrative users can register the IP addresses and port numbers of external management applications to enable them to receive SNMP traps from the library. (By default, the library ignores all SNMP SET operations, so external management applications cannot register themselves to receive SNMP traps from the library.)

After registering the IP addresses and corresponding port numbers, you can perform a test to verify that the library sends the SNMP traps to the addresses.

When registering external management applications to receive SNMP traps, you can set the following parameters:

- **Host Name/IP Address** — the host name or the IP address of the external management application you want to register. A host name may be entered only if DNS is enabled. Otherwise, IP addresses must entered. For information on DNS, see Modifying Network Settings on page 35.
- **Default Port** — the port number of the external application you want to register. The default port number for an external application is 162.
- **Create** — adds the IP address and port number of the external application to the list of registered addresses that will be sent SNMP traps.
- **Modify** — allows you to modify a selected IP address and port number.
- **Delete** — allows you to delete a selected IP address and port number.
- **Test —** verifies only that the library has sent SNMP traps to all registered IP addresses. Check the external applications to verify that the traps were received.

  While the test is in progress, the **Progress Window** appears. If the test is successful, **ful** appears in the **Progress Window** and the traps were successfully sent. If the test is unsuccessful, **Failure** appears in the **Progress Window.** Follow the instructions listed in the **Progress Window** to resolve any issues that occur during the operation.

See the *Basic SNMP Reference Guide(6-01370-xx)* for further configuration and access details.

Note

On the operator panel, selecting **Apply** on the **SSL**, **Trap Registration**, or **SNMP Version** tab applies the settings on all three tabs. The HTTP service restarts when you select **Apply**. All logged-in users have to reconnect after HTTP services have been restarted.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

Enabling SNMP Versions

Administrative users can enable or disable support for SNMP v1 and v2c. The recommended practice is to disable SNMP v1 and SNMP v2c in highly secure environments.

SNMP v3 is always enabled and cannot be disabled. The authentication algorithm is set to MD5, and the encryption is disabled system-wide.

See the *Basic SNMP Reference Guide(6-01370-xx)* for further configuration and access details.

The paths to open the appropriate screens are as follows:

- From the web client select **Setup > Network Management > SNMP**.
- From the operator panel, select **Setup > Network Mgmt > SSL/SNMP Configuration**.

Modifying the Read SNMP Community String

Administrative users can modify the Read SNMP community string. The Read SNMP community string is a text string that acts as a password to authenticate GET and GET-NEXT SNMP v1 and SNMP v2c messages exchanged between the library and an external management application. The Read SNMP community string used by the library must match the string used by the external management application.

The default Read SNMP community string on the library is: *publicCmtyStr.* For security purposes, this string should be modified. When modifying the community string, adhere to the following guidelines: the community string is case-sensitive, cannot be empty, and cannot exceed 32 characters.

See the *Basic SNMP Reference Guide(6-01370-xx)* for further configuration and access details.

You cannot modify the read SNMP community string from the operator panel. The path to open the appropriate screen is as follows:

- From the web client select **Setup > Network Management > SNMP**.

Enabling and Disabling SNMP Authentication Traps

Administrative users can enable or disable SNMP authentication traps. When the library receives an SNMP message that does not contain the correct community string or other authentication information, the library sends an SNMP authentication trap message to registered remote management systems, indicating the authentication failure. SNMP authentication traps are disabled by default.

See the *Basic SNMP Reference Guide(6-01370-xx)* for further configuration and access details.

You cannot enable or disable SNMP authentication traps from the operator panel. The path to open the appropriate screen is as follows:

- From the web client select **Setup > Network Management > SNMP**.

Downloading the SNMP MIB

The library supports an SNMP MIB that can be used to integrate the library with commercial SNMP management applications. The MIB can be queried to obtain the status of the library and many of its individual components. Administrative users can download the SNMP MIB from the library. The MIB can then be installed on an SNMP external management application.

For more information about the library MIB, see the *Basic SNMP Reference Guide(6-01370-xx)* or contact Technical Support. For contact information, see Getting More Information or Help on page 4. For information on integrating MIBs with an SNMP management application, contact your network management application vendor.

Note

The SNMP MIB is also available on the *Scalar i500 Documentation and Training CD*.

You cannot download the SNMP MIB from the operator panel. The path to open the appropriate screen is as follows:

- From the web client select **Tools > Download SNMP MIB**.

Working With Partitions

The **Setup Wizard: Partitioning** screens allow administrative users to select the number of new library partitions to create.

Partitions are virtual sections within a library that present the appearance of multiple, separate libraries for purposes of file management, access by multiple users, or dedication to one or more host applications. The library must contain at least one unassigned tape drive and slot to create a partition.

At any time after the initial configuration of the library, administrative users can add to the number of existing partitions by selecting **Setup > Partitions** on the web client or **Setup > Create Partitions** on the operator panel.

There are two ways to create partitions:

- **Automatically —** assigns library resources proportionately among the partitions, grouping tape drives according to their interface type (FC, SCSI, or SAS). You can create partitions automatically on either the operator panel or the web client. When you automatically create partitions, you add to the number of existing partitions.
- **Manually —** an administrative user can create partitions one at a time. Creating partitions manually gives you more control over resource allocation. You can, for example, assign different tape drive types to the same partition. You can create partitions manually only on the web client. When you manually create partitions, you add to the number of existing partitions.

The maximum number of partitions that can be created is equal to the number of drives in the library. Table 4 shows the possible number of partitions that can be created for each of the available library configurations.

Table 4 Number of Partitions Supported

Available Configurations	Tape Drives Minimum, Maximum	Partitions Minimum, Maximum
5U	1, 2	1, 2
14U	1, 6	1, 6
23U	1,10	1,10
32U	1,14	1,14
41U	1,18	1,18

Details on partitions include:

- Administrative users can create, modify, delete, and control access to all partitions. Users can be given access to only certain partitions and denied access to others.
- Partition names are limited to 12 lower-case alphanumeric characters and underscores (_).
- The maximum number of partitions that can be created is equal to the number of drives in the library.

- At minimum, a partition consists of one tape drive and one slot. The tape drive or slot cannot be shared with another partition.
- I/E station slots are shared between all partitions. Partitions take temporary ownership of I/E station slots when importing or exporting tape cartridges.

CAUTION **Before permanently removing an expansion module from your library, you need to perform a set of configuration operations that includes deleting all partitions. See Deleting Partitions on page 45 and Removing the 9U Expansion Module on page 148.**

Automatically Creating Partitions

At any time after the initial configuration of the library, administrative users can add to the number of existing partitions by using the automatic partitioning process. Automatic partitioning assigns available library resources proportionately among the partitions, grouping tape drives according to their interface type (FC, SCSI, or SAS).

The library must contain at least one unassigned tape drive and one unassigned slot to automatically create a partition. If no unallocated tape drives or slots exist, you must modify or delete one or more partitions to free up resources. For more information, see Modifying Partitions on page 45 and Deleting Partitions on page 45.

The maximum number of partitions that you can create is equal to the number of drives in the library. On the **Automatically Create Partitions** screen, you can select the number of partitions to create, from a minimum of one to a maximum that equals the number of tape drives in your library.

Automatic partitioning does not allow you to mix FC, SCSI, and SAS tape drive interfaces within the same partition. For example, if your library contains a combination of FC and SCSI tape drives, you must select at least two partitions on the **Automatically Create Partitions** screen. The library then automatically groups the FC tape drives and SCSI tape drives and assigns them to different partitions. Create the partitions manually if you want different tape drive types within the same partition. To manually create partitions, use the web client. See Manually Creating Partitions on page 42.

When the library automatically creates partitions, it creates control paths as shown in Table 5. You can also manually change the control path (see Modifying the Control Path on page 52).

Table 5 Control Path Assignment During Automatic Partitioning

If a partition contains...	Then control path assignment is as follows...
Only SCSI or SAS tape drives	The first SCSI or SAS tape drive assigned to a partition is designated and enabled as the control path tape drive by default.
Only FC tape drives and the library itself does not contain any FC I/O blades	The first FC tape drive assigned to a partition is designated and enabled as the control path tape drive by default.

Table 5 Control Path Assignment During Automatic Partitioning

If a partition contains...	Then control path assignment is as follows...
Only FC tape drives and there is at least one FC I/O blade installed in the library	The FC I/O blade is designated as the control path for the partition, even if the partition has no tape drives connected to the FC I/O blade. Proceed as follows: • In partitions that have tape drives connected to the host through an FC I/O blade, the FC I/O blade serves as the control path (no tape drive is configured as a control path drive). Do not manually select a tape drive as the control path for this partition unless you select a tape drive that is not connected to the FC I/O blade. (If you select a tape drive to host a control path and it is also connected to the FC I/O blade, you will effectively have two control paths and this can cause the host to see the same partition multiple times via the FC I/O blade.)[a] • In partitions that do not have tape drives connected to the host through an FC I/O blade, you must manually select a tape drive as the control path for that partition.

a. Selecting a control path for a tape drive attached to an FC I/O blade can affect what is displayed during host mapping configuration. It can also affect what devices are presented to the host application. If a tape drive is seen multiple times by the host, check to see if a control path has been defined for the partition and remove it. See Configuring Host Mapping on page 68 for information on host mapping.

By default, the library applies the Standard barcode format to each partition. You can change this setting by modifying the partition after it has been created. For information on modifying partitions, see Modifying Partitions on page 45.

Note This operation cannot be performed concurrently by multiple administrative users logged in from different locations. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > Partitions**.
- From the operator panel, select **Setup > Create Partitions**.

Manually Creating Partitions

Using the web client, administrative users can manually create additional partitions any time after the initial configuration of the library. The maximum number of partitions that can be created is equal to the number of drives in the library.

The library must contain at least one unassigned tape drive and slot to create a partition. If no tape drives or slots are available, you must modify or delete an existing partition to free up resources. For more information, see Modifying Partitions on page 45 and Deleting Partitions on page 45.

When you manually create partition, the library creates control paths as shown in Table 6. You can also manually change the control path (see Modifying the Control Path on page 52).

Table 6 Control Path Assignment During Manual Partitioning

If a partition contains...	Then control path assignment is as follows...
Only SCSI or SAS tape drives	The first SCSI or SAS tape drive assigned to a partition is designated and enabled as the control path tape drive by default.
Only FC tape drives and the library itself does not contain any FC I/O blades	The first FC tape drive assigned to a partition is designated and enabled as the control path tape drive by default.
Only FC tape drives and there is at least one FC I/O blade installed in the library	The FC I/O blade is designated as the control path for the partition, even if the partition has no tape drives connected to the FC I/O blade. Proceed as follows: • In partitions that have tape drives connected to the host through an FC I/O blade, the FC I/O blade serves as the control path (no tape drive is configured as a control path drive). Do not manually select a tape drive as the control path for this partition unless you select a tape drive that is not connected to the FC I/O blade. (If you select a tape drive to host a control path and it is also connected to the FC I/O blade, you will effectively have two control paths and this can cause the host to see the same partition multiple times via the FC I/O blade.) [a] • In partitions that do not have tape drives connected to the host through an FC I/O blade, you must manually select a tape drive as the control path for that partition.
FC and SCSI and/or SAS tape drives and there is no FC I/O blade installed in the library	• The first tape drive in the partition (FC, SCSI or SAS), will be assigned as the control path tape drive by default.

FC and SCSI and/or SAS tape drives and there is at least one FC I/O blade installed in the library	• In partitions where the first tape drive is an FC tape drive:
	  • If the FC tape drive is connected to an I/O blade, the partition represents an FC partition and the control path is reported via the FC I/O blade. Do not manually select a tape drive as the control path for this partition unless you select a tape drive that is not connected to the FC I/O blade. (If you select a tape drive to host a control path and it is also connected to the FC I/O blade, you will effectively have two control paths and this can cause the host to see the same partition multiple times via the FC I/O blade.) [a]
	  • If the FC tape drive is not connected to an FC I/O blade, you must manually select the FC tape drive and enable it to host the control path for that partition.
	• In partitions where the first tape drive is NOT an FC tape drive, and therefore not connected to an FC I/O blade, the first SCSI or SAS tape drive within the partition is designated and enabled as the control path tape drive by default.

a. Selecting a control path for a tape drive attached to an FC I/O blade can affect what is displayed during host mapping configuration. It can also affect what devices are presented to the host application. If a tape drive is seen multiple times by the host, check to see if a control path has been defined for the partition and remove it. See Configuring Host Mapping on page 68 for information on host mapping.

When creating partitions manually, you need to provide the following information:

- **Emulation Type** — the type of library that the partition is emulating
  - Scalar i500 (default)
  - Scalar 24
  - Scalar 100
  - Scalar i2000
- **Partition Name** — limited to a maximum of 12 lower-case alphanumeric characters and underscores (_)
- **Media Barcode Format** — defaults to Standard. The available options are as follows:
  - **Standard Six** — Six character barcode number with or without a one or two-character media ID, for example, "XXXXXXL4" or "XXXXXX". Only the six character barcode is reported to the host.
  - **Plus Six** — Six character barcode number followed by a media ID, for example, "XXXXXXL3". Six character barcode and media ID are reported to the host.
  - **Extended** — Five to 16 characters total, including a barcode number and optional media ID. All characters are reported to the host, regardless of having a media ID or not. If a media ID is included, the label must have a five to 14 character barcode followed by a media ID, for example, "XXXXXXXXXXXXXL2". If a media ID is not included, the label must have a five to 16 character barcode, for example, "XXXXXXXXXXXXXXX".
  - **Media ID Last** — Five to 14 character barcode number followed by media ID, for example, "XXXXXXXXXXXXXLT". The media ID is reported to the host last.
  - **Media ID First** — Five to 14 character barcode number followed by media ID, for example, "XXXXXXXXXXXXXL4". The media ID is reported to the host first.
  - **Standard** — (default) Five to 16 characters total, including a barcode number and optional media ID. The media ID is not reported to the host. If a media ID is included, the label must have a five to 14 character barcode followed by a media ID, for example, "XXXXXXXXXXXXXL3". If a media ID is not included, the label must have a five to 16 character barcode, for example, "XXXXXXXXXXXXXXX".
- **Number of Slots** — the number of storage slots allocated to the new partition.
- **Drives** — the tape drive or drives assigned to the partition.

Note — Bold column headings in the table can be sorted. For example, selecting the **Location** column heading will sort by location coordinates.

Note — Before creating partitions, verify that all tape drives are unloaded. For information on unloading tape drives, see Unloading Tape Drives on page 84

Note — Creating Partitions operations cannot be performed concurrently by multiple administrative users logged in from different locations. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

You cannot create partitions manually from the operator panel. The path to open the appropriate screen is:

- From the web client, select **Setup > Partitions**.

Modifying Partitions

Using the web client, administrative users can modify partition settings any time after the partition is created.

The tape drive set as the control path for a particular partition cannot be deleted from that partition. The check box associated with the control path is grayed out. For more information on setting the control path, see Modifying the Control Path on page 52.

The library automatically takes the partition offline before modifying it and places the partition back online after it is modified.

When modifying a partition, you may need to provide the following information:

- **Emulation Type —** the type of library that the partition is emulating.See Manually Creating Partitions on page 42 for descriptions of available options.
- **Partition Name** — limited to a maximum of 12 lower-case alphanumeric characters and underscores (_).
- **Media Barcode Format** — defaults to **Standard.** See Manually Creating Partitions on page 42 for descriptions of available options.
- **Number of Slots** — the number of tape cartridge slots allocated to the partition.
- **Drives** — the tape drive or drives assigned to the partition.

Note — Bold column headings in the table can be sorted. For example, selecting the **Location** column heading will sort by location coordinates.

Note — Before modifying partitions, verify that all tape drives are unloaded and that all cartridges are in their appropriate storage slot location. For information on unloading tape drives, see Unloading Tape Drives on page 84

You cannot modify partitions manually from the operator panel. The path to open the appropriate screen is:

- From the web client, select **Setup > Partitions**.

Deleting Partitions

A partition can be deleted when it is no longer needed or in preparation for removing a module from the library. Administrative users can delete one partition at a time.

Unload all tape drives and export all cartridges assigned to the partition that is to be deleted. After exporting the cartridges, remove them from the I/E station. For more information, see Unloading Tape Drives on page 84 and Exporting Media on page 82.

Details about deleting partitions include the following:

- After a partition is deleted, its resources (for example, tape drives and slots) become available and can be reassigned to new or existing partitions.
- Deleting a partition does not delete users assigned to that partition. However, if these users are not assigned to other partitions, they will not be able to perform library operations. See Changing Partition Access on page 46.

Note — You may need to modify settings in your host application as a result of deleting a partition. See your host application documentation.

Note

This operation cannot be performed concurrently by multiple administrative users logged in from different locations. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

Deleting Partitions Before Removing or Replacing Modules

You should delete partitions before:

- Removing the control module and replacing it with a new control module
- Removing a expansion module and replacing it with a new expansion module
- Permanently removing a expansion module from the library

Because partitions extend across the library's physical modules and share resources, the library will report errors if you permanently remove or replace a module in your library without first deleting partitions and modifying shared resources such as cleaning slots and I/E slots.

See Installing, Removing, and Replacing on page 101 for detailed instructions on preparing your library for the permanent removal or replacement of an expansion or control module. The following is a high-level summary of the preparation process:

- You may find it helpful to review your library's current configuration before removing the module. See Viewing the Library Configuration on page 91.
- Using your I/E station, export all the tape cartridges from your library. See Exporting Media on page 82.
- Reduce the number of cleaning slots in the library to 0. You can designate new cleaning slots after the module has been removed or replaced. See Configuring Cleaning Slots on page 48.
- Delete all partitions in the library. You can create new partitions after the module has been removed or replaced. See Working With Partitions on page 40.
- Set the number of I/E stations slots to 6. You can reconfigure I/E stations slots after the module has been removed or replaced. See Configuring I/E Station Slots on page 49.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Partitions**.
- From the operator panel, select **Setup** > **Partition Mgmt**.

Changing Partition Access

An administrative user can control which partitions a specified user can access by modifying the user's account. Also, any user assigned to a partition that has been deleted can be reassigned to other partitions.

To change partition access, you must provide the following information:

- **Password** — a unique password that can be viewed and modified by the administrative user.
- **Privilege Level** — determines the user's access privileges. See User Privileges on page 29 for more information on user privilege levels.
- **Partition Access** — the partitions to which the user has access.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Users**.
- From the operator panel, select **Setup** > **Modify Users**.

Changing Partition Modes

This topic focuses on using the library user interface, not the host application, to change partition mode. Changing a partition mode using the library user interface may affect your host application. See your host application documentation for more information.

There are two partition modes: online and offline.

- **Online** — Normal operating condition for the partition. In this mode, all host application commands are processed.
- **Offline** — Move commands are not processed. If the partition is taken offline, the physical library and other partitions are not affected.

When you are changing the partition mode, be aware of the following:

- When you access the **Change Partition Mode** screens, you will see only partitions to which you have been given access.
- The **Online/Offline** buttons toggle between states.
- If a partition is in use, the **Online/Offline** button is grayed out.
- If a tape drive within a partition is Active, that partition cannot be taken offline until the tape drive is Idle. The number of active tape drives within a partition is indicated in the Active column of the partition table.

Note — Some maintenance activities require that the entire library be taken offline. To take the library offline, change the mode of all partitions from online to offline.

Note — When changing the partition mode from online to offline, all host application commands in progress at the start of the mode change are completed.

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations** > **Partitions** > **Change Mode**.
- From the operator panel, select **Operations** > **Partition Mode**.

Disabling/Enabling Manual Cartridge Assignment

Administrative users can disable or enable manual cartridge assignment. When manual cartridge assignment is enabled (the default setting), the **Assign IE** screen automatically appears on the operator panel once cartridges are placed into the IE station. The **Assign IE** screen prompts the user to use the operator panel to assign the cartridges to a specific partition or to the system partition. The cartridges can then be used only by the assigned partition.

When manual cartridge assignment is disabled, the **Assign IE** screen does not appear on the operator panel, and the cartridges in the IE station are visible to all partitions, as well as the system partition, and can be used by any partition.

You can disable manual cartridge assignment by clearing the **Manual Cartridge Assignment** check box on the operator panel **System Settings** screen. For more information on system settings, Configuring System Settings on page 72.

Understanding Host Application Notification

When manual cartridge assignment is enabled, SCSI Unit Attention 6/2801 notifies the host application when the I/E station has been accessed, allowing the host to automatically detect the presence of media in the I/E station and update its I/E station status information.

When manual cartridge assignment is disabled, host notification via SCSI Unit Attention 6/2801 depends on the number of configured partitions:

- If multiple partitions are defined, the host application is not notified when the I/E station has been accessed. Media presence in the I/E station is reported to any partition requesting it.
- If a single partition is defined, the host application is notified when the I/E station has been accessed. Media presence is reported to the sole defined partition, as well as to the system partition, when either of these partitions checks for changes in the status of the I/E station.

For information about using the host to perform tape operations, see your host application documentation.

Manual cartridge assignment cannot be configured from the web client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools** > **System Settings**.

Configuring Cleaning Slots

Cleaning slots are used to store cleaning cartridges that are used to clean tape drives. The **Setup Wizard: Cleaning Slot Configuration** screens prompt you to enter the number of cleaning slots (if any) you want to designate for your library. You can also access the **Cleaning Slot Configuration** screens directly on the operator panel and web client.

The **Setup Wizard** default configuration settings include zero dedicated cleaning slots. Configuring at least one cleaning slot enables the library's AutoClean feature. When AutoClean is enabled, the library allows you to import and export cleaning cartridges. When a tape drive needs cleaning, it notifies the library. If AutoClean is enabled, the library automatically cleans the tape drive using a cleaning cartridge loaded in a cleaning slot.

Note

If you configure zero I/E station slots, you will not be able to import or export cleaning cartridges using I/E stations. See Configuring I/E Station Slots on page 49.

Cleaning slots are not assigned to specific partitions. Each partition can access cleaning cartridges located in the dedicated cleaning slots.

The maximum number of cleaning slots that can be configured is four. To disable AutoClean, configure zero cleaning slots.

Administrative users can configure cleaning slots during the initial library configuration and at any time after that, as long as unassigned slots are available. If no slots are available in the library, you must modify or delete a partition to free up slots. For more information see Modifying Partitions on page 45 and Deleting Partitions on page 45.

Administrative users can also clean tape drives manually. For information, see Manually Cleaning Tape Drives on page 88.

Note

Cleaning slots are not visible to the host application. To choose host-based cleaning, do not configure any cleaning slots, and configure your host application to manage cleaning tape drives. Configuring cleaning slots on the library may affect the host application. See your host application documentation for information.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > Cleaning Slots**.
- From the operator panel, select **Setup > Cleaning Slots**.

Configuring I/E Station Slots

I/E station slots are used to import and export tape cartridges into and out of the library without disrupting normal library operations. The **Setup Wizard: I/E Station** screens allow you to configure I/E Station slots. Administrative users can also configure these slots by selecting **Setup > I/E Station Slots** on either the operator panel or the web client.

Each control module contains six I/E station slots, and each expansion module contains 12 I/E station slots. The available library configurations support a minimum of six I/E slots in the 5U library to a maximum of 54 I/E slots in the 41U library configuration. You can also choose to configure zero I/E station slots and use all slots in all I/E stations for tape cartridge storage. For more information on configuring zero I/E slots, see Configuring Zero I/E Station Slots on page 50.

Each I/E station (6-slot or 12-slot) is configured as a complete unit. When configuring an I/E station, configure all the slots in the I/E station the same way: all storage or all I/E slots.

If the library consists of a 5U control module, all six I/E station slots must be configured either as storage or as I/E station slots. A 14U library consists of a 5U control module (with six I/E station slots) and a 9U expansion module (with 12 I/E station slots). All 12 of the slots in the 9U expansion module must be configured the same way, as either I/E station slots or storage slots. Therefore, a 14U library can contain a minimum of six and a maximum of 18 dedicated I/E station slots. Table 7 on page 50 lists the number of I/E station slots available per library for all base library configurations.

Details on configuring I/E station slots include:

- Before changing the number of I/E station slots, remove all tape cartridges from any slots currently configured as I/E station slots.
- An I/E station that has been configured for storage may contain cleaning slots. These cleaning slots must be deleted before you can reconfigure the storage slots as I/E station slots.
- The default number of dedicated I/E slots is six. If you accept the **Setup Wizard** default configuration settings, six I/E slots will be created in the control module.
- If you increase the size of your library by adding 9U expansion modules, the I/E stations in the new modules will be storage slots by default. You can select to reconfigure these slots as I/E slots.

- Based on the number of I/E slots you configure, the library automatically determines which I/E stations to configure as I/E slots and which to configure as storage.
  - The library configures I/E slots in the control module I/E station first and then works outward to the I/E stations in the 9U expansion modules. I/E stations in expansion modules below the control module have precedence over I/E stations in expansion modules above the control module.
  - All slots in an I/E station must be configured the same way: as either storage or I/E slots. For this reason, if your library includes one or more 9U expansion modules and you configure an even number of I/E slots greater than six, the 5U control module I/E station may be configured automatically as storage.
- If the I/E station is configured as data storage slots, its door is always locked. For information on unlocking I/E stations, see Locking and Unlocking the I/E Stations on page 89.
- I/E station slots are shared by all partitions within a library.
- To identify how a specific I/E station magazine is configured, view the **Library Location** report available from the **Reports** menu. See Viewing the Library Configuration on page 91.

Configuring Zero I/E Station Slots

Configuring zero I/E slots increases the number of storage slots in your library but has the following consequences:

- You will not be able to use the I/E station to import and export tape cartridges, including cleaning media.
- You will be required to open the library access door to bulkload and unload tape cartridges, disrupting library operations. See Bulkloading on page 80.
- You will not be able to perform any of the following drive management operations:
  - Updating tape drive firmware with a FUP tape
  - Creating FUP tapes
  - Erasing FUP tapes
  - Manually cleaning tape drives with a cleaning cartridge

For more information on using the I/E station to import and export media, see Running Your Library on page 75. For more information on performing drive management operations, see Updating Library and Tape Drive Firmware on page 95.

Table 7 Number of I/E Station Slots Available

Library Configuration	5U Control Module		9U Expansion Module		Library Total	
	I/E Stations	I/E Slots	I/E Stations	I/E Slots	I/E Stations	I/E Slots
5U	1	6	–	–	1	6
14U	1	6	1	12	2	18
23U	1	6	2	24	3	30
32U	1	6	3	36	4	42
41U	1	6	4	48	5	54

CAUTION **Configuring I/E station slots with cartridges already loaded compromises data security. First, remove cartridges from the I/E station and then configure the I/E station slots.**

Note This operation cannot be performed concurrently by multiple administrative users logged in from different locations. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup Wizard > I/E Station Slots**.
- From the operator panel, select **Setup Wizard > I/E Station Slots**.

Setting Tape Drive Parameters

Administrative users can modify certain tape drive parameters. You can set the SCSI ID for a SCSI-attached tape drive and the loop IDs, topology connection mode, and interface speed for a Fibre-attached tape drive. You cannot set parameters for SAS tape drives. A SAS tape drive's SAS address is automatically and uniquely generated based on a unique WWN that the drive receives when it is configured.

If the affected partition is online, it will be taken offline before the parameters are set, and brought back online after they are set.

Each device on a SCSI bus, including the host bus adapter (HBA) needs to have a unique SCSI ID. Changing the SCSI ID is necessary when there is a duplicate ID on a single bus. Typically, the HBA SCSI ID is set to 7. For example, if two tape drives are connected together on the same bus, each tape drive must have different SCSI IDs and they must be different from the HBA SCSI ID.

For SCSI tape drives, a SCSI ID can be set to a value between 0–15. The library assigns the following default SCSI IDs to SCSI tape drives:

- 5U control module: 1 and 2
- Each 9U expansion module: 3, 4, 5, and 6

For FC tape drives:

- The loop ID can be set to a value between 0–125. A unique loop ID is selected by default for all FC tape drives installed in the library. For example, the tape drive installed in the top drive bay of a 5U control module is assigned a default loop ID of 61. The tape drive installed in the 5U control module's bottom drive bay is assigned a default loop ID of 63.

  If you change the default loop IDs, make sure each FC tape drive with a topology setting of Auto (LN), Loop (L), or Auto (NL) has a unique loop ID.
- The requested topology connection mode can be set to one of the following:
  - Auto (LN) — Auto-configure trying L-Port first
  - Loop (L) — Force L-Port
  - Point to Point — Force N-Port
  - Auto (NL) — Auto-configure trying N-Port first (default)

- The requested interface speed can be set to Auto (default), 1 Gb/s, 2 Gb/s, and 4Gb/s. When you set the speed to 4Gb/s using the web client, a caution message appears informing you that the 4Gb/s speed selection may not be applicable to all FC tape drives installed in the library. Acknowledge the message by clicking **OK**.
- If the requested FC topology and speed settings are not supported, the next appropriate settings are negotiated. On the web client, the **Drive IDs** screen displays both the requested and the actual FC topology connection mode and interface speed. If FC drives are not connected to the host, the negotiated actual settings appear on the screen as "unknown."

Note

On the web client, the **Drive IDs** screen displays tape drive information in tables. Bold column headings in the tables can be sorted. For example, selecting the **Location** column heading will sort by location coordinates.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > Drive IDs**.
- From the operator panel, select **Setup > Drive IDs**.

Modifying the Control Path

The control path tape drive is used to connect a partition to a host application.

The library automatically creates control paths when you set up partitions. See Table 5 on page 41 and Table 6 on page 43 for a description of how control paths are selected during automatic and manual partitioning.

Only one tape drive in a partition can be selected as the control path per partition. In the event that the control path connection to the host application fails, you can select a new control path for the partition.

Control paths should not be selected for partitions that contain FC tape drives connected to a host applications through FC I/O blades, unless the control path tape drive is NOT connected to an FC I/O blade.

Note

Selecting a control path for a tape drive attached to an FC I/O blade can affect what is displayed during host mapping configuration. It can also affect what devices are presented to the host application. If a tape drive is seen multiple times by the host, check to see if a control path has been defined for the partition and remove it. See Configuring Host Mapping on page 68 for information on host mapping.

The **Setup > Control Path** screens list a selected partition's tape drives, including the tape drive that is currently designated as the control path. You can designate a new control path for the partition by selecting a different tape drive. You can also disable a partition's control path by clearing the current control path selection.

Note

You may need to modify settings in your host application as a result of modifying the control path. See your host application documentation.

Note

Bold column headings in the table can be sorted. For example, selecting the **Location** column heading will sort by location coordinates.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > Control Path**.
- From the operator panel, select **Setup > Control Path**.

Applying License Keys

The **Setup Wizard: Licensing** screen prompts you to enter a license key. You can also access the **Licensing** screen directly on the operator panel and web client.

A single license key may be applied to the library during the initial configuration or whenever licensed features are purchased. If an additional feature is purchased, the new license key will replace the current license key.

All Scalar i500 library configurations ship with the purchased number of slots pre-activated (always a minimum of 36). See Table 8 on page 54 for the number of default pre-activated slots available for each library configuration.

After the initial purchase, you can increase the number of usable slots in your library by purchasing a Capacity-On-Demand (COD) license key. COD license keys come in 46-slot increments. For example, a 14U library could have 82 slots licensed (36 + 46 = 82) at the time of the initial purchase. The remaining 46 slots of the 14U library can be enabled at a later time by purchasing and applying a COD license key. The full 128 slots would then be enabled and available for use. It is possible to license more slots than are physically available in the library at the time. In that case, when 9U expansion modules are added, the extra licensed slots then become available for use. Table 8 on page 54 shows the available COD slot upgrades for each library configuration.

For more information about the COD licensed feature, see Library Features on page 19.Also, see Obtaining a Capacity-On-Demand License Key below.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

You can enter the license key on the **Setup Wizard: Licensing** screen, and you can also use commands on the operator panel or web client to directly enter a license key at any time after exiting the **Setup Wizard**.The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > License**.
- From the operator panel, select **Setup > Licenses**.

Obtaining a Capacity-On-Demand License Key

All Scalar i500 library configurations ship with the purchased number of slots pre-activated. The number of available pre-activated slots begins at 36 for all library configurations and increases in 46-slot increments to a maximum of 402 slots in the 41U library configuration. See Table 8 for the number of default and available pre-activated slots available for purchase for each library configuration.

After the initial purchase, you can activate any remaining inactive slots in your library by purchasing a COD license key. Each license key activates an additional 46 slots in the library. For example, if you purchase a 14U library with only 82 slots of the maximum 128 slots active at the time of purchase, you can later activate the remaining 46 slots by purchasing a COD license key. (See Library Features on page 19 for more information about the COD feature.)

Table 8 on page 54 shows the number of slots you can activate with a COD license key for each library configuration.

Table 8 Available Slots and COD Upgrades Per Configuration*

	5U	14U	23U	32U	41U
Minimum, Maximum Available Slots	36, 36	36, 128	36, 218	36, 310	36, 402
Default Pre-Activated Slots	36	36	36	36	36
Available Pre-Activated Slots	36	36, 82, 128	36, 82, 128, 174, 218	36, 82, 128, 174, 220, 266, 310	36, 82, 128, 174, 220, 266, 312, 358, 402
Available COD Slot Upgrades	NA	82, 128	82, 128, 174, 218	82, 128, 174, 220, 266, 310	82, 128, 174, 220, 266, 312, 358, 402

*Including I/E station slots

When you purchase a COD slot upgrade, Quantum issues you an Authorization Code Certificate containing a code that enables you to retrieve your COD license key from the Quantum Capacity Upgrade website. You can then activate your COD slot upgrade by loading the license key on the library through the operator panel or web client (see Applying License Keys on page 53).

Details about the COD license key include:

- An authorization code to obtain a license key can be used one time only.
- A single license key can only be applied once and cannot be transferred to another library. The key is verified when it is applied to the library to make sure it has not been previously used. In addition, the license key is verified against the library to make sure that it is not allocated for more resources than what physically exist in the library.
- The license key may contain up to 12 alphanumeric characters. The license key can also contain the at (@), dash (-), or underscore (_) symbols. Alpha characters must be lowercase. The user interface automatically converts entries to lowercase.
- The license key is associated with the serial number of the 5U control module. If you must replace your control module for some reason, you will need to request a replacement license key from Quantum.
- You will also need to request a replacement license key if you replace your library control blade (LCB) compact flash card. The LCB compact flash card contains information about your library configuration, including licensed features. For contact information, see Getting More Information or Help on page 4.

To obtain your COD license key for a COD slot upgrade:

1 Contact your Quantum technical sales representative to submit your order for a COD slot upgrade. You can purchase license keys in 46-slot increments. For contact information, see Getting More Information or Help on page 4.

   Upon receipt of your order for a COD slot upgrade, Quantum will ship you an Authorization Code Certificate containing your COD authorization code.

2 On your library, locate the Serial Number. You will need the Serial Number to retrieve your license key from the COD website. To view the Serial Number:

   - On the operator panel, select **Tools > About Library**.

     - or -

   - On the web client, select **Reports > About Scalar i500**.

3 Access the Quantum Scalar i500 Capacity Upgrade website at http://license.quantum.com/quantum.

The Quantum Scalar i500 Capacity Upgrade website allows you to enter your authorization code and your library's Serial Number.

4 In the **Serial Number** box, enter your Serial Number.

5 Click Submit.

If you have entered a valid Serial Number, the website prompts you to enter your authorization code for the COD slot upgrade.

6 Following the on-screen instructions, enter your authorization code.

If you have entered a valid authorization code, the website allows you to retrieve the license key for your COD slot upgrade.

7 Following the on-screen instructions, retrieve your new license key.

You are now ready to apply the license key to the library, activating your COD upgrade. See Applying License Keys on page 53.

Setting Customer Contact Information

Administrative users can use the web client to enter contact information into the library for the person who is the primary customer contact for the library. Keep this information current to expedite the Service process.

Once the customer contact information has been entered, you can view it at any time on the web client or the operator panel. On the operator panel, you can use the scroll bars on the right and bottom of the screen to view all the customer contact information.

When a problem occurs with the library, the contact information is mailed to techsup@quantum.com along with Reliability, Availability, and Serviceability (RAS) ticket information, assuming that the default e-mail notification has been configured. For information on configuring the default e-mail notification see Creating E-mail Notifications on page 57.

You can set customer contact information from the web client user interface only, but you can view it from the operator panel user interface.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Notification** > **Contact Information**.
- From the operator panel, select **Setup** > **Notification**.

Configuring the Library E-mail Account

The library uses the library e-mail account whenever library e-mail services are used, such as when the library automatically sends e-mail notifications about library issues.

Before configuring the e-mail account, ask your network administrator for an IP address, valid login account (optional), and valid password (optional) for your SMTP server. The login account name and password can contain the following special characters: @ and #. E-mail account settings are not case-sensitive.

After configuring the e-mail account, you can send a test message to an e-mail address to verify that the account is configured properly.

The **Setup** > **Notification** > **E-mail Account** screen contains the following options:

- **SMTP IP Address** includes the IP address of the SMTP server. IP addresses must be entered in dot notation (for example, 192.168.0.1). IP address text boxes are limited to numeric characters and do not allow values exceeding 255 for dot-separated values. The library does not support using the hostname of the SMTP server. You must use the IP address.
- **Sender E-mail Address** includes an e-mail address for the library (for example, "libraryname@mycompany.com"). The library uses this address in the **From** field of e-mail messages that it sends out, indicating the originator of the message.
- **Send snapshot with e-mail notifications** instructs the library to automatically attach a library snapshot file (binary format) to most e-mail notifications. This feature is turned off by default. Library snapshot files can also be sent to specified e-mail addresses using the capture snapshot operation. The capture snapshot operation allows you to create the snapshot in a binary file format (default) or in ASCII-readable format. See Capturing Snapshots of Library Information on page 206.
- **Use Authentication** includes a means to enter the login account name and password for the library. Selecting the box enables use authentication. Clearing the box disables use authentication. The following fields are only available if use authentication is enabled:
  - **Login Account** includes the name of a valid account on the SMTP server (for example, "John.User"). The login account name can contain the following special characters: **@** and **#**.
  - **Password** is the password for the account that you specified in the **Login Account** text box. The password can contain the following special characters: **@** and **#**.
  - **Send a test email to** allows you to enter an e-mail address you want to test. Enter the address and click **Send Email**. Then check the e-mail account to verify that an e-mail message was sent from the library.

After configuring the e-mail account, save the library configuration. For information, see About Saving and Restoring the Configuration on page 208.

You can configure the library e-mail account from the web client user interface only, but you can view e-mail account information from the operator panel user interface.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Notification** > **E-mail Account**.
- From the operator panel, select **Setup** > **Notification**.

Working With E-mail Notifications

The library can be configured to automatically send e-mail notifications to specified e-mail addresses whenever an issue of a particular severity level occurs with one of its components. The information in the e-mail notification provides details about the issue and the library conditions at the time of the error.

Before you can configure e-mail notifications, you must configure the library's e-mail account so that the library can send notifications to the designated recipients. See Configuring the Library E-mail Account on page 55 for information on how to configure the e-mail account.

See Creating E-mail Notifications on page 57 for information on setting up additional e-mail notifications. The library supports a maximum of 20 e-mail notification recipients, including the default support e-mail notification.

Note

The default techsup@quantum.com e-mail notification settings can be modified, but not deleted. The e-mail address, techsup@quantum.com, cannot be modified.

There are three e-mail notification levels:

- **Low Filter —** Notifies e-mail recipients of all library issues, including minor, medium-level, and the most critical issues.
- **Medium Filter** — Notifies e-mail recipients of medium-level and the most critical issues.
- **High Filter** — Notifies e-mail recipients of only the most critical issues.

Administrative users can configure the library e-mail account and e-mail notifications. Users can receive e-mail notifications, but they cannot configure the library e-mail account and/or notifications.

You can configure e-mail notifications from the web client user interface only, but you can view them from the operator panel user interface.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Notification** > **Setup**.
- From the operator panel, select **Setup** > **Notification**.

Creating E-mail Notifications

Administrative users can create e-mail notifications. The library supports a maximum of 20 e-mail notification recipients, including the default support e-mail notification. Each e-mail notification recipient must have a unique e-mail address.

To set e-mail notifications, you need to provide the e-mail address and filter level setting for the recipient. For more information on filter levels, see Working With E-mail Notifications.

Each e-mail notification includes an optional **Comments** text box you can use to enter important system configuration details, such as the network environment or third-party software applications that interface with the library. Such information can help technical support personnel to troubleshoot the library.

Note

Do not enter more than one address in the **Enter E-mail Address** text box. If you need to send e-mail notifications to multiple addresses, create an e-mail notification for each e-mail address.

The path to open the appropriate screen is as follows:

- From the web client, select **Setup** > **Notification** > **Setup**.

Modifying E-mail Notifications

Administrative users can modify existing e-mail notification settings at any time after the e-mail notification is created. For example, you can modify the e-mail address, add, delete, or modify a comment, change the filter level, and enable or disable the notification. For more information on filter levels, see Working With E-mail Notifications on page 56.

Note

The default techsup@quantum.com e-mail notification settings can be modified, but not deleted. The e-mail address, techsup@quantum.com, cannot be modified.

The path to open the appropriate screen is as follows:

- From the web client, select **Setup** > **Notification** > **Setup**.

Deleting E-mail Notifications

Administrative users can delete an e-mail notification when it is no longer needed.

Note

The default techsup@quantum.com e-mail notification settings can be modified, but not deleted. The e-mail address, techsup@quantum.com, cannot be modified.

The path to open the appropriate screen is as follows:

- From the web client, select **Setup** > **Notification** > **Setup**.

Working With User Accounts

Administrative users can create local user accounts on the library or enable and configure the Lightweight Directory Access Protocol (LDAP). LDAP is the industry standard Internet protocol that provides centralized user account management. When LDAP is enabled, users can log into the library using either LDAP or local authentication.

About Local User Accounts

Administrative users can create and modify two types of local user accounts: user and administrative user. These users have different library privilege levels.

- **User** — has access to one or more assigned partitions and can perform functions within a partition, such as performing media and tape drive functions. A user cannot perform actions that affect the physical library, such as creating, modifying, or deleting a partition.
- **Administrative user** — has access to the entire physical library and all of its partitions.

The library ships with a default administrative user account. The user name for this account is **admin** and the password is **password**. You cannot delete this user account or change the user name, but you can change the password. The default administrative user account is used to perform the initial configuration of the library. If you misplace the password for the default administrative account, contact Technical Support. For contact information, see Getting More Information or Help on page 4.

See User Privileges on page 29 for more information on library permission levels. For information on changing passwords, see Modifying Local User Accounts on page 59

Creating Local User Accounts

During or after the initial configuration, you can use the default administrative user account to create up to eighteen additional local user accounts, including other accounts with administrative privileges. These administrative users can themselves create other local administrative user and user accounts. Users without administrative privileges cannot create user accounts. The library can contain eighteen user accounts, including the default administrative user account.

To create local user accounts, you need to provide information for the following fields:

- **User Name** — the login name of the user account you are creating. User names are limited to 1–12 lower-case alphanumeric characters and can include an underscore (_); for example, "john_usa."
- **Password** — the unique password for the user account you are creating. Passwords are limited to 6–12 lower-case alphanumeric characters and can include an underscore (_); for example, "pass_19."

- **Privilege** — is set to either **User** or **Admin**. See User Privileges on page 29 for more information on user privilege levels.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **User Management** > **User Accounts**.
- From the operator panel, select **Setup** > **Create Users**.

Modifying Local User Accounts

After a local user account has been created, administrative users can modify the account settings, such as the password, privilege level, and partition access. You cannot modify the user name. Instead, you will need to delete the user account and create a new one.

To modify local user accounts, you need to provide information for the following fields:

- **Password** — the unique password for the user account you are creating. Passwords are limited to 6–12 lower-case alphanumeric characters and can include an underscore (_); for example, "pass_19."
- **Privilege Level** — set to either **User** or **Admin**. See User Privileges on page 29 for more information on user privilege levels.
- **Partition Access** — the partitions to which this user has access. Any user assigned to a partition that has been deleted can be reassigned to other partitions.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Users**.
- From the operator panel, select **Setup** > **Modify Users**.

Deleting Local User Accounts

Administrative users can delete other local administrative user and user accounts when they are no longer needed.

Note The default administrative user account cannot be deleted.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Users**.
- From the operator panel, select **Setup** > **Modify Users**.

Configuring LDAP

Administrative users can enable and configure Lightweight Directory Access Protocol (LDAP). LDAP is the industry standard Internet protocol that provides centralized user account management. Enabling LDAP allows existing user accounts residing on an LDAP server to be integrated into the library's current user account management subsystem. User account information is centralized and shared by different applications, simplifying user account management tasks.

Once LDAP is enabled, users can log into the library using either LDAP or local authentication. To use LDAP authentication, a user must enter a directory service user name and password and specify an LDAP domain. To use local authentication, a user must enter only a local user name and password.

Administrative users can add, delete, and modify only local user account information. The library web client and operator panel do not allow you to create, modify, or delete user account information on an LDAP server. This must be done by the directory service provider. For more information on working with local user accounts, see About Local User Accounts on page 58.

Note the following LDAP server guidelines:

- The library supports the Microsoft® Active Directory® LDAP server. Windows® Services for Unix® 2.5 is required for this support.
- The library supports user account information in the schema defined by RFC 2307. User password schemes must be encrypted using UNIX crypt. In addition, user names (uid) and passwords (userPassword) must be created using lowercase characters to be compatible with the library.
- For LDAP users with user privileges, access to library partitions is determined by group assignment on the LDAP server. Groups must be created on the LDAP server with names that correspond to the library partition names. Users with user privileges must be assigned to these groups on the LDAP server to have access to the corresponding partitions on the library. LDAP users with administrative privileges have access to all partitions and administrative functions and do not need to be assigned to partition-related groups on the LDAP server.
- When setting up a user account in Microsoft Active Directory, make sure to populate the UNIX attributes with information. This requires all Active Directory users to be part of an NIS Domain, or have NIS Domain information entered. After entering NIS Domain information for a user, you will need to reset the user's password.
- The **Login** screen displays LDAP login options only when LDAP is enabled.

Details on configuring LDAP on the library include:

- Before configuring LDAP, obtain the following LDAP parameters from your network administrator. You need to enter these parameters in the **Setup - LDAP** screen on the web client:
  - **User provider —** the LDAP server URL, where user account information is stored.
  - **Group provider** — the LDAP server URL, where group information is stored. If the group information is stored in the same location as the user account information, use the user provider URL.
  - **Default domain** — the domain that is populated on the login screen by default.
  - **Principle authentication** — the login used to gain access to the directory service.
  - **Credential authentication** — the password for the principal authentication login.
  - **Library user group** — the name of the group you want to associate with the library. This group is equivalent to the local user privilege level. Any member of this group can manage this library.
  - **Admin group** — the name of the group associated with the library administrator, equivalent to the local administrative user privilege level. Any member of this group has administrative privileges.
- Selecting **Test LDAP** on the **Setup - LDAP** screen tests communication with the LDAP server. While the test is in progress, the **Progress Window** appears. If the test is successful, **Operation Successful** appears in the **Progress Window**. If the test is unsuccessful, **Operation Failed** appears in the **Progress Window.** Follow the instructions listed in the **Progress Window** to resolve any issues that occur during the operation.
- After configuring LDAP settings, save the library configuration.

Note

For step-by-step instructions on configuring LDAP on the library, see your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface. If LDAP is enabled, you can log into the library using either LDAP or local authentication.

You can view and enable LDAP settings from either the web client or the operator panel. However, you can only configure LDAP settings using the web client.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > User Management > LDAP**.
- From the operator panel, select **Setup > LDAP**.

Setting the Date and Time

Administrative users can either set the library date and time zone settings manually or configure the Network Time Protocol (NTP).

Setting the Date and Time Manually

The **Setup Wizard: Date and Time** screen allows you to set the date and time for the library. You can also access the **Date and Time** screen by selecting it from the **Setup** menu on either the operator panel or the web client.

Date and time settings are used to log the date and time events take place and to set the time for automatic backup and restore functions. At a minimum, you should set the library's date and time as part of the initial library configuration.

The time is set to a 24 hour clock. For example, four o'clock in the afternoon is entered as 16:00. On the web client **Date and Time** screen, you can also set the time zone. A drop-down menu lists time zones across the world.

Note

The library automatically adjusts for daylight savings time if the time zone is set on the web client. There is no need to manually reset the clock for time changes.

Note

This operation cannot be performed concurrently by multiple administrative users logged in from different locations. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > Date & Time**.
- From the operator panel, select **Setup > Date & Time**.

Setting the Date and Time Using the Network Time Protocol

The library supports the Network Time Protocol (NTP). NTP allows you to synchronize the library date and time with other components in your IT infrastructure. Administrative users can either modify the date and time zone settings manually or configure NTP.

If NTP is enabled, the time zone and IP addresses of at least one NTP server must be configured on the library. Contact your network administrator for NTP server IP address information.

You can use the **Setup Wizard - Date & Time** screen to enable and configure NTP. You can also access the **Date & Time** screen by selecting it from the **Setup** menu from either the operator panel or the web client.

Details on NTP settings include:

- At least one NTP server must be configured and available.
- NTP is enabled on the **Date & Time** screen. When NTP is enabled, you cannot manually configure date and time. For more information on setting date and time manually, see Setting the Date and Time Manually on page 61.
- You can enter an IP address for a primary and an alternate (optional) NTP server.
- NTP server IP addresses must be entered in dot notation (for example, 192.168.0.1). IP address text boxes are limited to numeric characters and do not allow values exceeding 255 for dot-separated values.
- After you apply NTP settings, system clock synchronization may take several minutes.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

Note

For step-by-step NTP configuration instructions, see your library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **Date & Time**.
- From the operator panel, select **Setup** > **Date & Time**.

Working With FC I/O Blades

The library supports optional FC I/O blades, which provide host connections to LTO-2, LTO-3, and LTO-4 FC drives. The number of I/O blades in any library configuration cannot exceed four, and each I/O blade in the library supports up to four FC tape drives.

FC I/O blades reduce switch port and cabling requirements and increase backup reliability. When tape drives are connected to I/O blades, the library proactively checks the status and readiness of the data paths from the hosts through the I/O blade to the FC tape drives.

In addition, two powerful features provide ways to manage the interaction between hosts and target devices:

- **Channel zoning** allows you to control access between I/O blade ports configured for host servers and ports configured for target devices. For more information, see Configuring FC I/O Blade Channel Zoning on page 64.
- **Host Mapping** allows you to control visibility to target devices and access from individual host servers to target devices. For more information, see Managing FC Hosts and Host Mapping on page 65.

The topics in this chapter cover configuring FC I/O blades. For additional information on I/O blades, see:

- FC Input/Output Blades on page 16
- Controlling FC I/O Blade Power on page 89
- Viewing I/O Blade Information on page 93
- Viewing I/O Blade Port Information on page 93
- Connecting Library FC Cables to FC I/O Blades on page 108
- Recommended Library Cabling for FC I/O Blades on page 112
- Identifying FC I/O Blades on page 213
- Permanently Removing FC I/O Blades on page 213
- Resetting FC I/O Blade Ports on page 213

Note FC I/O menu commands are available for use only when FC I/O blades are installed in the library.

Configuring FC I/O Blade Ports

When FC I/O blades are installed, administrative users can configure I/O blade FC port parameters.

Each I/O blade has six ports. Ports 1 and 2 are always target ports and are configurable. Ports 3 through 6 are always initiator ports and are not configurable. For information on viewing the current configured settings for all I/O blade ports, see Viewing I/O Blade Port Information on page 93.

Details on configuring FC I/O blade ports include:

- The **Setup - I/O Blade Port Configuration** screen lists all I/O blades found in the library. The screen lists the following information for each I/O blade: location in the library, World Wide Node Name (WWNN), status, and ports. You can select the I/O blade target port (1 or 2) you want to configure and proceed to the next screen. For the target port you selected, the screen displays the World Wide Port Number (WWPN).
- For the selected target port (ports 1 and 2), you can configure the following parameters:
  - **Loop ID —** Loop IDs can be set to **Auto** or a hard value between 0–125. Selecting **Auto** automatically selects a unique loop ID. Some FC host operating systems require hard loop ID settings. The default setting is **Auto**.
  - **Speed** — The interface speed can be set to **Auto**, **1Gb/s**, **2Gb/s**, or **4Gb/s**. Selecting **Auto** automatically sets the interface speed. The default setting is **Auto**.
  - **Frame Size —** Frame size can be set to **512**, **1024**, or **2048**. The default setting for ports 1 and 2 is **2048**. Your FC host might require a different setting.
  - **Connection** — The connection mode for the ports can be set to **Loop**, **Point to Point,** or **Loop Preferred**. The default setting is **Loop Preferred**.
- After modifying these parameters, save the library configuration. For instructions on how to save the library configuration, see About Saving and Restoring the Configuration on page 208.

The paths to open the appropriate screens are as follows:

- From the web client, **Setup > I/O Blades > Port Configuration**.
- From the operator panel, select **Setup > I/O Blades > Port Configuration**.

I/O Blade Internal Virtual Port for Media Changers

I/O blades use an internal virtual port to access the medium changer devices (every defined partition has a medium changer device). Each I/O blade can access all medium changer devices, except those that are defined in association with drive-based access (aka "LUN-1"). The Scalar i500 library can have up to 18 partitions. These internal virtual ports are not configurable via channel zoning; thus, all medium changer devices are accessible via ports 1 and 2 of each FC I/O blade present within the library. This may lead to one or more medium changers being discovered multiple times, depending on how the system is connected to host servers (for example, if four partitions are defined in a system that has two FC I/O blades, there would be four medium changers visible on ports 1 and 2 of both FC I/O blades, for a total of 16). To minimize unnecessary discovery of media changers, you need to configure host mapping. See Managing FC Hosts and Host Mapping on page 65.

Configuring FC I/O Blade Channel Zoning

When FC I/O blades are installed in the library, administrative users can configure channel zoning for selected I/O blades. Channel zoning, also called port zoning, configures access to an entire FC and all the LUNs on that channel for the exclusive use of a host or group of hosts on a single port. Channel zoning enables you to control access between specific target ports 1 and 2 and initiator ports 3 through 6 on an I/O blade.

Note

Channel zoning acts upon the FC tape drive LUNs seen through the intiator ports on the I/O blade. Channel zoning does not affect media changer LUNs (partitions). If you want to map hosts to media changer LUNs though an I/O blade, you must use the I/O blade's FC host mapping feature. For information on FC host mapping, see Managing FC Hosts and Host Mapping on page 65.

Note

If both channel zoning and host mapping are enabled, the channel zoning settings supersede any host LUN mapping on the I/O blade.

Details on configuring channel zoning include:

- By default, all target FC ports (ports 1 and 2) on an I/O blade have access to all initiator ports (ports 3-6).
- Changing channel zoning setting will cause the affected I/O blade to reboot.
- If host port failover is enabled on the I/O blade, channel zoning must be configured so that all target FC ports have access to all initiator ports. For information on host port failover, see Configuring FC Host Port Failover on page 69.
- The **Setup - Blade Channel Zoning** screen lists all I/O blades found in the library. I/O blades are listed by the following: location in the library, WWNN, and status. You can select the I/O blade you want to configure for channel zoning and proceed to the next screen.
- The two FC target ports (ports 1 and 2) and the four FC initiator ports (ports 3-6) are displayed in a grid, with the target ports listed in columns and the initiator ports listed in rows. Check boxes allow you to associate a target port with an initiator port.
  - To permit access, select the check box at the intersection of the target port and the initiator port. You can associate each initiator port with more than one target port.
  - To restrict access, clear the check box at the intersection of the target port and the initiator port.

- When you select a check box, the entire FC channel is zoned. This zoning affects any host application that might be accessing the I/O blade. If both channel zoning and host mapping are enabled, the channel zoning settings supersede any host LUN mapping on the I/O blade.
- After configuring channel zoning, save the library configuration. For instructions on how to save the library configuration, see About Saving and Restoring the Configuration on page 208.

Note — This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > I/O Blades > Channel Zoning**.
- From the operator panel, select **Setup > I/O Blades > Channel Zoning**.

Managing FC Hosts and Host Mapping

An FC host is the main processing server on a storage area network (SAN) that receives data and initiates communication with other devices. When FC I/O blades are installed in the library, administrative users can access, add, modify, and delete FC hosts and also configure FC host mapping. Before you can perform any of these FC host management operations, you need to enable host mapping, which is disabled by default.

Note — On the operator panel, the host management screens (**Setup > I/O Blades > Host Management**) are not available unless FC host mapping is enabled.

Note — If both channel zoning and host mapping are enabled, the channel zoning settings supersede any host LUN mapping on the I/O blade.

Enabling/Disabling FC Host Mapping

Administrative users can enable or disable the optional FC host mapping feature. This feature is disabled by default. When host mapping is enabled, you can add, modify, and delete hosts as well as configure FC host mapping.

Note — This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client select **Setup > I/O Blades > Blade Control**.
- From the operator panel, select **Setup > I/O Blades > Blade Control**.

Viewing FC Host Information

The following information is provided for FC hosts:

- **Host Name —** the host device name
- **I/O Blade —** the location of the FC I/O blade in the library

- **Status —** the online/offine (connectivity) status of the host
- **Host Port —** the host port number
- **WWNN —** the World Wide Node Name of the host device
- **Type —** the operating system of the host device

The paths to open the appropriate screens are as follows:

- From the operator panel, select **Setup > I/O Blades > Host Management**.
- From the web client, select **Setup > I/O Blades > Host Management**.

Adding, Modifying, and Deleting an FC Host Connection

Administrative users can manually add a connection to an FC host if the host was not already connected to the library when it was turned on. You can also modify and delete an existing FC host connection. You can perform these operations without shutting down the library. You can add up to 32 FC host connections per I/O blade.

After adding, modifying, or deleting an FC host connection, save the library configuration. For instructions on how to save the library configuration, see About Saving and Restoring the Configuration on page 208.

Adding or Modifying an FC Host Connection

For each FC host connection you want to add or modify, you can set the following parameters:

- **Name** — the host device name.
- **Host Port** — the host port number.
- **WWNN** — the World Wide Node Name of the host device. This item cannot be changed when you are modifying an existing FC host. The **WWNN** text box is limited to 17 lowercase alphanumeric characters and colons (:). The WWNN must be typed in the following format: 12345678:0b33ef12.
- **Select Type** — the appropriate host operating system.
- **I/O blades** — the I/O blades you can select for the host.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

Deleting an FC Host Connection

Administrative users can delete connections to FC hosts without powering down the system. Before deleting an FC host connection, make sure the FC host is disconnected (offline) from the I/O blade.

A message will appear if the FC host is online when you attempt to delete it. To continue, take the FC host offline or disconnect the FC host from the I/O blade, wait for the FC host to go offline, and then continue to delete the FC host connection.

Note

If the host application is connected through an FC switch, a power cycle of the I/O blade might be required to make the host go offline. For instructions on how to power cycle an I/O blade, see Controlling FC I/O Blade Power on page 89.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the operator panel, select **Setup > I/O Blades > Host Management**.
- From the web client, select **Setup > I/O Blades > Host Management**.

Host Mapping

Host mapping enables you to manually modify host information and set logical unit number (LUN) mappings, and to map specific hosts to library LUN devices.

Overview of Host Mapping

I/O blades discover target devices that are attached to ports 3 through 6, as well as their internal virtual port (see I/O Blade Internal Virtual Port for Media Changers on page 64). Each of these devices has their own native logical unit number (LUN) that is used to address the device via the port to which it is attached. These LUNs can be re-mapped to new LUNs for presentation via ports 1 and 2. Further, custom LUN maps can be simultaneously defined for individual hosts.

For example, the I/O blade may discover tape drives attached to ports 3 through 6, each of which report themselves at LUN 0. The I/O blade could be configured to re-map these to LUNs 1, 2, 3, and 4 for discovery on ports 1 and 2. If desired, they could also be simultaneously mapped to LUNs 3, 5, 7 and 9 for a specific host server.

There is also an internal (i.e., not attached to a port) controller device presented at LUN 0 by default. The controller device facilitates initialization and device discovery. In some instances it may be useful to map the controller device to a different LUN if an application typically expects to see a medium changer or tape drive at LUN 0.

LUNs can also be mapped to be accessible by specific host server World Wide Port Name (WWPN). Mapping a LUN to a specific WWPN can be used instead of channel zoning to control device visibility. Mapping a LUN to more than one WWPN may be useful for creating redundant paths to a medium changer, tape drive, or controller device. LUNs will need to be mapped to each WWPN for host servers that use multiple ports (e.g., multi-ported HBAs or multiple HBAs) if access is desired via all the host server ports (e.g., a LUN would need to be mapped to both WWPNs of a server that uses a dual-port HBA).

LUN masking is a complementary concept to host mapping in that LUNs that are mapped to specific host server WWPNs are hidden (i.e., masked) from other host servers. This is useful when more than one host server is attached to the I/O blade (e.g., in a SAN). One or more of the LUNs can be masked from discovery by specific host servers while maintaining their mapping and accessibility to other host servers via the same port(s).

Host Mapping Vs. Channel Zoning

Channel zoning places an operational restriction on mapped LUNs (for example, if port 1 is zoned to ports 3 and 4, but LUNs from ports 3 through 6 have been mapped to a specific host server WWPN, the devices on ports 5 and 6 cannot be accessed from that host via port 1, even though they are mapped to it; only the devices on ports 3 and 4 would be accessible from the host via port 1).

Host mapping can be used to control visibility of the medium changer devices found on the I/O blade internal virtual port, while channel zoning can be used to create simple access control to the other target devices. If the host mapping capabilities are used to control visibility and access for all the LUNs, channel zoning might not be necessary or desired.

Note

On the operator panel, the host mapping screens (**Setup** > **I/O Blades** > **Host Mapping**) are not available unless FC host mapping is enabled. See Enabling/Disabling FC Host Mapping on page 65.

Configuring Host Mapping

To configure host mapping, you need to select the partition, tape drive, or media changer you want to map and assign a new LUN number for the device.

CAUTION

Depending on host operating system constraints, it might be necessary to reboot or reconfigure the host due to device mapping changes that result from configuring host mapping.

Details on configuring host mapping include:

- Host mapping is an optional feature and is disabled by default. For instructions on how to enable or disable host mapping, see Enabling/Disabling FC Host Mapping on page 65.
- The **Setup - Blade Host Mapping** screen lists the host name, I/O blade location, World Wide Name (WWN), and operating system type of each available FC host. You can select the FC host to configure and proceed to the next screen.

  The screen lists the available partitions and tape drives connected to the I/O blade to which the FC host is attached. For each available partition and tape drive, the screen lists the following:

  - **Description** — For tape drives: Drive [location coordinates][(associated partition)]. For partitions: the name assigned to the partition during the partition creation process.
  - **Type** — Device type, for example, processor, media changer (partition), tape drive.
  - **Serial Number** — Serial number of the partition or tape drive.
  - **Vendor** — Device manufacturer.
  - **Product** — Name of the device.
  - **LUN** — Current logical unit number (LUN) assignment. Assign a new LUN number for the device.
- After configuring FC host mapping, save the library configuration. For instructions on how to save the library configuration, see About Saving and Restoring the Configuration on page 208.

Note

A warning message will display if the command and control LUN (CCL) or another device is not mapped to LUN 0 (zero). LUN 0 is typically occupied by the command and control LUN (CCL), unless it has been manually mapped to another LUN. Make sure at least one device is mapped to LUN 0.

Note

If an FC switch is attached to an I/O blade target port, the FC switch will appear in the Blade Host Management list as if it were an FC host. Do not map library devices to an FC switch. To avoid confusion, it is recommended that you modify the FC switch host name and type using Blade Host Management. See Adding or Modifying an FC Host Connection on page 66.

Note

If both channel zoning and host mapping are enabled, the channel zoning settings supersede any host LUN mapping on the I/O blade. For information on channel zoning, see Configuring FC I/O Blade Channel Zoning on page 64.

The paths to open the appropriate screens are as follows:

- From the operator panel, select **Setup > I/O Blades > Host Mapping**.
- From the web client, select **Setup > I/O Blades > Host Mapping**.

Configuring FC Host Port Failover

When I/O blades are installed in the library, administrative users can enable and configure the optional FC host port failover feature. This feature is disabled by default.

You can configure the FC host port failover feature so that a "standby" target port (1 or 2) on an I/O blade can assume the identity and LUN mapping configuration of the designated "active" target port if the active port fails. Host port failover enables the library to continue operations without requiring you to reconfigure the host or the SAN.

To enable host port failover, you must configure target ports 1 and 2 on the I/O blade as point-to-point connections. I/O blade target ports 1 and 2 must be attached to the same SAN fabric to provide host access. The primary active port is used for host communications, while the passive standby port is kept idle. In addition, channel zoning must be configured so that target ports 1 and 2 have access to all initiator ports (ports 3–6). If these conditions are not met, an error message will display when you attempt to enable host port failover.

Note

When both target ports on the I/O blade are attached to the same SAN fabric, you may see duplicate media changers being reported. To stop this from happening, you need to enable host port mapping and configure host mapping. For more information, see Configuring Host Mapping on page 68.

For information on configuring I/O blade ports and channel zoning, see Configuring FC I/O Blade Ports on page 63 and Configuring FC I/O Blade Channel Zoning on page 64.

The library generates a Reliability, Availability, and Serviceability (RAS) ticket when port failover occurs. Examine the ticket to determine the reason for the failover. When the failed port is repaired, the port must be re-enabled to make it available for host port failover as the standby or active port. For more information, see Repairing and Enabling a Failed Target Port.

Details on configuring host port failover include:

- The **Setup - Host Port Failover** screen displays all the I/O blades found in the library. I/O blades are listed by the following: location in the library, WWNN, and status. You can select the I/O blade you want to configure for host port failover and proceed to the next screen.
- To enable FC host port failover for the selected FC I/O blade, you can select **Enable Host Port Failover**. Clearing **Enable Host Port Failover** disables FC host port failover for the selected FC I/O blade.
- If you are enabling FC host port failover, select one target port on the FC I/O blade as the **Active Port**. The selected target port becomes active by default. The other target port will go on passive standby until failover occurs.

After enabling or disabling FC host port failover, save the library configuration. For instructions on how to save the library configuration, see About Saving and Restoring the Configuration on page 208.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > I/O Blades > Host Port Failover**.
- From the operator panel, **Setup > I/O Blades > Host Port Failover**.

Repairing and Enabling a Failed Target Port

After host port failover occurs, the failed target port must be repaired and enabled before it can be configured as an active or standby port for the host port failover feature. To repair the failed port, use the information in the RAS ticket that was generated when the host port failover occurred. For information on viewing and resolving RAS tickets, see About RAS Tickets on page 205.

Once the port has been repaired, you can enable it. Details on enabling a repaired target port include:

- The **Setup - Blade Port Failover** screen displays all the I/O blades found in the library. I/O blades are listed by the following: location in the library, WWNN, and status. You can select the I/O blade that had a failed target port and proceed to the next screen.
- In the **Physical Ports** section of the screen, check the **State**, **Failure Type**, and **Intervention** columns for the port that failed.

  Note: If you are using the operator panel user interface, select the **Port Info** button to view the physical ports information.

  - If the port has not yet been repaired, the port's state is offline, a failure type is indicated, and intervention is not yet required. You must repair the failed port using information in the RAS ticket that was generated for the host port failover. You can then return to this screen and enable the repaired port.
  - If the port's state is online, and intervention is required, the failed port has already been repaired and can be enabled. Click **Enable** to make the port available for another failover or for reconfiguration as the active port.
- After enabling the repaired target port, save the library configuration. For instructions on how to save the library configuration, see About Saving and Restoring the Configuration on page 208“ in Troubleshooting.”

Note: This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

For information on how to configure the repaired port as the standby or active target port, see Configuring FC Host Port Failover on page 69.

The paths to open the appropriate screens are as follows:

- From the Web clientweb client, select **Setup > I/O Blades > Host Port Failover**.
- From the operator panel, **Setup > I/O Blades > Host Port Failover**.

Working With Data Path Conditioning

When I/O blades are installed, administrative users can configure data path conditioning, an automatic means of verifying, monitoring, and protecting data path integrity between FC I/O blades and FC tape drives. Data path conditioning allows you to proactively detect and resolve data path problems before they affect backup, restore, and other data transfer operations.

The I/O blade does not manage data path conditioning along the path between the host and the I/O blade. It does manage data path conditioning along the path between itself and the FC tape drives. Data path monitoring automatically occurs at regular, configurable intervals. The I/O blade generates a RAS ticket if the monitoring tests fail for two intervals.

To configure data path conditioning, set the following parameters for the selected I/O blade:

- The level at which the data path is monitored between an I/O blade and the FC tape drives connected to it. The two levels are as follows:
  - **Interface Test —** performs tests to verify that FC controllers on I/O blades are responsive to commands. This is the default level.
  - **Device Datapath Test —** performs tests at the Interface Test level and also performs a device inquiry on each target device.
- **Test Interval —** the time interval between monitoring checks. You can configure the test interval. It can range from 5 to 2,880 minutes (48 hours). If you do not configure the test interval, the default test interval is 60 minutes.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > I/O Blades > Data Path Conditioning**.
- From the operator panel, select **Setup > I/O Blades > Data Path Conditioning**.

Configuring Library Security Settings

Administrative users can use the operator panel **Security Settings** screen to change the following security features:

- **Network Interface** — enables or disables all external access to the library. This setting is enabled by default to allow external access.
- **SSH Services** — enable or disable Secure Shell (SSH) services, such as SSH (port 22), from accessing the library. This setting is enabled by default.
- **ICMP** — enables or disables external attempts to discover the library by pinging it (by means of the Internet Control Message Protocol [ICMP] Echo packets). This setting is enabled by default.
- **Remote UI** — enables or disables web client user interface (port 80) to the library. This setting is enabled by default.
- **SNMP** — enables or disables SNMP traffic (port 161) across the Ethernet port. This setting is enabled by default.
- **SMI-S** — enables or disables SMI-S traffic (port 5988). This setting is enabled by default.

You cannot configure the security settings from the web client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools > Security Settings**.

Configuring the Internal Network

Use the **Internal Network Configuration** screen to configure your library's internal network setting. The default internal network address is **10.10.10.*X***.

The library's internal network enables communication among library components. While rare, it is possible that the default addressing of the internal network could conflict with your network, potentially causing the library to become confused. When installing the library, make sure that the external network setting is different than the internal network setting on the library. If DHCP is enabled or you do not know what your external network setting is, check with your network administrator.

From the operator panel, administrative users can change the setting of the internal network using the **Internal Network Configuration** screen. Select the new internal IP address from the list on the screen. You can select from nine IP addresses.

The **Internal Network Configuration** screen is only accessible from the operator panel. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools > Internal Network**.

Configuring System Settings

You can use the operator panel **System Settings** screen to configure the following system-wide settings:

- **Touch screen audio enable** — A beep sound occurs each time you select a button on the operator panel. The beep sound can be disabled or enabled at any time by selecting the **Touch screen audio enable** checkbox.
- **User session timeout (minutes)** — The library automatically logs out a user or administrative user when the library has detected no activity for 30 minutes. You can adjust the user session time by entering a numeric value in the **User session timeout (minutes)** text box. Valid user session times are 15 minutes to 480 minutes.
- **Unload assist** — Allows you to specify whether the library should automatically eject cartridges from tape drives. When the setting is enabled, the library will assist with tape drive unload operations in the event that a tape drive is not unloaded by a host command. When the setting is disabled, the library will not assist with tape drive unload operations and reject a move request from a tape drive, if the cartridge is not already unloaded. The **Unload assist** setting is enabled by default.
- **Logical SN addressing enable** — The library uses the actual tape drive serial numbers by default. Selecting the **Logical SN addressing enable** check box enables the library to assign logical serial numbers to all tape drives in the library. Specifically, the library assigns a logical serial number to a tape drive in a specific location, not the serial number of the particular tape drive. If the tape drive is then replaced by another tape drive in the same library location, the logical serial number remains the same. From the host application's perspective, the replacement tape drive is the same as the original.

CAUTION If you change the logical serial number addressing setting, you must power cycle the library (perform a shutdown and press the power button) or remove power from each tape drive for the change to take effect.

- **Manual cartridge assignment** — Administrative users can disable or enable manual cartridge assignment. When manual cartridge assignment is enabled (the default setting), the **Assign IE** screen automatically appears on the operator panel once cartridges are placed into the I/E station. The **Assign IE** screen prompts the user to use the operator panel to assign the cartridges to a specific partition or to the system partition. The cartridges can then be used only by the assigned partition.

  For more information on manual cartridge assignment, see Disabling/Enabling Manual Cartridge Assignment on page 47.

- **Disable Remote Service User** — For security purposes, prevents a service user from logging in to the library remotely, from either the web client or over the ethernet service port. The service user will still be able to log in to the library from the operator panel interface.

Details on the system settings include:

- Users can configure only the **Touch screen audio enable** setting.
- Administrative users can configure all the settings on the **System Settings** screen.

You cannot configure the system settings from the web client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools** > **System Settings**.

Configuring Operator Panel Display Settings

You can use the operator panel **Display Settings** screen to adjust the operator panel's brightness and contrast settings. The current applied settings appear on the screen. The brightness and contrast settings can be adjusted. The **Defaults** button sets the brightness and contrast to the default settings.

You cannot configure the display settings from the web client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools** > **Display Settings**.

Registering the Library

Registering the library activates the warranty. After completing the initial setup of the library, choose **Setup** > **Register Library** on the web client to access the online product registration form.

You cannot register the library from the operator panel. The path to open the appropriate screen is as follows:

- From the web client, select **Setup** > **Register Library**.

5

Running Your Library

This chapter explains how to access and operate your library. Most of the library functions described here can be found on the **Operations** menu.

Note — The information in this chapter assumes you are using the web client. Differences in functionality between the web client and the operator panel are noted.

Logging In

All users, service users, and administrative users must log in to the library to perform library functions or view library operations.

If you are logging in to the library for the first time using the default administrator account, type **admin** in the **User Name** text box and **password** in the **Password** text box.

After you log on for the first time, change the password for the default administrative user account. Passwords are limited to 6–12 lower-case alphanumeric characters and can include an underscore (_); for example, "pass_19." For information on changing passwords, see Modifying Local User Accounts on page 59.

Note — If you misplace the password for the default administrative account, contact Technical Support. For contact information, see Getting More Information or Help on page 4.

Logging In When LDAP is Enabled

When LDAP is enabled, the **Login** screen displays the following items in addition to the **User Name** and **Password** text boxes:

- **Use Local Authentication** — Users can select this option to log in using a local user name and password.
- **Use LDAP Authentication** — Users can select this option to select or enter a domain and log in using a directory service user name and password.

For more information on LDAP, see Configuring LDAP on page 59 in.

Logging Out

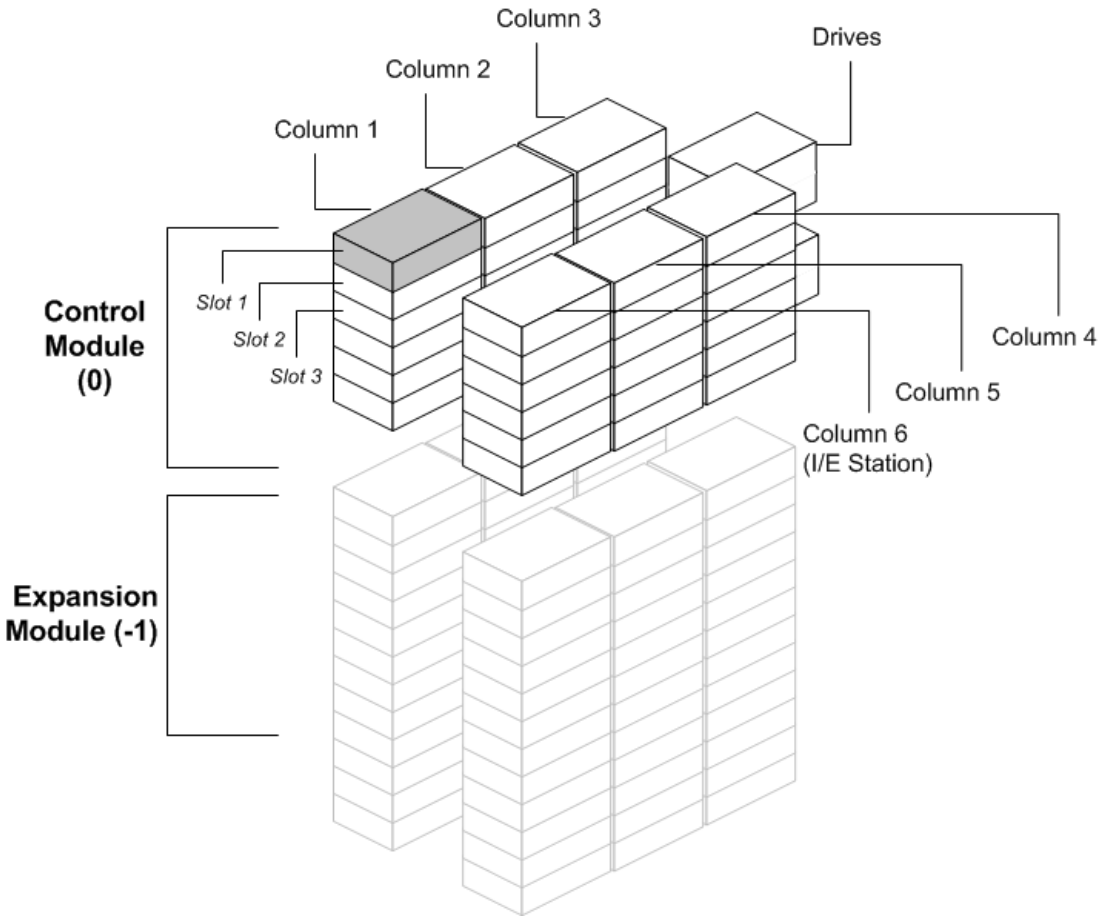
Logging out secures the library from being accessed by unauthorized users. Log out whenever you have finished accessing the library through either the web client or the operator panel.

From the web client or the operator panel, you can click the **LOGOUT** button at the top right of the screen to log out. From the web client, you can also select **Operations > Logout**.

Understanding the Location Coordinates

This section describes the numbering system used to identify components of the library. The library location coordinates contain the following digits: [Module],[Column],[Slot]. Figure 13 shows how a library with a control module and an expansion moduleis numbered.

Figure 13 Library Location Coordinates



Modules

Library modules are represented by the first digit of a library coordinate. Modules are identified relative to the control module.

The control module is numbered 0 (zero). Expansion modules stacked above the control module are addressed with positive integer digits depending on their position above the control module. For example, the expansion module stacked directly above the control module is number 1. The expansion module stacked directly above module 1 is number 2, and so on.

Modules stacked below the control module are numbered with negative integer digits, also depending on their relative position to the control module. For example, the expansion module stacked directly below the control module is number -1. The expansion module stacked directly below module -1 is number -2, and so on.

Columns

A storage column is a group of slots arranged vertically in the library. Columns are represented by the second digit of a library coordinate. Columns are identified relative to the front left of the library. The column in the front left of the library is number 1. The column numbering continues around the library in a clockwise direction. The I/E station column is always number 6.

Slots

Fixed storage slots are represented by the third digit of the library location coordinate. Within each column, slots are numbered from top to bottom, starting at 1. For example, in Figure 13 on page 76, the full location coordinate of Slot 1 is 0, 1, 1.

Tape Drives

Tape drives are addressed first by module and then by tape drive bay within the module. The drive bays within a module are numbered from top to bottom. A one-based numbering system is used. The full address of a tape drive is in the form of [module,drive bay]; for example: [0,1], [1,3], [-1,2].

I/O Blades

Fibre Channel (FC) I/O blades are addressed first by module and then by I/O blade bay within the expansion module. The blade bays within a module are numbered from top to bottom. A one-based numbering system is used. The full address of a an I/O blade bay is in the form of [module,I/O blade bay]; for example: [1,1], [-1,2].

Power Supplies

Power supplies are addressed as [module,PS#], where *PS#* is 1 for the left power supply and 2 for the right power supply. The PS# is also etched on the module chassis, above each power supply.

Performing Media Operations

Administrative users and users can use commands on the web client and operator panel **Operations** menu to perform the following media operations:

- Import data cartridges into the library
- Export data cartridges from the library
- Move data cartridges between tape drives, I/E stations, and storage slots within a partition
- Import cleaning cartridges into the library (AutoClean is enabled)
- Export cleaning cartridges from the library (AutoClean is enabled)
- Load cartridges into tape drives
- Unload cartridges from tape drives
- Change the tape drive mode from online to offline and back as needed

In addition, administrative users can:

- Clean tape drives manually, using the **Tools > Drive Mgmt > Clean Drive** command on the operator panel or **Tools > Drive Operations > Clean a drive** from the web client.

The following topics provide an overview of these media operations. For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

Note

The information and procedures in this *User's Guide* apply specifically to the library web client and the operator panel user interface, not to the host application. Performing media operations through the library user interface may affect your host application. See your host application documentation for information.

Importing Media

Note

If your library has zero I/E station slots, you cannot import or export media. See Configuring I/E Station Slots on page 49.

The Import Media operation allows you to use the I/E station to import data cartridges into the library. The library's scanner automatically reads the barcode on new cartridges imported into the library.

This topic focuses on using the library user interface, not the host application, to import media. Using the library to import media may necessitate performing an inventory of the library with the host application. See your host application documentation for more information.

When manual cartridge assignment is enabled (the default setting), you cannot import cartridges until you have assigned them to a partition. After you have loaded the cartridges into the I/E station and closed the I/E station door, the **Assign IE** screen automatically appears on the operator panel. The **Assign IE** screen prompts you to use the operator panel to assign the cartridges to a specific partition or to the system partition. The cartridges can be used only by the assigned partition.

Administrative users can disable manual cartridge assignment. In this case, the **Assign IE** screen does not appear on the operator panel. The cartridges in the I/E station are available for use by any partition, including the system partition. For more information, see Disabling/Enabling Manual Cartridge Assignment on page 47.

Before importing cartridges, verify that all tape drives are unloaded and that all cartridges are in their appropriate storage slot location. Doing this will avoid over-loading the library with cartridges.

If you have AutoClean enabled, you can also import cleaning cartridges into the library. For information, see Importing Cleaning Media on page 86. In addition, you can bulkload cartridges into the library rather than use the I/E station to import media. For information, see Bulkloading on page 80.

You must have access to the library's I/E Station and the operator panel to import cartridges.

CAUTION **Some host applications may fail import/export operations when the I/E station contains cartridges that are assigned to another partition. Move cartridges from the I/E station as soon as possible to avoid possible conflicts with the other partitions.**

The process for importing cartridges includes the following steps:

1 Go to the front of the library and insert cartridges into the I/E station.

2 Close the I/E station door.

The **Assign IE** screen appears on the operator panel if the **Manual Cartridge Assignment** setting is enabled on the operator panel **System Settings** screen (**Tools > System Settings**).

If the **Assign IE** screen appears, do the following:

a. Assign the cartridges to the appropriate partition by selecting a partition listed on the **Assign IE** screen. The screen lists only the partitions to which you have been given access.

The partition button turns red after it has been selected.

Note If you select the wrong partition, open the I/E station door. Move the cartridge to a different I/E station slot and close the I/E station door. The library will rescan the I/E station, and the **Assign IE** screen will appear again.

b. Select **Apply**.

If the selected partition is online, it will be taken offline before the import operation is performed, and brought back online after the operation is complete. If the library contains multiple partitions, the import operation will not affect operations in other partitions.

3 Use the **Import Media** screens on either the operator panel or the web client to import the cartridges into the partition. Follow the on-screen prompts, or see the library's online Help for step-by-step procedures. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

You need to provide the following information in the **Import Media** screens to import media:

- **Partition** — the partition into which you want to import the cartridges. The screen lists only the partitions to which you have been given access. The screen includes information about the partition mode (online or offline) and the number of empty slots in the partition. The number of cartridges you can import is limited to the number of empty slots.
- **Media** — the cartridges that you want to import.

Note You can filter the list of media by entering all or part of a barcode in the **Search** text box. Use an asterisk (*) to search with wildcards. You can also sort the list by clicking on columns with bold headings. For example, selecting the **Location** column heading sorts the list by location coordinates

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Media > Import**.
- From the operator panel, select **Operations > Import Media**.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

Bulkloading

Bulkloading is another way to load media into the library. If zero I/E station slots have been configured, you will always need to bulkload cartridges into the library. If I/E station slots have been configured, you may want to perform an initial bulkload when you first start using your library. The library will perform an inventory after the bulkload is complete.

Before bulkoading, print out the Library Configuration report from the web client to see how the physical slots of the library are configured. The report shows what slots are unavailable or configured as cleaning slots or as I/E station slots. For information on accessing the report, see Viewing the Library Configuration on page 91.

CAUTION Place cartridges in their appropriately configured slot location; for example, cleaning cartridges should not be placed in slots configured for storage.

When I/E station slots have been configured as I/E slots, the I/E station door is unlocked, and you can open the main access door to the library. When all I/E station slots are configured as storage, the I/E station door is always locked. You will not be able to open the main access door to bulkload tape cartridges into the library without first unlocking the I/E station door. If possible, bulkload the library before configuring the I/E station slots as storage. Otherwise, unlock the I/E station door. For information on locking and unlocking the I/E stations, see Locking and Unlocking the I/E Stations on page 89. For information on configuring I/E station slots, see Configuring I/E Station Slots on page 49.

To perform an initial bulkload, open the access door and manually insert directly into storage slots as many cartridges as you plan to use. The cartridges will not go in all the way if they are inserted incorrectly.

Note A small number of physical storage slots are inaccessible to the robot and should not be used for any tape cartridges. These slots appear as unavailable in the Library Configuration report. For detailed information on these slots, see Unused Slots on page 80.

Note When you open the main access door to load tape cartridges into the library, the library will automatically generate a Reliability, Availability, and Serviceability (RAS) ticket, alerting you to the fact that the door was opened. For information on resolving a RAS ticket, see About RAS Tickets on page 205.

After the initial bulkload, you can use the **Import Media** screen to add cartridges without interrupting library operations, as long as I/E station slots have been configured. For more information, see Importing Media on page 78.

Unused Slots

Each library configuration contains a limited number of slots that are not accessible to the robot. The slot counts in this *User's Guide* do not include these unusable slots.

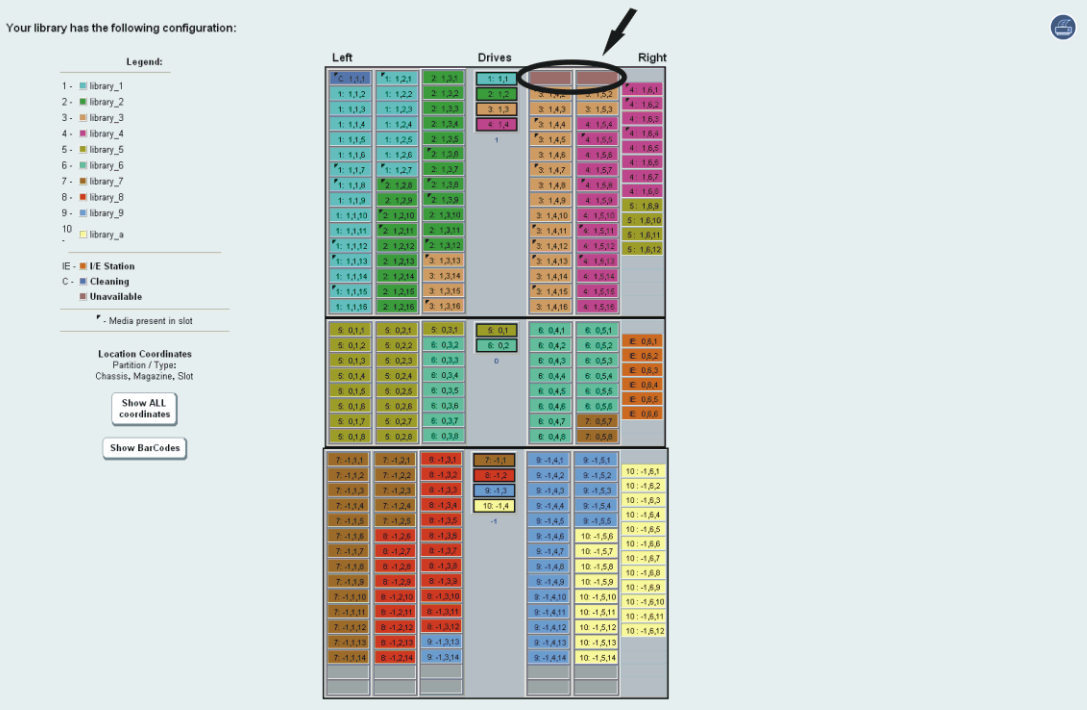
In any library configuration, the picker cannot access the bottom two slots in each column in the lowest module in the stack due to the fact that there is not enough clearance at the bottom of the library for the robotic picker. When bulkloading the library, do not insert storage or cleaning tapes into the bottom two rows of the lowest module in the library configuration.

In addition, in a 23U, 32U, or 41U library configuration, when all the physical slots are licensed, two physical storage slots in the top module are not utilized by the library. These two slots (which are usable in smaller library configurations) are in the top rows of columns 4 and 5.

Figure 14 on page 81 shows the Library Configuration report for a 23U library configuration. Note that in the report, the slots in the top row of columns 4 and 5 are shown as unavailable. These two slots should not be used for storage or cleaning cartridges. When bulkloading a 23U, 32U, or 41U library, do not insert tape cartridges into these two slots. If a tape is manually placed into one of these slots, the library will alert the user by generating a RAS ticket, explaining that media has been placed in an unavailable slot.

Since these slots are usable in 5U and 14U library configurations, users who expand their library to a 23U, 32U, or 41U library configuration and move an existing module to the top position need to export tapes from these slots. All other setting changes will occur automatically, without any operator intervention.

Figure 14 Two unutilized slots in the 23U, 32U, and 41U library configurations



Moving Media

Once media has been imported into the library, you can use the Move Media operation to move a single data cartridge between tape drives and slots within a partition.

Note — If your library has zero I/E station slots, you cannot move cartridges to and from the I/E station. See Configuring I/E Station Slots on page 49 .

This topic focuses on using the library user interface, not the host application, to move media. Using the library to move media may necessitate performing an inventory of the library with the host application. See your host application documentation for more information.

Details on using the library to move media include:

- If the partition is online, it will be taken offline before the move is performed and brought back online after the move is complete. You will be asked to confirm that you want to take the partition offline.

- You can select only the partitions to which you have been given access.
- You can only move media within one partition at a time.

You need to provide the following information in the user interface to move media:

- **Partition** — lists the partitions that you have permission to access.
- **Selected Media** — the single cartridge that you want to move.
- **Selected Destination** — the location to which you want to move the cartridge.

Note

You can filter the list of media by entering all or part of a barcode in the **Search** text box. Use an asterisk (*) to search with wildcards. You can also sort the list by clicking on columns with bold headings. For example, selecting the **Location** column heading sorts the list by location coordinates

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Media > Move**.
- From the operator panel, select **Operations > Move Media**.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

Exporting Media

Note

If your library has zero I/E station slots, you cannot import or export media.
See Configuring I/E Station Slots on page 49..

The Export Media operation enables you to export data cartridges from storage slots to empty I/E station slots for removal from the library.

This topic focuses on using the library user interface, not the host application, to export media. Using the library to export media may necessitate performing an inventory of the library with the host application. Also, if the host application has issued a prevent media removal command, you will not be able to use the library user interface to export media. See your host application documentation for more information.

If you have AutoClean enabled, you can also export cleaning cartridges. For information, see Exporting Cleaning Media on page 87.

CAUTION

Some host applications may fail import/export operations when the I/E station contains cartridges that are assigned to another partition. Move cartridges from the I/E station as soon as possible to avoid possible conflicts with the other partitions.

Details on exporting cartridges include:

- If the partition is online, it will be taken offline before the export operation is performed and brought back online after the operation is complete. You will be asked to confirm that you want to take the partition offline.
- You can select only the partitions to which you have been given access.
- You can only export cartridges if empty I/E station slots are available.
- You must have access to the library's I/E Station and the operator panel to import cleaning cartridges.

You need to provide the following information in the **Export Media** screens to export media:

- **Partition** — the partition from which you want to export cartridges. The screens include information about the partition mode (online or offline) and the number of empty I/E station slots. The number of cartridges you can export is limited to the number of empty slots.
- **Media** — the tape cartridges that you want to export.

Note

You can filter the list of media by entering all or part of a barcode in the **Search** text box. Use an asterisk (*) to search with wildcards. You can also sort the list by clicking on columns with bold headings. For example, selecting the **Location** column heading sorts the list by location coordinates.

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Media > Export**.
- From the operator panel, select **Operations > Export Media**.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

Loading Tape Drives

The Load Drive operation enables you to load a cartridge from a storage slot into a tape drive. The storage slot and tape drive must be assigned to the same partition.

This topic focuses on using the library user interface, not the host application, to load tape drives. Using the library to load tape drives may necessitate performing an inventory with the host application. See your host application documentation for more information.

Details on loading tape drives include:

- If the partition is online, it will be taken offline before the load operation is performed and brought back online after the operation is complete. You will be asked to confirm that you want to take the partition offline.
- You can select only partitions to which you have been given access.
- Default tape drive locations are highlighted if the barcode field is empty or the field is cleared.

You need to provide the following information in the **Load Drive** screens to load tape cartridges into tape drives:

- **Partition** — the partition containing the cartridge you want to load into a tape drive. The screens include information about the partition mode (online or offline).
- **Media** — the tape cartridges that you want to move

Note

You can filter the list of media by entering all or part of a barcode in the **Search** text box. Use an asterisk (*) to search with wildcards. You can also sort the list by clicking on columns with bold headings. For example, selecting the **Location** column heading sorts the list by location coordinates.

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Drives > Load**.
- From the operator panel, select **Operations > Load Drive**.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

Unloading Tape Drives

The Unload Drive operation allows you to unload a cartridge from a tape drive to a storage slot. The storage slot and tape drive must be assigned to the same partition.

This topic focuses on using the library user interface, not the host application, to unload tape drives. Using the library to unload tape drives may necessitate performing an inventory with the host application. See your host application documentation for more information.

Details about unloading tape drives include:

- Only drives with media loaded appear on the screen.
- You can select only partitions to which you have been given access.
- If the affected partition is online, it will be taken offline before the unload operation is performed, and brought back online after it is complete.

You need to provide the following information in the **Unload Drive** screens to unload tape cartridges from tape drives:

- **Partition** — the partition containing the tape drive that you want to unload. The screens include information about the partition mode (online or offline).
- **Tape drive** — the tape drive that contains the cartridge that you want to unload.

Note

You can sort the list of tape drives by clicking on columns with bold headings. For example, selecting the **Location** column heading sorts the list by location coordinates.

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Drives > Unload**.
- From the operator panel, select **Operations > Unload Drive**.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

Changing the Tape Drive Mode

You can take the tape drive online or offline. When the tape drive mode is online, the tape drive is available for use. When the tape drive mode is offline, the tape drive is offline to the host application and is not available for use.

Some operations require that the tape drive be offline. You can take a drive offline rather than the entire library or partition so as to minimize disruption of library operations.

This topic focuses on using the library user interface, not the host application, to change the tape drive mode. Using the library to change tape drive mode may affect the host application. See your host application documentation for more information.

Details on changing the tape drive mode include:

- The default tape drive mode is online.
- You can select only tape drives in partitions to which you have been given access.
- The **Online/Offline** buttons toggle between modes.

Note

If you change the mode of a control path tape drive to offline, a caution dialog appears asking you to confirm the mode change. For information on control path tape drives, see Modifying the Control Path on page 52.

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Drives > Change Mode**.
- From the operator panel, select **Operations > Drive Mode**.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

About Cleaning Tape Drives

Library tape drives require occasional cleaning. Cleaning cartridges are used to remove accumulated residue from each tape drive's read/write head.

The library supports two methods for cleaning tape drives with cleaning cartridges: AutoClean and Manual.

AutoClean — Configuring one or more dedicated cleaning slots automatically enables AutoClean. Cleaning cartridges are stored in the designated cleaning slots. When a tape drive needs cleaning, it notifies the library, and the library automatically cleans the tape drive using a cleaning cartridge loaded in a cleaning slot. Automatic cleaning is integrated into routine library operations. The host application requests the library to move a tape cartridge. If the tape drive performing the operation needs cleaning, the library will perform the move operation and then automatically clean the tape drive with a cleaning cartridge before informing the host application that the move operation is complete.

When a cleaning cartridge has expired, a RAS ticket informs the user to export the expired tape from the library. If more cleaning cartridges are present, the next cleaning cartridge will be used for the next cleaning request. If no more cleaning cartridges are available, a RAS ticket will inform the user that the tape drive needs cleaning and that a cleaning tape needs to be imported.

Only Administrative users can configure cleaning slots, thus enabling AutoClean. When AutoClean is enabled, the library allows you to import and export cleaning media through the I/E Station.

For information on configuring cleaning slots, see Configuring Cleaning Slots on page 48. For information on importing and exporting cleaning media, see Importing Cleaning Media on page 86 and Exporting Cleaning Media on page 87.

Note

Cleaning slots are not visible to the host application. To choose host-based cleaning, do not configure any cleaning slots, and configure your host application to manage cleaning tape drives. Configuring cleaning slots on the library may affect the host application. See your host application documentation for information.

Manual Cleaning — When a tape drive needs cleaning, it notifies the library. If the library's AutoClean feature is not enabled (no cleaning slots have been configured), the library generates a RAS ticket informing the user that the tape drive needs cleaning. Administrative users can clean tape drives manually, using commands on the operator panel or web client. For more information, see About Tape Drive Operations on page 88.

Enabling AutoClean

To enable AutoClean, an administrative user must configure at least one cleaning slot in the library. For information on configuring cleaning slots, see Configuring Cleaning Slots on page 48. For a description of AutoClean, see About Cleaning Tape Drives on page 85.

Importing Cleaning Media

When AutoClean is enabled (at least one cleaning slot has been configured), you can use the Import Cleaning Media operation to import cleaning cartridges from the I/E station to designated cleaning slots. For information on configuring cleaning slots, see Configuring Cleaning Slots on page 48. For a description of AutoClean, see About Cleaning Tape Drives on page 85.

When manual cartridge assignment is enabled (the default setting), you cannot import cartridges until you have assigned them to a specific partition or to the system partition. Cleaning cartridges should always be assigned to the system partition. Assigning cleaning cartridges to the system partition makes them available to all partitions in the library. For more information about manual cartridge assignment, see Importing Media on page 78 and Disabling/Enabling Manual Cartridge Assignment on page 47.

You must have access to the library's I/E Station and the operator panel to import cleaning cartridges.

CAUTION **Some host applications may fail import/export operations when the I/E station contains cartridges that are assigned to another partition. Move cartridges from the I/E station as soon as possible to avoid possible conflicts with the other partitions.**

Note If your library has zero I/E station slots, you cannot import or export cleaning media. See Configuring I/E Station Slots on page 49..

The process for importing cleaning cartridges includes the following steps:

1 Go to the front of the library and insert the cartridges into the I/E station.

Note Do not insert cartridges into the I/E station during the restart process.

2 Close the I/E station door.

The **Assign IE** screen appears on the operator panel if the **Manual Cartridge Assignment** setting is enabled on the operator panel **System Settings** screen (**Tools > System Settings**).

If the **Assign IE** screen appears, do the following:

a. On the **Assign IE** screen, select **System**.

The **System** button turns red after it is selected. Selecting **System** assigns the cartridge to the physical library and not to a specific partition.

b. Select **Apply**.

3 Use the **Import Cleaning Media** screen on either the operator panel or the web client to import the cleaning cartridges into the library. Follow the on-screen prompts, or see the library's online Help for step-by-step procedures. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

You need to provide the following information in the **Import Cleaning Media** screens to import media:

- **Media** — the cleaning cartridges that you want to import.

The screen includes information about the number of empty cleaning slots in the library. The number of cleaning cartridges you can import is limited to the number of empty cleaning slots.

Note — You can filter the list of media by entering all or part of a barcode in the **Search** text box. Use an asterisk (*) to search with wildcards. You can also sort the list by clicking on columns with bold headings. For example, selecting the **Location** column heading sorts the list by location coordinates

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Cleaning Media > Import**.
- From the operator panel, select **Operations > Import Cleaning Media**.

Exporting Cleaning Media

When AutoClean is enabled, you can use the Export Cleaning Media operation to export one or more cleaning cartridges from dedicated cleaning slots to the I/E station for removal from the library. You may need to export expired cleaning cartridges or free up cleaning slots for data storage.

After exporting cleaning cartridges, you can reduce the number of configured cleaning slots. The extra slots become available for use as storage slots. For information on configuring cleaning slots, see Configuring Cleaning Slots on page 48. For a description of AutoClean, see About Cleaning Tape Drives on page 85.

CAUTION — **Some host applications may fail import/export operations when the I/E station contains cartridges that are assigned to another partition. Move cartridges from the I/E station as soon as possible to avoid possible conflicts with the other partitions.**

Note — If your library has zero I/E station slots, you cannot import or export cleaning media. See Configuring I/E Station Slots on page 49.

Details on exporting cleaning cartridges include:

- You must have access to the library's I/E Station and the operator panel to export cleaning cartridges.
- You can only export cartridges if empty I/E station slots are available.

You need to provide the following information in the **Export Cleaning Media** screens to export cleaning media:

- **Media** — the tape cartridges that you want to export.

  The screen includes information about the number of empty I/E station slots in the library. The number of cleaning cartridges you can export is limited to the number of empty I/E station slots.

Note — You can filter the list of media by entering all or part of a barcode in the **Search** text box. Use an asterisk (*) to search with wildcards. You can also sort the list by clicking on columns with bold headings. For example, selecting the **Location** column heading sorts the list by location coordinates

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > Cleaning Media > Export**.
- From the operator panel, select **Operations > Export Cleaning Media**.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

About Tape Drive Operations

You can perform the following tape drive operations:

- Create a FUP tape — A FUP tape can be created of a tape drive firmware version already in use in your library. For more information, see Using an Image File to Update Tape Drive Firmware on page 96.
- Erase a FUP tape — When a FUP tape is no longer needed, you can erase it and reuse it as a data cartridge or again as a FUP tape. For more information, see Erasing a FUP Tape on page 98.
- Update tape drive firmware using a FUP tape. For more information, see Using a FUP Tape to Update Tape Drive Firmware on page 98.
- Update tape drive firmware using a firmware image file. For more information, see Using an Image File to Update Tape Drive Firmware on page 96.
- Retrieve tape drive logs — Tape drive logs can be retrieved from any tape drive installed in the library. For more information, see Retrieving Tape Drive Logs on page 212.
- Retrieve tape drive sled logs — Tape drive sled logs can be retrieved from any sled installed in the library. For more information, see Retrieving Tape Drive Sled Logs on page 212.
- Clean tape drives — Tape drive can be cleaned manually at any time.For more information, see Manually Cleaning Tape Drives below.

Manually Cleaning Tape Drives

The **Clean Drive** screens allow administrative users to manually clean tape drives.

Note — Be sure to unload the tape drive before attempting to clean it. If the tape drive is loaded with a cartridge, it will not available for this operation.

The **Clean Drive** screens allow you to select the tape drive that you want to clean. You are then prompted to insert a cleaning cartridge in the topmost I/E station slot and select **Apply**. The library then takes the tape drive and associated partition offline, moves the cleaning cartridge from the I/E station slot to the designated tape drive, and cleans the tape drive. You will be asked to confirm that you want to take the tape drive and partition offline.

When the operation is complete, the library moves the cleaning cartridge back to the I/E station slot and takes the tape drive and partition back online.

Note — If your library has zero I/E station slots, you will not be able to manually clean tape drives. See Configuring I/E Station Slots on page 49.

For step-by-step procedures, see the library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

The paths to open the appropriate screens are as follows:

- From the web client, select **Tools > Drive Operations > Clean a tape drive**.
- From the operator panel, select **Tools > Drive Mgmt > Clean Drive**.

Locking and Unlocking the I/E Stations

Each 5U control module and 9U expansion module has an I/E station door with multiple open and close sensors. A secondary door located behind the I/E station door acts as a redundant indicator as to whether the I/E station is opened or closed. When you are finished accessing the I/E station, make sure the station door is fully closed.

Administrative users can use this operation to lock or unlock the doors for all I/E stations that are configured as I/E station slots. If all I/E station slots are configured as storage, this operation unlocks the control module I/E station only.

Note Some host applications use a command to lock and unlock I/E station doors. This command usually cannot be overridden by the library. Use the host application to lock or unlock I/E station doors if this occurs. Using the library lock/unlock operation may affect the host application. See your host application documentation for information.

There are three reasons the I/E station door locks:

- The library imports or exports a cartridge from the I/E station door. While the library is attempting to import or export a tape from a given I/E station slot, only the associated I/E station door is locked in the closed position. All other I/E station doors remain accessible. On a get from an I/E station slot, the associated I/E station door remains locked until the media has been successfully moved to its destination. This allows the media to be returned to the I/E station slot in the event of a put error.
- A user has requested that the I/E station door be locked.
- If the I/E station slots are configured as storage slots, the door is always locked. When all I/E station slots are configured as storage slots, you can use the Locking and Unlocking I/E station operation to unlock the I/E station in the control module. When the I/E station is unlocked, you can open the main access door on the control module. This, in turn, unlocks all remaining I/E stations in the library, allowing you to access all remaining access doors in the library.

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations > I/E Station Lock/Unlock**.
- From the operator panel, select **Operations > Lock I/E Station**.

Controlling FC I/O Blade Power

Administrative users can turn on, turn off, or power cycle individual FC I/O blades in the library. Turning off or power cycling the I/O blade will cause a temporary loss of communication with connected hosts. The screen will display a warning message about the communication loss and ask you to confirm that you want to proceed.

The **Setup - Blade Control** screen allows you to perform the following operations on the selected I/O blades:

- Click **On** to turn on the I/O blade.
- Click **Off** to turn off the I/O blade.

- Click **Cycle** to power cycle the I/O blade. It takes approximately 3 minutes to power cycle a blade.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **I/O Blades** > **Blade Control**.
- From the operator panel, select **Setup** > **I/O Blades** > **Blade Control**

Shutting Down or Restarting the Library

Administrative users can use the **System Shutdown** screen to shut down or restart the library. Some maintenance activities require that the library be shut down or restarted.

Shutdown shuts down the library's operating system and firmware. When performing a shutdown, the library finishes all active commands received from the host application and does not process any new commands. It also shuts down all partitions. To finish the shutdown, press the power switch on the front of the control module.

Always perform a shutdown before completely removing power from the library. To completely remove power from the library, you must turn off the power switch on each power supply. Power is completely removed from the library when the blue LED on each power supply turns off.

To turn the library back on, turn the power switch on on each power supply, press the front power switch again, and then follow the login procedure.

CAUTION

If you do not perform library shutdown before you power off the library, loss of data could occur.

Restart shuts down and restarts the library's operating system and firmware. When performing a restart, the library finishes all active commands received from the host application and does not process any new commands. The library shuts down all partitions and restarts them during the reboot. In addition, the library performs an inventory of cartridges, tape drives, and slots during a reboot. Restarting takes approximately 5 minutes for the 5U control module and longer for the 14U and 23U library configurations.

If the "Not Initialized" message appears on the operator panel after the restart process is complete, the library did not properly initialize. View the **All RAS Tickets** screen to find the problem that is preventing the library from properly initializing. See Viewing RAS Tickets on page 205.

Note

The Restart operation should not be performed concurrently by multiple administrative users. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Operations** > **System Shutdown**.
- From the operator panel, select **Operations** > **Shutdown**.

6

Getting Information

The **About** screen on the operator panel gives you a quick glance at your library settings. You can view more information about the library by accessing items under the **Reports** menu. The **Reports** menu is available only on the web client.

Note

Users without administrative privileges can view only certain reports. See Understanding the User Interface on page 23 for information about user privileges.

Viewing System Information

The **System Information** report contains information on the following library settings:

- **Date and time** — current date, time, and time zone settings
- **Physical library** — host name, Internet Protocol (IP) address, serial number, and firmware version of the physical library, board support package (BSP) version, and the date the BSP was last updated.
- **Library Partitions** — name, serial number, control path, status, slots, media, and tape drives
- **Tape drives** — location coordinates, vendor name, model, type, physical serial number (P-SN), logical serial number (L-SN), firmware level, sled boot version, sled application version, and whether the tape drive is connected to an I/O blade

The path to open the report from the web client is **Reports > System Information**.

Viewing the Library Configuration

The **Library Configuration** report is a dynamic representation of the physical locations of various library resources, including tape drives, slots, partitions, and modules. Use the report to view information on the following resources:

- **Tape drives** — including the interface (FC, SCSI, or SAS), cartridge type, mode status, assigned partition, location coordinates, barcode, element address, vendor, model, physical serial number (SN), logical SN, World Wide Node Name (WWNN), World Wide Port Name (WWPN), topology request, speed request, topology actual, speed actual, SCSI or loop ID, firmware level, and control path setting of each tape drive

- **Slots —** including the type, assigned partition (storage and import/export [I/E] station slots only), location coordinates, barcode (storage and I/E station slots only), cartridge type, cleaning status (cleaning slot only), and element address of each slot
- **Partitions —** including the name, mode status, emulation type, barcode policy, total tape drives, active tape drives, total cartridges, mounted cartridges, total slots, full slots, total I/E stations, full I/E stations, and AutoClean setting of each partition
- **Modules —** including the manufacturer, model number, and serial number of each module

The path to open the report from the web client is **Reports > Library Configuration**.

Viewing Network Settings

The **Network Settings** report provides information on the following library settings:

- **Network settings —** host name, Dynamic Host Configuration Protocol (DHCP) settings, IP address, gateway, and network mask of the library
- **SSL settings —** SSL, port, and cipher of the library
- **SMI-S state —** SMI-S state setting of the library
- **SNMP settings —** v1, v2, v3, algorithm, encryption, and port of the library
- **SNMP-Traps —** IP addresses and ports of the library

The path to open the report from the web client is **Reports > Network Settings**.

Viewing Logged in Users

The **User Login** report contains information about the users that are currently logged into the library. The report contains the following information:

- **User name —** name of logged-in user
- **Role name —** privilege level of logged-in user (**Admin** for administrative user, **User** for non-administrative, non-service user)
- **Login date and time —** date and time the user logged into the library
- **Last activity date and time —** date and time the user last logged into the library
- **Login location —** IP address or host name of the system being used to access the system
- **Management interface —** user interface being used to access the system (**Web** for web client, **Local** for operator panel)

The path to open the report from the web client is **Reports > Logged in Users**.

Viewing Slot Information

The **All Slots** report contains information on all slots that are currently assigned to a partition and all I/E slots. The report contains the following information about each slot:

- **Slot type —** I/E station slot, cleaning slot, or storage slot
- **Barcode** — number of the cartridge installed in the slot (no barcode means the slot is empty)
- **Partition —** partition that owns the slot

- **Location —** location coordinates of the slot
- **Element Address —** element address of the slot

The path to open the report from the web client is **Reports > All Slots**.

Viewing I/O Blade Information

Administrative users can view information about all the I/O blades installed in the library. The **Tools - Blade Information** screen lists the following I/O blade information:

- **Location** — Library location coordinates of the blade: [module,blade#], where blade# is 1 for the top blade in the module and 2 for the bottom blade in the module
- **Firmware Version** — Firmware version of the blade (part of the library firmware)
- **Serial Number** — Serial number of the blade
- **WWNN** — World Wide Node Name (WWNN) of the blade
- **CCL** — Command control LUN (CCL)
- **Status** — The status of the blade can be: Ready, Note Ready, Auto Level Failed, Auto Leveling Booting, and Unknown.

The paths to open the appropriate screens are as follows:

- From the web clientweb user interface, select **Tools > IO Blade Info**.
- From the operator panel, select **Tools > IO Blade Info**.

Viewing I/O Blade Port Information

Administrative users can view information about all the I/O blades installed in the library. The **Tools - Blade Port Information** screen lists the following port information for each I/O blade:

- **Port number** — The port number: 1–6
- **WWPN —** World Wide Port Name (WWPN) of the port
- **Status** — The status of the blade: Config wait, Loop init, Login, Ready, Lost Sync, Error, Re-Init, Non part, and Failed
- **Actual Loop ID** — Negotiated loop ID of the port: 0–125
- **Actual Speed** — Negotiated speed of the port: 1Gb/s, 2Gb/s, or 4Gb/s
- **Requested Loop ID** — Requested loop ID of the port: Auto or 0–125
- **Requested Speed** — Requested speed of the port: Auto, 1Gb/s, 2Gb/s, or 4Gb/s
- **Framesize** — Framesize setting of the port: 528, 1024, or 2048
- **Mode** — Mode of the port: Public or Private
- **Role** — Role of the port: Target (ports 1–2) or Initiator (ports 3–6)
- **Connection** — Connection type of the port: Loop, Point to Point, or Loop Preferred

For information about configuring I/O blade ports, see Configuring FC I/O Blade Ports on page 63.

The paths to open the appropriate screens are as follows:

- From the web clientweb user interface, select **Tools > IO Blade Port Info**
- From the operator panel, select **Tools > IO Blade Info > Port Info**

Viewing Information About the Scalar i500

The **About** screen gives you a quick glance at your library settings. The screen contains information about your library, including the following information viewable from the operator panel and the web client.

From the web client, you can view the **About Scalar i500**report, which provides the following information about the library:

- Serial Number
- Firmware Version Number

From the operator panel, you can navigate to the **About** screen, which provides the following information about the library:

- Library Name
- Library IP Address
- State
- Serial Number
- Firmware Version Number
- Current Date
- Current Time
- Date and Time of Last Firmware Update

From the **About** screen, you can also navigate to other screens for information about the tape drives and partitions.

The paths to open the appropriate screens are as follows:

- From the web client, select **Reports > About Scalar i500**.
- From the operator panel, select **Tools > About Library**.

7

Updating Library and Tape Drive Firmware

There are two types of firmware that can be updated on the library: library firmware (including drive sled firmware) and tape drive firmware. There may be times when you will need to update your library and tape drive firmware as directed by technical support. You can also regularly monitor the Quantum Support website at www.quantum.com/support for firmware updates, but you need to make sure that the firmware you download is compatible with your library and tape drives.

Note Verify with technical support or the current *Release Notes* that you are selecting the correct firmware version to download.

Updating Library Firmware

The library firmware update operation allows you to update library firmware using the web client. Upgrading library firmware can take up to an hour for large configurations. .

Library firmware is available at the Quantum Support website. Navigate to the appropriate firmware version and download the file to your computer hard drive. Library firmware comes bundled with tape drive firmware, firmware update instructions, and Release Notes. Verify with the Release Notes or technical support that you are updating the library with the correct version of firmware. For technical support contact information, see Getting More Information or Help on page 4.

Library firmware version 200G.GSxxx and 210G.GSxxx (SP1) support library configurations of up to 14U. Library firmware 300G.GSxxx (I1) supports library configurations up to 23U. Library firmware version 320G.GSxxx (SP3) (and higher) support library configurations up to 41U. Make sure you are running the appropriate firmware version to support the size of your library.

Saving the current library configuration before you update library firmware is recommended in case the upgrade fails. After you have upgraded the firmware, save the library configuration again. For more information, see About Saving and Restoring the Configuration on page 208.

It is also a good idea to capture a snapshot of current logged information before making any significant change to your system such as upgrading library firmware. Service personnel can, if necessary, use the snapshot file to troubleshoot the library. For more information, see Capturing Snapshots of Library Information on page 206.

Note This operation should not be performed concurrently by multiple administrative users. You can access the screen, but you cannot apply changes while another administrative user is performing the same operation.

Note

The library automatically restarts after the firmware update is complete. Before logging into the library, clear the web browser cache. See your web browser's documentation for instructions on how to clear the cache.

You can find instructions on updating library firmware in the library firmware upgrade package you download from the Quantum Support website. You can also find step-by-step instructions in your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.

You cannot update library firmware from the operator panel. The path to open the appropriate screen is as follows:

- From the web client, select **Tools > Update Library Firmware**.

Updating Tape Drive Firmware

You can use the web client interface to update one or more tape drives in your library with an image file downloaded from the Quantum Support website.

You can also create a Firmware Update (FUP) tape of a tape drive firmware version already installed in your library. A FUP tape contains a specific version of tape drive firmware. You can then use the tape to transfer firmware to one or more tape drives installed in the library.

The following topics provide information on these procedures.

CAUTION

If your library has zero import/export (I/E) station slots, you will not be able to perform FUP tape operations. See Configuring I/E Station Slots on page 49.

Using an Image File to Update Tape Drive Firmware

The web client allows you to update tape drive firmware using a firmware image file. Note that updating tape drive firmware using an image file is a lengthy process, taking up to 90 minutes for each tape drive.

Tape drive firmware is available at Quantum Support website. Navigate to the appropriate firmware version and download the file to your computer hard drive. Tape drive firmware comes bundled with library firmware, firmware update instructions, and Release Notes. Verify with the Release Notes or technical support that you are updating the tape drives with the correct version of firmware. For contact information, see Getting More Information or Help on page 4.

Details on using an image file to update tape drive firmware include:

- The library allows you to update firmware on multiple tape drives at one time. Update firmware on all tape drives of the same interface type at the same time to make sure that all drives are at the same firmware level. Having different levels of drive firmware in the library is not recommended.
- Each tape drive interface type requires unique firmware. The image file must contain the appropriate SCSI, FC, or Serial Attached SCSI (SAS) firmware image for the corresponding SCSI, FC or SAS drive type.
- The tape drive and associated partition are automatically taken offline during the operation and brought back online when the operation completes. You will be asked to confirm that you want to take the tape drive and partition offline.

You can find detailed instructions on updating library firmware in the firmware upgrade package you download from the Quantum Support website. You can also find step-by-step instructions in your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.

CAUTION **Before you update tape drive firmware, make sure that cartridges are not loaded in any tape drives. If cartridges are loaded in tape drives during the update process, the library loses knowledge of the cartridges' storage slot location, resulting in library and host application inventory issues.**

CAUTION **Do not turn off power to the library during the update process. Turning off power to the library during the update can cause problems with the library.**

Note This operation should not be performed concurrently by multiple administrative users. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

You cannot update the tape drives with an image file from the operator panel. The path to the appropriate screen is as follows:

- From the web client, select **Tools > Drive Operations**.

Creating a FUP Tape

A FUP tape is a tape cartridge that is used to transfer updated tape drive firmware code to the library. When you create a FUP tape, you save a copy of a tape drive firmware version already in use in your library. The drive code image is copied onto the FUP tape, which you can then use to update the drive firmware on all of the specified drives within the library. Drive code versions are independent of the library versions.

The entire process of creating a FUP tape can be performed using the operator panel. If you choose to create the tape using the web client, be aware that part of the process must be performed on the operator panel and that you will need access to the physical library.

Details on creating FUP tapes include:

- If your library has zero import/export (I/E) station slots, you will not be able to perform FUP tape operations. See Configuring I/E Station Slots on page 49.
- FUP tapes are created using a blank, or scratch, tape. FUP tapes can also be ordered from Quantum. For contact information, see Getting More Information or Help on page 4.
- FUP tapes can be reused.
- Each tape drive interface type requires a unique firmware image. FUP tapes must contain the appropriate SCSI, FC, or SAS firmware image for the corresponding SCSI, FC, or SAS drive type.
- You cannot use an LTO-1 tape in LTO-3 tape drives, or LTO-1 or LTO-2 tapes in LTO-4 tape drives to create FUP tapes.
- You can select only empty tape drives to perform this operation. If the tape drive you want to use contains a tape cartridge, you will need to unload it first.
- The tape drive and associated partition are automatically taken offline during the operation and brought back online when the operation completes. You will be asked to confirm that you want to take the tape drive and partition offline.

You can find detailed instructions on creating FUP tapes and using them to update tape drive firmware in the tape drive firmware upgrade package you download from the Quantum Support website.You can also find step-by-step instructions in your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.web client

CAUTION **Any data on the scratch tape will be overwritten when you create the FUP tape.**

The paths to open the appropriate screens are as follows:

- From the operator panel, select **Tools > Drive Mgmt**.
- From the web client, select **Tools > Drive Operations**.

Erasing a FUP Tape

When the tape drive firmware version on a FUP tape is no longer needed, it can be erased and reused as a data cartridge.

Use this operation only when you need to reuse a FUP tape as a data cartridge. It is not necessary to erase a FUP before updating it with new tape drive firmware. In addition, this operation should not be used to erase information on data cartridges.

The entire process of erasing a FUP tape can be performed using the operator panel. If you choose to create the tape using the web client, be aware that part of the process must be performed on the operator panel and that you will need access to the physical library.

Details on erasing FUP tapes include:

- If your library has zero import/export (I/E) station slots, you will not be able to perform FUP tape operations. See Configuring I/E Station Slots on page 49.
- The tape drive and associated partition are automatically taken offline during the operation and brought back online when the operation completes. You will be asked to confirm that you want to take the tape drive and partition offline.
- You can select only empty tape drives to perform this operation. If the tape drive you want to use contains a tape cartridge, you will need to unload it first.

You can find step-by-step instructions on erasing FUP tapes in your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.

The paths to open the appropriate screens are as follows:

- From the operator panel, select **Tools > Drive Mgmt**.
- From the web client, select **Tools > Drive Operations**.

Using a FUP Tape to Update Tape Drive Firmware

You can update tape drive firmware using a FUP tape. A FUP tape contains a specific version of tape drive firmware and is used to transfer the firmware to one or more tape drives within the library. For information on creating FUP tapes, see Creating a FUP Tape on page 97.

Make sure to update the library with the appropriate level of tape drive firmware, compatible with the tape drive type. To determine the appropriate drive firmware, see the library's *Release Notes* or contact technical support. For contact information, see Getting More Information or Help on page 4.

The entire process of updating tape drive firmware with a FUP tape can be performed using the operator panel. If you choose to perform the operation using the web client, be aware that part of the process must be performed on the operator panel and that you will need access to the physical library.

Details on using a FUP tape to update tape drive firmware include:

- If your library has zero import/export (I/E) station slots, you will not be able to perform FUP tape operations. See Configuring I/E Station Slots on page 49.
- Update firmware on all of the drives in the library at the same time to make sure that all of the drives are at the same firmware level. Having different levels of drive firmware in the library is not recommended.
- Each tape drive interface type requires a unique firmware image. FUP tapes must contain the appropriate SCSI, FC, or SAS firmware image for the corresponding SCSI, FC, or SAS drive type.
- You cannot use an LTO-1 tape in LTO-3 tape drives, or LTO-1 or LTO-2 tapes in LTO-4 tape drives to create FUP tapes. See Creating a FUP Tape on page 97 for more information.
- The tape drive and associated partition are automatically taken offline during the operation and brought back online when the operation completes. You will be asked to confirm that you want to take the tape drive and partition offline.

You can find detailed instructions on creating FUP tapes and using them to update tape drive firmware in the tape drive firmware upgrade package you download from the Quantum Support website.You can also find step-by-step instructions in your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.web client

CAUTION **Before you update tape drive firmware, make sure that cartridges are not loaded in any tape drives. If cartridges are loaded in tape drives during the update process, the library loses knowledge of the cartridges' storage slot location, resulting in library and host application inventory issues.**

CAUTION **Do not turn off power to the library during the update process. Turning off power to the library during the update can cause problems with the library.**

Note This operation should not be performed concurrently by multiple administrative users. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the operator panel, select **Tools > Drive Mgmt**.
- From the web client, select **Tools > Drive Operations**.

Autoleveling Tape Drive Firmware

When FC I/O blades are installed, the autoleveling feature enables you to automatically update firmware on all FC tape drives that are connected to the I/O blades. This allows you to keep all FC tape drives of the same type (for example, LTO-3) at the same firmware level. Tape drive firmware is checked whenever a tape drive is reset, such as when the library is power cycled or rebooted, or whenever a tape drive is added or replaced. If the firmware does not match, the tape drive firmware is autoleveled.

FC tape drives must be connected to an I/O blade to participate in autoleveling operations. The library does not support autoleveling FC tape drives connected directly to an FC host or switch. In addition, the library does not support autoleveling SCSI or SAS tape drives.

To enable autoleveling, you must upload a firmware image file to the library. If you have multiple versions of FC tape drives installed in your library (for example, LTO-2, LTO-3, and LTO-4), you must upload a unique firmware image file for each version. You can also delete a firmware image file when you no longer want to autolevel tape drive firmware.

Uploading Tape Drive Firmware Used in Autoleveling

Before uploading tape drive firmware, verify with published Release Notes or technical support that you are uploading the correct version of firmware. For technical support contact information, see Getting More Information or Help on page 4.

You must have access to a tape drive firmware image file to enable autoleveling. Tape drive firmware is available at the Quantum Support website. Navigate to the appropriate firmware version and download the file to your computer hard drive.

It is not necessary to delete an old version of firmware before uploading a new version. The new version of firmware overwrites the old version.

You can find step-by-step instructions in your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.

You cannot upload tape drive firmware from the operator panel. The path to the appropriate screen is as follows:

- From the web client, select **Tools > Drive Operations**.

Deleting Tape Drive Firmware Used in Autoleveling

The library allows you to delete a firmware image file if you no longer want to autolevel tape drive firmware. In addition, you might want to delete a firmware image file if your library no longer contains a specific version of tape drives. For example, if you replace all LTO-2 tape drives with LTO-3 tape drives, you no longer need the LTO-2 firmware.

You can find step-by-step instructions in your library's online Help. To access the online Help system, click the Help icon at the top right of the web client or operator panel user interface.

You cannot upload tape drive firmware from the operator panel. The path to the appropriate screen is as follows:

- From the web client, select **Tools > Drive Operations**.

8

Installing, Removing, and Replacing

This chapter describes how to add, remove, and replace hardware within your library. Adding, removing, or replacing library components may require you to power off the entire library. There are a few components, however, that you can service without powering off the library, such as replacing tape drives. Instead, you may only need to take a specific partition offline, or you may not need to impact the status of the library at all.

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

WARNING

UNDER NO CIRCUMSTANCES SHOULD A RACK BE MOVED WHILE LOADED WITH ONE OR MORE MODULES.

WARNING

WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, A 5U CONTROL MODULE WEIGHS APPROXIMATELY 58 LBS. A 9U EXPANSION MODULE, WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, EXCEEDS 65 LBS.

TO AVOID SERIOUS INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO SAFELY LIFT THE MODULES INTO POSITION.

Taking the Library Online/Offline

Taking a library online makes it accessible to host applications via the Storage Area Network (SAN). Taking a library offline makes it inaccessible to host applications via the SAN.

Taking a Library Online

1 Using the library's operator panel or the remote web clientinterface, select **Operations > Change Partition ModeLogical Library Mode**.

2 For each partition that you want to take online, click **Online**.

3 Click **Apply**.

Taking a Library Offline

1 Using the library's operator panel or the remote web clientinterface, select **Operations > Change Partition ModeLogical Library Mode**.

2 For each partition that you want to take offline, click **Offline**.

3 Click **Apply**.

Cabling the Library

Use the cabling procedure appropriate for your drive type.

Connecting Library SCSI Cables to Hosts

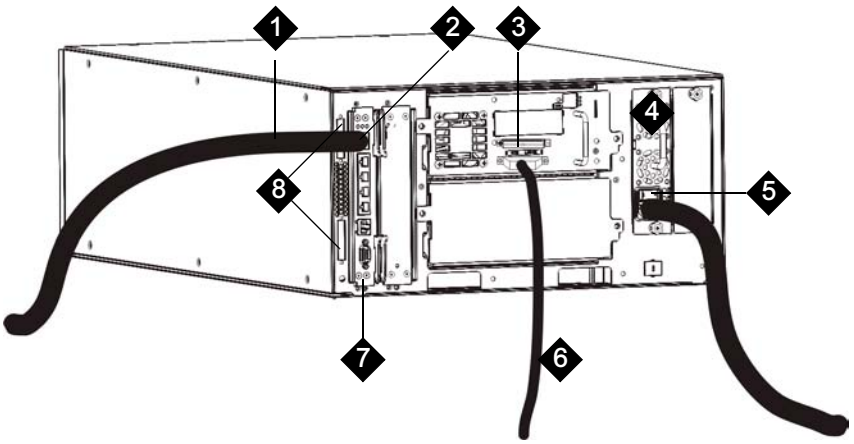
Use this procedure, along with Figure 15 and Figure 16 on page 103, if you are installing a library that includes SCSI tape drives:

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

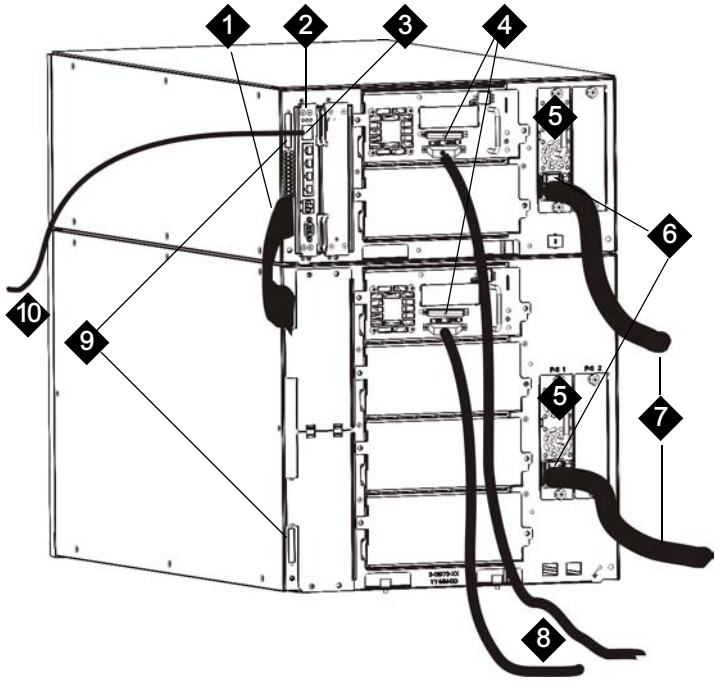
TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

Figure 15 Stand-Alone 5U Control Module SCSI Cabling



1	Ethernet cable to customer network	5	rear power switch
2	GB Ethernet port	6	SCSI cable to host
3	SCSI terminator	7	library control blade
4	power supply	8	module terminators

Figure 16 Multi-Module SCSI Cabling



1	module-to-module cable	6	rear power switch
2	library control blade	7	power cords
3	GB Ethernet port	8	SCSI drive to host cable
4	SCSI terminator	9	module terminator
5	power supply	10	Ethernet cable to customer network

1 If your library is 14U or larger, install it in a rack. See Installing the Rackmount Kit on page 181 for instructions. The instructions include procedures for removing and replacing tape drives.

2 Connect the SCSI cables to the tape drives.

   a. Terminate the SCSI tape drive with an appropriate SCSI terminator.

   b. Connect the SCSI tape drive to the host.

3 Connect the module-to-module cables.

CAUTION **The module terminator is not the same as a SCSI terminator. Using a SCSI terminator instead of a module terminator will damage the library.**

   a. Using the module terminators, terminate the top and bottom modules in the library stack. Install one module terminator in the top terminator connector on the topmost module and one in the bottom terminator connector on the bottommost module.

      If your library configuration consists of a single module, place module terminators in the module's top and bottom module terminator connector.

   b. If you need to add 9U expansion modules to the control module, remove the module terminator from the control module terminator connection that is closest to the 9U expansion module.

   c. Replace the module terminator in the 9U expansion module in the terminator connection that is furthest from the control module.

   d. Connect the module-to-module cable from the control module to the 9U expansion module.

4 Connect your Ethernet cable to the Gigabit (GB) Ethernet port on the library control blade (LCB) for remote access to the library via the web client.

5 Connect a power cord to the outlet on the power supply on the rear of the library.

   There should always be a power cord connected to the power supply on the control module. If redundant power supplies are used, connect a power cord to each of the additional power supply outlets.

6 Power on the library.

   a. Turn on the rear power switch of each of the power supplies.

   b. Turn on the front power switch.

   c. Power up the host system.

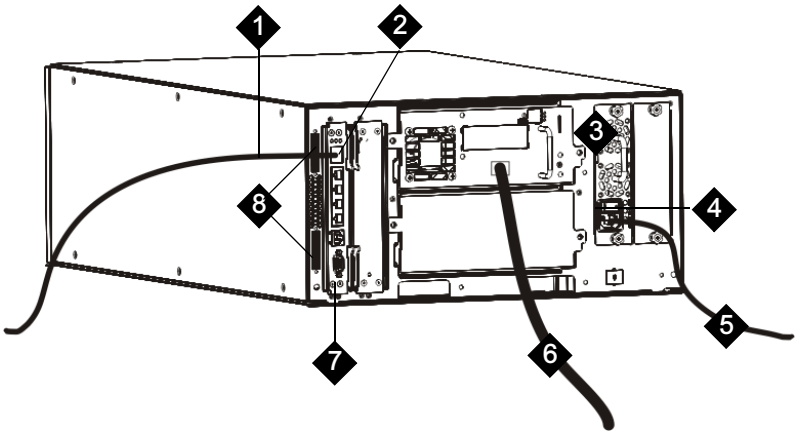
7 Verify communication with all devices on the bus.

8 Configure the library using the commands on the operator panel. See configuration information in Configuring Your Library on page 31.

Connecting Library FC Cables Directly to Host

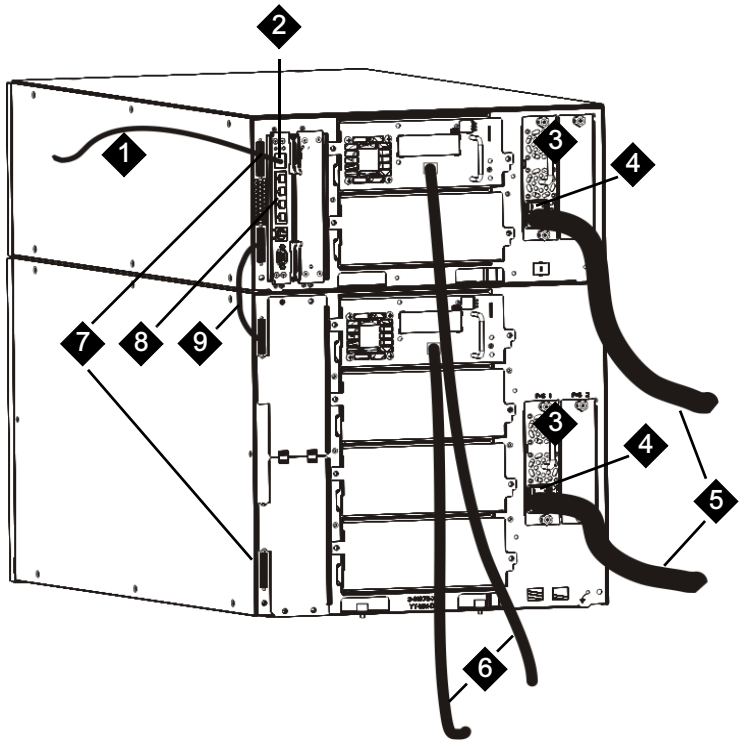
Use this procedure, along with Figure 17 and Figure 18 on page 106, if you are installing a library that includes FC tape drives that are connected directly to a host.

Figure 17 Stand-Alone 5U Control Module Fibre Channel Cabling



1	Ethernet cable to customer network	5	power cord
2	GB Ethernet port	6	fibre cable to host
3	power supply	7	library control blade (LCB)
4	rear power switch	8	module terminators

Figure 18 Multi-Module Fibre Channel Cabling



1	Ethernet cable to customer network	5	power cords
2	GB Ethernet port	6	fibre cables to host
3	power supplies	7	module terminators
4	rear power switches	8	library control blade(LCB)
		9	module-to-module cable

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

Note Pay attention to where the operator panel is positioned in the rack for optimum usability.

1 If your library is 14U or larger, install it in a rack.

   See Installing the Rackmount Kit on page 181 for instructions. The instructions include procedures for removing and replacing tape drives.

2 Connect the fibre cables to the tape drives.

   a. Attach one end of the fibre cable to the fibre port on each tape drive.

   b. Attach the other end of the cable to the host or switch.

   Note The fibre cable can be connected from the tape drive to a switch rather than a host.

3 Connect the module-to-module cables.

   CAUTION **The module terminator is not the same as a SCSI terminator. Using a SCSI terminator instead of a module terminator will damage the library.**

   a. Using the module terminators, terminate the top and bottom modules in the library stack. Install one module terminator in the top terminator connector on the topmost module and one in the bottom terminator connector on the bottommost module.

      If your library configuration consists of a single module, place module terminators in the module's top and bottom module terminator connectors.

   b. If you need to add 9U expansion modules to the control module, remove the module terminator from the control module terminator connection that is closest to the 9U expansion module.

   c. Replace the module terminator in the 9U expansion module terminator connection furthest from the control module.

   d. Connect the module-to-module cable from the control module to the 9U expansion module.

4 Connect your Ethernet cable to the Gigabit (GB) Ethernet port on the Library Control Blade (LCB) for remote access to the library via the web client.

5 Connect a power cord to the outlet on the power supply on the rear of the library.

   There should always be a power cord connected to the power supply on the control module. If redundant power supplies are used, connect a power cord to each of the additional power supply outlets.

6 Power on the library.

   a. Turn on the rear power switch of each of the power supplies.

   b. Turn on the front power switch.

   c. Power up the host system.

7 Verify communication with all devices on the bus.

Configure the library using the commands on the operator panel. See configuration information in Configuring Your Library on page 31.

Connecting Library FC Cables to FC I/O Blades

These instructions explain how to install the FC cables that connect the FC drives to the FC I/O blades. The FC I/O blades support connections to LTO-2, LTO-3, and LTO-4 drives. For information on installing FC I/O blades, see Adding, Removing, and Replacing FC I/O Blades on page 196.

Cabling may be affected by partitioning or zoning changes made as part of configuration. When cabling to drives, ensure that they are cabled to the correct hosts for the defined partitions. If the FC I/O blades have active channel zoning, ensure that the drives are attached to ports that are accessible to defined zone. For information on partitioning, configuring I/O blade ports, channel zoning, and host mapping, see Configuring Your Library on page 31.

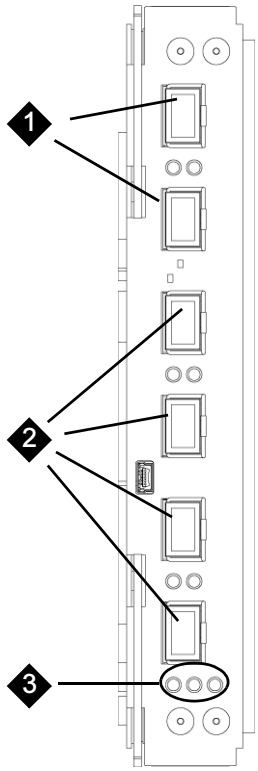
Details about cabling FC I/O blades include:

- Each expansion module can support up to two I/O blades. A maximum of four FC I/O blades can be present in any library configuration. A maximum of four FC drives can be connected to one FC I/O blade.
- Ports 1 and 2 on each FC I/O blade are reserved for connection to hosts. Ports 1 and 2 are always in target mode. The other four ports (3, 4, 5 and 6) are always in initiator mode. See Figure 19 on page 109.
- SAN-ready tape drives that are shipped with I/O blades include 24-inch, orange fibre optic cables to connect drives to initiator ports on an I/O blade.
- Ideally, an installed tape drive should be cabled to a port on the nearest I/O blade to eliminate the need to manage excessively long cables. The nearest I/O blade is usually located in the same expansion module as the tape drive.

Note

See Cable Management Guidelines on page 118 for best-practice guidelines for cabling a library.

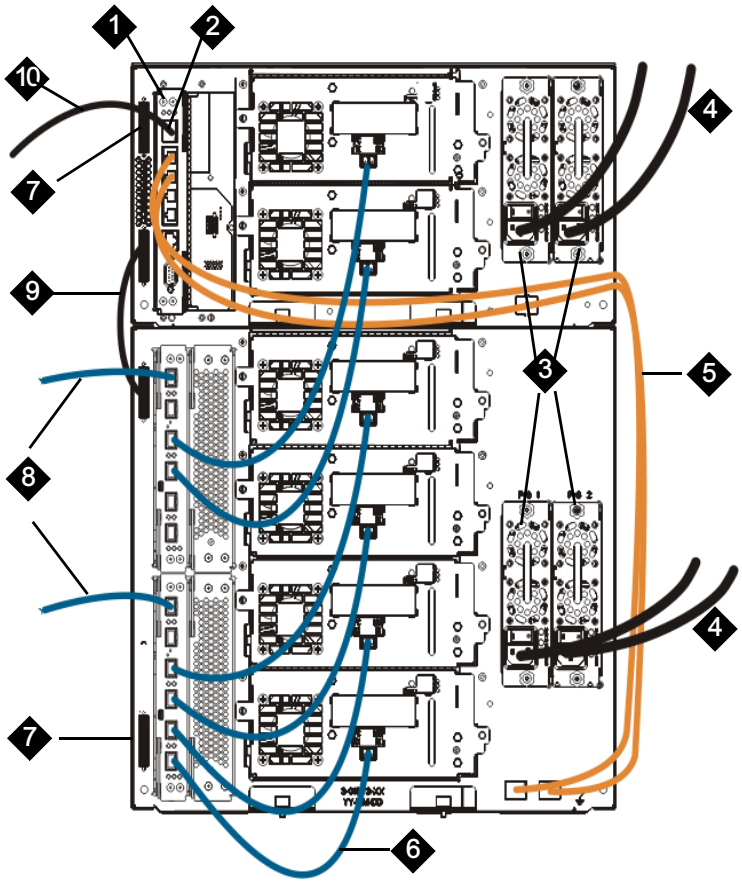
Figure 19 FC I/O Blade



1	Target ports 1 and 2 to host(s)
2	Initiator ports 3 – 6 to drives
3	LEDs (blue, amber, green)

Use the following procedure, along with Figure 20, if you are installing a library that includes FC tape drives that are connected to FC I/O blades.

Figure 20 FC With I/O Blade Cabling



1	Library control blade (LCB)	6	FC cable to tape drive
2	GB Ethernet port	7	Module terminator
3	Power supplies	8	FC cable to host
4	Power cords	9	Module-to-module cable
5	Ethernet cable from LCB to expansion module	10	Ethernet cable to customer network

Required tools: None

1 If your library is 14U or larger, install it in a rack.See Installing the Rackmount Kit on page 181 for instructions. The instructions include procedures for removing and replacing tape drives.

WARNING

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TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

Note Pay attention to where the operator panel is positioned in the rack for optimum usability.

2 For each FC I/O blade installed in an expansion module, connect the expansion module containing the FC I/O blade(s) to a port in the Ethernet hub on the LCB:

Note Without these Ethernet cables connected, the I/O blades will not work.

a. If the I/O blade is installed in the bottom bay of the expansion module, connect one end of an Ethernet cable to the Ethernet port labeled **Lower** in the lower right corner of the expansion module. Connect the other end of the cable to a port in the Ethernet hub on the LCB.

b. If the I/O blade is installed in the upper bay of the expansion module, connect one end of an ethernet cable to the ethernet port labeled **Upper** in the lower right corner of the expansion module. Connect the other end of the cable to a port in the ethernet hub on the LCB.

c. Follow the instructions in Cable Management Guidelines on page 118 for best practices in routing the Ethernet cables.

3 Remove and discard the necessary number of the black rubber protective covers from the ports on the FC I/O blades.

4 Carefully unwrap the FC cables and remove the two white plastic protective caps from each end of the cable.

CAUTION

FC cables will be damaged if they are bent at more than a four-inch arc.

5 Connect the FC cable to one of the following initiator ports on the FC I/O blade: 3, 4, 5, or 6. When you choose the port, take into account the location of any other tape drives that you plan to connect to the same FC I/O blade. See Cable Management Guidelines on page 118 for best-practice guidelines for cabling a library.

6 Insert the other end of the FC cable into the FC port on the FC tape drive.

7 Repeat the above steps for each FC drive you want to connect to the I/O blade. Do not connect any of these FC cables to ports 1 or 2 on the FC I/O blade.

8 Connect the host(s) to ports 1 and/or 2 on the FC I/O blade.

9 Install the module terminators.

CAUTION **The module terminator is not the same as a SCSI terminator. Using a SCSI terminator instead of a module terminator will damage the library.**

a. Using the module terminators, terminate the top and bottom modules in the library stack. Install one module terminator in the top terminator connector on the topmost module and one in the bottom terminator connector on the bottommost module.

   If your library configuration consists of a single module, place module terminators in the module's top and bottom module terminator connectors.

b. If you need to add 9Uexpansion modules to the control module, remove the module terminator from the control module terminator connection that is closest to the expansion module.

c. Replace the module terminator in the expansion module terminator connection furthest from the control module.

10 Connect the module-to-module cable from the control module to the expansion module.

11 Connect an Ethernet cable to the Gigabit (GB) Ethernet port on the Library Control Blade (LCB) for remote access to the library via the web client.

12 Connect a power cord to the outlet on the power supply on the rear of the library.

   There should always be a power cord connected to the power supply on the control module. If redundant power supplies are used, connect a power cord to each of the additional power supply outlets.

13 Power on the library.

a. Turn on the rear power switch of each of the power supplies.

b. Turn on the front power switch.

c. Power up the host system.

14 Verify communication with all devices on the bus.

Configure the library using the commands on the operator panel. See configuration information in Configuring Your Library on page 31.

Recommended Library Cabling for FC I/O Blades

Fibre optic cables connect Fibre Channel tape drives to I/O blades and I/O blades to a Storage Area Network (SAN) fabric or host. Correctly managing these cables on the rear of the library can prevent damage to the cables and Fibre Channel ports and ensure optimal data throughput.

Note This section applies to libraries containing Fibre Channel tape drives, which are connected to a host or a Fibre Channel switch using an I/O blade. For tape drives that are directly attached to a host or a SAN switch, follow standard fibre optic cable handling best practices.

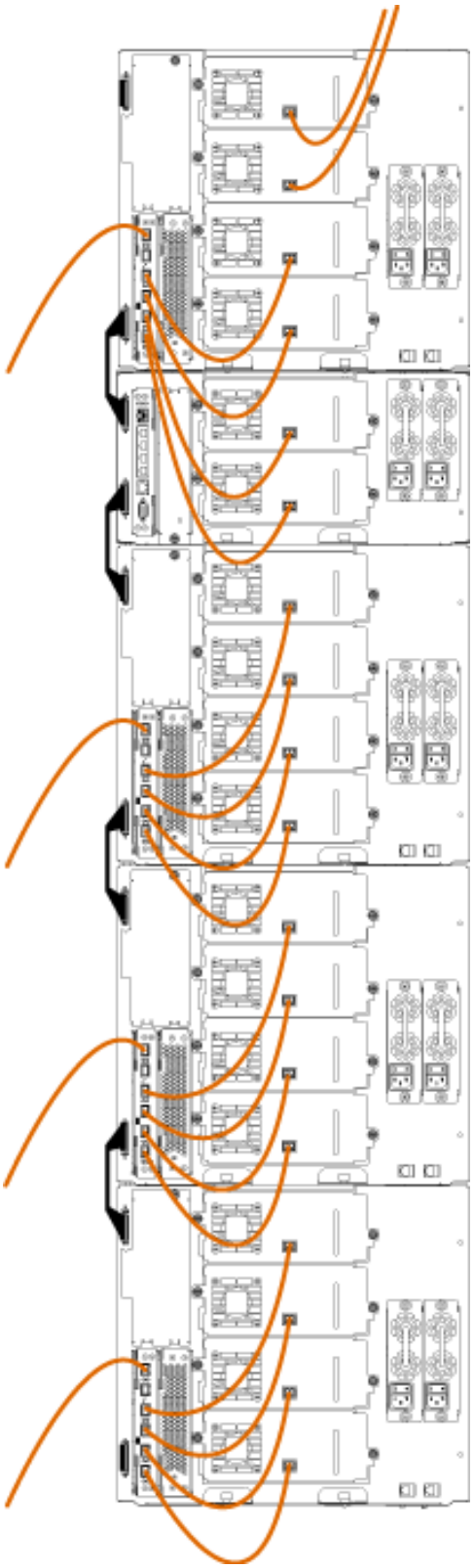
SAN-ready tape drives that are shipped with I/O blades include 24-inch fibre optic cables to connect drives to initiator ports on an I/O blade. The short length of these fibre cables is intentional. Ideally, an installed tape drive should be cabled to a port on the nearest I/O blade to eliminate the need to manage excessively long cables. The nearest I/O blade is usually located in the same expansion module as the tape drive.

The 24-inch fibre cables are orange in color. You will need to provide fibre cables long enough to connect a host or a SAN switch to a target port on an I/O blade.

It is important to consider how drives are assigned to partitions when cabling tape drives and hosts to an I/O blade. If you want a host to be able to communicate with a tape drive that is assigned to a particular partition, both the drive and the host that has access to the partition should communicate through the same I/O blade.

Table 9 provides an example of a 41U library with I/O blade-attached tape drives. The information next to the image shows each tape drive and the I/O blade and port to which each tape drive is connected.

Table 9 Recommended Fibre Channel Cabling With I/O Blades in Maximum Capacity Library

Recommended Cabling	Tape Drive	I/O Blade	I/O Blade Port
			
	[1,1]	N/A (direct attached)	
	[1,2]	N/A (direct attached)	
	[1,3]	[1,2]	Port 3
	[1,4]	[1,2]	Port 4
	[0,1]	[1,2]	Port 5
	[0,2]	[1,2]	Port 6
	[-1,1]	[-1,2]	Port 3
	[-1,2]	[-1,2]	Port 4
	[-1,3]	[-1,2]	Port 5
	[-1,4]	[-1,2]	Port 6
	[-2,-1]	[-2,-2]	Port 3
	[-2,-2]	[-2,-2]	Port 4
	[-2,-3]	[-2,-2]	Port 5
	[-2,-4]	[-2,-2]	Port 6
	[-3,1]	[-3,2]	Port 3
	[-3,2]	[-3,2]	Port 4
	[-3,3]	[-3,2]	Port 5
	[-3,4]	[-3,2]	Port 6

Connecting Library SAS Cables

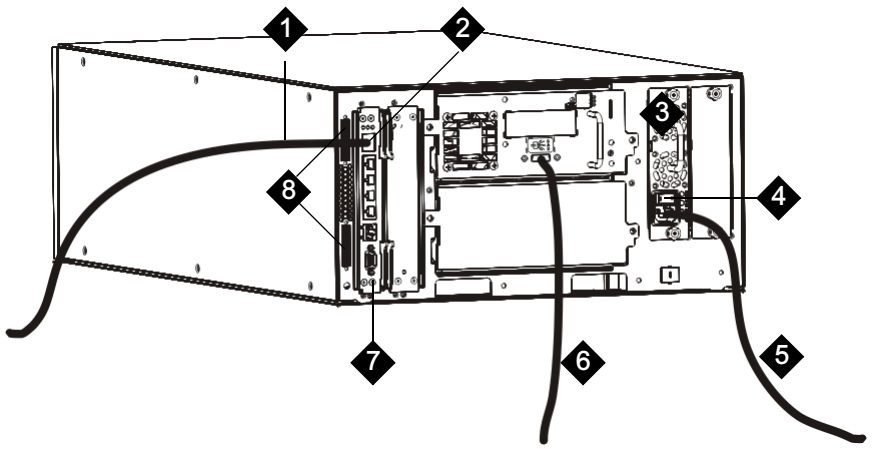
Use this procedure, along with Figure 21 and Figure 22 on page 116, to connect SAS cables directly to the host.

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

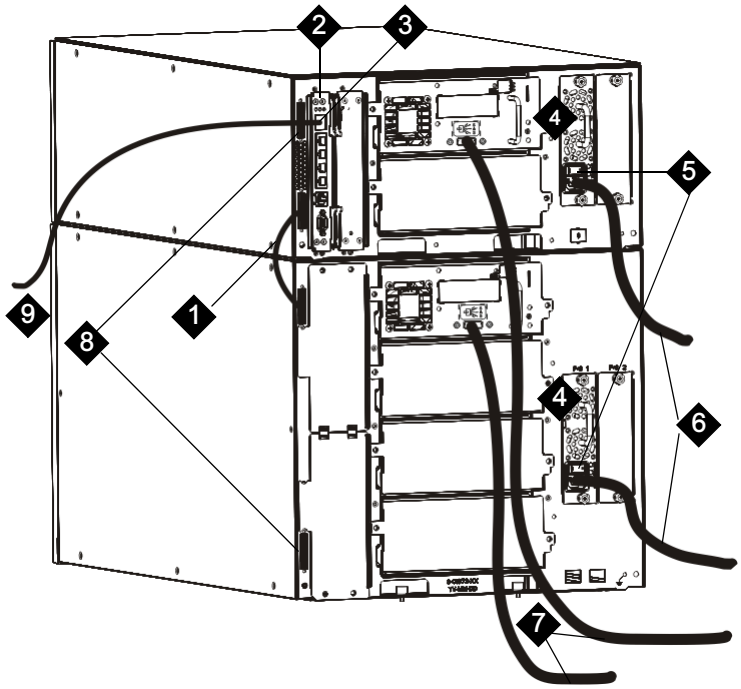
TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

Figure 21 Stand-Alone 5U Control Module SAS Cabling



1	Ethernet cable to customer network	5	power cord
2	GB Ethernet port	6	SAS cable to host
3	power supply	7	library control blade
4	rear power switch	8	module terminators

Figure 22 Multi-Module SAS Cabling



1	module-to-module cable	6	power cords
2	library control blade	7	SAS cables to host
3	GB Ethernet port	8	module terminators
4	power supply	9	Ethernet cable to customer network
5	rear power switch		

1 If your library is 14U or larger, install it in a rack. See Installing the Rackmount Kit on page 181 for instructions. The instructions include procedures for removing and replacing tape drives.

2 Connect one end of the SAS cable to the tape drive. Connect the other end of the SAS cable to the host.

3 If your library configuration consists of a single module, place module terminators in the module's top and bottom module terminator connectors.

CAUTION **The module terminator is not the same as a SCSI terminator. Using a SCSI terminator instead of a module terminator will damage the library.**

4 If the library consists of more than one module, connect the modules together as follows:

CAUTION **The module terminator is not the same as a SCSI terminator. Using a SCSI terminator instead of a module terminator will damage the library.**

a. Using the module terminators, terminate the top and bottom modules in the library stack. Install one module terminator in the top terminator connector on the topmost module and one in the bottom terminator connector on the bottommost module.

b. If you need to add 9U expansion modules to the control module, remove the module terminator from the control module terminator connection that is closest to the 9U expansion module.

c. Replace the module terminator in the 9U expansion module in the terminator connection that is furthest from the control module.

d. Connect the module-to-module cable from the control module to the 9U expansion module.

5 Connect your Ethernet cable to the Gigabit (GB) Ethernet port on the library control blade (LCB) for remote access to the library via the web client.

6 Connect a power cord to the outlet on the power supply on the rear of the library.

There should always be a power cord connected to the power supply on the control module. If redundant power supplies are used, connect a power cord to each of the additional power supply outlets.

7 Plug the power cord into a nearby AC power source.

8 Power on the library.

a. Turn on the rear power switch of each of the power supplies.

b. Turn on the front power switch.

c. Power up the host system.

9 Verify communication with all devices on the bus.

10 Configure the library using the commands on the operator panel. See configuration information in Configuring Your Library on page 31.

Cable Management Guidelines

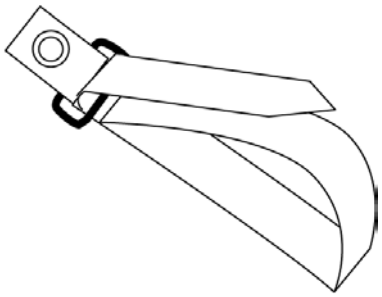
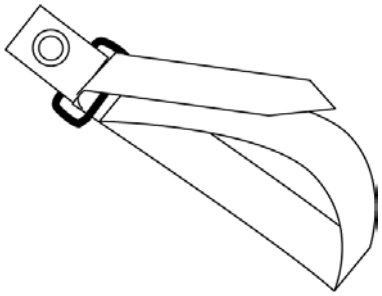
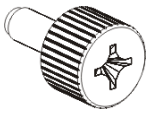
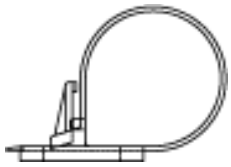
As the library expands to support larger configurations, it is important to restrain and organize cables and power cords on the rear of the library. Doing so ensures that the rear of the library remains accessible and reduces the possibility that cables become damaged.

Use this section to find cable management guidelines and best practices for power cords and Ethernet cables. Use the equipment specified in Cable Management Kit below. For recommended cabling of tape drives, see also Recommended Library Cabling for FC I/O Blades on page 112.

Cable Management Kit

Customers who purchase a Fibre Channel I/O blade will receive a cable management kit with all the equipment necessary to perform these procedures. You can also order the cable management kit from http://shop.quantum.com. The color of the straps matches the color of the cords they are designed to secure.

Table 10 Cable Management Kit Contents

Component	Description	Quantity
	Black hook-and-loop fastener — to secure power cords to expansion modules	1
	Blue hook-and-loop fastener — to secure Ethernet cables to expansion modules	1
	Push-in clip — to secure hook-and-loop fasteners to expansion modules	2
	M5 thumbscrew — for older library models without drilled holes for push-in clips. The M5 thumbscrew attaches hook-and-loop fasteners to the M5 threaded hole on the lower right of any module chassis.	2
	Push-in wire saddle cable clamp — to secure Ethernet cables to the control module	2
	Adhesive-backed wire saddle cable clamp — for older library models without drilled holes for push-in wire saddle clamps. The adhesive-backed wire saddle clamp secures Ethernet cables to the control module.	2

Managing Power Cords

Power cord management is important especially for the larger, expanded library configurations. A 41U library with redundant power, the maximum configuration, may contain as many as 10 power supply units with 10 power cords to manage.

To organize power cords on the rear of the library, mount a black hook-and-loop fastener to each module and then secure the power cords with the fastener.

Power cords and power cord hook-and-loop fasteners that are shipped with the library are black in color.

You can apply the following procedure to any library that contains at least one expansion module.

To secure a power cord to the library frame:

1 Facing the rear of the library, locate a specific hole that is drilled into the back of the expansion module for the hook-and-loop fastener. This hole is located on the rear of the library, about three inches from the top of the expansion module near the right side of the library chassis. Refer to the illustration below to locate this hole.

> Note — If your module chassis does not have the drilled hole, use an M5 thumbscrew to attach the black hook-and-loop fastener to the nearest available M5 threaded hole on the lower right of any module chassis.

2 Insert a push rivet into the rivet hole on the black hook-and-loop fastener. The head of the rivet should be on the same side of the fastener as the plastic loop.

3 Firmly press the push rivet through the hole in the expansion module described above. The hook-and-loop fastener should now be secured to the library chassis.

4 Plug the power cord into a power supply unit closest to the hook-and-loop fastener.

5 Determine how much cord length you need to reach and easily plug into the AC power source. Do not plug the cord into power source until you are ready to power on the library.

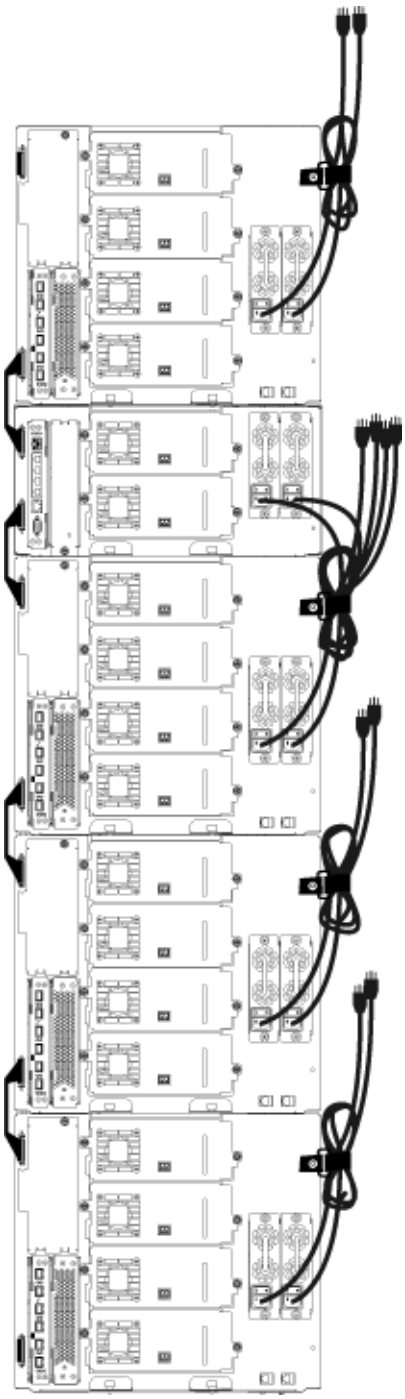
6 If there is excess power cord, loop the excess cord into a bundle in the shape of a figure-eight. The bundle should be small enough to hold comfortably with one hand, or about eight inches in length.

7 Wrap the bundle with the hook-and-loop fastener. Thread the strap through the plastic loop and tighten the strap around the bundled cord. Secure the strap by pressing it down.

The power cord is now secured to the expansion module. Repeat these steps to secure other power cords, if necessary. Bundle adjacent power cords together using the same hook-and-loop fastener.

Once complete, power cord management for a 41U library should look similar to Figure 23 below.

Figure 23 Power Cord Management



Managing Ethernet Cables

A Scalar i500 library with I/O blades uses external Ethernet cables on the rear of the library to provide connectivity between the LCB in the control module and an expansion module. The upper and lower I/O blade bays within an expansion module each have a corresponding Ethernet port on the back of the module. Running an Ethernet cable between this port and one of the Ethernet hub ports on the LCB establishes Ethernet connectivity between the I/O blade and the LCB.

The LCB provides ports for up to four Ethernet cables on its internal Ethernet hub. This allows the library to support up to four I/O blades.

To organize Ethernet cables on the rear of the library, mount two wire saddles on the control module to route the Ethernet cable(s) to the right side of the library. Mount a blue hook-and-loop fastener to each module and then secure the Ethernet cables with the fastener.

Ethernet cables and Ethernet hook-and-loop straps that are shipped with the library are blue in color.

Apply the following procedure to any library that contains at least one expansion module and at least one I/O blade.

To secure an Ethernet cable to the library frame using a cable tie:

1 Facing the rear of the library, install the two push-in wire saddle cable clamps onto the control module chassis. Push the rivet of one clip into the hole drilled into the cover plate located to the right of the LCB. Push the rivet of the other clip into the hole located near the extreme right side of the library, below the control module's power supplies. See Figure 24 for the locations of these holes.

Note If your control module chassis does not have the drilled holes, use the adhesive -backed wire saddle cable clamps in the location shown in Figure 24.

2 Locate a specific hole that is drilled into the back of the expansion module for the hook-and-loop strap. This hole is located on the rear of the library, about three inches from the bottom of the expansion module on the right side of the frame back plane. See Figure 24 for the location of this hole.

Note If your module chassis does not have the drilled hole, use an M5 thumbscrew to attach the black hook-and-loop fastener to the nearest available M5 threaded hole on the lower right of any module chassis.

3 Insert a push rivet into the rivet hole on the blue hook-and-loop fastener. The head of the rivet should be on the same side of the fastener as the plastic loop.

4 Firmly press the push rivet through the hole in the expansion module described above. The hook-and-loop fastener should now be secured to the library chassis.

5 Plug the one end of the Ethernet cable into one of the four Ethernet hub ports on the LCB.

6 Plug the other end of the Ethernet cable into the appropriate port on the expansion module.

If the I/O blade is installed in the module's upper I/O blade bay, plug the cable into the Ethernet port labeled "UPPER." If the I/O blade is installed in the module's lower I/O blade bay, plug the cable into the Ethernet port labeled "LOWER."

7 Open the wire saddle nearest the LCB, place the Ethernet cable inside, and snap the wire saddle shut.

8 Repeat for the other wire saddle.

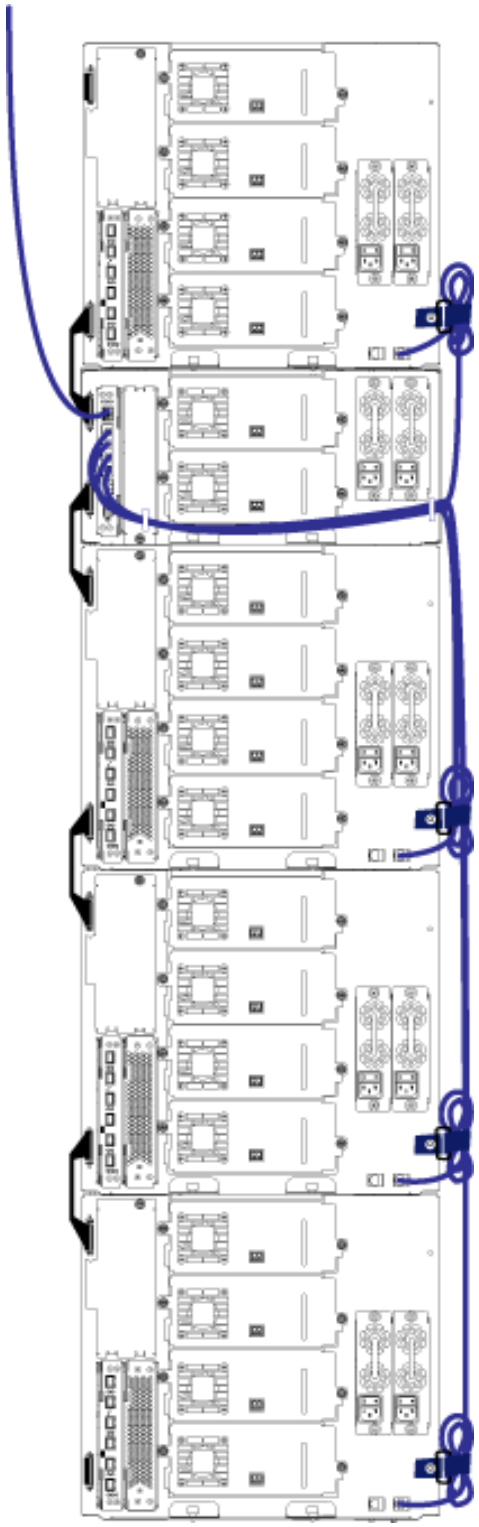
9 If there is excess Ethernet cable, loop the excess cable into a bundle in the shape of a figure-eight. The bundle should be small enough to hold comfortably with one hand, or about six inches in length.

10 Wrap the bundle with the hook-and-loop fastener. Thread the strap through the plastic loop and tighten the strap around the bundled cable. Secure the strap by pressing it down.

The Ethernet cable is now secured to the expansion module. Repeat these steps to secure other Ethernet cables, if necessary.

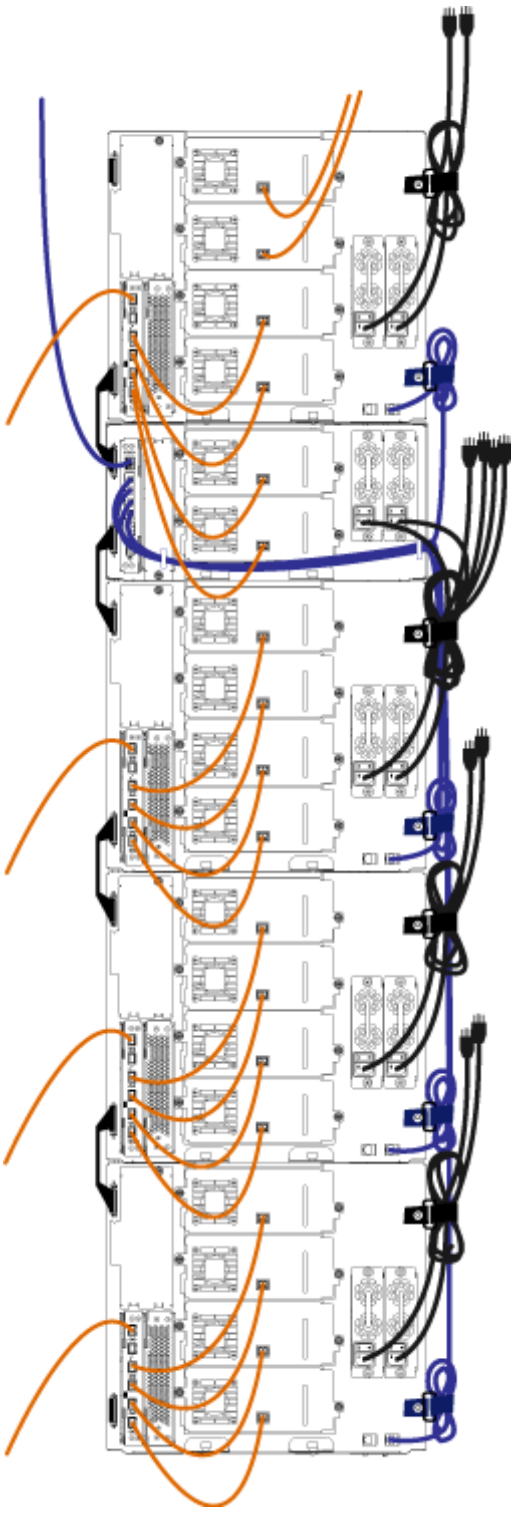
Once complete, the Ethernet cabling for a 41U library containing four I/O blades should appear similar to the illustration below.

Figure 24 Ethernet Cable Management



The illustration below shows how a 41U library would appear with power, Ethernet, and fibre cables installed and managed according to these guidelines.

Figure 25 Cable Management, All Cables,



Installing a Stand-Alone 5U Control Module

Required tools: None

Use this procedure to install a 5U library configuration:

1. Prepare the rack to hold modules, if you want to install your library in a rack. See Installing the Rackmount Kit on page 181 for instructions on installing a rack-mount kit.
2. Make sure all tape drives have been removed from the control module. See Adding, Removing, and Replacing Tape Drives on page 193 for instructions on removing tape drives.
3. Make sure all power supplies have been removed from the control module. See Adding, Removing, and Replacing Power Supplies on page 179 for instructions on removing power supplies.
4. Open the library's I/E station door and access door and lift the control module and place it in the desired location.
5. If you are placing the control module in a rack, use the rack ears to fasten the control module to the rack.
6. If not already installed, install the library control blade (LCB) in the control module. See Removing and Replacing the Library Control Blade and LCB Compact Flash Card on page 176 for instructions on installing the LCB.
7. Add the tape drives to the module.
8. Install the power supplies. See Adding, Removing, and Replacing Power Supplies on page 179 for instructions on installing power supplies.
9. Close the library's I/E station door and access door.
10. Connect all power cords and network data cables. See Cabling the Library on page 102.
11. Install module terminators in the top and bottom module terminator connectors. See Cabling the Library on page 102 for information on installing the module terminators.
12. Power on the library.
13. Configure the library using the operator panel Setup Wizard.
14. Add the tape cartridges to the library using the I/E station.
15. If your host application inventories the location of each tape cartridge in the library, open the host application and re-inventory to sync the logical inventory with the physical inventory of the library.

Installing a New Multi-Module Library Configuration

Use this procedure for installing a new multi-module library. A multi-module library contains a control module and up to four 9U expansion modules.

There are no restrictions on where the control module can be installed in the library configuration. However, the recommended placement of the control module for library configurations up to 32U is on top of all installed 9U expansion modules. The recommended placement of the control module for 41U library configurations is on top of three 9U expansion modules and below the top expansion module.

9U expansion module
5U control module
9U expansion module
9U expansion module
9U expansion module

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

Preparing to Install a Multi-Module Library

Required tools:

- Phillips #2 screwdriver, for removing and replacing the top cover plate
- T10 TORX screwdriver, for removing and replacing the bottom cover plate

1 Prepare the rack to hold modules, if you want to install your library in a rack. See Installing the Rackmount Kit on page 181 for instructions on installing a rackmount kit.

2 Make sure all tape drives have been removed from all of the modules you plan to install. See Adding, Removing, and Replacing Tape Drives on page 193 for instructions on removing tape drives.

3 Make sure all power supplies have been removed from all of the modules you plan to install. See Adding, Removing, and Replacing Power Supplies on page 179 for instructions on removing power supplies.

4 Park the robot assembly in the control module. Before unstacking the library, the robot assembly must be placed in the control module.

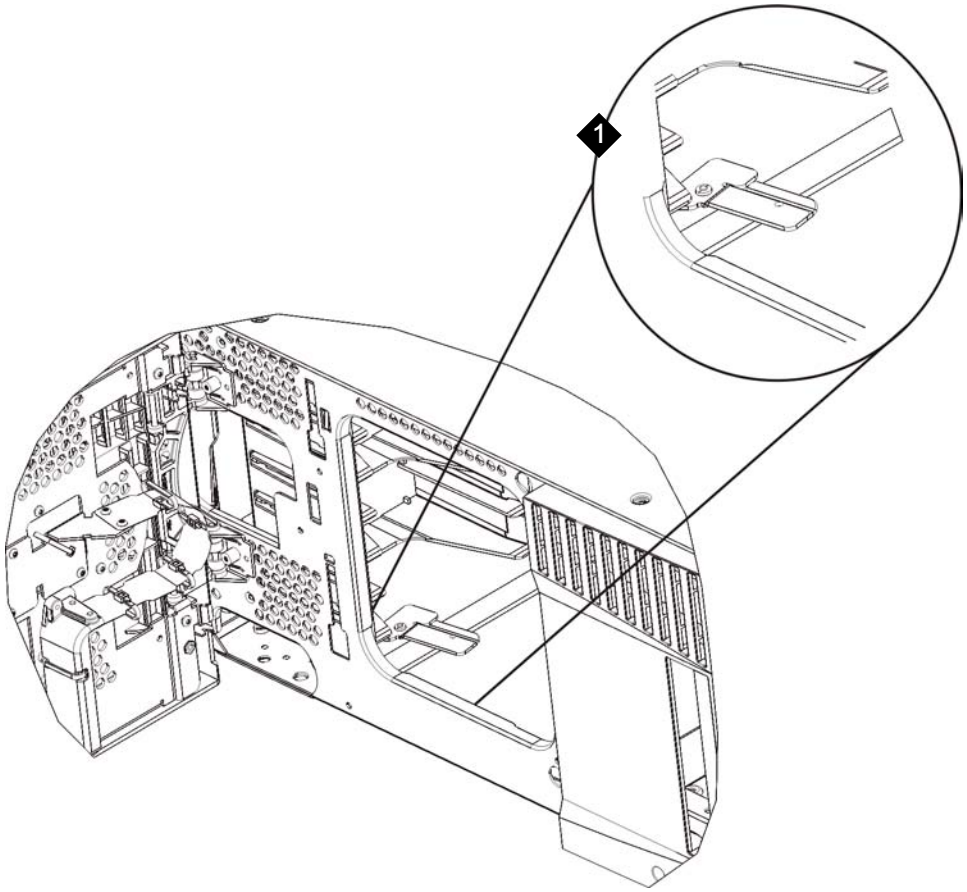
a. Open the I/E station and access doors of each module.

b. Using your hands, gently lift the robot assembly into the control module. The robot assembly should glide slowly and with some resistance.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

c. After raising the robot assembly to the approximate middle of the control module, hold it in place with one hand and, using your other hand, swivel the parking tab toward you. The metal parking tab is located at the bottom of column 1.

d. Gently release the robot assembly to rest on the parking tab.



1	parking tab in “park” position

5 Remove and replace the cover plates, if appropriate.

CAUTION **Before removing the control module's bottom cover plate, the robot assembly must be parked as described in Step 4 on page 127.**

a. If you plan to stack the control module at the top of the library, and if a 9U expansion module will be located below it, remove the control module's bottom cover plate and the 9U expansion module's top plate.

b. If you plan to stack the control module between 9U expansion modules, remove both the top and bottom plates of the control module. Also remove the top plate of the 9U expansion module located below the control module and the bottom plate of the 9U expansion module located above the control module.

c. If you plan to stack the control module at the bottom of the library, and if a 9U expansion module will be located above it, remove the control module's top plate and the 9U expansion module's bottom plate.

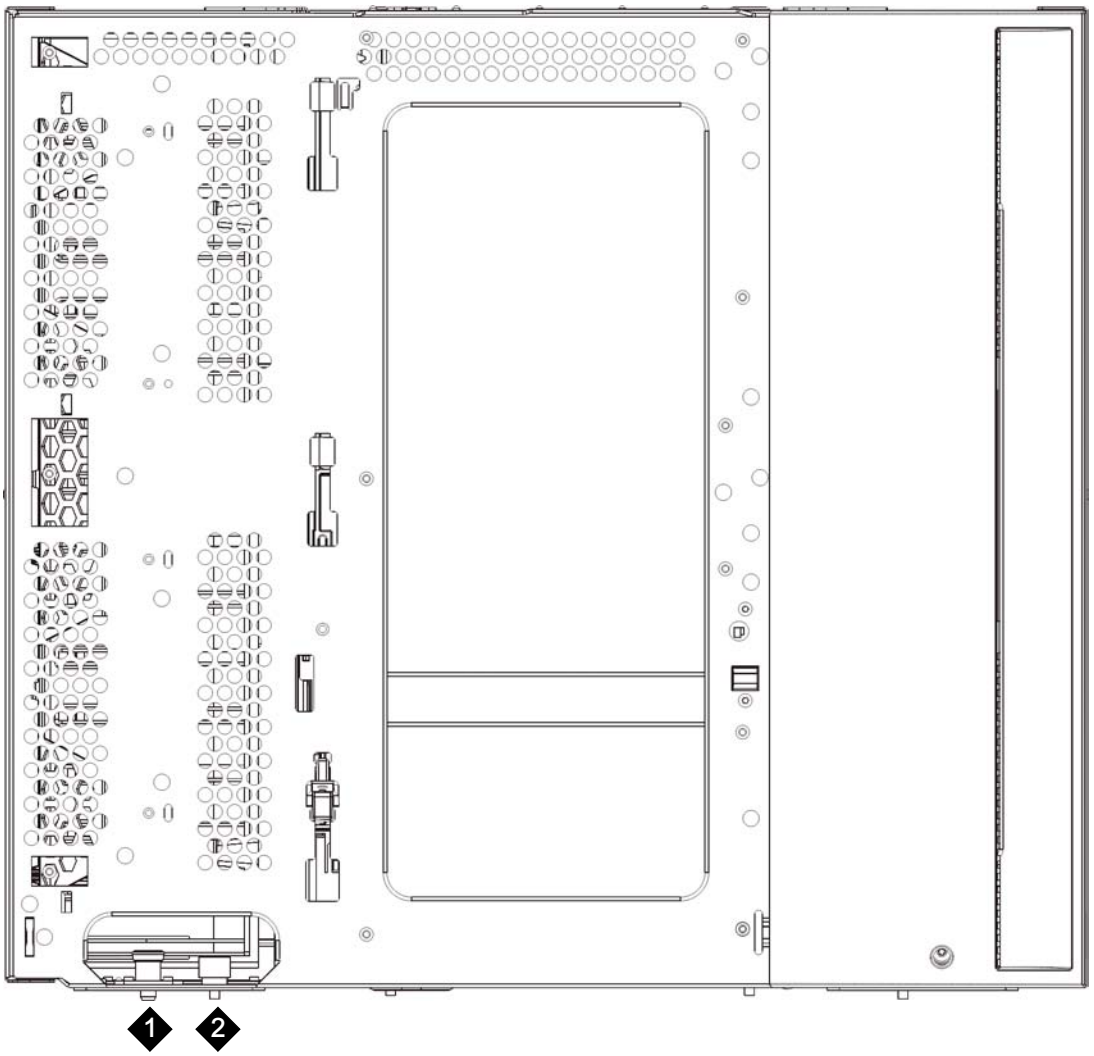
Table 11 Cover Plate Location

5U	14U	23U	32U	41U
				cover plate
			cover plate	NEW 9U Expansion Module*
		cover plate	5U Control Module	5U Control Module
	cover plate	5U Control Module	9U Expansion Module	9U Expansion Module
cover plate	5U Control Module	9U Expansion Module	9U Expansion Module	9U Expansion Module
5U Control Module	NEW 9U Expansion Module*	NEW 9U Expansion Module*	NEW 9U Expansion Module*	9U Expansion Module
cover plate	cover plate	cover plate	cover plate	cover plate

* Recommended location for adding an expansion module.

Installing the 9U Expansion Module

1 Open the 9U expansion module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module on which you are stacking.



1	guide pin
2	thumbscrew

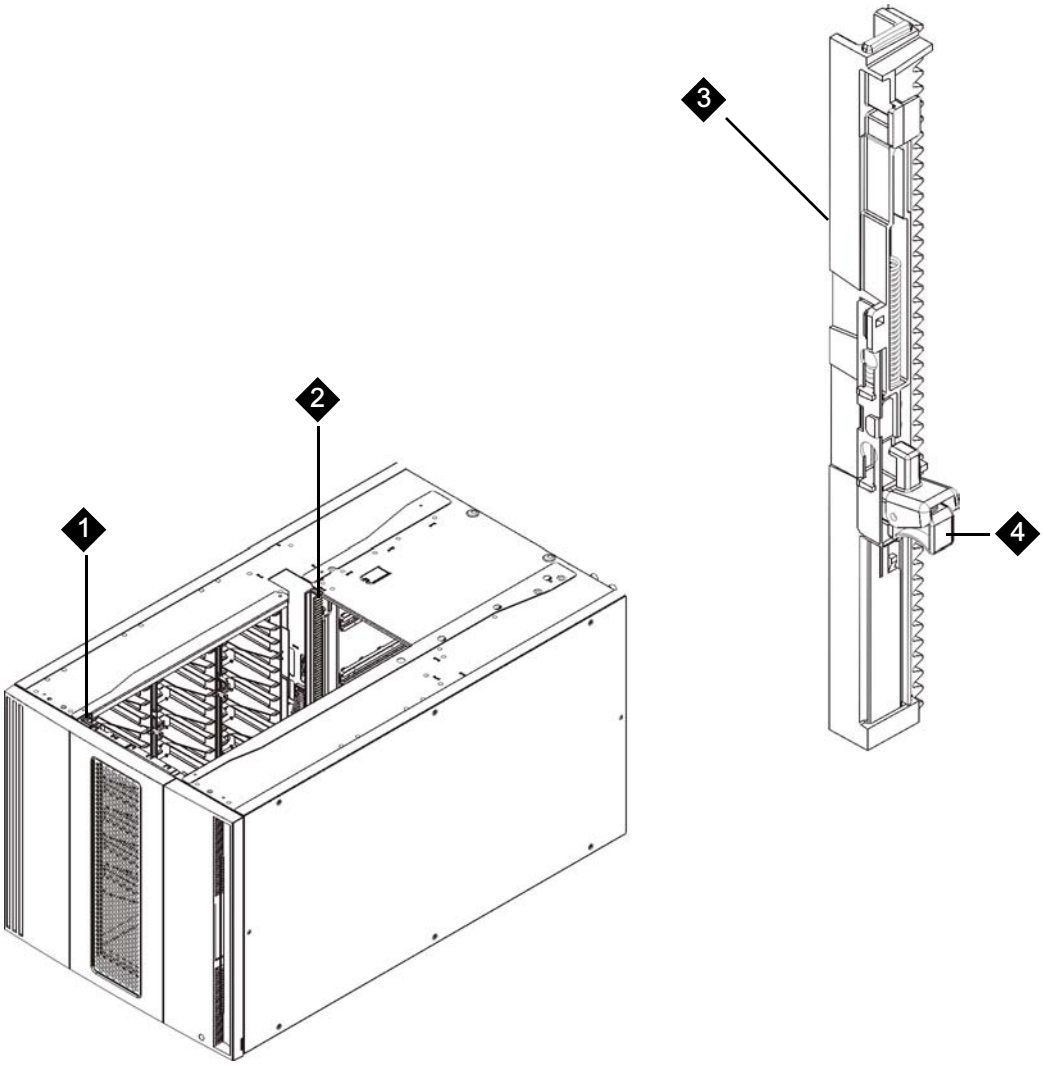
2 Lift the new 9U expansion module and, from the front of the library, place it in the desired location.

3 If stacking the 9U expansion module on top of another module, secure the two modules together by tightening the two thumbscrews at the base of the front of the module and the two thumbscrews located at the base of the back of the module. Then lower the module's guide pin (located at the base of the front of the module) by turning it and pushing it down.

4 Tighten all thumbscrews located at the base of the front and back of the modules.

5 Fasten the module to the rack with rack ears. See Installing the Rackmount Kit on page 181 for information on installing a rackmount kit.

6 If stacking the 9U expansion module on top of another module, engage the Y-rails of the new module in your library configuration. Ensure that the Y-rails are properly aligned and the thumbscrews are tightened.



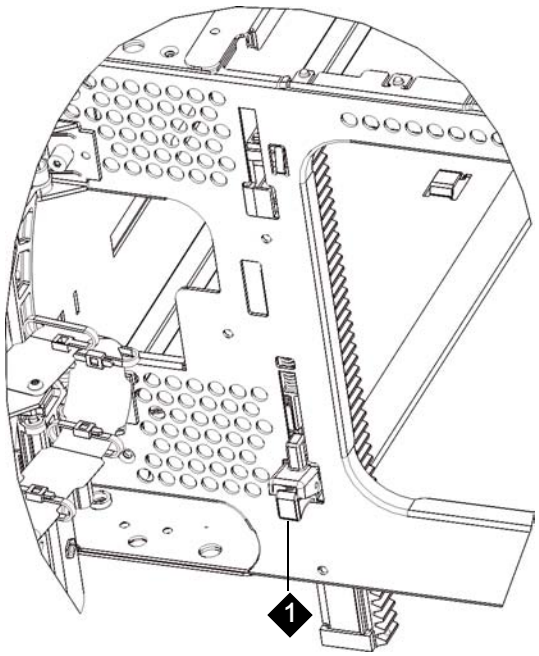
1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

a. From the front of the library, open the I/E station and access doors of the 9U expansion module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

b. From the back of the library, find the rear Y-rail release mechanism, which is located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

CAUTION **Check to make sure that there is no gap between the top and bottom Y-rails on both the front and back of the library. If a gap exists, the library cannot mechanically initialize.**

Doing this aligns the Y-rails with the Y-rails of the module beneath it.



1	Y-rail in unlocked, functional position

7 Repeat these steps for each expansion module you are installing.

Installing the 5U Control Module

1 Open the control module's I/E station door and access door.

2 Lift the control module and place it in the desired location.

3 If stacking the control module on top of another module, secure the two modules together by tightening the two thumbscrews at the base of the front of the module and the two thumbscrews located at the base of the back of the module. Then lower the module's guide pin (located at the base of the front of the module) by turning it and pushing it down.

4 Tighten all thumbscrews located at the base of the front and back of the modules.

5 Use the rack ears to fasten the control module to the rack.

6 If not already installed, install the library control blade (LCB) in the control module. See Removing and Replacing the Library Control Blade and LCB Compact Flash Card on page 176 for instructions on installing the LCB.

Preparing to Use the Multi-Module Library

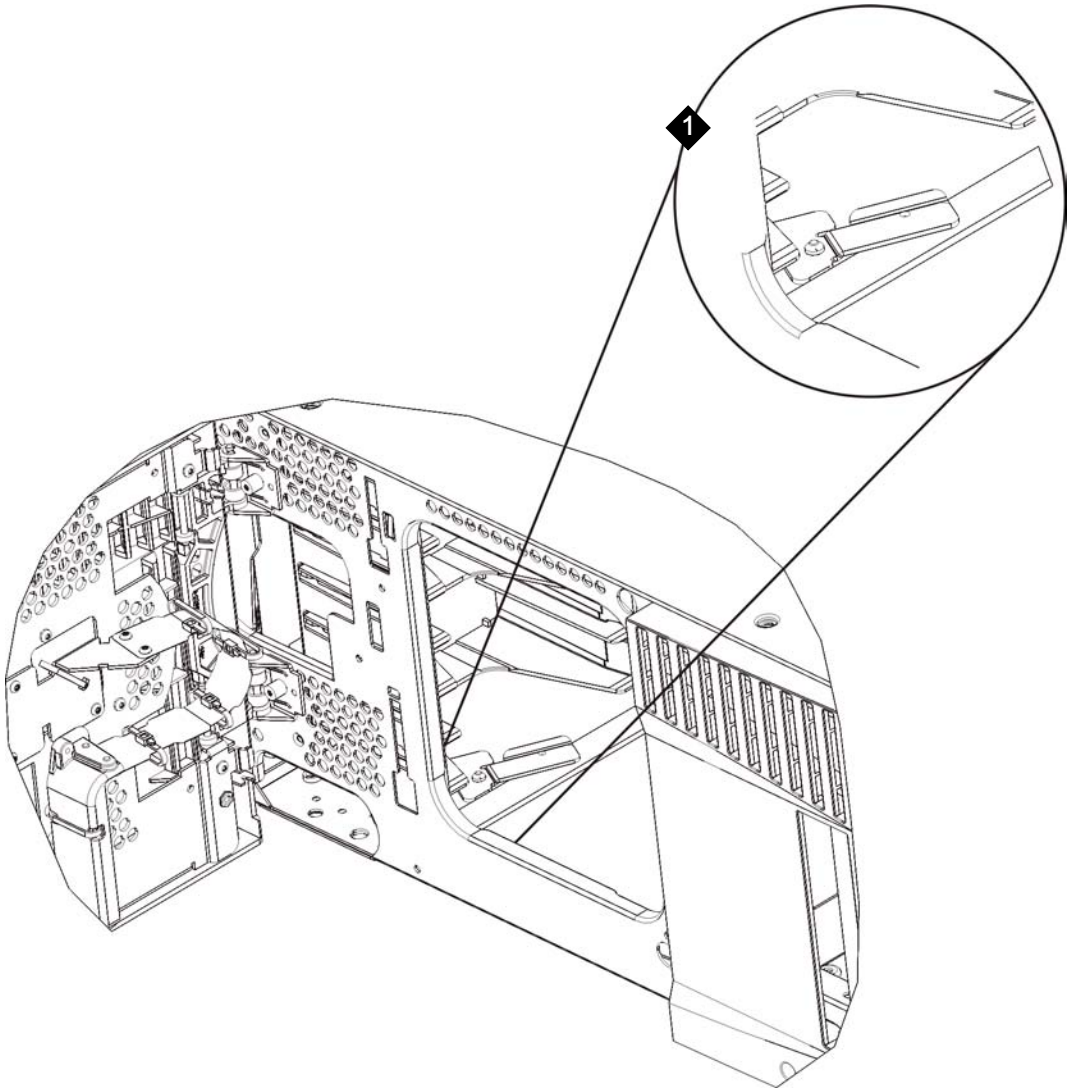
1 Unpark the robot assembly.

   a. Gently raise the robot assembly so that it no longer rests on the parking tab.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

   b. With your free hand, swivel the parking tab away from you until it is removed completely from the interior of the module. When replaced correctly, the parking tab will not accidentally swivel into the path of the robot.

   c. Gently release the robot assembly. It will lower to the bottom module of the library.



1	parking tab in “unpark” position

2 Close the library’s I/E station and access doors.

3 Add the tape drives to the modules. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

4 If your library contains FC I/O blades, install both the I/O blades and the accompanying fan blades in the expansion module. For details, see Adding, Removing, and Replacing FC I/O Blades on page 196 and Adding, Removing, and Replacing the I/O Fan Blade on page 201.

5 Add the power supplies. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

6 Connect all power cords, network data cables, and module-to-module cables. Make sure the module terminators are installed at the top and bottom of the stack of modules. For cabling instructions, see Cabling the Library on page 102.

7 Power on the library. For libraries larger than a 14U, boot time may take 15-20 minutes.

8 Configure the library using the **Setup Wizard** that appears on the operator panel interface.

9 Add the tape cartridges to the library's modules using the I/E station commands from the operator panel or web client.

10 Open the host application and reinventory in order to synchronize its logical inventory with the physical inventory of the library.

Adding 9U Expansion Modules to an Existing Library

Adding 9U expansion modules to the library increases the number of data cartridges available within the library system. These instructions explain how to add a 9U expansion module to an existing library.

Note

The maximum number of expansion modules supported in a library depends on the level of firmware the library is running. The latest firmware must be installed on the library if you are upgrading from a 5U or 14U configuration to a larger configuration. The latest firmware can be found at www.quantum.com/support.See Updating Library and Tape Drive Firmware on page 95 for more information.

There are some configuration settings to take into account when adding a 9U expansion module to an existing library.

- All COD licenses remain the same. If the current license key does not cover the expanded capacity, you will need a new license key to use the newly available slots.
- Partition, I/E station slot, and cleaning slot assignments do not change; however, unassigned slots may change location.
- Modifying partitions can cause the storage slots to be scattered throughout the library.
- I/E station slots in the new module(s) are assigned as data storage slots. You can reconfigure these slots as I/E station slots after the 9U expansion module has been added to the library.

A library can use up to four 9U expansion modules to a maximum height of 41U.

There are no restrictions on where the control module can be installed in the library configuration. However, the recommended placement of the control module for library configurations up to 32U is on top of all installed 9U expansion modules. The recommended placement of the control module for 41U library configurations is on top of three 9U expansion modules and below the top 9U expansion module.

When adding additional 9U expansion modules to an existing library configuration, the recommended placement of the new 9U expansion module is at the bottom of the existing library configuration (except for the 41U, where recommended placement is on top). Installing the new 9U expansion module at the bottom of the existing library configuration will logically assign slot numbering within the library.

9U expansion module
5U control module
9U expansion module
9U expansion module
9U expansion module

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

WARNING

WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, A 5U CONTROL MODULE WEIGHS APPROXIMATELY 58 LBS. A 9U EXPANSION MODULE, WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, EXCEEDS 65 LBS.

TO AVOID SERIOUS INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO SAFELY LIFT THE MODULES INTO POSITION.

Preparing to Install an Additional 9U Expansion Module

Required tools:

- Phillips #2 screwdriver, for removing and replacing the top cover plate
- T10 TORX screwdriver, for removing and replacing the bottom cover plate

You need to unstack the library to install the new 9U Expansion Module expansion module at the bottom of the new library configuration.

1 Upgrade the library firmware to a level that can support the number of modules you are adding. See Updating Library and Tape Drive Firmware on page 95 for information on upgrading firmware.

2 Remove all tape cartridges from the library using the import and export commands of the operator panel or web client.

3 Power off the library.

4 Disconnect all power cords, network data cables, and module-to-module cables from all of the modules.

Note You should label all cables before you remove them so you can later reconnect them to their proper locations.

5 Park the robot assembly in the control module. Before unstacking the library, the robot assembly must be placed in the control module.

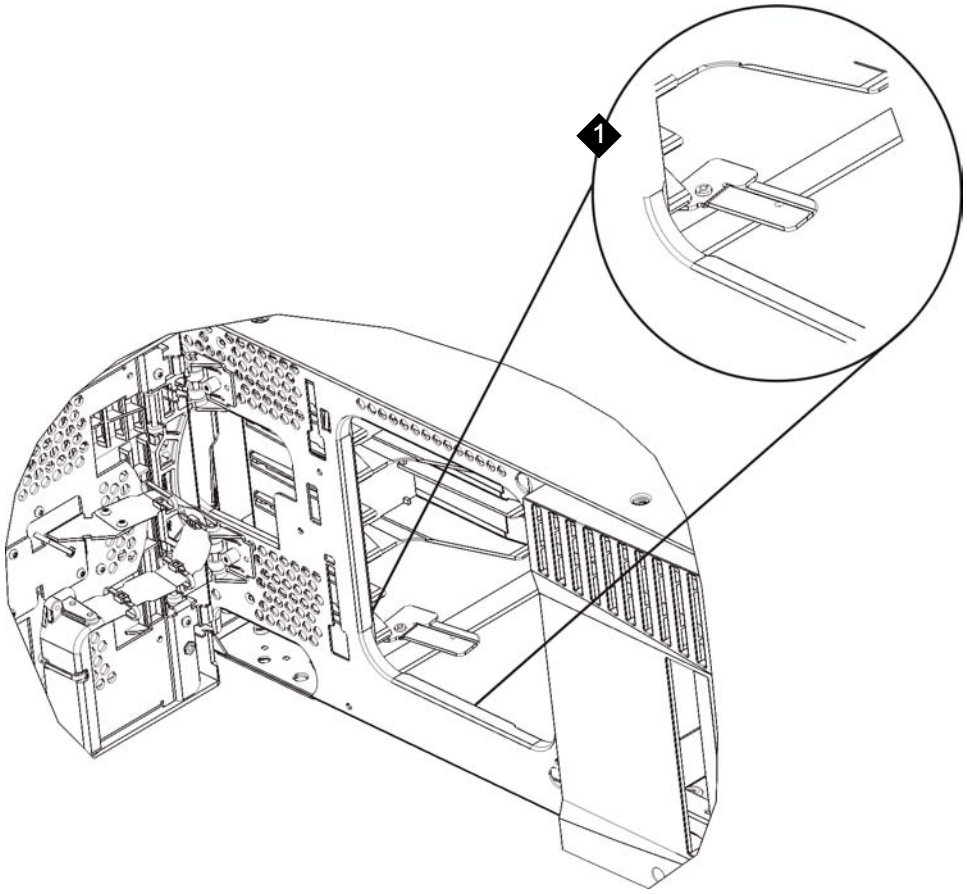
a. Open the I/E station and access doors of each module.

b. Using your hands, gently lift the robot assembly into the control module. The robot assembly should glide slowly and with some resistance.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

c. After raising the robot assembly to the approximate middle of the control module, hold it in place with one hand and, using your other hand, swivel the parking tab toward you. The metal parking tab is located at the bottom of column 1.

d. Gently release the robot assembly to rest on the parking tab.



1	parking tab in “park” position

6 Remove all power supplies from each module.

7 Remove all tape drives from each module.

Unstacking the Existing Modules

1 Starting with the topmost module of your library, open the I/E station and access doors.

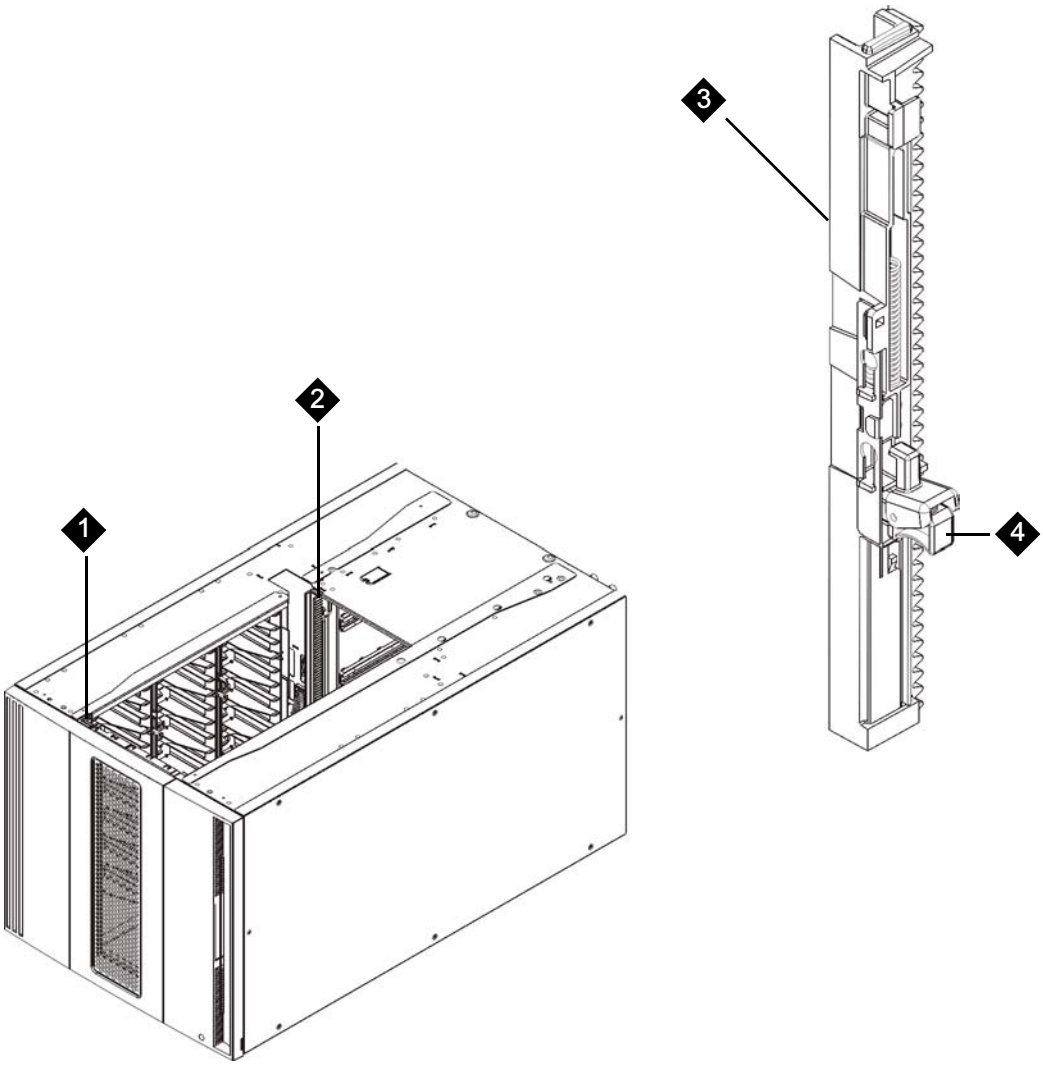
CAUTION **Before unstacking the modules, the robot assembly must be parked as described in Step 5 on page 136.**

2 If your current configuration already uses a 9U expansion module, disengage the Y-rails so the modules can be safely unstacked.

a. From the front of the library, find the Y-rail release mechanism, which is located on the left side of the module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.

b. From the rear of the library, find the rear Y-rail release mechanism located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.

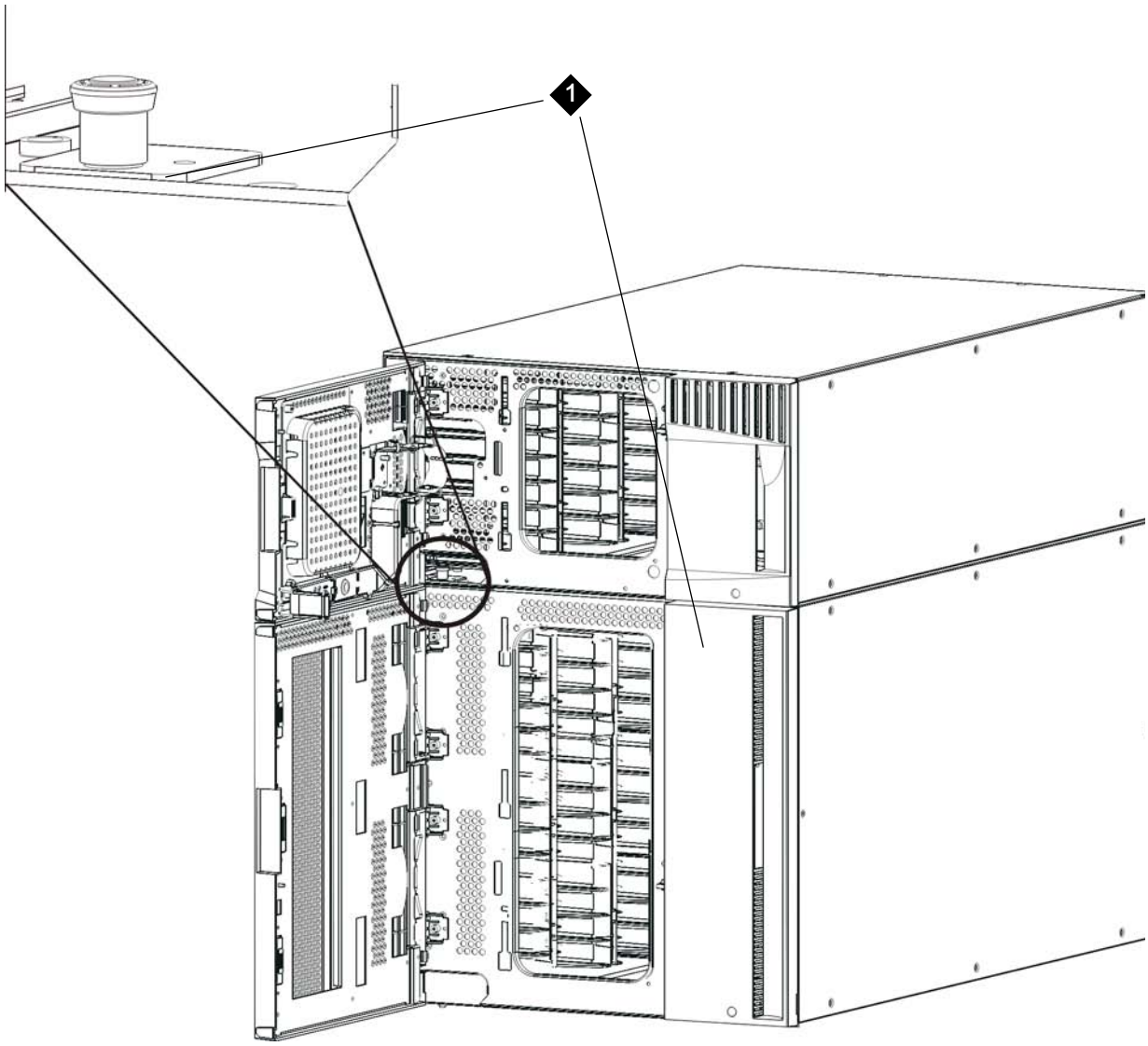
Note The rear Y-rail is impossible to lift up with the tape drives installed.



1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

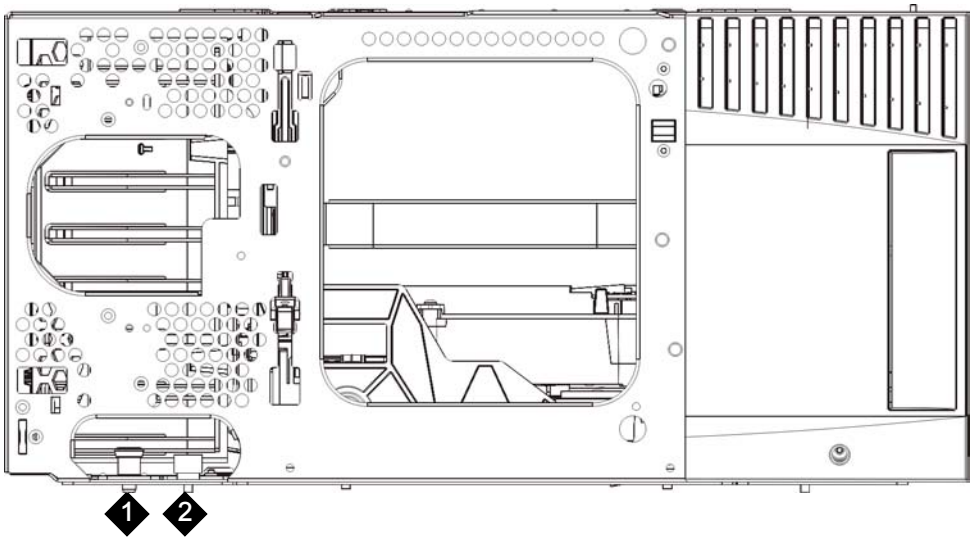
3 Remove the rack ears that fasten the module to the rack.

4 Loosen the thumbscrews located at the base of the front and rear of the module.



1	Thumbscrews (behind doors)

5 Open the module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module beneath it.



1	guide pin
2	thumbscrew

6 From the front of the library, slide the entire module toward you and lift it off of the module below it.

7 Repeat these steps for each module that you need to remove.

Installing the New 9U Expansion Module

1 Prepare the rack to hold modules, if you want to install your library in a rack. See Installing the Rackmount Kit on page 181 for instructions on installing a rackmount kit.

2 Remove and replace the cover plates, if appropriate.

CAUTION **Before removing the control module's bottom cover plate, the robot assembly must be parked as described in Step 5 on page 136.**

a. If you plan to stack the control module at the top of the library, and if a 9U expansion module will be located below it, remove the control module's bottom cover plate and the 9U expansion module's top plate.

b. If you plan to stack the control module between 9U expansion modules, remove both the top and bottom plates of the control module. Also remove the top plate of the 9U expansion module located below the control module and the bottom plate of the 9U expansion module located above the control module.

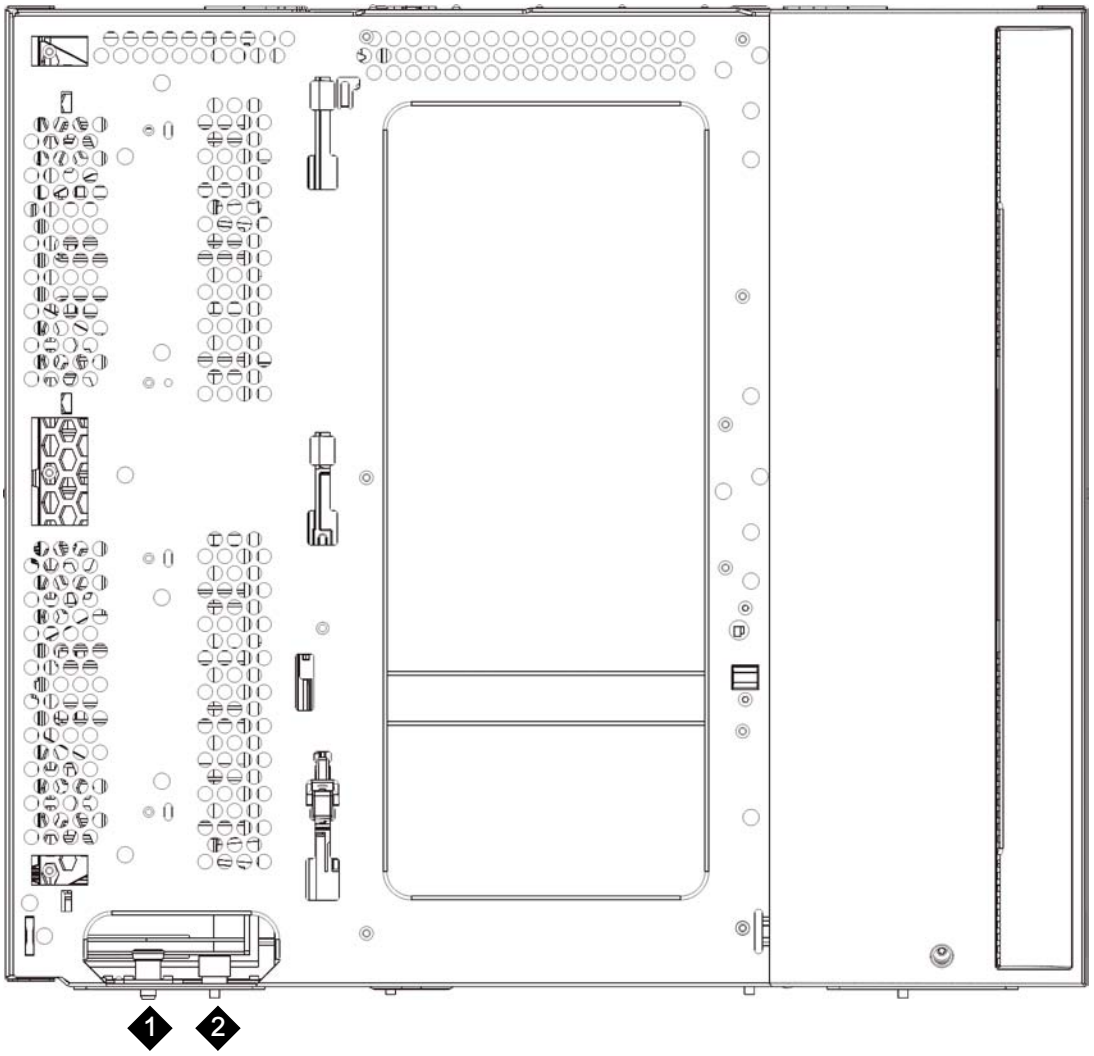
c. If you plan to stack the control module at the bottom of the library, and if a 9U expansion module will be located above it, remove the control module's top plate and the 9U expansion module's bottom plate.

Table 12 Cover Plate Location after Adding a 9U Expansion Module

5U	14U	23U	32U	41U
				cover plate
			cover plate	NEW 9U Expansion Module*
		cover plate	5U Control Module	5U Control Module
	cover plate	5U Control Module	9U Expansion Module	9U Expansion Module
cover plate	5U Control Module	9U Expansion Module	9U Expansion Module	9U Expansion Module
5U Control Module	NEW 9U Expansion Module*	NEW 9U Expansion Module*	NEW 9U Expansion Module*	9U Expansion Module
cover plate	cover plate	cover plate	cover plate	cover plate

* Recommended location for adding an expansion module.

3 Open the 9U expansion module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module on which you are stacking it.



1	guide pin
2	thumbscrew

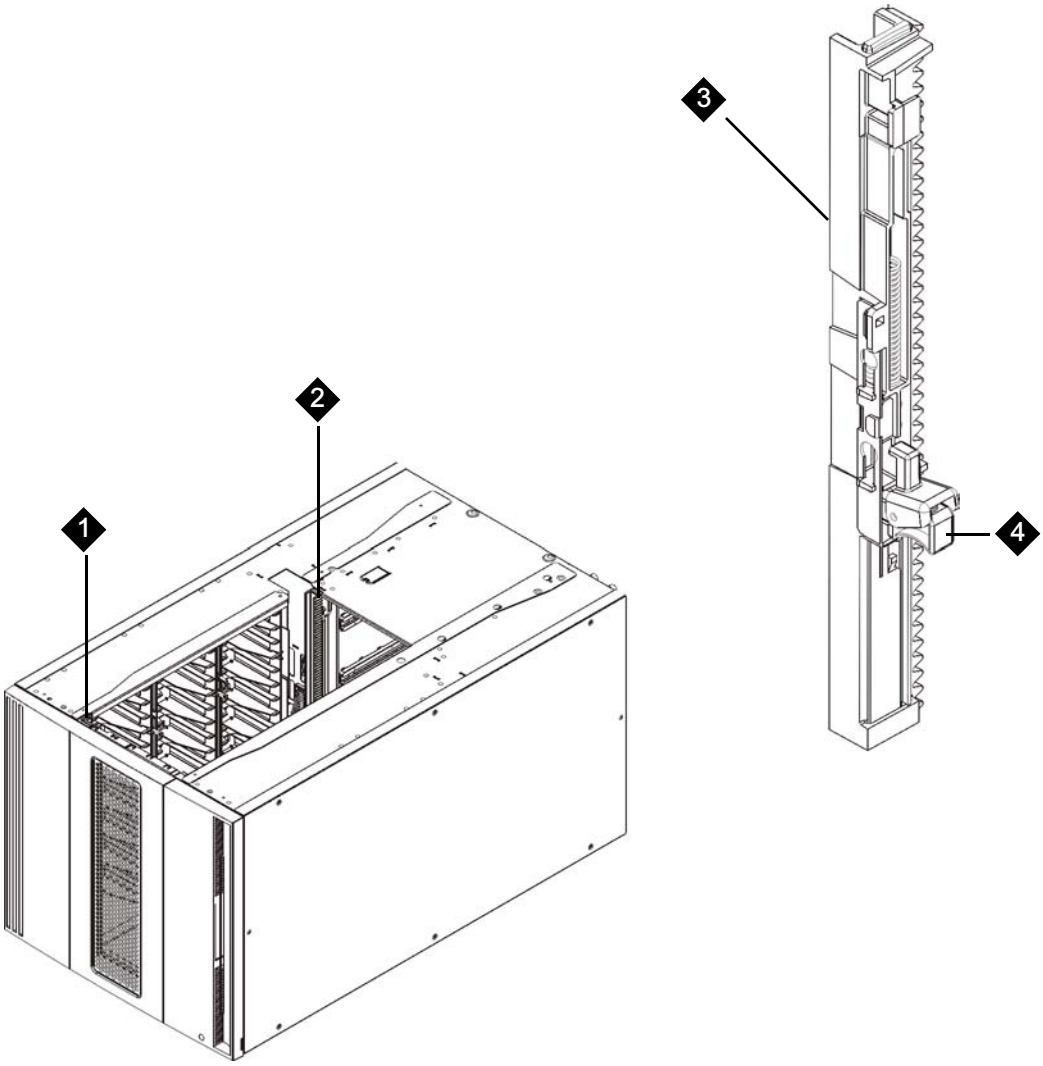
4 Lift the new 9U expansion module and, from the front of the library, place it in the desired location.

5 If there is already a module installed, secure the two modules together by tightening the two thumbscrews at the base of the front of the module and the two thumbscrews located at the base of the back of the module. Then lower the module's guide pin (located at the base of the front of the module) by turning it and pushing it down.

6 Tighten all thumbscrews located at the base of the front and back of the modules.

7 Fasten the module to the rack with rack ears.

8 Engage the Y-rails of the new module in your library configuration. Ensure that the Y-rails are properly aligned and the thumbscrews are tightened.



1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

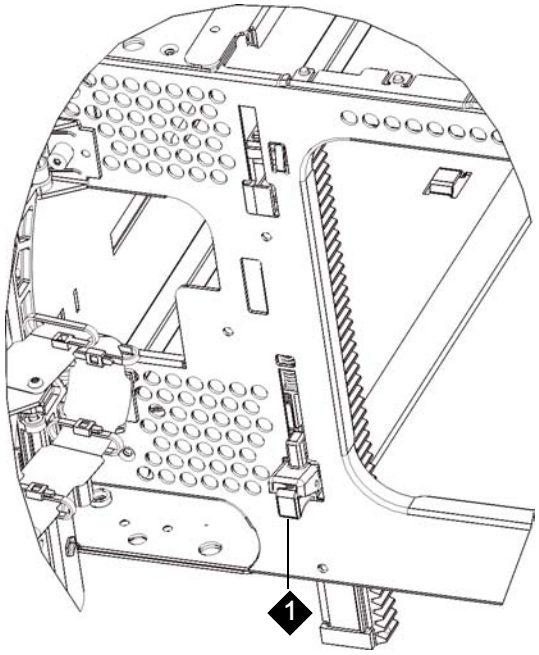
a. From the front of the library, open the I/E station and access doors of the 9U expansion module.

b. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

c. From the back of the library, find the rear Y-rail release mechanism, which is located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

   Doing this aligns the Y-rails with the Y-rails of the module beneath it.

CAUTION **Check to make sure that there is no gap between the top and bottom Y-rails on both the front and back of the library. If a gap exists, the library cannot mechanically initialize.**



1	Y-rail in unlocked, functional position

9 Repeat these steps for each module you need to re-install in the library configuration.

Preparing to Use the Library

1 Add the tape drives to the modules. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

2 Add the power supplies. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

3 Add the LCB to the control module. For details, see Removing and Replacing the Library Control Blade and LCB Compact Flash Card on page 176.

4 If your library contains FC I/O blades, install both the I/O blades and the accompanying fan blades in the expansion module. For details, see Adding, Removing, and Replacing FC I/O Blades on page 196 and Adding, Removing, and Replacing the I/O Fan Blade on page 201.

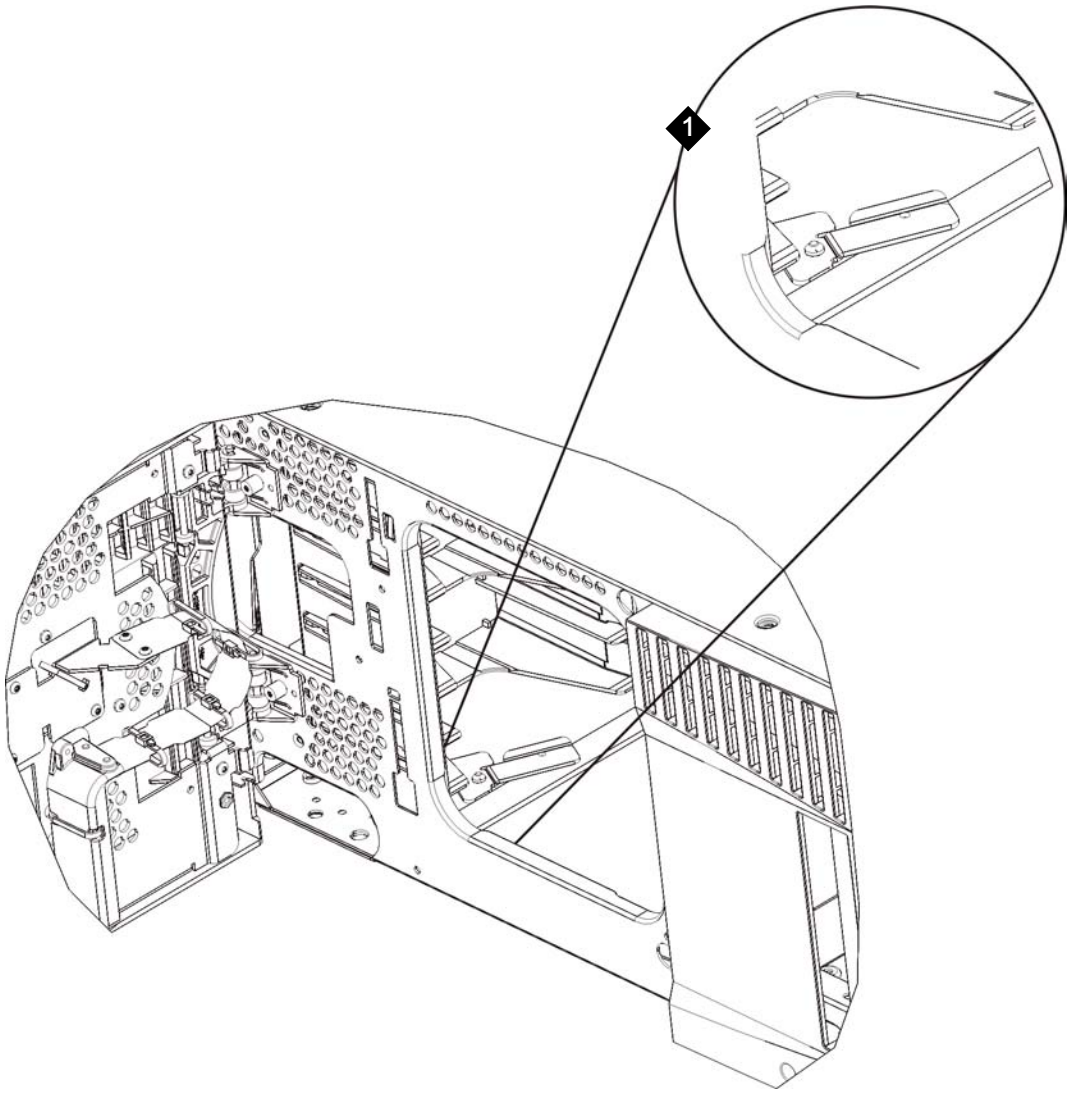
5 Unpark the robot assembly.

a. Gently raise the robot assembly so that it no longer rests on the parking tab.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

b. With your free hand, swivel the parking tab away from you until it is removed completely from the interior of the module. When replaced correctly, the parking tab will not accidentally swivel into the path of the robot.

c. Gently release the robot assembly. It will lower to the bottom module of the library.



1	parking tab in “unpark” position

6 Connect all power cords, network data cables, and module-to-module cables. Make sure the module terminators are installed at the top and bottom of the stack of modules. For cabling instructions, see Cabling the Library on page 102.

7 Power on the library.

8 Reconfigure the library, including applying the new COD license key, using the operator panel or web client.

9 Add the tape cartridges to the library's modules using the I/E station commands from the operator panel or web client.

10 Open the host application and reinventory in order to synchronize its logical inventory with the physical inventory of the library.

Removing 9U Expansion Modules From an Existing Library

These instructions explain how to permanently remove a 9U expansion module from the library.

There are some configuration settings to take into account when removing a 9U expansion module from an existing library.

- COD licenses remain the same. After the 9U expansion module is removed, there may be more slots licensed than are available. Only the available slots appear on the **License** screen.
- All resources in the removed module(s) are removed. A partition with all resources in the removed module(s) will be present with no slots or drives. This partition can only be deleted.

  The best practice before removing a 9U expansion module is to:

  - Using your I/E station, export all the tape cartridges from your library.
  - Delete all partitions.
  - Delete all cleaning slots.
  - Set the number of I/E station slots to six.

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

WARNING

WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, A 5U CONTROL MODULE WEIGHS APPROXIMATELY 58 LBS. A 9U EXPANSION MODULE, WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, EXCEEDS 65 LBS.

TO AVOID SERIOUS INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO SAFELY LIFT THE MODULES INTO POSITION.

Preparing to Permanently Remove the 9U Expansion Module

Required tools:

- Phillips #2 screwdriver, for removing and replacing the top cover plate
- T10 TORX screwdriver, for removing and replacing the bottom cover plate

1 Remove all tape cartridges from the library using the import and export commands of the operator panel or web client.

2 Reconfigure the library with the following settings:

- Partitions: 0
- Cleaning slots: 0
- I/E station slots: 6

3 Power off the library.

4 Disconnect all power cords, network data cables, and module-to-module cables from each module you will be removing.

5 Park the robot assembly in the control module. Before unstacking the library, the robot assembly must be placed in the control module.

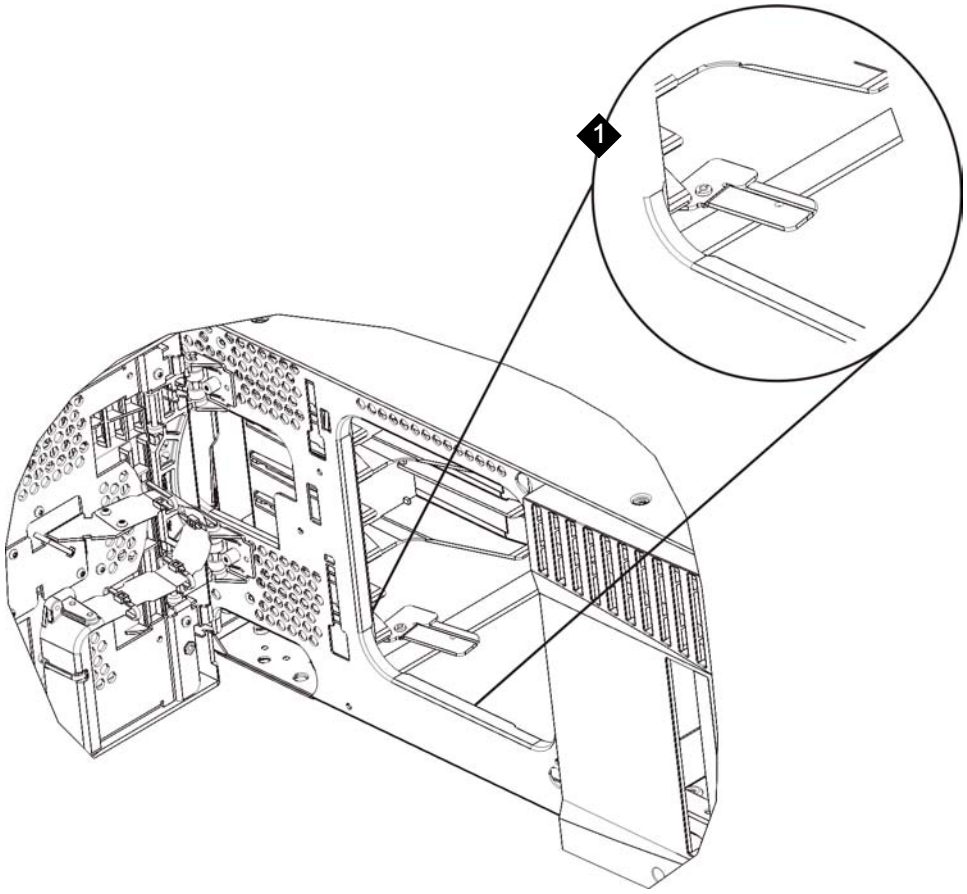
a. Open the I/E station and access doors of each module.

b. Using your hands, gently lift the robot assembly into the control module. The robot assembly should glide slowly and with some resistance.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

c. After raising the robot assembly to the approximate middle of the control module, hold it in place with one hand and, using your other hand, swivel the parking tab toward you. The metal parking tab is located at the bottom of column 1.

d. Gently release the robot assembly to rest on the parking tab.



1	parking tab in “park” position

6 Remove all power supplies from each module that you intend to remove. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

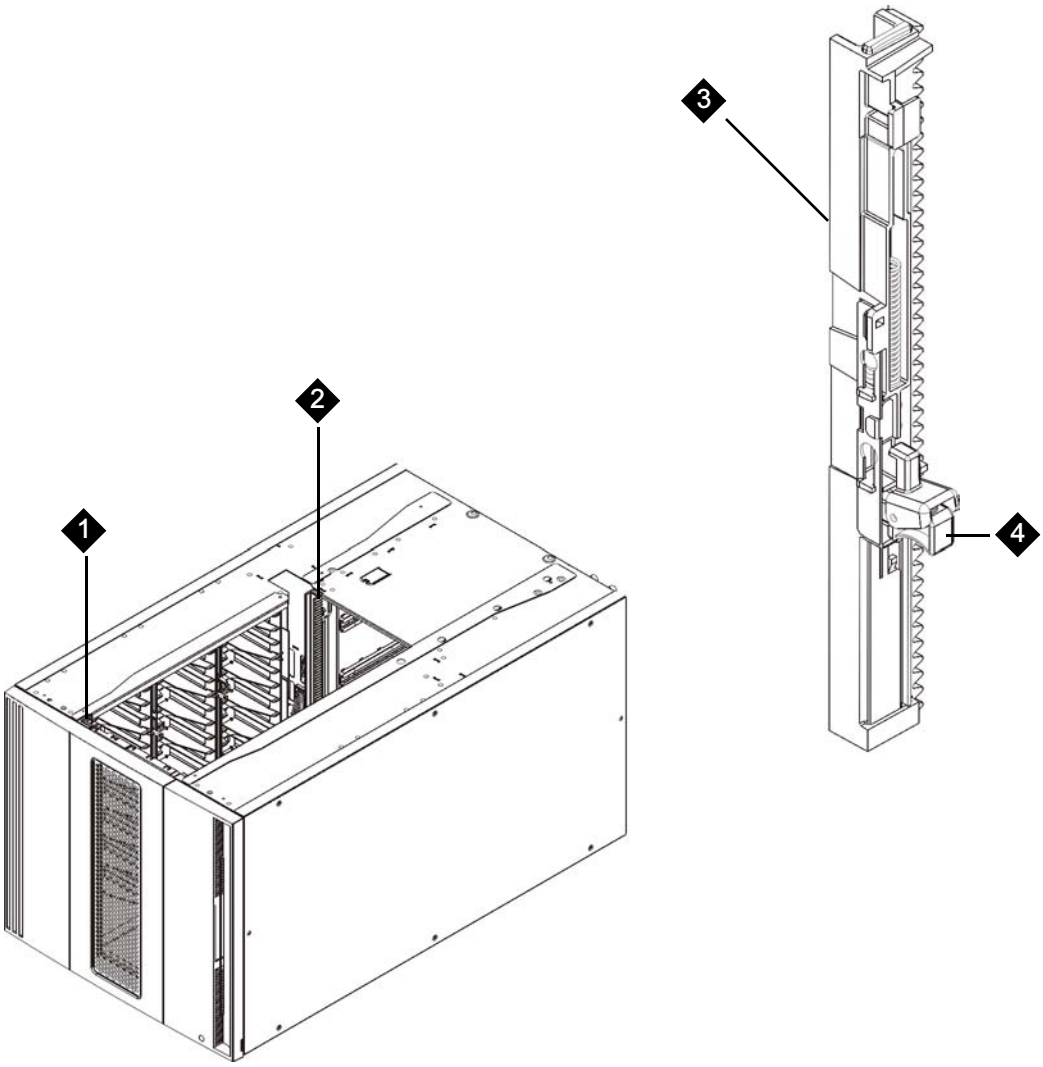
7 Remove all tape drives from each module that you intend to remove. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

Removing the 9U Expansion Module

1 For each module that you plan to remove, open the I/E station and access doors of each module.

CAUTION **Before unstacking the modules, the robot assembly must be parked as described in Step 5 on page 147.**

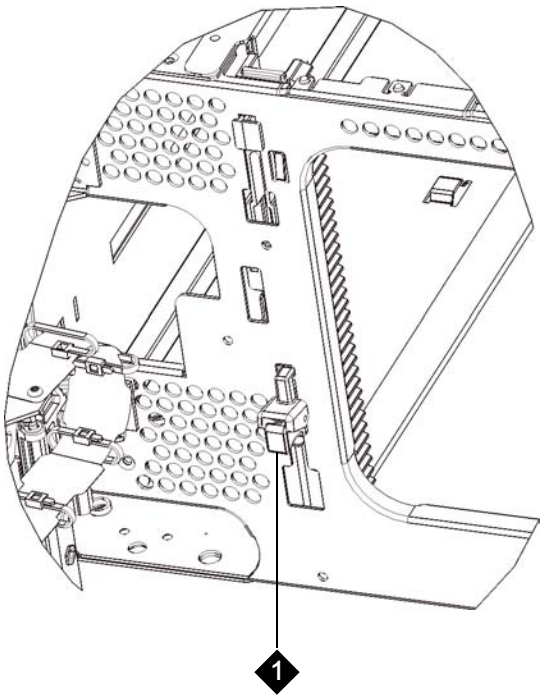
2 Disengage the Y-rails so the modules can be unstacked safely.



1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

a. From the front of the library, find the Y-rail release mechanism, which is located on the left side of the control module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.

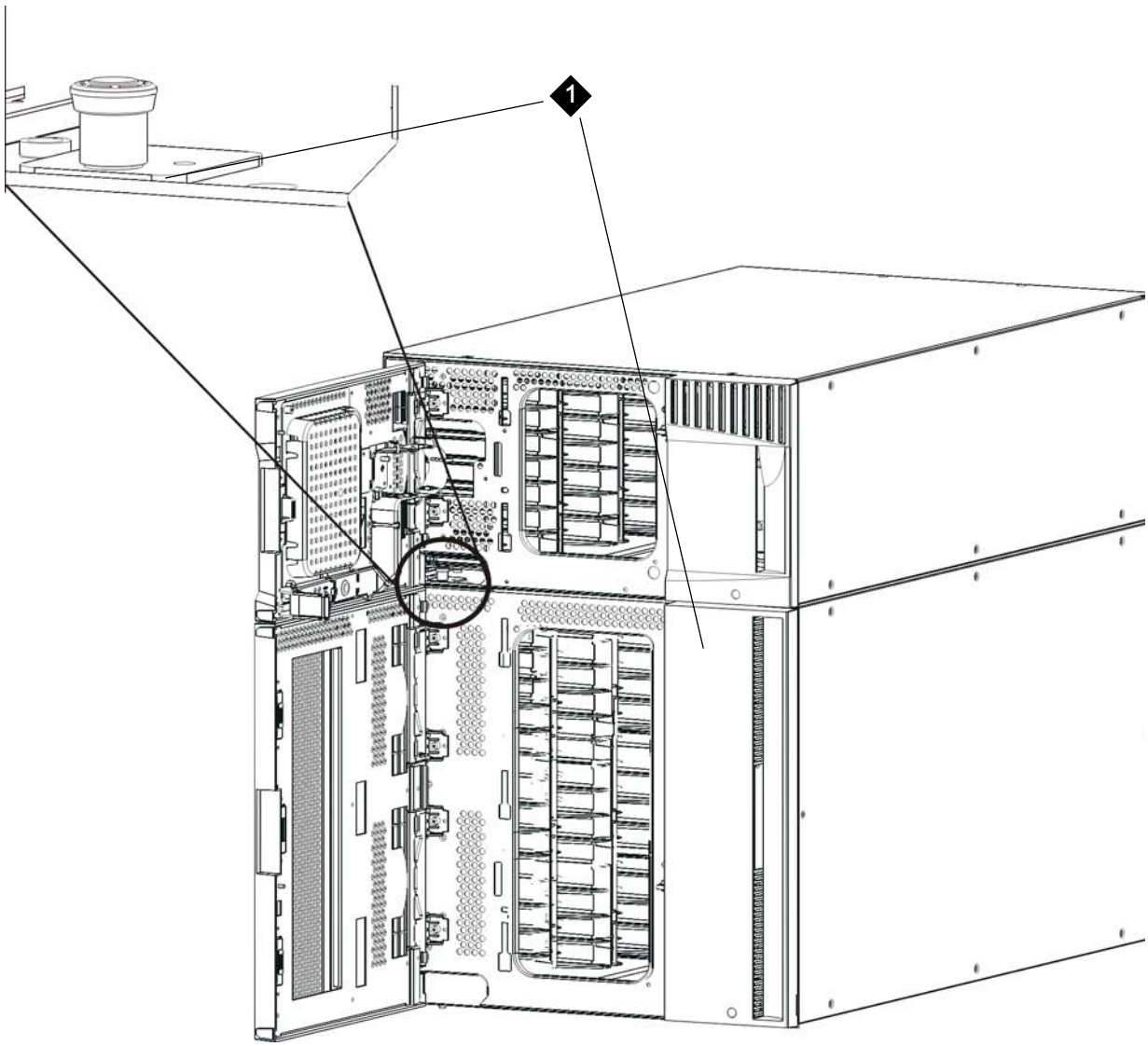
b. From the rear of the library, find the rear Y-rail release mechanism located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.



1	Y-rail in locked, non-functional position

3 Remove the rack ears that fasten the module to the rack. See Installing the Rackmount Kit on page 181 for detailed instructions on using the rack ears.

4 Loosen the thumbscrews located at the base of the front of the module.



1	Thumbscrews (behind doors)

5 Loosen the two thumbscrews located at the base of the back of the module.

6 Open the module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module beneath it.

7 From the front of the library, slide the entire module toward you and lift it off of the module below it.

8 Repeat these procedures for each module that you intend to remove.

9 Remove and replace the cover plates, if appropriate.

CAUTION **Before removing the control module's bottom cover plate, the robot assembly must be parked as described in Step 5 on page 147.**

a. If you plan to stack the control module at the top of the library, and if a 9U expansion module will be located below it, remove the control module's bottom cover plate and the 9U expansion module's top plate.

b. If you plan to stack the control module between 9U expansion modules, remove both the top and bottom plates of the control module. Also remove the top plate of the 9U expansion module located below the control module and the bottom plate of the 9U expansion module located above the control module.

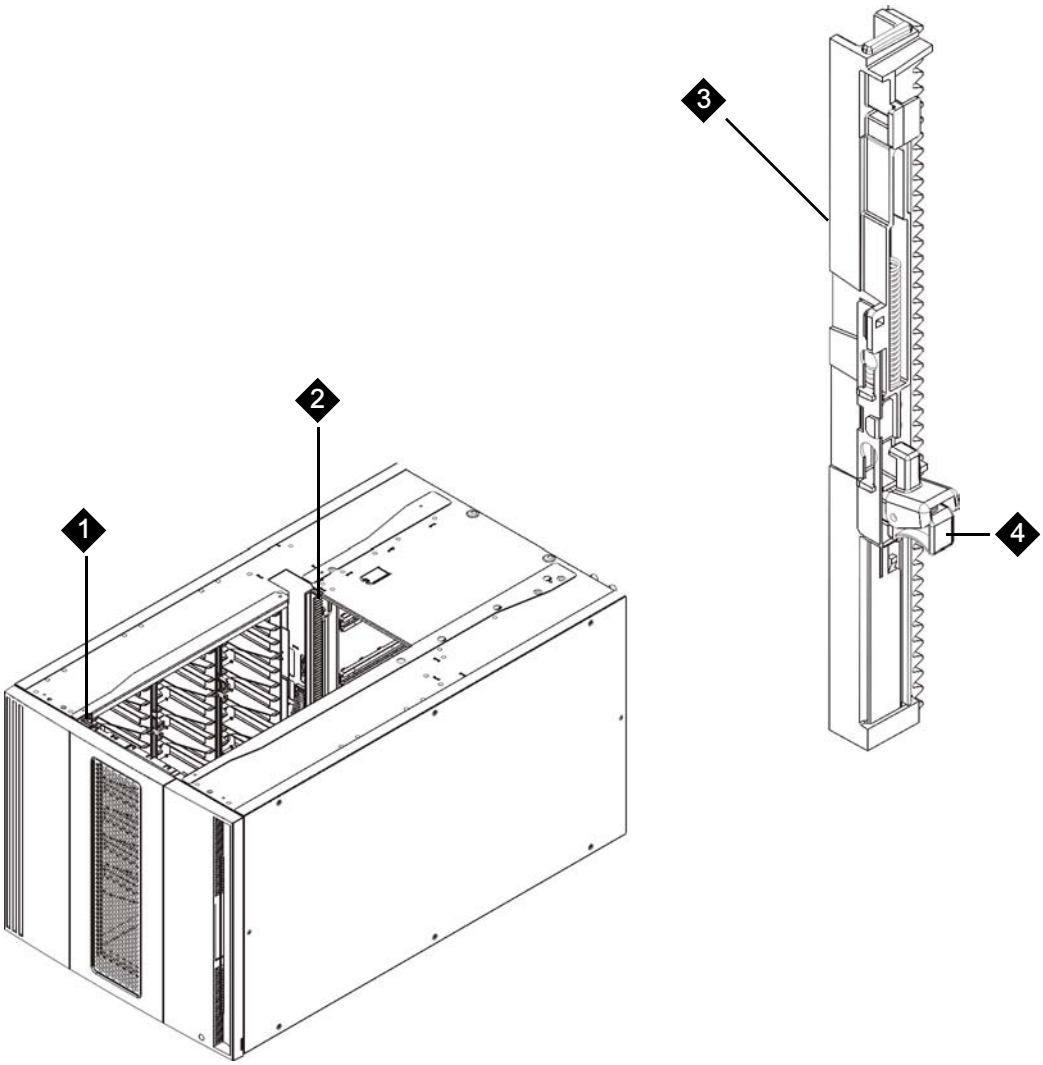
c. If you plan to stack the control module at the bottom of the library, and if a 9U expansion module will be located above it, remove the control module's top plate and the 9U expansion module's bottom plate.

Table 13 Cover Plate Location after Removing a 9U Expansion Module

5U	14U	23U	32U
			cover plate
		cover plate	5U Control Module
	cover plate	5U Control Module	9U Expansion Module
cover plate	5U Control Module	9U Expansion Module	9U Expansion Module
5U Control Module	9U Expansion Module	9U Expansion Module	9U Expansion Module
cover plate	cover plate	cover plate	cover plate

Preparing to Use the New Library Configuration

1 Ensure that the Y-rails are properly aligned and the thumbscrews are tightened.



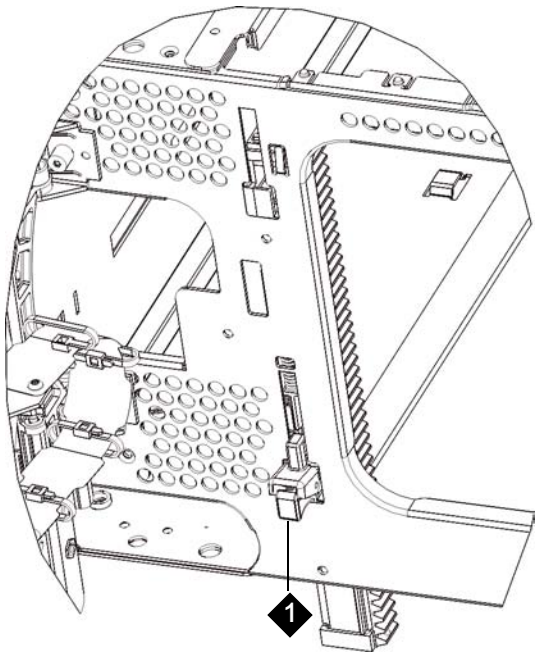
1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

a. From the front of the library, open the I/E station and access doors of the 9U expansion module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

b. From the back of the library, find the rear Y-rail release mechanism, which is located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

   Doing this aligns the Y-rails with the Y-rails of the module beneath it.

CAUTION **Check to make sure that there is no gap between the top and bottom Y-rails on both the front and back of the library. If a gap exists, the library cannot mechanically initialize.**



2 Add the tape drives to the modules. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

3 Add the power supplies. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

4 Add the LCB to the control module. For details, see Removing and Replacing the Library Control Blade and LCB Compact Flash Card on page 176.

5 If your library contains FC I/O blades, install both the I/O blades and the accompanying fan blades in the expansion module. For details, see Adding, Removing, and Replacing FC I/O Blades on page 196 and Adding, Removing, and Replacing the I/O Fan Blade on page 201.

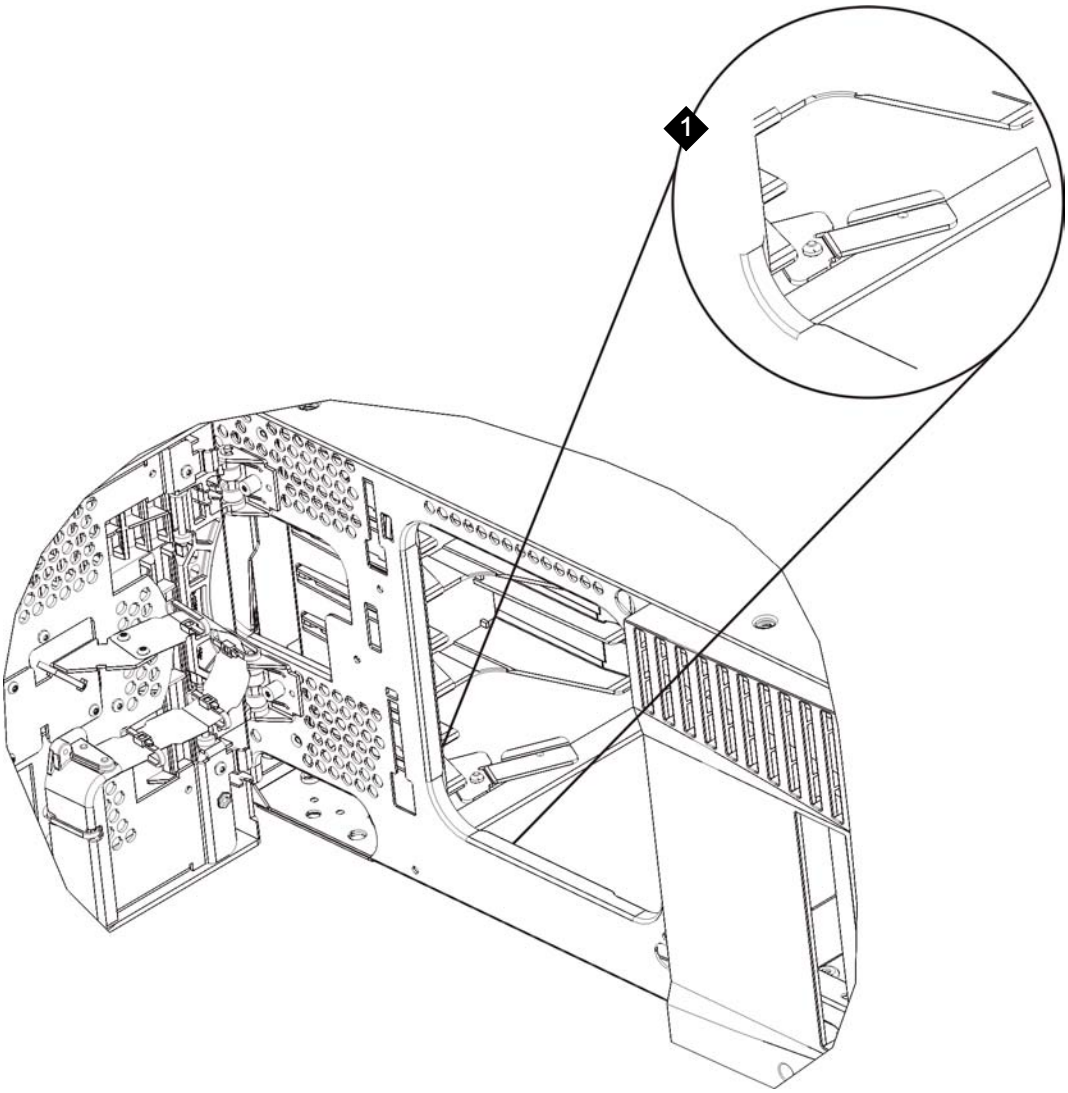
6 Unpark the robot assembly.

a. Gently raise the robot assembly so that it no longer rests on the parking tab.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

b. With your free hand, swivel the parking tab away from you until it is removed completely from the interior of the module. When replaced correctly, the parking tab will not accidentally swivel into the path of the robot.

c. Gently release the robot assembly. It will lower to the bottom module of the library.



1	parking tab in “unpark” position

7 Close the library’s I/E station and access doors.

8 Connect all power cords, network data cables, and module-to-module cables. Make sure the module terminators are installed at the top and bottom of the stack of modules. For cabling instructions, see Cabling the Library on page 102.

9 Power on the library.

10 Add the tape cartridges to the library's modules using the I/E station commands from the operator panel or web client.

11 Reconfigure the library settings using the operator panel or web client.

12 Open the host application and reinventory in order to synchronize its logical inventory with the physical inventory of the library.

Replacing the 5U Library Control Module

These instructions explain how to remove a 5U control module and replace it with a 5U control module field replaceable unit (FRU). You may need to replace the control module if its chassis is severely damaged. Typically, however, only certain customer replaceable units (CRUs) or FRUs within the control module need to be replaced.

There are some configuration settings to take into account when replacing the 5U control module.

- If you have applied a Capacity-On-Demand (COD) license key to the original control module, you will need to get a replacement license key to apply to the new control module.
- A partition with all resources in the removed module will be present with no slots or drives. This partition can only be deleted.

  The best practice before removing the 5U control module is to:

  - Using your I/E station, export all the tape cartridges from your library.
  - Delete all partitions.
  - Delete all cleaning slots.
  - Set the number of I/E station slots to six.

There are no restrictions on where the control module can be installed in the library configuration. However, the recommended placement of the control module for library configurations up to 32U is on top of all installed 9U expansion modules. The recommended placement of the control module for 41U library configurations is on top of three 9U expansion modules and below the top expansion module.

Before removing the control module, you must first remove all 9U expansion modules (if any) positioned above the control module.

WARNING

WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, A 5U CONTROL MODULE WEIGHS APPROXIMATELY 58 LBS. A 9U EXPANSION MODULE, WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, EXCEEDS 65 LBS.

TO AVOID SERIOUS INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO SAFELY LIFT THE MODULES INTO POSITION.

Note

If the library is installed in a rack, you need to perform additional steps to remove modules from and place modules into the rack.

Preparing to Remove the 5U Control Module

Required tools:

- Phillips #2 screwdriver, for removing and replacing the top cover plate
- T10 TORX screwdriver, for removing and replacing the bottom cover plate

1 Power off the library.

2 Disconnect all power cords, network data cables, and module-to-module cables from each expansion module located above the control module, and from the control module itself.

Note You should label all cables before you remove them so you can later reconnect them to their proper locations.

3 Remove all power supplies from each module that you intend to remove. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

4 Remove all tape drives from each module that you intend to remove. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

5 Remove the tape cartridges from each module that you intend to remove.

CAUTION **The library will not be able to locate tapes that are removed from one partition and returned to a different partition. The tapes must be returned to the same partition they were removed from. Since the library assigns slots to a partition, you must create a map to locate each tape or create a map of tape slots that belong to each partition. You can do this by going to the Setup > Library Configuration screen on the web client and clicking the Show BarCodes button.**

Note If you are unsure about which cartridge's barcode belongs in which partition, export the tape cartridges via the I/E station while keeping track of which partition they came from. Reconfigure the library and then re-import the cartridges via the I/E station into the appropriate partitions.

6 Park the robot assembly in the control module. Before unstacking the library, the robot assembly must be placed in the control module.

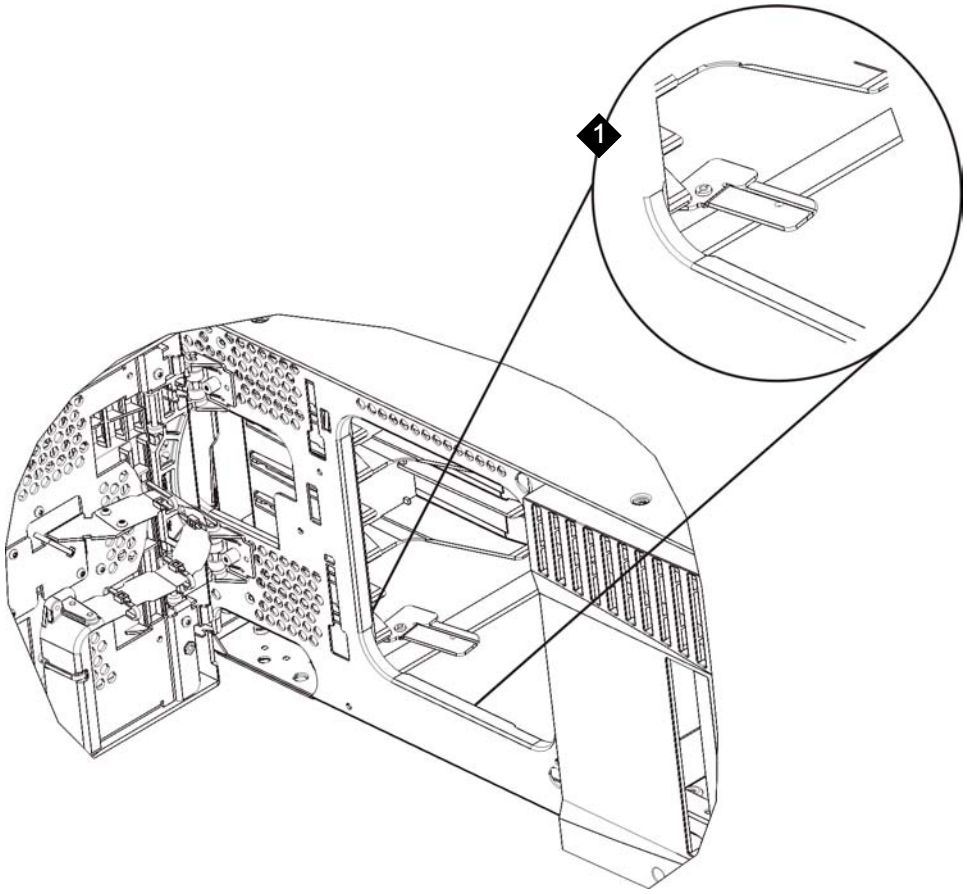
a. Open the I/E station and access doors of each module.

b. Using your hands, gently lift the robot assembly into the control module. The robot assembly should glide slowly and with some resistance.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

c. After raising the robot assembly to the approximate middle of the control module, hold it in place with one hand and, using your other hand, swivel the parking tab toward you. The metal parking tab is located at the bottom of column 1.

d. Gently release the robot assembly to rest on the parking tab.



1	parking tab in “park” position

7 If there are expansion modules stacked above the control module, remove them now.

Removing the 5U Control Module

1 Starting with the topmost module of your library, open the I/E station and access doors of the module.

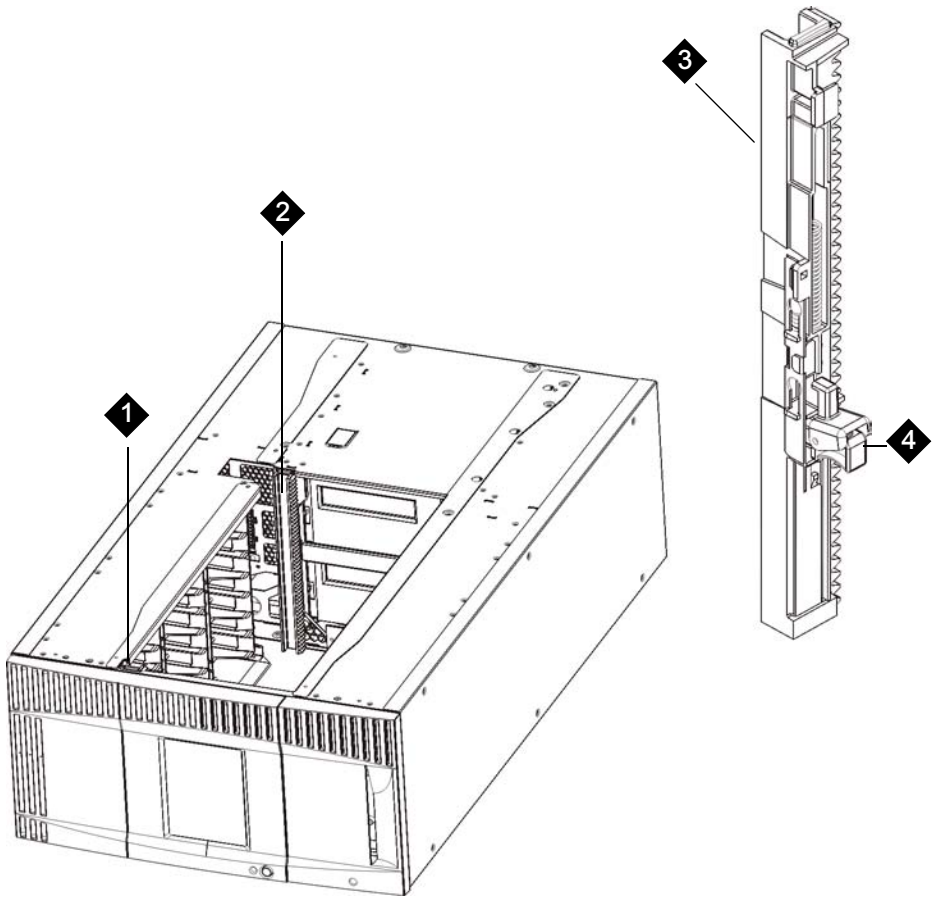
CAUTION **Before unstacking the modules, the robot assembly must be parked as described in Step 6 on page 157.**

2 Disengage the Y-rails so the modules can be safely unstacked.

a. From the front of the library, find the Y-rail release mechanism, which is located on the left side of the module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.

b. From the rear of the library, find the rear Y-rail release mechanism located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.

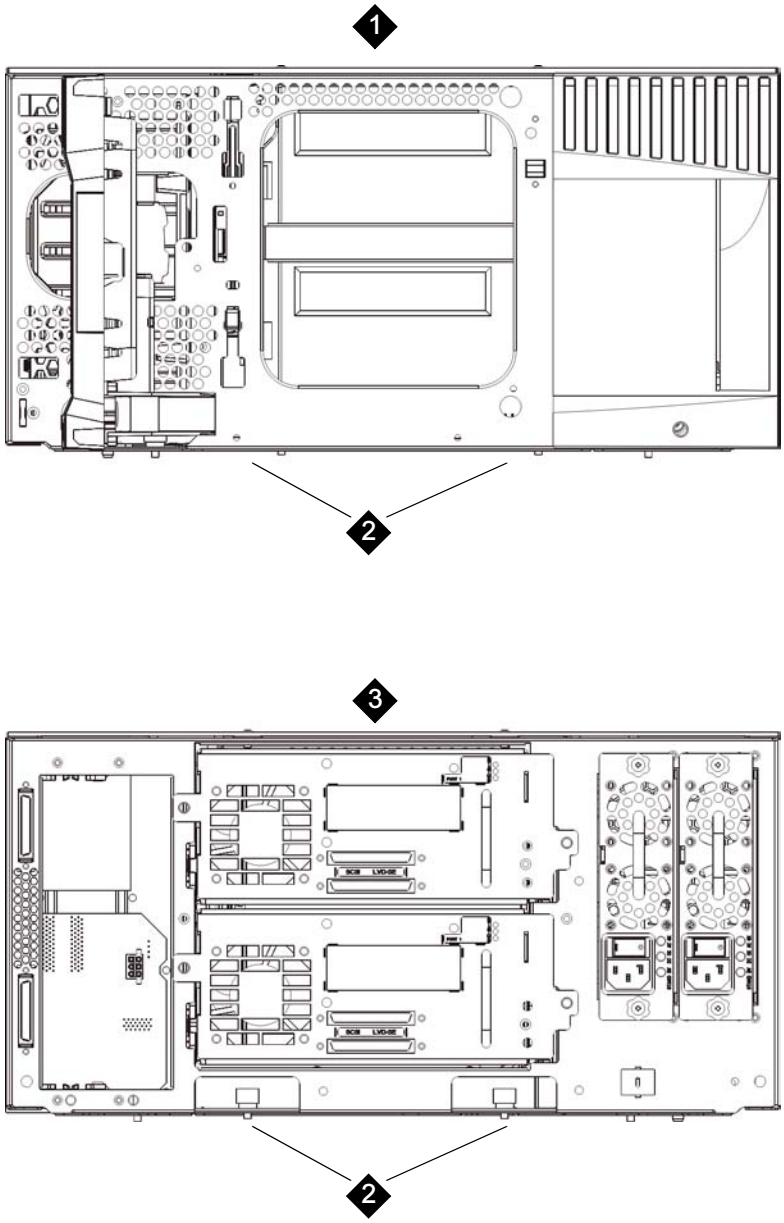
Note The rear Y-rail is impossible to lift up with the tape drives installed.



1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

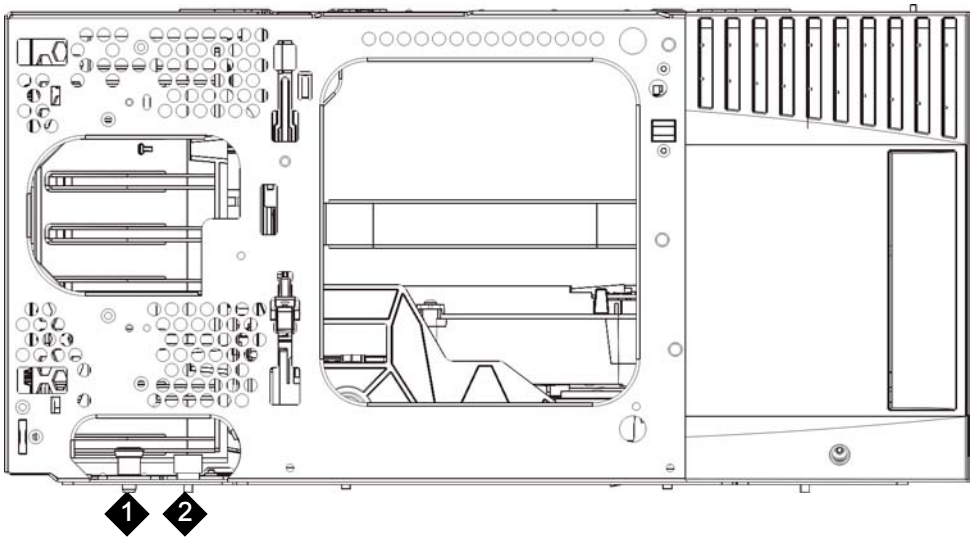
3 Remove the rack ears that fasten the module to the rack.

4 Loosen the thumbscrews located at the base of the front and rear of the module.



1	5U Library Control Module (front)
2	thumbscrews
3	5U Library Control Module (rear)

5 Open the module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module beneath it.



1	guide pin
2	thumbscrew

6 Slide the entire module toward you and lift it off of the module below it.

Replacing the 5U Control Module

1 Remove the tape drives from the new control module.

2 Remove the power supplies from the new control module.

3 Using the Phillips #2 screwdriver (for the top cover plate) and the T10 TORX screwdriver (for the bottom cover plate), remove the new control module plates from the top and bottom of the module, as necessary.

CAUTION **Before removing the** control module**'s bottom cover plate, the robot assembly must be parked as described in** Step 6 on page 157**.**

a. If your library consists of only the control module, do not remove the plates.

b. If you plan to stack the control module at the top of the library, and if a 9U expansion module is located below it, remove the control module's bottom cover plate.

c. If you plan to stack the control module in the middle of the library, remove both the top and bottom cover plates.

d. If you plan to stack the control module at the bottom of the library, and if a 9U expansion module is located above it, remove the control module's top cover plate.

4 Remove the LCB from the control module and set it aside.

The LCB stores information about the library's contents and configuration, so you will probably want to install this LCB (or possibly just the LCB compact flash card) in the new control module. For details about removing the LCB, see Removing and Replacing the Library Control Blade and LCB Compact Flash Card on page 176.

Note If you plan to stack the control module on top of a 9U expansion module, be sure to park the picker in the control module first.

5 If the library configuration includes 9U expansion modules below the control module, install them in the library now.

6 Install the new control module in the library. Lift the control module and, from the front of the library, place it in the desired location.

Place the control module on top of the 9U expansion module and slide it to the rear of the unit. A small notch on the bottom of the control module aligns it with the top of the 9U expansion module.

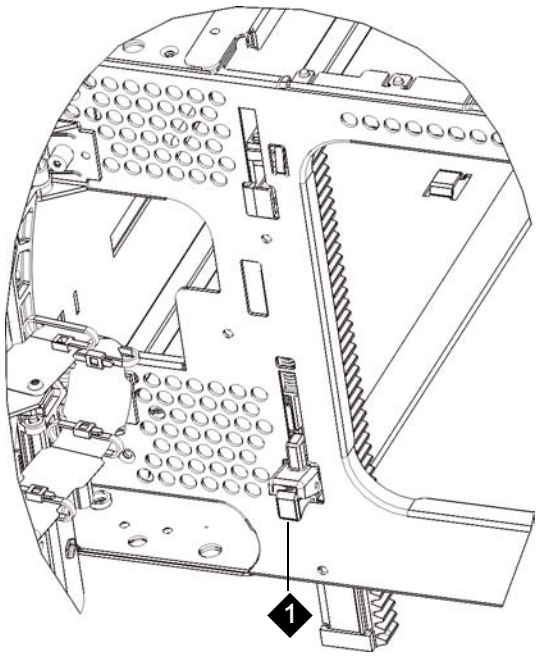
7 Use rack ears to fasten the control module on top of a 9U expansion module.

8 If you placed the control module on top of a 9U expansion module, secure the two modules by tightening the two thumbscrews at the base of the *front* of the module and the two thumbscrews located at the base of the *back* of the module. Then lower the module's guide pin (located at the base of the front of the module) by turning it and pushing it down.

9 Stack all 9U expansion modules (if any) in their original positions above the control module. Use rack ears to fasten the modules to the rack.Then tighten all thumbscrews located at the base of the front and back of the modules.

10 Engage the Y-rails. Tighten the thumbscrews and lower the guide pin. Doing this aligns the Y-rail with the Y-rail of the module beneath it.

a. From the front of the library, open the I/E station and access doors of the control module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.



1	Y-rail in unlocked, functional position

b. From the back of the library, find the rear Y-rail release mechanism, which is located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

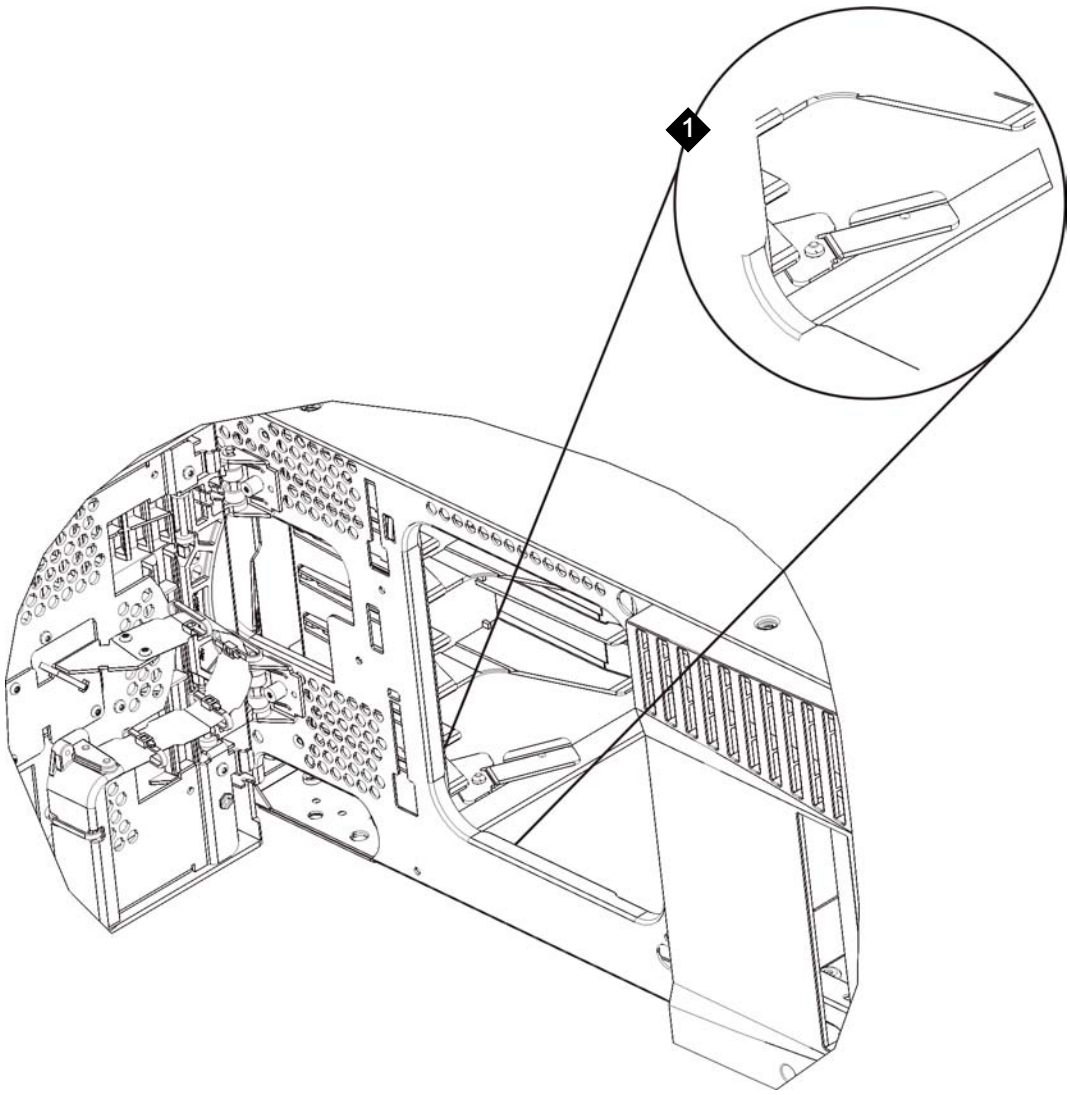
11 Unpark the robot assembly.

a. Gently raise the robot assembly so that it no longer rests on the parking tab.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

b. With your free hand, swivel the parking tab away from you until it is removed completely from the interior of the module. When replaced correctly, the parking tab will not accidentally swivel into the path of the robot.

c. Gently release the robot assembly. It will lower to the bottom module of the library.



1	parking tab in “unpark” position

Preparing to Use the 5U Control Module

1 Close the library’s I/E station and access doors.

2 Add the tape drives to the modules. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

3 Add the power supplies. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

4 Add the LCB to the control module. For details, see Removing and Replacing the Library Control Blade and LCB Compact Flash Card on page 176.

5 If your library contains FC I/O blades, install both the I/O blades and the accompanying fan blades in the expansion module. For details, see Adding, Removing, and Replacing FC I/O Blades on page 196 and Adding, Removing, and Replacing the I/O Fan Blade on page 201.

6 Connect all power cords, network data cables, and module-to-module cables. Make sure the module terminators are installed in their previous positions at the top and bottom of the stack of modules. For cabling instructions, see Cabling the Library on page 102.

7 Power on the library.

8 Add the tape cartridges to the library's modules using the I/E station commands from the operator panel or web client.

9 If the host application inventories the location of each tape cartridge in the library, open the host application and reinventory in order to sync its logical inventory with the physical inventory of the library.

Replacing a 9U Expansion Module

These instructions explain how to remove and replace a 9U expansion module. You may need to replace the 9U expansion module if its chassis is severely damaged.

A library can use up to four 9U expansion modules to a maximum height of 41U.

There are some configuration settings to take into account when removing and replacing a 9U expansion module.

- COD licenses remain the same. After the 9U expansion module is removed, there may be more slots licensed than are available. Only the available slots appear on the **License** screen.
- All resources in the removed module(s) are removed. A partition with all resources in the removed module(s) will be present with no slots or drives. This partition can only be deleted.

  The best practice before removing and replacing a 9U expansion module is to:

  - Using your I/E station, export all the tape cartridges from your library.
  - Delete all partitions.
  - Delete all cleaning slots.
  - Set the number of I/E station slots to six.

Note

The maximum number of 9U expansion modules supported in a library depends on the level of firmware the library is running. See Updating Library and Tape Drive Firmware on page 95 for more information.

WARNING

ALL LIBRARIES TALLER THAN 14U MUST BE INSTALLED IN A RACK HAVING A MAIN PROTECTIVE EARTHING (GROUNDING) TERMINAL, AND POWER MUST BE SUPPLIED VIA AN INDUSTRIAL PLUG AND SOCKET-OUTLET AND/OR AN APPLIANCE COUPLER COMPLYING WITH IEC 60309 (OR AN EQUIVALENT NATIONAL STANDARD) AND HAVING A PROTECTIVE EARTH (GROUND) CONDUCTOR WITH A CROSS SECTIONAL AREA OF AT LEAST 1.5 MM^2 (14 AWG).

TO ENSURE PROPER AIRFLOW AND ACCESS SPACE, ALLOW 60 CM (24 INCHES) IN THE FRONT AND BACK OF THE LIBRARY.

WARNING WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, A 5U CONTROL MODULE WEIGHS APPROXIMATELY 58 LBS. A 9U EXPANSION MODULE, WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, EXCEEDS 65 LBS.

TO AVOID SERIOUS INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO SAFELY LIFT THE MODULES INTO POSITION.

Preparing to Remove the 9U Expansion Module

Required tools:

- Phillips #2 screwdriver, for removing and replacing the top cover plate
- T10 TORX screwdriver, for removing and replacing the bottom cover plate

1 Power off the library.

2 Disconnect all power cords, network data cables, and module-to-module cables from each module you will be removing.

Note You should label all cables before you remove them so you can later reconnect them to their proper locations.

3 Remove all power supplies from each module that you intend to remove. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

4 Remove all tape drives from each module that you intend to remove. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

5 If your library contains FC I/O blades, remove both the I/O blades and the accompanying fan blades from the expansion module. For details, see Adding, Removing, and Replacing FC I/O Blades on page 196 and Adding, Removing, and Replacing the I/O Fan Blade on page 201.

6 Remove the tape cartridges from each module that you intend to remove.

CAUTION **The library will not be able to locate tapes that are removed from one partition and returned to a different partition. The tapes must be returned to the same partition they were removed from. Since the library assigns slots to a partition, you must create a map to locate each tape or create a map of tape slots that belong to each partition. You can do this by going to the Setup > Library Configuration screen on the web client and clicking the Show BarCodes button.**

Note If you are unsure about which cartridge's barcode belongs in which partition, export the tape cartridges via the I/E station while keeping track of which partition they came from. Reconfigure the library and then re-import the cartridges via the I/E station into the appropriate partitions.

7 If you are removing a 9U expansion module located below the control module, continue with the next step and substeps. If not, skip to the next section.

8 Park the robot assembly in the control module. Before unstacking the library, the robot assembly must be placed in the control module.

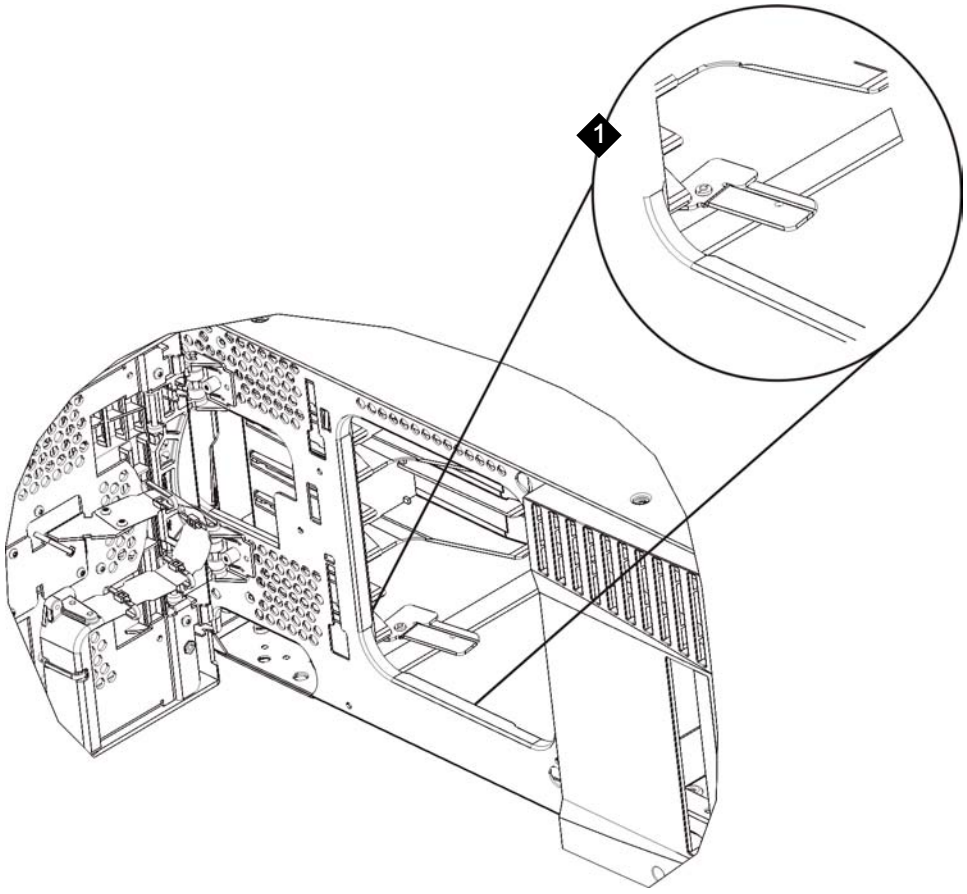
a. Open the I/E station and access doors of each module.

b. Using your hands, gently lift the robot assembly into the control module. The robot assembly should glide slowly and with some resistance.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

c. After raising the robot assembly to the approximate middle of the control module, hold it in place with one hand and, using your other hand, swivel the parking tab toward you. The metal parking tab is located at the bottom of column 1.

d. Gently release the robot assembly to rest on the parking tab.



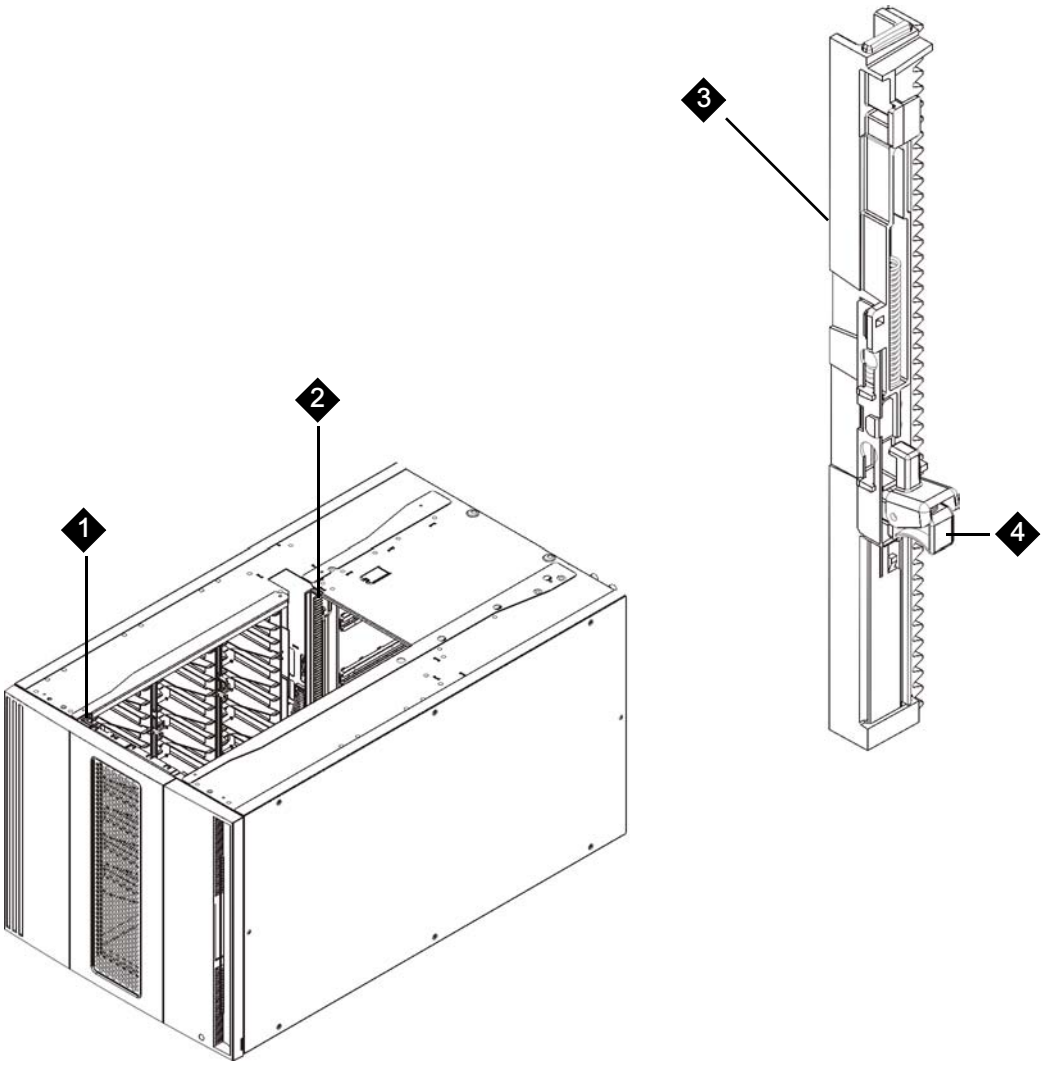
1	parking tab in “park” position

Removing the 9U Expansion Module

1 Starting with the topmost module of your library, open the I/E station and access doors of each module.

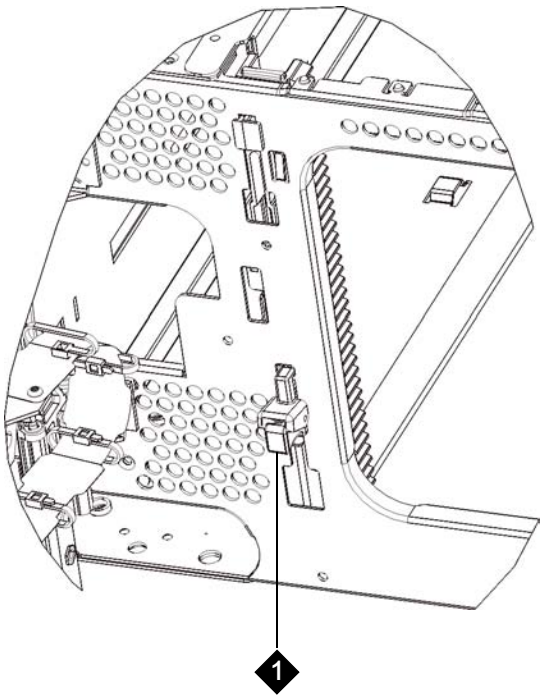
CAUTION **Before unstacking the modules, the robot assembly must be parked as described in Step 8 on page 167.**

2 Disengage the Y-rails so the modules can be unstacked safely.



1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

a. From the front of the library, find the Y-rail release mechanism, which is located on the left side of the control module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.

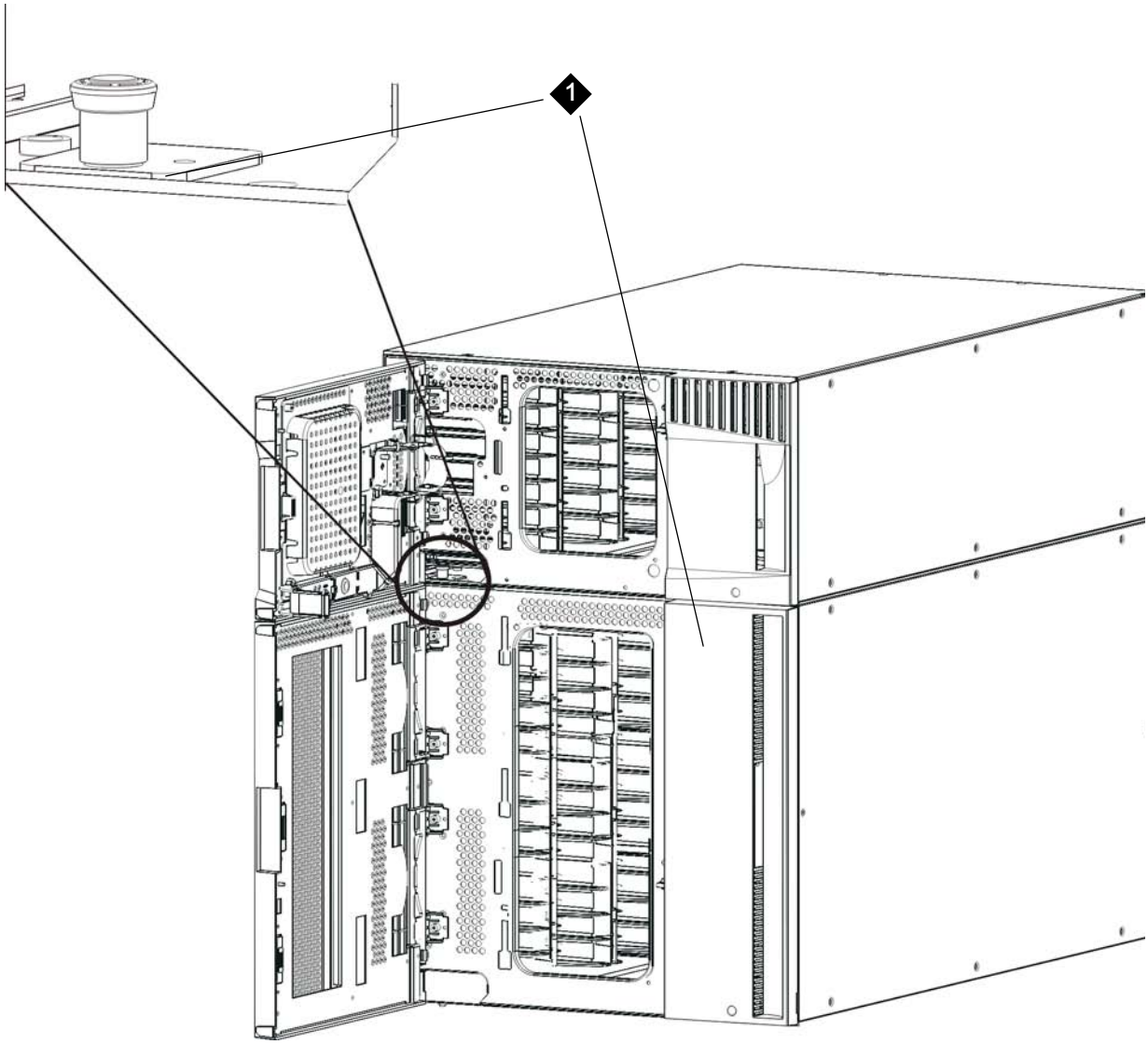


1	Y-rail in locked, non-functional position

b. From the rear of the library, find the rear Y-rail release mechanism located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it, and release it so that it locks into place.

3 Remove the rack ears that fasten the module to the rack. See Installing the Rackmount Kit on page 181 for detailed instructions on using the rack ears.

4 Loosen the thumbscrews located at the base of the front of the module.



1	Thumbscrews (behind doors)

5 Loosen the two thumbscrews located at the base of the back of the module.

6 Open the module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module beneath it.

7 From the front of the library, slide the entire module toward you and lift it off of the module below it.

8 Repeat these procedures for each module that you need to remove.

9 Remove and replace the cover plates, if appropriate.

CAUTION **Before removing the control module's bottom cover plate, the robot assembly must be parked as described in Step 8 on page 167.**

a. If you plan to stack the control module at the top of the library, and if a 9U expansion module will be located below it, remove the control module's bottom cover plate and the 9U expansion module's top plate.

b. If you plan to stack the control module between 9U expansion modules, remove both the top and bottom plates of the control module. Also remove the top plate of the 9U expansion module located below the control module and the bottom plate of the 9U expansion module located above the control module.

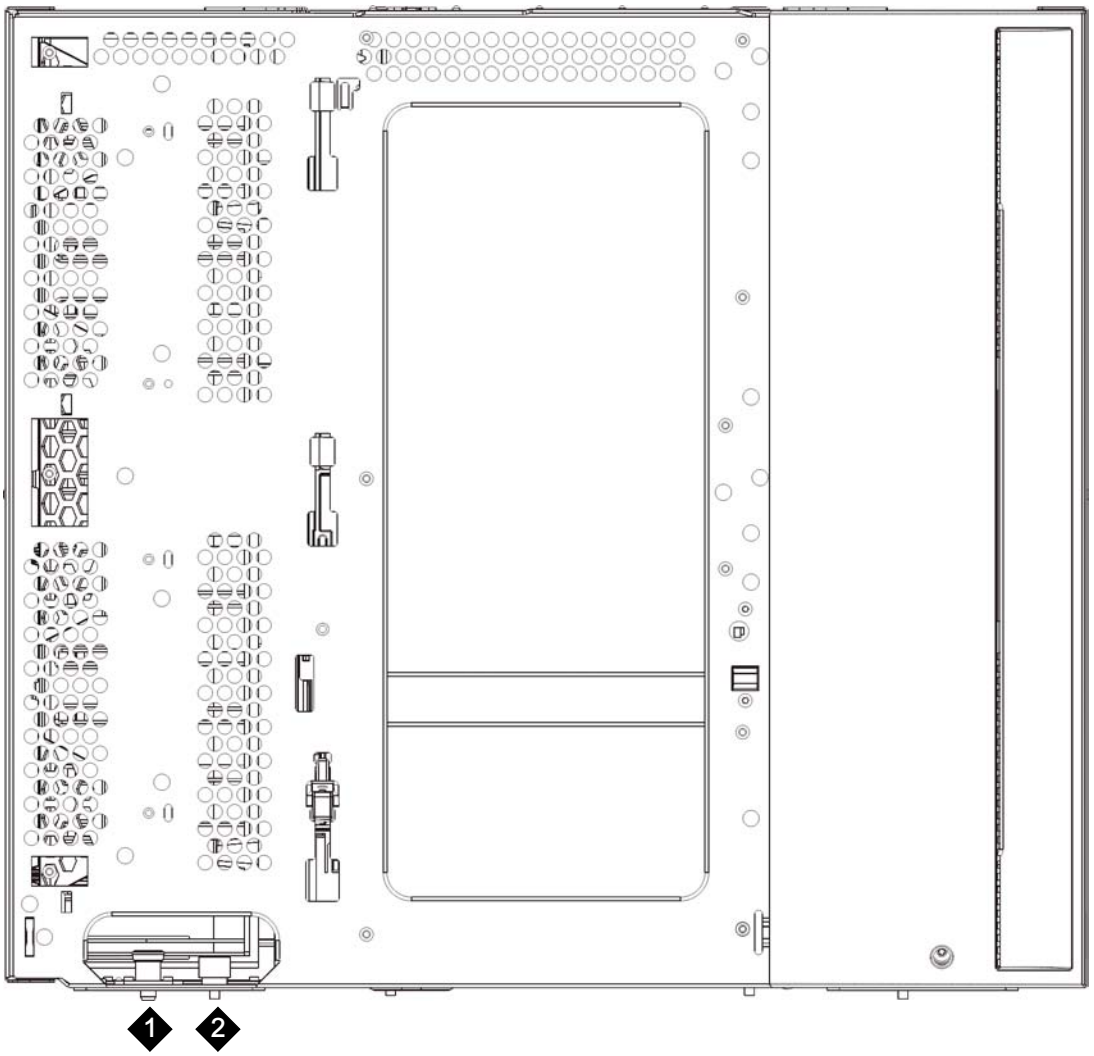
c. If you plan to stack the control module at the bottom of the library, and if a 9U expansion module will be located above it, remove the control module's top plate and the 9U expansion module's bottom plate.

Replacing the 9U Expansion Module

1 Remove all tape drives from the 9U expansion module that you are adding. See Adding, Removing, and Replacing Tape Drives on page 193 for instructions on removing tape drives.

2 Remove the power supplies from the 9U expansion module that you are adding. See Adding, Removing, and Replacing Power Supplies on page 179 for instructions on removing power supplies.

3 Open the 9U expansion module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module on which you are stacking it.



1	guide pin
2	thumbscrew

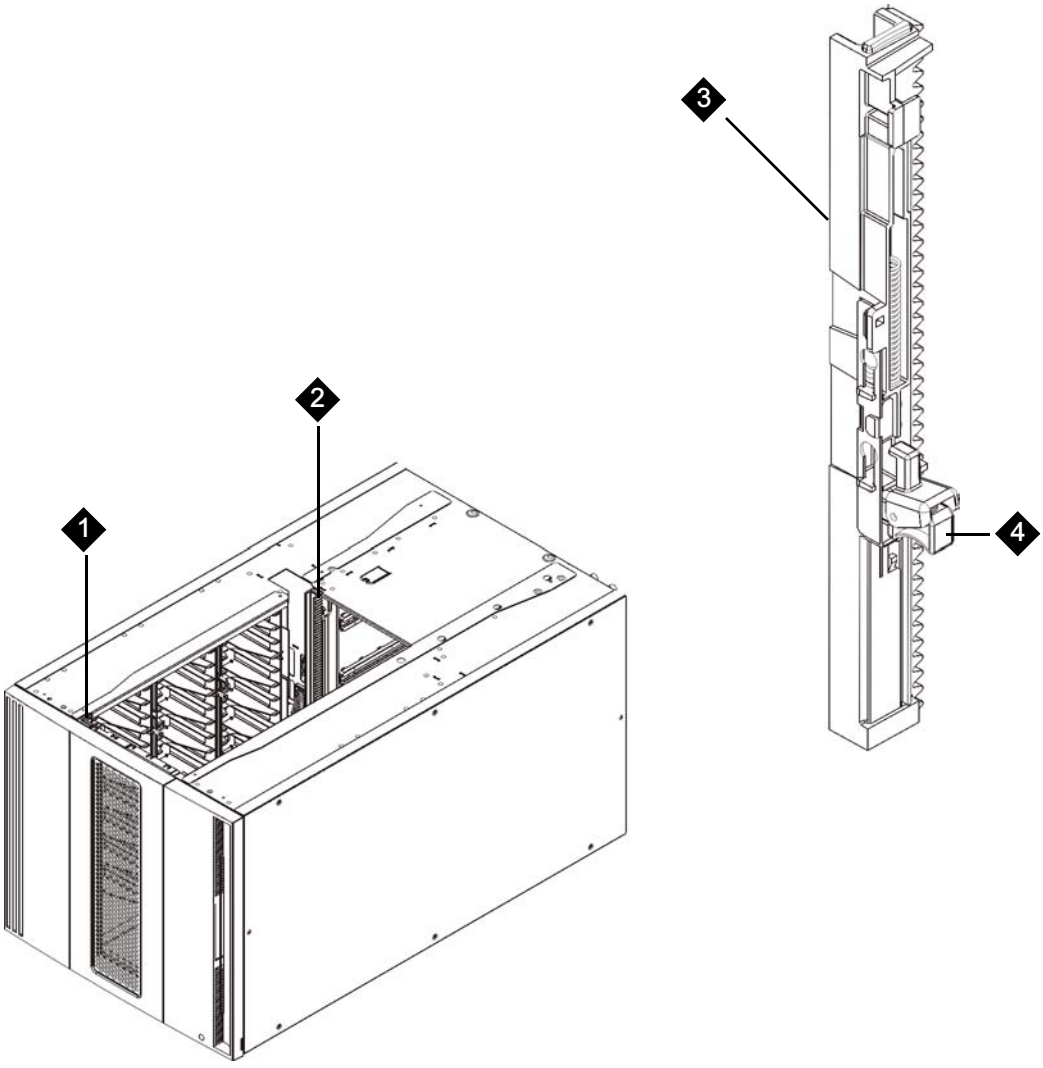
4 Lift the new 9U expansion module and, from the front of the library, place it in the desired location.

5 Fasten the module to the rack with rack ears.

6 Secure the two modules together by tightening the two thumbscrews at the base of the front of the module and the two thumbscrews located at the base of the back of the module. Then lower the module's guide pin (located at the base of the front of the module) by turning it and pushing it down.

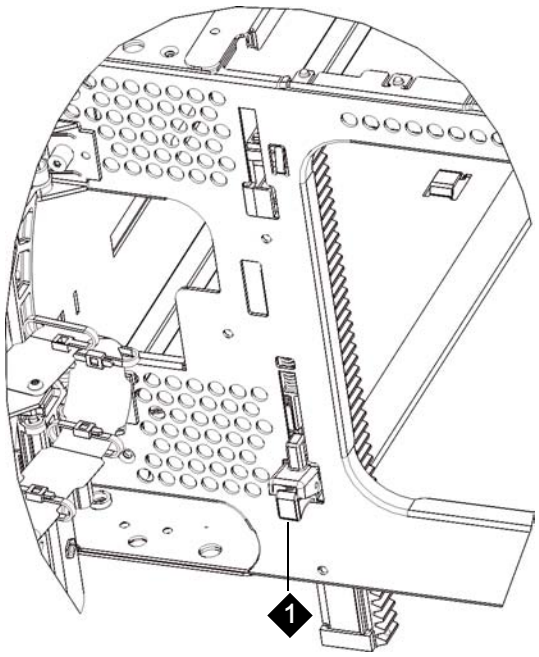
7 Tighten all thumbscrews located at the base of the front and back of the modules.

8 Engage the Y-rails of each module in your library configuration. Ensure that the Y-rails are properly aligned and the thumbscrews are tightened.



1	front Y-rail	3	Y-rail (this end up)
2	rear Y-rail	4	squeeze here to release

a. From the front of the library, open the I/E station and access doors of the 9U expansion module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.



1	Y-rail in unlocked, functional position

b. From the back of the library, find the rear Y-rail release mechanism, which is located in the interior of the right side of the module. Squeeze the handle of the Y-rail release mechanism, lift it out of its locked position, and slide it downward as far as it will go.

   Doing this aligns the Y-rails with the Y-rails of the module beneath it.

CAUTION **Check to make sure that there is no gap between the top and bottom Y-rails on both the front and back of the library. If a gap exists, the library cannot mechanically initialize.**

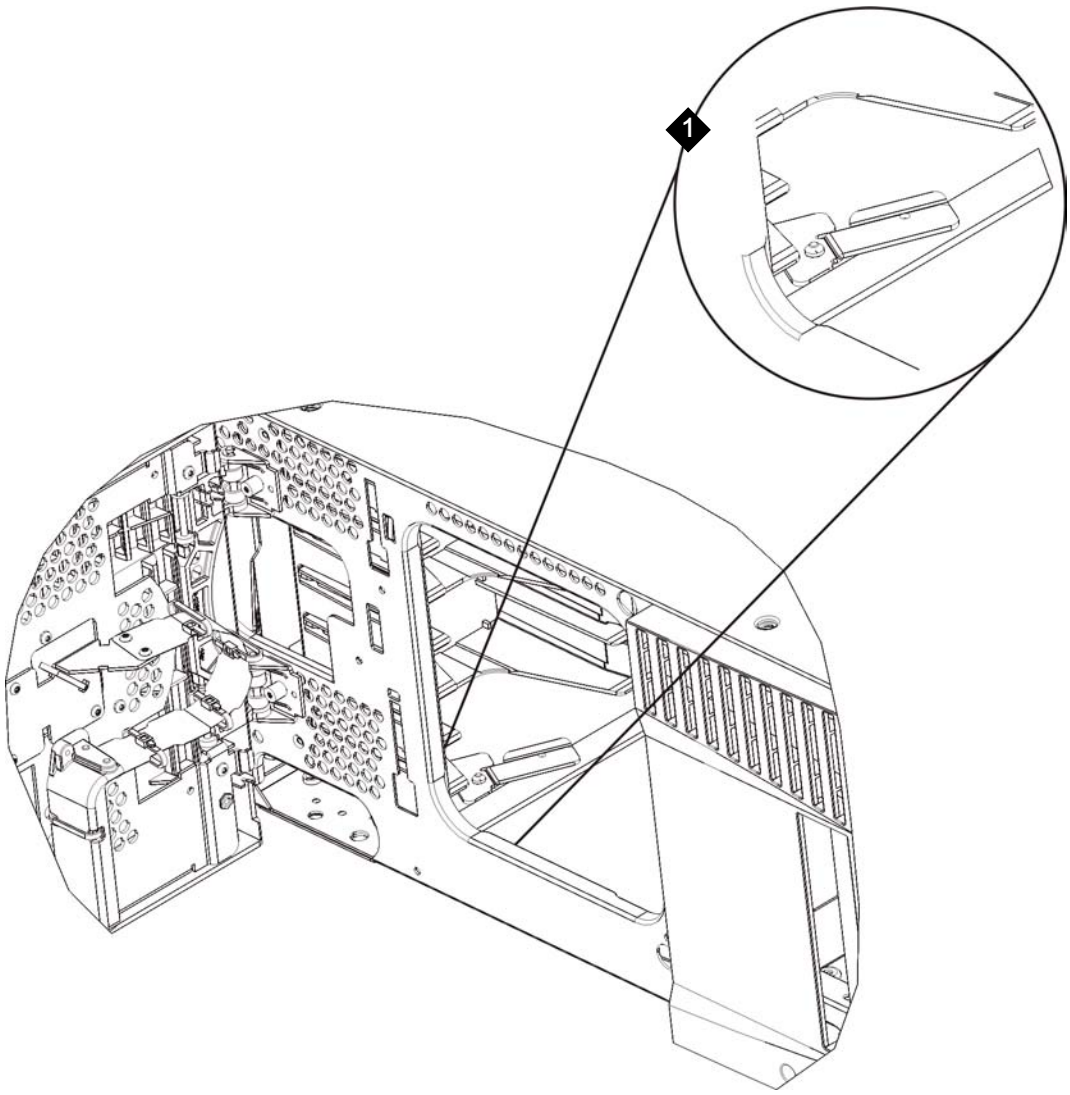
9 Unpark the robot assembly.

a. Gently raise the robot assembly so that it no longer rests on the parking tab.

CAUTION **Support the robot assembly by holding onto the broad metal X-axis plate. Lifting the robot by the thin metal rod will bend the rod.**

b. With your free hand, swivel the parking tab away from you until it is removed completely from the interior of the module. When replaced correctly, the parking tab will not accidentally swivel into the path of the robot.

c. Gently release the robot assembly. It will lower to the bottom module of the library.



1	parking tab in “unpark” position

Preparing to Use the 9U Expansion Module

1 Close the library’s I/E station and access doors.

2 Add the tape drives to the modules. For details, see Adding, Removing, and Replacing Tape Drives on page 193.

3 Add the power supplies. For details, see Adding, Removing, and Replacing Power Supplies on page 179.

4 If your library contains FC I/O blades, install both the I/O blades and the accompanying fan blades in the expansion module. For details, see Adding, Removing, and Replacing FC I/O Blades on page 196 and Adding, Removing, and Replacing the I/O Fan Blade on page 201.

5 Add the LCB to the control module. For details, see Removing and Replacing the Library Control Blade and LCB Compact Flash Card on page 176.

6 Connect all power cords, network data cables, and module-to-module cables. Make sure the module terminators are installed at the top and bottom of the stack of modules. For cabling instructions, see Cabling the Library on page 102.

7 Power on the library.

8 Once the console appears, use the operator panel or web client to delete and recreate all partitions.

9 Add the tape cartridges to the library's modules using the I/E station commands from the operator panel or web client.

10 If the host application inventories the location of each tape cartridge in the library, open the host application and reinventory in order to sync its logical inventory with the physical inventory of the library.

Removing and Replacing the Library Control Blade and LCB Compact Flash Card

The library control blade (LCB) manages the entire library, including the operator panel and picker assembly, and is responsible for running system tests to ensure that the library is functioning properly.

These instructions explain how to remove a library control blade (LCB) and replace it with a new one. The LCB compact flash card contains important information about your library configuration. If the compact flash card is replaced, then you will need to reconfigure your library.

Replacing the LCB and LCB Compact Flash Card

These instructions explain how to remove the existing LCB and existing LCB compact flash card and replace them with a new LCB and a new LCB compact flash card.

Required tools: None

1 Power off the library.

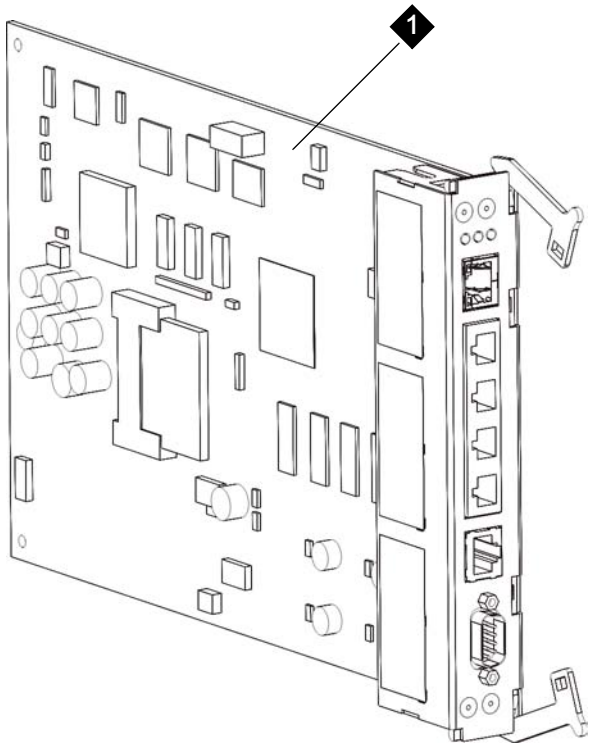
2 Access the back of the library and locate the existing LCB.

3 Disconnect all cables from the existing LCB. You may want to label each cable that is connected to the existing LCB to make sure that you can correctly reconnect them to the new LCB.

4 Remove the existing LCB from the library.

   To remove the existing LCB, release both of the LCB latch hooks and, using the latch hooks as handles, pull the entire LCB toward you.

5 Remove the existing LCB compact flash card from the existing LCB.



1	LCB compact flash card

6 Insert the new LCB compact flash card into the new LCB.

7 Insert the new LCB into the vacant LCB slot on the back of the library.

When inserting the new LCB into the slot, be sure that the LCB LEDs are located at the top of the blade, and that the latch hooks are on the right side of the blade.

When sliding the new LCB into the slot, there should be no resistance.

CAUTION **Do not force the LCB into the slot or damage may occur.**

8 After inserting the new LCB, secure it into the control module by depressing both of the LCB latch hooks into the blade. The LCB will fit snugly into its slot.

9 Reconnect all cables to the new LCB.

10 Power on the library.

11 Check the status of the LCB LEDs. All of its LEDs (blue, amber, and green) should be solidly lit for a short period of time.

12 Upgrade your library firmware.

a. Log on to the local operator panel as Admin.

b. Setup the library network on the **Network Configuration** screen.

c. Log off from the local operator panel.

d. Log on to the web client as Admin.

e. Upgrade to the appropriate level of library firmware.

   Firmware downloads are available at www.quantum.com/support.

Replacing the LCB

These instructions explain how to remove the existing LCB and existing LCB compact flash card and replace a new LCB and reuse the existing LCB compact flash card.

Required tools: None

1 Power off the library.

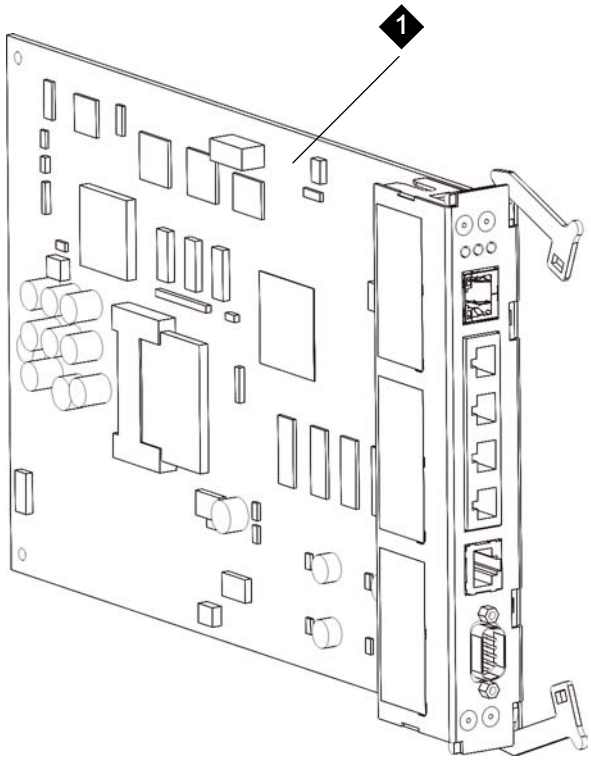
2 Access the back of the library and locate the existing LCB.

3 Disconnect all cables from the existing LCB. You may want to label each cable that is connected to the existing LCB to make sure that you can correctly reconnect them to the new LCB.

4 Remove the existing LCB from the library.

   To remove the existing LCB, release both of the LCB latch hooks and, using the latch hooks as handles, pull the entire LCB toward you.

5 Remove the existing LCB compact flash card from the existing LCB.



1	LCB compact flash card

6 Insert the existing LCB compact flash card into the new LCB.

7 Insert the new LCB (with existing LCB compact flash card) into the vacant LCB slot on the back of the library.

When inserting the new LCB into the slot, be sure that the LCB LEDs are located at the top of the blade, and that the latch hooks are on the right side of the blade.

When sliding the new LCB into the slot, there should be no resistance.

CAUTION **Do not force the LCB into the slot or damage may occur.**

8 After inserting the new LCB, secure it into the control module by depressing both of the LCB latch hooks into the blade. The LCB will fit snugly into its slot.

9 Reconnect all cables to the new LCB.

10 Power on the library.

11 Check the status of the LCB LEDs. All of its LEDs (blue, amber, and green) should be solidly lit for a short period of time.

Adding, Removing, and Replacing Power Supplies

Library power is controlled at the individual power supplies and at the front panel of the library. The switch on the rear of each power supply shuts down power at the input of the individual power supplies. The switch on the front of the control module provides power to all control module and 9U expansion module power supplies. You can also turn off library power using the web client, if necessary.

Adding a Redundant Power Supply

These instructions explain how to add a second (redundant) power supply to a module. You may need to add a redundant power supply to the library to make sure that the library does not go down (and become inaccessible) if its original power supply happens to fail. The library automatically uses the redundant power supply if the first power supply fails for any reason.

Note The control module and each 9U expansion module with drives must use at least one power supply. You can add a redundant power supply to each module.

Installing one power supply in one module and another power supply in another module does not provide redundant power; the two power supplies must reside within the same module.

Required tools: None

1 Save the library configuration.

2 Locate the vacant power supply slot and remove the cover plate. Save the cover plate in case the redundant power supply needs to be removed at a later date.

3 Insert the new power supply into the vacant slot.

When inserting the power supply, make sure that you insert it correctly with its on/off switch located at the bottom of the supply, below the handle. The power supply must be level to slide in smoothly.

4 Tighten the power supply's thumbscrews to secure the power supply to the library module.

5 Plug in the power supply cord.

6 Turn on the power supply's power, using the switch on the rear of the power supply.

7 Check the status of the power supply's LEDs. The top green LED and the blue LED should be solidly lit.

8 Power on the library.

9 Check the status of the power supply's LEDs. The two green LEDs should be solidly lit, and the blue LED should be off.

Permanently Removing a Redundant Power Supply

These instructions explain how to remove a redundant power supply from the control module. You may need to remove the second power supply if it is no longer necessary for the library.

Required tools: None

1 Save the library configuration.

2 Access the back of the library, and locate the power supply that you want to replace.

3 Turn off the power supply's power, using the switch on the rear of the power supply.

4 Disconnect the power supply cord from the power supply and from its source.

5 Loosen the power supply's thumbscrews.

6 Remove the power supply by gripping the power supply handle and pulling it toward you.

7 Install a cover plate over the vacant power supply slot.

Removing and Replacing a Power Supply

These instructions explain how to remove a power supply and replace it with a new one. You may need to replace a power supply if there are problems with one that is currently in use.

If the library has a redundant power supply, you can replace the power supply without powering off the library. If the library has only one power supply, you must power off the library before performing this procedure.

Required tools: None

1 Save the library configuration.

2 If the library does not use a second (redundant) power supply, power off the library.

3 Access the back of the library, and locate the power supply that you want to replace.

4 Turn off the power supply's power, using the switch on the rear of the power supply.

5 Disconnect the power supply's power cord.

6 Loosen the power supply's thumbscrews.

7 Remove the power supply by gripping the power supply handle and pulling it toward you.

8 Insert the new power supply into the vacant power supply slot.

When inserting the power supply, make sure that you insert it correctly with its on/off switch located at the bottom of the supply, below the handle. The power supply must be level to slide in smoothly.

9 Tighten the power supply's thumbscrews to secure the power supply to the library module.

10 Reconnect the power supply's power cord.

11 Turn on the power supply's power.

12 Check the status of the power supply's LEDs. The top green LED and the blue LED should be solidly lit.

13 Power on the library.

14 Check the status of the power supply's LEDs. The two green LEDs should be solidly lit, and the blue LED should be off.

Installing the Rackmount Kit

The rackmount kit secures your library within a rack. These instructions explain how to install your stand-alone library into a rack and how to install additional modules into an existing rack.

All Scalar i500taller than 14U must be installed in a rack.The rack secures the bottom module, and all other modules are then secured to the bottom module.

Installing the modules into the rack requires at least two people.

WARNING UNDER NO CIRCUMSTANCES SHOULD A RACK BE MOVED WHILE LOADED WITH ONE OR MORE MODULES.

WARNING WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, A 5U CONTROL MODULE WEIGHS APPROXIMATELY 58 LBS. A 9U EXPANSION MODULE, WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, EXCEEDS 65 LBS.

TO AVOID SERIOUS INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO SAFELY LIFT THE MODULES INTO POSITION.

Note The rackmount kit cannot be used with every type of rack. Racks with threaded rails or unique hole spacing, for example, may not support the rackmount kit.

Preparing Rackmount Kit for Installation

Required tools: None

1 Verify the contents of the rackmount kit. Before installing the rackmount kit, verify its contents to make sure that no parts are missing. The rackmount kit contains all parts required for installing your library into a rack.

Table 14 Rackmount Kit Contents

Component	Description	Quantity
	Small ferrule — for use in racks with round holes	8
	Large ferrule — for use in racks with square holes	8

Table 14 Rackmount Kit Contents (Continued)

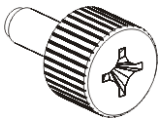
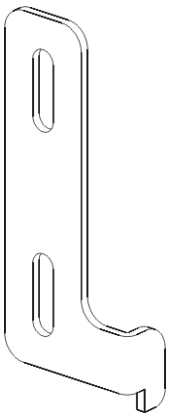
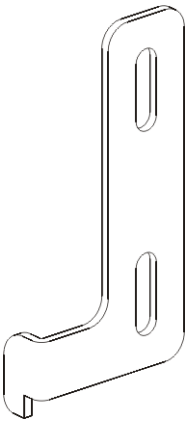
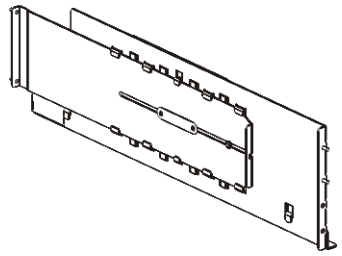
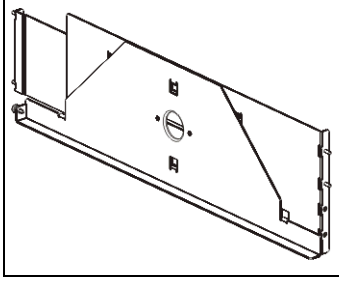
Component	Description	Quantity
	Thumbnut	8
	M5 thumbscrew	4
	Rack ear, left	1
	Rack ear, right	1

Table 14 Rackmount Kit Contents (Continued)

Component	Description	Quantity
	Rack shelf, left	1
	Rack shelf, right	1

2 Remove all rack hardware that may interfere with the installation of the rackmount kit and the modules that you plan to add to the rack.

3 Consider removing the front and back doors of the rack to obtain full access to the mounting holes and other areas of the rack.

4 Determine the type of rack in which you plan to install the rackmount kit. Different racks require different rackmount parts. Although the rackmount kit contains many parts, the parts you use depend on your rack's mounting holes.

   a. If the rack has round mounting holes, use the small ferrules and the nut clips.

   b. If the rack has square mounting holes, use the large ferrules and the cage nuts.

   c. If the rack has threaded (tapped M6) holes, do not use the ferrules, nut clips, or cage nuts.

5 Determine where in your rack you want to install the rackmount shelves.

   Consider installing the shelves at a height that puts the base of the control module anywhere between the 28U-32U alignment markers, which is usually a comfortable height for reading the operator panel. Remember, the control module can be placed anywhere within the library configuration above, below, or between any 9U expansion modules.

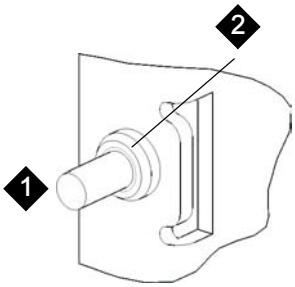
Installing the Rackmount Shelves

Required parts: Rackmount shelves, ferrules, thumbnuts

1 If the rackmount shelves are extended, collapse them to their smallest size. It is easier to fit and position the shelves within the rack when the shelves are compact.

Note Extending the shelves can be difficult, but they are designed to be resized by hand. Do not use tools to resize the shelves, and never take them apart.

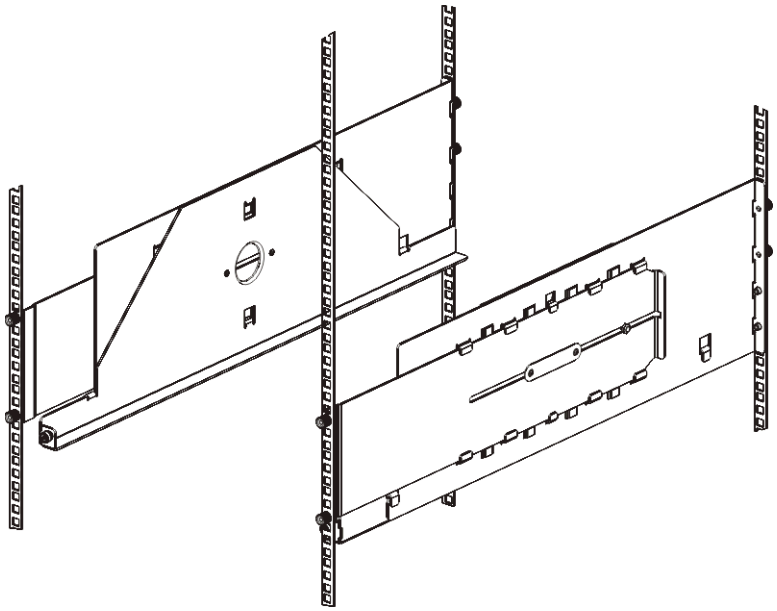
2 Place a ferrule on the end of each stud, and screw it on completely. The larger side of the ferrule should face the rack shelf, and the tapered end should face out. Be sure to use the proper size ferrule as described in Preparing Rackmount Kit for Installation on page 181.



1	ferrule
2	stud

3 Install the rackmount shelves into the rack so that they are level with one another.

a. Install the shelf's rear studs in the rack's rear mounting holes.

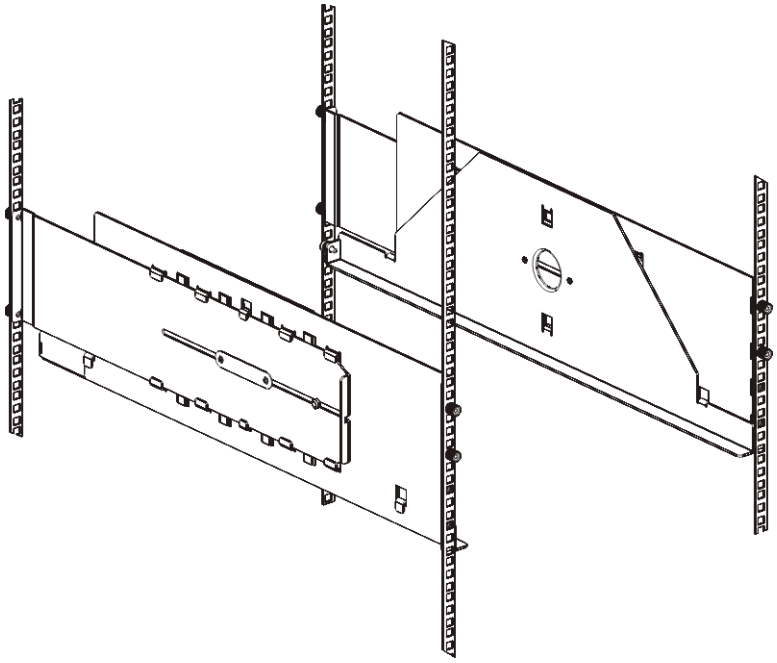


b. Position the shelf to the appropriate side of the rack (right or left) and align the shelf at the desired height.

c. Insert the shelf's rear studs into the rack's rear mounting holes.

d. Fasten a thumbnut to the end of each stud. Secure the rack tightly, so that the ferrule fits snugly within the hole in the rack.

e. Next, install the shelf's front studs in the rack's front mounting holes.



f. If the studs do not reach the mounting holes, pull the front of the shelf toward you to extend it to the necessary length. Hold the base of the shelf with one hand, and pull the extensible part of the shelf with your other hand.

Note Extending the shelves can be difficult, but they are designed to be resized by hand. Do not use tools to resize the shelves, and never take them apart.

g. Insert the shelf's front studs into the rack's front mounting holes.

h. Fasten a thumbnut to the end of each stud. Secure the rack tightly, so that the ferrule fits snugly within the hole in the rack.

4 Visually make sure that both shelves are level, and that they are aligned properly within the rack.

5 Make sure that all thumbnuts are fastened tightly. Some thumbnuts may have loosened during installation.

Preparing Your Library for Rack Installation

1 Power off your library and disconnect all power cords, network data cables, and module-to-module cables.

2 Remove all tape drives from the library modules. The modules are much easier to lift into the rack without the additional weight of the tape drives.

WARNING WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, A 5U CONTROL MODULE WEIGHS APPROXIMATELY 58 LBS. A 9U EXPANSION MODULE, WITHOUT TAPE DRIVES, TAPE CARTRIDGES, OR POWER SUPPLIES, EXCEEDS 65 LBS.

TO AVOID SERIOUS INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO SAFELY LIFT THE MODULES INTO POSITION.

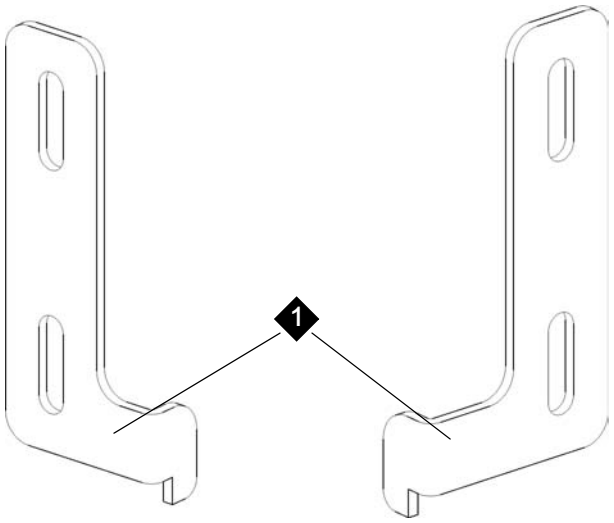
Installing Modules in the Rack

Required parts: Rack ears, M5 thumbscrews

1 Place the desired module (whichever module you want to be the bottom module of the library) onto the rack-mount shelves. From the front of the rack, lift the module onto the shelf and gently slide it into the rack. Slide the module to the back of the rack, so that the front of the module is flush with the mounting holes.

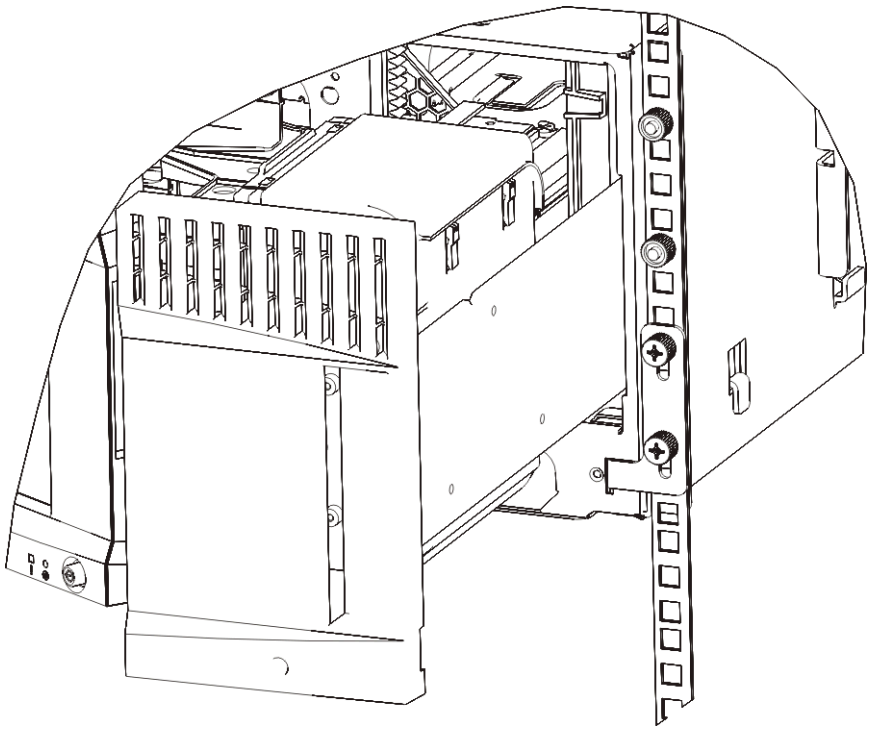
2 From the back of the rack, secure the module to the rack-mount shelves by tightening the two silver thumbscrews that are attached to the rear of the rack-mount shelves.

3 Install the right rack ear. From the front of the library, open the I/E station door. At the lower right corner of the module is a vertical slot. Insert the hinge of the right rack ear into the slot, and then position the holes of the rack ear flush with the rack rail.



1	hinge of rack ears

4 Using two M5 thumbscrews, fasten the rack ear to the rack. The thumbscrews should fasten completely and evenly.

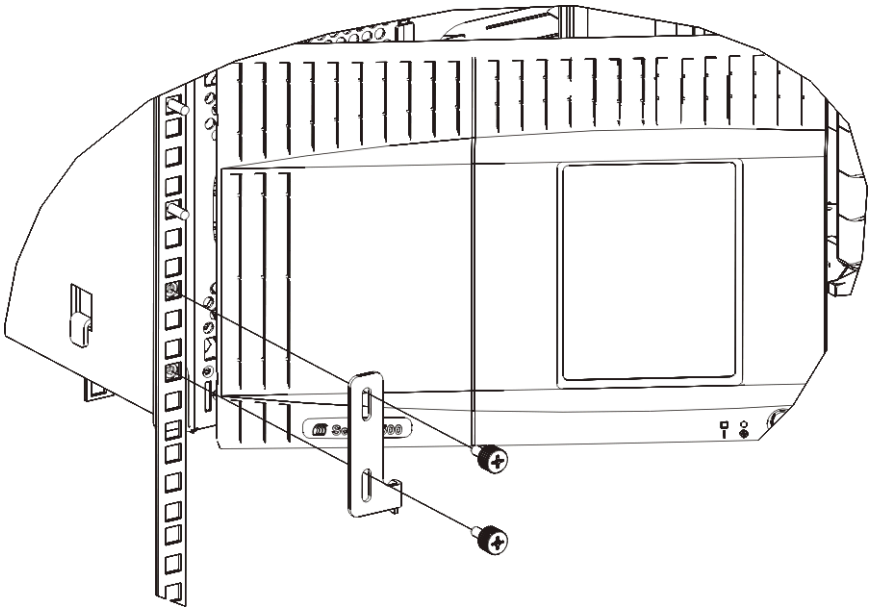


5 Install the left rack ear in the same manner that you installed the right rack ear.

a. With the I/E station door open, open the left door (the access door) of the module and locate the slot in the lower left corner of the module. Install the left rack ear in the same manner as the right rack ear. (The flexible door hinge allows the door to be pulled away from the module, providing access to the slot.)

Note You may need to pull the door toward you in order to access the slot.

b. Using two M5 thumbscrews, fasten the rack ear to the rack. The thumbscrews should fasten completely and evenly.



6 Close the module's doors.

7 Install the remaining modules of your library (if any).

8 Reinstall the tape drives in the library.

9 Cable your library as necessary, following the instructions provided in Cabling the Library on page 102.

10 Power on the library.

Installing Additional Modules Into the Rack

All modules that you add to the rack must be positioned above the module that you previously installed, since the bottom module must be secured to the rackmount shelves (unless you decide to uninstall the entire library from the rack and reconfigure it).

Required parts: Rack ears, M5 thumbscrews, nut clips or cage nuts

Explanation of parts: Each rack ear contains two elongated holes, enabling you to fasten it to the rack (using the M5 thumbscrews and either the nut clips or cage nuts) using the most accessible mounting holes.

1 Determine where in the rack to install the nut clips (or cage nuts).

Note

Consider using the following method to determine where to install the nut clips (or cage nuts) rather than adding the module to the rack first. If you add the module to the rack first, installing the nut clips (or cage nuts) can be difficult because rack space has become restricted.

a. If you are adding a module above a previously racked 9U module, count nine full units from the location of the 9U expansion module's rack ears, and prepare to install the nut clip (or cage nut) to that location on the rack.

   For example, if the 9U expansion module's rack ears are located at 1U and 2U, then the nut clips (or cage nuts) should be installed at 10U and 11U.

   Next, determine which holes you must use within the 10U and 11U markers. Notice that each rack unit (U), as delineated by the alignment markers in the rack, contains three mounting holes. If you are adding a module anywhere above the control module, position the nut clip (or cage nut) at the middle hole in that unit. If you are adding a module anywhere below the control module, position the nut clip (or cage nut) at the upper hole in that unit.

b. If you are adding a module directly above a previously racked control module, count five full units from the location of the control module's rack ears, and prepare to install the nut clip (or cage nut) to that location on the rack.

   For example, if the control module's rack ears are located at 1U and 2U, then the nut clips (or cage nuts) should be installed at 6U and 7U.

   Next, determine which holes you must use within the 6U and 7U markers. Notice that each rack unit, as delineated by the alignment markers in the rack, contains three mounting holes. If you are adding a module anywhere above the control module, position the nut clip (or cage nut) at the middle hole in that unit. If you are adding a module anywhere below the control module, position the nut clip (or cage nut) at the upper hole in that unit.

2 Install the nut clips (or cage nuts) to the desired location in the rack.

Installing nut clips:

a. Hold the nut clip so that its semi-circle design faces outside the rack.

b. Push the nut clip onto the rack's mounting holes so that the nut is behind the rack's holes. (After the nut clip is installed, you can slide it up and down the mounting holes, if necessary.)

Installing cage nuts:

a. Hold the cage nut so that its hinges face outside the rack, and so that its hinges clasp the upper and lower portions of the square hole.

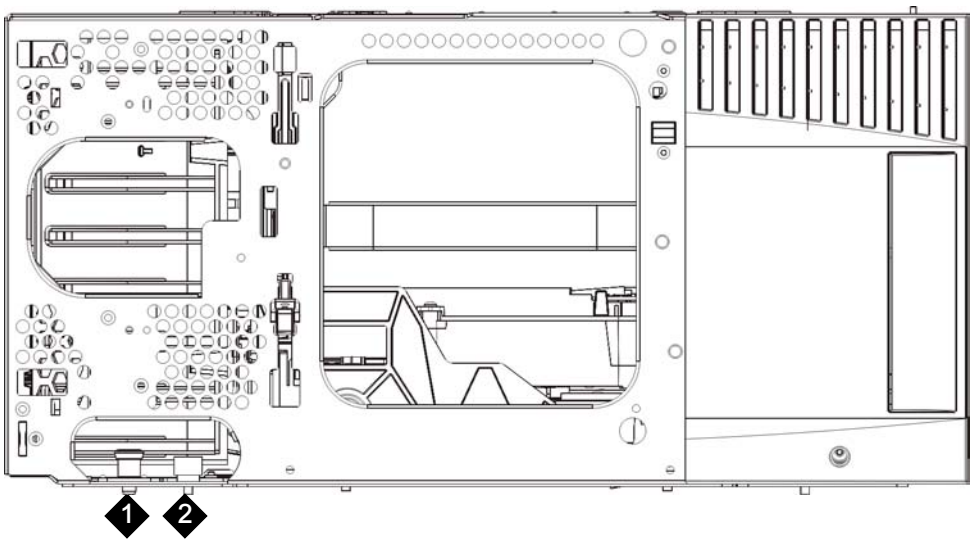
b. Place the cage nut in the desired hole. Insert one hinge in the hole first, then pinch the cage nut and push it into the hole until it snaps into place. (You may want to use a screwdriver to help push the hinge into the hole.)

3 Prepare the module to be stacked in the rack.

a. Power off the module and disconnect all power cords, network data cables, and module-to-module cables.

b. Consider removing all tape drives from the module. Modules are much easier to lift into the rack without the additional weight of the tape drives.

c. Open the module's access door and raise the guide pin by pulling it up and turning it slightly as if it were a screw. Otherwise, the guide pin may scratch the front doors of the module on which you are stacking it.

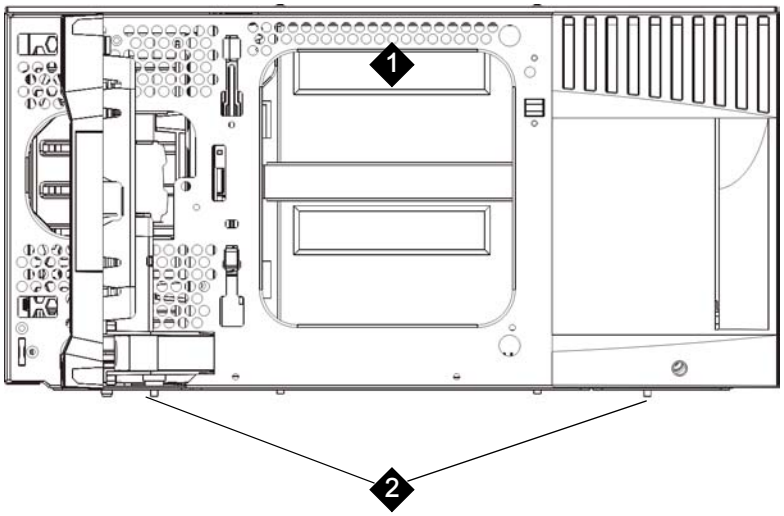


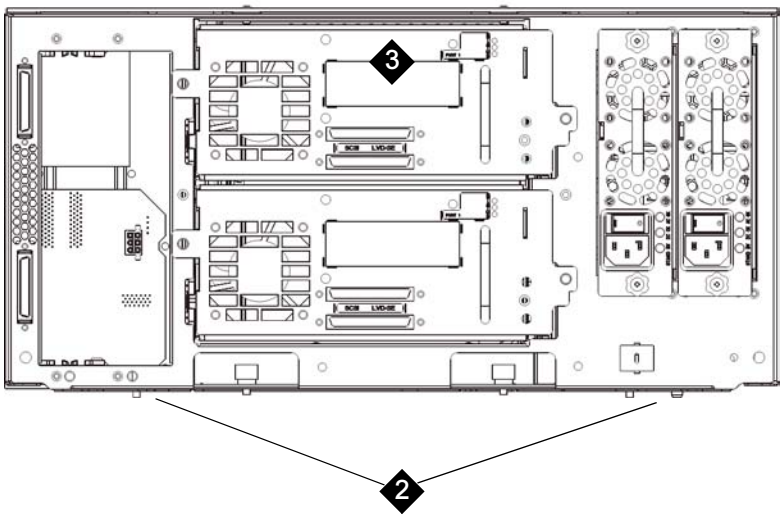
1	guide pin
2	thumbscrew

4 Lift the module, align it so that it is parallel with the module below it, and slide it into place.

5 Lower the module's guide pin by turning it and pushing it down.

6 Secure the module to the module beneath it by tightening the thumbscrews located at the base of the front and back of the module. Press down the thumbscrew, and then tighten it.

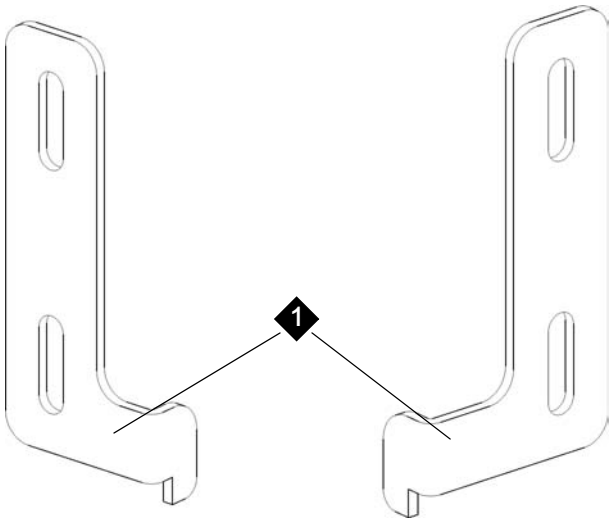




1	5U Library Control Module (front)
2	thumbscrews
3	5U Library Control Module (rear)

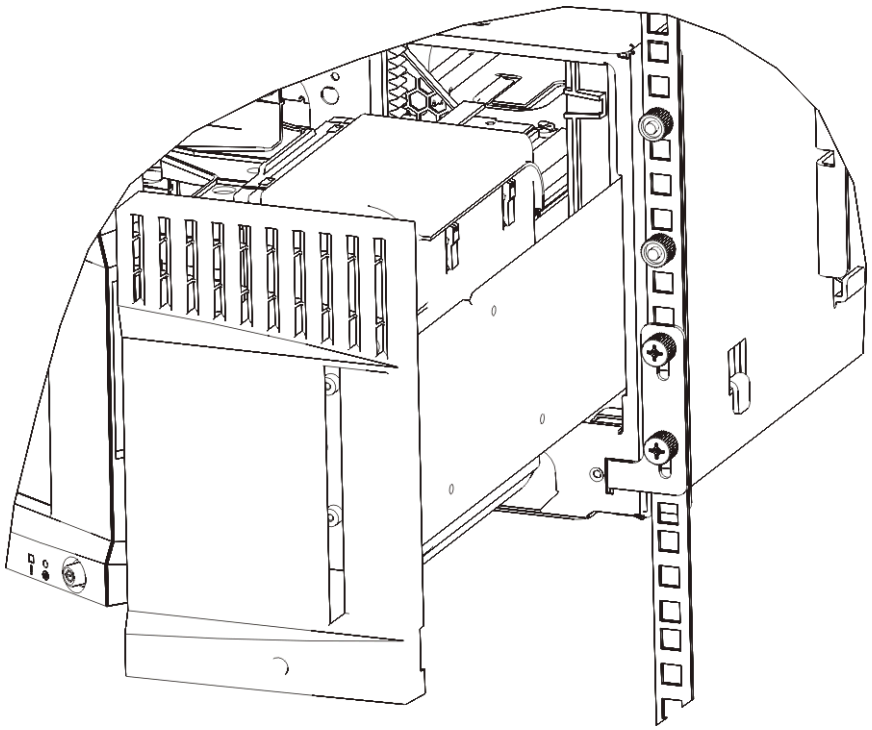
7 Install the right rack ear. At the front of the library:

a. Open the I/E station door. At the lower right corner of the module is a vertical slot. Insert the hinge of the right rack ear into the slot and then position the holes of the rack ear flush with the rack rail.



1	hinge of rack ears

b. Using two M5 thumbscrews, fasten the rack ear to the rack. The thumbscrews should fasten completely and evenly.



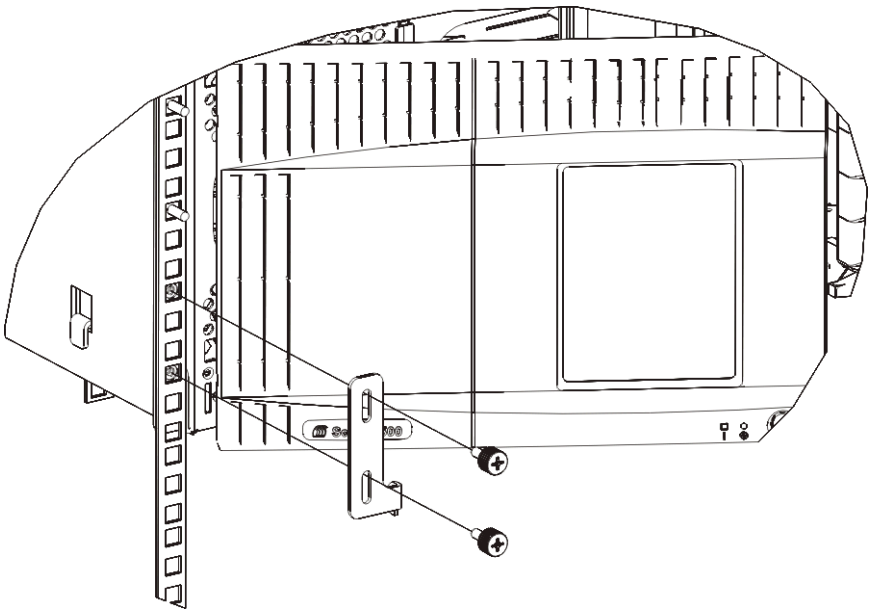
8 Install the left rack ear.

a. With the I/E station door open, open the left door (the access door) of the module and pull the door toward you in order to access the slot located in the lower left corner of the module. (The flexible door hinge allows the door to be pulled away from the module, providing access to the slot.)

Note You may need to pull the door toward you in order to access the slot.

b. Install the left rack ear in the same manner as the right rack ear.

c. Using two M5 thumbscrews, fasten the rack ear to the rack. The thumbscrews should fasten completely and evenly.



9 Close the module's doors.

10 Reinstall the tape drives to the library.

11 Cable your library as necessary, following the instructions provided in Cabling the Library on page 102.

12 Power on the library.

Adding, Removing, and Replacing Tape Drives

The tape drive enables you to connect the library to servers within your storage area network (SAN).

Note Newly added tape drives need to be installed and verified one at a time. Alternatively, all of the tape drives can be added to the drive bays at one time with no wait time between adding tape drives.

Adding a Tape Drive

These instructions explain how to add a tape drive to your library. You can add a tape drive while the library is powered on.

Required tools: None

1 Save the library configuration.

2 Detach the tape drive slot's cover plate. Loosen the cover plate's thumbscrews and remove the plate.

Store the cover plate in a separate cabinet. If you later decide to remove the tape drive, you will need to reinstall the cover plate.

3 Insert the tape drive into the drive slot. Using the guide rails on both the tape drive and in the tape drive slot, slowly slide the tape drive into the slot. The tape drive must be level to slide in smoothly.

4 Tighten the tape drive's thumbscrews to secure the tape drive to the module.

The thumbscrews must be aligned with the module's screw holes. If they are not aligned, the tape drive was not inserted correctly.

5 Power on the library (if it is not powered on already).

6 If the green LED is solidly lit for three seconds and then blinks twice, wait 10-15 minutes while the universal drive sled (UDS) firmware upgrades.

There are two types of firmware related to the tape drive: firmware for the tape drive itself, and firmware for the UDS that surrounds the tape drive. The UDS firmware is part of the library firmware. The library automatically upgrades the UDS firmware if the firmware on the newly inserted UDS is different than the library's current UDS firmware. Firmware downloads may take about 15 minutes.

7 Check the tape drive's LEDs to make sure that the drive functions correctly.

When the UDS firmware is downloading, the green LED is solidly lit for three seconds and then blinks twice. If the blue and amber LEDs never become lit, reinstall the tape drive.

8 Connect the host interface cables to the tape drive.

9 Take the tape drive online.

a. From the **Operations** menu, select **Drive > Change Mode**.

The **Change Drive Mode** screen appears.

b. Locate the tape drive that you want to take online.

c. In the **New** column, click **Offline** to change the button status to **Online**.

1 If necessary, update drive firmware by following the instructions provided in Updating Library and Tape Drive Firmware on page 95. The library can use the drive immediately after the tape drive firmware is downloaded.

Permanently Removing a Tape Drive

These instructions explain how to remove a tape drive that you do not intend to replace with another one. You may want to permanently remove a tape drive from your library if you are decreasing the size of your SAN or reducing the number of partitions in your library.

You can remove a tape drive while the library is powered on. Do not, however, remove a tape drive that is currently in use.

Required tools: None

1 Prepare host applications for tape drive removal.

2 Save the library configuration.

3 If there is a tape cartridge in the target tape drive, use the web client to eject it.

4 Using the web client, delete the partitions that uses the target tape drive. Then re-create the partition, if desired, using another tape drive.

5 Disconnect the host interface cables from the tape drive that you want to remove.

6 From the back of the library, loosen the tape drive's thumbscrews.

7 Remove the tape drive by gripping the tape drive handle and pulling the entire tape drive toward you.

8 Install a cover plate over the vacant drive slot.

   If you cannot find a cover plate, order one. It is important that all vacant slots have a cover plate to keep unwanted materials out of the library.

WARNING **RUNNING THE LIBRARY WITHOUT A COVER PLATE CAN BE DANGEROUS. DOING SO ALSO CAUSES THE LIBRARY TO RUN AT A REDUCED SPEED.**

Removing and Replacing a Tape Drive

These instructions explain how to remove a tape drive and replace it with a new one. You may need to replace a tape drive if you are experiencing problems with one that is currently in use.

You can remove a tape drive while the library is powered on. Do not, however, remove a tape drive that is currently in use.

Required tools: None

1 Prepare host applications for tape drive removal.

2 Save the library configuration.

3 Using the web client, take the tape drive offline. When the tape drive is ready for removal, its blue LED will be solidly lit.

   a. From the **Operations** menu, select **Drive > Change Mode**.

      The **Change Drive Mode** screen appears.

   b. Locate the tape drive that you want to take offline.

   c. In the **New** column, click **Online** to change the mode to **Offline**.

4 If there is a cartridge in the tape drive, use the web client to eject it.

5 Disconnect the host interface cables from the tape drive that you want to remove.

6 From the back of the library, loosen the tape drive's thumbscrews.

7 Remove the tape drive by gripping the tape drive handle and pulling the entire tape drive toward you.

8 Add the new tape drive in the vacant slot. Using the guide rails on both the tape drive and the tape drive slot, slowly slide the tape drive into the slot. The tape drive must be level to slide in smoothly.

9 Tighten the tape drive's thumbscrews to secure the tape drive to the module.

   The thumbscrews must be aligned with the module's screw holes. If they are not aligned, the tape drive was not inserted correctly.

10 Power on the library (if it's not powered on already).

11 Check the tape drive's LEDs to ensure that it functions correctly.

When the tape drive is downloading firmware, the green LED is solidly lit for three seconds and then blinks twice. Firmware begins to download as soon as the library detects a new tape drive. Firmware downloads may take more than 15 minutes.

If the blue and amber LEDs never become lit, reinstall the tape drive.

12 Connect the host interface cables to the tape drive.

13 Take the tape drive online.

a. From the **Operations** menu, select **Drive > Change Mode**.

The **Change Drive Mode** screen appears.

b. Locate the tape drive that you want to take online.

c. In the **New** column, click **Offline** to change the mode to **Online**.

14 If necessary, update drive firmware by following the instructions provided in the Updating Library and Tape Drive Firmware on page 95. The library can use the tape drive immediately after the drive firmware is downloaded.

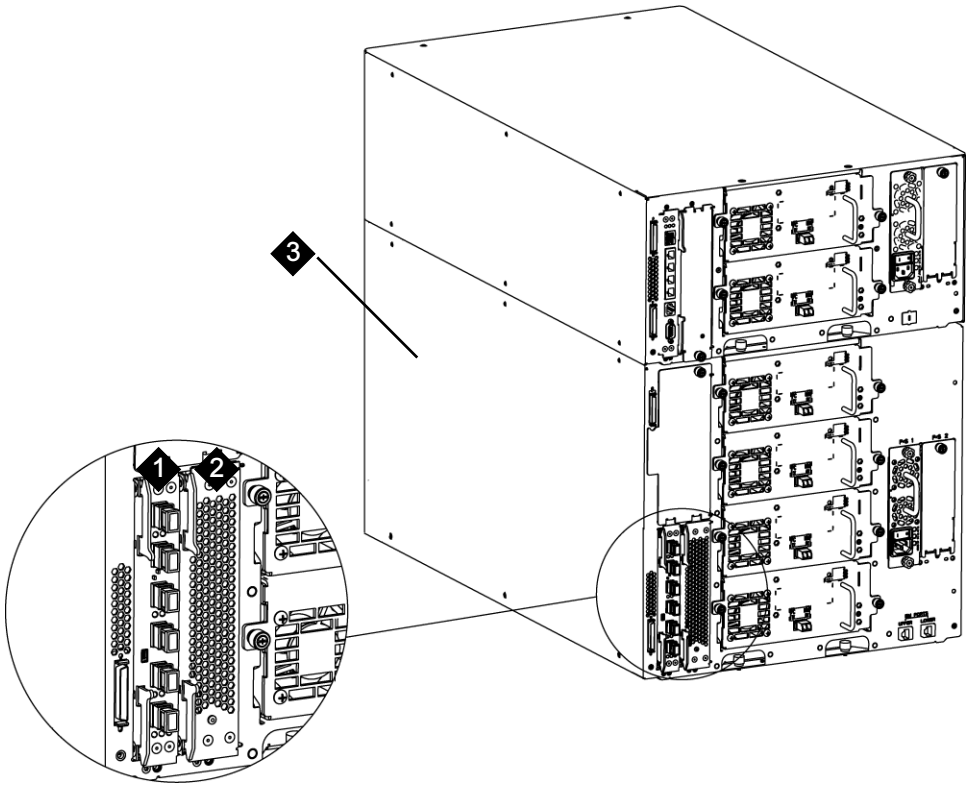
Adding, Removing, and Replacing FC I/O Blades

This section describes adding, removing, and replacing FC I/O blades. The FC I/O blades support connections to LTO-2, LTO-3, and LTO-4 FC drives.

Details about FC I/O blades include:

- Each expansion module can support up to two I/O blades. A maximum of four FC I/O blades can be present in any library configuration. A maximum of four FC drives can be connected to one FC I/O blade.
- FC I/O blades cannot be installed in control modules. However, FC tape drives in the control module can be connected to FC I/O blades in an expansion module.
- Each FC I/O blade is accompanied by a fan blade that cools the FC I/O blade. The fan blade is installed to the right of the I/O blade in the expansion module. Each expansion module has four bays and can accommodate two FC I/O blades and two fan blades. Figure 26 shows the FC I/O blade and I/O blade fan installed in the expansion module. For instructions on installing the I/O blade fan, see Adding, Removing, and Replacing the I/O Fan Blade on page 201.
- The recommended order of installing the FC I/O blade and fan blade in any expansion module is starting from the bottom two bays and moving up.

Figure 26 FC I/O Blade and Fan Blade Bays in Expansion Module



1	FC I/O blade
2	fan blade
3	expansion module

Adding an FC I/O Blade

These instructions explain how to add an FC I/O blade to your library. You can add an FC I/O blade while the library is powered on.

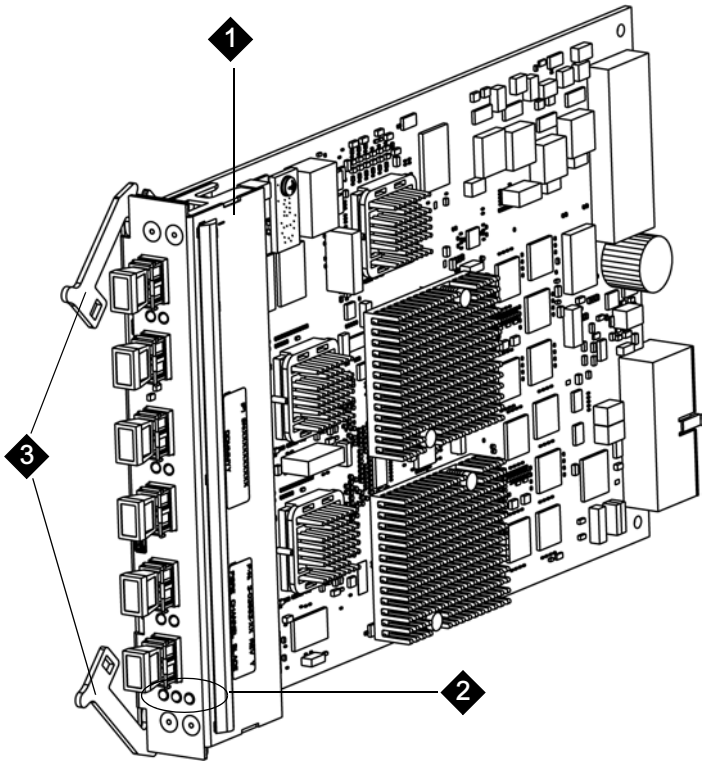
Required tools: None

1 Access the back of the expansion module.

Note The recommended order of installing the FC I/O blade and fan blade in an expansion module is starting from the bottom bay and moving up.

2 Remove the cover plate from the appropriate I/O blade bay.

3 Press up and out to open the latch hooks on each side of the I/O blade.



1	I/O blade
2	LEDs
3	latch hooks, open

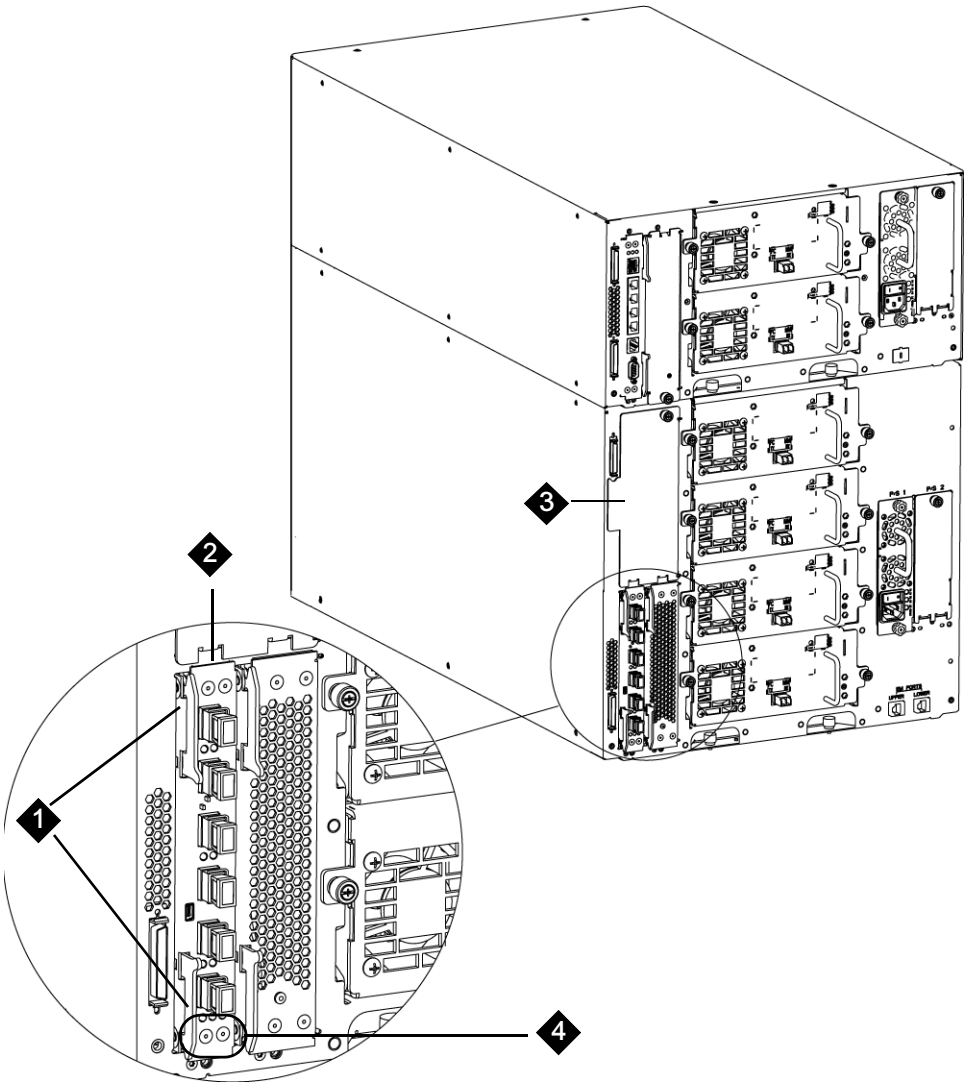
4 Carefully align the FC I/O blade with the guide slots in the bay. The status LEDs must be at the bottom.

CAUTION **Forcing the blade into the bay can cause the pins to bend.**

5 Evenly apply pressure to both sides of the blade and slide it into the expansion module until the latch hooks begin to move towards the middle of the blade. Push the latch hooks towards the middle of the blade and into the locked position. You will feel the blade pins connect with the expansion module's backplane as the blade locks into place.

Note The LEDs for the I/O blade are on the bottom of the blade when the blade is correctly installed in the expansion module.

6 Remove the necessary number of the black rubber protective covers from the ports on the FC I/O blades when you are ready to cable the blade.



1	latch hooks, locked	3	cover plate on empty bay
2	I/O blade	4	I/O blade LEDs

7 Make sure cover plates are installed over any unused bays in the expansion module.

CAUTION **Bays that are not populated with blades must contain a cover plate. If the cover plate is not installed, FC I/O blade temperature errors will occur.**

8 Cable the library as described in Connecting Library FC Cables to FC I/O Blades on page 108.

9 Save the library configuration. See About Saving and Restoring the Configuration on page 208.

Removing an FC I/O Blade

These instructions explain how to remove an FC I/O blade from your library. You can remove an FC I/O blade while the library is powered on.

Note

The library will generate a RAS ticket when you remove the I/O blade. If you do not want the library to generate a RAS ticket, you can power down the I/O blade before removing it. See Controlling FC I/O Blade Power on page 89.

Required tools: None

1 Access the back of the expansion module containing the I/O blade.

2 Tag and disconnect all FC cables from the FC I/O blade.

CAUTION

Handle the FC cables with care. They will be damaged if they are bent at more than a four inch arc.

3 Lift the latch hooks out of the locked position and push them up. You will feel the FC I/O blade unplug from the expansion module's backplane.

4 Continue lifting on the latch hooks until the blade is totally unplugged from the backplane.

5 Slide the FC I/O blade out of the expansion module.

6 Make sure cover plates are installed over any unused bays in the expansion module.

7 If you are permanently removing the I/O blade, you will need to configure the library to stop monitoring the I/O blade. See Permanently Removing FC I/O Blades on page 213.

8 Save the library configuration. See About Saving and Restoring the Configuration on page 208.

Replacing an FC I/O Blade

These instructions explain how to replace an FC I/O blade in your library. You can remove and replace a FC I/O blade while the library is powered on.

Note

The library will generate a RAS ticket when you remove the I/O blade. If you do not want the library to generate a RAS ticket, you can power down the I/O blade before removing it. See Controlling FC I/O Blade Power on page 89.

Required tools: None

1 Access the back of the expansion module.

2 If you have not already done so, remove the old I/O blade, following the directions in Removing an FC I/O Blade on page 200.

3 Press up and out to open the latch hooks on each side of the replacement I/O blade.

4 Carefully align the FC I/O blade with the guide slots in the bay. The status LEDs must be at the bottom.

CAUTION

Forcing the blade into the bay can cause the pins to bend.

5 Evenly apply pressure to both sides of the blade and slide it into the expansion module until the latch hooks begin to move towards the middle of the blade. Push the latch hooks towards the middle of the

blade and into the locked position. You will feel the blade pins connect with the expansion module's backplane as the blade locks into place.

Note The LEDs for the I/O blade are on the bottom of the blade when the blade is correctly installed in the expansion module.

6 Remove and discard the necessary number of the black rubber protective covers from the ports on the FC I/O blades.

7 Reconnect the FC cables to the appropriate FC ports on the FC I/O blade.

CAUTION **Fibre optical cables will be damaged if they are bent at more than a four inch arc.**

8 Save the library configuration. See About Saving and Restoring the Configuration on page 208.

Note After you replace the FC I/O blade, the library ensures that the FC I/O blade is loaded with the proper firmware. This firmware is based on the currently installed level of library firmware. If the autoleveling process fails, the FC I/O blade becomes inoperable and the library creates a ticket to report the issue. For information about LED behaviors on blades during autoleveling operations, see LCB and FC I/O Blade LEDs on page 215.

Adding, Removing, and Replacing the I/O Fan Blade

Each FC I/O blade is cooled by a fan blade. The fan blade is always installed in the bay to the right of the FC I/O blade. Each expansion module has four bays and can accommodate two FC I/O blades and two fan blades.

The recommended order of installing the FC I/O blade and fan in the expansion module is starting from the bottom two bays and moving up.

Figure 26 on page 197 shows the FC I/O blade and I/O blade fan installed side-by-side in the expansion module.

Adding an I/O Fan Blade

These instructions explain how to add an I/O fan blade to your library. You can add an I/O fan blade while the library is powered on.

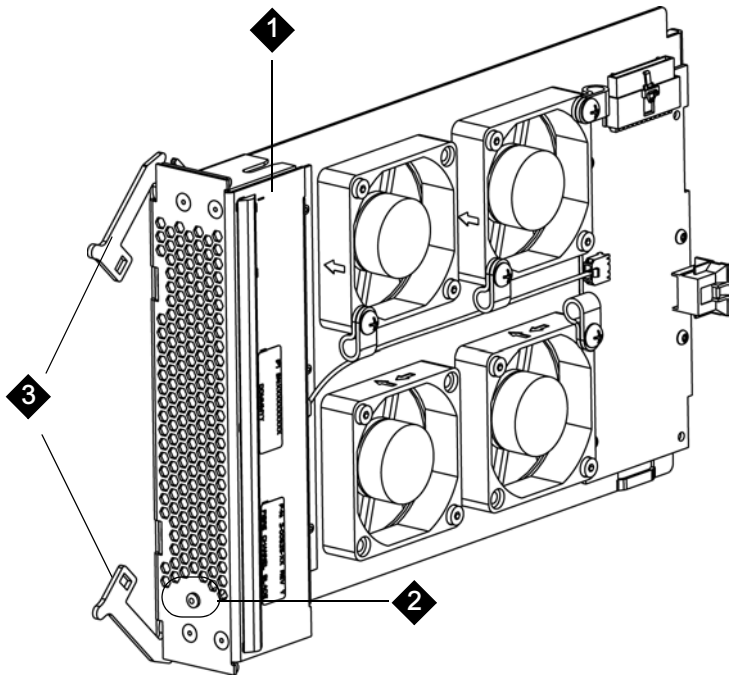
Required tools: None

1 Access the back of the expansion module.

2 Remove the cover plate from blade bay to the right of the bay for the FC I/O blade.

Note The recommended order of installing the FC I/O blade and fan blade in an expansion module is starting from the bottom two bays and moving up.

3 Press up and out to open the latch hooks on each side of the I/O fan blade. The LED must be at the bottom of the blade.



1	I/O Fan blade
2	LED
3	latch hooks, open

CAUTION **Forcing the blade into the bay can cause the pins to bend.**

4 Evenly apply pressure to both sides of the blade and slide it into the expansion module until the latch hooks begin to move towards the middle of the blade. Push the latch hooks towards the middle of the blade and into the locked position. You will feel the blade pins connect with the expansion module's backplane as the blade locks into place.

Note The LED for the I/O fan blade is on the bottom of the blade when the blade is correctly installed in the expansion module.

5 Save the library configuration. See About Saving and Restoring the Configuration on page 208.

Removing an I/O Fan Blade

These instructions explain how to remove an I/O fan blade from your library. You can remove an I/O fan blade while the library is powered on.

Required tools: None

1 Access the back of the expansion module containing the I/O fan blade.

2 Lift the latch hooks out of the locked position and push them up. You will feel the I/O fan blade unplug from the expansion module's backplane.

3 Continue lifting on the latch hooks until the blade is totally unplugged from the backplane.

4 Slide the I/O fan blade out of the expansion module.

5 If you are permanently removing the I/O fan blade, place a cover on the empty bay.

6 Save the library configuration. See About Saving and Restoring the Configuration on page 208.

Replacing an FC I/O Fan Blade

These instructions explain how to replace an I/O fan blade in your library. You can remove and replace an I/O fan blade while the library is powered on.

Required tools: None

1 Access the back of the expansion module.

2 If you have not already done so, remove the old I/O fan blade, following the directions in Removing an I/O Fan Blade on page 202.

3 Press up and out to open the latch hooks on each side of the replacement I/O fan blade.

4 Carefully align the I/O fan blade with the guide slots in the bay. The status LED must be at the bottom.

CAUTION **Forcing the blade into the bay can cause the pins to bend.**

5 Evenly apply pressure to both ends of the I/O fan blade and slide it into the expansion module until the latch hooks begin to move towards the middle of the blade. As you push in on the blade, you will feel the blade pins connect with the expansion module's backplane.

6 Push the latch hooks into the locked position.

7 Save the library configuration. See About Saving and Restoring the Configuration on page 208.

9

Troubleshooting

The Scalar i500 library includes advanced system monitoring and alerting mechanisms that inform you of library status and issues. It provides you with status information about various library subsystems and components. It also notifies you of issues it detects and guides you through diagnosing and correcting issues before problems interfere with backups.

About RAS Tickets

The Scalar i500 library uses advanced problem detection, reporting, and notification technology to alert you of problems as soon as they occur. The library performs numerous self-tests to monitor the library's temperature, voltage and currents, and standard library operations. It performs these self-tests each time the library is powered on and during normal operation when the library is idle.

If the self-test detects a problem, the library generates a Reliability, Availability, and Serviceability (RAS) ticket that identifies the component that is likely causing the problem. The library's light emitting diodes (LEDs) may also turn on or off and flash to indicate an abnormal state. If the problem is not severe, the library continues to provide full functionality to all unaffected partitions.

When possible, the RAS ticket provides instructions for resolving problems. You can view RAS tickets on both the operator panel and the web client. Access the library's online Help system if you have questions about the instructions provided. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

You can frequently resolve a simple problem yourself, but if the problem is complex or involves a field replaceable unit (FRU), you will be directed to contact service. Only qualified service technicians can service FRUs.

Viewing RAS Tickets

Selecting **All RAS Tickets** from the **Tools** menu on both the operator panel and the web client opens the **All RAS Tickets** screen, which lists RAS tickets in the order in which they were generated, beginning with the most recent. Included in the list is a brief description of the error condition captured by the RAS ticket. The **All RAS Tickets** screen allows you to view RAS ticket details and navigate to ticket resolution information. If you want to request technical support, the **Ticket Details** and **Ticket Resolve** windows provide a link to the online service request web site.

The initial status of all RAS tickets is Unopened. Once the administrative user selects the **Resolve** button on the **All RAS Tickets** screen for a ticket, its status changes to Opened. When the user closes the ticket, its status changes to Closed. You can view Opened and Unopened tickets on both the operator panel and the web client, but you can view Closed tickets only on the web client.

The paths to open the appropriate screens are:

- From the web client, select **Tools > All RAS Tickets**.
- From the operator panel, select **Tools > All RAS Tickets**.

Resolving RAS Tickets

Administrative users can resolve some RAS tickets. Others must be resolved by Service personnel. Only one person at a time can resolve a ticket. Multiple users can, however, view ticket details simultaneously. If your web client session goes down while resolving a RAS ticket, you must wait 3 minutes before you can continue resolving the RAS ticket from either theweb client or the operator panel.

1 Log in to the web client.

2 From the **Tools** menu, select **All RAS Tickets**.

The **Tools - All RAS Tickets** screen appears.

3 Identify the RAS ticket you want to resolve.

Note — You can use the **Go to RAS Ticket** text box at the bottom of the screen to locate a specific RAS ticket number. In addition, if there is more than one page of RAS tickets, use the **Page 1 of x** arrows to view the additional tickets.

4 Click **Resolve**.

The **Ticket Resolution** window appears. This window contains information on how to resolve the ticket.

5 Review the description.

6 Do one of the following:

a. To close the ticket now, click **Close**. The **Tools - All RAS Tickets** window displays, with the RAS ticket no longer in the list. The task is complete and the RAS ticket is resolved.

b. To leave the ticket open for future troubleshooting, click **Exit**. Then you can perform the diagnostic steps you need to resolve a related RAS ticket.

If you want to request technical support, the **Ticket Resolve** window provides a link to the online service request web site.

Note — To display all closed tickets, select the **Include Closed Tickets** check box at the bottom of the screen. The **Tools - All RAS Tickets** screen refreshes, with the **Resolve** button unavailable for all closed RAS tickets.

The path to open the appropriate screen is:

- From the web client, select **Tools > All RAS Tickets**.

Capturing Snapshots of Library Information

Technical support personnel may ask you to perform the Capture Snapshot operation, so they can better diagnose issues. The Capture Snapshot operation captures detailed information about the entire library in a single binary file that can be e-mailed to technical support personnel. You can also choose to create the snapshot in ASCII-readable format.

The logged information consists of configuration data, status information, and trace logs for library components. Trace logs collect problem data and provide support personnel with vital library information for troubleshooting and solving problems.

You can e-mail the Capture Snapshot file from both the operator panel and the web client. On the web client, you can also download the Capture Snapshot file to a computer. You cannot download Capture Snapshot files from the library's operator panel, and you cannot print Capture Snapshot files from either the web client or the operator panel.

Depending on the library configuration and your connection speed, saving the Capture Snapshot file takes approximately 30 minutes. The resulting file size can be large. Your firewall file-size limitations could prohibit you from e-mailing the file.

On the web client, ensure that the library e-mail account is appropriately configured before you perform the Capture Snapshot operation, so that the library can send Capture Snapshot files to the recipient. If the library e-mail account address is not configured, an error appears. For information on setting up the e-mail account, see Configuring the Library E-mail Account on page 55.

The paths to open the appropriate screens are as follows:

- From the web client, select **Tools > Capture Snapshot**.
- From the operator panel, select **Tools > Capture Snapshot**.

E-mailing the Library Configuration Record

Administrative users can use the **Tools - Email Configuration Record** screen on the web client to e-mail the library configuration record. The library configuration record contains details about the library's configuration and can be e-mailed to a specified e-mail address.

Do not enter more than one e-mail address in the **E-mail Address** text box on the **Tools - Email Configuration Record** screen. If you need to send the configuration record to multiple e-mail addresses, repeat the procedure for each e-mail address.

Before you can e-mail the configuration record, the library e-mail account must be configured. For information on setting up the e-mail account, see Configuring the Library E-mail Account on page 55.

Information in the library configuration record includes:

- Product information — vendor, model, product ID, product version (library firmware version), and serial number
- Capacity on Demand (COD) license information — licensed slots and expiration date
- Module information — vendor, module type, module serial number, and module location coordinates
- Tape drive information:
  - SCSI tape drives — partition name, number of tape drives in partition, drive location, SCSI element address, online status, active status, ready state, vendor, model, serial number, tape drive firmware version, drive type, logical serial number, interface type, SCSI ID, and LUN
  - Fibre Channel (FC) tape drives — partition name, number of tape drives in partition, drive location, SCSI element address, online status, active status, ready state, vendor, model, serial number, tape drive firmware version, drive type, logical serial number, interface type, world wide name (WWN) loop ID, topology, speed, and actual speed

Note

If the FC tape drive is attached to an FC I/O blade, the WWN indicates the WWN of the I/O blade, not the tape drive.

- Serial Attached SCSI (SAS) tape drives — partition name, number of tape drives in partition, drive location, SCSI element address, interface type, drive type, ready state, online status, barcode, media type, element address, vendor, model, physical serial number, logical serial number, SCSI ID, firmware level, control path status
- I/O blade information — blade number, blade ID, location coordinates, serial number, WWN, firmware version, and control LUN
- Partition information — number of partitions, number of cleaning slots, number of unassigned slots, number of import/export (I/E) slots, I/E manual assignment setting, partition name, number of slots, number of tape drives, and number of cartridges

You cannot e-mail the library configuration record from the operator panel. The path to open the appropriate screen is as follows:

- From the web client, select **Tools > Email Configuration Record**.

About Saving and Restoring the Configuration

The library has many configurable items, such as tape drive IDs, partitions, user accounts, Import/Export (I/E) stations, and cleaning slots. In the event of a hardware failure or firmware upgrade, the save and restore operations can be used to restore the library's configurable items to a previous state.

Note

The Saving and Restoring operations should not be performed concurrently by multiple administrative users logged in from different locations. You can access the screens, but you cannot apply changes while another administrative user is performing the same operation.

Saving the Configuration

CAUTION

Always save the library configuration after modifying a configurable item and before upgrading firmware. This allows you to restore the most current settings if necessary.

This operation saves your current library configuration and library firmware. Save your library configuration when it is in a known working state. In the event of a hardware failure, the saved configuration can be used to restore the configuration after hardware repairs are made. Before initiating a firmware upgrade, you should save the library configuration. You then have the option to restore the configuration after either a successful or an unsuccessful upgrade.

The Save/Restore Configuration operation is available only on the web client. The path to open the appropriate screen is:

- From the web client, select **Tools > Save/Restore Configuration**.

Restoring the Configuration and Library Firmware

You can use the **Restore System Configuration** screen to restore the library's configurable items to a previous state using a saved configuration file. If you updated the library firmware since last saving the configuration, the library automatically restores the library firmware to the version that was saved with the configuration.

You can also downgrade library firmware to an earlier version using the **Tools > Update Library Firmware** command. Note that you will lose all your current library configuration information except for network settings, date and time, and license keys. You can restore the other configurable items using a configuration file that was saved when the earlier version of library firmware was installed on the library, or you can reconfigure your library's settings.

The Save/Restore Configuration operation is available only on the web client. The path to open the appropriate screen is:

- From the web client, select **Tools > Save/Restore Configuration**.

Troubleshooting "Library Not Ready" Messages

The operator panel and web client user interfaces each include a header that contains the company logo, product name, and the three main navigation buttons **Home**, **Help**, and **Logout**. In addition, a message in the header alerts you when the library is not ready. (No message displays in the header when the library is in a ready state.)

On the operator panel, **LIBRARY NOT READY** flashes at regular intervals whenever the library robotics are not yet ready to perform library functions. To view more information about the library's condition, select **Tools > About Library**. The **State** field on the **About Library** screen will display **Not ready**, followed, when applicable, by a brief explanation. For example, if the library door is open, the **State** field will display: **Not ready, door is open**.

The header in the web client user interface also alerts you when the library is not ready. For instance, if the library door is open, the header will display the following message: **Library's door is open**.

"Library Not Ready" messages appear in the header in the operator panel and the web client user interfaces under the following circumstances:

- The robot is in the process of calibrating. When the robot has finished calibrating, the "Library Not Ready" message will no longer appear.
- The robot cannot calibrate. For example, a fiducial label is missing, preventing the robot from calibrating.
- The robot requires manual intervention. For example, the picker contains a tape cartridge that it cannot unload.
- The library door is open. The robot will not operate if the door is open.
- If none of the above situations apply, but the library is still not ready to operate, the header will display a "Library Not Ready" message without additional detail. The library generates a RAS ticket whenever the library enters a "not ready" state. The RAS ticket may provide information that can help you troubleshoot the problem. See Viewing RAS Tickets on page 205 for more information.

"Library Not Ready" messages continue to display in the header as well as on the **About Library** screen until the issue has been resolved, and the robot has completed its calibration.

Note

You may not see the "Library Not Ready" message in the web client user interface until the browser refreshes. Similarly, even if the problem has been resolved, the "Library Not Ready" message will not disappear from the web client user interface until the browser refreshes.

Duplicate Devices Discovered

If both target ports (ports 1 and 2) on an I/O blade are connected to the same host, or if more than one host is connected to a target port, you may see duplicates of all the devices connected to the initiator ports (ports 3 – 6) of that FC I/O blade. To prevent this from happening, you can do either (or both) of the following:

- If only one host is connected to a target port, you can use channel zoning to tell the target port which devices to see (see Configuring FC I/O Blade Channel Zoning on page 64).
- If more than one host is connected to a target port, you can use host mapping to tell each host which devices to see (see Configuring Host Mapping on page 68).

Duplicate Media Changers Discovered

You may see one or more medium changers being discovered multiple times. For information on why this happens, see I/O Blade Internal Virtual Port for Media Changers on page 64.

To prevent this, do the following:

1. Ensure that host mapping is enabled (see Enabling/Disabling FC Host Mapping on page 65).
2. Assign each media changer a unique LUN and map each one to the appropriate host (see Configuring Host Mapping on page 68).

Identifying Tape Drives

You can use the operator panel and the web client user interfaces to view information about all tape drives installed in the library. In addition, you can identify tape drives, including the control path tape drive, in selected partitions. The web client also allows you to identify tape drives that are not assigned to specific partitions. On the web client, you can only identify tape drives that are in a ready state.

The operator panel **Drive Information** screen lists the following information for each tape drive:

- Control path tape drive status — yes/no
- Vendor
- Model
- Type
- Serial number
- Tape drive firmware version
- Sled boot version
- Sled application version
- Mode status — online/offline, ready/not ready
- Loaded status — unloaded/loaded
- SCSI ID for SCSI tape drives
- World Wide Node Name (WWNN) for Fibre Channel (FC) tape drives
- SAS address for SAS tape drives

The web client **Identify Drives** screen lists the following information for each tape drive:

- Location coordinates
- Mode status — online/offline

- State — ready/not ready
- Drive type
- Protocol
- Control path tape drive status — yes/no
- Vendor
- Physical serial number (P-SN)
- Logical serial number (L-SN)
- Tape drive firmware version

Note — Bold column headings in the table can be sorted. For example, selecting the **Location** column heading will sort by location coordinates.

On the operator panel **Drive Information** screen, you can identify the tape drives assigned to the selected partition as well as the control path tape drive for the partition by flashing the green light-emitting diodes (LEDs) on the back of the tape drives.

- Use the **Identify All** button to flash the green LEDs on the back of the tape drives assigned to the partition. The LEDs blink 10 times per second for one minute.
- Use the **Identify Ctrl Path** button to flash the green LED on the back of the control path tape drive for the partition. The control path tape drive is used to connect each partition to the host application. Use this button when you are cabling the library or troubleshooting the library control paths of tape drives. The green LED blinks 10 times per second for one minute.

On the web client **Identify Drives** screen, you can identify the tape drives assigned to a particular partition, all unassigned tape drives, and the control path tape drive for each partition by flashing the green LEDs on the back of tape drives that are in a ready state:

- Use the **Identify All** button to flash the LEDs on the back of the selected tape drives. Only tape drives in a ready state will flash. If you have selected a specific partition or have only one partition configured, all the green LEDs on the tape drives within the partition will blink. If you have selected **Unassigned**, all the green LEDs on the unassigned tape drives will blink. If you have selected **All**, the green LEDs on all tape drives installed in the library will blink.
- Click **Identify Control Path** to flash the green LEDs on the back of the one or more control path tape drives. Only tape drives in a ready state will flash. The control path tape drive is used to connect each partition to the host application. Use this button when you are cabling the library or troubleshooting the library control paths of tape drives. If you have selected a partition, the green LED on the partition's control path tape drive will blink. If you have selected **All**, the green LEDs on all the ready control path tape drives will blink.

Note — There is no control path tape drive for a partition that uses FC I/O blades to connect tape drives to a host application.

The paths to open the appropriate screens are as follows:

- From the web client, select **Tools > Identify Drives**.
- From the operator panel, select **Tools > Drive Info**.

Retrieving Tape Drive Logs

Administrative users can use the web client to retrieve tape drive logs. Tape drive log information can be used to help troubleshoot library and tape drive issues. You can use the **Retrieve Drive Log** screen to select the appropriate tape drive.

Note

Bold column headings in the table can be sorted. For example, selecting the **Location** column heading will sort by location coordinates.

Details on retrieving tape drive log files include:

- Since the log retrieval process can take up to 30 minutes, the tape drive and associated partition are automatically taken offline during the operation and brought back online when the operation completes. You will be asked to confirm that you want to take the tape drive and partition offline.
- Tape drive logs adhere to the following naming convention: **UDS_ID_SN.dmp**, where **ID** identifies the tape drive coordinate location within the library and **SN** identifies the tape drive serial number.
- You can select the interface type (SCSI, SAS, or FC) of the tape drive from which you want to retrieve logs.

For more detailed, step-by-step instructions, see your library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

You cannot retrieve tape drive logs from the operator panel. The path to open the appropriate screen is as follows:

- From the web client, select **Tools > Drive Operations**.

Retrieving Tape Drive Sled Logs

Administrative users can retrieve tape drive sled logs. Tape drive sled log information can be used to help troubleshoot library, tape drive sled, and tape drive issues. You can use the **Retrieve Drive Sled Log** screen to select the appropriate tape drive sled.

Note

Bold column headings in the table can be sorted. For example, selecting the **Location** column heading will sort by location coordinates.

Details on retrieving tape drive sled log files include:

- The tape drive and associated partition are automatically taken offline during the operation and brought back online when the operation completes. You will be asked to confirm that you want to take the tape drive and partition offline.
- Tape drive sled logs adhere to the following naming convention: **UDS_ID_SN.LOG**, where **ID** identifies the tape drive sled coordinate location within the library and **SN** identifies the tape drive sled serial number.
- You can select the interface type (SCSI, SAS, or FC) of the tape drive sled from which you want to retrieve logs.
- A **Save** dialog allows you to specify where you want to save the tape drive sled log files file.

For detailed, step-by-step instructions, see your library's online Help. To access the online Help system, click the **Help** icon at the top right of the web client or operator panel user interface.

You cannot retrieve tape drive sled logs from the operator panel. The path to open the appropriate screen is as follows:

- From the web client, select **Tools > Drive Operations**.

Identifying FC I/O Blades

Administrative users can flash the green LED on a selected FC I/O blade to identify the physical location of the I/O blade in the library. After performing this blade operation, go to the back of the library and identify the I/O blade with the rapidly blinking LED at the bottom of the I/O blade. The LED will blink for one minute.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **I/O Blades** > **Blade Control**.
- From the operator panel, select **Setup** > **I/O Blades** > **Blade Control** > **Identify Blade**.

Permanently Removing FC I/O Blades

Library firmware monitors all FC I/O blades after they are installed in the library. Once an I/O blade is installed, the library expects the blade to be in the same installed location after every power cycle.

If an I/O blade is relocated or is permanently removed from the library, the library firmware must be configured to stop monitoring the blade. Administrative users can perform this operation by selecting the I/O blade and performing the remove blade operation on the **Setup - Blade Control** screen. If this is not done and the library continues to monitor a removed I/O blade, RAS tickets could be generated.

You do not need to configure the library to stop monitoring an I/O blade if the failed blade is replaced with a new I/O blade. For instructions on how to remove and replace an I/O Blade, see Adding, Removing, and Replacing FC I/O Blades on page 196.

Performing the remove blade operation will cause a temporary loss of communication with connected hosts. The screen will display a warning message about the communication loss and ask you to confirm that you want to proceed.

Note Before permanently removing the I/O blade, verify the location of the I/O blade. See Identifying FC I/O Blades on page 213.

Note This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup** > **IO Blades** > **Blade Control**
- From the operator panel, select **Setup** > **IO Blades** > **Blade Control** > **Remove Blade**

Resetting FC I/O Blade Ports

Administrative users can reset individual ports on FC I/O blades. Resetting these ports can help troubleshoot I/O blade issues. The **Setup - Blade Control** screen allows you to perform the Reset Port operation on a selected I/O blade port.

Resetting an I/O blade port will cause a temporary loss of communication with connected hosts. The screen will display a warning message about the communication loss and ask you to confirm that you want to proceed.

Note

This operation should not be performed concurrently by multiple administrative users logged in from different locations. You can access the appropriate screens, but you cannot apply changes while another administrative user is performing the same operation.

Note

Before resetting I/O blade ports, verify the location of the I/O blade. See Identifying FC I/O Blades on page 213.

The paths to open the appropriate screens are as follows:

- From the web client, select **Setup > IO Blades > Blade Control**.
- From the operator panel, select **Setup > IO Blades > Blade Control > Reset Port**.

Viewing and E-Mailing the Command History Logs

When FC I/O blades are installed, administrative users can use the **Command History Log** screens to view the most recent command and response activity that has occurred with externally addressable library devices, controller LUNs, partitions, and tape drives. This information can help you isolate the source of an issue, such as a library device or host application.

You can select any configured I/O blade in the library and display a list of associated library devices. For each device, you can view the command history log. You can also choose to e-mail the command history to a specific e-mail address. The log is sent as a text file attached to an e-mail message.

Before you can e-mail the command history log, the library e-mail account must be configured. For information on setting up the e-mail account, see Configuring the Library E-mail Account on page 55 in Configuring Your Library.

You cannot view command history logs from the Web clientweb client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools > Command History Log**.

Interpreting LEDs

LEDs provide a visual indication about the status of certain library components. LEDs can sometimes communicate that a problem exists when RAS tickets cannot. For example, an LED can indicate a firmware problem that prohibits the library from generating RAS tickets.

The following components of the library have LEDs:

- Library Control Blade (LCB)
- FC I/O Blade
- FC I/O Fan Blade
- Tape drives
- Power supplies

Some of these components may also include a fibre port link LED.

LCB and FC I/O Blade LEDs

LCB and FC I/O blade LEDs indicate status by the rate at which they blink. The color of the LED identifies the area of the component being reported.

Use Table 15 to interpret the current status of the LCB and FC I/O blade LEDs.

Table 15 Library Control Blade and FC I/O Blade LEDs

LED Color	Represents	Blade Status
Green	Library Application Code status	• Solid on/solid off — Library application code not operating. • Solid on for 3 seconds, then blinks twice — Blade firmware is downloading. • 1 blink per second — Normal: Library application code operating. • 10 blinks per second — Identify mode (per user request, to distinguish it from other blades).
Amber	Health status	• Solid on — Booting up or compact flash memory problems. • 1 blink per second — Library application code not operating. • Solid off — Normal: Blade operational.
Blue	Power Control status	• Solid on — Swap mode: Ready to be removed or replaced. • 1 blink per 10 seconds — Normal: Blade on. • Solid off — Blade not receiving power.

Amber LED on the LCB and FC I/O Blade

Under normal operating conditions, the amber LED on the blade is not lit. If you see that the amber LED on an LCB or FC I/O blade is either blinking continuously or solidly lit for at least 10 minutes, service the blade as soon as possible. The library may or may not generate RAS tickets, depending on the source of the problem.

CAUTION **Never remove an LCB when its amber LED is solidly lit, unless it has been solidly lit for at least 10 minutes.**

Table 16 indicates the actions you can take, based on the condition of the LED.

Table 16 Amber LED on the LCB

State of Amber LED	Suggested Service Action
Solid on for 10+ minutes	Replace the LCB.
1 blink per second	Check the firmware for the LCB and make sure that you have the most current firmware available. Do not replace the blade. It is unlikely that the LCB hardware is the source of the problem.

Ethernet Hub Port LEDs on the LCB

The LED for an Ethernet hub port is located above the port. Use Table 17 to interpret Ethernet hub link activity on an LCB.

Table 17 Ethernet Hub LED on LCB

LED Color	Represents	Fibre Port Link Status
Amber	Link and activity	• Solid on — The link is up. • Blinks — The link is up and currently transmitting commands.

Servicing the LCB Based on LED Status

1 Observe the blinking patterns of the LEDs for at least 30 seconds.

2 Capture a snapshot of the library, and send it to technical support for analysis.

Fibre Port Link LED on FC I/O Blades

A fibre port link LED on a FC I/O blade shows the current state of an FC link and indicates whether or not the link is ready to transmit commands.

The link LED for an I/O blade fibre port is located either below or above the port. For each link LED pair on the I/O blade, the LED on the left belongs to the fibre port below. The LED on the right belongs to the fibre port above. Black lines on the I/O blade faceplate may indicate which LED belongs to which port.

Use Table 18 to interpret Fibre Channel link activity on an I/O blade.

Table 18 Fibre Port Link LED on I/O Blade

LED Color	Represents	Fibre Port Link Status
Green	Link and activity	• Off – no link or link with constant activity[a] • Solid On – link or blade is booting • Flashing – link with activity

a. LED flashing increases as the activity increases and can actually appear off if the activity is high enough. Also, when the blade boots up, the link LEDs are all on until firmware initializes the ports, at which time they turn off until the port transmitter is enabled and link is acquired.

FC I/O Fan Blade LED

RAS tickets typically report problems related to fan blades.

Use Table 19 to interpret fan blade activity.

Table 19 Fan Blade LED

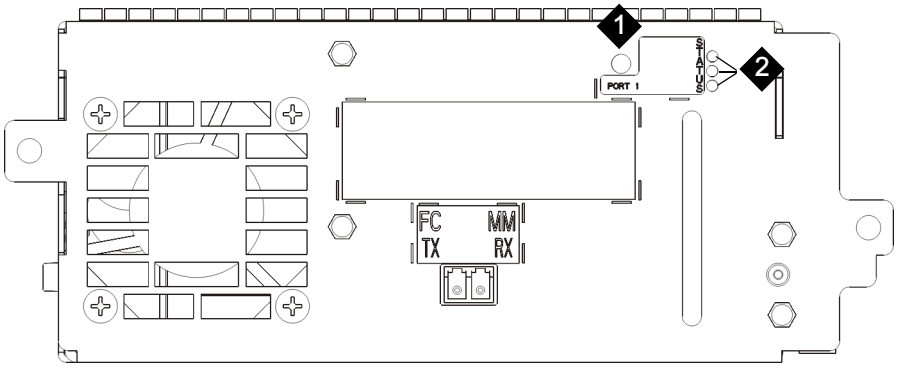
LED Color	Represents	Fibre Port Link Status
Amber	Health of the blade	• Solid off — The fan blade is operating normally. • Solid on — There may be one or more problems, including: fan speed is too high or too low; temperature is too high; there is a faulty fan speed sensor; or there is a power control problem.

Tape Drive LEDs

RAS tickets typically report all problems related to tape drives, including error codes and tape alerts. By observing the blinking pattern of LEDs on tape drives, however, you can discern which operation the tape drive is currently performing.

Figure 27 shows where the tape drive LEDs and the fibre port link LED are located.

Figure 27 Location of Tape Drive LEDs



1	Fibre Port LED
2	Tape Drive LEDs

Use Table 20 to interpret tape drive activity:

Table 20 Tape Drive Activity

LED Color	Represents	Tape Drive Status
Green	Processor activity	• Solid on/solid off — Tape drive's main processor is not operating. • Solid on for 3 seconds, then blinks twice — Tape drive firmware is downloading. • 1 blink per second — Normal: Drive operational. • Blinks 3 times in 3 seconds, then pauses (solid off), and then repeats — Drive is activating (varying online). • 10 blinks per second — Identify mode.
Amber	Health of the drive	• Solid on — Drive has failed. • Solid off — Normal.
Blue	Power control	• Solid on — Swap mode: Ready to be removed or replaced. • 1 blink per 10 seconds — Normal: Drive operational. • Solid off — Drive is not receiving power.

Fibre Port Link LED on Tape Drives

The fibre port link LED shows the current state of the FC link and indicates whether or not the link is ready to transmit commands. The fibre port link LED on a tape drive is located on the rear of the tape drive, beside the fibre port.

Use Table 21 to interpret FC link activity:

Table 21 Fibre Port Link LED on Tape Drive

LED Color	Represents	Fibre Port Link Status
Green	LIP and activity	• Solid on — Loop initialization protocol (LIP) has occurred. • Blinks at regular intervals — Host command/data activity is occurring.
Amber	Online and light detected	• Solid on — The library has enabled the tape drive data bus, and it can detect light through a fibre optic cable.
No color	No activity or no light detected	• Solid off — Either the tape drive is off or the tape drive cannot detect light through a fibre optic cable (which is equivalent to a missing fibre cable). If the tape drive is offline, the tape drive's blue status LED will be solidly lit.

Power Supply LEDs

RAS tickets typically report all problems related to power supplies. You can also observe the blinking pattern of LEDs on power supplies to see if the they are functioning appropriately.

Power supply LEDs indicate status by the rate at which they blink. The color of the LED identifies the area of the component being reported.

Use Table 22 to interpret power supply activity.

Table 22 Power Supply LEDs

LED Color	Represents	Power Supply Status
Green	AC OK (top)	• Solid on — The power supply's AC input is above the minimum requirements to operate. • Solid off — The power supply's AC input is below the minimum requirements to operate.
Green	DC OK (middle)	• Solid on — The power supply's output voltage is within regulation. • Solid off — The power supply's output voltage is not within regulation.
Blue	Standby (bottom)	• Solid on — Swap mode: Ready to be removed or replaced. • Solid off — Normal.

In the RAS tickets associated with the defective power supply, record both the number of the module and the number of the power supply connected to that module.

The 9U expansion modules are numbered according to their position in relation to the control module. The control module is assigned the number 0. All 9U expansion modules stacked beneath the control module are assigned a negative number, while 9U expansion modules stacked above the control module are assigned a positive number. For example, 9U expansion module -2 is the second 9U expansion module beneath the control module, while 9U expansion module +2 is the second 9U expansion module above the control module.

Each module can have up to two power supplies. The power supply on the left is #1, while the power supply on the right is #2.

Using the Installation Verification Test

Administrative users may run the Installation Verification Test (IVT) following a library service action to determine if the library is ready for production use. Examples of such library service actions include installing a new library or replacing a FRU or CRU.

A new IVT Log is created each time you run IVT. The log reports detailed information about library readiness and indicates where specific marginal conditions and failures are located in the library subsystems if there are any.

The full IVT is divided into five subtests. You may choose to run only certain subtests depending on the amount of time available and your area of interest. The full IVT may take up to five and one-half hours to complete for a maximum configured library that includes five modules, five I/E stations and 18 drives.

- The **Robot** test evaluates the basic functionality of the library robotics assembly, including the picker assembly and the Y-carriage assembly, the barcode scanner and the calibration sensors. Time required to complete the Robot test is five minutes.
- The **Frame** test assesses the control and expansion module configuration and alignment.Time required to complete the Frame test is three minutes per module.
- The **I/E Station** test assesses the configuration and functionality of each I/E station. Time required to compete the I/E Station test is three minutes per I/E station.
- **Drives** performs functional tests on the library drives. Time required to complete the Drives test is 15 minutes per drive.
- **Tour** moves a scratch data cartridge through all storage slots in the extreme library locations. It also scans the top and bottom-most slots in the library. Time required to complete the Tour is five minutes per module.

Details on running the IVT subtests include:

- All IVT subtests are preselected by default. Clear the check box next to a subtest name to exclude that test from this IVT run. Select **Apply** when you are ready to run the IVT.
- The Robot, Drives and Tour subtests each require that you to provide a scratch data cartridge before the test can begin. If you select one of these subtests, you will be prompted to place a scratch data cartridge into the top I/E station slot. When you close the I/E station, the **Assign IE** screen appears if the **Manual Cartridge Assignment** setting is enabled on the operator panel **System Settings** screen (**Tools > System Settings**). Assign the new scratch data cartridge to the **System** partition, and then select **Apply**.
- If a subtest is missing required resources (for example, scratch data cartridges) the subtest will fail.
- The IVT starts by performing an inventory of the library. The inventory is recorded in the IVT log along with the test results.
- Select **Details** on the **Library Test Progress** screen to see the IVT results. If the IVT is still running, you will only see results for tests that have completed.

- Select **Stop** on the **Library Test Progress** screen to cancel the current IVT run between subtests. The last issued commands will complete before library control is returned.
- Once the selected tests are complete, select **Next**. You can choose to view the detailed IVT log or e-mail the detailed IVT log. Make your choice and select **Next**.

The IVT test cannot be performed from the web client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools > Library Tests > Installation & Verification Tests**.

Viewing the IVT Log

A new IVT Log is created each time you run IVT. The log reports detailed information about library readiness and indicates where specific marginal conditions and failures are located in the library subsystems if there are any. You can view a summary or detailed version of a log following an IVT run.

You cannot use the web client to view the IVT log. The paths to open the appropriate screens are as follows:

- From the operator panel, select **Tools > Library Tests > View Last Summary Log**.
- From the operator panel, select **Tools > Library Tests > View Last Detailed Log**

E-mailing the Last Detailed Log

You can also send the detailed IVT log as a text file to an e-mail address.

You cannot use the web client to e-mail the IVT log. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools > Library Tests > E-mail Last Detailed Log**

Running Library Demo

Administrative users can run Library Demo, a simple way to test robotics functionality following a FRU or CRU replacement. It shows the library's ability to correctly move a scratch data cartridge from an I/E station to randomly selected open storage slots until the demonstration is stopped.

Details on running Library Demo include:

- Media in the storage magazines are not affected by the demonstration. The scratch data cartridge is returned to the I/E station following each cycle of 20 moves or when the demonstration is stopped.
- Before running Library Demo, ensure that no host applications are accessing the library.
- After you select **Library Demo** on the **Tools > Library Tests** screen, you will be prompted to place a scratch data cartridge into the top I/E station slot. The library robot will use this cartridge to perform its moves during the demonstration.
- When you close the I/E station, the **Assign IE** screen appears if the **Manual Cartridge Assignment** setting is enabled on the operator panel **System Settings** screen (**Tools > System Settings**). Assign the new scratch data cartridge to the **System** partition, and then select **Apply**.
- Before the demonstration starts, the library may perform an inventory. If the screen shows the flashing "Library Not Ready" message, which indicates that an inventory is occurring, wait until the library is ready before you select **Apply** to begin Library Demo.
- The operator panel will show that the demonstration is in progress. There is an intentional delay of two seconds between move media commands to prevent unnecessary wear on the robotics
- To stop the demonstration, select **Stop** on the **Library Demo** screen. The last issued commands will complete before the demonstration is stopped and library control is returned. The operator panel will display a "Demo Being Stopped" message.

Library Demo cannot be performed from the web client. The path to open the appropriate screen is as follows:

- From the operator panel, select **Tools > Library Tests > Library Demo**.

Configuring the Internal Network

When installing your library, you need to make sure that the external network setting is different than the internal network setting on the library. If the external and internal network settings are the same, the web client cannot connect to the library. If DHCP is enabled or you do not know what your external network setting is, check with your network administrator.

From the operator panel, you can change the setting of your internal network using the **Internal Network Configuration** screen. Select the new internal IP address from the list on the screen.

The screen is only accessible from the operator panel. The path to open the appropriate screen is:

- From the operator panel, select **Tools > Internal Network.**

10

Working With Cartridges and Barcodes

This chapter describes how to work with cartridges and barcodes. When working with tape cartridges, certain considerations should be taken into account. For example, all tape cartridges in the library must have a barcode label. In addition, when loading your library, you should be aware of whether or not your cartridges are write-protected.

This section discusses these types of items in general terms. See Specifications on page 227 for information on what type of tape cartridges are supported for each drive type.

Handling Cartridges Properly

To ensure the longest possible life for your cartridges, follow these guidelines:

- Select a visible location to post procedures that describe proper media handling.
- Ensure that anyone who handles cartridges has been properly trained on all procedures.
- Do not drop or strike cartridges. Excessive shock could damage the internal contents of cartridges or the casings themselves, rendering the cartridges unusable.
- Do not expose cartridges to direct sunlight or sources of heat, including portable heaters and heating ducts.
- Do not stack cartridges more than five high.
- The operating temperature range for Linear Tape Open (LTO) cartridges is 10º to 45ºC. The storage temperature range is 16º to 32ºC in a dust-free environment with a relative humidity range between 20% and 80% (noncondensing).
- If cartridges have been exposed to temperatures outside the ranges specified above, stabilize the cartridges at room temperature for the same amount of time they were exposed to extreme temperatures or 24 hours, whichever is less.
- Do not place cartridges near sources of electromagnetic energy or strong magnetic fields, such as computer monitors, electric motors, speakers, or x-ray equipment. Exposure to electromagnetic energy or magnetic fields can destroy data and the embedded servo code written on the media by the cartridge manufacturer, rendering the cartridges unusable.
- Place identification labels only in the designated slots on the cartridges.
- If you ship cartridges, ship them in their original packaging or something stronger.

- Do not insert damaged cartridges into tape drives.
- Do not touch the tape or tape leader.

CAUTION **Do not degauss cartridges that you intend to reuse.**

Write-Protecting Cartridges

All cartridges have a write-protect (write-inhibit) switch to prevent accidental erasure or overwriting of data. Before loading a cartridge into the library, make sure that the write-protect switch is positioned correctly (either on or off).

Slide the red or orange write-protect switch to the right so that the padlock shows in the closed position. The switch is located on the left side of the cartridge front.

Barcode Requirements

Cartridges must have an external barcode label that is machine and operator-readable. A barcode must use only uppercase letters A to Z and/or numeric values 0 to 9. The library supports Code 39 (3 of 9) type barcodes.

The supported tape cartridge barcode formats are as follows:

- Standard Six — Six character barcode number with or without a one or two-character media ID, for example, "XXXXXXL4" or "XXXXXX". Only the six character barcode is reported to the host.
- Plus Six — Six character barcode number followed by a media ID, for example, "XXXXXXL3". Six character barcode and media ID are reported to the host.
- Extended — Five to 16 characters total, including a barcode number and optional media ID. All characters are reported to the host, regardless of having a media ID or not. If a media ID is included, the label must have a five to 14 character barcode followed by a media ID, for example, "XXXXXXXXXXXXXL2". If a media ID is not included, the label must have a five to 16 character barcode, for example, "XXXXXXXXXXXXXXX".
- Media ID Last — Five to 14 character barcode number followed by media ID, for example, "XXXXXXXXXXXXXLT". The media ID is reported to the host last.
- Media ID First — Five to 14 character barcode number followed by media ID, for example, "XXXXXXXXXXXXXL4". The media ID is reported to the host first.
- Standard — (default) Five to 16 characters total, including a barcode number and optional media ID. The media ID is not reported to the host. If a media ID is included, the label must have a five to 14 character barcode followed by a media ID, for example, "XXXXXXXXXXXXXL3". If a media ID is not included, the label must have a five to 16 character barcode, for example, "XXXXXXXXXXXXXXX".

Quantum-supplied barcode labels provide the best results. Barcode labels from other sources can be used, but they must meet the following requirements:

- ANSI MH10.8M-1983 Standard
- Number of digits: 6+2 (LTO)
- Background reflection: greater than 25 percent
- Print contrast: greater than 75 percent
- Ratio: greater than 2.2

- Module: 250 mm
- Print tolerance: ± 57 mm

Additional Requirements:

- Length of the rest zones: 5.25 mm ± 0.25 mm
- No black marks should be present in the intermediate spaces or rest zones
- No white areas should be present on the bars

Installing Barcode Labels

Each cartridge in the library must have an external label that is machine and operator-readable to identify the barcode. Most manufacturers offer cartridges with the labels already applied or with the labels included that you can attach.

All barcode labels must be applied to the front of a cartridge. Peel off the label and place it on the cartridge. Verify that the label is oriented so that the numbers appear above the barcode. The cartridge cannot have any stickers or labels attached to the top or bottom because if the labels come loose, they can get caught in the tape drives or become unreadable by the scanner.

CAUTION **Do not place a barcode label or any labels on the top or bottom of a cartridge. Doing so can cause the tape cartridge and tape drive operations to fail.**

11 Specifications

Scalar i500 libraries follow the specifications described in this chapter.

Library Specifications Summary

Table 23 lists the library components available in Scalar i500 libraries.

Table 23 Library Specification Summary

Scalar i500 Library Specifications	
Supported Cartridges	• LTO-1 (read-only in LTO-3 and LTO-4 drives) • LTO-2 (read/write in LTO-2 and LTO-3 drives, read-only in LTO-4 drives) • LTO-3 (read/write in LTO-3 and LTO-4 drives) • LTO-4 (read/write in LTO-4 drives)
Supported Drive Types	• LTO-2 • RoHS-compliant LTO-3 • RoHS-compliant LTO-4
Library Robot Control	Logical Unit Number (LUN)
Connectivity	Native drive interface
Power	350W with optional redundant power supply and line cord
Library Management	• Operator panel touch screen • Web client • SNMP protocol • SMI-S protocol

Library Capacity

Table 24 contains information about library capacity.

Table 24 Library Capacity

	5U	14U	23U	32U	41U
Maximum Storage Slots Available*	36	128	218	310	402
I/E Station Slots Available	0, 6	0, 6, 12, 18	0, 6, 12, 18, 24, 30	0, 6, 12, 18, 24, 30, 42	0, 6, 12, 18, 24, 30, 54
Maximum Drive Capacity	2	6	10	14	18
Maximum Power Supplies	2	4	6	8	10
Maximum Partitions	2	6	10	14	18
Maximum FC I/O Blades	0	2	4	4	4

*Including I/EI station slots

Library Environmental Specifications

Table 25 lists the environmental specifications of the library.

Table 25 Library Environmental Specification

	Operating	Non-Operating	Shipping & Storage
Altitude	3,048m (10,000 ft.)	3,048m (10,000 ft.)	3,048m (10,000 ft.)
Temperature	50º – 100º F* (10º – 38º C)	50º – 113º F* (10º – 45º C)	-40º – 150º F* (-40º – 65º C)
Relative Humidity	20 – 80% non-condensing	10 – 90%, non-condensing	0 – 95%, non-condensing

* Temperature ranges apply to product inlet temperatures, not necessarily to ambient room temperatures. Airflow restrictions or other heat-generating equipment within the rack enclosure may cause a rise over ambient room temperatures.

Library Dimensions

Table 26 lists the physical dimensions of the library in inches (in).

Table 26 Library Dimensions

Library Configuration	Rack Height	Maximum Physical Height (in)
5U control module	5U	8.61
5U control module + (1) 9U expansion module	14U	24.36
5U control module + (2) 9U expansion modules	23U	40.11
5U control module + (3) 9U expansion modules	32U	55.86
5U control module + (4) 9U expansion modules	41U	71.86

Library Component Weights

Table 27 lists the weights of the library hardware components in pounds (lbs).

Table 27 Library Component Weight

Component	Weight (lbs)
Drive Sled	9.0
Power Supply	4.0
Robot	4.5
5U Chassis (empty)	47.5
9U Chassis (empty)	65.0
5U Package Kit	approx. 20
9U Package Kit	approx. 24
14U Package Kit	approx. 40

Electrical Specifications

Library Power Consumption and Heat Output

Table 28 lists the typical library power consumption (Watts) and heat output (BTU/hr). Figure 28 on page 231 shows the typical and maximum library power consumption (Watts) and heat output (BTU/hr), and Figure 29 on page 231 shows the library typical and maximum power draw.

Table 28 Library Typical Power Consumption and Heat Output

Library Configuration	Typical Power Consumption (Watts)	Typical Heat Output (BTU/Hour)
Subassembly Power Consumption:		
SCALAR I500 Library with Robot and LCB	65	222
UDS3 IBM Ultrium 2 Drive Sled Module (SCSI)	29	99
UDS3 IBM Ultrium 2 Drive Sled Module (Fiber Channel)	32	109
UDS3 IBM Ultrium 3 Drive Sled Module (SCSI)	27	92
UDS3 IBM Ultrium 3 Drive Sled Module (Fibre Channel)	29	97
UDS3 IBM Ultrium 4 Drive Sled Module (SCSI)	27	92
UDS3 IBM Ultrium 4 Drive Sled Module (Fibre Channel)	30	102
UDS3 IBM Ultrium 4 Drive Sled Module (SAS)	30	102
Control Module:		
Minimum (1 drive)	97	331
Maximum (2 drives)	129	440
Expansion Module:		
Minimum (no drives)	0	0
Maximum (4 drives)	193	659

Figure 28 Library Power Consumption and Heat Output

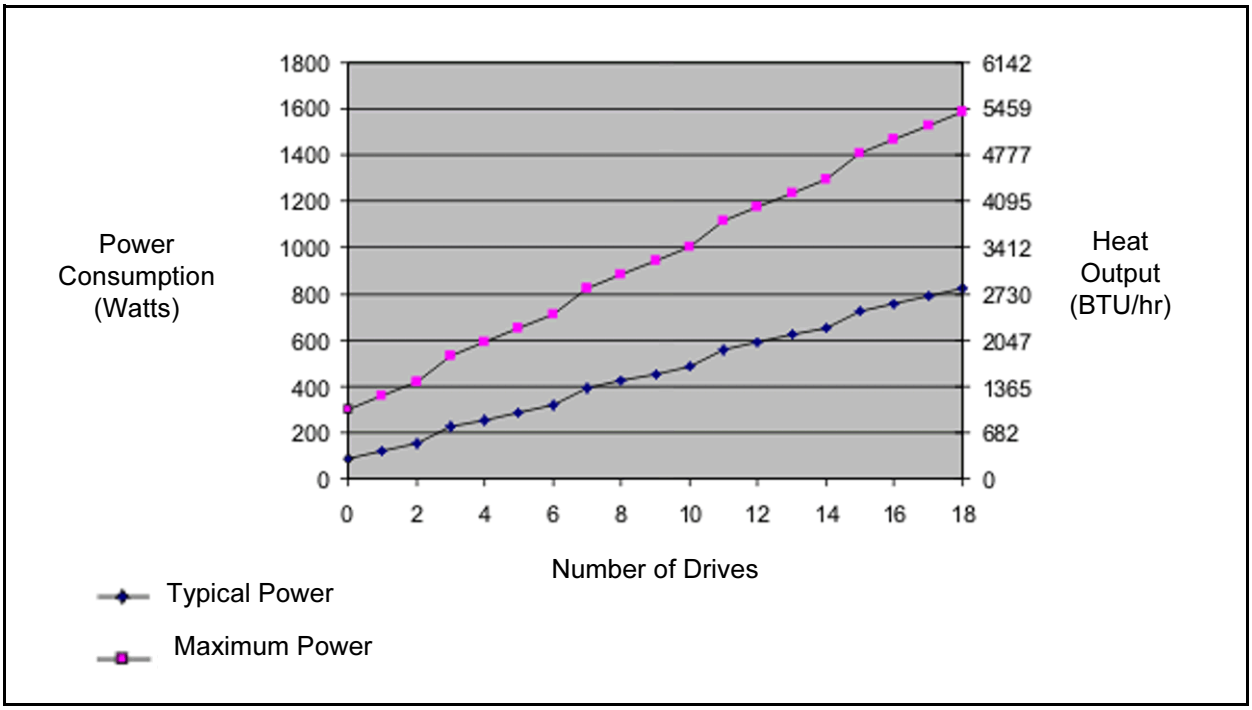
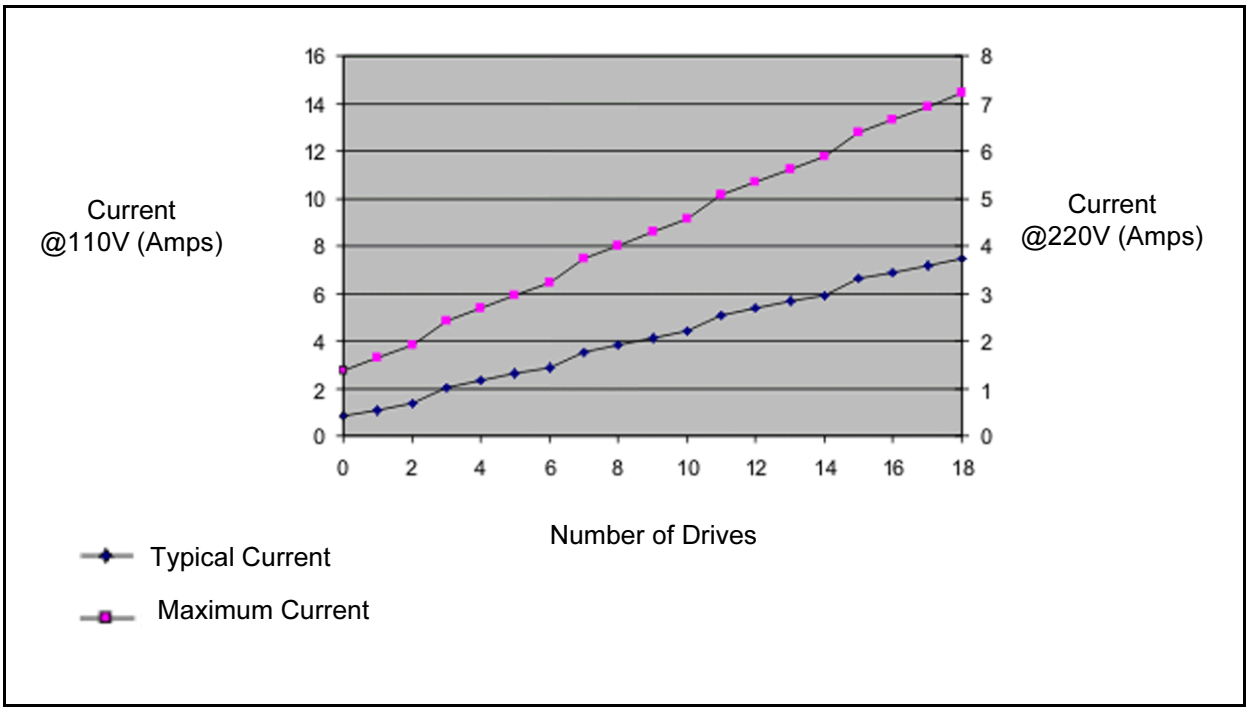


Figure 29 Library Current Draw



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Glossary

1U, 2U, 3U, etc.
Racks manufactured for mounting computer hardware often define vertical space as "units." The components that are mounted in the racks are defined by how many units of rack space they require. For example, the height of a unit in a rack is 1.75". If a component is 5.25" in thickness, the component is said to be a 3U component.

Arbitrated loop
A Fibre Channel configuration that attaches multiple communicating ports in a loop. Two or more ports can interconnect, but only two ports can communicate simultaneously.

Arbitration
The submission of a request to gain access to an arbitrated loop by a device, so that it can transmit data in the loop.

Availability
A RAS attribute that refers to the accessibility of a system resource in a timely manner; for example, the measurement of a system's uptime.

Barcode
A printed array of varied rectangular bars and spaces that can be scanned and read for object identification.

Bus
A transmission channel through which electrical signals are carried from one device to another device.

CAN (Controller Area Network)
A serial bus network of microcontrollers that connects devices, sensors and actuators in a system or sub-system for real-time control applications. There is no addressing scheme used in controller area networks, as in the sense of conventional addressing in networks (such as Ethernet). Rather, messages are broadcast to all the nodes in the network using an identifier unique to the network.

Cartridge
A container that is a protective housing for storage media, such as cartridges for tapes or optical disks.

Channel zoning
A method of subdividing a storage area network into disjoint zones on a per-channel basis in order to enhance security and qualify access.

Cleaning tape / cleaning cartridge
A tape used to clean recording heads and reading heads on a tape drive.

Cleaning slot
The physical home where a cleaning tape or cartridge resides.

CLI (Command Line Interface)
A method of interfacing with a file system in which the user types commands, using a specific command syntax, from a command line.

COD (Capacity on Demand)
A library feature that allows users to have a large physical library, but only be licensed to use a subset of its total capacity. Users pay only for what they are currently using. License upgrades enable more capacity without causing a system interruption.

Compact flash
A card on the LCB that stores information about a library's contents and configuration.

Connectivity
The method by which hardware devices or software communicate with other hardware or software.
The first module of the library. It consists of an operator panel touch screen, library control blade (LCB), storage, tape drives, power supplies, I/E station.

Control path
The connection between a partition and host application. The control path connection is made through a designated tape drive. Only one tape drive can be selected as the control path per partition.

Controller
The PCB or system that translates computer data and commands into a form suitable for use by the storage disks.

CRU (Customer Replaceable Unit)

The smallest hardware component that can be replaced at a customer installation by a customer.

Default
A value or setting that is selected by the hardware or software unless specified otherwise by the user.

DHCP (Dynamic Host Configuration Protocol)
A protocol for assigning dynamic IP addresses to devices on a network. DHCP supports a mix of static and dynamic IP addresses.

Directory
A file that contains a list of other files. *Directory* is short for *directory file*.

Drivers
Software programs that enable a computer to communicate with hard drives, CD ROM drives, printers, and other peripherals. Drivers are stored on a hard disk and loaded into memory at boot up.

Element ID - Logical
An address used by a library to locate and track library component. The address is specified in programming logic rather than on the physical location of a component within a library. When a logical library is used, the logical element ID masks the physical element ID.

Element ID - Physical
An address used by a library to locate and track library component. The address is based on the physical location of a component within a library. Applications expect to see resources at specific IDs.

Ethernet
A type of local area network designed to transport data at rates up to 10 million bits per second. Other software, such as TCP/IP runs on top of Ethernet to provide high-level networking services to applications.

Event
A condition that matches a numbered, predefined set of circumstances.

Event log
A list of all predefined events logged by library and software management tools.

Expansion Module
An optional module of the library. It provides additional storage, tape drive capacity, power, and optional I/E stations. The module lacks an operator panel touch screen and LCB.

F_Port
Fabric Port. A port on a fabric switch to which N_Ports may be directly connected. The F_Port is not capable of communicating with FC-AL protocol.

FC (Fibre Channel)
A high speed data transfer architecture. Using optical fibre to connect devices, Fibre Channel communications are serial communications that occur at full duplex and achieve data transfer rates of 200 MBps.

FC-AL (Fibre Channel Arbitrated Loop)
A form of Fibre Channel network in which up to 126 nodes are connected in a loop topology. See also *Arbitrated loop*.

FC-AL Device
A device that employs Fibre Channel-Arbitrated Loop and consists of one or more NL_Ports.

Fiber
A thin filament of glass. An optical waveguide consisting of a core and a cladding which is capable of carrying information in the form of light. Fiber is also a general term used to cover all physical media types supported by Fibre Channel, such as optical fiber, twisted pair, and coaxial cable.

Fiducial
In a library storage context, fiducial refers to the reliable identification of media, including both location and media type information. For example, in a library a fiducial label is a barcoded label that provides the library with location and media type information for three designated containers: magazines in I/E stations, storage slots, and tape drive sleds.

Firewall
A set of security tools designed to separate an internal network from the public Internet in order to keep unauthorized users out of a restricted network. Firewalls are the primary line of security defense for businesses.

FL_Port
Fabric Loop Port. An F_Port that is capable of supporting an attached Fibre Channel Arbitrated Loop. An FL_Port on a loop will have the AL_PA hex'00' giving the fabric the highest priority access to the loop. N_Ports or NL_Ports can attach to it in an Arbitrated Loop topology and are capable of communicating with FC-AL protocol.

FMR (Field Microcode Replacment) tape
See *FUP (Firmware Upgrade) tape*.

FRU (Field Replaceable Unit)
The smallest hardware component that can be replaced at a customer installation by a certified field service representative.

FUP (Firmware Upgrade) tape
A tape that can be used as an alternative to upgrading firmware with SCSI or host.

Gb E or **GigE (Gigabit Ethernet)**
A transport protocol used for transmitting data across traditional LANs. GigE is an enhanced version of the Ethernet protocol that has been used for many years as the underlying transport technology in IP networks.

GUI (Graphical User Interface)
A computer environment that provides a visual view of a system by incorporating windows, icons, menus, and a pointing device. Also referred to as a Windows, Icons, Mouse, and Pointers (WIMP) interface.

HDD (High Density Drive)
A drive that contains increased storage capacity of bits and/or tracks per square inch.

Home position
Accessor axes positioned at 0 vertical and 0 horizontal, that serve as the point of reference for the position of other library components. Home position is used as a basis for calibration.

Host
In general, a host is a computer or program that contains data and provides services to other computers or devices. In Fibre Channel terms, a host is a computer that initiates contact with storage devices.

Hot swappable
The ability to replace a defective component while the system continues to function normally.

HTTP (Hypertext Transfer Protocol)
The communication rules by which a Web browser (client) and a server delivering Web pages exchange information.

I/E (Import/Export or Insert/Eject)
The movement of data or hardware in and out of processing and storage systems.

I/E slot
A bin that contains a single piece of media in the I/E station.

I/E (Import/Export) station
A door on the front of the library that contains tape magazines, into which cartridges to be imported are placed manually or cartridges to be exported are placed by the picker.

Interoperability
The capability of two or more hardware devices or two or more software routines to work together.

I/O (Input/Output) slot
See *I/E slot*.

I/O station
See *I/E station.*

IP (Internet Protocol)
A protocol that specifies the formats of packets and addresses. Addresses are formulated as four groups of 2 or 3 digit numbers separated by periods, such as 255.255.255.255.

Kernel
The heart of the UNIX operating system. The kernel is the part of the operating system that allocates resources and controls processes. The design strategy has been to keep the kernel as small as possible and to put the rest of the UNIX functionality into separately compiled and executed programs.

L_Port
Loop Port. It only has the capability to communicate over FC-AL hubs and through FL_Ports.

LED (Light Emitting Diode)
The mode of data transmission for multimode cables with short wave optical transceivers. Single-mode cables, by comparison, use high powered, long wave lasers.

Library
A large-scale tape device with robotics that can house multiple tape drives and a significant amount of tape cartridges.

Library Control Module
See *Control module*.

License key
An absolute value that can only increase a licensed feature. For example, a license key can be applied to the library to enable unlicensed slots.

Logical library
See *Partition*.

Loop
With this Fibre Channel option, the port operates with attached loop-capable devices. If a point-to-point device is attached, the appliance is not able to communicate with it.

Loop ID
A unique 7-bit value from 0 to 126 that represents the 127 valid AL_PAs (physical addresses) on a loop.

LTO (Linear Tape Open)
A family of magnetic tape media that are “open” in the sense of not being owned by a single proprietor. LTO comes in two formats, Accelis and Ultrium. Accelis is the fast access implementation, while Ultrium is the high capacity implementation.

LUN (Logical Unit Number)
A unique identifier used on a SCSI bus to distinguish between devices that share the same bus. A LUN can be an end user, a file, or an application. In storage technology, a single large storage device might be divided into smaller pieces, either to make the vast storage space more manageable or because the storage space is dedicated to different servers, drives, or applications. When the storage space is divided into smaller parts, each part is configured with its own SCSI unique identifier, or LUN.

Magazine
A container for removable media storage used in tape libraries.

Media
A material that stores data, such as tapes in cartridges or optical disks.

Media ID
A barcode number attached to a specific piece of media.

Media type
A format/size of media, for example, LTO.

Medium
See *Media*.

Mixed media
The ability of a library to simultaneously support multiple types of storage media.

N_Port
Node Port. It only has the capability to communicate through an F-Port. It is a port on a computer, disk drive, and so on, through which the device does its Fibre Channel communication as a direct fabric-attached port for use with the point-to-point or fabric topology. It is identified by a world wide name.

NL_Port
Node Loop Port. It has the capability to communicate over both FC-AL hubs and through F_Ports.

Online
A status for a component that indicates it is active and available for use.

Operator Intervention Message
See *RAS ticket*.

OS (Operating System)
A control program for a computer that allocates computer resources, schedules tasks, and provides the user with a way to access the resources.

Partition
An abstraction of an underlying physical library that may present a different personality, capacity, or both to a host. It is a representation of real physical elements, combined to create a grouping that is different from the physical library. Also a logical portion of the physical library that is viewed by the host as if it is a complete library. Partitions present the appearance of multiple, separate libraries for purposes of file management, access by multiple users, or dedication to one or more host application.

Pathname
A list of directories separated by slashes (/) and ending with the name of a directory or nondirectory file. A pathname is used to trace a path through the file structure to locate or identify a file.

Picker
The robotic hand that handles cartridges.

Point to Point
A Fibre Channel topology that consists of a dedicated connection between two devices: a sending device and a receiving device.

Rackmount
An industry standard communication and computer equipment rack cabinet.

RAS (Reliability, Availability, and Serviceability)
Three key attributes of computing system quality design. See *Reliability*, *Availability*, and *Serviceability*. An infrastructure to support serviceability in order to identify, diagnose, and fix problems within the system. This approach is designed to address the ability of service personnel and customers to diagnose and resolve problems identified within the system. Additionally, configuration is addressed to support detection of hardware configuration compatibility issues and persistence across FRUs.

RAS ticket
A ticket that alerts service personnel and customers of an issue with the library. RAS tickets identify which library components are most likely causing the issue. When possible, a RAS ticket provides instructions for resolving the issue.

Reliability
A RAS attribute that is designed to prevent failure of a storage solution. See also *RAS*.

SAM (SCSI Architecture Model)
An ANSI standard that defines the generic requirements and overall framework in which other SCSI standards are defined. New generations of this standard are identified by a numeric suffix; for example, the second generation standard is SAM2.

SAN (Storage Area Network)
A dedicated network that connects storage devices and servers in a pool, providing consolidated storage and storage management. Storage interconnects between many initiators and target devices. The SAN allows for sharing resources (target devices) among multiple servers (initiators).

SCSI (Small Computer System Interface)
A set of standards for a high-speed, parallel interface that connects processing devices to peripheral devices, such as storage subsystems. The acronym is pronounced "scuzzy."

SCSI ID (Small Computer Systems Interface Address)
An address on a SCSI BUS. Typically there are 16 addresses on a single channel SCSI BUS.

Server
A powerful, centralized computer (or program) designed to provide information to clients (smaller computers or programs) upon request.

Serviceability
A RAS attribute that refers to a component that is designed to accurately diagnose and report failures, as well as minimize downtime in a storage solution. See also *RAS*.

Setup wizard
A tool for initially configuring the library. It appears the first time the user starts the library. However, it can be used to modify configurable items anytime after the initial configuration.

Sled
See *UDS*.

SMI-S (Storage Management Initiative Specification)
An industry standard SMI-S application programming interface (API) developed by SNIA that facilitates the management of multi-vendor devices in a storage area networks (SANs) environment.

Snapshot
A rapid, point-in-time image of a volume created initially on the same disk as the original by duplicating metadata rather than copying the full data set. Snapshots are often used to protect against data corruption (viruses, etc.) or to create test or pre-production environments. Snapshots are also often used as a first step for creating non-disruptive point-in-time backups, and for copying datasets to a second disk to create a full duplicate copy of the volume. Snapshots are created on disk, and in the same format as the original data. Snapshots are also referred to as point-in-time copies and as shadow copies.

SNMP (Simple Network Management Protocol)
The protocol governing network management and the monitoring of network devices and their functions. Similar in function to SAM, except SNMP governs LAN, whereas SAM governs SAN.

SSL (Secure Sockets Layer)
A protocol that provides encrypted communications on the Internet. SSL is layered beneath application protocols such as HTTP, SMTP, Telnet, FTP, Gopher, and NNTP and is layered above the connection protocol TCP/IP.

Storage device
An appliance containing data that can be accessed, added to, changed, or deleted by the user. The storage media types include tapes and optical disks. A storage device can be a single disk drive, or constitute thousands of tapes in a large tape library.

Storage slot
The physical home where a data cartridge resides.

Subsystem status
A feature that provides predictive alerts, warning of any loss of connectivity or device failure using local or remote alerts. Subsystem status allows administrators to correct faults before they affect backup or other data transfer operations.

Tape drive
A device that spins disks and tapes while it reads and writes data in storage.

TCP/IP (Transmission Control Protocol/Internet Protocol)
The communications protocol used by the Internet. It runs on top of Ethernet to provide high-level networking services to applications.

Topology
The logical and/or physical arrangement of stations on a network.

Trap
An SNMP alert that is sent when predefined conditions are met. For example, an error trap tests for an error condition and provides a recovery routine.

UDS (Universal Drive Sled)
The hardware that houses Fibre Channel and SCSI tape drives in a module.

User ID
An alphanumeric value that the password database associates with a login name. Also, UID.

WORM (Write Once, Read Many)
A common type of data storage medium, in which data can be read and reread, but not altered, after it has been recorded.

WWNN (World Wide Node Name)
A unique number assigned by a recognized naming authority. The world wide name is integral to Fibre Channel operations.

WWPN (World Wide Port Name)
The WWPN is a 64-bit, hard-coded address for each port on an FC-connected device. It is used to identify available SAN devices at end points.

X-axis, X-position
The horizontal position of the library's robotic arm.

Y-axis, Y-position
The vertical position of the library's robotic arm.