Quantum

Planning Guide Planning Guide **Planning Guide** Planning Guide

Quantum Scalar *i*6000 Library

Scalar i6000

6-66882-01 A

Scalar i6000 Planning Guide, 6-66882-01 A, May 2010, Made in USA.

Contents

Chapter 1

About This Guide and Your Product

This guide contains information necessary for site planning prior to the installation of the Scalar i6000. This guide is intended for anyone interested in learning about or anyone that needs to know how plan for the installation of the Scalar i6000.

CAUTION **Be sure to read all operating instructions in this manual and in the *System, Safety, and Regulatory Information Guide* before operating this product.**

This guide is intended to be used by system administrators, information technology professionals, and Quantum professional services and service personnel who will be involved with the installation of the library.

Product Safety Statements

This product is designed for data storage and retrieval using magnetic tape. Any other application is not considered the intended use. Quantum 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.

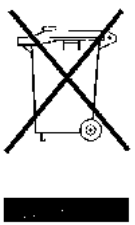
WARNING

BEFORE POWERING ON OR USING THIS EQUIPMENT, READ THE *SYSTEM, SAFETY, AND REGULATORY INFORMATION GUIDE*. KEEP THE GUIDE FOR FUTURE REFERENCE.

Mercury Statement

Projectors, LCD displays, and some multifunction printers may use lamp(s) that contain a small amount of mercury for energy-efficient lighting purposes. Mercury lamps in these products are labeled accordingly. Please manage the lamp according to local, state, or federal laws. For more information, contact the Electronic Industries Alliance at www.eiae.org. For lamp-specific disposal information check www.lamprecycle.org.

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: http://qcare.quantum.com or contact your local government authority, your household waste disposal service or the business from which you purchased the product.

Product Regulatory Model Number

The Scalar i6000 model number is as follows: SCi2000

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 i6000 User's Guide* (6-66879-01)
- *Quantum Intelligent Libraries Basic SNMP Reference* (6-01159-04)
- *System, Safety, and Regulatory Information Guide* (6-00618-*10)*

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.

Contacts

Quantum Corporate Headquarters

Quantum Corporation Headquarters
1650 Technology Drive, Suite 700
San Jose, CA 95110-1382

Technical Publications

Provide documentation feedback at:
comments@quantum.com

Getting More Information or Help

More information about this product is available on the Service and Support website at www.quantum.com/support. The Service and Support Website contains a collection of information, including answers to frequently asked questions (FAQs). You can also access software, firmware, and drivers through this site.

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

Global Call Handling	1-800-284-5101
For additional contact information:	www.quantum.com/support
To open a Service Request:	www.quantum.com/osr
Quantum Corporation	www.quantum.com

Training

Important: Register for and complete the online training for the Scalar i6000 in order to make the best use of your product.

The online training is available at www.quantum.com/ServiceandSupport/StorageCareLearning/Index.aspx

Chapter 2
Description

The Scalar i6000 library automates the retrieval, storage, and control of cartridges. The cartridges are mounted and retrieved from tape drives using a robotic assembly that is driven by application software from the host without operator intervention.

The library can be installed on a solid or a raised floor. The library has a standard 19-inch rack footprint and can be placed in a standard server rack space. Access is from the access and service doors so the library can be placed with either side against a wall, or between racks.

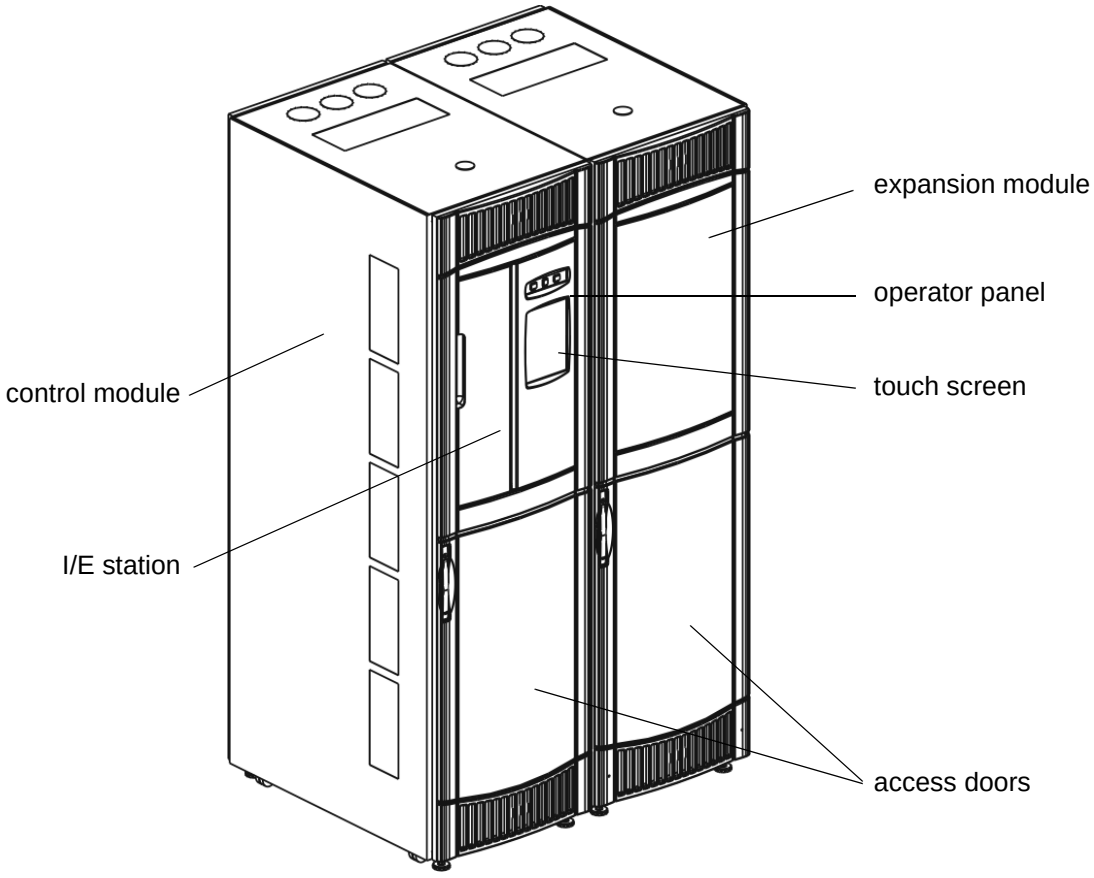
The library is designed for ease of installation, configuration, and field upgrades. The minimum library configuration consists of one control module. Up to eleven expansion modules can be added to the control module as storage and tape drive requirements change. The first seven expansion modules can contain either a 24 slot I/E station or a 72-slot I/E station.

Note Expansion modules in positions nine through twelve are storage-only modules and do not contain I/E stations, drives, or power supplies.

The maximum library can be configured to accommodate from 102 through 5,000 LTO cartridges or from 100 through 2,915 SDLT cartridges, and from 1 through 96 tape drives. See figure 1 on page 8.

This chapter provides a description of the following features and components:

Figure 1 Front View of a Control Module and Expansion Module



Control Module

The control module contains the following components, as shown in figure 2 on page 10.

Figure 2 Front and Back View of the Control Module

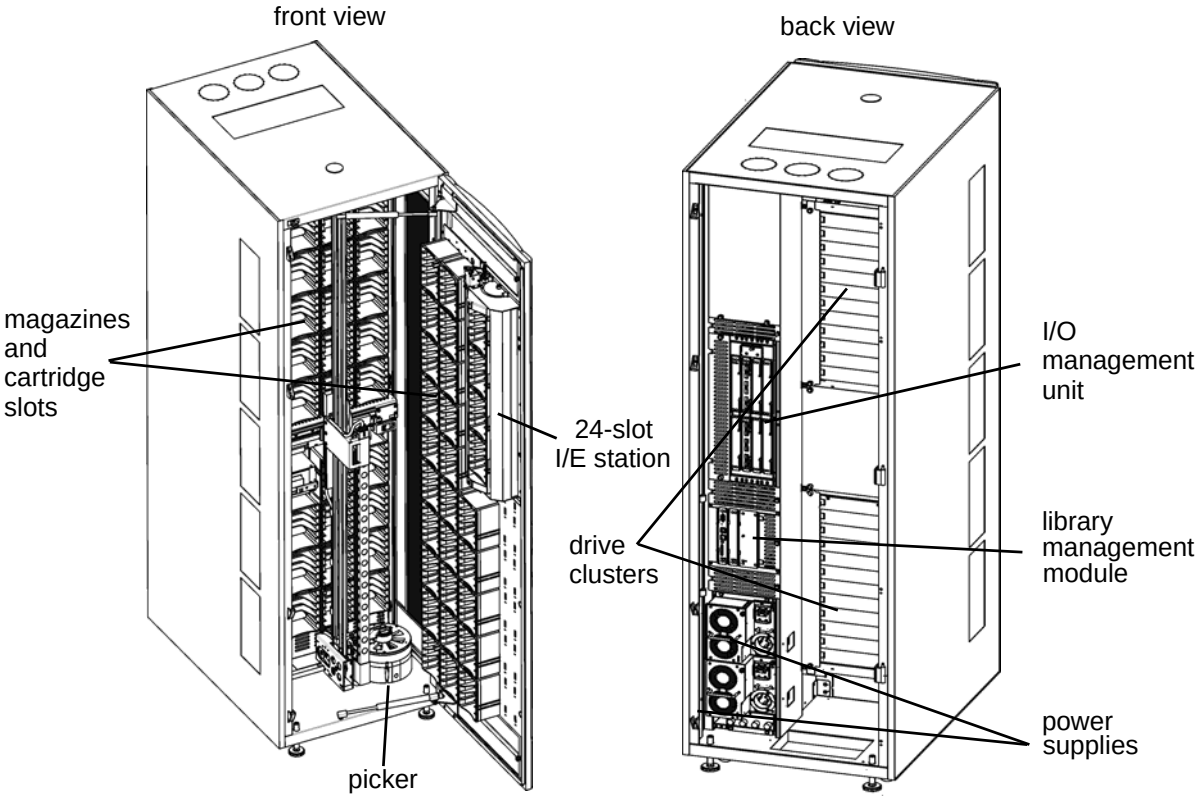
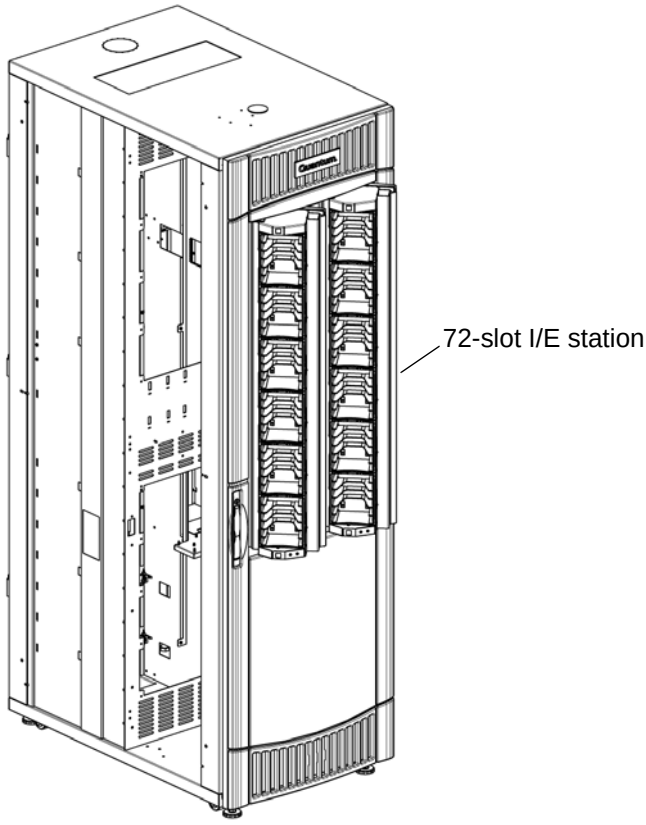


Figure 3 Front and Internal Side View - Expansion Module with 72-slot I/E station

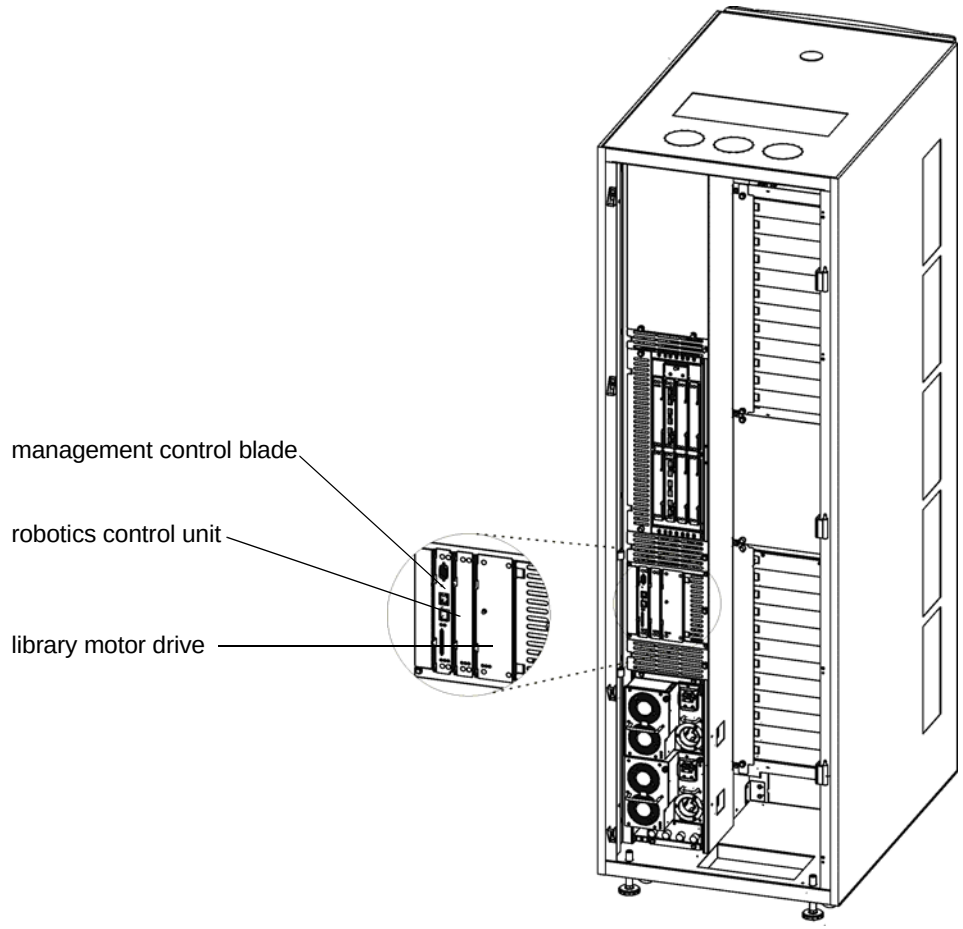


Library Management Module

The library management module controls system hardware and enables external devices to perform configuration and obtain system status. The library management module contains the following boards:

- Management control blade (MCB) - Manages the library, passing commands to and from the robotics control unit as well as the storage area network (SAN) components.
- Robotics control unit (RCU) - Controls the picker and accessor functionality.
- Library motor drive (LMD) - Distributes power to the picker along with the X and Y-axis circuits. It also distributes power to the touch screen.

Figure 4 Library Management Module Boards



Cartridge Accessor

The cartridge accessor moves cartridges between storage cells, tape drives, and the I/E station. A picker is used to get or put cartridges in a storage cell or a tape drive slot. The picker moves along an X and Y axis and can pivot 180°. A barcode scanner on the picker assembly identifies cartridges located in storage cells.

Import/Export Station

I/E stations enable you to import and export cartridges without interrupting normal library operation. The I/E station is installed on the front of the control module or any of the first seven expansion modules Expansion modules in positions nine through twelve are storage-only modules and do not contain I/E stations or drives. See figure 1 on page 8 and figure 2 on page 10 to see the location of the I/E station.

Each 24-slot I/E station has a capacity of 24 LTO or 20 SDLT cartridges that are located in four removable magazines. The 72- slot I/E station consists of two side-by-side 36-slot I/E stations that can be operated as one 72-slot I/E station or can be operated independently. Each 36-slot I/E station provides I/E capacity of 36 LTO cartridges in six removable magazines. The 72-slot I/E station supports LTO cartridges only.

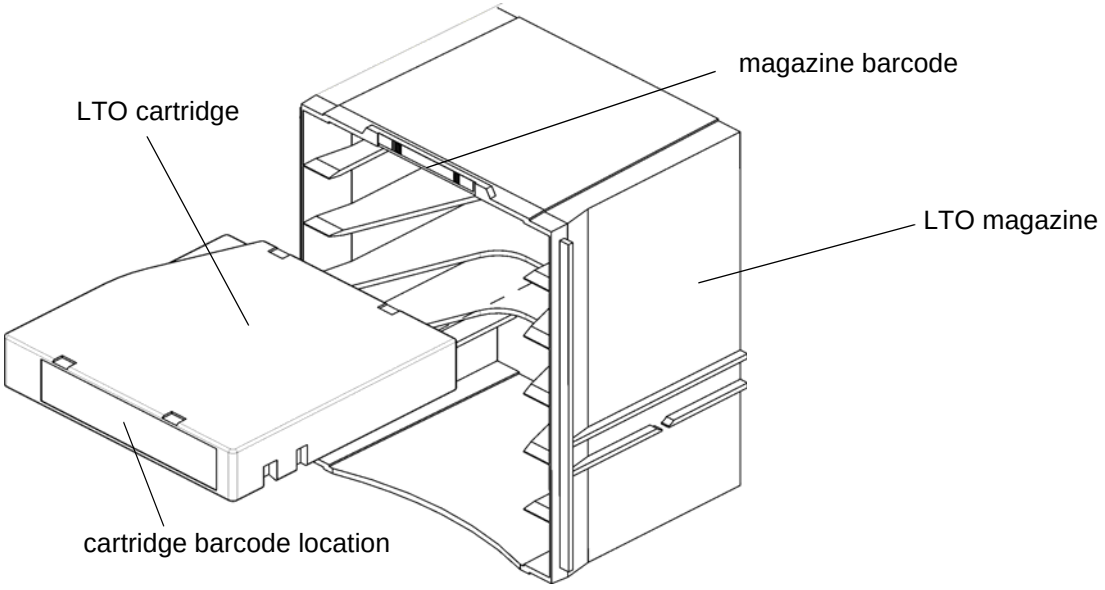
Note

The I/E station cannot be configured as a storage location, but can be part of a a logical division of library resources known as partitions.

Cartridges

Cartridges are stored in magazines within the library and identified by an operator-attached, machine-readable barcode label. The library supports barcode labels with 14 characters plus a one- or two-character media identifier depending on drive type, LTO or SDLT. The library currently supports Code 39 (3 of 9) type barcode labels.

Figure 5 Example of LTO Cartridge Insertion into a Magazine



See Mixed Media Support and Rules on page 17 for details about the use of drives and cartridges. See Barcode Requirements on page 74 for additional specification information.

WORM Support

The Scalar i6000 library supports WORM (write once, read many) technology in LTO-3, LTO-4, and LTO-5 tape drives. WORM requirements include:

- Cartridges
- Firmware
- WORM-supported LTO-3 tape drives
- WORM-supported LTO-4 tape drives
- WORM-supported LTO-5 tape drives

WORM allows non-erasable data to be written once and provides extra data security by prohibiting accidental data erasure. When the library firmware and WORM-supported LTO-3 or, LTO-4, or LTO-5 tape drive

code are installed on a library with LTO-3 or, LTO-4, or LTO-5 tape drives, the WORM feature is supported whenever the operator uses WORM cartridges.

Tape Drives

The tape drives are enclosed in a universal drive sled. The library supports the following tape drives types:

- IBM LTO-1 or LTO-2 LVD–SCSI
- IBM LTO-1, LTO-2, LTO-3, or LTO-4 FC Multi-mode
- HP LTO-3, HP LTO-4, and LTO-5 FC Multi-mode
- Quantum SDLT-320 LVD–SCSI
- Quantum SDLT-600 FC
- Quantum DLT-S4 FC

The Scalar i6000 supports library managed encryption systems. These encryption systems are enabled using a centralized key manager application that generates, protects, stores, and manages encryption keys. These keys are used by IBM LTO-4 and/or HP LTO-4 and LTO-5 tape drives to encrypt information being written to, and decrypt information been read from, tape media.

You must have the appropriate encryption application license installed on the library to begin encrypting data using the tape drive encryption capabilities. For more information, see Encryption and Key Management Solutions on page 34.

The control module and first seven expansion modules have upper and lower drive clusters. Each library must have at least one tape drive. Each drive cluster can house up to six tape drives for a total of 12 drives. Additional drives can be added to each of the first seven expansion modules in the configuration. This enables you to have a total of 96 drives. Expansion modules in positions nine through twelve are storage-only expansion modules.

Note

The term *drive cluster* defines a grouping of up to six tape drives below or above the middle X-axis rail. See figure 2 on page 10 for the locations of drive clusters.

The drives must be installed in the bottom-to-top order in the control module before any are added to the first expansion module. See figure 7 on page 21 for details about the use of drives and cartridges. Refer to Drive Requirements and Compatibility on page 70 for LTO and SDLT drive requirements.

Note When you add drives, you lose storage slots.

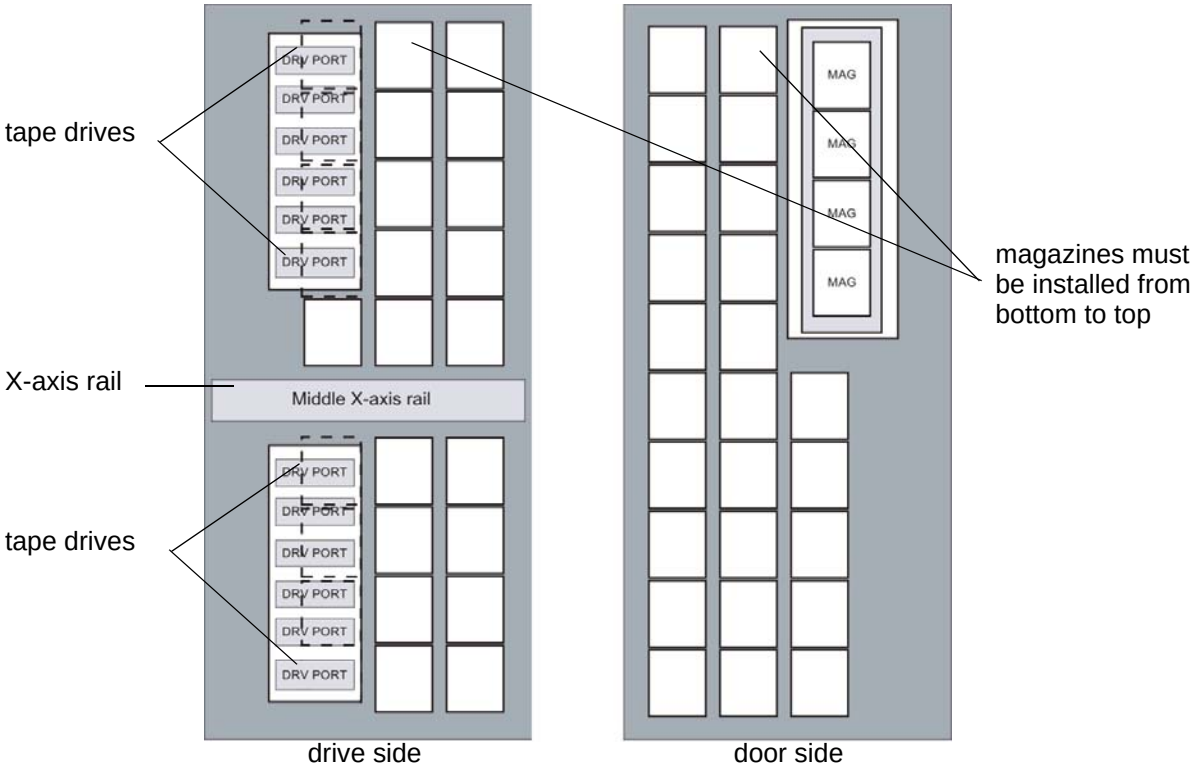
Mixed Media Support and Rules

The library supports both LTO and SDLT cartridges and drives in the same configuration, providing you adhere to the following rules:

- When purchasing a library with mixed media, the new orders must specify the base system technology (either LTO or SDLT) and the number of magazines, the number of drives, and the number of I/E magazines for each media type they need. The base system is considered the primary media type used in the library.
- SDLT is not supported on expansion modules in positions nine through twelve.
- Multiple generations of LTO media can be mixed at the magazine level. LTO and SDLT media cannot be mixed within a magazine. These media types must be in separate magazines.
- The supported multiple media are LTO-1, LTO-2, LTO-3, LTO-3 WORM, LTO-4, LTO-4 WORM, LTO-5 WORM, SDLT-320, SDLT-600, and DLT-S4.
- If you are loading cartridges into the library via the I/E station, you must have a magazine of each of the two types of media in the I/E station (LTO and SDLT).
- Mixed media can be within the 100 slot capacity increment, with the following restrictions:
  - SDLT must be ordered in multiples of five because the magazines hold five cartridges.
  - LTO must be ordered in multiples of six because the magazines hold six cartridges.
- Regardless of the mixed quantities of each media type, the total slots licensed will still be in multiples of 100.

- Field upgrades of the library to existing single media systems must specify a mixed media picker kit, if mixed media will be used in the upgraded library.
- Drive types can be installed in any order. For example, an LTO drive can occupy the first drive position, an SDLT drive can occupy the second, and another LTO can occupy the third drive position.
- However, drives must be installed starting in the lower most drive slot of the control module. Once the control module has 12 drives installed from bottom to top, you must move to bottom drive position of the first expansion module.
- The library must include at least one drive for each type of cartridge used.
- Magazines must be installed in the control module starting with back rack (drive side). Once the back rack (drive side) is full, you must then install magazines in the door side, starting with the top left corner. See figure 6 on page 19.
- The secondary media type is installed beginning at storage slot 4,096 or the first media magazine. See figure 6 on page 19.

Figure 6 Magazine Installation Order



Cartridge Magazines

The cartridge magazine is a storage assembly that installs on the drive side or door side of the control module or expansion module. It contains the cartridge slots and provides flexibility when adding storage cartridges to a module. There are two types of magazines, one for SDLT and another for LTO. Because the two magazines are the same size they can be mixed in the library. The SDLT magazines hold five cartridges and the LTO magazines hold six cartridges.

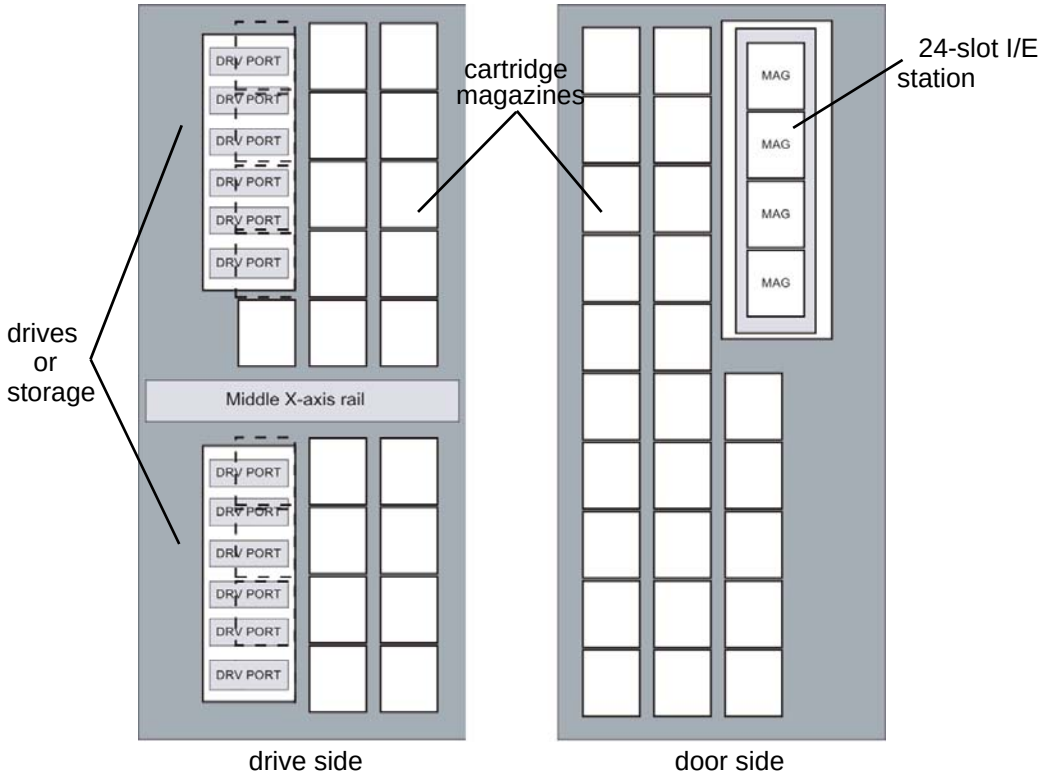
Table 1 Cartridge Capacities in Library Modules

Type of Cartridge	Cartridges per Magazine	Magazines per Control Module[a]	Magazines per Expansion Module[b]	Control Module Cartridge Capacity[c]	Expansion Module Cartridge Capacity[d]
SDLT	5	44 min/51 max	50 min/76 max	220 min/255 max	250 min/380 max
LTO	6	44 min/51 max	50 min/76 max	264 min/306 max	300 min/456 max

a.The minimum is based on having 11 additional drives installed. The maximum is based on having one drive and one I/E station installed.
b.The minimum is based on having an I/E station and 12 drives installed. The maximum is based on having no drives or an I/E station installed.
c.The minimum is based on having 11 additional drives installed. The maximum is based on having one drive and one I/E station installed.
d. The minimum is based on having an I/E station and 12 drives installed. The maximum is based on having no drives or an
I/E station installed.

Each magazine has a barcode label that the scanner reads for identification and inventory. An optional, snap-on dust cover is available for the magazines. The magazines with the dust cover have interlocked stacking that enables easier storage of the media when they are removed from the library for external storage.

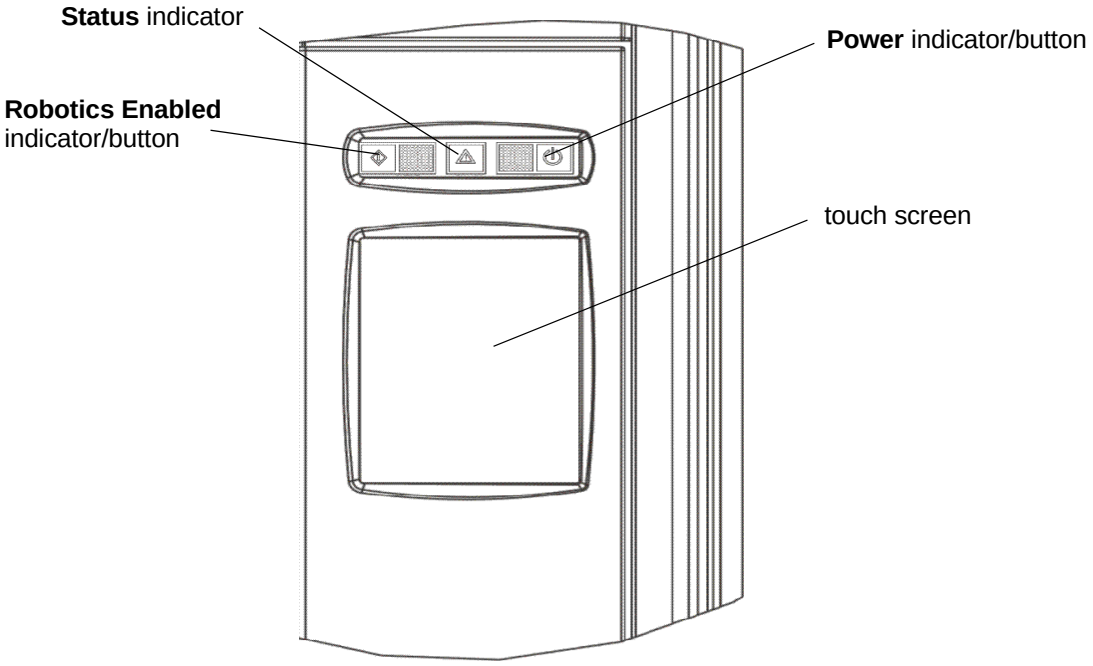
Figure 7 Magazine and Drive Location in the Control Module



Operator Panel

The operator panel is located on the front of the control module and consists of indicators and a touch screen (see figure 8). The buttons are for library control and power while the indicators provide library status.

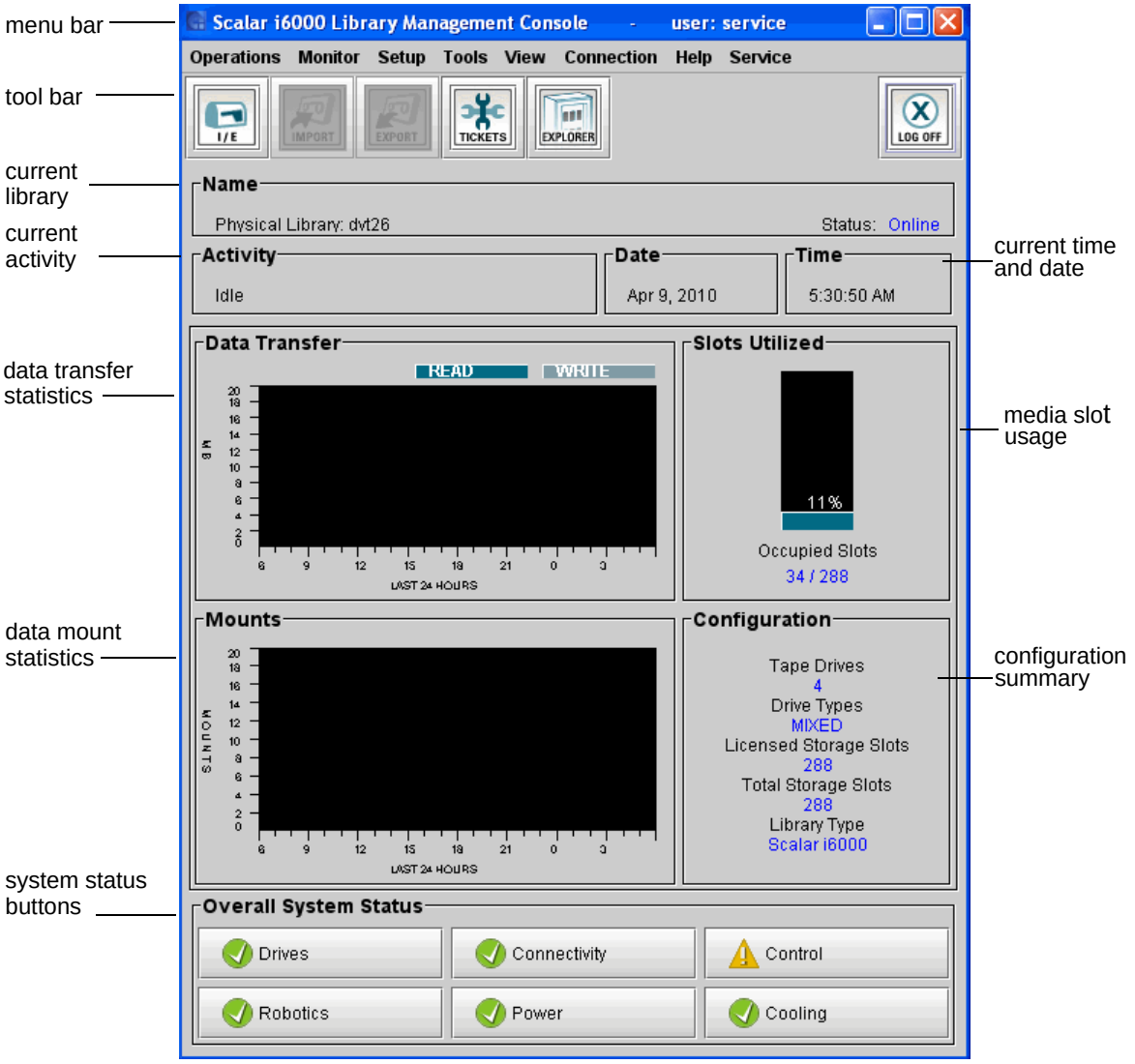
Figure 8 Operator Panel



The touch screen is the library navigation point and provides access to the Library Management Console (LMC), which is shown in figure 9 on page 23. The LMC consists of five primary areas:

- Title bar–provides the library name
- Menu bar–provides menu access to all library management commands
- Tool bar–provides quick access to the most commonly executed functions
- Library information panel–provides real-time library information
- Overall system status–provides real-time status information for the six subsystems of the physical library

Figure 9 LMC



For additional information on the touch screen and the LMC, refer to the *Scalar i6000 User's Guide*.

Power System

The library supports single and redundant power configurations. The single 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. You can hot swap a power supply if you have a redundant power supply. You can hot add a second power supply.

The power system consists of the following:

- Power supply
- Power distribution unit
- AC power cord

A single power switch, located on the front door, turns on and off all power for the control module and attached expansion modules. Each power distribution unit has a second circuit breaker, located in the rear of the module, that controls the module power supply output. The power supply has three LEDs that provide status information. The power system also has four fuses for system protection.

Expansion Modules

Expansion modules enable the library to expand by adding space for tape drives, an I/E station, and storage. Each expansion module up to the seventh expansion module adds from 300 through 456 LTO or from 250 through 380 SDLT cartridge slots depending on the number of tape drives installed and whether an I/E station is installed. See figure 10 on page 25 for location information. The library's maximum configuration includes up to eleven expansion modules for a total of twelve modules. Expansion modules can be added only to the right of the control module.

Expansion modules nine through twelve are storage-only expansion modules. The first seven expansion modules can accommodate the following functional units:

- I/O management unit
- Tape drives
- Cartridge storage
- I/E station (optional)

- AC power compartment (required only if drives are added)

If an expansion module contains only cartridges, all power is derived from the control module.

Note

If FC I/O blades are used, then a control management blade (CMB) must be installed in the control module, in the highest expansion module containing a FC I/O blade, and every expansion module in between.

Figure 10 Magazine and Drive Location in the 24-slot Expansion Modules

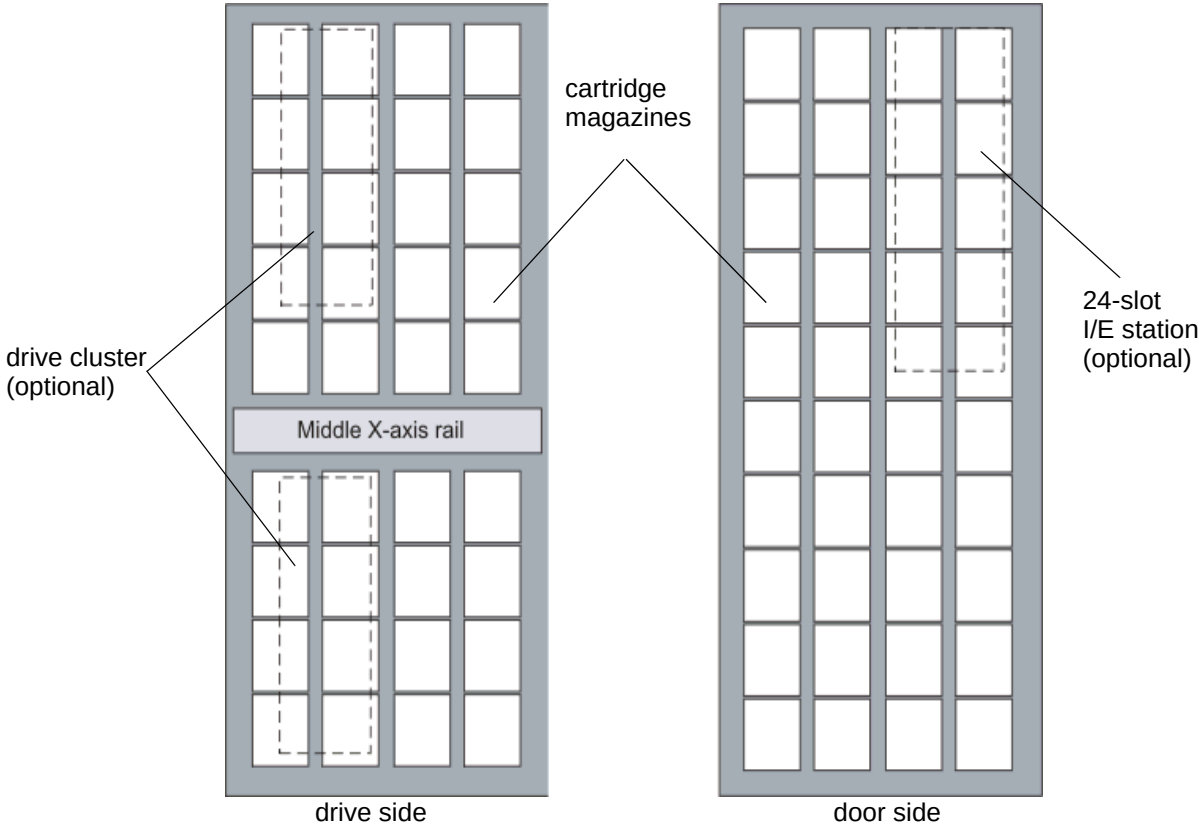
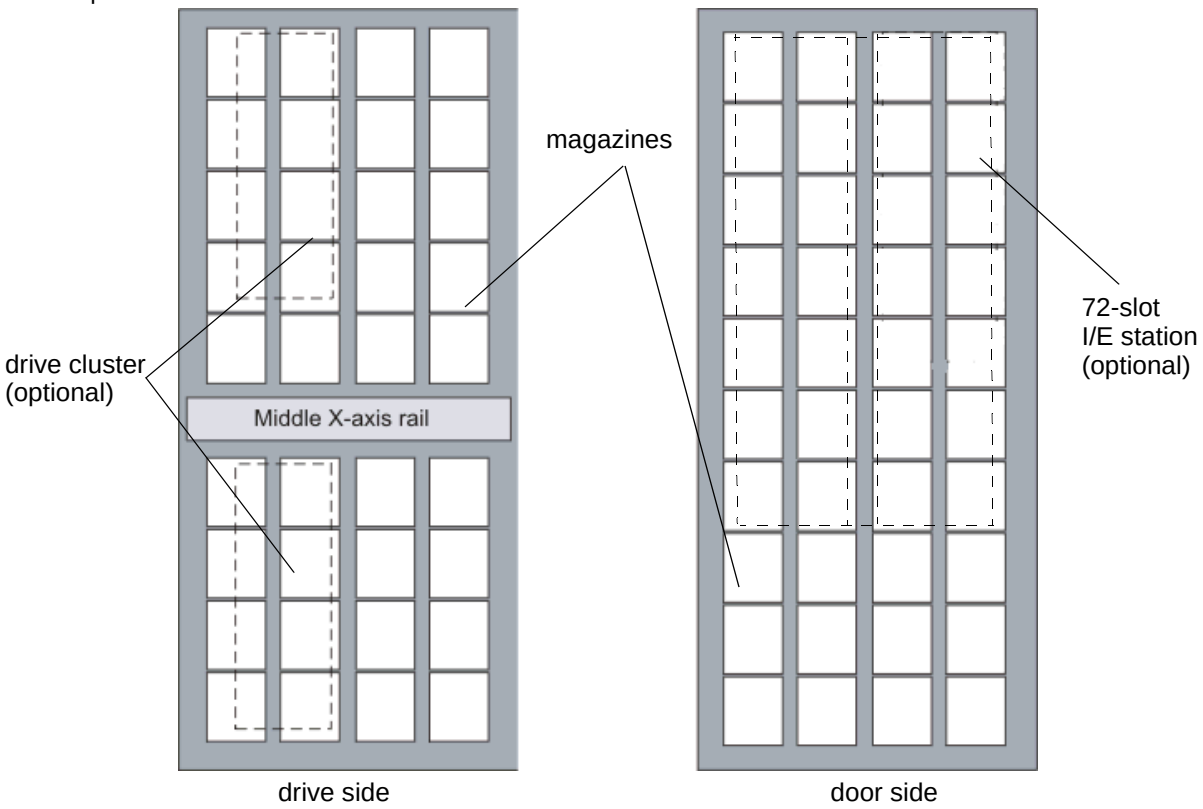


Figure 11 Magazine and Drive Location in the 72-slot I/E Station Expansion Modules



I/O Management Unit

The I/O management unit provides connectivity to a SAN fabric and the hosts, as shown in figure 12 on page 28. The I/O management unit houses up to six FC I/O blades which provide the FC connections for up to 12 Fibre Channel drives in the module. The I/O management unit can be used to perform all tape drive and library host communication functions in a library that is attached to a SAN.

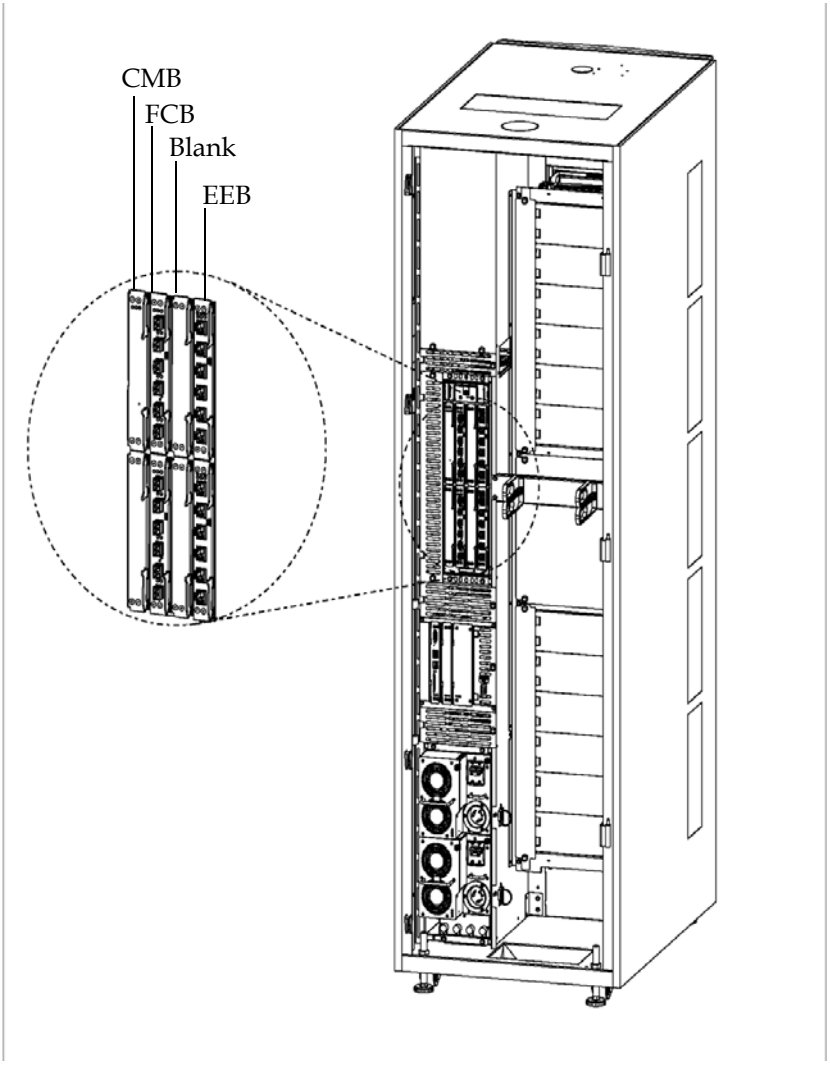
The I/O management unit supports the control management blade (CMB), and the FC I/O blades, and the Ethernet Expansion Blade (EEB).

I/O management units may be installed in the control module and expansion modules. The I/O management unit supports the following two blades:

- The control management blade performs unit status monitoring including power and I/O present conditions, and internal network switch functions connecting I/O blades with the library management module.
- There are two different FC I/O blade types: 6404 that auto-negotiates up to 2 Gbps and 7404 that auto-negotiates up to 4 Gbps. Each FC I/O blade has an embedded controller that provides connectivity and features that enhance the performance and reliability of tape operations. Each blade provides two host communication ports and four connection ports to drives.)
  - Fibre Channel LTO-1, LTO-2, LTO-3, LTO-4, LTO-5 DLT-S4, and SDLT-600 drives can be connected to drive-aggregating Fibre Channel I/O blades or directly attached to a host, so these drives do not require an external SNC.
  - We recommend that you do not connect an LTO-5 drive to a blade; the I/O blade supports only 4 GB per second, but the drive supports 8 GB.
- The Ethernet Expansion Blade (EEB) provides the option for Ethernet connectivity to each LTO-5 drive (for MCB to drive communication purposes only. The connection is at T100. This EEB provides a control path to the drive for commands as well as facilitates taking drive logs and downloading drive firmware. Each EEB has 6 Ethernet ports to

allow attachment to 6 LTO-5 drives. The EEB provides Ethernet connectivity to the library's internal Ethernet and should not be connected to an external Ethernet source.

Figure 12 I/O Management Unit



Host Attachment

Requests issued from the host application result in cartridge movement in the library. The primary requests issued are for mounting and dismounting cartridges in and out of the tape drives and for importing and exporting cartridges in and out of the library. The library manages the physical location. In addition to requesting cartridge movement in the library, the host application can use the FC or SCSI command interface to obtain status, configuration information, and cartridge storage information from the library.

Hosts can be attached to the library in the following ways:

- FC drives can be directly-attached to host systems or to the SAN. In these configurations, the MCB has one library control port (Fibre Channel or SCSI) connecting to the controlling host computer.
- Attachment of the FC drives to the FC I/O blade in the I/O management unit. There are two 4Gb fiber ports on each FC I/O blade that can be connected directly to the host or to the SAN. These ports provide a dedicated 4Gb library control port.

Managing Your Remote Library

The library can be managed locally or remotely using the Library Management Console (LMC). Locally, the LMC is displayed on the touch screen (operator panel) on the front of the library. Remotely, the LMC is accessed using a Java-enabled browser.

Remote management is accomplished using the LMC. This interface is accessed through a web browser , which is identical to the front panel interface, using Java RMI communications to provide real time updates to LMC clients. This enables the library to provide end-users with status changes and events as they occur.

At a high level, remote access can be managed using security functions embedded within the Scalar i6000. This includes authentication via individual user names/passwords and access control settings which

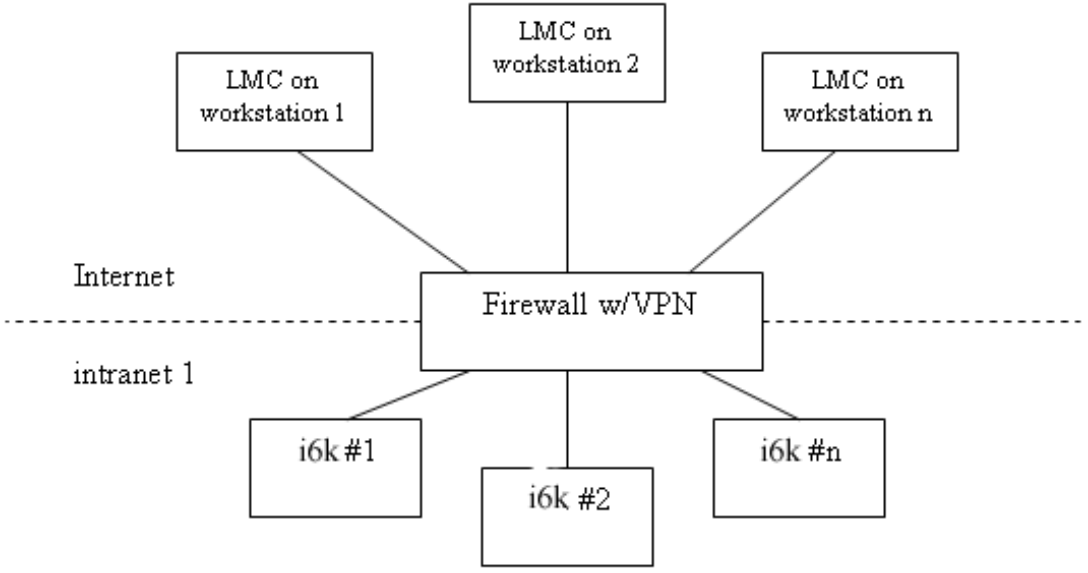
enable or disable specific access protocols to limit what type of remote management is possible.

In addition to this, most customers should have one or more firewalls in place to govern remote access. As with any Internet accessible service, the LMC requires a communication path so that data can be transmitted between clients and the Scalar i6000. How this communication path is managed depends on the user's configuration.The following three scenarios typical configurations.

Scenario 1: Internet based clients managing multiple internal Scalar i6000s

For most organizations, a single administrator will not be managing all storage resources. In this instance, as shown in figure 13 on page 30 multiple administrators and even Quantum service personnel may be asked to remotely access Scalar i6000s.

Figure 13 Multiple Workstations



In the scenario shown in figure 13, Quantum highly recommends using virtual private network (VPN) software to control access to the Scalar i6000. VPNs offer authentication and encryption services to protect data

transmissions and determine who can access a corporate network. By using VPN, the LMC client appears to be inside the firewall and have unrestricted access when communicating with the library.

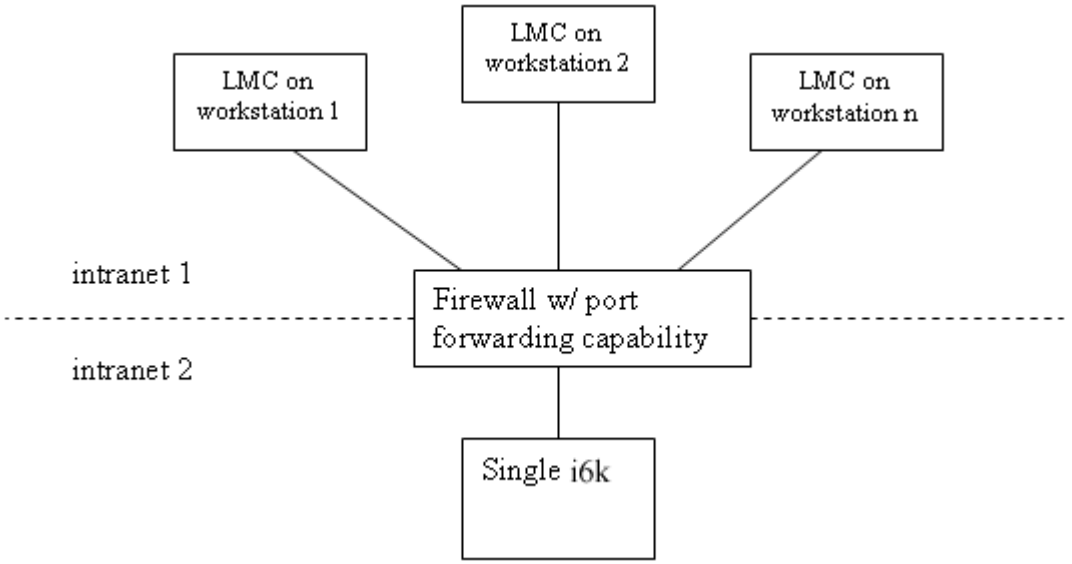
While a VPN is recommended, customers could use port blocking to provide access. In this instance, the following firewall requirements must exist:

- Inbound access to port 1099 (Java RMI server port)
- Stateful access control – used with most web technologies (for example, web mail) to enable a server to communicate with the client that started the connection

Scenario 2: Internal clients accessing a single library across an internal firewall

Another common customer configuration, is that a customer will want to allow multiple internal clients to manage a single Scalar i6000. For instance, as shown in figure 14 on page 32, network operation/data center staff providing monitoring services of specific resources. Administrators are inside the corporate firewall, but security considerations necessitate an additional firewall between administrators and the resources they manage.

Figure 14



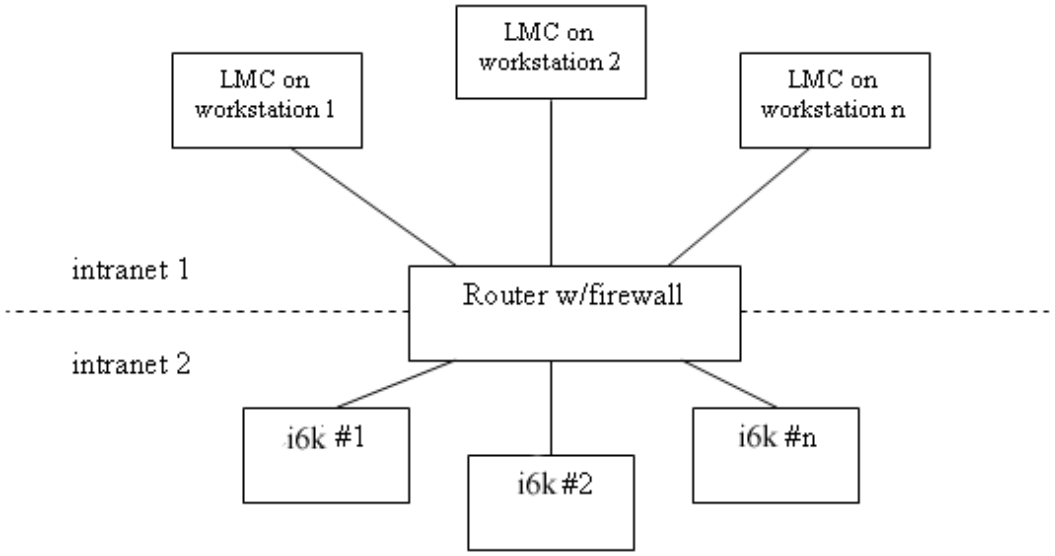
In the scenario shown in figure 14 customers can utilize port forwarding functionality to enable specific access to a Scalar i6000. Port forwarding works by taking all host communications directed to a specific port and forwarding them to a single IP device. In this case, port forwarding would be configured so that all communications to the Java RMI server port (1099) would be directed to the IP address of the Scalar i6000.

The benefit of this solution is that it forces all traffic to a single library and prevents any other traffic using port 1099 from going to other devices. This does mean that only a single Scalar i6000 can be accessed. Multiple Scalar i6000 libraries could not be accessed.

Scenario 3: Internal clients accessing multiple libraries across an internal firewall

Many customers use a layered system of firewalls to safeguard resources. In the scenario shown in figure 15, a customer may have multiple Scalar i6000s which need to be administered by internal staff (for instance data center / network operations staff) – with a firewall in between the administrators and libraries.

Figure 15



To enable LMC access between firewall zones, two solutions are possible depending on the customer configuration. If the two zones are on the same IP subnet, then the firewall will provide IP address and port blocking functionality and should follow these rules:

- Inbound access to port 1099 (Java RMI server port) by client IP addresses
- Stateful access control – used with most web technologies (e.g. web mail) to enable a server to communicate with the client that started the connection

If the two zones are on different subnets, or an IP address translation is performed to mask the library's true IP address, then the firewall must

provide routing rules that allow the client IP addresses to access specific library IP addresses.

Capacity on Demand

If you purchased capacity on demand, the library is initially licensed for a default configuration of 100 SDLT or 102 LTO storage slots. The number of storage slots differs between media types because the library only supports full magazines for capacity on demand.

The library's license key must be enabled during installation to configure those parts of the library that are governed by additional licensing. Customer license keys are available from Global Call Handling.

The capacity on demand library can be expanded from a single module to up to twelve modules. With capacity on demand, you can purchase enough storage to accommodate your current needs. As your storage needs change you can add storage in blocks of 100 cartridges, without being required to purchase additional hardware. Capacity on demand begins at 100 cartridges and can be increased to as many as 5,300 LTO or 2,915 SDLT cartridges inside one library.

For more information, refer to the *Scalar i6000 User's Guide*.

Encryption and Key Management Solutions

The Scalar i6000 supports library managed encryption systems, which are enabled using a centralized key manager application to generate, protect, store, and manage encryption keys. These keys are used to encrypt the information being written to tape media and read from tape media. Policy control and keys pass through the library-to-drive interface; therefore encryption is transparent to the host application software.

You must have an Encryption Key Manager (EKM) license installed on the library to begin encrypting data using the tape drive encryption

capabilities. For more information, see Quantum Encryption Key Managers User's Guide (6-01847-01).

Quantum Encryption Key Manager (Q-EKM)

Q-EKM supports encryption on LTO-4 cartridges using IBM LTO-4 Fibre Channel tape drives only. Caution: You must be running Q-EKM version 2.0 (or higher) to support LTO-5 tape drives.

Scalar Key Manager (SKM)

SKM supports encryption on LTO-4 and LTO-5 tape cartridges using HP Fibre Channel tape drives only.

If you are using SKM, you can import and export encryption keys and encryption certificates via the library interface, which enables you to share encrypted tape with others who use SKM, or create backups in case of server failure.

If you choose to purchase and use the licensed Encryption Key Management, you must supply a server on which to install the appropriate applications. Professional Q-EKM integration must be performed by Quantum or Quantum authorized service personnel. For more information, contact the Global Call center at www.quantum.com/support.

Note: In order for Encryption Key Management to work properly, you must upgrade both your library and tape drive firmware to the latest released versions. For instructions on performing the firmware upgrades, see the *Scalar i6000 User's Guide* (6-66879-01).

Chapter 3

System Specifications

This section provides performance, environmental, electrical, and physical specifications for modules in the library. The major sections include:

Performance Specifications

The performance of the library is 53 cartridge exchanges per hour (EPH) for a twelve module system, 130 cartridge EPH for an eight-module system, with a maximum EPH of 265.

Environmental Specifications

Table 2 lists the key environmental information for the library.

Table 2 Environmental Specifications

Temperature	Humidity	Altitude	BTU/Heat Dissipation	
			Minimum[a]	Maximum[b]
LTO: 59°F - 89.6°F (16°C - 32°C) SDLT: 64°F - 82°F (18°C - 28°C)[c]	15 - 75%	10,000 ft	.375 kwh 1280 BTU	4.3 kwh 14651 BTU

a.Configuration includes a control module with one drive.
b.Configuration includes a control module and seven expansion modules with a total of 48 drives and four I/O management units with a total of 12 I/O blades (three blades in each of the four I/O management units).
c.Once an SDLT cartridge is used for archival storage these temperature ranges apply.

Electrical Specifications

Although each system is configured with a single AC power source, redundant power is an option. If redundant power is chosen, the control module and the first seven expansion modules that contain tape drives require two independent AC power sources. Expansion modules 8 - 11 are storage-only.

CAUTION **You must install your library with two independent power sources to have redundant power. You will not have redundant power if you use only one AC power source.**

The power cable length for each of these inputs is 14 feet (4.26 m). See table 3.

For North America, the NEMA L6 - 30 power cord ships by default.

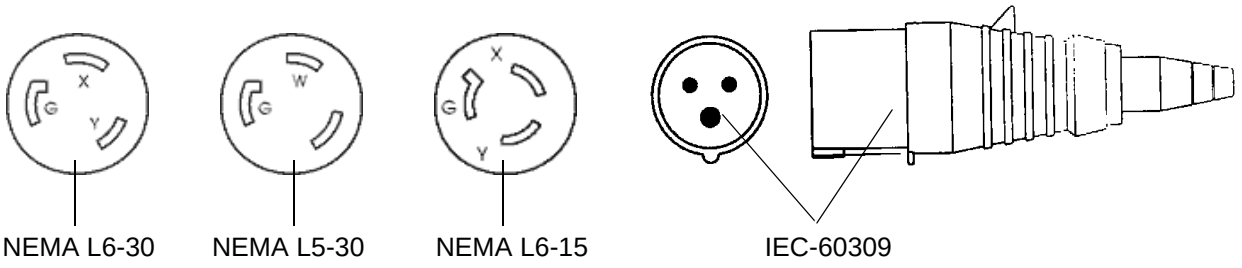
Table 3 Electrical Specifications for Control and Expansion Modules

Location	Voltage (Single Phase, 50 - 60 Hz)	Required Protective Service	Delivered Power Connector	AMPs
North America	110	30	NEMA L5 - 30	30
North America	208	30	NEMA L6 - 30[a]	30
North America	208	15	NEMA L6 - 15	15
International	240	16	IEC60309 2P+E	20[b] or 16[c]

a.For North America, the NEMA L6 - 30 power cord ships by default.
b.20 amps in North America
c.16 amps international.

The L5-30, L6-15, and IEC60309 power connectors are shown in figure 16.

Figure 16 Supported Power Connectors



The typical power consumption for each module is listed in table 4 on page 40.

Table 4 Typical Module Power Consumption

Module	AMP @ 110 V	AMP @ 220 V	kW	BTU/hr
Control Module				
Minimum (1 drive)	3.4	1.7	.375	1280
Each additional drive	0.446	0.223	.050	167
Maximum (12 drives)	8.31	4.2	0.92	3121
I/O management unit	0.69	0.35	0.075	258
Each FC I/O blade	1.0	0.5	0.110	376
Ethernet Expansion Blade (EEB)	0.091	0.045	0.010	34
Maximum (12 drives, 1 I/O management unit, and 3 I/O blades)	12	6	1.32	4508
Expansion Module (Expansion modules in configuration positions nine through twelve are storage-only)				
Minimum (no drives)	0	0	0	0
Each additional drive	0.446	0.223	.050	167
Maximum (12 drives)	5.31	2.7	0.58	1990
I/O management unit	0.69	0.35	0.075	258
Each FC I/O blade	1.0	0.5	0.110	376
Ethernet Expansion Blade (EEB)	0.091	0.045	0.010	34
Maximum (12 drives, 1 I/O management unit, and 3 I/O blades)	9	4.5	.99	3381

Table 5 Scalar i6000 Power Consumption Characteristics

230V / 50 Hz / 1 pH.								
Robot Operating								
Total Number Drives	12	12	12	12	6	3	1	0
Operational Drives	12	6	3	1	6	3	1	0
KW	0.77	0.76	0.75	0.74	0.54	0.48	0.35	0.31
KVA	0.82	0.8	0.79	0.79	0.58	0.52	0.38	0.35
KVAR (capacitive)	0.28	0.26	0.26	0.26	0.22	0.21	0.16	0.16
Power Factor	0.94	0.94	0.94	0.95	0.93	0.92	0.9	0.89
Crest Factor	1.85	1.85	1.82	1.82	1.87	1.8	1.68	1.6
Amps (RMS)	3.63	3.54	3.53	3.55	2.58	2.15	1.85	1.6
Amps (Peak)	7.097	7.214	7.063	6.983	5.532	4.714	3.924	2.588
208 v / 60 Hz / 1 pH.								
Robot Operating								
Total Number Drives	12	12	12	12	6	3	1	0
Operational Drive	12	6	3	1	6	3	1	0
KW	0.77	0.76	0.76	0.75	0.54	0.43	0.35	0.31
KVA	0.82	0.81	0.8	0.8	0.57	0.46	0.38	0.34
KVAR (capacitive)	0.28	0.27	0.27	0.27	0.18	0.17	0.15	0.14
Power Factor	0.94	0.94	0.94	0.94	0.95	0.93	0.92	0.91
Crest Factor	1.68	1.69	1.7	1.7	1.69	1.61	1.56	1.58
Amps (RMS)	4.06	3.92	4.04	3.91	2.78	2.31	1.93	1.75
Amps (Peak)	7.227	7.244	7.078	7.122	7.045	4.422	3.975	2.787

Customer Library Connection Types and Speeds

Table 6 lists the library connection types and speeds.

Table 6 Library Connections Types and Speeds

Connection[a]	Connector	Speed
Fibre Channel on FC I/O Blade	LC	2 gigabit/sec (6404) 4 gigabit/sec (7404)
Fibre Channel on management control blade	LC	1 gigabit/sec
Ethernet on management control blade	RJ45	10/100 Base-T
SCSI-2 on management control blade	68-pin VHDCI	Ultra-2 SCSI

a.The DB-9 serial connection on the management control blade is not intended for customer use.

Physical Specifications

This section contains the physical specifications for the library modules.

If the library is installed on a raised floor, the raised floor should be stabilized to prevent any horizontal movement. The library has four point loads each on the control and expansion modules. See table 7 on page 43.

Note

The Scalar i6000 control module-only weight is approximately 600 lbs. This is the weight of a control module without packaging or media.

Table 7 Physical Specifications

Height	Width	Depth	Maximum Weight	Distributed Load	Point Load
Control Module[a]					
77.4 in. 1965.9 mm	24.3 in. 616.7 mm	38.3 in. 973.9 mm	899 lb 408.6 kg	139.1 lb/ft^2 680.4 kg/m^2	73.8 lb/in^2 5.2 kg/cm^2
Expansion Modules[b]					
77.4 in. 1965.9 mm	23.6 in. 599 mm	38.3 in. 973.9 mm	885 lb 402.3 kg	140.9 lb/ft2 689.6 kg/m^2	72.7 lb/in^2 5.1 kg/cm^2
Storage-Only Expansion Modules[c]					
77.4 in. 1965.9 mm	23.6 in. 599 mm	38.3 in. 973.9 mm	777 lb 353.2 kg	123.7 lb/ft2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.Includes 12 drives, populated I/O management unit, redundant power, and full media.
b.Includes 12 drives, populated I/O management unit, redundant power, and full media.
c.Includes media and unpopulated I/O management unit.

Shipping Pallet Specifications

The library control modules and expansion modules are each shipped on the same type of specially designed pallet. The pallet's dimensions are listed in table 8 on page 44.

Control Module and Expansion Module Pallet Specifications

Table 8 Pallet Dimensions

Height	Width	Length
87 in. 2209.8 mm	42.5 in. 1079.5 mm	47 in. 1193.8 mm

LBX Considerations

LBX2 0 OHM cards must be installed in all expansion modules located in positions nine - twelve of a twelve module library configuration. If your library configuration contains expansion modules in positions nine through twelve, the LBX2 0 OHM card must also be installed in the expansion module in position eight.

I/E Station Considerations

Expansion modules 1 - 7 can contain either a 24 slot I/E station or a 72-slot I/E station. The 72- slot I/E station consists of two side-by-side 36-slot I/E stations that can be operate as one 72-slot I/E station or can be operated independently. Each 36-slot I/E station provides I/E capacity of 36 LTO cartridges in six removable magazines.

Configuration One

The first configuration consists of the control module. The minimal configuration contains one I/E station and one drive. Options include:

- Combination of up to 12 drives (LTO and SDLT can be mixed)
- Redundant power supply

A diagram of the first configuration is shown in figure 17 on page 45. Physical specifications are listed in table 9 on page 46.

Figure 17 Configuration One Diagram

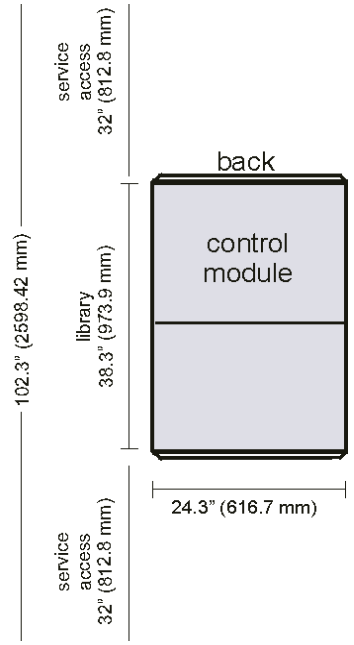


Table 9 Configuration One Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	24.3 in. 616.7 mm	38.3 in. 973.9 mm	899 lb 408.6 kg	139.1 lb/ft^2 680.4 kg/m^2	73.8 lb/in.^{2} 5.2 kg/cm^2

a.Weight includes library fully loaded with drives, populated I/O management units, redundant power, and full media.

Configuration Two

The second configuration consists of the control module and one expansion module. Options include:

- Up to 12 additional LTO or SDLT drives (for a total of 24 drives) (LTO and SDLT can be mixed)
- Redundant power supply
- Each expansion module in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The second configuration is shown in figure 18 on page 47. Physical specifications are listed in table 10 on page 47.

Figure 18 Configuration Two Diagram

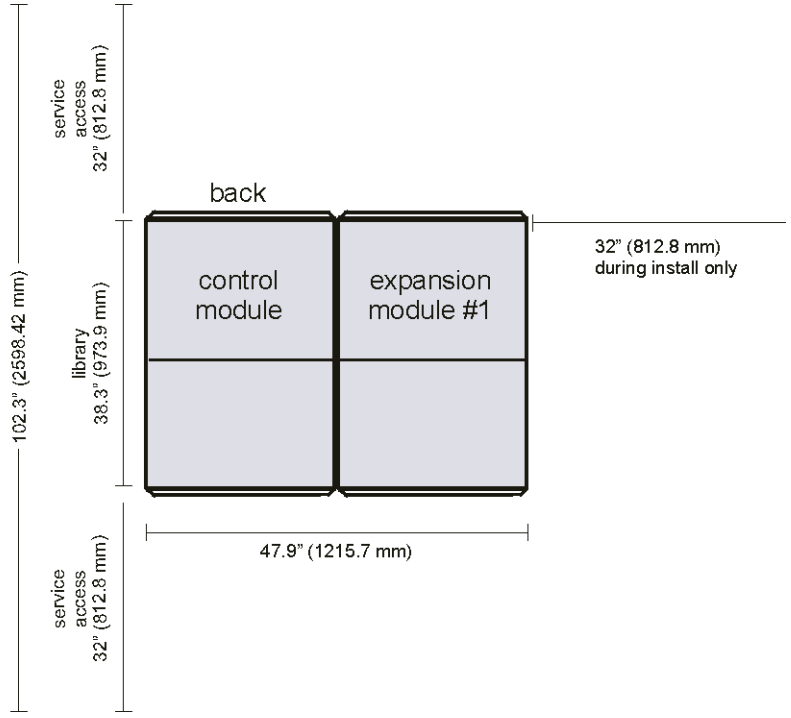


Table 10 Configuration Two Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	47.9 in. 1215.7mm	38.3 in. 973.9 mm	1784 lb 810.9 kg	140 lb/ft^2 684.9 kg/m^2	73.3 lb/in^2 5.2 kg/cm^2

a.Weight includes library fully loaded with drives, populated I/O management units, redundant power, and full media.

Configuration Three

The third configuration consists of one control module and two expansion modules. Options include:

- Up to 12 additional LTO or SDLT drives (for a total of 36 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Each expansion module can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The third configuration is shown in figure 19 on page 49. Physical specifications are listed in table 11 on page 49.

Figure 19 Configuration Three Diagram

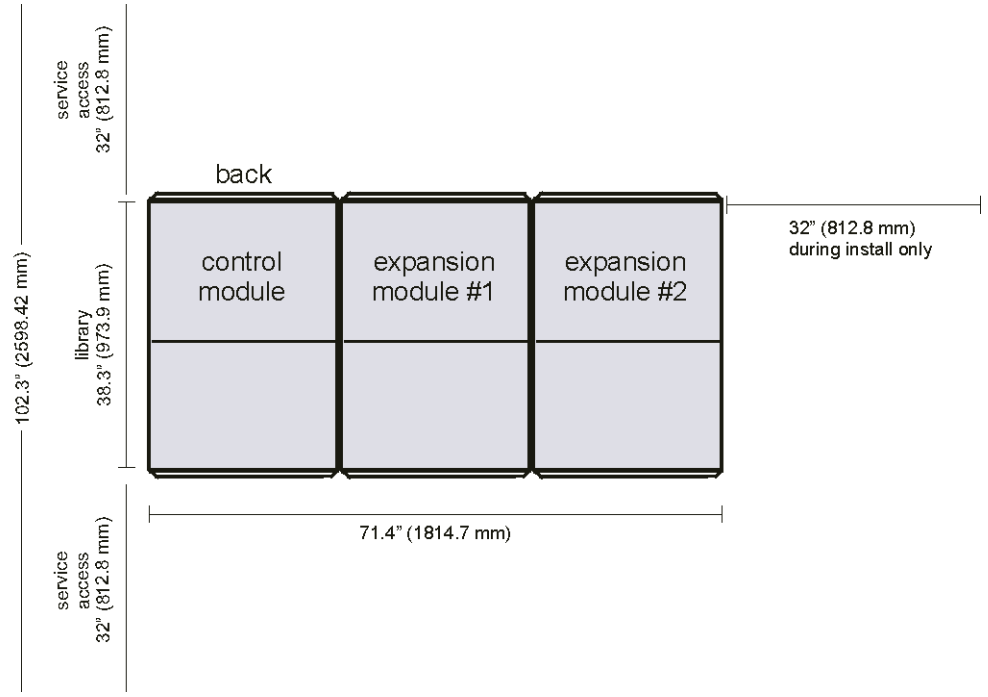


Table 11 Configuration Three Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	71.4 in. 1814.7 mm	38.3 in. 973.9 mm	2669 lb 1213.2 kg	140.3 lb/ft^2 686.4 kg/m^2	73.1 lb/in^2 5.1 kg/cm^2

a.Weight includes library fully loaded with drives, populated I/O management units, redundant power, and full media.

Configuration Four

The fourth configuration consists of the control module and three expansion modules. Options include:

- Up to 12 additional LTO or SDLT drives (for a total of 48 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Each expansion module in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The fourth configuration is shown in figure 20 on page 51. Physical specifications are listed in table 12 on page 51.

Figure 20 Configuration Four Diagram

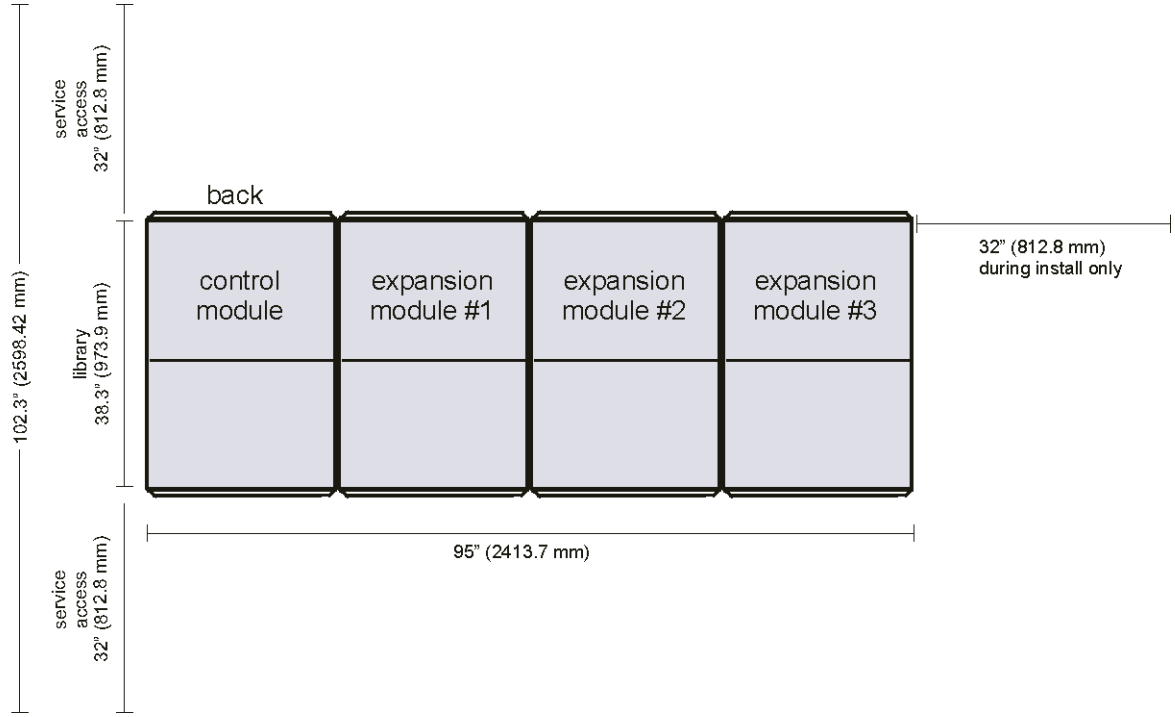


Table 12 Configuration Four Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	95.0 in. 2413.7 mm	38.3 in. 973.9 mm	3554 lb 1615.5 kg	140.5 lb/ft^2 687.2 kg/m^2	73 lb/in^2 5.1 kg/cm^2

a.Weight includes library fully loaded with drives, populated I/O management units, redundant power, and full media.

Configuration Five

The fifth configuration consists of the control module and four expansion modules. Options include:

- Up to 12 additional LTO or SDLT drives (for a total of 60 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Each expansion module can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The fifth configuration is shown in figure 21 on page 53. Physical specifications are listed in table 13 on page 53.

Figure 21 Configuration Five Diagram

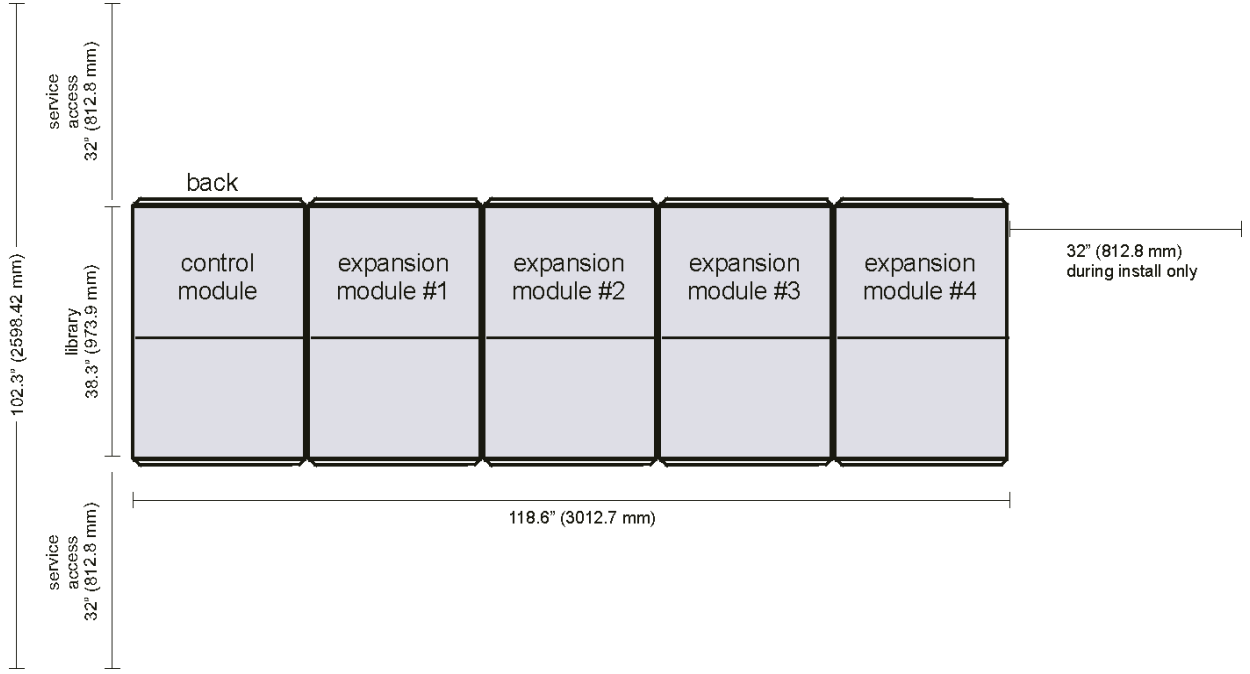


Table 13 Configuration Five Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	118.6 in. 3012.7 mm	38.3 in. 973.9 mm	4331 lb 1968.6 kg	123.7 lb/ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.In this example, the weight includes a library that has the first four modules fully loaded with drives, populated I/O management units, redundant power, and full media. In this example, the last module will be loaded only with full media.

Configuration Six

The sixth configuration consists of the control module and five expansion modules. Options include:

- Up to 12 additional LTO or SDLT drives (for a total of 72 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Each expansion module in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The sixth configuration is shown in figure 22 on page 55. Physical specifications are listed in table 14 on page 55.

Figure 22 Configuration Six Diagram

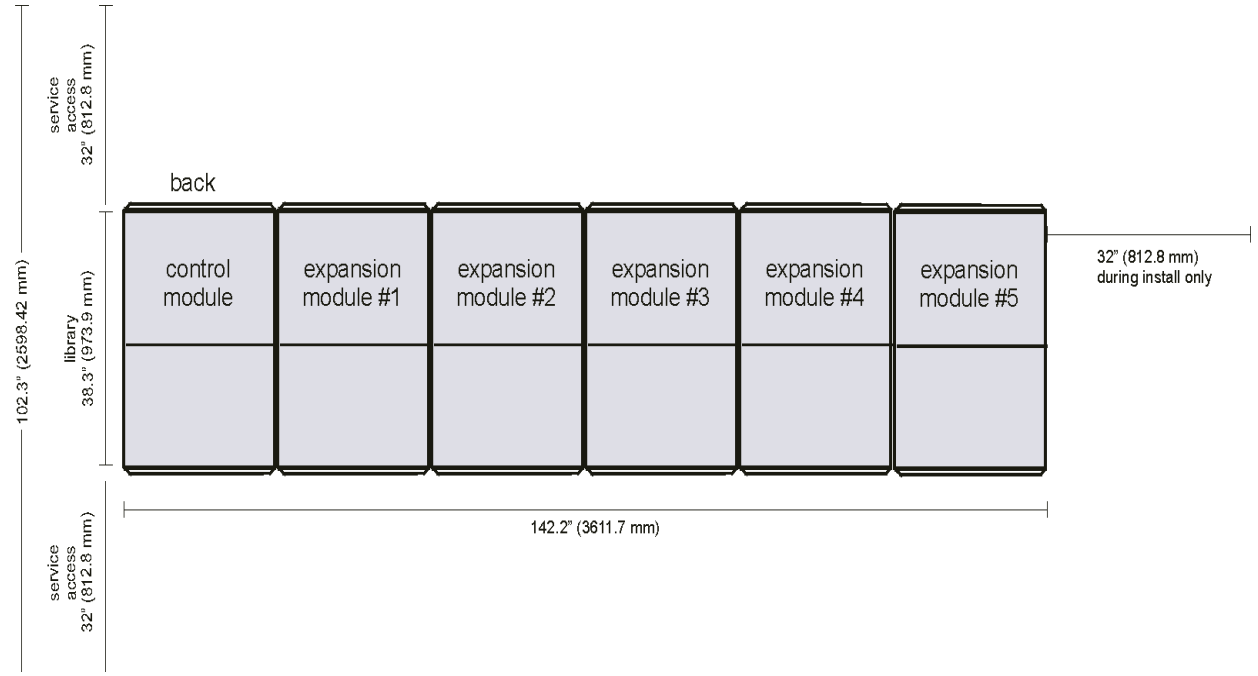


Table 14 Configuration Six Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	142.2 in. 3611.7 mm	38.3 in. 973.9 mm	5108 lb 2321.8 kg	123.7 lb/ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.In this example, the weight includes a library that has the first four modules fully loaded with drives, populated I/O management units, redundant power, and full media. In this example, the last module will be loaded only with full media.

Configuration Seven

The seventh configuration consists of the control module and six expansion modules. Options include:

- Up to 12 additional LTO or SDLT drives (for a total of 84 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Each expansion module in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The seventh configuration is shown in figure 23 on page 57. Physical specifications are listed in table 15 on page 57.

Figure 23 Configuration Seven Diagram

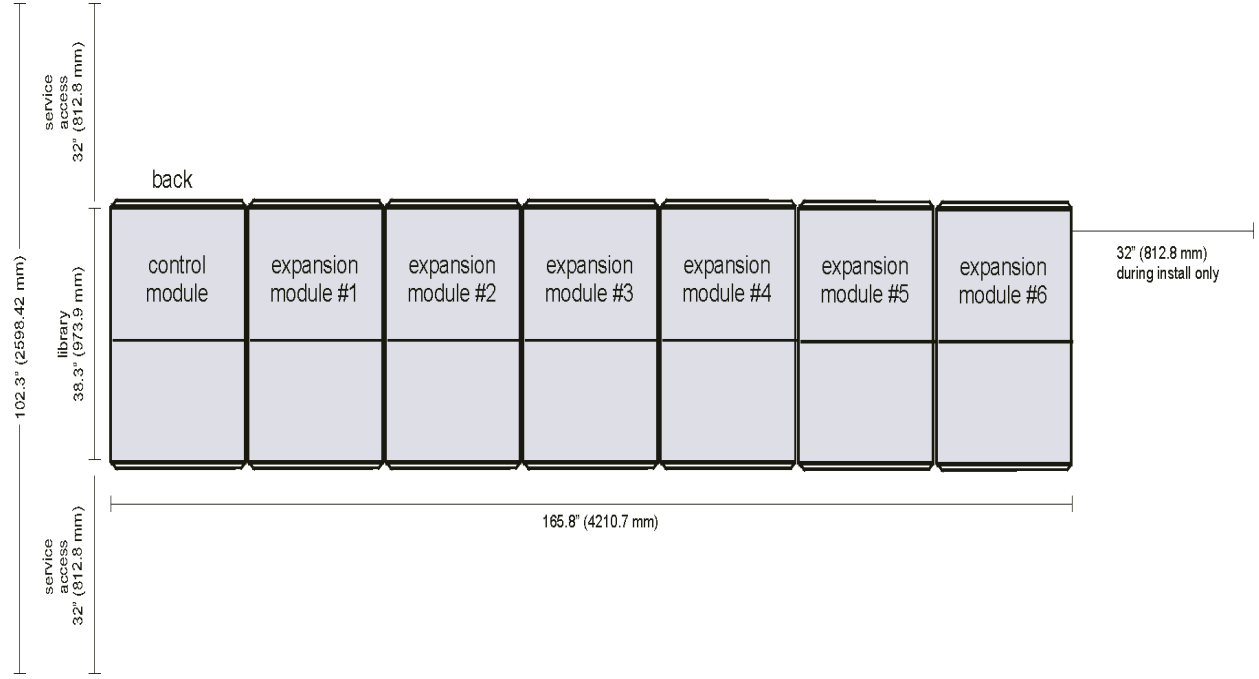


Table 15 Configuration Seven Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	165.8 in. 4210.7 mm	38.3 in. 973.9 mm	5885 lb 2675 kg	123.7 lb/ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.In this example, the weight includes a library that has the first four modules fully loaded with drives, populated I/O management units, redundant power, and full media. In this example, the last module will be loaded only with full media.

Configuration Eight

The eighth configuration consists of the control module and seven expansion modules.The options available are:

- Up to 12 additional LTO or SDLT drives (for a total of 96 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Each expansion module in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges))

The eighth configuration is shown in figure 24 on page 59. Physical specifications are listed in table 16 on page 59.

Figure 24 Configuration Eight Diagram

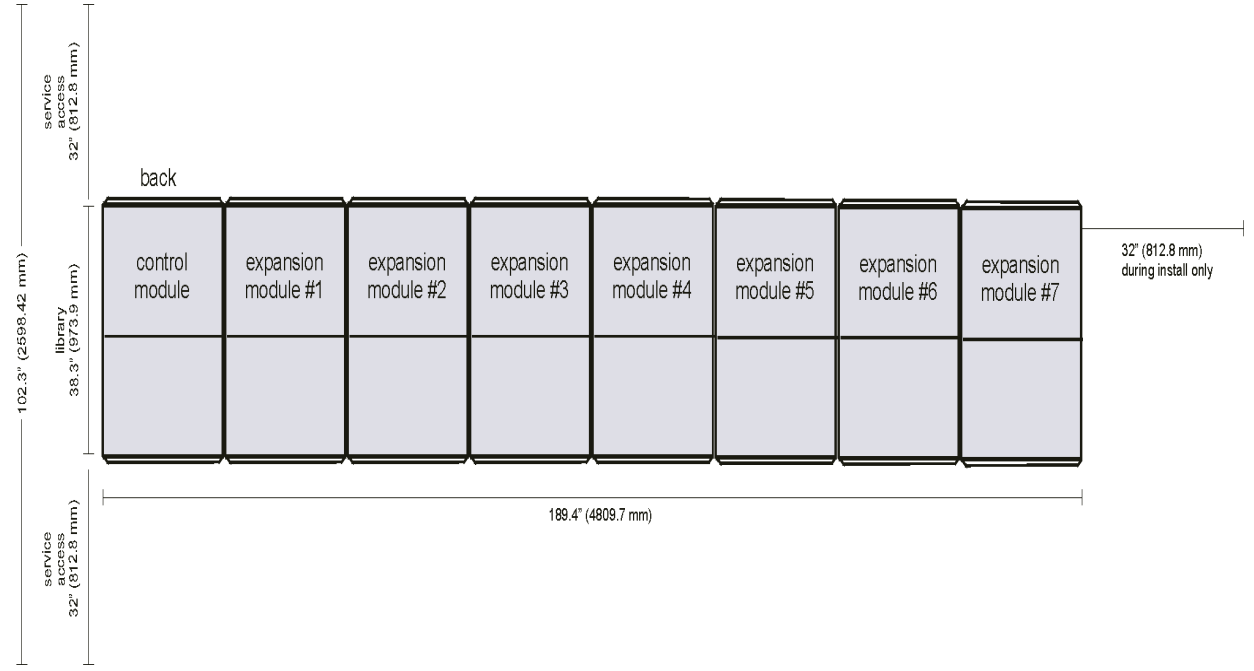


Table 16 Configuration Eight Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	189.4 in. 4809.7 mm	38.3 in. 973.9 mm	6662 lb 3028.2 kg	123.7 lb/ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.In this example, the weight includes a library that has the first four modules fully loaded with drives, populated I/O management units, redundant power, and full media. In this example, the last module will be loaded only with full media.

Configuration Nine

The ninth configuration consists of the control module and eight expansion modules. Expansion module #8 is a storage-only expansion module. This module does not contain drives, power supplies, or an I/E station.

The options available are:

- Up to 12 additional LTO or SDLT drives for a total of 96 drives (LTO and SDLT can be mixed) (expansion modules #1 through #7)
- Redundant power supplies (expansion modules #1 through #7)
- Expansion modules #1 through #7 in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The ninth configuration is shown in figure 25 on page 61. Physical specifications are listed in table 17 on page 61.

Figure 25 Configuration Nine Diagram

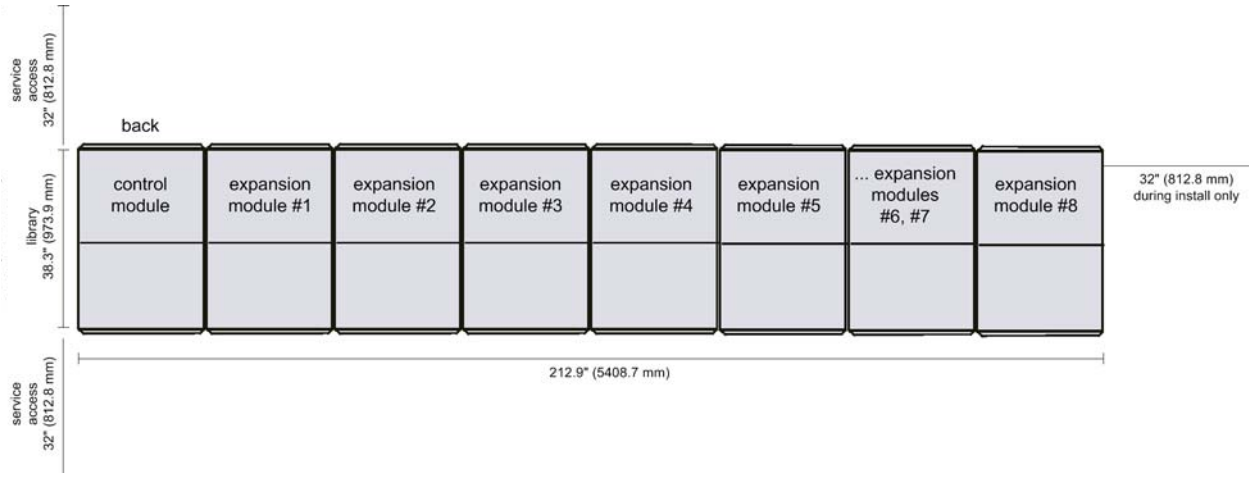


Table 17 Configuration Nine Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	212.9 5408.7 mm	38.3 in. 973.9 mm	7439 lb 3374.3 kg	123.7 /ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.In this example, the weight includes a library that has the maximum 96 drives, populated I/O management units, redundant power, and full media. Expansion module #8 is storage-only.

Configuration Ten

The tenth configuration consists of the control module and nine expansion modules. Expansion module #9 is a storage-only expansion module. This module does not contain drives, power supplies, or an I/E station.

The options available are:

- Up to 12 additional LTO or SDLT drives (for a total of 96 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Each expansion module in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Additional storage (up to 456 LTO or 380 SDLT cartridges)

The tenth configuration is shown in figure 26 on page 63. Physical specifications are listed in table 17 on page 61.

Figure 26 Configuration Ten Diagram

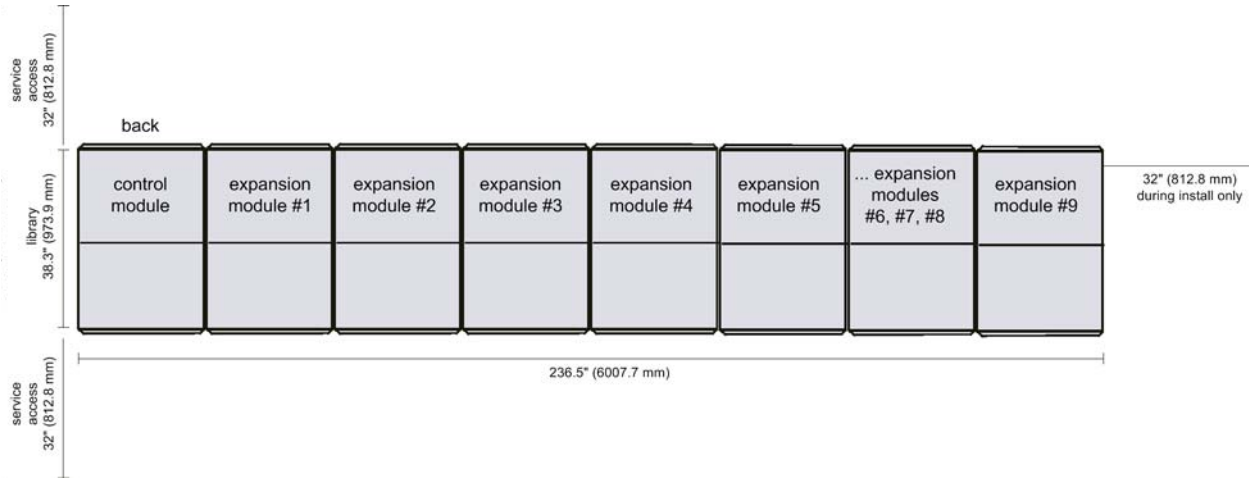


Table 18 Configuration Ten Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	236.5in. 6007.7 mm	38.3 in. 973.9 mm	8216 lb 3726.7 kg	123.7 lb/ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.In this example, the weight includes a library that has the maximum 96 drives, populated I/O management units, redundant power, and full media. Expansion module #8 and #9 are storage-only modules.

Configuration Eleven

The eleventh configuration consists of the control module and ten expansion modules. Expansion module #10 is a storage-only expansion module. This module does not contain drives, power supplies, or an I/E station.

The options available are:

- Up to 12 additional LTO or SDLT drives (for a total of 96 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Expansion modules #1 through #7 in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Depending upon your configuration, additional storage (up to 456 LTO or 380 SDLT cartridges)

The eleventh configuration is shown in figure 27 on page 65. Physical specifications are listed in table 19 on page 65.

Figure 27 Configuration Eleven Diagram

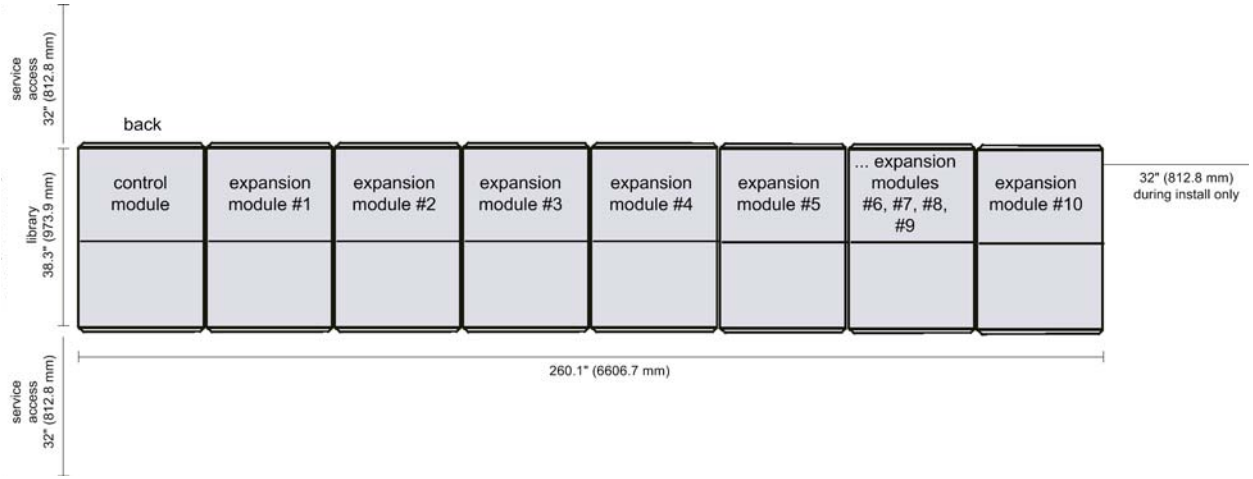


Table 19 Configuration Eleven Specifications

Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	260.1 in. 6606.7 mm	38.3 in. 973.9 mm	8993 lb 4079.2 kg	123.7 lb/ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.n this example, the weight includes a library that has the maximum 96 drives, populated I/O management units, redundant power, and full media. Expansion modules #8, #9, and #10 are storage-only modules.

Configuration Twelve

The eleventh configuration consists of the control module and eleven expansion modules. Expansion module #11 is a storage-only expansion module. This module does not contain drives, power supplies, or an I/E station.

The options available are:

- Up to 12 additional LTO or SDLT drives (for a total of 96 drives) (LTO and SDLT can be mixed)
- Redundant power supplies
- Expansion modules #1 through #7 in this configuration can contain either one 24-slot I/E station or one 72-slot I/E station
- Depending upon your configuration, additional storage (up to 456 LTO or 380 SDLT cartridges)

The twelfth configuration is shown in figure 28 on page 67. Physical specifications are listed in table 20 on page 67.

Figure 28 Configuration Twelve Diagram

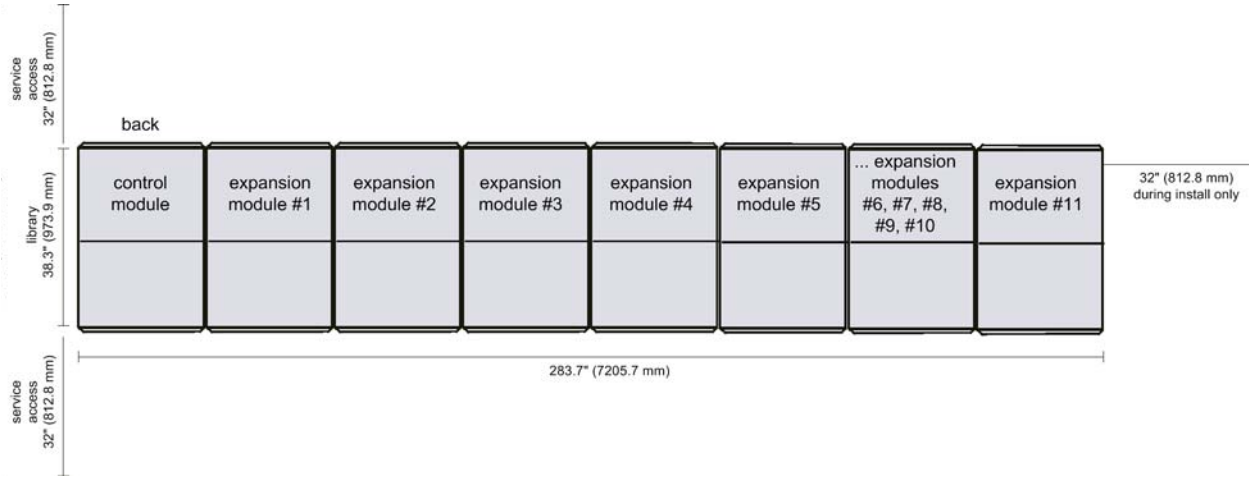


Table 20 Configuration Twelve Specifications

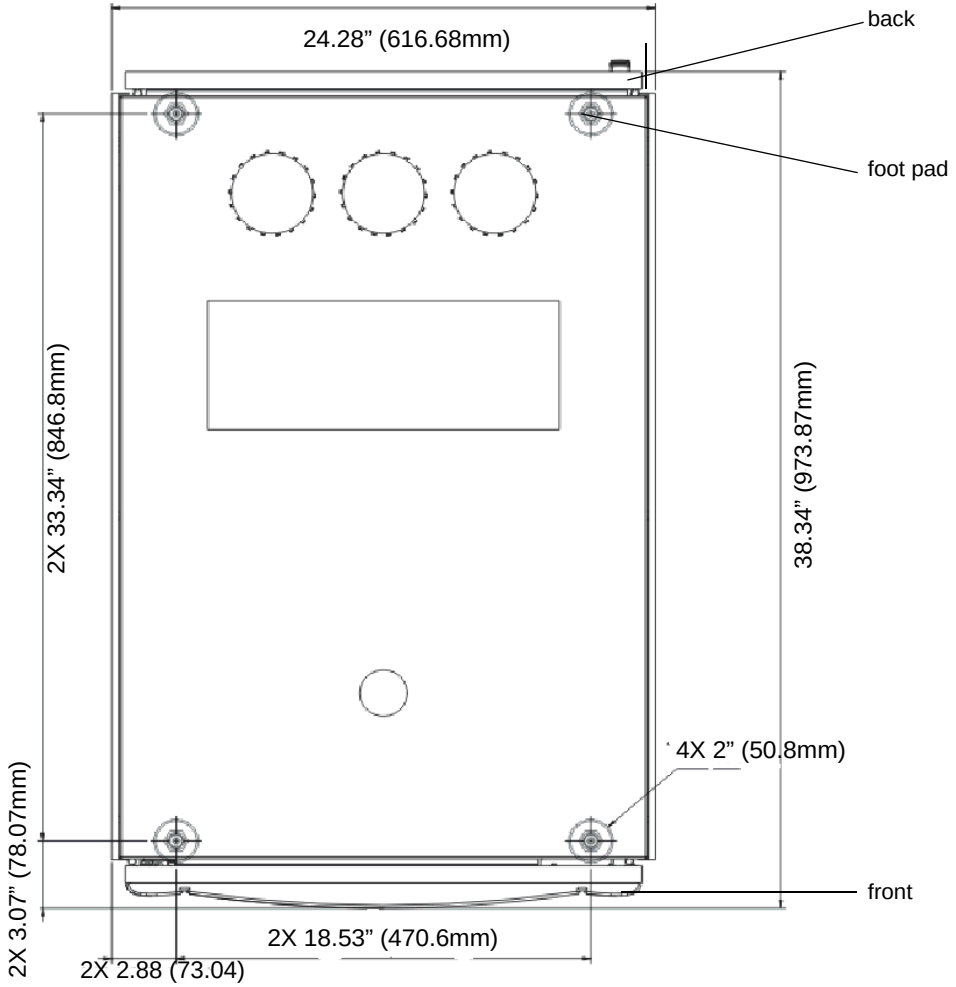
Height	Width	Depth	Maximum Weight[a]	Maximum Distributed Load	Maximum Point Load
77.4 in. 1965.9 mm	283.7 in. 7205.7 mm	38.3 in. 973.9 mm	9770 lb 4431.6 kg	123.7 lb/ft^2 605.4 kg/m^2	63.8 lb/in^2 4.5 kg/cm^2

a.In this example, the weight includes a library that has the maximum 96 drives, populated I/O management units, redundant power, and full media. Expansion modules #8, #9, #10, and #11 are storage-only modules.

Module Foot Pad Positions

The library foot pad positions looking down from the top are shown in figure 29 on page 68. The foot pad positions are the same for the control module and expansion modules.

Figure 29 Library Module Foot Pad Positions



Module Floor Cutout

The foot pad positions are shown from underneath the library in figure 30 on page 69. The module floor cutouts are the same for the control module and expansion modules.

Figure 30 Module Floor Cutout (Bottom View)

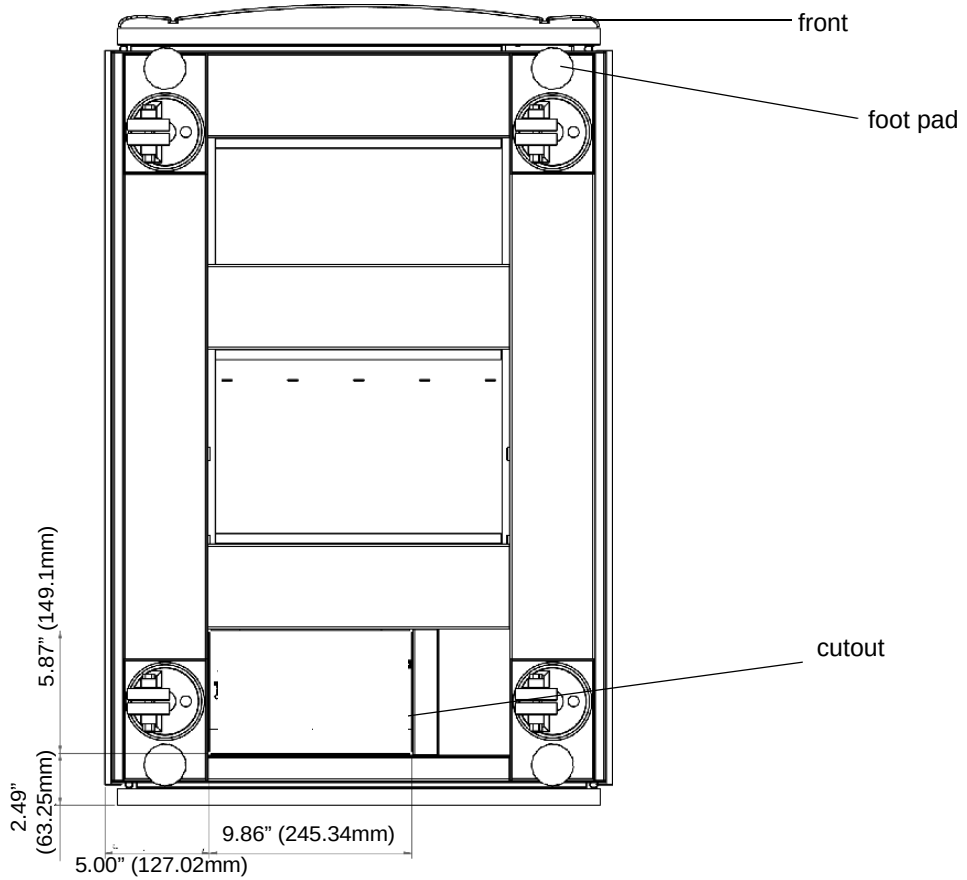
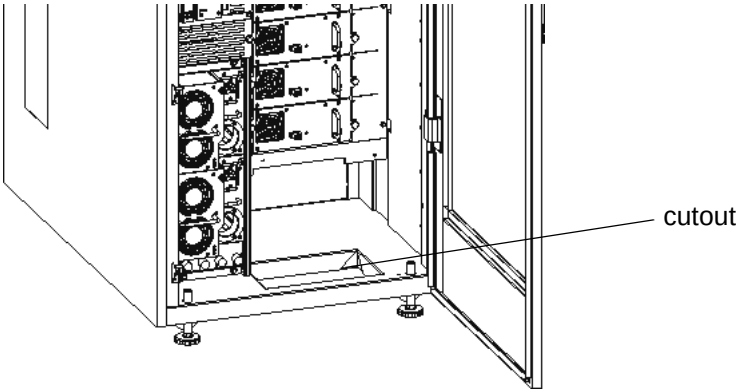


Figure 31 Module Floor Cutout (Front View)



Drive Requirements and Compatibility

The library supports both FC and SCSI drives. Mixed media configurations are supported. The control module and first seven expansion modules can each contain up to 12 full-height FC linear tape-open format (LTO-1, LTO-2, LTO-3, LTO-4, and LTO-5), SDLT-600 tape drives, or SDLT-320 SCSI drives.

LTO Drives

Although all five generations of LTO drives are supported in the library, the drives are not fully compatible (both read/write) as shown in table 21 on page 71.

Table 21 LTO Drive and Cartridge Compatibility

	LTO-1 Cartridges	LTO-2 Cartridges	LTO-3 Cartridges	LTO-3 WORM	LTO-4 Cartridges	LTO-4 WORM	LTO-5 Cartridges	LTO-5 WORM
LTO-1 Drives	Reads/ Writes	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible
LTO-2 Drives	Reads/ Writes[a]	Reads/ Writes	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible
LTO-3 Drives	Reads[b]	Reads/ Writes[c]	Reads/ Writes	Write Once, Read Many[d]	Not compatible	Not compatible	Not compatible	Not compatible
LTO-4 Drives	Not compatible	Reads	Reads/ Writes	Write Once/Read Many	Reads/ Writes	Write Once, Read Many[e]	Not compatible	Not compatible
LTO-5 Drives	Not compatible	Not compatible	Read	Read Many	Reads/ Writes	Write Once, Read Many	Reads/ Writes	Write Once/ Read Many[f]

a.LTO-2 drives do not reformat LTO-1 cartridges. The drives will write to the cartridges in the LTO-1 format (100 GB capacity).
b.LTO-3 drives only read LTO-1, they do not write to the LTO-1.
c.LTO-3 drives do not reformat LTO-2 cartridges to contain the same density as the LTO-3 cartridges (400 GB). The LTO-3 drives will write to the LTO-2 cartridges in the LTO-2 format (200 GB capacity).
d.LTO-3 WORM requires the installation of library firmware and WORM-supported LTO-3 tape drive code
e. LTO-4 WORM requires the installation of the library firmware and WORM-supported LTO-4 tape drive code.
f.LTO-5 WORM requires the installation of the library firmware and WORM-supported LTO-5 tape drive code.

All LTO cartridges are the same size, which means they use the same magazines in the library. LTO drives can be directly attached to hosts, attached to the storage area network (SAN), or connected to FC I/O blades in the I/O management unit. SCSI drives must be directly attached to hosts or the SAN.

SDLT and DLT-S Drives

Four generations of SDLT and DLT-S cartridges are supported in the library, but the drives are not fully compatible (both read/write) as shown in table 23.

Table 22 SDLT Drive and Cartridge Compatibility

	SDLT-600 Cartridges	SDLT-320 Cartridges	SDLT-220 Cartridges	SDLT-VS 160 Cartridges
SDLT-600 Drives	Reads/Writes	Reads	Reads	Reads
SDLT-320 Drives	Not compatible	Reads/Writes	Reads/Writes	Not compatible
DLT-S4	Read	Read	Read	Not compatible

The SDLT-600 tape drives support reading and writing to SDLT II cartridges. They also have a backward-read compatibility (BRC) mode. When in this mode, the SDLT-600 is capable of reading SDLT-220 and SDLT-320 tape formats in a SDLT I data cartridge, as well as the SDLT-VS160 tape format in the DLTtape VS1 data cartridge. The SDLT-600 tape drive will eject a data cartridge written in DLT formats other than DLT-VS160.

The SDLT-600 backward-read compatibility transfer rates are given in table 23.

Table 23 SDLT and DLT Tape Drive Backward-Read Compatibility Transfer Rates

Format	Data Cartridge type	Capacity	BRC Transfer Rate[a]
SDLT-600	SDLT II	300 GB native 600 GB compressed	36 MB/s native 72 MB/s compressed
SDLT-320	SDLT I	160 GB	12.8 MB/s
SDLT-220	SDLT I	110 GB	8.8 MB/s

Table 23 SDLT and DLT Tape Drive Backward-Read Compatibility Transfer Rates

Format (Continued)	**Data Cartridge type**	**Capacity**	**BRC Transfer Rate**[a]
DLT-S4	DLTtape S4	800 GB native 1600 GB compressed	60 MB/s native 120 MB/s compressed
SDLT-VS160	DLTtape-VS1	80 GB	6.4 MB/s

a.The transfer rates shown are nominal based on 80% of actual native read transfer rate of uncompressed data. The DLT-S4 transfer rate shown is 2:1 compression ratio.

All SDLT and DLT cartridges are the same size, which means they will use the same magazines in the library. The SDLT-320 SCSI tape drives are supported in the library, but they must be connected to an FC Host Storage Area Network (SAN) by means of an external Storage Networking Controller (SNC) 5100.

Barcode Requirements

Cartridges must have an external barcode label that is machine-readable to identify the volume serial number. 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 barcode labels.

For LTO media barcodes, the library dynamically supports 1 to 14 characters for volume serial number plus a two-character media type identifier. The image below is an example of a supported LTO barcode label.

For SDLT I media barcodes, the library dynamically supports 1 to 6 characters for volume serial number plus a one-character media type identifier. The image below is an example of a supported SDLT I barcode label.

For SDLT II media barcodes, the library dynamically supports 1 to 6 characters for volume serial number plus a one- character media type identifier. The image below is an example of a supported SDLT II barcode label.

For DLT-S4 media barcodes, the library dynamically supports 1 to 6 characters for volume serial number plus a one-character media type identifier. The media identifier should be “4”.

Quantum-supplied barcode labels will 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+1 (DLT) or 6+2 (LTO)
- Background reflection: greater than 25 percent
- Print contrast: greater than 75 percent
- Ratio: greater than 2.2
- Module: >= .254 mm
- Print tolerance: ± 57 mm

Additional Requirements:

- Height of the visible portion of the barcode: 10 mm ±2 mm
- 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

Chapter 4

Site Preparations

This chapter provides a structure for the collection of all necessary information concerning the delivery site. Record all requested information in the forms provided or create additional sheets as needed. This chapter provides the following information:

General Information

Place any additional information in Additional Comments on page 88.

Customer name

Mailing address

Shipping address

Sales contact

Telephone _____

Quantum sales rep. _____

Quantum account manager _____

Installation contact _____

_____

Telephone _____

Target installation date _____

Target operational date _____

Physical Environment

Place any additional information in Additional Comments on page 88.

Room dimension _____

_____

_____

Ceiling projection _____

_____

_____

Floor type _____

_____

_____

Floor load capacity _____

_____

_____

Fire protection	
Seismic bracing - If seismic bracing is being used, verify that the seismic bracing solution is supported prior to installation.	
Type of power connector required	

Access Conditions

Access to the library room (elevator, stairs, door widths, etc.)

Dimensions and location of the smallest door or opening

Loading dock specifications (dock height, type of ramps, weather protection, etc.)

Semitrailer accessibility (Y or N)

Preferred/required local carrier company

Where is the trailer location for staging?

Availability of material handling equipment

Location for uncrating

Preferred time of day for unloading and moving materials

Off hours/weekends accessibility for installation team

Procedure for obtaining building passes

Procedure for scheduling the elevator, loading dock

Waste disposal considerations

Bargaining unit considerations

Other considerations

Required Configuration Information

The following is some of the information that will be needed during installation of the library. Place any additional information in Additional Comments on page 88.

Library name:

License string:

IP address (internal)

IP addresses of the two network time protocol (NTP) servers:	1. _____ 2. _____
SNMP server:	_____
SNMP account:	_____
SNMP sender address	_____
Subnet mask:	_____
Default gateway:	_____
SMTP server IP address:	_____

Note If your mail server requires a user name and password you can enable this on the library and enter these for e-mail authentication.

E-mail addresses of local administrators to be notified if issues arise with the library: _____

Operating system and version running off the remote servers that will connect to the library: _____

SAN Readiness

All servers or appliances intended to communicate with the Scalar i2000 robotic controller or tape drives must be already installed on the SAN before configuring the library for fiber channel SAN connectivity. Additionally, the World Wide Names (WWNs) of the associated fiber channel HBAs should be visible on the SAN. This is necessary because the Scalar i2000 "Extended Virtual Private SAN" (eVPS) feature can only grant LUN access to WWNs it discovers on the SAN at the time of configuration.

Are all necessary servers or appliances visible on the SAN? (Y or N):

_____

Additional Comments

Record any additional information from other pages. For reference purposes, note the page number with the information. Add and number additional sheets as necessary.

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