Scalar *i*6000

Installation Guide Installation Guide Installation Guide Installation Guide

Scalar i6000 Installation Guide, 6-66881-01 A**,** May 2010, Made in USA.

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About This Guide and Your Product

This guide contains information and instructions necessary for the installation and configuration of the Scalar® i6000.

📝 Note   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 Quantum professional services and service personnel who will service 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.

⚠️ **CAUTION**   **Do not obstruct the top or bottom airflow by placing objects above or below the library. Do not cover ventilation areas on the library.**

Do not expose the library to moisture or store the library in temperatures higher than 60°C (140°F) or extremely low temperatures. For information about operating temperatures and humidity, see the *Scalar i6000 Planning Guide*.

⚠️ **WARNING**   **CREATING A HIGH LEAKAGE CURRENT EARTH CONNECTION IS ESSENTIAL BEFORE YOU CONNECT THE POWER SUPPLY.**

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

Mechanical Locks

The access and service doors can only be opened with a key. The key should be kept by an authorized person at your company. Access to the interior of the library is both a data integrity and a safety issue.

Door Interlock Switches

Door interlock switches detect when the access door has been opened and automatically remove power from the picker.

⚠ **WARNING** **DOOR INTERLOCK SWITCHES ARE PROVIDED FOR YOUR SAFETY. YOU SHOULD NOT INTERFERE WITH THEIR NORMAL OPERATION.**

Power Button on the Library's Indicator Panel

Switching off the **Power** button on the indicator panel, located on the front of the library, removes power from the electronics, which causes the picker to stop immediately. This button also removes power from the drives.

⚠ **WARNING** **THIS POWER BUTTON FUNCTIONS AS A POWER INTERRUPT ONLY. TO COMPLETELY REMOVE ALL POWER BEFORE SERVICING OR IN AN EMERGENCY, TURN OFF THE CIRCUIT BREAKER ON THE POWER DISTRIBUTION UNIT, AND THEN DISCONNECT THE POWER CORD FROM THE ELECTRICAL SOURCE.**

Physically Accessing the Library

The library is completely enclosed in a housing that serves as a guard, separating the danger area of the library from the normal working area. You can access the internal components of the library through the access and service doors only. When the library is powered on, the interlock on the access door is active.

⚠ **WARNING** **MOVEMENTS OF MECHANICAL PARTS IN THE LIBRARY CAN CAUSE SERIOUS INJURY OR DEATH. ACCESS TO INTERNAL LIBRARY COMPONENTS IS RESTRICTED TO AUTHORIZED PERSONNEL. DO NOT ENTER THE LIBRARY UNLESS YOU ARE AUTHORIZED BY YOUR COMPANY AND TRAINED ON HOW TO ENTER THE LIBRARY SAFELY.**

⚠ **WARNING** **WHEN DRIVE SLED POSITIONS ARE EMPTY, DRIVE COVER PLATES MUST BE INSTALLED AND IN PLACE AT ALL TIMES TO PREVENT ACCESS INTO THE EMPTY DRIVE SLED POSITIONS.**

Authorized persons can access the library only when one or more of the following conditions are true:

- The library has been taken offline and the **Robotics Enabled** button on the library's indicator panel has been turned off.
- The access door has been opened.
- The **Power** button on the Library's indicator panel has been turned off.
- The AC line cord has been disconnected from the main power source.

⚠ **WARNING** **THE AC POWER CORD MUST BE INSTALLED NEAR THE LIBRARY AND MUST BE EASILY ACCESSIBLE AT ALL TIMES.**

Performing Mechanical Maintenance

Observe the following safety guidelines while performing maintenance on the library.

General Guidelines

Before you begin performing maintenance on the library, perform the following tasks:

- Locate escape routes and emergency exits, and clear them of obstacles.
- Identify a safe location for library components and other parts that you will remove from the library. Unauthorized persons should not have access to this location.
- Have a plan to keep components and equipment clean during work. Maintaining a clean working environment promotes safety.

Clothing must be in compliance with the following safety guidelines:

- Clothing must not have metal fasteners.
- Clothing must be close-fitting so that it cannot be caught in moving machine parts.
- Long sleeves must be buttoned up or rolled up.
- Scarves must be removed or the ends must be tucked into other clothing.
- Long hair must be fully covered.
- Remove watches, rings, jewelry, badges, and other items that could get caught in or damage equipment.

Wear safety glasses when you do any of the following tasks:

- Use a safety drill.
- Work on springs, retaining rings, and so forth.
- Solder or work on cables.
- Clean with chemical agents.
- Perform any other work that could endanger the eyes.

Wear safety shoes when handling heavy components.

Before you begin work and after you finish, be careful to remove or reinstall all safety provisions as appropriate (covers, hazard alert messages, warning signs, grounding wires, and so forth).

Working on Live Components

⚠️ **WARNING**

CONTACT WITH ELECTRICAL PARTS CAN CAUSE ELECTRICAL SHOCK, RESULTING IN POSSIBLE SEVERE OR FATAL BURNS AND INTERNAL INJURY. A PERSON WHO COMES INTO CONTACT WITH A LIVE PART OFTEN CANNOT BREAK LOOSE FROM THE PART. A SECOND PERSON MUST STAND NEAR THE MAIN CIRCUIT BREAKER, READY TO IMMEDIATELY SWITCH IT OFF IF A HAZARDOUS SITUATION OCCURS.

NEVER ASSUME THAT A CIRCUIT IS WITHOUT POWER. ALWAYS CHECK THE CIRCUIT. WHEN WORKING ON AC POWER COMPONENTS, ANOTHER PERSON MUST SUPERVISE YOUR WORK.

THIS SYSTEM HAS MORE THAN ONE POWER SUPPLY CABLE. TO REDUCE THE RISK OF ELECTRICAL SHOCK, DISCONNECT ALL POWER SUPPLY CABLES WHEN PERFORMING SERVICE PROCEDURES THAT REQUIRE POWER TO BE TURNED OFF.

When performing work on live parts, observe the following guidelines:

- Be thoroughly familiar with accident prevention rules.
- Use only suitable tools and measuring devices in good working condition.
- Verify that measuring devices are adjusted correctly and operating within specified measuring ranges.
- Work with only one hand, which can prevent internal injuries if electrical shock occurs.
- Avoid contact with conducting floors (especially metal) or equipment parts, covering the working area with suitable protective rubber mats if necessary.

Mercury Statement

(Hg) 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
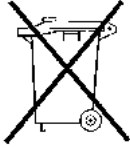
This symbol on the product or on its packaging indicates that this product should not be disposed of with your other waste. Instead, it should be handed over to a designated collection point for the recycling of electrical and electronic equipment. The separate collection and recycling of your waste 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 Web site 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 Model Number

The Scalar i6000 Regulatory Model Numbers are as follows:

SCi2000 Control Model

SCi2000 Expansion Model.

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 Planning Guide* (6-66882-01
- *Scalar i6000 Release Notes i8* (6-66883-01)
- *Scalar i6000 User's Guide* (6-66879-01)
- *Scalar i6000 Unpacking Instructions* (6-66934-01)
- *Scalar i2000/i6000 Maintenance Guide* (6-66880-01)
- *System, Safety, and Regulatory Information Guide* (6-00618-11)

☑	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

More information about this product is available on the Service and Support Web site at www.quantum.com/support. The Service and Support Web site 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

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

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Getting Started

This chapter describes how to get started with setting up the library. The information includes:

- Unpacking and Inspecting on page 9
- Checking the Accessories on page 10
- Initial Setup Procedure Road Map on page 11
- Required Tools on page 13
- Illustrations of Modules on page 14

Unpacking and Inspecting

Use the instructions supplied with the library to unpack. All boxes packed around the library on the pallet contain parts needed to install the library. When you remove the packing material from the parts in the base of the module, put the parts in a safe area so they will not get damaged or lost.

Make sure you have read the *Scalar i6000 Planning Guide* before you start the installation procedure.

Two silver and two gold keys are shipped with each module. The gold keys (FRU ID 401) open the service door. The silver keys (FRU ID 402) work on both the access and service doors. All modules are keyed the same, so there is no chance that a customer who has two or more modules could end up with different keys. All keys are to be left with the customer.

Note   Access to the interior of the library is both a data integrity and a safety issue.

Checking the Accessories

The library can be ordered in different configurations. Based on your configuration, check to make certain that the following items are included with the library and that none of them are damaged.

Libraries with native SCSI drives:

- Ordered number of SCSI LVD drives
- One terminator
- One library power cord (two power cords if you ordered redundant power supplies)

Libraries with native Fiber Channel (FC) drives:

- Ordered number of native FC drives
- One library power cord

Libraries with I/O management unit with FC drives:

- Ordered number of FC drives
- FC I/O blades (1 per 4 drives)
- Optional 2m optical cable (one per drive, connects drive to FC I/O blade)
- 30m multi-mode optical cables LC-LC (two per FC I/O blade, connects FC I/O blade to SAN)
- One library power cord

Libraries with Ethernet Expansion blades with LTO-5 drives:

- Ordered number of LTO-5 drives
- Ethernet Expansion blade (1 per 6 drives)
- One shielded Ethernet cable per drive

Library field service kit (delivered with each control module):

- Ethernet crossover cable (RJ45 to RJ45)
- Service kit
- Velcro cable clamps (3)
- Velcro hook and loop straps (2)
- Electrostatic discharge (ESD) wrist strap

Library documentation (delivered with each control module):

- CD-ROM that contains online versions of documentation
- *Scalar i6000 Installation Guide* (this manual)
- *Scalar i6000 Unpacking Instructions*
- *Scalar i6000 Release Notes*

Initial Setup Procedure Road Map

This section provides a road map for initial installation of a library. A library includes one control module and may include up to eleven expansion modules. The proper sequence for setting up a library is illustrated in the following flowchart. Pointers to the instructions are provided to the right of the flowchart.
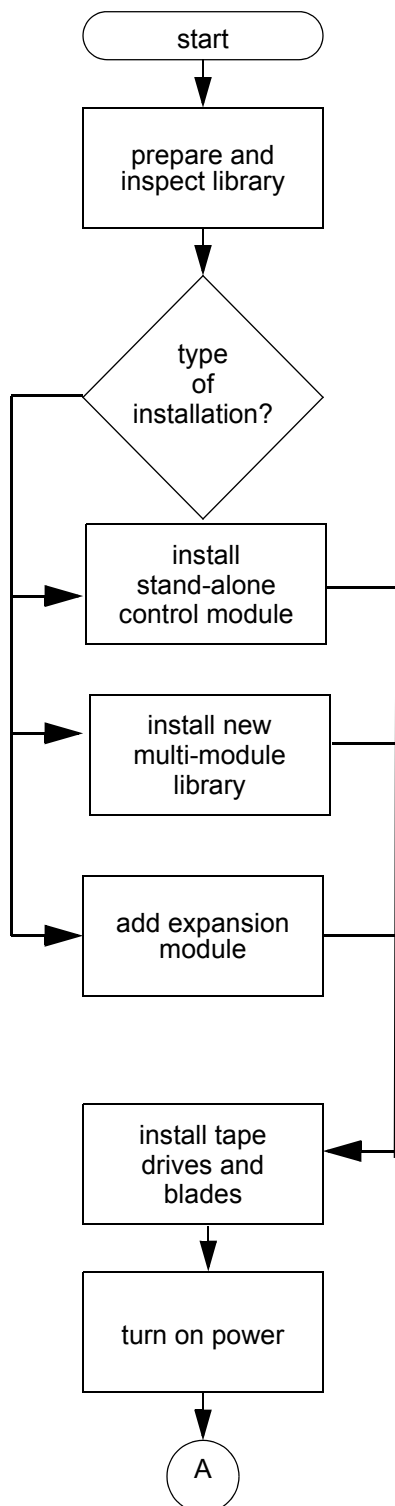
Getting Started on page 9, describes how to prepare and inspect the library. You will use the instructions supplied with the modules to perform the unpacking procedures.

Installing a Stand-Alone Control Module on page 19, provides instructions for installing the control module. Each configuration must contain one control module.

Preparing to Install a New Multi-Module Library on page 28 and Adding an Expansion Module to an Existing System Unit on page 36 contain the instructions for installing a control module and up to a total of eleven expansion modules.

Adding an Expansion Module to an Existing System Unit on page 36 contains the instructions for adding expansion modules to an existing library, up to a total of eleven expansion modules.

Installing Drives and Blades on page 97 provides instructions for installing and connecting the tape drives in the drive modules.

Applying Power on page 93, contains instructions for applying power to your library.
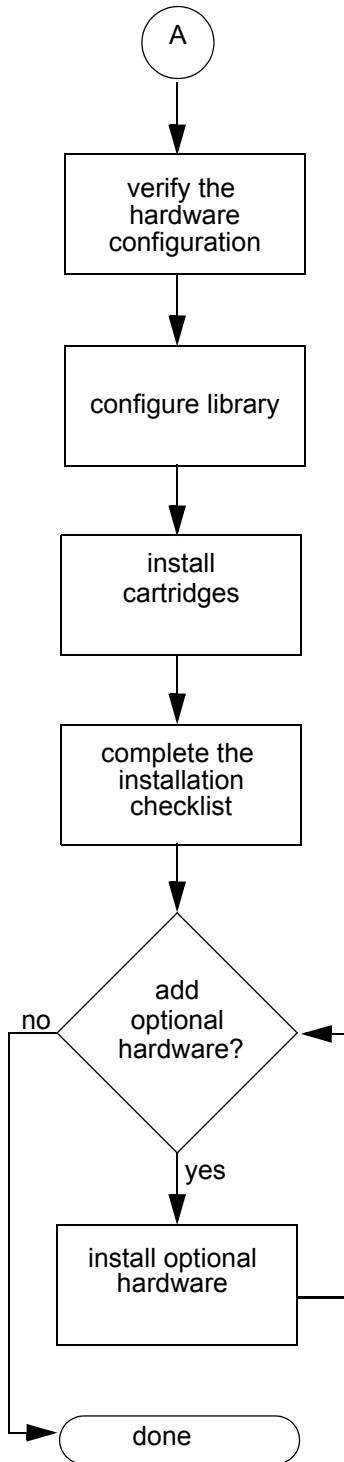
```
        ( A )
          │
          ▼
┌─────────────────┐     Verifying the Hardware Installation on page 307 has
│   verify the    │     the procedure you should use to verify the hardware
│    hardware     │     configuration. Installation Verification Test Overview
│  configuration  │     on page 309 must also be performed.
└─────────────────┘
          │
          ▼
┌─────────────────┐     Configuring the Library on page 153 tells you how to
│                 │     set up the library.
│ configure library│
│                 │
└─────────────────┘
          │
          ▼
┌─────────────────┐     Installing Cartridges on page 131 gives the
│     install     │     instructions for installing the cartridges in the two
│    cartridges   │     supported methods.
│                 │
└─────────────────┘
          │
          ▼
┌─────────────────┐     Completing the Installation Verification Checklist on
│  complete the   │     page 332, provides a checklist that helps you
│  installation   │     determine if all necessary steps have been completed
│    checklist    │     during the installation of the library.
└─────────────────┘
          │
          ▼
        ╱─────╲
       ╱  add  ╲
no    ╱ optional ╲        Adding Optional Hardware on page 231 provides
◄─────  hardware? ─────   instructions for the following optional hardware:
       ╲         ╱
        ╲───────╱
           │
          yes
           │
           ▼
┌─────────────────┐
│ install optional│─────►
│    hardware     │
└─────────────────┘

(  done  )
```

Required Tools

Table 1 provides a list of the tools needed to install a library.

Table 1   Required Tools for Installing a Library

Tool Type	Tool Sizes
Open end wrenches	• 24 mm • 16 mm • 13 mm • 8 mm • 7 mm
Hex wrenches	• 6 mm • 4 mm • 3 mm • 2.5 mm • 2 mm
Screw drivers	• #1 Phillips • #2 Phillips • Flat head
Pliers and wire cutters	• Needle nose pliers • Standard pliers • Wire cutters
Nut drivers	• 8 mm • 7 mm
Miscellaneous tools	• Measuring tape • Laptop computer • Digital volt meter • Digital level • X-axis rail alignment tool (part number 3-00147-01) • ESD wrist strap • Metric ruler • Small zip ties (quantity 100) • Flashlight

Illustrations of Modules

An illustration of an 8-module configuration along with figures of the front and back of both the control module and expansion modules are shown on the following pages.

Figure 1   Front View of an 8-Module Library
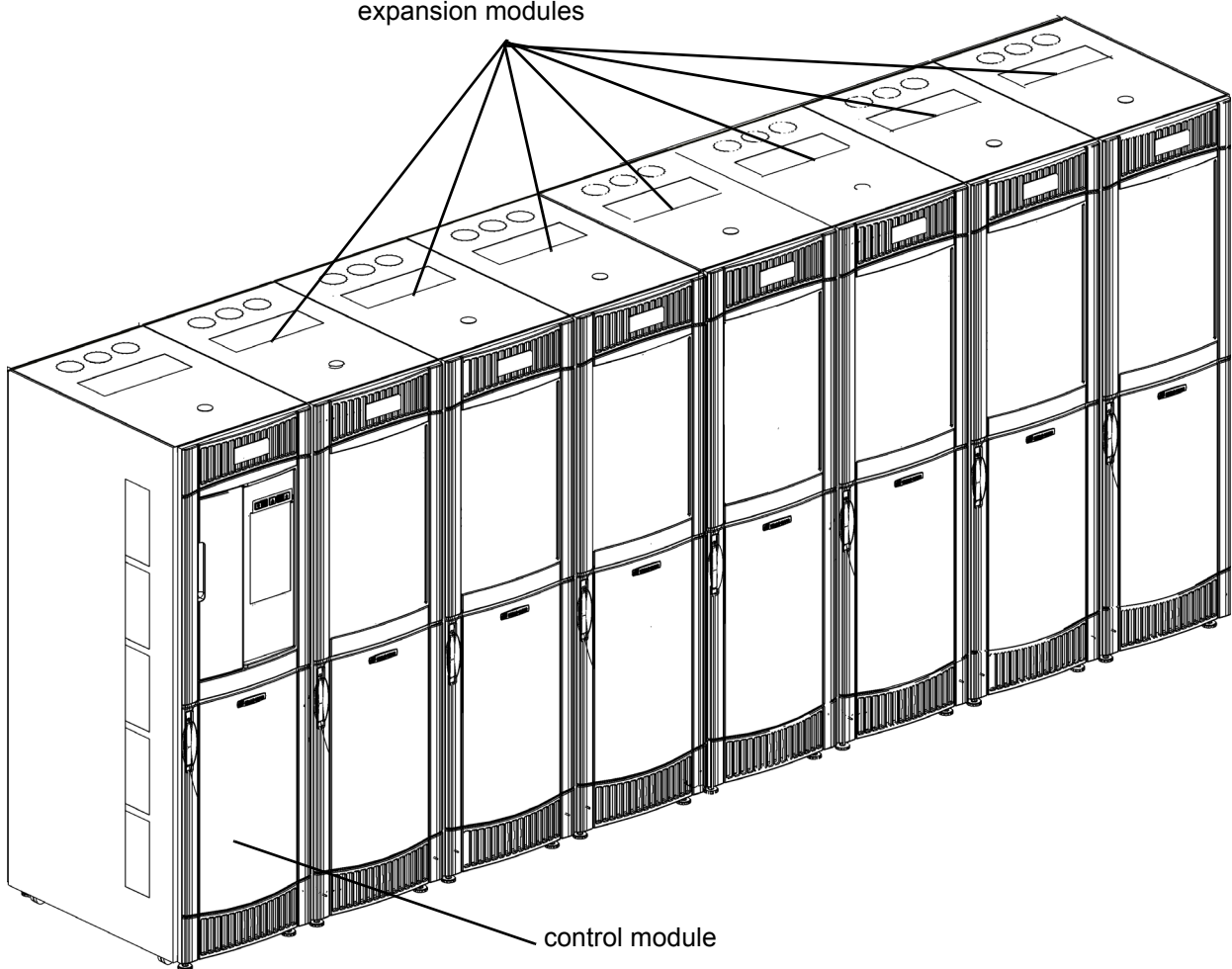
Figure 2   Front View of a Two-Module Library

top cable entry

fire suppressant access

service door

indicator panel

touch screen

I/E station

access door

control module
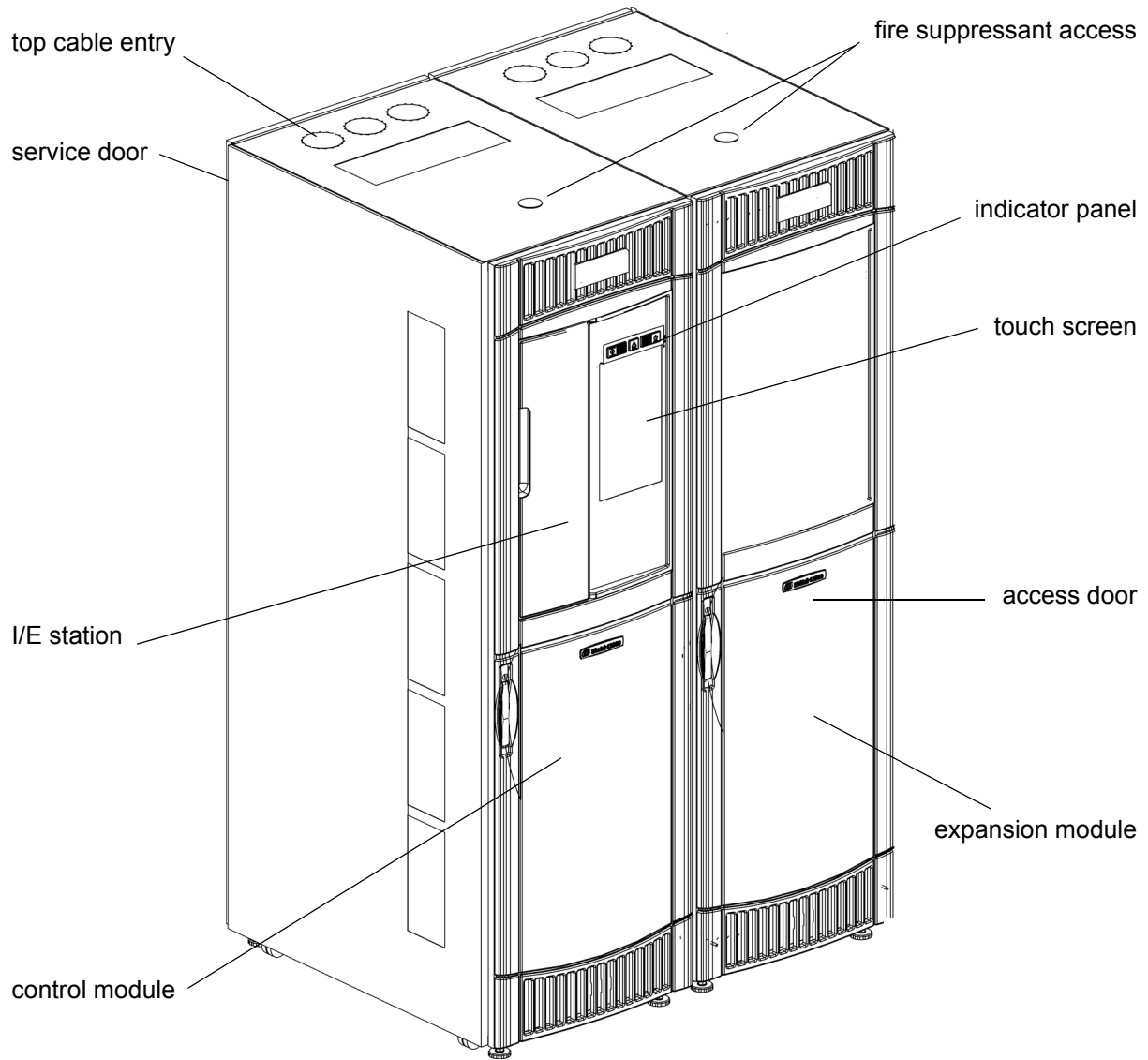
expansion module

Figure 3   Control Module, Front View Component Location

fire suppressant access

picker

I/E station

drive sled

access door

magazine

leveling foot
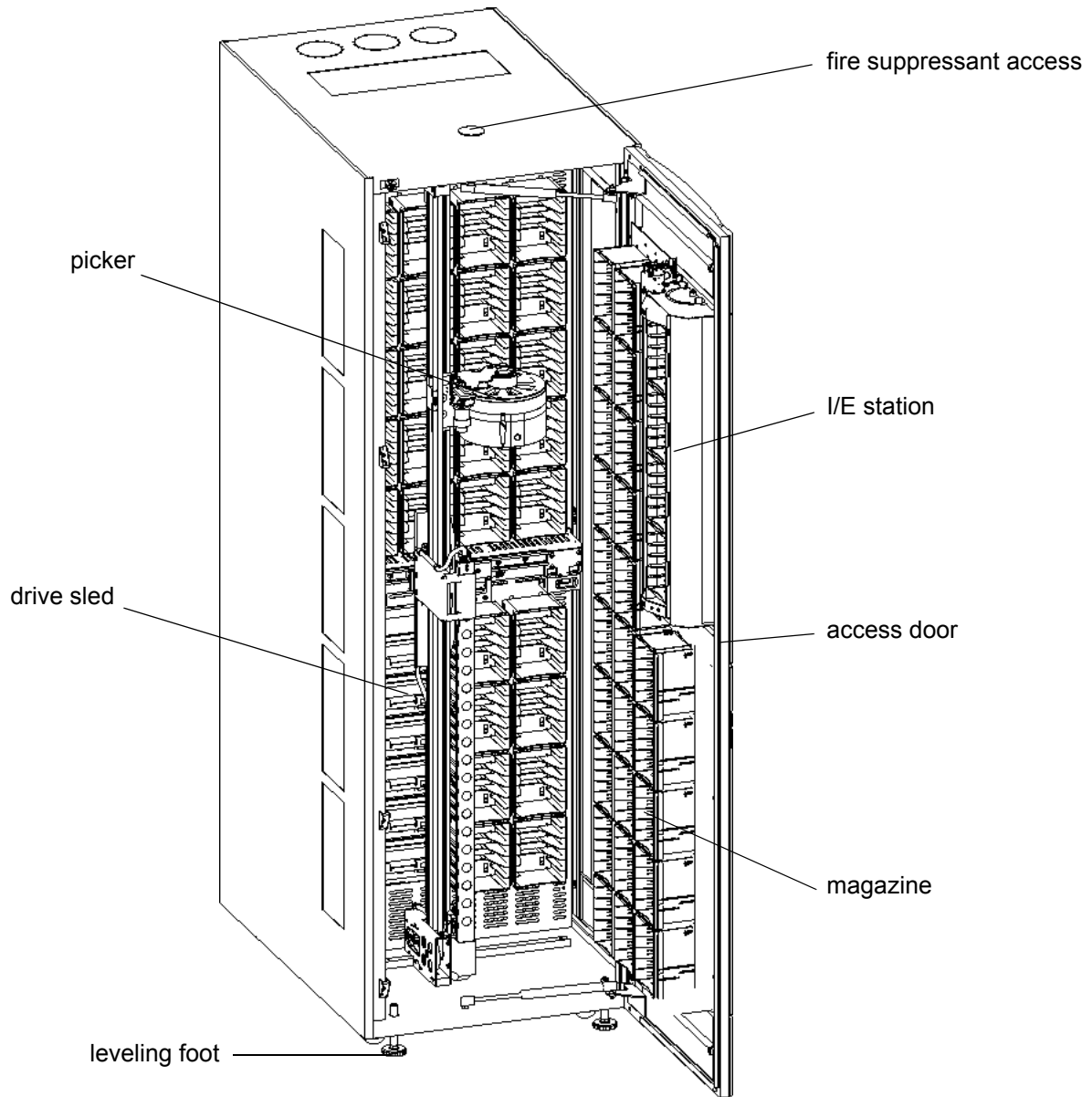
Figure 4   Control Module, Rear View Component Location

top cable entry

service door

I/O management
unit

drive clusters

library
management
module

power distribution units

bottom cable entry
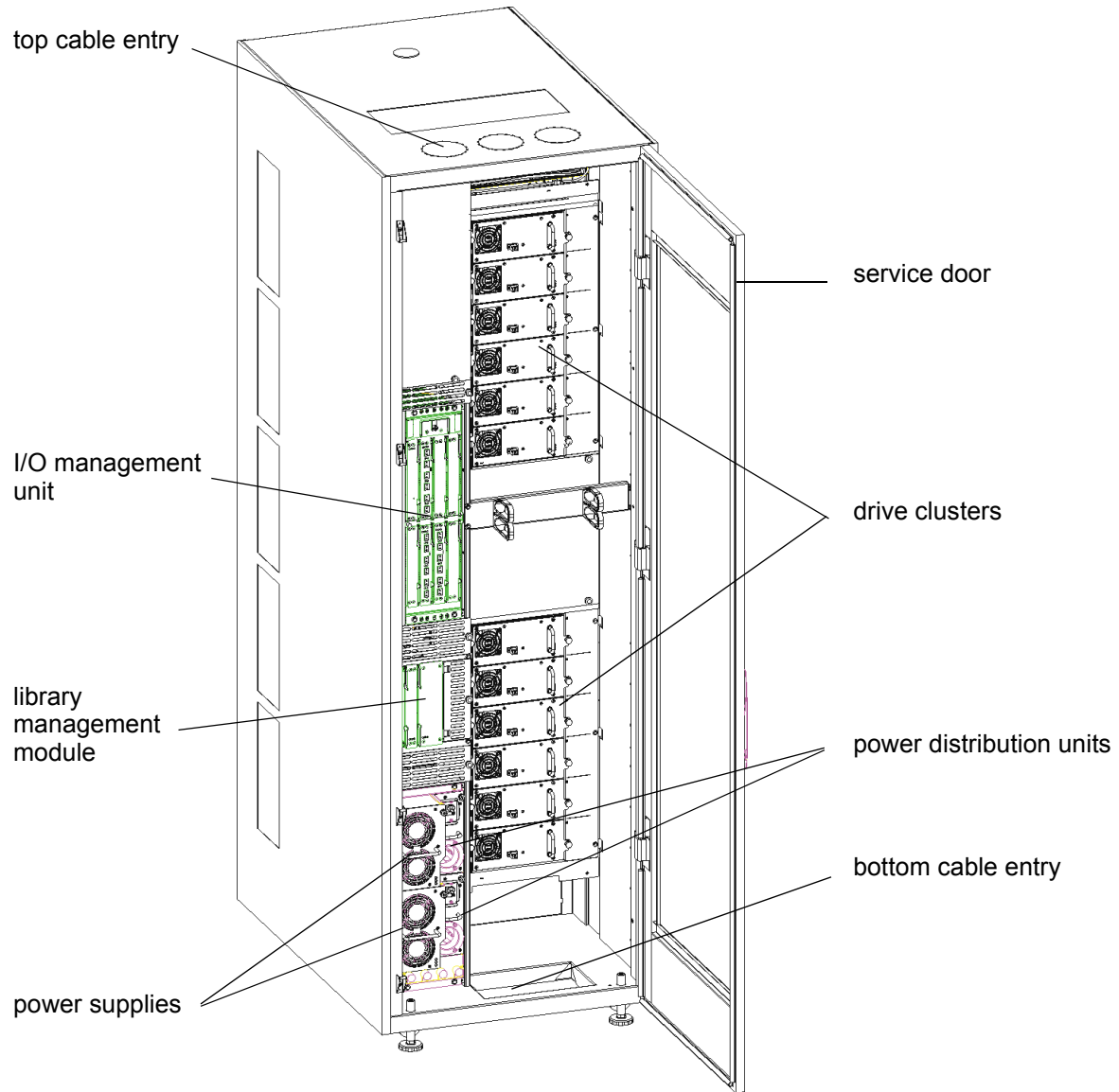
power supplies

Figure 5 shows the back of an expansion module. Only expansion modules that contain drives will be delivered with power supplies, which enables them to support the tape drives. Expansion modules in positions 9 -12 are LTO storage-only modules.

Figure 5   Expansion Module, Back View Component Location

the I/O management unit is installed and blades are installed only when required to support drives

the library management module is not installed in expansion modules

power chassis are installed only if there are drives in the expansion modules

drives are installed in these clusters

<div align="right">
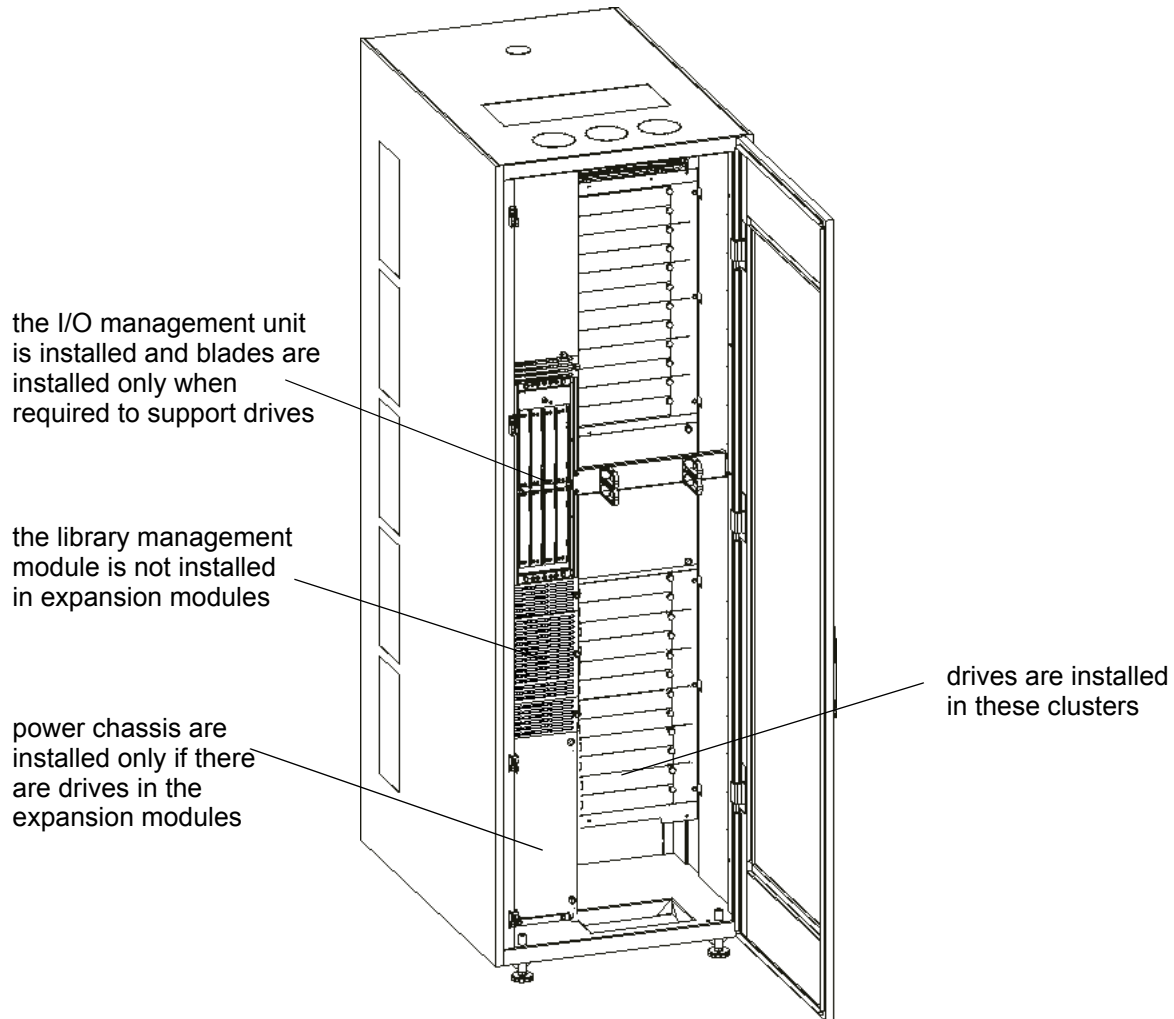
3

</div>

Installing a Stand-Alone Control Module

This chapter describes how to install a stand-alone control module. To install a new multi-module library or add expansion modules to an existing control module or multi-module library, see Installing a Multi-Module Library on page 27.

To install a stand-alone control module, complete the following procedures:

- Positioning the Stand-Alone Control Module on page 20
- Lowering the Leveling Legs on page 20
- Raising the Control Module Off the Casters on page 21
- Testing the Digital Level on page 22
- Verifying Level Condition on page 23
- Additional Leveling on page 24
- Setting the Leg Lock Nuts on page 25

Required tools:

- 24 mm open end wrench
- 16 mm open end wrench
- 6 mm hex wrench
- Digital level

Positioning the Stand-Alone Control Module

The first steps in setting up a stand-alone control module involve locating and positioning the control module. For more information on location specifications, see the *Scalar i6000 Planning Guide*.

1   Verify the placement of the control module.

2   Verify the following:

   •   There is an AC outlet within 10 feet (3.05 m) of the control module's location.

   •   There is adequate clearance for the access and service doors.

   •   The selected location is level using the instructions in Verifying the Level of the Install Location on page 321.

   •   All raised floor tiles have been cut out accordingly to accommodate the power, SCSI, Fibre, and Ethernet cables to the control module.

3   Position the control module in its intended location.

4   Verify that the control module is positioned correctly.

5   Ensure that the leveling legs are not resting on tiles that will need to be raised to accommodate cables after the control module has been installed.

Lowering the Leveling Legs

Required tools: 24 mm open end wrench, 6 mm hex wrench or 16 mm open end wrench.

1   Use the 24 mm open end wrench to loosen the four locking nuts on the four corner legs.

> ⚠ **CAUTION**   If you do not loosen the locking nuts, you may strip the threads on the leveling legs during movement.

2   Lower the four corner legs by hand until they touch the floor.

   You may have to use the 6 mm hex wrench or 16 mm open end wrench to turn the legs if the threads do not turn freely.

> 📝 Note   To ensure even weight distribution on the legs, it is very important that all legs be brought into contact with the floor without lifting the module. You can verify whether a leg is in contact with the floor by attempting to slide a piece of paper underneath it.

Raising the Control Module Off the Casters

Required tools: 6 mm hex wrench or 16 mm open end wrench

1 Open the access and service doors of the control module.

2 Using the 6 mm hex wrench or 16 mm open end wrench, raise the control module at each of the four corner legs seven (7) half turns after initial contact with the floor.

During this process one or two leveling legs may raise off of the floor. This is not a concern. Even if a leg is lifted off the floor, only give that leveling leg seven (7) half turns. This should raise the whole control module off of the casters seven (7) half turns.

> **Note** Making a mark on the top of the leg will help you keep track of the half turns.

make mark here to keep track of seven half turns

leveling leg

leveling foot
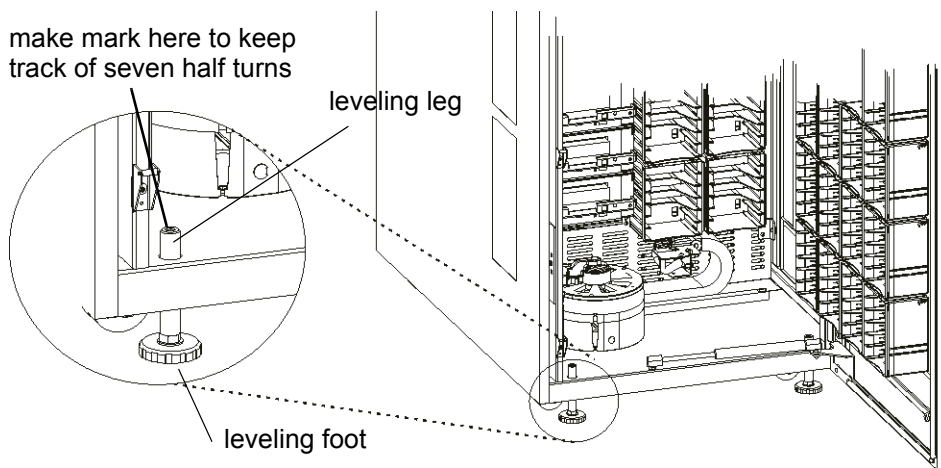
3 Check each corner leg to ensure that there is pressure on the foot and you cannot turn it by hand.

- If you have correctly given each corner leg seven (7) half turns you should not be able to turn the feet by hand.

- If you can turn one of the feet by hand, lower the control module back onto the casters and restart this procedure at Lowering the Leveling Legs on page 20. The goal is to have the control module weight evenly distributed across all four leveling legs when it is properly raised. The module may or may not be level at this time.

Testing the Digital Level

Required tools: digital level

Perform this test before each use of the digital level and any time the digital level has been dropped or is being used in an environment that varies ±9°F from the environment in which it was last calibrated. If the digital level fails the accuracy test you must re-calibrate the level before use.

1   Turn on the level by pushing the **ON/OFF** button. Position the level with the display facing you and the text on the face of the level right-side up. Ensure that the level is on a clean, flat, and horizontal surface. This surface does not have to be exactly level. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

2   Rotate the level end-for-end so the display is facing away from you. The screw on the back of the level should be on the left side. Be sure to set the level in the exact spot as in Step 1. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

3   Roll the level toward you so that the display is facing you, but the lettering on the face of the unit is upside down. Be sure to set the level in the exact spot as in Step 1. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

4 Rotate the level end-for-end so the display is facing away from you. The screw on the back of the level should be on the right side. Be sure to set the level in the exact spot as in Step 1. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

5 Compare the level display readings that you captured from Steps 1 through 4. If any of the four readings vary from one another more than 0.1 degree, you must re-calibrate the level. For more information, see Calibrating the Digital Level on page 339. If the variance between the readings are within the 0.1 degree limit, the level is within compliance and is ready to be used.

Verifying Level Condition

Required tools: digital level

1 Verify the module is level front to back and left to right by placing the digital level at the following locations:

    a. Inside the access door

    b. Inside the service door

    c. On the left side inside the access door

A reading on the digital level that is 0.00 +/- 0.30 is to be considered level.

> **Note** Make sure the digital level is not resting on any frame welds or debris that would cause an inaccurate reading. To find the small circular frame welds, run your finger tips over the spot where you are going to place the level

placements of level
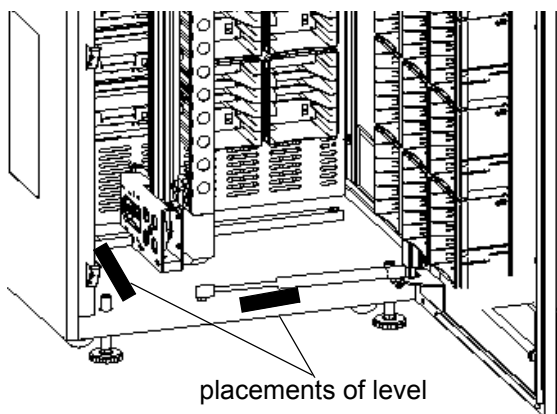
If the module does not meet the 0.00 +/- 0.30 leveling requirement, go to Additional Leveling on page 24. If the module is sufficiently level, go to Setting the Leg Lock Nuts on page 25.

Additional Leveling

Customer floors may be such that further leveling is required. The goal in leveling the control module is to adjust the leveling legs to achieve a digital level reading that is 0.00 +/- 0.30.

1   Place the digital level inside the access door. Use the following rules when leveling from left to right:

   •   Rule 1: Always make your leveling adjustments to raise the control module (turn the legs clockwise looking from the top).

   •   Rule 2: Since the control module frame is very stiff, adjust the appropriate left or right leg pair the same amount when leveling left to right.

   •   Rule 3: Use small adjustment increments; no more than one half (½) turn at a time.

   •   Rule 4: If the leveling adjustment has raised any of the other leveling legs off the floor, take out the adjustment and work on the opposite end of the control module (front to back).

   •   Rule 5: Wait at least 10 seconds for the digital level to settle between adjustments.

> **Note**   Make sure the digital level is not resting on any frame welds or debris that would cause an inaccurate reading. To find the small circular frame welds, run your finger tips over the spot where you are going to place the level.

2   Place the level on the left side inside the access door. Use the following rules when leveling from front to back:

   •   Rule 1: Always make your leveling adjustments to raise the control module (turn the legs clockwise looking from the top).

   •   Rule 2: Since the control module frame is very stiff, adjust the appropriate front or rear leg pair the same amount when leveling front to back.

   •   Rule 3: Use small adjustment increments; no more than one half (½) turn at a time.

   •   Rule 4: If the leveling adjustment has raised any of the other leveling legs, take out the adjustment and work on the other side.

   •   Rule 5: Wait at least 10 seconds for the digital level to settle between adjustments.

Setting the Leg Lock Nuts

Required tools: 24 mm open end wrench

1 Verify that all four leveling legs are carrying load and that the control module does not rock.

2 Use the 24 mm open end wrench to raise the four leveling leg lock nuts to the top and tighten them against the welded nut.

> **Note** Ensure that you do not take the leveling legs out of adjustment during this process.

4

Installing a Multi-Module Library

This chapter describes how to install a new multi-module library and how to add expansion modules to an existing control module or existing multi-module library.

To install a stand-alone control module, see Installing a Stand-Alone Control Module on page 19.

If you are installing a new multi-module library, see Preparing to Install a New Multi-Module Library on page 28.

If you are adding an expansion module to an existing system unit, see Installing Expansion Modules after Installing the System Unit on page 37.

If you are adding one or more expansion modules to an existing control module, first go to Preparing an Existing Library to Receive an Expansion Module on page 74

Required tools:

- 24 mm open end wrench
- 16 mm open end wrench
- 13 mm open end wrench
- 8 mm nut driver or open end wrench
- 6 mm hex wrench
- 3 mm hex wrench
- 2.5 mm hex wrench
- X-axis alignment tool (part number 3-00147-01)
- digital level

Preparing to Install a New Multi-Module Library

To prepare to install a new multi-module library, complete the following procedures:

Attaching Control and Expansion Modules as System Units

If you are installing four frames or less, you can bolt the frames together while the frames are on their casters, and then raise and level the frames as one system unit.

Aligning and Bolting the Frames

1   Using the corner edges of the frames as a rough alignment, position the frames together so the attachment bolt holes are aligned.

Verify that the attachment holes are aligned. If necessary, adjust the frame legs to better align the attachment bolt holes.

2   Repeat the following steps for the front lower bolt, front upper bolt, back lower bolt, and back upper bolt, in that order:

a. Insert the attachment bolt from right to left into the attachment hole

> **Note**   For older libraries, you may need to insert the back lower bolt from left to right. See Technical Bulletin 6-00925, "Change in Procedure for Joining i2000 Frames".

b. If the bolts do not slide smoothly into the holes, raise the appropriate leveling legs until they do.

c. Once the bolts are inserted, loosely thread the nuts onto the bolts.

front upper bolt

front lower bolt

back upper bolt

back lower bolt
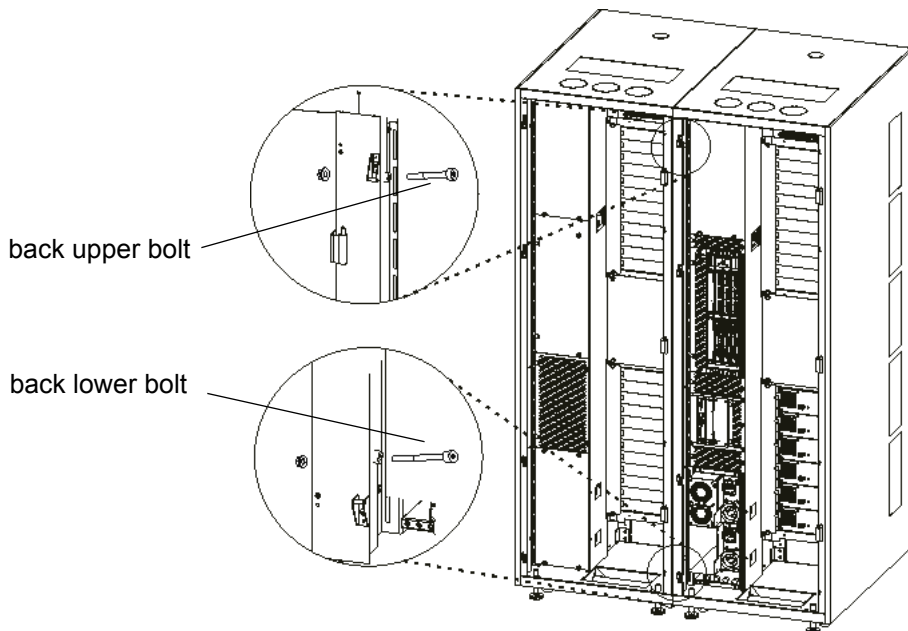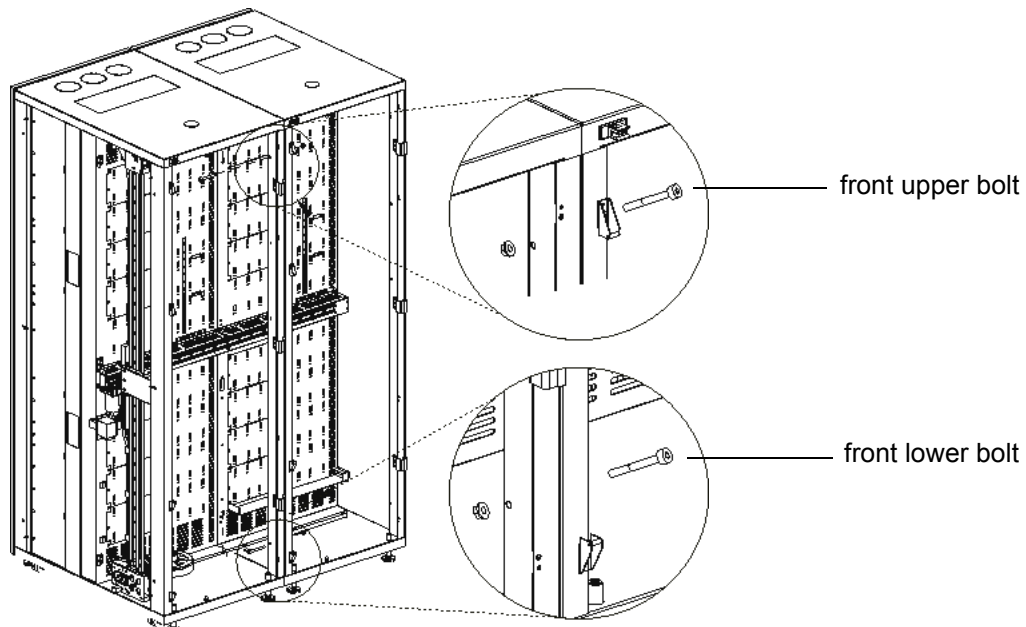
3   Tighten the bolts using the 6 mm hex wrench and the 13 mm open end wrench.

> ✎ Note   Do not overtighten the bolts. Overtightening can damage the vertical frame post structure.

4   Once the frames are aligned and bolted properly together, proceed to Positioning the System Unit on page 30.

Positioning the System Unit

For more information on location specifications, see the *Scalar i6000 Planning Guide*.

1   Verify the placement of the system unit.

> **Note**   The control module is at the left end of a multi-module library.

2   Verify the following:

- There is an AC outlet within 10 feet (3.05 m) of the control module's location.

- There is adequate clearance for the access and service doors.

- All raised floor tiles have been cut out accordingly to accommodate the power, SCSI, Fibre, and Ethernet cables to any of the modules.

3   Position the system unit in its intended location.

4   Verify that the system unit is positioned correctly.

5   Ensure that the leveling legs are not resting on tiles that will need to be raised to accommodate cables after the system unit has been installed.

Lowering the System Unit Leveling Legs

Required tools: 24 mm open end wrench, 6 mm hex wrench or 16 mm open end wrench.

1   On only the four outer edge corner legs of the system unit, use the 24 mm open end wrench to loosen the four locking nuts.

> **CAUTION**   If you do not loosen the locking nuts, you may strip the threads on the leveling legs during movement.

2   Lower the four outer edge corner legs by hand until the legs touch the floor. You may need to use the 6 mm hex wrench or 16 mm open end wrench to turn the legs if the threads do not turn freely.

> **Note**   To ensure even weight distribution on the legs, it is very important that the lowered legs be brought into contact with the floor without lifting the system unit. You can verify whether a leg is in contact with the floor by attempting to slide a piece of paper underneath it.

Raising the System Unit Off the Casters

Required tools: 6 mm hex wrench or 16 mm open end wrench

1 Using the 6 mm hex wrench or 16 mm open end wrench, raise the entire system unit by only the four outer edge corner legs seven (7) half turns during the system raising process. If a leg is lifted off the floor, give only that leg seven (7) half turns. This should raise the entire system unit off of the casters seven (7) half turns.

> ✕ Note   Making a mark on the top of the leg will help you keep track of the half turns. It is important to track the total number of turns, especially if you are installing additional expansion modules.

make mark here to keep track of seven half turns

leveling leg

leveling foot
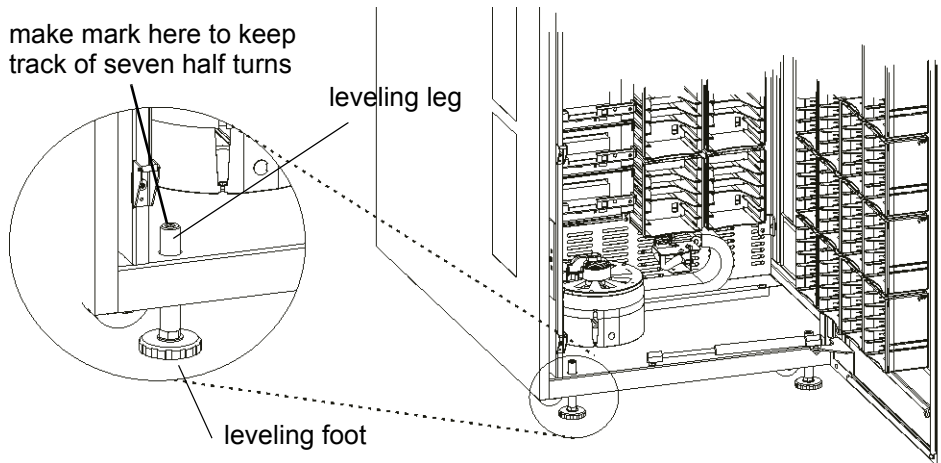
2 Check each corner leg to ensure that there is pressure on the foot and you cannot turn it by hand.

- If you have correctly given each outer edge corner leg seven (7) half turns you should not be able to turn the feet by hand.

- If you can turn one or more of the feet by hand, lower the system unit back onto the casters and restart this procedure at Lowering the Leveling Legs on page 37. The goal is to have the system unit weight evenly distributed across all four outer edge leveling legs when it is properly raised. The system unit may or may not be level at this time.

Testing the Digital Level

Required tools: digital level

Perform this test before each use of the digital level and any time the digital level has been dropped or is being used in an environment that varies ±9°F from the environment in which it was last calibrated. If the digital level fails the accuracy test, you must re-calibrate the level before use.

1 Turn on the level by pushing the **ON/OFF** button. Position the level with the display facing you and the text on the face of the level right-side up. Ensure that the level is on a clean, flat, and horizontal surface.

This surface does not have to be exactly level. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

2   Rotate the level end-for-end so the display is facing away from you. The screw on the back of the level should be on the left side. Be sure to set the level in the exact spot as in Step 1. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

3   Roll the level toward you so that the display is facing you, but the lettering on the face of the unit is upside down. Be sure to set the level in the exact spot as in Step 1. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

4   Rotate the level end-for-end so the display is facing away from you. The screw on the back of the level should be on the right side. Be sure to set the level in the exact spot as in Step 1. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

5   Compare the level display readings that you captured from Steps 1 through 4. If any of the four readings vary from one another more than 0.1 degree, you must re-calibrate the level. For more information, see Calibrating the Digital Level on page 339. If the variance between the readings are within the 0.1 degree limit, the level is within compliance and is ready to be used.

Verifying Level Condition

Required tools: digital level

1 In the control module only, verify the system unit is level front to back and left to right by placing the digital level at the following locations:

    a. Inside the access door

    b. On the left side inside the access door

A reading on the digital level that is 0.00 +/- 0.30 is to be considered level.

> **Note** Make sure the digital level is not resting on any frame welds or debris that would cause an inaccurate reading. To find the small circular frame welds, run your finger tips over the spot where you are going to place the level

placements of level
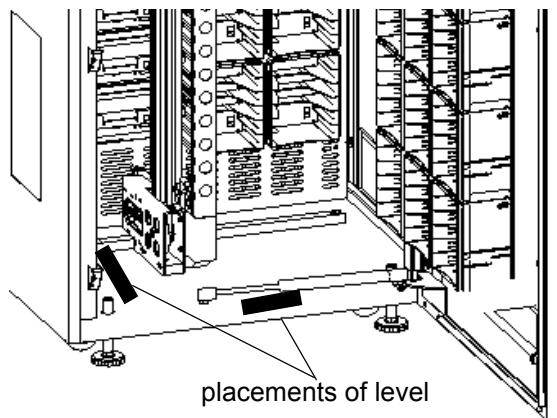
If the module does not meet the 0.00 +/- 0.30 leveling requirement, go to Additional Leveling on page 34.

If the module is sufficiently level, go to Lowering All Other Leveling Legs on page 35.

Additional Leveling

Customer floors may be such that further leveling is required. The goal in leveling the system unit is to adjust the leveling legs to achieve a digital level reading that is 0.00 +/- 0.30.

1 Place the digital level inside the control module access door (positions 1). Use the following rules when leveling from left to right:

- Rule 1: Always make your leveling adjustments to raise the system unit (turn the legs clockwise looking from the top).
- Rule 2: Since the frames are very stiff, adjust the appropriate left or right leg pair the same amount when leveling left to right.
- Rule 3: Use small adjustment increments; no more than one half (½) turn at a time.
- Rule 4: If the leveling adjustment has raised any of the other leveling legs off the floor, take out the adjustment and work on the opposite end of the system unit (front to back).
- Rule 5: Wait at least 10 seconds for the digital level to settle between adjustments.

> **Note** Make sure the digital level is not resting on any frame welds or debris that would cause an inaccurate reading. To find the small circular frame welds, run your finger tips over the spot where you are going to place the level.
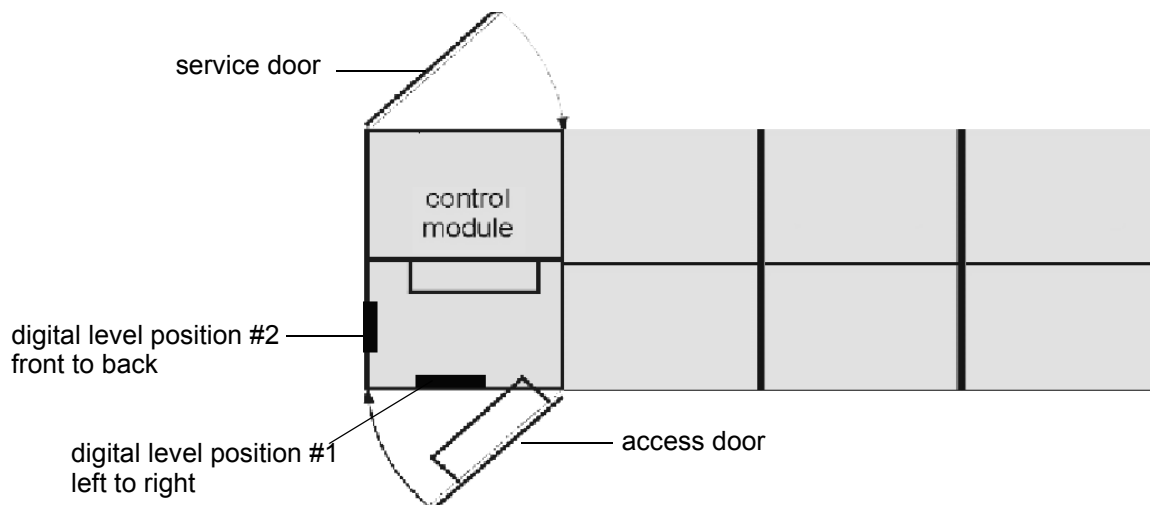
2 Place the level on the left side inside the control module access door (position 2). Use the following rules when leveling from front to back:

- Rule 1: Always make your leveling adjustments to raise the system unit (turn the legs clockwise looking from the top).
- Rule 2: Since the frames are very stiff, adjust the appropriate front or rear leg pair the same amount when leveling front to back.
- Rule 3: Use small adjustment increments; no more than one half (½) turn at a time.
- Rule 4: If the leveling adjustment has raised any of the other leveling legs, take out the adjustment and work on the other side.
- Rule 5: Wait at least 10 seconds for the digital level to settle between adjustments.

Lowering All Other Leveling Legs

1 Lower all remaining frame leveling legs until the legs touch the floor.

2 To support the weight of the system, give each non-leveling leg 1/4 turn.

3 Check all leveling legs to verify that all the legs are on the floor.

4 Use the digital level to double-check the levelness of the library.

Setting the Leg Lock Nuts

Required tools: 24 mm open end wrench

1 Verify that all leveling legs are carrying load and that the system unit does not rock.

2 Use the 24 mm open end wrench to raise the leveling leg lock nuts to the top and tighten them against the welded nut.

> **Note** Ensure that you do not take the leveling legs out of adjustment during this process.

If you are installing additional expansion modules to the system unit, proceed to

Proceed to

Adding an Expansion Module to an Existing System Unit

If you are adding one or more expansion modules to an existing library, first go to Preparing an Existing Library to Receive an Expansion Module on page 74, prior to completing the procedures below.

To add an expansion module to an existing system unit during a new installation process, complete the following procedures:

Installing Expansion Modules after Installing the System Unit

Only use the following procedures if you are adding expansion modules to a newly installed system unit (a system unit consists of four or less frames). For more information on system units, see Attaching Control and Expansion Modules as System Units on page 28.

Positioning the New Expansion Module

The first steps in adding a new expansion module to a system unit involve locating and positioning the expansion module. For more information on location specifications, see the *Scalar i6000 Planning Guide*.

> **Note** A label placed on the floor in the rear of the expansion module shows the order in which to place the module.

Required tools: none

1 Position the expansion module next to the last module in the system unit.

2 Verify the following:

   • There is adequate clearance for the access and service doors.

   • All raised floor tiles have been cut out accordingly to accommodate the power, SCSI, Fibre, and Ethernet cables to any of the modules.

3 Verify that the expansion module is positioned correctly.

4 Ensure that the leveling legs are not resting on tiles that will need to be raised to accommodate cables after the expansion module has been installed.

Lowering the Leveling Legs

Required tools: 24 mm open end wrench, 6 mm hex wrench or 16 mm open end wrench.

1 Use the 24 mm open end wrench to loosen the four locking nuts on the four corner legs.

> **CAUTION** If you do not loosen the locking nuts, you may strip the threads on the leveling legs during movement.

2 Lower the legs by hand until the pads touch the floor. You may need to use either a 6 mm hex wrench or 16 mm open end wrench to turn the legs if the threads do not turn freely.

> **Note** To ensure even weight distribution on the legs, it is very important that all legs be brought into contact with the floor without lifting the module. You can verify whether a leg is in contact with the floor by attempting to slide a piece of paper underneath it.

Raising the Expansion Module Off the Casters

Required tools: 6 mm hex wrench or 16 mm open end wrench

Use either the 6 mm hex wrench or 16 mm open end wrench to raise each of the four corner legs of the module seven (7) half turns. If a leg is lifted off the floor, give only that leg seven (7) half turns. This should raise the entire module off of the casters seven (7) half turns, unless the turn count was different during the CM installation. If you know the CM installation turn count, use that count.

Note   Making a mark on the top of the leg will help you keep track of the half turns.

leveling leg

leveling foot
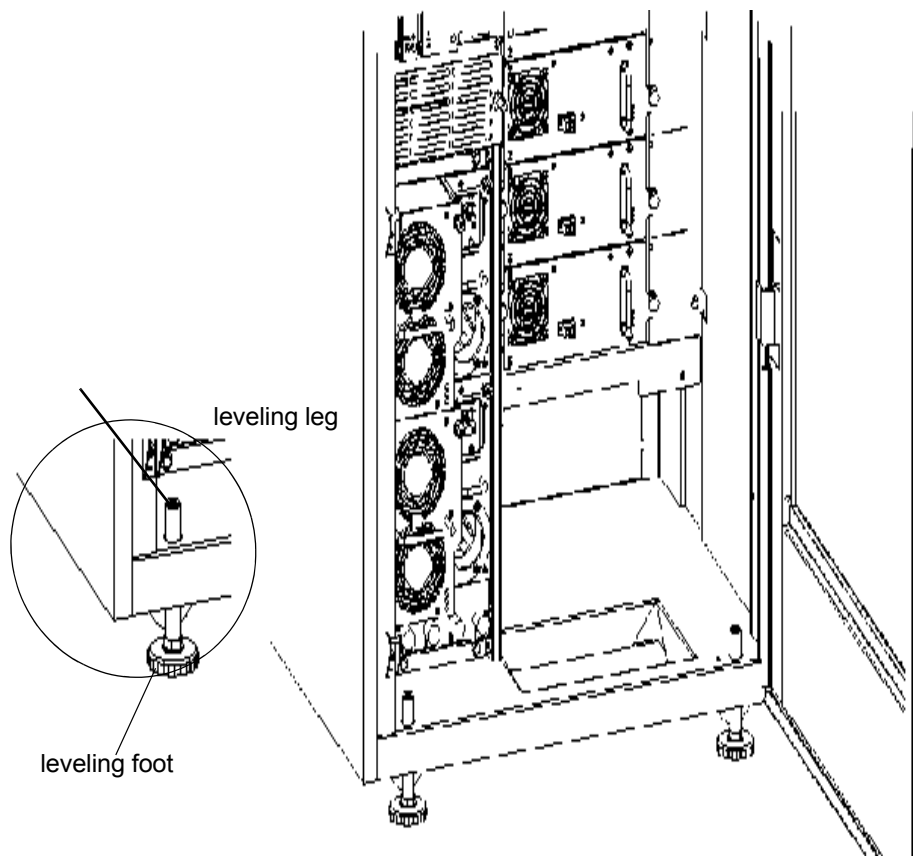
3   Check each leg to ensure that there is pressure on the foot and you cannot turn it by hand.

- If you have correctly given each leg seven (7) half turns, you should not be able to turn any of the feet by hand.

- If you can turn one or more of the feet by hand, lower the module back onto the casters and restart this procedure at Lowering the Leveling Legs on page 37. The goal is to have the module weight evenly distributed across all four leveling legs when it is properly raised. The module may or may not be level at this time.

Aligning the New Expansion Module with the System Unit

Modules use a four-bolt attachment method with close-clearance 8 mm bolt holes. The tight clearances allow the bolts to act as module-to-unit alignment pins.

1 Push the new expansion module toward the system unit until the frames touch.

2 Adjust the expansion module leveling legs until the frame corners and the attachment bolts are aligned.

Inserting the Attachment Bolts

1 Verify that the adjacent sides of the receiving unit and the new expansion module are parallel.
If not, adjust the leveling legs on the opposite side of the new module until the adjacent sides are parallel. Be sure to turn the front and back legs the same number of turns.

2 Verify that the attachment holes are aligned. If not, adjust the leveling legs of the new module until the attachment holes align. Be sure to turn the front and back legs the same number of turns.

    a. Repeat these steps for the front lower bolt, front upper bolt, back lower bolt, and back upper bolt, in that order:
    Insert the attachment bolt from right to left into the attachment hole

.

> **Note** For older libraries, you may need to insert the back lower bolt from left to right. See Technical Bulletin 6-00925, "Change in Procedure for Joining i2000 Frames".

    b. If the bolt does not slide smoothly into the hole, raise or lower the leveling legs until it does.

    c. Once the bolt is inserted, loosely thread the nut onto the bolt. Do not tighten the nut.

front upper bolt

front lower bolt

back upper bolt

back lower bolt
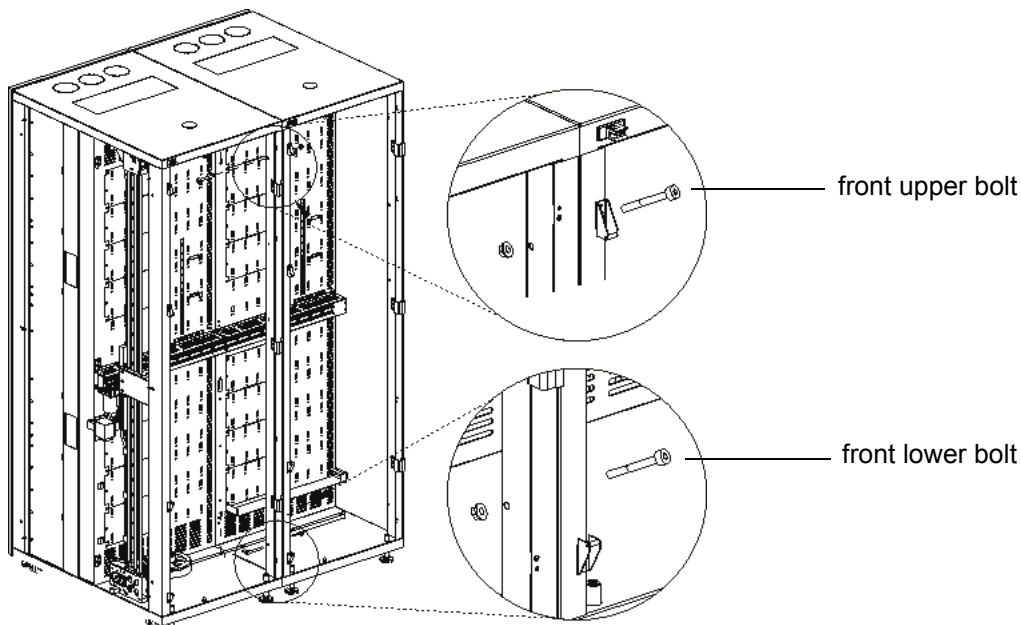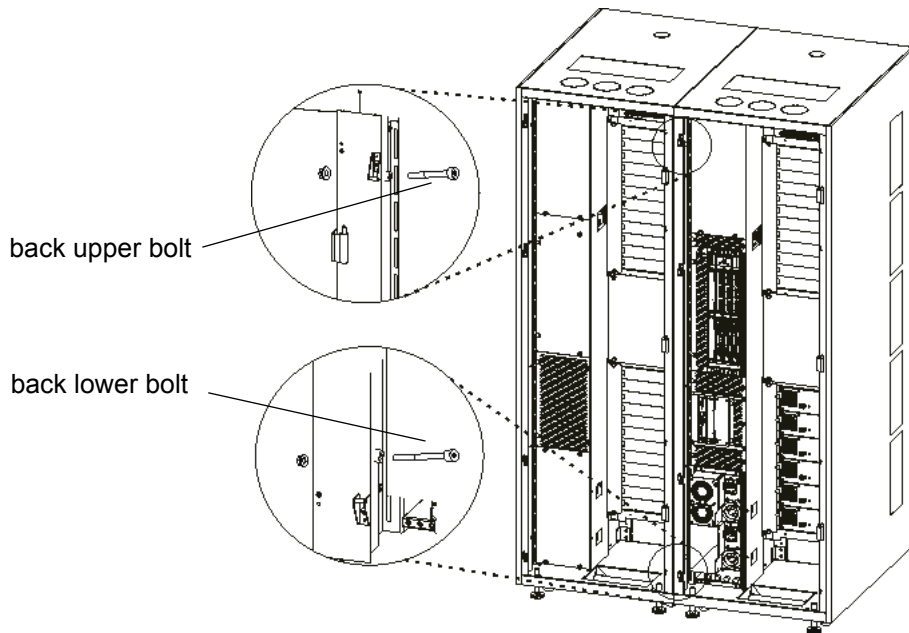
Tightening the Attachment Bolts

Once the bolts have been inserted, tighten the bolts using the 6 mm hex wrench and the 13 mm open end wrench.

> **Note** Do not overtighten the bolts. Overtightening can damage the vertical frame post structure.

If this is the last new expansion module, go to Setting the Leg Lock Nuts on page 40.

If you are installing a seventh or eighth module, go to Installing the X-Axis Chain Trough on page 63.

To install additional expansion modules, repeat these procedures, Installing Expansion Modules after Installing the System Unit on page 37, for each additional expansion module.

For libraries with seven or eight modules, see Installing the X-Axis Chain Trough on page 63.

Setting the Leg Lock Nuts

Required tools: 24 mm open end wrench

1   Verify that all legs are carrying load and that the library does not rock.

2   Use the 24 mm open end wrench to raise all of the leveling leg lock nuts to the top and tighten them against the welded nut.

> **Note** Ensure that you do not take the leveling legs out of adjustment during this process.

Attaching the X-Axis Rails

📝 Note   The X-axis rails are shipped in a package secured in the back of the expansion module with the cable management ties. Remove the packages and unpack them in a convenient location before beginning the following procedures.

Attaching and Aligning the Upper and Lower X-Axis Rails

Repeat the following procedure for each additional expansion module, starting with the first new expansion module and working to the right.

📝 Note   For expansion modules in positions 9 through 12, the X-axis upper and lower rails contain longer slots. Check for the rail identification hole which signifies the replacement X-axis upper or lower rail.

Required tools: 2.5 mm hex wrench

1   Attach the upper X-axis rail as follows:

     a.   Use the 2.5 mm hex screws to attach the upper X-axis rail loosely.

     b.   Push the rail to the left and align it front to back with the previous rail so that the joint is smooth.

     c.   Tighten each screw on the rail beginning at the left end. Do not tighten the screw that is on the next rail at the junction between the current module and the module to the right.

2.5 mm hex screw attached to module on left
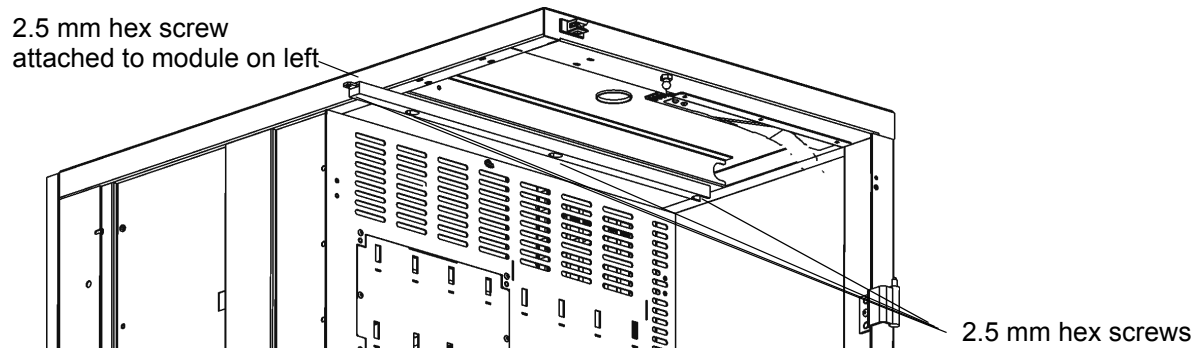
2.5 mm hex screws

2   Attach the lower X-axis rail as follows:

    a.   Use the 2.5 mm hex screws to attach the lower X-axis rail loosely.

    b.   Push the rail to the left and align it front to back with the previous rail so that the joint is smooth.

    c.   Tighten each screw on the rail beginning at the left end. Do not tighten the screw that is on the next rail at the junction between the current module and the module to the right.

2.5 mm hex screws

2.5 mm hex screw attached to module on left

expansion modules 9 - 12
X-axis upper and lower rails contain longer slots

elongated slot

rail identification mark (hole)
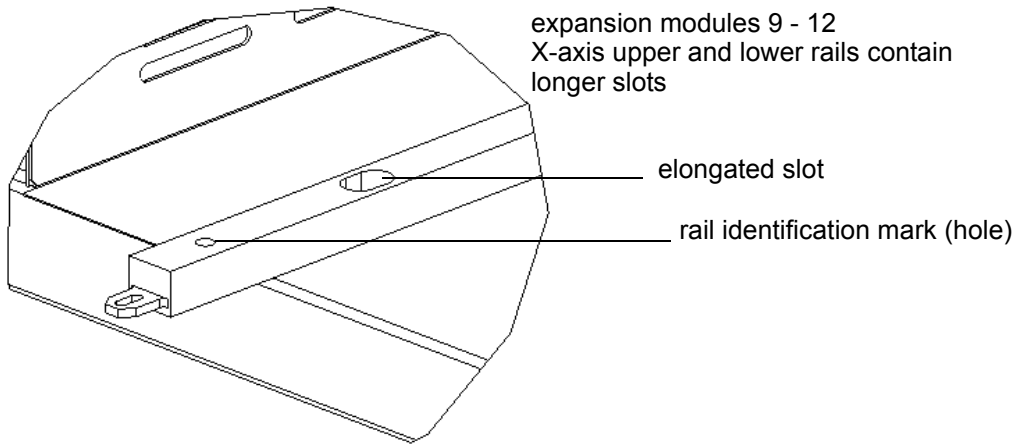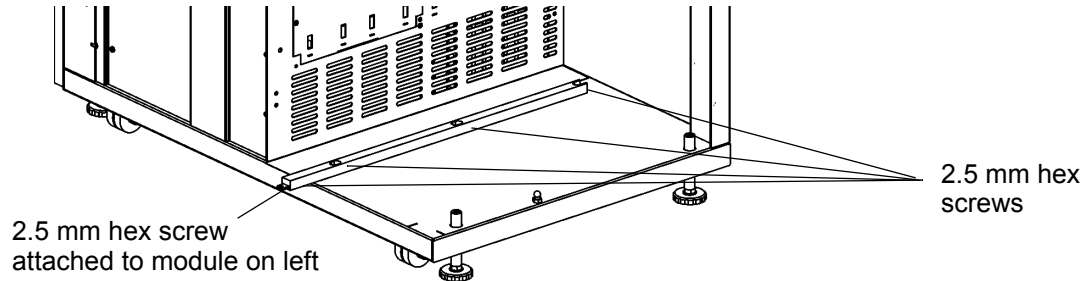
Attaching the Middle X-Axis Rail

1 Use a 3 mm hex wrench to attach the middle X-axis rail loosely to the X-axis channel with screws 1 through 10.

X-axis channel

10

9

8

7

6

5

4

3

2

1

middle X-axis rail
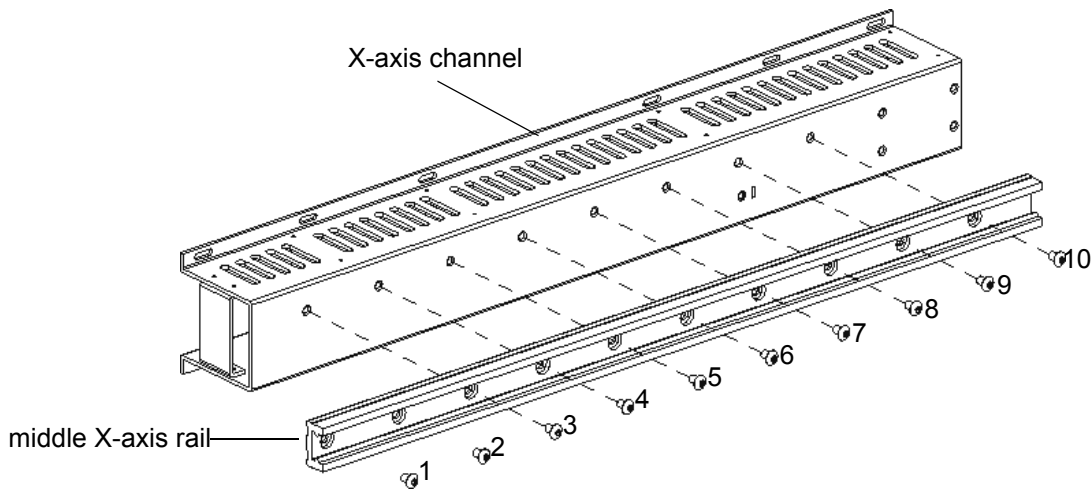
Note If you are adding expansion modules onto an eight module library, the new expansion modules ship with a special center X-axis rail that must be installed in module eight of the existing library. This rail is 7mm shorter then standard X-axis rails. The shorter X-rail is etched with a part number and description. You must remove the previous middle X-axis rail to install the new rail. See Removing the Middle X-Axis Rail from Module Eight on page 81.

Etched part number identifying special rail for adding EM to eight or more library configuration
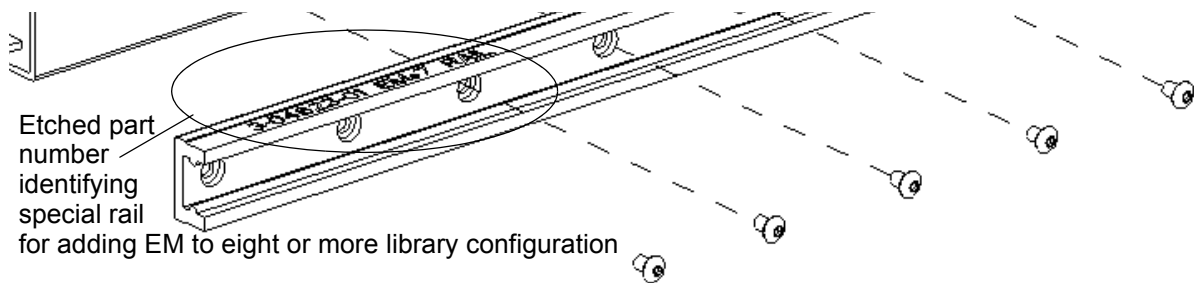
When attached, the middle X-axis rail must appear as shown below.

Note   The holes will appear slightly shifted on the 7mm shorter rail.

middle
X-axis rail
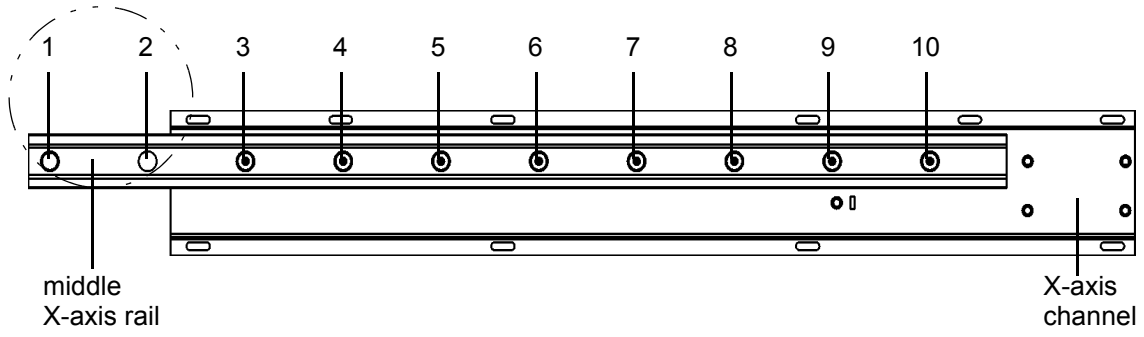
X-axis
channel

Aligning the Middle X-Axis Channel

If you are installing a new library, go to Aligning the Middle X-Axis Rail on page 46.

> **Note** You only need to perform this procedure on expansion modules being added to the system unit. Complete systems ship from the factory with the middle X-axis channel already aligned.

If you are adding one or more expansion modules to a system unit, do the following:

1 With the middle X-axis rail completely loose, do the following:

    a. Place the centering tool over screw 3 and into the counterbore of the X-axis rail.

    b. Holding the centering tool in place, tighten screw 3.

    c. Repeat for screw 8.
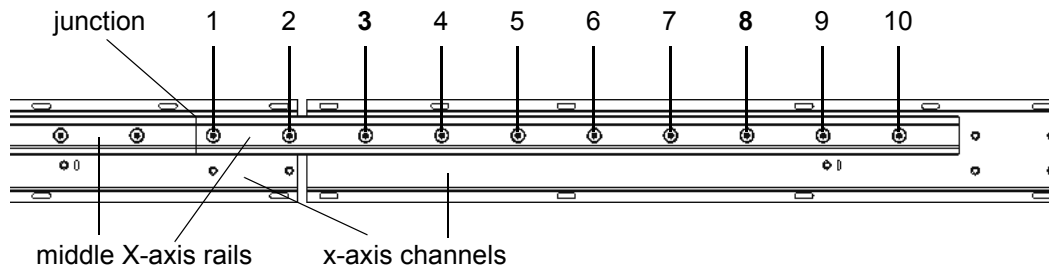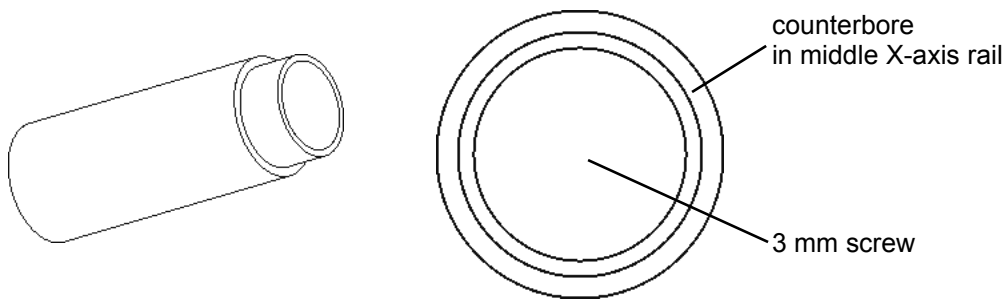
2   Loosen the eight 2.5 mm screws attaching the X-axis channel to the module.

alignment pins

2.5 mm screws   2.5 mm screws
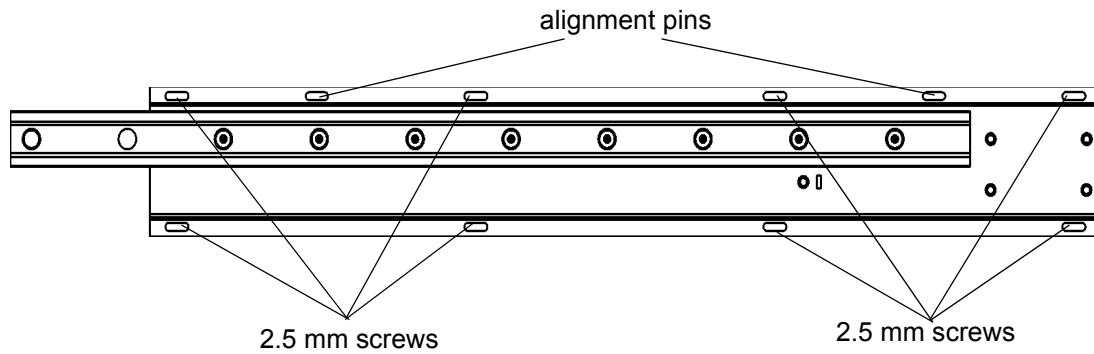
3   Push the X-axis channel and middle X-axis rail to the left until the X-axis rail of the expansion module contacts the X-axis rail of the module on the left.

4   Hold the X-axis channel so that the adjacent X-axis rails are touching each other and tighten the eight 2.5 mm screws.

5   Loosen the X-axis rail 3 mm screws that were tightened <u>Step 1</u> on page 45.

Aligning the Middle X-Axis Rail

1   Loosen the five 8 mm nuts on the X-axis rail alignment tool (part number 3-00147-01). Once the nuts are loose, separate the two metal bars of the tool and insert the back bar into the X-axis rail.

X-axis alignment tool

8 mm nuts
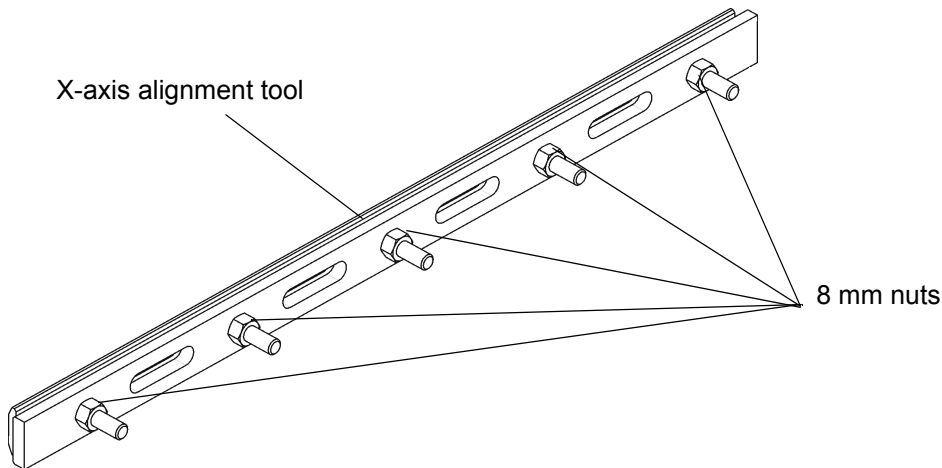
2   Position the middle of the X-axis rail alignment tool over the junction point in the rails.
If the X-axis rail tool is positioned correctly you should be able gain access to the 3 mm screws through the holes in the tool.

junction   3 mm screws

middle X-axis rails   x-axis channels

Installing a Multi-Module Library
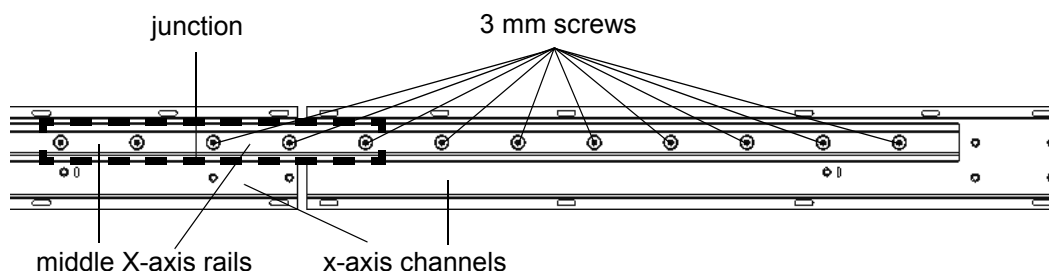
3 Push the loose middle X-axis rail in the expansion module towards the X-axis rail in the control module or expansion module to verify that there is no gap in the junction between the two rails.

4 While holding the X-axis rail against the adjoining rail use an 8 mm nut driver or open end wrench to tighten the five 8 mm nuts on the X-axis rail alignment tool. This will align the two separate rails.

5 Working from left to right, tighten the ten 3 mm screws on the middle X-axis rail.

6 Use an 8 mm nut driver or open end wrench to loosen the five 8 mm nuts on the X-axis rail alignment tool. Remove the tool from the X-axis rail.

7 Manually move the accessor over the rail junction points to verify that you cannot feel the junction.

> **Note** There may be a slight clunk sound as you pass over the junction, but you should not feel the transition between the rails in the accessor.

Verifying the Middle X-Axis Rail Alignment

1 Place the digital level on the lower side of the control module X-axis rail between screws 3 and 4 as counted from the left. Record this value.
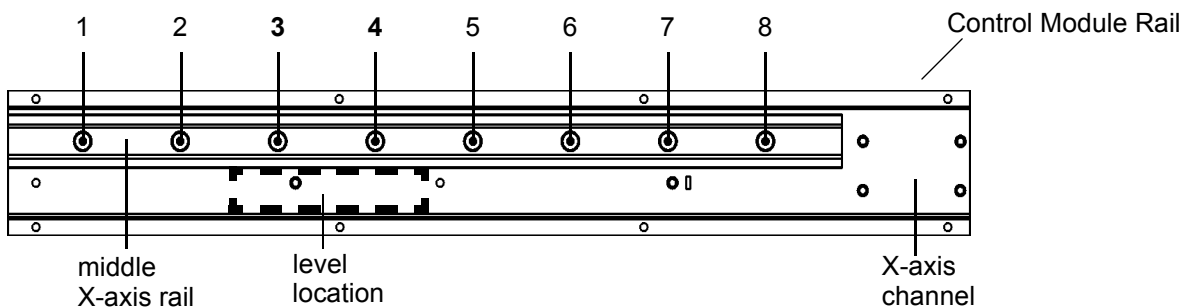
> **Note** Do not place the level on the control module X-axis rail alignment pins.

2 Place the level against the lower side of the expansion module X-axis rail between screws 5 and 6 as counted from the left.
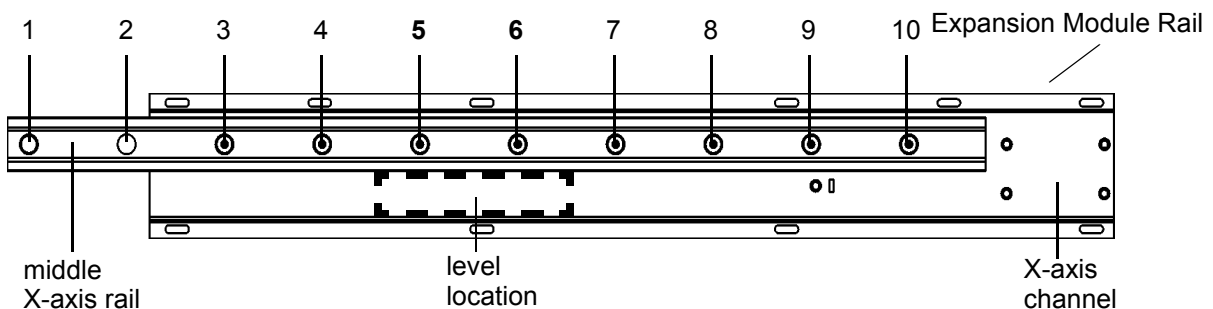
3 Verify that value for the expansion module middle X-axis rail is within +/- 0.05 degrees of the value recorded for the control module. Make note of this value.

4 If the rail is not within this tolerance, align it as follows:

a. Loosen screws 3 through 10 on the middle X-axis rail that is out of alignment.

Note   Do not loosen screws 1 and 2 or the rail-to-rail alignment will be lost.

1   2   3   4   5   6   7   8   9   10

middle
X-axis rail
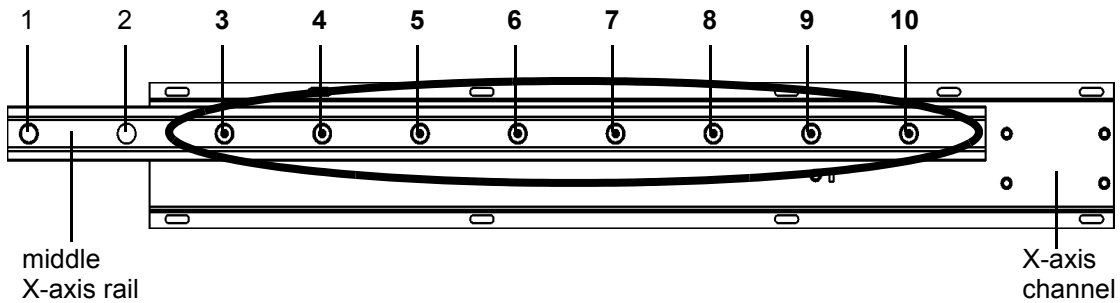
X-axis
channel

b. Adjust the X-axis rail until the level matches that of the control module, then tighten screw 10.

c. Verify that the rail is still within tolerance, then tighten the remaining screws.

d. Repeat Step 4 for each expansion module. The X-axis rails should now be level.

If you need to attach and align the middle X-axis rail in another expansion module, go to Attaching the Middle X-Axis Rail on page 43.

Verifying Accessor Assembly Alignment

1 Verify that the accessor assembly is aligned correctly as follows

   a. Position the front edge of the Y-drive mount so that it is aligned with the scribe mark on the lower left end of the control module's upper and lower X-axis rail.

Y-axis rail

front edge of
Y-drive mount

scribe mark
on lower X-axis rail
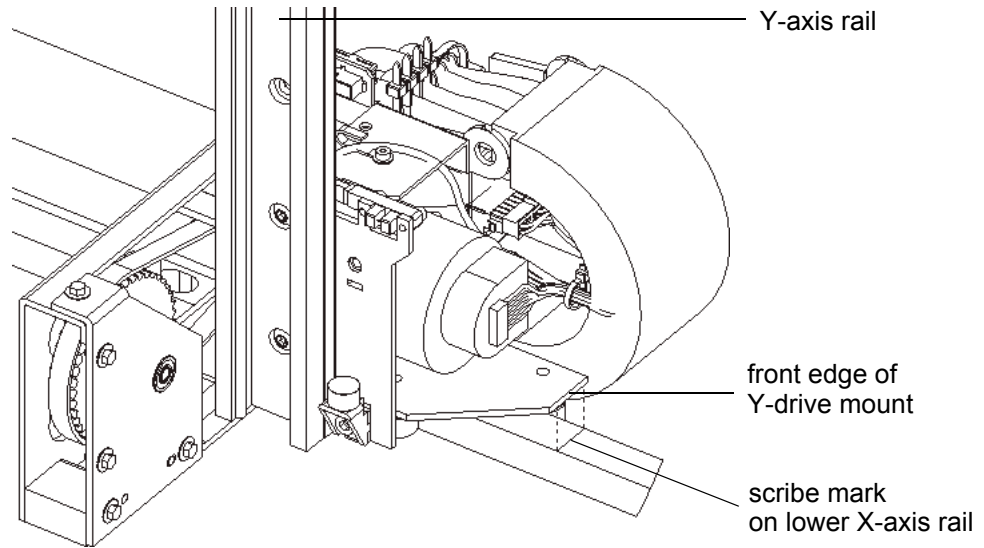
   b. Verify that the upper X-axis bearing is within one mm of the scribe mark on the upper X-axis rail.

Y-axis rail
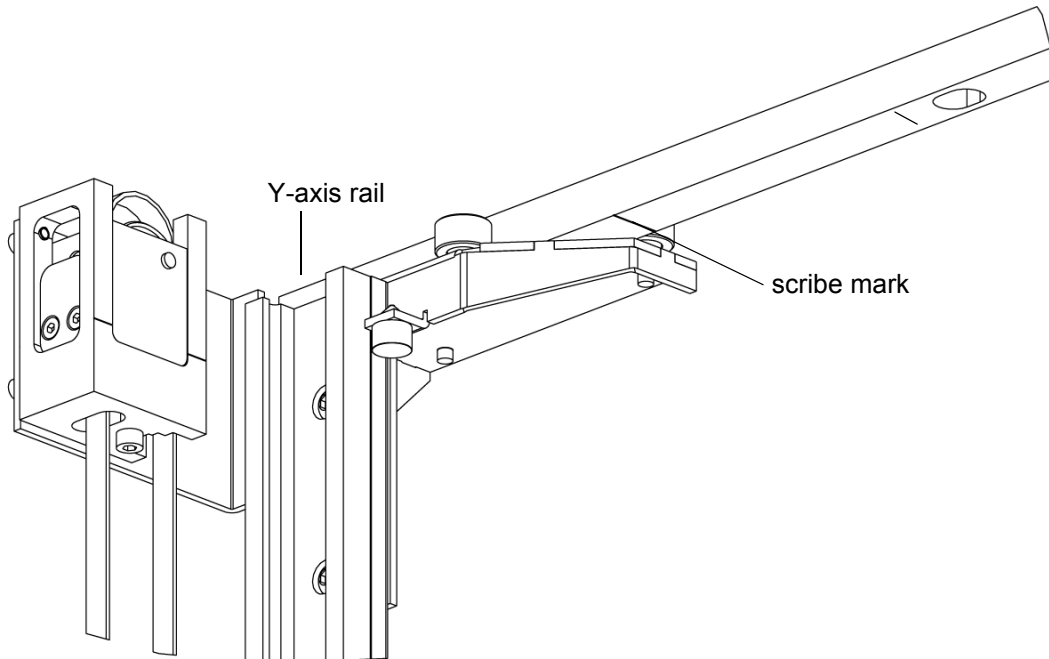
scribe mark

2   If the accessor assembly is not aligned correctly, do the following:

    a. Loosen the five screws that hold the accessor to the X carriage.

    b. Position the front edge of the Y-drive mount so that it is aligned with the scribe mark on the lower X-axis rail.

    c. Align the upper X-axis bearing with the scribe mark on the upper X-axis rail.

    d. Tighten the five screws.

    e. Move the accessor assembly to the right about 100 mm away from the scribe marks.

    f. Repeat Step 1 above to verify alignment.

Attaching the Tensioner Bracket and Hard Stop

Determine library configuration requirements:

- If the library configuration will be less than eight modules, use the tensioner bracket and hard stop you removed previously. Proceed to Eight Modules or Less Configuration on page 50.

- To add expansion modules onto an existing eight module library configuration, you must use the new tensioner bracket which is provided in the installation kit. The new tensioner bracket has a vertical slot instead of a hole on the bottom left. Proceed to Nine Modules or More Configuration on page 51.

For information on removing the tensioner bracket, see Removing the Tensioner Bracket and Hard Stop on page 80.

Eight Modules or Less Configuration

1   On the expansion module that will be the last in the configuration, use a 3 mm hex wrench to attach the X-axis tensioner bracket to the X-axis channel.

3 mm screws
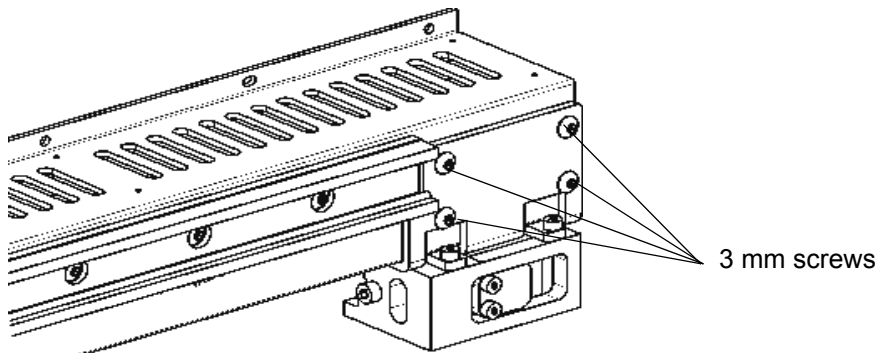
2 On the expansion module that will be the last in the configuration, use a 3 mm hex wrench to attach the hard stop.

3 mm screw
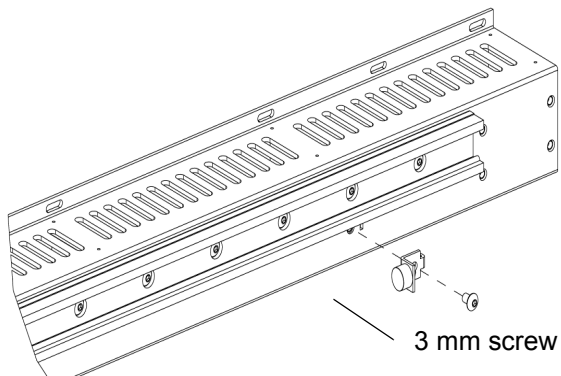
Nine Modules or More Configuration

To add expansion modules onto an existing eight module library configuration, you must use the new tensioner bracket which is provided in the installation kit. The new tensioner bracket has a vertical slot instead of a hole on the bottom left.

1 Confirm the tensioner assembly in the installation kit is anodized black and that it has the FRU ID 939.

2 On the X-axis tensioner that you removed earlier, use a 3 mm hex wrench to remove the 4 screws that attach the tensioner assembly to the tensioner assembly bracket.

3 mm screws

Removed tensioner mounting bracket with hole instead of slot

black tensioner assembly
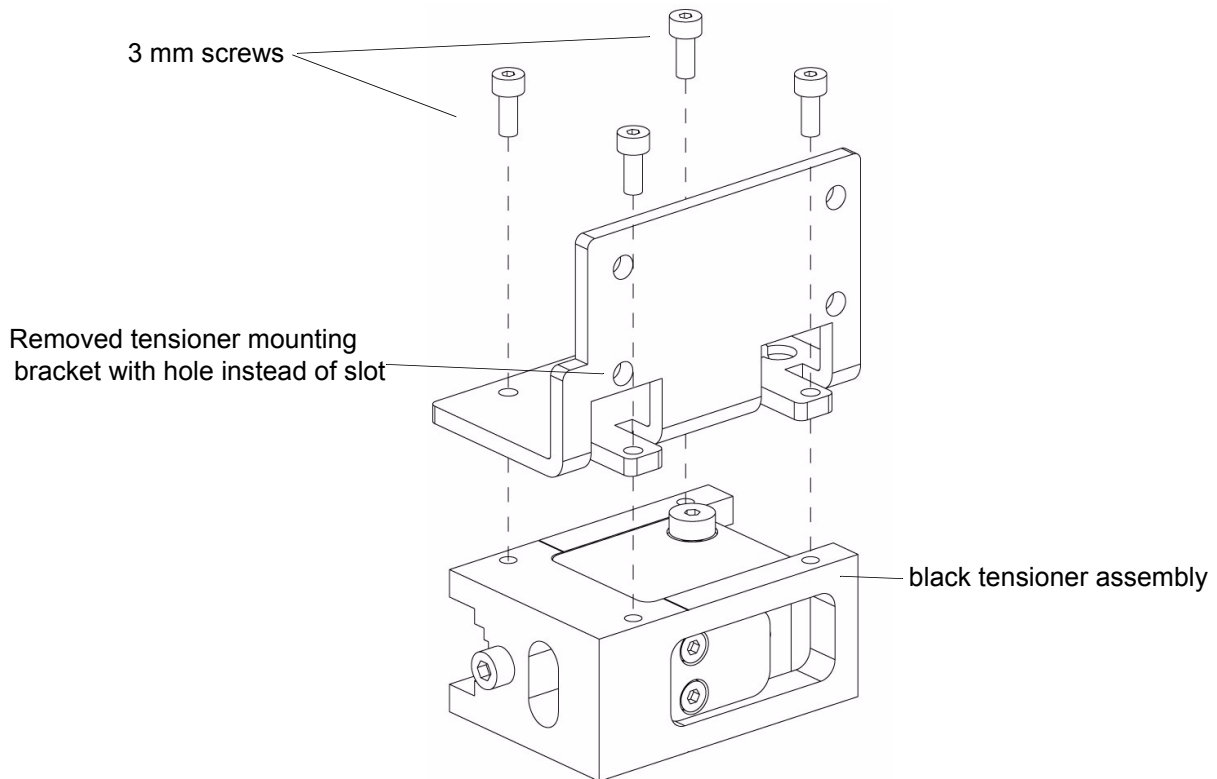
3   Using a 3 mm hex wrench install the 4 screws that attach the tensioner assembly to the replacement tensioner bracket.

3 mm screws

Replacement tensioner mounting bracket with slot

black tensioner assembly
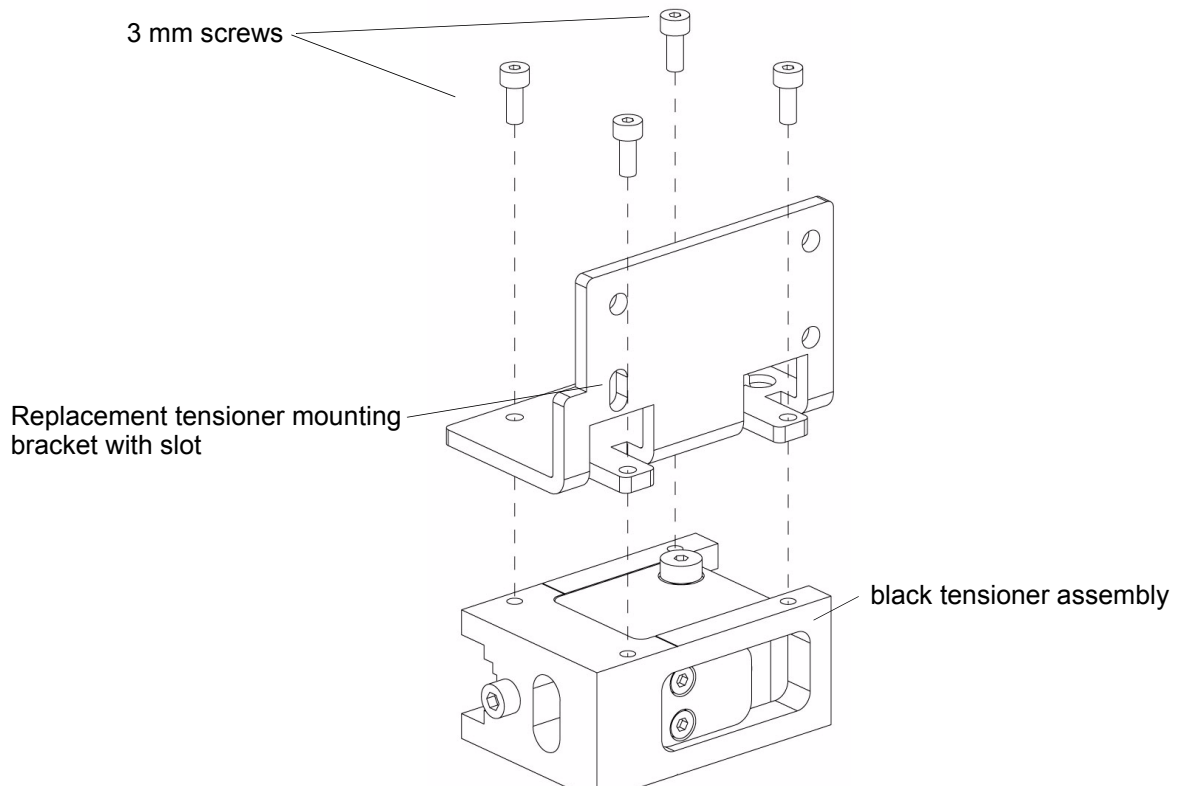
4   Use a 3 mm hex wrench to install the fours screws that attach the X-axis tensioner to the substrate of the last expansion module in your library configuration.

substrate

tensioner mounting bracket

3 mm screws

black tensioner assembly
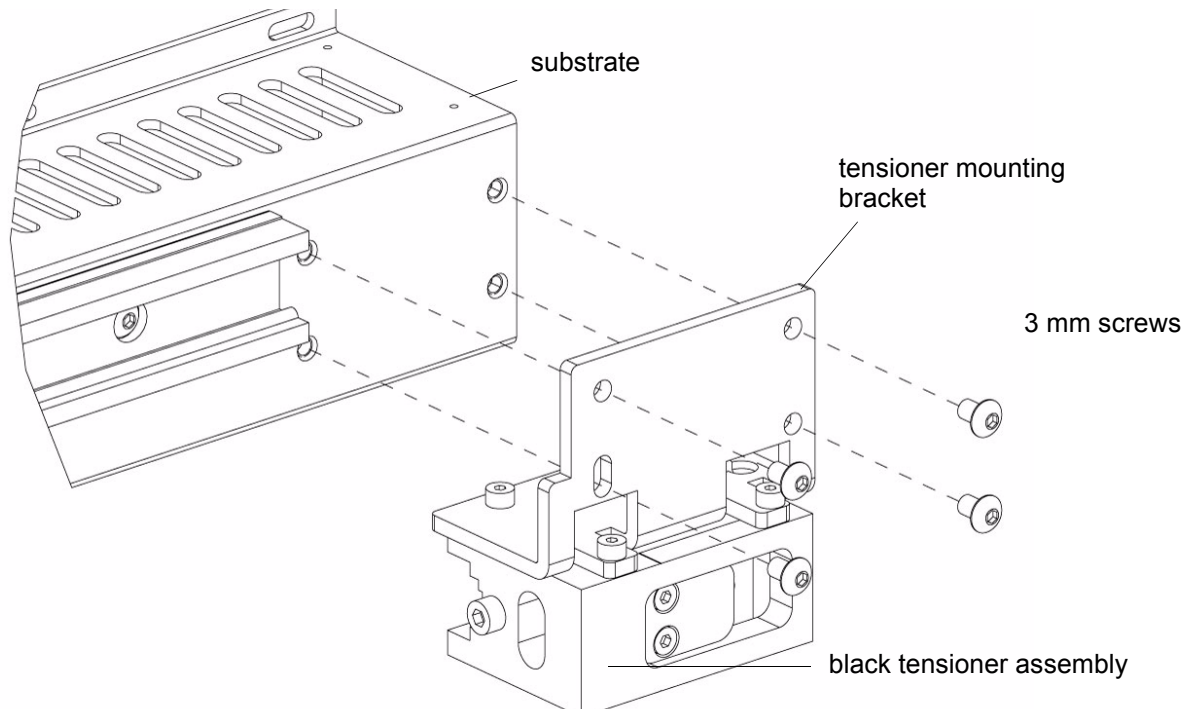
5 Use a 3 mm hex wrench to attach the hard stop to the substrate below the X-axis center rail.

3 mm screw
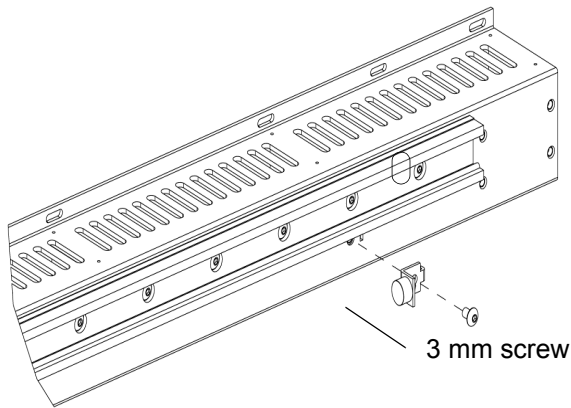
Installing the X-Axis Belt

Determine the library configuration requirements:

If the library configuration will be less than eight modules, follow the Eight Modules or Less Configuration on page 53.

If the library configuration will be nine modules or more, follow the Nine Modules or More Configuration on page 56.

Tools required: 2.5 mm hex wrench, 4 mm hex wrench, 3 mm hex wrench

Eight Modules or Less Configuration

1 Thread the belt around the back side of the X-axis pulley assembly.

thread belt through the back of the pulley assembly
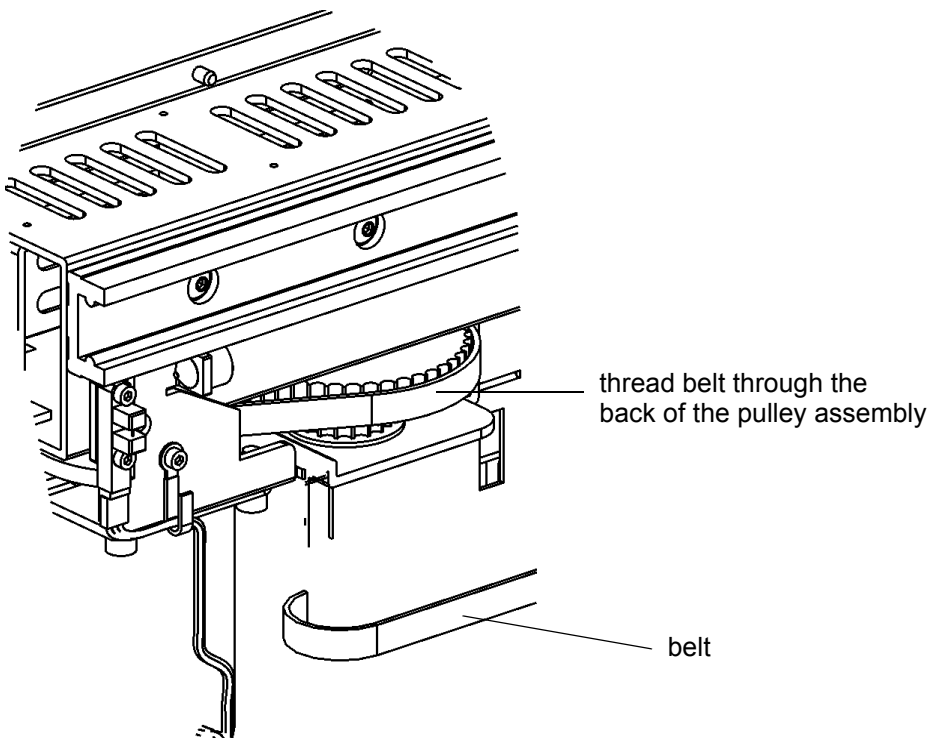
belt

2   Thread the end of the belt through the back opening in the tensioner.

tensioner

thread belt through opening
in the back of the tensioner
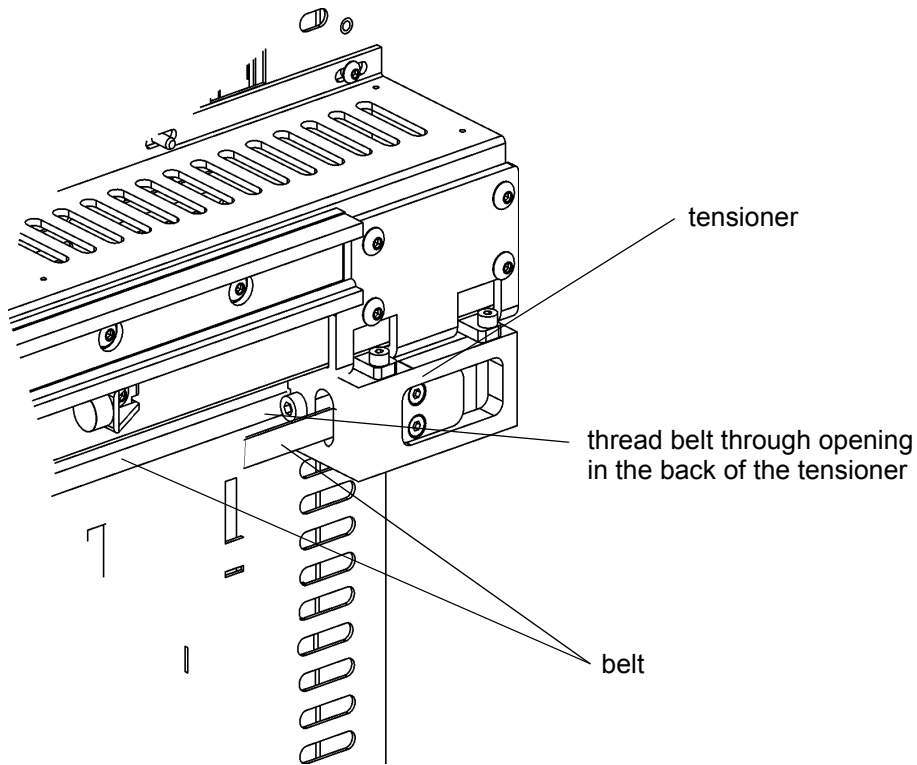
belt

3   Locate the X-axis belt clamp.

The X-axis belt clamp was removed as part of the disassembly procedure on an existing library. See
Step 5 on page 79. The clamp is connected to the X-axis carriage on a new library.

4   To attach the belt to the right side of the X-axis belt clamp, use a 2.5 mm hex wrench to tighten the first
screw.

2.5 mm hex screw
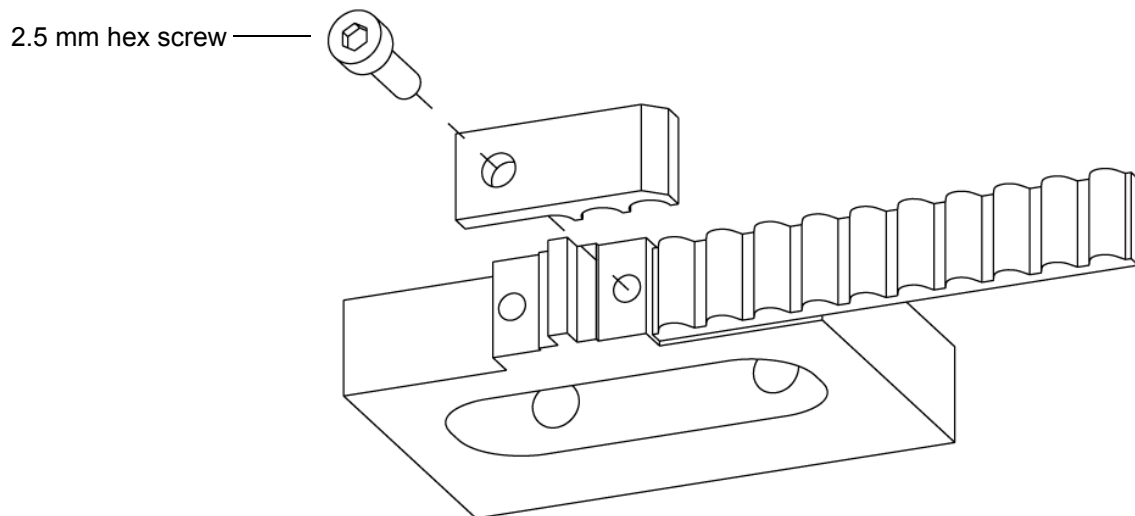
5 Pull the belt tight and mark where it should be cut. You must leave three belt teeth extra on the belt so it can be attached to the left side of the clamp.-

marking point
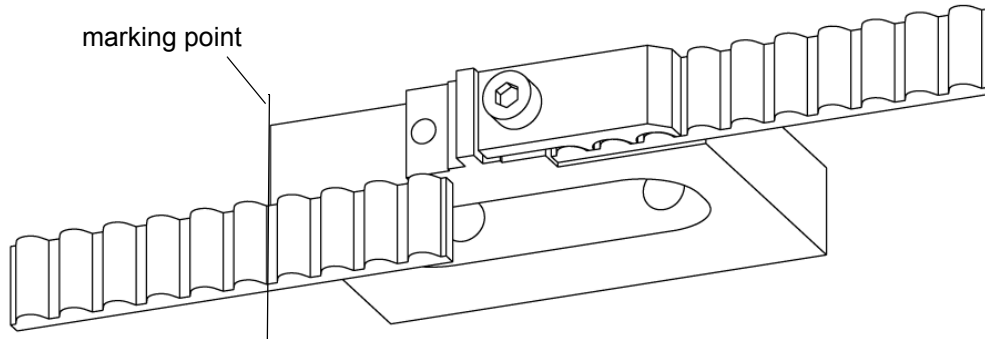
6 Cut off the excess length from the belt.

7 Insert three teeth of the X-axis belt into the left side of the clamp and tighten the 2.5 mm screw to secure the belt in place.

2.5 mm hex screw
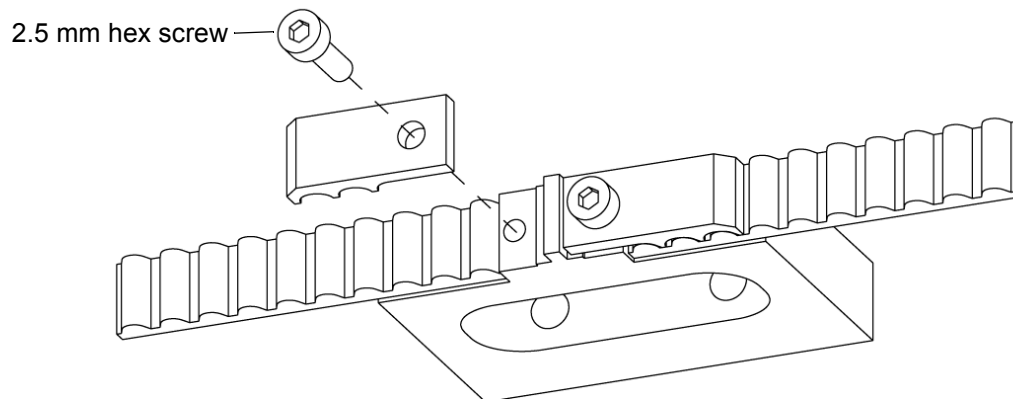
8 Secure the belt clamp to the X-axis carriage by installing the two 4 mm screws through the X-axis carriage into the belt clamp. If your library configuration involves nine or more modules, see Nine Modules or More Configuration on page 56. Otherwise, proceed to step Step 9 on page 56.
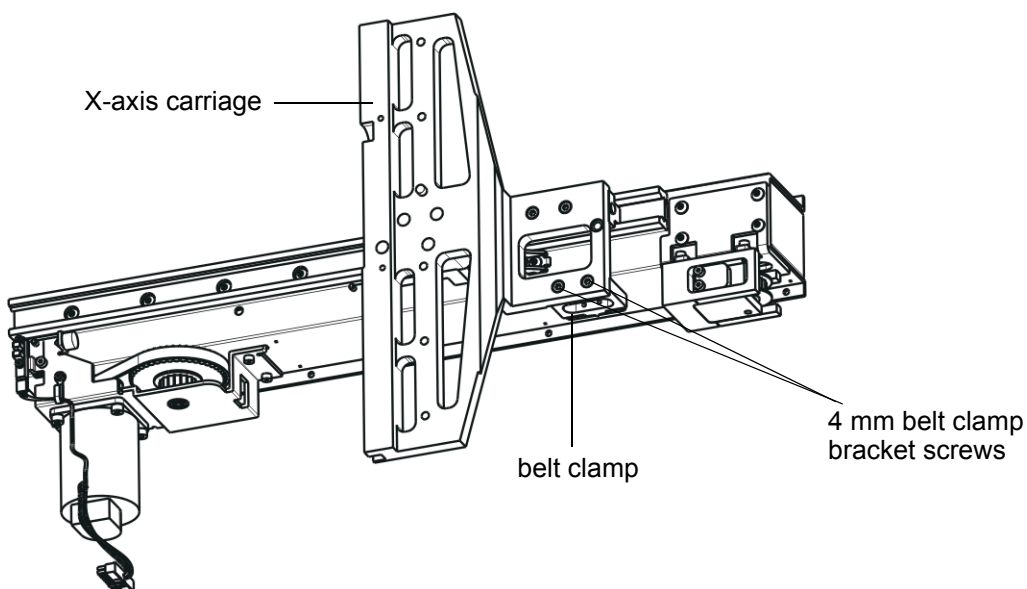
X-axis carriage

4 mm belt clamp bracket screws

belt clamp

9 Use the 4 mm hex wrench to turn the spring-load screw counter clockwise to uncompress the tensioner. Note that the gap cannot exceed 5 mm between the score mark and the tensioner base.

10 Continue to unscrew the compression screw (turning counterclockwise) until there is a 10 mm gap between the screw head and tensioner base.
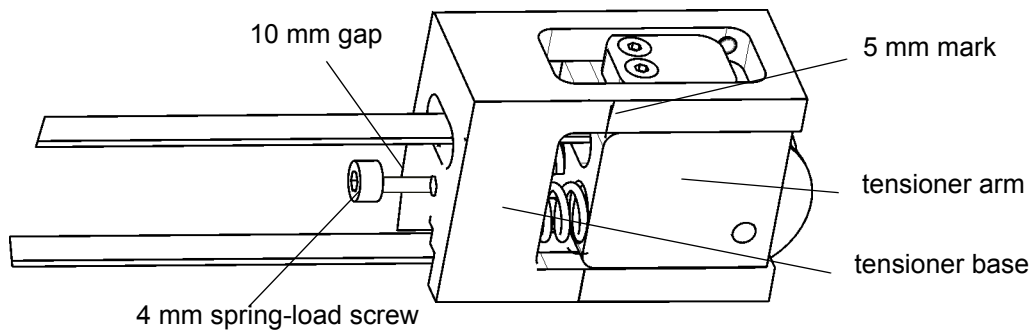
11 Move the accessor over the full length of the X-axis to verify that the belt is not twisted.

12 Return the accessor to the home position in the control module so you can install the X-axis chain assembly.

Nine Modules or More Configuration

To add expansion modules onto an existing eight module library configuration you must follow steps 1-6 in the Eight Modules or Less Configuration on page 53 and then complete the steps below. The longer belts have an initial stretch on install. You must make certain the tensioner arm is to the left of the 5mm mark and that the gap does not exceed 3.5mm.

1 Use the 4 mm hex wrench to turn the spring-load screw counter clockwise to uncompress the tensioner.
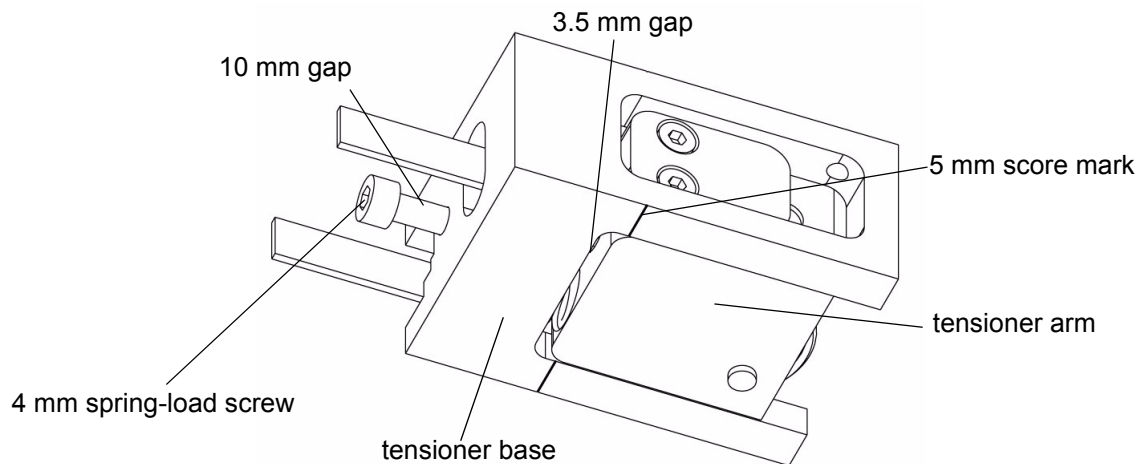
2 Verify the gap does not exceed 3.5mm.
If the gap does not exceed 3.5 mm, go to Step 12 on page 58.
If the gap exceeds 3.5 mm, go to Step 3 on page 56.

3 Use the 4mm hex wrench to turn the spring-load screw clockwise to re-compress the tensioner.

4 Remove the three screws from the tensioner bracket and loosen the screw in the vertical slot 1/4 turn. This allows the X-axis tensioner to drop down and rotate clockwise generating additional slack in the

belt, making it possible to cut off excess. Remove only one tooth at a time as you adjust the belt for length.
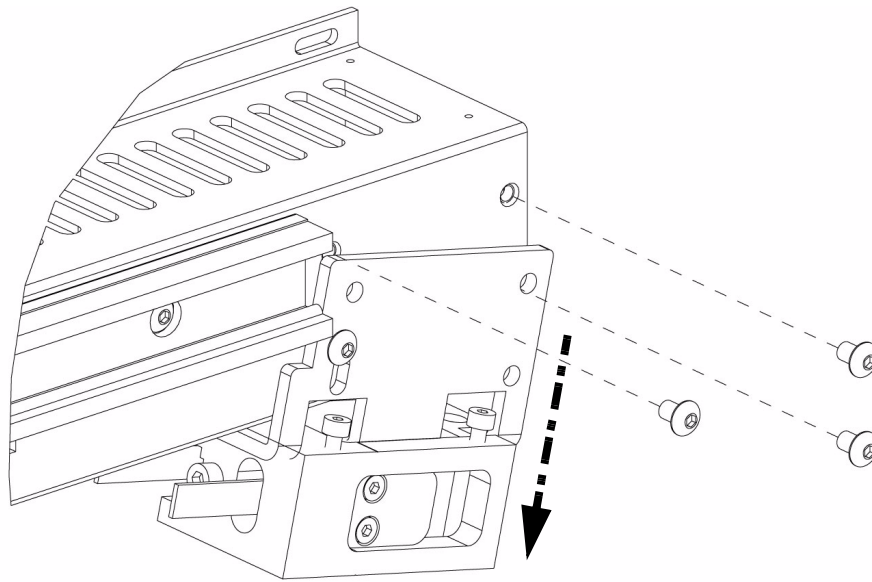
5 Use a 2.5 mm hex wrench to remove the belt from the left side of the X-axis belt clamp.

6 Cut off one tooth and then reinstall the belt to the left side of the X-axis belt clamp using the 2.5 mm hex wrench.

7 To reinstall the x-axis tensioner assembly, rotate it counter-clockwise and then push it upwards.
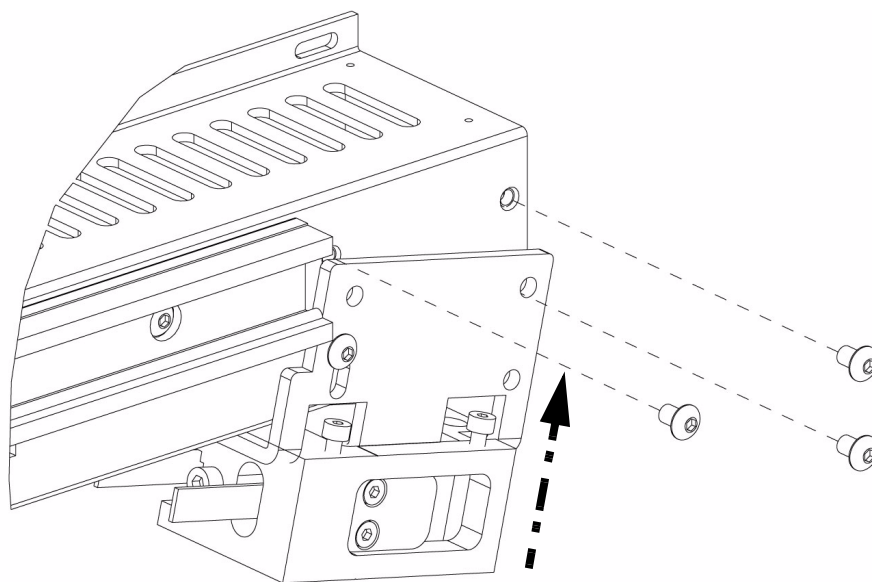
8 Use a 3mm hex wrench to install the remaining three screws and tighten the loosened screw in the vertical slot.

9 Use the 4mm hex wrench to turn the spring-load screw counter clockwise to uncompress the tensioner.

10 Verify that the tensioner gap does not exceed 3.5mm

11 If necessary, repeat steps 3 -10 and remove one belt tooth.

12 Once the tensioner has been uncompressed and the 3.5mm gap has been achieved, secure the belt clamp to the X-axis carriage by installing the two 4mm screws through the X-axis carriage into the belt clamp.
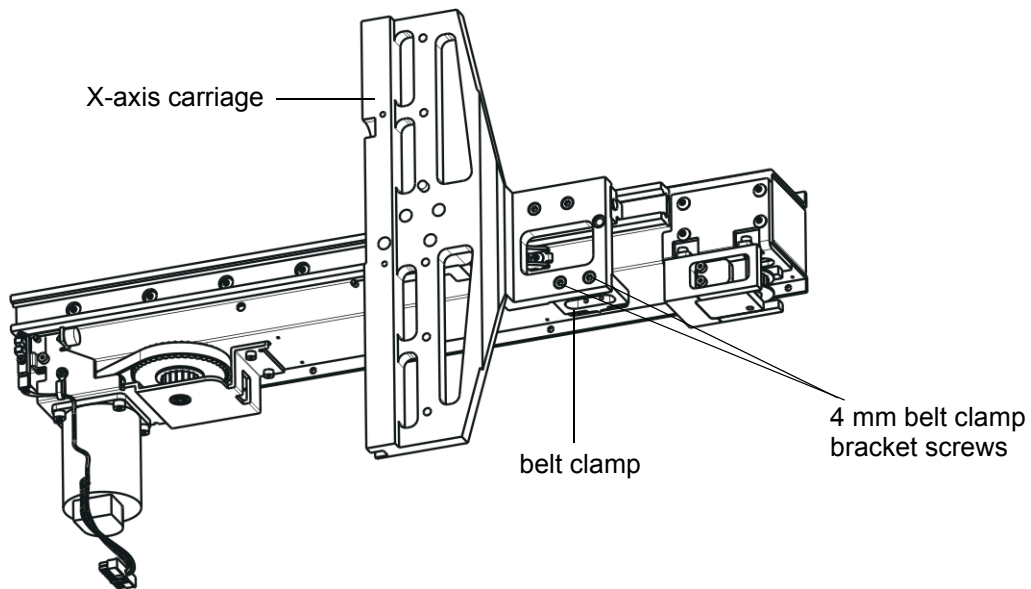
13 Move the accessor over the full length of the X-axis to verify that the belt is not twisted.

14 Return the accessor to the home position in the control module so you can install the X-axis chain assembly.

Installing the X-Axis Chain Assembly

The X-axis chain that has been removed will not be used in the new configuration. Follow the procedure below to install the X-axis chain assembly that shipped in the installation kit.

Required tools: 3 mm hex wrench

1 Thread the X-axis chain assembly into the slot behind the lower X-axis rail.

It is easier to fold over a large chain and feed it through from the last expansion module in the library if the side panel is not installed.

2 Using the 3 mm hex wrench, secure the X-axis chain assembly (W8) to the bottom of the control module using two 3 mm screws.

3 mm screws

X-axis chain assembly (W8)

3 Connect the X-axis chain (W8) connector from the control module bulkhead.
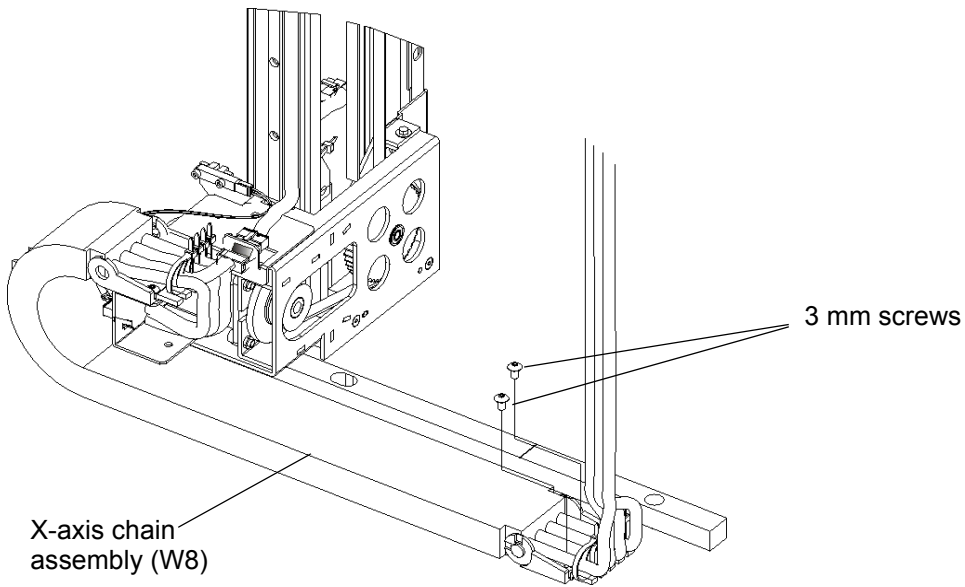
X-axis chain (W8) connection
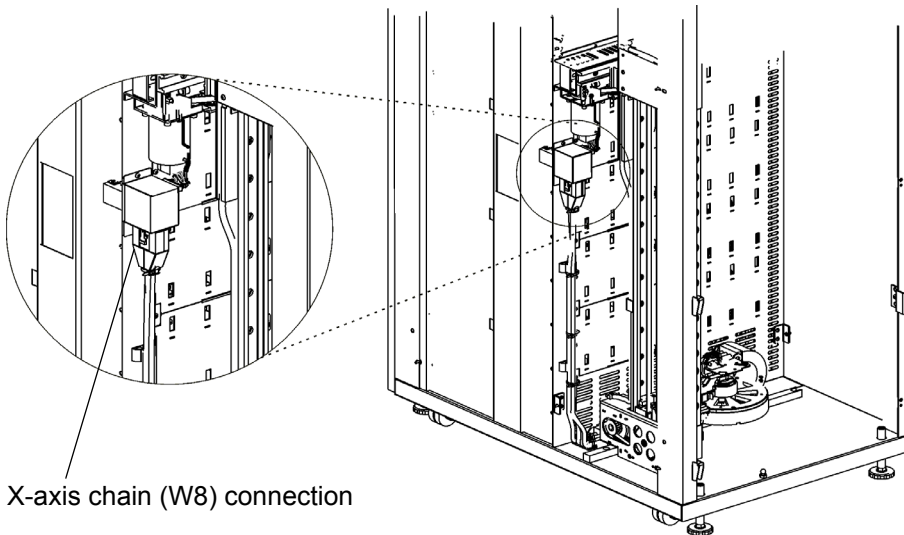
4   Connect the X-axis chain connector (W8) to the control module bulkhead using Velcro straps.

Velcro straps
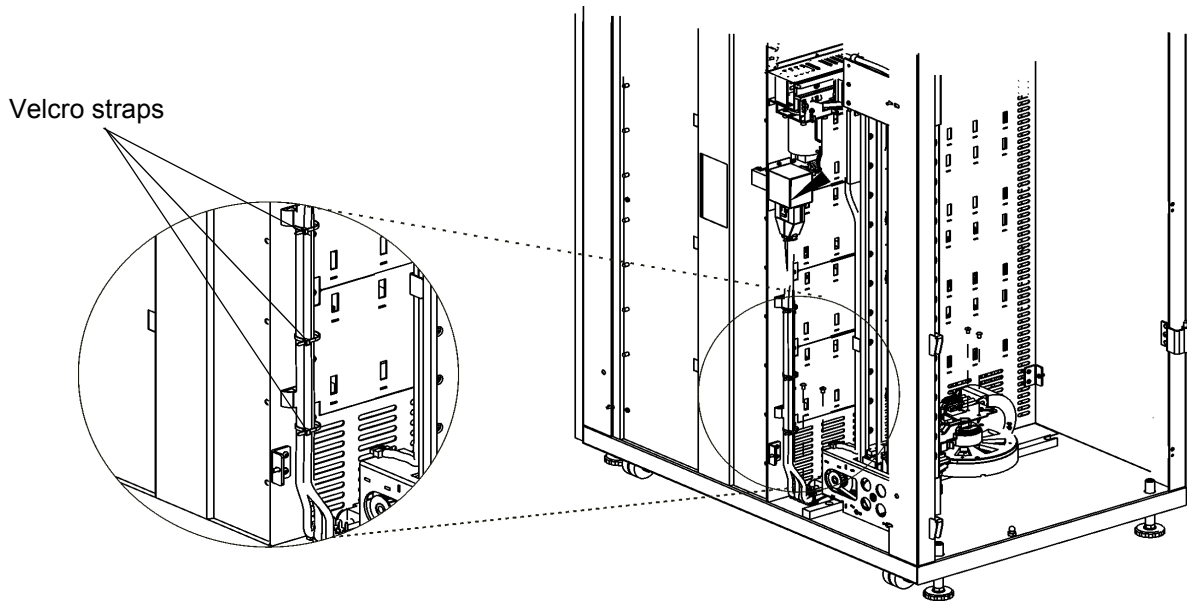
5   Use a 3 mm hex wrench to attach the X-axis chain assembly (W8) to the Y-axis drive mount assembly using two 3 mm screws.

3 mm screws

X-axis chain
assembly

Y-axis drive
mount assembly
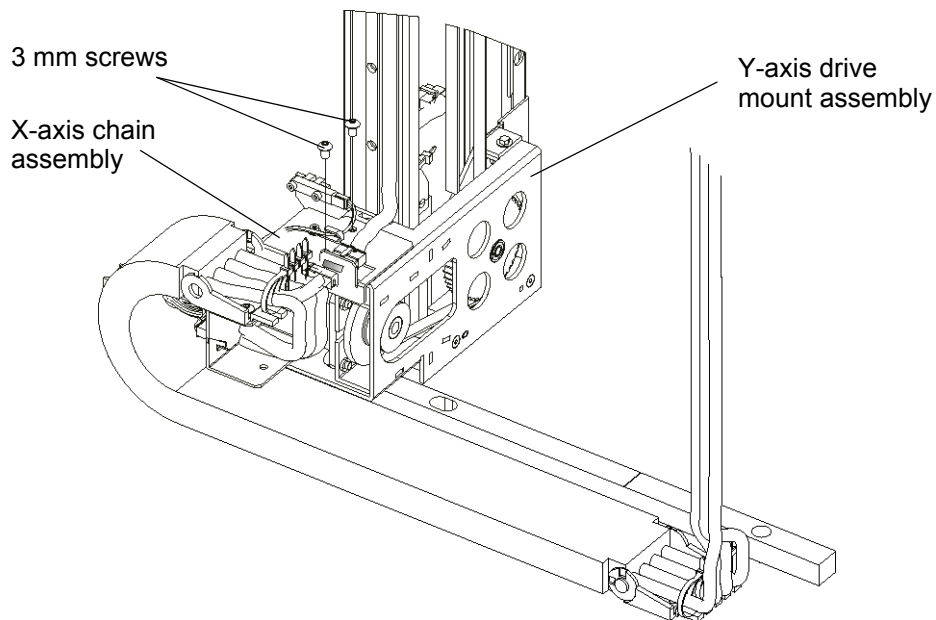
6 Connect the Y-axis motor/home sensor cable to the X-axis chain assembly (W8).

X-axis sensor cable

X-axis chain
assembly (W8)
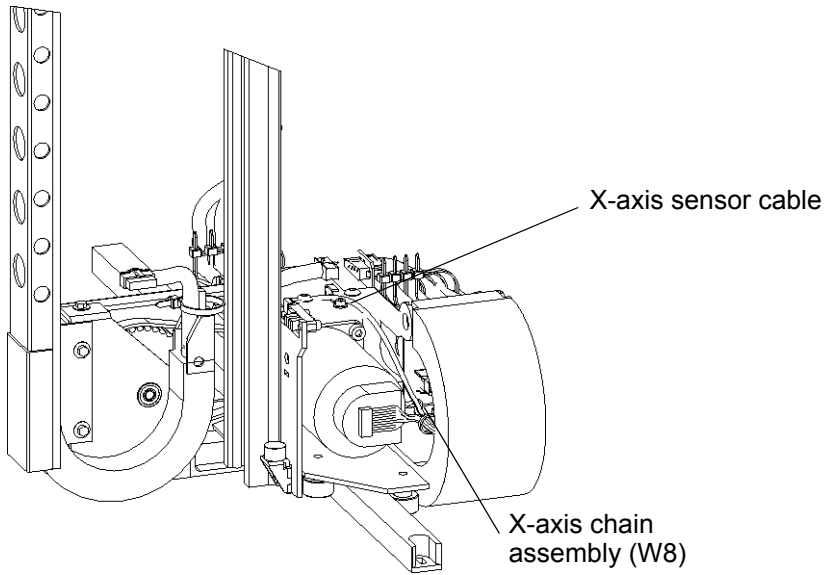
7 Connect the Y-axis chain (W9) to the X-axis chain assembly (W8).

Y-axis chain
assembly (W9)

connector

X-axis chain
assembly (W8)
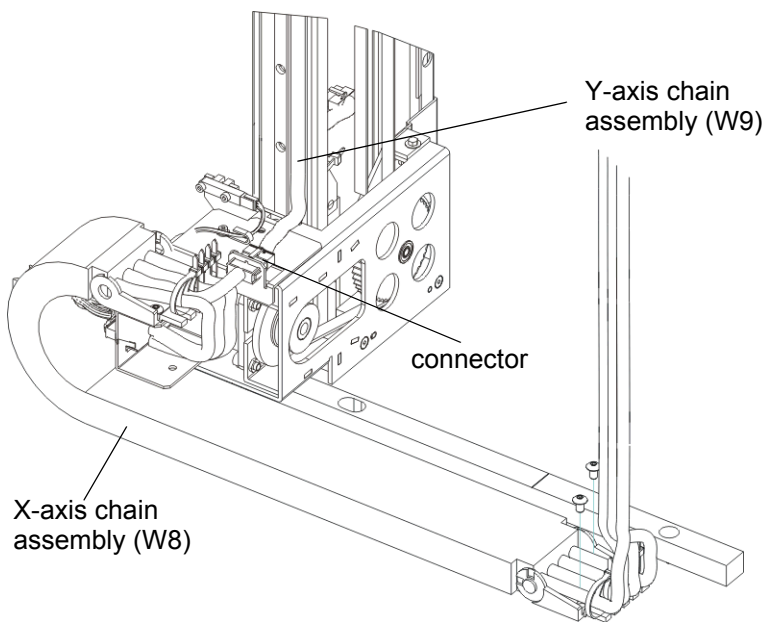
8   On the top of the X-axis chain assembly, lock down the Y-axis home sensor cable by pressing down on the hold-down.

hold down

Y-axis home
sensor cable
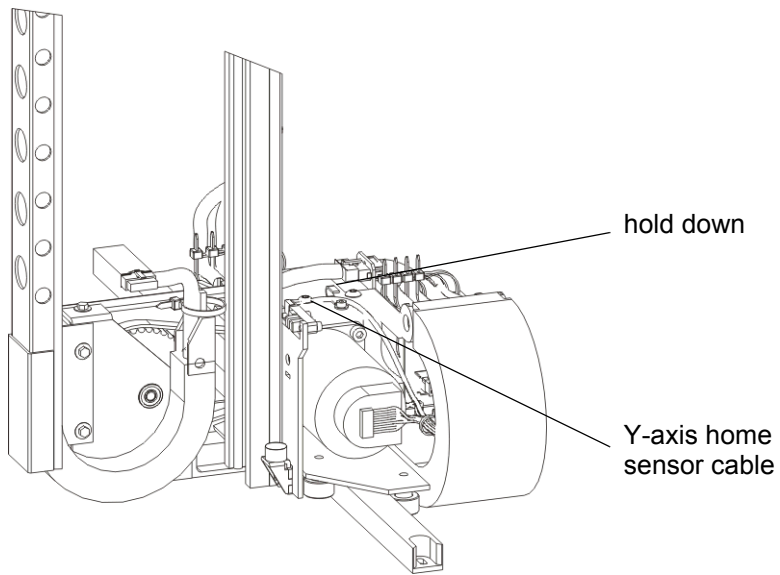
9   Test the Y-axis assembly by moving the accessor assembly to its home position and verifying the cables do not have contact with the cables routed up the bulkhead. If they do, reposition the cables along the bulkhead with the Velcro straps.

Installing the X-Axis Chain Trough

> **Note** The X-axis chain trough is installed only in 7- 12 module configurations. Skip this procedure if the configuration you are installing has six or fewer modules.

> **Note** Center the trough in modules 3, 4, 5, and 6 with a slight left offset.

Library Configuration	Trough Locations
CM + 6 EM	module 3
CM + 7 EM	module 3
CM + 8 EM	module 3 and 4
CM + 9 EM	module 3, 4 and 5
CM + 10 EM	module 3, 4, and 5
CM + 11 EM	module 3, 4, 5, and 6

Required tools: 2.5 mm hex wrench

1 Locate the X-axis cable trough (part number 3-01740-01).

2.5 mm hex screw
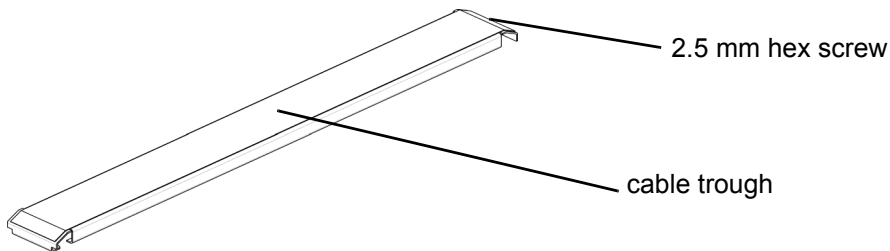
cable trough

2 Use the 2.5 mm hex wrench to remove the clip from the end of the trough.

3 Place the trough between the top and bottom portions of the X-axis chain. Clip the end of the trough over the bottom chain of the X-axis cable in the middle of the third module (second expansion module).

expansion module in
position 3

hook the clipped end of the trough
into a lower link of the X-axis cable
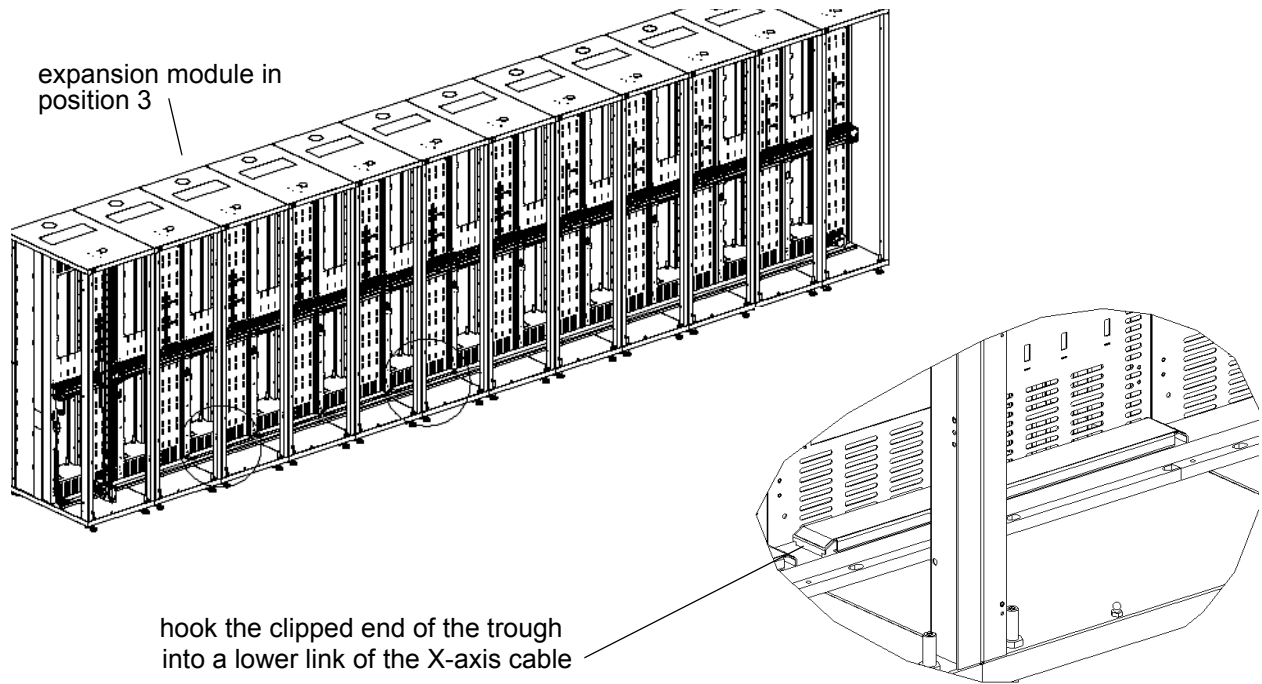
4 Lay the trough flat on the X-axis cable. Clip the end of the trough that was removed onto the cable and attach it using the 3 mm hex wrench.

3 mm hex screw

clip that was removed
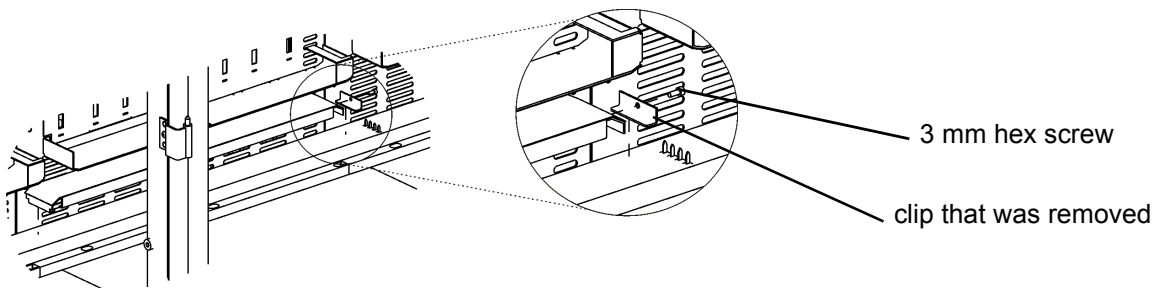
Routing and Connecting Module Cables

Required tools: Phillips screwdriver

> **Note** The cables will be preinstalled on the LBX board in the expansion modules. You must route them through the hole in the bulkhead to either the control module or previous expansion module.

1 On the back of the existing control module or last expansion module, do the following:

    a. Loosen the thumbscrew on the LBX/IEX cover plate and remove the plate.

LBX/IEX cover
plate thumbscrew
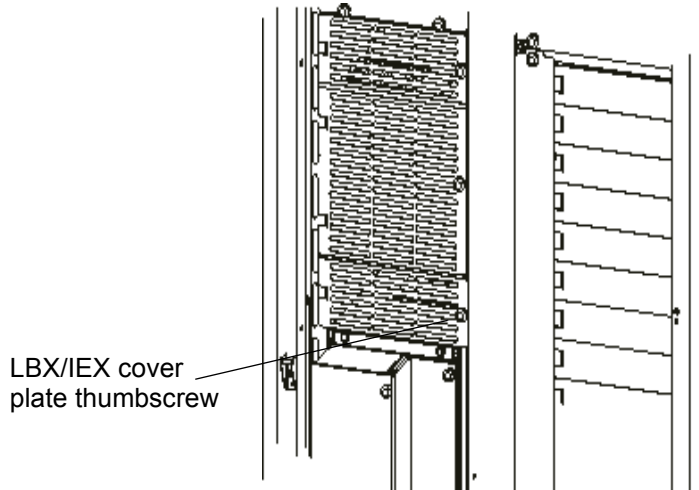
    b. Use a #2 Phillips screwdriver to remove the four thumbscrews that retain the cover plate between the top and bottom drive positions.
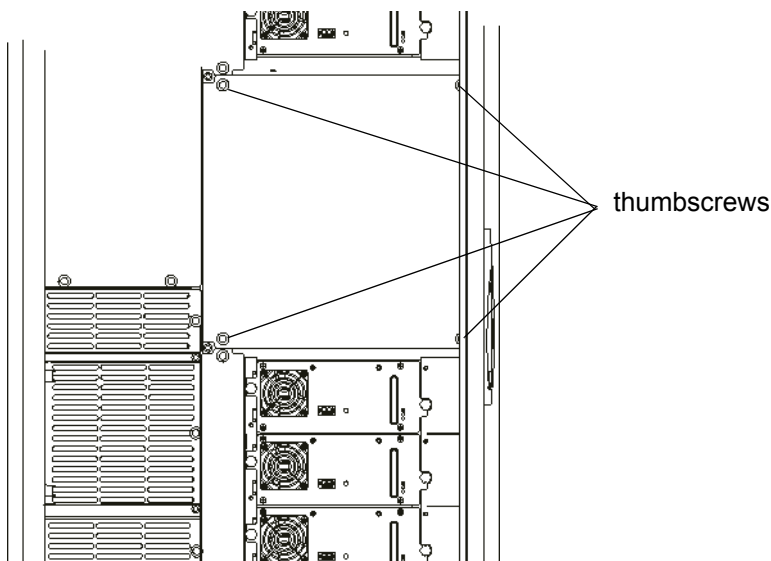
thumbscrews

2   On the new expansion module, loosen the thumbscrew on the LBX/IEX cover plate and remove the plate.

LBX/IEX cover
plate thumbscrew
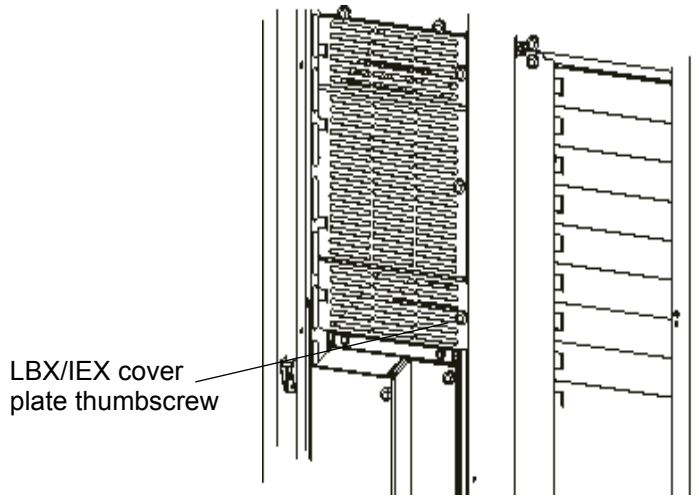
3   Locate the W1 and W2 cables on the new expansion module.

W2 cable
(Ethernet)

W1 cable (large ribbon cable)
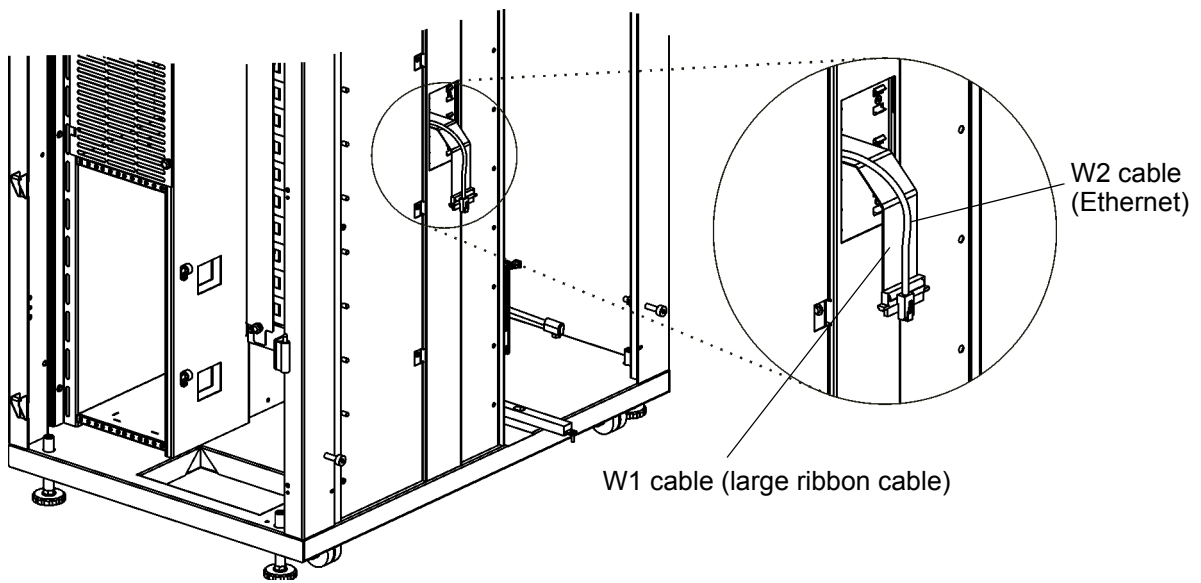
4   Route the W1 and W2 cables from the new expansion module through the opening in the left bulkhead of the control module or last expansion module in the existing configuration.

route the W1 and W2 cables through opening in the left bulkhead
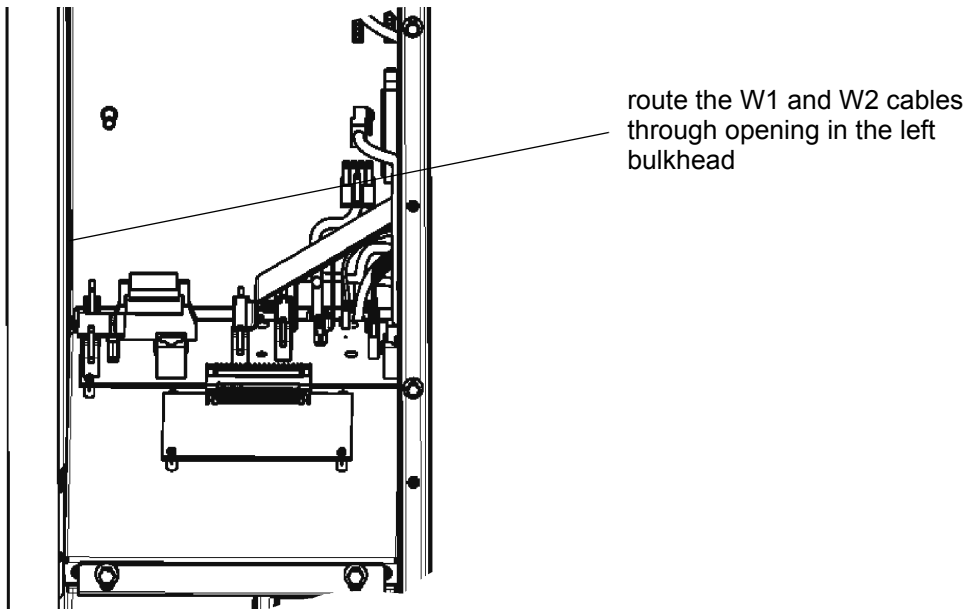
5   Connect the W1 ribbon cable to the J2 connection on the LBX board on the control module or last expansion module in the existing configuration.

This connects the J1 connection on the LBX board in the new expansion module to the J2 connection on the LBX board in the control module or last expansion module in the existing configuration.

> 📝 Note   The LBX board has three versions and the terminator has two versions. For more information, see LBX Board on page 345 and LBX Terminator on page 349. Make certain you have the correct version LBX based on the library configuration you are installing.

LBX board on expansion module   W1 cable (large ribbon cable)   LBX board on control module or expansion module

J2   J1   J2   J1
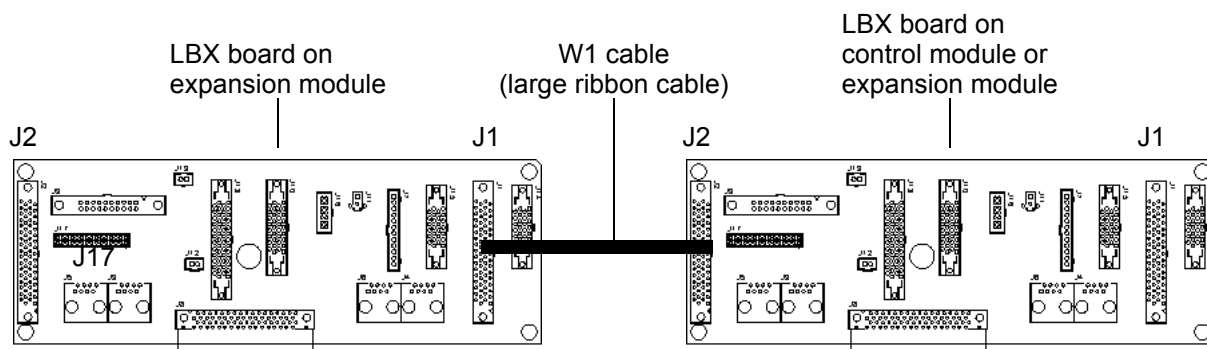
6 Connect the W2 Ethernet cable to the J3 connection on the LBX board on the control module or last expansion module in the existing configuration.

This connects the J4 connection on the LBX board in the new expansion module to the J3 connection on the LBX board in the control module or last expansion module in the existing configuration.

> 📝 **Note** The LBX board has three versions and the LBX terminator has two versions. For more information, see LBX Board on page 345 and LBX Terminator on page 349.

LBX board on expansion module   W1 cable (large ribbon cable)   LBX board on control module or expansion module

J2   J1   J2   J1

J17

J4   J3

W2 cable (Ethernet)
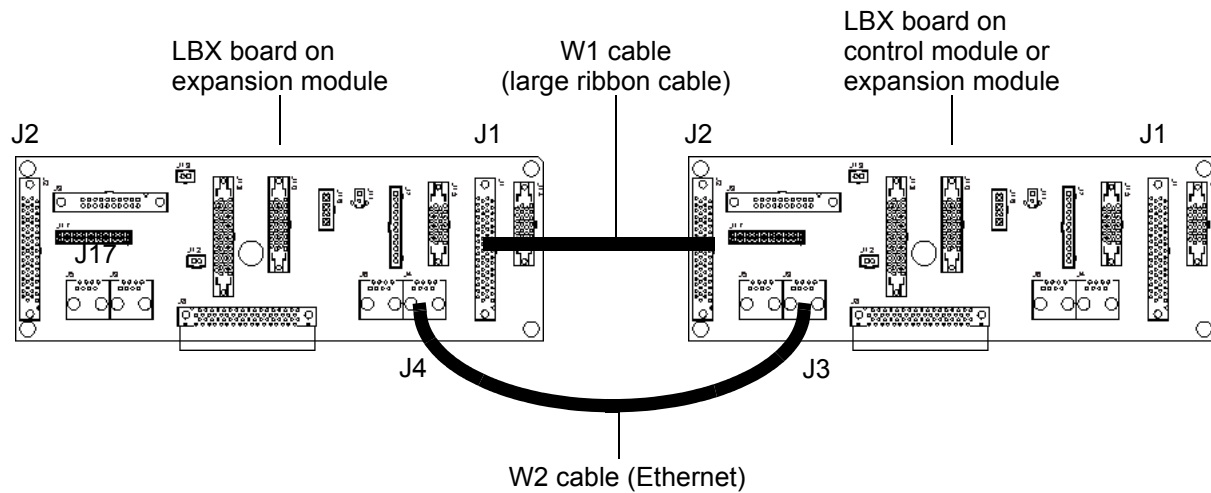
7 Determine the LBX terminator installation:
- Determine your library configuration and verify what style of terminator is needed. There are two versions of the LBX terminator board (card). For more information, see LBX Terminator on page 349.

- Once you have determined what style of terminator you need, install it into the J17 connection on the LBX board in the last expansion module.

LBX terminator   J17 connection
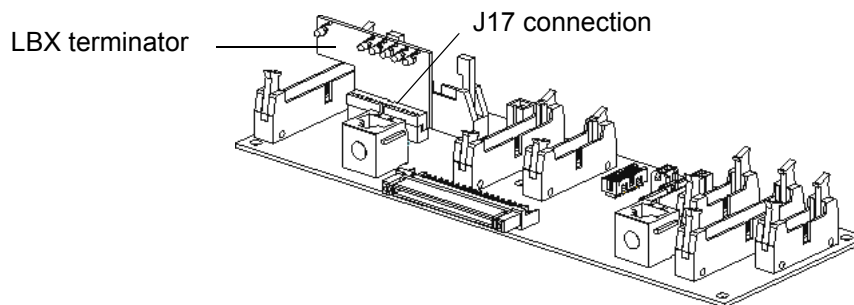
8 Use the cover plate thumbscrew to replace the LBX/IEX cover plates on the modules.

LBX/IEX cover
plate thumbscrew
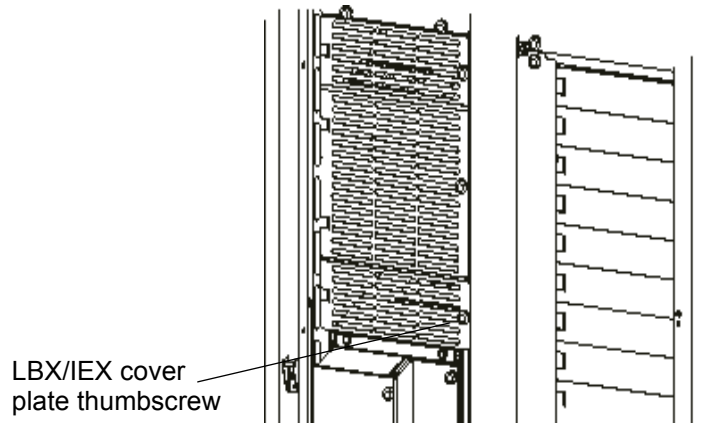
9 Use a #2 Phillips screwdriver to replace the cover plate between the drive positions.

thumbscrews
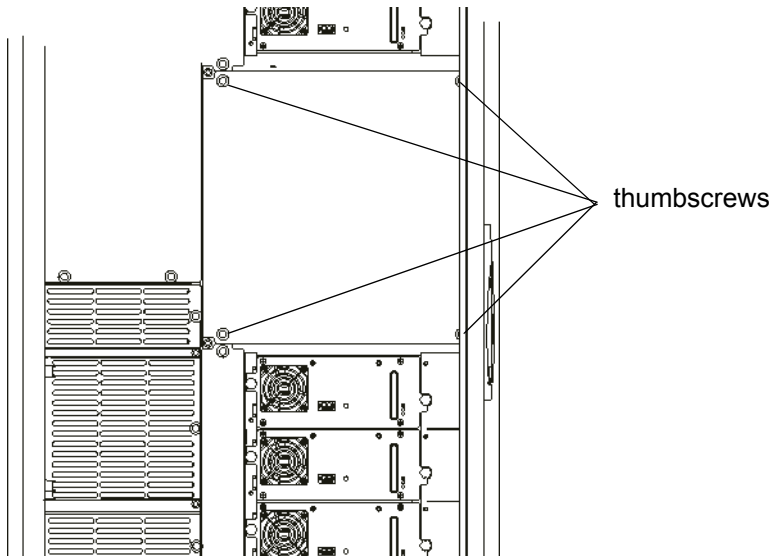
Assembling the Last Expansion Module

Required tools: 2.5 mm hex wrench,

1 Remove the magazine storage on rack # 1 in sections 1 - 5 on Column 4 in the last expansion module.
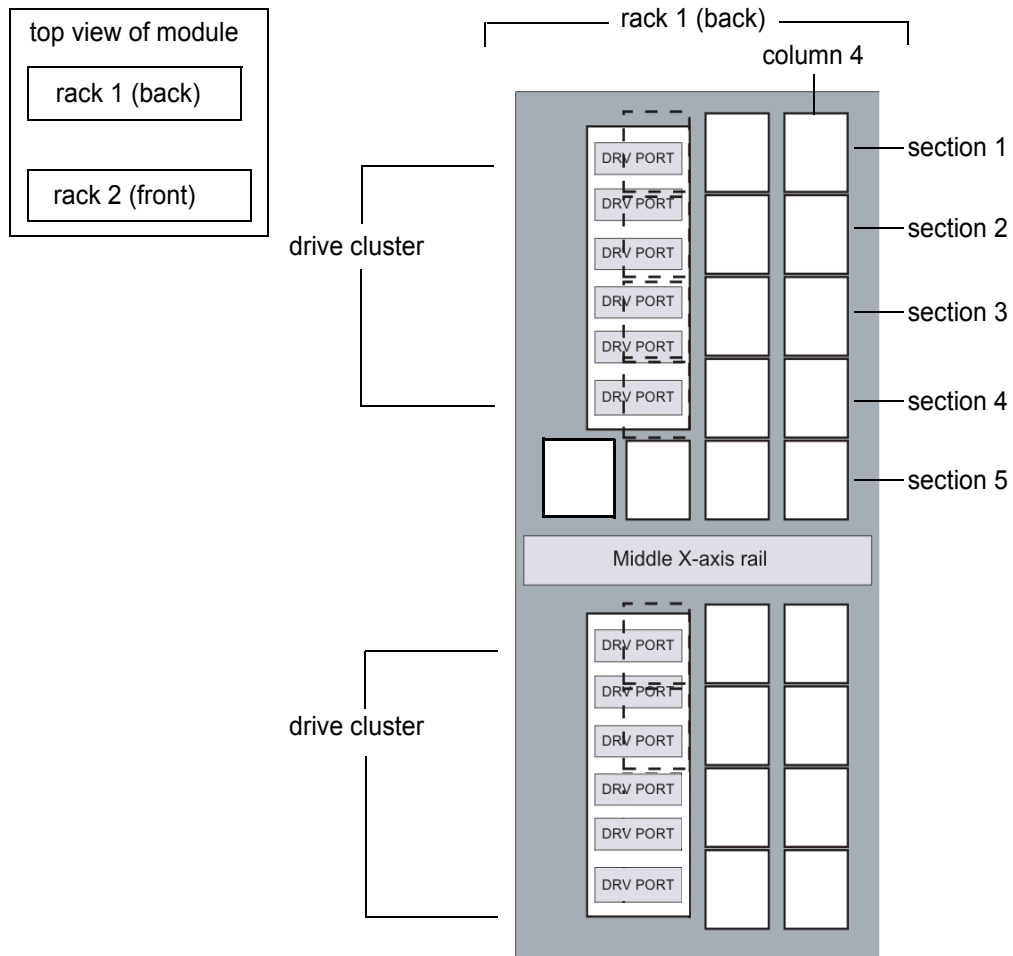
2   Install the L brackets. Each bracket is attached to the module frame by two 2.5 mm hex screws.

2.5 mm screws that retain the L-brackets
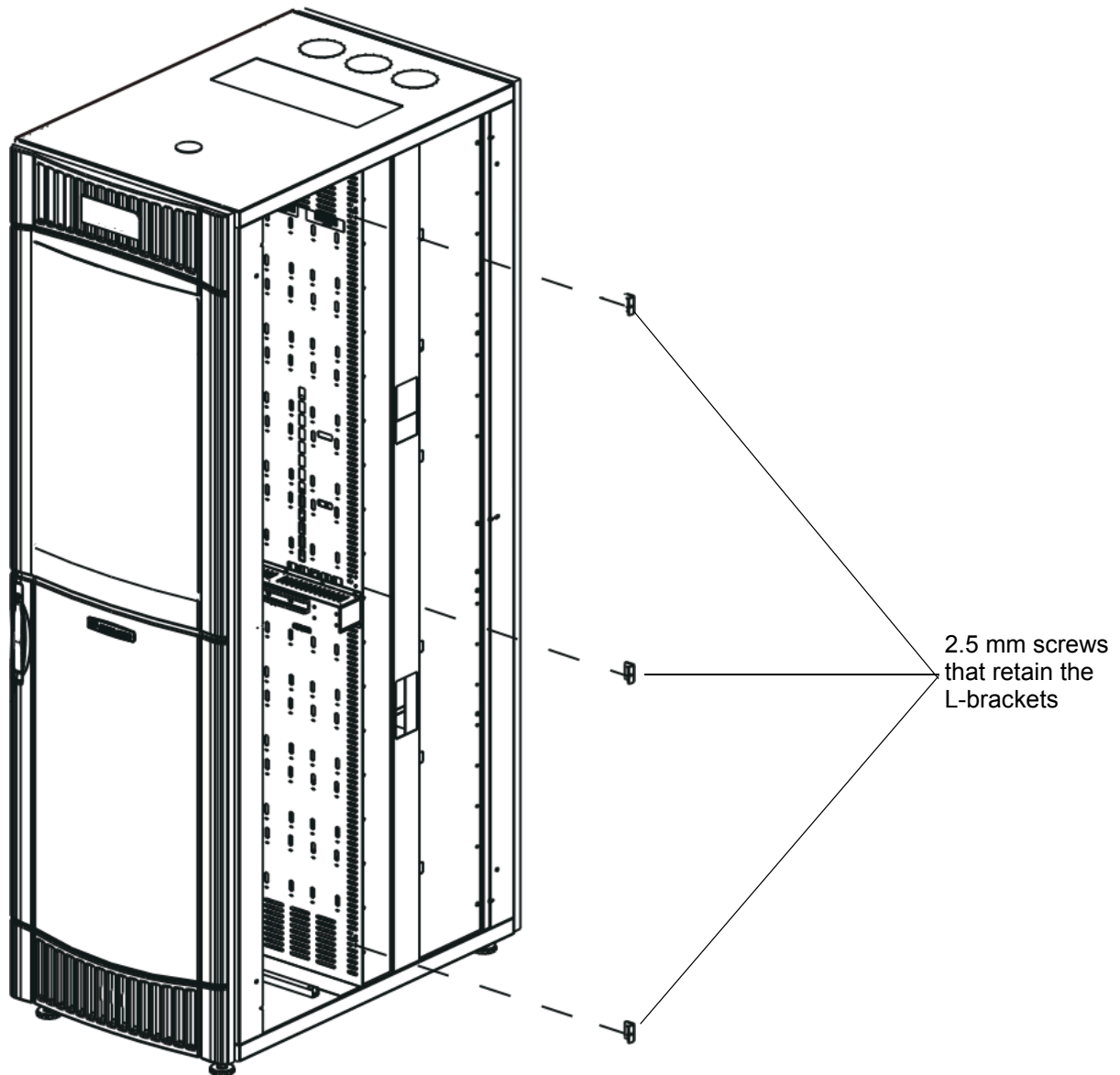
3   Locate the right side panel that was removed from the control module or previous expansion module.

4 Align the side cover with the screw holes in the expansion module.

screw holes

screw holes
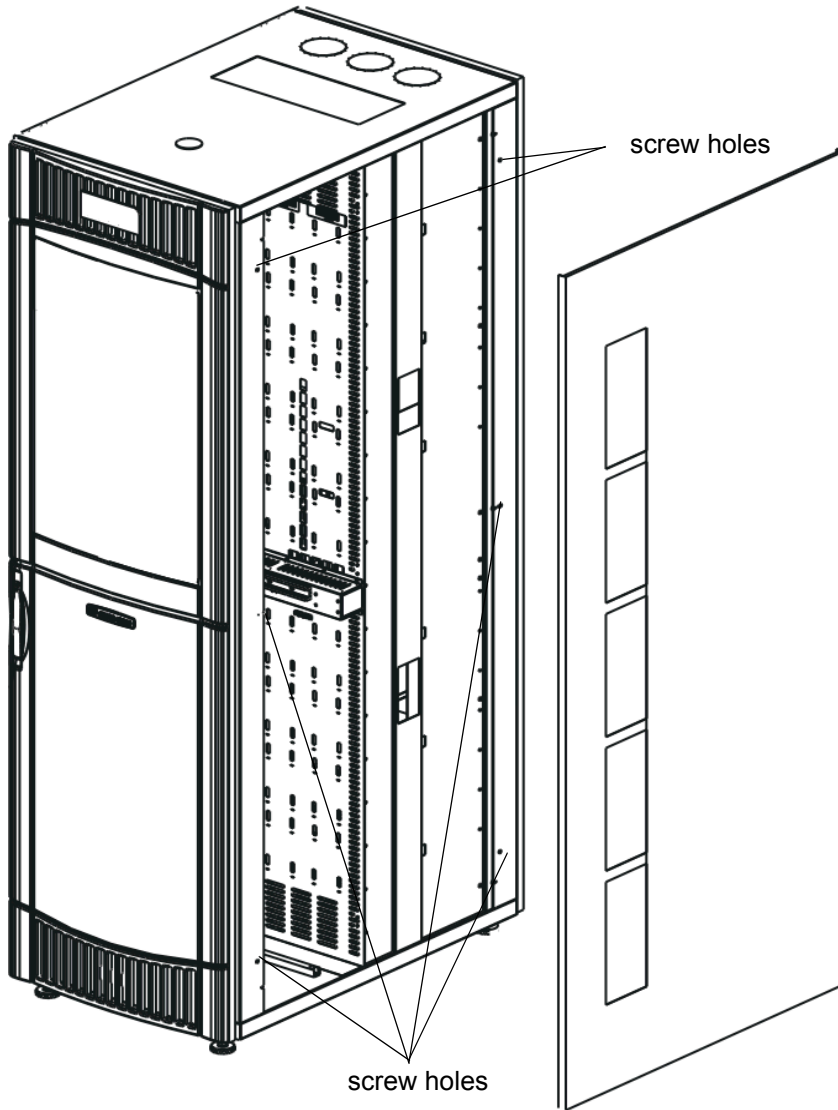
5 From inside the expansion module, use a 2.5 mm hex wrench to install the nine (9) screws that attach the side panel to the module.

2.5 mm screw

2.5 mm screws

front of module

back of module

2.5 mm screw

2.5 mm screws

2.5 mm screw

2.5 mm screws
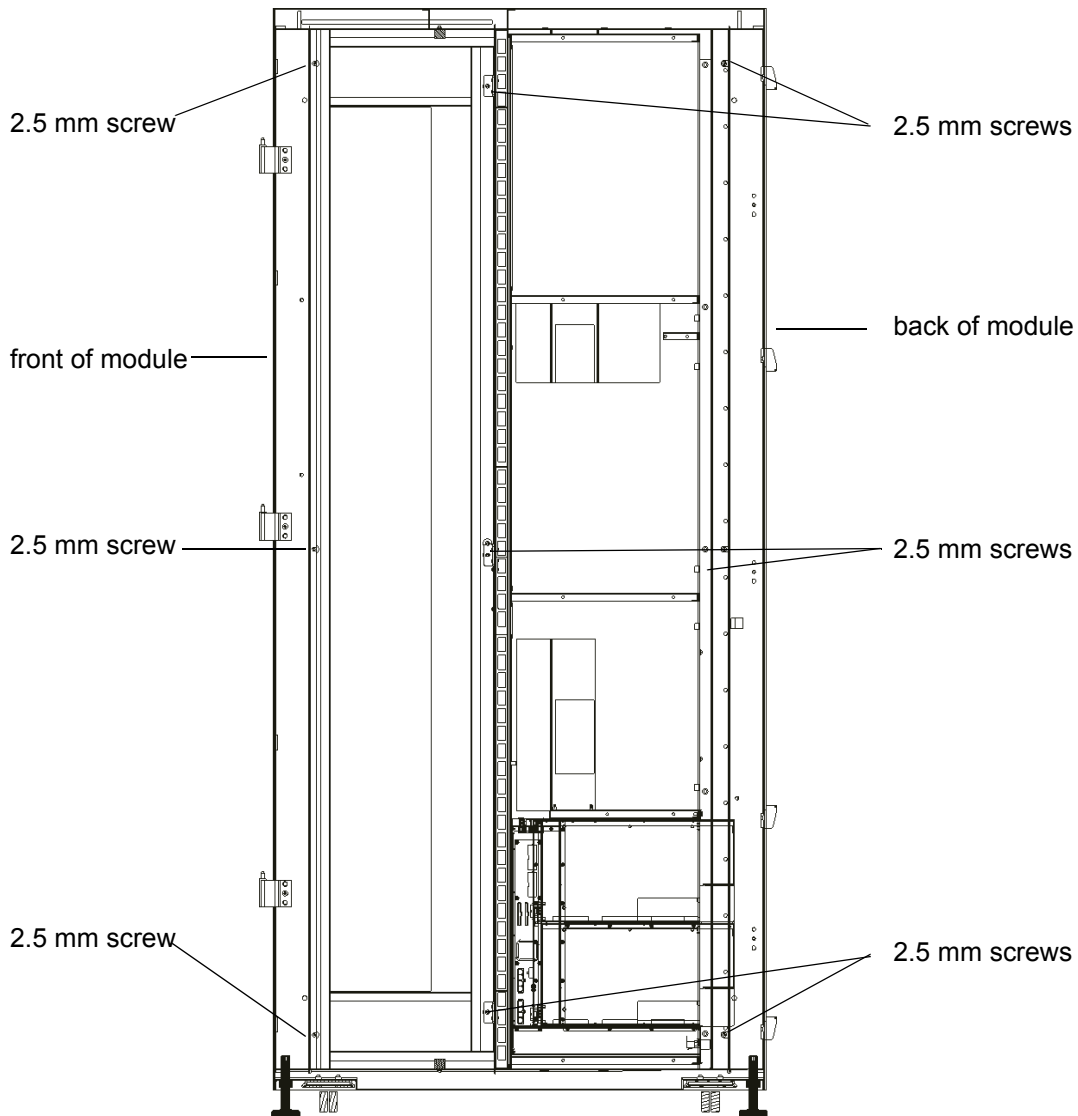
6 Reinstall the removed magazines removed in

7 Reattach all of the service doors.

8 Repeat steps on each expansion module.

9 Once the components are installed, if applicable, perform the procedures detailed in

Preparing an Existing Library to Receive an Expansion Module

To prepare an existing library to receive an expansion module, complete the following procedures:

- Positioning the Existing Library on page 74

- Removing the Right Side Panel from the Last Existing Module on page 75

- Removing the X-Axis Belt on page 79

- Removing the Tensioner Bracket and Hard Stop on page 80

- Removing the X-Axis Chain Assembly on page 82

- Removing the LBX Terminator Board on page 85

- Removing and Replacing the LBX Board on page 86

Note   To ensure Ethernet communication, control management blades (CMB) must be installed in each expansion module of a multi-module configuration. If the last expansion module does not contain FC I/O blades, a CMB is not necessary

Positioning the Existing Library

If you must move the existing library prior to installing a new expansion module, follow the preceding steps to locate and position the modules. For more information on location specifications, see the *Scalar i6000 Planning Guide*.

Required tools: 24 mm open-end wrench, 2.5 mm hex wrench, 3 mm hex wrench, 4 mm hex wrench

1   Verify the quantity and placement of new expansion modules.

2   Verify the following:

- There is adequate clearance for the access and service doors.

- The selected location the new modules is level. See Verifying the Level of the Install Location on page 321.

- All raised floor tiles have been cut out accordingly to accommodate the power, SCSI, Fibre, and Ethernet cables to any of the modules.

3   Verify that the existing library is level. See Verifying Level Condition on page 33.

4   Remove all of the service doors by opening them and then lifting them off the hinges. Set the doors aside.

5   Open all access doors.

Removing the Right Side Panel from the Last Existing Module

1 On the control module or far right expansion module, remove the storage magazines in sections 1- 5 of column 4 of rack 1.

This will enable you to access the 2.5 mm hex screws that attach the right side panel to the control module or last expansion module.

Magazines must be removed in a top-down order. To remove the magazines:

   a. Remove any cartridges from the magazine.

   b. Starting at the top-most magazine, use both hands to push the magazine upwards until it unsnaps.

   c. Pull the magazine toward you to remove it.
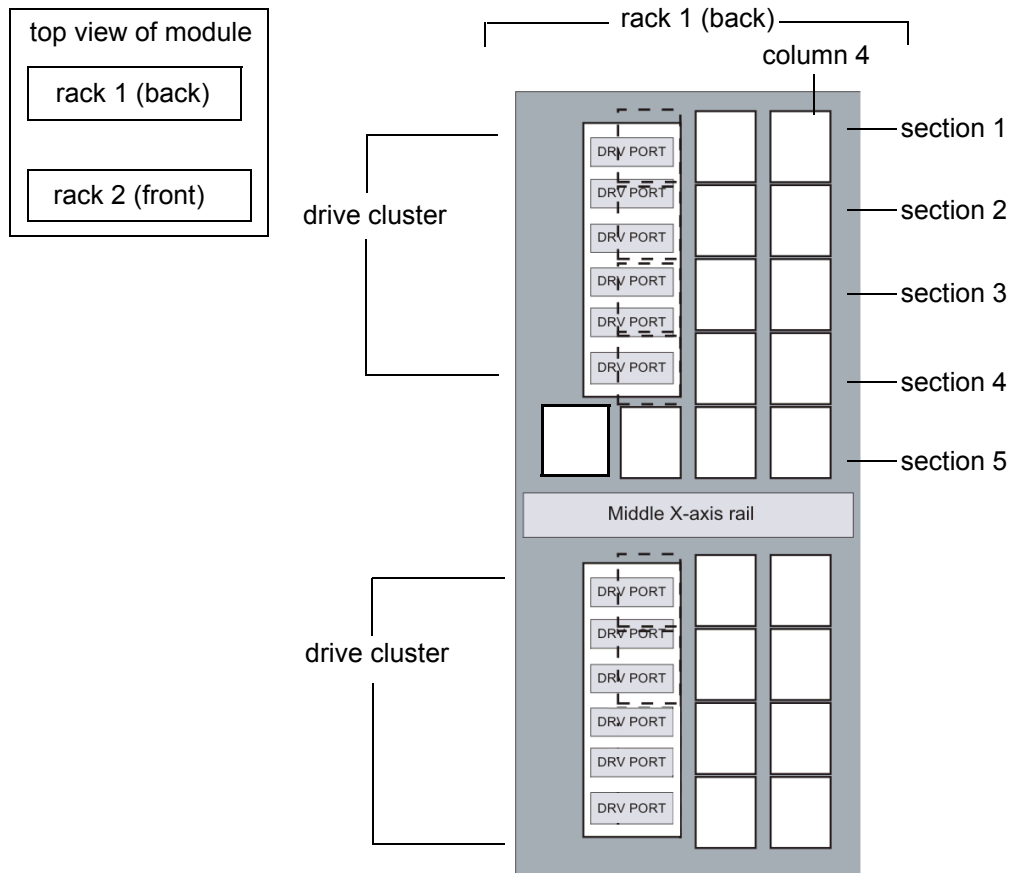
2 Remove the nine (9) 2.5 mm screws that attach the right side panel to the module.

Note Three screws are located at the front corner post, three at the back corner post, and three at the storage wall.

2.5 mm screw

2.5 mm screws

back of module

front of module

2.5 mm screws

2.5 mm screw

2.5 mm screw

2.5 mm screws
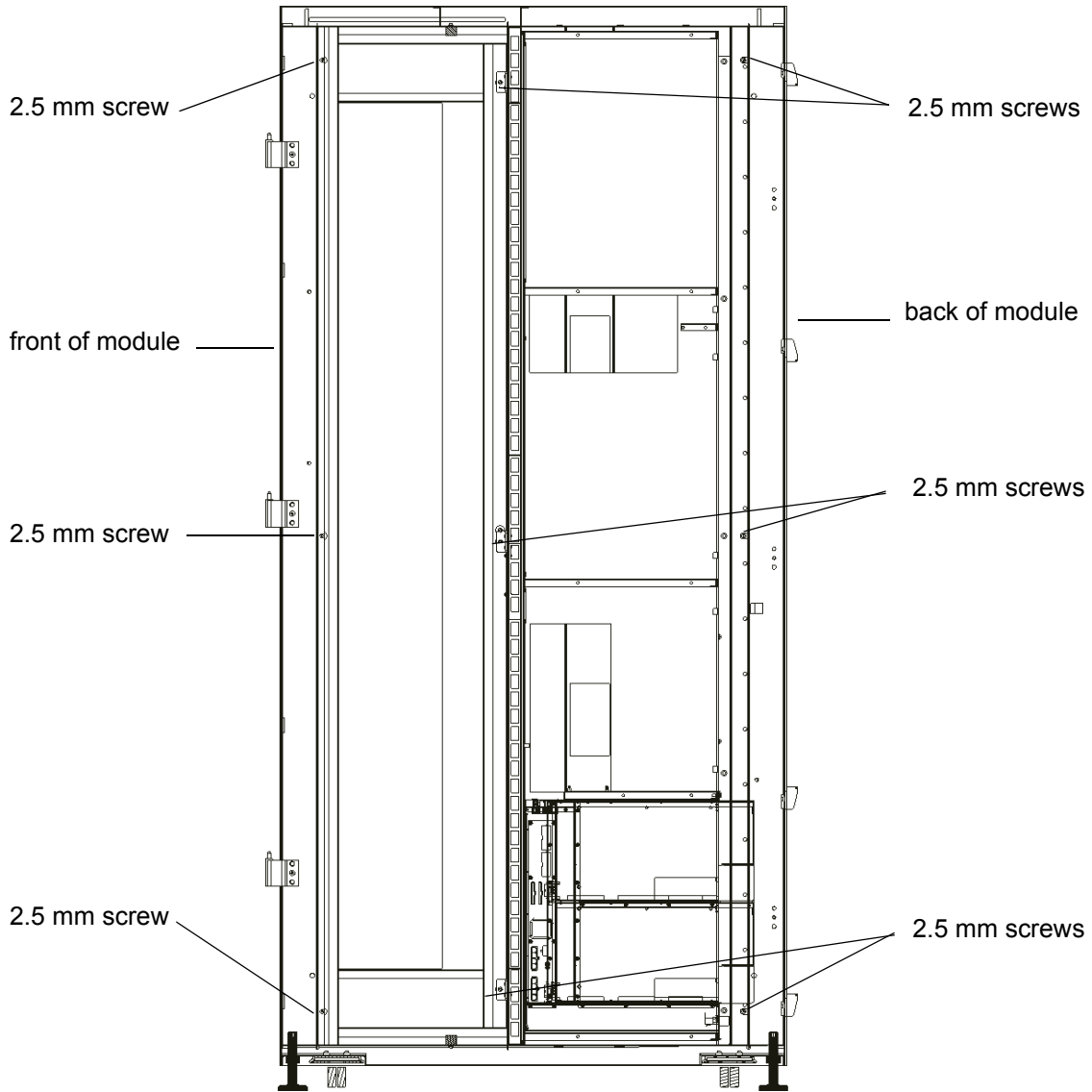
3 Lift the right side panel off the module and set it aside until the expansion module install procedure calls to reinstall it on the last expansion module.

screw holes

screw holes
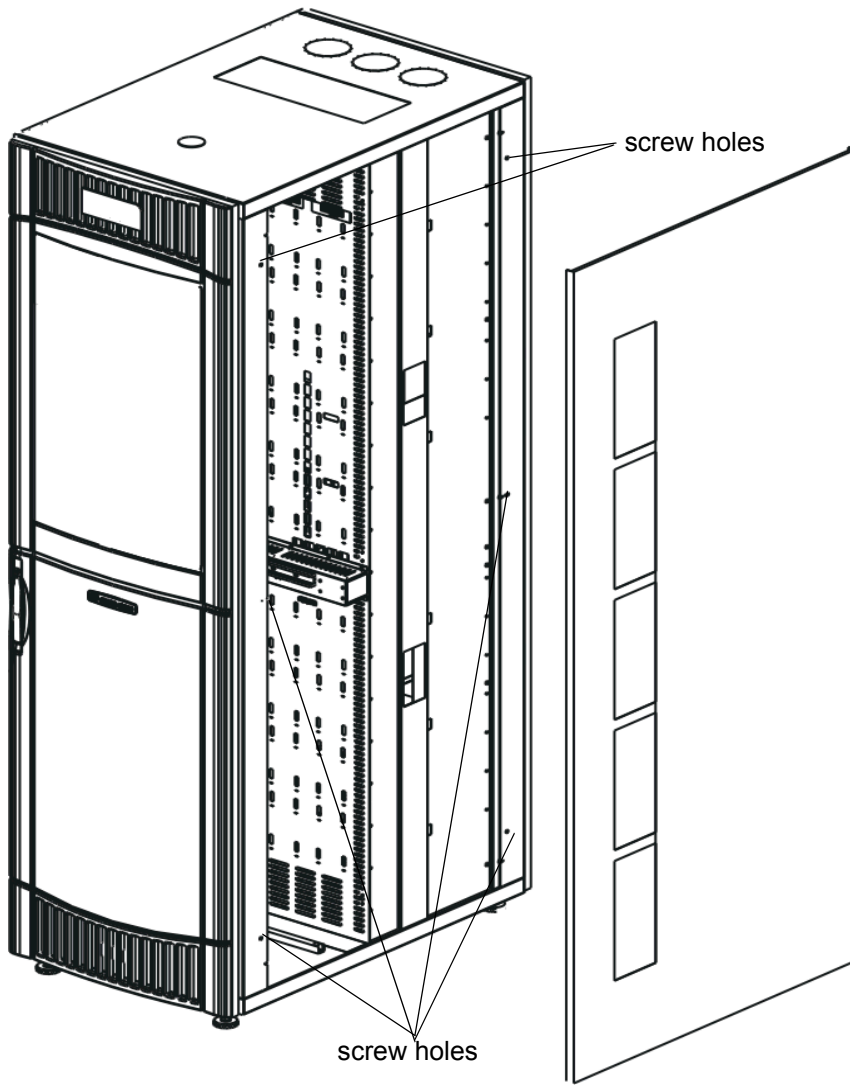
4   Use a 2.5 mm hex wrench to remove the three L-brackets that mount the side panel to the storage wall and set them aside.

The L-brackets will be reused to attach the side panel to the last expansion module.

2.5 mm screws
retaining
L-brackets
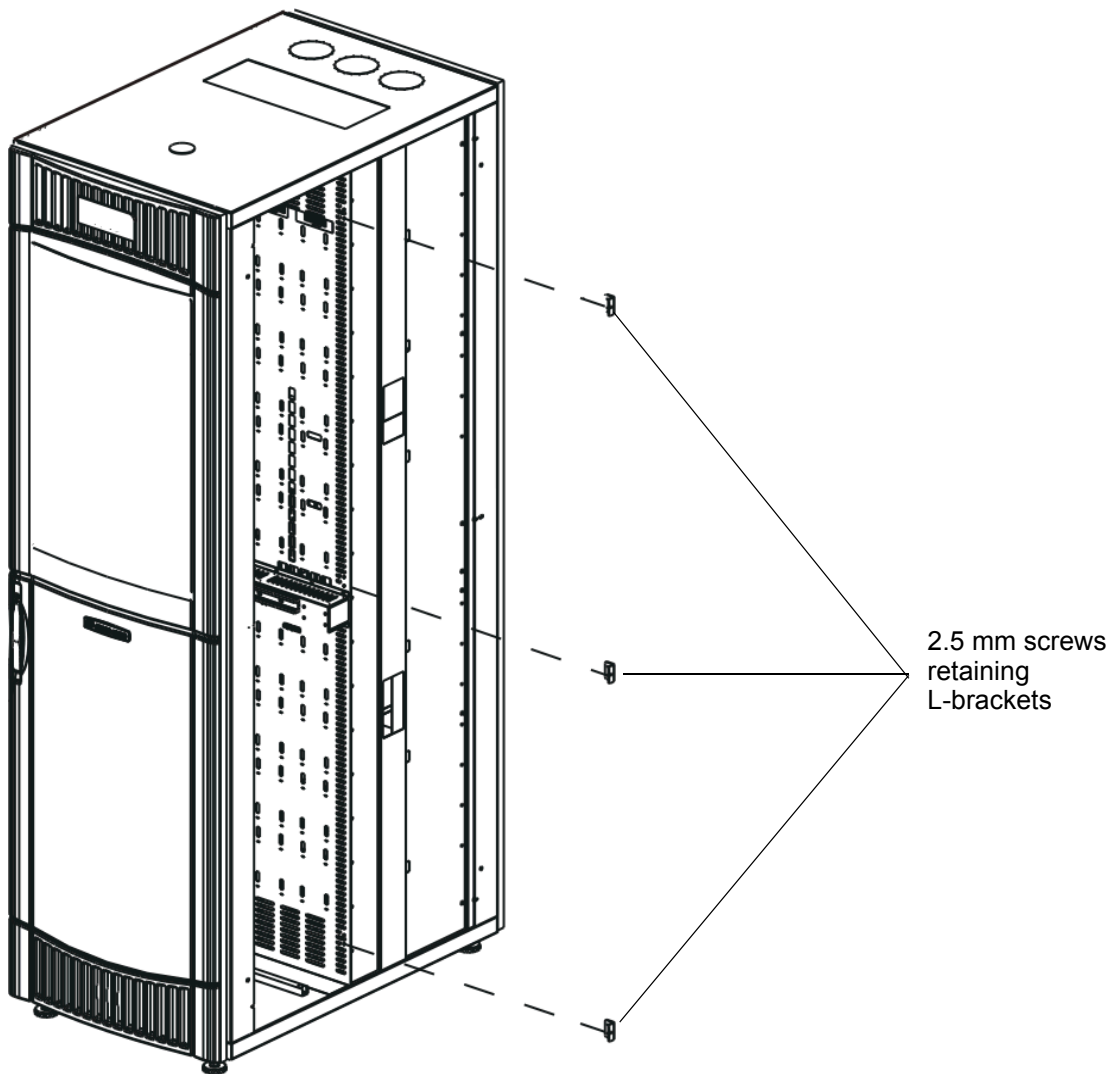
5   Reinstall the magazines that were removed in

Removing the X-Axis Belt

1 Use the 4 mm hex wrench to turn the spring-load screw clockwise until the two parts of the tensioner assembly touch.

tensioner base

5 mm mark

spring-load screw

tensioner arm
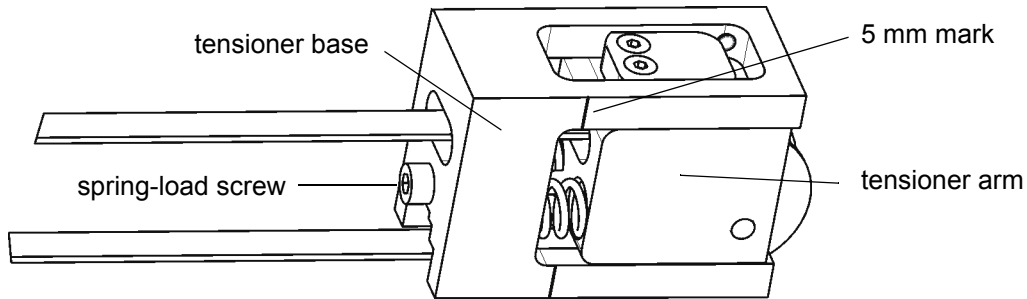
2 Use a 4 mm hex wrench to remove the two screws on the X-axis belt clamp bracket. The belt clamp bracket will be removed from the X-axis carriage.

X-axis carriage

belt clamp assembly

4 mm screws
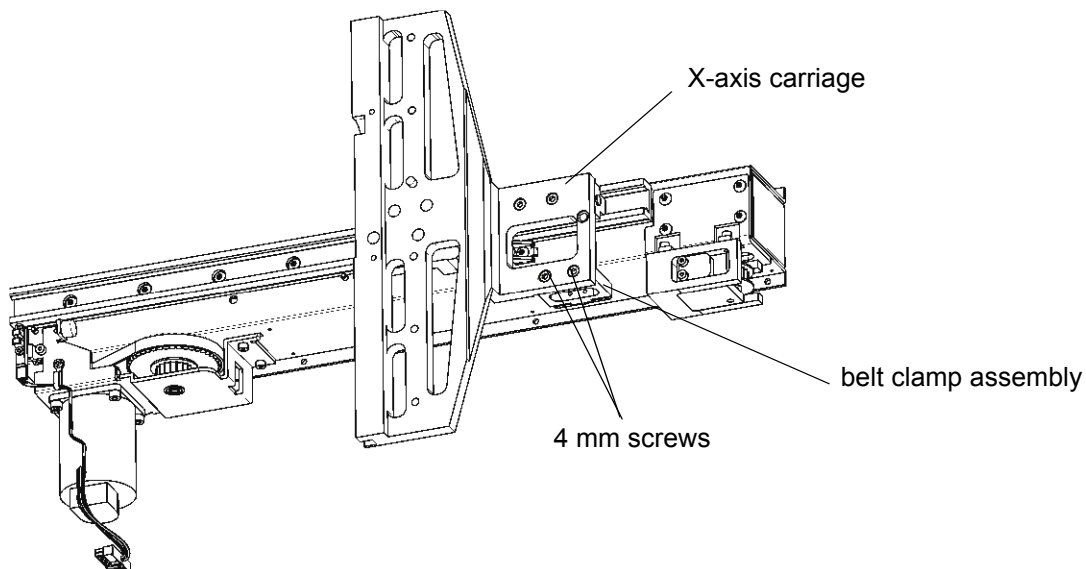
3 Turn the X-axis belt clamp assembly over.

4 Use a 2.5 mm hex wrench to loosen the two screws on the belt clamp assembly.

2.5 mm hex screws
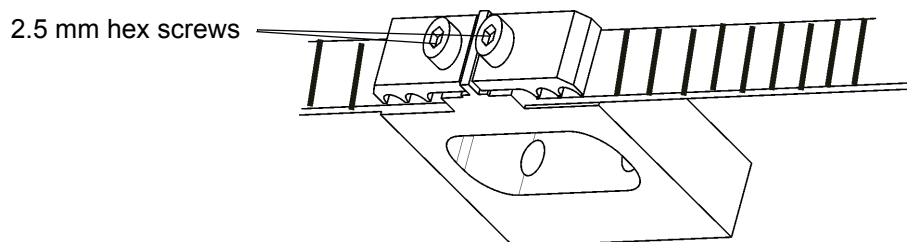
5 Take the X-axis belt off the X-axis belt clamp assembly and pull the belt free from the pulleys.
Set the belt clamp assembly aside. The assembly will be reused in later steps.
Discard the belt. It will not be used in the new configuration.

Removing the Tensioner Bracket and Hard Stop

1   Use a 3 mm hex wrench to remove the four (4) screws that are attaching the X-axis tensioner bracket to the X-axis channel in the control module or last expansion module.

> ✎ **Note**   Do not use ball drivers to remove the hex screws because the screws could be stripped.

3 mm screws
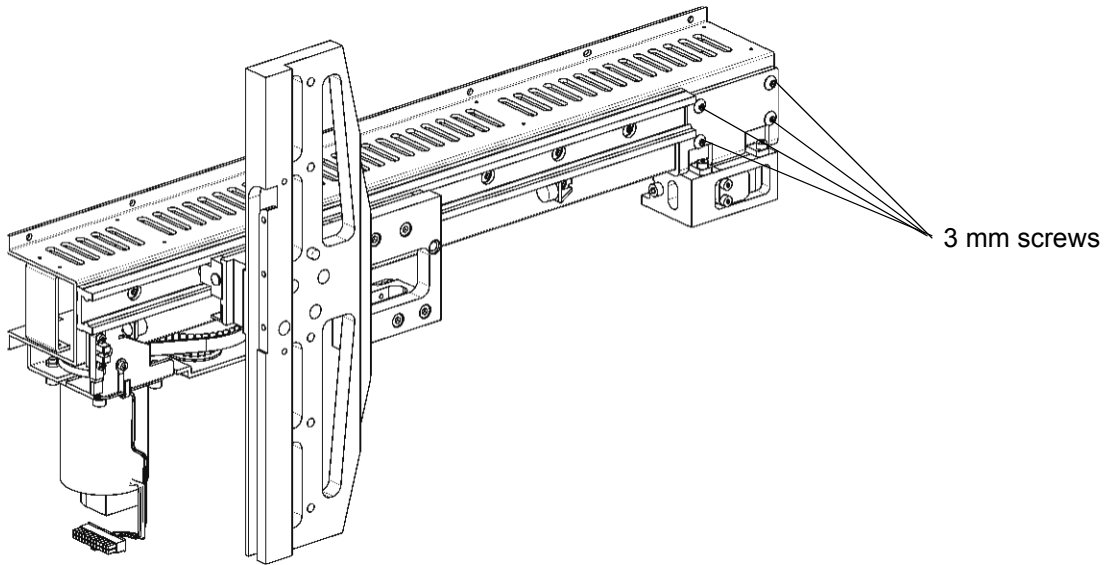
2   Use a 3 mm hex wrench to remove the X-axis hard stop.

3 mm screw
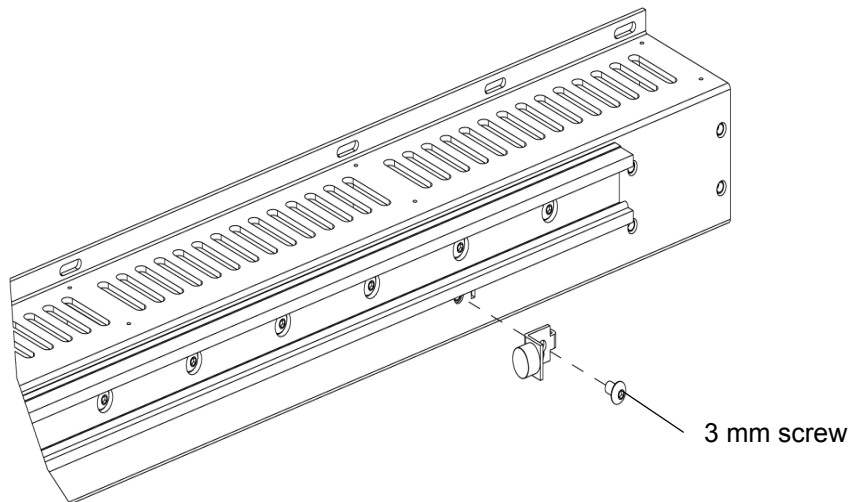
Removing the Middle X-Axis Rail from Module Eight

📝 **Note** You only need to remove the middle X-axis rail from module eight if you are adding expansion modules to an existing eight module library. Later, you will replace this rail with a special rail for the expanded configurations.

1 Use a 3 mm hex wrench to remove screws 1 through 10.

X-axis channel

middle X-axis rail

1 2 3 4 5 6 7 8 9 10
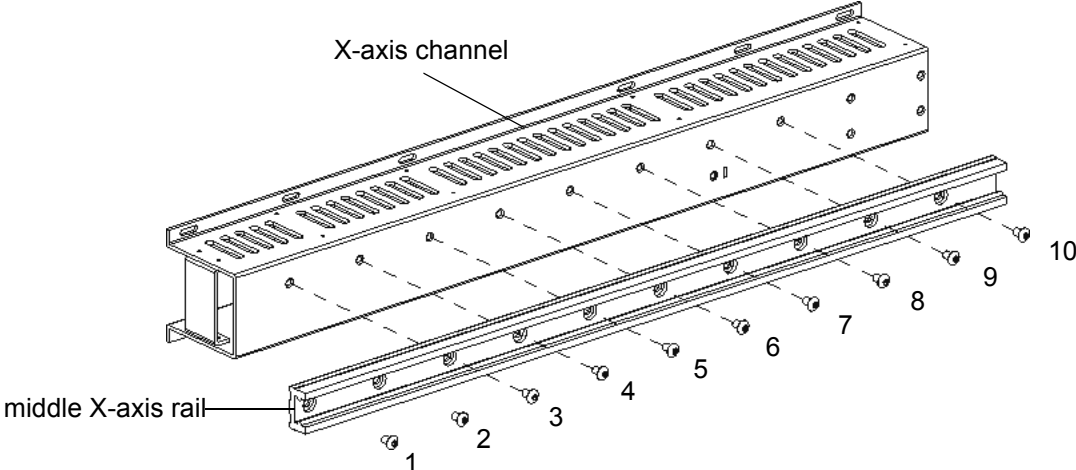
2 Lift the rail from the frame, and set aside.

Removing the X-Axis Chain Assembly

1 On the top of the X-axis chain assembly, release the Y-axis home sensor cable by flipping up the hold-down.

hold down

Y-axis home sensor cable
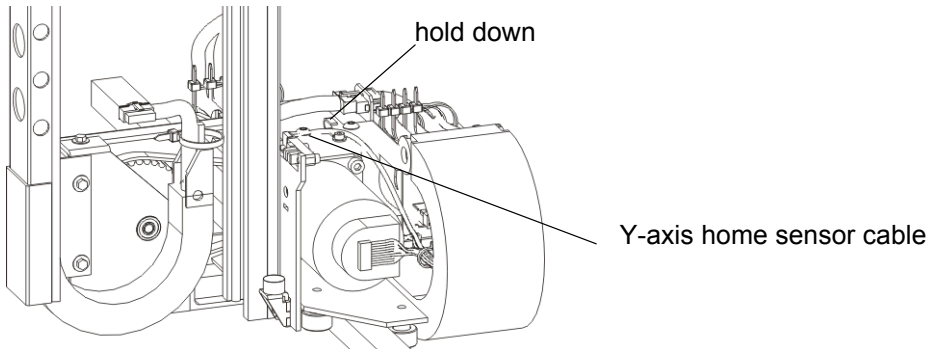
2 Disconnect the Y-axis chain (W9) from the X-axis chain assembly (W8).

Y-axis chain
assembly (W9)

connector

X-axis chain
assembly (W8)
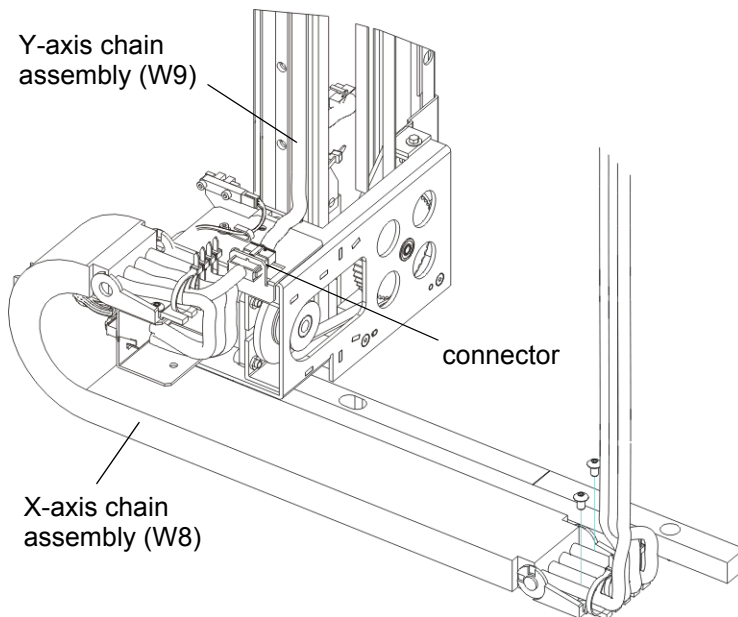
3 Disconnect the Y-axis home/motor cable from the X-axis chain assembly (W8).

X-axis chain
assembly (W8)
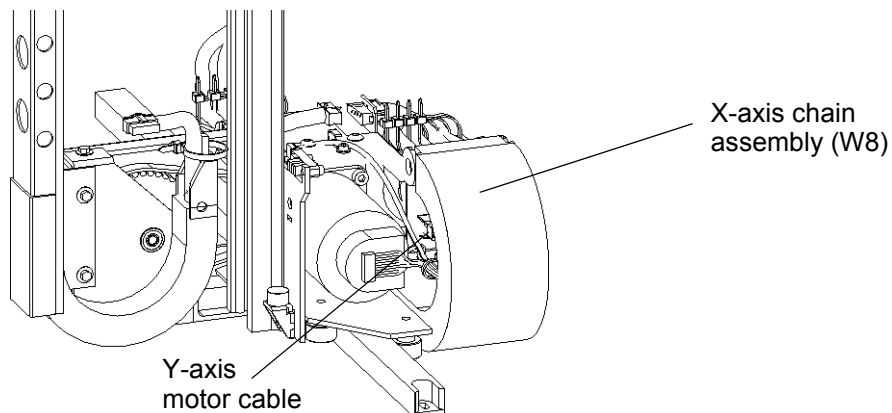
Y-axis
motor cable

4 Using the 3 mm hex wrench, remove two 3 mm screws attaching the X-axis chain assembly (W8) to the Y-axis drive mount assembly.

3 mm screws

Y-axis drive
mount assembly

X-axis
chain assembly
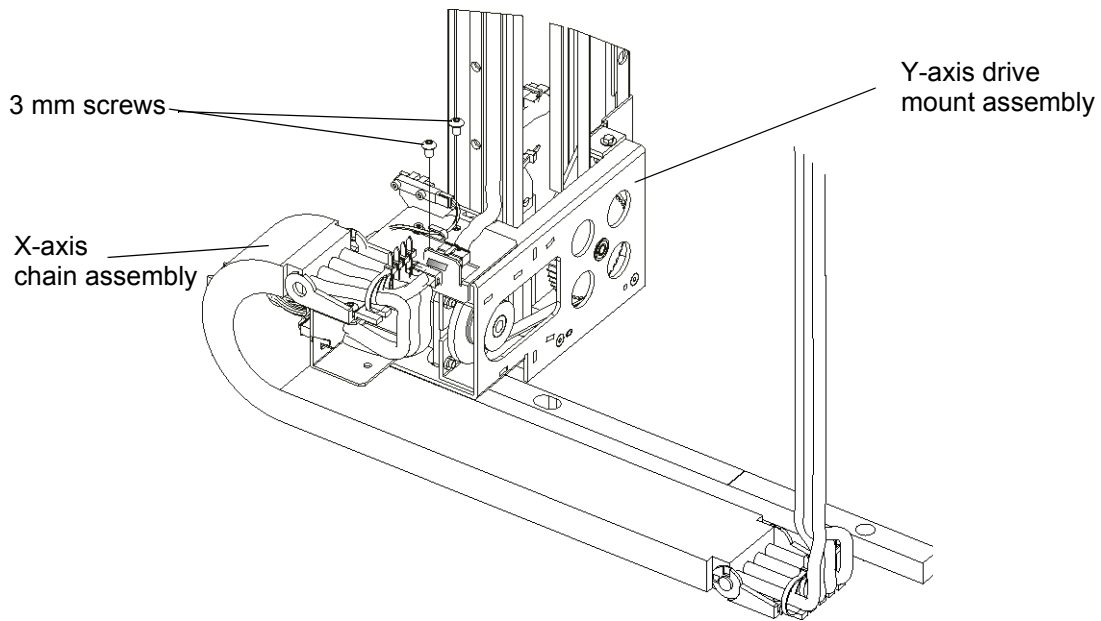
5 Using the 3 mm hex wrench, remove the two screws securing the X-axis chain assembly (W8) to the bottom of the control module.

3 mm screws

X-axis chain
assembly (W8)
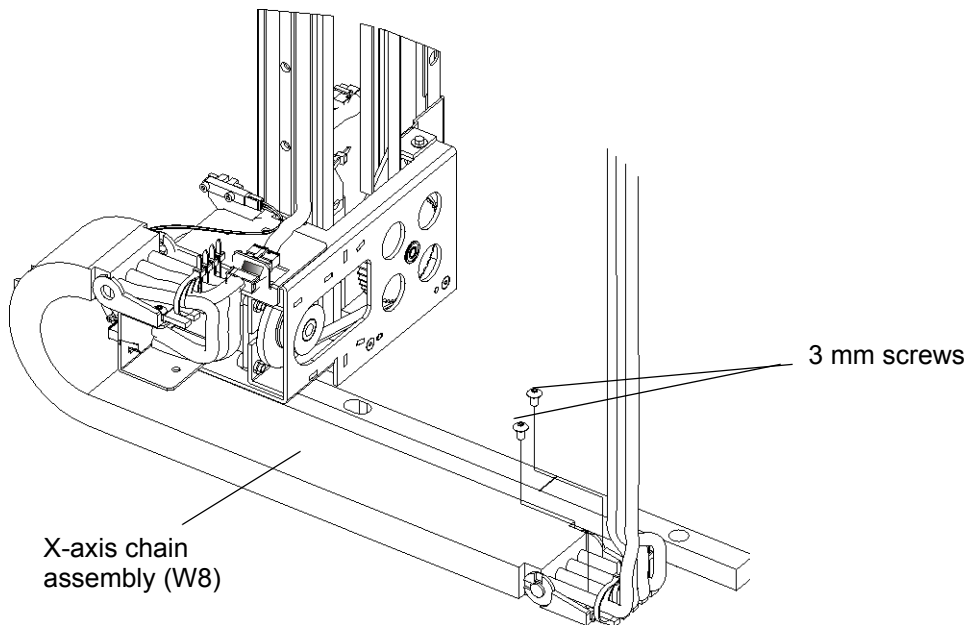
6   Remove Velcro straps (or zip ties) holding the X-axis chain (W8) to the control module bulkhead.
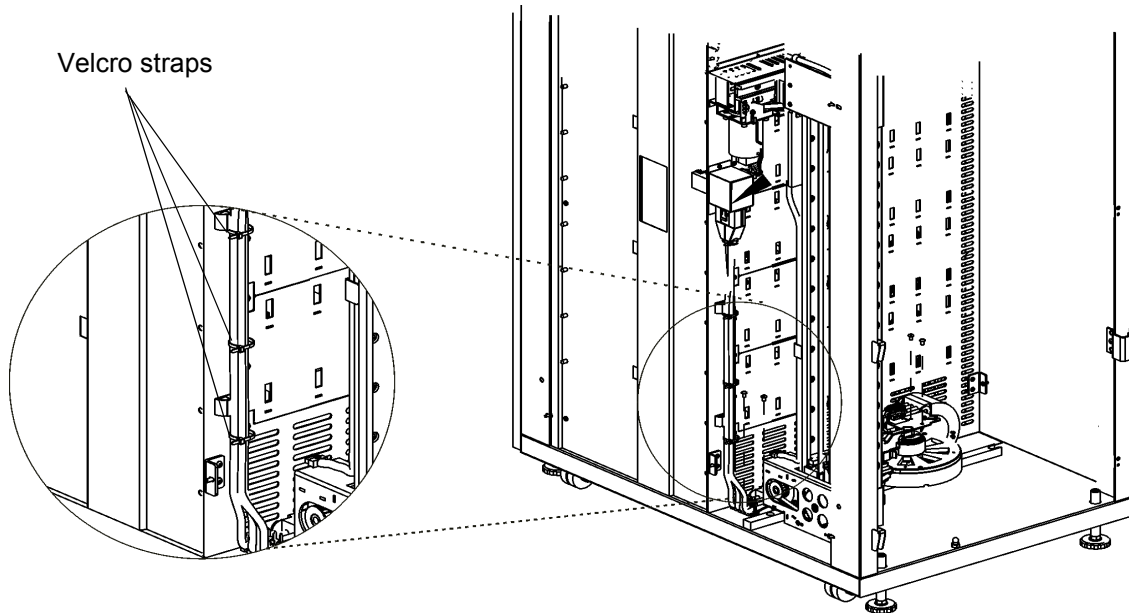
Velcro straps

7   Disconnect the X-axis chain (W8) connector from the control module bulkhead.

X-axis chain (W8) connector
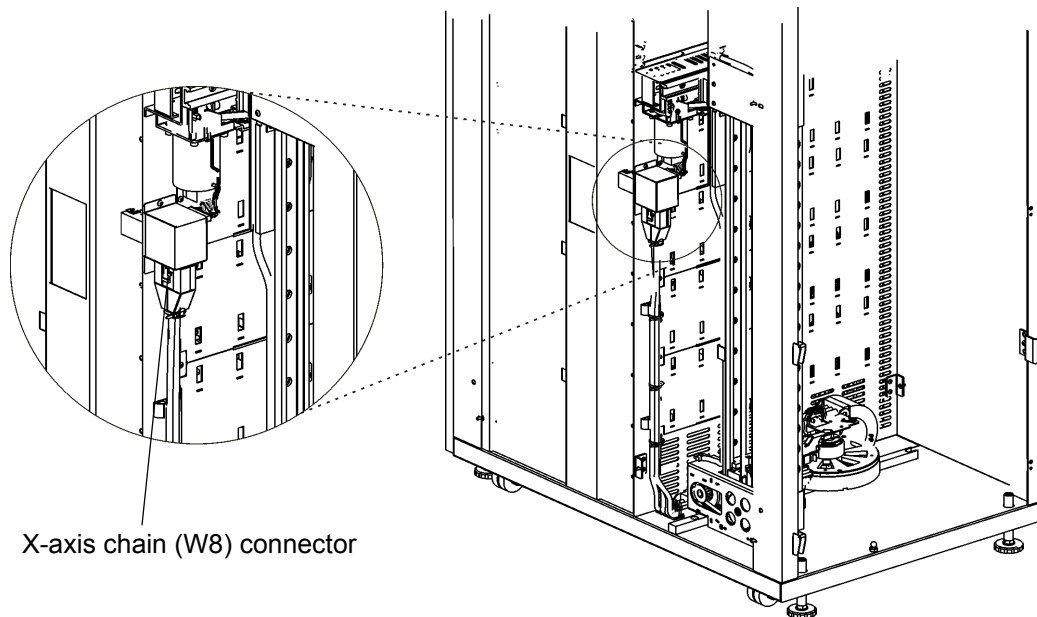
8   Remove the X-axis chain from the module and discard it appropriately. It will not be used in the configuration.

Removing the LBX Terminator Board

> ![Note icon] **Note** There are three versions of the LBX board (card) and two versions the LBX terminator board (card). For more information, see <u>LBX Board</u> on page 345 and <u>LBX Terminator</u> on page 349.

1 Unscrew the thumbscrew and remove the LBX/IEX cover plate from the control module or last expansion module in the existing configuration.

LBX/IEX cover
plate thumbscrew
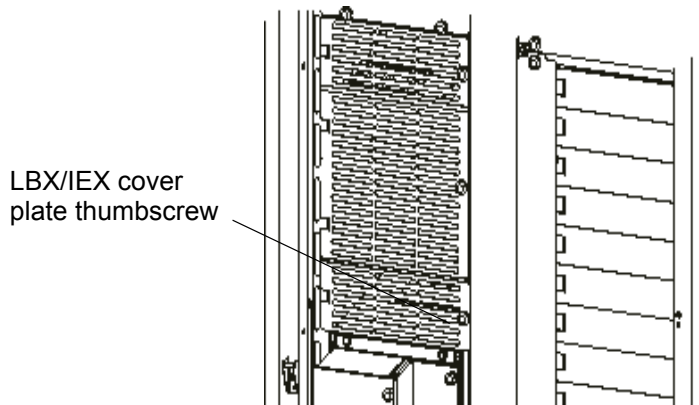
2 Remove the LBX terminator from the J17 and J2 connections on the LBX board.

3 Determine your library configuration and verify what version of LBX terminator is needed.
There are two versions of the LBX terminator board (card). For more information, see <u>LBX Terminator</u> on page 349.

LBX terminator   J17 connection
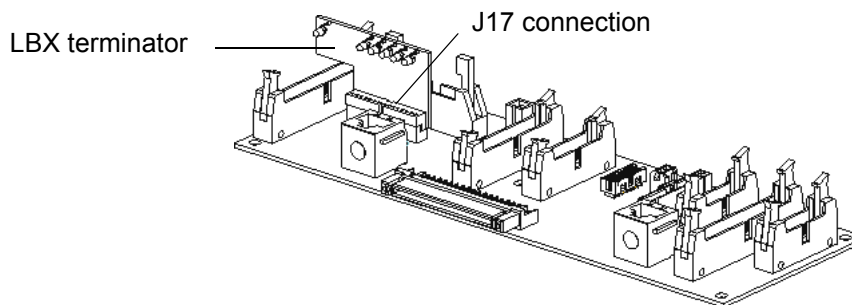
Removing and Replacing the LBX Board

If you are adding one or more expansion modules to an existing eight-module library, you must remove the LBX2 Gen 2 board from expansion module seven and replace it with the LBX2 GEN 3 version (red sticker identifier). Only do this for expansion module seven.

> ⚠️ **CAUTION** Only use this procedure if you are preparing to install expansion modules to an existing eight-module library.

> 📝 **Note** The LBX2 GEN 3 boards are identified by red stickers.
> Additional storage-only expansion modules in positions 9 -12 of a library configuration ship with the latest LBX board versions. Check to make certain the LBX2 GEN 3 boards with red stickers are installed.

Removing the LBX Board

Required Tools: None
FRU ID: 104

1 Shut down the library.

For more information, see

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Unscrew the thumbscrew and remove the LBX/IEX cover plate.

thumbscrew
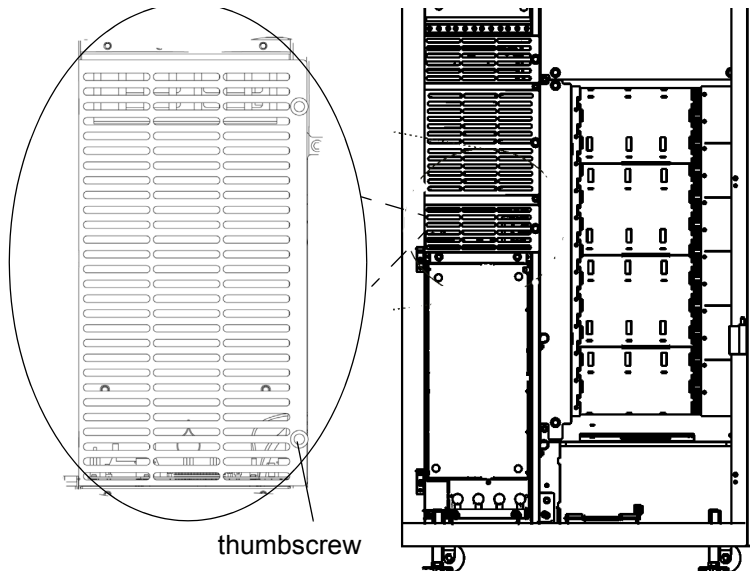
4 Disconnect all cables from the LBX: the LBX cable (W1), internal Ethernet cable (W2), LBX-drive cluster cable (W3), power supply status cable (W5), I/E station cable (W6), CAN cable (W7), Ethernet cluster

cable (W11), power distribution cable to library (W12), power distribution cable to drive cluster (W13) door interlock cable (W15), power supply status cable (W16), and I/O management unit cable (W17).

connector: J14
plug: W3 to lower drive cluster

connector: J1
plug: W1 to BPI or
from previous LBX

connector: J15
plug: W3 to upper drive cluster

connector: J4
plug: W2 to BPI or
from previous LBX

connector: J7
plug: W6 to I/E station

connector: J11
plug: W15 to door interlock

connector: J16
plug: W16 to I/O management unit

connector: J10
plug: W11 to I/O management unit;
Ethernet

connector: J8
plug: IEX board

connector: J13
plug: W7 to I/O management unit;
CAN interface

plug: J19
connector: 1 x 2 aisle light
cable

connector: J9
plug: W5 to power enclosure

connector: J3
plug: W2 to J4 of next LBX

connector: J17
plug: LBX terminator

connector: J2
plug: W1 to LBX extended
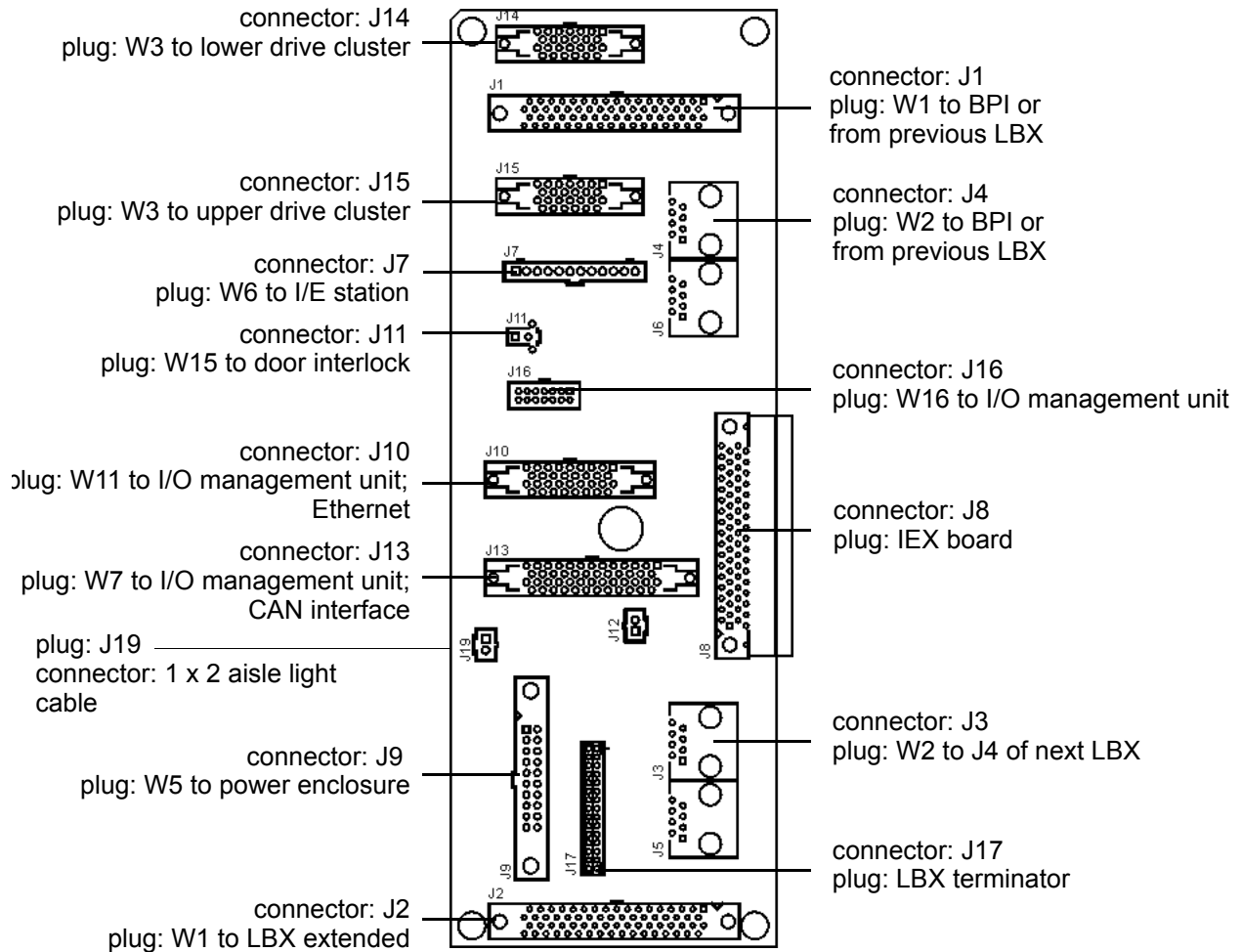
5 Use your thumb to unsnap the IEX board from the standoffs, and then unplug it from the LBX board. Then use your thumb to unsnap the LBX board from the standoffs.

To avoid damage to the backside of the LBX board, you should use care when removing the LBX board from the space above the metallic standoffs.

6 Remove the IEX and LBX boards.

Replacing the LBX Board

> **Note** Red stickers identify the LBX2 GEN 3 board required in the expansion modules added to a library configuration greater than eight.

Required Tools: None
FRU ID: 104

1 If the library is not shut down, shut down the library.

   For more information, see [Shutting Down the Library](#) on page 232.

1 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

2 Remove the new LBX board from the anti-static bag.

3 Use your thumb to snap the LBX and IEX boards onto the standoffs.

   To avoid damage to the backside of the LBX board, you should use care when inserting the LBX board into the space above the metallic standoffs.

4 Plug the IEX board into the new LBX board.

   Reconnect all cables to the LBX: the aisle light cable, the LBX cable (W1), internal Ethernet cable (W2), LBX-drive cluster cable (W3), power supply status cable (W5), I/E station cable (W6), CAN cable (W7), Ethernet cluster cable (W11), power distribution cable to library (W12), power distribution cable to drive cluster (W13) door interlock cable (W15), power supply status cable (W16), and I/O management unit cable (W17).

Removing and Replacing the IEX Card

If you are adding one or more expansion modules to an existing eight-module library, each expansion module you are adding must contain an IEX2 card. The IEX2 card is identified by a red sticker. If an expansion module you are adding contains an earlier version of the IEX card, you must remove the earlier version and replace it with an IEX2 card.

⚠ **CAUTION**	Only use this procedure if you are preparing to install expansion modules to an existing eight-module library.

📝 Note	New IEX2 cards are identified by red stickers. Earlier IEX card versions have no stickers.

Removing the IEX Board

Required Tools: None
FRU ID: 105 (IEX board)

1 If the library is not shut down, shut down the library.

For more information, see

2 Open the service door.

3 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

4 Unscrew the thumbscrew and remove the LBX/IEX cover plate.

thumbscrew
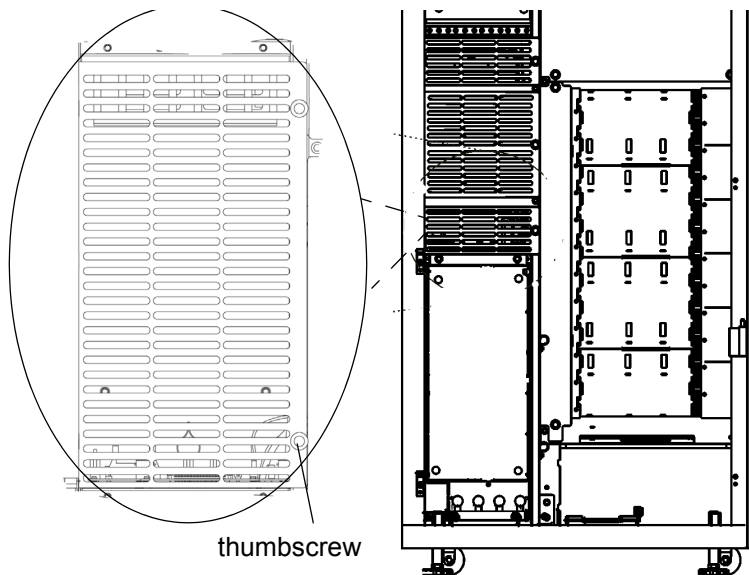
5 Use your thumb to unsnap the IEX board from the two standoffs.

IEX board

standoffs

6 Unplug the IEX board from the LBX board.

connection between IEX
and LBX boards
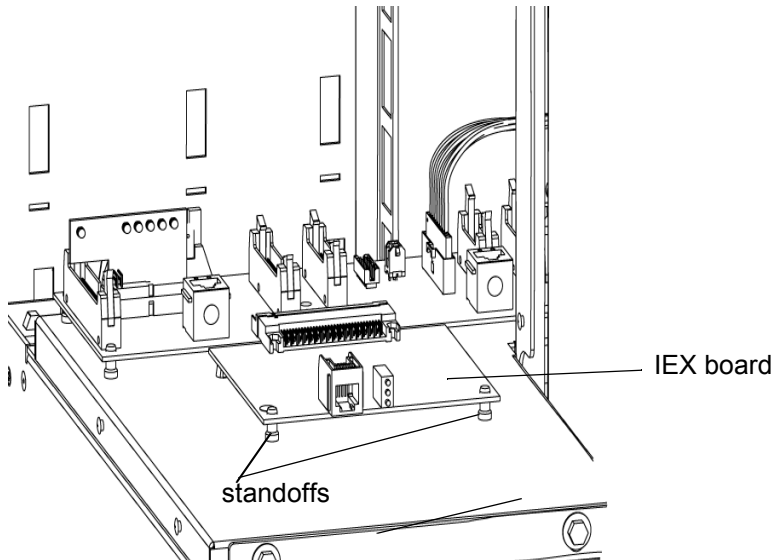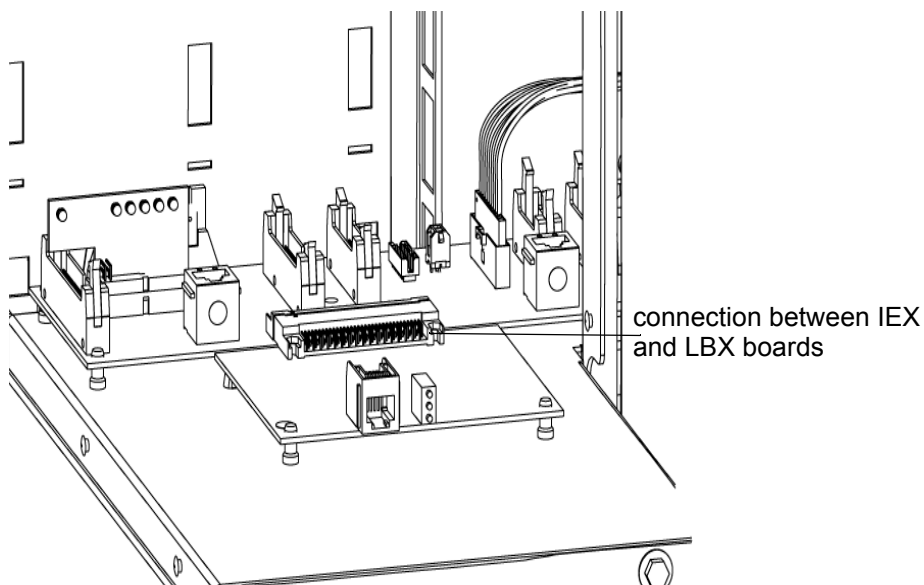
7 Remove the IEX board.

Replacing the IEX Board

Required Tools: None
FRU ID: 105

1 If the library is not shut down, shut down the library.

For more information, see Shutting Down the Library on page 232.

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Remove the new IEX board from the anti-static bag.

4 Plug the IEX board into the new LBX board.

5 Use your thumb to snap the IEX board onto the two standoffs.

IEX board

standoffs
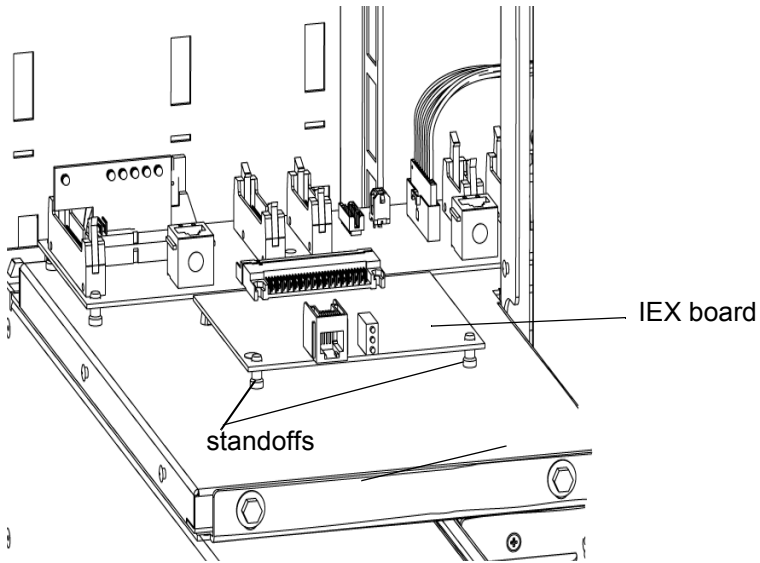
6 Replace the LBX/IEX cover plate and tighten the thumbscrew.

thumbscrew
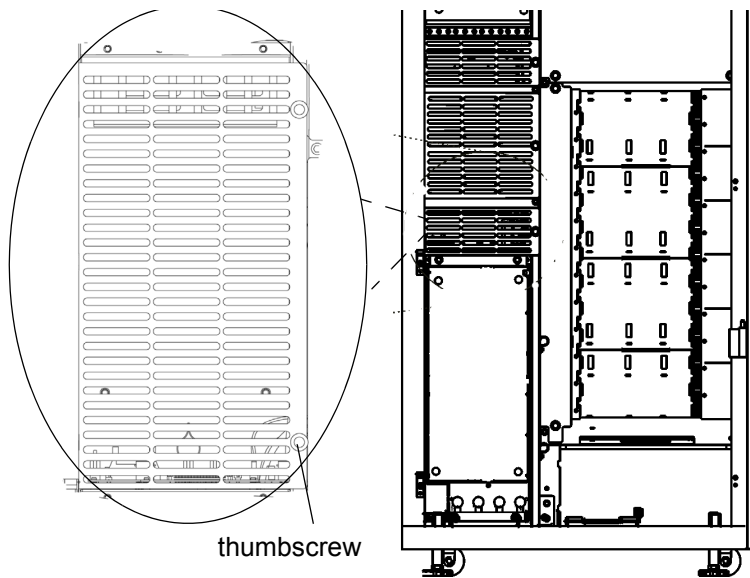
7 Detach the ESD strap and close the door.

5

Applying Power

The instructions in this chapter tell you how to apply power to a library. Before applying power, you should perform a voltage check. The information in this chapter includes:

Supported AC Power Cables

Each library is configured with a single AC power source, but redundant power is an option. If redundant power is chosen, the control module and all expansion modules that contain tape drives require two independent AC power sources.

⚠️ **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 2 on page 93.

Table 2   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	15	NEMA L6 - 15	15
International	240	16	IEC60309 2P+E	20[a] or 16[b]

a. 20 amps in North America
b. 16 amps international

Powering on the Library

Required tools: None

1 Verify that the circuit breaker on the power distribution units is down in the off (O) position.

2 Plug an AC power cable into each of the power distribution units.

3 Plug the other end of all AC power cables into power sources.

   Independent power sources for the power distribution units in each module are needed if you want redundant power.

4 On each of the power distribution units, set the circuit breaker switch to the up (I) position. Fan power supplies will start but library power is not fully on.
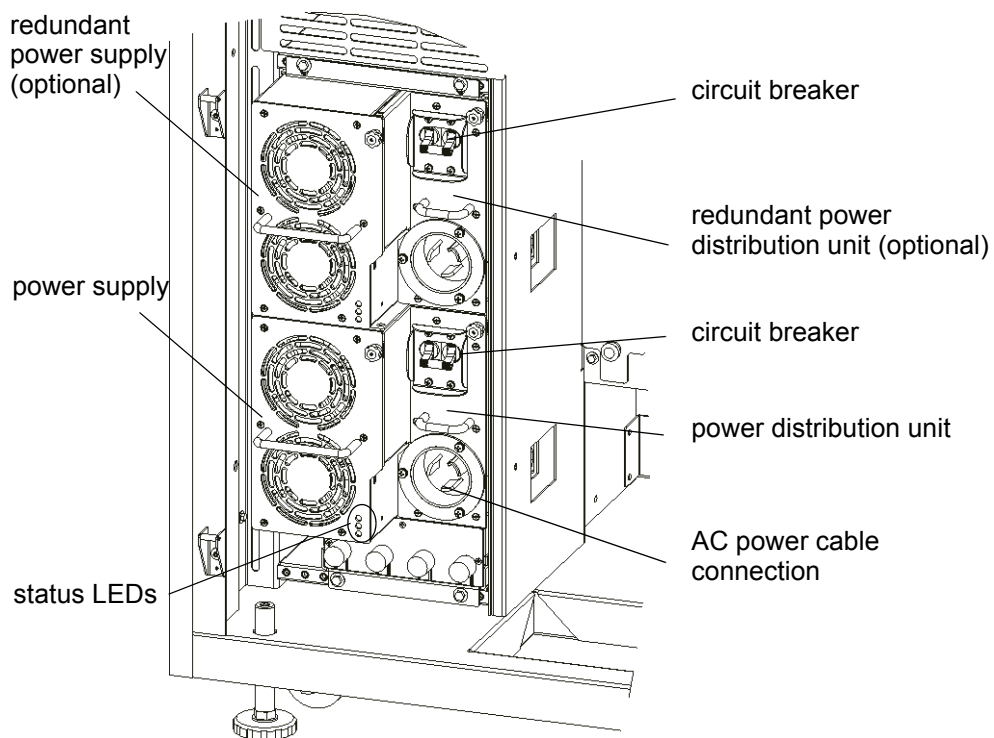
5 Verify that the power supply status LEDs are on.

   • AC OK - Green

   • DC OK - Green

   • Fault - Blue

6 Close and latch the service door and access door.

7 On the indicator panel, press **Power** button to turn on power.

> 📝 Note   Make sure the service and access doors are closed and latched.

The library will power on.

Status indicator

Robotics Enabled indicator/button

Power indicator/button
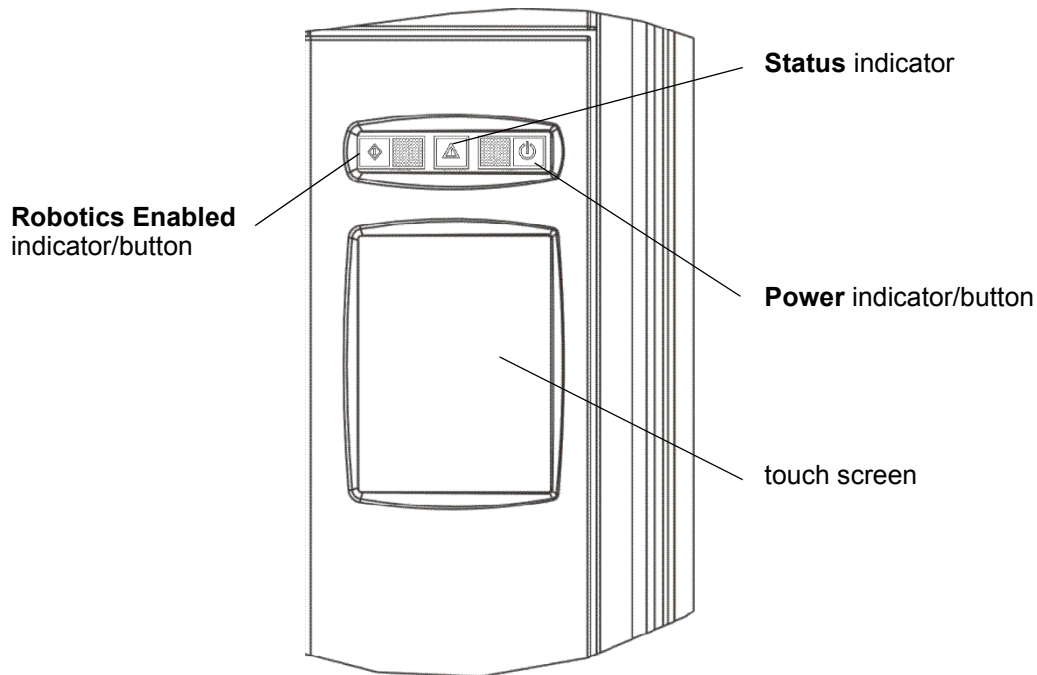
touch screen

> 📝 Note   Depending on the size of the configuration it can take more than 90 minutes for the library to fully power on and the Library Management Console to be displayed on the touch screen. During this time, **Working ...** will be displayed on the screen.
>
> During the power-on sequence, the **Robotics Enabled** indicator will flash.
>
> Anytime the library is powered Off (I), you must wait 10 seconds before power On (O).

Once the library powers on, the Library Management Console (LMC) will be displayed on the touch screen on the operator panel. The following illustration shows the boot screen on the operator panel. Wait until the system is fully powered up and running, and then continue with the instructions in <u>Configuring the Library</u> on page 153.

Figure 6   Library Management Console Touch Screen
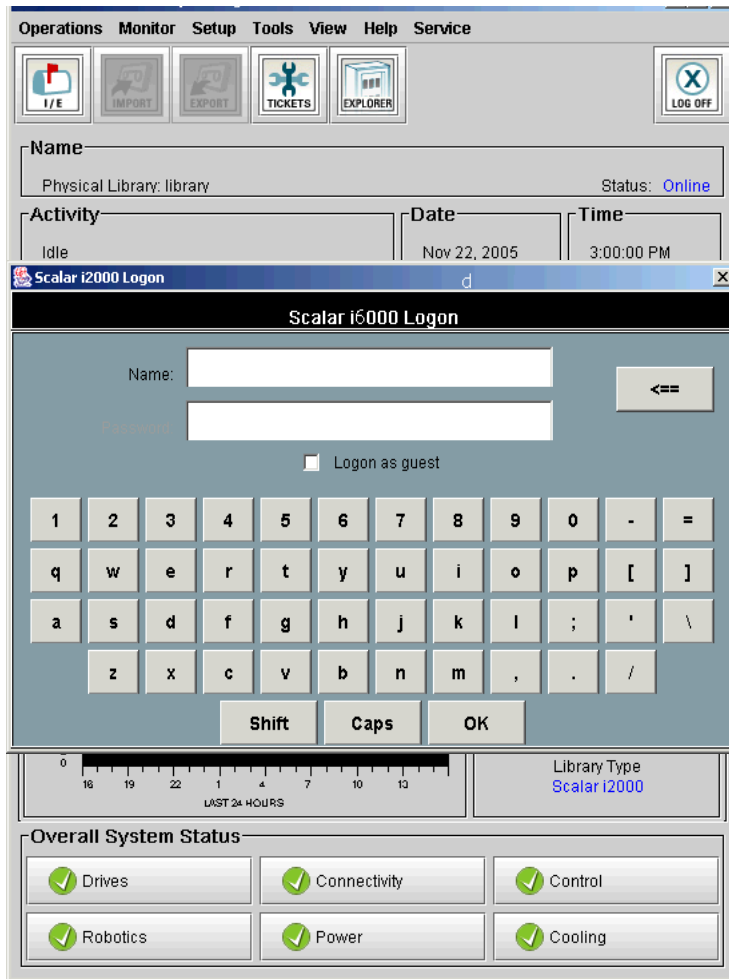
You are now ready to connect the drives and the library using the instructions in <u>Cabling</u> on page 111.

> ✎ **Note**   Make sure you review the information in <u>Cabling</u> on page 111 before connecting the drives and blades.

Applying Power

6

Installing Drives and Blades

This chapter provides the step-by-step instructions for installing and connecting the drives in the library. The information in this chapter includes:

- Numbering Sequences on page 101

- Installing Drives on page 105

- Installing Blades in the I/O Management Unit on page 108

Note   The installation instructions in this chapter assume that you are installing drives and blades in a new library.

- If you are installing drives in a new library, the library is shipped with the frames preconfigured to accept the drive quantity that has been ordered. For example, if a customer orders 10 drives, 10 drive positions will be ready to accept the drives. See Installing Drives on page 105.

- If you are adding drives to an existing library, see Adding Drives to an Existing Installation on page 233.

- If you are removing and replacing failed drives in an existing library, see the *Scalar i2000/i6000 Maintenance Guide*.

Referencing Tape Drive Compatibility

Tape drives are enclosed in a universal drive sled. You can hot swap and hot add all supported drives, regardless of type. The library supports the following types of tape drives:

- IBM LTO-1 or LTO-2 LVD–SCSI

- IBM LTO-1, LTO-2, LTO-3, LTO-4

- HP LTO-3, LTO-4, LTO-5 FC Multi-mode

- Quantum SDLT-320 LVD–SCSI

- Quantum SDLT-600 FC

- Quantum DLT-S4 FC

LTO drives can be connected directly to hosts, to the storage area network (SAN), or to FC I/O blades in the I/O management unit. SCSI drives must be connected directly to hosts or the SAN.

For detailed information on tape drive compatibility, WORM support, and mixed media rules, see the *Scalar i6000 User's G*

LTO Drives

Five generations of LTO drives are supported, but they are not fully compatible as shown in Table 3.

Table 3   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	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

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 read LTO-1; they do not write to the LTO-1 cartridges.

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.

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 SAN, or connected to FC I/O blades in the I/O management unit. SCSI drives must be directly attached to hosts or to the SAN.

DLT Drives

Five generations of DLT cartridges are supported in the library, but the drives are not fully compatible as shown in Table 4.

Table 4   DLT Drive and Cartridge Compatibility

	SDLT-600 Cartridges	SDLT-320 Cartridges	SDLT-220 Cartridges	SDLT-VS 160 Cartridges	DLT-S4 Cartridges
DLT-S4 Drives	Reads	Reads	Reads	Not compatible	Reads/Writes
SDLT-600 Drives	Reads/Writes	Reads	Reads	Reads	Not compatible
SDLT-320 Drives	Not compatible	Reads/Writes	Reads/Writes	Not compatible	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 DLT tape VS1 data cartridge. The SDLT-600 tape drive will eject a data cartridge written in DLT formats other than DLT-VS160. All DLT cartridges are the same size, which means they will use the same magazines in the library.

SDLT-320 SCSI tape drives are supported in the library. They can be directly connected to a host.

Numbering Sequences

This section describes the numbering sequences used in the library for the following:

- Drives—corresponds with the drive sections in rack 1, column 1 of a module.
- FC I/O blade ports—the order of the ports on the I/O blade.
- Ethernet expansion blade ports—the order of the ports on the Ethernet expansion blade.
- I/O management unit—the bays within the unit.

These sequences are used to determine where to locate blades in the I/O management unit and how to connect drives to blades. See for more information.

Drive Numbering Sequence

An example of the numbering sequence for all drives except SDLT-320 SCSI drives is shown in below.

For information on the library's coordinate system, see .

> ✍ **Note**   Gaps between drive locations are not supported. Drives must be installed in each module in the order shown in Figure 7 . The control module must be fully populated with 12 drives before installing any drives in the first expansion module. Each expansion module must be fully populated before installing any drives in subsequent expansion modules.

Figure 7   Drive Numbering Sequence in the Control Module and Expansion Modules
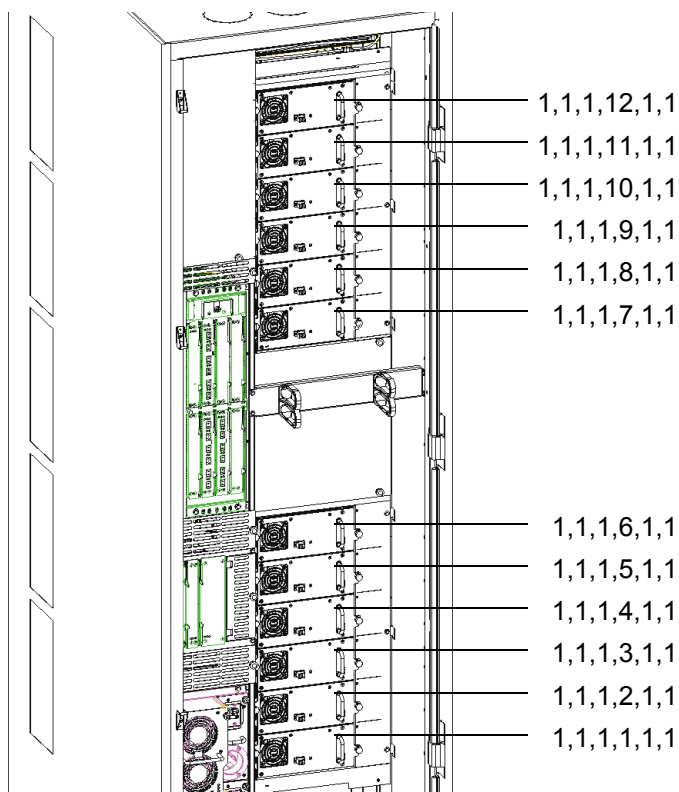
FC I/O Blade Numbering Sequence

Quantum has requirements for connecting FC I/O blades to drives. Figure 8 shows the numbering (bottom to top) on the FC I/O blades. There can be a maximum of four drives connected to each FC I/O blade installed in the I/O management unit. FC-1 and FC-2 are reserved for connections to the SAN or hosts.

Figure 8   Fibre Channel I/O Blade Connection Numbering Sequence
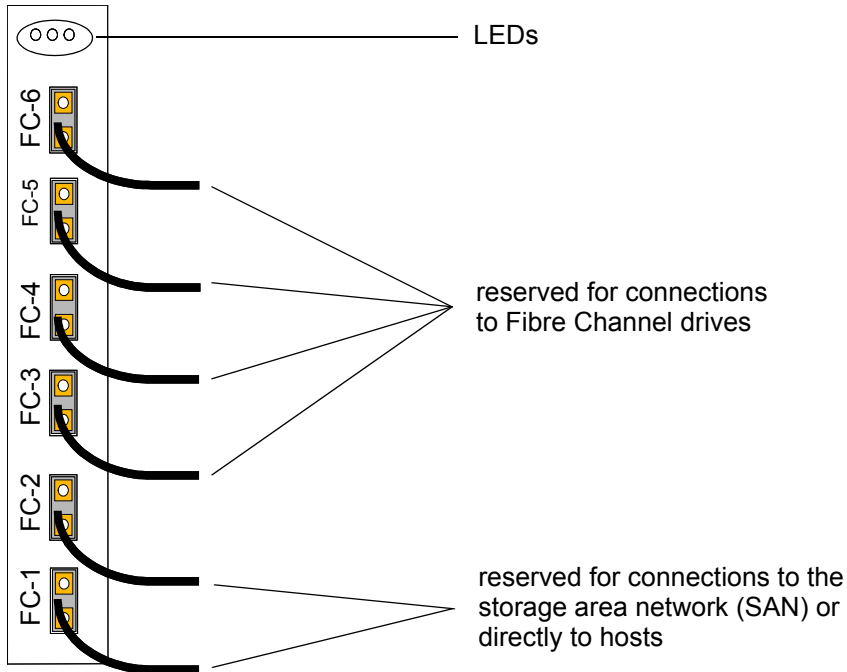
Ethernet Expansion Blade Numbering Sequence

Quantum has requirements for connecting the Ethernet Expansion blades (EEB) to drives. Figure 9 shows the numbering (bottom to top) on the Ethernet Expansion blade. There can be a maximum of six drives connected to each EEB installed in the I/O management unit.

Figure 9   Ethernet Expansion Blade Connection Numbering Sequence

LED status lights

EEB connection ports to LTO-5 drives
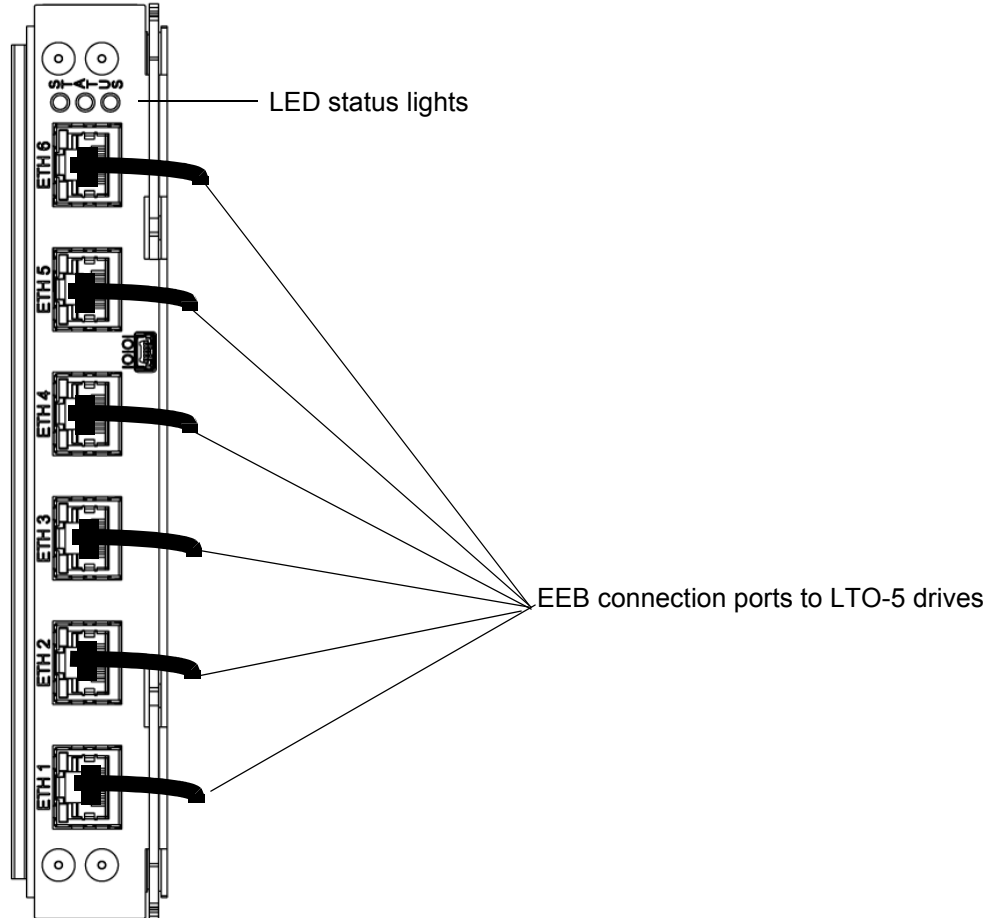
I/O Management Unit Bay Numbering Sequence

Figure 10 shows the numbering sequence and the bay positions in the I/O management unit.

> 📝 Note   Bay 2 is reserved for the control management blade (CMB). Bay 1 is not used.

Figure 10   I/O Management Unit Bay Layout

cooling assembly			
bay 2 (CMB)	bay 4 (second FC I/O blade)	bay 6 (not used)	bay 8 (second Ethernet expansion blade)
bay 1 (not used)	bay 3 (first FC I/O blade)	bay 5 (third FC I/O blade)	bay 7 (first Ethernet expansion blade)

Installing Drives

Use the procedure in this section to install LTO-1, LTO-2, LTO-3, LTO-4, LTO-5, SDLT-600, SDLT-320, and DLT-S4 drives in either the control module or an expansion module in a new library. See Adding Drives to an Existing Installation on page 233 to add drives to an existing library.

These instructions assume that you have not yet turned on power to the library.

> **Note**   The library supports mixing the FC and SCSI drives in any order in the drive sled positions. However, gaps between drive locations are not supported. Drives must be installed in each module in the order shown in Figure 7 on 101. The control module must be fully populated with 12 drives before installing any drives in the first expansion module. The first expansion module must be fully populated before installing any drives in additional expansion modules. Each additional expansion module must be fully populated before installing any drives in subsequent expansion modules.

> **Note**   If you are installing a SCSI drive, you must attach the SCSI terminator to the drive before you insert it into drive slot when the library power is on.

> **Note**   **LTO-5 Drives**
> The LTO-5 FC drive can be connected either through an Ethernet Expansion blade or through a 7404 FC I/O blade.
>
> An LTO-5 FC drive connected to an Ethernet Expansion blade provides the following:
>
> - 8 Gbps data speed maximum
> - Full data path services—drive brick firmware autoleveling, LUN mapping, channel zoning, capturing drive logs
> - Not a data path for drives
>
> An LTO-5 FC drive connected to a 7404 FC I/O blade provides the following:
>
> - 4 Gbps data speed maximum
> - Limited data path services—drive brick firmware autoleveling
> - Serves as a data path for drives

For instructions on how to install drives in an existing library, see the Adding Drives to an Existing Installation on page 233.

Required tools: #2 Phillips screwdriver, ESD strap

1. Open the service door of the control module or expansion module.

2. Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3. Use the #2 Phillips screwdriver to remove the necessary number of cover plates from the drive sled positions. Remove the cover plates starting at the bottom and working towards the top of the library.

Either discard the cover plates or leave them with the customer for future use.

cover plates

thumbscrew
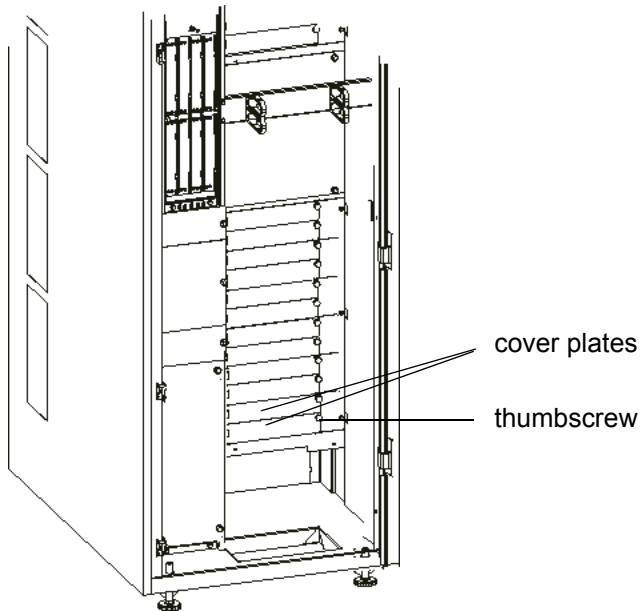
4   Remove the drives from the anti-static bag and place them in a location where they cannot be damaged.

Figure 11   LTO drive examples

thumbscrew

LTO-5 tape drive

LTO-3 tape drive

DRIVE ASM - DESCRIPTION
XX-YYYYYY-ZZ
AABCCCDEFF
CONFIGURATION: GG-HH-KK-LL
MADE IN USA
-48V-2.0A

FC
PORT 1 PORT 2

FC connector

guide rail

EEB port connector

FC Ports (use Port 1 on left)

FC LED status LEDs
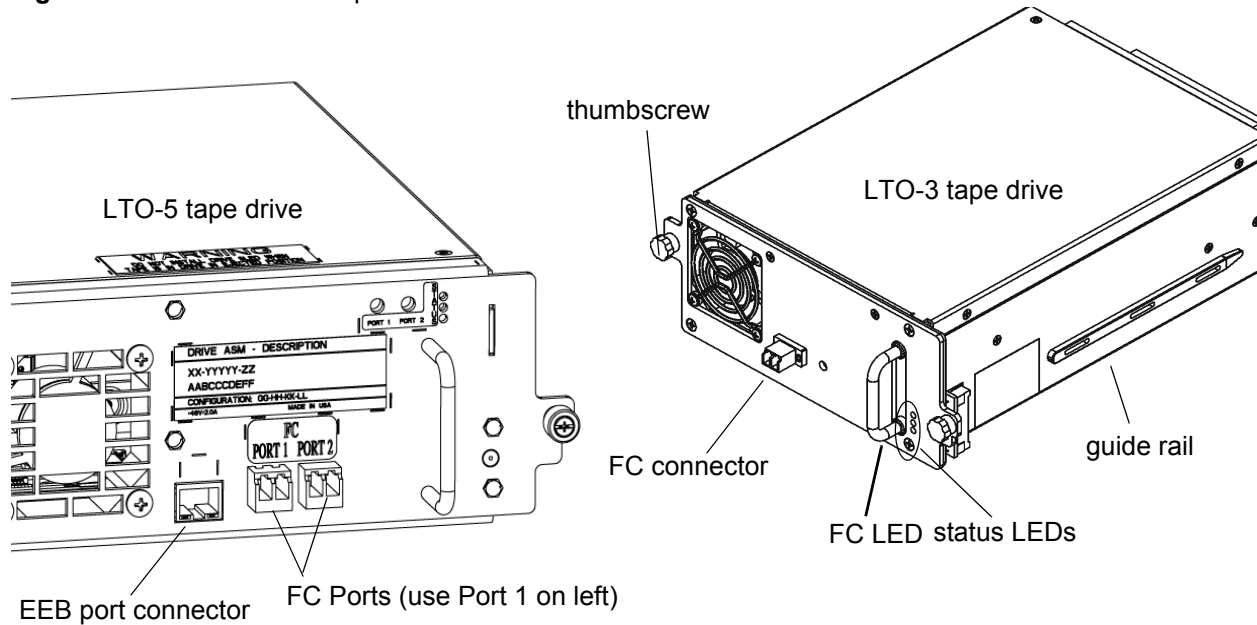
5   Using the notches and markings on the drive sled position, slide the drive in slowly so the guide rails engage.You might need to tilt the drive up or down in order to engage the rails. Once inserted, the drive should be flush with no gaps above, below, or on either side. The screws must line up with the screw holes.

6   Use the #2 Phillips screwdriver to tighten the two thumbscrews on the drive.

7   Follow the numbering scheme shown in when installing any additional drives.

8   Detach the ESD strap.

9 If you are installing FC I/O blades in the I/O management unit, proceed to Installing Blades in the I/O Management Unit on page 108.

If you are not installing FC I/O blades, proceed to Applying Power on page 93, and then follow one of these paths:

- If you are going to directly attach either the FC or SCSI drives to a host, proceed to Attaching FC and SCSI Drives Directly to Hosts on page 124.

- If you are connecting the FC drives to I/O blades, you will first follow the instructions in Installing Blades in the I/O Management Unit on page 108 and then complete the procedure in Drive Cabling Considerations and How Drive Connection Model Affects Library Control Paths on page 112.

Note   Make sure you review the information in Cable Connection Requirements for FC Drives on page 114 before connecting the cables.

Installing Blades in the I/O Management Unit

This subsection provides step-by-step instructions for installing a control management blade (CMB), Fibre Channel (FC) I/O blades, and Ethernet Expansion blades into the I/O management unit.

- Each FC I/O blade supports 4 tape drives.
- 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.
- Each Ethernet expansion blade supports 6 LTO-5 tape drives.

If there are FC I/O blades or Ethernet Expansion blades in the I/O management unit of an expansion module, a CMB must also be present.

Required tool: ESD strap

1 Open the service door of the control module or expansion module.

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Determine the designation for the blade based on the locations shown below.

cooling assembly			
bay 2 (CMB)	bay 4 (second FC I/O blade)	bay 6 (not used)	bay 8 (second Ethernet expansion blade)
bay 1 (not used)	bay 3 (first FC I/O blade)	bay 5 (third FC I/O blade)	bay 7 (first Ethernet expansion blade)

4 Remove the necessary number of cover plates from the I/O management unit by pressing to the left and pulling out on the latchhooks.

Either discard the unused cover plate or leave it with the customer for future use.

cover plates
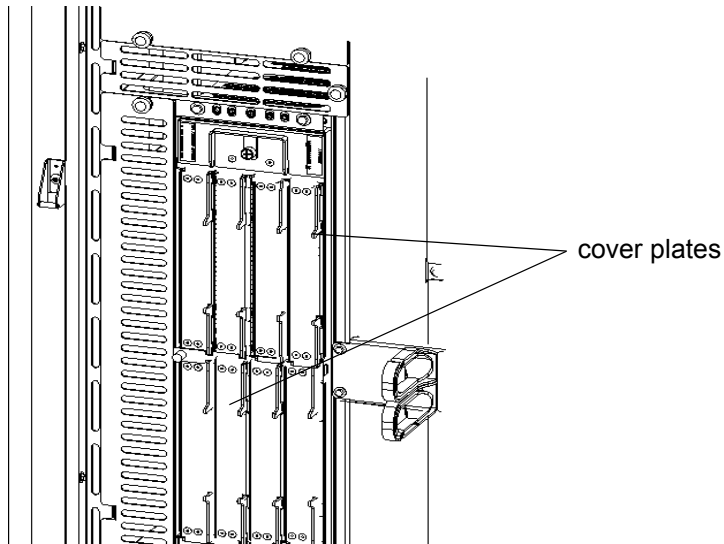
5 Remove the blade from the anti-static bag.

6 Press up and out to open the latchhooks on each side of the blade.

7 Evenly apply pressure to both sides of the blade and slide it into the I/O management unit until the latchhooks begin to move towards the middle of the blade. Push the latchhooks towards the middle of the blade and into the lock position. You will feel the blade pins connect with the I/O management unit's backplane as the blade locks into place.

⚠ **CAUTION**   **Forcing the blade into the bay can cause the pins to bend.**
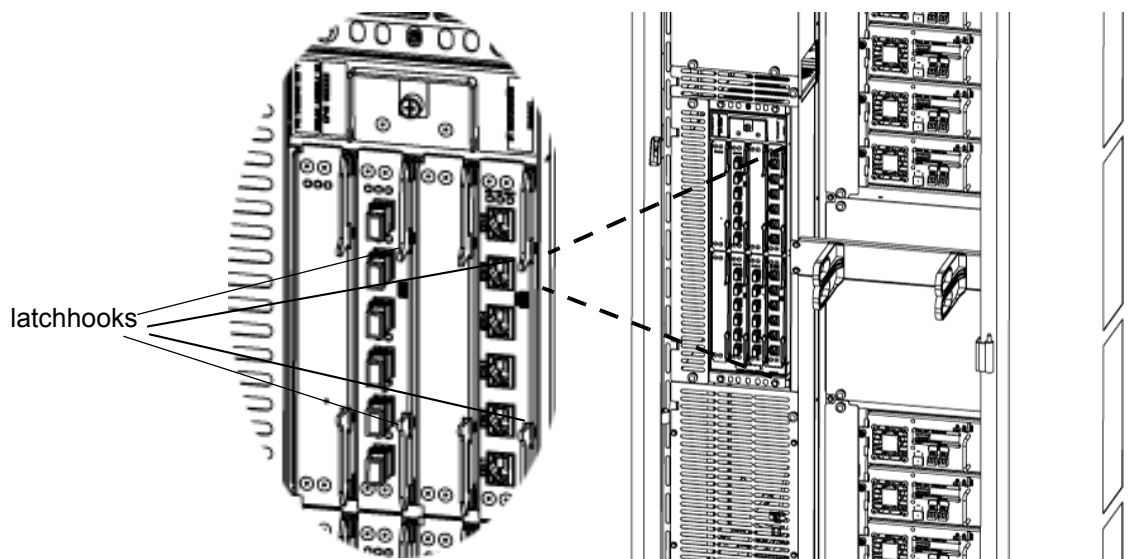
latchhooks

8 Make sure cover plates are installed over any unused bays in all of the I/O management units. If any are missing, insert the cover plate with the latchhooks on the right side and evenly apply pressure to both side of the plate until the latchhooks begin to move towards the middle of the blade. Push the latchhooks towards the middle. You will feel the latchhooks lock into place.

⚠ **CAUTION** **Slots that are not populated with blades must contain a cover plate. If the cover plate is not installed, blade temperature errors will occur.**

cover plates
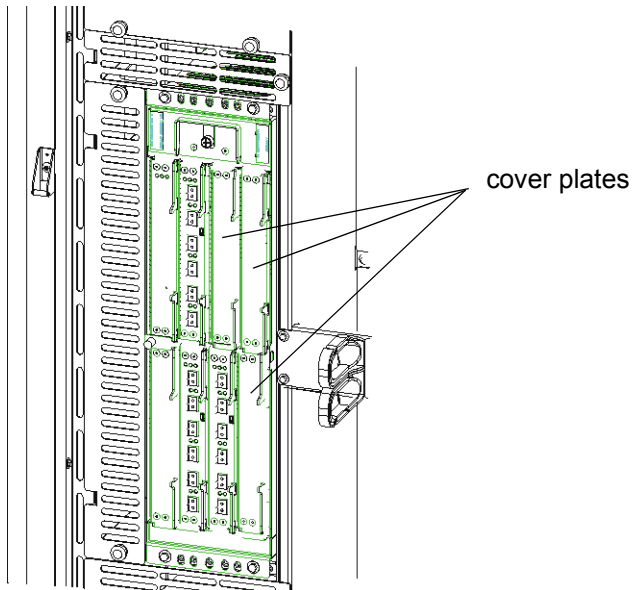
9 Detach the ESD strap.

If you are not adding any optional hardware, you are now ready to power up the library. Applying Power on page 93 provides step-by-step instructions for powering up the library. If you are adding optional hardware, see Adding Optional Hardware on page 231.

7

Cabling

This chapter contains instructions for connecting the library to the SAN or hosts. The library can be connected in the following ways:

- FC and SCSI drives can be directly attached to host systems or to the SAN. In these configurations, the MCB has one library control port (FC 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 ports on each FC I/O blade that can be connected directly to the host or to the SAN.

- A partition can be LUN mapped through a direct-attached LTO-5 drive.

This chapter contains the following sections:

- Drive Cabling Considerations and How Drive Connection Model Affects Library Control Paths on page 112

- Attaching Drives to FC I/O Blades on page 113

- Attaching FC LTO-5 Drives to Ethernet Expansion Blades on page 119

- Attaching FC and SCSI Drives Directly to Hosts on page 124

- Attaching Hosts to FC Ports on page 124

The instructions in this chapter assume you have installed the tape drives and FC I/O blades using the instructions in Installing Drives and Blades on page 97.

Drive Cabling Considerations and
How Drive Connection Model Affects Library Control Paths

Cabling of the library depends largely on the drive configuration that is purchased for installation. Each drive purchased is to be either Storage Networking (SNW) or native attach. These two drive purchase options create different customer physical connection options and library configuration options. There are two types of connections to define: drive data path connection and library control path connection.

Each library partition has its own library control path to consider, see

Cabling Configuration for Storage Networking Drives

Pre LTO-5 SNW Drives

Pre LTO-5 SNW drives are automatically accompanied by FC I/O blades. The FC I/O blade becomes an aggregation point for each drive FC connection (four drive ports total per I/O blade). Two ports on each FC I/O Blade are designated as Host or SAN ports.

- Drive Data Path Physical Connection - connect FC cable direct from drive to FC I/O blade

- Library Control Path Physical Connection – The two host/SAN ports on each FC I/O blade are the recommended connection point for all partitions in a library. When possible, if there are multiple partitions and therefore multiple Library Control Paths, the configuration should spread the Library Control Paths across several FC I/O blades to minimize the single point of failure. It is logical to combine drives from a particular partition and the Library Control Path for a particular partition on one FC I/O Blade.

LTO-5 SNW Drives

LTO-5 SNW drives are automatically accompanied by an Ethernet Expansion blade (EEB). The EEB is NOT a drive data path connection point. The EEB provides the library with a high speed connection point to the tape drive. This high speed connection point allows the drive to become a "bridge" for the library control path to the customer SAN or hosts through the drive data port.

- Drive Data Path Physical Connection – connect the primary drive data cable to the customer SAN or host.

- Library Control Path Physical Connection – the drive data cable becomes the physical connection for a library control path. Part of setting up a partition is to designate the control path drive for that partition. The control path drive for a partition must be a drive that is assigned to that partition.

Cabling Configuration for Native Attach Drives

Pre LTO-5 Native Attach Drives

Pre LTO-5 native attach drives DO NOT come with any auxiliary FC I/O Blades or EEB's

- Drive Data Path Physical Connection - connect the primary drive data cable to the customer SAN or host

- Library Control Path Physical Connection – The primary method of connecting any library control path is through the physical SCSI or FC connector on the library MCB.

LTO-5 Native Attach Drives

LTO-5 native attach drives are similar to Storage Networking drives because they are automatically accompanied by an EEB. The EEB is NOT a drive data path connection point.   Native attach drives differ from Storage Networking drives because they do not have a Storage Networking License to enable the Storage Networking feature set. An LTO-5 native attach drive still allows the drive to become a "bridge" for the library control path to reach the customer SAN or hosts.

- Drive Data Path Physical Connection – connect the primary drive data cable to the customer SAN or host.

- Library Control Path Physical Connection – the drive data cable becomes the physical connection for a library control path. Part of setting up a partition is to designate the control path drive for that partition.

Interaction of Physical Cabling and Library Configuration Options

- The maximum hosts mapped to a single FC I/O blade is 64 per port. This same limitation applies to the data port of a Storage Networking LTO-5 drive.

- The FC I/O blades have active channel zoning that can affect which hosts have access to which drives. Ensure that you define your channel zoning to match the physical cabling of the drives.

- When cabling drives, ensure that they are cabled to the correct hosts for the defined partitions. The physical cabling must allow connection of desired hosts to desired library partition(s) and drives.

- LTO-5 drives should never be connected to both a FC I/O blade and an EEB. Certain library features can work over either physical connection, but do not work properly if both connections are present.

- LTO-5 drives connected to FC I/O blades are limited to a 4 Gbps connection speed because the FC I/O blade is a 4 Gbps device.

Attaching Drives to FC I/O Blades

The FC I/O blades support connections to LTO-1, LTO-2, LTO-3, LTO-4, LTO-5,. DLT-S4, and SDLT-600 drives.

Libraries that have control management blade (CMB) in the I/O management unit support connection to the drives and library controller through FC I/O blades. The hosts communicate with the drives via the FC I/O blades. The drives are represented by their own unique FC_LUN ID assigned by its respective I/O blade (data path).

Although direct host connection to the MCB is possible, communication through the library partition to I/O blade fibre ports is the recommended standard practice unless special requirements exist. Each library partition will have a respective LUN ID mapped to a user selectable FC I/O blade port.The library partition LUN is mapped to a host port on the same FC I/O blade to which the partition's drives are connected. Host connectivity. Direct attached LTO-5 drives can be configured using control path and SNW functionality. See

Table 5 shows which FC I/O blades must be connected to the FC drive in each of the 12 drive coordinates in either a control module or expansion module. For information on the library's coordinate system, see Storage Addressing System Overview on page 132.

Table 5   Cable Connection Requirements for FC Drives

FC I/O Blade Positions in the I/O Management Unit	FC Connection on I/O Blade	Drive Coordinates
Bay 3	FC-3	1,1,1,1,1,1
Bay 3	FC-4	1,1,1,2,1,1
Bay 3	FC-5	1,1,1,3,1,1
Bay 3	FC-6	1,1,1,4,1,1
Bay 4	FC-3	1,1,1,5,1,1
Bay 4	FC-4	1,1,1,6,1,1
Bay 4	FC-5	1,1,1,7,1,1
Bay 4	FC-6	1,1,1,8,1,1
Bay 5	FC-3	1,1,1,9,1,1
Bay 5	FC-4	1,1,1,10,1,1
Bay 5	FC-5	1,1,1,11,1,1
Bay 5	FC-6	1,1,1,12,1,1

Figure 12 shows an example of drives connected to the FC I/O blades.

Figure 12   Example of Drives Connected to FC I/O Blades

connection to host or SAN

cable from FC-6 to drive coordinate 1,1,1,4,1,1

cable from FC-5 to drive coordinate 1,1,1,3,1,1

cable from FC-4 to drive coordinate 1,1,1,2,1,1

cable from FC-3 to drive coordinate 1,1,1,1,1,1
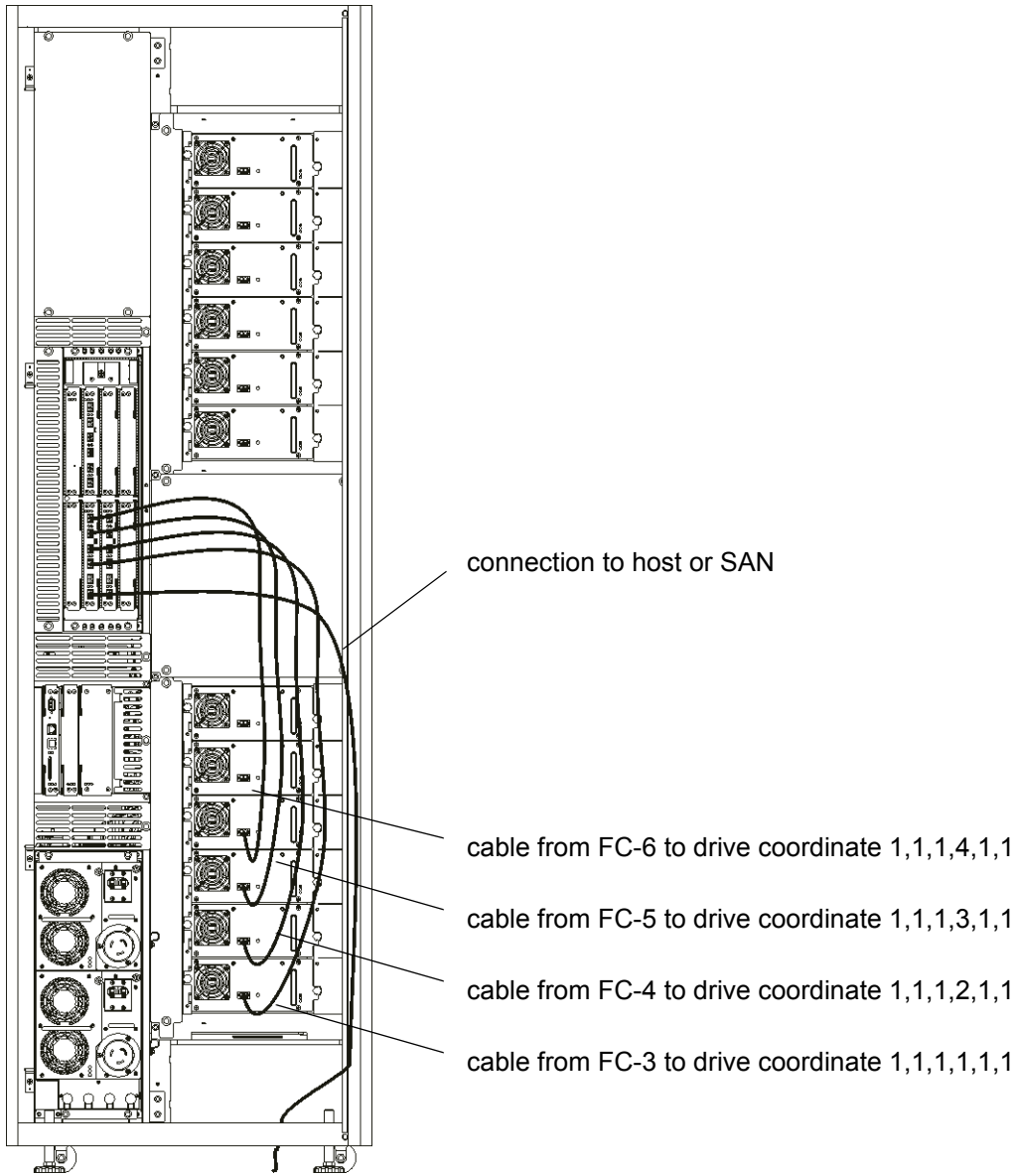
Drives can only be connected to ports FC-3 through FC-6. Host connections are made through ports FC-1 and FC-2.

Connecting FC Drives to FC I/O Blades

Use these instructions to install the Fibre optical cables that connect the FC drives to the FC I/O blades.

✎ Note	• See Table 5 on page 114 to see the correct location where the Fibre optic cables will be connected. • The goal when installing the FC cables is to keep the cables out of the way of the other components in the control module or expansion module. Use the cable keepers and Velcro straps to accomplish this. • A maximum of four FC drives can be connected to one FC I/O blade.

Required tools: ESD strap

1 Open the service door of the control module or expansion module.

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Remove and discard the white plastic LC covers from the FC connectors on the tape drives.

4 Remove and discard the necessary number of the black rubber protective covers from the ports on the FC I/O blades.

5 Carefully unwrap the six-foot Fibre optical cables and remove the two white plastic protective caps from each end of the cable.

⚠ **CAUTION**	**Fibre optical cables will be damaged if they are bent at more than a four inch arc.**

6 Connect the Fibre optical cable to port FC-3 on the FC I/O blade that is installed in bay 3 of the I/O management unit. See Table 5 on page 114 for information about the cable connection requirements.

port FC-3 on the FC I/O blade in in bay 3

7   Route the cable through the cable keepers and down the right side of the control module or expansion module.

Fibre optic cable routed through cable keepers

cable connected to FC 3 on FC I/O blade in bay 3 of the I/O management unit

8   Insert the Fibre optical cable into the Fibre Channel connection on the drive.

Fibre optic cable connected to drive in coordinate 1,1,1,1,1,1
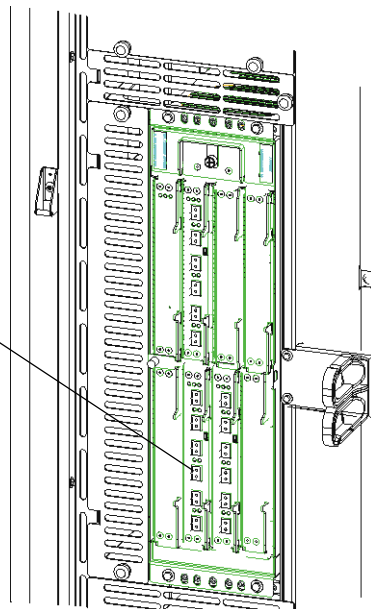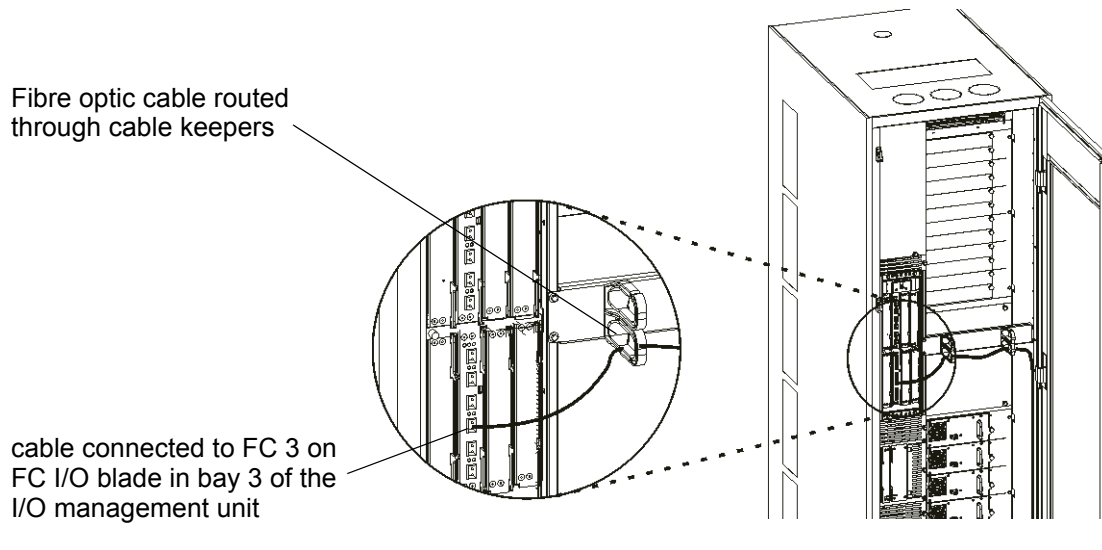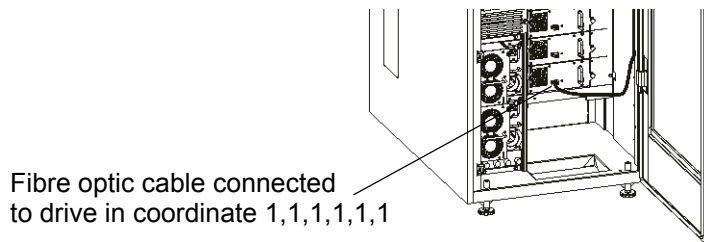
9   Repeat Step 5 on page 116 through Step 8 on page 117 for each drive that will be installed.

Note   The FC port and drive numbers will change according to Table 5 on page 114.

10 Gather the fibre optical cables and put them inside the Velcro straps that are attached to the right side of the module.

use Velcro straps
to secure cables
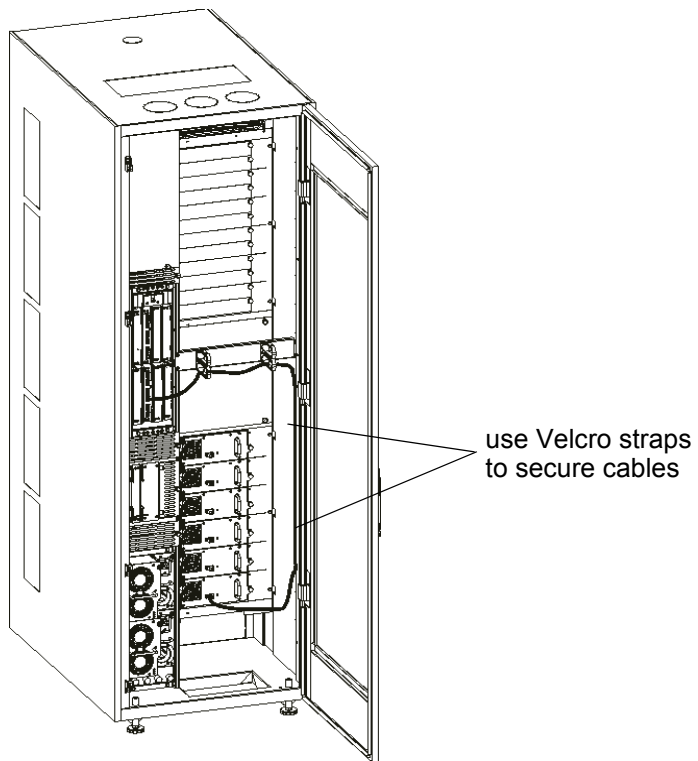
11 Connect the designated host to the FC-1 or FC-2 port on the FC I/O blade.

12 Detach the ESD strap.

Attaching FC LTO-5 Drives to Ethernet Expansion Blades

The Ethernet Expansion blade (EEB) provides the option for Ethernet connectivity to each LTO-5 drive for library-to-drive communication purposes only. The EEB is not in the data path as the FC I/O blade, but provides a control path to the LTO-5 drive for partition move medium commands as well as functionality. Each EEB has six Ethernet ports to allow attachment to six LTO-5 drives. The EEB provides Ethernet connectivity to the library's internal Ethernet and should not be connected to an external Ethernet source. External Ethernet cables should not be connected to your LTO-5 drives.

> **Note** An LTO-5 tape drive cannot be connected to both an EEB and a FC I/O blade. See Installing Drives on page 105.

Table 6   Cable Connection Recommendations for Ethernet Expansion Blades

EEB Positions in the I/O Management Unit	LTO-5 Connection on EEB	Drive Coordinates
Bay 7	ETH-1	1,1,1,1,1,1
Bay 7	ETH-2	1,1,1,2,1,1
Bay 7	ETH-3	1,1,1,3,1,1
Bay 7	ETH-4	1,1,1,4,1,1
Bay 7	ETH-5	1,1,1,5,1,1
Bay 7	ETH-6	1,1,1,6,1,1
Bay 8	ETH-1	1,1,1,7,1,1
Bay 8	ETH-2	1,1,1,8,1,1
Bay 8	ETH-3	1,1,1,9,1,1
Bay 8	ETH-4	1,1,1,10,1,1
Bay 8	ETH-5	1,1,1,11,1,1
Bay 8	ETH-6	1,1,1,12,1,1

Figure 13 Example of LTO-5 Drives Connected to Ethernet Expansion Blades

1,1,1,12,1,1

1,1,1,11,1,1

1,1,1,10,1,1

1,1,1,9,1,1

1,1,1,8,1,1

1,1,1,7,1,1

1,1,1,6,1,1

1,1,1,5,1,1

1,1,1,4,1,1

1,1,1,3,1,1

1,1,1,2,1,1

1,1,1,1,1,1

LTO-5 Drive

EEB port connection
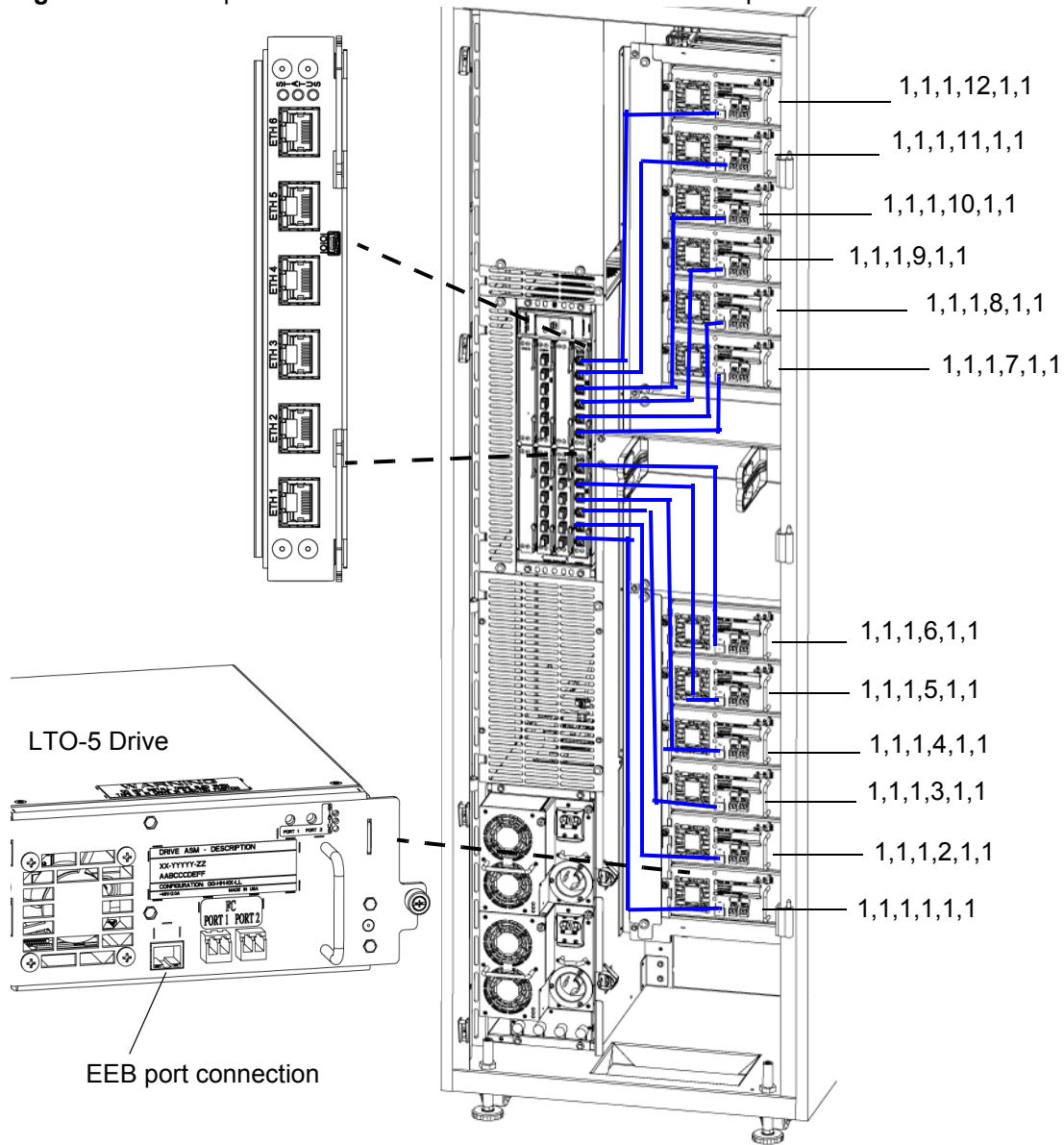
Connecting LTO-5 Drives to Ethernet Expansion Blades

Use these instructions to install the Ethernet Expansion blade cables that connect the LTO-5 drives to the Ethernet Expansion blades.

> **Note**
> - See Table 6 on page 119 to see the correct location where the EEB cables will be connected.
> - The goal when installing the EEB cables is to keep the cables out of the way of the other components in the control module or expansion module. Use the cable keepers and Velcro straps to accomplish this.
> - A maximum of six LTO-5 drives can be connected to one Ethernet expansion blade.

Required tools: ESD strap
Use Quantum provided cables: FRU ID 834

1 Open the service door of the control module or expansion module.

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Remove and discard the protective covers from the Ethernet connector on the tape drives.

4 Remove and discard the protective covers from the ports on the Ethernet Expansion blades.

5 Carefully unwrap the EEB cables.

6 Connect the EEB cable to ETH 1 on the EEB that is installed in bay 7 of the I/O management unit. See Table 6 on page 119 for information about the cable connection requirements.
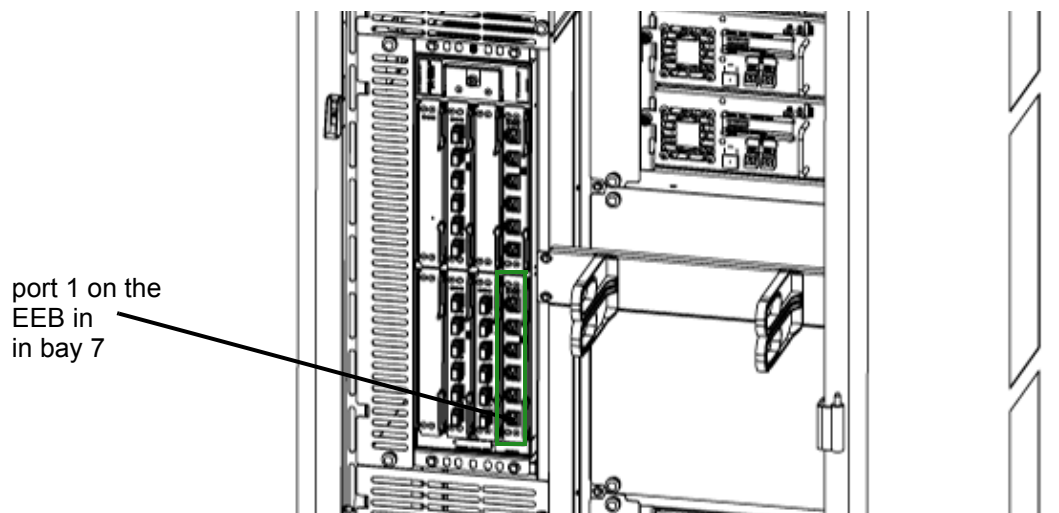
port 1 on the EEB in in bay 7

7   Route the cable through the cable keepers and down the right side of the control module or expansion module.

EEB cable routed through cable keepers

8   Insert the EEB cable into the EEB port connection on the drive.

EEB cable connected to drive coordinate 1,1,1,1,1,1
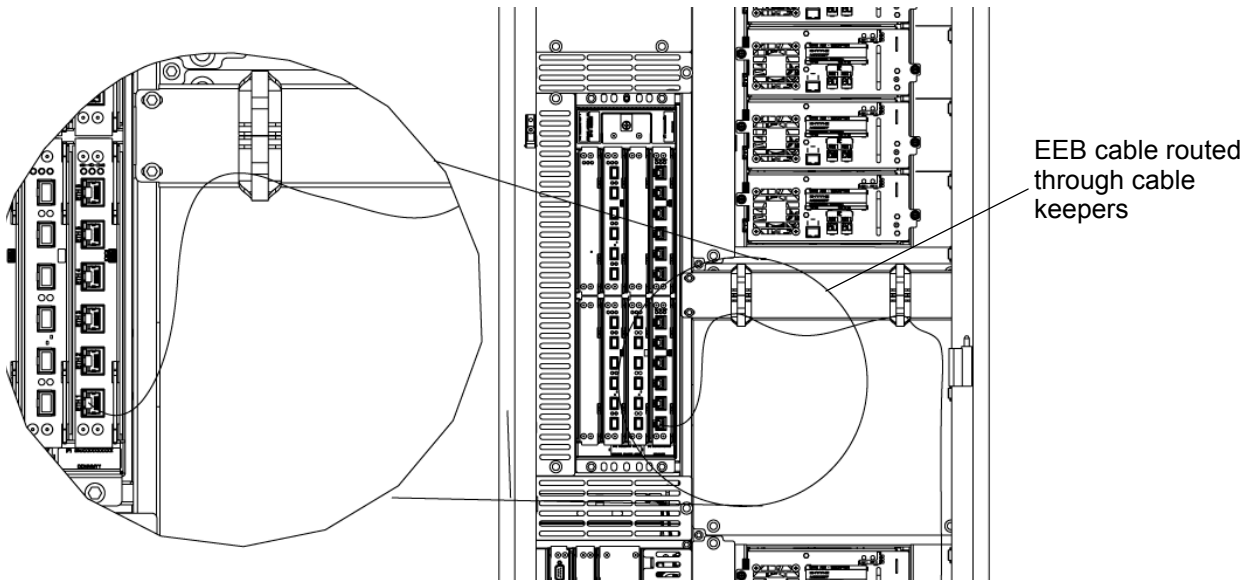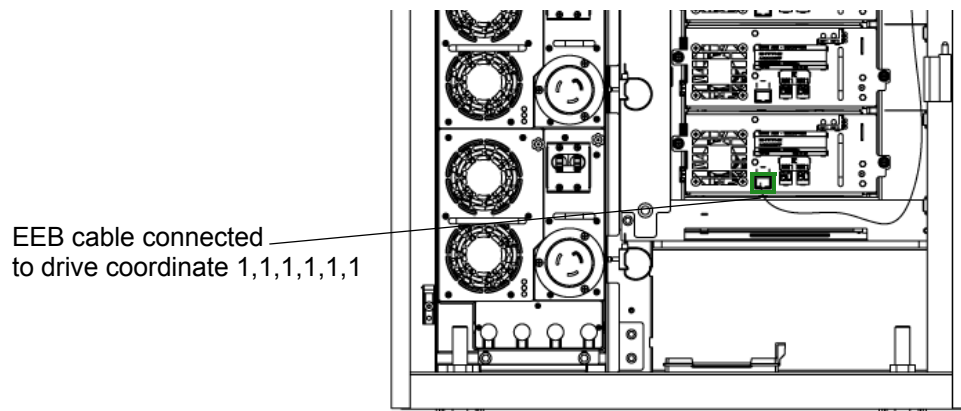
9   Repeat Step 5 on page 121 through Step 8 on page 122 for each drive that will be installed and connected to an EEB.

> **Note**   The EEB port and drive numbers will change according to Table 6 on page 119.

10 Gather the EEB cables and put them inside the Velcro straps that are attached to the right side of the module.

use Velcro straps to secure cables
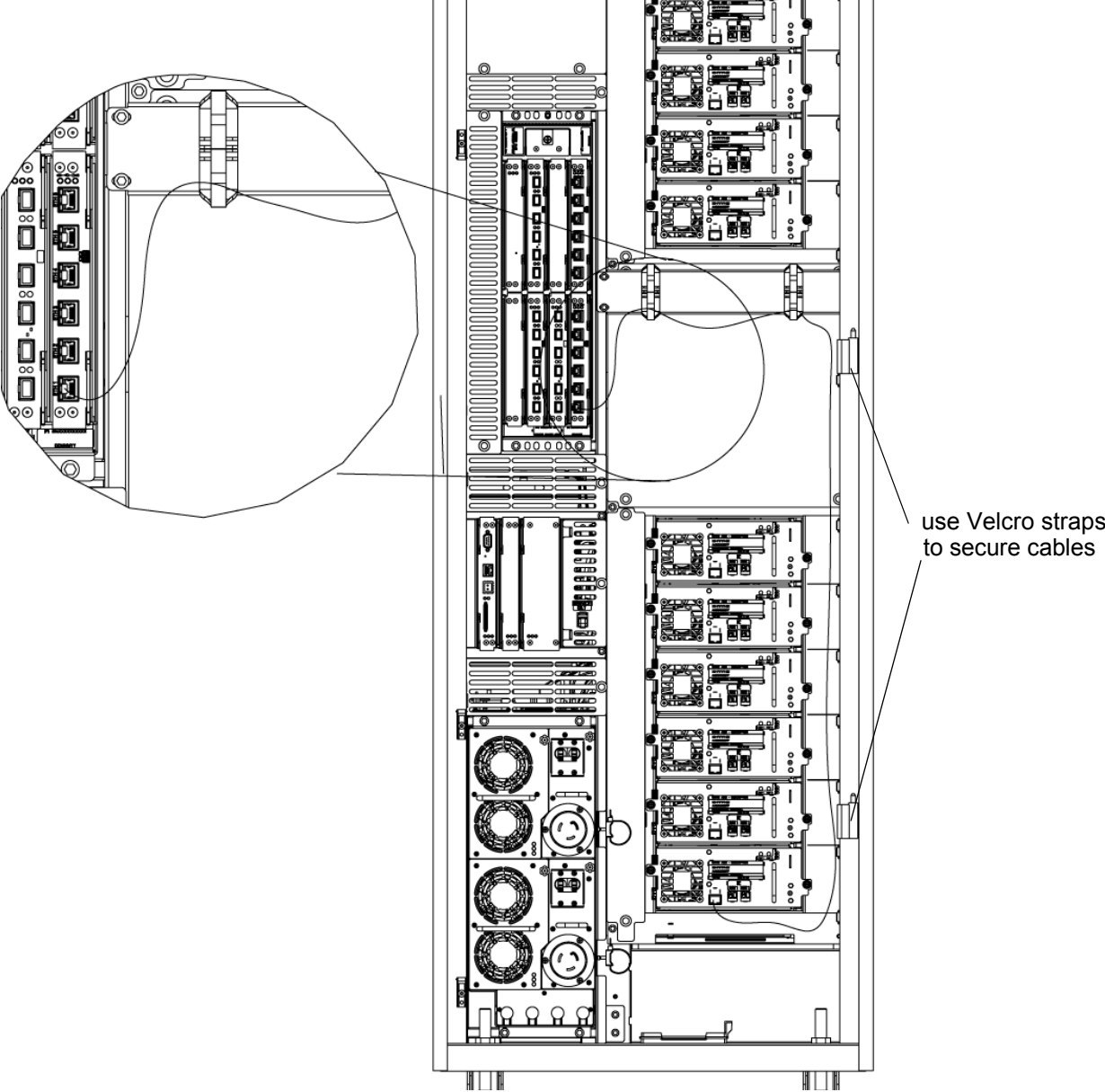
11 Detach the ESD strap.

Attaching Hosts to FC Ports

Each FC I/O blade installed in the library has two ports reserved for connection to hosts or the SAN. These ports are FC-1 and FC-2. By default, ports FC-1 and FC-2 are in target mode. The other four ports (FC-3, FC-4, FC-5, and FC-6) are in initiator mode by default.

A library that has multiple FC I/O blades may have many connections to several hosts.

One way to manage these connections is through the use of FC persistent binding, which enables the administrator to control the devices that are to be presented to the hosts.

Persistent binding permanently maps a device to the following:

- Binding type (world wide port name (WWPN), world wide node name (WWNN), or a destination identifier (D_ID)
- SCSI bus
- SCSI ID

The driver on the host detects all devices attached to the host bus adapters (HBA). By default global automapping assigns a binding type, target ID, SCSI bus, and SCSI ID to the device. The binding type, SCSI bus, and SCSI ID may change when the library is rebooted. When persistent binding is applied to one of these targets, the binding type, SCSI bus, and SCSI ID remain the same whether the library is rebooted or whether Global Automap All Targets is subsequently disabled. The automap is enabled by default.

The binding information is permanent because it is stored in the host registry or configuration file on a UNIX host. The driver refers to the binding information when the library boots.

> 📝 **Note**   Persistent binding must be redone if the fibre optical cables connected to the FC I/O blades are changed.

You are now ready to configure the library using the instructions in <u>Configuring the Library</u> on page 153.

Attaching FC and SCSI Drives Directly to Hosts

In direct attached library configurations, the controlling host system connects directly to either the SCSI or Fibre Channel (FC) drives in the library.

In the direct attached configurations, the management control blade (MCB) has one library control port (SCSI or FC) connecting to the controlling host computer. The MCB SCSI control port provides its own termination.

Tape drives attach directly to host computers and are represented by their own unique SCSI ID or world wide node name/world wide port name (WWNN/WWPN) and FC_LUN ID. For information on LTO-5

There are limitations on the number of hosts that can access a single drive. Limitations are summarized below:

- SCSI-attached drives support a maximum of two initiators on the same bus
- Fibre Channel-attached drives support a minimum of one initiator

The Fibre Channel LTO-1 tape drive is an arbitrated-loop-only device (also known as an NL ports). The drive supports Fibre Channel Arbitrated Loop (FC-AL) protocol, and uses Class 3 Service frames. The drive also supports both public (switch-attached) and private loops. This is not true for the LTO-2 and LTO-3 drives.

The library uses a LUN ID which is configured by using the Library Management Console (LMC) FC host. Library partitions as well as drives are presented as devices to be mapped. SCSI IDs or cabling may affect which SCSI device map LUN is associated with which FC host or SCSI host LUN ID; therefore, caution is required to ensure that the device order is not altered when swapping drives, cables, or locations. The partition should map to a higher priority LUN than the drives.

> **Note**
> - To connect a SDLT-600 to a SAN Fabric, you must either connect that drive to designated port on the FC I/O blade or directly attached the drive to a host.
> - Cabling may be affected by partitioning or zoning changes done as part of configuration.
> - When cabling to drives, ensure that they are cabled to the correct hosts for the defined partitions.

Examples of the direct attach cabling for SCSI and Fibre Channel drives are shown in

Figure 14   Example of Direct Attached Library With SCSI Drives

install terminators

Ethernet

library controller
to host

secure cables with
Velcro straps

cables routed to
the SAN or hosts

install
terminators
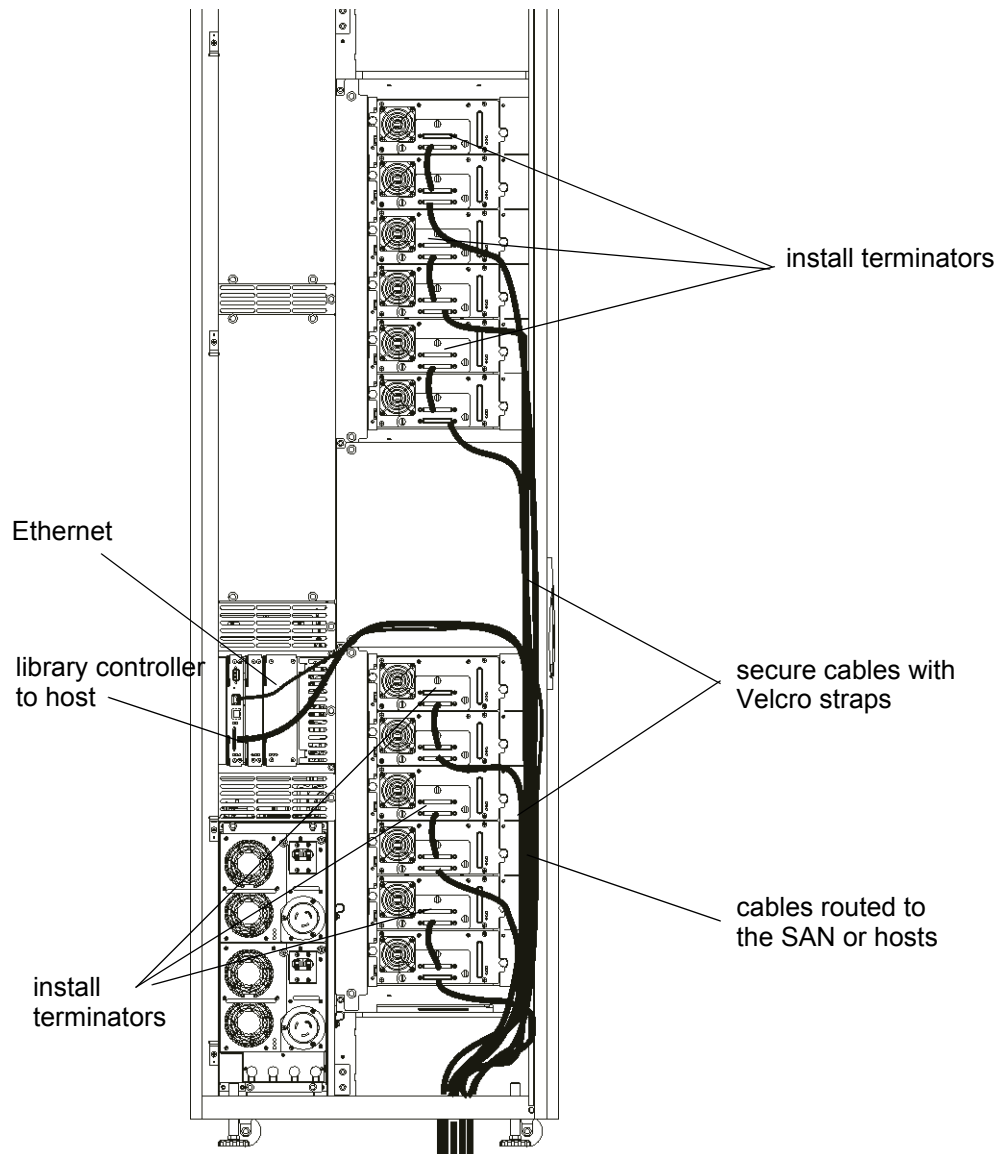
| ☒ Note | In the example shown in Figure 14 , the SCSI drives 2, 4, 6, 8, 10, and 12 must be terminated by installing an appropriate terminator on the ports shown. |

| ⚠ CAUTION | **Do not cable a drive to the MCB. The library does not support using the MCB as a terminating device on a chain of drives.** |

The MCB has one library control Fibre Channel port, which connects directly to the controlling host computer. This Fibre Channel port is located on the MCB that is installed into the control module.

Figure 15   Example of Direct Attached Library with FC Drives

Ethernet

library controller
to host cable

secure the cables
to the sides of the
modules using the
Velcro straps

cables routed
directly from the
drives to hosts
or the SAN
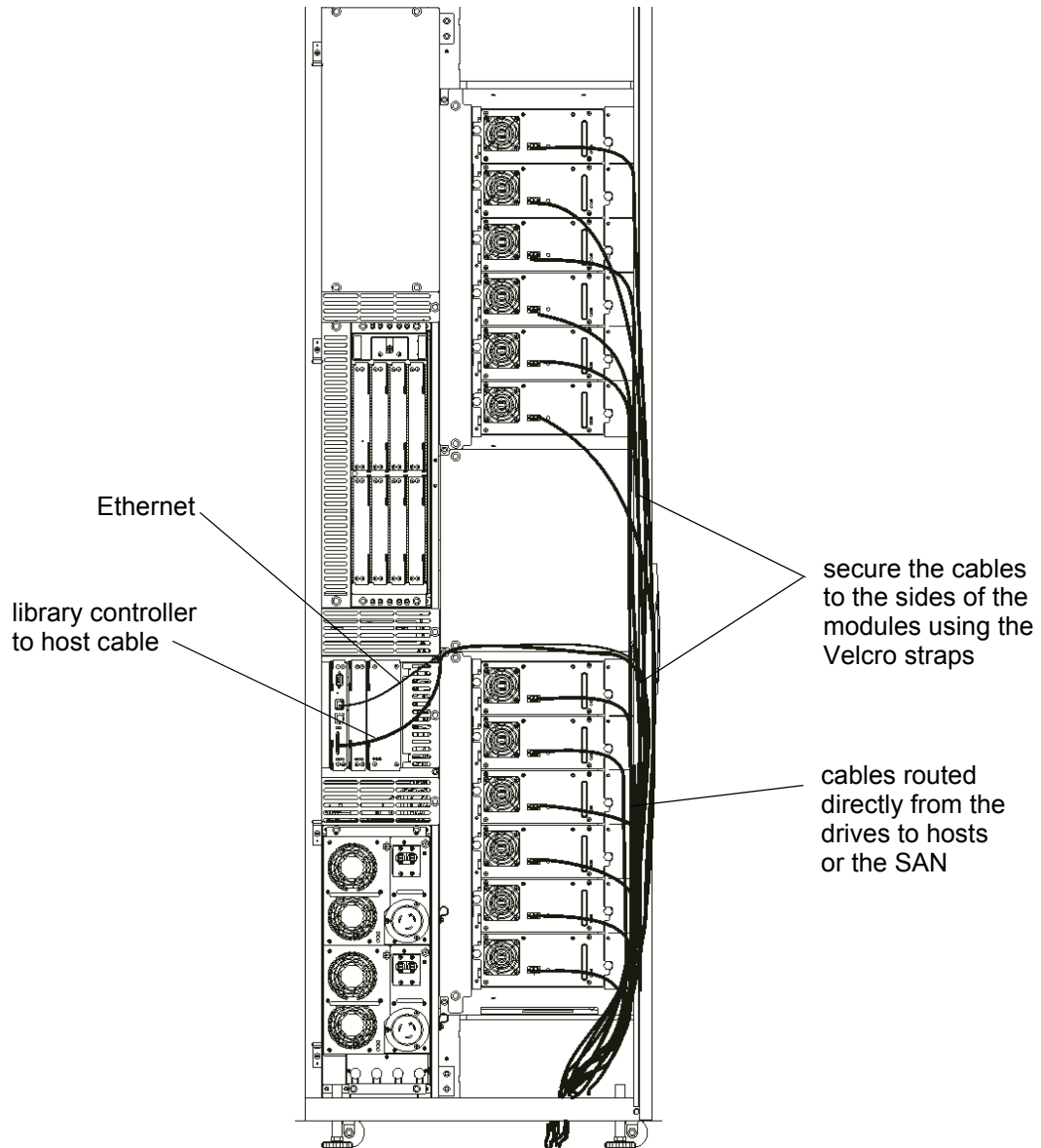
Connecting FC Drives to Hosts

The procedure in this subsection tells how to directly attach compatible tape drives to the host computers.

> ☑ **Note**   The goal when installing the FC cables is to keep the cables out of the way of the other components in the control module or expansion module. Use the cable keepers and Velcro straps to accomplish this.

Required tools: ESD strap

1   Open the service door of the control module or expansion module.

2   Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3   Remove and discard the white plastic covers from the FC connectors on the tape drives.

**4**   Carefully unwrap the Fibre optical cables and remove the two white plastic protective caps from each end of the cable.

> ⚠ **CAUTION**   **Fibre optical cables will be damaged if they are bent at more than a four-inch arc.**

5   Label each end of the cables with the drive number and the destination host name. You should label the end that connects to the tape drive with the name of the host and the end that connects to the host with the name and location of the tape drive. This will help you find the correct cable if there is a cable problem in the future.

6   Connect the fibre optical cable to the Fibre port on the drives.

7   Connect a fibre optic cable to the port of the MCB in the control module.

8   If e-mail notification is going to be used to monitor the library, connect the Ethernet cable that is provided with the library to the Ethernet port on the MCB in the control module.

9   Route all cable to the right side of the module and either up through one of the three holes in the top or down through the opening at bottom of the control module. Secure the cable to the right side using the Velcro straps.

> ☑ **Note**   Make sure the cables are out of the way of other equipment and not in a position where they can be damaged

10 Connect the fibre optical cable from the MCB to the server that has been designated to interface with the library.

11 Connect the fibre optical cables from the drives to the designated hosts.

12 Connect the Ethernet cable to the customer network.

13 Detach the ESD strap.

Connecting SCSI Drives to Hosts

The procedure in this subsection tells how to directly attach SCSI tape drives directly to the host computers.

> **Note** The goal when installing the SCSI cables is to keep the cables out of the way of the other components in the control module or expansion module. You will use the cable keepers and Velcro straps to accomplish this.

Required tools: ESD strap

1 Open the service door of the control module or expansion module.

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Unwrap the SCSI cables.

4 Label each end of the cables with the drive number and the destination host name. You should label the end that connects to the tape drive with the name of the host and the end that connects to the host with the name and location of the tape drive. This will help you find the correct cable if there is a cable problem in the future.

5 Connect the SCSI cable to the port on the drives.

6 Install the SCSI terminators.

Ethernet

library controller to host cable

install terminators if you are "daisy-chaining" the SCSI drives

secure cables using the Velcro straps
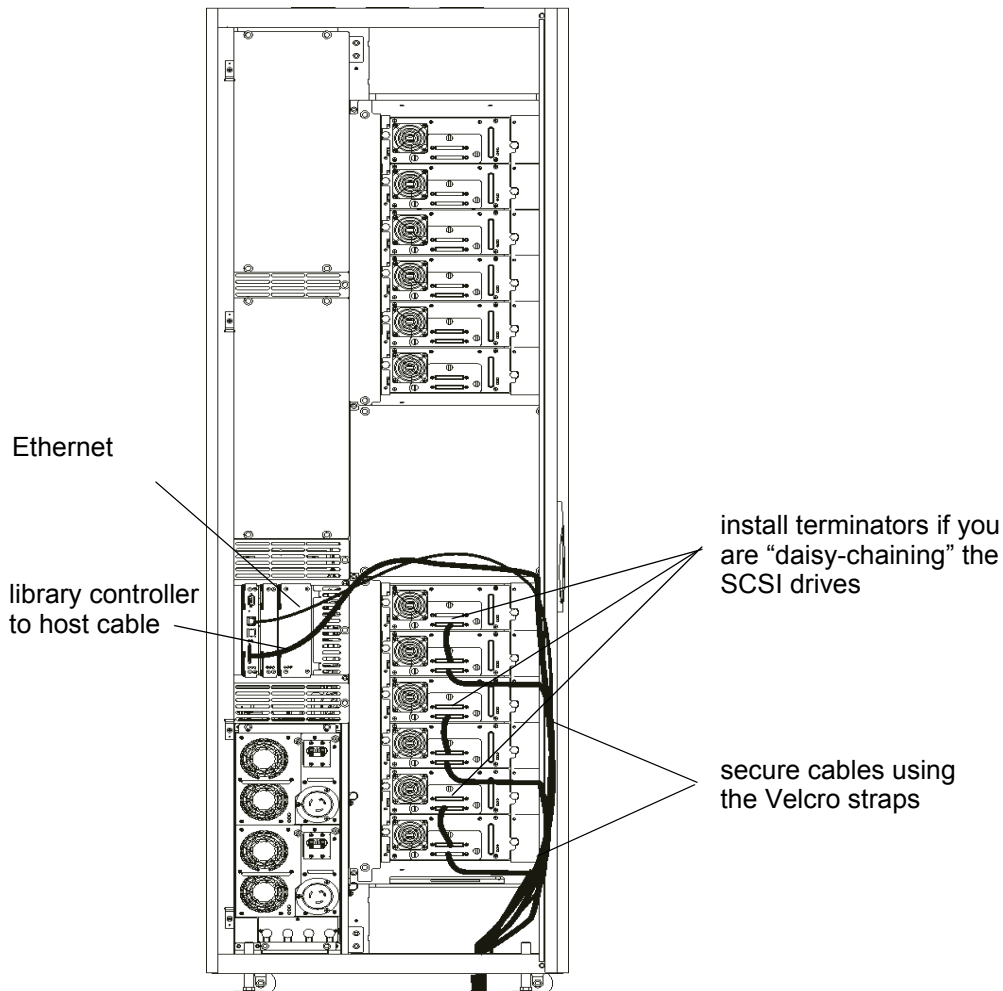
7   Connect a SCSI cable to the port of the MCB in the control module.

8   If e-mail notification is going to be used to monitor the library, connect the Ethernet cable that is provided with the library to the Ethernet port on the MCB in the control module.

9   Route all cable to the right side of the module and either up through one of the three holes in the top or down through the opening at bottom of the control module. Secure the cable to the right side using the Velcro straps.

10 Connect the SCSI cables from the drives to the designated hosts.

11 Connect the SCSI cable from the MCB to the server that has been designated to interface with the library.

12 Connect the Ethernet cable to the internal network.

13 Detach the ESD strap.

<div align="right">

8

</div>

<div align="right">

Installing Cartridges

</div>

This chapter gives instructions for loading cartridges into the library. The information provided includes:

- Loading Cartridges on page 131
- Installing Barcode Labels on page 137
- Importing Cartridges Using the I/E Station on page 139
- Manually Bulk Loading Cartridges on page 142

Loading Cartridges

Loading cartridges into a large library configuration can be time consuming.

Cartridges can be loaded two ways:

- **Import**: If the library will have more than one partition, insert cartridges in the I/E station and use the Library Management Console (LMC) to import the cartridges. For more information, see Importing Cartridges Using the I/E Station on page 139.

- **Bulk Load**: If the library will only have one partition, open the access door and manually insert cartridges in the magazines that are licensed for access by the customer. If you cannot locate the license keys shipped with the library, you can obtain them by contacting Quantum Technical Assistance Center. For more information, see Manually Bulk Loading Cartridges on page 142.

Storage Addressing System Overview

The library uses a coordinate addressing system that defines the location of cartridges using six coordinates. The coordinates are represented by the library in a comma separated list. For example:

1,1,1,1,2,1 = aisle 1, module 1, rack 1, section 1, column 2, row 1

Each of the variables are explained in the following bulleted list:

- **Aisle** - There is only one aisle in the library. This value will always be 1.

- **Module** - There are from one to twelve modules, the control module and up to eleven expansion modules. The value will be between 1 and 12.

- **Rack** - There are two rack designations inside each module. These will always be either 1 or 2, with 2 being the inside of the access door.

Figure 16   Aisle, Module, and Rack Numbering Locations
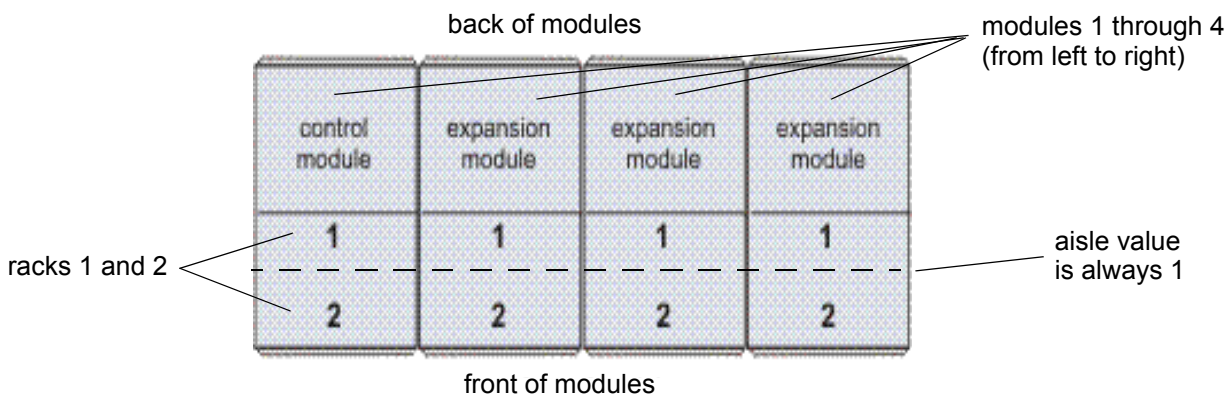
- **Section** - There are 10 sections in a rack, numbered from top to bottom as you face the rack.

- **Column** - There are four columns in a rack, numbered from left to right as you face the rack. These are numbered between 1 and 4.

- **Row** - This is equal to one cartridge slot. The number of rows per section can vary depending on the size of the cartridge. The rows are numbered between 1 and 6 for LTO cartridges and 1 and 5 for DLT cartridges.

Figure 17 shows the section, column and row numbering for rack 1 of a module with LTO cartridges. See Figure 16 on 132 to review the rack numbering.

Figure 17   Section, Column, and Row Numbering Locations for Rack 1 Using LTO Cartridges

row (individual slot)

X-axis rail counts as Section 6
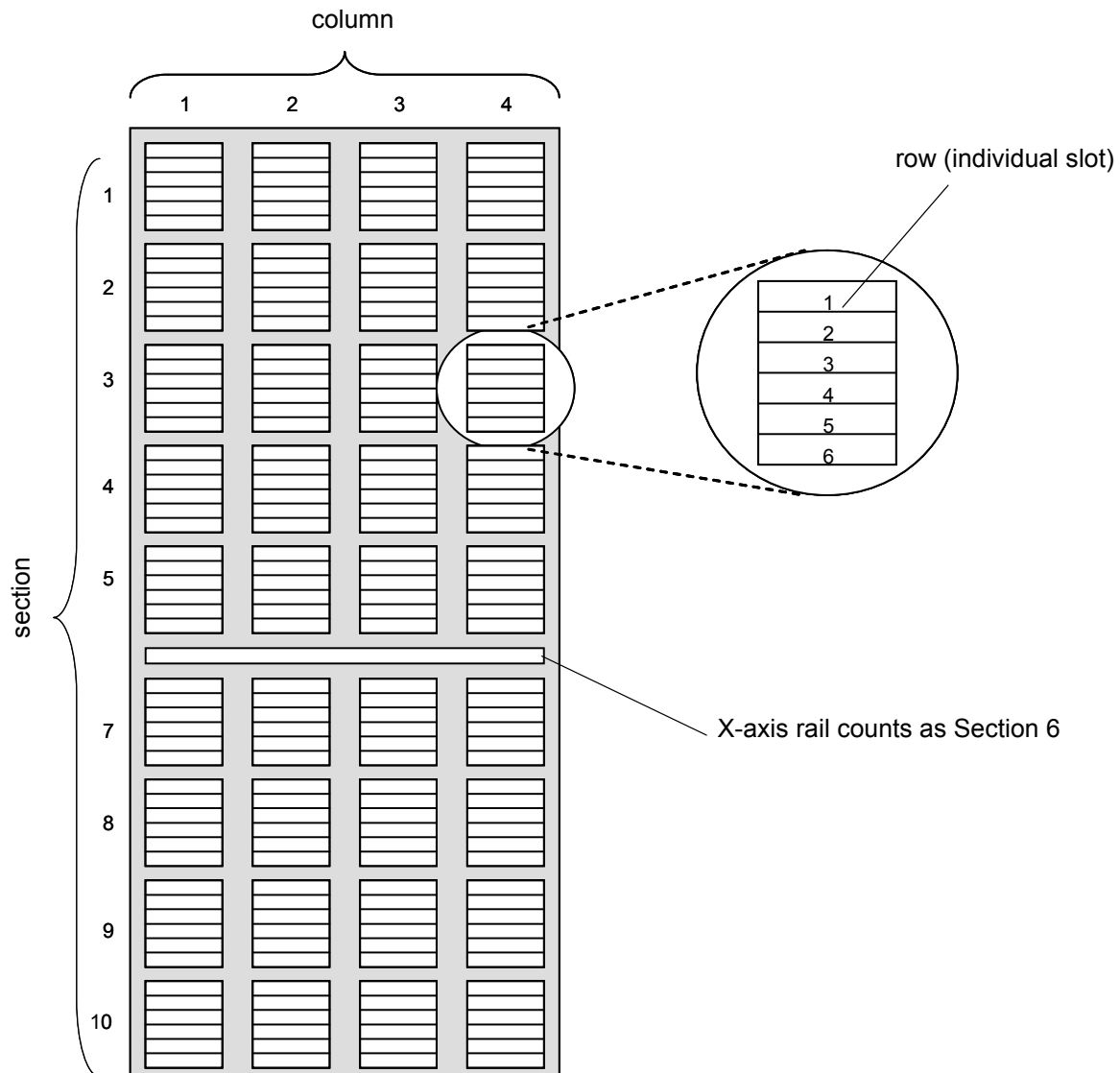
📝 Note   When tape drives are installed on rack 1 of a control module or expansion module, they replace the storage in columns 1 and 2. Because drives are installed from the bottom to the top you will lose the storage starting in section 10 first. You do not lose the magazine in column 2 of section 5.

Column 1 does not contain storage in the control module.

Figure 18 shows the section, column and row numbering for rack 2 of a module using LTO cartridges. See Figure 16 on 132 to review the rack numbering.

> **Note** The cartridges in the 24-slot LTO I/E station are addressed as part of column 3 and are in sections 1 through 4 (top to bottom). When you have an I/E station installed on rack 2, there are no cartridges in columns 3 and 4 of sections 1-5. See Figure 18 for an illustration.

Figure 18   Section, Column, and Row Numbering Location for Rack 2 Using LTO Cartridges
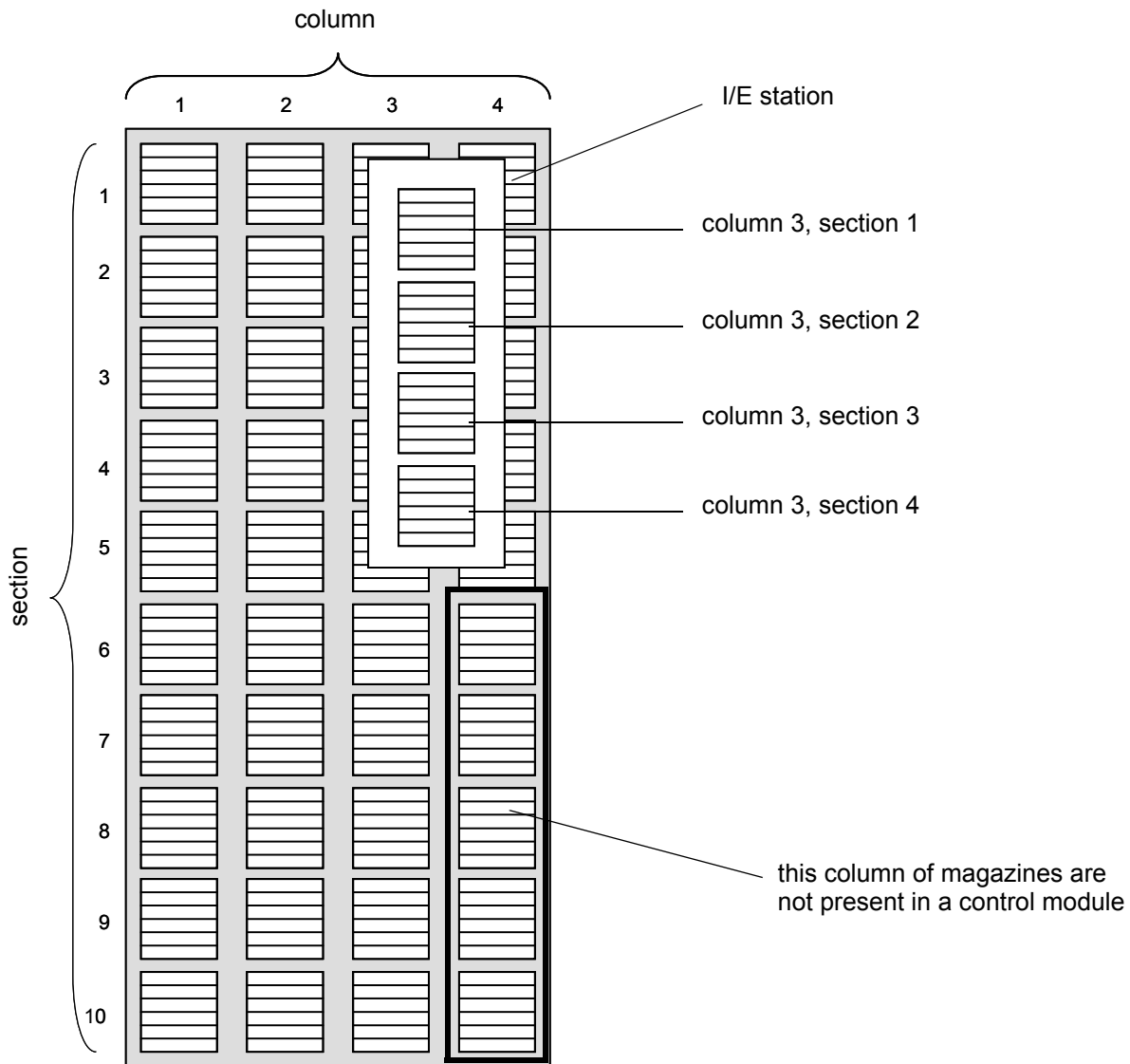
> **Note** In Figure 18 on 134, the five magazines shown in column 4, sections 6-10 do not exist in a control module. The magazines do exist in expansion modules.

Figure 19 on 135 shows example location coordinates. The examples assume that the linear storage are located in aisle 1, module 1, and rack 1. That is why the first three numbers in the comma separated list are 1,1,1. The last three numbers represent the address on the linear storage assembly.

Figure 19   Example Location Coordinates
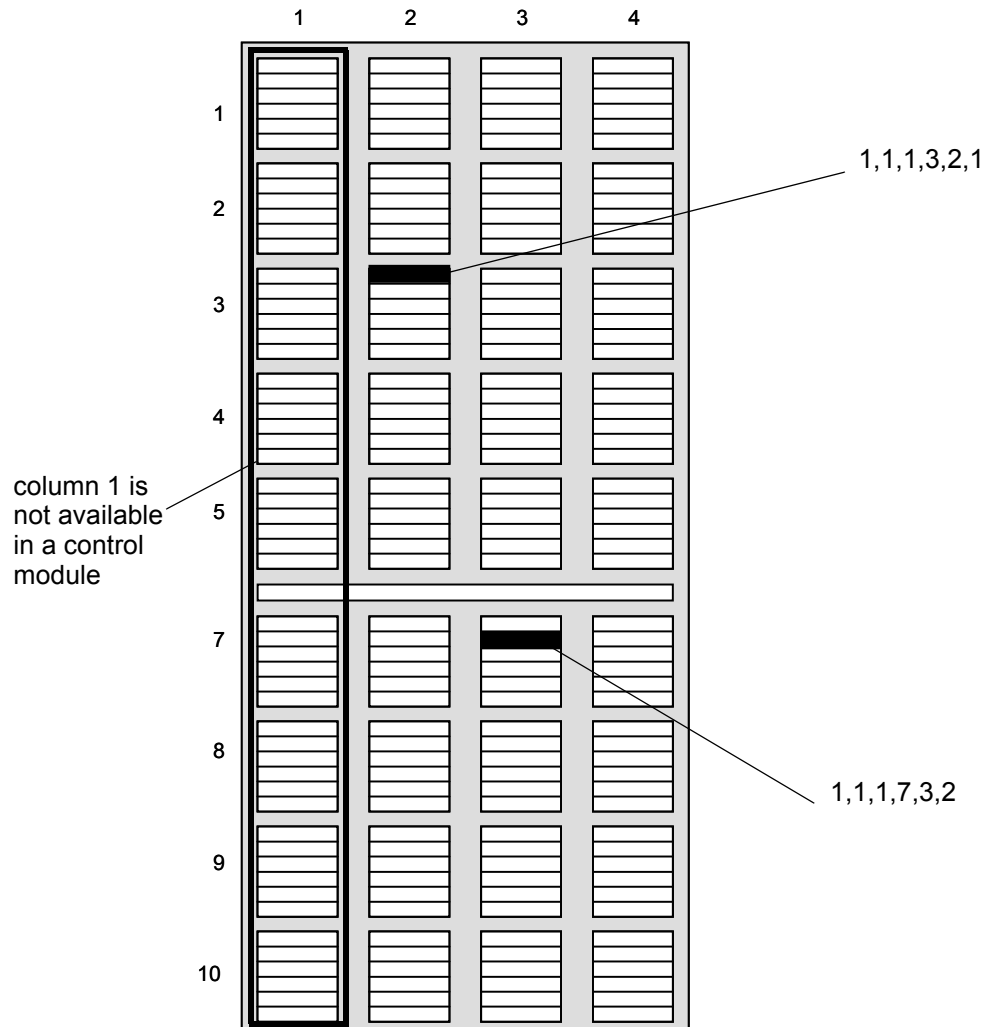
The Library Management Console (LMC) uses dialog boxes like the one in Figure 20 that enable you to specify cartridge locations. These coordinates are reported in parenthetical format, each element separated by commas. In parenthetical format, the location for the device listed in the **Load Drives** dialog box below would be written (1,1,2,2,2,2).

Figure 20 Location Coordinates Used in the **Load Drives** Dialog Box
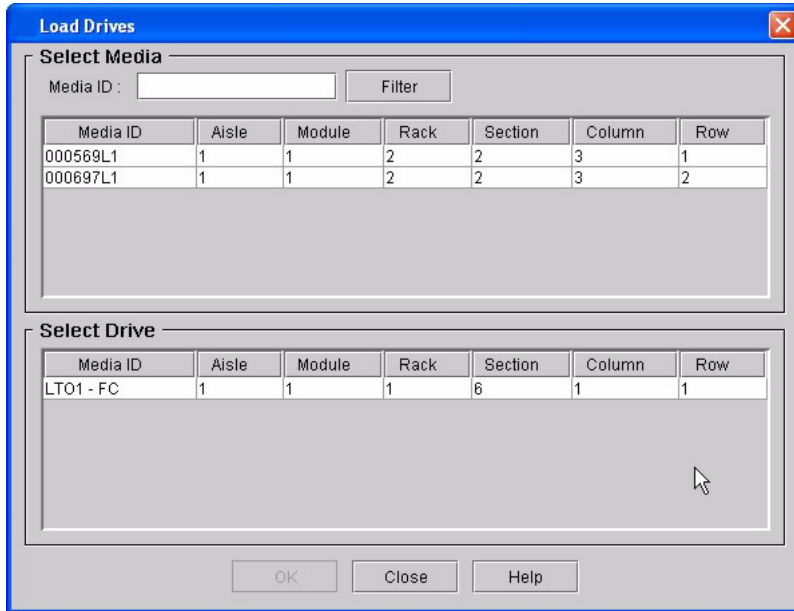
Installing Barcode Labels

Each cartridge in the library must have an external label that is operator and machine readable to identify the barcode number. Most manufacturers offer cartridges with the labels already applied or with the labels included that can be attached at the customer site.

> **Note** Duplicate barcodes are not supported even if you have mixed media or multiple partitions in the library. If the library has cartridges with identical barcode labels, the library will issue a ticket notifying you of the problem. Areas in the LMC where media IDs are listed will show information for the first cartridge, but the cartridge with the duplicate barcode label will not be listed.

All barcode labels are applied to the front of a cartridge. shows an example of a barcode label being applied to a LTO cartridge.

> **Note** To ensure the proper operation of tape cartridges, pickers, and drives, make sure your hands are dirt- and grease-free before handling tape cartridges. Clean the sides of all tape cartridges with a clean, dry paper towel or cloth before installing them in the library.

> ⚠ **CAUTION** **Do not place a barcode label on top of a cartridge. Placing a barcode label on top of a cartridge can cause an inventory to fail or damage the drive.**

Figure 21   Applying Barcode Labels to LTO Cartridges

top of cartridge

barcode label

write protect lock
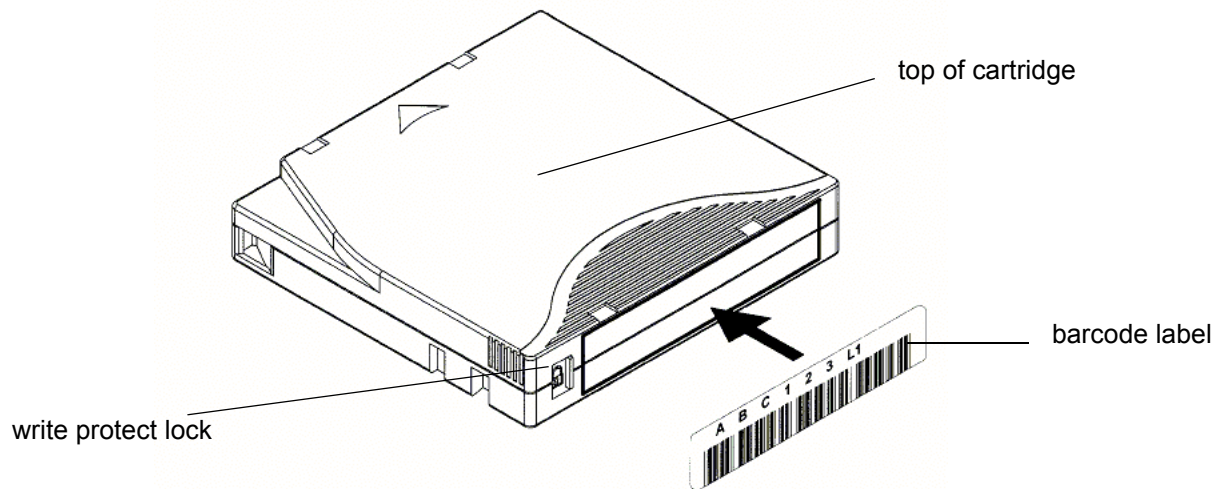
Barcode Requirements

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. See the image below for an example of a supported LTO barcode label.

two character media
identifier (L1, L2, L3, LT, L4, LU, L5, LV)
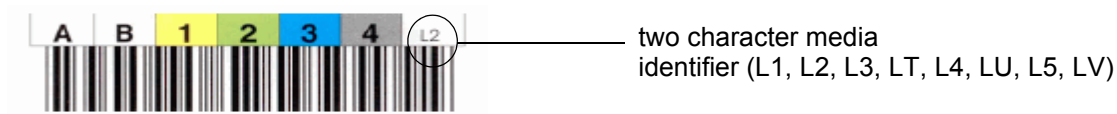
For SDLT I media barcodes, the library dynamically supports 1 to 6 characters for volume serial number plus a one-character media type identifier. The image below is an example of a supported SDLT I barcode label.

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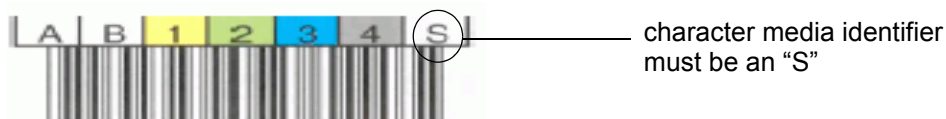
For SDLT II media barcodes, the library dynamically supports 1 to 6 characters for volume serial number plus a one-character media type identifier. The image below is an example of a supported SDLT II barcode label.

character media identifier
must be a "2"
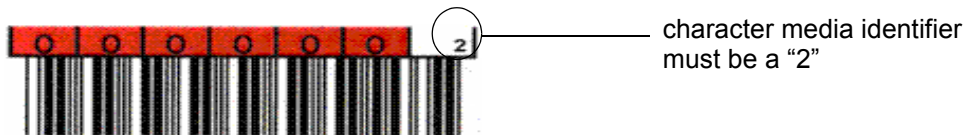
For DLT-S4 media barcodes, the library dynamically supports 1 to 6 characters for volume serial number plus a one-character or two-character media type identifier. The media identifier should be either "4".

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

Importing Cartridges Using the I/E Station

These instructions assume that you have already entered your license key, set up your partitions, and attached the barcode labels to the cartridges. You will use the I/E station to load cartridges.

> **Note** To ensure the proper operation of tape cartridges, pickers, and drives, make sure your hands are dirt- and grease-free before handling tape cartridges. Clean the sides of all tape cartridges with a clean, dry paper towel or cloth before installing them in the library.

1 Make sure that you are viewing the partition into which you want to import a cartridge.

2 From the **View** menu, select a partition.

3 Click **Operations > Import** to add cartridges into the partition.

The **Import Media** dialog box appears.
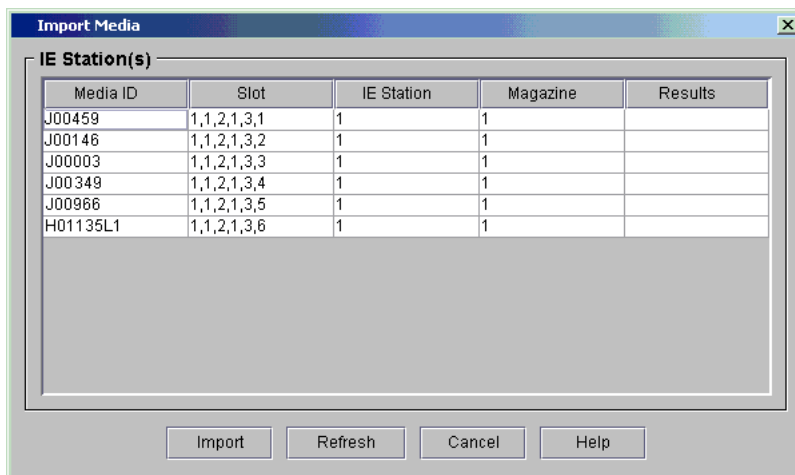
4 Click **Yes** if you are prompted to take the partition offline.

5 Insert cartridges into appropriate I/E station magazines.

You can insert multiple cartridges up to the maximum number of slots in your I/E station. You must insert cartridges in the correct I/E stations magazines based on how you created the partitions. As the cartridges are inserted into the I/E station, the scanner automatically reads the barcodes.

To see which I/E stations are associated with a particular partition, click **Monitor→ I/E Station**.

Element	Description
IE Station #	The number of the I/E station, which is the same as the control module or expansion module that contains it. All 24-slot single door I/E stations are numbered starting with 1 at the control module. All 72-slot double door I/E stations are numbered with a number and a letter . "A" indicates the first 36 slots on the left side of the I/E station. "B" indicates the right side.
Magazine #	The number of the I/E station magazine (numbered from top to bottom in the I/E station).
Media ID	The cartridge barcode or the word EMPTY.
Slot Type	Media type, for example LTO.
Partition Name	The name of the partition to which the I/E station is assigned.

6 Select **Operations→ Import** or use the **Import** toolbar button.

The **Import Media** dialog box appears with a list of cartridges in the I/E station displayed. The following table describes the elements on the **Import Media** dialog box.

Designation	Description
Media ID	The volume serial number of the cartridge
Slot	The row where the cartridge located.
I/E station	The number of the I/E station, which is the same as the control module or expansion module that contains it. All 24-slot single door I/E stations are numbered starting with 1 at the control module. All 72-slot double door I/E stations are numbered with a the module and a letter. "A" indicates the first 36 slots on the left side of the I/E station. "B" indicates the right side.
Magazine	The number of the magazine (section) where the slot is located, numbered from the top down
Results	"Imported" or "Failed"

7 Click **Import**.

The accessor moves the cartridge automatically from the I/E station to the first available empty slot in that partition. You cannot manually specify the destination slot.
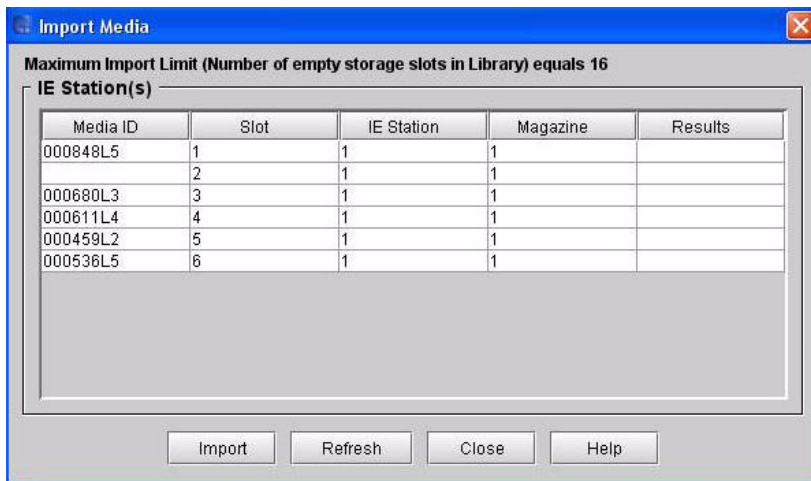
Manually Bulk Loading Cartridges

This section provides instructions for bulk loading cartridges into the library.

| ![Note icon] Note	To ensure the proper operation of tape cartridges, pickers, and drives, make sure your hands are dirt- and grease-free before handling tape cartridges. Clean the sides of all tape cartridges with a clean, dry paper towel or cloth before installing them in the library.

![Caution icon] **CAUTION**	**Do not bulk load cartridges into a library that will have more than one partition because there is a risk the cartridges will not be accessible by a specific partition.** **Also, it is possible to insert cartridges into unlicensed slots when they are installed manually.**

Figure 22 Cartridge Insertion Into Magazine
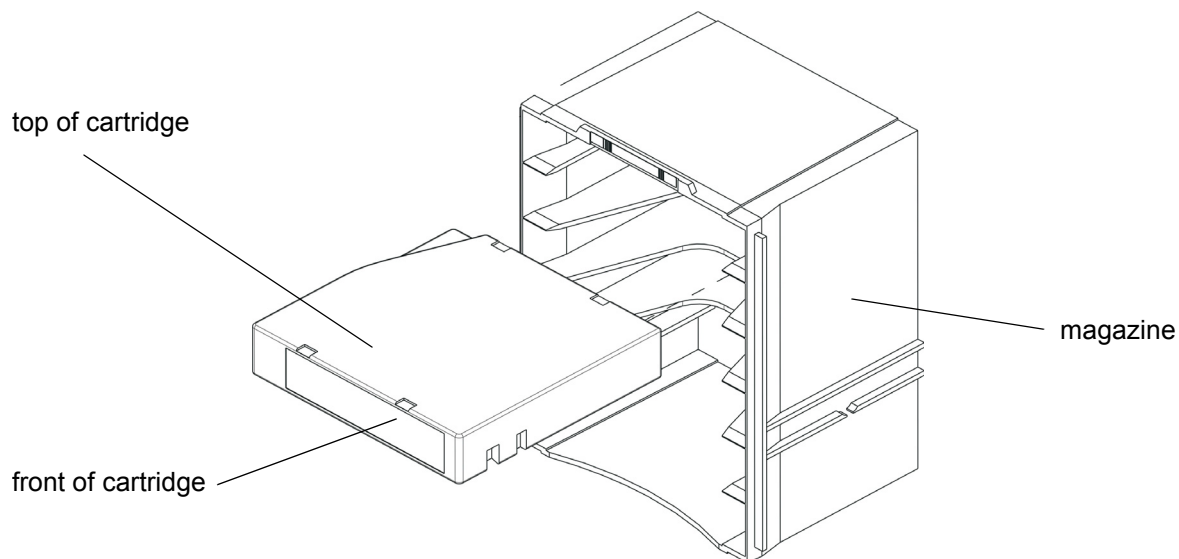
Bulk loading of cartridges must be done with caution. When bulk loading cartridges make certain:

- All cartridges have a valid barcode label.

- The barcode side is facing out of the slot.

- The cartridge is completely seated in the slot. The accessor assembly motion can be impeded if the cartridge is not completely seated within the slot.

- The media is not inserted in the slot upside down (see Figure 22).

- The media is not dropped while loading it into the library.

Follow these instructions to bulk load the magazines.

1 From the LMC, select a partition using the **View** menu.

You are prompted to take the partition offline.

2 When prompted to take the partition offline, click **Yes**.

3 Press the **Robotics Enabled** button.

4 Open the access door of the control module or expansion module.

5 When you have completed your bulk load, make sure all cartridges are inserted completely.

6 Close the access door of the control module or expansion module.

7 Press the **Robotics Enabled** button.

8 Run the **Inventory** command by clicking **Operations**→ **Inventory** from the LMC.

Click **OK** to start the inventory. You are prompted when the inventory is complete.

Inventory	⊠
Number of slots	688
Number of occupied slots	151

OK   Close   Help
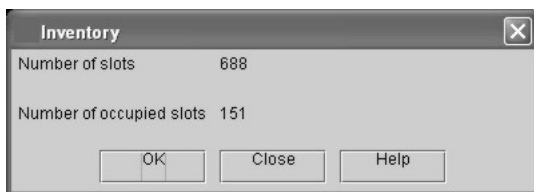
You are now ready to continue installation with the instructions in <u>Setting up Your Library for Access</u> on page 145.

<div style="text-align: right; font-size: 4em; color: #ccc;">9</div>

Setting up Your Library for Access

This chapter contains the compatibility requirements and instructions for setting up a computer for remote library access. The instructions include:

- [Configuring Library Security](#) on page 146

The same Library Management Console (LMC) available from the local library touchscreen is also available as a Java applet using a Web browser.

Launching the Remote Client

In order to manage your library remotely, point your client to the IP address of the library. Only one administration user should be logged on and performing library configuration at any one time.

Use one of the following procedures to start the LMC, depending on the operating system being used.

Note	• Only one LMC session should be running on a single host at the same time. • Only one LMC session should be run against a single library at one time.

Configuring Library Security

You can change the internal IP address of the library and other library security settings, including enabling or disabling network services, enabling or disabling remote access to the library, setting up firewall access for server callbacks to remote clients, and enabling or disabling SNMP or SMI-S access.

Changing Internal IP Network Addressing

The default internal network subnet setting for the Scalar i6000 is 10.10.X.X. Attaching the library to a 10.10.X.X external network can cause library and network problems. The **Change Internal IP** dialog box enables you to change the library's internal IP addressing so that conflicts do not occur. This dialog box is accessible only from the library's touch screen. You must be logged in as a Service user to access this feature.

Keep in mind the following considerations:

- You only need to change the default internal IP setting if your external network is 10.10.X.X.

- Do not set up internal IP addressing to conflict with existing external IP addressing. If you set up the same IP subnet for both the internal and external IP networks (for example, 10.10.X.X), the library will become unusable.

- If you change the internal IP addressing, and then later a user opens the **Network Configuration** dialog box (**Setup**→ **Network Configuration**) to assign a static IP address to the library that conflicts with the internal network, the assignment request will fail and the library will issue a ticket.

- If you change the internal IP addressing, and if Dynamic Host Configuration Protocol (DHCP) is enabled and DHCP assigns to the library an IP address that conflicts with the internal network, address conflicts could occur between internal library devices and external customer devices and the library will issue a ticket.

1 Log on as the service user.

2 Click **Service**→ **Change Internal IP**.

The **Change Internal IP** dialog box appears.
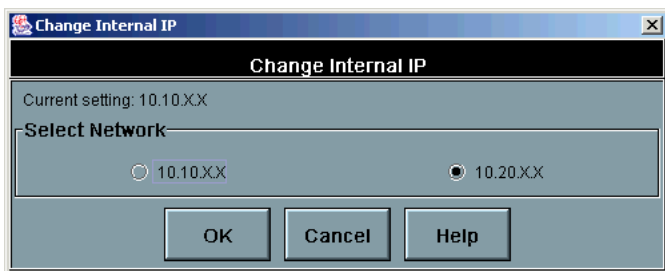
By default, the internal IP subnet address that is automatically selected on this dialog box is not the one to which your internal network is currently set. In the example shown, the current internal network IP setting is 10.10.X.X, and the automatic selection by default is 10.20.X.X. If this selection is accepted, the internal IP setting will change to 10.20.X.X.

3 To accept the automatic internal IP setting, click **OK**.

The following message appears.
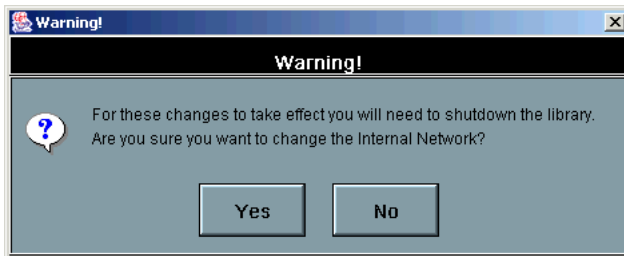
⚠ **CAUTION**   **Setting the internal IP network to be on the same subnet that the external IP network is on causes library failure and results in the management interface (the management control blade (MCB)) becoming unusable. For example, if you set 10.10.X.X as the internal IP network and your external IP network is also 10.10.X.X, a conflict occurs. If you are unsure about whether the change is appropriate, click No.**

4 If you are sure that you want to make the change, click **Yes**.

5 After the library processes the request successfully, a message appears that asks you whether you want to shut down the library. You must shut down and restart the library.

Changing the Library Security Configuration

The **Security Configuration** dialog box enables you to restrict external users and various remote services from accessing the library through the Ethernet port on the MCB. It also enables you to configure the session timeout.

📝 Note	Changing security configuration settings using the remote client might cause a loss of connectivity. If this happens, use the local touch panel to reset the security configuration settings and restore remote connectivity.

Accessing the Security Configuration

1 Log on as the service user.

2 Click **Setup**→ **Security**.

The **Security Configuration** dialog box appears with the **Services** tab displayed.

Configuring Access for Network Services

The **Services** tab on the **Security Configuration** dialog box enables you to entirely prevent all external access to the library or allow access according to other security settings on this dialog box. It also enables you to allow or prevent access by SSH, SSHv1, and to allow or prevent external attempts to discover the library by pinging it.

1 Click the **Services** tab on the **Security Configuration** dialog box.
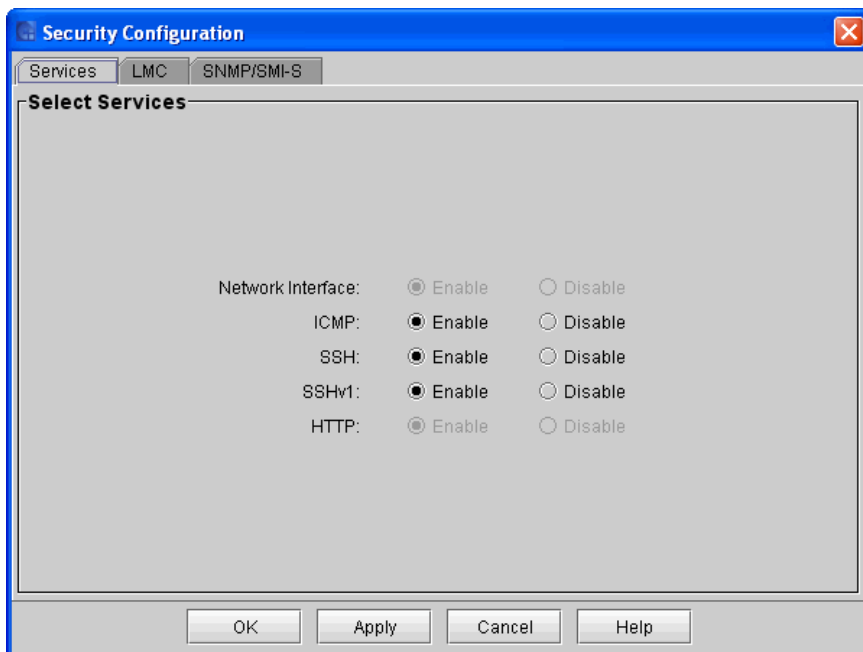
2 You can change the security settings for any of the following items:

- **Network Interface** — To entirely prevent all external access to the library through the MCB Ethernet port, regardless of other settings on the **Security Configuration** dialog box, select **Disable**. To allow external access to the library in accordance with other security settings on the **Security Configuration** dialog box, select **Enable**. (The **Network Interface** option is unavailable when accessing the LMC remotely.)

- **ICMP** — To prevent external attempts to discover the library by pinging it (by means of Internet Control Message Protocol [ICMP] Echo packets), select **Disable**. Using this setting can prevent denial-of-service (DoS) attacks, which can flood the library with pings and cause loss of network connectivity and services.

  If Dynamic Host Configuration Protocol (DHCP) is enabled for your library on the **Network Configuration** dialog box (**Setup**→ **Network Configuration**), you also should enable ICMP. This ensures that the DHCP server can determine whether the IP address that is assigned to the MCB is still valid. (ICMP is enabled by default.)

- **SSH**—To prevent Secure Shell access to the library, select **Disable**. To allow SSH to run on the library, select **Enable**.

- **SSHv1**—To prevent Secure Shell version 1 protocol from running on the library, select **Disable**. To allow SSH v1 to run on the library, select **Enable**.

- **HTTP**—To prevent access to library using the remote Java browser, select **Disable**. If you choose disable HTTP, access to the library is limited to the library's operator panel. To permit access to the library GUI using a remote Java browser, select **Enable**.(The **Network Interface** option is unavailable when accessing the LMC remotely.)

3 If you want to apply the changes, but you do not want to close the dialog box, click **Apply**. Otherwise, click **OK** to apply the changes and close the dialog box.

Configuring Access for Remote LMC Clients

You can use the **LMC** tab on the **Security Configuration** dialog box to configure the following options:

- To allow or prevent remote LMC client access to the library.

- To set up firewall access for server callbacks to remote clients.

- To enable or disable service login.

- To set up the length of time before a session timeout.

1 Click the **LMC** tab on the **Security Configuration** dialog box.

2 Change the security settings for any of the following items:

- **Remote Access** — To prevent all remote LMC clients from accessing the library, select **Disable**. To allow them to access the library, select **Enable.** (The **Network Interface** option is unavailable when accessing the LMC remotely.).

  Select **Use SSL** to enable secure communication between the LMC client and the library.

  > **Note**   Enabling SSL can impact the network performance of remote operations (for example, downloading new library software).

- **Callback Port Range** — To configure firewall access for server callbacks to remote clients, type the first port number of a range of ports that you want to be used for callbacks in the **Starting** text box, and then type the last port number in the **Ending** text box. Valid port ranges must fit within the range 1024 to 65535. Remote client service ports must be within the range of ports specified here. Otherwise, callbacks fail because the library's firewall blocks outbound packets designated for out-of-range ports.

- **Service Login** — To allow service login, select **Enable**. To prevent service login, select **Disable**. The Admin user can enable or disable the service user login on both the front panel access and the remote client access.

  > **Note**   The default service login through the service port is still available for use. For security purposes, the service port can be physically locked down by locking the back door of the i6000.

- **Session** — To configure the length of the session's timeout, type or use the arrow buttons to specify the length of a session before it times out. Valid session timeouts are 1-1440 minutes (1 minute - 24 hours), where the default is 30 minutes.

3 If you want to apply the changes, but you do not want to close the dialog box, click **Apply**. Otherwise, click **OK** to apply the changes and close the dialog box.

Configuring Access for SNMP and SMI-S

The **SNMP/SMI-S** tab on the **Security Configuration** dialog box enables you to allow or prevent SNMP or SMI-S traffic across the MCB Ethernet port.

1 Select the **SNMP/SMI-S** tab on the **Security Configuration** dialog box.
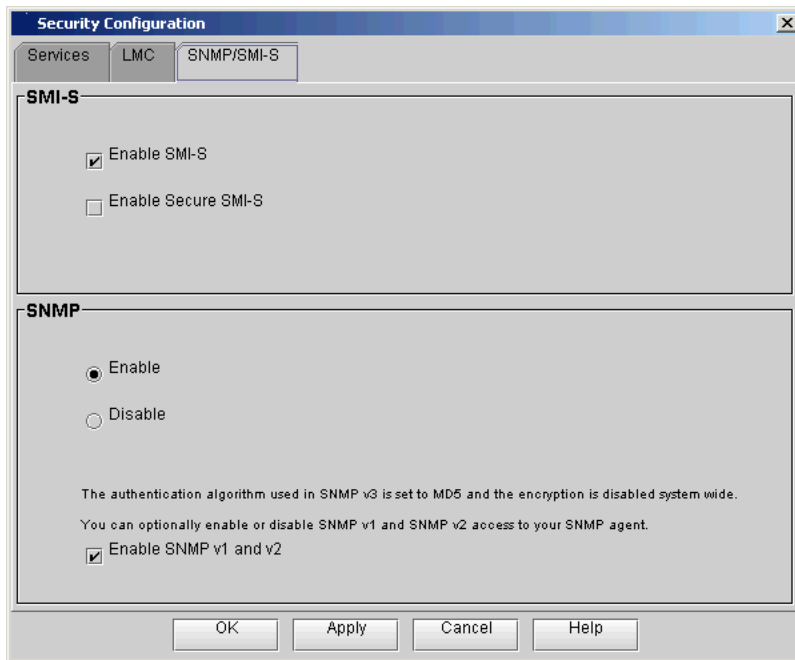
2 Change the security settings for any of the following items:

- **SMI-S** — To enable SMI-S traffic (port 5988), select the **Enable SMI-S** check box. To allow encryption of SMI-S traffic (SSL, port 5989), select the **Enable Secure SMI-S** check box.

> **Note** Port 427 is used for Service Location Protocol (SLP), which is used along with the Common Information Model (CIM) server.

- **SNMP** — To prevent all SNMP traffic across the MCB Ethernet port, select **Disable**. To allow SNMP GET operations, select **Enable**.

  If SNMP traffic is allowed, then SNMP v3 is always available. If you want to permit less secure SNMP access, select **Enable SNMP v1 and v2**. If you decide you do not want to use SNMP v1 and v2, clear the **Enable SNMP v1 and v2** check box.

  The library ignores all remotely issued SNMP SET operations under any circumstance, which means that external applications cannot register themselves to receive SNMP traps from the library. However, the **Trap Registration** dialog box (**Setup→ Trap Registration**) enables you to perform this registration yourself by entering the necessary IP and port information. For more information about the **Trap Registration** dialog box, see the *Scalar i6000 User's Guide*.

3 If you want to apply the changes, but you do not want to close the dialog box, click **Apply**. Otherwise, click **OK** to apply the changes and close the dialog box.

10

Configuring the Library

This chapter provides step-by-step instructions for configuring the library using the Library Management Console (LMC). The information in this chapter includes:

Before the library can be used, there is some basic configuration that must be done. Configuration varies depending on the type of library and the features that will be used. Before configuring the library, you should review all Technical Bulletins and Release Notes and Errata for the product.

> **Note**   Only one administrator can be logged on and performing library configuration at any one time. If another administrator attempts to log on, a message appears, warning that only one administrator at a time is permitted on the library. If a service user logs on while an administrator or regular users are logged on, the library automatically logs off those users.

Addressing Configuration Prerequisites

You must obtain the following information from the customer, before configuring the library.

- Proposed IP address of library
- Subnet Mask for local network
- IP address for the gateway on the local subnet
- IP address of the SMTP server
- Access account of SMTP server

- Customer e-mail addresses (if they want e-mail notification)

Logging on to the Library

After the library has finished booting, you will see the **Logon** dialog box. Use the keyboard displayed on the touch screen to log on.

Note   Select the **Shift** key to access uppercase and special characters.

1   Position the cursor in the **Name** text box by tapping it.
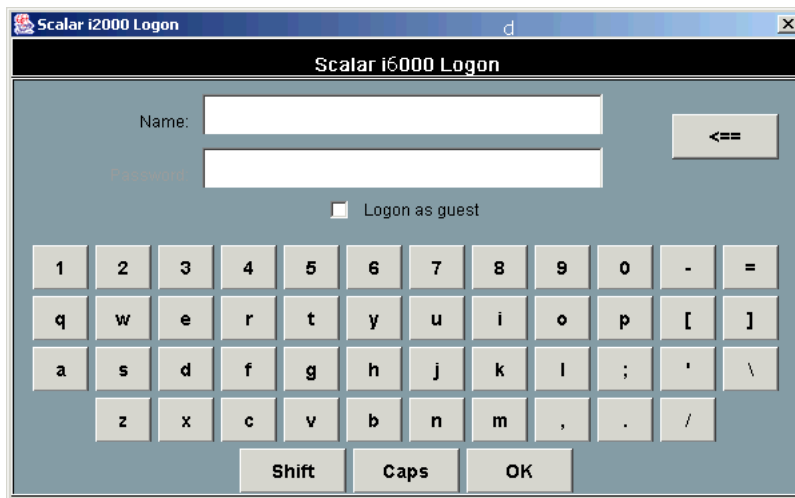
2   Use the keyboard to type the word **admin** in the **Name** text box.

3   Position the cursor in the text box below the **Name** text box by tapping it.

4   Use the keyboard to type the word **password** in the text box.

Note   If you are logging on to the library for the first time using the default administrator account (admin), type password. After you log on, the library prompts you to change the default admin password. You must enter and confirm a new password. Passwords that are most secure include a combination of letters, numbers, and non-alphanumeric characters. Passwords must be eight or more characters in length. The word "password" is not available for use.

5   Select **OK**.

Note   You can change the default password at anytime. This helps ensure security standards for the site.

You must now decide which method you want to use to configure the library:

- If you want to perform a minimal configuration using the **Setup Wizard**, proceed to the instructions in

- If you want to perform the configuration manually using **Expert Mode**, proceed to the instructions in

> **Note** You cannot create partitions that include mixed media using the **Setup Wizard**.
> You must perform the configuration manually using **Expert Mode**.

Performing Basic Configuration

The minimal configuration can be performed using the **Setup Wizard** and then enabling notifications. The configuration items in the **Setup Wizard** are typically sufficient for customers running libraries without FC I/O blades.

> **Note**   You cannot create partitions that include mixed media using the **Setup Wizard**.
> You must perform the configuration manually using **Expert Mode**.

Before you can run the Setup Wizard, you must first delete a default partition that is created by the library during initial startup.

Setting up a library using the basic configuration includes the following procedures:

- [Deleting the Default Partition](#) on page 157

- [Running the Setup Wizard](#) on page 158

- Set up e-mail (optional see [Setting up E-mail](#) on page 170)

- Set up e-mail notification (optional see [Setting up Notification](#) on page 171)

For libraries that contain FC I/O blades and Ethernet Expansion blades, it is recommended that you bypass the **Setup Wizard** and use the instructions in [Performing Advanced Configuration](#) on page 163.

> **Note**   You cannot manage the library from a remote system until you have logged on
> locally and setup the library's network connection. Once connected, you can
> perform all management tasks from a remote location.

The interaction between drive types and partitions include the following:

- If the library discovers two different domains of storage, it will allow you to create two partitions even if the license if for only one partition. This enables users to turn on a small number of minority slots. For instance, if the user has one DLT magazine and one DLT drive in a configuration that is almost totally LTO drives and cartridges.

- The discovery of two drive types should not trigger the same multi-partition behavior. For example, LTO-2 SCSI and LTO-2 Fibre Channel in the same library should not allow two partitions unless a multi-partition license is sold.

Proceed to [Deleting the Default Partition](#) on page 157.

Deleting the Default Partition

The library creates an initial partition on the initial start-up. If you need more than one partition in the library, this partition must be deleted before you can use the **Setup Wizard** to automatically create one or more new partitions.

1   Click **Setup**→ **Partitions**→ **Configure**.

       The Partitions dialog box appears.
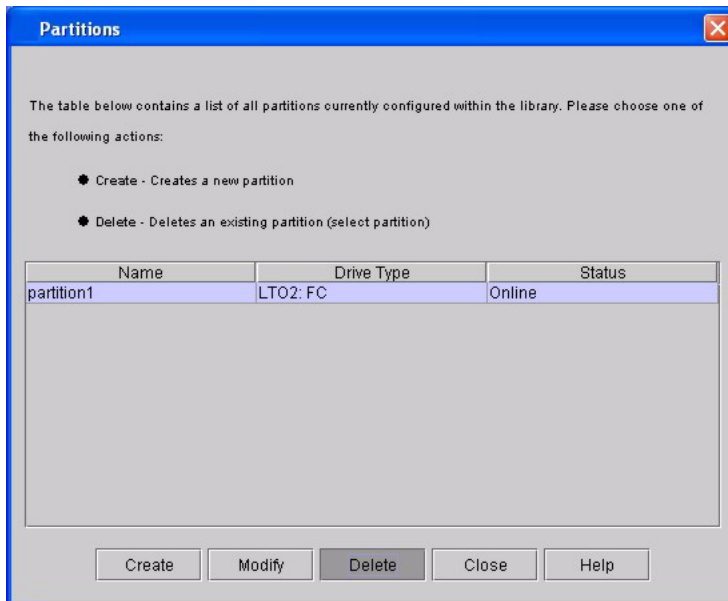
2   Select **partition1**, the default partition.

3   Click **Delete**.

         a. If the partition is online, you will be asked whether or not it can be taken offline.You must answer **Yes** to continue the deletion process. If you answer **Yes**, the partition is taken offline.

         b. Click **Delete**.

       The selected partition has been deleted.

4   Click **Close**.

Proceed to

Running the Setup Wizard

Note | You must first run the **Setup Wizard** or manually configure the library network configuration in order to manage your library remotely.

Use the **Setup Wizard** to enable or modify:

- Licenses (See Enabling Licenses on page 164 for more information.)
- Library partitions (See Creating Partitions on page 182 for more information.)
- Device mapping and zoning (See Configuring Host Access on page 204 for more information.)
- Network configuration (See Setting Up the Network Configuration on page 165 for more information.)
- Date and time (See Setting Date and Time on page 169 for more information.)

For additional information on any of the steps, see the information in the Performing Advanced Configuration on page 163.

Follow this procedure to run the Setup Wizard:

1 Click **Setup→ Setup Wizard**.

The **Setup Wizard** dialog box appears.
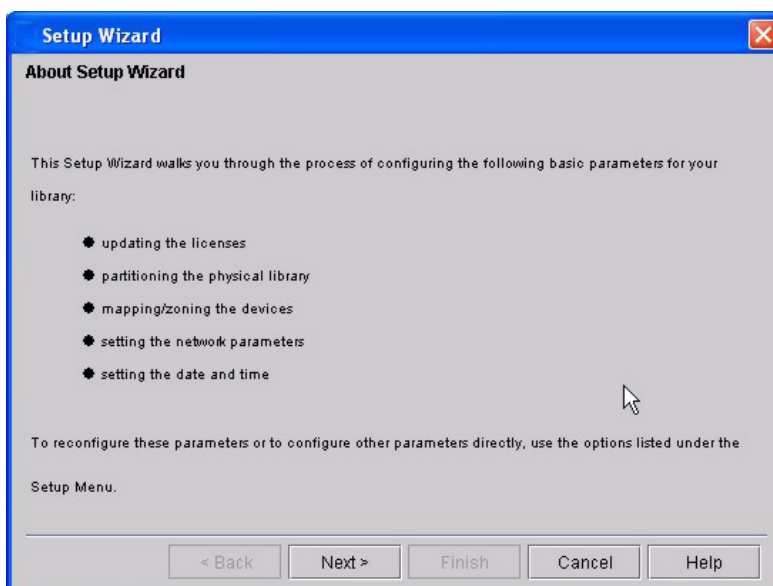
2 In the **Setup Wizard** dialog box, click **Next** to continue.

3   In the **Enter License Key** box, type the appropriate license key.

License keys are not case sensitive and all inclusive. For example, J2BGL-22622-52C22. Click **Next** to continue.
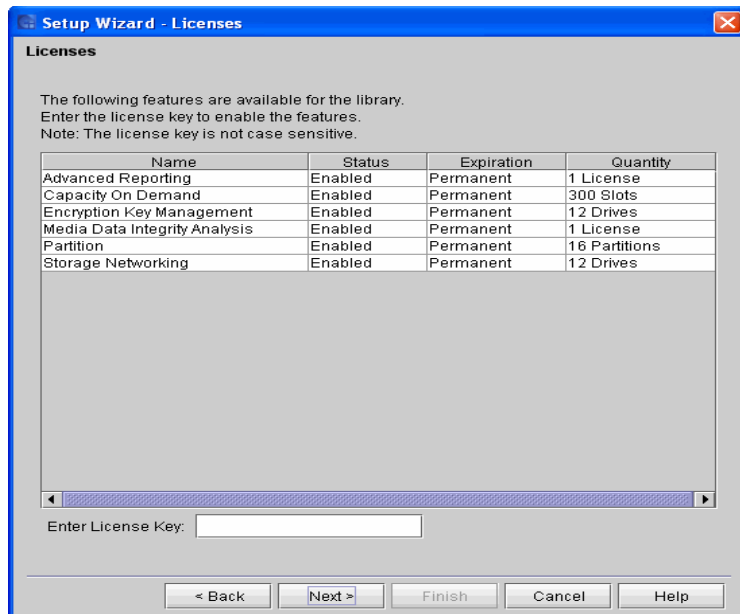
4   If you deleted the default partition, you are given the choice of creating a partition automatically. (See Deleting the Default Partition on page 157for instructions for deleting the default partition.)
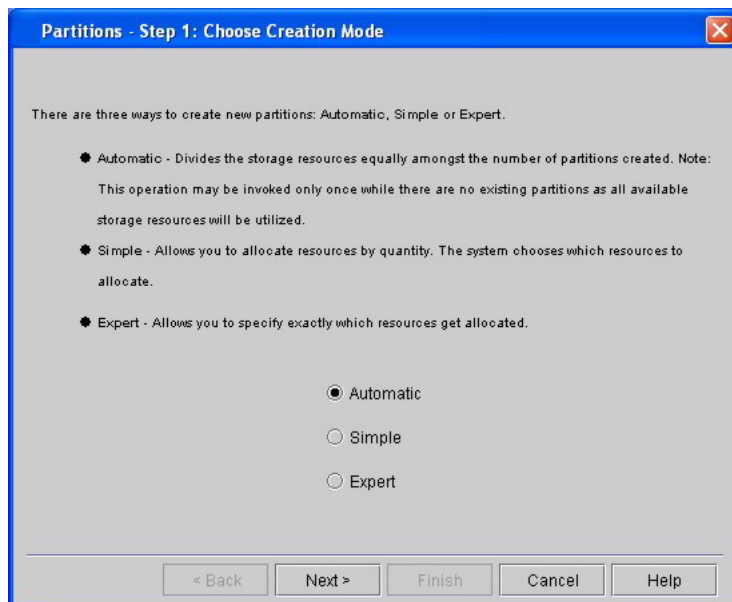
5 Type the number of partitions for each drive type.
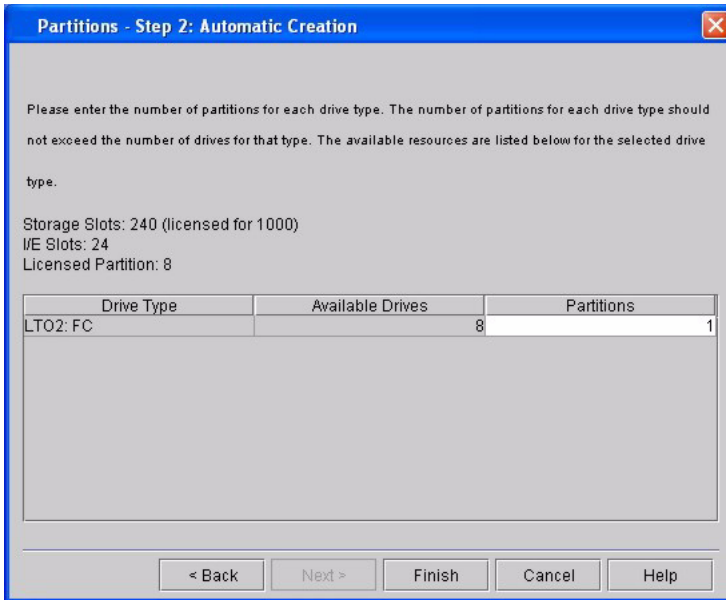
6 Click **Finish**.

The **Partition Setup** dialog box appears.

7 Select the partition.
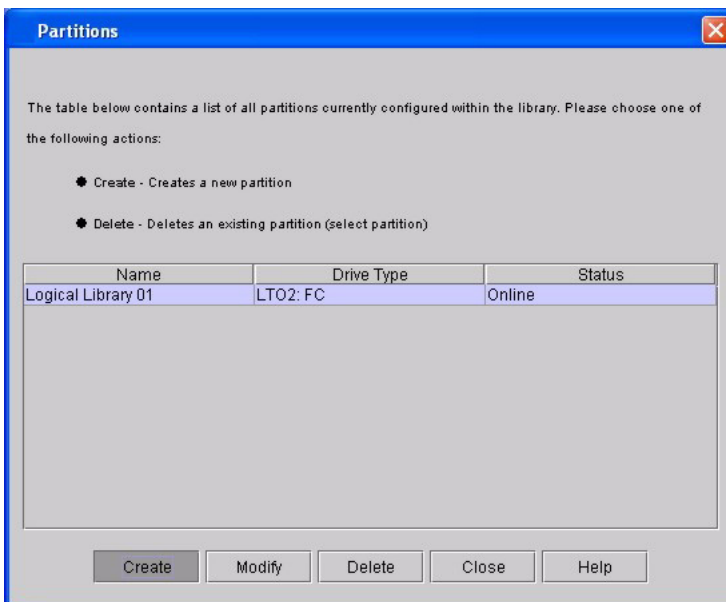
8 Click **Create** to create the partition.

The **LUN Mapping** dialog box appears

9   To configure the LUN mapping for the drives, select the type of drives you have.

Depending on the drive type you selected, see the following for detailed instructions:

- FC Host LUN Mapping on page 204
- SCSI Host LUN Mapping on page 209
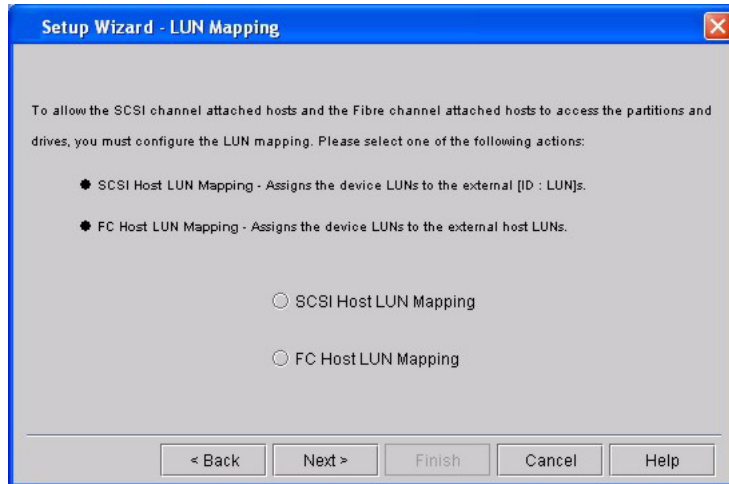
10 Click **Next**.

In the **Network Configuration** dialog box, you can set the following configuration:

- If Dynamic Host Configuration Protocol (DHCP) is enabled on your network, select **Enable**. DHCP automatically configures the library network settings.

- If you do not have DHCP enabled on your network, select **Disable** and type the library name, IP address, subnet mast, and the IP address of the default gateway for your network.

- Under **Port Settings**, select **Enable** or **Disable** for **Auto Negotiation** and then select a **Port Speed**.
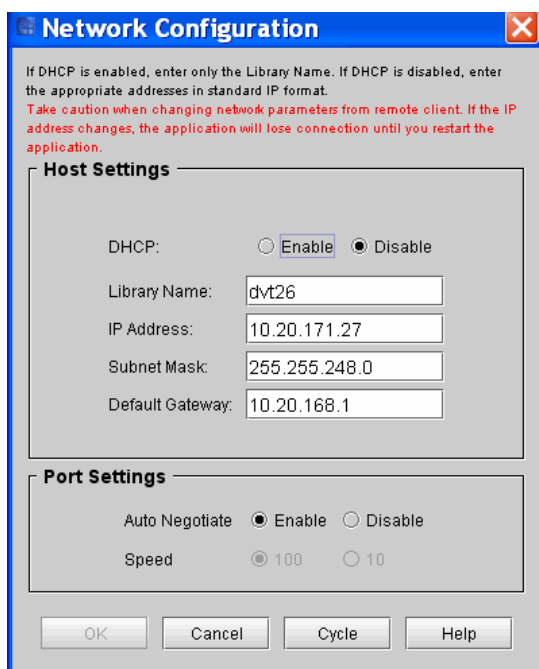
11 Click **Next**.

The **Date and Time** dialog box appears. To set the date and time, either enter the iPv4 or iPv6 addresses of the two NTP servers on your network or set the date and time manually.

12 When you reach the end of the Setup Wizard, click **Finish** to exit.

13 To log off, click **Operation**→ **Log Off**.

14 Continue with the setup and configuration of the library:

- Optionally set up e-mail, using the instructions in Setting up E-mail on page 170.

- Optionally set up e-mail notification using the instructions in SSetting up Notification on page 171.

Once you have completed the configuration, proceed to Installing Cartridges on page 131.

Performing Advanced Configuration

For libraries that will consist of more than one partition, configure the library in the following order:

Enabling Licenses

At installation, the library is initially licensed for a default Capacity on Demand (COD) configuration of 102 LTO or 100 DLT cartridge storage slots. You must enable the library's license keys before you can use more storage slots and configure those parts of the library that are governed by additional licensing.

The characteristics of licensed functionality include:

- COD quantities are displayed as the number of slots licensed.

- Partition quantities are displayed as the maximum number of partitions possible.

- Other features not licensed by quantity are displayed as "1" in the Quantity column.

If you cannot locate the license keys shipped with the library, you can obtain them by contacting Quantum Technical Assistance Center at www.quantum.com/support

Follow this procedure to enable your licensed features:

1 If you are not already working from the physical library, select it from the **View** menu.

2 Click **Setup→ Licenses**.

The **Licenses** dialog box appears.

3 In the **Enter License Key** box, type the appropriate license key. License keys are not case sensitive and all inclusive. For example, J2BGL-22622-52C22 can be entered as j2bgl-22622-52c22.
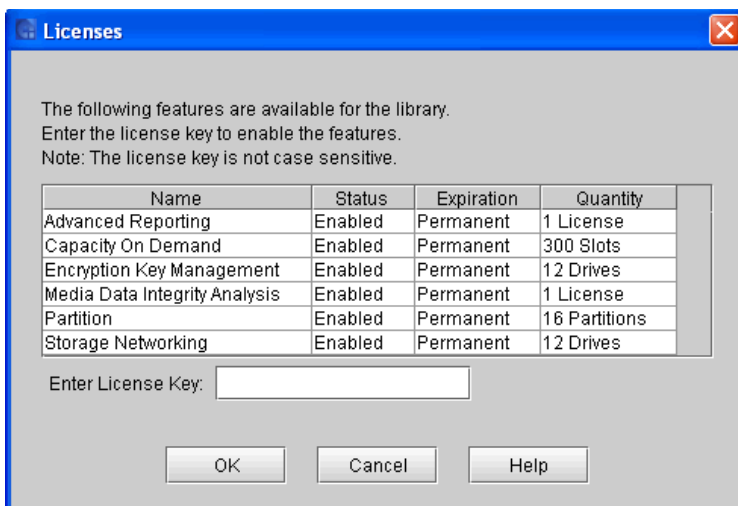
4 Click **OK**.

Licensed features are shown with the status and expiration date for each feature.

Proceed to<u>Setting Up the Network Configuration</u> on page 165.

Setting Up the Network Configuration

Make sure that your library is attached to the network before you use the **Network Configuration** command.

⚠️	**CAUTION**	**You must fully understand all network issues before you change the network configuration for an already configured library. It is recommended that you consult with your network administrator before changing your network configuration.**

📝	Note	If you want to set up an network connection, make sure that the IPv6 option is enabled on the Physical Library dialog.

1   Log on as an administrator.

2   Make sure that you are viewing the physical library. From the **View** menu, select the name of the physical library.

3   Click **Setup**→ **Network Configuration**.

The **Network Configuration** dialog box appears. Then, depending on whether IPv6 is enabled or disabled and the protocol of the network connection you want to configure:

- If IPv6 is disabled, the IPv4 **Network Configuration** dialog box appears.
  Proceed to Setting up IPv4 Network Configuration on page 166.

- If IPv6 is enabled, but you want to configure an IPv4 connection, click **IPv4 Configuration** on the Network Configuration submenu to display the IPv4 **Network Configuration** dialog.
  Proceed to Setting up IPv4 Network Configuration on page 166.

- If IPv6 is enabled and you want to configure an IPv6 connection, click **IPv6 Configuration** on the Network Configuration submenu to display the IPv6 **Network Configuration** dialog.
  Proceed to Setting up IPv6 Network Configuration on page 167.

Note   The Network Configuration submenu only appears if you have enabled
        IPv6 for the physical library.

Setting up IPv4 Network Configuration

After completing steps 1 through 3 of Setting Up the Network Configuration on page 165, the IPv4 **Network Configuration** dialog box appears.

The following table describes the elements on the **Network Configuration** dialog box.

Element	Description
In the **Host Settings** area:	
DHCP	If Dynamic Host Configuration Protocol (DHCP) is enabled on your network, select **Enable** to have DHCP automatically configure the library network settings. **Enable** makes the **IP Address**, **Subnet Mask**, and **Default Gateway** text boxes unavailable. Select **Disable** to make the **IP Address**, **Subnet Mask**, and **Default Gateway** text boxes available for you to manually set the library network settings.
Library Name	The network name that you want to assign to the library.
IP Address	The IP address of the library. This text box is available only if **DHCP** is disabled.
Subnet Mask	The subnet mask. This text box is available only if **DHCP** is disabled.
Default Gateway	The IP address of the default gateway for your portion of the Ethernet network. This text box is available only if **DHCP** is disabled.

Element	Description
In the **Port Settings** area:	
Auto Negotiate	Select **Enable** to have the library automatically negotiate port speeds. **Enable** makes the **Speed** options unavailable. Select **Disable** to make the **Speed** options available for you to manually set the port speed.
Speed	The port speed (10 Mbps or 100 Mbps). **Speed** options are available only if **Auto Negotiate** is disabled.

The **Cycle** button enables you to cycle the external Ethernet interface without rebooting the library.

1   Make the appropriate network configuration changes, and then click **OK**.

2   A prompt appears that informs you that network connectivity will be temporarily lost and asks whether you want to proceed. click **Yes**.

Proceed to

Setting up IPv6 Network Configuration

After completing steps one through 3 of the **Static IP** tab of the IPv6 Network Configuration dialog box appears.
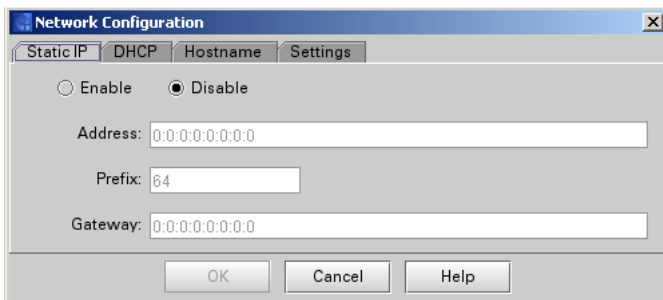
1   Use the **Static IP** tab to disable or to enable and specify a static IP address. Valid static IP addresses include link local, site local, and global unicast.

2   To display the **DHCP** tab, click **DHCP**.
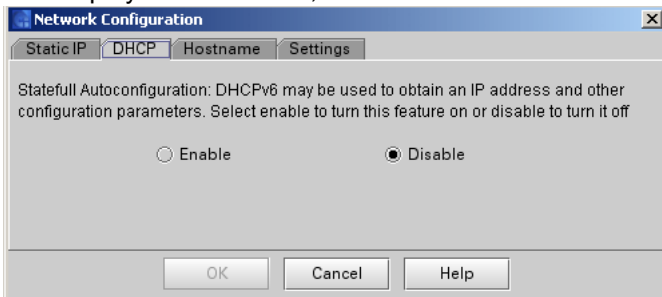
3   As prompted, use the **DHCP** tab to enable or disable the Dynamic Host Configuration Protocol (DHCP) autoconfiguration function.

4 To display the **Hostname** tab, click **Hostname.**
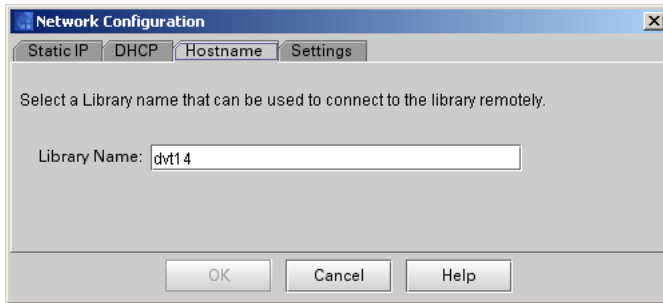
5 Use the **Hostname** tab to specify a library name that can be used for remote connections to the library.

6 To display the **Settings** tab, click **Settings**.
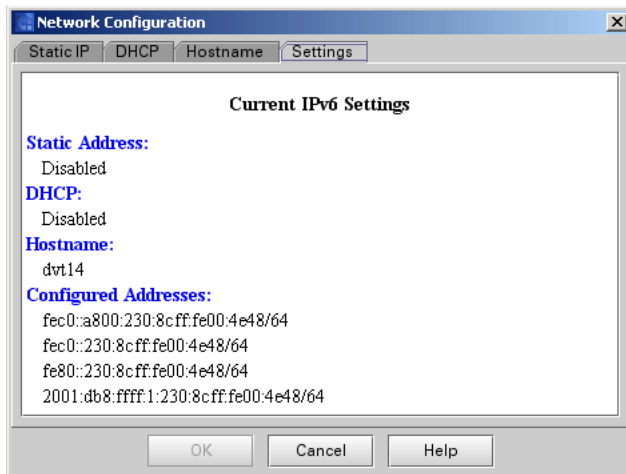
7 Use the **Settings** tab to view the current IPv6 configuration settings.

8 After you make the appropriate network configuration changes, click **OK**.

9 A prompt appears informing you that network connectivity will be temporarily lost and asks whether you want to proceed. Click **OK**.

Proceed to

Configuring the Library

Setting Date and Time

1 Click **Setup**→ **Date and Time**.

The **Date and Time** dialog box appears.

2 In the NTP section:

- If you choose to enable NTP, click **Enable**.

   The **Date and Time** sections of the dialog box are grayed out.

- Type valid IP addresses for the **Primary Server** and optionally the **Secondary Server**.

   - If the DNS Server has not been configured in the LMC, type valid numeric IP addresses that are accessible from the library (example 111.11.11.111). You have the option of using one or two IP addresses. Go to step 5.

   - If the DNS Server has been configured through the LMC (**Setup**→ **DNS Configuration**), type the valid alpha/numeric IP Addresses that are accessible from the library. You have the option of using one or two IP addresses. Go to step 7.

- If NTP is enabled and you no longer want to use this setting, click **Disable**.

   If you choose to disable NTP, you must manually set the date and time. Go to the next step.

3 Use the **Date** drop-down lists to select the month, date, and year.

4 Use the **Time** drop-down lists to select the hour, minute, and whether the time is A.M. or P.M.

5 Use the **Time Zone** drop-down list to select the appropriate time zone.

> **Note** The default time zone is GMT. The time zone that you select appears only on your library information panel. Regardless of your selection for the library information panel, the system operates on the GMT zone.

6   Click **OK**.

Proceed to

Setting up E-mail

The library uses the e-mail settings on the Email Configuration dialog box whenever library e-mail services are used, such as when you use the Send command to e-mail snapshots or logs and when the library automatically sends e-mail notifications of library problems.

1   Click **Setup→ Email Configuration**.

The **Email Configuration** dialog box appears.

2   Enter the following information into the **Email Configuration Settings** dialog box:

- **SMTP Server**—for example, 192.16.68.2 You can use either iPv4 or iPv6 addresses.

> **Note** You must identify the SMTP server by its server address.

- **Authentication**—select either **Password** or **None**. If you select None, you will not be prompted for an **Account** or **Password**.

- **Account**—for example, Jay.User

> **Note** The account specified must be a valid account at the named SMTP server.

- **Password**—for example, password

> **Note**   The password specified must be valid for the specified account at the named SMTP server.

- **Sender Address**—for example, MyLibrary@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. If you type, for example, "scalari6000", the library appends the domain information (for example, "@mycompany.com"). If you type, for example, "scalari6000@mycompany.com", the library does not append any additional information.

3   To test the e-mail configuration, type an e-mail address in the **Recipient** box of the **Test Current Configuration** area and click **Test email**.

4   Confirm that the library displays a message indicating that the test completed successfully and sends a test message to the specified e-mail address.

5   The subject of the test message should be "Test email from Scalar i6000" and the message text should include the library name, version, and serial number, along with the date and time that the message was sent.

6   Click **OK**.

Proceed to .

Setting up Notification

The **Notification** command allows you to send e-mail to specific individuals whenever certain conditions occur. The information in the e-mail notification provides details about the issue and the library conditions at the time of the error.

1   Complete the steps in , unless you have already done so.

2   Click **Setup**→ **Notification**→ **System Setup**.

  The **System Setup Notification** dialog box appears with the **Contact Information** tab displayed.

  Enter the contact information you want included in an e-mail notification if an error occurs in the library.

Note   If you have previously saved a configuration, and you enter a configuration change, the system asks you to perform a **Save Configuration** operation.

3   Click **Close**.

4   Setup the rules.

a. Click **Setup→ Notification→ System Setup**.

The **System Setup Notification** dialog box appears with the **Contact Information** tab displayed.

The **Notification** dialog box displays the **Rules** tab.
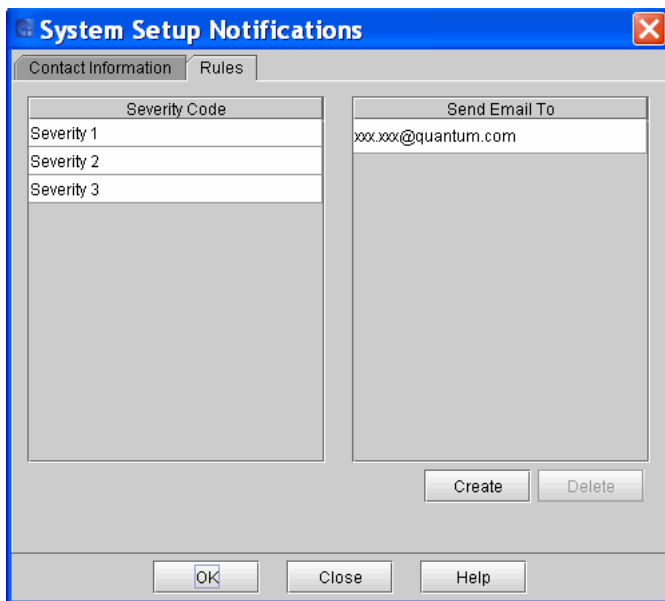
This dialog box shows all notification recipients that are set up currently in the LMC. By default, the only e-mail address to which the library sends e-mail notifications (severity level 1 [Failed] issues only) is techsup@quantum.com (Quantum technical support), as shown in this **Notification** dialog box example.

Note   • Even though you can remove the Quantum technical support e-mail address so that Quantum does not receive severity level 1 notifications, Quantum recommends that you do not remove it. Also, do not include the Quantum technical support e-mail address for severity level 2 or 3 notifications.

• The remaining steps in this procedure guide you through setting up new e-mail notification recipients. To delete an existing e-mail address, click the e-mail address in the **Send Email To** column, and then click **Delete**.

5   To set up a new e-mail notification recipient, click **Create**.

The **New Email Notification** dialog box appears.

6   In the **Email Address** text box, type the e-mail address that you want to receive notifications.

Do not enter multiple addresses into this box. To associate more than one e-mail address with events of a particular severity, repeat the **Create** process.

7 Select the severity level that will be reported.

Select level 1, "Failed," to receive only emergency-related notifications. The severity levels are numbered from 1 to 3, with 3 being the least severe.

Level	Meaning	Type of Information Reported
1	Failed	• Library system has failed • At least one partition (also referred to as a logical library), drive, or cartridge needs attention • Service ticket has been posted to the LMC
2	Degraded	• Library system is degraded • Host operations should be possible, but admin should investigate • Service ticket has been posted to the LMC
3	Warning	• Library system is warning about an issue • Host operations should be possible, but admin should investigate • Service ticket has been posted to the LMC

If working from the remote client, select multiple severity levels by holding down **CTRL** and clicking each choice.

8 Repeat Step 3 on page 171 through Step 10 on page 174 as often as necessary.

9 In the **New Email Notification** dialog box, click **OK**.

10 You are finished entering your specifications, click **OK** on the **System Setup Notification** dialog box.

Proceed to

Enabling Logical Serial Number Addressing for Drives

The **Physical Library** dialog box enables you to set up the library to automatically assign logical serial numbers to drives in the library. Specifically, the library assigns a logical serial number to a drive in a specific location. This is not the serial number of the particular drive. If a drive is replaced by another drive in the same library location, the logical serial number remains the same. From the host's perspective, the replacement drive is the same as the original one.

1   Log on as the service user.

2   Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

3   Click **Setup**→ **Physical Library**.

The **Physical Library** dialog box appears.
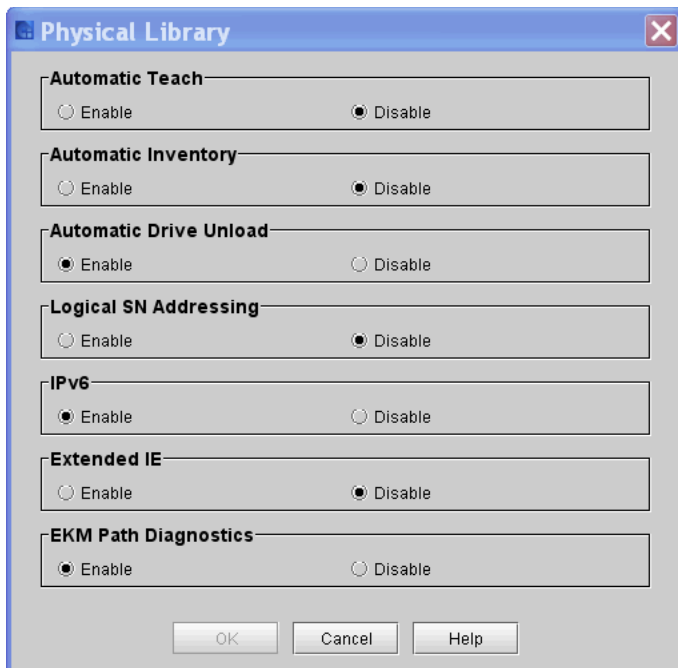
The **Logical SN Addressing** area is available to service users only.

4   In the **Logical SN Addressing** area, select **Enable** to cause the library to automatically assign logical serial numbers to drives. **Disable** is the default setting.

5   Click **OK**.

Proceed to

Using LDAP

Lightweight Directory Access Protocol (LDAP) is the industry standard Internet protocol that provides centralized user account management. This library supports the Microsoft® Active Directory® LDAP server and user account information in the schema defined by RFC 2307. User password schemes must be encrypted using UNIX® crypt.

> **Note** The Scalar i6.5 release provided enhancements to the Lightweight Directory Access Protocol (LDAP) features. For maximum ease of use of this feature, Quantum strongly recommends that you are running version i6.5 or greater.

You can configure the Lightweight Directory Access Protocol (LDAP) settings any time after the initial library configuration. Once you enable and configure LDAP, you can view your current LDAP settings using the LDAP menu.

> **Note** Active Directory no longer requires Windows Services for Unix 2.5.

> **CAUTION** **Any LDAP configurations from i6.3.1 and earlier will not import into the i6.5 LDAP configuration. You must reconfigure LDAP for the i6.5 update.**

LDAP Server Guidelines

LDAP is the industry standard Internet protocol that provides centralized user account management subsystem. User account information is centralized and shared by different applications, simplifying user account management tasks. Administrative users can add, delete, and modify only local user account information. For more information concerning setting up user accounts, see the *Scalar i6000 User's Guide*.

User and Group Access

For LDAP accounts 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 without administrator privileges must be assigned to these groups on the LDAP server to have access to the corresponding partitions on the library. LDAP accounts 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.

> **Note** Usernames and group objects must be in LDAP Distinguished Names formats.

OpenLDAP 2.4

You must install and run OpenLDAP 2.4 or later. The supported Objects in OpenLDAP 2.4 and above are of type "Person" or derived objects, and the group Objects must be of type "GroupOfNames".

OpenLDAP must be compiled with Overlay Support and requires the installation of "memberOf" overlay. More information can be found in the man pages of OpenLDAP with the "man slapo-memberof" command.

Configuring LDAP

1 From the **Setup** menu, click **LDAP**.

The **LDAP Configuration** dialog box displays with the **General** tab displayed.
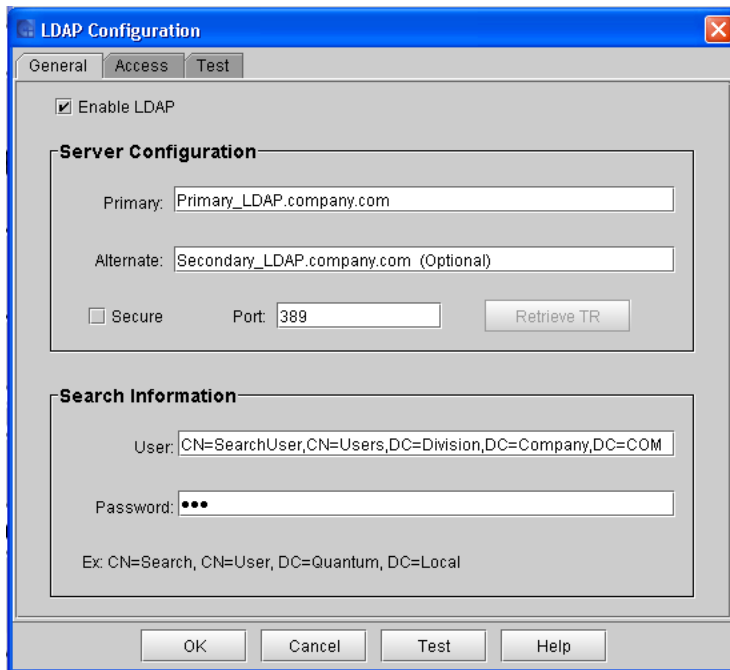
2 In the **General** tab, you can enable or disable LDAP functionality:

- To enable LDAP, select **Enable LDAP**.

- To disable LDAP, clear the **Enable LDAP** check box.

> **Note**   If you disable LDAP, single sign-on functionality will not be available on the library.

3 To configure or modify LDAP, use the appropriate tabs and set the following configurations:

General tab

- **Server Configuration** section

  - **Primary**: You must provide a primary IP address or DNS name.

  - **Alternate**: An alternate IP address or DNS name is optional.

  - **Secure**: Use this check box to enable the setup options to access a secure LDAP server, which can be done using any port except 389. The default secure port is 636. If you enable this option, you must retrieve the Trusted Root Certificate from the server by clicking **Retrieve TR**.

  - **Port**: Enter the appropriate port in this field. The default port for non secure connection is 389 – and 636 for secure (SSL) based LDAP connections. The port setting can be changed.

  - **Retrieve TR**: Use this function to retrieve the Trusted Root Certificate from the LDAP server. A dialog box displays basic Trust Root certificate information, for example, subject name, MD5, and SHA 1 hashes. It is recommended that you verify this information independently on the LDAP server.

⚠ CAUTION	**The first time you use Retrieve TR, the process can take 5 to 10 minutes. To connect to a secure LDAP server, you must complete the retrieval process.**

- • **Search Information** section

  The Search Information section allows you to enter on the LDAP server a user name and password for a user who has sufficient privileges to search for user names. The user name is specified in distinguished name format. To use this feature administrative user rights are not required, but you must have the right to search user names in the LDAP directory.

4 Click the **Access** tab.

Use this tab to configure LDAP authentication.

- • **Context Information** section

  - • **User Context**: This is a path in distinguished name format to the location used to search for the login users. You can search for a user in the context specified and all contexts below it.

  - • **Group Context**: This is a path in distinguished name format to the location used to search for the groups to which a user belongs. Only groups which are in the Group context or below are considered for library access.

- • **Library Access** Groups section

  - • **User**: This field contains a fully distinguished name of the groups to which all the library non-admin users belong.

  - • **Admin**: This field contains a fully distinguished name of the group to which all admin users belong.

Note Non-admin library users also need to be members of the groups that match the partition names for which they are granted access. These group names needn't be specifically listed anywhere in the LDAP setup on the library. When user logins are validated during login, their group memberships for partition access are validated automatically.

5 To validate your configuration, click **OK** or **Test**.

6 Click the **Test** tab.

You can use the Test functionality to simulate an LDAP login for a specific user and quickly discover what access rights the user has and to what partitions the user has access.
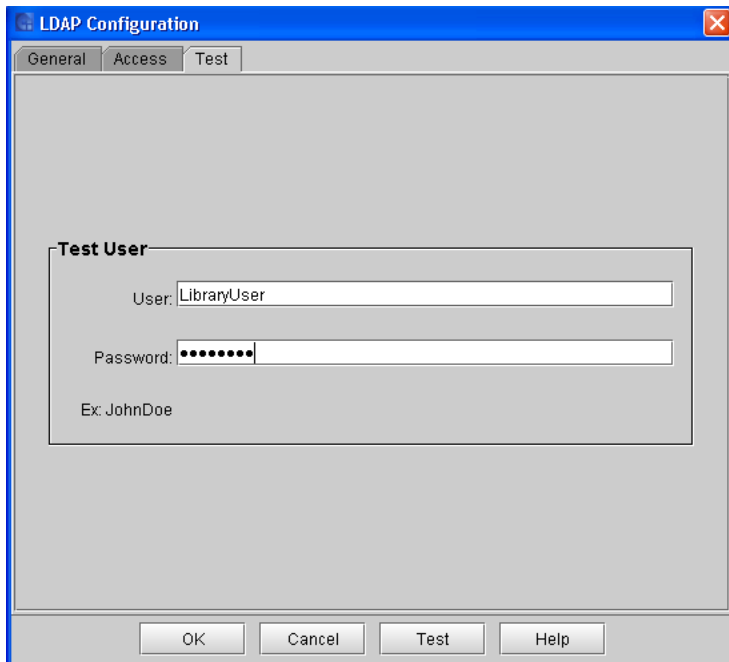
Test User section

- **User**: Type the appropriate User name.
- **Password**: Type the user password.

7 To initiate the library authentication process to the LDAP server, click **Test** after providing the user name and password.

A dialog box appears displaying what level of access the user is assigned, and to which library partition(s) the user has access.

8 After you have entered the LDAP configurations, click **Test** to verify the LDAP connection.

A connection with the LDAP server(s) is established and the library determines whether the LDAP Distinguished Names specified in the Access tab are valid.

A message box appears indicating that the success or failure of the LDAP connection.

- If the connection failed, the error message contains information that you can use to resolve the issue.

Click **OK** to return to the LDAP Configuration dialog box.

- • If the connection was successful, in the message box, click **OK** and continue.

9 To accept and save the library configuration, in the LDAP Configuration dialog box, click **OK**.

10 To validate your configuration, click **OK** or **Test**.

Proceed to

Working with Library Control Paths

You must define a control path for each library partition. The control path is used to connect a partition to a host application. The Scalar i2000/i6000 does not automatically assign a control path when you create a partition. Each partition control path can occur through one of several different physical connection points depending on the hardware configuration of your library. The procedure for setting up and defining the control path for a partition depends on which physical connection point you choose to use.

Note	If you have more than one FC I/O blade in the library, each FC I/O blade presents each partition--that does not have a tape drive as the control path -- as a target device to the host. Thus the host may see the same partition multiple times. To avoid confusion, configure host mapping so that each host sees each device only once.

CAUTION	**Once a control path connection to a host is configured through a drive, that same host to control path connection will not be visible through a FC I/O blade and vice versa. Once the control path is established via one physical connection, it must be deleted before it can be set up through an alternate physical connection.**

The following table defines which procedures to use to complete setting up partitions and configuring a control path for each of the possible physical connection points.

Table 7   Control Path Matrix

GUI Menu Path	Procedure References	MCB Direct Connection	FC I/O Blade Connection	LTO-5 Connection
Setup > Partitions > Configure	Creating Partitions on page 182	**Step 1**	**Step 1**	**Step 1**
Setup > Connectivity >	Configure FC IO Blade • Configuring FC I/O Blade Ports on page 194 • Configuring FC Host Port Failover on page 198 • Enabling a Disabled Target Port on page 200 • Configuring Datapath Conditioning on page 201 • Configuring Switch Zoning on page 204		**Step 2**	
Setup > Device > Access	Configuring Host Access • FC Host LUN Mapping on page 204 • Channel Zoning on page 208 • SCSI Host LUN Mapping on page 209 • LUN Mapping Wizard on page 211		**Step 3**	
Setup > Device > Access	Step 1 on page 195 Setup > Connectivity > Port Configuration	**Step 2**		
Setup > Partitions > Control Path	Configuring Control Path on page 215			**Step 2**
Setup > Device > Access > SNW Drives	Selecting a Storage Networking Drive on page 217 (s)			**Step 3**

Table 7   Control Path Matrix

GUI Menu Path	Procedure References	MCB Direct Connection	FC I/O Blade Connection	LTO-5 Connection
Setup > Device > Access	Configuring Host Access • FC Host LUN Mapping on page 204 • LUN Mapping Wizard on page 211			**Step 4**
Setup > Device > Access > SNW Host	Configuring the SNW Host Device on page 218			**Step 5**

Proceed to the appropriate steps.

Creating Partitions

The ability to create multiple partitions is controlled by licenses. See Enabling Licenses on page 163 if you have not already configured your library's licenses.

You can create partitions automatically or manually. If you choose to configure a partition manually, you can allocate library resources to it using either **Simple** or **Expert** mode.

Creating Partitions Automatically

You can use the library's automatic mode to create partitions within limits based on licensing restrictions and available resources. Because automatic mode is available only if no partitions currently exist, you must first delete the default partition that was initially configured on the initial boot-up.

1   Click **Setup→ Partitions→ Configure**.

The **Partitions** dialog box appears.
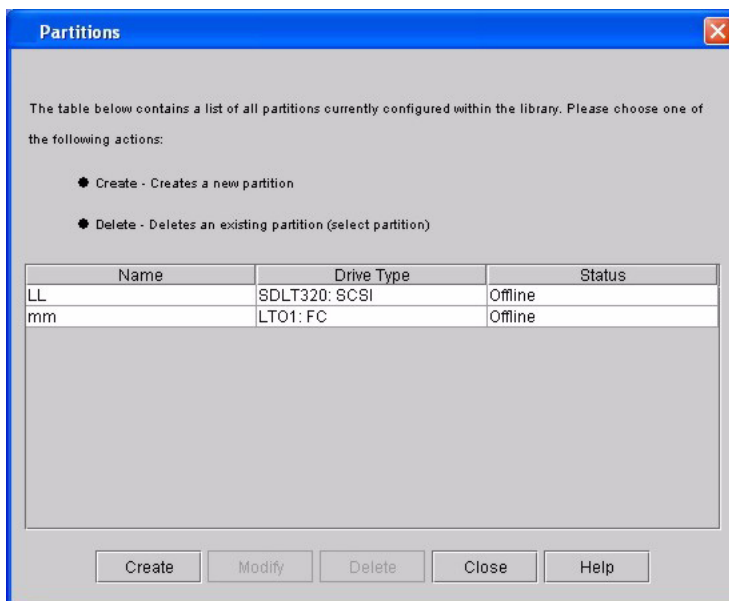
2   Click **Create**.

The **Partitions – Choose Creation Mode** dialog box appears.
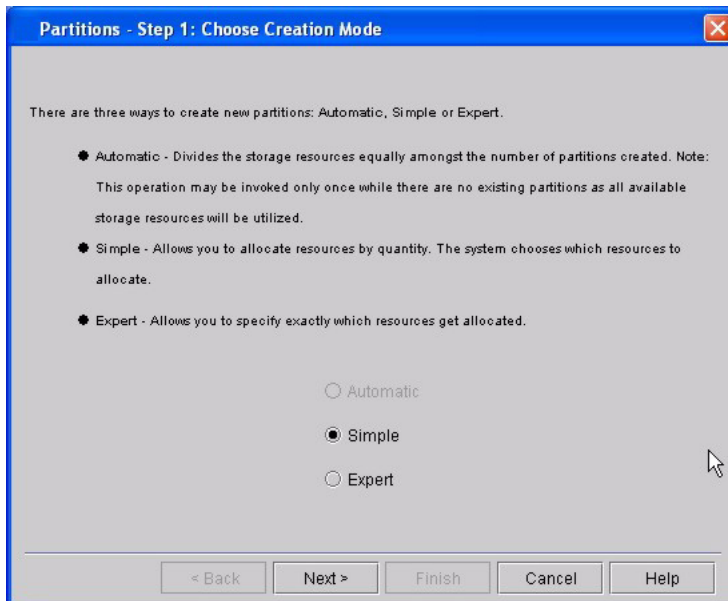
3   Select **Automatic**, and then click **Next**.

The **Partitions – Automatic Creation** dialog box appears.

4   In the **Partitions** column, type the number of partitions you want to create for each media/drive type.

The maximum number of partitions that you can specify is determined by the number of partitions you are licensed to create and the number of drives available. The library is licensed either for one partition or for the maximum of 16 partitions.

5   Click **Finish**.

Creating Partitions Manually

Use manual mode to allocate specific drives, storage slots and I/E station magazines when creating a new partition. Manual mode provides two ways to allocate library resources: simple and expert modes. In simple mode, you can specify the quantity of each element you want assigned to the partition. The library assigns the next available elements to the partition. In expert mode, you indicate specifically by location which drives, storage magazines, I/E station magazines, or (if enabled) extended I/E station magazines to assign to the partition.

To create a partition with mixed media, you must use expert mode in the **Partitions** dialog box.

1 Click **Setup→ Partitions→ Configure**.

The **Partitions** dialog box appears.
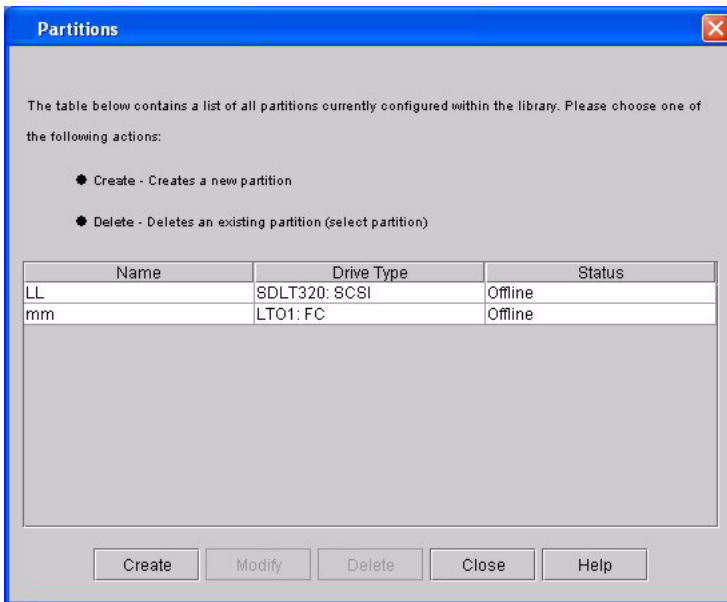
2 Click **Create**.

If no partitions currently exist, the **Partitions – Choose Creation Mode** dialog box appears.

3 Select **Simple** and then click **Next.**

If at least one partition is already configured, this dialog will not appear.
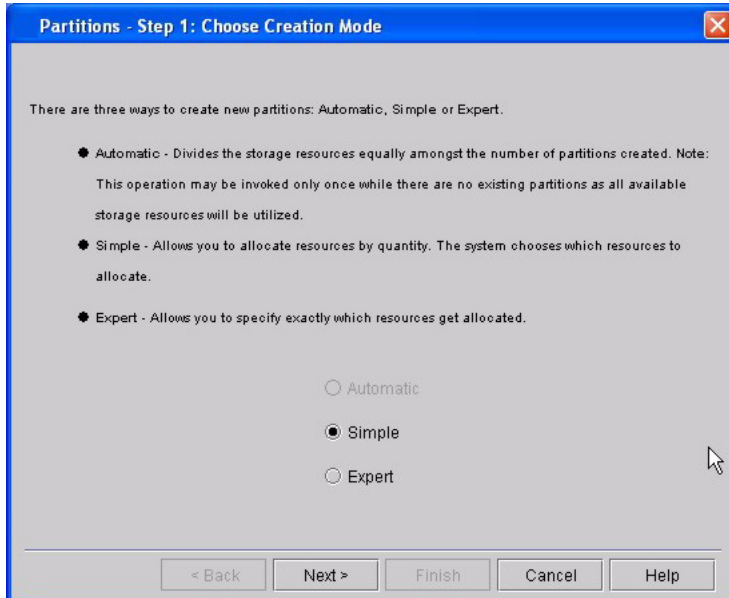
4 In the **Choose Partition Properties** dialog box, configure the following settings:

- In the **Name** box, describe the new partition.
- In the **Drive Domain** drop-down list, select the appropriate drive domain.
- From the **Vendor ID**, select the vendor.
- In the **Product ID** drop-down box, select the appropriate product type.
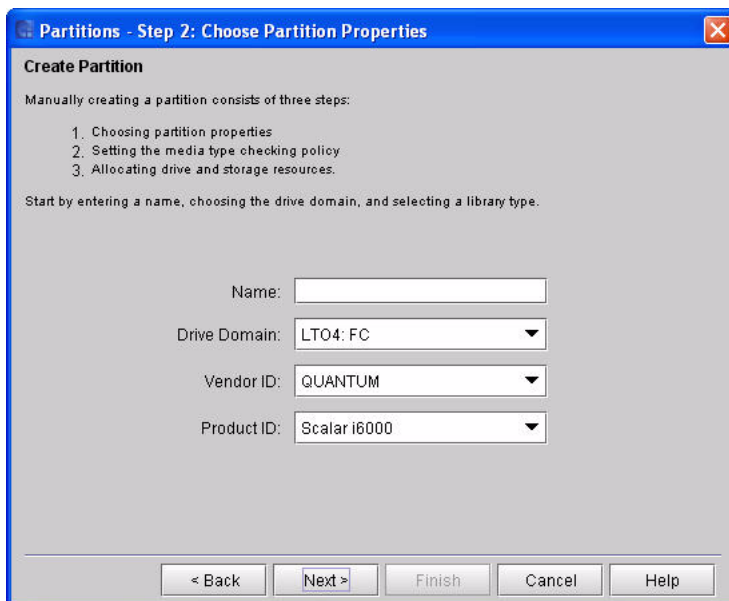
5 Click **Next** to proceed.

6   In the **Choose Policy Settings** dialog box:

- Select whether or not to enable **Media Type Checking**. With a valid media type identifier present and the Media Type Checking setting enabled, which it is by default, a host is prevented from executing invalid media moves across differing media types. For example, a host can be prevented from moving LTO-3 media to an LTO-2 drive. If an invalid move is attempted, an error is returned to the host.

  Regardless of whether or not partition media policies are enabled or disabled, the library always prevents host move-media commands that cross different media domains. For example, the library will never execute a host command to move an LTO cartridge from an LTO drive to a DLT storage slot, and vise versa.

- For **Media Checking Policy**, choose either **Required** or **Not Required**.

  In **Required** mode, if the library does not find a valid media ID on a cartridge, the library does not allow it to be moved into or within the library. If the library finds a valid media ID, the library allows it to be moved from an I/E station into a partition that contains magazines matching the media domain of the cartridge (for example, LTO), but the library does not allow the cartridge to be moved from storage to a drive that does not have a matching type (for example, an LTO-2 cartridge will not be allowed to move to an LTO-1 drive).

  In **Not Required** mode, if the library does not find a valid media ID on a cartridge, the library allows it to be moved into or within the library as long as the I/E station magazine, storage magazine, or drive matches the media domain of the cartridge. If the library finds a valid media ID, the library does not allow the cartridge to be moved from storage to a drive that does not have a matching type (for example, an LTO-2 cartridge will not be allowed to move to an LTO-1 drive).

- Configure the **Return Media Identifier**. With the **Return Media** Identifier setting, you can control if and where a media type identifier appears in the volume serial number that is returned to the host.
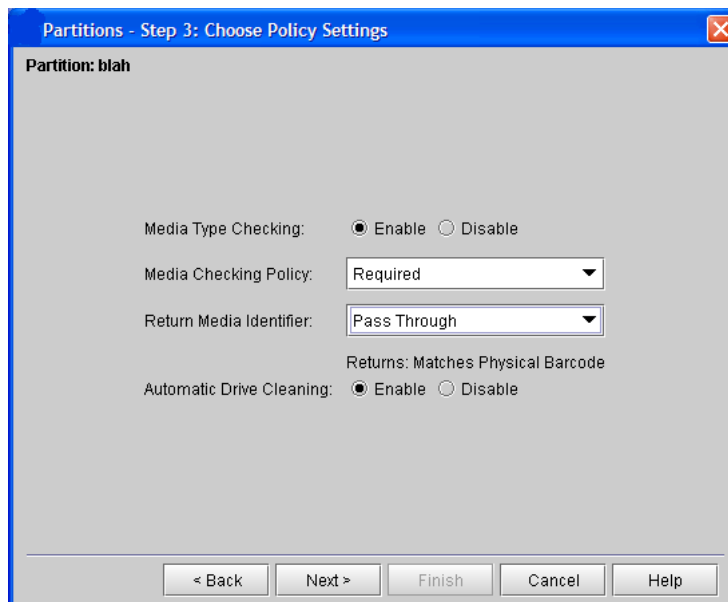
Table 7 shows an example of how the return media identifier behavior works depending on which setting you choose: **Disabled**, **Prefix**, **Suffix**, and **Pass Through**. The bold, underlined portion represents the media identifier.

Table 8   Return Media Identifier Behavior Example

Actual LTO-1 Barcode Label	ABC123**L1**
Behavior	**Volume serial number returned to Host**
Disabled	ABC123
Prefix	**L1**ABC123
Suffix	ABC123**L1**
Pass Through	ABC123**L1**

> ☑ **Note**   Once a media volume serial number has been reported to a host, changing the Return Media Identifier setting may cause the host to not recognize media within the library.

For more information on how media policies in the library work, see the library *Scalar i6000 User's Guide*.

• For **Automatic Drive Cleaning**, click either **Enable** or **Disable**. This setting is enabled by default.

Enabling automatic drive cleaning allows the library to initiate drive cleaning each time a drive requests a cleaning operation. For automatic drive cleaning to function, you must first configure drive cleaning for the library. For more information about configuring drive cleaning, see Configuring Drive Cleaning on page 214.

> ☑ **Note**   Automatic drive cleaning should be enabled for partitions only if the host application does not support the coordination of drive cleaning. If drive cleaning functionality is enabled on the host application, do *not* enable automatic drive cleaning for any partitions in the library.

7   Select **Next** to proceed.

8   In the **Choose Resource Allocation Mode** dialog box, select either **Simple** or **Expert**.

9   Select **Next** to proceed.

Performing Simple Partition Resource Allocation

This procedure continues from

1   In the **Choose Resource Quantities** dialog box, enter the number of elements to include in the partition by specifying:

    •   Number of drives

    •   Number of storage slots

    •   Number of I/E station slots

    The quantity available for each type of resource element indicates resources not already assigned to existing partitions. Storage slot quantity is limited by the total slots authorized in the capacity on demand license.

2   Click **Next** to proceed.

3   In the **Partitions – Summary Information** dialog box, verify that the parameters you set are correct.

4 To create the partition, click **Create**.

5 In the **Partitions – Completed** dialog box, review the information to make certain it is correct.
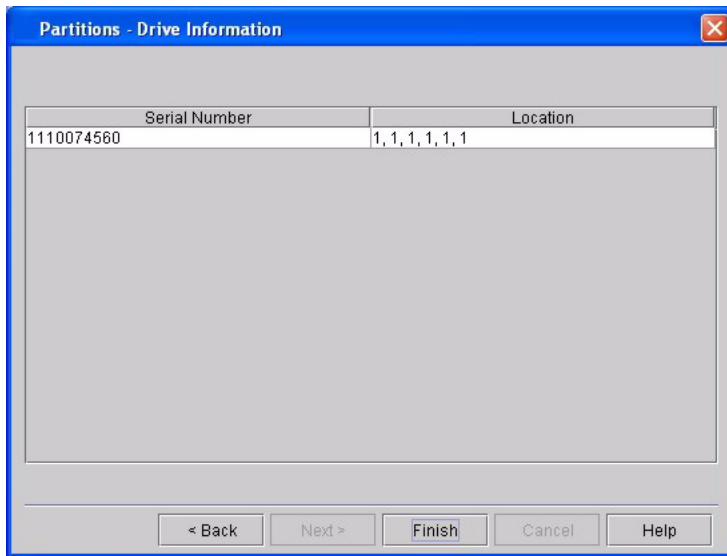
6 Click **Finish**.

The **Partitions** window appears, showing the new partition.

7 Optionally, click **Next** to identify and view the details of the drive or drives assigned to the partition.

8 Click **Close** to exit the **Partitions** window.

Performing Expert Partition Resource Allocation

This procedure continues from

1 In the **Select Drives** dialog box, select the location of the desired drive or drives. Make sure that you select the appropriate module, since the library can have drives in the control module and in any other expansion module.
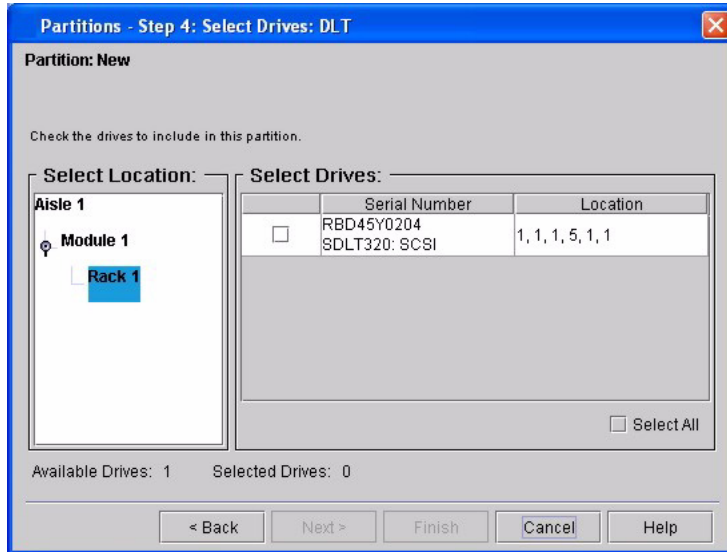
2 To assign a drive, select its check box. You can identify a drive by its serial number and location coordinates.

3 Click **Next** to proceed.

4 In the **Select Storage Slots** dialog box, select the rack location of one or more storage magazines.
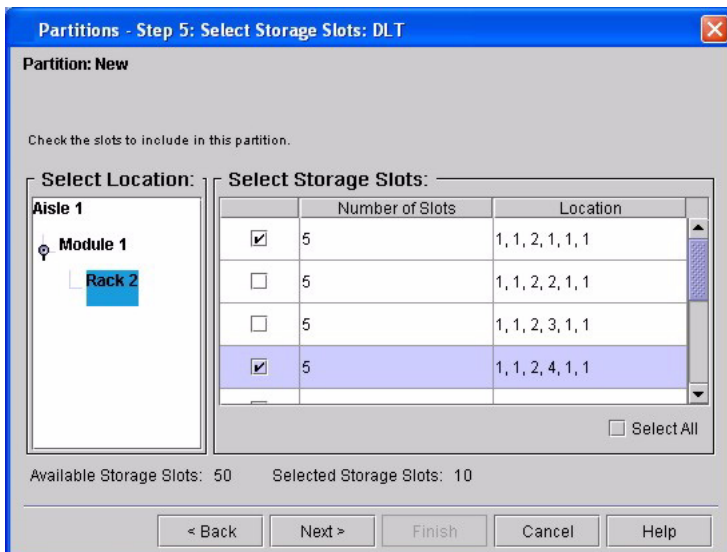
5 Assign a storage magazine by selecting its check box. You can identify a storage magazine by its location coordinates. The number of slots available in the magazine is determined by the drive media type.

> 📝 **Note**   You can only assign complete magazines to a partition.

6 Click **Next** to proceed.

7 In the **Select I/E Slots** dialog box, select the location of one or more I/E station magazines. Make sure that you select the appropriate module, since the library can have I/E stations in the control module and in any of the eleven expansion modules.
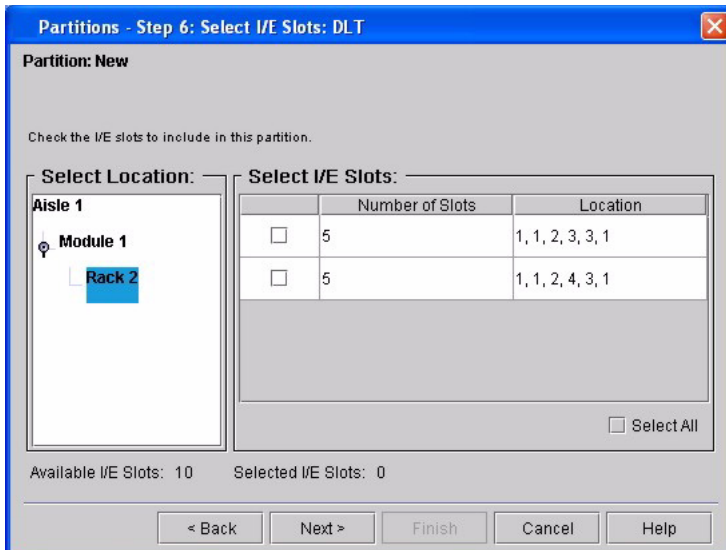
8 Assign an I/E station magazine by selecting its check box. You can identify an I/E station magazine by its location coordinates.

> 📝 **Note**   You can only assign complete magazines to a partition.

9 Click **Next** to proceed.

10 In the **Partitions – Summary Information** dialog box, verify that the parameters you set are correct.
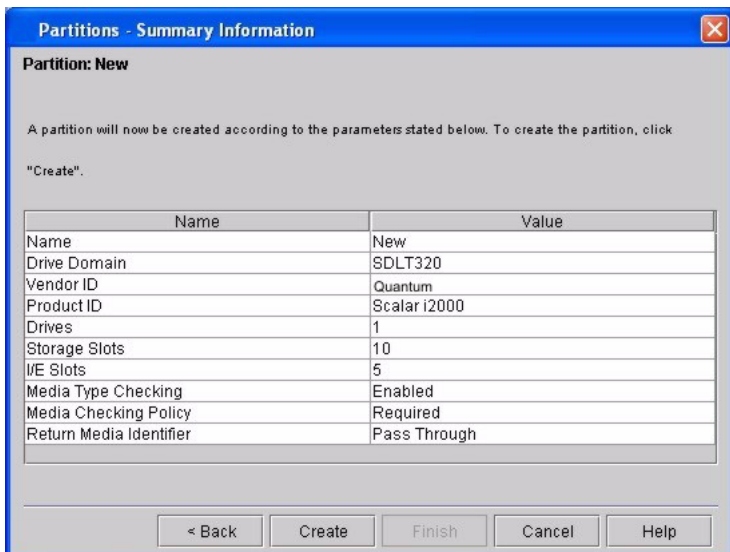
11 To create the partition, click **Create**.

12 In the **Partitions – Completed** dialog box, review the information to make certain it is correct.

13 Optionally, click **Next** to identify and view the details of the drive or drives assigned to the partition.

14 In the **Partitions** dialog box, click **Finish**.

Viewing Partition Details

If you want to see settings and information for a partition but do not need to make changes, view partition details. Unlike modifying a partition, viewing details does not require you to take a partition offline.

1 Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

2 On the menu bar, click **Monitor**→ **Partitions.**

The **Partitions Status** dialog box appears with a list of all logical partitions in the library and information about each partition.
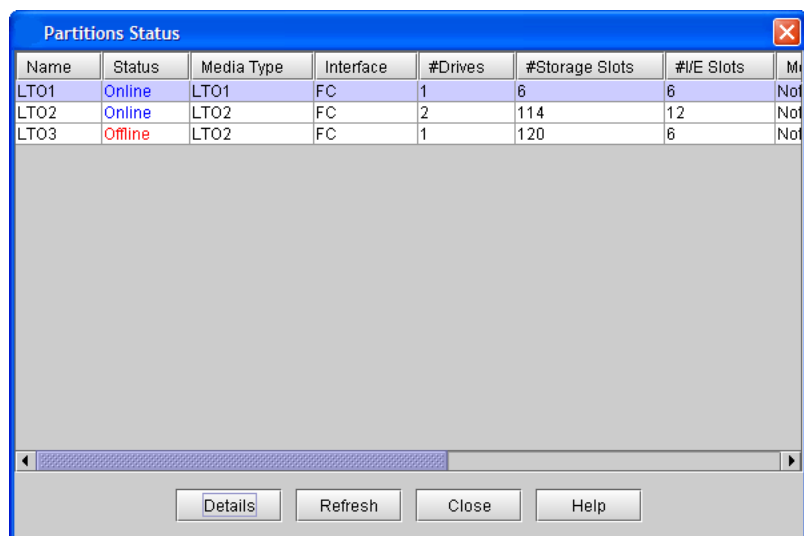
The following table describes the elements on the **Partitions Status** dialog box.

Element	Description
Name	The name of the partition.
Status	The status of the partition (Online or Offline).
Vendor	Displays Vendor ID.
Product ID	Displays the what type of library the system is reporting as.
Serial Number	The serial number of the library.
Media Type	The type of media used in the partition (LTO-1, LTO-2, LTO-3, LTO-4, LTO-5, or DLT).
Interface	The type of interface used to connect to the host (FC or SCSI).
#Drives	The number of tapes drives in the partition.
#Storage Slots	The number of storage slots in the partition.
#I/E Slots	The number of I/E station slots in the partition.
Media Type Checking	The current setting for media type checking (Required, Not Required, or Disabled).
Media Identifier	The current setting for return media identifier (Suffix, Pass Through, Prefix, or Disabled).
Drive Autolevel	The current setting for drive firmware autoleveling (Enabled or Disabled).
Auto Drive Clean	The current setting for automatic drive cleaning (Enabled or Disabled).
Encryption	Reports whether the media is encrypted. The values are Application Managed or Library Managed.

3 To see additional details for a partition, click the partition in the list, and then click **Details**.

The **Partition Details** dialog box appears. This windows shows additional information about the partition, such as vendor, product ID, and serial number.

4   Click **Close** to close the **Partition Details** dialog box.

5   Click **Close** to close the **Partitions Status** dialog box.

Proceed to Configuring FC I/O Blade Ports on page 194.

Configuring FC I/O Blade Ports

Each FC I/O blade installed in the library has two ports reserved for connection to hosts or the SAN. These ports are FC-1 and FC-2. By default, ports FC-1 and FC-2 are in target mode. The other four ports (FC-3, FC-4, FC-5, and FC-6) are in initiator mode by default.

The default FC I/O blade ports are given in Table 9 on page 194.

Table 9   FC I/O Blade Default Port Settings

Port	Loop ID	Speed	Frame Size	Port Mode	Connection Option	Private/Public
FC-1	Soft	Auto	2048	Target	Loop preferred	Public
FC-2	Soft	Auto	2048	Target	Loop preferred	Public
FC-3	Soft	Auto	2048	Initiator	Loop preferred	Public
FC-4	Soft	Auto	2048	Initiator	Loop preferred	Public
FC-5	Soft	Auto	2048	Initiator	Loop preferred	Public
FC-6	Soft	Auto	2048	Initiator	Loop preferred	Public

1 Click **Setup**→ **Connectivity**→ **Port Configuration**.

The **Connectivity** dialog box appears. All components that provide FC and SCSI ports show in the dialog box if they are detected.
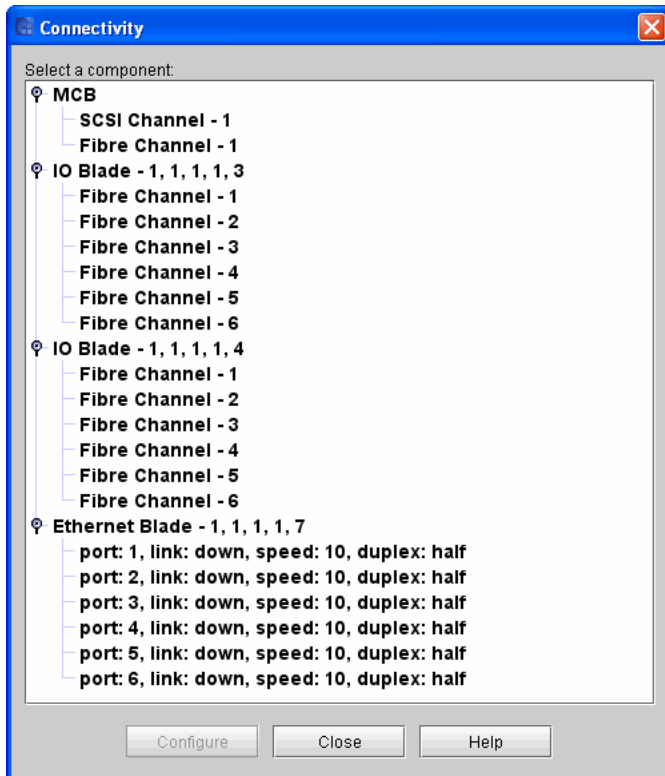
2 Select a component to expand its list of detected connectivity boards and the ports on each.

3 Click a port to highlight it, and then click **Configure**.

For an FC port on either the MCB or an I/O blade, the **Fibre Channel Parameters** dialog box appears.

You can configure two settings for an MCB connection and all settings for an I/O blade connection. The figure above shows an FC port configured for target mode and a loop preferred connection.

    a. In the **Loop ID** area of the **Fibre Channel Parameters** dialog box, selecting **Soft** acts as a toggle, checking and clearing the box. If the box is not checked, you can click a hard loop ID (within the range from 0 to 125) from the drop-down list. Some operating systems require hard ID settings. Consult your service representative before making changes to this setting.

    b. Select **Auto** to automatically set the interface speed. To configure the speed manually, clear the **Auto** check box and use a setting from the drop-down list. Because this setting is not configurable on the MCB, the **Speed** area does not appear on the **Fibre Channel Parameters** dialog box when configuring the MCB FC port. The MCB FC port speed is always 1 Gb/sec.

    c. FC **Frame Size** is specified by each receiving node and need not match any other node. The frame size is typically set to 2048. (You can use another frame size if it is required by a particular software application.)

    d. FC ports support **Private** and **Public** Fibre Channel attachments. The default port mode setting for FC ports 1 and 2 is **Target Public**, and the default port mode setting for FC ports 3 through 6 is **Initiator Public**. With **Public**, the loop is scanned for Fabric devices and allows the Fabric to have access to all available target devices that are attached to it. With **Private**, the local loop is scanned for devices except for Fabric devices. In **Target** mode, the port is set to receive connections from another FC initiator, such as a host or FC switch. In **Initiator** mode, the port scans for storage devices. In **Target and Initiator** mode, the port operates in both modes simultaneously.

e. The default connection mode for both target and initiator ports is **Loop Preferred**. For target ports, other options include **Loop** and **Point to Point**. For initiator ports, other options include **Loop** and **Loop Preferred**. Therefore, if you want to change a target port that is set to **Point-to-Point** to initiator mode, you cannot do it until you first change the port connection type to **Loop** or **Loop Preferred**. Consult your service representative before making changes to this setting.

4 After you finish selecting the port configuration settings, click **OK**.

5 A message appears that asks whether you want to make the change. Click **Yes**.

Proceed to

Configuring FC Host Port Failover

Configure the optional FC Host Port Failover (HPF) feature so that an alternate "standby" target port on an I/O blade can assume the identity and LUN mapping configuration of the primary "active" target port if the primary port fails. HPF enables the library to continue operations without requiring you to reconfigure the host or the SAN.

To enable HPF, you must make sure that two ports on the I/O blade are in target mode and point-to-point connection. Use ports 1 and 2, which are ports that are traditionally configured to be host targets. I/O blade ports are numbered from bottom to top as the blade sits in the I/O management unit.

Both ports must be attached to the same SAN fabric to provide host access. The active primary port is used for host communications, while the passive standby port is kept idle. The way that you configure the recovery settings determines how the failed port behaves after it is restored from a failed state.

The library generates a ticket when port failover occurs. Examine the ticket and the repair page associated with the ticket to determine the reason for the failover.

To configure HPF, perform the following steps:

1   Log on as an administrator.

2   Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

3   Confirm that there are two ports on the I/O blade in target mode and point-to-point connection. For more information, see "FC Host" in the *Scalar® i6000 User's Guide*.

4   Click **Setup**→ **Connectivity**→ **FC Host Port Failover**.

    The **FC Host Port Failover** dialog box appears, showing all the I/O blades found in the library. Each blade is identified by name and by location.
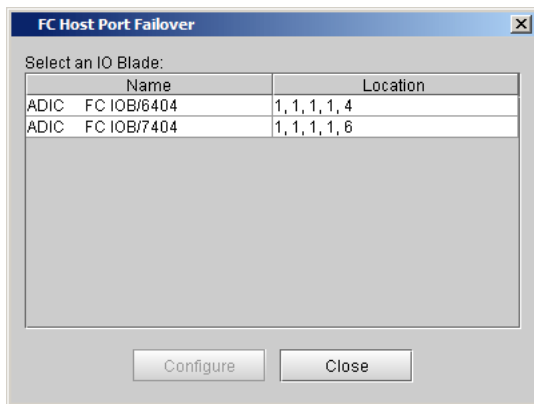
5 Click a blade to highlight it, and then click **Configure**.

The **FC Port Failover** dialog box appears.

6 In the **Feature Enable** area, select **Enable FC Host Port Failover**, and then click **Set** to make the **Configuration** tab available.

> ![Note icon] Note On the **Configuration** tab, settings are unavailable if the current state of the tab is set to **Disabled**.
>
> Be aware that there might be incompatibilities with channel zoning configuration on the I/O blade if you enable host port failover. Both target ports must have the same ports mapped.

7 Accept the recovery setting default values unless an authorized representative advises you otherwise.

Note   Before you set recovery settings, understand the following elements in the **Recovery Setting** area:

- **Error count recovery mode** sets the recovery scenario for all ports when port failure is caused by excessive errors on the port. The only setting option is **Require Intervention**.
- **Link down error recovery mode** sets the recovery scenario for all ports when port failure is caused by the port going offline for more time than the threshold specified in the Link down **delay time** text box. The only setting option is **Require Intervention**.
- **Link down delay time** sets the timeout threshold before link down status applies. The default value is zero (0) seconds. There is no maximum value.

  Require Intervention means that a user must manually use the **Physical Ports** tab to bring a failed port that has recovered back online.

8   Configure the Primary Port by using the **Select Primary** drop-down list to select from the target ports that are online and available.

Note   Only ports that are in target mode and point-to-point connection can participate in host port failover. The primary port becomes active by default and the alternate port will go on passive standby until a failover occurs. You must select a primary port. **Current Active** indicates the currently active port.

9   Click **Set**. If your configuration has errors, a warning message appears.

Enabling a Disabled Target Port

Use the **Physical Ports** tab to manually enable an online target port that was disabled because of a previous connection error. If the **Intervention** column displays "true," you must manually bring the recovered port back online using **Enable**. If the port state is "disabled," the port's connection is repaired and it is ready to be re-enabled. If the **Configuration** tab itself is disabled, the table on the **Physical Ports** tab will be empty.

Note   If the target port state is offline, the port's connection has not been repaired. The error condition that caused the port to fail still exists.

To enable a disabled target port:

1   On the **FC Host Port Failover** dialog box, click the **Physical Ports** tab.

The tab lists each target port on the FC I/O blade, its state and the type of failure, if applicable.
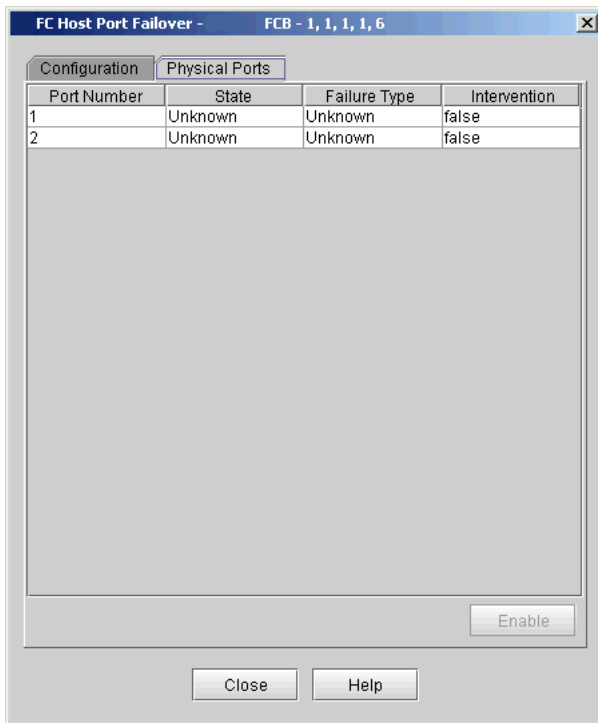
2   Click the port you want to enable and click **Enable**.

> ☒ Note   **Enable** is available only if the port is disabled.

3   To return to the main **FC Host Port Failover** dialog box, click **Close**.

4   Proceed to Configuring Datapath Conditioning on page 201.

Configuring Datapath Conditioning

For the library, target-side data path monitoring is performed automatically and proactively. The **Datapath Conditioning** dialog box enables you to set the level at which the data path is monitored between an I/O blade and the drive(s) connected to it. You also can set the time interval between monitoring checks (up to 48 hours).

> ☒ Note   I/O blades must be present to access the **Datapath Conditioning** dialog box.

1   Log on as an administrator.

2   Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

3   Click **Setup**→ **Connectivity**→ **Datapath Conditioning**.

4 The **Datapath Conditioning** dialog box appears, showing all the I/O blades found in the library. Each blade is identified by name and by geographic location.
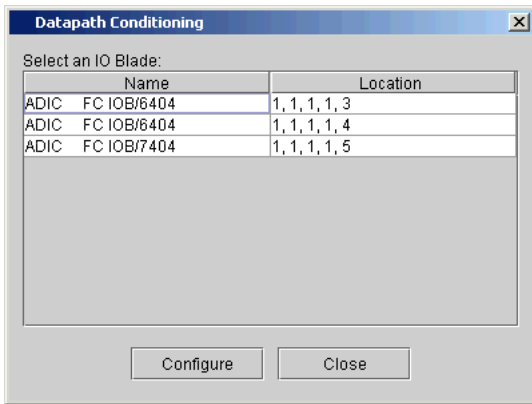
5 Click a blade to highlight it and then click **Configure**.

The **Datapath Conditioning Setting** dialog box appears.
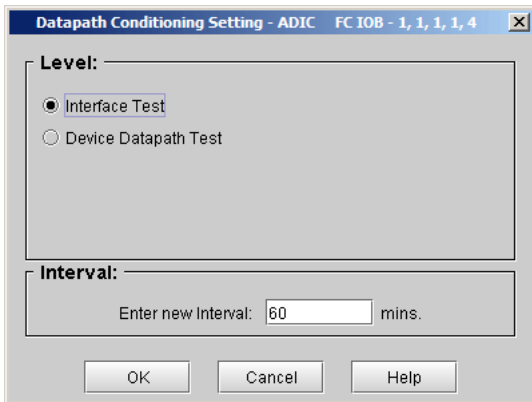
6 In the **Level** area, choose the appropriate level. The default level is **Interface Test**. To enable data path monitoring tickets, set the level to **Device Datapath Test**.

The following table describes the functionality for each data path monitoring level.

Level Name	Functionality Description
Interface Test	Performs tests to verify that Fibre Channel controllers on I/O blade are responsive to commands.
Device Datapath Test	Everything from Interface Test level, in addition to performing a device inquiry on each target device.

7 In the **Enter new Interval** text box, type the amount of time that should elapse between automatic monitoring checks. The interval can range from 1 to 2,880 minutes (48 hours). The default interval is 60 minutes.

| Note | • The data path from I/O blade to the drive must experience problems for two period intervals before a problem is detected and a ticket is generated. |
| | • The default time interval for Windows is five minutes. You must disconnect the drive for at least five minutes to know you have triggered the Ticket. |

8 To save your configuration and return to the **Datapath Conditioning** dialog box, click **OK**.

Proceed to if applicable. Otherwise, proceed to .

Configuring Switch Zoning

If one or more FC switches is attached to the library, verify that proper switch zoning is configured.

Proceed to

Configuring Host Access

If your host(s) are connected through the management control blade or an FC I/O blade, run **FC Host** or **SCSI Host**, as appropriate, to allow the library to manage your media properly. See Configuring FC Host LUN Mapping on page 204 or SCSI Host LUN Mapping on page 209.

If you are configuring your LTO-5 drives attached to Ethernet Expansion blades, go to Setting up Control Path and Storage Networking on page 215.

If your host(s) are directly connected to drives, configure your third-party tape handling software.

FC Host LUN Mapping

During device discovery, a particular partition or drive may map to a higher LUN space than is optimal for a particular application. The **FC Host** feature allows you to create a virtual private remapping of available LUNs for a specific Fibre Channel-attached host. LUN mapping is required to give hosts access to partitions and devices. You can also make devices appear to the host as if they were at lower LUNs in order to optimize library performance.

Depending upon host operating system constraints, it may be necessary to reboot or reconfigure the host as a result of device map changes resulting from the use of **FC Host**.

Once connected, a host will persist in the FC I/O blade memory until it is manually deleted.

Configuring FC Host LUN Mapping

1   Click **Setup**→ **Device**→ **Access**→ **FC Host**.

The **FC Host** dialog box appears.
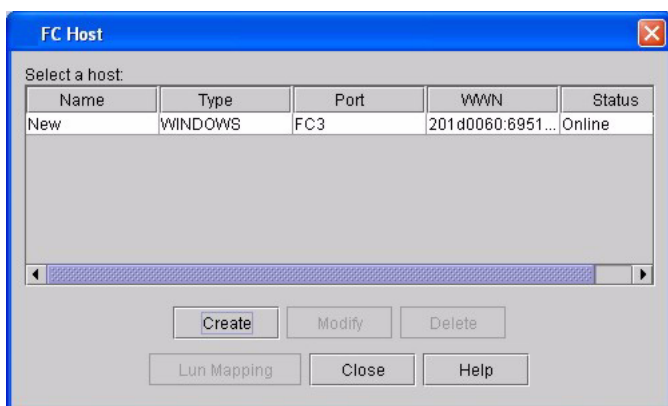
2   Select an FC host to configure.

3 Click **LUN Mapping**.

The **LUN Mapping** dialog box for the selected host appears. The **LUN Mapping** dialog box displays all partitions and drives connected to the blade that are attached to the host.

The partitions that have not yet been manually reassigned to a new map position appear in bold in the **Device** column. The library treats partitions as devices. You must drag a partition to the **LUN/Device** column for the LMC to manage it and its media.
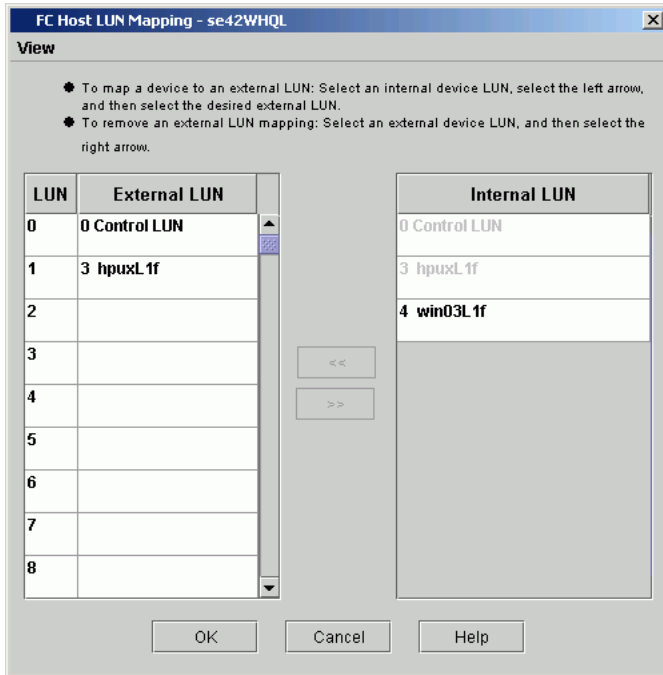
Compare the default view with the **Show Details** view shown in the following figure.
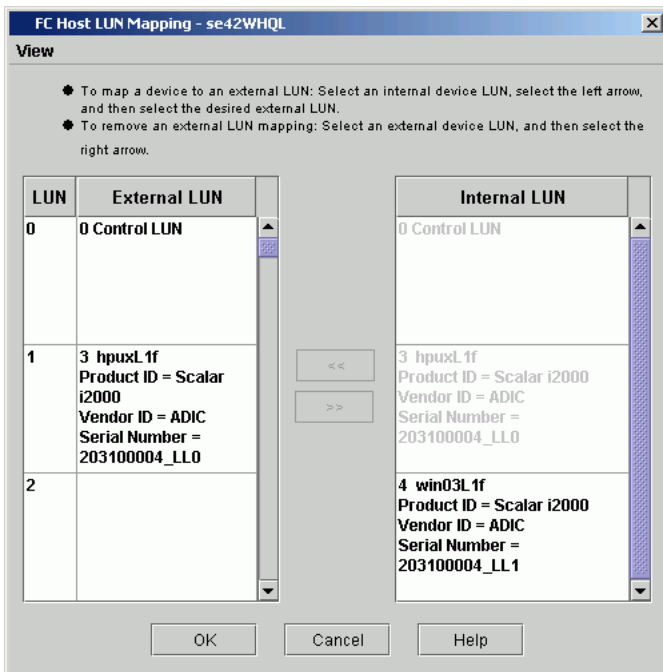
In this figure, the **Internal LUN** column has been scrolled down. The **Show Details** view for partitions shows the partition name, product ID, vendor ID, and the serial number of the partition. For drives, LMC displays the device LUN, connection type, port connection, vendor ID, serial number, and the associated partition.

The following table describes the descriptors that appear in the **Show Details** view for partitions.

Descriptor	Description
Partition Name	Name assigned during partition creation process.
Product ID	The **Product ID** setting controls the product ID string that is returned in a standard SCSI INQUIRY response. The library can report that it is a Scalar 24, Scalar i500, Scalar 100, Scalar 1000, Scalar i2000, Scalar i6000, or Scalar 10K. This feature can enable the library to be used with host applications that do not yet include the Scalar i6000 in a list of recognized devices. In addition, the various Microsoft Windows operating systems maintain a list of recognized devices. If the Scalar i6000 is not in an operating system list of recognized devices, the library will appear as an unknown device in device lists. You might prevent the library from being listed as unknown by setting **Product ID** to a library other than Scalar i6000. This setting does not cause any library operational changes other than the SCSI INQUIRY response.
Vendor ID	ADIC or Quantum
Serial Number	Partition ID as shown by **System→ Monitor**.

The following table describes the descriptors that appear in the **Show Details** view for drives.

Descriptor	Description
[Number] [Connection Type] [Port Connection]	[LUN] [Fibre or SCSI] [Port Number].
Vendor ID	Drive manufacturer.
Serial Number	Drive Serial Number.
Partition	Name of the partition with which the drive is associated.

In the default view, only the names of available partitions and the names of the devices (drives) are shown. LUN spaces from 0-255 are available. In the **Show Details** view, a partition that has not yet been manually reassigned to a new map position appears in heavy black type in the **Internal LUN** column. Partitions are treated by the library as devices. You must assign a partition to the **LUN/External LUN** column for the LMC to manage it and its media. In this example, the control LUN has already been remapped as shown in heavy black type in the **LUN/External LUN** column.

4 If you are working from the local touch screen, you must select an internal device LUN, select the left arrow, and then select the desired external LUN. If you are working from the remote client, you can use the select method or you can drag and drop the devices from the **Internal LUN** column to the appropriate LUN assignment in the **LUN/External LUN** column. Always use LUN 0 for command and control.

In the following figure, all devices have been mapped manually.
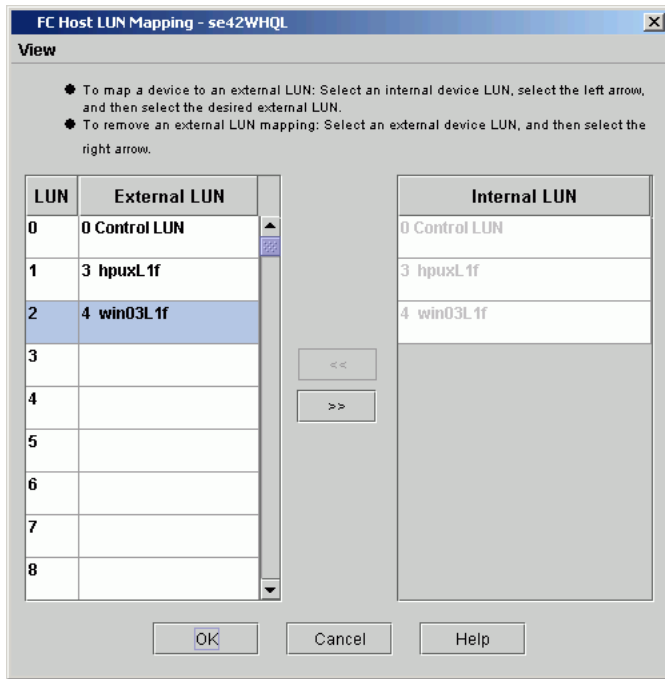
The new map locations appear in heavy black type in the **LUN/External LUN** column. The previous (default) device map position of a remapped device is shown in gray type in the **Internal LUN** column.

5   Click **OK**.

The **FC Host** map is automatically saved as part of the configuration. For more information about device numbering in a SAN context, see related sections in the *Scalar i6000 User's Guide* or use the Online Help.

Channel Zoning

You can use channel zoning to restrict host access to specific ports on the FC I/O blade. In most cases, however, channel zoning should be left at default settings. Use the procedure below if you need to configure channel zoning as part of your initial library setup.

Configuring FC Channel Zoning

1 Click **Setup**→ **Device**→ **Access**→ **Channel Zoning**.

The Channel Zoning configuration box appears.
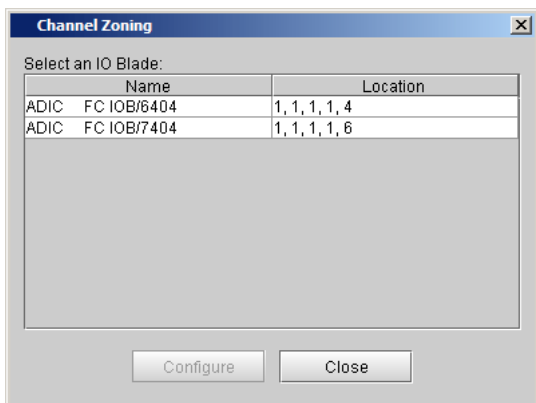
2 Select a blade and then click **Configure**.

3 To restrict access, clear the check mark in the cell where the target port and the initiator channel meet.
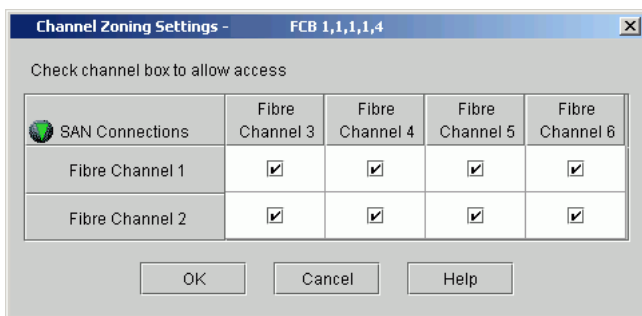
All combinations are possible with one exception. If a FC port is set to target & initiator mode, it will appear in both the horizontal row and vertical column. The FC port will not be allowed access to itself, however, in order to prevent "ghosting." Ghosting is a condition where hosts can see storage in two places.

Be aware that an entire channel is zoned when the cell is checked. This effects any host that may be accessing the FC I/O blade.

4 Click **OK** to save your settings.

SCSI Host LUN Mapping

During device discovery, a particular partition or drive may map to a higher LUN space than is optimal for a particular application. The **SCSI Host** feature allows you to create a virtual private remapping of available LUNs for a specific SCSI channel-attached host. With it, you can make devices appear to the host as if they were at lower LUNs in order to optimize system performance.

> **Note**   Use **SCSI Host** to map partitions when a SCSI channel host is connected to the MCB SCSI port.

Depending upon host operating system constraints, it may be necessary to reboot or reconfigure the host as a result of device map changes resulting from the use of **SCSI Host**.

1   Click **Setup→ Device→ Access→ SCSI Host**.

The **SCSI Host** dialog box appears.
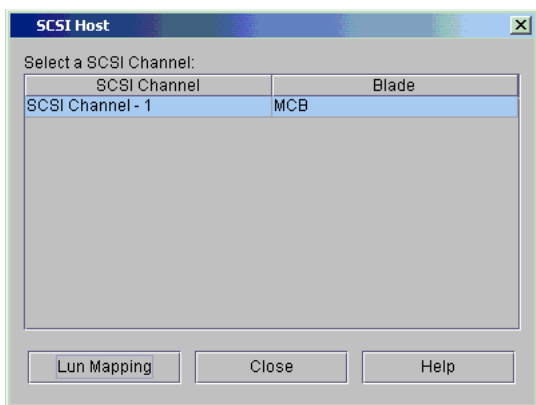
2   Select a SCSI port to configure.

The **SCSI Host** dialog box appears.

3   Select a SCSI port to configure.

4   With the port selected, click **LUN Mapping**.

The **SCSI Host Map** dialog box appears.

5 Drag the partitions that you want the SCSI host to manage from the **Internal LUN** column to the **External LUN** column.
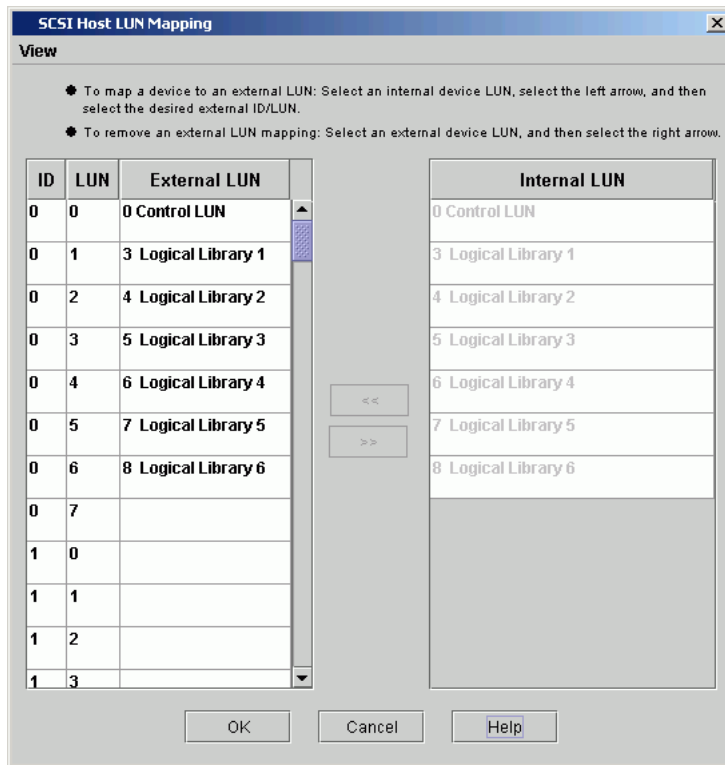
6 Drag and drop the devices from the **Internal LUN** column to the appropriate LUN assignment in the **External LUN** column.

The right column of the SCSI host map dialog box, labeled **Internal LUN**, lists all available devices. The **External LUN** column on the left provides map space for IDs 0-15 associated with the selected SCSI Channel, and LUNs 0-7 associated with each ID. Drag and drop devices from the **Internal LUN** column into the boxes associated with particular LUN assignments in the **External LUN** column.

7 Click **OK** to save the mapping.

Proceed to

LUN Mapping Wizard

LUN mapping is required to give hosts access to partitions and devices. You can also make devices appear to the host as if they were at lower LUNs in order to optimize library performance.

The **LUN Mapping Wizard** guides you through the setup of LUN mapping for your Fibre Channel hosts.

> **Note**   If you want to manually assign a target LUN, or want to add/modify/delete the host, select **Setup→ Device→ Access→ FC Host** on the menu bar. For more information, see

The **LUN Mapping Wizard** automatically assigns sequential numbers for the external LUN of each mapped device, without any gaps between them per blade. When using the **LUN Mapping Wizard**, the LUN for some devices may change even if you did not specify the changes. If a control LUN is mapped, it is always assigned LUN 0.

Depending upon host operating system constraints, it may be necessary to reboot or reconfigure the host as a result of device map changes resulting from the use of the **LUN Mapping Wizard**.

1   Click **Setup→ Device→ Access→ LUN Mapping Wizard**.

The **LUN Mapping Wizard – Overview** dialog box appears.
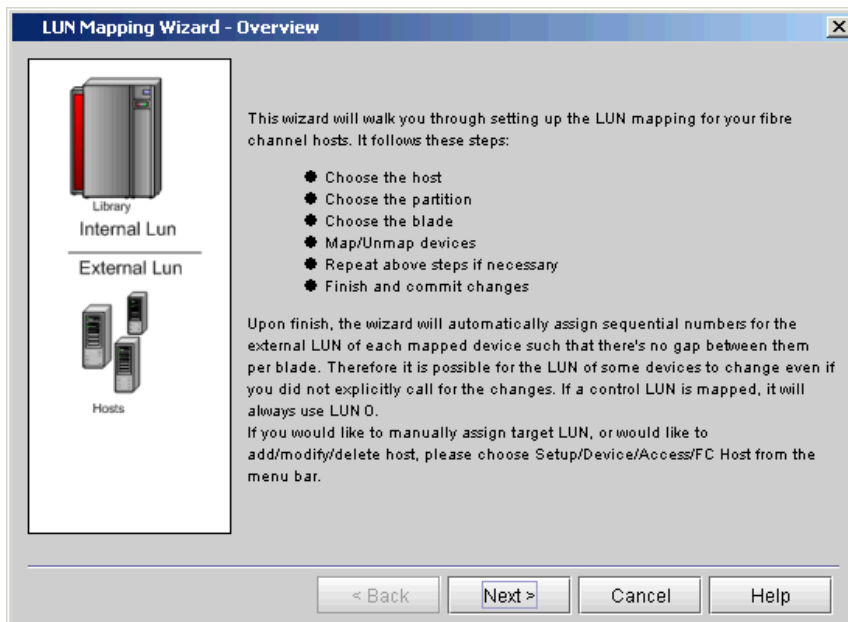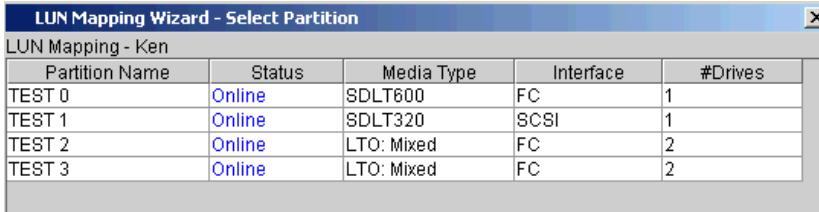
2   Review the **LUN Mapping Wizard Overview,** then click **Next** to continue.

The **LUN Mapping Wizard – Select Host** dialog box appears. All available hosts are listed on this dialog box.

3   Select a host to configure and then click **Next** to continue.
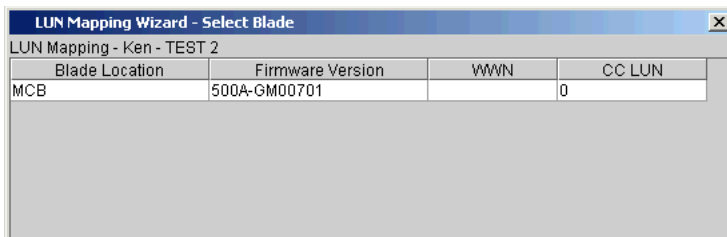
The **LUN Mapping Wizard – Select Partition** dialog box appears. All available partitions on the selected host are listed on this dialog box.

4   Select a partition to configure and then click **Next** to continue. All available blades on the selected partition are listed on this dialog box.
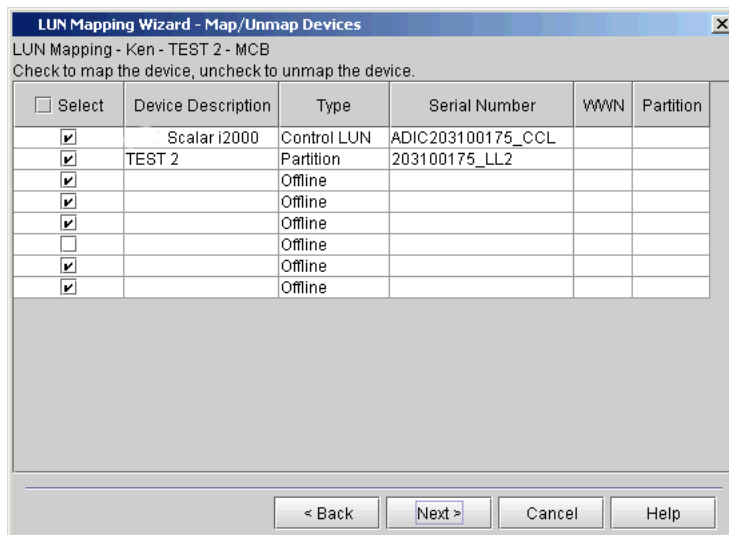
The **LUN Mapping Wizard – Select Blade** dialog box appears.

5   Select a blade to configure and then click **Next** to continue.

The **LUN Mapping Wizard – Map/Unmap Devices** dialog box appears.

6 Select the check box to map a device or clear the check box to unmap a device, then click **Next** to continue.

The **LUN Mapping Wizard – What Next?** dialog box appears.
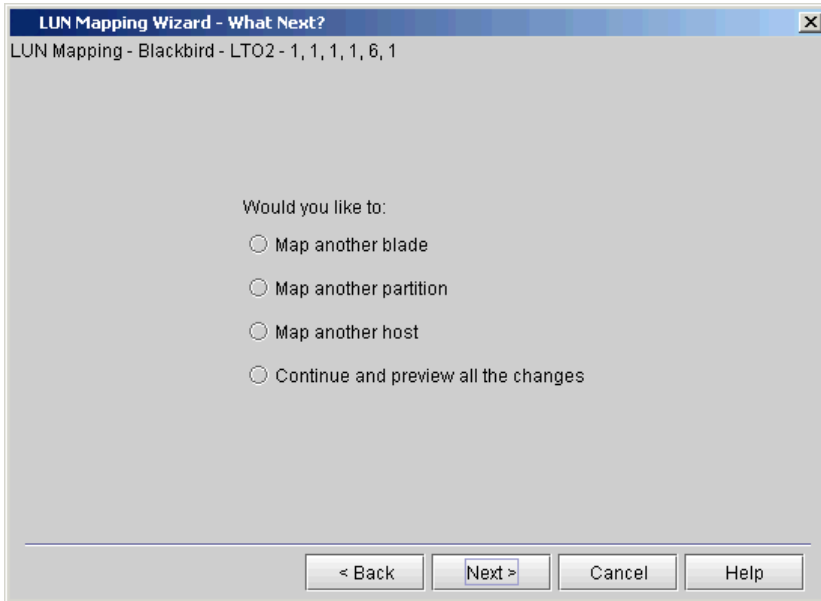
7 Select one of the following and click **Next** to continue:

- **Map another blade** – this allows you to map another blade on the same partition.
- **Map another partition** – this allows you to map another partition on the same host.
- **Map another host** – this allows you to map another host.
- **Continue and preview all the changes** – this allows you to view an online printout of the change report which presents a preview of all changes, showing whether you added, modified or deleted any devices.

If your configurations are complete, select **Continue and preview all changes**.

The **LUN Mapping Wizard – Preview All Changes** dialog box appears.
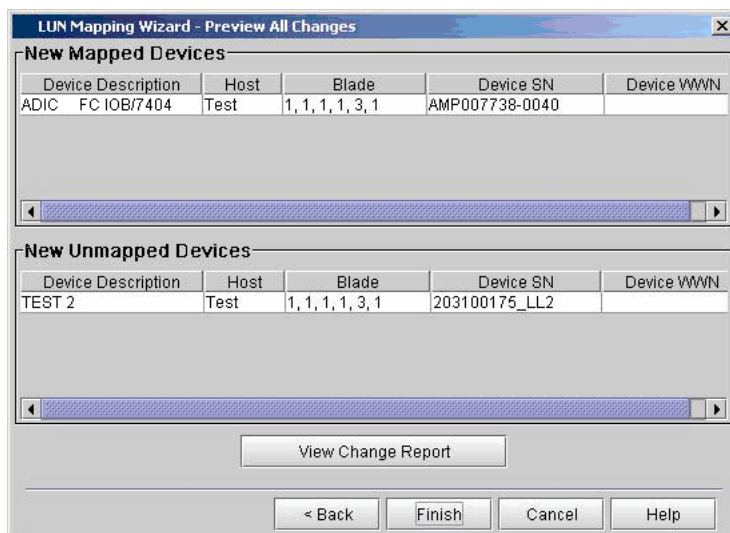
8 Prior to finishing and saving your LUN mapping configuration changes, review your newly mapped or unmapped devices in this dialog box.

- If you would like to create a report of your changes, click **View Change Report**.

- If you are satisfied with your LUN mapping changes and want complete the wizard process, click **Finish**. Your LUN mapping changes are finalized, and then you have the option of viewing the LUN Mapping Report. For more information on reporting features, see the *Scalar i6000 User's Guide*.

The **LUN Mapping Change Preview Report – Print Preview** dialog box appears. This dialog box displays what types of changes were made to all devices.
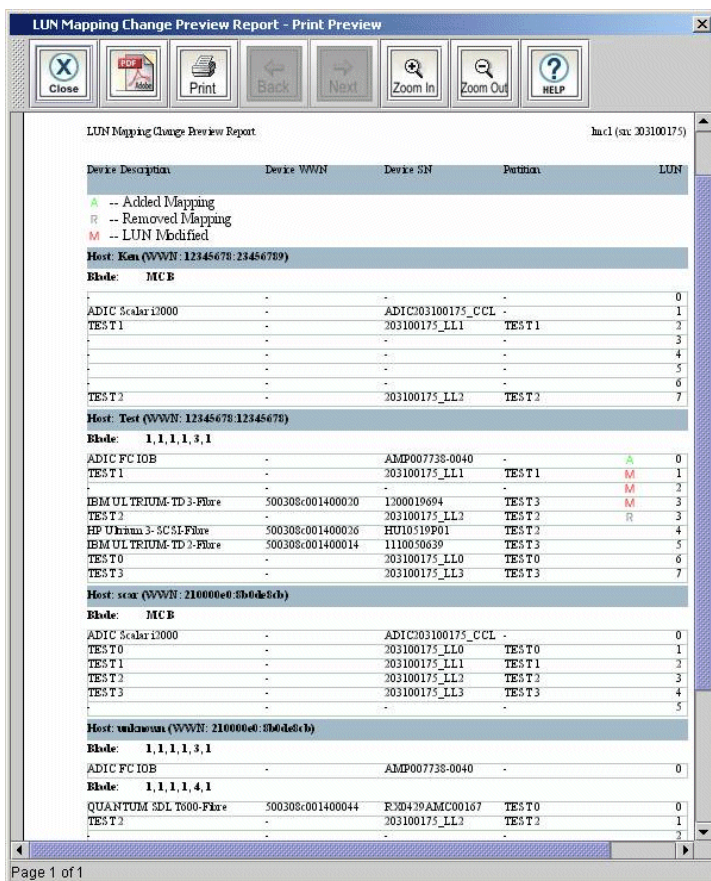
The changes on the report include:

- Added Mapping – (**A**)

- Removed Mapping – (**R**)

- LUN Modified – (**M**)

On the **LUN Mapping Change Preview Report – Print Preview** dialog box, you can select the following:

- To save the report as a PDF file, click **PDF**. Specify a file path and file name, and then click **Confirm**.

- To print the report, click **Print**. Specify print options, and then click **OK**.

- To navigate through the pages of the report, click **Back** or **Next**.

- To increase or decrease the magnification of the report, click **Zoom In** or **Zoom Out**.

- To access the Online Help, click **Help.**

9 After you have reviewed the **LUN Mapping Change Preview Report**, click **Close** to return to the **LUN Mapping Wizard – Preview All Changes** dialog box.

10 If you are satisfied with your LUN mapping changes and want to complete the wizard process, click **Finish**. Your LUN mapping changes are finalized, and then you have the option of viewing the LUN Mapping Report.

Setting up Control Path and Storage Networking

If your library contains LTO-5 drives attached to Ethernet Expansion blades, use the following procedures to set up your LTO-5 SNW drives.

To use SNW features, you must install an SNW license. See Enabling Licenses on page 164.

For more information on Control Paths, see Working with Library Control Paths on page 180.

Configuring Control Path

Use the **Control Path** function to configure a partition and the appropriate drives to handle the host application's control path commands. When you initially create the library partitions, you can configure the control paths and they are assigned. For more information, see the *Scalar i6000 User's Guide*.

Follow the steps below to select a partition and configure the control path for your LTO-5 SNW drive.

1 Log on as an administrator.

2 From the main console, select **Setup→ Partitions→ Control Path**.

The **Storage Networking Partitions** dialog box appears.
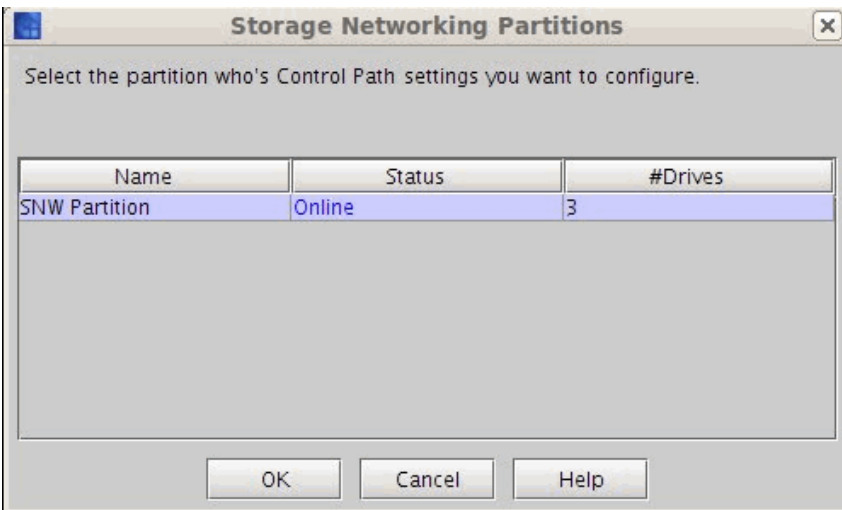
3 Highlight the partition you want to configure, and click **OK.**

The **Control Path** dialog box appears.
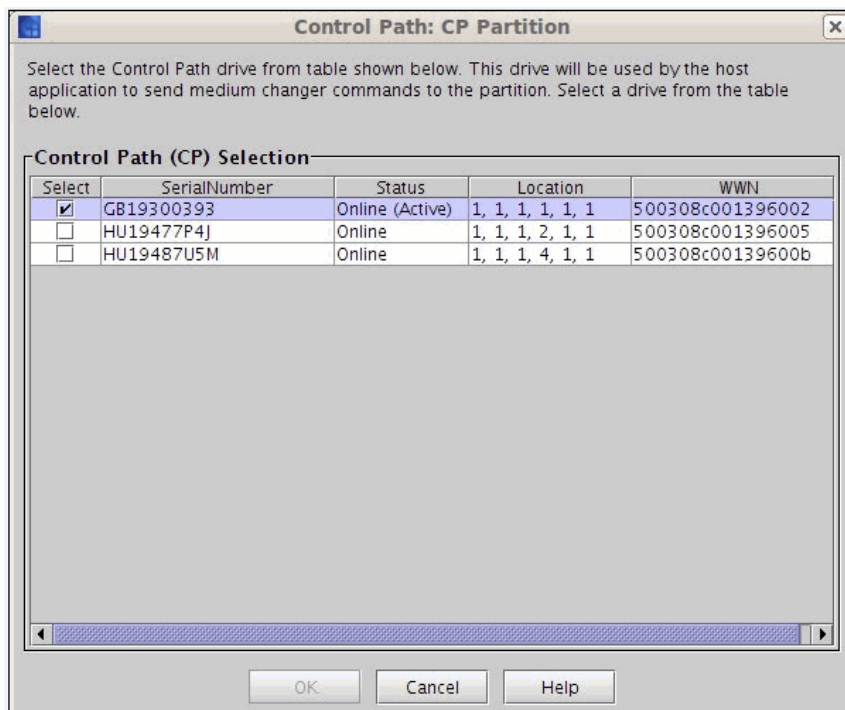
4 In the **CP Drive Selection** field, select the drive you want to configure as the control path.

The primary Control Path Drive you selected is highlighted in yellow.

5 Click **OK**.

Selecting a Storage Networking Drive

Use the **SNW Drives** command to the select the LTO-5 drives that you want managed using the SNW feature. You can configure your drives to allow or deny access to client hosts. Only LTO-5 generation or later drives support the SNW functionality.

An SNW license is required for each drive using SNW functionality.

1   If you are not already working from the physical library, select it from the **View** menu.

2   Click **Setup**→ **Device**→ **Access**→ **SNW Drives.**

The **Storage Networking License Drive Configuration** dialog box appears.
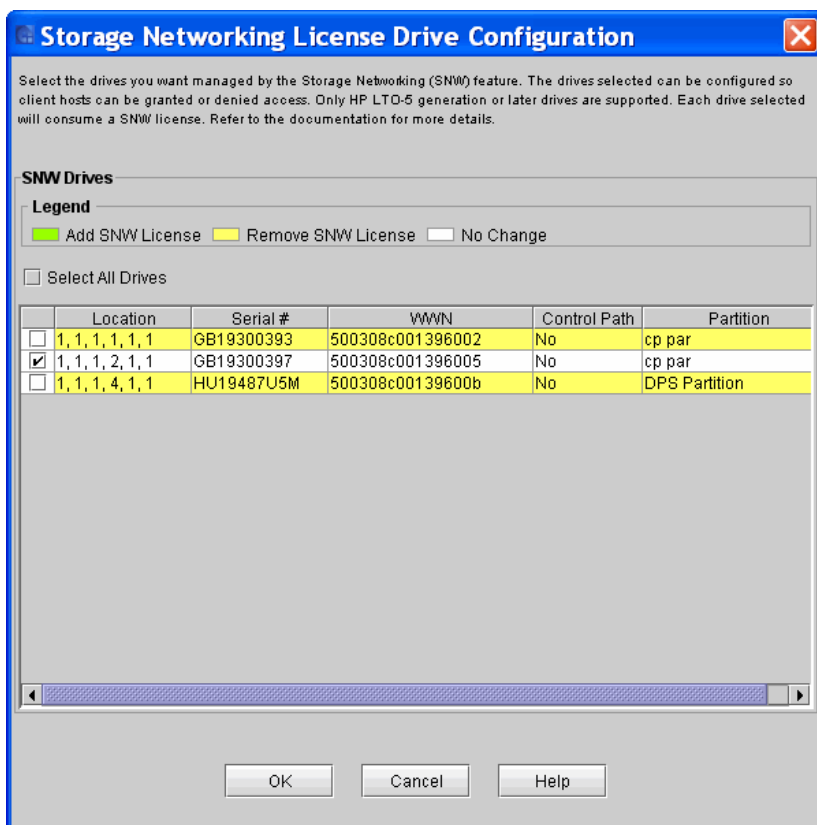
3   To select all drives, click the check box next to **Select All Drives**.

4   To select an individual drive, click the check box in the left column for the appropriate row.

5   Click **OK**.

Configuring the SNW Host Device

Use the SNW Host commands to configure host access to the Storage Networking (SNW) drives. For more information on Host configuration, see the *Scalar i6000 User's Guide.*

1   If you are not already working from the physical library, select it from the **View** menu.

2   Click **Setup**→ **Device**→ **Access**→ **SNW Host.**

The **Storage Networking Host Configuration** dialog box appears
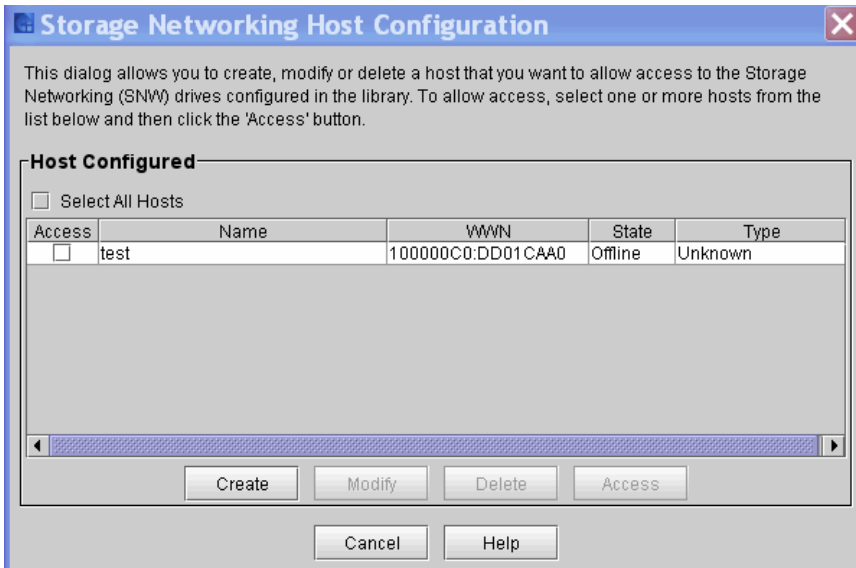
3   Select the host(s) you want to access by clicking the check box from the Host Configured table.

4 Click **Access**.

The **Host Access** dialog box appears.
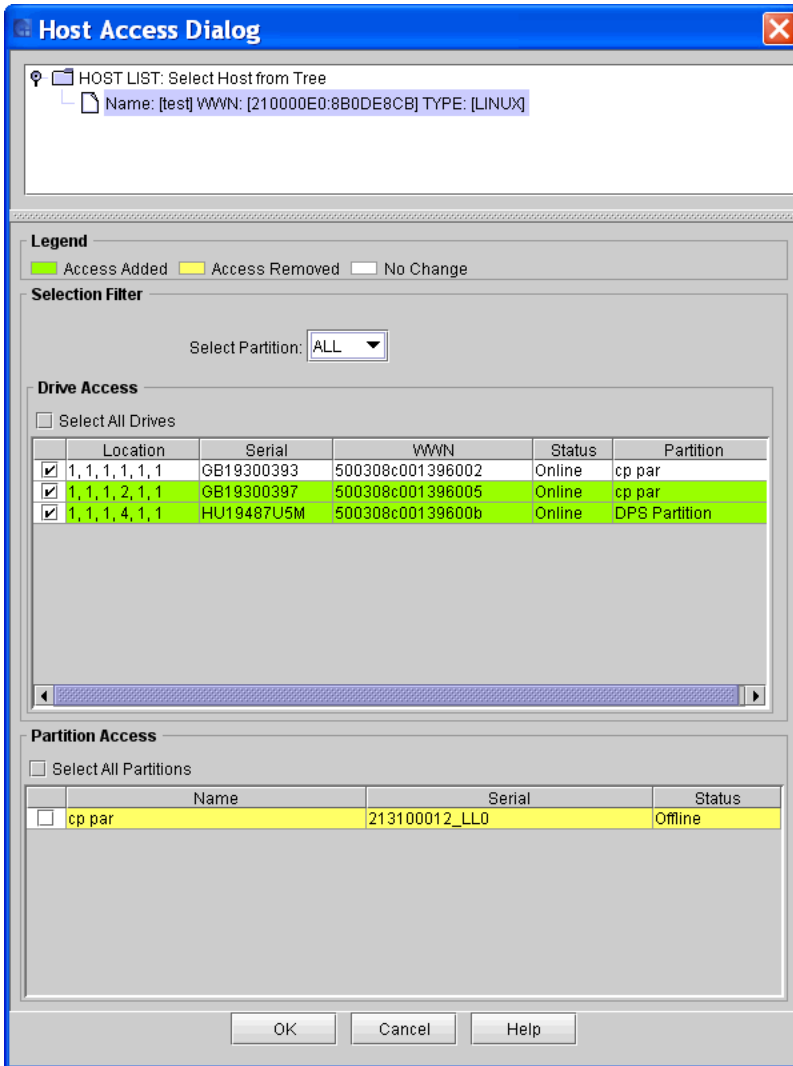
5 On the top portion of the screen, expand the **HOST LIST** folder, and highlight the host you want to change.

6 From the **Select Partition** drop down menu, select the appropriate partition.

This action filters the drives in the Drive Access table and show only those drives that belong to the partition selected. By default all SNW drives will be displayed.

In the **Partition Access** section, the partitions are displayed.

7 Select drives.

To select all drives in the Drive Access table, click the **Select All Drives** check box; to select individual drives, select the check box for each drive.

When a drive check box is selected/unselected the color of the row in the table will change to indicated the change to the current drive configuration. The colors have the following meaning GREEN (access will be granted to the host selected in the HOST LIST), YELLOW (access will be denied to the host selected in the HOST LIST) and WHITE (no change has been made).

The drives that are presented in the **Drive Access** table have the following characteristics:

> • The drives have a SNW license.

- The drives are LTO5 fibre drives.

- The drives are connected to a Ethernet Expansion blade.

8 Select partitions.

9 To select all partitions in the **Partition Access** table, click the **Select All Partitions** check box; to select individual partition, select the check box for each partition.
When a partition is selected/unselected the table row color will change indicating the new configuration requested. The colors have the same meaning as the drive table described above.

The partitions that are presented in the Partition Access table have the following characteristics:

- The partitions contain one or more SNW licensed drives.

- The partitions have a Control Path drive configured.

10 To make changes to a number of hosts, follow steps 6 through 9 for each host.

11 Click **OK** to apply the changes.

The Host is now configured.

Putting Physical Library and Partitions Online

Individual partitions, as well as the physical library, must be online in order for a host to communicate with them.

Putting a Partition Online

1 Select the partition using the **View** menu.

2 Click **Operations**→ **Change Mode**.

The **Change Library Mode** dialog box appears.
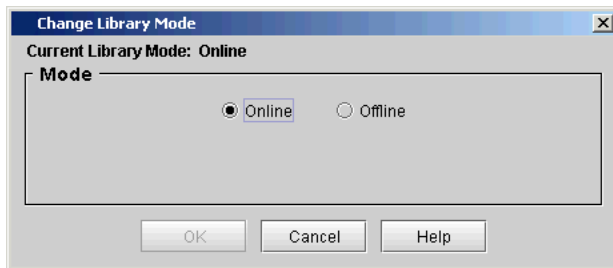
3 Select **Online**.

4 Click **OK**.

Putting the Physical Library Online

1 Select the physical library using the **Change Library Mode** menu.

2 Click **Operations**→ **Change Mode**.

The **Change Library Mode** dialog box appears.
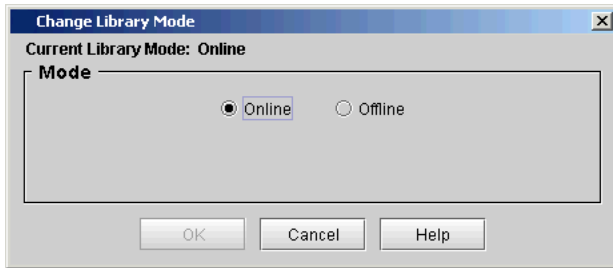
3 Select **Online**.

4 Click **OK**.

Proceed to Configuring Screen Saver Preferences on page 226.

Online and Offline Functionality

Some library functions require the physical library or partitions to be in a particular state (either online or offline) before they can be performed. If you choose a function that requires the library or partition state to be changed from its current state, you are prompted to do so.

Table 10 on page 222 summarizes the library functions that require the physical library or partitions to be either online or offline.

Table 10   Library Functions Requiring Online or Offline State

Function	Physical Library	Partition
Operations→ Import **Operations→ Export** **Operations→ Drives→ Load** **Operations→ Drives→ Unload** **Operations→ Move Media** **Operations→ Inventory** (partition view) **Setup→ Partitions** (create, modify, or delete)	**Online**	**Offline**
Setup→ Device→ IDs **Tools→ Partitions Defragmentation**	—	**Offline**
Operations→ Inventory (physical library view) **Tools→ Teach** **Tools→ Save/Restore** (restore, revert, or rescue) **Tools→ Verification Tests** (start test) **Tools→ Update Software** (update or reinstall library software) **Service→ Manual Diagnostics**	**Offline**	—
Tools→ Update Software (set up autoleveling or update drive firmware) **Tools→ Update Drive Firmware**	**(Offline)** Current view (library or partition) must be offline	

Configuring Drive Cleaning

When you create or modify a partition, you can specify that tape drives in that partition be automatically cleaned each time the drive requests a cleaning operation.

For automatic drive cleaning to function, you must configure drive cleaning for the library. To configure drive cleaning, first assign cleaning magazines, and then import cleaning media. Designated cleaning media can also be used when manually cleaning drives. (Cleaning magazines and media are not part of any logical partition, and so are not visible to the host application.)

If cleaning magazines are no longer needed, you can unassign them. In addition, you can export expired cleaning media to remove it from the library.

> **✓ Note**
> Automatic drive cleaning should be enabled for partitions only if the host application does not support the coordination of drive cleaning. If drive cleaning functionality is enabled on the host application, do *not* enable automatic drive cleaning for any partitions in the library.
>
> For more information about enabling automatic drive cleaning for a partition, see Table on page 182. For more information about manually cleaning drives, see the *Scalar i6000 User's Guide*.

Assigning Cleaning Magazines and Importing Cleaning Media

To configure the library for drive cleaning, first assign one or more magazines as cleaning magazines, and then import cleaning media.

> **✓ Note**
> At least one magazine must be assigned for cleaning before you can import cleaning media. Also, only magazines that do not belong to a partition can be assigned for cleaning.

1 Insert one or more pieces of cleaning media into the I/E station and close the I/E station door.

   Use a standard barcode label for cleaning media. Barcode numbers do not require a specific prefix or suffix.

2 Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

3 On the menu bar, click **Setup**→ **Drive Cleaning.**

   The **Drive Cleaning Configuration** dialog box appears.

   Click a magazine slot or a piece of media to select it. Details about the selected slot or media appear under **Information**, including the type of media, barcode number, location, and the number of times the media has been mounted in a drive.

   If the library has more than one frame, click the arrow buttons to display the next or previous frame.
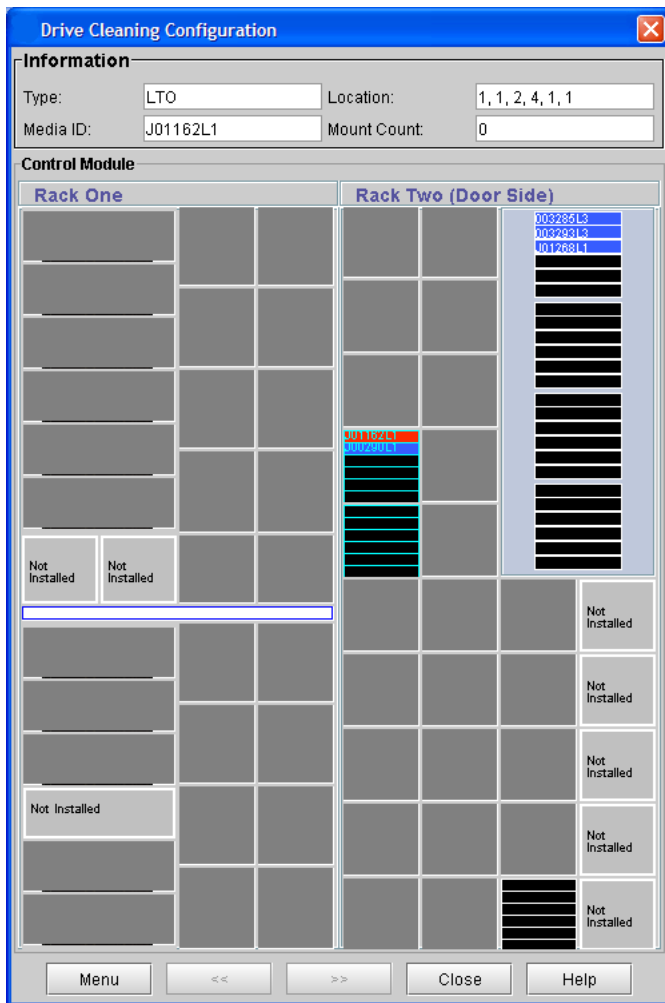
4 To assign a magazine for cleaning, click any slot in the magazine to select it. Click **Menu**, and then click **Assign magazine for cleaning**.

The magazine is assigned for cleaning. Repeat this step to assign additional cleaning magazines.

5 To import cleaning media, click the cleaning media in the I/E station to select it, and then do one of the following:

- To import only the selected piece of media, click **Menu**, and then click **Import <barcode number> as cleaning media**.

- To import all media in the selected I/E station magazine, click **Menu**, and then click **Import all tapes in magazine as cleaning media**.

The cleaning media is moved to an available cleaning magazine, and can be used for automatic or manual cleaning.

6 Click **Close** to close the **Drive Cleaning Configuration** dialog box.

📝 Note   If you are working on the remote LMC, you can right-click a magazine slot or a piece of cleaning media to see a menu of available options.

Exporting Cleaning Media

Cleaning media can be used a limited number of times. If a piece of media is expired, export it and remove it from the library

1 Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

2 On the menu bar, click **Setup**→ **Drive Cleaning.**

The **Drive Cleaning Configuration** dialog box appears. If the library has more than one frame, click the arrow buttons to display the next or previous frame.

To determine if a piece of cleaning media has been used the maximum number of times, click the media to select it, and then check the **Mount Count** value under **Information**.

3 Click the cleaning media in a cleaning magazine to select it, and then do one of the following:

- To export only the selected piece of media, click **Menu**, and then click **Export cleaning media <barcode number>**.

- To export all media in the selected magazine, click **Menu**, and then click **Export all cleaning media in magazine**.

The cleaning media is moved to an available I/E station magazine.

4 Click **Close** to close the **Drive Cleaning Configuration** dialog box.

Unassigning a Cleaning Magazine

If a magazine is no longer needed for holding cleaning media, first export all cleaning media from the magazine, and then unassign it.

1 Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

2 On the menu bar, click **Setup**→ **Drive Cleaning.**

The **Drive Cleaning Configuration** dialog box appears. If the library has more than one frame, click the arrow buttons to display the next or previous frame.

3 If the magazine you want to unassign contains cleaning media, export all cleaning media to the I/E station.

For more information on exporting cleaning media, see Exporting Cleaning Media on page 225.

4 Click any slot in the cleaning magazine to select it.

5 Click **Menu**, and then click **Unassign magazine for cleaning**.

The magazine is no longer assigned for cleaning.

6 Click **Close** to close the **Drive Cleaning Configuration** dialog box.

> Note   If you try to unassign a cleaning magazine that contains cleaning media, a message appears asking if you are sure you want to continue. If you click **Yes**, any media in the magazine is not accessible until you add the magazine to a partition or assign it again as a cleaning magazine.

Configuring Screen Saver Preferences

Use the **Screen Saver** preferences tab to customize the images that display on the LMC screen when the library is not in use. The screen saver starts automatically if the library is idle for a specified amount of time.

> ✍ **Note**   Screen saver preferences can only be configured remotely, not using the touch panel.

1   From the menu bar, click **Setup→ Preferences**.

The **Preferences** dialog box appears with the **Screen Saver** tab displayed.
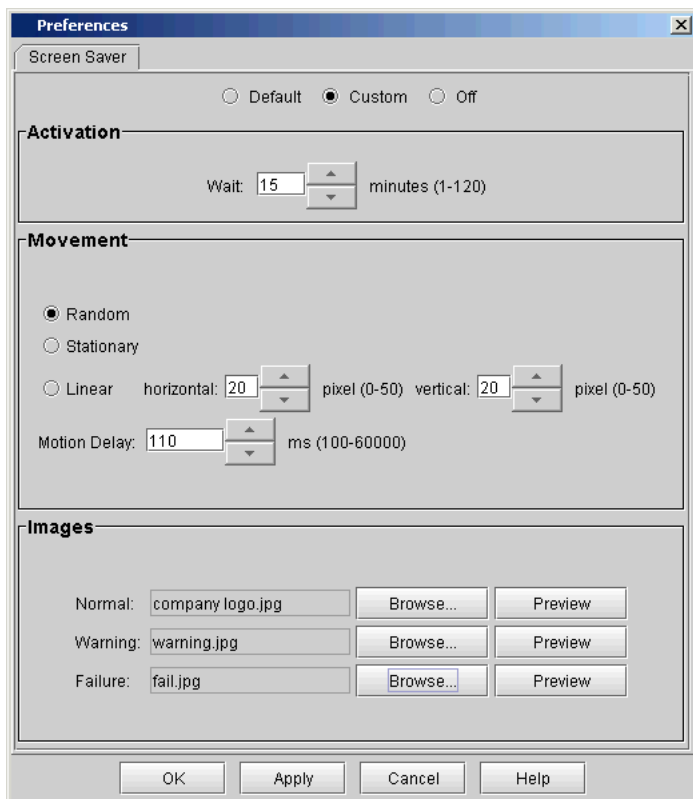
2   Do one of the following:

- Select **Default** to use the default Quantum screen saver with standard settings.
- Select **Custom** to change screen saver settings such as activation, movement, or images.
- Select **Off** to disable the screen saver. (The current settings are cleared.)

If you selected **Custom**, go to . Otherwise, go to .

3   Under **Activation**, enter a value in the **Wait** box to specify how much idle time must pass before the screen saver is activated.

The activation wait time can be 1–120 minutes.

4   Under **Movement**, specify the position and the motion of the screen saver image on the screen.

- Select **Random** to display the screen saver image in a variety of positions.
- Select **Stationary** to display a static screen saver image that does not move.

- Select **Linear** to display the screen saver image as a floating image.

  Enter values in the **horizontal** and **vertical** boxes to specify the movement of the screen saver image in pixels.

  Enter a value in the **Motion Delay** box to specify the movement speed of the screen saver image.

5 Under **Images**, specify the image files to display for normal functions, warning notices, and failure notices. You must select image files for all three functions.

  To specify an image file, click **Browse**. Select the image file and then click **Open**. The image file must be in GIF, JPEG, or PNG format, and cannot be larger than 1 MB. In addition, image resolution is limited to 600 x 800 pixels.

  Click **Preview** to preview an image file.

6 Click **OK** to save the settings and close the **Preferences** dialog box.

  Or click **Apply** to save the settings without closing the **Preferences** dialog box.

  If you previously made system configuration changes, you are prompted to save the configuration changes. For more information, see .

Saving the Library Configuration

Save a copy of the library configuration as a local rescue image and to a remote location as a restore image. See the Scalar i6000 User's Guide for more details on library configuration saving.

> **Note** The **Save/Restore** command is not available from the library's touch screen.

> **⚠ CAUTION** **As a result of restore, rescue, or revert operations, the library shuts down. You must have physical access to the library to bring the library back up. If you are performing a restore, rescue, or revert operation using remote access, the library will remain shut down until the library is directly powered back on.**

1 Log on as an admin or service user on the remote client.

2 If you are not already working from the physical library, select the physical library from the **View** menu.

3 Click **Tools**→ **Save/Restore**.

The **Save and Restore Library Configuration** dialog box appears.

4 Click **Save**.

5 From the **File Chooser** dialog box, specify where to save the restore image on the remote file system. You need only to specify the path since the management control blade determines the image file name.

6 Click **Open** when you are ready to proceed.

7 Click **Yes**, when you are prompted whether you want to generate a rescue image at the same time the remote image is saved. You are asked because no rescue image currently exists.

If the save operation is successful, a message dialog box appears indicating the name of the image file that was saved to the remote file system. The time stamp of the local rescue image will also appear on the **Save and Restore Library Configuration** dialog box.

If the save operation is not successful, a message dialog appears describing the error.

Proceed to

Logging Off

Log off using the touch screen after you are finished with your management session.

Click **Operation**→ **Log Off**.

You can also log off by clicking **Log Off** on the toolbar.

Clicking the **Log Off** command causes the **Log On** dialog box to appear. To return to library management, log on again.

11

Adding Optional Hardware

This chapter describes how to add optional hardware to an existing library. The instructions include:

> **Note** The instructions in this chapter assume that you are adding optional hardware to an existing library.
>
> If you are installing a new library, use the instructions in:
>

Shutting Down the Library

Some optional hardware can be installed only if the library is powered off. If you are instructed to shut down the library, use the following procedure.

1 Log on as an admin or service user.

2 Make sure that you are viewing the physical library. From the **View** menu, select the name of the physical library.

3 Click **Operations**→ **System Shutdown**.

The **System Shutdown** dialog box appears with **Shutdown** selected as the default.
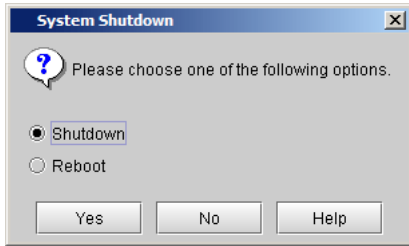
4 Click **Yes** to accept **Shutdown** as the default.

5 A message appears that asks you whether you want to continue. If you are sure that all I/O operations are finished, click **OK**.

When the shutdown process completes, the LMC display turns dark. The library is now ready to be powered off.

6 Turn off power to the library by pressing the **Power** button on the indicator panel.
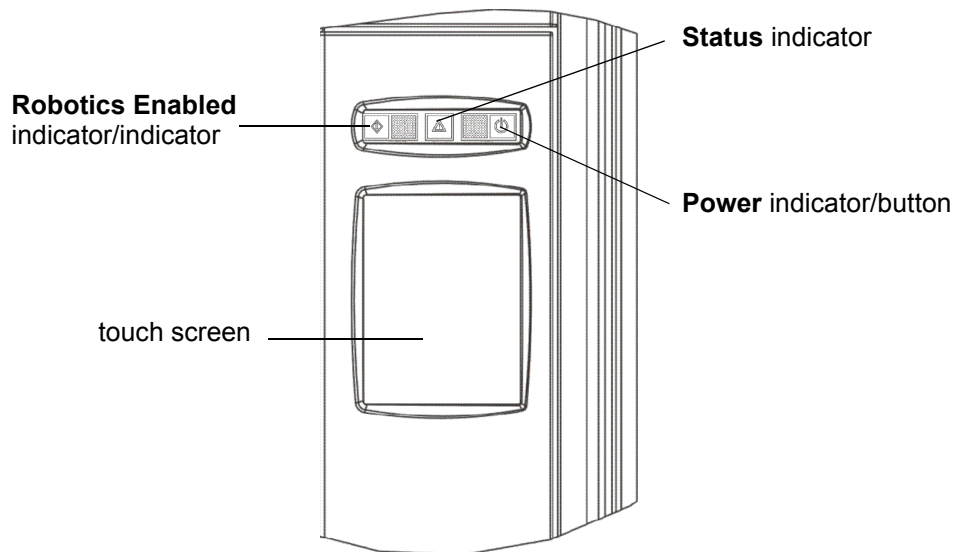
Adding Drives to an Existing Installation

The instructions in this section assume that you are adding optional drives to an existing installation.

- If you are installing drives in a new library, see the instructions in <u>Installing Drives and Blades</u> on page 97.

- If you are adding drives to an existing library, you must remove storage magazines and drive plates to gain access to the drive positions. You must also modify the partition to accommodate the changes to storage and drives. <u>Adding Drives to an Existing Installation</u> on page 233.

- If you are removing and replacing failed drives in an existing library, see the *Scalar i2000/i6000 Maintenance Guide*.

If you are installing drives in expansion modules that have been added to an existing library you may need to replace all of the LBX cards in all modules as well as the LBX terminator with new versions that support the new configuration. For information on the LBX board and terminator versions, see <u>LBX Board and Terminator</u> on page 345. For information on replacing the LBX board and terminator, see "Removing and Replacing Satellite Boards" in the *Scalar i2000/i6000 Maintenance Guide*

If you are adding drives in an expansion module that has never contained drives, you must add a power supply to the expansion module. See <u>Adding a Power Supply Chassis</u> on page 240.

If you plan to connect drives to FC I/O blades in the I/O management unit, remember that each FC I/O blade supports up to 4 drives and that you may need to add FC I/O blades and CMBs. See <u>Adding an I/O Management Unit</u> on page 247, <u>Adding Blades to the I/O Management Unit</u> on page 257, and <u>Installing a Control Management Blade</u> on page 259.

Drive Numbering Sequence

An example of the numbering sequence for drives is shown in Figure 23 below.

For information on the library's coordinate system, see Storage Addressing System Overview on page 132.

Gaps between drive locations are not supported. Drives must be added to each module in the order shown in Figure 23 . The control module must be fully populated with 12 drives before adding any drives in the first expansion module. The first expansion module must be fully populated before adding any drives to additional expansion modules. Each additional expansion module must be fully populated before adding any drives to subsequent expansion modules.

Figure 23   Drive Sled Positions

Adding Optional Hardware
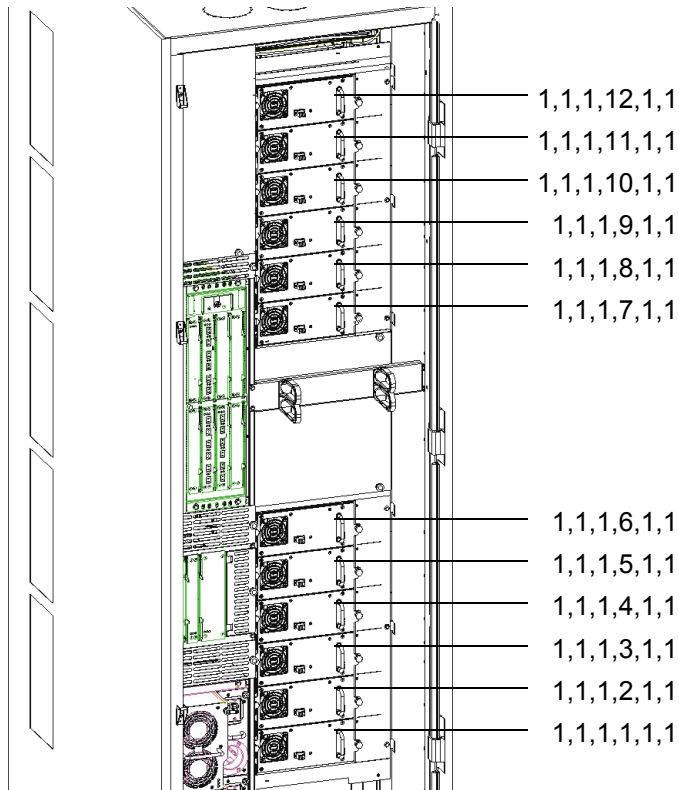
The following procedure provides instructions for adding drives to an existing library. See [Installing Drives](#) on page 105 for installing drives in a new library.

Required tools: 2.5 mm hex wrench, #2 Phillips screwdriver, ESD strap

7   Determine which magazines must be removed in order to add a drive and determine if the magazines are used in any partitions.

8   Remove the magazines from each partition(s) using the following procedure:

> ⚠️ **CAUTION**   **All partition elements associated to this upgrade procedure must be modified before proceeding with this procedure.**
>
> **Prior to modifying any partitions, you must understand your configuration changes and the potentially disruptive effects those changes can have on the host application(s).**
>
> **Care must be taken whenever you add or delete partition elements, which includes drives, storage magazines, and I/E station magazines.**

   a.   Click **Physical** on the **View** menu.

   b.   Click **Setup**→ **Partitions**→ **Configure.**

      The **Partitions** dialog box is displayed.

   c.   Select the partition that include the affected magazines and click **Modify.**

   d.   Return the affected magazines to the physical pool.

   e.   Repeat Steps a through d for each partition associated with the drive installation procedure.

9   On the operator panel, press the **Robotics Enabled** button to return the accessor assembly to the home position.

   The power remains on for all other components.

10   Open the access door.

11   Remove the magazines in front of the lowermost vacant drive location to make room for the drive. To remove, push the magazine upward with both hands until it unsnaps, and then pull the magazine toward you.

You might need to remove more than one magazine to create enough space for the drive you are adding. It is recommended that you remove all of the magazines in the column and remove them from the top down.
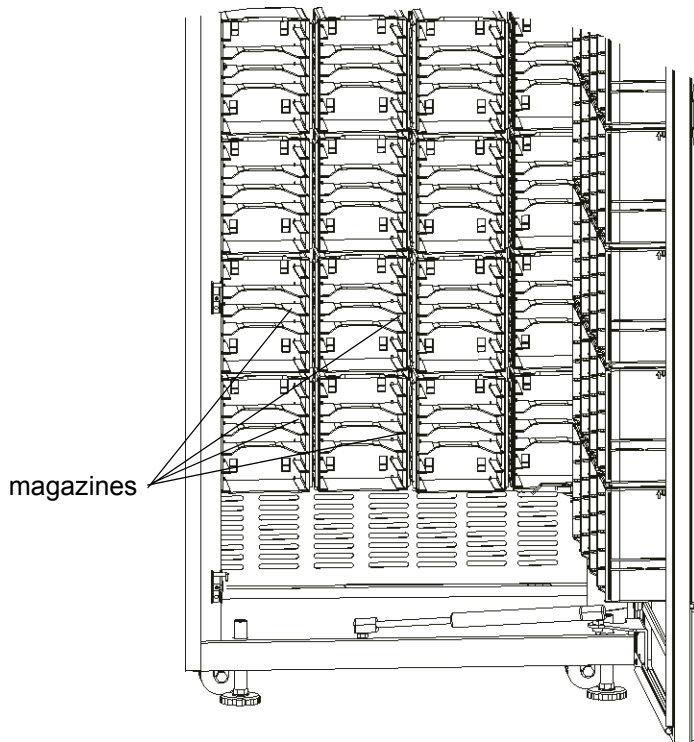
magazines

12 Use a 2.5 mm hex wrench to unscrew the retaining screws (two screws per plate) and remove the cover plates from the drive position.

cover plates

two 2.5 mm hex screws
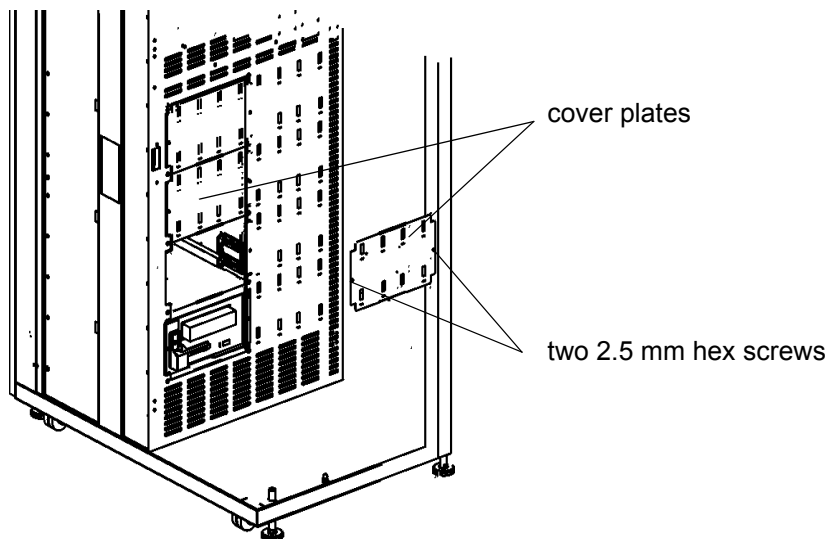
13 Reinstall the magazines above the new drive position.

> 📝 **Note**   Make sure that you fully seat each magazine by inserting each of the magazine's four corner tabs into the available holes in the cover plate.

14 Close the access door.

15 On the front panel, press the **Robotics Enabled** button and verify that the button's status light illuminates in solid green state.

> ![Note icon] **Note** Before inserting drives, you must enable the robotics, otherwise the RCU cannot perform the necessary functions to add drives to the configuration.

16 Open the service door.

17 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

18 In the corresponding drive location, using the #2 Phillips screwdriver or your fingers, unscrew the retaining thumbscrews and remove the drive cover plates. You must remove two cover plates for each drive that you are adding.

thumbscrews on cover plates
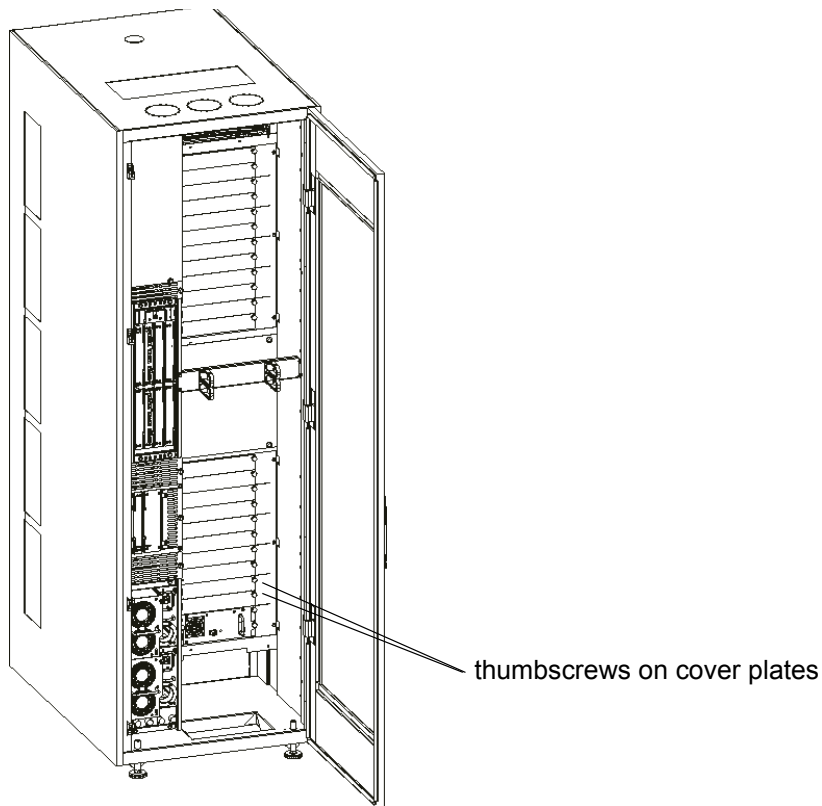
19 Using the markings on the drive slot, insert the drive slowly so the guide rails engage. The drive should be flush with no gaps above or below it.

Use the bottom of the empty drive cluster as a guide if you are adding the drive to the Drive 1 or Drive 7 position.

.

cover plate

glide rail
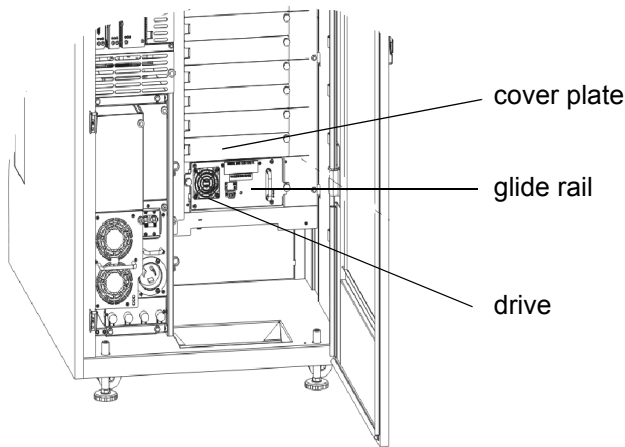
drive

20 Use the #2 Phillips screwdriver or your fingers to tighten the two retaining thumbscrews of the UDS drive sled.

21 Add any additional tape drives in the lower drive cluster. When the lower cluster is full, add the next tape drive to the upper drive cluster.

22 Verify that the green LED on the back of the drive is on. If it is not on, the drive is not installed properly.

23 Observe the state of the green LED while the drive sled firmware automatically loads. It could take up to 20 minutes to complete the drive sled firmware download. When the green LED is solid on for three seconds, then blinks twice and repeats, the drive firmware is downloading. The drive sled firmware download is complete when the green LED blinks one time every second, the amber LED is off, and the blue LED blinks one time every 10 seconds. See Interpreting Drive Status LEDs on page 354 for a complete listing of the LED blinking codes.

> **Note**
> - After you add a drive, the robotics control unit ensures that the drive sled is loaded with the proper firmware. This firmware is based on the currently installed level of library firmware on the management control blade (MCB). If the autoleveling process fails, the drive sled becomes inoperable and the library creates a ticket to report the issue.
>
> - If more than one drive is added into the library, when the library is already powered up, the RCS autolevels the drive after approximately 30 seconds. The autolevel countdown restarts if another drive is added within 30 seconds of the last added drive. The RCS queues up all drives inserted before performing the autolevel.
>
> - Because UDS-2 and UDS-3 sleds require different application images, if your library contains both types of sleds, the RCS may need to autolevel twice.

24 Use the instructions in Cabling on page 111 to connect the new drives.

25 Detach the ESD strap and close the door.

The power is on.

26 From the LMC, click **Tools**→ **Teach**.

27 Click **Configure,** and then click **Start**.

The **Working** screen appears. Once the teach is completed, a message appears in the **Results** field, for example, "Command Completed."
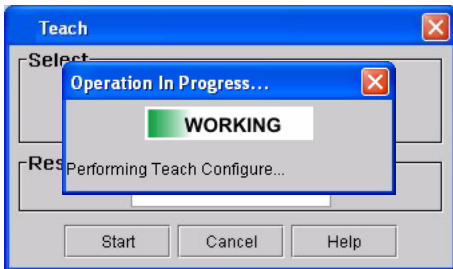
28 Add the new drive(s) to a partition using the following procedure:

    a. Log into the LMC as service user.

    b. Click **Setup→ Partitions→ Configure.**

       The **Partitions** dialog box is displayed.

    c. Select the partition that include the affected magazines and click **Modify.**

    d. Select a partition and add the new drive(s).

29 To avoid confusion, add the affected magazines back into the appropriate partition. The partition should be the same size as the original partition.

> **Note** Due to licensing requirements, the physical location of the affected magazines may not be available until the procedures completes.

Adding a Power Supply Chassis

Required tools: 7 mm socket wrench, ESD strap

1 Shut down the library.

For more information, see [Shutting Down the Library](#) on page 232.

2 Open the service door on the control module or expansion module where you are adding the power supply chassis.

3 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

4 On the power distribution unit(s), set the circuit breaker switch to the down (0) position.

5 Remove the four thumbscrews retaining the cover plate from the power chassis opening.

thumbscrews
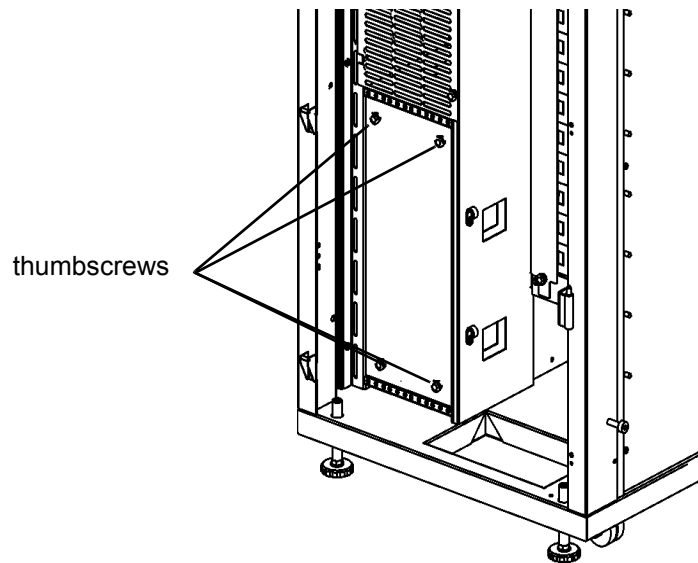
6 Remove the LBX cover plate.

thumbscrews
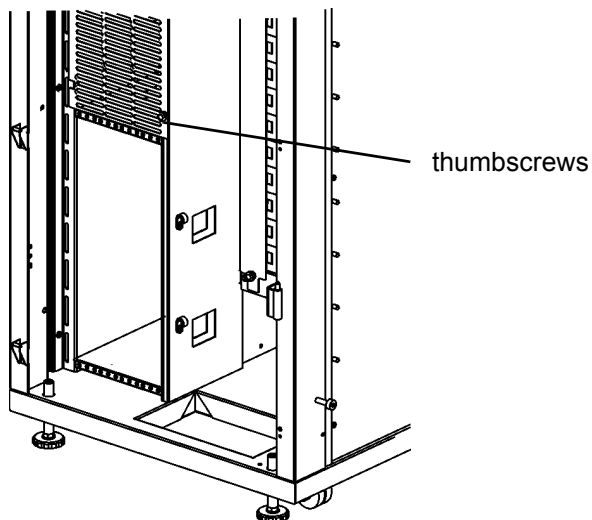
7 Unpack the power chassis.

8 Slide the power chassis into the module and attach it using the four 7 mm screws.

7 mm screws
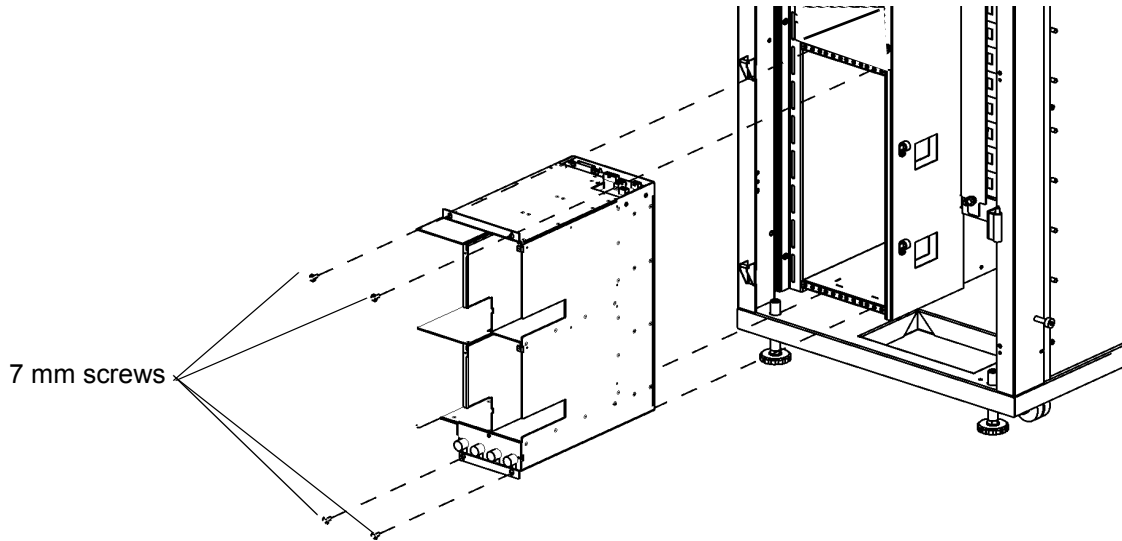
9 Install the power supplies and power distribution units.

Not all expansion modules will receive redundant power supplies, as those shown below.

power distribution units

power supplies
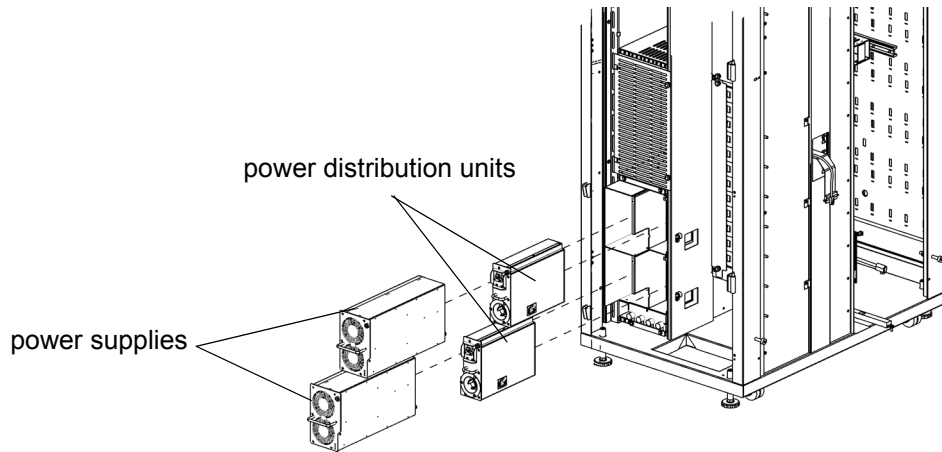
10 Through the space the LBX occupied, connect all the cables to the top of the power chassis.

The connections include four white connectors and one gray ribbon cable (the LBX ribbon). You only need to connect the white connectors from the power chassis.

11 Connect the LBX ribbon cable.

connector: J48AP
plug: W17 to I/O
management unit

connector: J48S
plug: W5 to LBX

connector: J48B
plug: W13 to upper drive cluster

connector: J48A
plug: W13 to lower drive cluster

12 Insert and tighten the LBX/IEX cover plate using the thumbscrew.
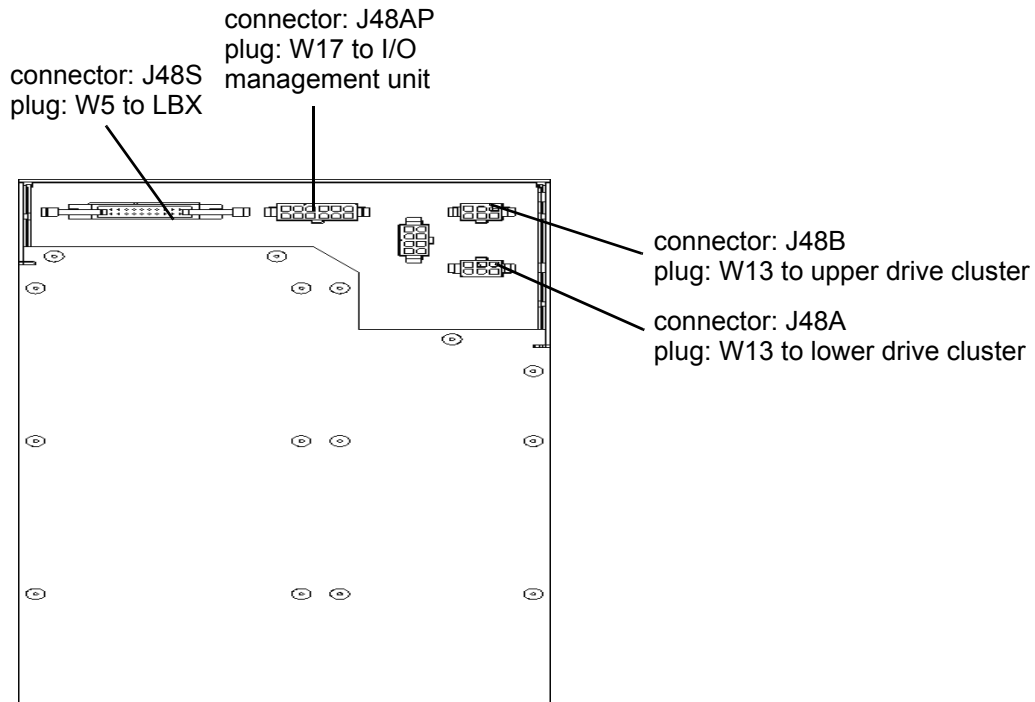
LBX/IEX cover
plate thumbscrew
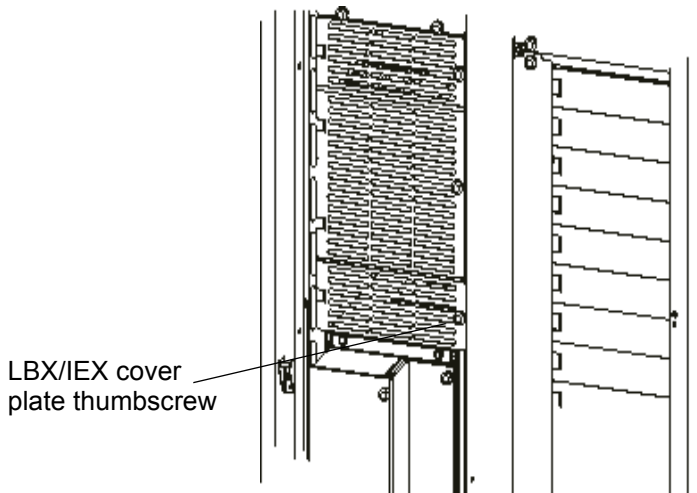
13 Insert the power cords into the power distribution units and turn them clockwise.

plug the power cables into
the power distribution units
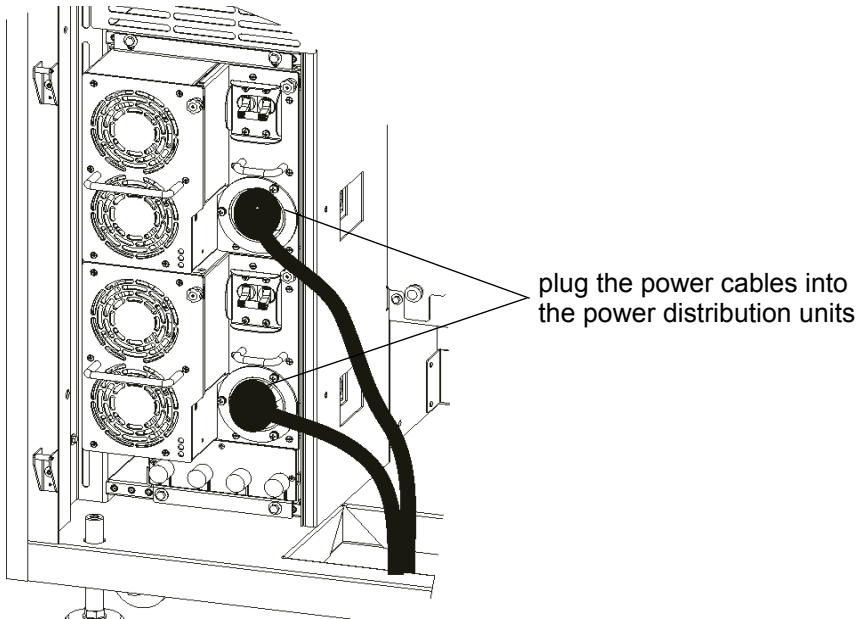
14 Plug the two power cords into the power source.

15 On both power distribution units, toggle the power switch to the up (I) position to turn on the power. If you have power coming to other modules of the library, they must be turned on as well.

turn both power switches
to the on position (I)
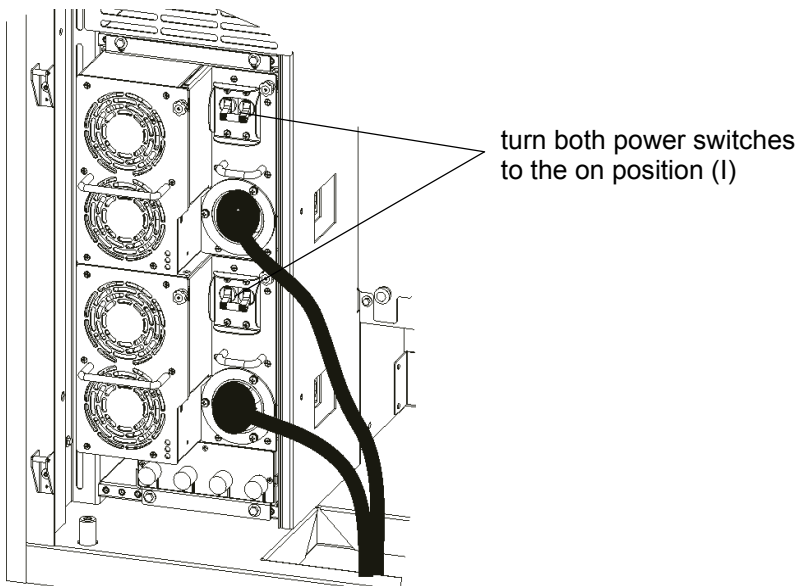
16 Detach the ESD strap and close the door.

17 To turn on power to the library, press the **Power** button on the indicator panel.

The library begins to boot up. Within five minutes, the LMD display appears on the library's touch screen. A library with only a few drives usually will be fully powered on and ready for use within 10 minutes. However, if a library is large with a high number of drives, it can take more than an hour for the library to fully power on, complete its discovery process, and become ready for use. During the power-on process, the **Robotics Enabled** indicator flashes. When the library is fully up and ready to receive commands, the **Robotics Enabled** indicator turns solid green.

Adding a Redundant Power Supply

The library supports both non-redundant and redundant power configurations. The non-redundant configuration has a single power supply and power distribution unit. The redundant configuration has two power supplies and two power distribution units.

This subsection provides step-by-step instructions for installing a second power supply into a module. These instructions work for both the control module and expansion modules.

> **Note**   You do not need to take the library offline in order to add the second power supply for redundancy.
>
> Power supplies are not used in expansion modules eight through eleven. Only the control module and first seven expansion modules support a power supply. A power supply in an expansion module powers the drives and, therefore, a power supply must be present for each module that has a drive.

Required tools: #2 Phillips screwdriver, ESD strap

1   Open the service door on the control module or expansion module where you are adding the power supplies.

2   Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3   Use the Phillips screwdriver to loosen the thumbscrews that retain the cover plate over the power supply slot. Discard the cover plate or leave them with the customer for future use.
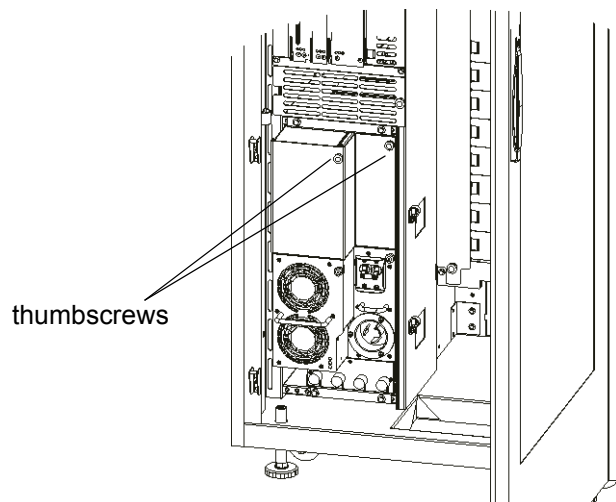
thumbscrews

4   Carefully unpackage the power supply and power distribution unit and remove them from the antistatic bags.

5 Slide in the power supply and tighten the thumbscrew.

power supply
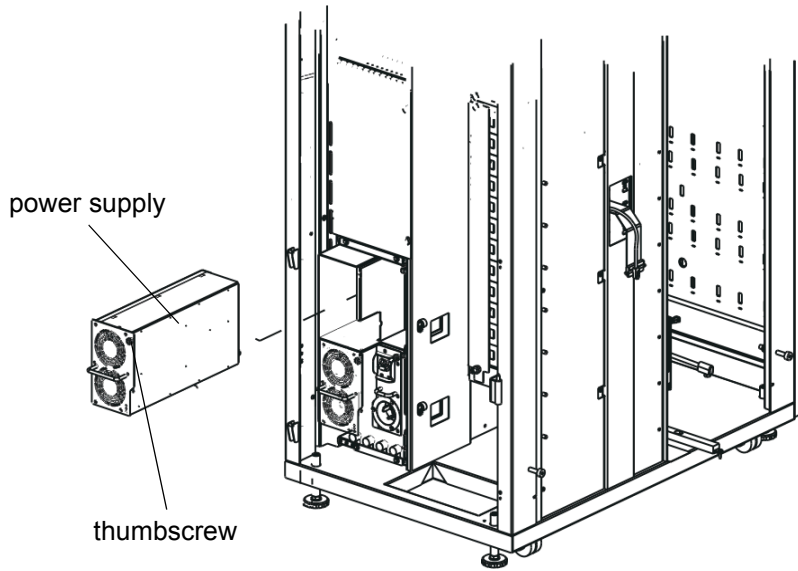
thumbscrew

6 Slide in the power distribution unit and tighten the thumbscrew.

power distribution unit

thumbscrew
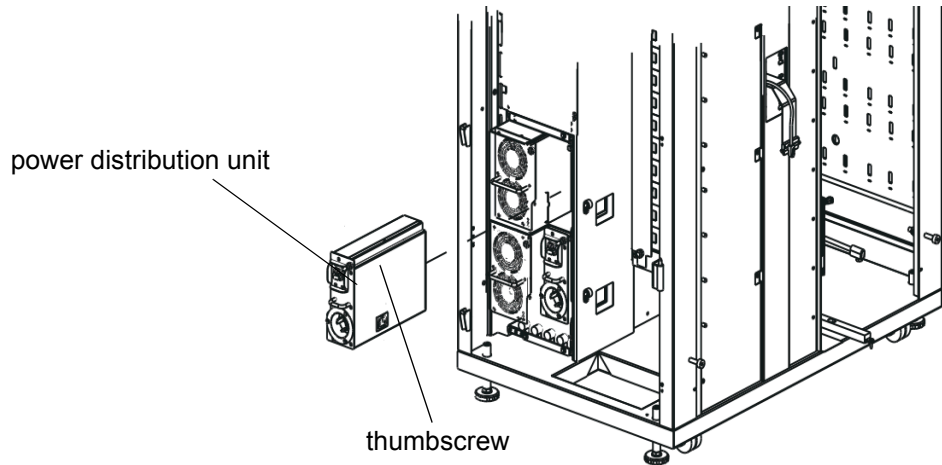
7 Route the power cord through the cable access opening at the bottom of the module.

power distribution unit

cable access opening
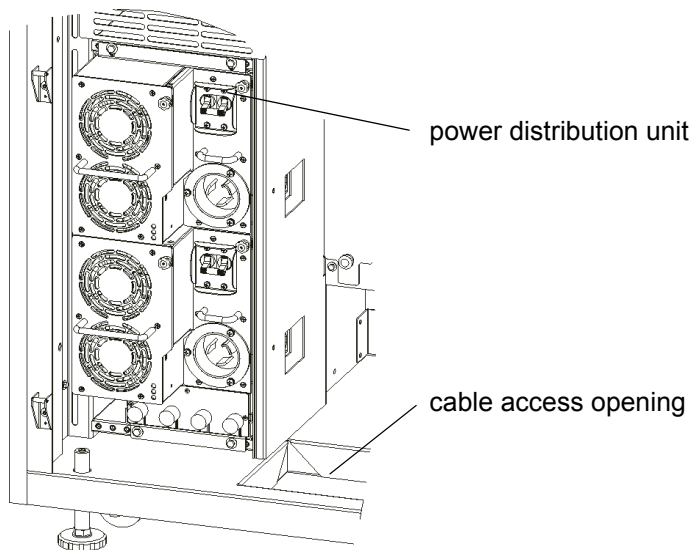
8 Connect the power cord to the power distribution unit.

9 Route and connect the AC power cord to the power source.

10 On the power distribution unit, toggle the circuit breaker switch to the On position (I) to turn on the power.

circuit breakers
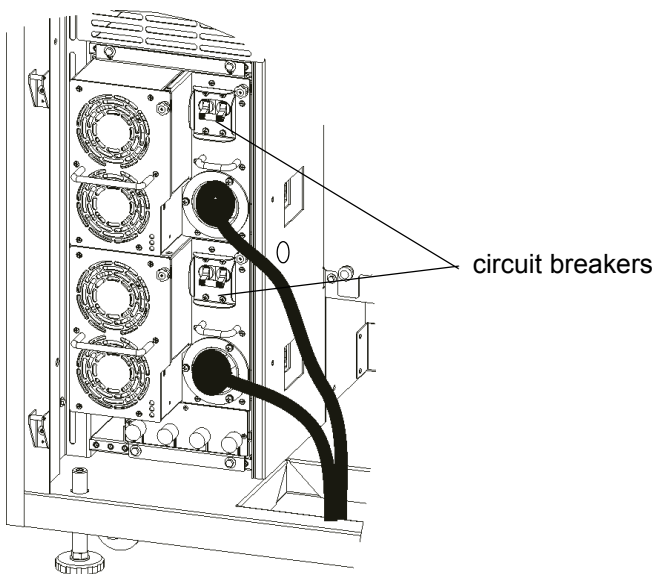
Note The power supply in the top position is represented as power supply 1 in the Library Management Console (LMC) and the power supply in the bottom position is represented as power supply 2.

Adding Optional Hardware

Adding an I/O Management Unit

☒ Note   There must be a power chassis in the expansion module when adding an I/O management unit.

Required tools: 7 mm socket wrench, Phillips screwdriver, ESD strap

1 Shut down the library.

   For more information, see Shutting Down the Library on page 232.

2 Open the service door.

3 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

4 Use your finger or a Phillips screwdriver to loosen the thumbscrews on the cover plate where the I/O management unit will be installed.

thumbscrews
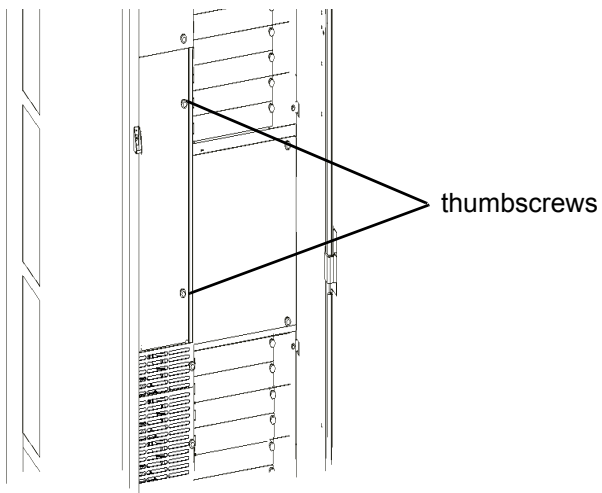
5 Remove the vented cover plate from in front of the LBX board. The cover plate will be reused later in this procedure.

thumbscrews
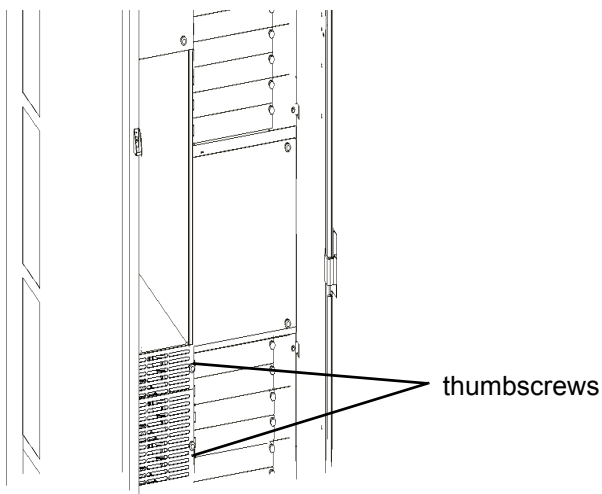
6   Use your fingers or a Phillips screwdriver to unscrew the two tall covers next to the drive clusters and the mid-module cover plate. Remove the cover plates and set them aside. They will be reused later in this procedure.

thumbscrews

thumbscrews

thumbscrews
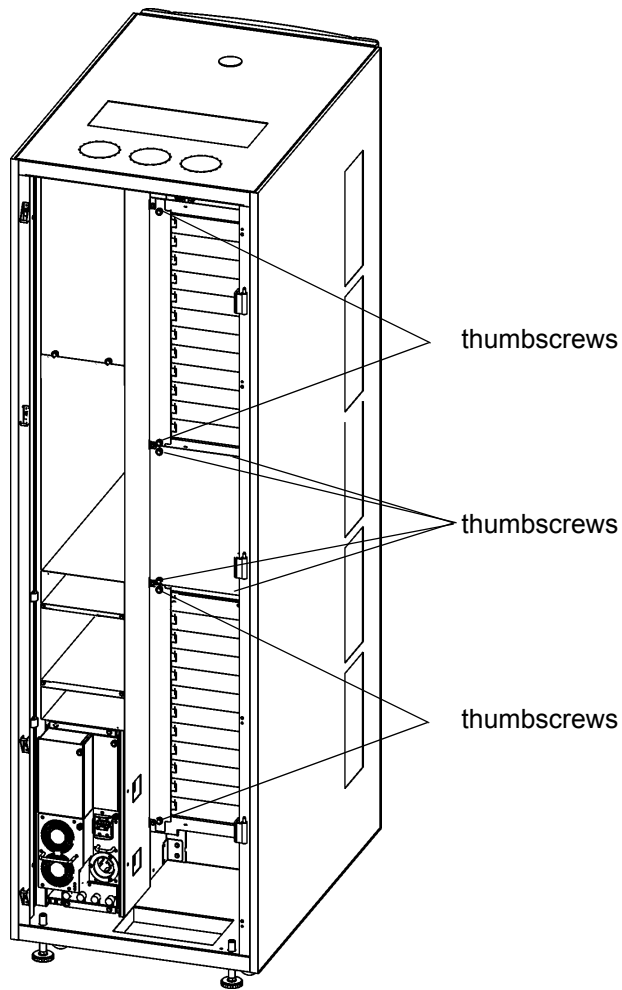
7   Open the box containing the new I/O management unit.

8   Feed the I/O management unit's cables into the space behind where the I/O management unit is installed. The cables must go downward towards the LBX board.

9   Insert the I/O management unit into the opening. Make sure the cables are not bent and continue going down towards the LBX board.

10 Use the 7 mm nut driver to secure the four retaining screws.

7 mm screws
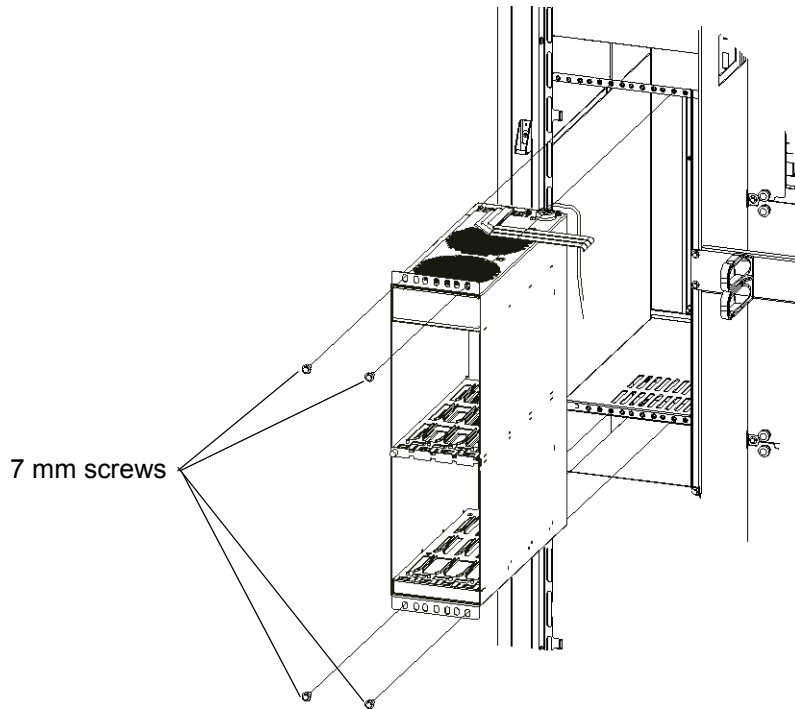
11 Through the space behind the LBX board, connect the W17 cable to the J48AP connection on top of the power chassis. This is the connection to the power distribution unit.

connector:J48AP
plug: W17 to I/O management unit
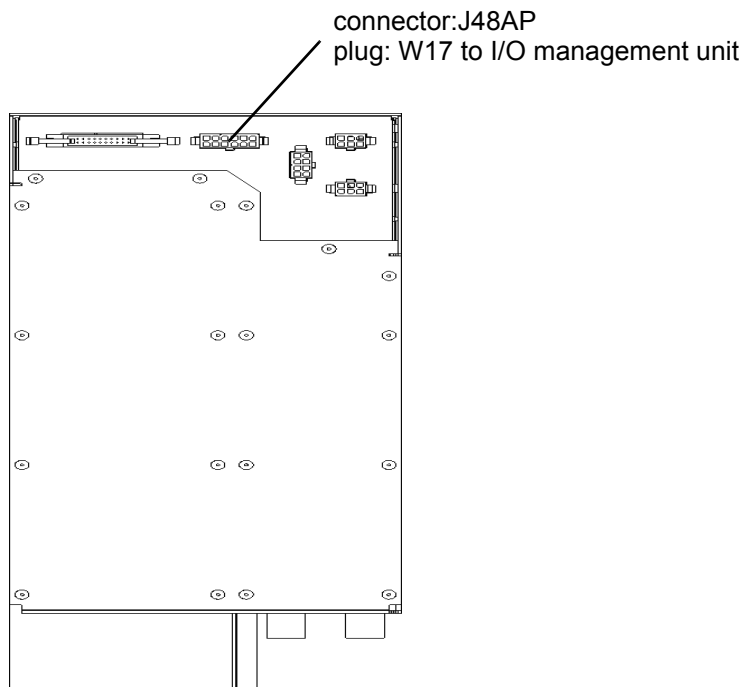
12 Connect the I/O management cables to the LBX board. This includes connecting the CAN cable (W7) to J13, connecting the Ethernet cluster cable (W11) to J10, and connecting power supply status cable (W16) to J16.

> **Note** For more LBX version information, see LBX Board and Terminator on page 345.

connector: J13
plug: W7 to I/O
management unit
and CAN interface

connector: J10
plug W11 to I/O
management unit
and Ethernet

connector: J16
plug: W16 to power
supply status cable
from LBX board

13 Insert and tighten the LBX/IEX cover plate using the thumbscrew.
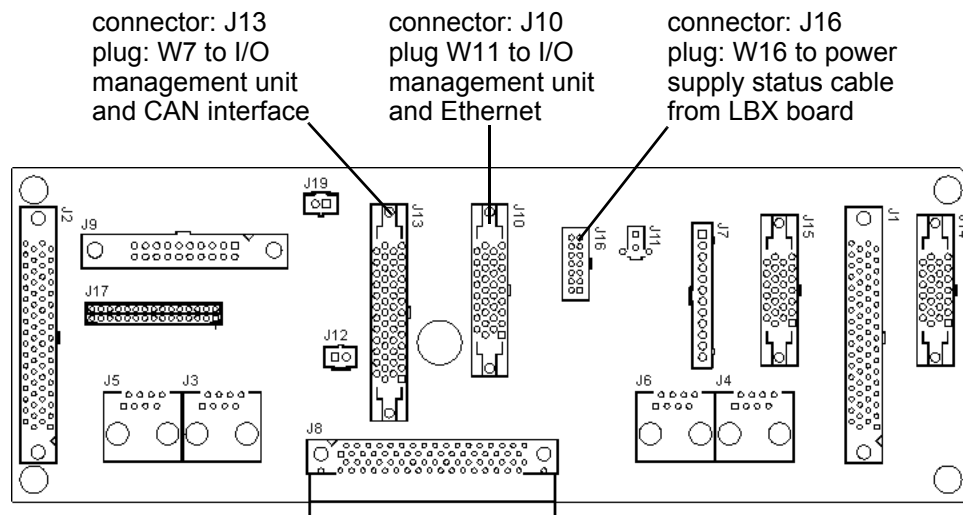
LBX/IEX cover
plate thumbscrew
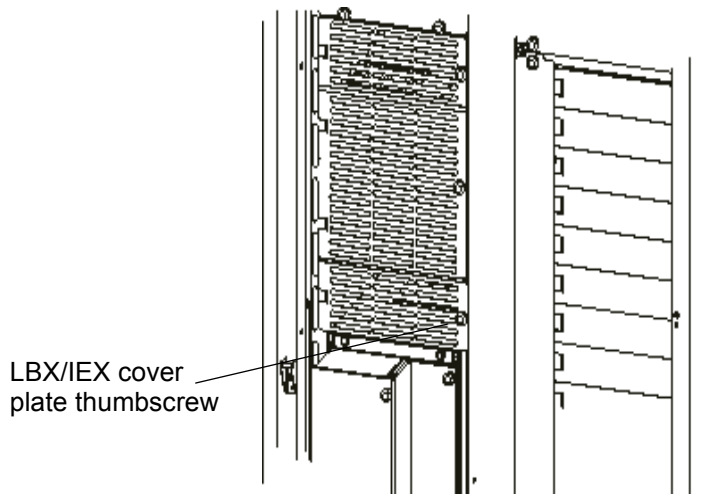
14 Insert and tighten the two tall covers next to the drive clusters and the mid-module cover plate.

tall top cover plate

mid-module cover plate

tall bottom cover plate
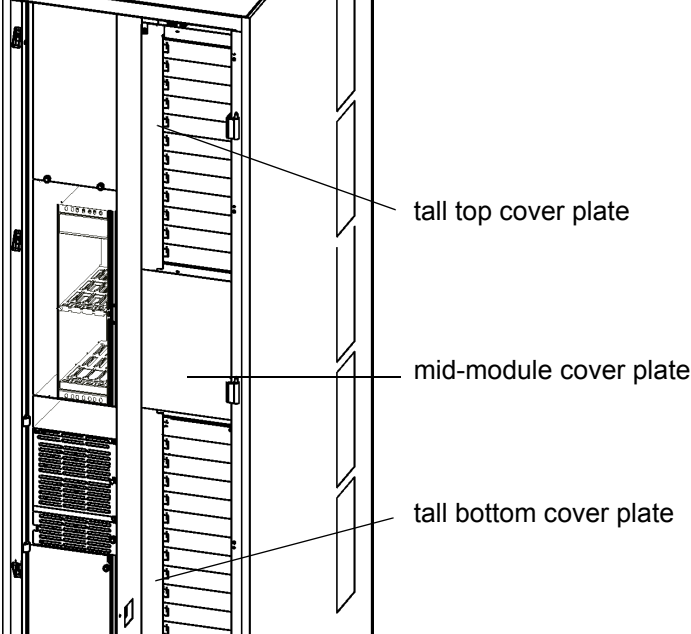
15 Install the grated covers on the side and top of the I/O management unit.

thumbscrews

thumbscrews
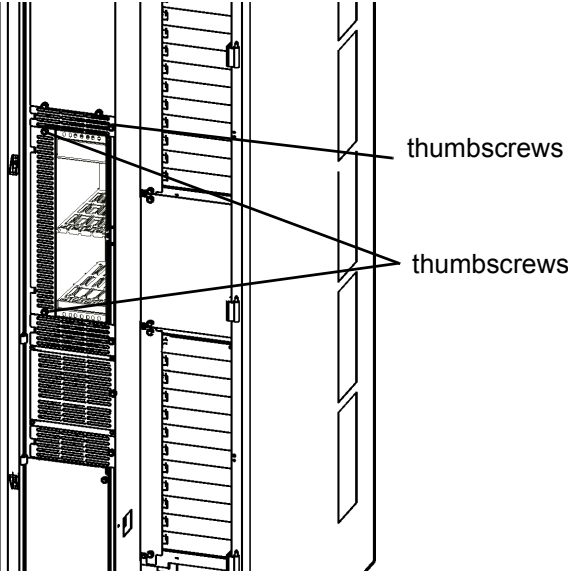
16 Use the 7 mm nut driver to attach the cable bracket.

7 mm screws
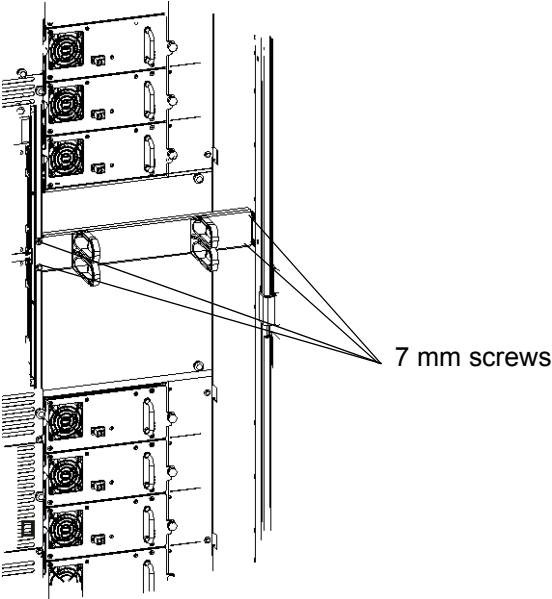
17 Insert the I/O management unit cooling assembly and push the handle up to lock it in place. Use a #1 Phillips screwdriver tighten the screw.

Phillips screw
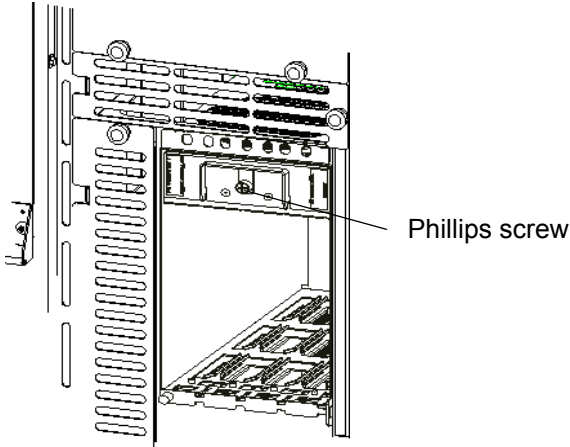
18 Evenly apply pressure to both ends of the control management blade (CMB) and slide it into bay 2 of the I/O management unit. As you insert the CMB, the latchhooks will begin to move towards the middle of the blade. Push the latchhooks towards the middle of the blades and into the lock position. You will feel the blade pins connect with the I/O management unit's backplane as the blade locks into place.

⚠ **CAUTION**   **Forcing the blade into the bay can cause the pins to bend.**

Figure 24   I/O Management Unit Bay Layout

cooling assembly			
bay 1 (not used)	bay 2 (CMB)		
bay 3 (first FC I/O blade)	bay 4 (second FC I/O blade)		
bay 5 (third FC I/O blade)	bay 6 (not used)		
bay 7 (first Ethernet expansion blade)	bay 8 (second Ethernet expansion blade)		

19 Evenly apply pressure to both ends of the blades and slide them into the correct bay of the I/O management unit until the latchhooks begin to move towards the middle of the blade. Push the latchhooks towards the middle of the blades and into the lock position. You will feel the blade pins connect with the I/O management unit's backplane as the blade locks into place.
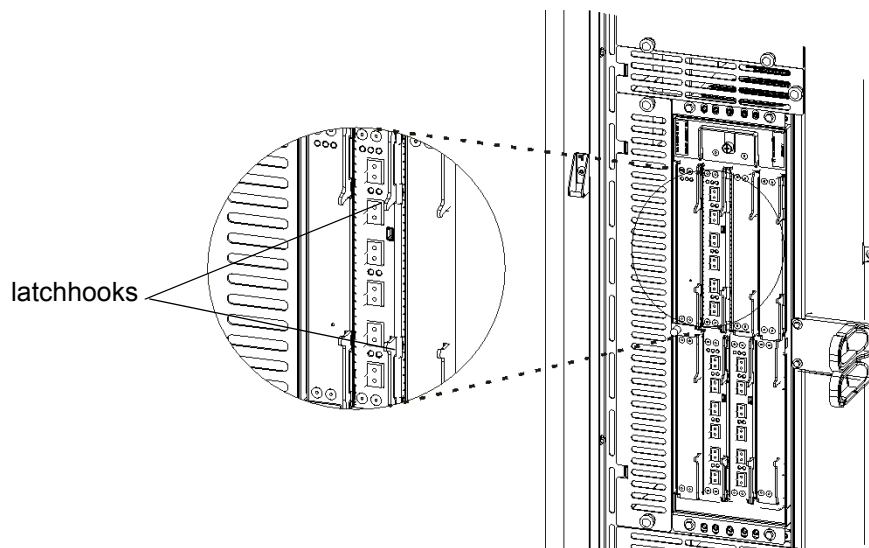
20 Install cover plates over any bays that are not populated with blades.

⚠ CAUTION	**Slots that are not populated with blades must contain a cover plate. If the cover plate is not installed, blade temperature errors will occur.**
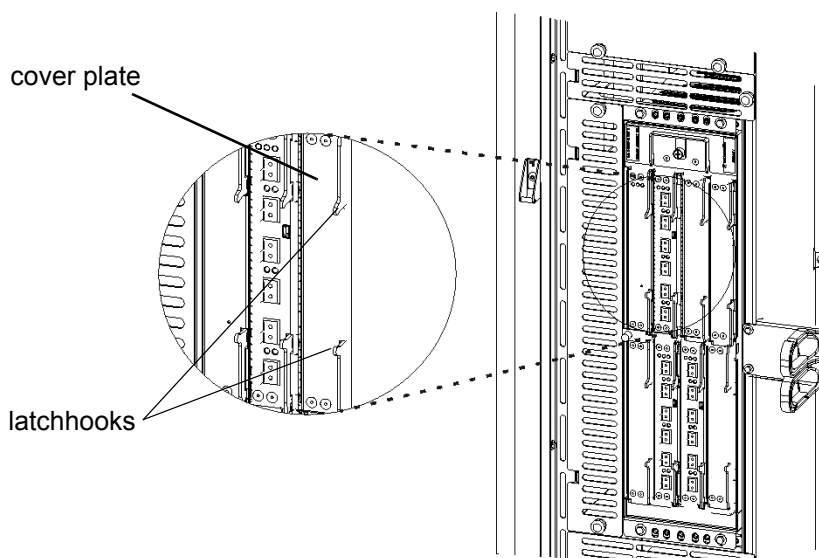
21 Connect the six-foot Fibre optical cables to the appropriate Fibre Channel connections on the blades. Ports 1 and 2 default to target and ports 3, 4, 5, and 6 default to initiator mode.

> ⚠️ **CAUTION** **Fibre optical cables will be damaged if they are bent at more than a four inch arc.**

22 Route the cable through the cable keepers and down the right side of the module.

Fibre optic cable routed through cable keepers
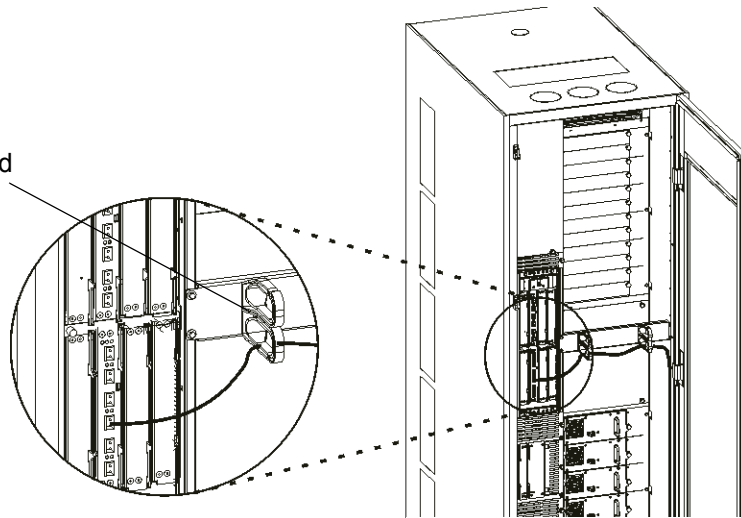
23 Insert the Fibre optical cable into the Fibre Channel connection on the drive.

Fibre optic cable connected to drive in drive sled position 1

24 Gather the Fibre optical cables and put them inside the Velcro straps that are mounted on the right side of the module.
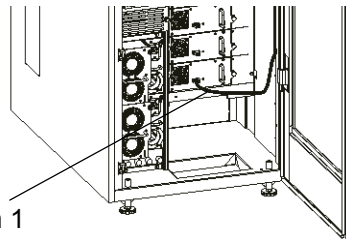
use Velcro straps
to secure cables
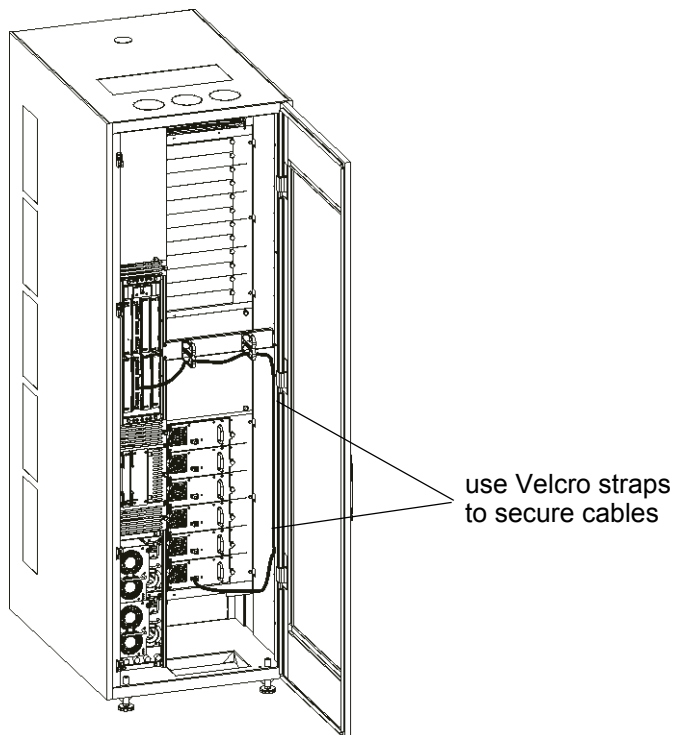
25 Detach the ESD strap and close the door.

26 To turn on power to the library, press the **Power** button on the indicator panel.

The library begins to boot up. Within five minutes, the LMD display appears on the library's touch screen. A library with only a few drives usually will be fully powered on and ready for use within 10 minutes. However, if a library is large with a high number of drives, it can take more than an hour for the library to fully power on, complete its discovery process, and become ready for use. During the power-on process, the **Robotics Enabled** indicator flashes. When the library is fully up and ready to receive commands, the **Robotics Enabled** indicator turns solid green.

Adding Blades to the I/O Management Unit

The instructions in the following subsections are to be used for upgrading existing library configurations. If you are installing blades in a new library, see Installing Drives and Blades on page 97 for instructions.

If you are adding blades to the I/O management unit, you must first install a cooling assembly if there is not one in the module.

> **Note** You do not need to take the library offline in order to install the I/O management cooling assembly, CMBs, or FC I/O blades. However, if the library is not taken offline RAS tickets will be posted.

Installing the I/O Management Unit Cooling Assembly

The I/O management unit cooling assembly contains the fans that regulate temperature for the I/O management unit.

Required tools: #1 Phillips screwdriver, ESD strap

1   Open the service door of the module.

2   Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3   Use a #1 Phillips screwdriver to remove the cover over the slot where the I/O management unit cooling assembly will be installed.

cooling assembly cover
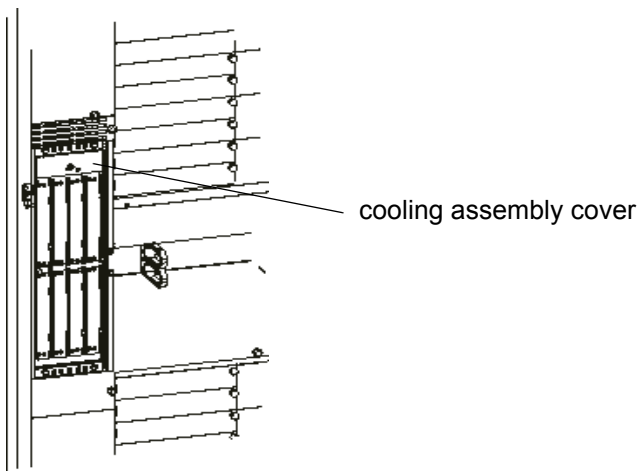
4   Remove the I/O management unit cooling assembly from the packaging.

5   Slide the I/O management unit cooling assembly into the top slot of the I/O management unit until fully seated.

cooling assembly

latch handle

I/O management unit

6   Push the latch handle into the up position.

7   Use a #1 Phillips screwdriver to tighten the thumbscrew on the I/O management unit cooling assembly.

Phillips screw
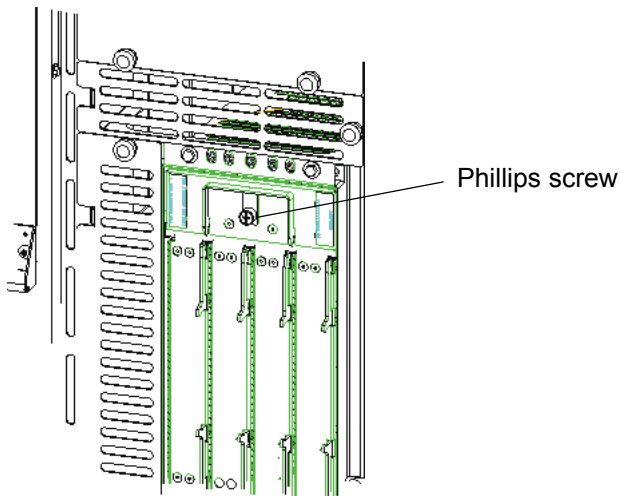
Installing a Control Management Blade

Required tools: ESD strap

1   Open the service door of the module.

2   Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3   Remove the cover plate from bay 2, the CMB slot.
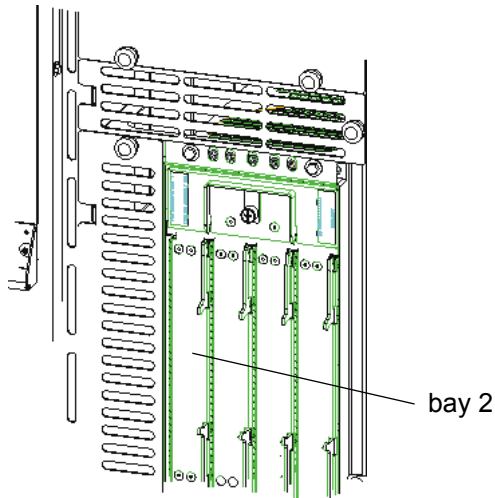
bay 2

4   Remove the CMB from the protective anti-static bag.

5   Press up and out to open the latchhooks on each side of the CMB.

6   Carefully align the CMB with the guide slots in bay 2. The LEDs will be on the top.

⚠ **CAUTION**   **Forcing the blade into the bay can cause the pins to bend.**
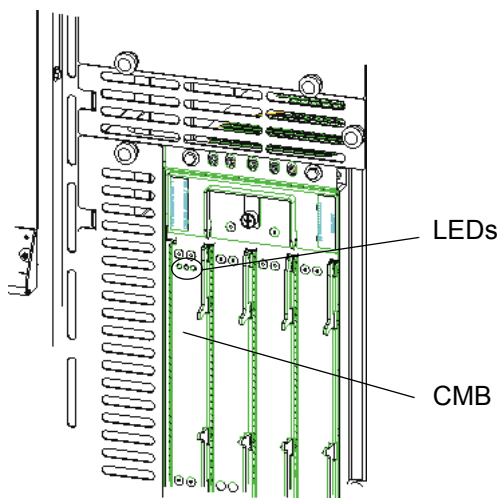
LEDs

CMB

7 Use your thumbs on each end of the blade to evenly apply pressure and slide it into the I/O management unit. When you feel the pins of the CMB lock into the backplane, push the latchhooks towards the middle of the blade and into the lock position.

⚠ **CAUTION** **Slots that are not populated with blades must contain a cover plate. If the cover plates are not installed, FC I/O blade temperature errors will occur.**

8 Detach the ESD strap and close the door.

Installing an FC I/O Blade

Required tools: ESD strap

1 Open the service door of the module.

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Remove the cover plate from bay where the FC I/O blade will be installed. The population order for the FC I/O blades is shown below.

📝 Note   Make sure you install the FC I/O blade into the correct bay.

cooling assembly			
bay 2 (CMB)	bay 4 (second FC I/O blade)	bay 6 (not used)	bay 8 (second Ethernet expansion blade)
bay 1 (not used)	bay 3 (first FC I/O blade)	bay 5 (third FC I/O blade)	bay 7 (first Ethernet expansion blade)

4 Remove the FC I/O blade from the protective anti-static bag.

5 Press up and out to open the latchhooks on each side of the FC I/O blade.

6 Carefully align the FC I/O blade with the guide slots in the bay. The status LEDs must be at the top.

> ⚠ **CAUTION** **Forcing the blade into the bay can cause the pins to bend.**

status LEDs

FC I/O blades installed
in bays 3, 4, and 5
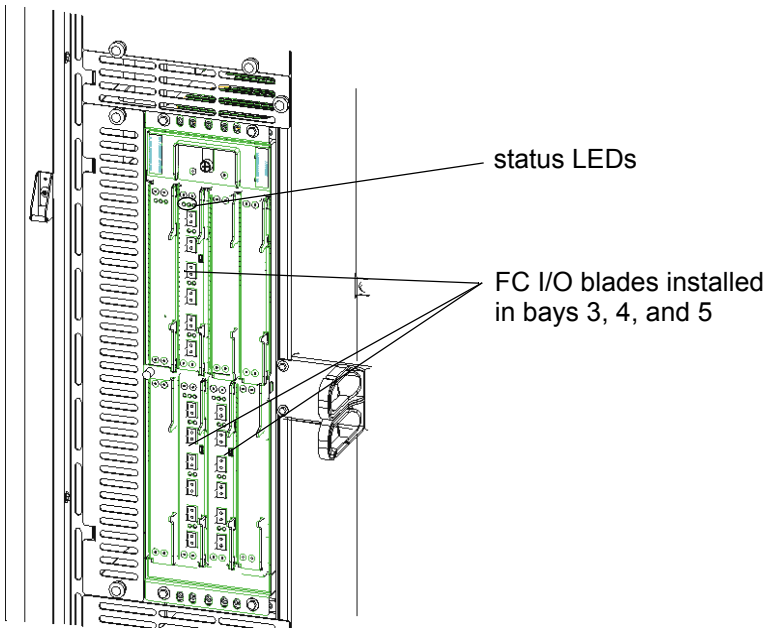
7 Use your thumbs on each end of the blade to evenly apply pressure and slide it into the I/O management unit. When you feel the pins of the FC I/O blade lock into the backplane, push the latchhooks towards the middle of the blade and into the lock position.

> ⚠ **CAUTION** **Slots that are not populated with blades must contain a cover plate. If the cover plates are not installed, FC I/O blade temperature errors will occur.**

8 Remove and discard the white plastic covers from the FC connectors on the tape drives.

9 Remove and discard the necessary number of the black rubber protective covers from the ports on the FC I/O blades.

10 Carefully unwrap the six-foot Fibre optical cables and remove the two white plastic protective caps from each end of the cable.

> ⚠ **CAUTION** **Fibre optical cables will be damaged if they are bent at more than a four inch arc.**

11 Connect the Fibre optical cable to port FC-3 on the FC I/O blade that is installed in bay 3 of the I/O management unit. See <u>Table 5</u> on page 114 for information about the cable connection requirements.

port FC-3 on the
FC I/O blade in
in bay 3

12 Route the cable through the cable keepers and down the right side of the control module or expansion module.

Fibre optic cable routed
through cable keepers

cable connected to FC 3 on
FC I/O blade in bay 3 of the
I/O management unit
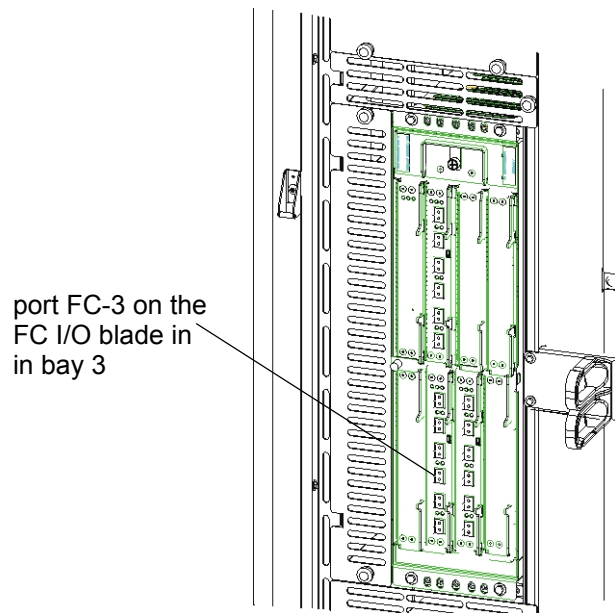
13 Insert the Fibre optical cable into the Fibre Channel connection on the drive.
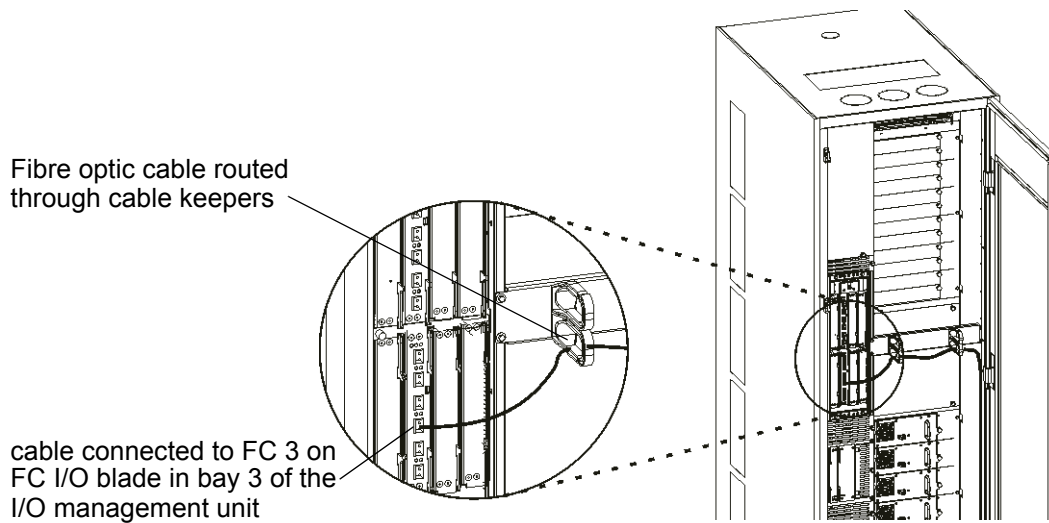
Fibre optic cable connected
to drive in drive sled position 1
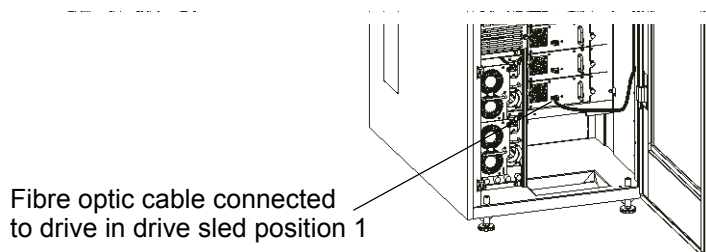
14 Repeat Step 10 on page 261 through Step 13 on page 262 for each drive that will be installed.

> ![Note icon] **Note**   The FC port and drive numbers will change according to Table 5 on page 114.

15 Gather the Fibre optical cables and put them inside the Velcro straps that are mounted on the right side of the module.

use Velcro straps
to secure cables

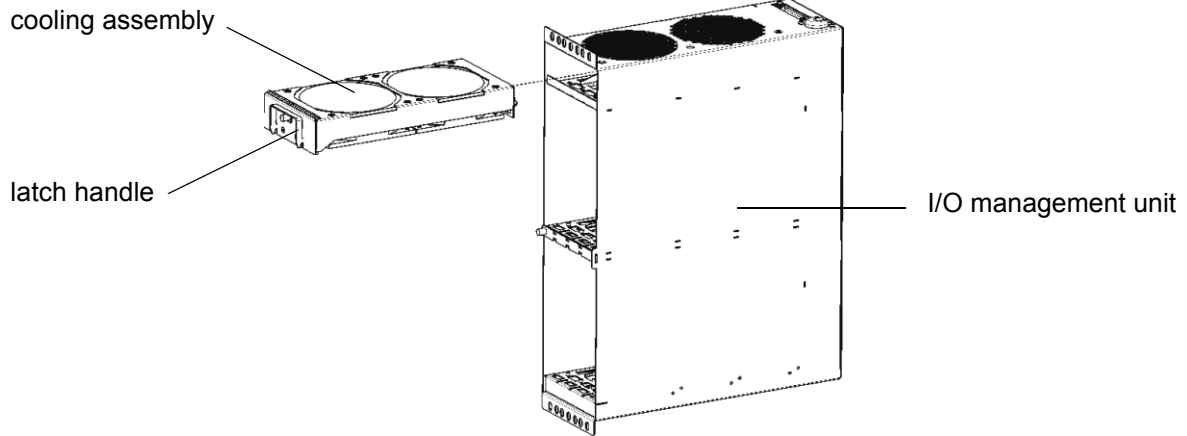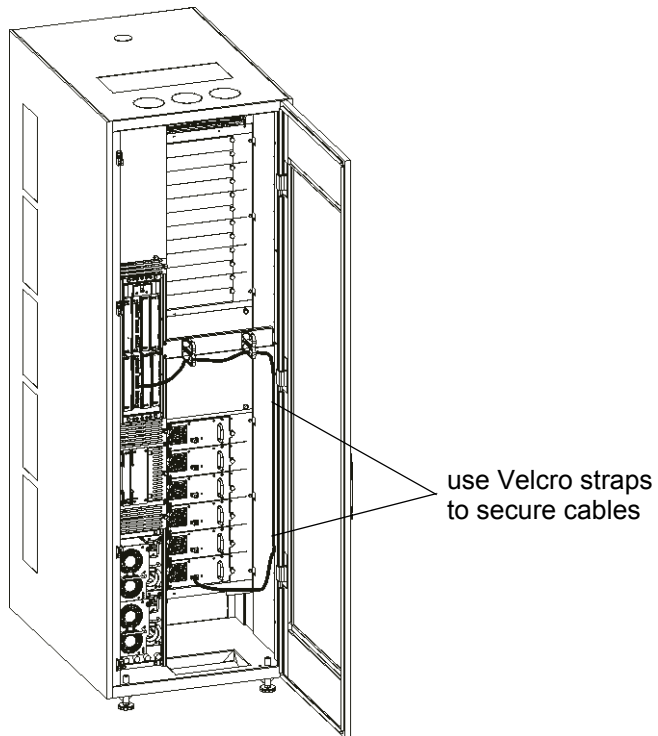**16** Detach the ESD strap and close the door.

Installing an Ethernet Expansion Blade

Required tools: ESD strap

1 Open the service door of the module.

2 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

3 Remove the cover plate from bay where the Ethernet Expansion blade will be installed. The population order for the Ethernet Expansion blades is shown below.

> **Note**   Make sure you install the EEB into the correct bay.

cooling assembly			
bay 2 (CMB)	bay 4 (second FC I/O blade)	bay 6 (not used)	bay 8 (second Ethernet expansion blade)
bay 1 (not used)	bay 3 (first FC I/O blade)	bay 5 (third FC I/O blade)	bay 7 (first Ethernet expansion blade)

4 Remove the Ethernet Expansion blade from the protective anti-static bag.

5 Press up and out to open the latchhooks on each side of the Ethernet Expansion blade.

6 Carefully align the blade with the guide slots in the bay. The status LEDs must be at the top.

> ⚠ **CAUTION**   **Forcing the blade into the bay can cause the pins to bend.**

status LEDs

Ethernet Expansion blades installed in bays 7 and 8
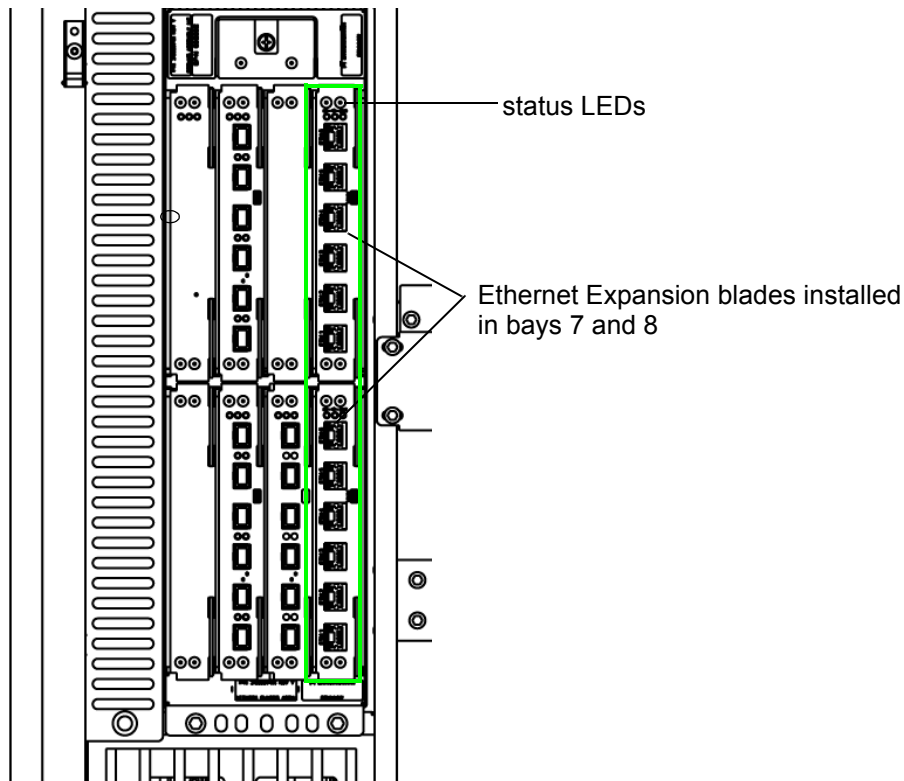
7 Use your thumbs on each end of the blade to [Figure 23](#) on page 234 evenly apply pressure and slide it into the I/O management unit. When you feel the pins of the blade lock into the backplane, push the latchhooks towards the middle of the blade and into the lock position.

> ⚠ **CAUTION**   **Slots that are not populated with blades must contain a cover plate. If the cover plates are not installed, blade temperature errors will occur.**

8 Remove and discard the plastic covers from the Ethernet connector on the tape drives.

9 Remove and discard the protective covers from the ports on the Ethernet Expansion blades.

10 Carefully unwrap the EEB cables and remove the two plastic protective caps from each end of the cable.

11 Connect the cable to ETH 1 on the Ethernet Expansion blade that is installed in bay 7 of the I/O management unit. See Cabling on page 111 for information about the cable connection requirements.
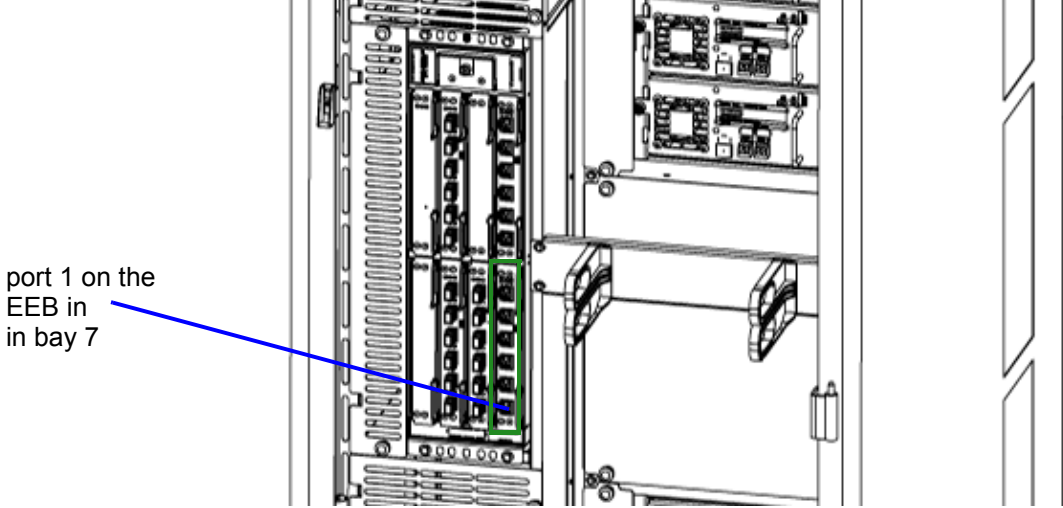
port 1 on the
EEB in
in bay 7

12 Route the cable through the cable keepers and down the right side of the control module or expansion module.

EEB cable routed
through cable
keepers

Adding Optional Hardware

13 Insert the EEB cable into the EEB port connection on the drive.
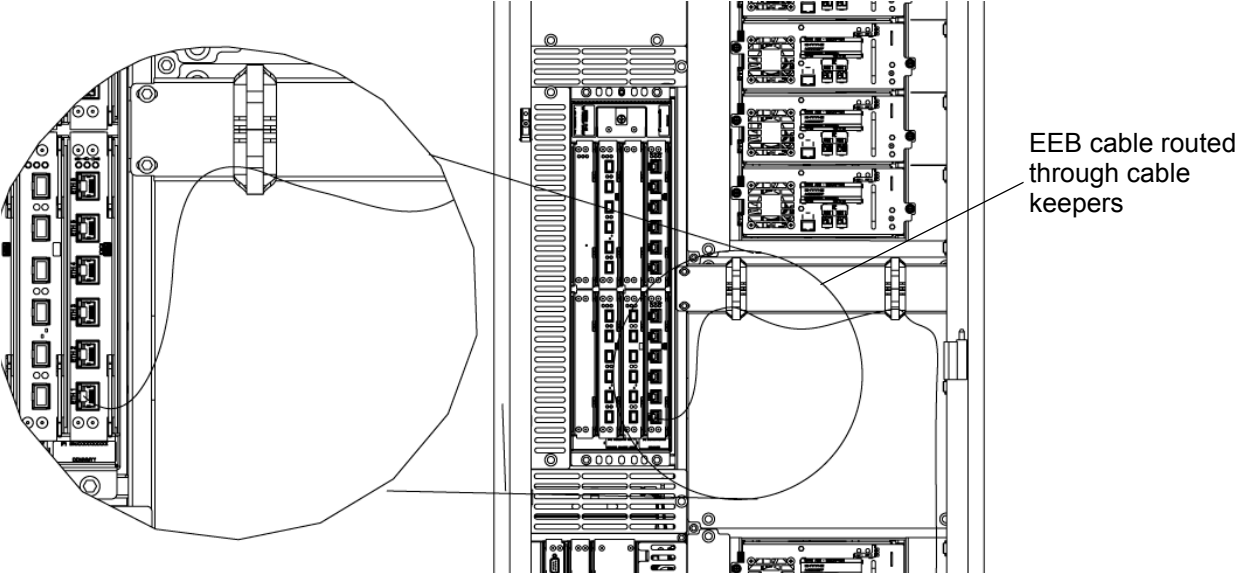
EEB cable connected
to drive in drive sled 1
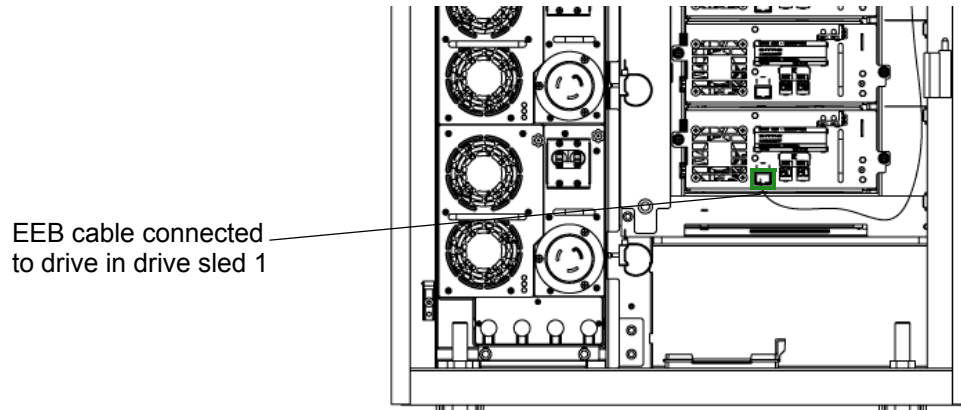
14 Repeat Step 10 on page 265 through Step 13 on page 267 for each drive that will be installed and connected to an EEB.

> **Note** The EEB port and drive numbers will change according to Cabling on page 111.

15 Gather the EEB cables and put them inside the Velcro straps that are attached to the right side of the module.

use Velcro straps
to secure cables
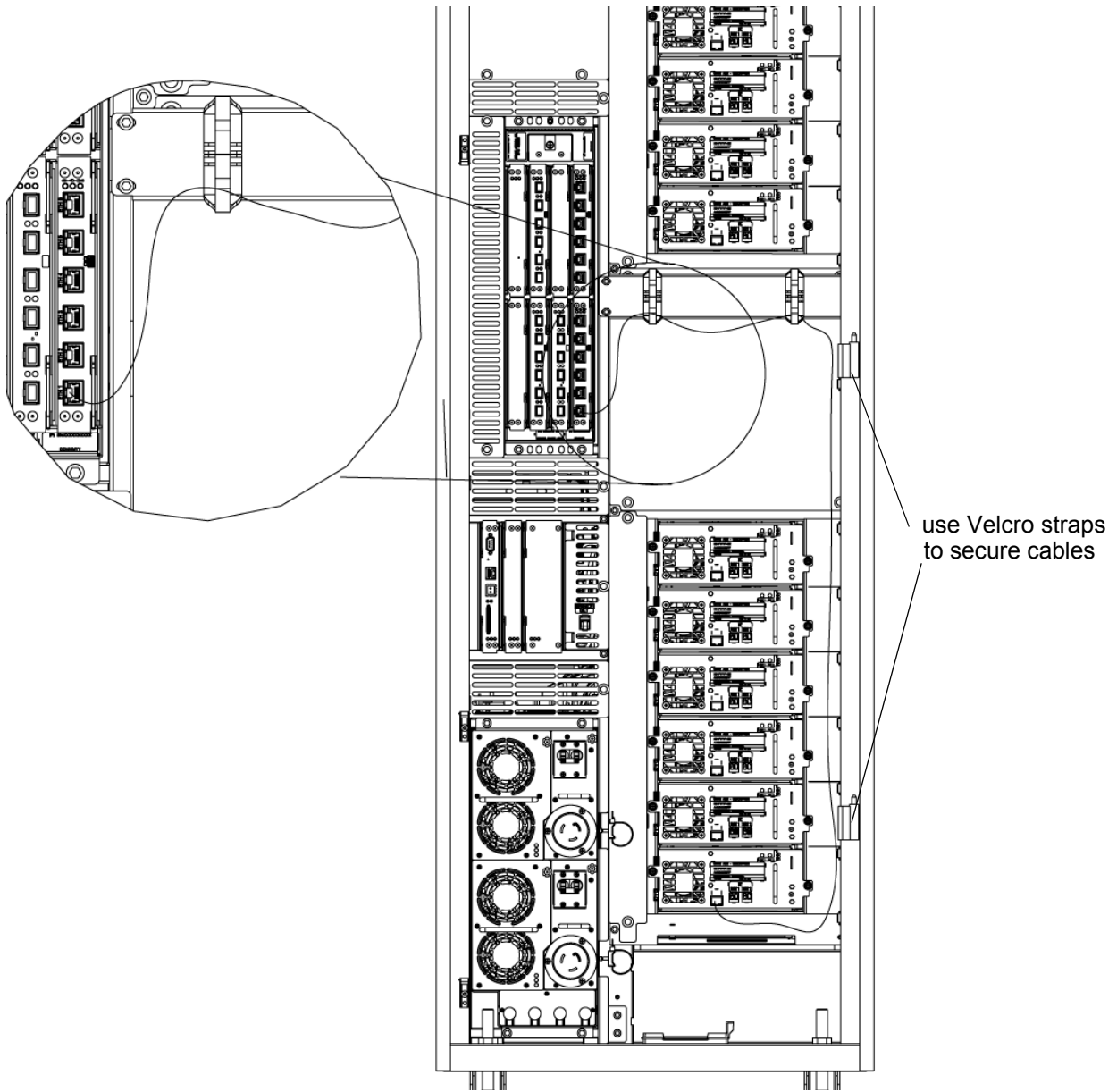
16 Connect the designated host to the port on the EEB.

17 Detach the ESD strap.

Adding a 24-Slot I/E Station to an Expansion Module

This section describes how to upgrade an expansion module to include a 24-slot I/E station.

> **Note**   You can add 24-slot I/E stations to the control module and any of the first seven expansion modules.

Required tools: #2 Phillips screwdriver, 2.5 mm hex wrench, disposable screw capture tool, wire cutters (for plastic ties), ESD strap

1   You must export all media from the access door being upgraded.

    a. Log into the Library Management Console (LMC).

    b. Click **Operations** → **Export.**

2   Before removing any magazines in the access door of the expansion module you are upgrading, determine if the magazines are used in any partitions.

3   If the **Automatic Teach** mode is being used, disable it to perform this upgrade procedure.

4   Remove the magazines in the access door from each partition(s) using the following procedure:

    a. Click **Physical** on the **View** menu.

    b. Click **Setup**→ **Partitions**→ **Configure.**

       The **Partitions** dialog box is displayed.

    c. Select the partition that include the affected magazines and click **Modify.**

    d. Return the affected magazines to the physical pool.

    e. Repeat Steps a through d for each partition associated with the access door you are upgrading.

5   Shut down the library.

For more information, see <u>Shutting Down the Library</u> on page 232.

6 Open the access door of the expansion module that is to receive the I/E station.

7 Remove the magazines in columns 1 through 4, sections 1 through 5 of rack 2 to access screws and to make room for the I/E station. Also removing the magazines in columns 3 and 4, section 6 provides additional space when installing the I/E station.

> **Note** Make a note of the target magazine location when it is removed. Keep this magazine within reach. You will need it to perform of this procedure.
>
> If you are adding the I/E station to the control module, none of the magazines in column 4 will be present.

column

1   2   3   4

I/E station location

section

1
2
3
4
5
6
7
8
9
10

remove all magazines
inside the boxed area
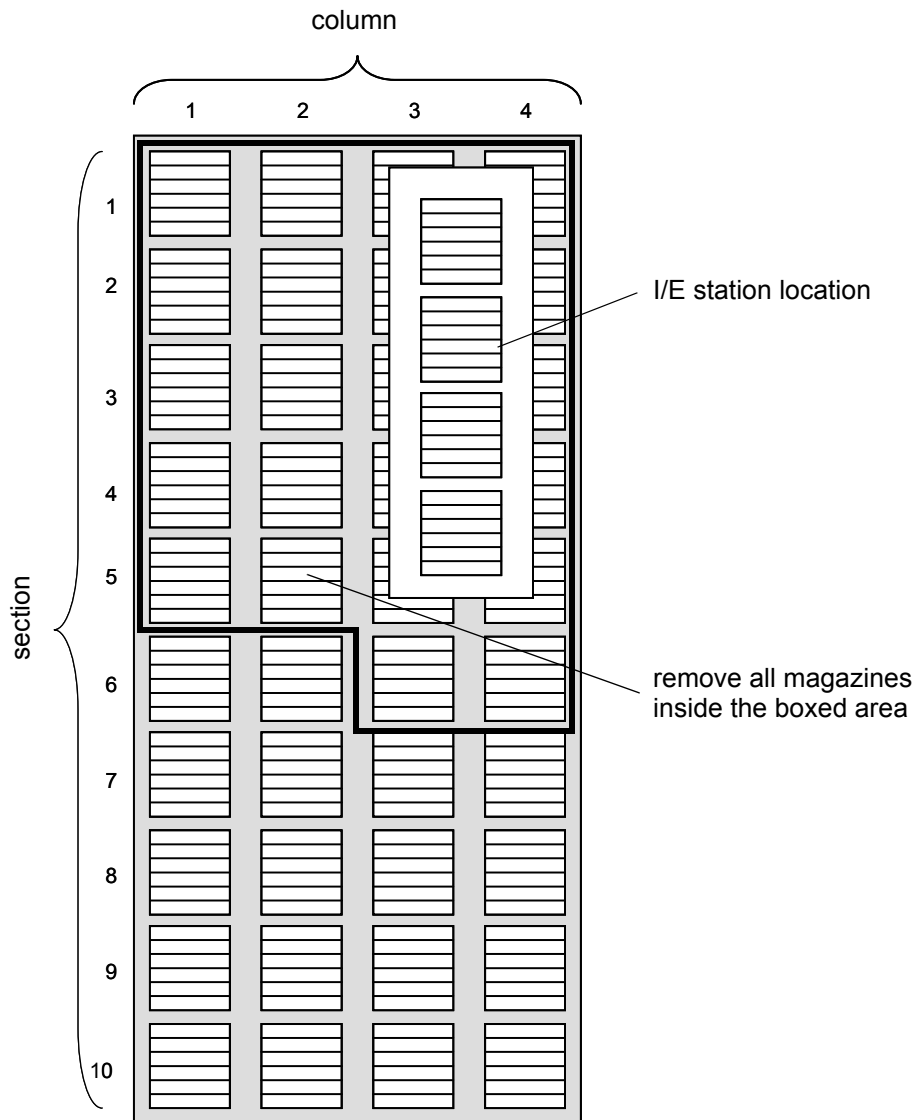
8 For each of the six screws on the top cover of the access door:

    a. Place the disposable screw capture tool over the screw.

    b. Insert the #2 Phillips screwdriver through the disposable screw capture tool until seated on the screw.

    c. Remove the screw and set it aside.

📝 Note   Be careful when removing the last screw that the skin does not fall off the front of the access door.

top cover on access door

six #2 Phillips screws
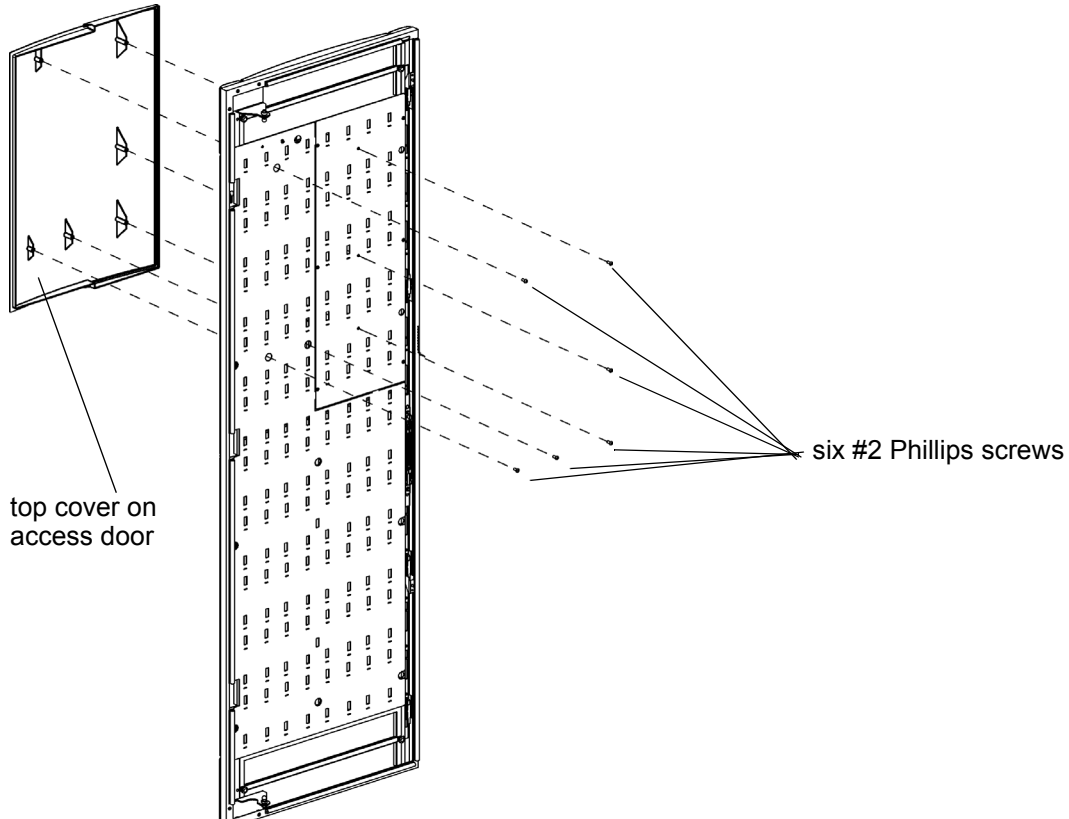
9 Use the 2.5 mm hex wrench to remove the six screws that hold the top-right magazine filler panel to the inside of the access door.

10 Remove the filler panel. Set the screws aside.

magazine filler panel

2.5 mm hex screws
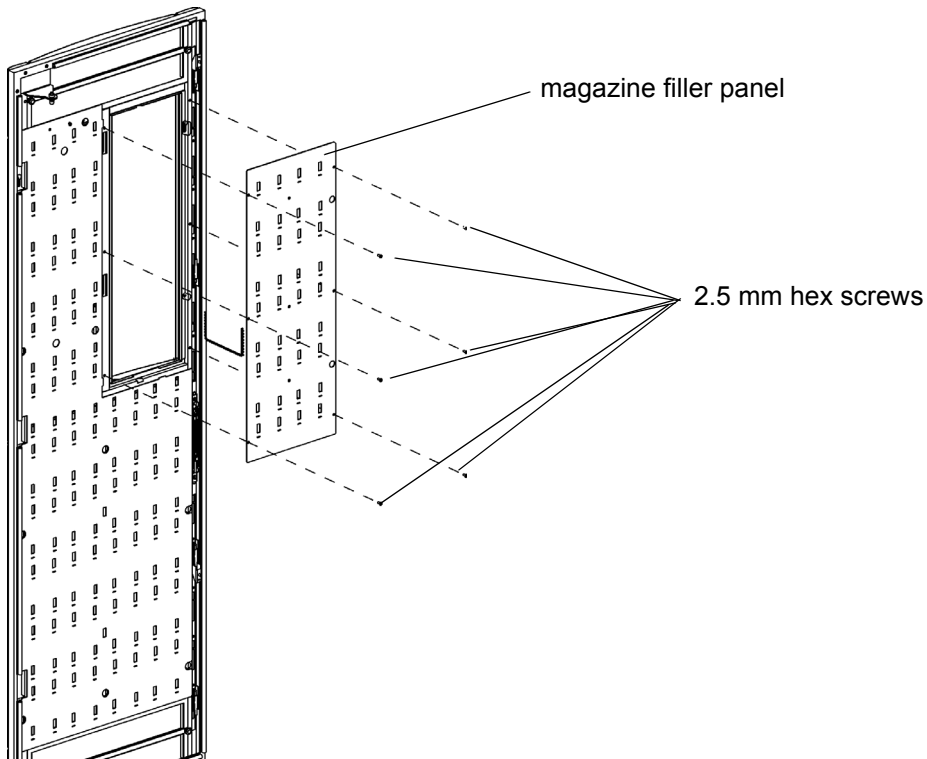
11 From the inside of the access door, mount the I/E station by first inserting the top of the I/E station over the top rim flange of the door's I/E station opening. Once the top is in place, the I/E station should hang in the opening with the screw holes cut in the sides of the I/E station lining up with the holes in the door.

12 Use a 2.5 mm hex wrench to attach the I/E station to the door using the six screws removed in

2.5 mm screws
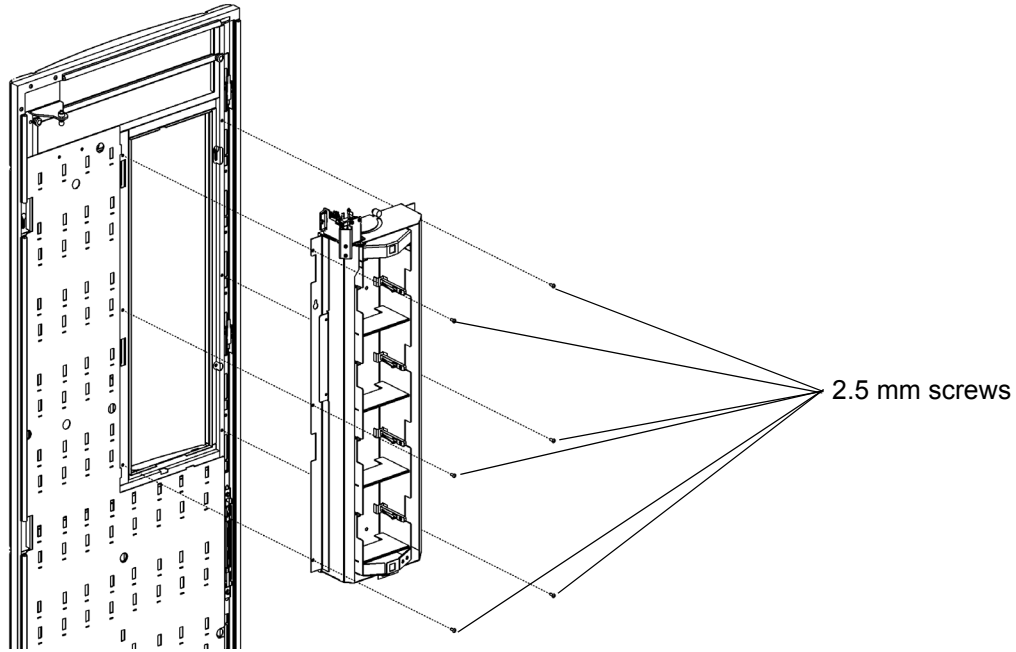
13 Use a #2 Phillips screwdriver to mount the new expansion module skin onto the upper area of the access door next to the I/E station using three screws.

three #2
Phillips screws
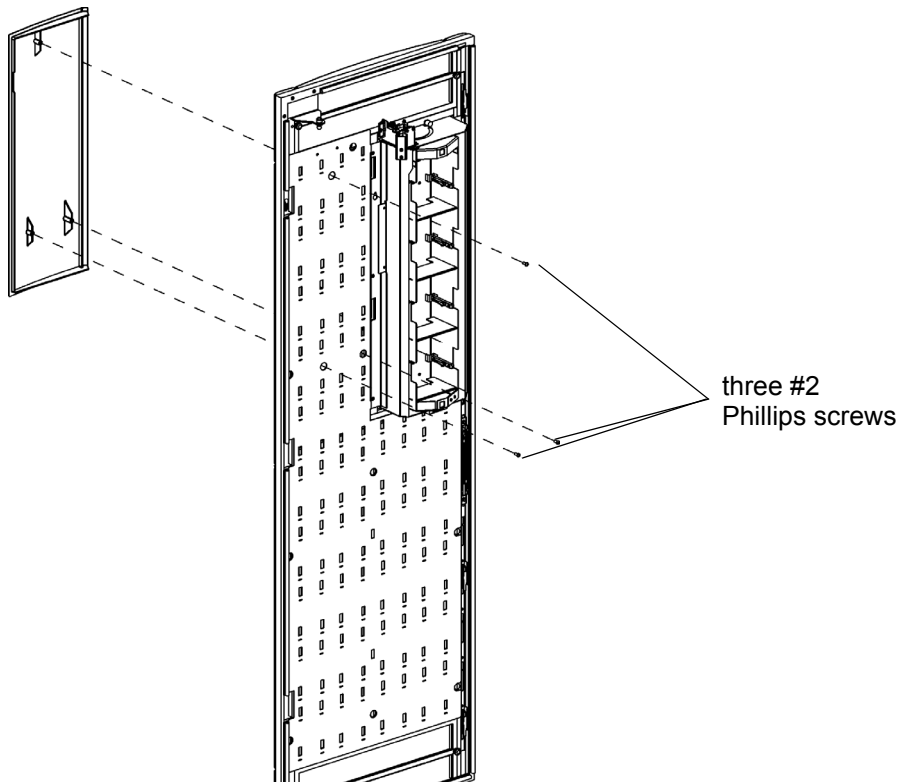
14 Use a #2 Phillips screwdriver to insert and tighten the four screws that secure the I/E station panel cover onto the I/E station door.

I/E station door

four #2 Phillips screws
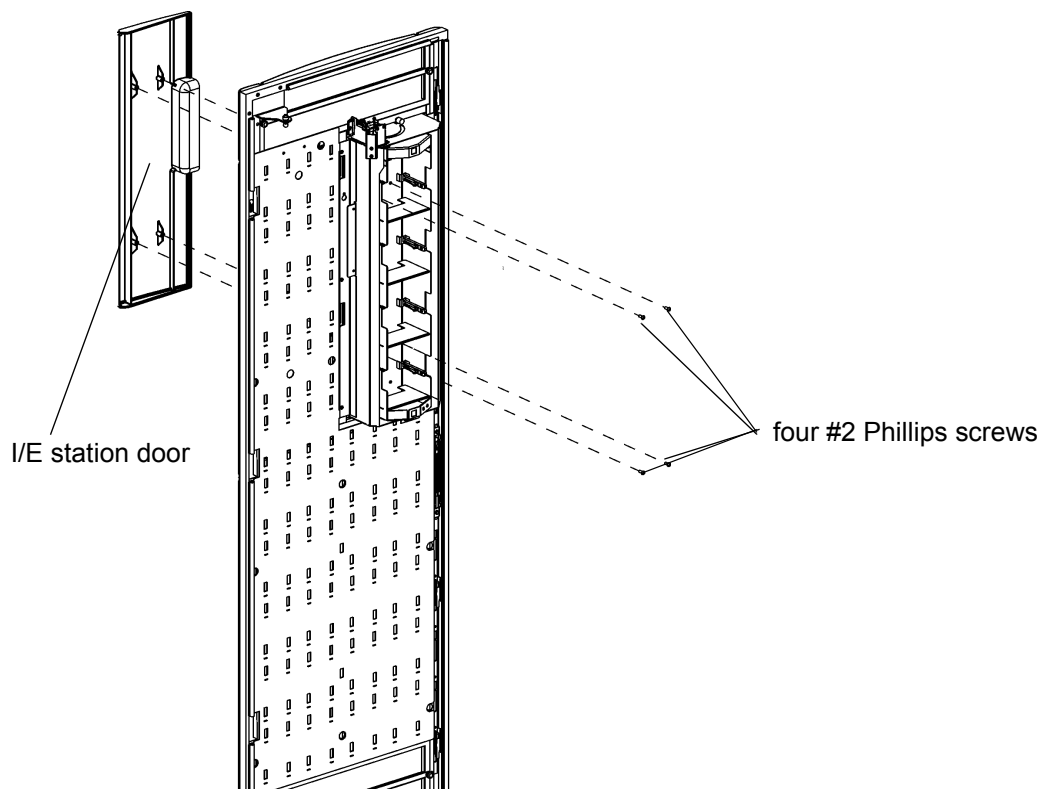
15 Test the fit of the outer covers by opening and closing the I/E station. Adjust the door as necessary.

16 Cut and remove the two cable ties that hold the door interlock cables to the expansion module frame.
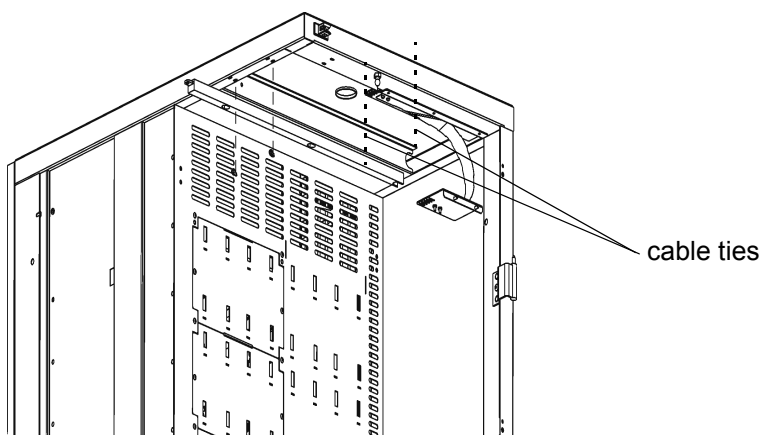
cable ties

17 Open the service door of the expansion module.

Adding Optional Hardware

18 Use a #2 Phillips screwdriver to remove the top drive cluster cover plate, the mid-module cover plate, the bottom drive cluster cover plate, and the LBX/IEX cover plate.

top drive cluster
cover plate

mid-module cover plate

LBX/IEX cover plate

bottom drive cluster
cover plate
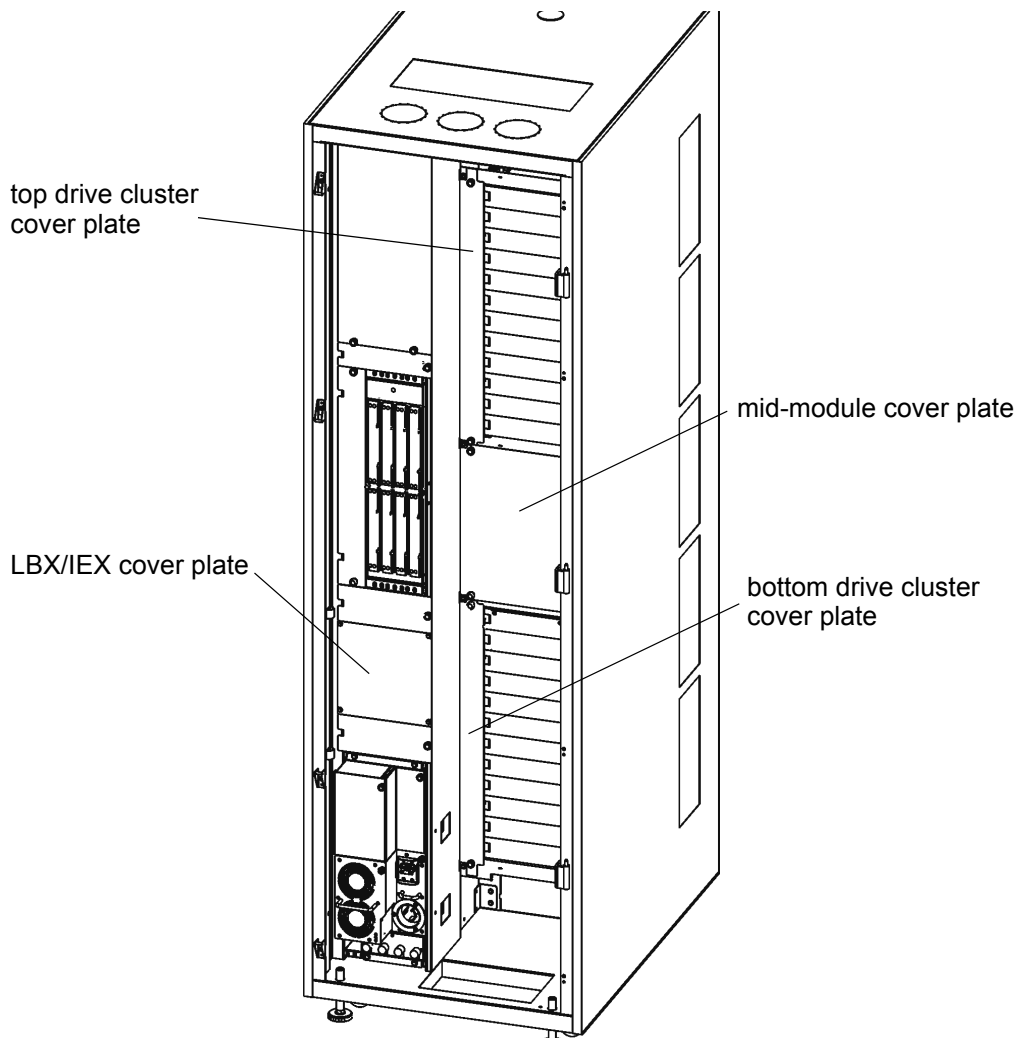
19 Connect cable W6 to the I/E station lock assembly and route the cable around the cable tray.

W6 cable

I/E station lock
assembly
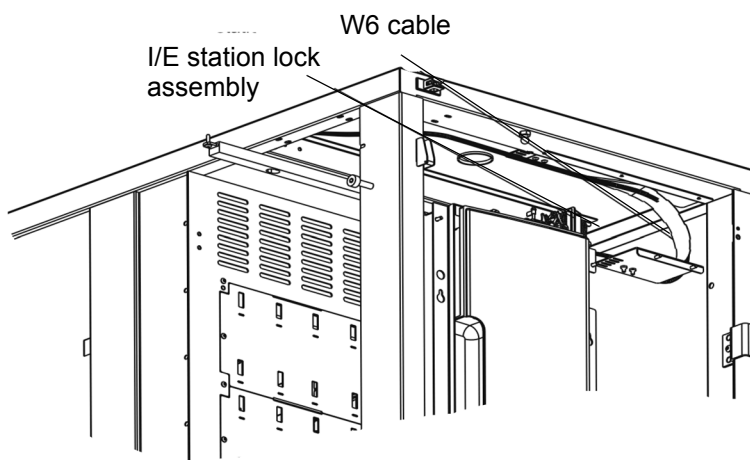
20 Following the cutouts on the cable tray ramp, secure cable W6 to the cable tray using the eight Velcro straps provided.

Velcro straps
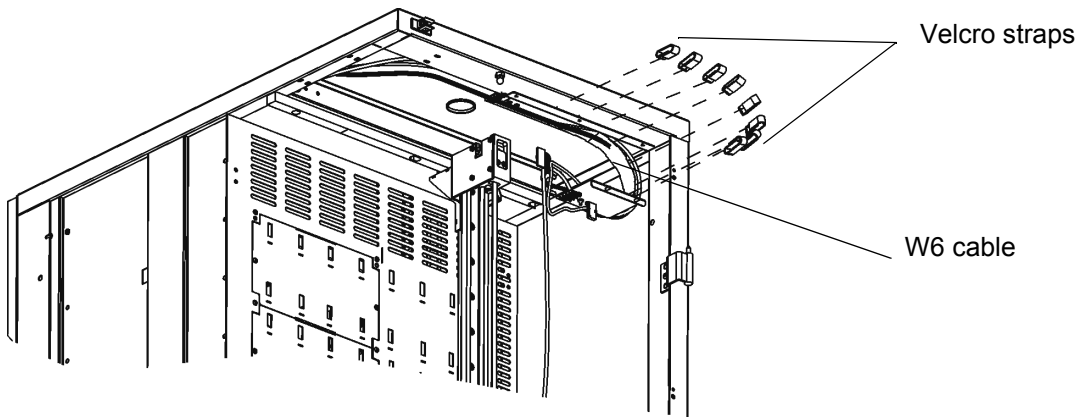
W6 cable

21 Secure the cable to the expansion module frame and cable tray using the five cable ties provided.

cable ties

22 Plug the W6 cable into the I/E station and secure the cable using the plastic ties.

W6 cable
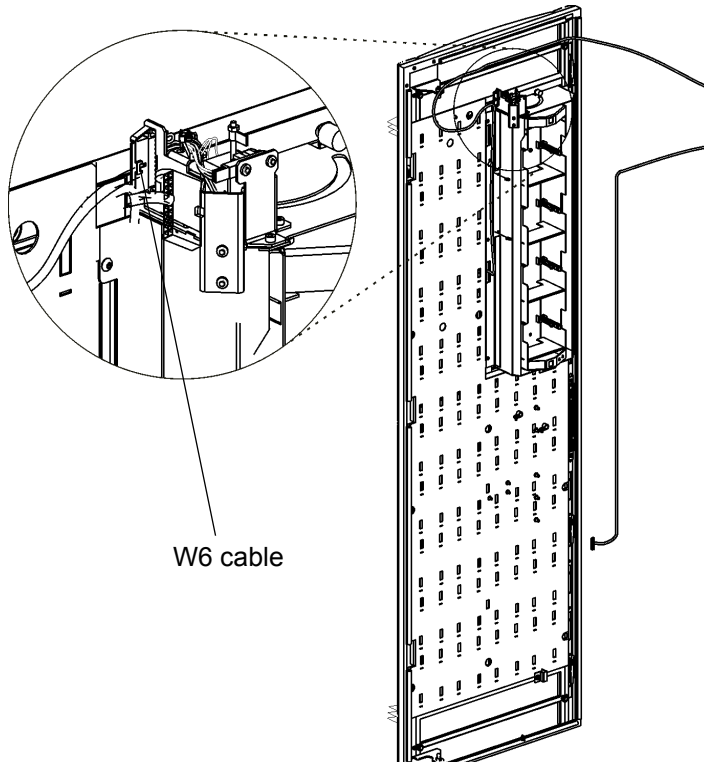
23 Route the I/E station cable (W6) from the I/E station lock assembly following the door interlock cable to toward the rear of the expansion module. Continue routing cable W6 through the drive cluster clamps down toward the LBX board.

24 Connect cable W6 to the J7 connector on the LBX board.
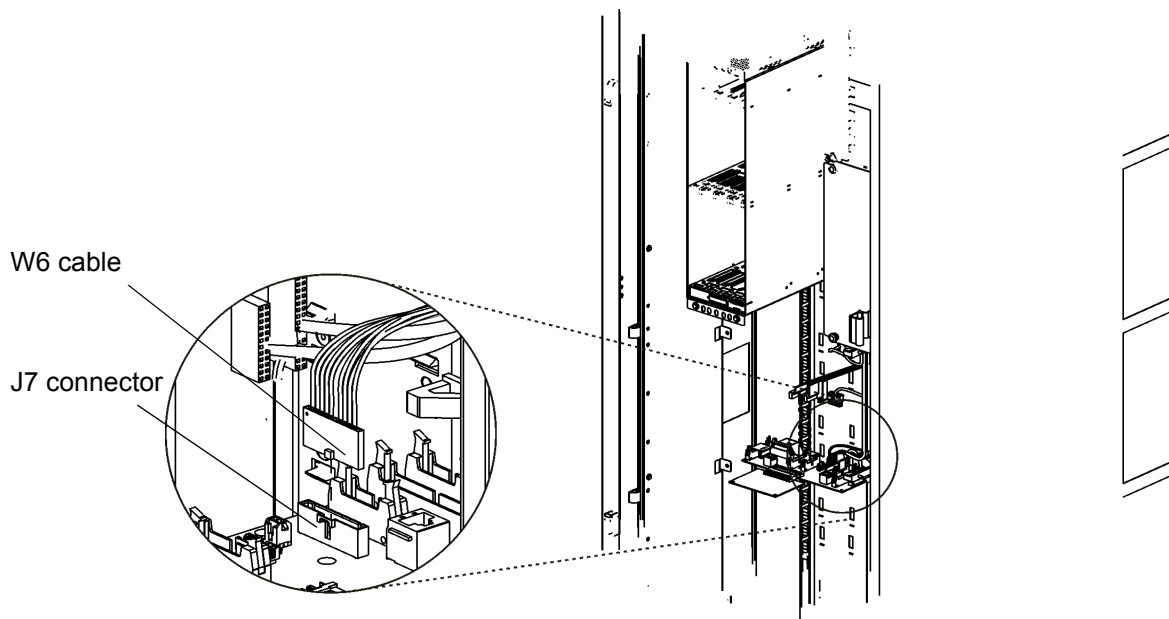
W6 cable

J7 connector

25 Use a #2 Phillips screwdriver to replace the top drive cluster cover plate, the mid-module cover plate, the bottom drive cluster cover plate, and the LBX/IEX cover plate.

top drive cluster
cover plate

mid-module cover plate

LBX/IEX cover plate

bottom drive cluster
cover plate
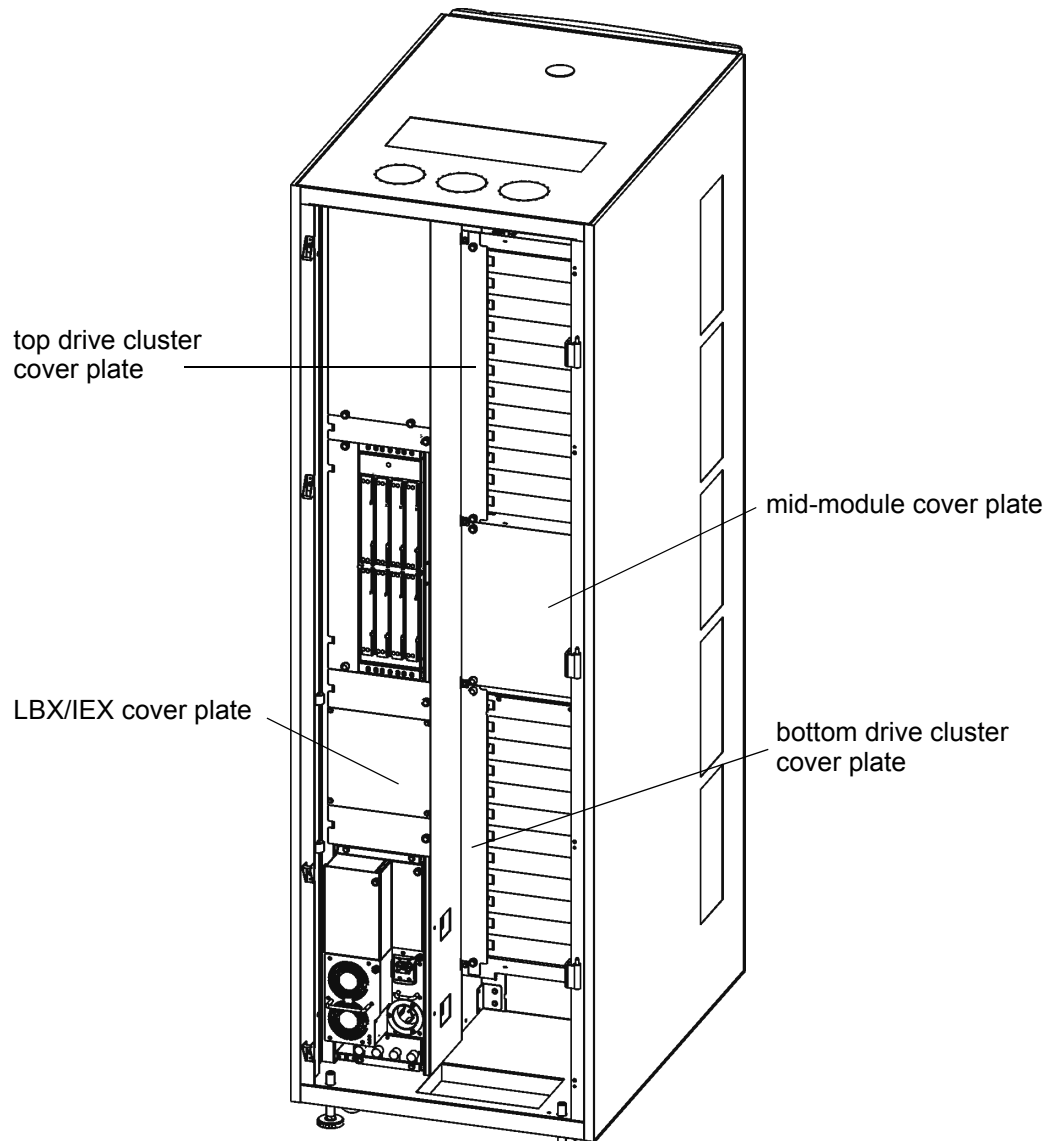
26 Reinstall the magazines you removed. Replace the upper target magazine in the column 2, section 1 position on the access door. If the target magazine is not in the correct position, the library will fail calibration.

column 2, section 1
magazine position

magazines

27 Install four magazines into the I/E station.

.
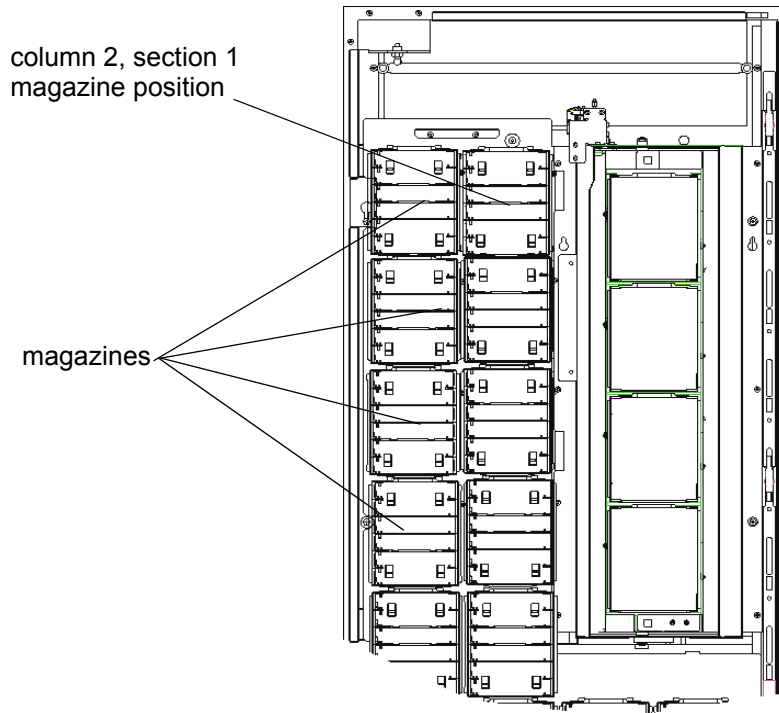
install four magazines
into the I/E station
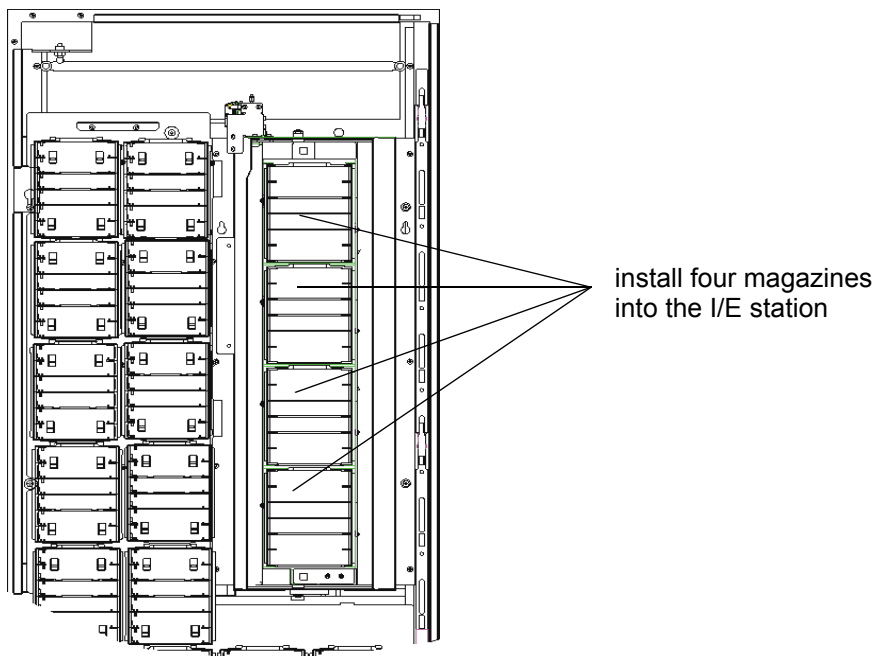
28 Detach the ESD strap and close the door.

29 Press the **Power** switch on the operator panel.

30 Log on to the library as service.

31 Run the **Configure** and **Calibrate** teach commands by clicking **Tools**→ **Teach** from the LMC.

32 Select **Configure** and click **Start**. The **WORKING** screen appears.

Once the teach is completed, a message appears in the **Results** field, for example, "Command Completed."
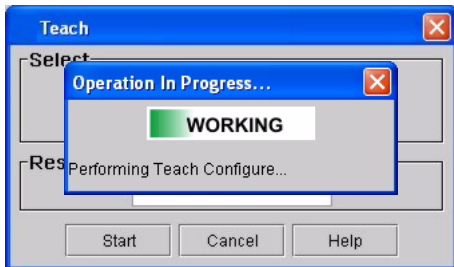
33 For a library that is already configured, you must modify any existing partition that includes resources altered or removed by the change in the expansion module physical configuration to incorporate the new I/E station.

In the LMC, click **Setup**→ **Partitions** to modify partitions and create new ones. See the *Scalar i6000 User's Guide* for more information about working with partitions.
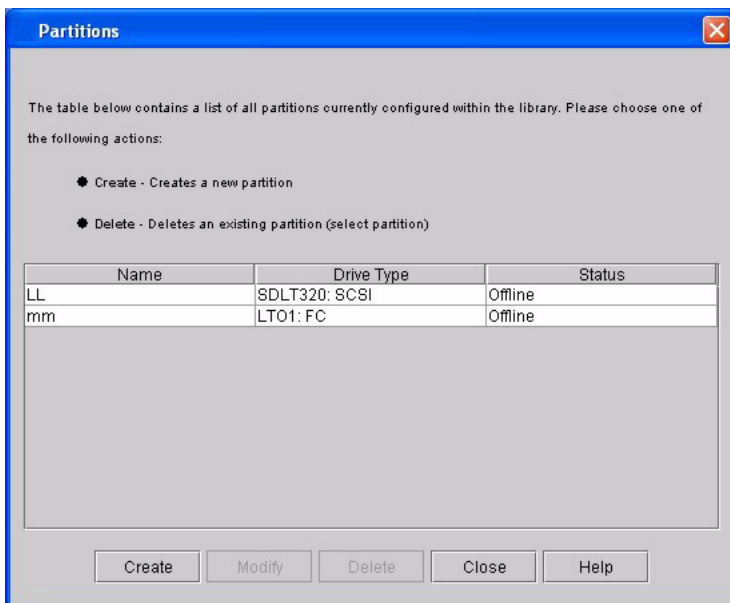
Adding a 72-slot I/E Station to an Expansion Module

This section describes how to upgrade an expansion module to include an access door with a 72-slot I/E station. The first seven expansion modules can contain 72-slot I/E stations.

Note   Make certain the firmware installed on the library system is the required version for the 72-slot I/E station functionality. Check Quantum site: www.quantum.com/osr for the lasted firmware information.

Required tools: #2 Phillips screwdriver, 2.5 mm hex wrench, 3 mm hex wrench, wire cutters (for plastic ties), foot jack, M4x10 screws, ESD strap

1   You must export all media from the access door being replaced.

     a.   Log into the Library Management Console (LMC).

     b.   Click **Operations → Export.**

2   Before removing any magazines in the access door of the expansion module you are upgrading, determine if the magazines are used in any partitions.

3   If the **Automatic Teach** mode is being used, disable it to perform this upgrade procedure.

4   Remove the magazines in the access door from each partition(s) using the following procedure:

⚠ CAUTION   **All partition elements associated to this upgrade procedure must be modified before proceeding with this procedure.**

                      Prior to modifying any partitions, you must understand your configuration changes and the potentially disruptive effects those changes can have on the host application(s).

                      Care must be taken whenever you add or delete partition elements, which includes drives, storage magazines, and I/E station magazines.

     a.   Click **Physical** on the **View** menu.

     b.   Click **Setup→ Partitions→ Configure.**

        The **Partitions** dialog box is displayed.

     c.   Select the partition that include the affected magazines and click **Modify.**

     d.   Return the affected magazines to the physical pool.

     e.   Repeat Steps a through d for each partition associated with the access door you are upgrading.

5   Shut down the library.

     For more information, see

6   Open the service door of the expansion module that you are upgrading.

7 Use a #2 Phillips screwdriver to remove the top drive cluster cover plate, the mid-module cover plate, the bottom drive cluster cover plate, and the LBX/IEX cover plate.

top drive cluster
cover plate

mid-module cover plate

LBX/IEX cover plate

bottom drive cluster
cover plate
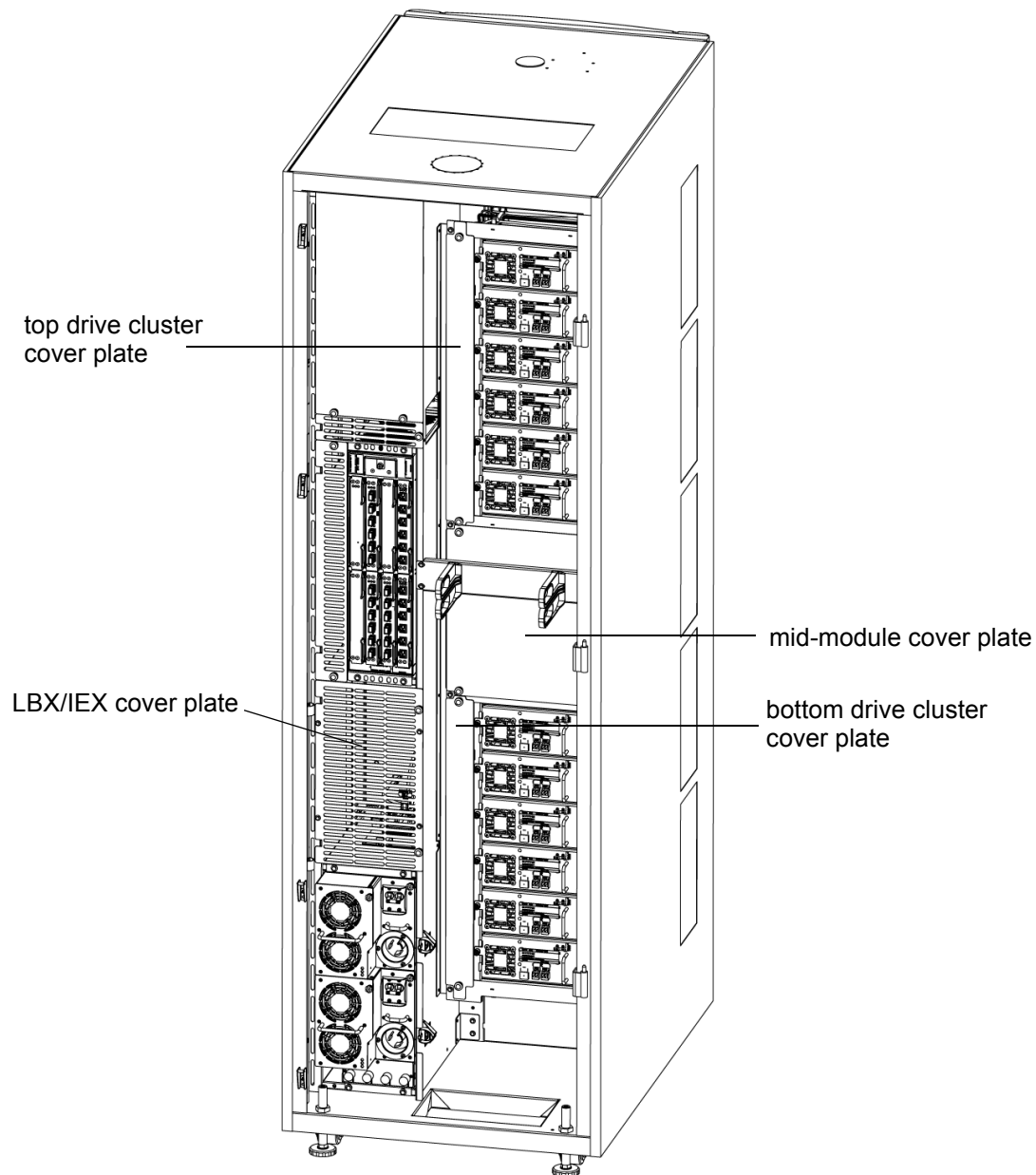
8 Identify which version of the IEX card is currently installed in the library, If the library contains an IEX2 card (identified by a red sticker), skip to . Otherwise, proceed to .

9 Use your thumb to unsnap the IEX1 board from the two standoffs.

IEX1 board

standoffs
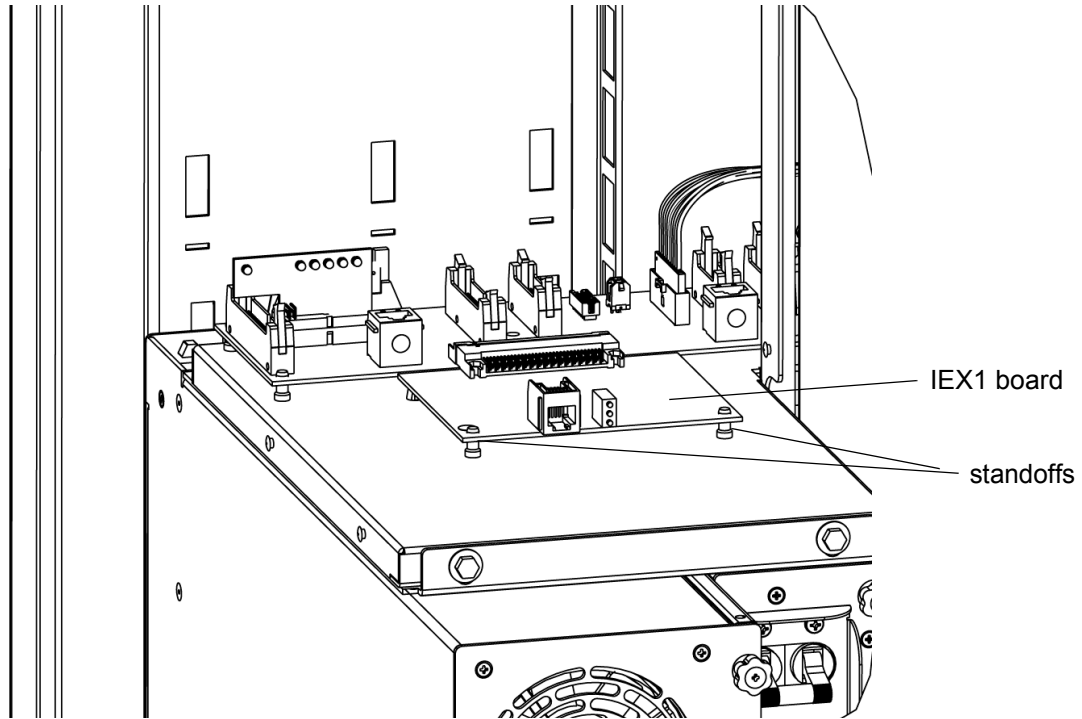
10 Unplug the IEX board from the LBX board, and then remove the IEX board.

connection between IEX1
and LBX boards
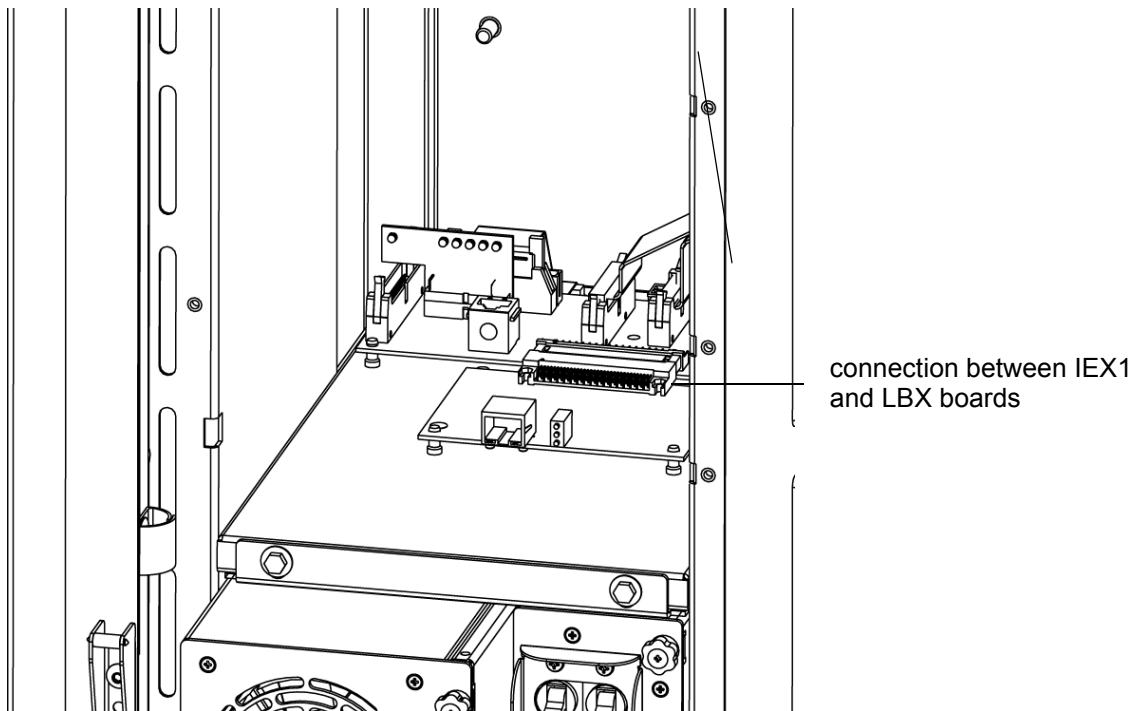
Note To complete this upgrade procedure, you must replace the existing IEX1 board with an IEX2 board. A small red label on the IEX2 board distinguishes it from the IEX1 board.

red sticker

mounting hole
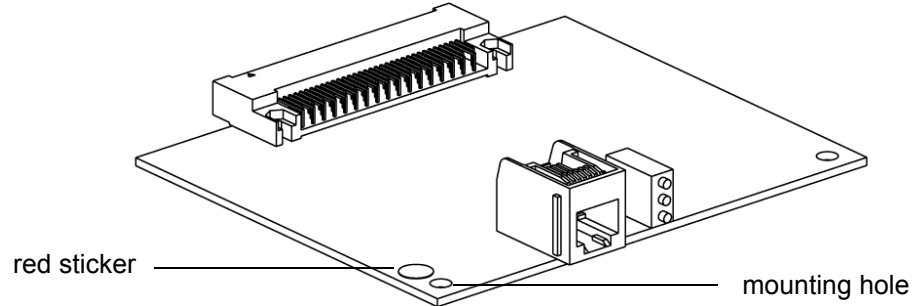
11 Plug the IEX2 board into the LBX board.

12 Use your thumb to snap the IEX2 board onto the two standoffs

IEX2 board

standoffs
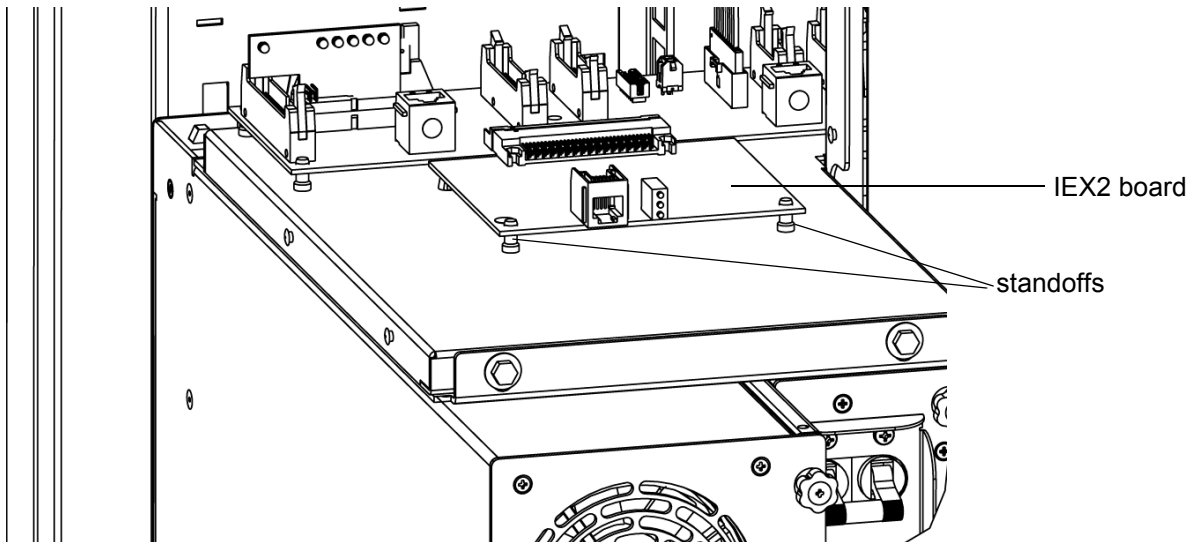
13 Determine if an I/E cable is already present and routed, if is present proceed to Otherwise, proceed to

I/E connection

J7 connector
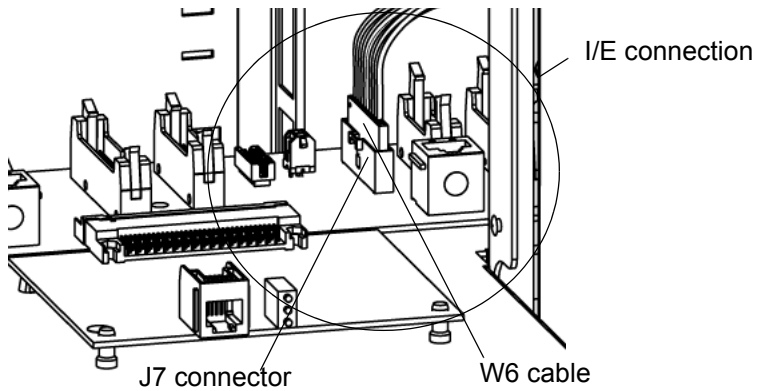
W6 cable

14 Connect the I/E cable W6 to the J7 connector on the LBX board.

Adding Optional Hardware

15 Route the W6 cable from the LBX board following the door interlock cable to the front of the expansion module, allowing the W6 cable to hang near where the I/E station lock assembly will be located.
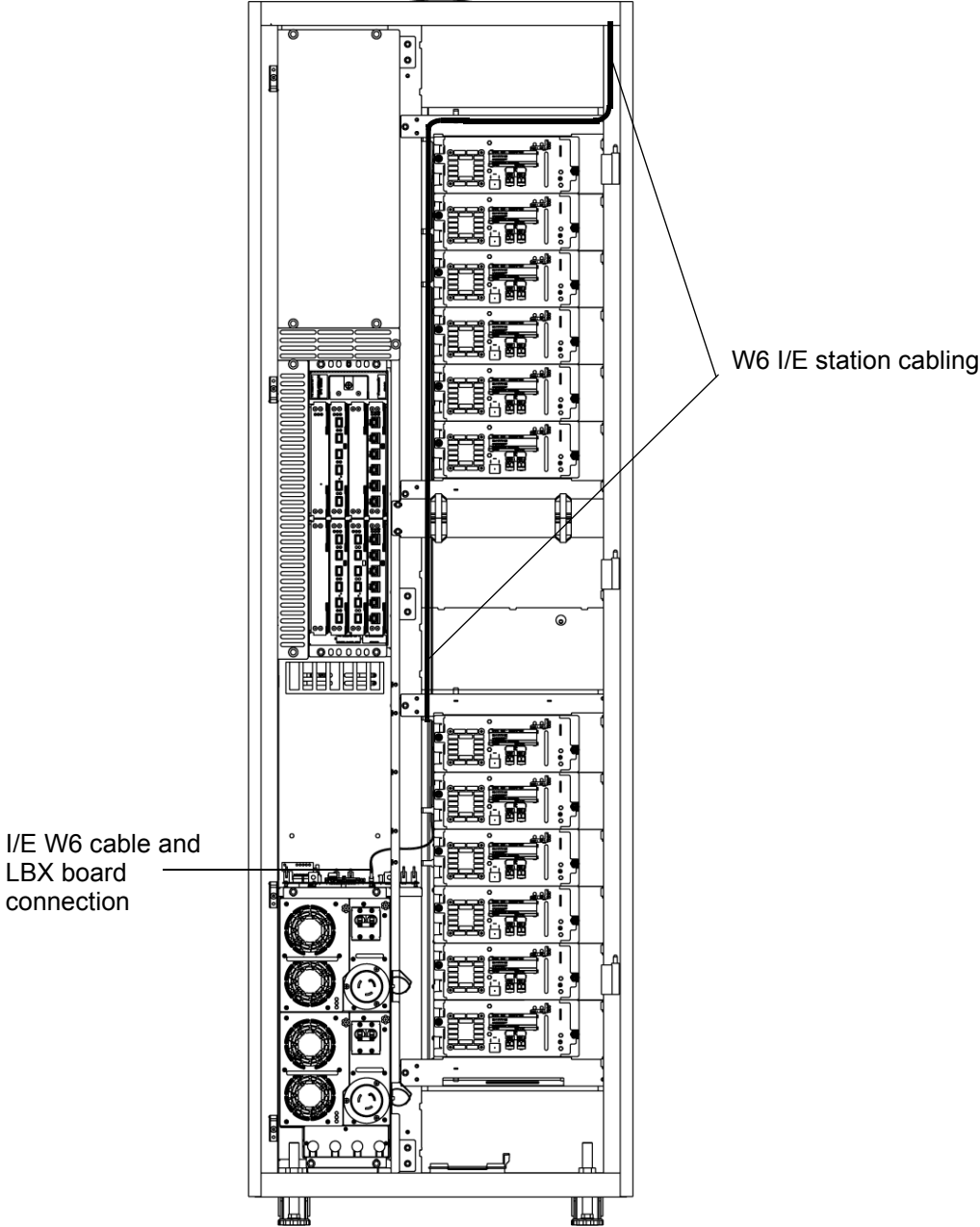
W6 I/E station cabling

I/E W6 cable and LBX board connection

16 Use a #2 Phillips screwdriver to replace the top drive cluster cover plate, the mid-module cover plate, the bottom drive cluster cover plate, and the LBX/IEX cover plate.
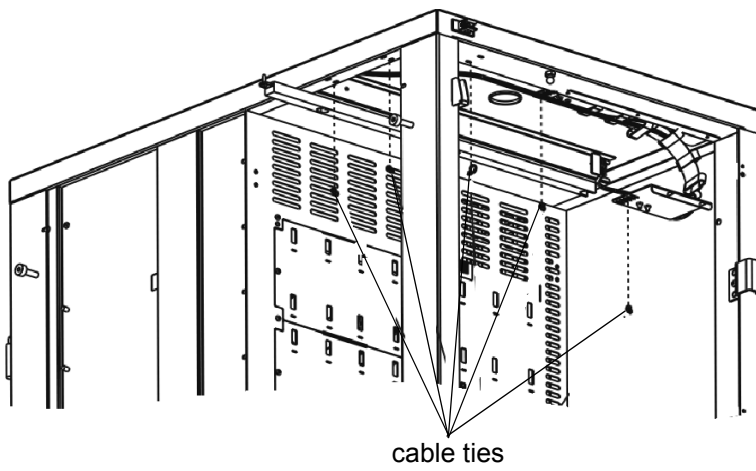
top drive cluster
cover plate

mid-module cover plate

LBX/IEX cover plate

bottom drive cluster
cover plate
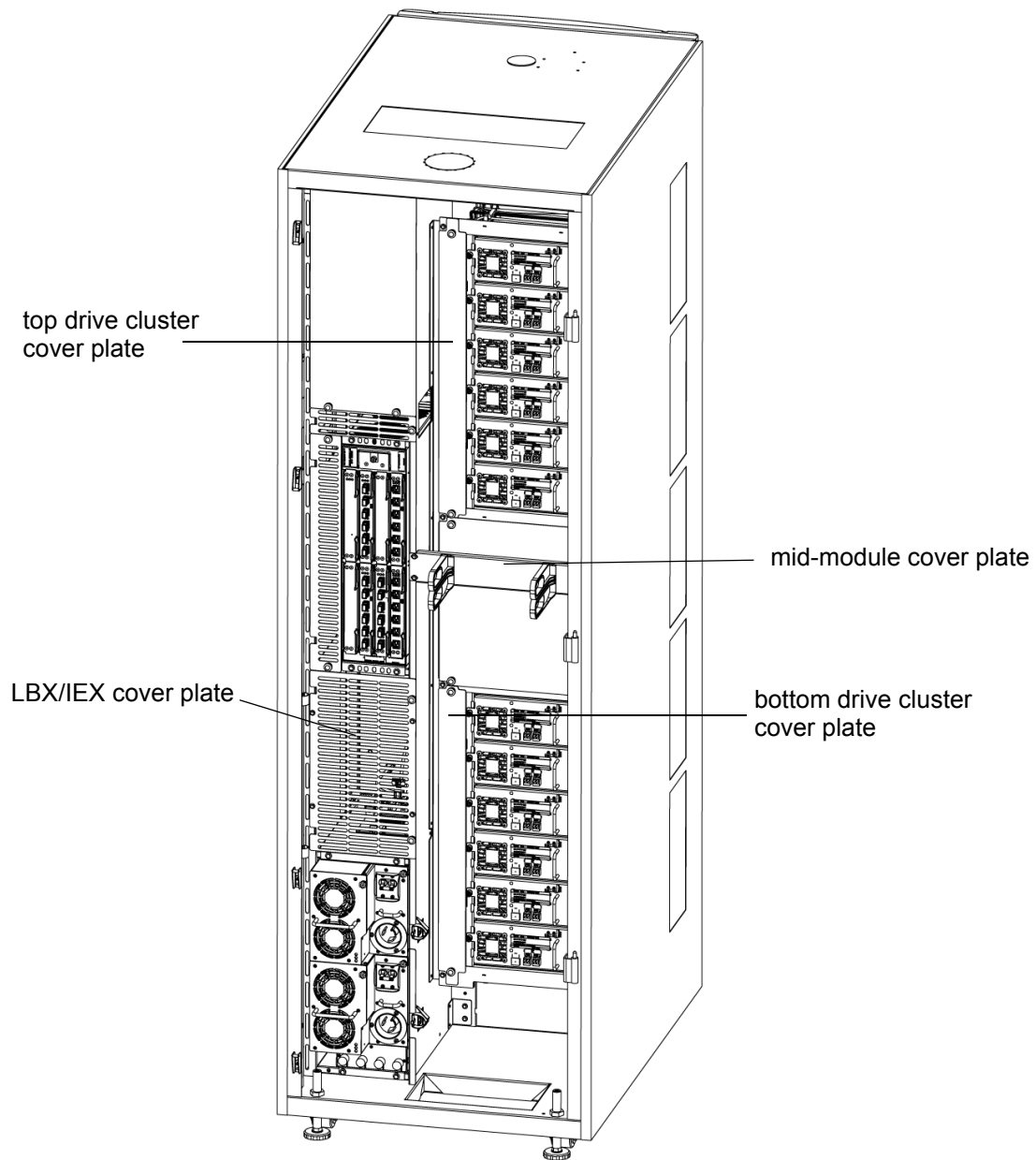
17 If there is an expansion module immediately to the right of the expansion module you are upgrading, open its access door for clearance.

18 To avoid scratching the new access door on the door latches of the expansion module to the right, use a 3 mm hex wrench to remove the four door latches.

top latches

bottom latches
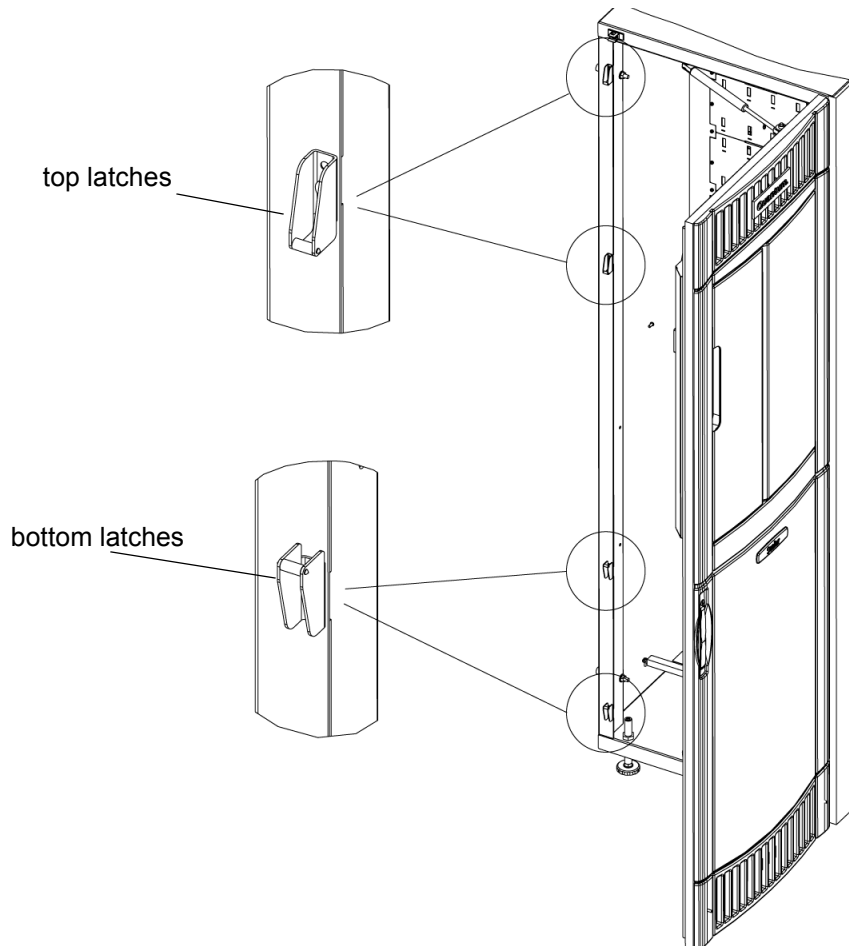
19 To lighten the weight of the access door you are replacing, uninstall the magazines prior to removing the door.

20 If a 24-slot I/E station exists, disconnect the I/E station cable from the I/E lock and release the cable from the Velcro straps securing it to the cable carrier.

W6 cable
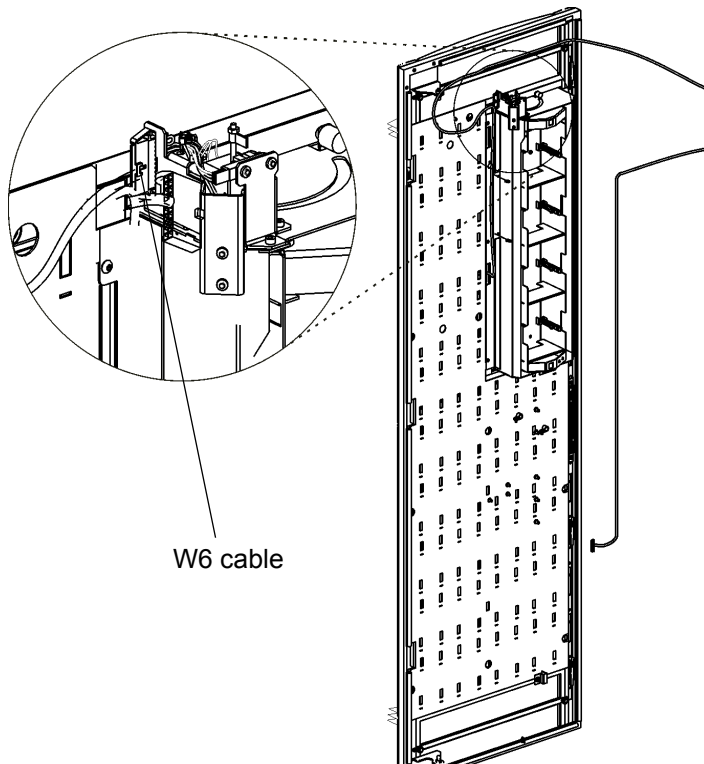
21 Use the supplied hex wrench to remove the two screws that secure the flex cable bracket to the top of the expansion module. The flex cable bracket will not be used with the 72-slot I/E station upgrade.

⚠ CAUTION	**Use caution when removing the screws securing the spring-loaded flex cable bracket.**

2 screws
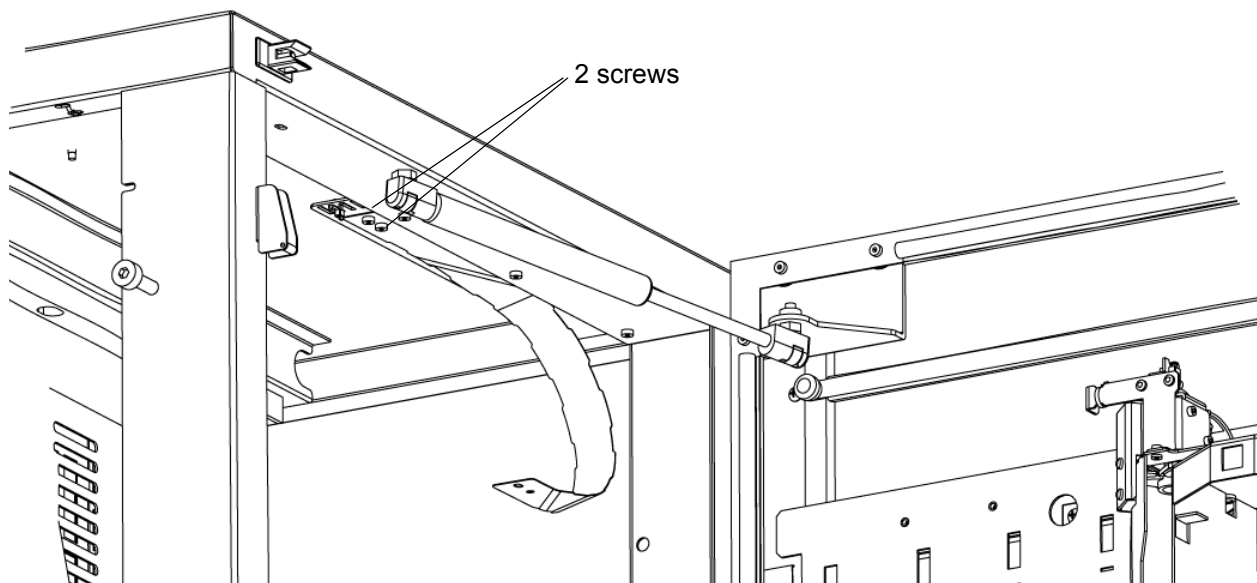
22 On only the access door side, detach both the top and bottom door dampers. Slide the small flat-head screwdriver into the space under the spring clip of each damper and lift the spring clip to release the damper from the ball joint.

insert small flat-head screwdriver in opening and lift to release damper
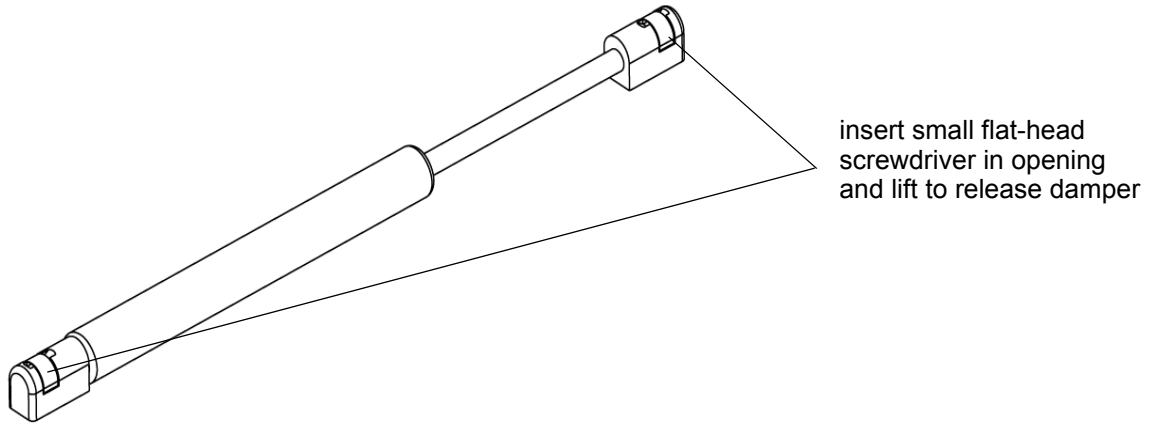
23 Place the foot jack in front of the expansion module being upgraded. The right side of the foot jack should be in the down position which will allow it to pass under the access door

24 Close the door to a 45 degree angle and press one foot downward on the foot jack while carefully supporting the access door.

> ⚠️ **CAUTION** **Removing the access door requires two people. The access door is heavy and may become unstable after it is freed from the hinge pins.**

25 To raise the door off the hinge pins, gently swivel the access door clockwise and lift the door free.

26 Properly discard the old access door.

27 Carefully lift the new access door from the crate and position it in front of the expansion module at a 45 degree angle.

> 📝 Note   Be careful when handling the door to avoid damaging its plastic cover (skin).

28 Lift and mount the door onto the hinges.

29 Verify the door is seated upon all three hinge pins.

30 Reattach the two door dampers. For each damper, press the damper onto the ball joint.

31 Install the twelve supplied magazines into the storage area beneath the 72-slot I/E station opening.

32 Install the two calibration targets on the storage magazines beneath the 72-slot I/E station opening.

- Column 2, section 8
- Column 2, section 10

33 Mount the IEM1 circuit card onto the access door filter bracket and snap it over the four pegs on the bracket.

34 Use a 2.5mm hex wrench to install the M4x10 screw to secure the IEM1 card in place.

M4x10 screw
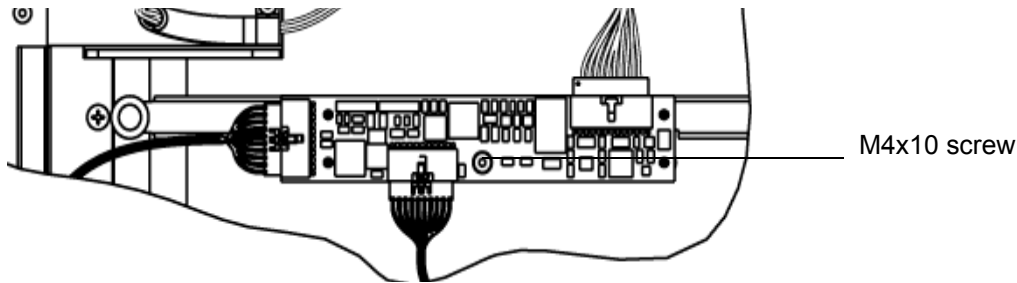
35 Insert the I/E cable into the slit of the protective cable sheath. Bend the cable sheath away from the I/E cable and gently press the cable into the sheath.

36 Drape the I/E cable (W6) over the top damper and insert the cable's connector into the top connection on the IEM1 card until it snaps into place.

37 Use a 2.5 mm hex wrench to secure the I/E cable to the door using a P clamp.
Place the P clamp around the cable (not the sheath) and secure it to the upper damper bracket mounting hole.

p-clamp

roof p-clamp
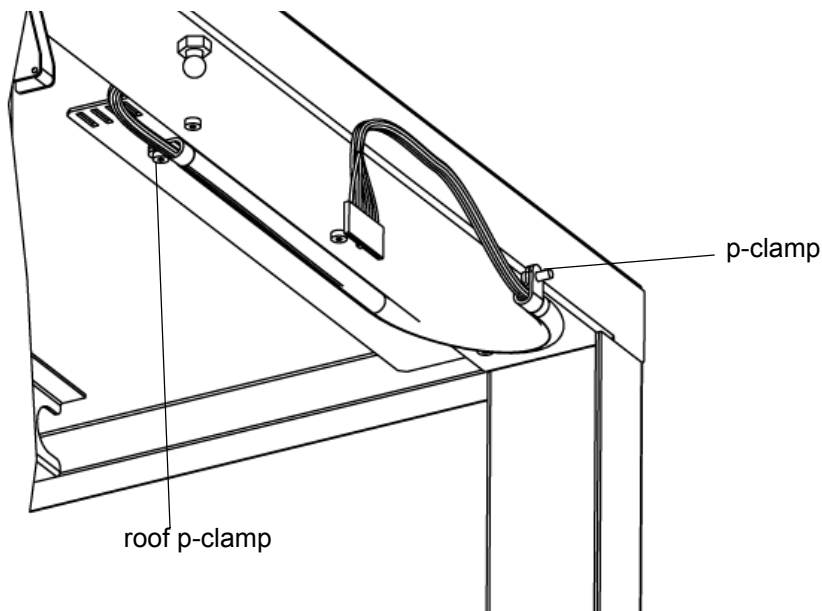
38 Place the second P clamp around the I/E cable and secure it to the carrier bracket in the roof of the expansion module using a 2.5 mm hex wrench to install one screw to the right of the vacant cable carrier screw holes.

39 With the access door fully open, verify that the I/E cable has a small amount of slack.
When the access door is closed the slack from the I/E cable forms a "U" shape and protrudes toward the firewall. See the following illustration.

40 Close the access door.

41 From an adjacent module, view the I/E cable and verify that the I/E cable is within 12.7mm (1/2 inch) from the frame cable bracket's main surface and that the cable is flush within +/- 12.7mm from the edge of the frame cable bracket. See the following illustration.

"U" protrusion

edge of frame cable bracket

small amount of slack

cable bracket's main surface
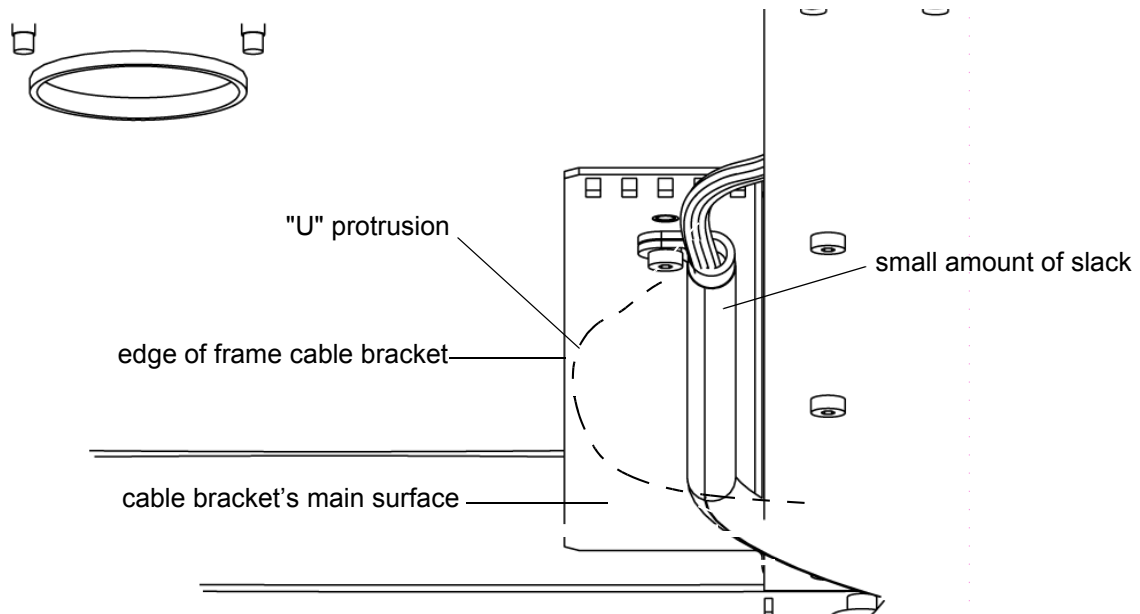
42 From inside the access door of the expansion module you are upgrading, position the I/E station so that its bottom edge rests on the bottom of the opening in the access door.

📝 Note   To avoid scratching or damaging the I/E stations handle them with care.

43 Align the I/E station side flange mounting holes with those on the access door.

44 After testing the cable clearance, open the access door.

45 To initiate securing the I/E station to the door frame before mounting it to the door, use a 2.5 mm hex wrench to insert (do not tighten) the eight screws in the door.
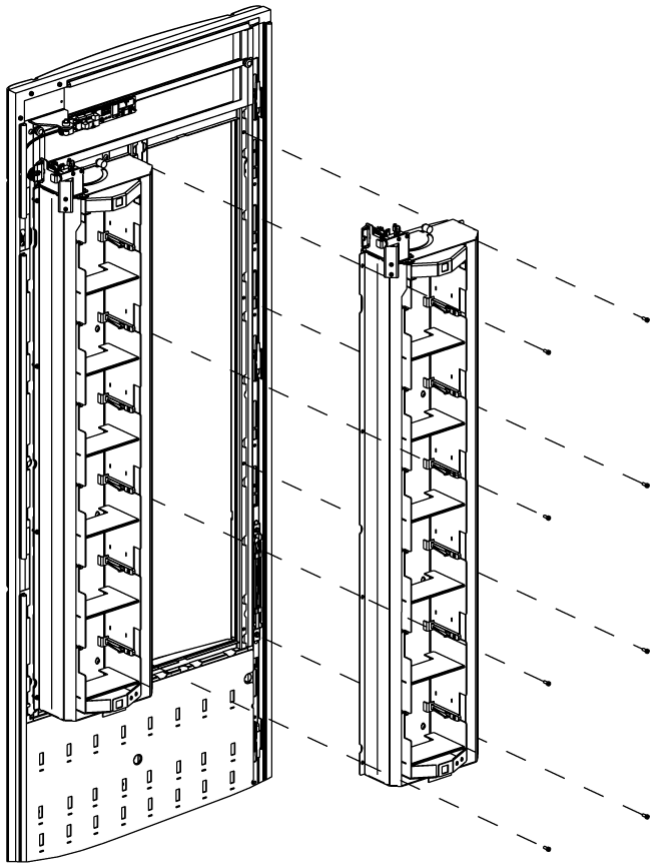
eight 2.5 mm screws

46 After inserting the screws, tighten the screws to ensure the bottom edge of the shroud is flat against the cross bar of the door opening. Make certain there is no gap.

Make certain bottom edge of shroud is flat against the cross bar and there is NO gap
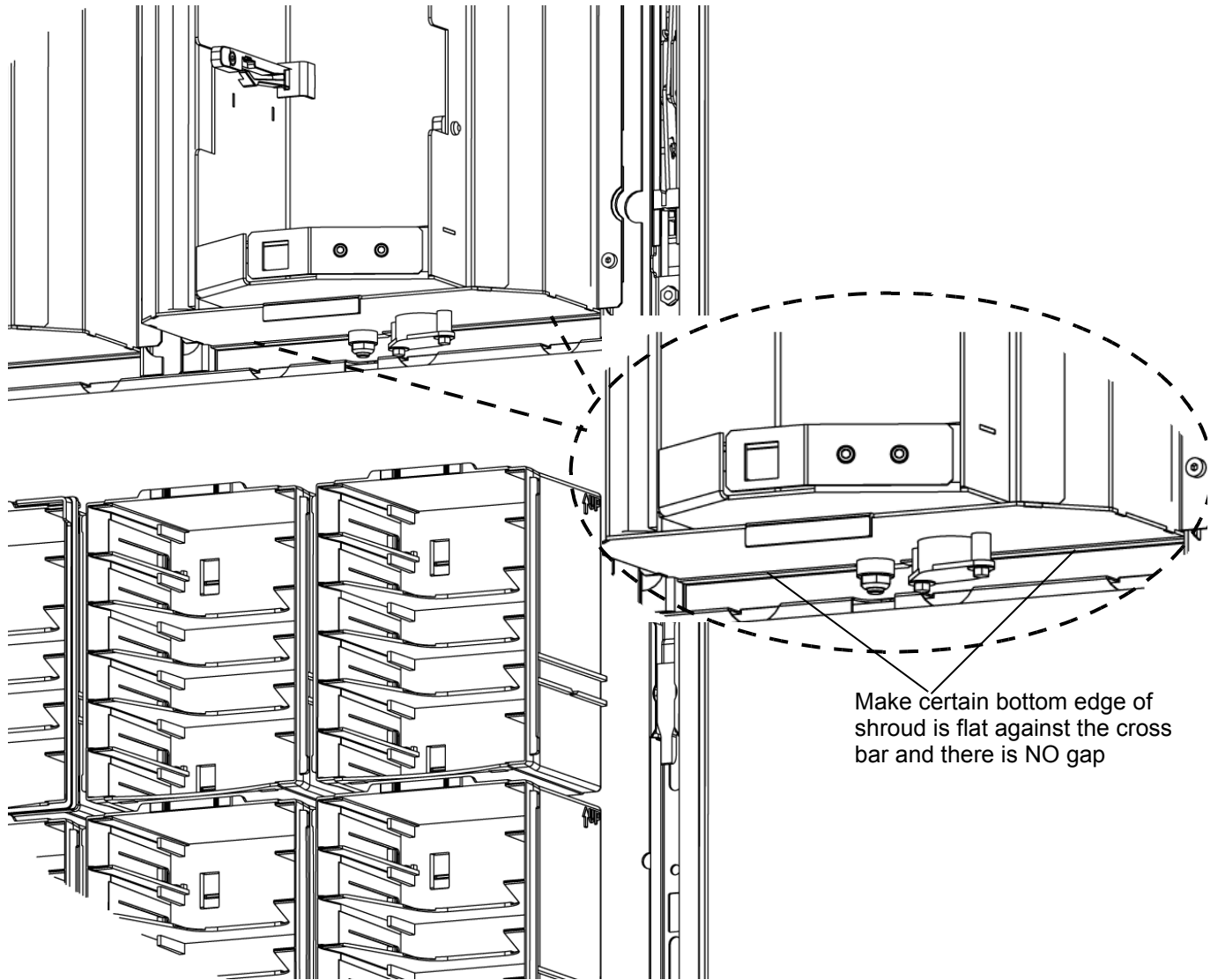
47 Repeat Step 40 through Step 45 to install the second I/E station.

48 On the left I/E station door, attach the 12-pin connector end of the cable to the door lock connector and the 10-pin cable connector into IEM1 card.

49 On the right I/E station door, connect the 12-pin connector end of the cable to the door lock connector and the 10-pin connector end to the IEM1 card.
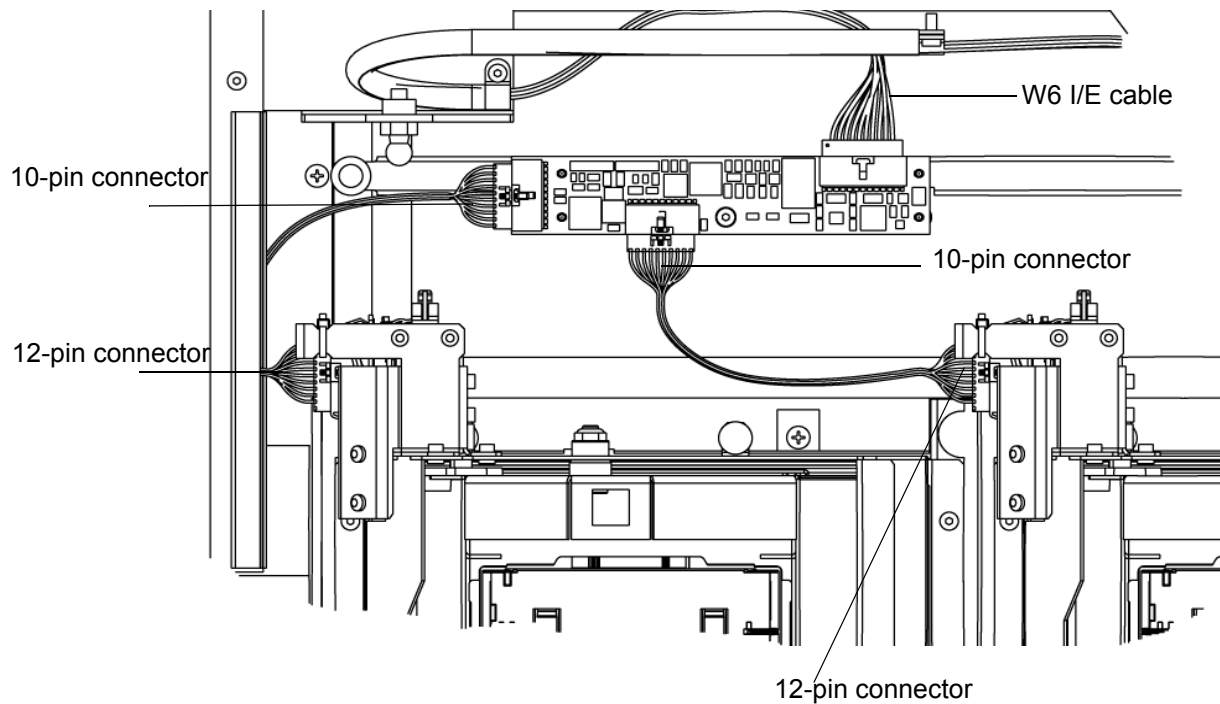
50 On the I/E station closest to the door hinge, tuck the cable behind the door gasket flange.

51 Open and close each I/E station door to ensure proper alignment. If the doors are not opening and closing properly, return to

52 Install the supplied magazines into each of the I/E stations.

I/E station magazines

storage
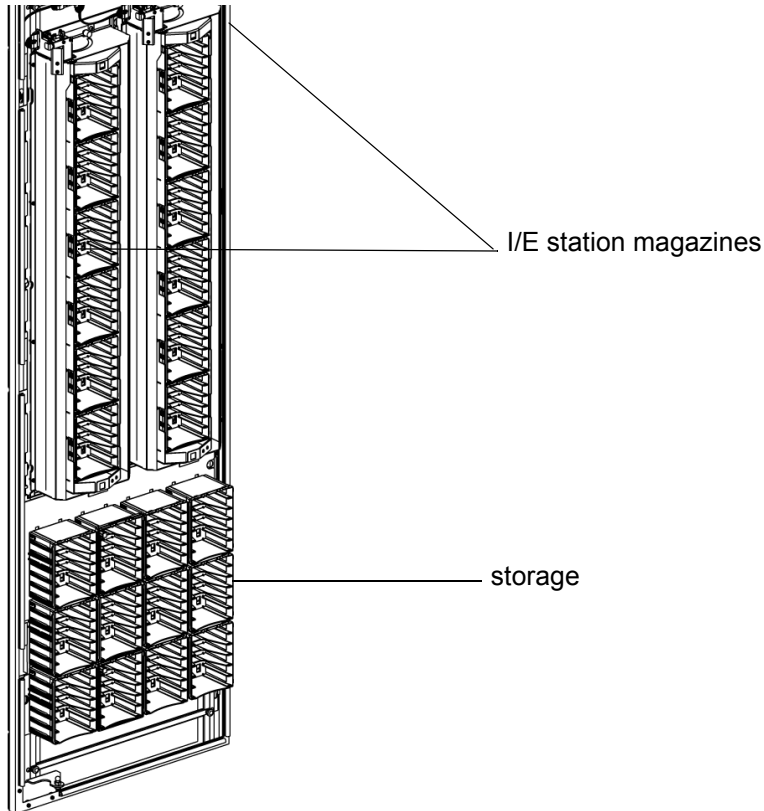
53 Using a 3 mm hex wrench to reinstall the access door latches of the expansion module to the right of the new access door. Make certain the latches are positioned correctly.

Top two latches have rollers pointing down

bottom 2 latches have rollers pointing up
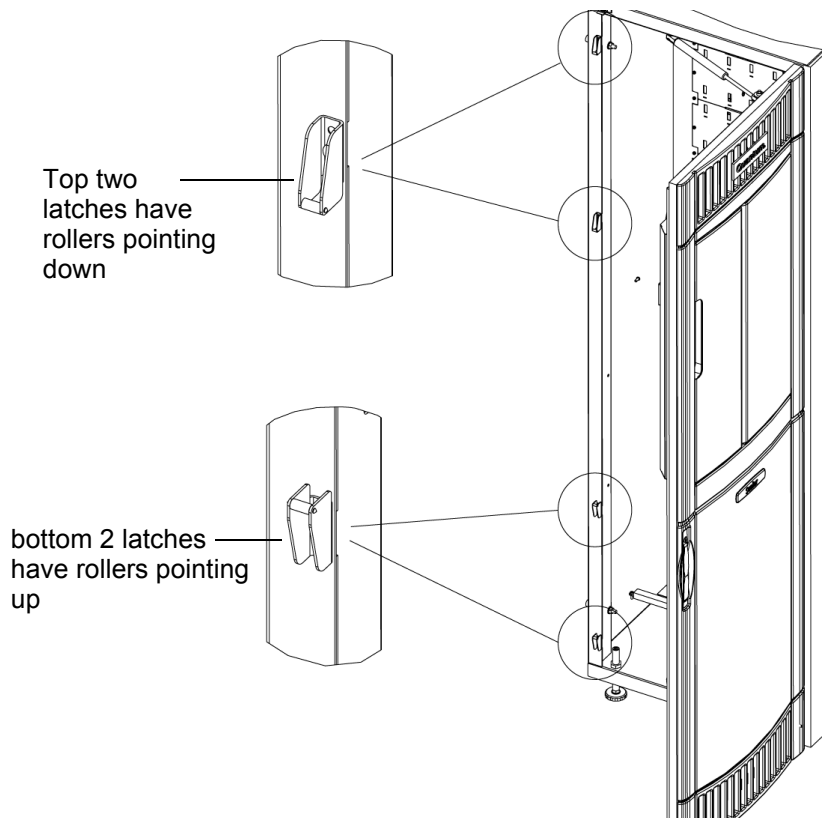
54 Close the I/E stations and all access doors.

55 Press the **Power** switch on the operator panel.

56 Log on to the library as a service user. See the *Scalar i2000 / i6000 Maintenance Guide*.

57 From the LMC, run **Configure** by clicking **Tools→ Teach→ Configure**.
See the *Scalar i6000 User's Guide* for more information.

58 After completing the configure process, run **Calibrate** click **Tools→ Teach→ Calibrate.**

59 Run a complete Install Verification Test est to verify proper installation by clicking **Tools > Verification Tests > Install.** The results appear on the **Verification Tests** dialog box after the test is complete.

60 If using Auto Teach, make certain to turn this feature back on.

61 You must modify and configure any existing partitions that include resources altered or removed by the change in the expansion module physical configuration to incorporate the new I/E station.

In the LMC, click **Setup→ Partitions→ Configure** to modify partitions and create new ones.
See the *Scalar i6000 User's Guide* for more information about working with partitions.

62 Assign the new I/E station and storage slot in the new access to their appropriate partitions.

63 If the magazines on the access door are assigned to partitions, you must import all the cartridges you removed from the previous expansion module access door to the appropriate partitions in the new access door.

64 If there is not enough space for all the cartridges from the previous access door due to the larger I/E station, reassign the access door's storage slots to appropriate partitions.

65 If appropriate, perform **Partitions Defragmentation**. Click **Tools→ Partitions Defragmentation**.

The **Partitions Defragmentation** dialog box appears. This dialog box shows a graphical representation of the tape magazines in the library. Magazines are color-coded to indicate which partition they belong to. If the library has more than one module, click the arrow buttons to display the next or previous module. If one or more partitions are fragmented, you can defragment them.

66 For more information on the I/E station features, see the *Scalar i6000 User's Guide.*

Adding Aisle Lights

This section describes how to install aisle lights into your i2000 / i6000 library.

> **Note** The aisle light upgrade feature requires certain hardware levels be present in the i2000/i6000 library. Not all i2000's in the install base have the necessary hardware features.
> To qualify for the aisle light option, your Control Module serial number in your i2000/i6000 library configuration must be at least 203102253 or begin with 2631xxxxx.
>
> Any i2000 / i6000 system with the required serial numbers should have the proper hardware pre-installed.
>
> Required hardware:
>
> - Threaded studs in frame roof
> - LBX2 Gen 2 (blue label) or LBX2 Gen 3 (red label)
>
> If the library you are upgrading does not meet the required hardware criteria, do NOT attempt to work around or upgrade the system. Instead, escalate the situation through normal escalation paths. The customer must be contacted and notified that the system is not compatible with the aisle light feature option.

Required tools: ESD strap, 7mm nut driver, wire cutters, Phillips #2 screwdriver

1 Shut down the library.

For more information, see

2 Open the access door.

aisle light assembly location

front of library
access door
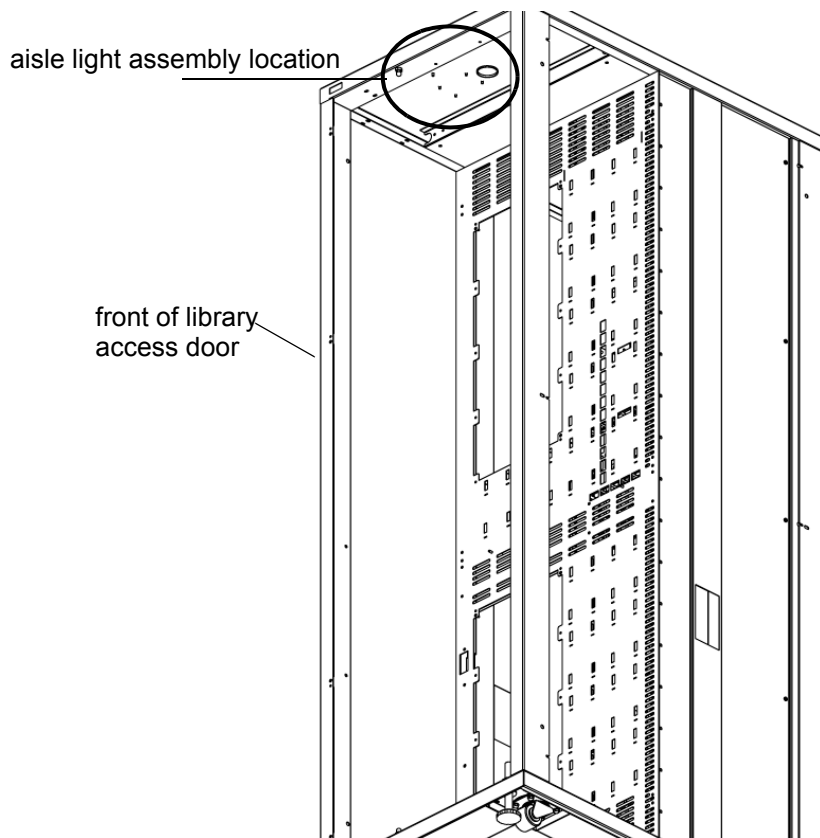
3 Attach the ESD strap to your wrist and to an unpainted surface inside the door.

4 Start the nuts onto the threads but do not tighten them down.

5 Slide the aisle light assembly through the keyholes and push toward the front of the library.

4 nuts

keyhole

aisle light assembly
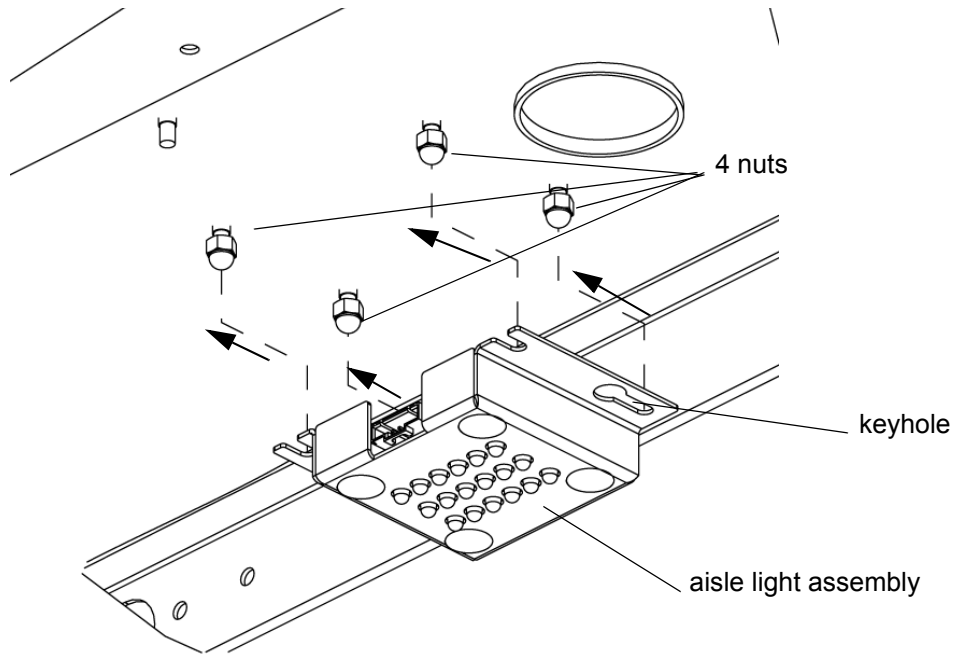
6 Using a 7mm nut driver, tighten the 4 nuts snug against the keyholes.

4 nuts tightened
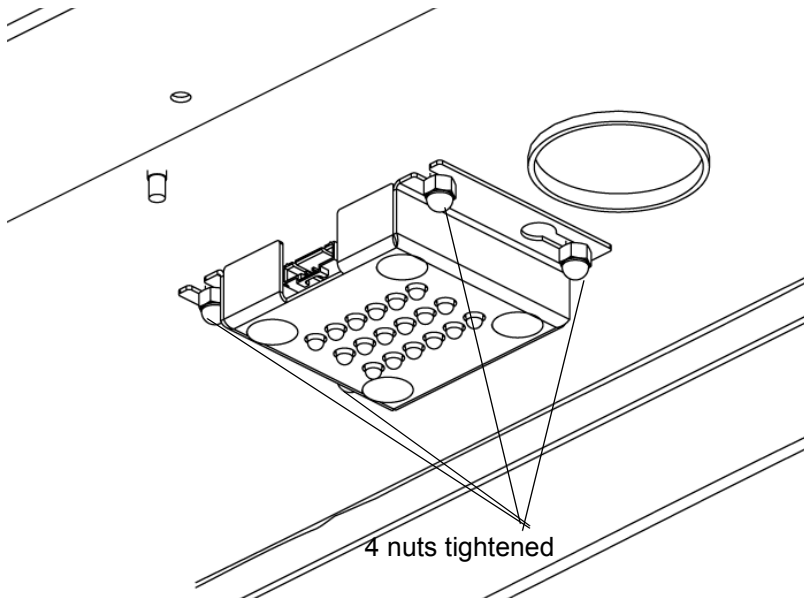
7 Route the cable into the P-clamp.

aisle light cable
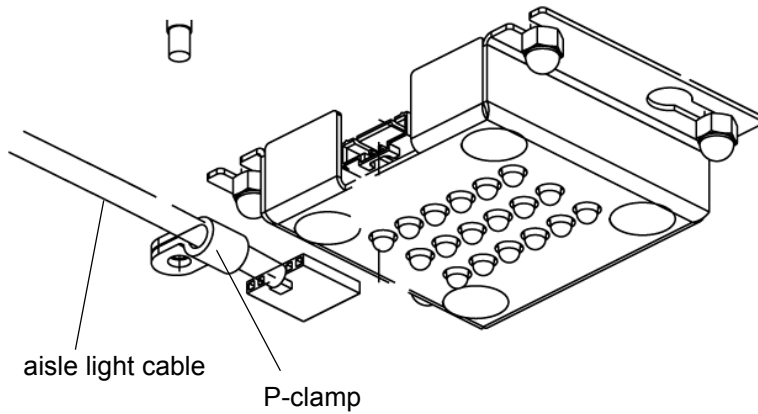
P-clamp

8 Plug the aisle light cable into the aisle light assembly connector.

9 Install the P-clamp to the bolt and partially tighten the nut.

aisle light assembly connector

bolt

nut
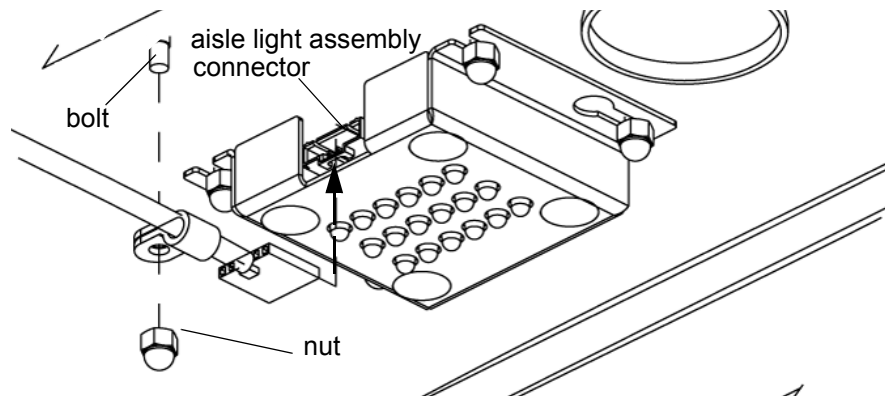
10 Pull any excess aisle light cable through the P-clamp towards the front of library.

11 Completely tighten the P-clamp nut.

12 Run the aisle light cable along top panel of the frame, routing it with any cables that exist, and feed the cable through the rear access hole to the back side of the library.

rear access hole
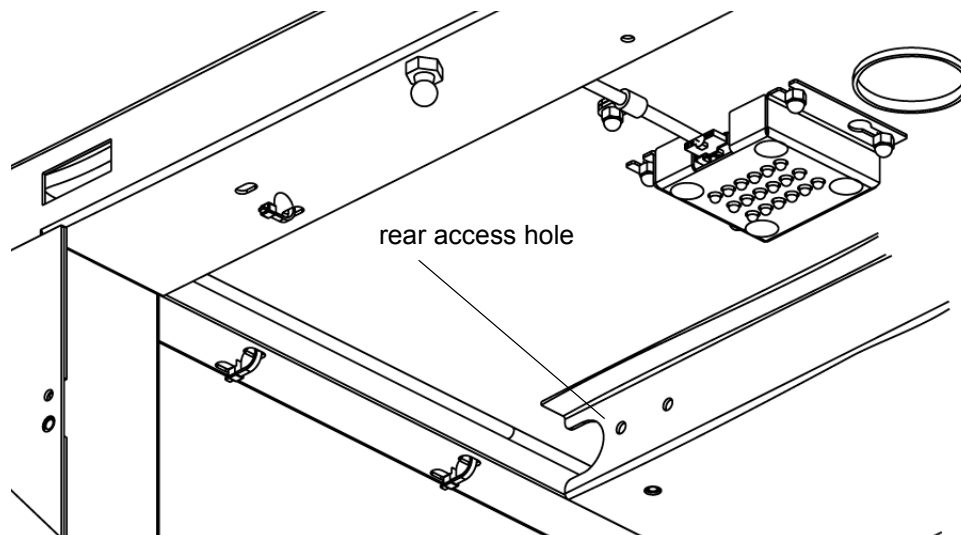
13 Remove any cable ties along this route.

14 Install the three zip ties to secure the aisle light cable (and any other cables routed with it) in place along the frame.

rear access hole

zip ties
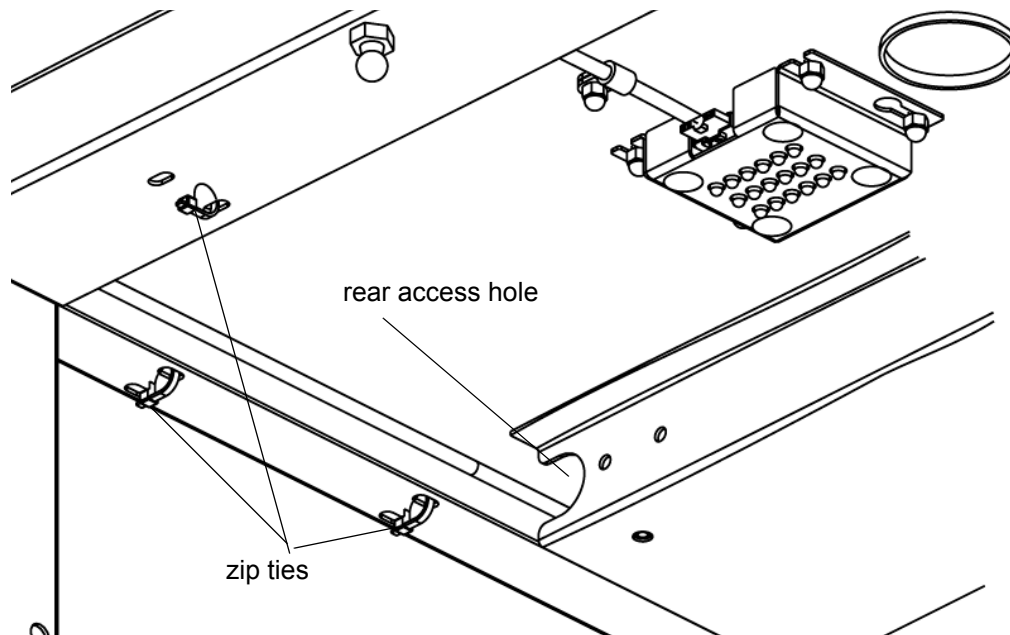
15 Open the service door.

16 Use a #2 Phillips screwdriver to remove the top drive cluster cover plate, the mid-module cover plate, the bottom drive cluster cover plate, and the LBX/IEX cover plate.
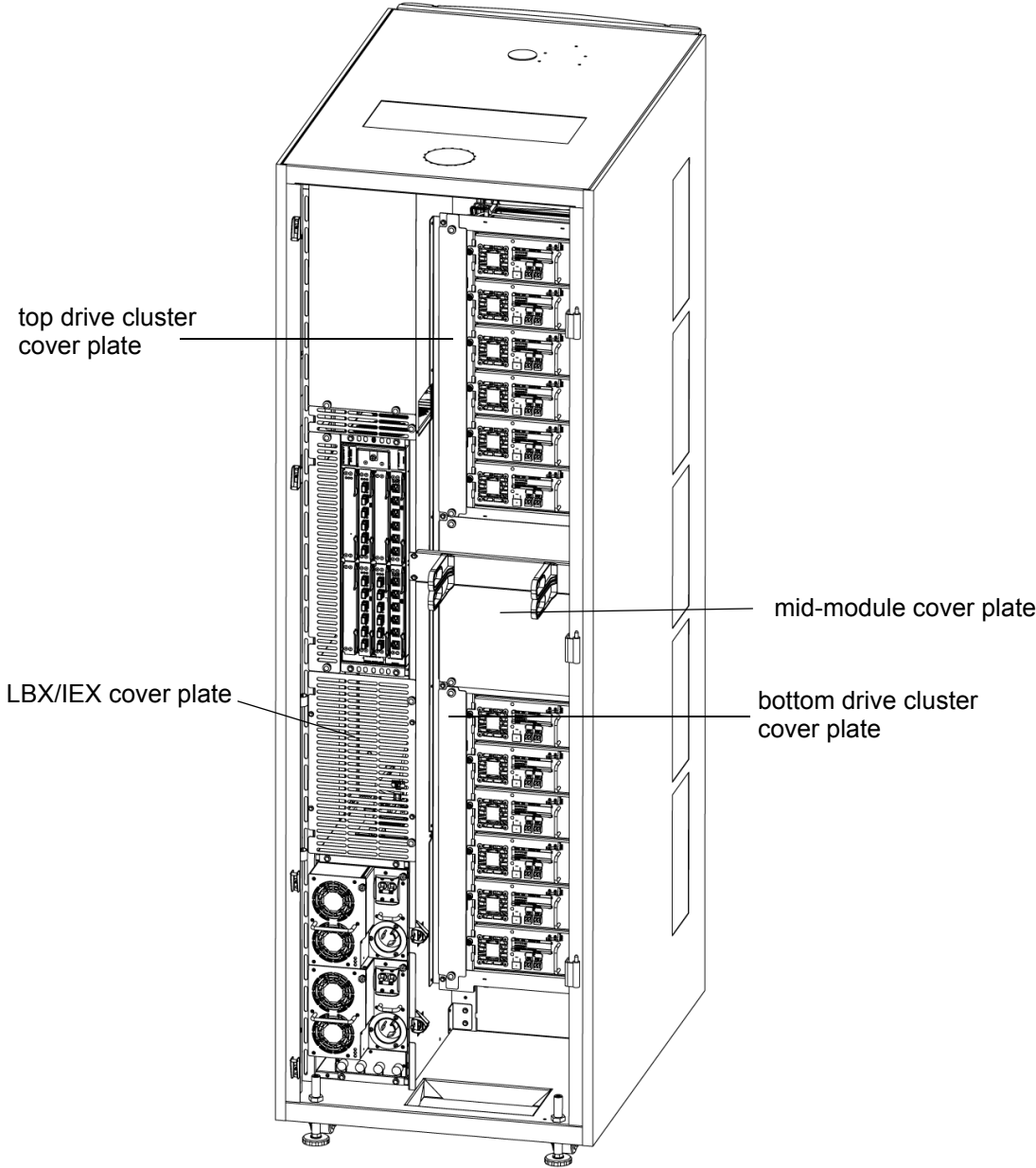
17 Complete routing the cable through the back side of the library.

aisle light cabling

aisle light cable to
LBX board
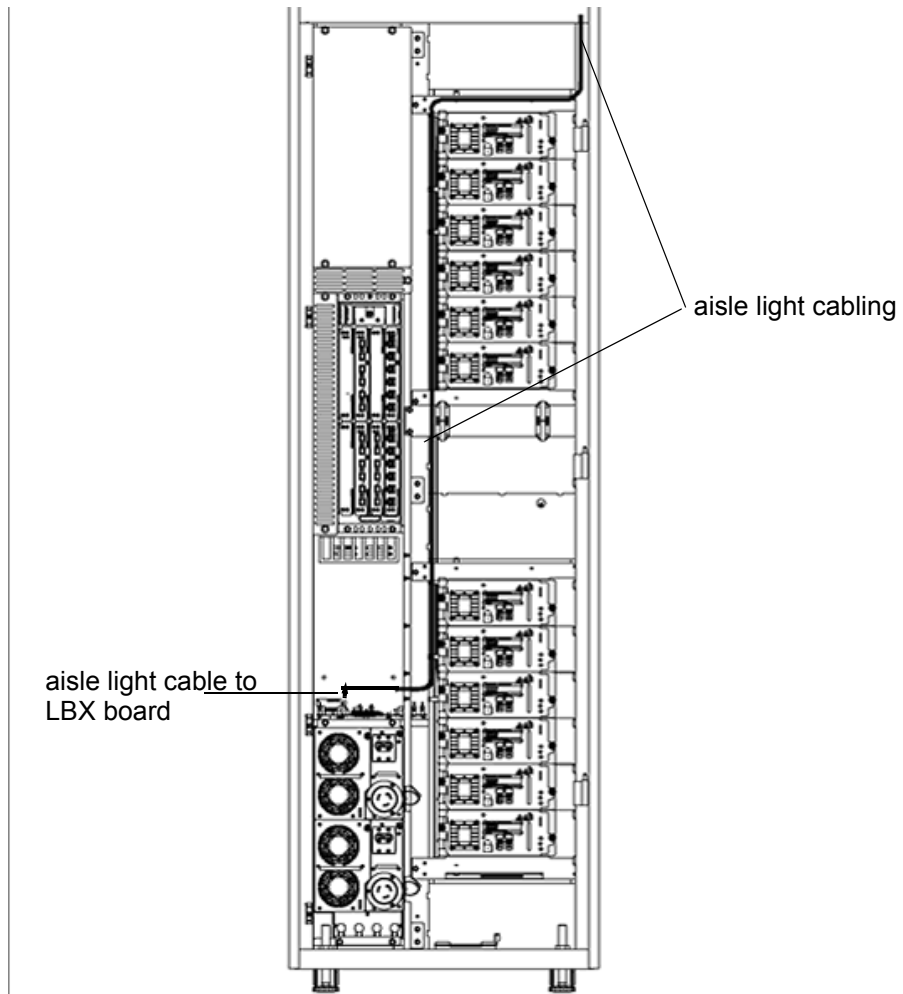
18 Plug the cable's 1 x 2 connector end into the LBX board connector J19. For more information on the LBX board, see LBX Board on page 345.
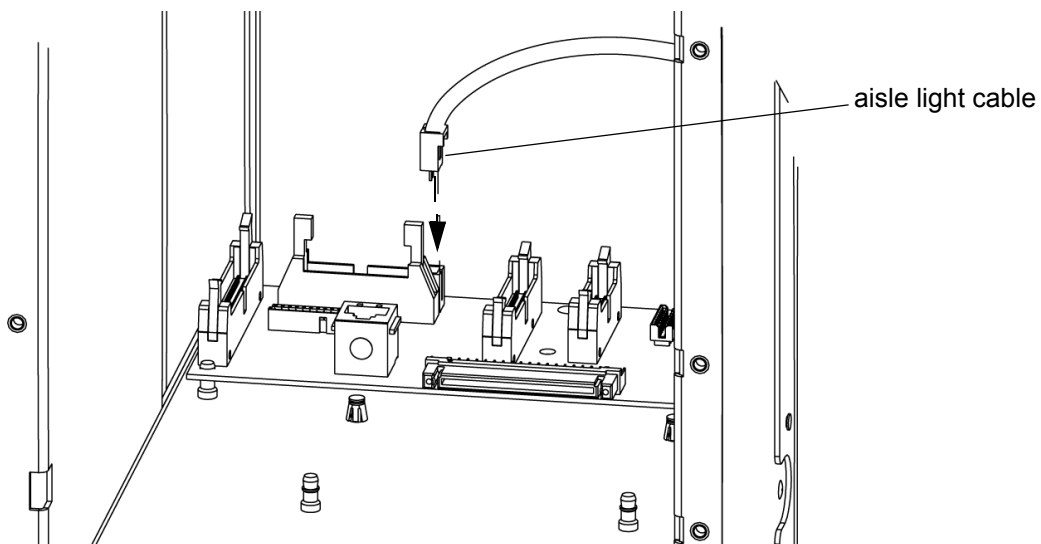
aisle light cable

19 Use a #2 Phillips screwdriver to replace the top drive cluster cover plate, the mid-module cover plate, the bottom drive cluster cover plate, and the LBX/IEX cover plate.

top drive cluster cover plate

mid-module cover plate

LBX/IEX cover plate

bottom drive cluster cover plate
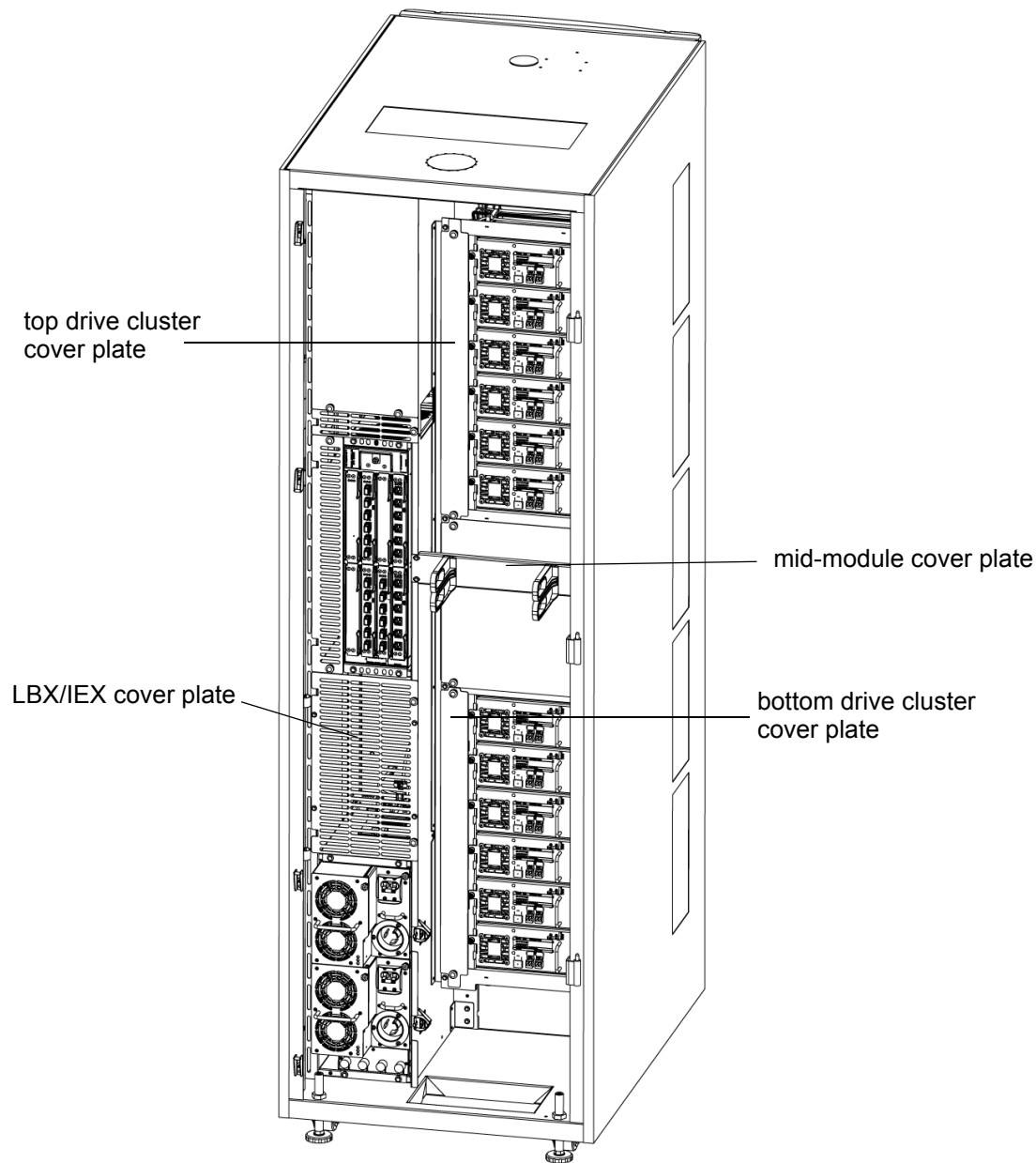
20 Close the service and access doors.

21 Press the **Power** switch on the operator panel.

📝 **Note**   To avoid interference with the scanner, the aisle lights are automatically turned off whenever the Teach or Inventory functions are used.

22 After the Robotics Enabled Indicator turns solid green, log in to the library.

23 Make sure that you are viewing the physical library. From the **View** menu, select the name of the physical library.

24 From the LMC, select **Setup > Aisle Light Settings**.

25 The **Aisle Light Settings** dialog box appears.

26 Initially to turn the lights on you must choose either **30 minutes** or **1 Hour.** If you choose **Always Off** the aisle lights will not come on.
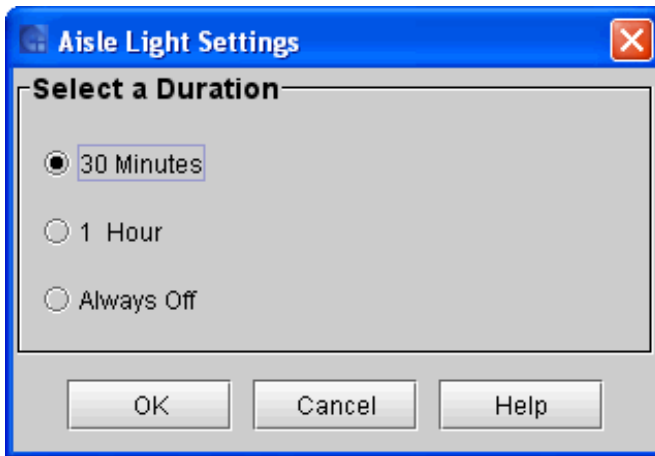
27 Click **OK**.
See the *Scalar i6000 User's Guide* for more information concerning aisle lights.

28 Visually verify all the aisle lights in your system are on. You can view the aisle lights either through the top filter of each access door or you can look down the aisle of the system via the side windows.

29 Open and close any I/E station and verify that the aisle lights shut off automatically when the robot scans the I/E station.

Installation Testing and Verification

This chapter contains testing procedures for performing the following:

Verifying the Hardware Installation

To verify the hardware, follow these steps:

1 Verify that the library is leveled based on the instructions in Installing a Stand-Alone Control Module on page 19 and Installing a Multi-Module Library on page 27.

2 Close the access door.

3 Verify that the **Robotics Enabled** and **Status** indicators above the Library Management Console (LMC) are illuminated in solid green state.

Status indicator

Robotics Enabled indicator/button

Power indicator/button

touch screen
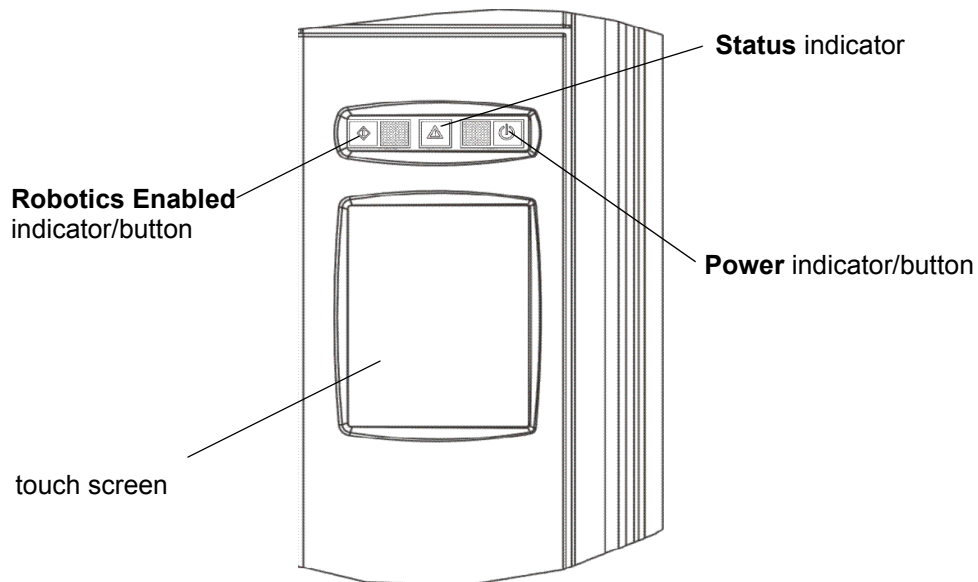
4   Log onto the LMC as a service user.

5   Verify that the LMC is displayed and there are no yellow or red sub-system statuses. If there are yellow or red statuses, see the *Scalar i2000/i6000 Maintenance Guide* for corrective procedures.

6   For each partition, verify that all drives are online by performing the following:

  a. From the LMC, select the partition using the view menu.

  b. Click **Monitor**→ **Drives** and verify all expected drives are available.

7   From the LMC, click **Tools**→ **Teach** to perform a configuration and a calibration on the library.

The **Teach** dialog box appears. The default choice is **Configure**.

8   Click **Start**.

Once the teach is completed, a message appears in the **Results** field, for example, "Command Completed."
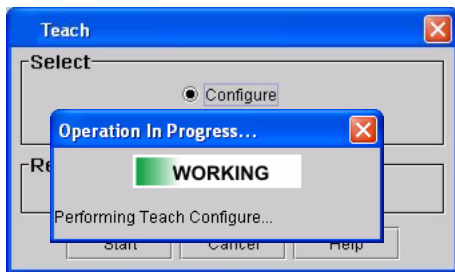
9   Select **Configure** and click **Start**.

During the calibration teach process, the picker moves to the home position, which is X-Y coordinate position 0,0. It then moves to a magazine at the top and a magazine at the bottom on each side of each module, and stores those positions in coordinates relative to the 0,0 position. Teach results appear in the **Results** area when the process completes. If the calibration teach process completes successfully, the dialog box closes automatically.

Once you have verified the hardware using this procedure, go to the and proceed with those instructions.

If hardware verification indicates problems, consult the troubleshooting procedures in the *Scalar i2000/ i6000 Maintenance Guide*.

Installation Verification Test Overview

The installation verification test enables you to verify that the library's installation and configuration is complete and functioning correctly. The installation verification test runs the following individual tests:

- Library alignment test
- Picker assembly test
- I/E station assembly test
- Get/Put test
- Scanner fiducial test

These tests require that you log on as an admin or service user. The accessor assembly must be ready and functional, and the library must be powered on. In addition, the library must be in an offline state, and at least one scratch tape must be inserted in the I/E station.

The smaller library configuration will require about 1 hour and the larger configurations will require as long as 4 hours to run the installation verification test. The time to complete individual tests on an twelve module configuration is approximately:

- Library alignment test - 45 minutes
- Picker assembly test - 4 minute
- I/E station assembly test - 7 minutes for each I/E station
- Get/Put test - 2 hours and 45 minutes
- Scanner fiducial test - 75 minutes

Note   These times do not include debug or repair time.

Installation Verification Test Functions

Use the **Verification Tests** dialog box to run the installation verification test and view results. Figure 25 shows the parts of the **Verification Tests** dialog box. To display the dialog box, click **Tools→ Verification Tests**.

Figure 25   Verification Tests Dialog Box
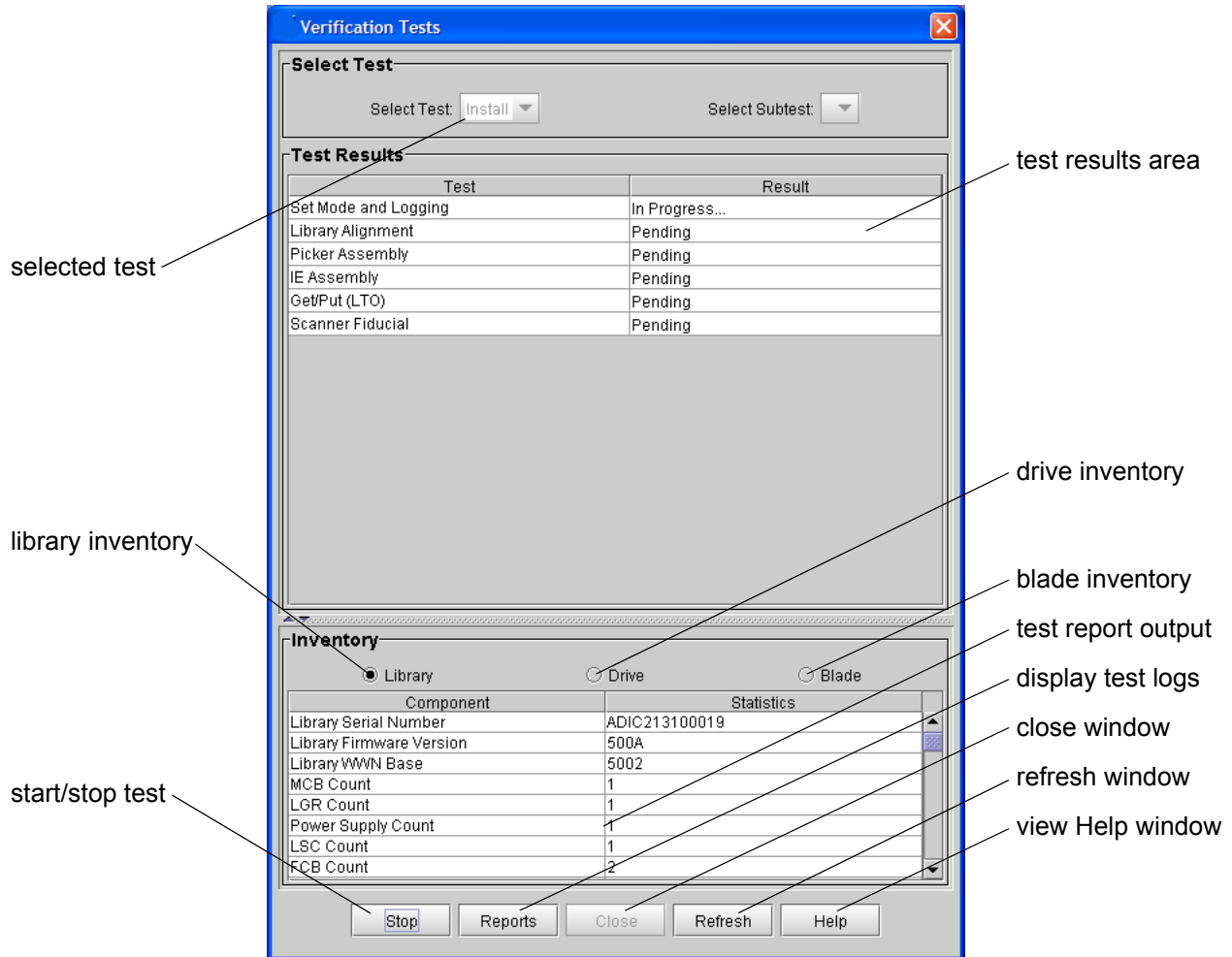
Library Alignment Test

The library alignment test performs the following tasks:

- Performs accessor X-axis and Y-axis travel test (also calls the FRU accessor assembly test)

- Calibrates library and checks calibration offsets by comparing them to the default values for the drives and I/E stations

- Checks magazine offsets

- Checks collected offset alignments for magazines, I/E stations, and drive sleds

- Checks joint alignment quality

Get/Put Test

The Get/Put test performs the following tasks:

- Performs a Get/Put of a scratch tape in the top and bottom slots of each magazine that supports the scratch tape's media
- Performs a Get/Put of existing media if no scratch tape is found or if the top or bottom is occupied
- Moves a scratch tape to one row in each frame to test cross-frame alignment
- Uses a scratch tape to perform a Get/Put in each compatible drive

Picker Assembly Test

The picker assembly test performs the following tasks:

- Performs pivot left and right check
- Performs reach and retract five times
- If the LMC gets its side done, performs a Get/Put of the selected cell
- Scans the control module serial number to make sure the scanner is reading properly

I/E Station Assembly Test

The I/E station assembly test performs the following tasks:

- Locks and unlocks I/E station
- Calibrates each I/E station and check offsets collected
- Checks each magazine's fiducial in the I/E station
- Performs Get/Put tests on all the I/E station cells

Scanner Fiducial Test

The scanner fiducial test performs the following tasks:

- Scans and checks each magazine fiducial
- Scans and checks each drive sled fiducial
- Tests the calibration sensor
- Calibrates and checks repeatability, up to three times for marginal and failed calibration targets

Library Inventory

This inventory list provides the following statistical information:

- Frame card serial numbers
- Power supply serial numbers
- Number of cartridges in the library
- Controller serial number and firmware information for the following:
  - Management control blade
  - Control management blade
  - Robotic control unit or RCU
  - Picker

- I/E stations

Drive Inventory

This inventory list provides the following information about each drive:

- Drive sled locations
- Drive sled controller serial numbers
- Drive sled controller boot and application firmware versions
- Drive brick serial numbers and firmware versions
- Drive logical serial number if the library is configured for logical serial number addressing

Blade Inventory

This inventory list provides the following information about each Fibre Channel I/O blade:

- Location of each blade
- Serial number of the blades

Test Results

The results of all subtests are displayed on the **Verification Tests** dialog box after each individual test is completed. See Table 11 for an explanation of test results.

Table 11   Test Results

Test Results	Explanation
PASSED	Completed the test without reported errors.
MARGINAL	Completed the test, but the system had to retry or had to skip part of the test. A MARGINAL result is considered PASSED, but the log should be checked to see if the marginality can be corrected.
FAILED	An error has been found and needs to be corrected. A fatal error, or an error that causes a part of the system to become disabled, will halt the test.
INCOMPLETE	This portion of a test was incomplete due to an interruption or a portion of the test was run (for example, no scratch tape was used so must only use existing tapes). An incomplete will occur when the door is opened, an abort command is issued, or when the **Robotics Enable** button is pressed.
SKIPPED	This portion of the test was skipped. The cause is that either a scratch tape was not present or the library was not configured for the test.
WARNING	A warning is additional information about the test that the user should know. For example, if a calibration failed, but the stored offsets are analyzed, a warning should be posted that states that the offset check might not be accurate.
STOPPED	The test was interrupted. The log will show the result to provide a record of test interruption.

> **Note**   A single problem in the library can cause failed results in multiple tests. After taking action to correct a failed result, run tests that yielded marginal or failed results again.

Verification Test Graphical Reports

Verification tests produce graphical reports that let you easily see if the test generated passed, marginal, or failed results. Each result is shown in a different color:

- P - passed (green)
- M - marginal (yellow)
- F - failed (red)

There are eight types of graphical reports. Each individual test generates two or more graphical reports (except for the scan barcode test, which does not generate graphical reports). The following sections show an example of each type of graphical report and actions to take to correct a marginal or failed result.

To view the graphical reports for a test, click **Reports** on the **Verification Tests** dialog box. Figure 26 shows the parts of the report window.

Figure 26   Report Window
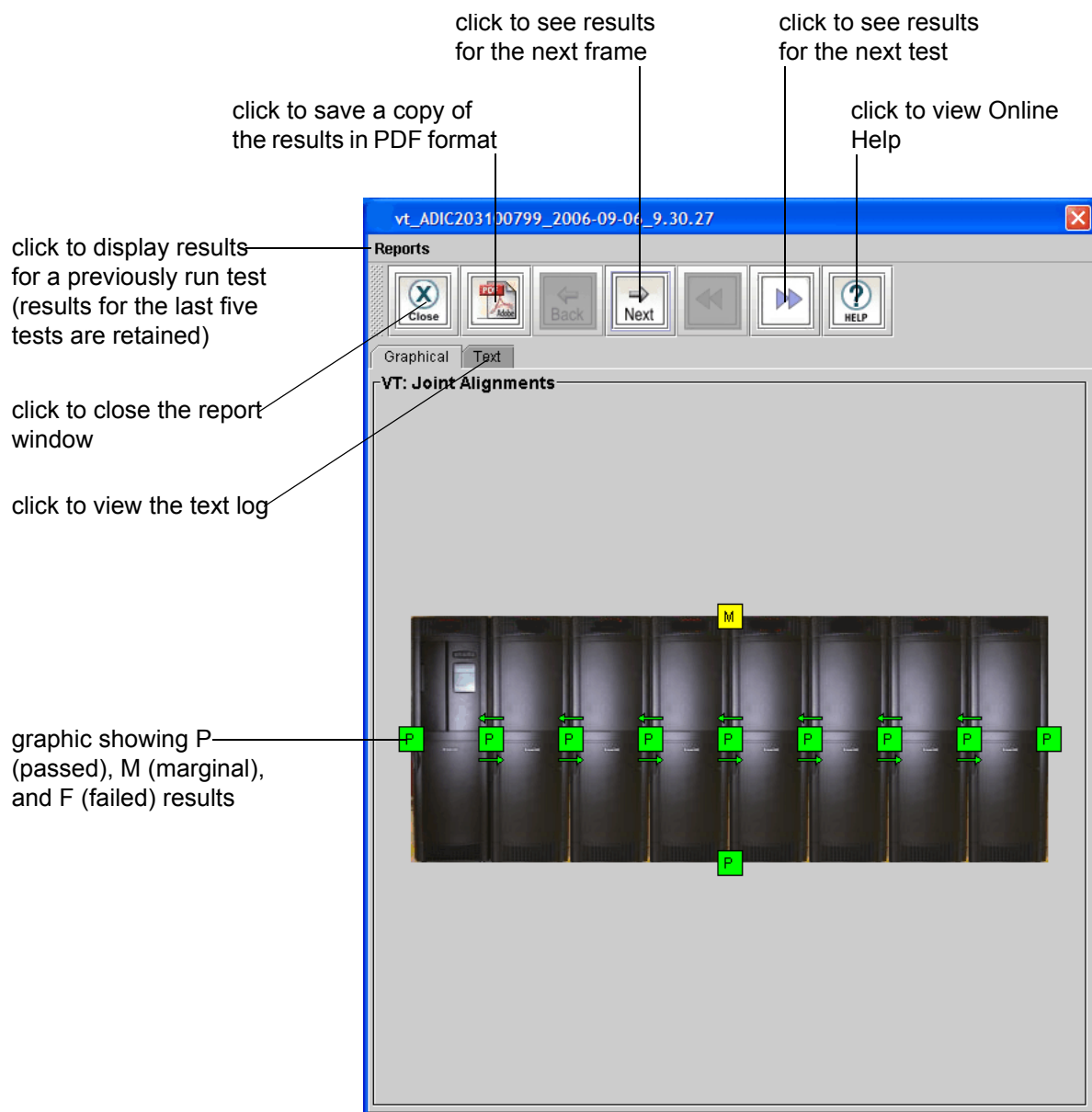
Joint Alignments

The joint alignment graphical report shows the results for tests of alignment between frames. It also shows the results for tests of accessor travel to all corners of the library.

- If the graphical report shows one or more failed results for joint alignment, realign the middle X-axis rail and check the alignment of the top and bottom X-axis rails at the location of the failure.

- If all the joints passed testing but accessor movement failed, manually move the accessor down the aisle in each direction to locate any places where motion of the accessor is not smooth or is restricted. Then realign the middle X-axis rail and check the alignment of the top and bottom X-axis rails at the location of the failure.

Figure 27   Joint Alignments Graphical Report
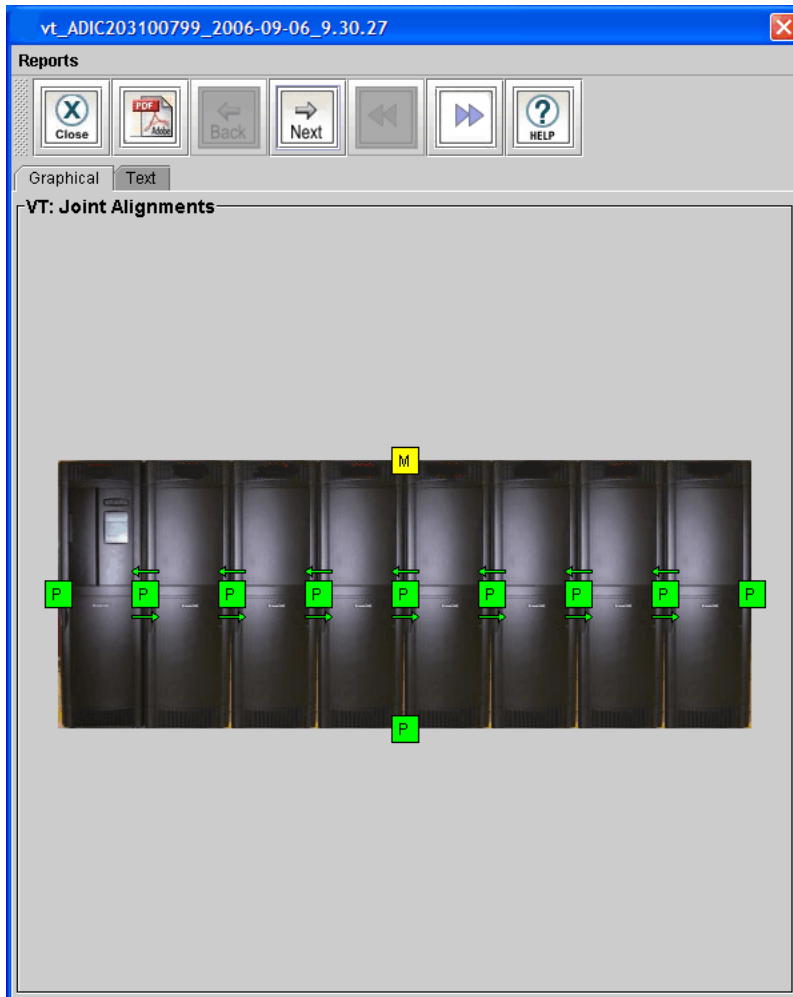
Vertical Alignments

The vertical alignments graphical report shows the results for test of vertical alignment of tape magazines on the drive-side and door-side of each frame, and for vertical alignment of each I/E station.

- If the graphical report shows a failed result for the drive-side or door-side, make sure that all tape magazines are installed properly on that side and that the calibration targets are correctly snapped on to the magazines.

- If the graphical report shows a failed result for the I/E station, make sure the I/E station and front door are completely shut.

- If running the test again still generates failed results, realign the middle X-axis rail and check the alignment of the top and bottom X-axis rails at the location of the failure.

Figure 28   Vertical Alignments Graphical Report
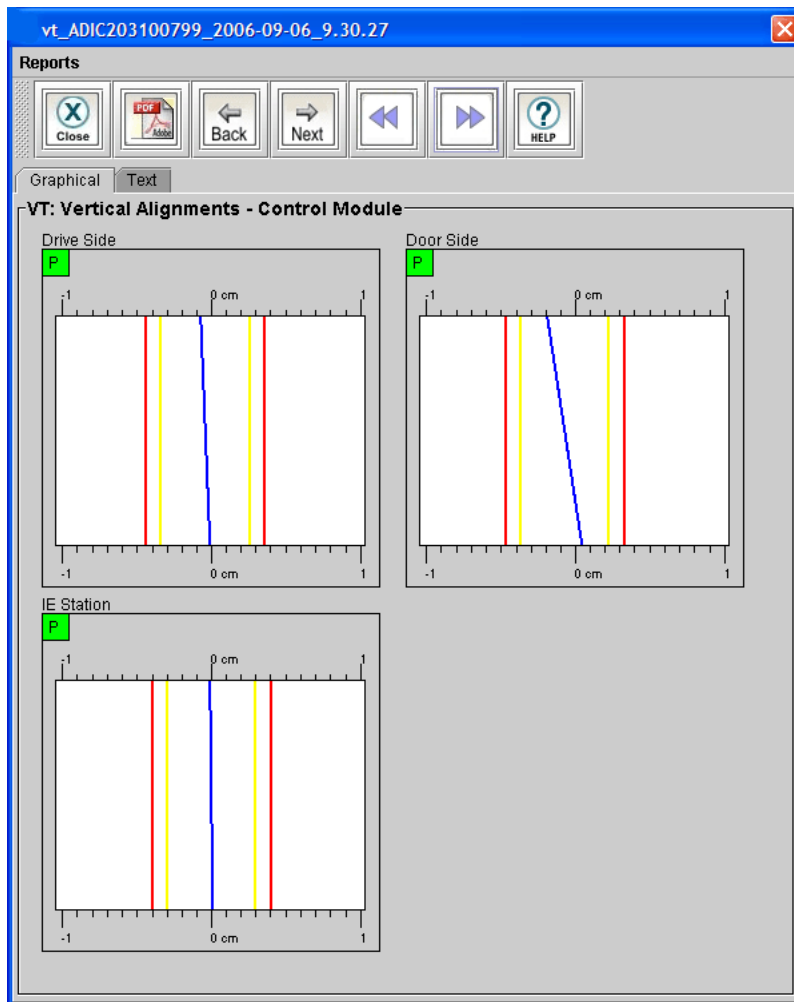
Horizontal Alignments

The horizontal alignments graphical report shows the results for tests of horizontal alignment of tape magazines on the drive-side and door-side across frames, and for horizontal alignment of I/E stations across frames.

> ✍ **Note**   This graphical report is not generated for libraries with only one frame.

- If the graphical report shows a failed result for the drive-side or door-side, make sure that all tape magazines are installed properly on that side and that the calibration targets are correctly snapped on to the magazines.
- If the graphical report shows a failed result for the I/E station, make sure the I/E station and front door are completely shut.
- If running the test again still generates failed results, realign the middle X-axis rail and check the alignment of the top and bottom X-axis rails at the location of the failure.

Figure 29   Horizontal Alignments Graphical Report
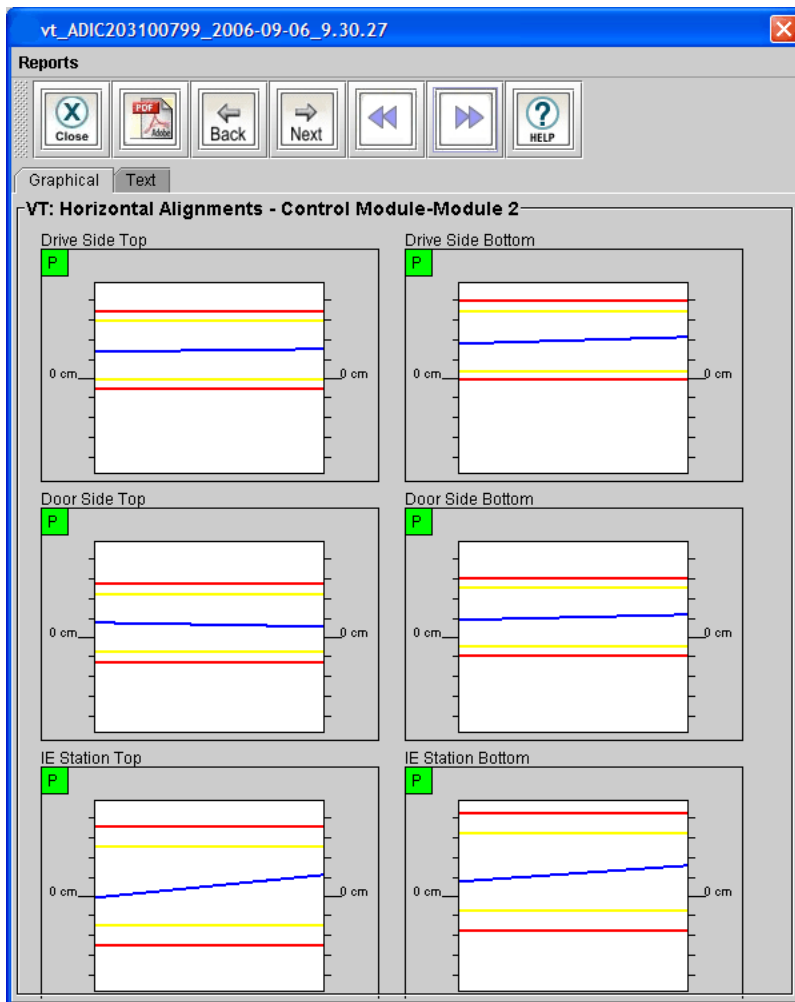
Calibration Offsets

The calibration offsets graphical report shows the results for tests of tape magazine, drive sled, and I/E station offsets compared to predefined tolerances. Reports are generated for drive-side and door-side for all frames.

- If the graphical report shows a failed result for one or more tape magazines, make sure the magazines at the location of the failure are installed properly and that the calibration targets are correctly snapped on to the magazines.

- Make certain the magazines are fully seated in the I/E station.

- If the graphical report shows a failed result for the I/E station, make sure the I/E station and front door are completely shut.

- If running the test again still generates failed results, realign the middle X-axis rail and check the alignment of the top and bottom X-axis rails at the location of the failure.

Figure 30   Calibration Offsets Graphical Report

Boundary/Accessibility

The boundary/accessibility graphical report shows the results for tests of the accessor while performing get, put, and scan functions for all tape magazines and drive sleds. (This tests whether magazines and sleds are within the maximum allowable movement range of the accessor.)

* If the graphical report shows a failed result for one or more tape magazines, make sure the magazines at the location of the failure are installed properly and that the calibration targets are correctly snapped on to the magazines.

* If the graphical report shows a failed result for the I/E station, make sure the I/E station and front door are completely shut.

* If running the test again still generates failed results, realign the middle X-axis rail and check the alignment of the top and bottom X-axis rails at the location of the failure.

Figure 31 Boundary/Accessibility Graphical Report
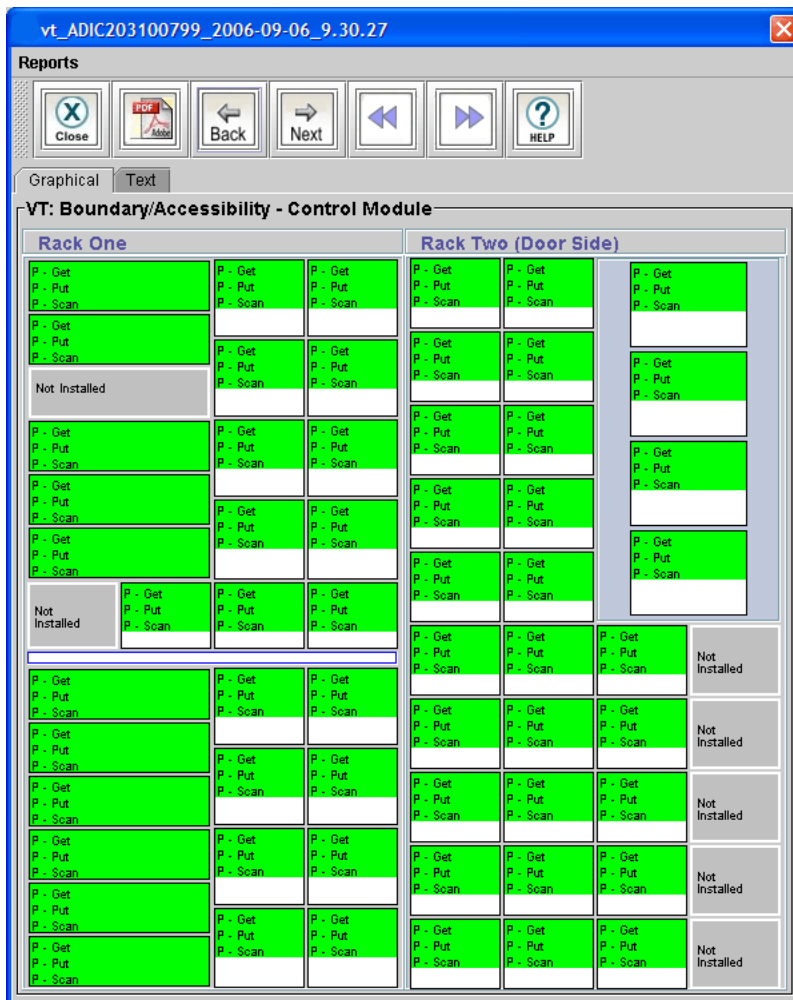
Get/Put

The Get/Put graphical report shows the results for tests of the picker assembly while performing one get and one put function for each tape magazine. The picker will use the selected scratch tape or the existing tape if it finds one at the target.

- If the graphical report shows a failed result for one or more tape magazines, make sure the magazines at the location of the failure are installed properly.

- If there are multiple marginal results in an area, review the area to make sure it is not prone to problems. Also run the library alignment test (part of the installation verification or partial frame test) to make sure the library properly aligned.

- If there are a large number of issues, use rubbing alcohol to clean the picker fingers and the detents in the side of the tapes.

- If the problems persist, you may need to replace the picker assembly.

Figure 32   Get/Put Graphical Report

Scan Fiducials

The scan fiducials graphical report shows the results for tests of the fiducial barcode on each tape magazine and drive sled, including the width, expected Y position (shift), and the number of hits the scanner receives while traveling up and down. (Only known magazines are tested.)

- If the graphical report shows a failed result for one or more tape magazines, replace the affected magazines.

- If there are multiple marginal or failed results, run the library alignment test (part of the installation verification or partial frame test) to make sure the library properly aligned.

- If the library is aligned and there are multiple marginal or failed results, the scanner should be inspected and replaced if necessary.

Figure 33   Scan Fiducials Graphical Report
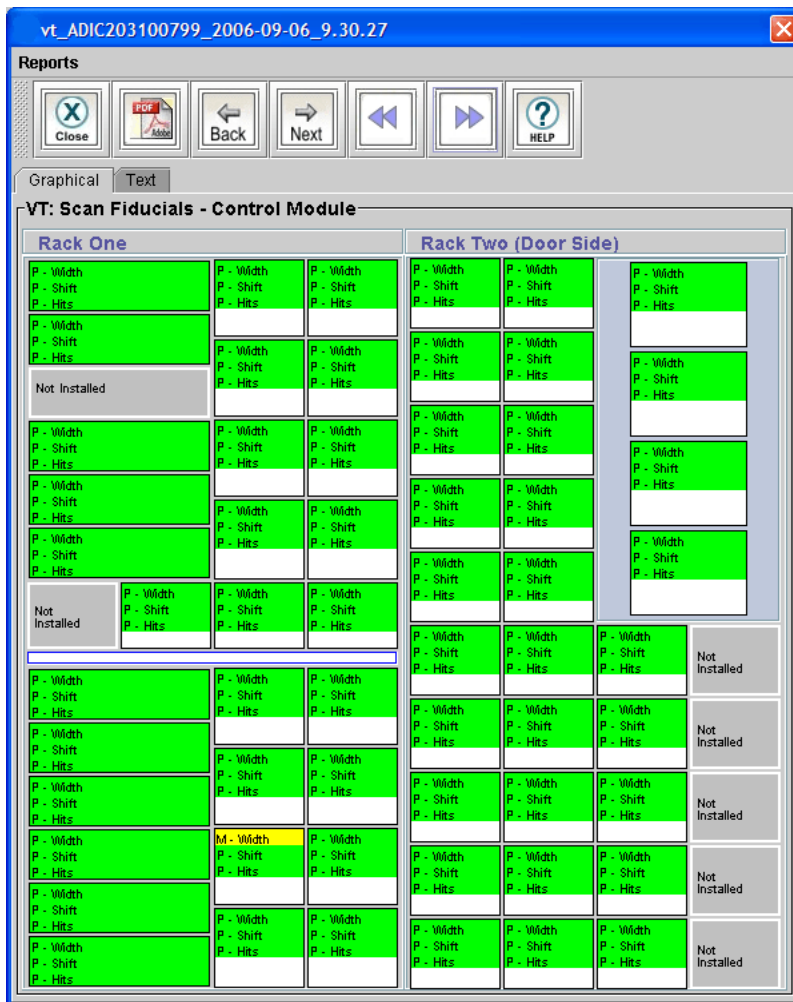
Picker Pivot/Reach

The picker pivot/reach graphical report shows the results for tests of the picker while performing rotation and reach/retract actions.

- If the graphical report shows one or more marginal or failed results, inspect the picker. It should rotate easily by hand, and the fingers should spring into a clamped position. Make sure both rotation axis belts are free of debris. Also make sure that the storage is correctly seated in the I/E station and that the I/E station and front door are completely shut.

- If the problems persist, you may need to replace the picker assembly.

Figure 34   Picker Pivot/Reach Graphical Report
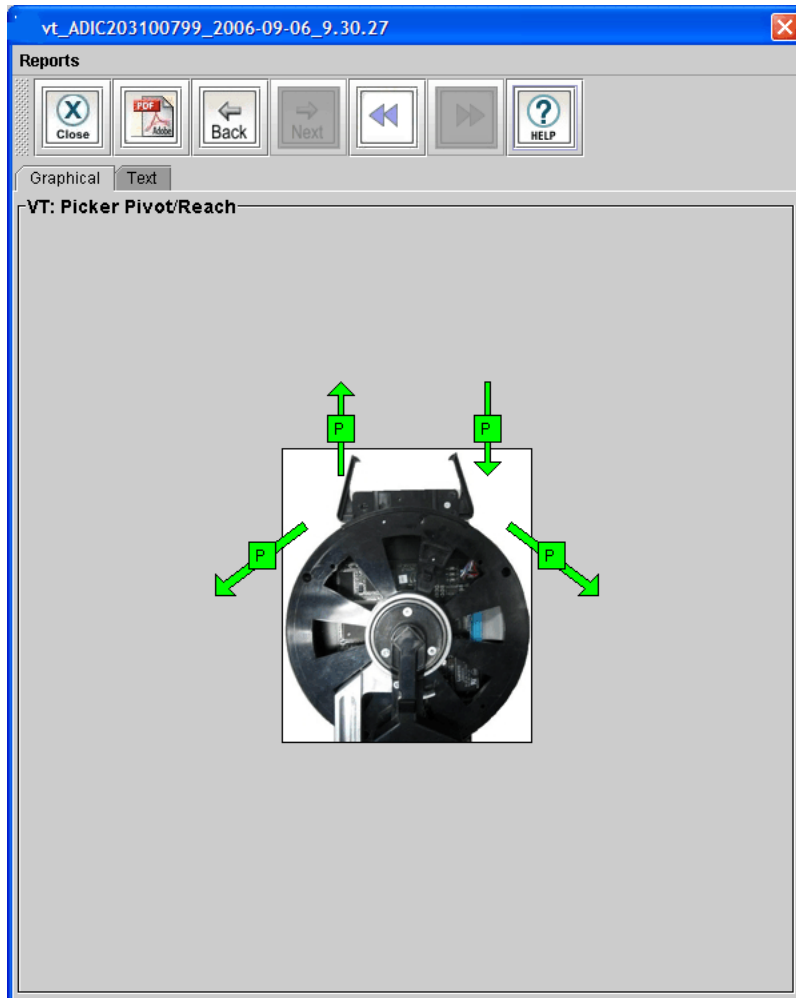
Verification Test Logs

Each verification test produces a test log that details all information and results from the individual tests and subtests. In addition, the log includes information to help you understand the test results and to help resolve any problems encountered. To view a test log, click **Reports** on the **Verification Tests** dialog box to display the report window, and then click the **Text** tab.

You can view results for the five most recent tests. Click **Reports**, and then click the test results you want to view.

This log file is appended with data as each test finishes. You can repeat the test if any problems are found and fixed. If the **Verification Tests** dialog box was not closed during the retesting, all results are contained in one log file.

To save the information that the test generates, click **Send**. If you are using the remote LMC client, you can choose to save the log to your hard drive. If you choose to save directly to your hard drive, the report listing and test log are combined into one text file.

shows an example of a test log. It provides the following information:

- The test output is from the library alignment test.

- The test title is always shown between rows of equal signs.

- A brief guide for understanding coordinates and offsets used in the test results is provided near the beginning of the log.

- The X-axis and Y-axis limits applied by this test are shown. MARGINAL output is placed between parentheses, and FAILED output is placed between brackets; for example, (30) and [45].

- The results of the subtest are displayed between dashed lines.

- Coordinates are represented as A (aisle), F (frame), R (rack), S (section), C (column), and R (row).

- All location values are in 0.1 mm.

- All results that you should review are identified with four arrows (>>>>) in the column to the left of the detailed results.

- At the end of every test, summary results of every subtest are given. The overall test result is displayed between asterisk lines, and a summary of subtest results follows. See on page 313 to determine the meaning of the results.

Figure 35   Example Test Log Output

```
================================================================
              TEST ACCESSOR LIBRARY ALIGNMENT
================================================================
Library  serial number = 203100119
MCB time: 02/26/2010 05:02:47.39
Library Reserved for VT Testing.


  Checking input parameters...
      PASSED    0x00      Start Frame         OK
      PASSED    0x00      End Frame           OK
      PASSED    0x00      Start Rack          OK
      PASSED    0x00      End Rack            OK


  ------------------------------------------------------------------------
                  GUIDE TO VERIFICATION TEST LOG
   COORDINATES
      A F R S C R  = aisle, frame, rack, section, column, row
      Index        = internal RCS number for a location
   OFFSETS
      Marginal offsets appear in (), Failed appear in []
      Predicted X Offset is the average of the previous frame's X offsets.
        This number is used to check the offset found against the tolerances.
  ------------------------------------------------------------------------


Using frames 1 to 1, racks 1 to 1.


Checking XY Travel...

  Verifying Frame Terminator Corresponds with Hard Stops...
      This test uses the accessor to push up against the outside edge
      of the library. A hard-stop should be installed in the X and Y
      rail that limits the accessor's movement. If the frame terminator
      (installed on the last frame's LBX card) does not agree with the
      hardstops, this test will fail.

    PASSED: Max X hardstop matches frame terminator.
    PASSED: Max Y hardstop matches frame terminator.
      Position Stats          X  |   Y
        Set Limits:         3255 | 16731
        Hardstop Test:      3285 | 16740
      Move Details          X  |   Y
        Max Current:        2011 |  747
        Min Current:         371 |  698
        Following Error:      27 |    2
        Position Error:        0 |    0
```

Running the Installation Verification Test

When the installation verification test is running, no one else can log on to the library. The message, "Verification Test is Running," is displayed in the **Activity** area of the main LMC display.

1 Log on as an admin or service user.

2 Make sure that you are viewing the physical library. From the **View** menu, click the name of the physical library.

3 Click **Tools**→ **Verification Tests**.
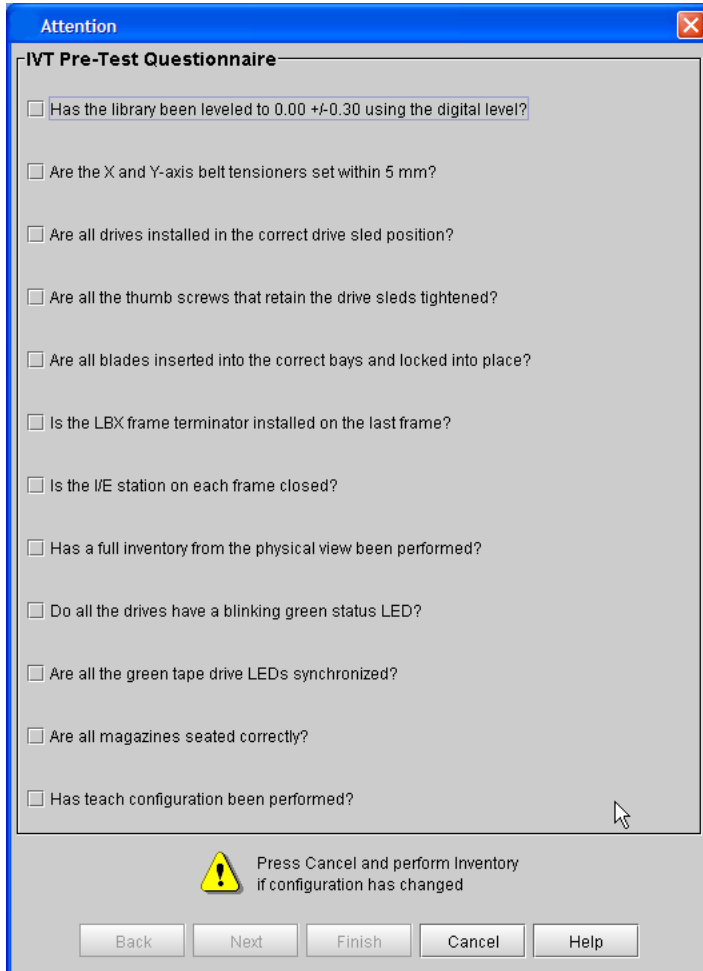
The **Verification Tests** dialog box appears.
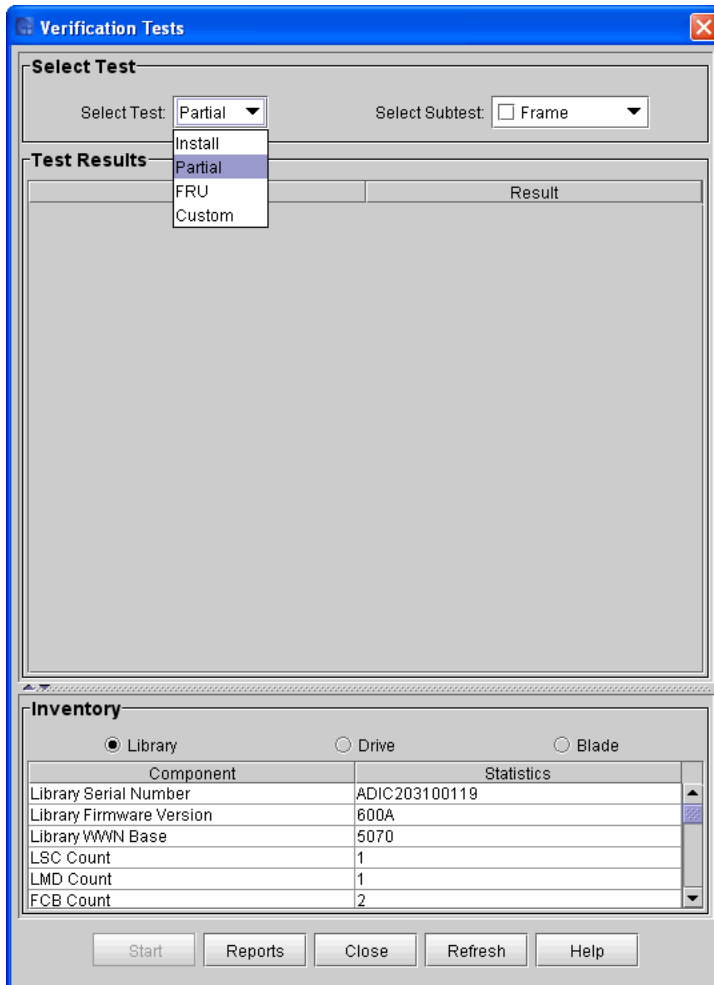
4 From the **Select Test** drop-down list, click **Install**.

5 Click **Start**.

6 If prompted to take the library offline, click **Yes**.

The **IVT Pre-Test Questionnaire** appears.

7 Complete the pre-test questionnaire by clicking inside the box next to the questions.

You cannot continue with the installation verification test until you have completed and verified the question requests on this questionnaire.

> **Note** Make sure you physically verify each of the questions on the questionnaire. Each of the items listed can cause the installation verification test to have unexpected behavior and unreliable results. The tests must be re-run if they fail.

8 After you complete the questionnaire, click **Next**.

The following dialog box appears.


```
Attention                                          ⊠

        ⚠  Insert Scratch Tapes into IE Station and click "Next".
            You will be allowed to select Scratch Tapes of different
            types from the list of all Tapes in IE Stations. It is
            important that Customer's tapes are not selected since
            Scratch Tapes may be overwritten during the test!

        [ Back ]  [ Next ]  [ Finish ]  [ Cancel ]  [ Help ]
```
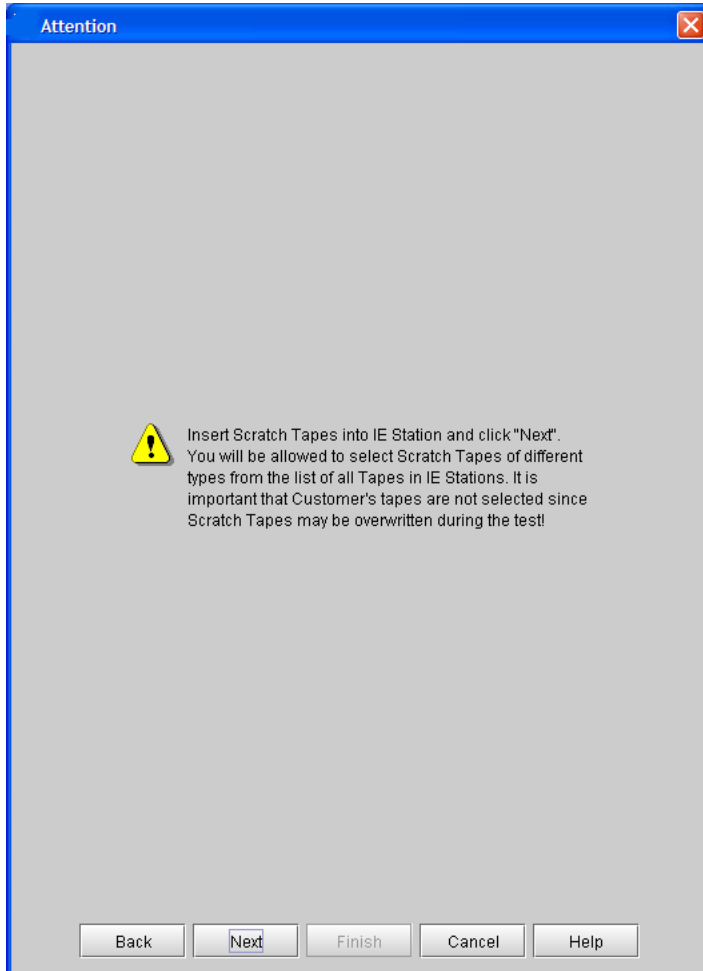
9 Insert a "scratch" cartridge into the I/E station, and then click **Next**.

> 📝 Note
> - Make sure that your scratch tapes are formatted and contain no data that cannot be overwritten. Scratch tapes must have barcode labels with valid volume serial (volser) numbers on them. Also, you might find it useful to write down the volser number so that you can identify your scratch tapes.
> - This procedure will not damage any cartridges that are already installed in the library. You can load both LTO and DLT scratch cartridges if your library has mixed media.
> - If the scratch cartridge becomes lodged in a drive or magazine, it must be manually removed from the library. If not removed, the cartridge will become part of the partition the next time the accessor assembly is enabled.

The I/E station will be locked until the inventory is complete.

10 Select a "scratch" cartridge of each media type listed on the following dialog box.

> ✎ Note You can select one "scratch" cartridge per media type. Each test that requires a scratch cartridge will call the media types as needed.

11 After you select the cartridges, click **Finish**.

As the tests run, the library will generate RAS tickets if problems are discovered. You must close the **Verification Tests** dialog box to view those tickets. Return to the **Verification Tests** dialog box to view test results.

12 After the test is complete, click **Reports** to view the test results.

The report window appears with the **Graphical** tab displayed. Use the **Graphical** tab to view graphical reports and to quickly identify areas where marginal or failed results occurred.

Use the toolbar to navigate between graphical reports or to save the results in PDF format. For more information about how to work with graphical reports, see <u>Verification Test Graphical Reports</u> on page 314.
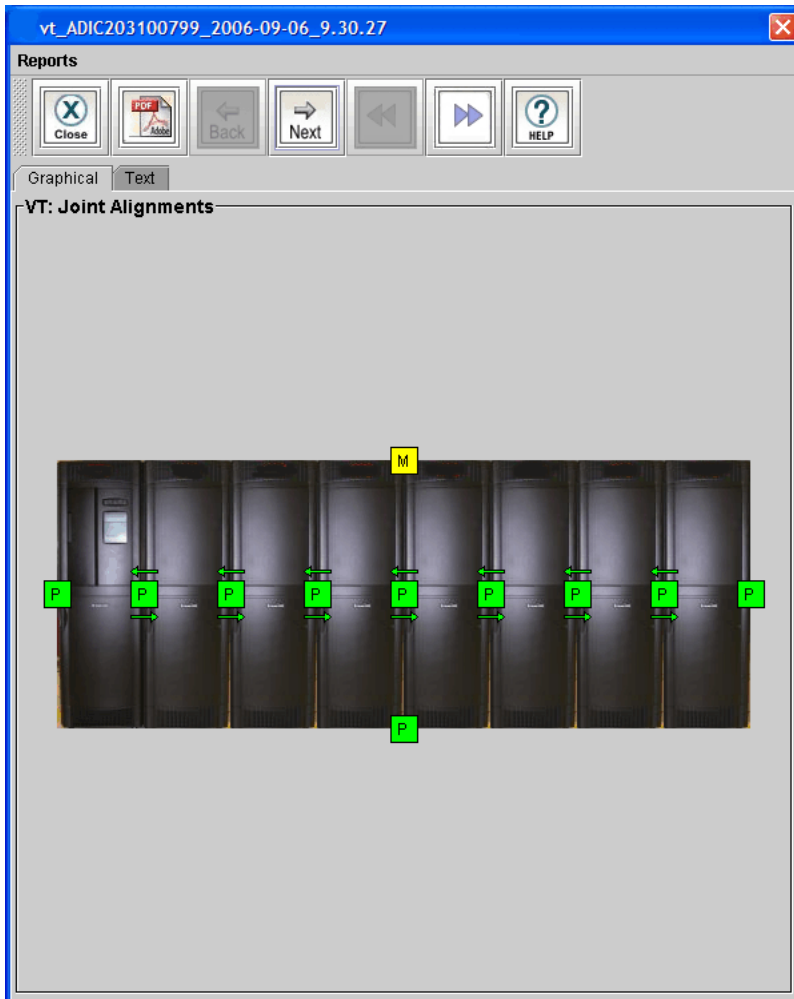
13 For more detailed test results, click the **Text** tab to view the test log generated by the LMC.

Review the test log to find marginal or failed test results, and to see troubleshooting information. To e-mail the test log or save it as a text file, click **Send** and then specify the output location. For information about how to interpret and save test logs, see Verification Test Logs on page 323.

```
===============================================================
                  VT Inventory Reports
===============================================================
Library Report
--------------
Library Serial Number        ADIC213100019
Library Firmware Version     500A
Library WWN Base             5002
Number of Cartridges         17
Number of IE Stations        1
Number of Frames             1
Number of Drives             10
Number of Aisles             1

MCB Serial Number AMJ000120-0016
MCB Location
MCB App Fwr Version 500A-TS00301
MCB Boot Fwr Version 500.00301
MCB Pip Fwr Version 2.2

LGR Serial Number AMQ000661-0029
LGR Location
LGR App Fwr Version 500A.TR002
LGR Boot Fwr Version 110A.GR001
LGR Pip Fwr Version

LSC Serial Number AMJ000130-0005
LSC Location
LSC App Fwr Version 500A.TR00200
LSC Boot Fwr Version 110A.GR00100
```

14 To see the results for a previous test, click **Reports**, and then click a test. The LMC saves the most recent five test results.

15 When you are done working with the test results, click **Close** to close the result window.

If you are done performing verification tests, click **Close** to close the **Verification Tests** dialog box.

Completing the Installation Verification Checklist

This Installation Verification checklist provides a convenient way to review the configuration of the library and, in some cases, document the settings as configured. Before leaving the site, perform the following checklist in the following sequence. Most of these procedures are performed in the Library Management Console (LMC).

❑ Verify that the proper library system firmware level and drive brick firmware level are loaded on the library. Review the Quantum Support site for current releases at www.quantum.com/osr/.

❑ Review all Tech Bulletins and Release Notes applicable to the firmware being loaded or running on the library.

❑ Verify that there are no subsystems with a **Failed**, **Degraded**, or **Warning** status. If there are, open the RAS ticket and resolve according to the repair instructions.

❑ Verify all physical components, connections, and cabling.

   • Visually inspect connections to ensure all cables are fully plugged in.

   • Check the status and connection LED's on all blades to ensure proper functionality and connectivity

   • Ensure power has been applied to all components.

   • Ensure there are no RAS "amber" LEDs flashing or solidly lit indicating component error.

❑ Verify proper network configuration.

1   Click **Setup→ Network Configuration** and verify all entries.

   • Under Host Settings:

      • DHCP Enabled OR Disabled per customer network _____

      • Library Name _____

      • IP Address _____

      • Subnet Mask _____

      • Default Gateway _____

   • Under Port Settings

      • Auto Negotiate _____

      • Speed _____

2   Have the customer system administrator ping the library.

   • From within the subnet

   • From outside the subnet

❏ Verify the proper Time and Date is established within the library. Click **Setup**→ **Date and Time**. The following entries are visible from this screen:

- • NTP Setting _____
  - • Server Address 1 _____
  - • Server Address 2 _____
- • Date _____
- • Time _____
- • Time Zone _____

❏ Verify proper e-mail configuration.

1 Click **Setup**→ **Email Configuration** to verify that the e-mail server is configured correctly.

2 Click **Setup**→ **Notification**. Each Severity has an associated list of addresses to send automatic notification messages. Severity 1 should contain techsup@quantum.com and any customer specified addresses. Severity 2 – 3 are optional and can be disabled in certain library firmware levels. (Note: 4 columns are provided for convenience, there is no requirement for or limitation to 4 entries).

Table 12   Automatic E-mail Notification

Severity	e-mail 1	e-mail 2	e-mail 3	e-mail 4
1	techsup@quantum.com			
2				
3				

3 Send an e-mail to an address specified by the customer system administrator to confirm end-to-end e-mail functionality. Go to **Monitor**→ **System**. Select **Send** and type in the e-mail address.

❏ Verify that the Physical Library is properly set up. The library's default configuration is to Disable Automatic Teach and Automatic Inventory. This setting is recommended to save start up time during a library power on or a Robotics Enable. If a customer will be routinely performing bulk load operations or removing/installing media without using the I/E station, it is recommended that Automatic Inventory be enabled.

- • Automatic Teach _____Enable_____Disable
- • Automatic Inventory_____Enable_____Disable
- • Logical SN Addressing_____Enable_____Disable
- • Automatic Drive Unload_____Enable_____Disable

❏ Verify that all licenses installed per the customer's order are properly functioning. Click **Setup→ Licenses**. (Note: four licenses are listed for convenience, there is no requirement for or limitation to four entries).

Table 13   Customer License Verification

License Key	Feature Name	Status	Expiration

❏ Verify partitioning. Click **View**, then select the partition you want. Verify that the information displayed for each Library Partitioning are correct. Make sure the partition's status field states "Online."

Table 14   Library Partitioning

Library	Number of Drives	Drive Type	Number of Storage Cells	I/E
Physical Library				
Partition 1				
Partition 2				
Partition 3				
Partition 4				
Partition 5				
Partition 6				
Partition 7				
Partition 8				
Partition 9				
Partition 10				
Partition 11				
Partition 12				
Partition 13				
Partition 14				
Partition 15				
Partition 16				

❑ Verify all FC I/O blade port configurations. Click **Setup**→ **Connectivity**→ **Port Configuration**. Select each installed FC I/O blade and one of the 6 ports. All FC I/O blades have the same port settings, as shown in Table 15 .

Table 15   FC I/O Blade Default Port Settings

Port	Loop ID	Speed	Frame Size	Port Mode	Connection Option	Private/Public
FC-1	Soft	Auto	2048	Target	Loop preferred	Public
FC-2	Soft	Auto	2048	Target	Loop preferred	Public
FC-3	Soft	Auto	2048	Initiator	Loop preferred	Public
FC-4	Soft	Auto	2048	Initiator	Loop preferred	Public
FC-5	Soft	Auto	2048	Initiator	Loop preferred	Public
FC-6	Soft	Auto	2048	Initiator	Loop preferred	Public

❑ Verify that the physical library and all partitions are online.

- In the LMC, click **Operations**→ **Change Mode** and verify that **Online** is selected. Repeat this for each partition that was created.

❑ Verify Host Type Settings.

- In the LMC, click **Setup**→ **Device Access**→ **FC host** and then click **Host Type** to verify the values.

❑ Verify all Host LUN Mapping.

- In the LMC, click **Setup**→ **Device**→ **Access**→ **FC Host**, and then click **LUN Mapping** to verify the values.

❑ Verify proper switch zoning, if one or more are connected to the library.

❑ Verify the host bus adapter (HBA) configuration and port settings on the host(s).

❑ Verify that the Media Changer and Devices appear in the device list for each host.

❑ Save the library's configuration file onto a remote computer running the remote LMC client.

Perform the following steps after verifying configuration and connectivity:

1 Store both library door keys for each module in a safe location. There is the key that opens the access and service doors (FRU ID 401) and the key that opens only the service door (FRU ID 402). The key that opens the access door should be given to the system administrator to load the storage racks with cartridges. The key that opens the service door should be given to the operator to reconfigure the library.

> **Note** The access door key works on the access and service door, the service door key works only on the service door.

2 Store the library tools, manuals, and miscellaneous items (for example, tools and spare fuse box). Keep them available for service activity.

A

Testing and Calibrating the Digital Level

This appendix provides step-by-step instructions for performing the following:

Testing the Digital Level

Perform this test before each use of the Pro 3600 digital level and any time the digital level has been dropped or is being used in an environment that varies ±9°F from the environment in which it was last calibrated. If the digital level fails the accuracy test you must recalibrate the level before use.

Follow this procedure to test the digital level:

1 Turn on the level by pushing the **ON/OFF** button. Position the level with the display facing you and the text on the face of the level right-side up. Ensure that the level is on a clean, flat, and horizontal surface. This surface does not have to be exactly level. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

2 Rotate the level end-for-end so the display is facing away from you. The screw on the back of the level should be on the left side. Be sure to set the level in the exact spot as in Step 1. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

3 Roll the level toward you so that the display is facing you, but the lettering on the face of the unit is upside down. Be sure to set the level in the exact spot as in Step 1 on page 337. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

4 Rotate the level end-for-end so the display is facing away from you. The screw on the back of the level should be on the right side. Be sure to set the level in the exact spot as in Step 1 on page 337. Wait 10 seconds for the level to completely settle and take note of the angle on the display.

5 Compare the level display readings that you captured from Step 1 through Step 4. If any of the four readings vary from one another more than 0.1 degree, you must recalibrate the level. For more information, see Calibrating the Digital Level on page 339. If the variance between the readings are within the 0.1 degree limit, the level is within compliance and is ready to be used.

Calibrating the Digital Level

This section describes how to calibrate the Pro 3600 digital level.This procedure re-calibrates the level through its entire 360 degree range by recording four horizontal and four vertical settings. You should perform this procedure whenever the accuracy test shows a variance larger than ±0.1 degree.

Follow this procedure to calibrate the digital level:

1   Turn on the level by pushing the **ON/OFF** button. Place the level on a flat surface free of dust or debris. You can use any horizontal surface within 10 degrees of level and any vertical surface within 10 degrees of plumb to perform the calibration. You must use the same surface(s) throughout the entire calibration process. If at any time the calibration process fails or will not continue, you can turn the level off and on and then restart the calibration procedure from Step 2.

> ✎ Note   Each time you position the level during the calibration process, wait a minimum of 10 seconds before pressing the **HOLD** button to advance to the next step. Also ensure that the level is placed in the same position each time it is moved.

2   Press and hold the **HOLD** and **ALT ZERO** buttons simultaneously until **SUP** is displayed; this usually takes three seconds. Release the buttons once **SUP** is displayed. **SUP** will display for a few seconds and then the **[0]** is displayed. The level is now ready to be calibrated.

3   Place the level so that the display is facing you and lettering on the face of the level is right-side up. Mark the position of the level so you can place the level back in the same spot when you move it during this calibration process. Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until **[1]** appears on the display.

4   Rotate the level so that it faces away from you and the screw on the back of the level is on the left side. Ensure that the level is positioned in the same spot as Step 3. Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until **[2]** appears on the display.

5   Roll the level towards you so the display is facing you but the lettering on the face of the level is upside down. Ensure that the level is positioned in the same spot as Step 3. Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until an upside down **[3]** appears on the display.

6   Rotate the level so that it faces away from you and the screw on the back of the level is on the right side. Ensure that the level is positioned in the same spot as Step 3. Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until an upside down **[4]** appears on the display. At this time, all of the horizontal calibration settings are done.

7   Stand the level on its end so the display is facing you and the text on the face of the level can be read from bottom to top. Mark the position of the level so you can place it in the same spot when you move it during this vertical calibration process. Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until a **[5]** appears on the display.

8 Turn the level around so the display is facing away from you and the screw on the back of the level is at the top. Ensure that the level is positioned in the same spot as Step 7. Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until a **[6]** appears on the display.

9 Rotate the level end-for-end so the display is facing you and the text on the face of the level can be read from top to bottom. Ensure that the level is positioned in the same spot as Step 7. Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until a **[7]** appears on the display.

10 Turn the level around so the display is facing away from you and the screw on the back of the level is at the bottom. Ensure that the level is positioned in the same spot as . Wait 10 seconds for the level to completely settle. Without moving the level, gently press the **HOLD** button until an **[8]** appears on the display. If this last step is performed correctly the **[8]** will display for a short amount of time and then the level will display the current angle measurement that it detects. The level is now calibrated and is ready for use.

B

LBX Board and Terminator

This appendix describes the LBX board and terminator.

LBX Board

A module may contain one of three versions of the LBX board shown in Figure 36.
For information on the LBX terminator, see LBX Terminator on page 349.

- Library configurations of four modules or fewer may contain LBX2 Gen 1 or Gen 2 boards.

- Library configurations of five to eight modules must contain LBX2 Gen 2 boards.

- Library configurations of nine to twelve modules:

    - Modules one through seven must contain LBX2 Gen 2

    - Modules eight through twelve must contain LBX2 Gen 3

- If you are adding one or more expansion modules to an existing eight-module library, and the LBX board is an earlier version, you must remove the LBX board from expansion module seven (position eight) and replace it with the new version, LBX2 Gen 3.

For instructions on removing and replacing the LBX board and terminator, see the *Scalar i2000/i6000 Maintenance Manual*.

> **Note** Red stickers identify the LBX2 Gen 3 board required in the expansion modules added to a library configuration greater than eight modules.
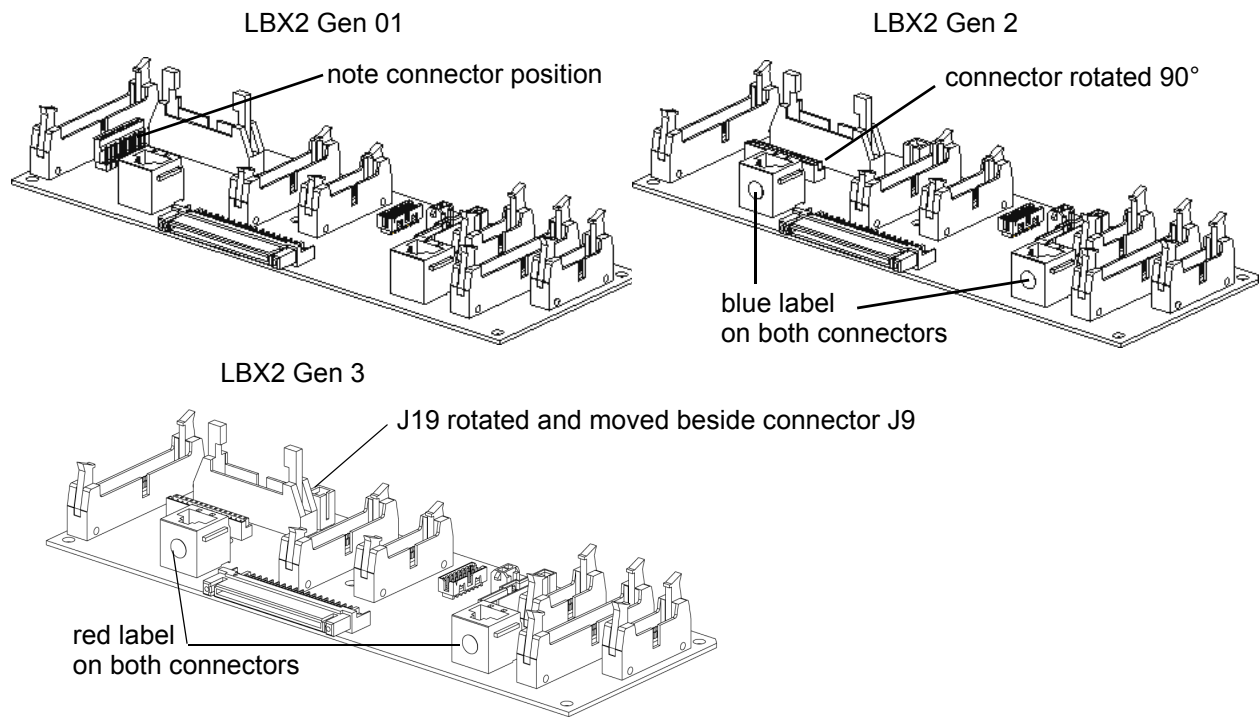
Figure 36   Comparison of LBX Board Versions

LBX2 Gen 01

note connector position
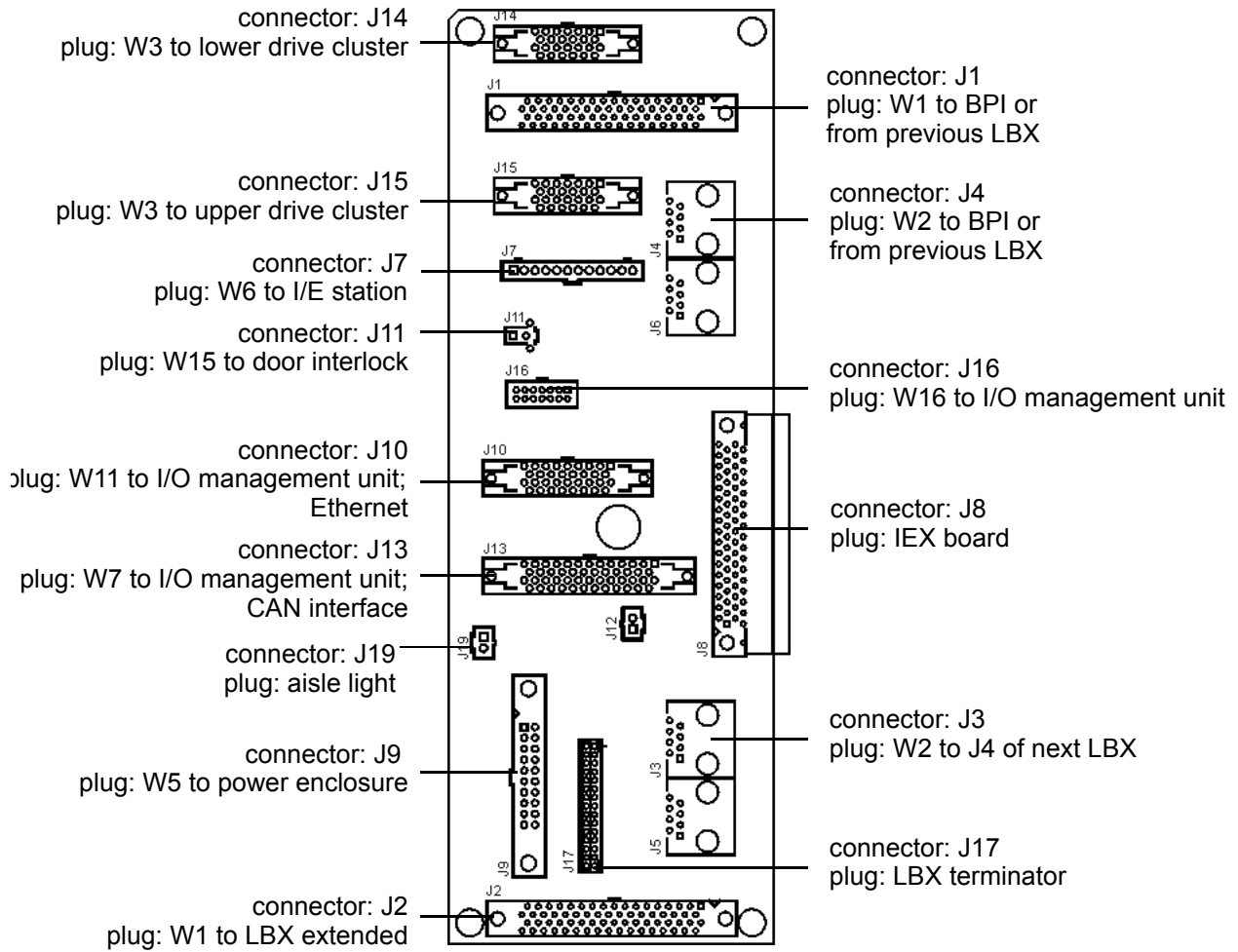
LBX2 Gen 2

connector rotated 90°

blue label
on both connectors

LBX2 Gen 3

J19 rotated and moved beside connector J9

red label
on both connectors

Figure 37 LBX Connections (LBX2 Gen 2)

connector: J14
plug: W3 to lower drive cluster

connector: J1
plug: W1 to BPI or
from previous LBX

connector: J15
plug: W3 to upper drive cluster

connector: J4
plug: W2 to BPI or
from previous LBX

connector: J7
plug: W6 to I/E station

connector: J11
plug: W15 to door interlock

connector: J16
plug: W16 to I/O management unit

connector: J10
plug: W11 to I/O management unit;
Ethernet

connector: J8
plug: IEX board

connector: J13
plug: W7 to I/O management unit;
CAN interface

connector: J19
plug: aisle light

connector: J9
plug: W5 to power enclosure

connector: J3
plug: W2 to J4 of next LBX

connector: J17
plug: LBX terminator

connector: J2
plug: W1 to LBX extended

Figure 38   LBX Connections (LBX2 Gen 3)

connector: J14
plug: W3 to lower drive cluster

connector: J1
plug: W1 to BPI or
from previous LBX

connector: J15
plug: W3 to upper drive cluster

connector: J4
plug: W2 to BPI or
from previous LBX

connector: J7
plug: W6 to I/E station

connector: J11
plug: W15 to door interlock

connector: J16
plug: W16 to I/O management unit

connector: J10
plug: W11 to I/O management unit;
Ethernet

connector: J8
plug: IEX board

connector: J13
plug: W7 to I/O management unit;
CAN interface

connector: J19

connector: J3
plug: W2 to J4 of next LBX

connector: J9
plug: W5 to power enclosure

connector: J17
plug: LBX terminator

connector: J2
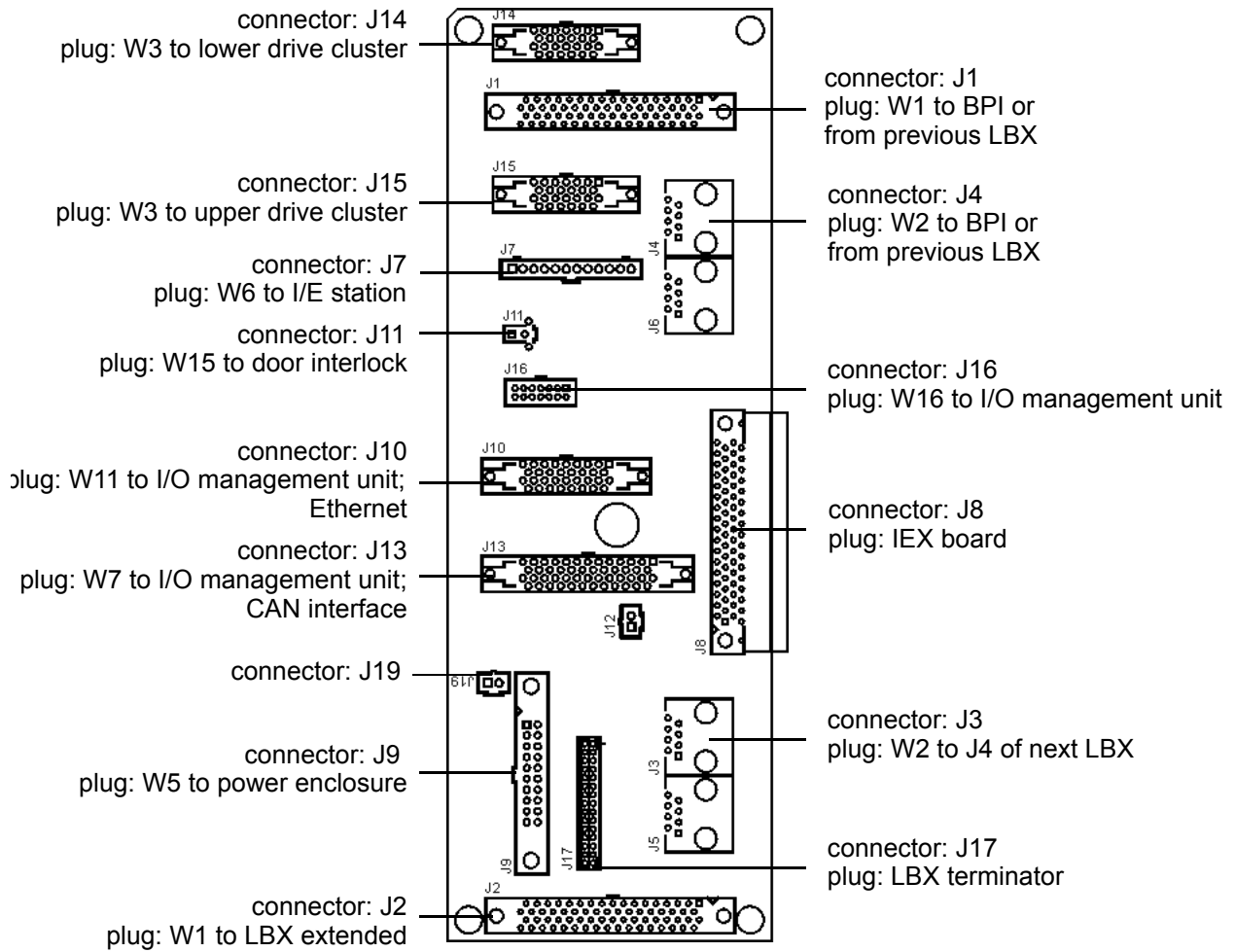plug: W1 to LBX extended

LBX Terminator

For information on the LBX board, see LBX Board on page 345. For information on interpreting the LBX terminator LEDs, see Interpreting LBX Terminator LEDs on page 362

📝 Note
- Any LBX board version LBX2 Gen 1 located in the last module in the library must be terminated using LBX terminator version 01 shown in Figure 39.
- Any LBX board version LBX2 Gen 2 located in the last module in the library must be terminated using LBX terminator version 03 shown in Figure 39.
- Any LBX board version LBX2 Gen 3 located in the last module in the library must be terminated using LBX terminator version 03 shown in Figure 39
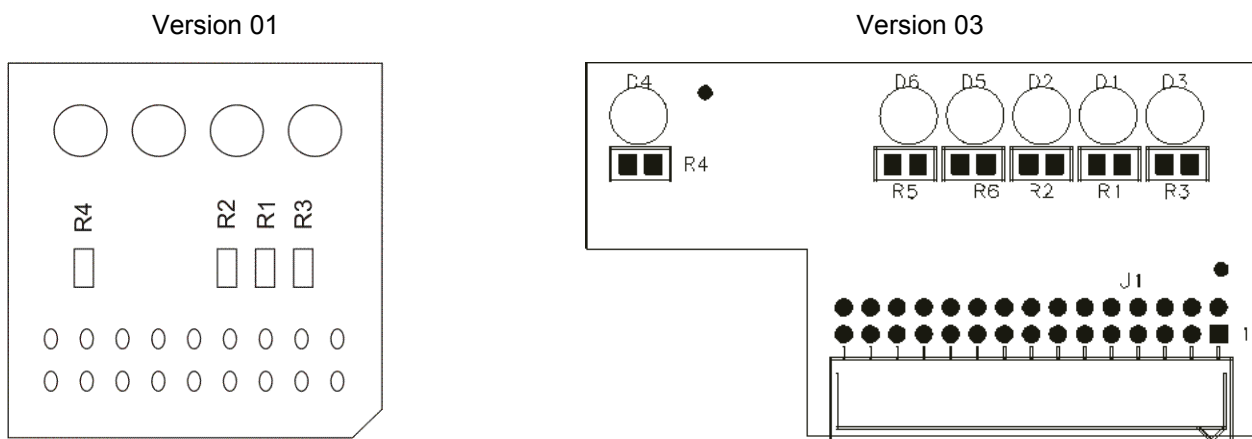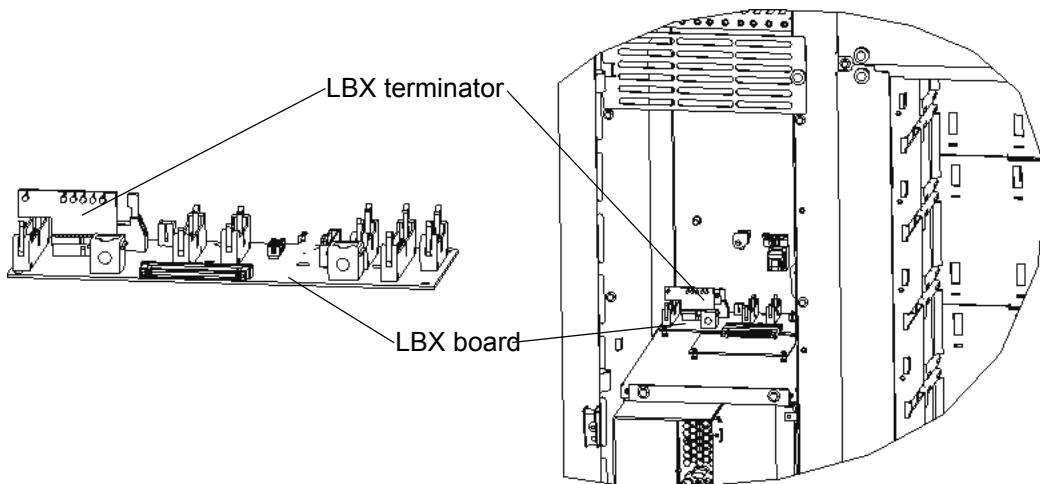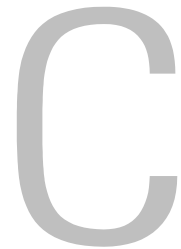
Figure 39   Comparison of LBX Terminator Versions

Figure 40   LBX Board and Terminator Installed

C

Interpreting LED Codes

Blade status and Fibre port link LEDs can provide you with useful information to help you assess the state of a library component. The primary library LEDs can be broken down into four groups based on behavior. LEDs can help you assess the state of a library component. The primary library LEDs can be grouped as follows:

Interpreting Blade Status LEDs

Each of the following library blades has a set of green, amber, and blue LEDs that indicate blade processor status, health status, and power control status:

- Management control blade (MCB)
- Control management blade (CMB)
- Fibre Channel (FC) I/O blade
- Robotics control unit (RCU)
- Library motor drive (LMD)

Figure 41 shows the locations and colors of the status LEDs of the five blades that can be in the library.

Figure 41   Locations and Colors of Blade Status LEDs
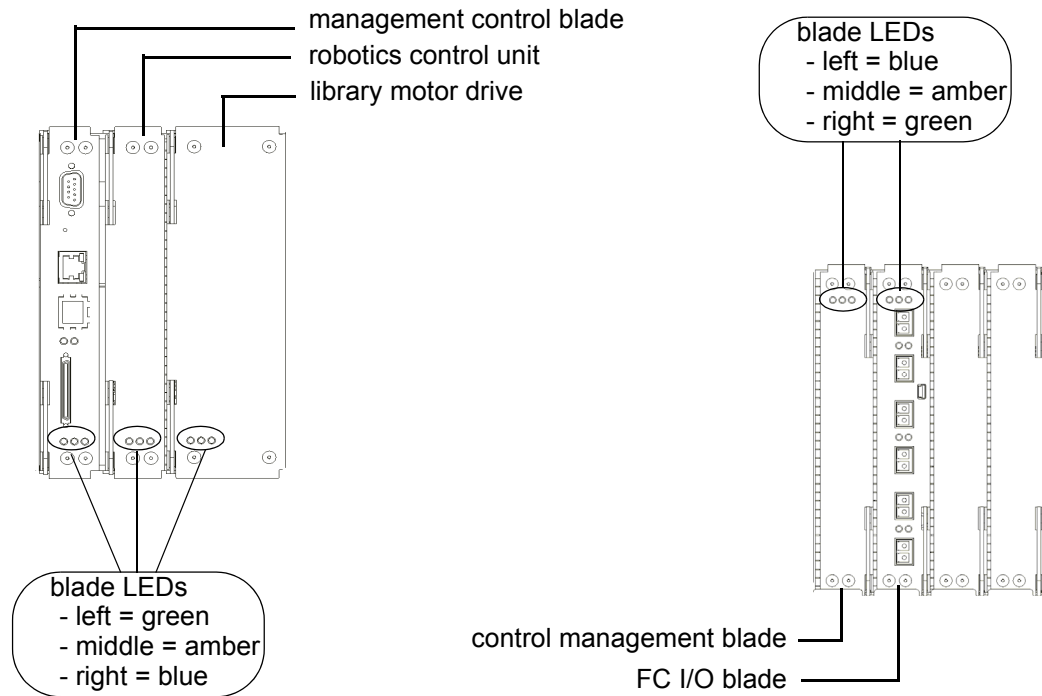
Blade status LEDs provide troubleshooting information that you can use in conjunction with tickets that the library creates. However, the LEDs might not directly correspond to tickets. The LEDs can indicate a firmware or hardware problem so severe that the library cannot create or display a ticket. For example, if the MCB firmware becomes inoperable, the amber LED flashes at 1 Hz, but the library might not be able to display any related tickets.

For a description of each LED color and what its state might mean, see Table 16. For a description of how the blade status LEDs appear under normal conditions, see Table 17.

Table 16   Explanations of Blade Status LED States

LED Color	Represents	Possible States and Explanations
Green	Processor status	• Solid off — blade's main processor is not operating (or blade is booting) • Solid on — blade's main processor is not operating (however, this does not apply to the LMD; solid on indicates that the LMD's main processor is operating normally) • Blinks one time every second (1 Hz) — blade's main processor is operating normally • Blinks 10 times every second (10 Hz) — identify mode • Solid on for three seconds, then blinks twice at 1 Hz, and then repeats — blade firmware is downloading

Table 16   Explanations of Blade Status LED States (Continued)

LED Color	Represents	Possible States and Explanations
Amber	Health status	• Solid off — blade's power and control subsystem is operating normally • Solid on — blade's power and control subsystem has failed Solid on also can mean that the blade's power and control subsystem firmware is autoleveling. In conjunction with the blue amber LED blinking one time every 10 seconds, this is a normal condition. Autoleveling takes about three minutes for each blade, and blades within an I/O management unit autolevel in series. It can take as long as three minutes for the power and control subsystem to download. Never remove a blade when the amber LED is solid on unless it has been on continuously for at least 10 minutes.
Blue	Power control status	• Solid off — blade is not receiving power • Solid on — blade is powered down; ready to be replaced (swap mode) • Blinks one time every 10 seconds (flash) — blade is powered on; operating normally

Table 17   Explanations of Blade Status LED States Under Normal Conditions

LED Color	State and Explanation
Green	Blinks one time every second (1 Hz) — blade's main processor is operating normally (however, this does not apply to the LMD; solid on indicates that the LMD's main process is operating normally)
Amber	Solid off — no errors are detected; blade's power and control subsystem is operating normally
Blue	Blinks one time every 10 seconds (flash) — blade is powered on; operating normally

Actions Based on LED States

When the RAS system is operating properly, service actions should be based on tickets first and foremost. However, some situations occur when the amber LED indicates problems that are not detected by the ticket system. You should always act on any amber LED that is solidly on, which indicates that the blade's power and control subsystem has failed. In this case, replace the blade.

When you replace a blade FRU or escalate a problem based on LED states, perform the following steps:

1   Observe and report the timing pattern of the blue, amber, and green LED group. Spend at least 30 seconds observing the LEDs and record the results in the service request (SR) and on any equipment failure report form that is returned with the part. Proper reporting of all LED states is critical for determining the root cause of the failure.

**2**   Capture a system snapshot and send it to technical support for analysis.

Interpreting Drive Status LEDs

The library reports all drive issues that can affect customer operations. In addition to examining library reports, you should observe drive sled link LED and status LED activity.

📝 **Note**   The blinking codes described in Table 18 on page 355 are the same for Fibre Channel and SCSI drives in the UDS-2 drive sleds.

Figure 42 shows the locations of the status LEDs and the Fibre Channel link LED on the rear of a UDS-2 drive sled.

Figure 42   Rear View of Fibre Channel Drive Sled (UDS-2)

fibre port

FC link LED

status LEDs:
- top = blue
- middle = amber
- bottom = green
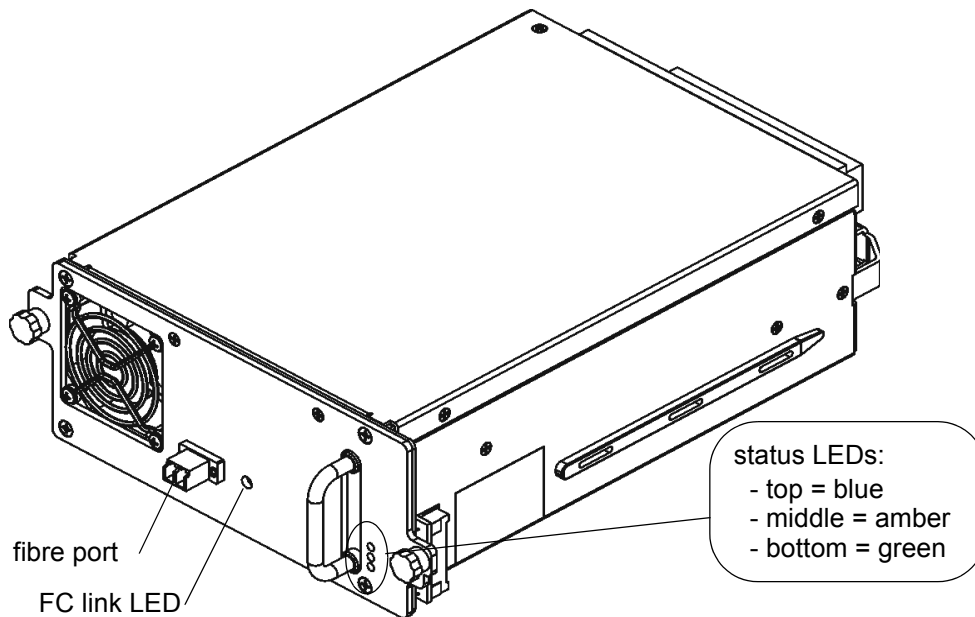
📝 **Note**   SDLT-600 Fibre drives do not have a Fibre Channel link LED.

Figure 43 shows the locations of the status LEDs and the Fibre Channel link LED on the rear of a UDS-3 drive sled.

Figure 43   Rear View of Fibre Channel Drive Sled (UDS-3 LTO-4 and LTO-5 Drives))
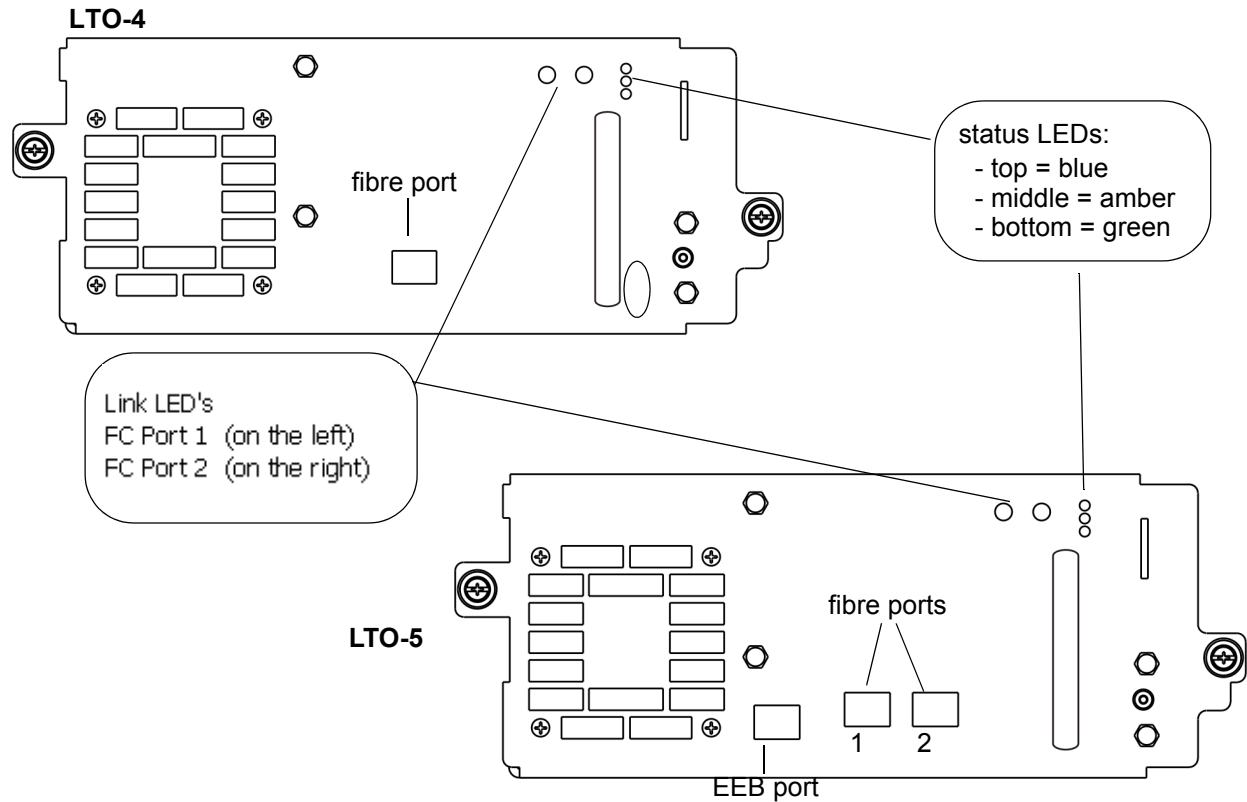

Table 18 describes how to interpret the drive sled status LED activity that you might see on the rear of a UDS-2 or UDS-3 drive sled. For a description of how the blade status LEDs appear under normal conditions, see Table 19 on page 356. For information about interpreting the drive link LED, see Drive Sled Fibre Channel Link LED on page 356.

Table 18   Explanations of Drive Sled Status LED States (UDS-2 and UDS-3)

LED Color	Represents	Possible States and Explanations
Green	Processor status	• Solid on / solid off — tape drive's main processor is not operating • Blinks one time every second (1 Hz) — drive sled's main processor is operating normally • Two quick blinks within 1.25 seconds; then on solid for 1.25 seconds; repeat — tape drive sled firmware is downloading • Three quick blinks within 1.25 seconds; then off for 1.25 seconds; repeat — tape drive is activating. • Ten blinks in 1.25 second; then off for 1.25 seconds; repeat — tape drive firmware is downloading • Ten blinks per second — identify mode
Amber	Health status	• Solid off — drive sled's controller (drive DC to DC converter [DDC]) is operating normally • Solid on — drive sled's DDC has failed

Table 18   Explanations of Drive Sled Status LED States (UDS-2 and UDS-3) (Continued)

LED Color	Represents	Possible States and Explanations
Blue	Power control status	• Solid off — drive sled is not receiving power • Solid on — drive brick is powered down; ready to be replaced (swap mode) or varied on • Blinks one time every 10 seconds (flash) — drive brick is powered on; operating normally

Table 19   Explanations of Drive Sled Status LED States Under Normal Conditions

LED Color	State and Explanation
Green	Blinks one time every second (1 Hz) — drive sled's main processor is operating normally. The green LEDs for all drive sleds that are operating normally blink together.
Amber	Solid off — no errors are detected; drive sled's controller is operating normally.
Blue	Blinks one time every 10 seconds (flash) — drive sled is powered on; operating normally.

Table 20   Explanations of Ethernet Port LED States

LED Color	Possible States and Explanations
Green	• Solid on — the link is up; data can be sent or received through the Ethernet port • Solid off — the link is not up; data cannot be sent or received through the Ethernet port
Amber	• Flashes at irregular intervals — data activity is occurring through the Ethernet port • Solid off — no data activity is occurring through the Ethernet port

Interpreting Fibre Port Link LEDs

A fibre port link LED shows the state of the Fibre Channel link and whether the link is ready to transmit commands.

Drive Sled Fibre Channel Link LED

The Fibre Channel link LED for a drive sled is located on the rear of the drive sled. Figure 42 on page 354 shows the location of the Fibre Channel link LED on the rear of the UDS-2 drive sled, and Figure 43 on page 355 shows the location of the Fibre Channel link LED on the rear of the UDS-3 drive sled.

📝 Note   SDLT-600 Fibre drives do not have a Fibre Channel link LED.

Table 21 describes how to interpret the Fibre Channel link LED activity that you might see on the rear of the UDS-2 drive sled. Table 22 on page 357 describes the Fibre Channel link LED activity on the rear of the UDS-3 drive sled.

Table 21   Explanations of Fibre Drive Sled Link LED States (UDS-2)

LED Color	Represents	State and Explanation
Green	LIP and activity	• Solid on — loop initialization protocol (LIP) has occurred. • Blinks at irregular intervals — host command/data activity is occurring.
Amber	Online and light detected	• Solid on — the library has enabled the drive data bus; it can detect light through a fiber optic cable.
No color		• Solid off — the drive brick is varied off or the drive cannot detect light through a fiber optic cable (equivalent to no fibre cable plugged in). If the drive brick is varied off, the blue status LED will be solid on.

Table 22   Explanations of Fibre Drive Sled Link LED States (UDS-3)

| LED Color	Represents	State and Explanation
Green	LIP and activity	• Solid on — loop initialization protocol (LIP) has occurred. • Blinks at irregular intervals — host command/data activity is occurring.
Amber	Online and light detected	• Solid on — the library has enabled the drive data bus; it can detect light through a fiber optic cable. • Blinks at regular intervals — the library has enabled the drive data bus, but light is not detected through the fiber optic cable.
No color		• Solid off — the library has not enabled the drive data bus or the drive brick is varied off. If the drive brick is varied off, the blue status LED will be solid on.

📝 Note   A UDS-2 drive with no fiber optic cable plugged in is healthy if the link LED is solid off. A UDS-3 drive with no fiber optic cable plugged in is healthy if the LED is amber and blinking at regular intervals, indicating that the library has enabled the drive data bus, but no light is detected.

FC I/O Blade Fibre Port Link LED

The link LED for an FC I/O blade fibre port is located next to the port. On the FC I/O blade faceplate, black lines indicate how each link LED belongs to a port. Figure 44 shows the locations of the I/O blade Fibre port link LEDs.

Figure 44   Locations and Colors of I/O Blade Fibre Port Link LEDs

FC I/O blade link LEDs
- left = green (belongs
  to port below)
- right = green (belongs
  to port above)
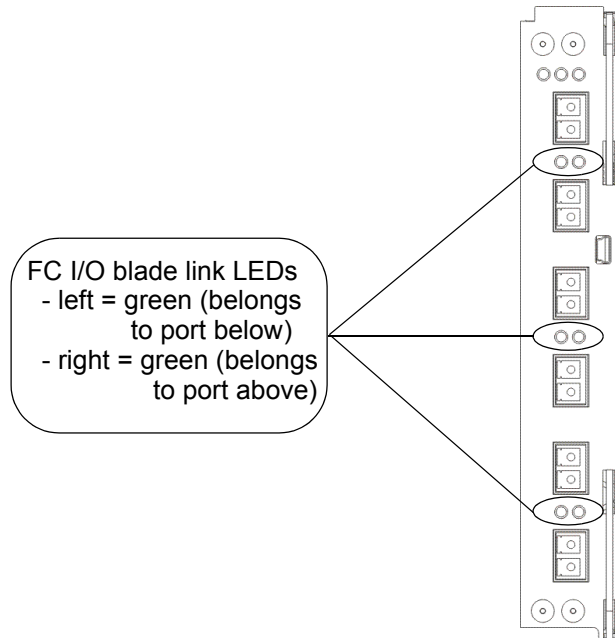
Table 23 describes how to interpret the link LED activity that you might see. There are two different models of I/O blade: 6404 and 7404. LED behavior varies based on which model is installed in the library.

Table 23   Explanations of I/O Blade Link LED States

Blade Model	Possible Green LED States and Explanations
6404	• Solid on — the I/O blade has established a proper link and is ready to use. The blade FC port detects light through the fiber optic cable. • Blinks slowly — the link is up and currently transporting commands. • Blinks rapidly — when the I/O blade is beginning to reboot or power up, all I/O blade link LEDs, along with the I/O blade's green status LED, blink rapidly to indicate that the blade is starting the Power On Self Test (POST). • Blinks with other link LEDs in a racetrack pattern — when all of the I/O blade link LEDs blink consecutively in a clockwise order, the blade is booting up. This pattern stops when the blade is powered and ready. If the pattern doesn't stop, the blade is unable to completely boot up. In this situation, follow the repair page instructions. • Solid off — the I/O blade does not detect light through the fiber optic cable.
7404	• Solid on — the I/O blade has established a link but is not currently transporting data. • Blinks — the link is active and is currently transporting data. • Solid off — the I/O blade has not established a link **OR** the link is active and is currently transporting a large amount of data.

✎ Note   For the 7404 I/O blade, fibre port LEDs are off while the blade is booting up.

Ethernet Expansion Blade LEDs

The status LEDs for an Ethernet Expansion blade are located at the top of the EEB above ETH 6. Figure 45 shows the locations of the I/O blade Fibre port link LEDs.

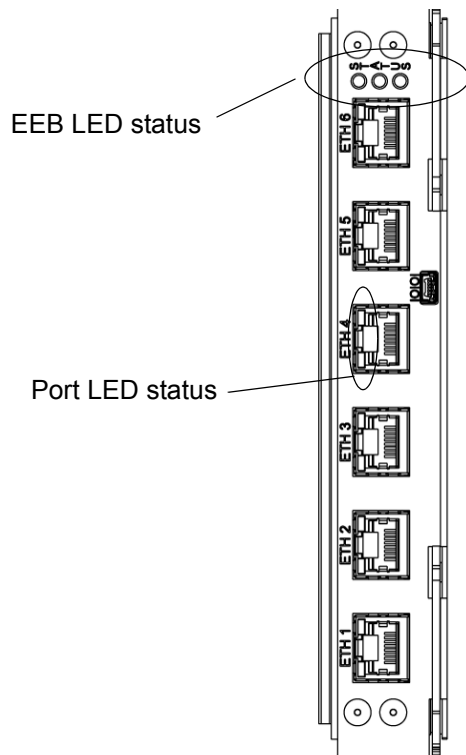**Figure 45** Location and Colors of Ethernet Expansion Blade Status LEDs

Table 24   Explanations of Ethernet Expansion Blade LED States

Blue	Green	Amber	Description
Off	Off	Off	No power
1 Hz	Off	Off	Powered Down - Ready for removal
Off	Off	On	Booting
Flash	1 Hz	Off	Normal
Flash	10 Hz	Off	Normal - Identify

Table 25   Explanations of EEB Ethernet Port LED States

LED Color	Possible States and Explanations
Green	• Solid on — the link is up; data can be sent or received through the Ethernet port • Solid off — the link is not up; data cannot be sent or received through the Ethernet port
Amber	• Flashes at irregular intervals — data activity is occurring through the Ethernet port • Solid off — no data activity is occurring through the Ethernet port

Interpreting MCB Port LEDs

The MCB has LEDs for the Ethernet, Fibre Channel, and SCSI ports.

MCB Ethernet Port LEDs

The LEDs on the MCB Ethernet port indicate status and activity. Figure 46 shows the locations and colors of the MCB Ethernet port LEDs.

Figure 46   Locations and Colors of MCB Ethernet Port LEDs

MCB Ethernet
port LEDs
  - top = green
  - bottom = amber
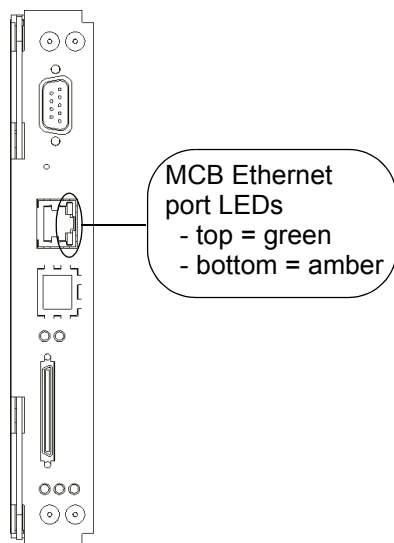
Table 26 describes how to interpret the Ethernet port LED activity that you might see.

Table 26   Explanations of MCB Ethernet Port LED States

LED Color	Possible States and Explanations
Green	• Solid on — the link is up; data can be sent or received through the Ethernet port • Solid off — the link is not up; data cannot be sent or received through the Ethernet port
Amber	• Flashes at irregular intervals — data activity is occurring through the Ethernet port • Solid off — no data activity is occurring through the Ethernet port

MCB Fibre Channel and SCSI Port LEDs

The LEDs for the MCB Fibre Channel and SCSI ports are shown below. Figure 47 shows the locations and colors of the LEDs.

Figure 47   Locations and Colors of MCB Fibre Channel and SCSI Port LEDs

MCB port LEDs
 - left = green (belongs to
         SCSI port below)
 - right = green (belongs
          to FC port above)
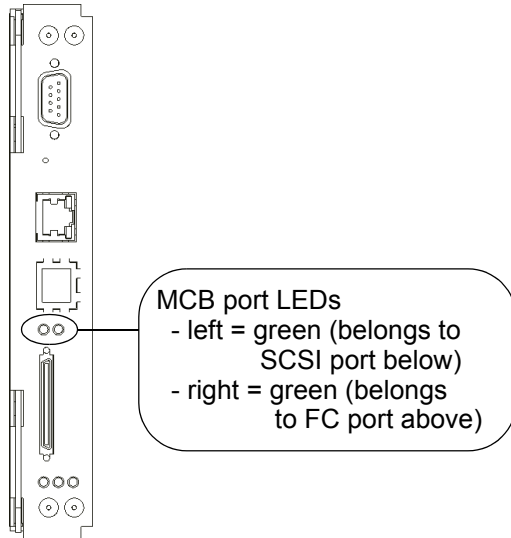
Interpreting LBX Terminator LEDs

The LBX terminator has two versions. Version 01 has four LEDs and Version 03 has six LEDs. For more information, see LBX Board and Terminator on page 345.

LBX Terminator Version 01 LEDs

The LBX terminator has four green LEDs that indicate the presence of modules in the library. Figure 48 shows the locations of the LEDs. Table 27 describes how to interpret LED activity on the LBX terminator.

The terminator must be located in the LBX of the last expansion module. The LED status should reflect the physical installed module count of the system.

Figure 48   Locations of LBX Terminator LEDs (Version 01)
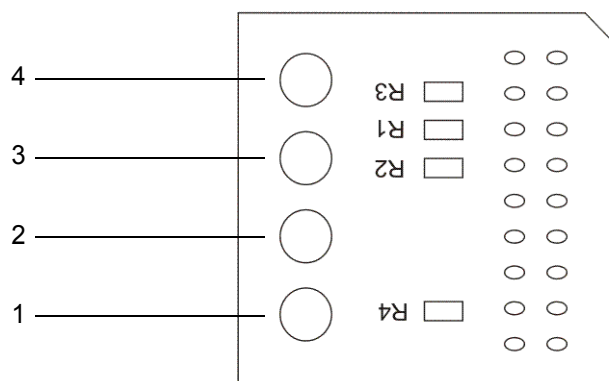
Table 27   Explanations of LBX Terminator LED States (Version 01)

| LED On/Off Combinations				Explanation
1	2	3	4	
Off	Off	Off	Off	Robotics are disabled, the access door is open, or the LBX terminator is misaligned.
On	Off	Off	Off	The library has one control module and no expansion modules.
On	On	Off	Off	The library has one control module and one expansion module.
On	On	On	Off	The library has one control module and two expansion modules.
On	On	On	On	The library has one control module and three expansion modules.
On	Off	On	On	The library has one control module and four expansion modules.
On	On	Off	On	The library has one control module and five expansion modules.
On	Off	On	Off	The library has one control module and six expansion modules.
On	Off	Off	On	The library has one control module and seven expansion modules.

LBX Terminator Version 03 LEDs

The LBX terminator version 03 has six green LEDs that indicate the presence of modules in the library. Figure 49 shows the locations of the LEDs. Table 28 describes how to interpret LED activity on the LBX terminator.

Figure 49 Locations of LBX Terminator LEDs (Version 03)
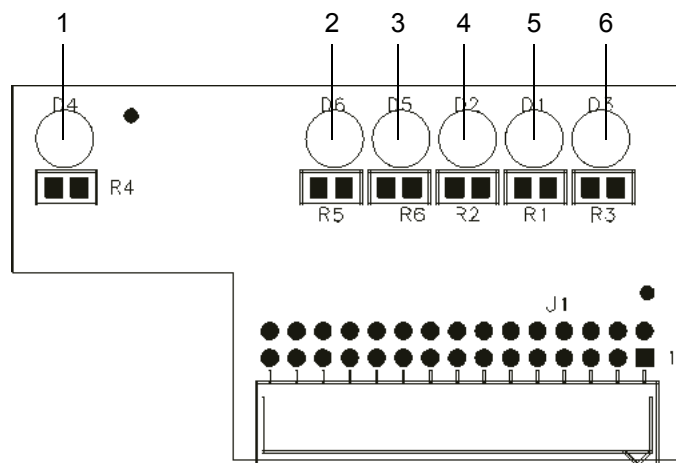
Table 28 Explanations of LBX Terminator LED States (Version 03)

LED On/Off Combinations						Explanation
1	2	3	4	5	6	
Off	Off	Off	Off	Off	Off	Robotics are disabled, the access door is open, or the LBX terminator is misaligned.
On	Off	Off	Off	Off	Off	The library has one control module and no expansion modules.
On	Off	Off	On	Off	Off	The library has one control module and one expansion module.
On	Off	Off	On	On	Off	The library has one control module and two expansion modules.
On	Off	Off	On	On	On	The library has one control module and three expansion modules.
On	Off	Off	Off	On	On	The library has one control module and four expansion modules.
On	Off	Off	On	Off	On	The library has one control module and five expansion modules.
On	Off	Off	Off	On	Off	The library has one control module and six expansion modules.
On	Off	Off	Off	Off	On	The library has one control module and seven expansion modules.
On	On	Off	Off	Off	Off	The library has one control module and eight expansion modules.
On	On	Off	On	Off	Off	The library has one control module and nine expansion modules.
On	On	Off	On	On	Off	The library has one control module and ten expansion modules.
On	On	Off	On	On	On	The library has one control module and eleven expansion modules.

Interpreting Power Supply LEDs

Power supply problems are reported in tickets. To physically identify a power supply, note the power supply number and module number in the ticket details. Modules can have up to two power supplies each. The top supply is #1 and the bottom supply is #2.

> 📝 **Note**   The library can be physically configured to include up to eleven expansion modules. The first seven expansion modules can contain power supplies if drives are present.

Figure 50 shows the locations and colors of the power supply LEDs.

Figure 50   Locations and Colors of Power Supply LEDs

power supply LEDs
 - top (AC OK) = green
 - middle (DC OK) = green
 - bottom (FAULT) = blue
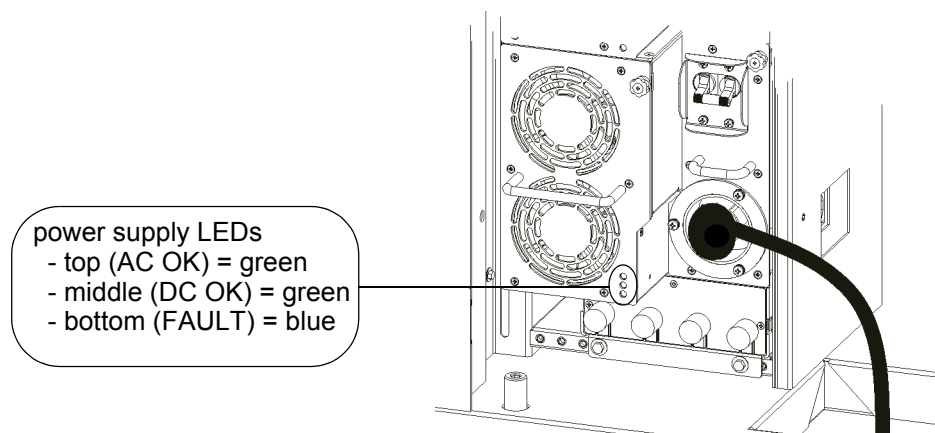
Table 29 describes how to interpret LED activity that you might see.

Table 29   Explanations of Power Supply LED States

LED Color	Represents	Possible States and Explanations
Green (top LED)	AC OK	• Solid on — power supply's AC input is above minimum requirements to operate • Solid off — power supply's AC input is below minimum requirements to operate
Green (middle LED)	DC OK	• Solid on — power supply's output voltage is within specifications • Solid off — power supply's output voltage is outside of specifications

Blue (bottom LED)	Fault	• Solid on — indicates any of the following conditions:
		  •Power supply output is outside of specifications
		  •Current limit has been exceeded
		  •Temperature limit has been exceeded
		  •Fan failed while AC input is present and above minimum operating voltage
		  •AC input is below minimum operating voltage
		  •PDU is on, but the **Power** button on the library's indicator panel is off
		• Solid off — no faults are detected

D

Glossary

This glossary consists of terms unique to the library along with some storage industry terminology.

Access door
Refers to the doors on either the control module or expansion module from which you can access the magazines and accessor assembly.

Capacity on demand (COD)
A Scalar library feature that enables users to have a large physical library, but users pay only for what capacity they are currently using. License upgrades enable more capacity to be added without a system interruption.

Control management blade (CMB)
A version of the MCB that has no I/O ports for Ethernet, SCSI, serial, or Fibre Channel. It is the controller board for the I/O management unit.

Control module
The first module of the library. It consists of an library management module, cartridges, drives, power, and an I/E station.

Data path
One of the many possible paths that data can move over in the storage area network environment, potentially involving many components or connections between initiators and targets that have been set since the initial configuration occurred.

Drive pooling
Drives to be held in a pool (or pools) of drives. You can specify policy settings for the drive pools to configure how each pool will react to a drive failure and load balancing.

Drive sled position
A slot where a Fibre Channel or SCSI drives reside in the control module or expansion module in one of the two drive clusters. There are six drive sled positions in each of the two drive clusters.

Encryption Key Management (EKM)
A generic term used to encompass any encryption key management solution.

(EEB)
Provides Ethernet connectivity to 6 Ethernet drives. This connectivity is to the library's internal Ethernet and should not be connected to an external Ethernet source.

Expansion module
Expansion modules enlarge the library configuration by adding modules for additional media storage. You can add up eleven expansion modules to a library configuration. The first seven expansion modules may contain optional hardware, such as additional drives, I/O blades, and I/E stations.

I/E station
A door on the access door of the control module (or expansion modules) that contains magazines into which cartridges can be imported into or exported out of the library.

All single door I/E stations are numbered starting with 1 at the control module. All double door I/E stations are numbered with a number and a letter—for example 2A and 2B—the module number (1–8), with A as the left I/E station and B the right.

I/O management unit
A management and connectivity interface for the library. The control module and first seven expansion modules can have I/O management units installed. The I/O management unit may contain a CMB, FC I/O blades and Ethernet Expansion blades.

Latchhook
The latches used to lock the printed circuit blades into place when they are inserted into the I/O management unit or library management module (LMM).

Library Management Console (LMC)
The management software client for the library. You can use the LMC either locally from the touch screen operator panel on the control module or remotely through a web browser running a Java applet.

Library management module (LMM)
The connectivity interface for the three blades that provide intelligence and connectivity to the library through the control module. The management control blade (MCB), robotics control unit (RCU), and library motor drive (LMD) blades are installed in the LMM.

Library management partition (LMP)
Partition in the i6000 that is like any other partition, except it is not visible to any backup applications or hosts. Allows the library to be able to manage the partition, rather than the backup application managing the partition. Use the LMP partition as a workspace for library to do value-added features outside environment—like MeDIA (automated data integrity checking routine).

Linear Tape-Open (LTO)
A media technology that is open format. LTO comes in two formats, Accelis and Ultrium. Accelis is the fast access implementation, while Ultrium is the high capacity implementation.

Management control blade (MCB)
The library controller board, which resides in the LMM. The MCB has I/O ports for Fibre Channel, Ethernet, serial, and SCSI.

Partition
A partition is 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 applications.

Picker
The robotic hand portion of the accessor assembly that handles cartridges.

Quantum Encryption Key Manager (Q-EKM)
Quantum's encryption key management solution that supports IBM LTO-4 and LTO-5 FC tape drives.

Scalar Key Manager (SKM)
Quantum's encryption key management solutions that supports HP LTO-4 and LTO-5 FC tape drives.

Service door
The door on either the control module or expansion module that provides access to the I/O management unit, LMM, power supplies, drive sleds and other components.

Storage area network (SAN)
A SAN is a dedicated, high-performance network whose primary purpose is the transfer of data along FC or high-speed Ethernet connections between servers, interconnect devices, and storage peripherals.

Storage networking (SNW)
A licensable feature that allows you to take advantage of the control path failover and host access configuration features of 8 Gbps/LTO-5 tape drives, without those drives being connected to a 4 Gbps/Fibre Channel I/O blade.

Universal drive sled (UDS)
A sheet metal case that houses LTO or SDLT drives in the drive clusters.

WORM
The Scalar i6000 library supports write once, read many technology in LTO-3 and greater tape drives. WORM allows non-erasable date to be written once and provides extra data security by prohibiting accidental data erasure.

X-axis
The horizontal position of the accessor assembly.

Y-axis
The vertical position of the accessor assembly.

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