Q40™ Tape Library

Installation and Operations Manual

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Revision History

Date	Issue	Revision	Author	Description of changes
2018-08-01	Initial release	01	Kevin Yi	
2019-07-01		07-01-19	Kevin Yi	Address updated

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Product warranty caution

The Q40 Tape Library contains no user-serviceable components. Only an authorized service center should carry out any servicing or repairs. The warranty for the tape library shall not apply to failures of any unit when:

- Any of the tape library components is repaired or modified by anyone other than Qualstar's personnel or approved agent. **Note**: Certain components of the Q40 Tape Library, are identified in this manual as 'field replaceable'. These include the power supply, tape drives, library controller and magazines. User replacement of such complete components with corresponding parts supplied by Qualstar does not affect warranty, provided the user strictly adheres to the instructions herein.
- The tape library is physically abused, or used in a manner that is inconsistent with the operating instructions or product specification defined by Qualstar.
- The tape library fails because of accident, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, modification, or service by anyone other than the factory service center or its approved agent.
- The tape library is repaired by anyone, including an approved agent, in a manner that is contrary to the maintenance or installation instructions supplied by Qualstar.
- The manufacturer's serial number tag is removed.
- The tape library is damaged because of improper packaging on return.

In case of unauthorized repairs or modifications, your warranty becomes immediately void.

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1 Introduction

Document Purpose

This manual provides information about installing, operating, troubleshooting and servicing a Qualstar Q40 Tape Library. It is intended for system administrators and general users who need physical and functional knowledge of the Q40 Tape Library.

The main components are

Base library: 800-0016-9

Expansion module: 800-0017-7

This document uses the reference Q40 to refer to the Q40 Tape Library.

1.1 General Warnings

Document Conventions:

	**WARNING**	Indicates that failure to follow directions could result in bodily harm or death.
	**CAUTION**	Indicates that failure to follow directions could result in damage to equipment or data.
!	**IMPORTANT**	Provides clarifying information or specific instructions.
	**NOTE**	Provides additional information.
	**TIP**	Provides helpful hints and shortcuts.

1.2 General Product Warnings:

	**DANGER**	**High voltage** **Risk of electric shock** • Do not remove covers (top, bottom or rear). No user-serviceable parts are inside. • Refer servicing to qualified service personnel.

MECHANICAL HAZARD

Danger

- Risk of hand pinching, can trap hands, fingers and cause serious injury. Keep hands clear during operation.

WARNING

Product Weight

Risk of personal injury

Before lifting a library:

- Observe local health and safety requirements and guidelines for manual material handling.
- Remove all tapes to reduce the weight.
- Remove all tape drives to reduce the weight.
- Obtain adequate assistance to lift and stabilize the library during installation or removal.

Risk of damage to devices

When placing a library into or removing the library from a rack:

- Extend the rack's levelling jacks to the floor.
- Ensure that the full weight of the rack rests on the levelling jacks.
- Install stabilizing feet on the rack.
- Extend only one rack component at a time.

CAUTION

Static Sensitive

Risk of damage to devices

- A discharge of static electricity damages static-sensitive devices or micro circuitry.
- Proper packaging and grounding techniques are necessary precautions to prevent damage.

NOTE

- Ventilation – Place the product in a location that does not interfere with proper ventilation.
- Heat – Place the product in a location away from heat sources.
- Power sources – Connect the product to a power source only of the type directed in the operating instructions or as marked on the product.
- Power cord protection – Place the AC line cord so that it is not possible to be walked on or pinched by items placed upon or against it.
- Object and liquid entry – Insure that objects do not fall onto and that liquids are not spilled into the product's enclosure.

WARNING

Only trained personnel should operate this equipment. Read all documentation and procedures before installation or operation. This product is intended for installation and operation in a computer rack with the front and rear doors closed and secured. Only personnel with technical and product safety training should be provided access to the library. Such personnel are referred to as users throughout this document. Do not insert any tools or any part of your body into openings of an operating system.

2 Product Overview

The Qualstar Q40 is a 3U highly scalable library system. The Q40 is expandable, allowing a user to grow their tape storage capacity as their data requirements increase.

All Q40 installations begin with the 3U Base Module, with capacity for 32 tape cartridges and 3 half-height LTO tape drives.

Each Expansion Module provides an additional 40 tape cartridges and supports an additional 3 half-height LTO tape drives.

Up to 6 Expansion Modules can be added to a Base Module, bringing the total library capacity to 272 tape cartridges and 21 half-height LTO tape drives.

2.1 Supported Library Configurations – Rackmount Installation

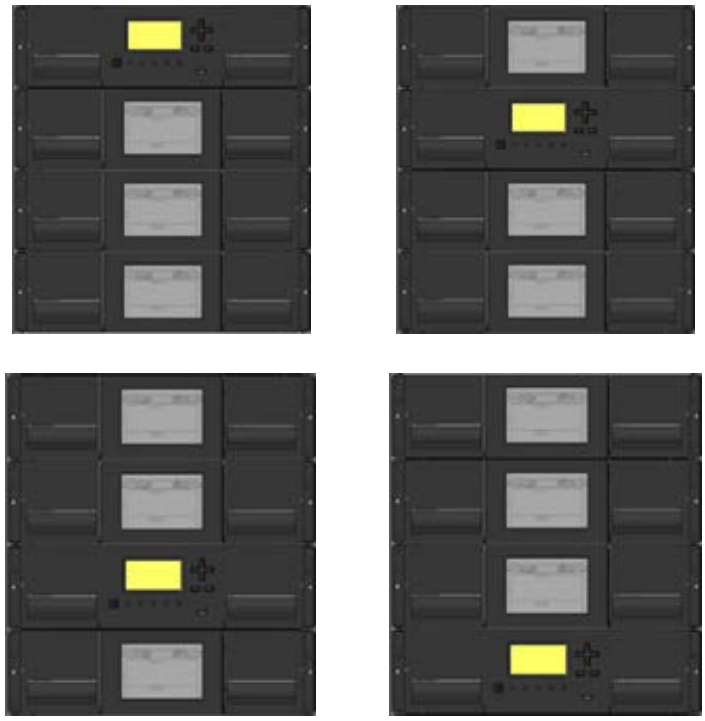
All Q40 Libraries start with a Base Module. Up to 6 Expansion Modules can be added as needed to support customer requirements. The architecture has been designed to support a maximum of 3 Expansion Modules above and 3 Expansion Modules below. The Base Module must be mounted with 9U of empty space above and 9U of empty space below to ensure a full stack can be installed. Table 1 shows the supported configurations for libraries ranging from one to seven total modules.

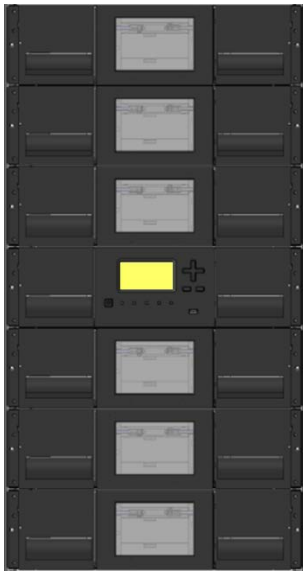
The Base Module is depicted by the following image with the Operator Control Panel shown in yellow:

Each Expansion Module is represented by the following image with a large clear viewing window in the center.

Table 1: Supported Library Configurations

Module Quantity	Supported Library Configurations
1 Module Library Base Module	

Module Quantity	Supported Library Configurations
2 Module Library Base Module 1 Expansion Module	
3 Module Library Base Module 2 Expansion Modules	
4 Module Library **Base Module** **3 Expansion Modules**	

Module Quantity	Supported Library Configurations
5 Module Library **Base Module** **4 Expansion Modules**	
6 Module Library **Base Module** **5 Expansion Modules**	
7 Module Library **Base Module** **6 Expansion Modules**	

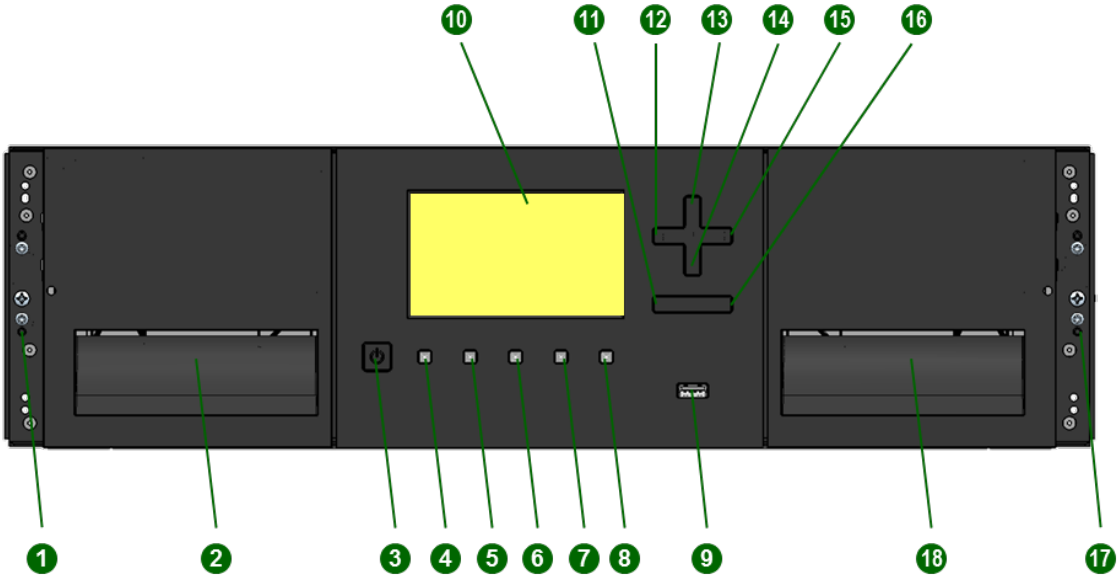
2.2 Supported Tape Drives

The Q40 was developed to integrate industry-standard LTO Ultrium tape drives. Mixed drive generations and mixed interfaces are supported within a single library and within a single module.
Listed below in Table 2 are the tape drives that have been tested and implemented in the Q40.

Table 2: Supported Tape Drives

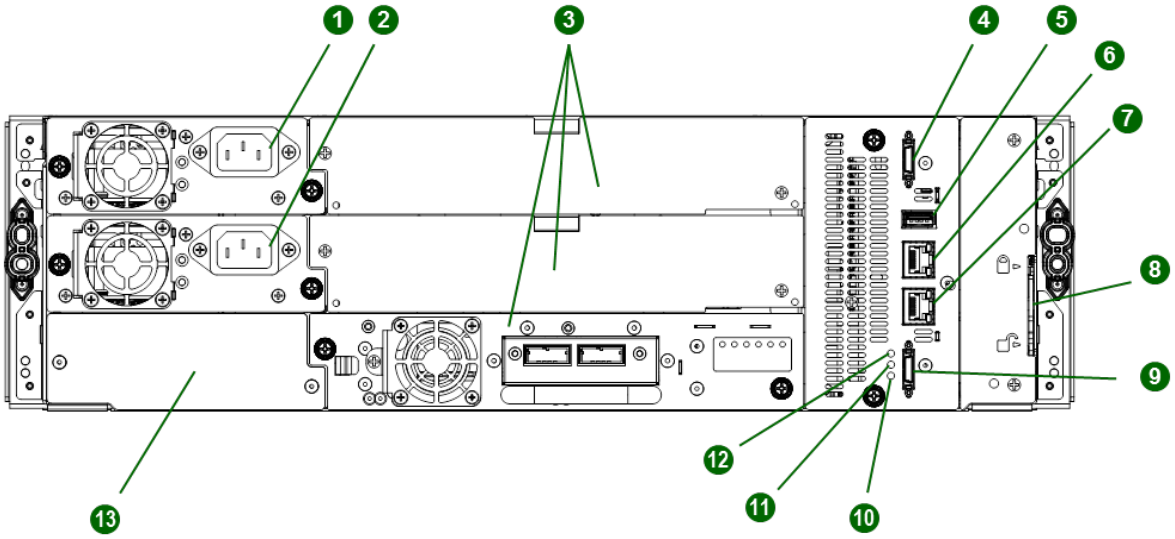
LTO Drives
LTO-6 Half-Height FC Single Port LTO-6 Half-Height FC Dual Port
LTO-6 Half-Height SAS Dual Port
LTO-7 Half-Height FC Single Port LTO-7 Half-Height FC Dual Port
LTO-7 Half-Height SAS Dual Port
LTO-8 Half-Height FC Single Port LTO-8 Half-Height FC Dual Port
LTO-8 Half-Height SAS Dual Port

2.3 Front Panel



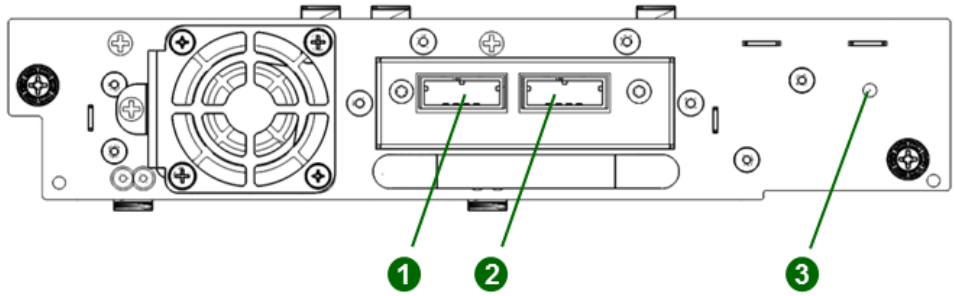
1	Left Magazine Emergency Release Access Hole	
2	Left Magazine Access Handle	
3	Power Button	Base Module Only
4	Unit Identification LED, Blue	Base Module Only
5	Ready LED, Green	Base Module Only
6	Clean LED, Amber	Base Module Only
7	Attention LED, Amber	Base Module Only
8	Error LED, Amber	Base Module Only
9	USB Port	Base Module Only
10	Operator Control Panel (OCP) Display	Base Module Only
11	Back/Return Button	Base Module Only
12	Navigation Button - Left	Base Module Only
13	Navigation Button – Up	Base Module Only
14	Navigation Button – Down	Base Module Only
15	Navigation Button – Right	Base Module Only
16	Enter Button	Base Module Only
17	Mailslot/Right Magazine Access Handle	
18	Right Magazine Emergency Release Access Hole	

2.4 Rear Panel



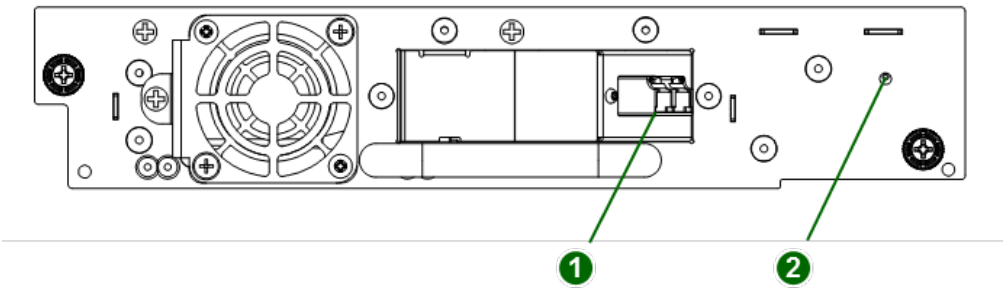
1	Power Supply 1	Standard on Base Module Optional on Expansion Module
2	Power Supply 2	Optional on Base Module Optional on Expansion Module
3	Half-Height Tape Drive Bays	
4	Upper Expansion Module Connection Port	
5	USB Port	Optional on Base Module Only
6	Ethernet Port A	Base Module Only
7	Ethernet Port B	Optional on Base Module Only
8	Module Alignment Mechanism	
9	Lower Expansion Module Connection Port	
10	Unit Identifier LED, Blue	
11	Controller Error LED, Yellow	
12	Controller Health Status LED, Green	
13	Product Serial Number Tag Location	

2.5 LTO-6/7/8 HH SAS Dual Port



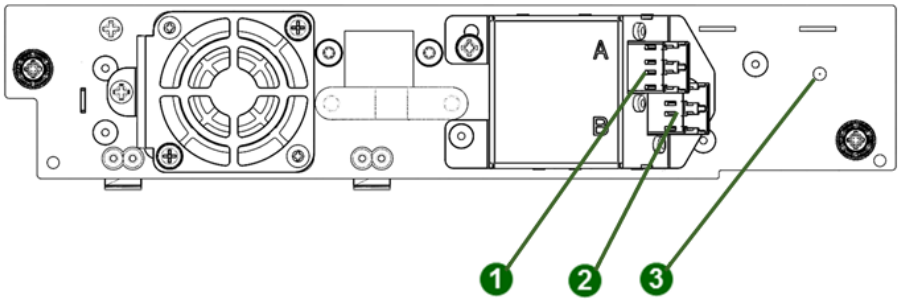
1	SAS Port A
2	SAS Port B
3	Tape Drive Power LED, Green

2.6 LTO-6/7/8 HH FC Single Port



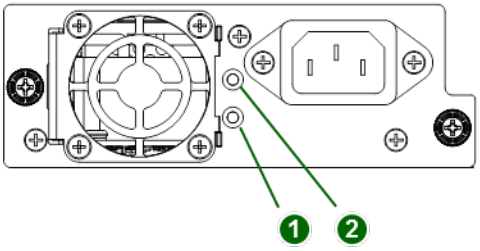
1	FC Port A
2	Tape Drive Power LED, Green

2.7 LTO-6/7/8 HH FC Dual Port



1	FC Port A
2	FC Port B
3	Tape Drive Power LED, Green

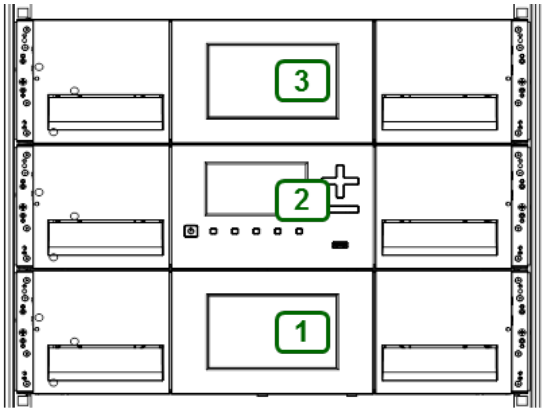
2.8 Power Supply Rear Panel LEDs

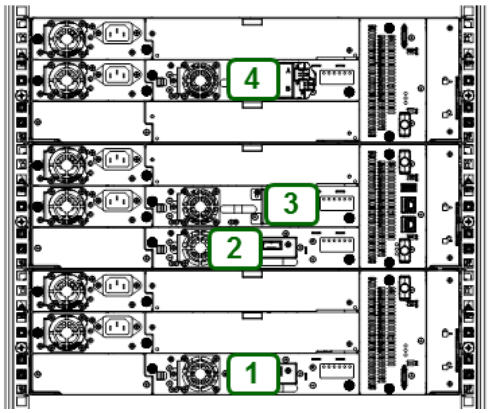


1	White	AC power connected, but Module Powered Off
2	Green	Module Powered On

2.9 Element Numbering

The library will generally display logical element numbering of modules, storage slots and tape drives starting with number one from the bottom up.





3 Installing the Library

3.1 Planning Installation

- Choose a location for the library. See "**Location Requirements**".
- Plan the SAS or Fibre Channel configuration and obtain the necessary cables. See **"SAS Configuration Requirements"** or "**Fibre Channel Configuration Requirements**".
- Plan the rack layout. See "**Planning the Module and Rack Layout**".
- Internal IP Range Selection

3.2 Location Requirements

NOTE

- The library was designed for rack installation.
- Rack installations must use the provided rack rails.
- Select a location with access to the host server.
- Choose a location that meets the criteria in the table below.

Table 3: Location Requirements

Criteria	Definition
Rack Requirements	Standard 19-inch rack (minimum depth of 1 meter) with an appropriate # of U's (Rack Units) of clearance for the planned module quantity
Rack Space Requirements	3U for the Base Module and 3U for each Expansion Module
Room Temperature	10-35º C (50-95º F)
Power Source	◆ AC Power Voltage: 100-240 VAC ◆ Line Frequency: 50-60 Hz ◆ Library Located near AC Outlet(s) The AC power cord is the library's main AC disconnect device and must be easily accessible at all times.
Air Quality	◆ Place the library in an area with minimal sources of particulate contamination ◆ Avoid areas near frequently used doors and walkways, stacks of supplies that collect dust, printers, and smoke-filled rooms ◆ Excessive dust and debris can damage tapes and tape drive
Humidity	20-80 percent RH non-condensing

3.3 SAS Configuration Requirements

Serial Attached SCSI (SAS) is a computer bus technology mainly used to transfer data to and from storage devices, including disk drives and tape drives. SAS is designed to transfer data at up to 6 Gbps. SAS uses serial connections, with a direct connection between the host server and each of the storage devices. This eliminates the need to configure SCSI busses and assign SCSI IDs, as is required for parallel SCSI devices.

The host server must have a SAS **H**ost **B**us **A**dapter (HBA) with an external connector. The HBA uses multiple **L**ogical **U**nit **N**umbers (LUNs) to communicate with the library. Verify that your HBA supports multiple LUNs. Please note, most RAID controllers do not have multiple LUNs support. Most SAS HBA ports have four SAS channels. A tape drive uses one channel, so each HBA port can support up to four tape drives. You can use a cable with one connector on each end, or a fan-out cable, which has one connector on one end and up to four connectors on the opposite end. Supported speeds by drive generation are shown in the table below.

Table 4: Supported SAS Speeds

LTO Generation	Supported Speeds
LTO-6	1.5 Gbps, 3 Gbps, 6 Gbps
LTO-7	1.5 Gbps, 3 Gbps, 6 Gbps
LTO-8	1.5 Gbps, 3 Gbps, 6 Gbps

CAUTION

High quality SAS cables rated at the transfer rate of the SAS drives are required. Always verify that the SAS cable you are using is rated for the data transfer speed of the interface of your components. SAS cables described as "equalized" may not support 6 Gb/s data rates and should not be used with LTO-6 or later generation tape drives unless these cables are verified for 6 Gb/s data rates.

CAUTION

The library has one or more mini-SAS connectors on each SAS tape drive. Mini-SAS connectors are keyed. Do not force a SAS cable's mini-SAS connector into the tape drive as it might be keyed differently.

A SAS tape drive is identified by a unique identifier called a World Wide Name (WWN) or World Wide Identifier (WWID). The library assigns the WWID to the drive bay. When a tape drive is replaced, the WWID is re-assigned to the new tape drive.

The operating system tracks the WWID for the tape drive on each HBA channel. Each of the drive connectors on the fan-out cable is associated with an HBA channel. Once a tape drive has been plugged in, it should remain on the same channel to retain the association between the HBA channel and WWID.

3.4 Fibre Channel Configuration Requirements

The Fibre channel tape drive can be connected directly to the server with a host bus adapter (HBA) or through a storage area network (SAN).

The installation requires one Fibre Channel cable for each tape drive. The tape drives all utilize an LC-style connector. Some drives will have two FC ports, but only one cable connection is needed per drive. The cable can be connected to either drive FC port.

Supported speeds by drive generation are listed in the table below.

Table 5: Supported Fibre Channel Speeds

LTO Generation	Supported Speeds
LTO-6	2 Gbps, 4 Gbps, 8 Gbps
LTO-7	2 Gbps, 4 Gbps, 8 Gbps
LTO-8	2 Gbps, 4 Gbps, 8 Gbps

NOTE

- Use an appropriate HBA for your tape drive to match performance requirements.
- A lower Gbps HBA might result in performance degradation when moving highly compressible data to a higher Gb tape drive.
- In a SAN installation, all switches between the host and the library must be of the appropriate type.
- A lower Gb switch in the path may result in performance degradation. Configure zoning so only the backup servers may access the library.

3.5 Planning Module and Rack Layout

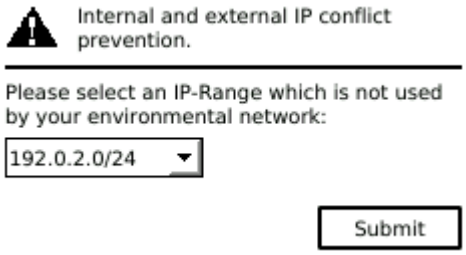
If possible, install the Base Module in the middle of the rack to provide space for the permitted 3 Expansion Modules above and 3 Expansion Modules below. See *Table 1:* ***Supported Library Configurations*** for additional details.

3.6 Internal IP Range Selection

For internal communication between modules the tape library uses an Ethernet connection with an internal IP address range. To prevent any conflict between the internal IP address range and the external IP addresses it is required to select the internal IP range before the tape library gets connected to the external Ethernet port.

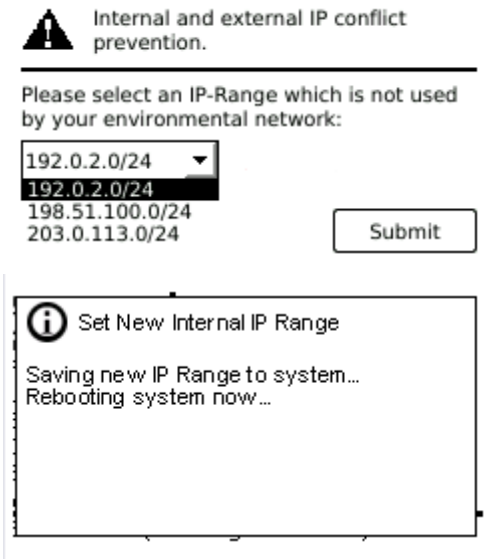
Therefore, a file which contains the internal IP range is stored onto the Base Module backplane: **/opt/storage/mfg/stack/network.range and LCM /opt/storage/configuration/network.range**

The Values must be in the following format: **RANGE=192.0.2**



Please note: the last section of the IP address is not set because it will be set internally.

The file will be created through the Operator Control Panel (OCP) IP Range selection page when the Stack starts for the very first time or if the unit was reset to Manufacturing Defaults / Reset via OCP or Remote Management Interface (RMI).



3.7 Host Preparation

CAUTION

Static Sensitive

Risk of damage to devices

- A discharge of static electricity damages static-sensitive devices or micro circuitry.
- Proper packaging and grounding techniques are necessary precautions to prevent damage.

Follow these general guidelines:

- Check with a system administrator before powering off the host computer.
- For a SAS library, confirm availability or install a SAS HBA that supports multiple LUNs.
- For a direct-attach Fibre Channel library, confirm availability of install an FC HBA.
- For connection of a Fibre Channel library through a compatible switch, verify that sufficient ports are available.

3.8 Installation Precautions

WARNING

Product Weight

Each Q40 module weighs more than 20 kg (44 lbs) without drives or tapes and more than 35 kg (77 lbs) with 3 tape drives and 40 tapes.

Risk of personal injury

Before moving or lifting a library:

- Observe local health and safety requirements and guidelines for manual material handling.
- Remove all tapes to reduce the weight and to prevent cartridges from falling into the robotics path and damaging the library.
- Remove all tape drives to reduce the weight.
- Obtain adequate assistance to lift and stabilize the library during installation or removal.

Risk of damage to devices

When placing a library into or removing the library from a rack:

- Extend the rack's levelling jacks to the floor.
- Ensure that the full weight of the rack rests on the levelling jacks.
- Install stabilizing feet on the rack.
- Extend only one rack component at a time.

CAUTION

- Do not expose the library to moisture.
- Do not place a module on either the ends or sides as this may cause damage.

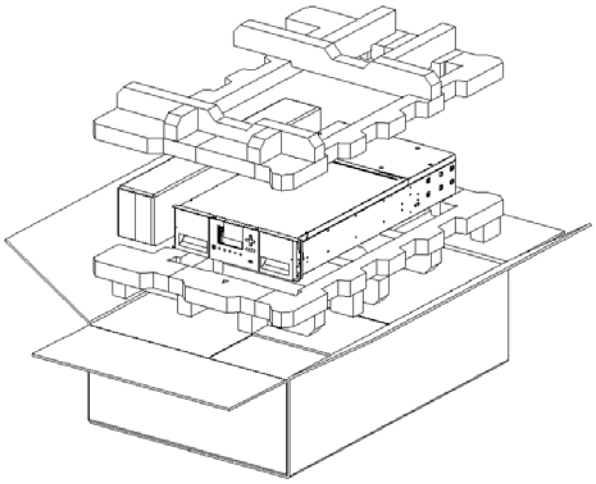
3.9 Unpacking Base Module and Expansion Modules

Before unpacking any modules, clear a work surface near the targeted rack for installation.

CAUTION If the temperature in the room where the library will operate varies by 15° C (30° F) from where the module was stored, allow it to acclimate for at least 12 hours prior to unpacking.

Unpacking a Q40 Base Library or Expansion Module:

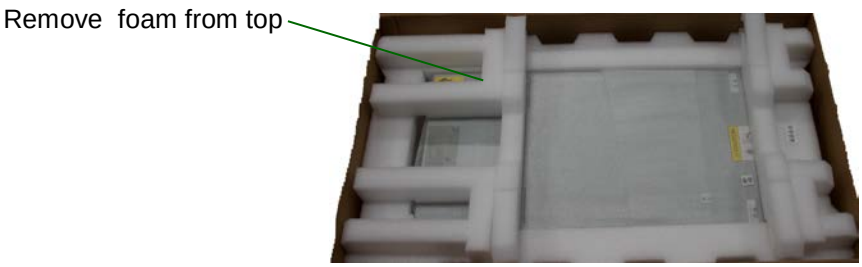
1. Before opening and removing a module from the box, inspect the container for shipping damage.
2. If you notice any damage, report it to the shipping company immediately.
3. Overview of packaging.



4. Make sure the box is aligned properly before opening the box. The arrows on the box should be pointing upwards.

5. Remove the rack rails and the accessory kit box.

6. Remove the foam pieces from the top of the module.

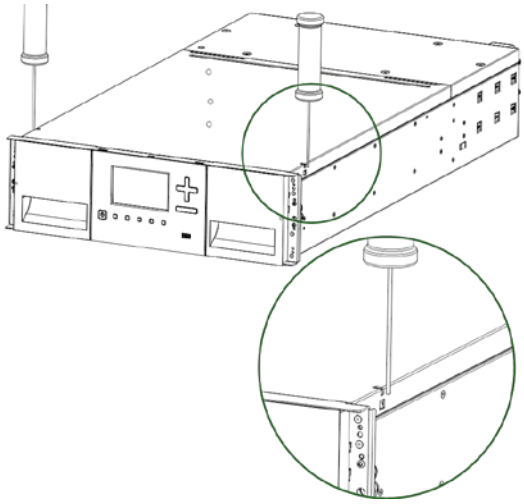


With assistance, lift the module out of the bottom foam nest, remove the wrapping from the module and then place the module on the work surface.

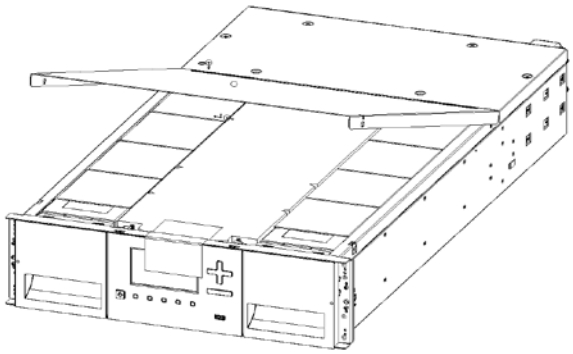
CAUTION Do not place a module on either the ends or sides as this may cause damage.

7. Save the packaging materials for future use.

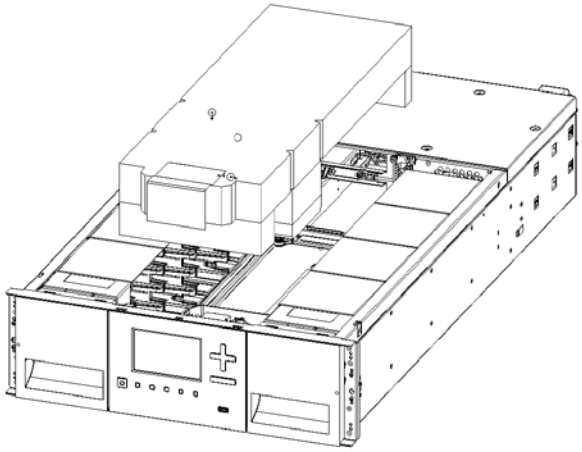
8. The robotics is protected during shipment by an insertion foam which has to be removed prior to installation
9. To remove the top cover plate from the Base Module, unlock the top cover using two small screwdrivers.



10. Lift the cover front end and pull gently forward to disengage from the pivot point at the unit center



11. Remove the insertion foam.



12. If you are installing a Base Module only without an Expansion Module install the top cover again on the Base Module
13. If you want to install a library system with multiple modules see chapter "Preparing Top and Bottom Modules"
14. Save the packaging materials for future use.

CAUTION Do not place a module on either the ends or sides as this may cause damage.

3.10 Identifying Library Module Components

If you have unpacked a Base Module, confirm that you have received the following components:

1. Base Module
2. Two Rack Rails
3. Accessory Kit
   a. One packet of rack mount hardware
   b. One North American Power Cord
   c. One European Power Cord

If you have unpacked an Expansion Module, confirm that you have received the following components:

1. Expansion Module
2. Two Rack Rails
3. Accessory Kit
   a. One packet of rack mount hardware
   b. Expansion Interconnect Cable

For SAS libraries, you must provide SAS cabling with the correct configuration for your HBA. For Fibre Channel libraries, you must provide one Fibre Channel cable for each tape drive.

3.11 Preparing Top and Bottom Modules

Skip this step if you are installing a Base Module only without an Expansion Module.

The Base Module has removable top and bottom covers.

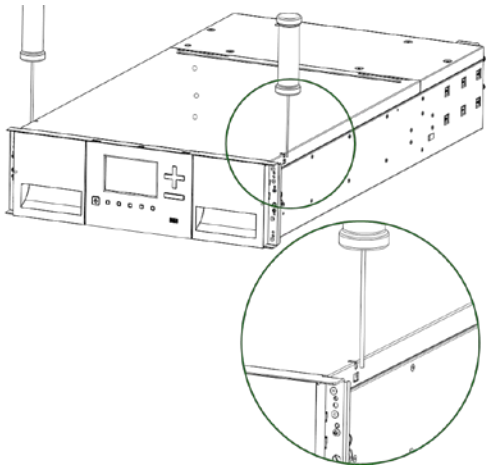
If you are installing one or more Expansion Modules above the Base Module, move the top cover from the Base Module to the Expansion Module that will be installed at the top of the library.

If you are installing on or more Expansion Modules below the Base Module, move the bottom cover from the Base Module to the Expansion Module that will be installed at the bottom of the library.

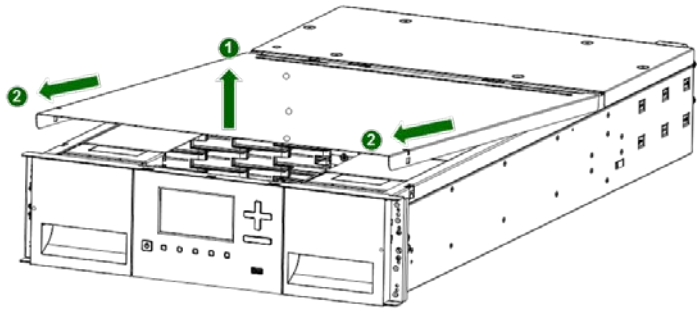
3.11.1 To move the library top cover plate from the Base Module to an Expansion Module:

1. Remove the library top cover plate from the Base Module.
   a. Place the Base Module on a work table

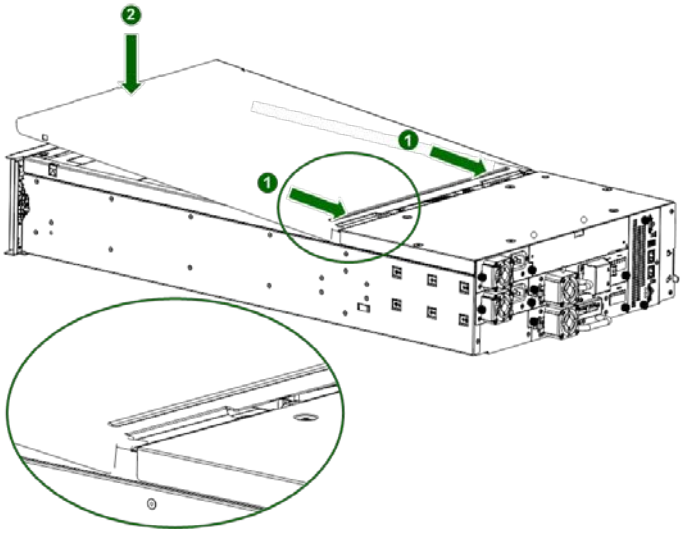
b. Unlock the top cover using two small screwdrivers.



c. Lift the front end of the cover and pull gently forward to disengage from the pivot point at the unit center.

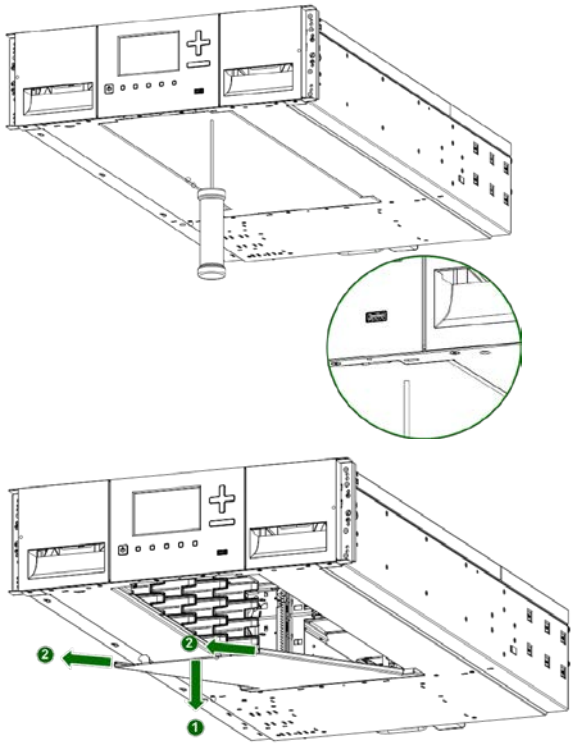


2. Install top cover on the Expansion Module that will be installed on the top of the library.
   a. Place the Expansion Module on a work table
   b. With the front of the top cover raised, engage the rear of the cover at the Expansion Module pivot point located at the back of the opening.
   c. Lower the front of the top cover until the latches engage on both sides.

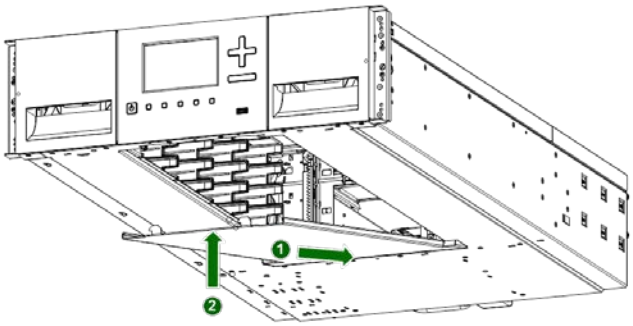


3.11.2 To move the library bottom cover plate from the Base Module to an Expansion Module:

1. Remove the library bottom cover plate from the Base Module.
   a. Place the Base Module on a work table
   b. Lift the front end of the module (use module's rear as a pivot edge)
   c. Support the bottom cover with one hand. Insert a small flathead screwdriver or Torx screwdriver into the hole and slide sidewards to unlock the spring loaded lock.
   d. Lower the front end of the cover and pull gently forward to disengage from the pivot point at unit center
   e. Remove the cover from the module.



2. Install the library bottom cover plate to the Expansion Module.
   a. Place the Base Module on a work table
   b. Lift the front end of the module (use unit rear as a pivot edge)
   c. Insert the bottom cover at the center
   d. Lift up the cover front edge until hard stop and it locks in at the module front.



3.12 Installing Modules in a Rack

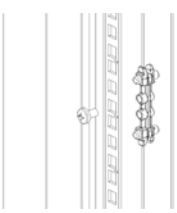
Q40 modules are easy to install in racks compliant to the EIA 310A Standard, when at least 1 meter deep. You need a #2 Phillips screwdriver for this process.

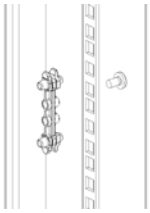
To locate the rail locations when installing multiple modules:

1. Locate the bottom of the lowest full U where the lowest module will be installed.
2. Continue identifying the locations for any additional module 3U higher.

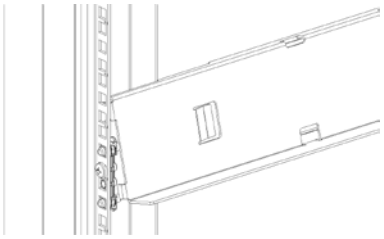
To install the rails into the rack, starting from the lowest rack location:

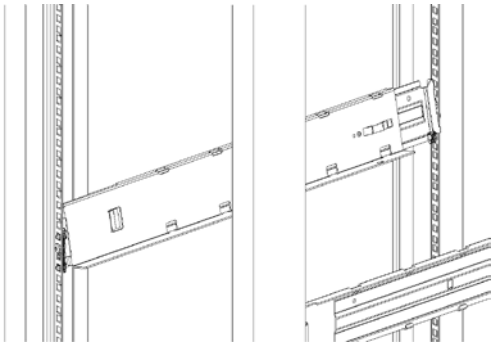
1. Locate the 4 adapter blocks, 4 Philips screws (Shipped in the accessory box) and 2 rackmount rails (LH and RH).
2. On the front of the rack, mount an adapter block at the appropriate height to the right and left rack posts. Mount them in the middle square hole of the height unit (The middle of a height unit is the hole between two wide and neighboring division bars.).

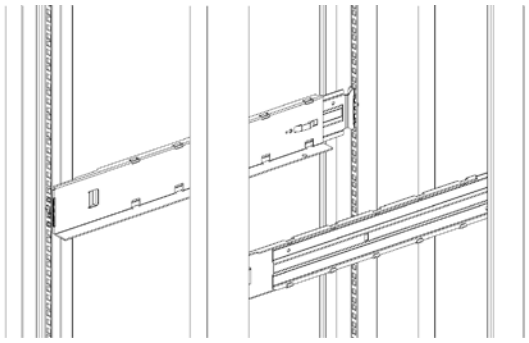




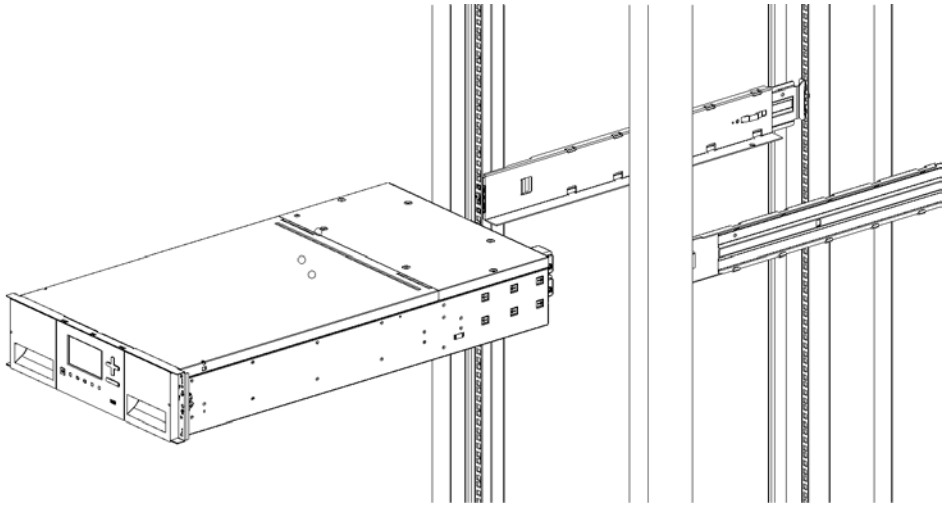
3. Repeat step 2 on the right and left rack posts in the rear of the rack.
4. Mount the LH Rackmount rail to the adapter blocks.
5. Repeat step 4 with the RH Rackmount rail.



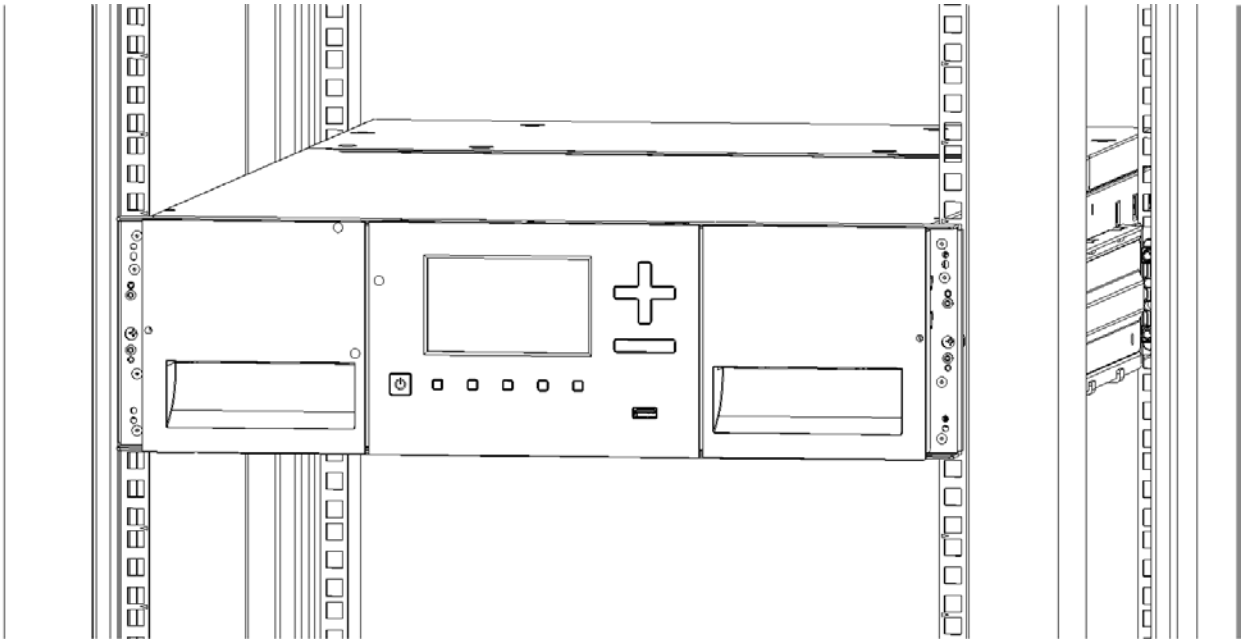




6. Place the library at the front of the rack on the support angles of the sliding rails and push it into the rack to the back stop.



7. If you are installing multiple modules, verify that this module has been installed directly above or below its adjacent module and is contained within the correct 3U volume. The gap between modules must be less than 4 mm.



8. Use a Phillips screwdriver to tighten the screws on each side of the module.
9. Repeat steps 3 through 5 to install the rest of the modules into the rack

3.13 Aligning and Connecting Modules

Skip this step if the library does not have Expansion Modules.

Aligning the modules ensures that the robot can move freely between the modules. The library will not operate unless the alignment mechanism is in the locked position.

1. From the front of the library, loosen the screws on each of the modules two full turns.
2. From the back of the library, starting with the bottom pair of modules, align each module with the module below. Repeat for each pair of modules.
   a. Move the alignment lever to the locked position. If you encounter resistance, adjust the position of the upper module so the pin of the alignment mechanism moves into the mating hole in the lower module.

3. Verify that the lowest module in the library has its alignment mechanism in the unlocked position
4. From the front of the library, tighten the Philips screws on each of the modules to secure the modules to the rack.
5. From the back of the library connect the modules of each pair to its adjacent module using the expansion interconnect cable as shown.

3.14 Installing Tape Drives

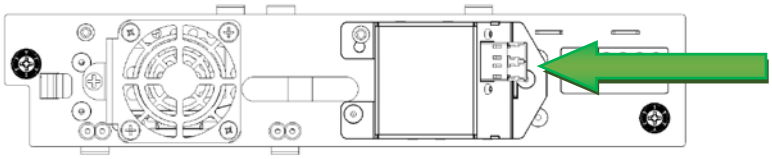
1. Locate an appropriate vacant drive bay on the back of the library.
2. To assist in aligning the drive, only remove the drive bay covers for one drive at a time. Remove the face plate covering the drive bay by removing the screws holding it in place. Remove one drive bay cover to install one half-height tape drive.
3. Holding the tape drive by the handle and supporting it from the bottom, slide the tape drive along the alignment rails into the drive bay until it is flush with the back of the library.
4. Tighten the blue captive screws with your fingers to secure the tape drive to the chassis. If the thumbscrews cannot be tightened, verify that the tape drive is aligned properly.

CAUTION All drive bays without tape drives installed must have drive bay covers installed.

MECHANICAL HAZARD **Danger** Risk of hand pinching. Keep hands clear during operation.

3.15 Connecting Fibre Channel Cables

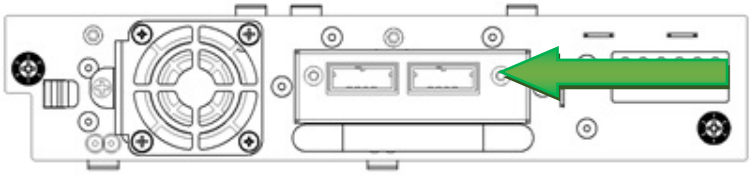
1. Remove the FC port caps if necessary. Attach one end of the FC cable to port A on the tape drive.



2. Attach the other end of the FC cable to a switch or HBA.

3.16 Connecting SAS Cables

1. Attach the HBA end of the SAS cable into the connector on the HBA. If you are using a SAS fan out cable, the end of the cable with only one connector should be plugged into the HBA.
2. Connect the drive end of the cable into the drive.
   - If you are using a SAS fan out cable, attach one mini-SAS connector into the connector on each tape drive. Any unused connectors should be secured to the rack to minimize stress on the connectors.



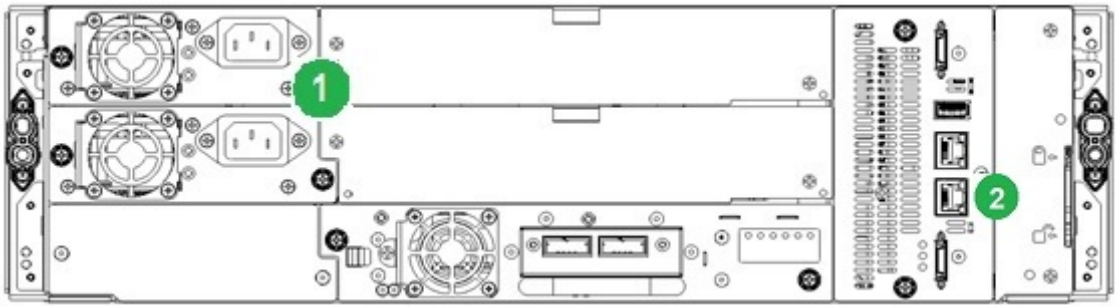
NOTE SAS signal rates require clean connections between the HBA and tape drive. Do not use adapters or converters between the HBA and the tape drive. For reliable operation, use a maximum SAS cable length of six meters.

3.17 Powering On the Library

1. Plug the power cord into the power connector on each module and into power outlets.

NOTE If the library has dual redundant power supplies. Plug each power cord into a different AC power circuit.

2. To use the RMI, connect an Ethernet cable from the bottom Ethernet port on the Base Module controller to your network.



1	Power Connectors	
2	Ethernet Ports	(Base Module Only)

3. Power on the library by pressing the power button on the Base Module just below the OCP; the green light will illuminate. When the library is powered on, it inventories the tape cartridges in the magazines, checks the firmware version on all modules, configures the tape drives, confirms the presence of the existing modules, and searches for any new modules.

3.18 Using the Configuration Wizard

Start the Initial Configuration Wizard from the OCP. The wizard will guide you through configuring the basic network configuration, date and time, and setting the administrator PIN. You can skip items and stop the wizard at any time. Once you have configured the network settings, you can initiate the wizard from the RMI to complete the remaining configurations. For Login to the RMI use the default Administrator Password “adm001”

3.19 Verifying the Host Connection

To verify the connections between the host computer and the library:

1. Install the application software and/or drivers that are compatible with the library. Backup software packages might require additional software or licensing to communicate with the robotics.
2. Verify the connection between the library and the host using the host server’s operating system utilities.

3.20 Labeling Tape Cartridges

Barcode labels are recommended in production environments to improve inventory time in the library and ease cartridge handling processes outside the library.

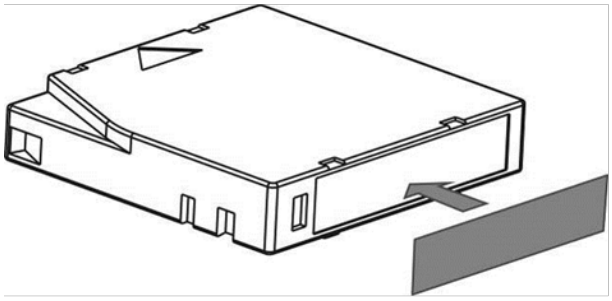
The Q40 contains a bar code reader that reads the tape labels and stores the inventory data in memory. The Q40 then provides the inventory information to the host application, OCP, and RMI. Having a bar code label on each tape cartridge enables the bar code reader to identify the cartridge quickly, thereby speeding up inventory time. Make it a practice to use bar code labels on your tape cartridges.
A proper bar code label includes the media identifier in the last two characters of the bar code. The library will not load an incompatible cartridge, based on the barcode media identifier, into a tape drive. For example, the library will not load a cartridge labeled as L3 into an LTO-6 tape drive.

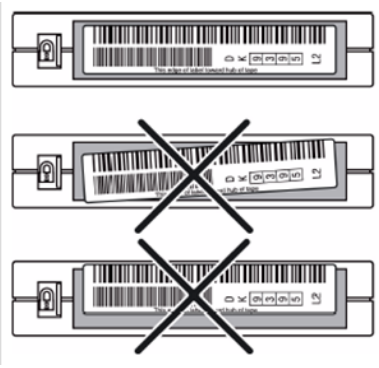
Your host software may need to keep track of the following information via the associated bar code:

- Date of format or initialization
- Tape's media pool
- Data residing on the tape
- Age of the backup
- Errors encountered while using the tape (to determine if the tape is faulty)

!	**IMPORTANT**	Misusing and misunderstanding barcode technology can result in backup and restore failures. Use only high-quality labels. Self-printed labels are not recommended as they are often a source of barcode reading issues.

LTO tape cartridges have a recessed area located on the face of the cartridge next to the write-protect switch. Use this area for attaching the adhesive-backed bar code label. Only apply labels as shown:



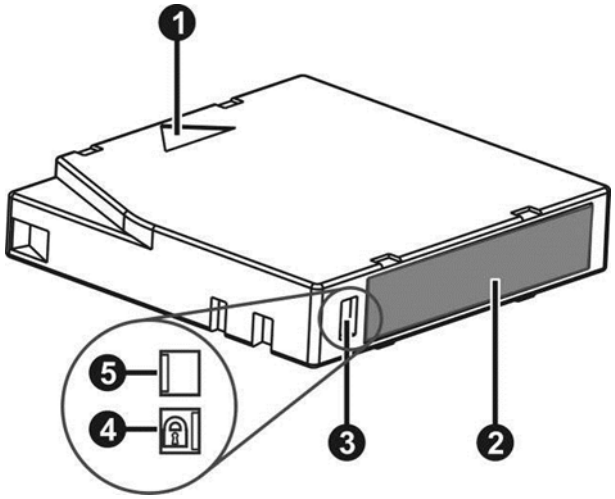


!	**IMPORTANT**	Never apply multiple labels onto a cartridge because extra labels can cause the cartridge to jam in a tape drive.

3.21 Write Protecting Tape Cartridges

All rewriteable data cartridges have a write-protect switch to prevent accidental erasure or overwriting of data. Before loading a cartridge into the device, make sure the write-protect switch on the front of the cartridge is in the desired position.

- Slide the switch to the left to allow the device to write data to the cartridge.
- Slide the switch to the right to write-protect the cartridge. An indicator, such as a red mark or small padlock, is visible showing that the cartridge is write-protected.



1	Insertion Arrow
2	Barcode Label
3	Write-Protect Switch
4	Write-Protected
5	Write-Enabled

3.22 Tape Cartridges

Use the Ultrium data and cleaning tape cartridges designed for your LTO tape drive.

Table 6: LTO-6 Tape Drive

Cartridge Type
LTO-6 Ultrium 6.25TB* Data Cartridge
LTO-6 Ultrium 6.25TB* WORM Data Cartridge
Ultrium Universal Cleaning Cartridge

Table 7: LTO-7 Tape Drive

Cartridge Type
LTO-7 Ultrium 15TB* Data Cartridge
LTO-7 Ultrium 15TB* WORM Data Cartridge
Ultrium Universal Cleaning Cartridge

Table 8: LTO-8 Tape Drive

Cartridge Type
LTO-8 Ultrium 30TB* Data Cartridge
LTO-8 Ultrium 30TB* WORM Data Cartridge
Ultrium Universal Cleaning Cartridge

* - with 2.51 Compression factor

	**CAUTION**	Do not degauss LTO data cartridges! These data cartridges are pre-recorded with a magnetic servo signal. This signal is required to use the cartridge with the LTO tape drive. Keep magnetically charged objects away from the cartridge.

To ensure the longest possible life for your data cartridges, follow these guidelines:

- Use only the data cartridges designated for your device.
- Clean the tape drive when the Clean drive LED is illuminated.

	**CAUTION**	Use only Ultrium Universal cleaning cartridges. All cleaning tapes must have a label with the prefix “CLN”

- Do not drop a cartridge. Excessive shock can damage the internal contents of the cartridge or the cartridge case itself, making the cartridge unusable.
- Do not expose data cartridges to direct sunlight or sources of heat, including portable heaters and heating ducts.
- The operating temperature range for data cartridges is 10 to 35º C. The storage temperature range is

-40 to +60º C in a dust-free environment in which relative humidity is always between 20 percent and 80 percent (non-condensing).

- If the data cartridge has been exposed to temperatures outside the specified ranges, stabilize the cartridge at room temperature for the same length of time it was exposed to extreme temperatures or 24 hours, whichever is less.
- Do not place data cartridges near sources of electromagnetic energy or strong magnetic fields such as computer monitors, electric motors, speakers, or X-ray equipment. Exposure to electromagnetic energy or magnetic fields can destroy data and the embedded servo code written on the media by the cartridge manufacturer, which can render the cartridge unusable.
- Place identification labels only in the designated area on the cartridge.

3.23 Read and Write Compatibility

Table 9: Media and Tape Drive Compatibility

	LTO-3 Drive	LTO-4 Drive	LTO-5 Drive	LTO-6 Drive	LTO-7 Drive	LTO-8 Drive
LTO-3 Media	*Read/Write*	*Read/Write (no encryption)*	*Read Only*	*Incompatible*	*Incompatible*	*Incompatible*
LTO-4 Media, Unencrypted	*Incompatible*	*Read/Write*	*Read/Write*	*Read Only*	*Incompatible*	*Incompatible*
LTO-4 Media, Encrypted	*Incompatible*	*Read/Write with encryption key*	*Read/Write with encryption key*	*Read/only with encryption key*	*Incompatible*	*Incompatible*
LTO-5 Media, Unencrypted	*Incompatible*	*Incompatible*	*Read/Write*	*Read/Write*	*Read Only*	*Incompatible*
LTO-5 Media, Encrypted	*Incompatible*	*Incompatible*	*Read/Write with encryption key*	*Read/Write with encryption key*	*Read/only with encryption key*	*Incompatible*
LTO-6 Media, Unencrypted	*Incompatible*	*Incompatible*	*Incompatible*	*Read/Write*	*Read/Write*	*Incompatible*
LTO-6 Media, Encrypted	*Incompatible*	*Incompatible*	*Incompatible*	*Read/Write with encryption key*	*Read/Write with encryption key*	*Incompatible*
LTO-7 Media, Unencrypted	*Incompatible*	*Incompatible*	*Incompatible*	*Incompatible*	*Read/Write*	*Read/Write*
LTO-7 Media, Encrypted	*Incompatible*	*Incompatible*	*Incompatible*	*Incompatible*	*Read/Write with encryption key*	*Read/Write with encryption key*
LTO-8 Media, Unencrypted	*Incompatible*	*Incompatible*	*Incompatible*	*Incompatible*	*Incompatible*	*Read/Write*
LTO-8 Media, Encrypted	*Incompatible*	*Incompatible*	*Incompatible*	*Incompatible*	*Incompatible*	*Read/Write with encryption key*

Note: All listed media are incompatible to LTO1 and LTO2 drives

3.24 Loading Tape Cartridges

The library will power on without cartridges, but needs cartridges before performing data read and write operations, or any tests or operations that transfer cartridges.

The easiest way to open a mailslot or magazine is to use the emergency release access button located on the left and right side of each module.

The LED in the translucent button indicates different states of the mailslot or magazine:

- LED OFF: mailslot is not enabled
- LED steady ON: mailslot is enabled
- LED flashing slowly: unlock operation in process
- LED flashing quickly: mailslot or magazine is unlocked and can be removed

	NOTE	You can also open mailslots or magazines through the **Operation > Open Mailslot** or **Operation > Open Magazine** page on the RMI. Opening mailslots or magazines through the OCP is not possible.

3.25 Using the Mailslot

If the mailslot is enabled (indicated by the right button LED steady ON), you can use it to load cartridges into the library.

1. Press the right button for less than 3 seconds. This will start the unlock operation for the mailslot, indicated by the LED slowly flashing.
2. When the mailslot is unlocked the LED starts quickly flashing
3. Pull out the mailslot from the library. As soon as the mailslot is pulled out, the LED switches OFF.

NOTE

- The mailslot is attached to the magazine and cannot be removed completely
- The mailslot will relock after 30 seconds.

IMPORTANT

- You can enable mailslots only through the **Configuration > Mailslots** page on the RMI.
- Wait before pulling out the mailslot until the LED is quickly flashing and OCP message says that the mailslot is unlocked

Picture depicting an open right side mailslot.

3.26 Bulk Loading Magazines

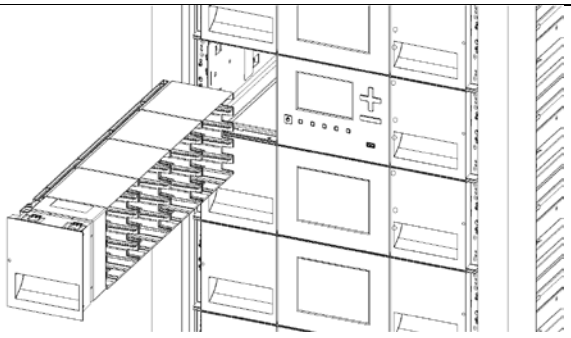
1. Press the button for more than 3 seconds. This will start the unlock operation for the magazine, indicated by the LED slowly flashing.
2. When the magazine is unlocked the LED starts quickly flashing
3. Pull out the magazine from the library. As soon as the magazine is pulled out, the LED switches OFF.

NOTE

- Opening a magazine will take the library off-line
- The magazine will relock after 30 seconds.

IMPORTANT

- Wait before pulling out the magazine until the LED is quickly flashing and OCP message says that the mailslot is unlocked



Picture depicting an open left side magazine.

4. Load the tape cartridges into the magazine
5. Insert the magazine to the unit
6. Push the magazine handle slowly until the magazine release latch snaps into place. The magazine locks into place.
7. Repeat steps 1 through 3 for each of the other magazines.

!	IMPORTANT	Push the magazine fully into place until the latch snaps into place.

4 Initial Setup of the Library

The library provides two main interfaces:

- Operator Control Panel (OCP) — With the OCP, you can monitor, configure, and control the library from the front panel.
- Remote Management Interface (RMI) — With the RMI, you can monitor, configure, and control the library from a web browser. The RMI hosts a dedicated, protected Internet site that displays a graphical representation of the library.

4.1 Using the OCP

The OCP has a power button, an LCD display, six navigation buttons, and five LEDs. With the OCP you can monitor, configure, and operate most library functions from the library front panel. To navigate the OCP, use the six navigation buttons (up/down, left/right, Enter, Back).

Table 10: Front Panel LED Indicators

Unit ID	Blue when activated. The unit identification (UID) LEDs are controlled by the user through the RMI Maintenance > UID LED Control screen. The UIDs on the *OCP* and base module back panel are activated and deactivated together. In addition, UIDs on drives and expansion module back panels can be activated separately. The UIDs are helpful for locating components of the library in a data center.
Ready	Green, steady when power is on, blinking during tape drive or library robotic activity
Clean	Amber when a tape drive is requesting cleaning
Attention	Amber blinking if the library has detected a condition for which user attention is necessary.
Error	Amber if an unrecoverable tape drive or library error occurs. A corresponding error message is displayed on the LCD screen. User intervention is required.

4.2 Using the RMI

With the RMI, you can monitor, configure, and operate most library functions from a web browser. To start the RMI, open the latest version of a supported HTML browser and enter the IP address of the library. When possible, it is recommended that the RMI be used as the primary library interface because the web interface provides access to additional features and is easier to use. However, the RMI is not required to use the product, except to configure advanced features, such as SNMP, IPv6, encryption, and partitions. Before using the RMI, you must configure the library network settings with the OCP. This can be done with the Initial Configuration Wizard.
Supported browsers include Internet Explorer, Firefox, Chrome and Safari.

Table 11: RMI Status Icons

	The green Ready LED indicates that the library is fully operational and that no user interaction is required
	The blue Attn LED indicates that user attention is necessary, but that the device can still perform most operations.
	The red Error LED indicates that user intervention is required and that the device is not capable of performing some operations.

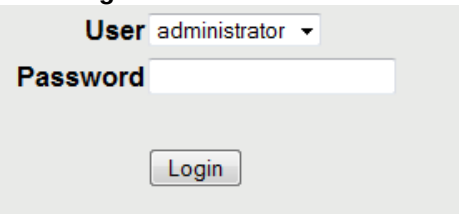
4.3 Logging into the Library

To login to the library on the OCP:

1. If the OCP screen saver is on, press the Enter button to get to the login page.
2. Select the **User**.
3. If required, enter the **PIN**. Leave the **PIN** blank unless the user PIN has been set in the Initial System Setup wizard
4. Navigate to the **Login** button and press the **Enter** button.

To login to the library on the RMI:

1. Open a supported web browser and enter the IP address of the library.
2. Select the **User**.
3. If required, enter the **Password**.
4. Click **Login**.



The user levels are:

- **User** – No password is required (leave the Password field blank unless the user password has been set in the Configuration > Configure User Accounts page).
  The user account provides access to status information, but not configuration, maintenance or operation functions.

- **Administrator** – The administrator password is required to login as the administrator. The default PIN is 0000. The default administrator password is adm001. The administrator password can be changed in the Configuration > Configure User Accounts page
  The administrator user has access to all functionality except for the log configuration and Security and Service features.

- **Security** – The default security password is sec001. The security password can be changed in the Configuration > Configure User Accounts page
  The security user has access to all functionality expect the log configuration and Service features.

- **Service** –The default PIN is 3574. The default service password is Update001. Both the administrator and service passwords are required for a service person to enter the service area.
  The service user has full access to all functionality. The service user should only be accessed by trained personnel or by direction from Qualstar Technical Support.

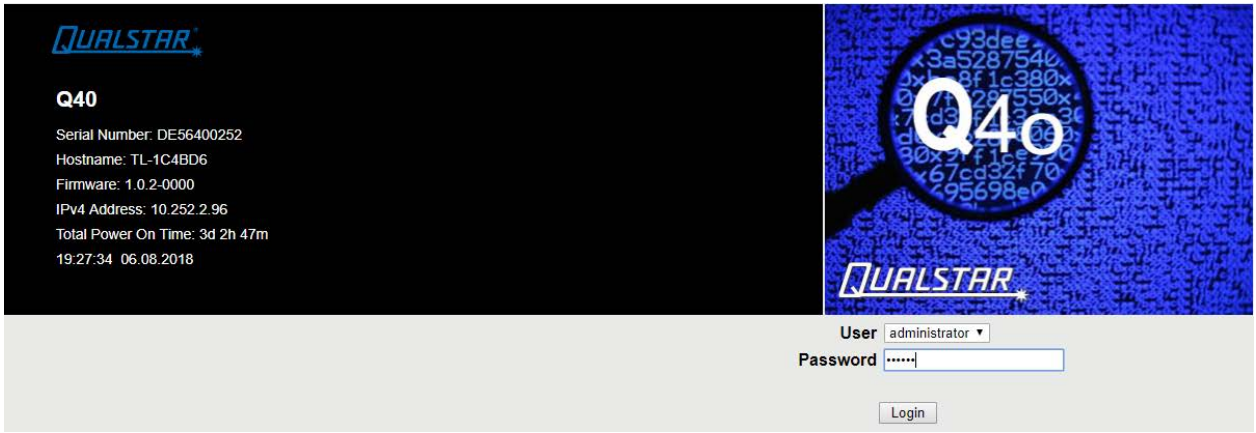
4.4 Using the Initial Configuration Wizard on the OCP

For initial configuration navigate to the **Home > Configuration > Initial System Setup** feature.
The wizard guides you through setting the library network configuration, configuring date and time, and setting the administrator PIN. You can skip items and stop the wizard at any time.

	NOTE	On the very first power up of the library the user is prompted to walk through the Initial Configuration Wizard. It is recommended to walk completely through the wizard and finish the wizard by pressing the **Finish Button**. Otherwise, the User will be prompted to walk through the wizard on each subsequent login.

Once you have configured the network settings, you can initiate the wizard from the RMI to finalize the remaining configuration settings.

To login the very first time on the RMI you should use the default administrator password, “adm001”. To set your own password navigate to the **Configuration > User Accounts** page on the RMI.



5 Operating the Library using the Operator Panel

The OCP contains a power button, an LCD display, six navigation buttons, and five LEDs. With the OCP you can monitor, configure, and operate most library functions from the library front panel. To navigate the OCP, use the six navigation buttons (up/down, left/right, Enter, Back).
In addition, on each module two buttons are available to unlock magazines or I/O stations.

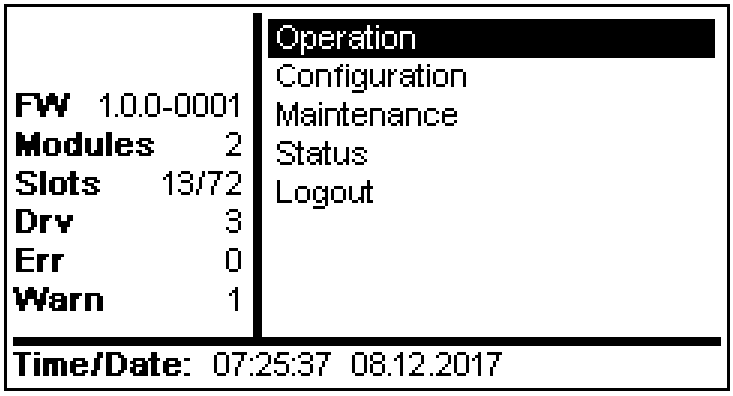
The OCP provides a subset of menu items compared to the full capability of the RMI. Menu items that are similar to the RMI are not described. For details please refer to the corresponding item in the section Operating the Library using the RMI.

Table 12: Front Panel LED Indicators

Unit ID	Blue when activated. The unit identification (UID) LEDs are controlled by the user through the RMI Maintenance > UID LED Control screen. The UIDs on the *OCP* and base module back panel are activated and deactivated together. In addition, UIDs on drives and expansion module back panels can be activated separately. The UIDs are helpful for locating components of the library in a data center.
Ready	Green, steady when power is on, blinking during tape drive or library robotic activity
Clean	Amber when a tape drive is requesting cleaning
Attention	Amber blinking if the library has detected a condition for which user attention is necessary.
Error	Amber if an unrecoverable tape drive or library error occurs. A corresponding error message is displayed on the LCD screen. User intervention is required.

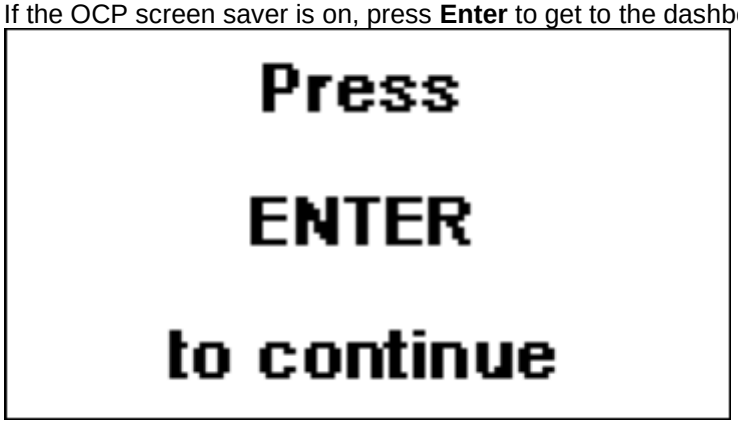
OCP main screen layout

- Left Pane - Displays the library status (firmware revision, number of modules, number of slots, number of drives, number of errors, number of warnings
- Center Pane - provides access to operate and configure the library and to view additional status information (Operation, Configuration, Maintenance, Status, Logout)
- Bottom Pane - Displays additional status information (library status, time/date, IPv4 or IPv6 address). The bottom pane will automatically scroll through the various status items every 10 seconds.

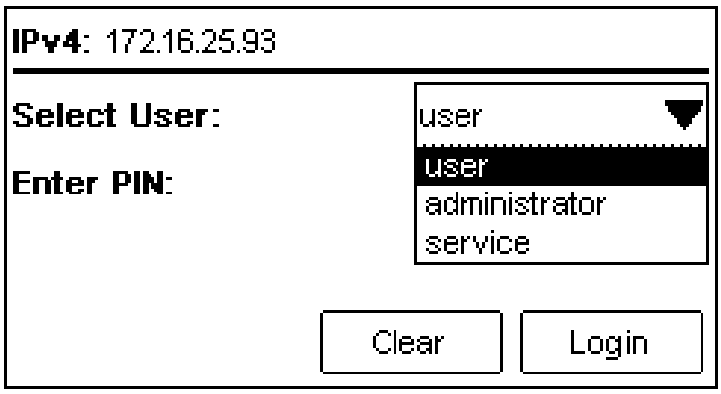


5.1 Login

1. If the OCP screen saver is on, press **Enter** to get to the dashboard page.



2. On the Login screen navigate to the dropdown box and select the user.



3. Then navigate to the **Enter PIN** field and enter the 4-digit PIN

4. Afterwards, navigate to **Login** and press **Enter**.

5.2 Magazine Buttons

Each magazine has a button that provides an easy way to unlock a magazine.

Each magazine can be configured to have a portion designated as a mailslot. To unlock the mailslot, press the magazine button for less than 3 seconds.
To unlock the entire magazine, press the magazine button for more than 3 seconds.

The user will need to pull out the magazine, as the magazine does not eject.

After a magazine has been open and closed, a library inventory will be performed. The LED on the button provides an indicator of the current state of that magazine.

Table 13 : Magazine States

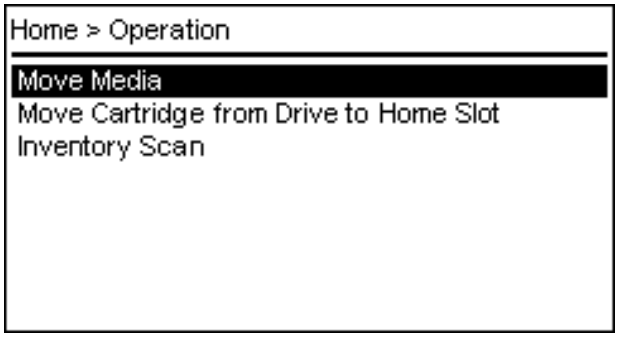
Magazine State	LED state	Description
Closed	Steady ON	mailslot is enabled
Closed	Slow Flash	Magazine unlock is in progress
Closed	Fast Flash	Magazine is unlocked
Closed	OFF	mailslot is not enabled
Opened	OFF	Magazine is opened

NOTE

1. If a magazine unlock is in process, no other magazines or mailslots can be unlocked.
2. If an unlocked magazine is not opened within 30 seconds, the magazine will be re-locked automatically.

5.3 Operation

Navigate with the **Up/Down** buttons to the **Operation** menu entry on the Home screen to access the operation features.



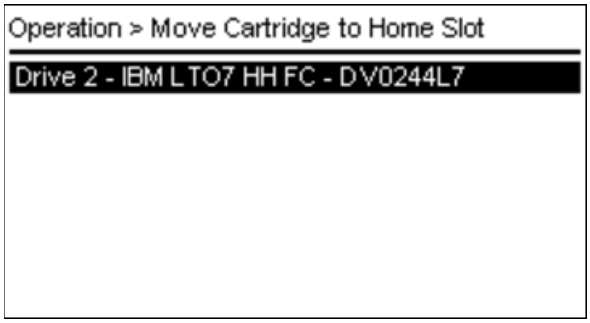
The Operation Menu provides the following submenus:

- Move Cartridge from Drive to Home Slot
- Move Media
- Inventory Scan

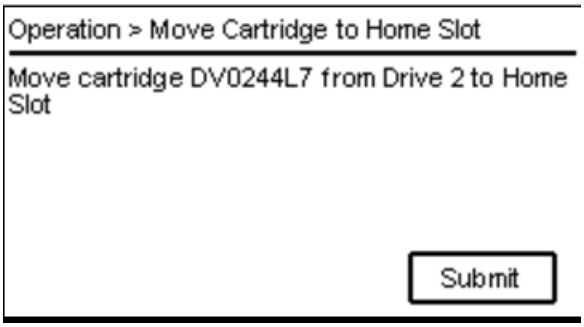
5.3.1 Moving Cartridge from Drive to Home Slot

With the **Operation > Move Cartridge from Drive to Home Slot** feature, the user can move a cartridge from a drive back to its home slot.

1. The **Operation > Move Cartridge from Drive to Home Slot** screen displays all drives that contain cartridges. Navigate with the **Up** or **Down** to the drive where you want to move the cartridge back to the home slot.



2. Press Enter

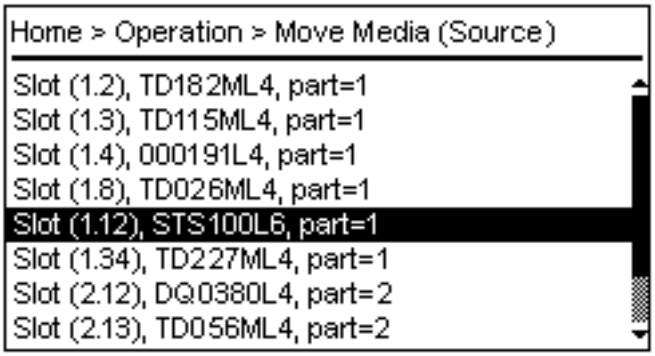


3. Press **Enter** to submit the **Move** command.

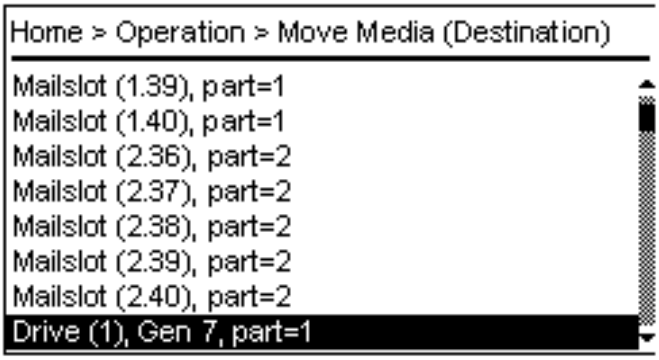
5.3.2 Move Media

Navigate to **Operation > Move Media** page. The first page provides instructions how to proceed.

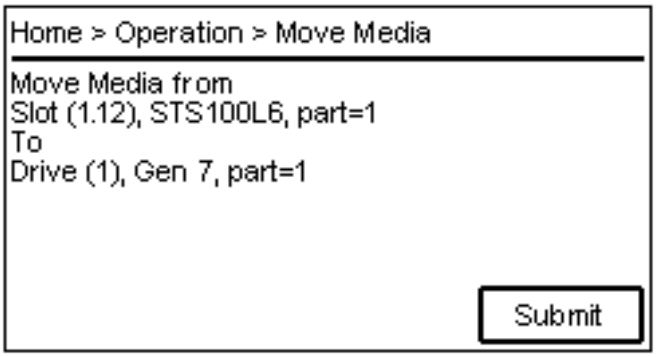
1. Pressing the **Enter** button opens the source screen. A list will be shown like below. Pressing the **Back** button will take the screen back to the Operation menu. Navigate with the **Up** or **Down** buttons to select the source element.



2. Pressing the **Enter** button opens the destination screen. A list will be shown like below. Pressing the **Back** button will take the screen back to the Operation menu. Navigate with the **Up** or **Down** buttons to select the destination element.



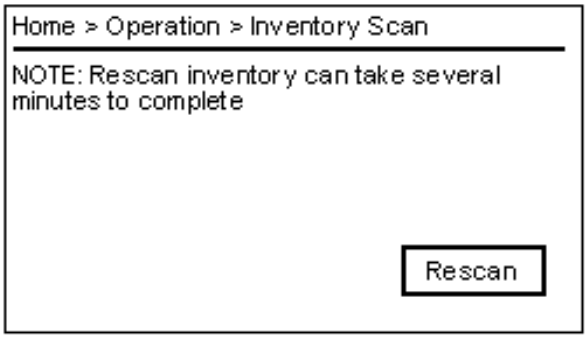
3. Pressing the **Enter** button opens the last page which provides the summary of the move data.



4. Pressing the **Enter** button submits the move command and starts the Move Media operation. Once the command is finished the page will be switched back to the first page. Pressing the **Back** button shall abort the procedure and take the screen back to the Operation menu. Using the left and right buttons on the OCP panel will allow the user to step through the pages again and change the selection.

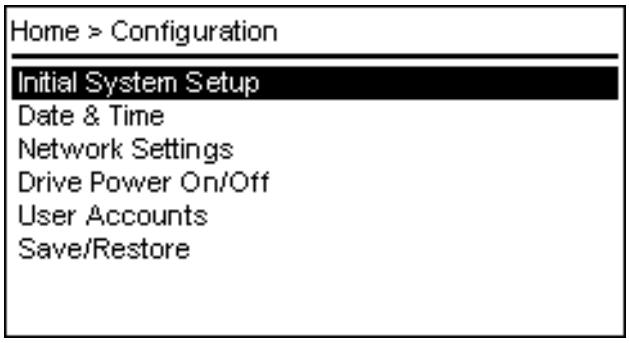
5.3.3 Inventory Scan

Navigate to **Operation > Inventory Scan** page. Pressing the Enter button will start the inventory scan process.



5.4 Configuration

Navigate with the **Up/Down** buttons to the **Configuration** menu entry on the Home screen to access the configuration features.



The Configuration Menu provides the following submenus:

- Initial System Setup
- Date & Time
- Network Settings
- Drive Power On/Off
- User Accounts
- Save/Restore

5.4.1 Initial System Setup

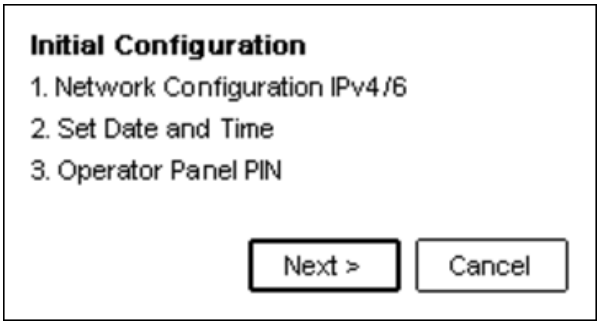
For initial configuration go to the **Configuration > Initial System Setup** screen.

The wizard guides you through setting the library network configuration, configuring date and time, and setting the administrator PIN. You can skip items and stop the wizard at any time. When you have configured the network settings, you can initiate the wizard from the RMI to complete the remaining configurations.

	NOTE	On the very first power up of the library the user is prompted to walk through the Initial Configuration wizard. It is recommended to walk completely through the wizard and finish the wizard by pressing the **Finish Button**. Otherwise with every login on the OCP the user will be prompted again to walk through the wizard.

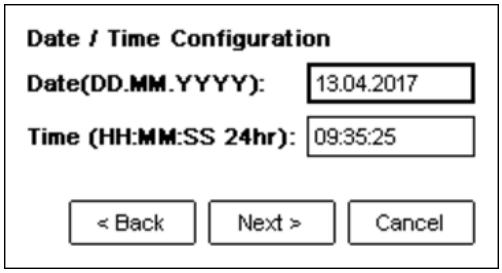
To log in the first time on the RMI you should use the default administrator password *adm001*. To set your own password navigate to the Access > Users page on the RMI.

1. Press **Next>**, then **Enter** to start the wizard beginning with the network configuration.

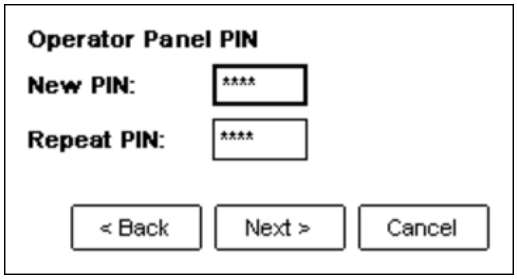


2. In the network configuration page you can configure these items.
    - Host Name
    - Domain Name
    - Protocol
    - IPv4 related settings:
        - Method
        - IPv4 Address
        - Netmask
        - IPv4 Gateway
        - IPv4 DNS1
        - IPv4 DNS2
    - IPv6 related settings:
        - Method
        - IPv6 Address
        - IPv6 Gateway
        - Prefix Length
        - IPv6 DNS1
        - IPv6 DNS2

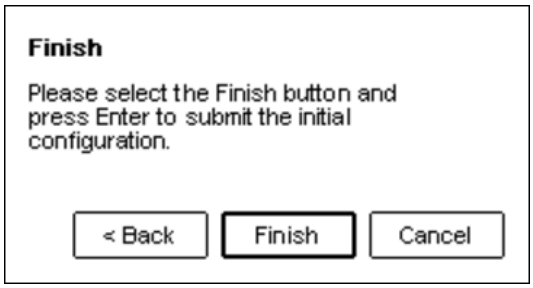
3. When finished with the network settings, select **Next>** and press **Enter** to switch to date and time.



4. When finished with the date and time settings, select **Next>** and press **Enter** to switch where the Administrator OCP PIN can be changed.



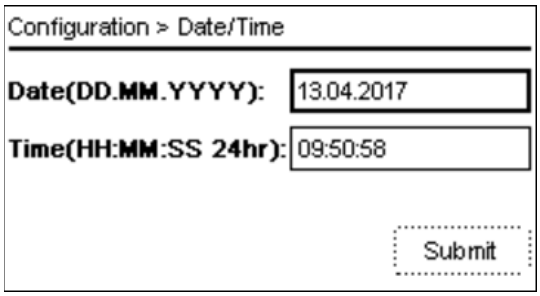
5. When finished with the PIN change, select **Next>** and press **Enter** to switch to the finish screen.



6. To keep the settings, select **Finish** and press **Enter**. With **Cancel,** you can skip the configuration and leave the wizard without any changes. With **Back,** you can correct your changes before they are submitted.

5.4.2 Date & Time

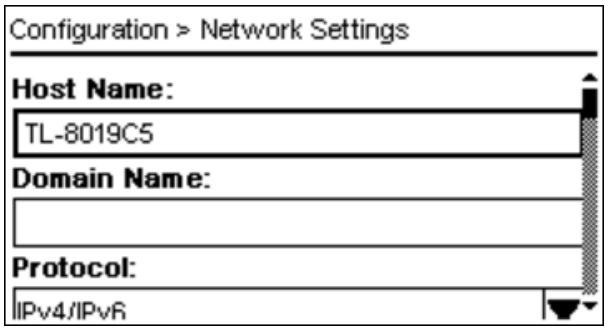
To configure date and time navigate to the **Configuration > Date & Time** screen.



1. Press **Enter** and use **Up** or **Down** buttons to change the date.
2. Press the **Right** button to move to the month and select the correct month
3. Repeat this procedure for the year
4. Press **Enter**
5. Press **Down** to navigate to the **Time** field
6. Press **Enter** and use **Up** or **Down** buttons to change the hour.
7. Press the **Right** button to move to the minutes and select the correct minute
8. Repeat this procedure for the seconds
9. Press **Enter.**
10. The **Submit** option is activated
11. Press **Down** to navigate to Submit
12. Press **Enter** to submit the new date and time

5.4.3 Network Settings

To configure the network settings go to the **Configuration > Network Settings** screen.

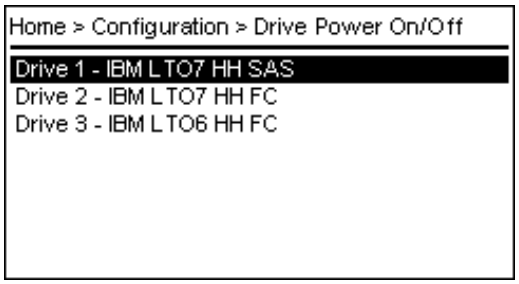


The following settings can be changed on the **Network Settings** screens:

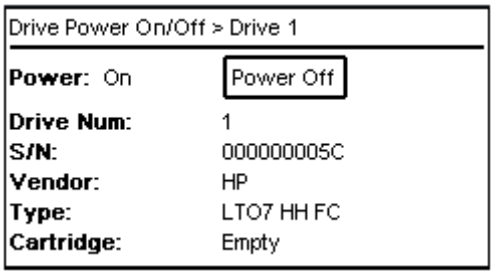
- Host Name
- Domain Name
- Protocol
- IPv4 related settings:
  - Method
  - IPv4 Address
  - Netmask
  - IPv4 Gateway
  - IPv4 DNS1
  - IPv4 DNS2
- IPv6 related settings:
  - Method
  - IPv6 Address
  - IPv6 Gateway
  - Prefix Length
  - IPv6 DNS1
  - IPv6 DNS2

5.4.4 Drive Power On/Off

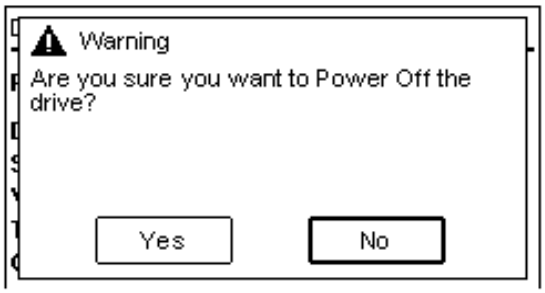
From the **Configuration > Drive Power On/Off** page you can switch power on or off for an installed drive.



1. The page provides a list of all installed drives. Select the drive that you want to power on or off and press **Enter**
2. The page for the selected drive provides further details for this drive. Press **Enter** to change the drive power status.



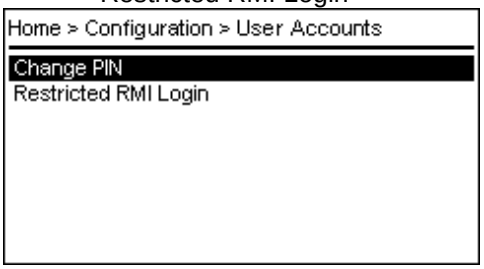
3. A dialog will prompt the user to confirm to change the drive power status.



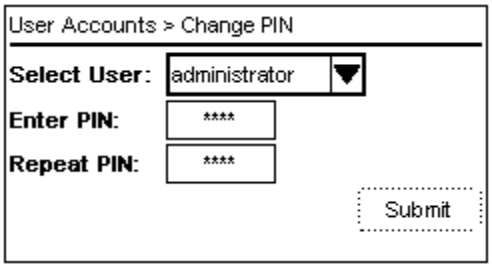
5.4.5 User Accounts

The **Configuration > User Accounts** page provides the following submenus:

- Change PIN
- Restricted RMI Login

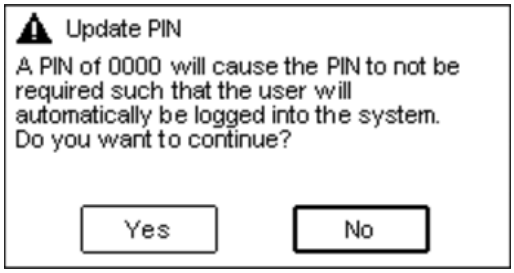


From the **Configuration > User Accounts > Change PIN** page you can change the PIN to access the OCP.

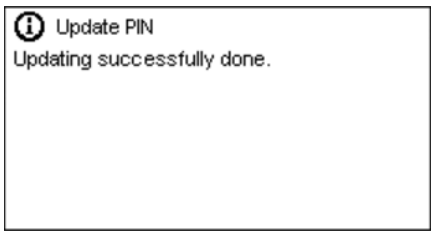


1. Navigate to the user dropdown box and select a user
2. Navigate to the Enter PIN field
3. Press **Enter** and use the **Up** or **Down** buttons to select the first number of the PIN.
4. Press the **Right** button to move to the next number and select the second number.
5. Repeat this procedure for the third and fourth numbers.
6. Press **Enter**.
7. Press the **Down** button to navigate to the Repeat PIN field.
8. Repeat steps 3 to 5 and enter the new PIN.
9. Press **Enter.**
10. The **Submit** button is activated.
11. Press the **Down** button to navigate to the Submit button.
12. Press **Enter** to submit the new PIN.

In case "0000" is selected as the PIN, the user will automatically be logged into the system and the following confirmation message will be shown.



If pressing **Yes** or in case a different PIN was entered, the PIN update is confirmed with the following message.

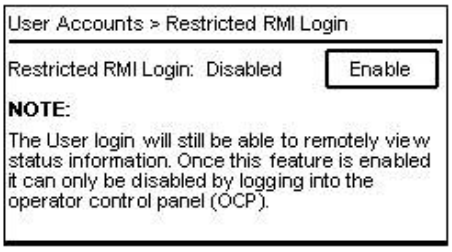


NOTE

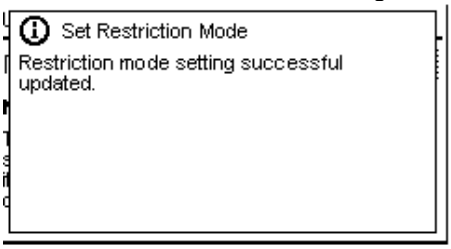
As long as you stay logged in, the new PIN will not become active. The new PIN becomes valid after you logout of the current session.

From the OCP **Configuration > User Accounts > Restricted RMI Login** page you can enable RMI Login restriction. If the Restricted RMI Login is enabled, the administrator and the security accounts will not be able to login via RMI anymore. The administrator has to disable the restriction mode via OCP.

1. After entering the **Restricted RMI Login** page, the screen below will be shown.



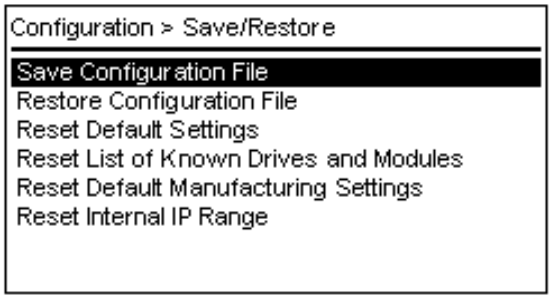
2. Press **Enter** to enable the Restricted RMI Login. The following screen will be shown to inform the user that the Restricted RMI Login is enabled.



5.4.6 Save/Restore

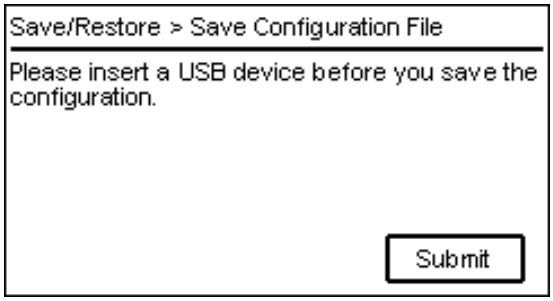
The **Configuration > Save/Restore** page provides the following submenus:

- Save Configuration File
- Restore Configuration File
- Reset Default Settings
- Reset the List of Known Drives and Modules
- Reset Default Manufacturing Settings (only accessible with service PIN)
- Reset Internal IP Range

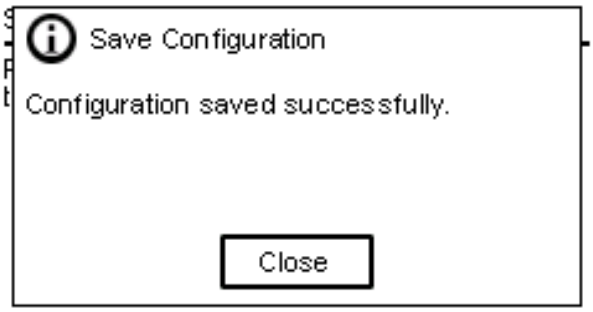


5.4.6.1 Save Configuration File

From the **Save/Restore > Save Configuration File** page you can save the library configuration to a USB device.

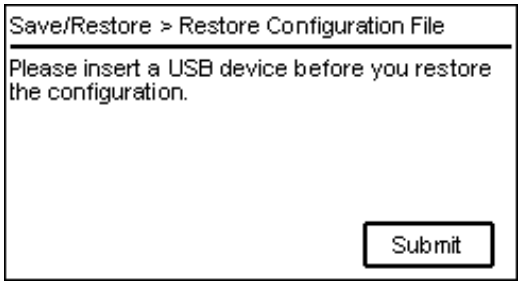


1. Insert a USB device on the OCP.
2. Press **Submit** to save the configuration file on the USB device. A dialog will notify the user that the saving process has started.
3. A dialog box will confirm that the configuration file was saved successfully.



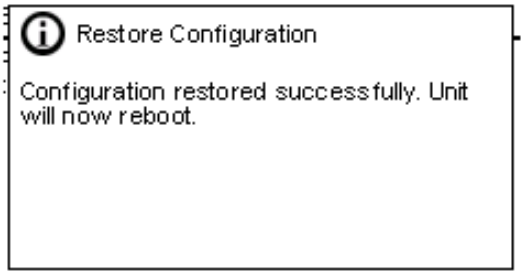
5.4.6.2 Restore Configuration File

From the **Save/Restore > Restore Configuration File** page you can restore the library configuration from a USB device.



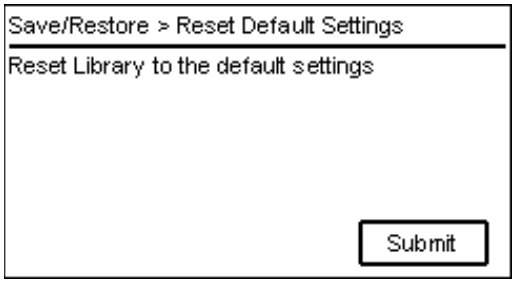
1. Insert a USB device on the OCP.
2. Press **Submit** to start the restore process.
3. A dialog box will prompt the user to confirm the restore process.

4. A dialog box will confirm that the file was restored properly.

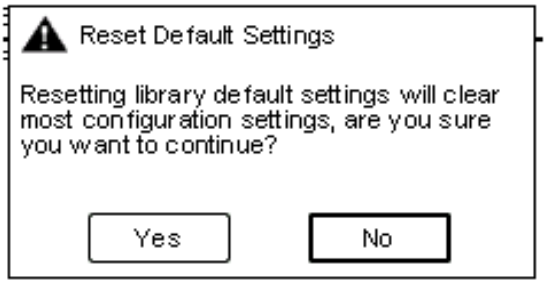


5.4.6.3 Reset Default Settings

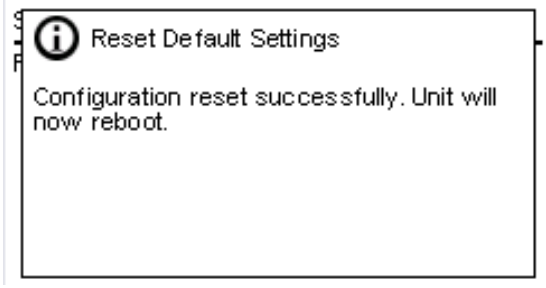
From the **Save/Restore > Reset Default Settings** page you can reset the library to default configuration settings.



1. Press **Submit** to reset the configuration settings to default.
2. A dialog will prompt the user to confirm to reset to defaults.

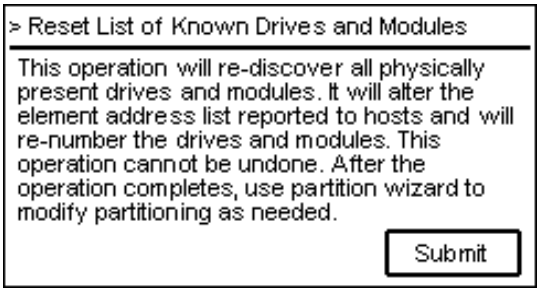


3. A dialog box will confirm that the default settings were reset.



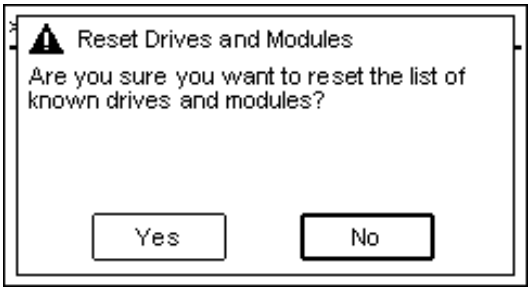
5.4.6.4 Reset List of Known Drives and Modules

The **Save/Restore > Reset List of Known Drives and Modules** page enables you to remove Modules and Drives that have been physically removed from the library stack.

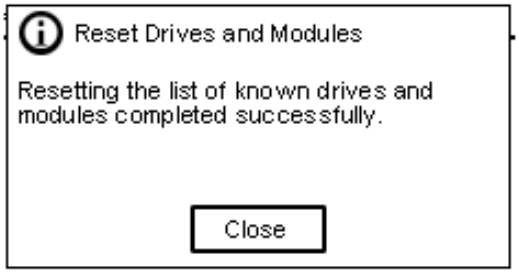


1. Press **Submit** to reset the list of drives and modules in the library stack

2. A dialog will prompt the user to confirm to reset the list.

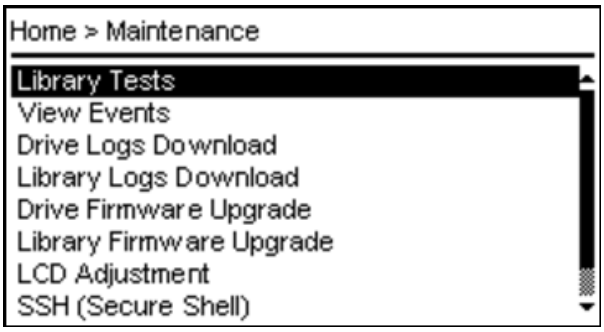


3. A dialog box will confirm that the drives and modules list has been reset.



5.5 Maintenance

Use the **Up/Down** buttons to go to **Maintenance** on the Home screen to access the maintenance features.



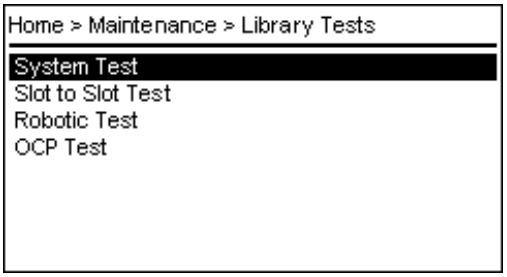
The Maintenance Menu provides the following submenus:

- Library Tests
- View Events
- Drive Logs Download
- Library Logs Download
- Drive Firmware Upgrade
- Library Firmware Upgrade
- LCD Adjustment
- SSH (Secure Shell)

5.5.1 Library Tests

The **Maintenance > Library Tests** page provides the following submenus:

- System Test
- Slot to Slot Test
- Robotic Test
- OCP Test

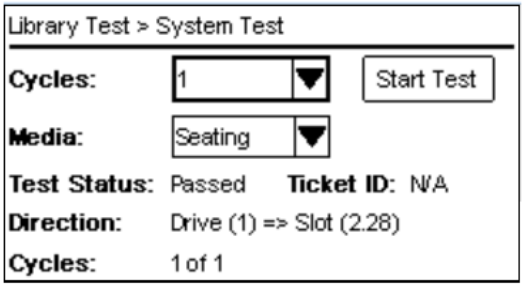


Other Library Tests like the Wellness Test or Element to Element Test are only available on the RMI. To run these tests please navigate to the **Maintenance > Library Tests** page on the RMI and select the test from the menu list.

5.5.1.1 System Test

To run the System Test, go to the **Maintenance > Library Tests > System Test** screen.

The System Test exercises overall library functionality by moving cartridges within the library.

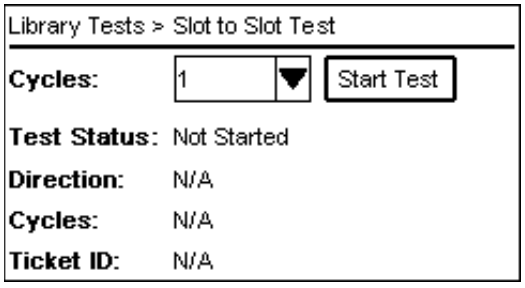


- During each cycle the library moves a cartridge from a full slot to an empty drive and then returns it to its original slot. You can select the number of cycles for the test. If the test is cancelled, the library returns the cartridge to its original slot.
- The library does not move cleaning cartridges during the test.
- The test operates across the entire library and does not consider partition configuration.
- During the test the library is off line.

5.5.1.2 Slot to Slot Test

To run the Slot to Slot Test, go to the **Maintenance > Library Tests > Slot to Slot Test** screen.

The Slot to Slot Test exercises overall library functionality by moving cartridges between magazine slots within the library.

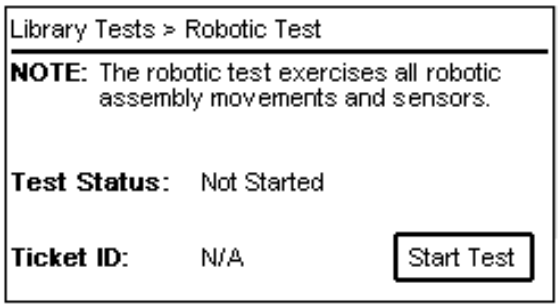


- During each cycle the library moves a cartridge from a full slot to an empty, randomly selected slot. You can select the number of cycles for the test. If the test is cancelled, the library completes the current move and then stops.
- The test operates across the entire library and does not consider partition configuration.
- During the test the library is off line.

5.5.1.3 Robotic Test

To run the Robotic Test, go to the **Maintenance > Library Tests > Robotic Test** screen.

The Robotic Test exercises overall robotic functionality by initializing motors and checking sensors and the barcode reader. During the test the library is off line.



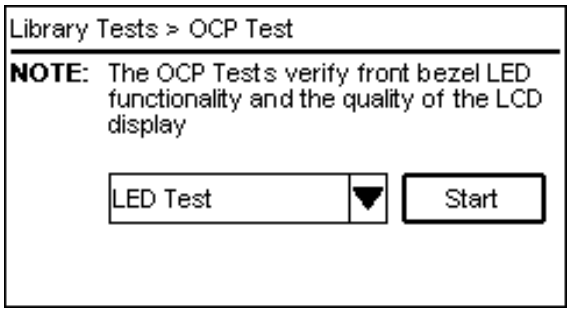
The field **Test Status** provides the following status information:

- Not Started
- Running
- Passed
- Aborted
- Failed (according Ticket ID for the failure is posted)

5.5.1.4 Operator Control Panel Test

To run the OCP Test, go to the **Maintenance > Library Tests > OCP Test** screen.

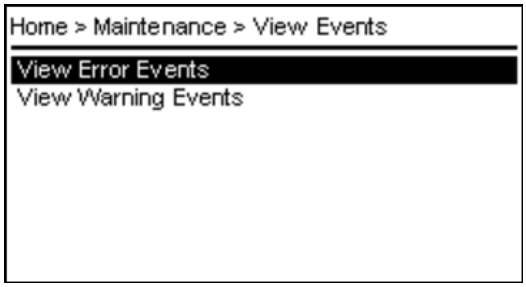
The OCP Test exercises functionality of the LEDs on the OCP. The LED Test switches every LED on/off sequentially left to right and right to left.
During the test the library is off line.



5.5.2 View Events

From the **Maintenance > View Events** screen you can get a quick overview of recent Error Events and Warning Events.

1. Navigate with the **Up**/**Down** buttons to select **Warning** or **Error Event Log** from the list

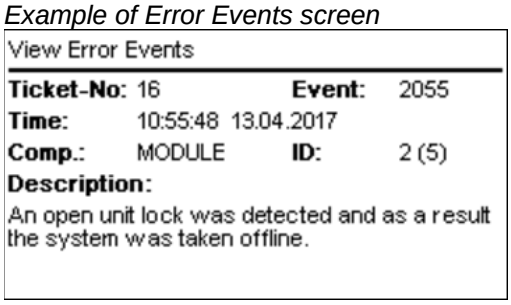


2. Press **Enter.**

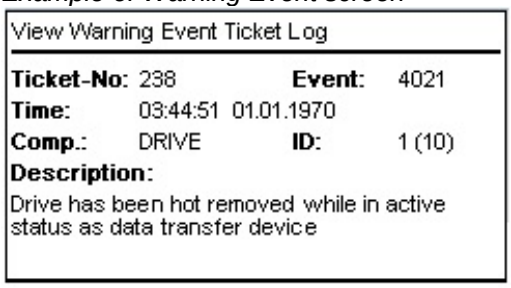
3. The screen shows these components:
   - **Ticket number**
   - **Event Code**
   - **Time**
   - **Component**
   - **ID**
   - **Description**

Small arrows on the left and right side indicate that the log contains more than one ticket. To go to the previous/next ticket use the **Left** or **Right** button.

Example of Error Events screen

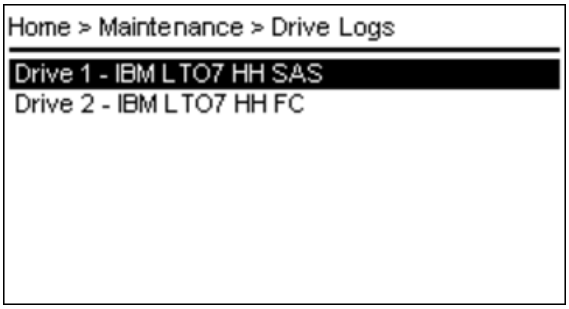


Example of Warning Event screen

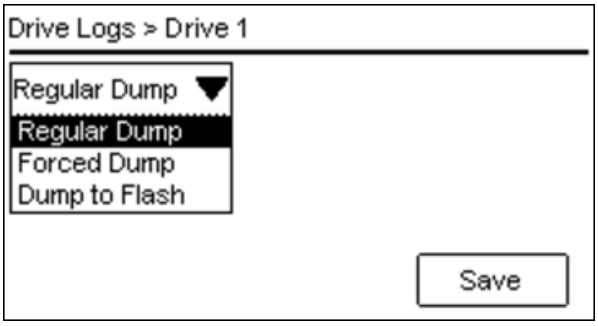


5.5.3 Drive Logs

From the **Maintenance > Drive Logs** page you can download logs from every drive that is installed in the library.



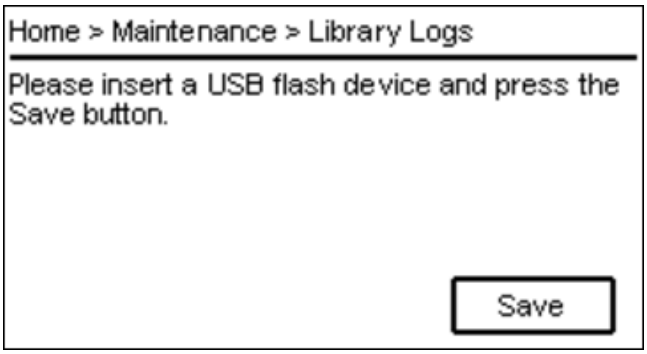
1. Use the **Up**/**Down** buttons to choose the drive and use **Enter** to confirm the selection.
2. On the next screen you can select the desired drive log type. Press **Enter** and use the **Up**/**Down** buttons to change the drive log type and confirm the selection with **Enter**. For the *Regular Dump* and *Forced Dump* log type, a USB flash device must be connected to the library USB port. The *Dump to Flash* type does not require a USB flash device, the log is written to the internal flash of the drive.



3. Press the **Down** button to go to the **Save** button.
4. Press **Enter** to start the download.

5.5.4 Library Logs

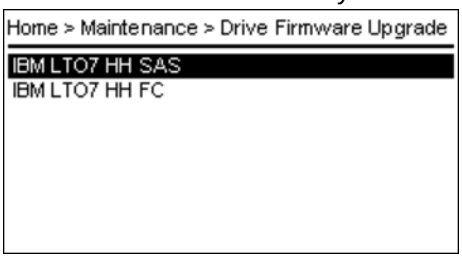
From the **Maintenance > Library Logs** pages you can download the library logs to a USB flash device.



1. Insert an USB flash device and press **Enter** to start the download.

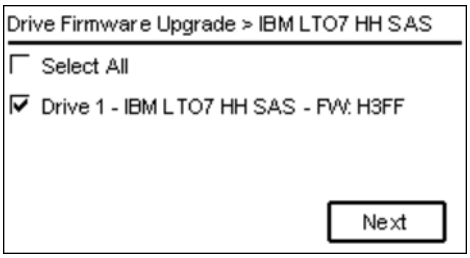
5.5.5 Drive Firmware Upgrade

From the **Maintenance > Drive Firmware Upgrade** page you can upgrade the firmware revision of every drive that is installed in the library.

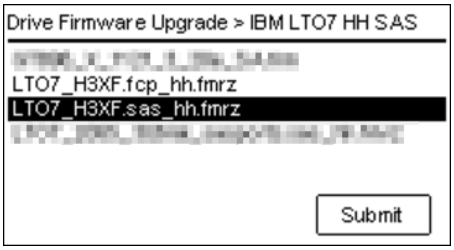


To update the drive firmware from the OCP, the drive firmware files needs to be available on a USB drive.

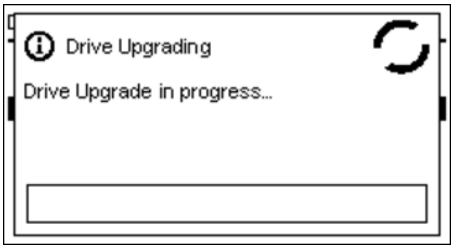
1. Use the **Up**/**Down** buttons to select a drive from the drive list.
2. On the next screen you can select either to upgrade all installed drives of the same type or one specific drive of the previously selected type. Navigate with the **Up**/**Down** buttons and confirm the selection with **Enter**.



3. Press the **Down** button to navigate to **Next.**
4. Use the **Up**/**Down** buttons to select the appropriate firmware file for the upgrade process and confirm the selection with **Enter**.



5. Press the **Down** button to navigate to **Submit**.
6. Press **Enter** to start the upgrade process.

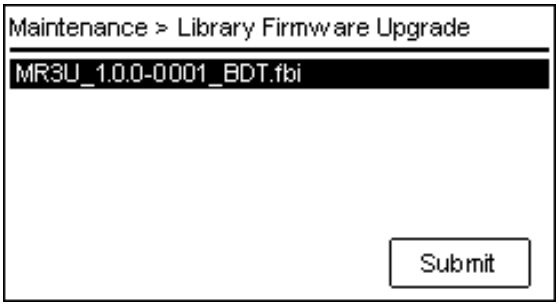


5.5.6 Library Firmware Upgrade

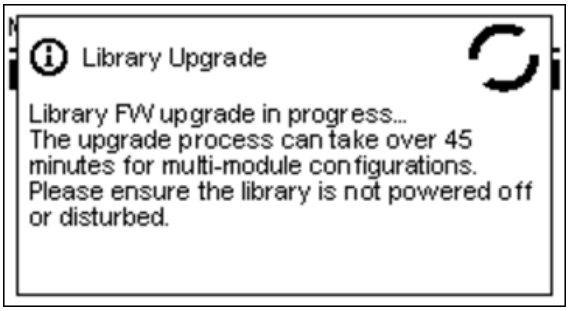
From the **Maintenance > Library Firmware Upgrade** page you can upgrade the firmware revision of the library. When the library firmware is updated, the library will also update the firmware of all connected expansion modules.

1. To update the library firmware from the OCP, the library firmware file needs to be on a USB drive. Insert the USB drive into the OCP and press **Enter**.

2. Use the **Up/Down buttons** to select the firmware file you want to use for the upgrade process. Confirm the selection by clicking **Enter**.



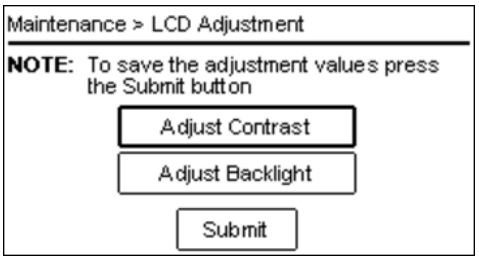
3. Press **Down** to go to **Submit.**
4. Press **Enter** to start the upgrade process.



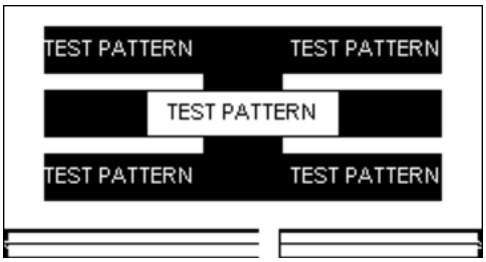
5.5.7 LCD Adjustment

On the **Maintenance > LCD Adjustment** page, the LCD display can be adjusted according to your personal needs. You can adjust the contrast and the backlight brightness of the LCD display

1. On the **Home > Maintenance** screen select **LCD Adjustment** and press **Enter**. This action opens the **Maintenance > LCD Adjustment** screen.



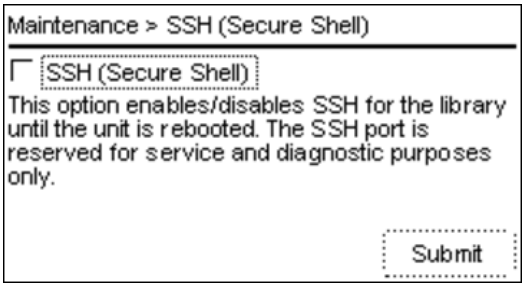
2. The **Adjust Contrast** button is active. Press **Enter** to open the contrast adjustment screen.



3. With the **Right** button you can move the slider to the right and increase the contrast, with the **Left** button you can move the slider to the left and decrease the contrast.
4. Press **Back** when you are finished to get back to the **Maintenance > LCD Adjustment** screen.
5. To go to the **Adjust Backlight** button press **Up** or **Down**. Press **Enter** to open the backlight adjustment screen.
6. Adjust the backlight with the **Left** or **Right** button.
7. Press **Back** to go back to the **Maintenance > LCD Adjustment** screen.
8. When you are finished with the adjustment press **Down**, then select **Submit**.
9. Press **Enter** to submit the new adjustment values.

5.5.8 SSH (Secure Shell)

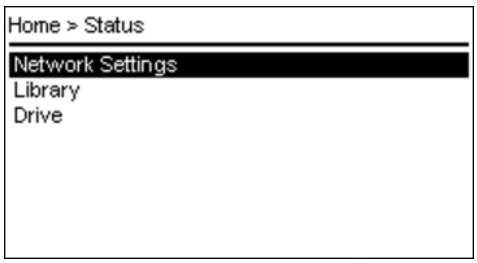
On the **Maintenance > SSH (Secure Shell)** page, you can enable the SSH port on the network interface.



1. Press **Enter** to check SSH (Secure Shell) check box. Now **Submit** is activated.
2. Press **Down** to navigate to the Submit button.
3. Press **Enter** to submit the change.

5.6 Status

Use the **Up/Down** buttons to go to the **Status** page on the Home screen to access status information.



The Status Menu provides the following submenus:

- Network Settings
- Library
- Drive

5.6.1 Network Settings

From the **Status > Network Settings** screen you can see the status of network settings.

This status page provides the following information:

- Host Name
- Domain Name
- Protocol

General Network Settings

- MAC Address
- Link Status
- Link Speed
- Duplex

IPv4

- DHCP
- Address
- Netmask
- Gateway
- DNS 1
- DNS 2

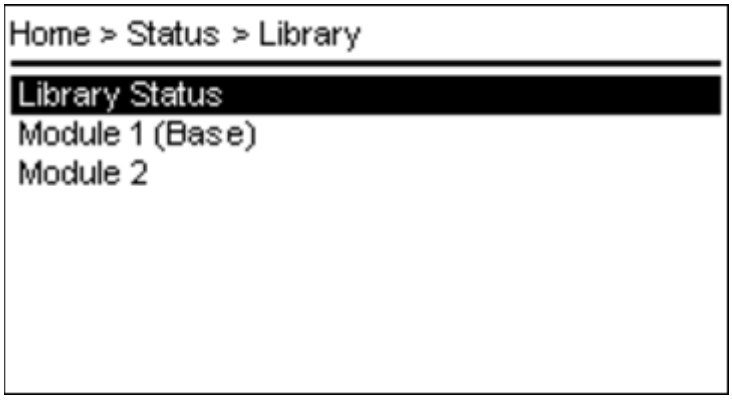
IPv6

- Method
- Address
- Prefix Length
- Gateway
- DNS 1
- DNS 2

5.6.2 Library

From the **Status > Library** screen you can see the library status information.

- Library Status
- Module Status for each single module in the stack (up to 7 modules can be possible)



The **Status > Library > Library Status** screen provides the following status information:

Library Information:

- Vendor
- Product ID
- Serial Number
- Base Firmware Revision
- Expansion Firmware Revision
- Robotic Hardware Revision
- Robotic Firmware Revision
- Barcode Reader Hardware Revision
- Barcode Reader Firmware Revision

Library Status:

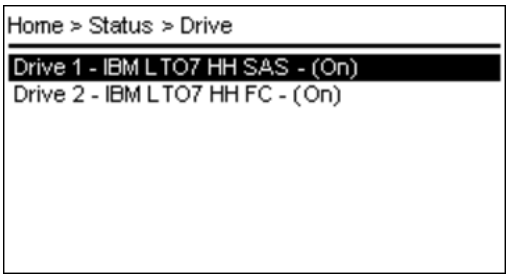
- Library Status - e.g. Scanning, Moving, Idle
- Total Power On Time - days/hours/minutes
- Cartridge in Transport - source slot of current moving cartridge
- Odometer
- Robotic Location - Position in Stack
- Shipping Lock - Locked/Unlocked

The **Status > Library > Module** screen provides the following status information:

- Controller Revision - Base/Expansion controller
- Power Supply Status
- Lower Power Supply - Present/Not Present
- Upper Power Supply - Present/Not Present

5.6.3 Drive

From the **Status > Drive** screen you can see the configuration and status of each drive that is installed in the library. Use **Up** and **Down** to select a drive from the drive list The drive list already provides the powered status of the drives (On, Off).



The **Status > Drive > Drive x** screen provides the following status information:

- Vendor
- Personality
- Firmware
- Generation
- Form Factor - HH, FH
- Interface Type - Fibre Channel (FC), SAS
- Manufacturer S/N
- Powered - On, Off
- WWNN
- Temperature
- Logical Library
- Encryption
- Cartridge - Barcode label, N/A if no cartridge loaded
- Module Location
- Cooling Fan Status - Active, Not Active

Fibre Channel Drive: Status for Port 0 and Port 1 (if present)

- WWPN
- Speed
- Port Type
- Port ID or Loop ID / ALPA
- Interface

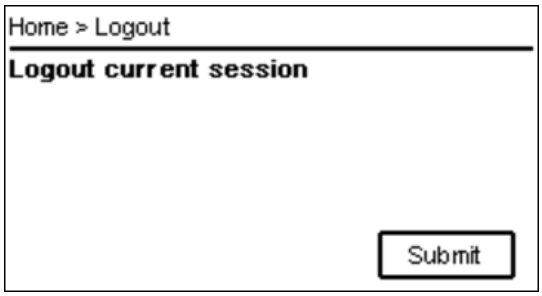
SAS Drive: Status for Port 0 and Port 1

- WWPN
- Interface
- Speed

5.6.4 Logout

Use the **Up/Down** buttons to go the **Logout** page on the Home screen.

On the **Logout** screen you can exit the current session on the OCP and return to the login screen.



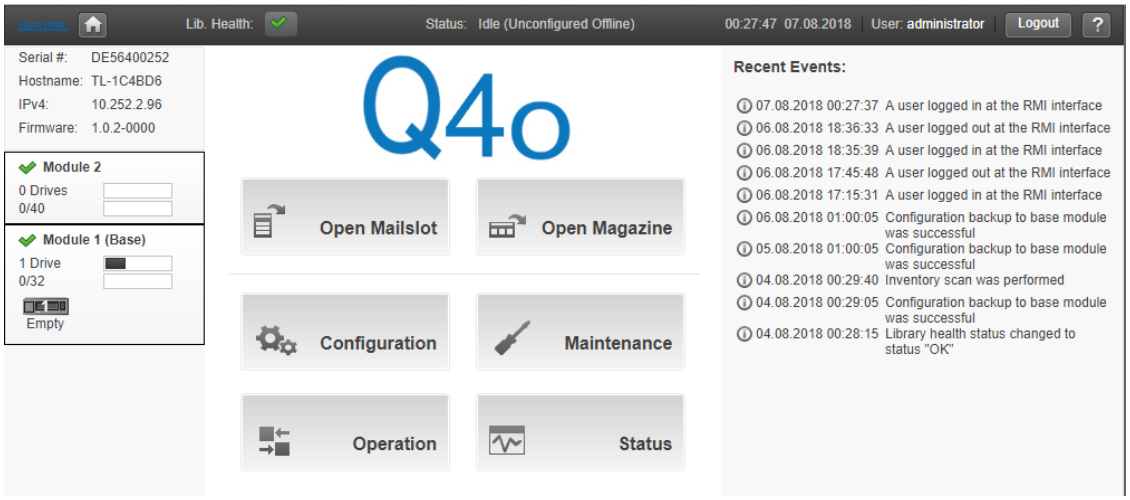
Press **Enter** to logout and return to the login screen.

6 Operating the library using the RMI

6.1 Using the Library Main Screen with the RMI

The library main screen is organized into the following regions:

- Top Banner - Contains the home button and displays the overall status and information about the library and user
- Left Pane - Displays the library identity and module status
- Center Pane - Provides access to operate and configure the library and to view additional status information
- Right Pane - Displays a log of recent events



6.1.1 Top Banner Elements

-  – **Home Icon** – Returns the RMI to the library home screen
- **Library Health** – An icon indicating the overall health status of the library
  -  – The green check mark icon indicates that all library components are fully operational and that no user intervention is required.
  -  – The yellow triangle exclamation point icon indicates that user attention is needed, but that the library can still perform most operations. Click the icon to display the event ticket log.
  -  – The red circle X icon indicates that user intervention is required and the library is not capable of performing some operations. Click the icon to display the event ticket log.
- **Status** – The status of the library's robot
  - **Idle** – The library's robot is ready to perform an action.
  - **Moving** – The library's robot is moving a cartridge.
  - **Scanning** – The library's robot is performing an inventory of cartridges.
  - **Offline** – The library's robot has been taken off line by the library.

- **Library Time & Date** – helpful when analyzing event logs and support tickets, and might be needed when contacting support.
- **User** – The user account for this session.
- **Logout** – Logs out of this session.
- **?** –– Accesses online help.

6.1.2 Left Pane Elements

- **Library Status** – Overall library status
    - **Serial #** – The Base Module serial number
    - **Hostname** – The library hostname
    - **Network Configuration** – The IP version (IPv4 or IPv6) and IP address
    - **Firmware** – The library firmware version
- **Module Status Overview** – A summary of each module's configuration and health. Click the module status area to select the module.
    - Module Health Icon
        - The green check mark icon indicates that the module is fully operational and that no user intervention is required.
        - The yellow triangle explanation point icon indicates that user attention is necessary, but that the library can still perform most operations.
        - The red circle X icon indicates that user intervention is required and the module is not capable of performing some operations.
    - Module Number – Modules are numbered based on their location in the physical library. The bottom module is **Module 1**. The Base Module is annotated with (**Base**).
    - Drive Status – The number of drives installed in each module and the health of each drive. Click on the drive to display drive configuration and status information in the center pane.
        - A black square indicates that the drive is fully operational and that no user intervention is required.
        - A yellow square indicates that user attention is necessary, but that the drive can still perform most operations.
        - A red square indicates that user intervention is required or the drive is not capable of performing some operations.
    - Magazine Slot Usage – The number of cartridge slots available and the number in use.
    - Drive Operation Status – The current drive activity for each drive in the module. The drive operation status is only displayed for the selected module.
        - Write – The drive is performing a write operation.
        - Read – The drive is performing a read operation.
        - Idle – A cartridge is in the drive but the drive is not performing an operation.
        - Empty – The drive is empty.
        - Encryp – The drive is writing encrypted data.

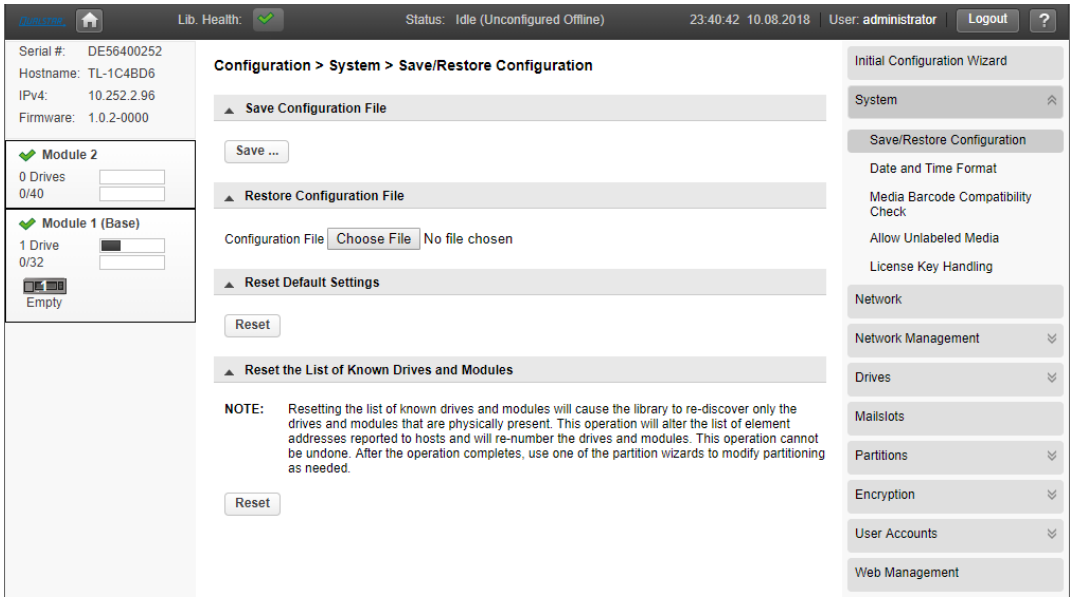
6.1.3 Center Pane Elements

- **Open Mailslot** – (Administrator user only) Click to unlock the mailslot on the selected module. Mailslots must be enabled before the slots can be used as mailslots. See "**Enabling or Disabling Mailslots**".
- **Open Magazine** – (Administrator user only) Click to unlock a magazine in the selected module. Only one magazine in the library can be open at a time. See "**Opening a Magazine**".
- **Configuration** – (Administrator user only) Click to configure the library. See "**Configuring the Library**".
- **Maintenance** – (Administrator user only) Click to access maintenance functions. See "**Maintaining the Library**".
- **Operation** – (Administrator user only) Click to access operation functions. See "**Operating the Library**".
- **Status** – Click to access status information. See "**Viewing Status Information**".
- **Service Area** – (Service user only) Click to access to functionality restricted to Service engineers.

6.2 Configuring the Library with the RMI

6.2.1 Saving, Restoring and Resetting the Library Configuration

Use the **Configuration > System > Save/Restore Configuration** page to save the library configuration settings to a file, restore the settings, or reset the library configuration to the default settings. The saved configuration database will make it easier to recover the library configuration if you need to replace the Base Module or Base Module Controller.
The feature Reset the List of Known Drives and Modules will do a re-discovery of installed hardware components.



Saving the library configuration to a file

1. Navigate to the **Configuration > System > Save/Restore Configuration** screen as shown above.
2. Click **Save.** Starts to download the configuration file to the browser or system running the RMI

Restoring the library configuration from a file

1. Navigate to the **Configuration > System > Save/Restore Configuration** screen.
2. Click **Browse** to navigate to and select the configuration file. The file has to be a zip file.
3. Select the file and press **Upload File & Restore.** Starts the uploading process and restores the configuration file from the system running the RMI.

Resetting the default settings

To reset the library configuration to the default settings, click **Reset Default Settings**. For the default settings, see "**Defaults and Restore Defaults Settings**".

Resetting the List of Known Drives and Modules

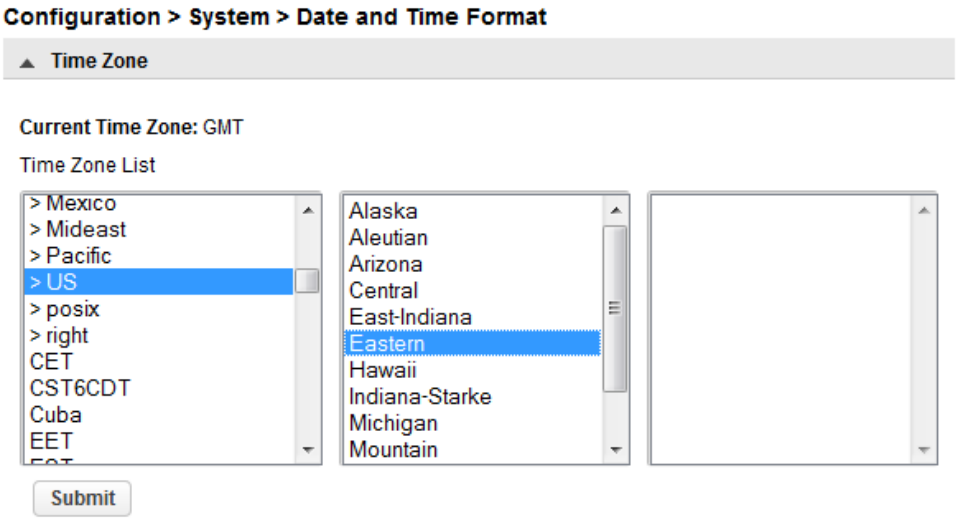
To reset the List of Known Drives and Modules, click **Reset**. Removes not present Modules and Drives from the library stack

6.2.2 Configuring the Date and Time Format

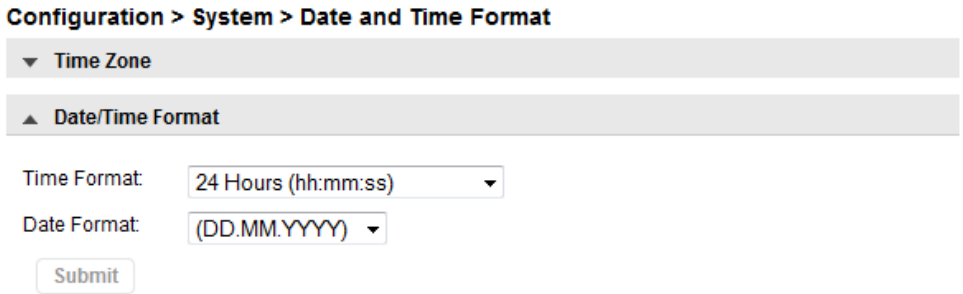
To configure the date and time format parameters navigate to the **Configuration>System > Date and Time Format** screen.

	NOTE	The library does not adjust its time for daylight savings time; the time must be adjusted manually.

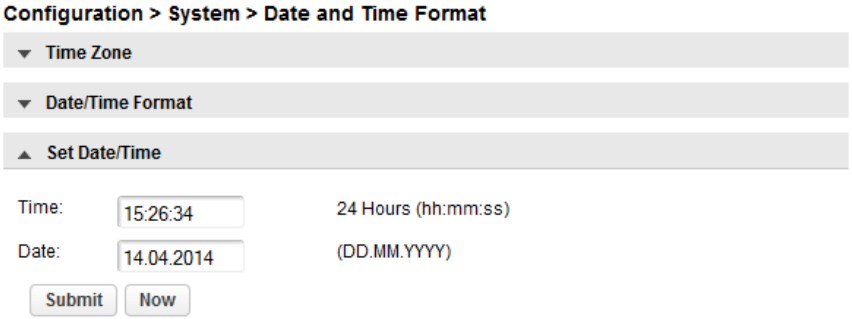
To set the Time Zone, select Time Zone. And select the desired zone.



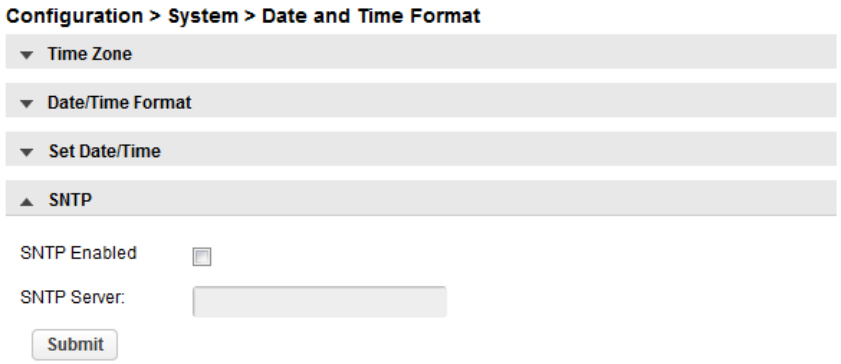
To set the date and time format, select Date/Time Format.



To set the current Date/Time, select Set Date/Time.



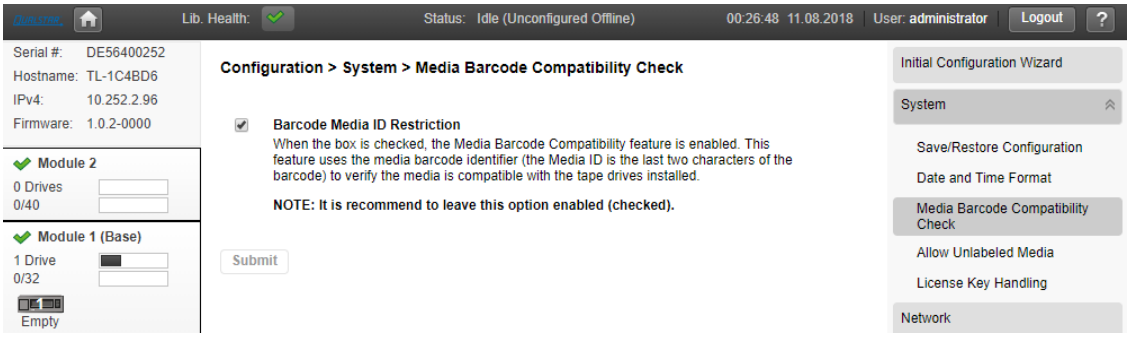
If the library has network access to an SNTP server. Click SNTP.



Check the SNTP checkbox. Enter the SNTP server IP address and click the Submit button.

6.2.3 Configuring Media Barcode Compatibility Checking

Use the **Configuration > System > Media Barcode Compatibility Check** page to enable or disable the barcode media ID check.



When **Barcode Media ID Restriction** is enabled, the library will only allow appropriate tape cartridges to be loaded into the appropriate tape drives. The barcode media ID is the last two characters of the barcode. For example, an LTO-6 labeled cartridge will not be allowed to move into an LTO-4 tape drive. When disabled, the library will move any tape to any tape drive. If the cartridge is incompatible with the tape drive, the library will display a message.

	NOTE	It is strongly recommended that all cartridges have barcode labels with the correct media identifier, and that the Barcode Media ID Restriction is enabled.

6.2.4 Configuring Allow Unlabeled Media

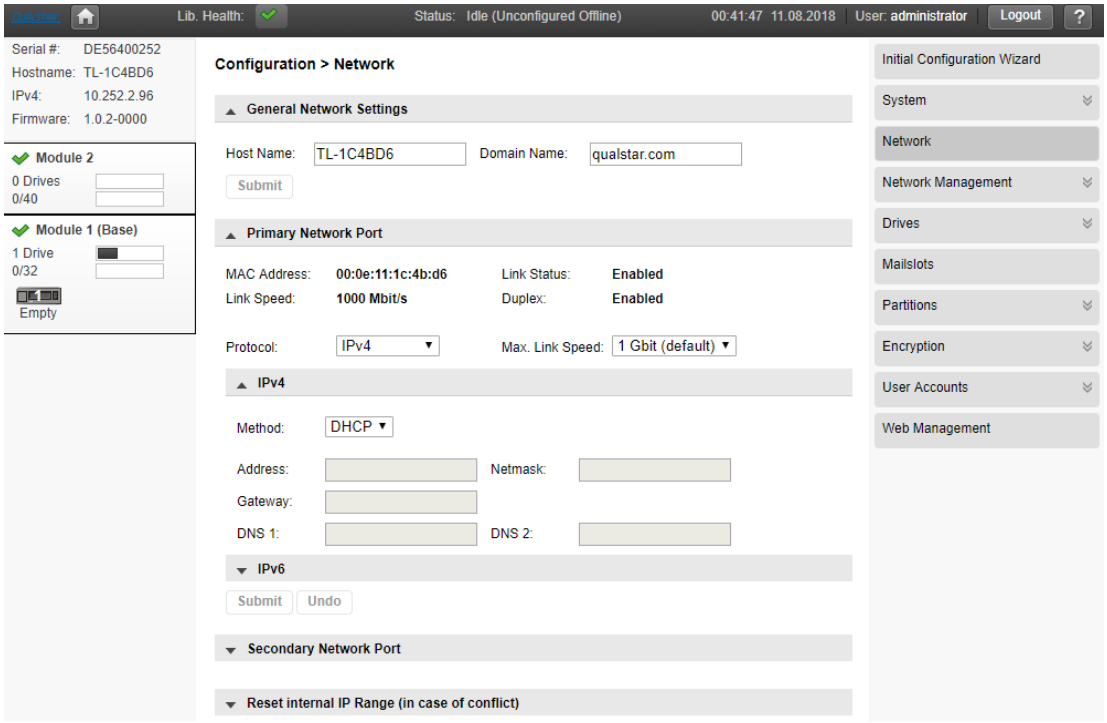
Use the **Configuration > System > Allow Unlabeled Media** page to enable or disable the detection of media without barcode labels.

This option should only be enabled if you **must** use media without labels. Please note that using media without labels will increase the duration of the inventory scan significantly.

	NOTE	It is strongly recommended that all cartridges have barcode labels with the correct media identifier, and that the Allow Unlabeled Media option be disabled.

6.3 Configuring the Library Network Settings

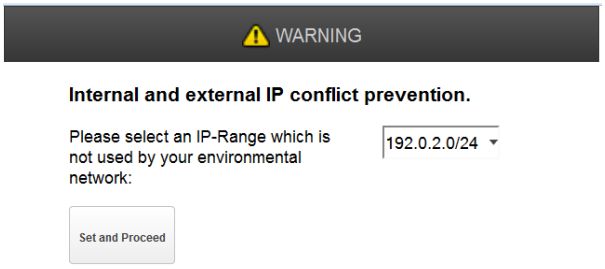
Use the **Configuration > Network** page to configure the library network settings.



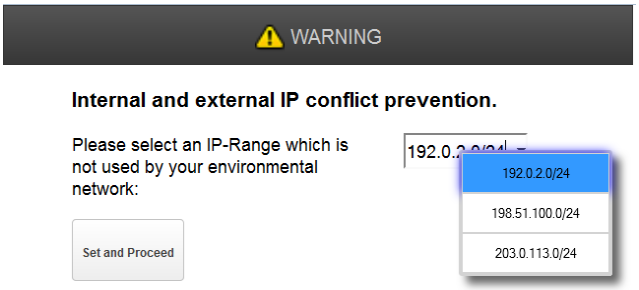
1. Navigate to the **Configuration > Network** screen.
2. Configure or update the **Host Name** and **Domain Name**. The RMI URL is *<Host Name>.<Domain Name>*.
3. Select the internet protocol to use for the library.
4. Configure the settings for the selected internet protocol.
5. To have the library obtain an internet address from a DHCP server, select DHCP, otherwise use the Static option and enter the required network information.
6. Click **Submit**.

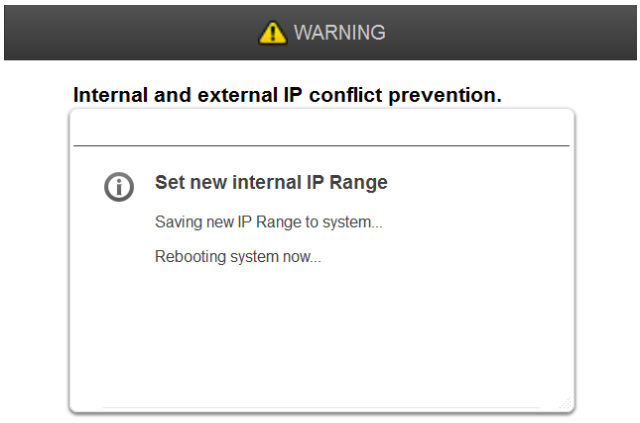
6.3.1 Network > Reset internal IP Range

For internal communication between modules the tape library uses an Ethernet connection with an internal IP address range. To prevent any conflict between the internal IP address range and external IP addresses it is required to select the internal IP range before the tape library gets connected to the external Ethernet port.



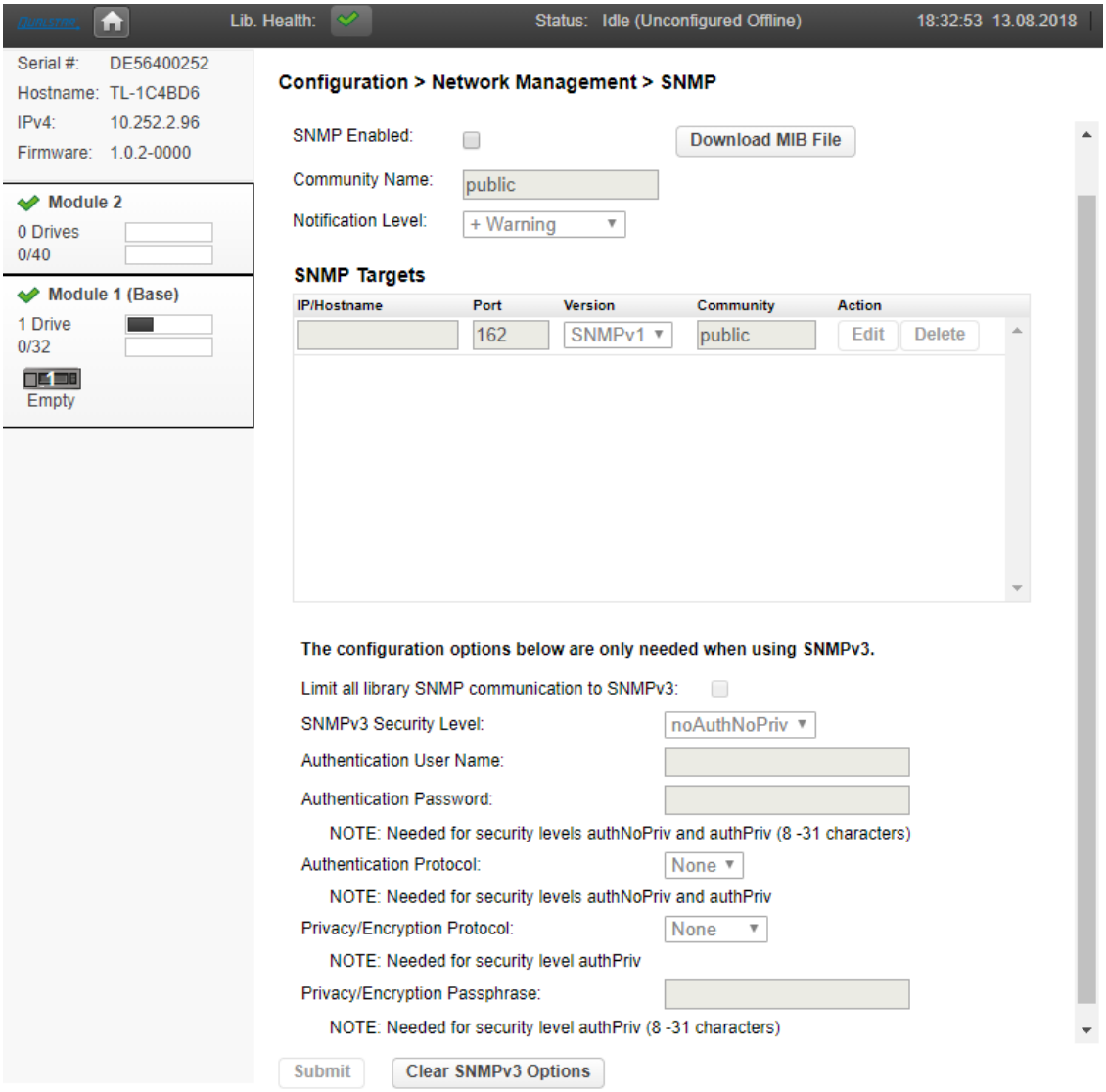
Please note: the last section of the IP address is not set because it will be set automatically by the library.





6.3.2 Configuring SNMP

Use the **Configuration > Network Management > SNMP** page to enable and configure SNMP (Simple Network Management Protocol), which allows applications to manage the device. The library supports both SNMP configuration and SNMP traps.



- **SNMP Enabled** – When checked, the library can be managed by computers listed in the SNMP Target IP Addresses field.
- **Community Name** – A string used to match the SNMP management station and library. It must be set to the same name on both the management station and the library. The default community name is *public*.
- **SNMP Targets** – List of configured SNMP targets.

To add an SNMP target or edit information for an SNMP target:

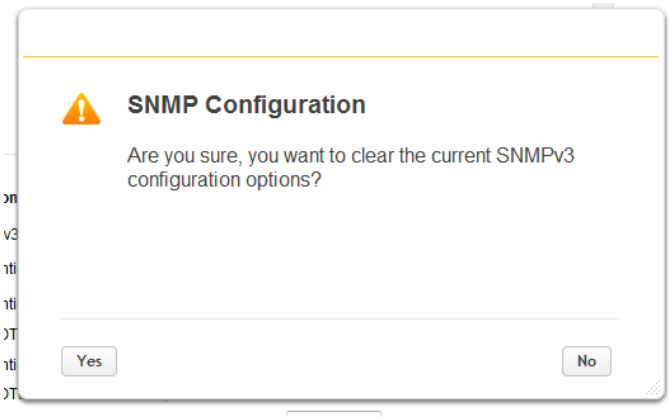
1. Click **Edit** for the appropriate SNMP target. When adding an SNMP target, click **Edit** next to a target without an IP/Hostname.
2. Enter the target IP address or hostname
3. Enter the port.
4. Select the SNMP version.
5. Enter the SNMP community string for the target.
6. Click **Submit**.

To delete an SNMP target:

1. Click **Delete** for the target to be deleted.
2. Click **Submit**.

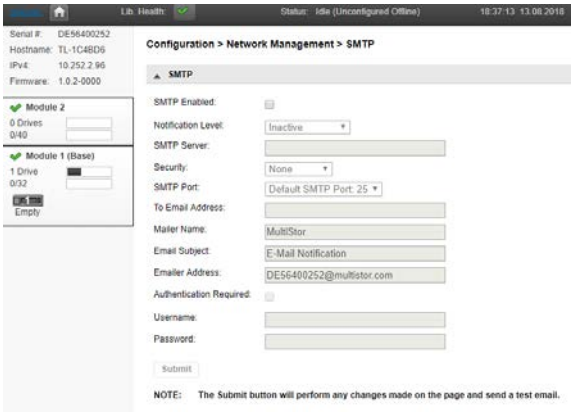
To clear SNMPv3 Options:

1. Click **Clear SNMPv3 options**
2. To confirm that you want to clear the SNMPv3 Options, click **Yes**



6.3.3 Configuring Event Notification Parameters

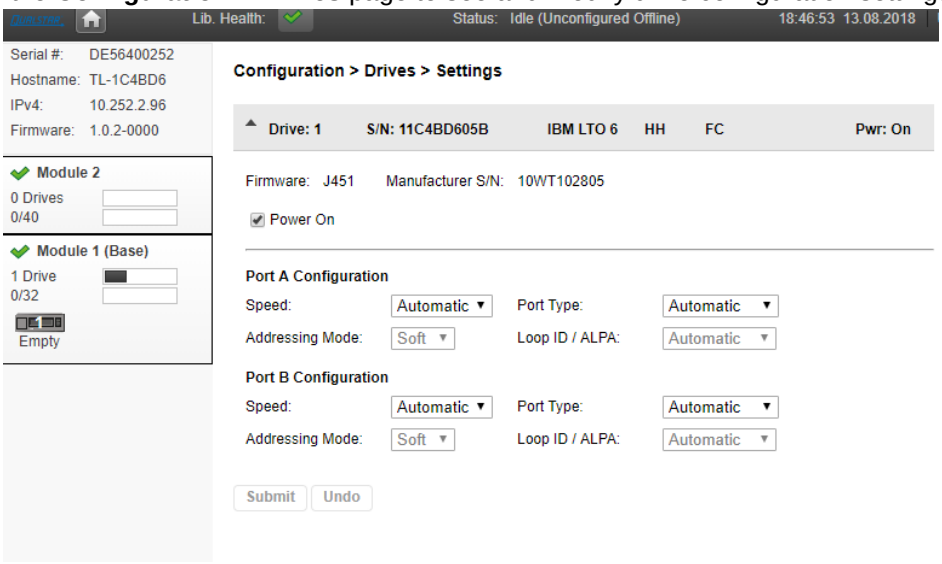
Use the **Configuration > Network Management > SMTP** page to enable SMTP (Simple Mail Transfer Protocol) functionality and configure e-mail notification of library events. The library must have network access to an SMTP server.



- **SMTP Enabled** – Check to enable SMTP. When checked, the remaining configurations are active.
- **Notification Level** – The types of events for which the library should send e-mail
    - **Inactive** – No events are sent.
    - **Critical** – Only critical events are sent.
    - **+ Warnings** – Only critical and warning events are sent.
    - **+ Configuration** – Only critical, warning, and configuration events are sent.
    - **+ Information** – All events are sent.
- **SMTP Server** – Hostname or IP address of the SMTP server
- **Security** – Security protocol for accessing the SMTP server
    - **None**
    - **SSL => SSL/TLS**
    - **TLS = STARTTLS**
- **SMTP Port** – SMTP server port. The default port for the selected protocol will be selected. You can choose one of the default ports or configure a custom port.
- **To Email Address** – The address to receive the reported events (for example firstname.lastname@example.com). Only one email address can be configured.
- **Mailer Name** – Name of the sender of the e-mail
- **Email Subject** – Subject line for the e-mail message
- **Emailer Address** – Return address to use for the e-mail message
- **Authentication Required** – When checked, a username and password are required to access the SMTP server.
- **Username** – User account for logging into the SMTP server when authentication is required
- **Password** – Password associated with the Username when authentication is required

6.3.4 Configuring Tape Drives

Use the **Configuration > Drives** page to see and modify drive configuration settings.



- Drive number – Drives are numbered from the bottom of the library up beginning with one. The drive currently hosting the SCSI communication for the library is designated with (LUN).
- Serial Number – The serial number assigned to the tape drive by the library. This serial number is reported to host applications. The serial number cannot be modified. Please note: this is not the serial number of the drive. The tape drive serial number is shown in the Manufacturer S/N field.
- LTO generation
    - LTO 6 Ultrium Tape Drive
    - LTO 7 Ultrium Tape Drive
    - LTO 8 Ultrium Tape Drive
- Drive interface
    - FC – Fibre Channel
    - SAS – Serial Attached SCSI
- **(Modified)** – When present indicates that a setting has been changed. To apply the changes, click **Submit**. To reset all changed fields to their previously saved values, click **Undo**.
- **Pwr** – Indicates whether the drive is currently powered on or off.
- **Firmware** – The version of firmware currently installed on the drive.
- **Manufacturer S/N** – The tape drive serial number. Use this serial number when working with Qualstar Technical Support.
- **Power On** – Checked when the drive is powered on.

	NOTE	Always power off a tape drive before removing it from the library or moving it to a new location within the library.

- **Port configuration (FC only)** – Drive port configuration.
    - **Speed** –The currently selected ◦ speed. The default is Automatic.
    - **Port Type**
        - **Automatic**
        - **Loop** – Enables selection of the Addressing Mode.

            Addressing Mode – Addressing Mode can be set to **Soft** or **Hard**

            ALPA – When Addressing Mode is set to Hard, you can choose an ALPA address from the dropdown list.
        - **Fabric**

To modify the configuration of one or more tape drives:

1. Modify any of the configurable values.
2. Click **Submit**.

6.4 Enabling or Disabling Mailslots

Use the **Configuration > Mailslot** page to view the status of each of the mailslots. To change the state, click the button for the mailslot and then click **Submit**. Slots not enabled as mailslots are available as storage slots.

Configuration > Mailslots

Module	Mailslot Magazine	
Module 2	Disabled	Enable
Base	Enabled	Disable

6.5 Configuring Library Partitions

The library has a flexible partitioning scheme with the following restrictions:

- Each partition must have at least one tape drive. One drive in each partition will host the library LUN for the partition.
- The maximum number of partitions is 21.
- Magazine slots are allocated in five-slot groups.
- Mailslots must be enabled for a module before they can be allocated to a partition.

A partition does not need to have a mailslot. If a partition does not have a mailslot, the magazine must be accessed to import or export cartridges. Opening a magazine takes the library offline.
Although the mailslot magazine is shared between partitions, the mailslot elements are assigned individually to partitions. The Wizards will guide you through the partition configuration process. The wizards are only accessible from the RMI.

- Basic Partition Wizard – Use this wizard if you want to simply specify the total number of desired partitions and allow the wizard to assign drives and storage slots as evenly as possible to the requested partitions. Any extra drives or slots are assigned to the first partition.
    - Use the Basic Partition Wizard to configure partitions that will have similar resources **OR** to configure the barcode label behvior for a library with a single partition.

- Expert Partition Wizard – You add or remove partitions from the current partitions configuration and then edit each partition configuration to add or remove library resources.
    - Use the Expert Partition Wizard to configure partitions that will have different resources or to adjust resource assignments for existing partitions or those created with the Basic Partition Wizard.

	**CAUTION**	The library will go off line while partitions are being configured. Ensure that all host operations are idle before running a partition wizard.

6.5.1 Using the Basic Partition Wizard

1. Click **Configuration** > **Basic Wizard** to start the wizard.
2. The **Information** screen displays the existing partitions, which will be deleted by the wizard.
3. Click **Proceed** and then click **Next**.
4. The **Create Partition Scheme** screen displays the number of slots, mailslots, tape drives, and maximum available partitions for the library.

	**NOTE**	If you want to enable or disable the mailslots, **Cancel** out of the wizard and update the mailslot configuration before configuring partitioning.

1. Select the number of partitions.
2. Select the number of barcode characters reported to the host application. This option provides interchange compatibility with libraries with more limited barcode reading capabilities. The maximum length is 15 and the default is 8. This configuration will apply to all partitions.

	**NOTE**	The industry standard length for LTO barcode labels is eight characters. Barcode labels longer than eight characters might scan incorrectly. Cleaning tapes must have a prefix of ‘CLN’.

3. Select whether to report the barcode characters from the left or right end of the barcode label to the host application when reporting fewer than the maximum number of characters. For example, when reporting only six characters of the barcode label 12345678, if alignment is left, the device will report 123456. If alignment is right, the device will report 345678. The default is left. Click Next.
4. The **Finish Configuration** screen displays the proposed allocation of library resources into partitions.

    - To update the configuration, click **Back**.
    - To have the wizard configure the partitions as shown, click **Finish**.
    - After the wizard reconfigures the partition, the library will come on line automatically.
    - To exit the wizard, click **Cancel** or **Exit**.

	**TIP**	You can use the Expert Partition Wizard to adjust the allocation of resources after creating the partitions with the Basic Partition Wizard.

6.5.2 Using the Expert Partition Wizard

Click **Configuration > Expert Wizard** to start the wizard. The **Create Partition Scheme** screen lists the current partitions, if any, and the free resources. Use the wizard to configure one partition at a time.

	NOTE	If you want to enable or disable mailslots, **Cancel** out of the wizard and update the mailslot configuration prior to initiating the Partition Wizard.

6.5.2.1 To Add a Partition,

Click Add and then click Next.

	NOTE	The **Add** button will only be active if there are available resources. If there are no available resources, select edit a partition and release resources from it or remove a partition that contains extra resources

1. Enter a name for the partition.

2. Select the number of barcode characters reported to the host application. This option provides interchange compatibility with libraries with more limited barcode reading capabilities. The maximum length is 15 and the default is 8. This configuration will apply to all partitions.

	NOTE	The industry standard length for LTO barcode labels is eight characters. Barcode labels longer than eight characters might scan incorrectly. Cleaning tapes must have a prefix of 'CLN'.

3. Select whether to report the barcode characters from the left or right end of the barcode label to the host application when reporting fewer than the maximum number of characters. For example, when reporting only six characters of the barcode label 12345678, if alignment is left, the device will report 123456. If alignment is right, the device will report 345678. The default is left. Click **Next**.
4. In the **Assign Storage Slots** screen, use the >> and << buttons to assign slots to the new partition and then click **Next**.
5. In the **Assign Mail Slots** screen, use the >> and << buttons to assign mailslots to the new partition and then click **Next**.
6. Individual mailslot elements cannot be shared between partitions. Importing or exporting cartridges in a partition without an assigned mailslot will require magazine access, which will take the library off line.
7. In the **Assign Drives** screen, use the >> and << buttons to assign drives to the new partition and then click **Next**.

   If the partition has multiple tape drives, the lowest numbered drive in the partition will host the SCSI communication for the changer. If you want to select a different drive to host the SCSI communication for the changer, select the desired drive and then click **Next.**
8. Verify the partition configuration and then click **Finish**.
9. After the wizard reconfigures the partition, the library will come on line automatically.

6.5.2.2 To Remove a Partition:

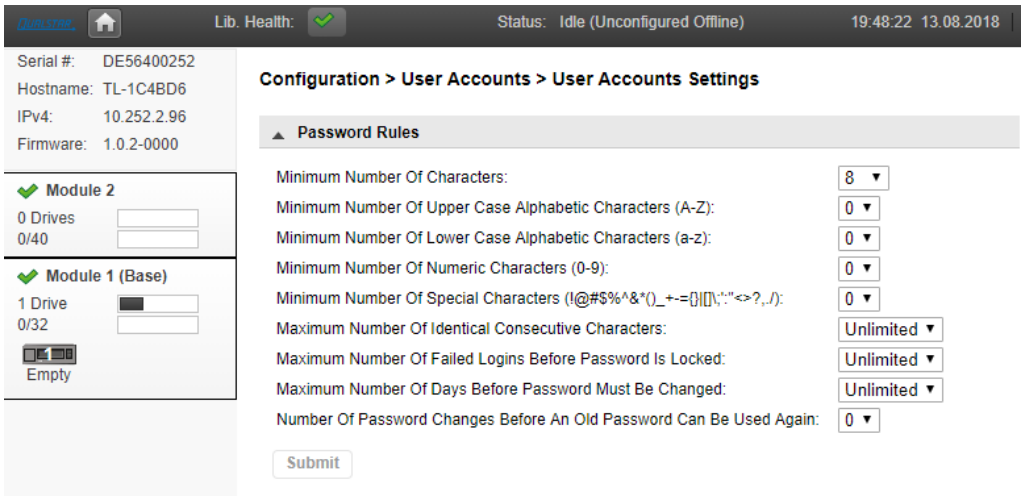
1. Select the partition, click Remove, and then click **Next**.
2. Verify that you want to remove the partition and then click **Finish**.
3. After the wizard removes the partition, the library will come on line automatically.

6.5.3 Configuring Passwords for User Accounts

Use the **Configuration > User Accounts** page to configure the password settings for the library. There are two types of accounts you can configure.

- User – The *user* account allows access to library status information and does not allow access to configuration, maintenance, or operation features. A password is not required for the user account. Setting a user password restricts access to status information to only those who know the user password.
- Administrator – Setting an administrator password provides access to the administrator functions of the RMI and restricts access to administrator functions to only those who know the administrator password. The library initially has a default administrator password of “adm001”, which allows unrestricted access to all administrative functions through the RMI. Please note, the administrator password can only be changed from the RMI.

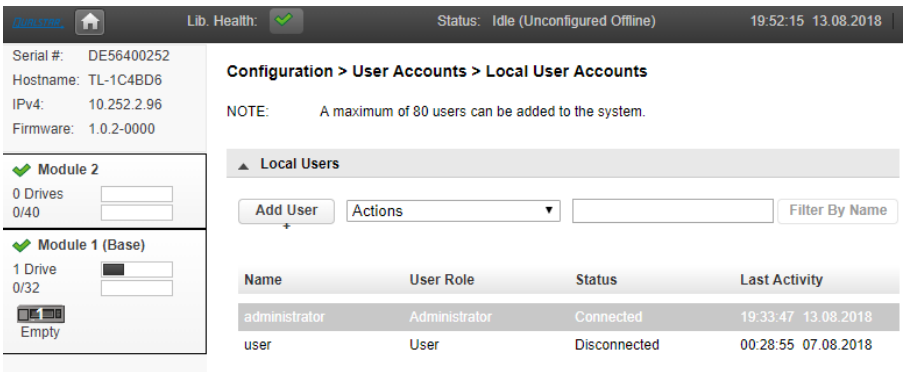
NOTE Before adding new Local User accounts or editing the password of the default User or Administrator accounts please take note of the Password requirements displayed in the **Configuration > User Accounts > User Accounts Settings** page. If the New Password does not meet the requirements set on this page the library will **NOT** allow you to click the modify or add button.



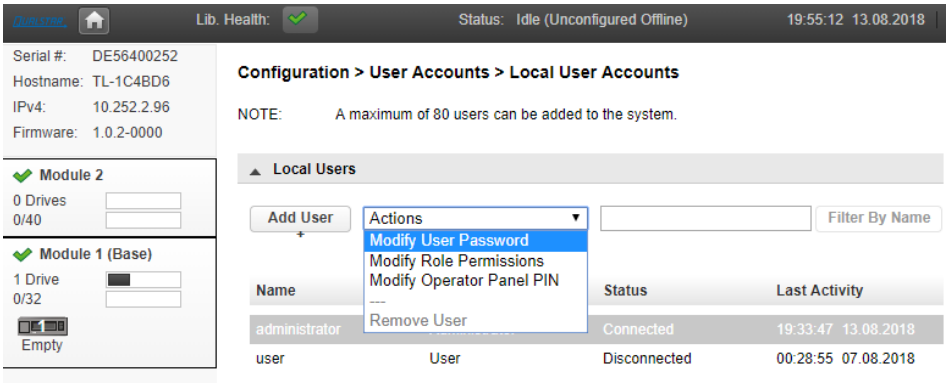
After reviewing and updating the Password Rules as desired navigate to the **Configuration > User Accounts > Local User Accounts** page.

To modify the password of an existing account,

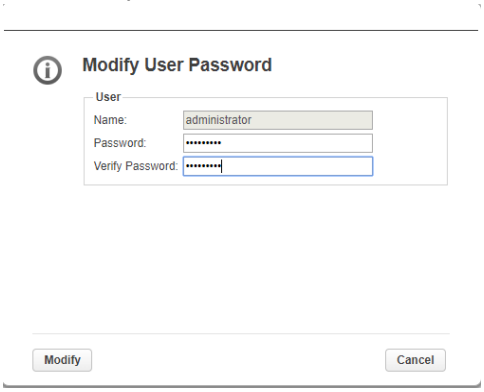
- Select the account from the list



- Click the down arrow in the Actions box and choose the desired operation



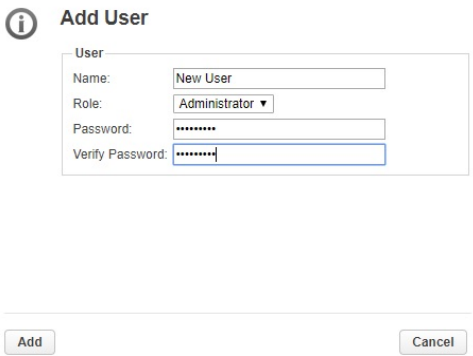
- Enter the New Password.
- Verify the New Password.
- If the new password satisfies the Password Rules you can click the Modify button.



- If the Modify button remains greyed out, the new password either does not satisfy the Password Rules or the password and verify password fields do not match.

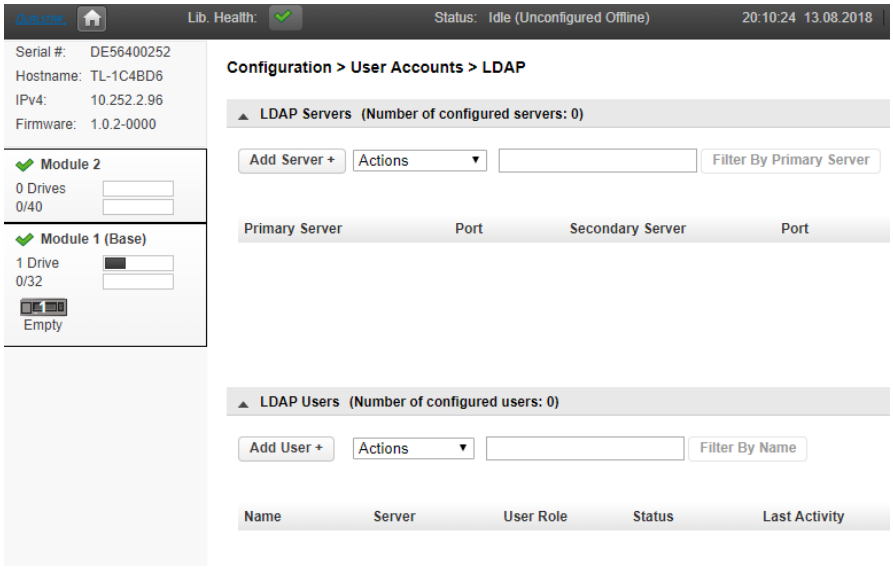
To add a new User,

- Click the Add User button.
- Enter the Name of the new user.
- Select the Account Type, User or Administrator
- Enter the Password.
- Verify the Password.
- Click the Add button.

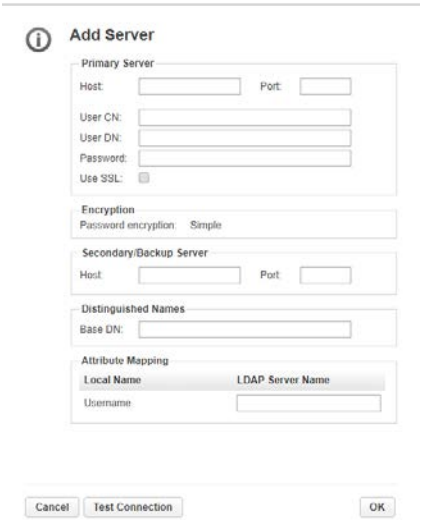


- If the Add button remains greyed out, the new password either does not satisfy the Password Rules or the password and verify password fields do not match.

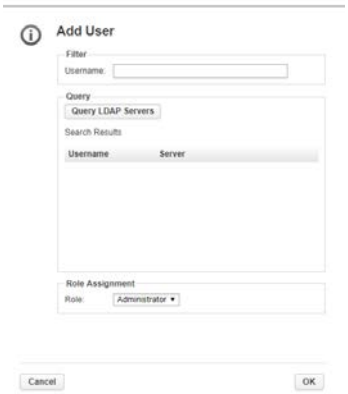
To use LDAP to validate user accounts navigate to **Configuration > User Accounts > LDAP**



Add your LDAP server information.

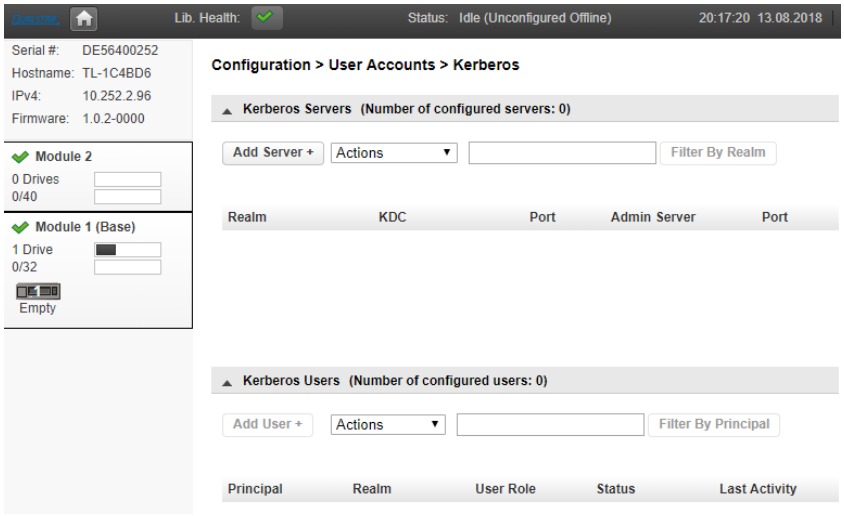


Make sure to click Test Connection to verify connectivity.
Click OK once completed.
After adding the LDAP server information, you can add a User.

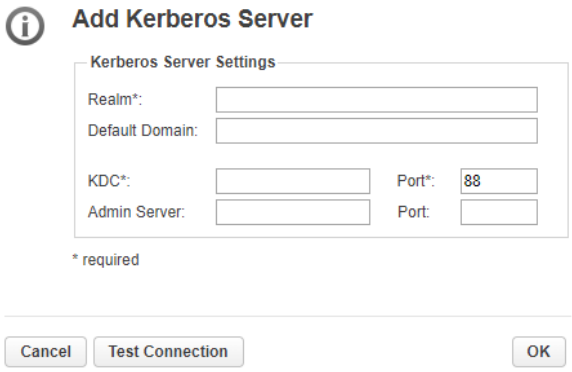


Click OK once done.

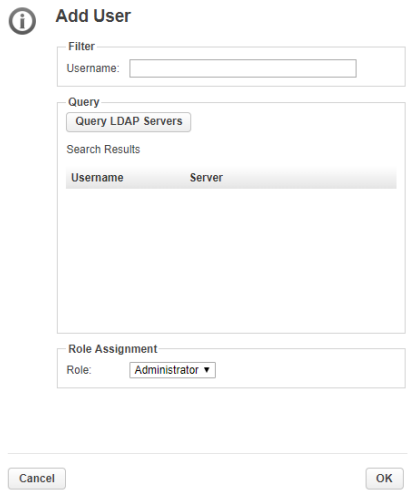
To use Kerberos to validate user accounts navigate to **Configuration > User Accounts > Kerberos**



Add your Kerberos server information.



Make sure to click Test Connection to verify connectivity.
Click OK once done.
After adding the Kerberos server information, you can add a User.



Click OK once done.

6.5.4 Restricted RMI Login

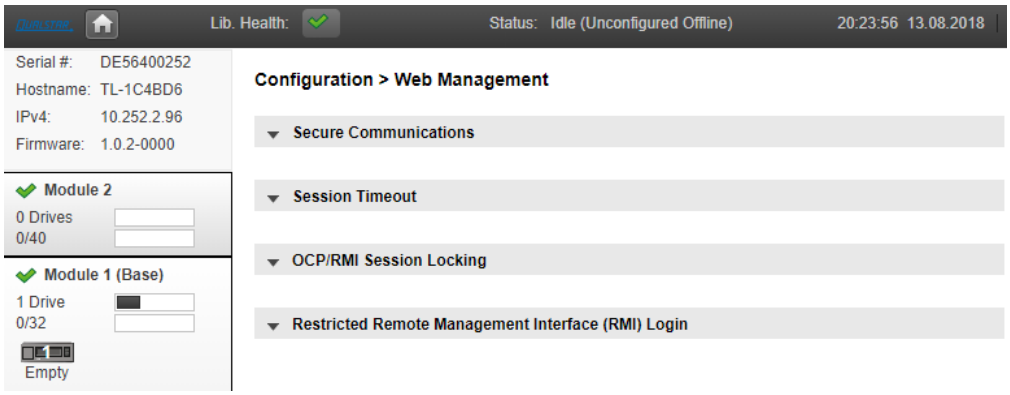
The administrator has the possibility to set login restrictions for administrator and security login. If restriction mode is enabled the administrator and the security user are not allowed to login via RMI. The administrator has to disable the restriction mode by logging into the operator control panel (OCP)

Only the administrator is allowed to set and reset the restricted RMI login.

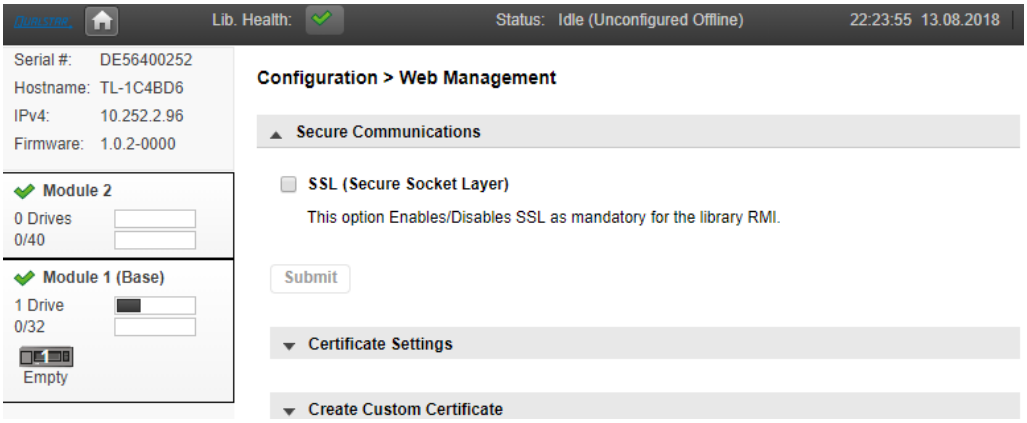
Allow magazine and mailslot access
The administrator can give the user the right to have access to mailslot and/or magazines by setting the appropriate checkbox.

6.6 Configuring Web Management Options

The library offers several Web Management options. To access these options, navigate to **Configuration > Web Management**

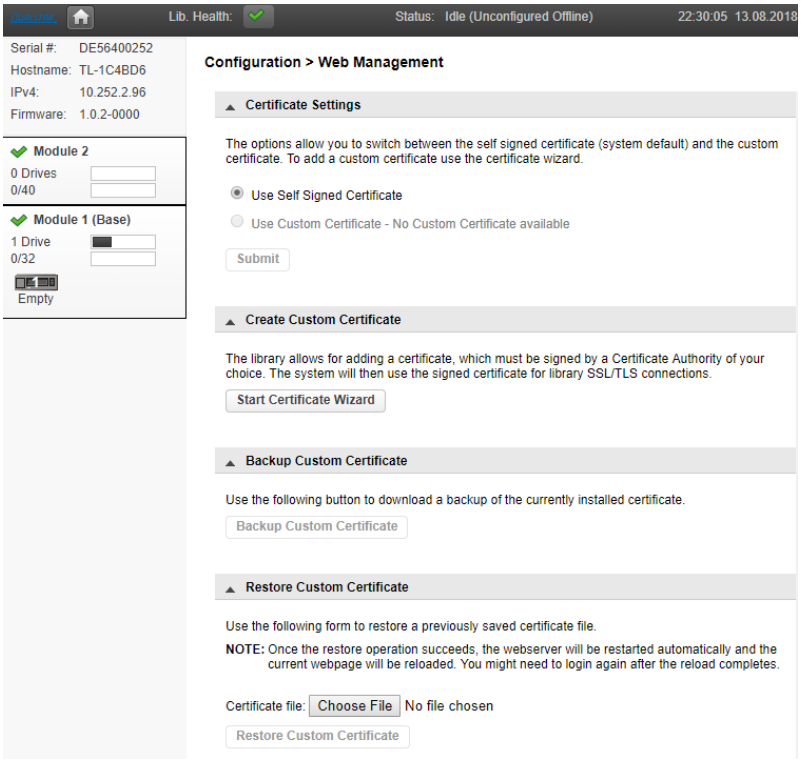


To configure different Security options, select Secure Communications.



To enable/disable SSL, select the checkbox next to SSL.

The Q40 offers different Certificate options:



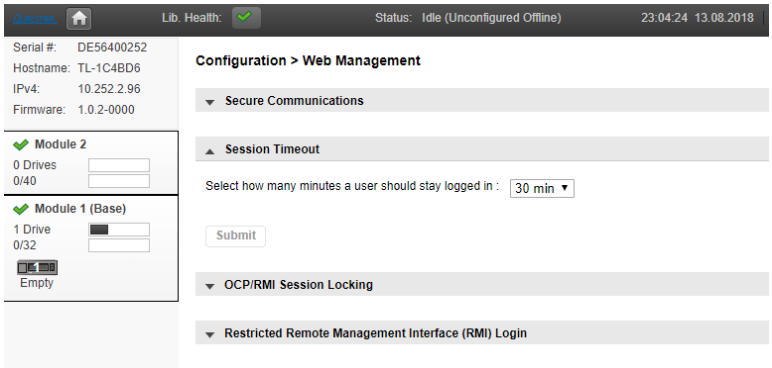
You can change the Certificate assigned to the library. The default setting of the library uses the library's self-signed Certificate.

Select the Start Certificate Wizard button to create your own certificate.
Follow the prompts to create and deploy the new certificate.

Once the Custom Certificate has been created and deployed click the Backup Custom Certificate button to back up the certificate.

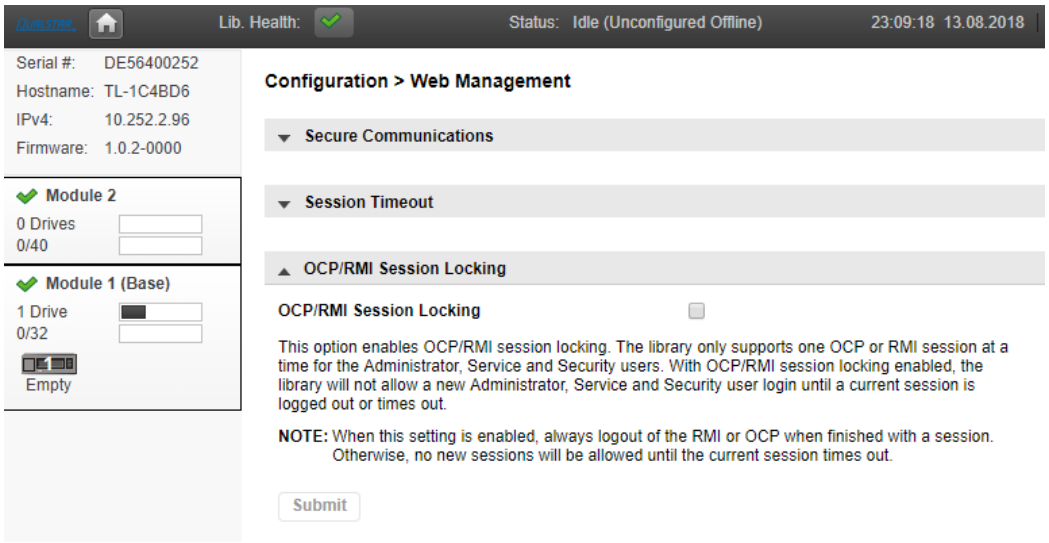
Use the Restore Custom Certificate option to restore a previously saved certificate file.

To configure how long an inactive user should be kept logged in select the **Session Timeout** page.



The default setting is 30 minutes. If you want to change the timeout period click the down arrow and choose 5 Min or 30 Min.
Click Submit to save the change.

OCP/RMI Session Locking can be used to prevent users from logging into the library until the current user logs out of the OCP/RMI.



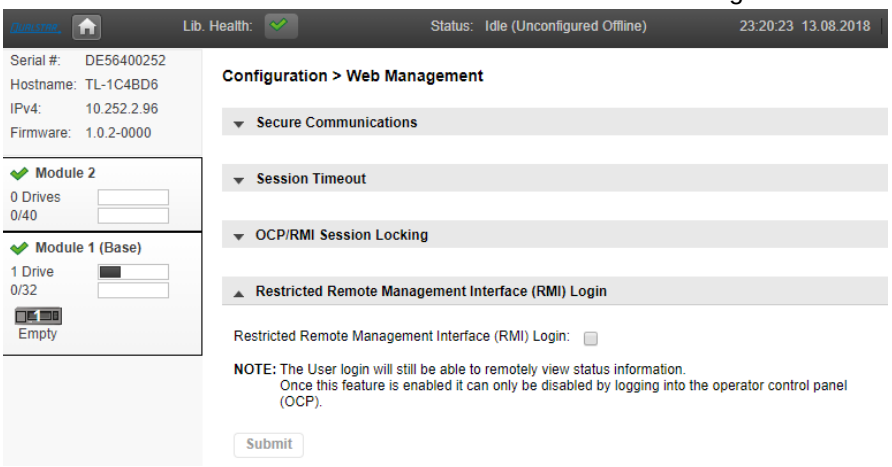
	NOTE	When Session Locking is enabled, users must always logout of their RMI/OCP session. Otherwise, no new sessions will be allowed until the session timeout expires.

6.6.1 Restricted RMI Login

The administrator has the option to restrict RMI access. If restriction mode is enabled, User accounts can continue to login and view library status information, however, administrator and security accounts are not allowed to login via the RMI.

The administrator has to disable restriction mode by logging into the operator control panel (OCP)

Only the administrator is allowed to set and reset the restricted RMI login.



6.7 Maintaining the Library on the RMI

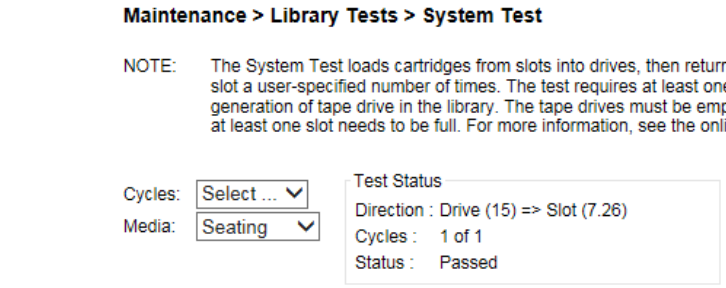
From the Home screen, click **Maintenance** to access the library's maintenance features.

6.7.1 System Test

The system test exercises overall library functionality by moving cartridges within the library.

- During each cycle the library will move a cartridge from a full slot to an empty drive and then return it to its original slot. You can select the number of cycles for the test. If the test is cancelled, the library will return the cartridge to its original slot.
- The library will not move cleaning cartridges during the test.
- During the test the library is offline.

CAUTION The test can move cartridges between partitions.



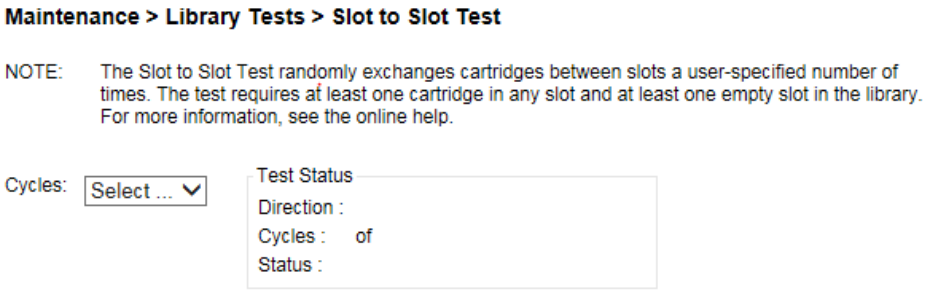
To run the system test, navigate to the **Maintenance > Library Tests > System Test** page, select the number of cycles and then click **Start Test**.

6.7.2 Slot to Slot Test

The slot to slot test randomly exchanges cartridges between slots to verify that the library is operating correctly. At the end of the test, the cartridges are NOT returned to their original slots. If a tape is moved to an incompatible drive, the drive will reject the tape, as designed.

CAUTION The test can move cartridges between partitions.

For service and diagnostics, use the robotic test.

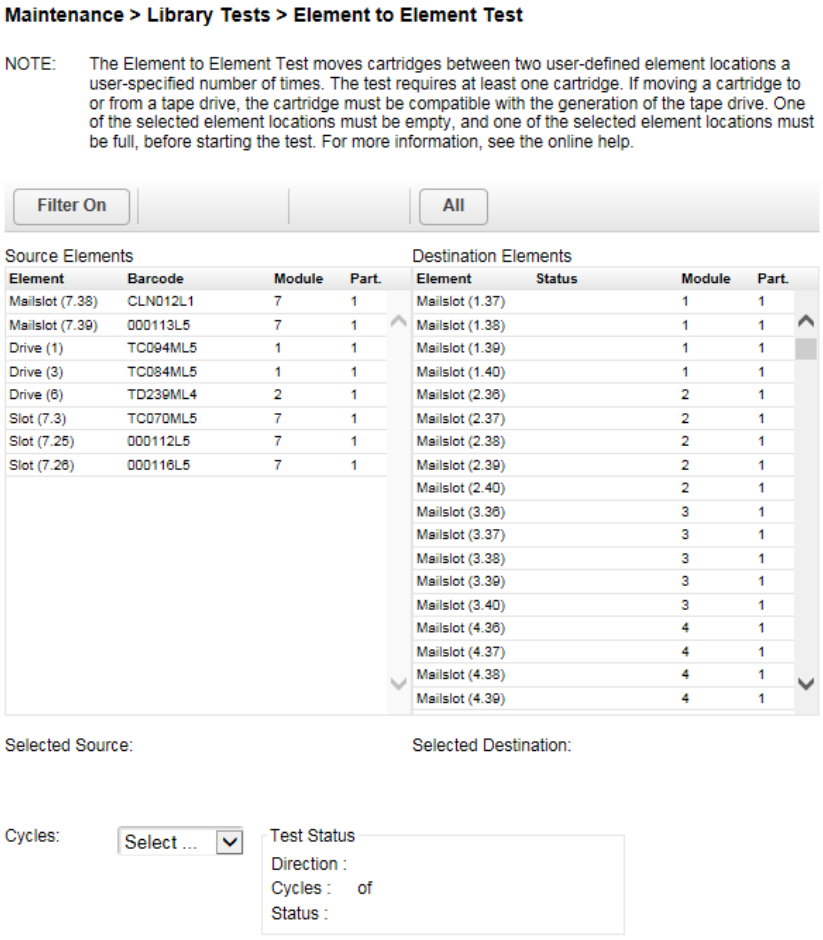


To run the slot to slot test, navigate to the **Maintenance > Library Tests > Slot to Slot Test** page, select the number of cycles and click **Start Test**.

6.7.3 Element to Element Test

The element to element test moves a selected cartridge to a selected slot or tape drive, and then returns it to the original slot. You can select the number of times to move the selected cartridge to the destination location and back.

The element to element test is intended to show that the library is operating correctly. To diagnose problems with the robotic assembly or verify that it has been correctly replaced, use the robotic test.



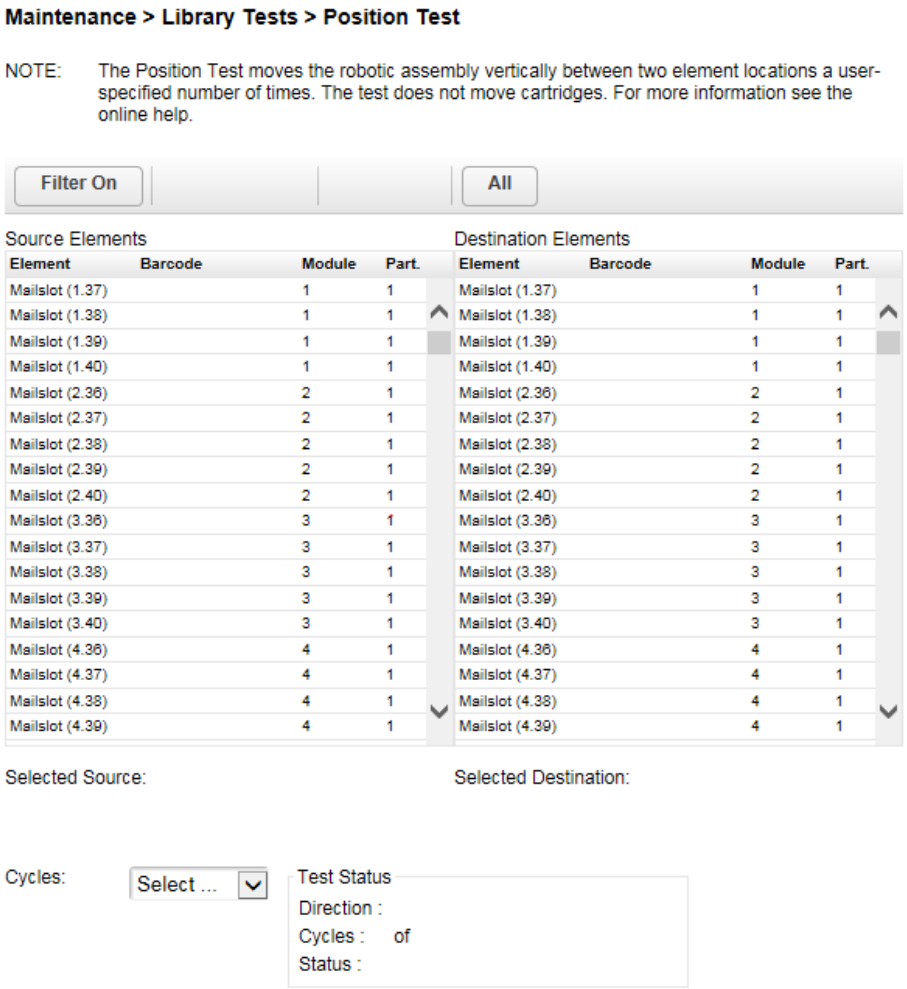
To run the element test:

1. Navigate to the **Maintenance > Library Tests > Element to Element Test** screen.
2. Select a cartridge from the **Source Elements** list.
3. To select from a subset of the cartridges:
    1. Click **Filter On**.
    2. Enter characters into the search box and then click **Search**.
4. The **Source Elements** list is updated to only include cartridges with a barcode label including the search characters.
5. Select a location from the **Destination Elements** list.
6. Select the number of cycles.
7. Click **Start Test**.

6.7.4 Position Test

The position test moves the robotic assembly vertically between two element locations. The test does not move cartridges. You can select the number of times to move the robotic assembly between two element positions.

The position test is intended to show that the vertical movement of the robotic assembly is operating correctly. To diagnose problems with the robotic assembly itself or verify that it has been correctly replaced, use the robotic test.



To run the position test:

1. Navigate to the **Maintenance > Library Tests > Position Test** screen.
2. Select a source location from the **Source Elements** list.
3. Select a destination location from the **Destination Elements** list.
4. Select the number of cycles.
5. Click **Start Test**.

6.7.5 Wellness Test

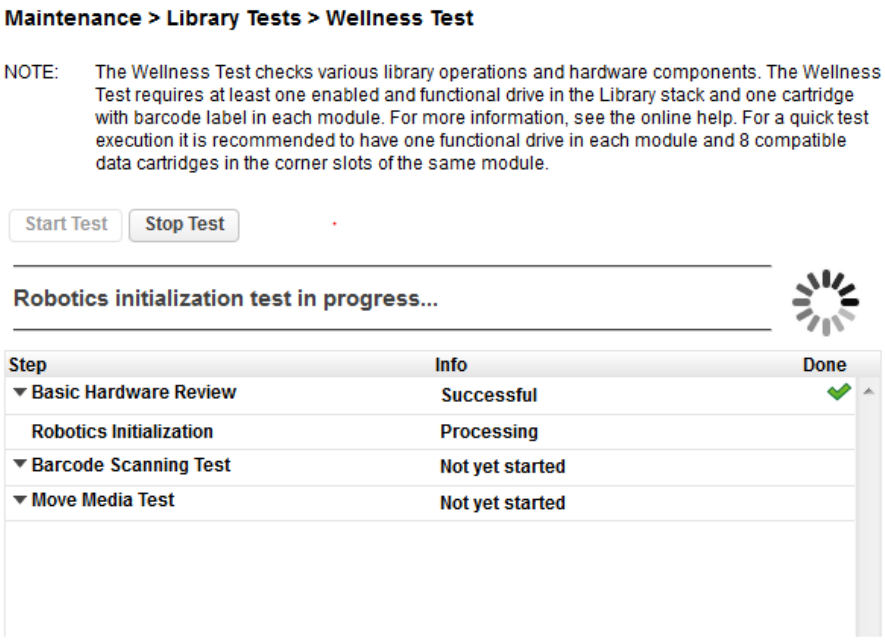
The wellness test performs a general health check of the library by running the following tests:

- Basic Hardware Review
- Robotics Initialization Test
- Barcode Scanning Test
- Move Media Test

- Running the test requires at least one enabled and functional drive and one cartridge with a barcode label in each module.
- After the test has been started the **Stop Test** button is active. Clicking the button will abort the wellness test but not before the current test has been completed.
- During the test the library is offline.

CAUTION The test can move cartridges between partitions.

- The Info column notifies the user about the status and result of each test.

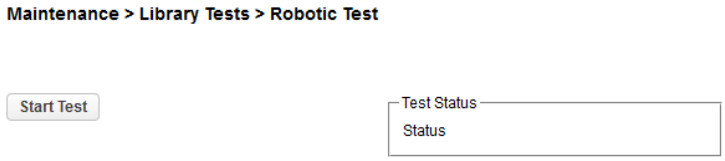


To run the Wellness test, navigate to the **Maintenance > Library Tests > Wellness Test** screen, and then click **Start Test**.

NOTE For best results, it is recommended to have one functional drive in each module and 8 compatible data cartridges in the corner slots of the same module.

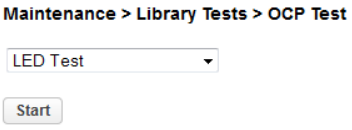
6.7.6 Robotic Test

The robotic test exercises all robotic movements and sensors. To run the robotic test, navigate to **Maintenance > Library Tests > Robotic Test** and click **Start Test**



6.7.7 OCP Test

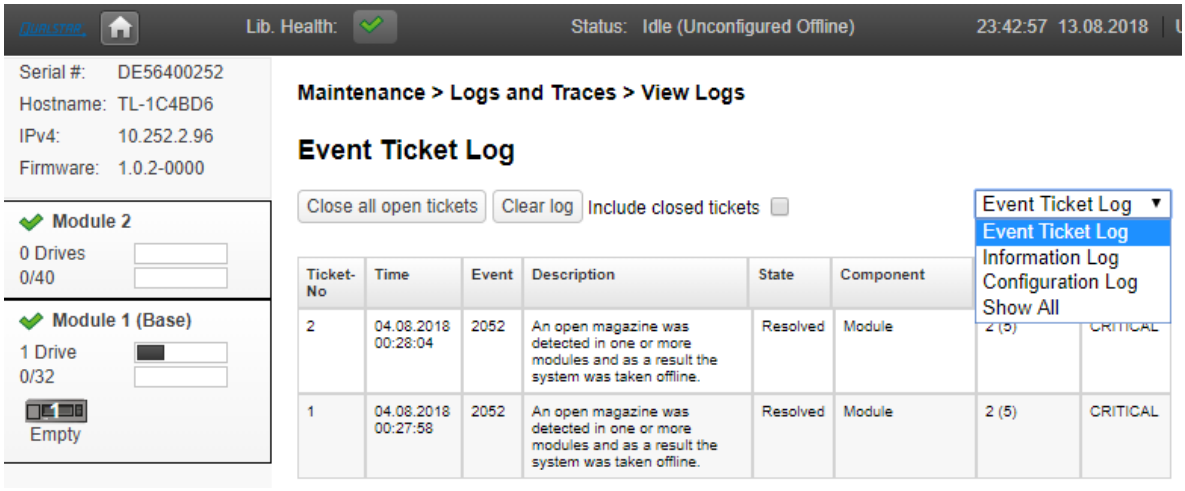
From the RMI you can run an LED test on the OCP. The test illuminates each of the front panel LEDs. To start the test, navigate to **Maintenance > Library Tests > OCP Test** and then click **Start**.



6.8 Viewing Log Files

To view the library log files, navigate to the **Maintenance > Logs and Traces > View Logs** page and then select one of the logs. The available logs are:

- Event Ticket Log – Records library error and warning events
- Information Log – Records library information warnings
- Configuration Log – Records configuration changes

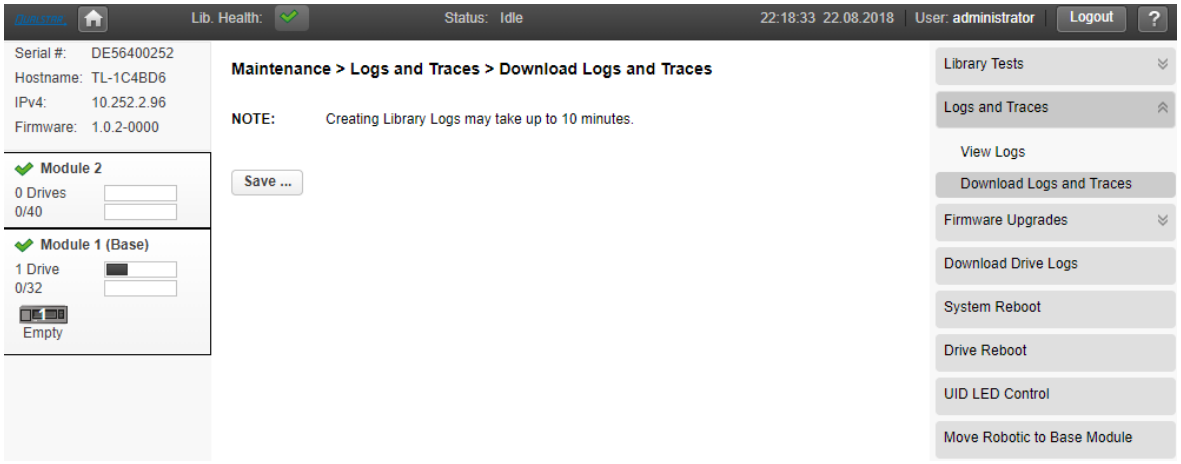


The log entries are displayed in order of most recent to oldest. The log entries contain a date and time code, event code, severity, component identifier and event details. The format for the date and time is: *YY.MM.DD HH.MM.SS.ss*.

- YY.MM.DD – The date displayed as Year.Month.Day
- HH.MM.SS.ss – The time displayed as Hour.Minute.Second.Hundredths of a second

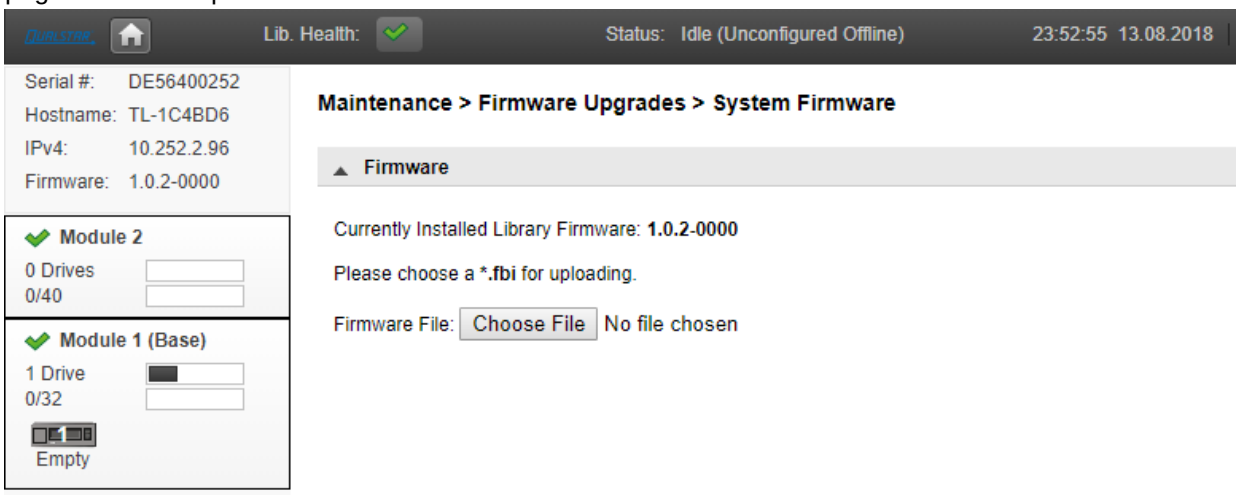
6.9 Saving Log Files

To save the library log files, navigate to the **Maintenance > Logs and Traces > Download Logs and Traces** page and then select Save.



6.10 Managing System Firmware

The firmware version currently installed on the library is displayed in the library status area on the Home page and the left panel.



To update library firmware from the RMI, click **Choose File** and select the firmware file from the local computer.

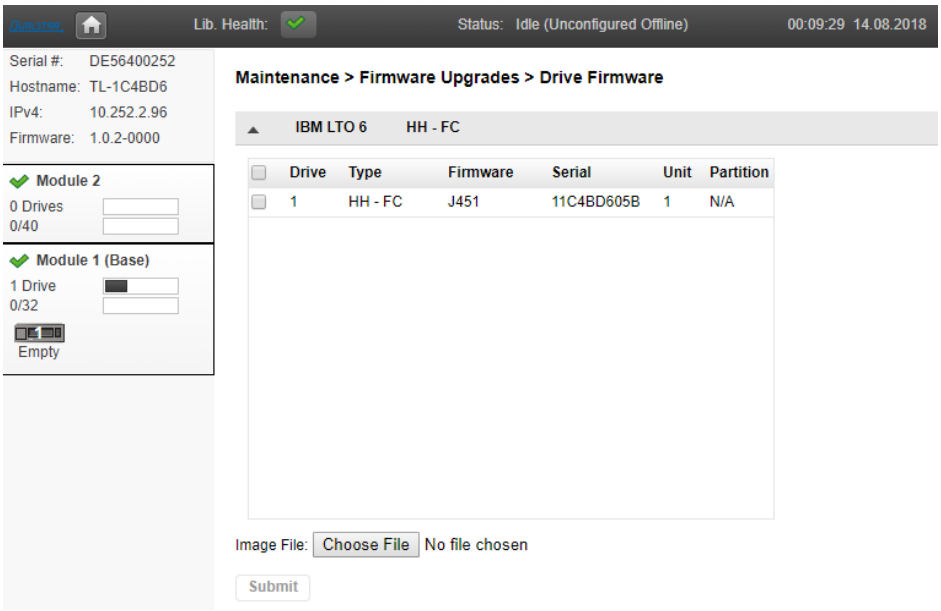
To update the library firmware from the OCP:

1. Copy the firmware file to a USB thumb drive.
2. Insert the USB thumb drive into the USB port on the front of the library.
   The library detects the USB thumb drive.
3. Select the firmware file.
4. Click **Start Upgrade**.

When you update the library firmware, the library will automatically update the firmware of any expansion modules to a compatible version.

6.11 Managing Drive Firmware

Drive firmware can be updated on multiple drives of the same type at the same time. Drive firmware can only be updated from the RMI. Each drive will only accept appropriate firmware.

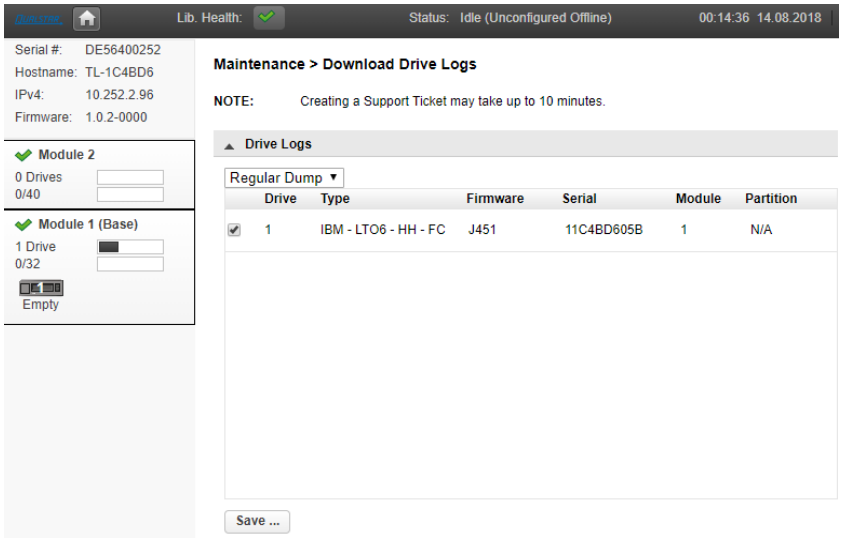


To update drive firmware from the RMI:

1. Navigate to **Maintenance > Software Upgrades > Drive Firmware**. The tape drives are organized by drive type.
2. Expand the appropriate drive type and select one or more of the tape drives.
3. Click **Choose File**, and then select the file from the local computer.
4. Click **Submit**.

6.12 Downloading Drive Logs

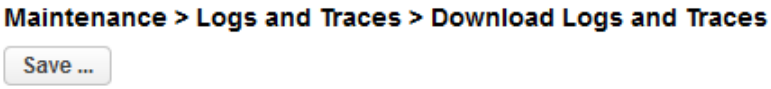
To download drive logs, navigate to **Maintenance > Download Drive Logs.**



Select the drive in question. Select Regular Dump.
Click the Save button.

6.13 Downloading Library Log and Trace Files

To download the library log and trace files from the RMI, navigate to the **Maintenance > Logs and Traces > Download Logs and Traces** screen and then click **Save**.

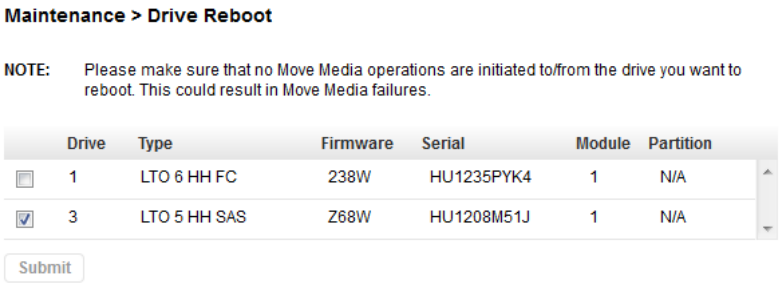


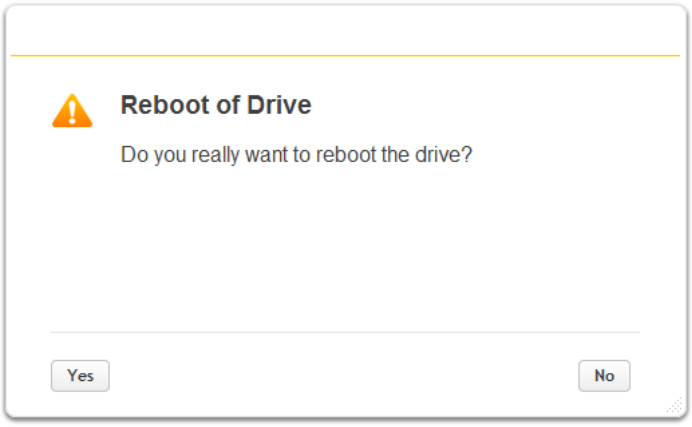
6.14 Rebooting the Library

To reboot the library remotely, navigate to **Maintenance > System Reboot** and click Reboot.

6.15 Rebooting Drives

To reboot a tape drive, navigate to **Maintenance > Drive Reboot.** Select the desired tape drive and click Submit. Only one drive can be rebooted at a time.

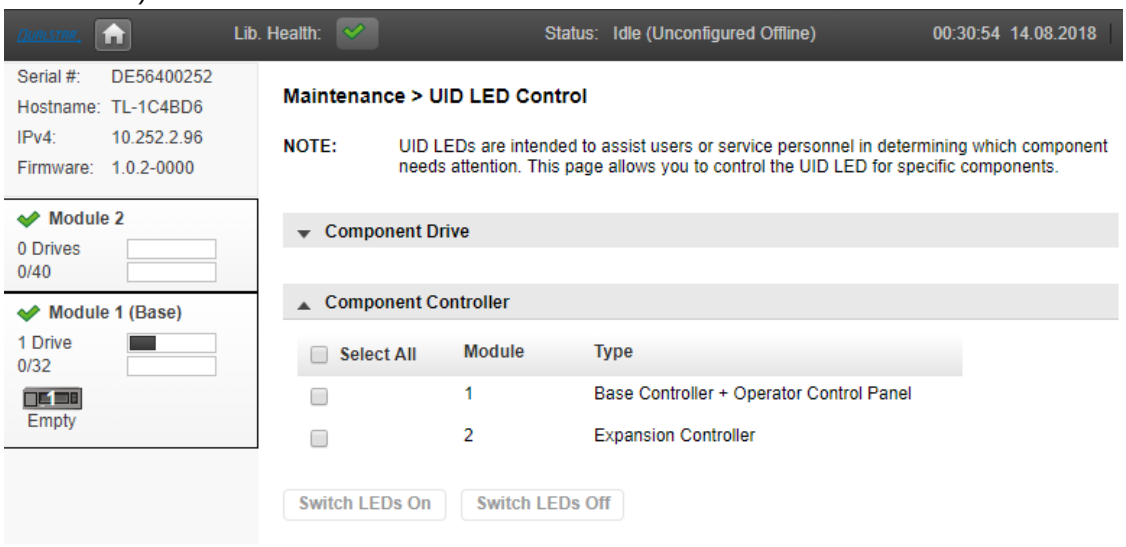




6.16 Controlling the UID LEDs

The UID (Unit Identification) LED refers to blue LEDs on the tape library that assist users and service personnel in determining which component requires attention.

UID LEDs can be found on the controller board of each base and expansion module. Additionally, there is one UID LED on the Operator Control Panel OCP. Control of this LED is linked to the base controller UID LED (i.e. if the base controller is selected and its UID LED is switched on, the OCP UID LED will be switched on as well).

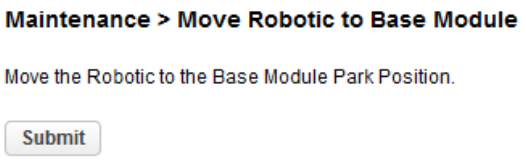


To use UID, navigate to **Maintenance > UID LED Control.**

1. Expand the **Component Module** list, if necessary, by clicking the down arrow next to Component Controller.
2. Select the desired module.
3. Click the **Switch LEDs On** button (or the Switch LEDs Off button to turn off any UID LED)

6.17 Moving the Robotic Assembly to the Base Module

Before removing a module from the rack, the robotic assembly must return to the Base Module. Under normal circumstances, when the library is powered off using the front power button the robot automatically parks and locks into the Base Module behind the OCP. After powering off the library and before proceeding with removing a module from the rack, look inside the upper or lower expansion module windows to verify that the robotic assembly is behind the OCP.
If the library did not move the robotic assembly to the base module, you can do so from the **Maintenance > Move Robotic to Base Library** screen.

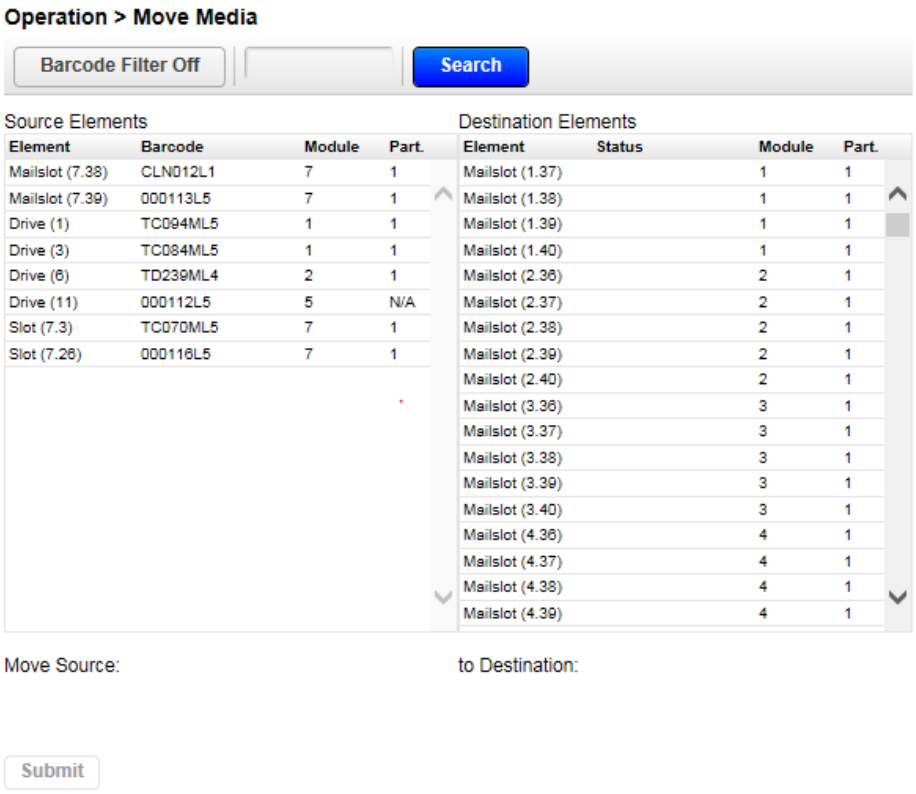


6.18 Operating the Library with the RMI

Click the **Operations** button on the Home page of the library to access the library's operations functions.

6.18.1 Moving Media

From the **Operation > Move Media** page you can move a tape cartridge located in a source element to an available destination element within the same partition.



- **Source Elements** – Tape drives, enabled mailslots, and storage slots that contain a tape cartridge
- **Destination Elements** – Tape drives, enabled mailslots, and storage slots that do not contain a tape cartridge

- Tape drives are listed at the top of each element list and listed in the order of their drive numbers.
- Tape drives are numbered from the physical top of the library starting with Drive (1).
- Slots are listed in the order of the slot numbers. Slots are numbered *m.s*, where *m* is the module number and *s* is the slot within the module.

6.18.1.1 Filtering Based on Barcode

To see a subset of the cartridges in the library, enter some or all of the barcode label characters in the search area and click **Search**. The **Source Element** list updates to display only the cartridges with labels that include the characters in the search box.

To perform a different search or display all of the available cartridges, click **Barcode Filter Off**.

6.18.1.2 Moving a Cartridge

1. Select the cartridge from **Source Elements**.
2. Select the destination location from **Destination Elements**.
3. Click **Submit**.

6.18.2 Opening a Mailslot

To open a mailslot navigate to **Operation > Open Mailslot.**

Operation > Open Mailslot

NOTE: To open multiple mailslots, select a mailslot to open, and then after the mailslot has been pulled out, select another mailslot to open.

Module	Mailslot	
Module 7	Closed	Open
Module 6	Closed	Open
Module 5	Closed	Open
Base	Disabled - mailslot cannot be opened.	
Module 3	Closed	Open
Module 2	Closed	Open
Module 1	Closed	Open

To open a mailslot, click **Open** for the appropriate mailslot. The library will release the lock. You can then pull the mailslot out of the library to access the mailslot.

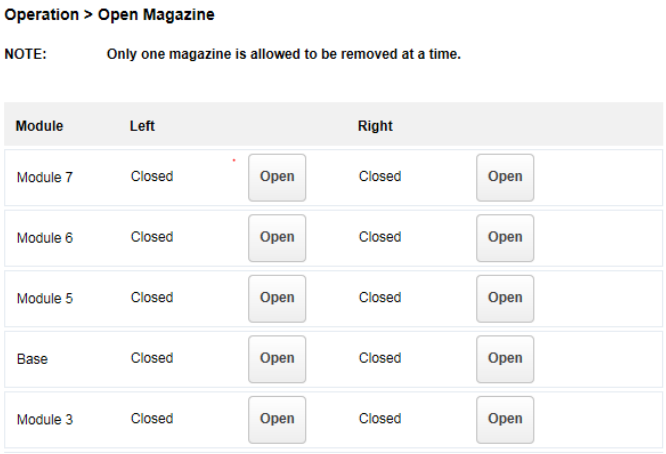
NOTE The mailslot will relock after 30 seconds

The mailslot must be enabled before it can be opened. To enable a mailslot, see **Enabling or Disabling Mailslots.**

WARNING Hazardous moving parts exist inside this product. Do not insert tools or any portion of your body into the interior of the library while the mailslot is pulled out.

6.18.3 Opening a Magazine

From the **Operation > Open Magazine** screen you can unlock any magazine in the library.



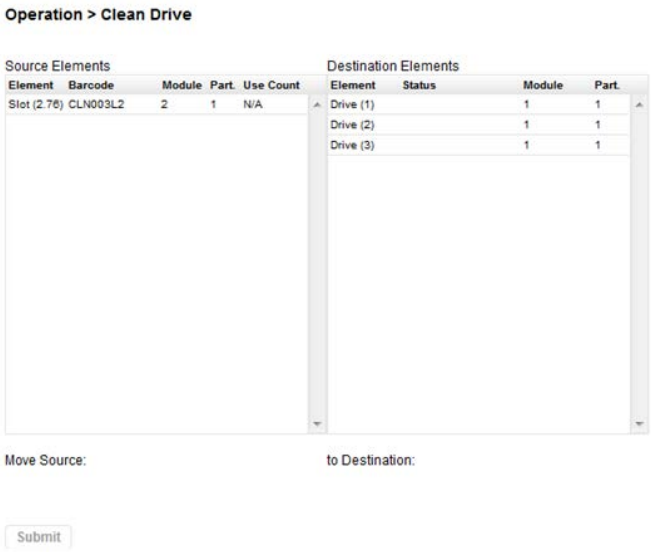
To unlock a magazine, click **Open** for the magazine. The library will release the lock. You can then pull the magazine out of the library to access the storage slots.

NOTE

- Opening a magazine will take the library off-line.
- The magazines will relock after 30 seconds.

6.18.4 Cleaning a Tape Drive

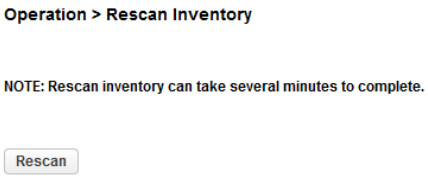
From the **Operation > Clean Drive** page you can initiate a drive cleaning operation.



1. Select a cleaning cartridge from the **Source Elements** list. The library uses the barcode label to identify cleaning cartridges. The prefix of the label must be “CLN”
   If no cleaning cartridges are available, load one into a mailslot or magazine slot.
2. Select the tape drive to be cleaned from the **Destination Elements** list.
   Tape drives currently containing a cartridge are not listed. To clean a tape drive not listed, move the cartridge out of the drive.
3. Click **Submit**

6.18.5 Rescanning the Cartridge Inventory

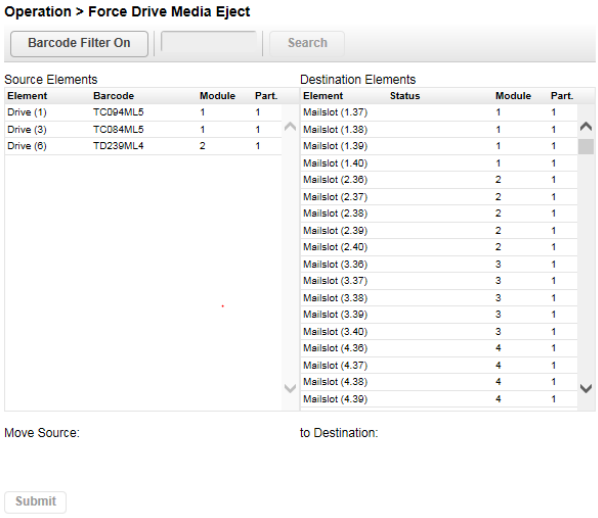
To have the library rescan the cartridges, navigate to the **Operation > Rescan** page and click **Rescan**. The library's status will change to Scanning and will be unavailable to perform other operations until the scan is complete.



6.18.6 Forcing a Drive to Eject a Cartridge

The force drive media eject operation attempts to force a tape drive to eject a cartridge and place it into an open slot. Access to this feature requires the administrator password.
Before performing this option, it is recommended that you attempt to eject the tape using the backup software or library move media operation. While a drive is being force ejected, a window indicating the process is ongoing should appear. No operations will be available until the force eject completes.

	NOTE	If the drive has difficulty ejecting the cartridge, the media is possibly bad or damaged.



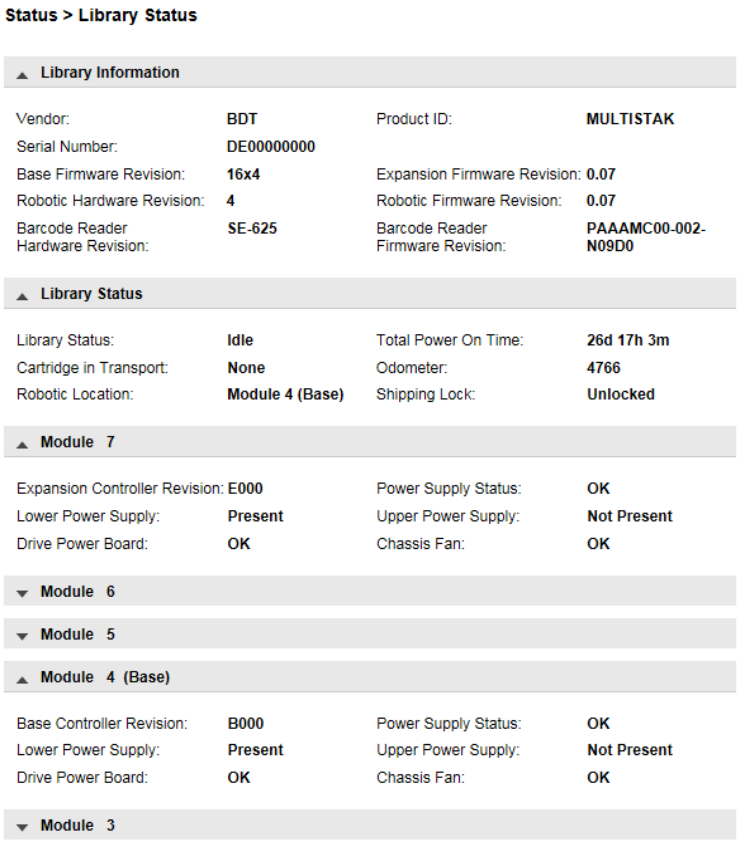
1. Navigate to the **Operation > Force Drive Media Eject** screen.
2. Select the drive in the **Source Elements** list.
3. Select the destination in the **Destination Elements** list.
4. Click **Submit**.

6.19 Viewing Status Information on the RMI

Click the **Status** button on the Home page of the library to view library status information.

6.19.1 Viewing Library and Module Status

Summary information is displayed in the top banner and the left side bar. For additional library status information navigate to **Status > Library Status**.



The Library Information section provides the following information:

- **Vendor**
- **Serial Number** – Library serial number
- **Robotic Hardware Revision**
- **Barcode Reader Hardware Revision**
- **WWide Node Name** – A worldwide unique identifier that the library reports over SCSI and can be used by operating systems or software applications to identify and track the library.
- **Product ID**
- **Firmware Revision** – Version of the currently installed library firmware
- **Robotic Firmware Revision** – Version of the currently installed robotic assembly firmware. The robotic assembly firmware is bundled and installed with the library firmware.
- **Barcode** Reader Firmware Revision – Version of the currently installed barcode reader firmware. The barcode reader firmware is bundled and installed with the library firmware.

The Library Status section provides the following information:

- **Idle** – The library robotic is ready to perform an action.
- **Moving** – The library robotic is moving a cartridge.
- **Scanning** – The library robotic is performing an inventory of cartridges.
- **Offline –** The library robotic has been taken off line by the library.
- **Robotic Location –** Displays the module where the robotic is currently located
- **Shipping Lock –** Indicates whether the robotic is unlocked or locked for shipment
- **Cartridge in Transport** – When applicable, displays the barcode label of the cartridge currently in the robotic assembly.
- **Total Power On Time** – Total time that the Base Module has been powered on since it was manufactured
- **Odometer** – Robotic assembly move count

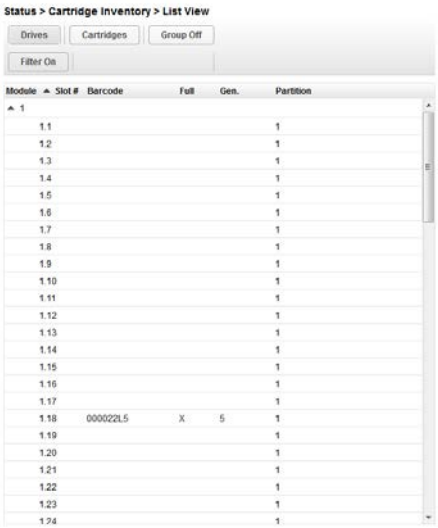
The Module Status section provides the following information:

- **Base Controller Revision or Expansion Controller Revision** – Hardware revision of the controller board currently installed in the module.
- **Drive Power Board Status** – Status of the drive power board (DC-DC converter) for the three half-height drive slots in the module.
- **Power Supply Status –** Displays the status of power redundancy.
- **Lower/upper Power Supply –** Displays the presence status of the power supplies

6.19.2 Cartridge Inventory

To see the library's current inventory information, navigate to **Status > Cartridge Inventory**.
There are 2 views available to see the inventory, Graphical View and List View.

6.19.2.1 List View



In the Inventory List View, you can see:

- **Module –** The module number
- **Slot # -** The slot number in the form <module> <slot>.
- **Label –** Barcode label.
- **Full –** X if a cartridge is using the element.
- **Gen –** LTO generation of the cartridge
- **Partition –** The partition number

6.19.2.1.1 Filtering by Barcode Label

To filter the list based on barcode label, enter characters in the filter box and then click **Search**.

1. Click **Filter On**.

   The search box is displayed.

2. Enter characters into the search box and then click **Search**.

   The characters can be anywhere in the barcode label. The search characters are not case sensitive. There are no wildcards.

To disable filtering, click **Filter Off**.

6.19.2.1.2 Listing Just Drives or Cartridges

To limit the list to tape drives, click **Drives**.

To limit the list to cartridges, click **Cartridges**.

To see all elements, click **Partition** or **Slots**.

6.19.2.1.3 Viewing Elements by Group

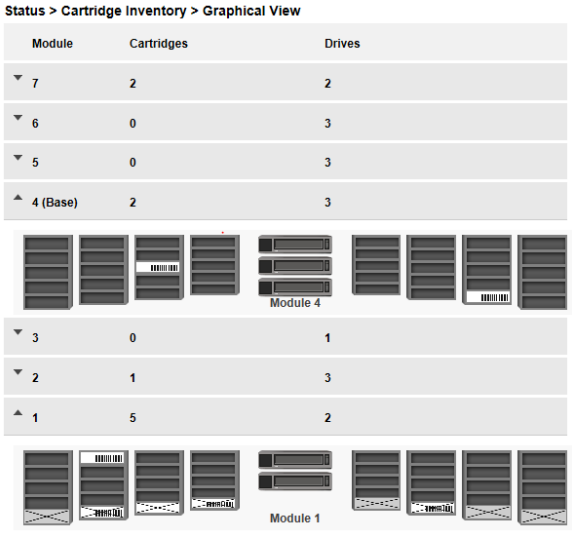
When the list is grouped, you can expand or contract the list for each group by clicking the triangle next to the number in the first column. Grouping is enabled by default.

To disable grouping, click **Group Off**.

To enable grouping, click **Group On**.

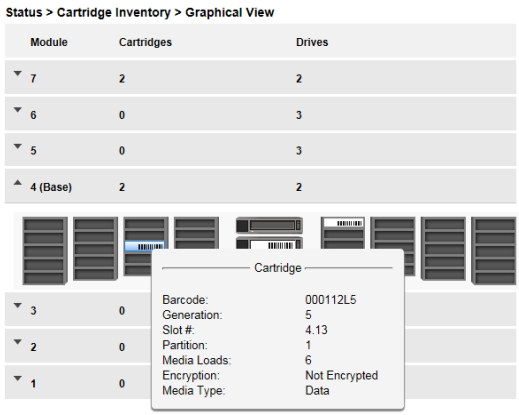
6.19.2.2 Graphical View

The inventory graphical view displays each of the elements, such as slots and tape drives, with information about the cartridge stored in the element. Unused slots, which are not available for move operations, are greyed out and marked with a cross. Cartridges stored in these slots are displayed in the same way as regular slots.

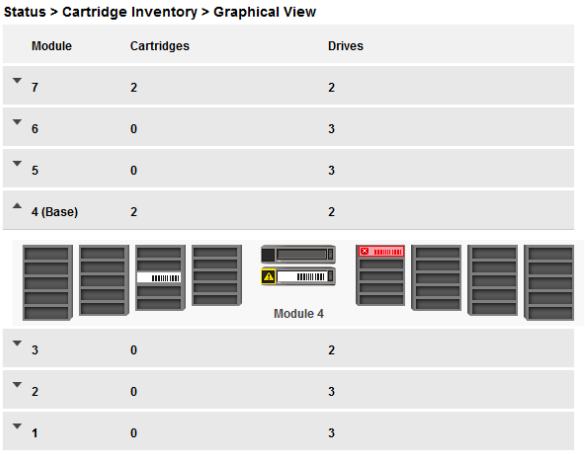


Moving the mouse over drives or cartridges will display additional information:

- **Drive** – LTO generation of drive and format (Full Height or Half Height)
- **Drive #** - The drive number
- **Serial #** - Serial number of the drive
- **Slot #** – The slot number in the form <module>, <slot>, where module is the module number and slot is the slot number
- **Barcode** – Barcode data on label
- **Generation** – LTO generation of cartridge
- **Partition** – The partition number
- **Media Loads** – The number of media loads
- **Encryption** – Indicates whether data on this media is encrypted or not encrypted
- **Media Type** – Indicates whether this media is a data or a cleaning cartridge



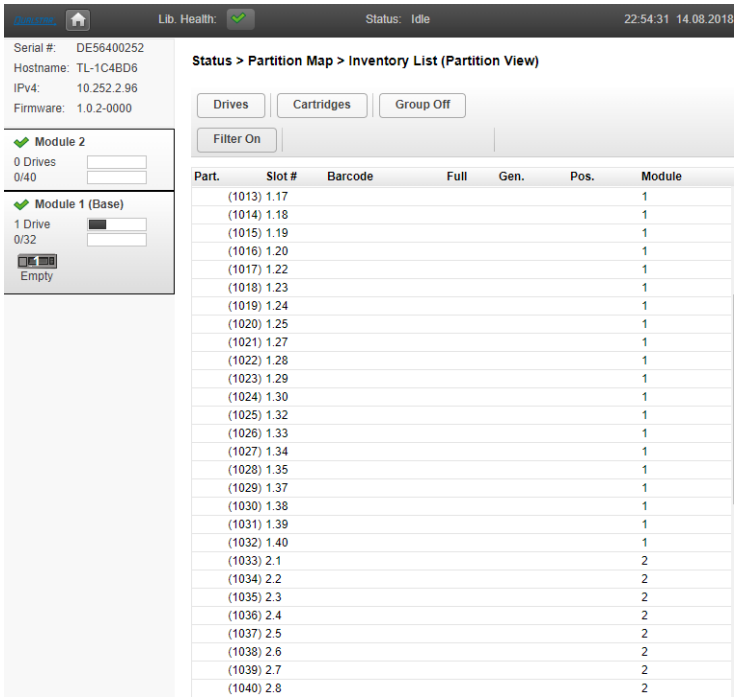
Warning State and Error State for a specific drive or cartridge are indicated with icons.



6.19.2.3 Partition Map

The partition map displays each of the elements, such as slots and tape drives, with information about the cartridge stored in each element. Cartridges stored in unused slots, which are not available for move operations, are greyed out and are not assigned to any partitions.

6.19.2.3.1 List View



In the Inventory List (Partition View) you can see:

- **Module –** The module number
- **Slot # -** The slot number in the form <module> <slot>.
- **Label –** Barcode label.
- **Full –** X if a cartridge is using the element.
- **Gen –** LTO generation of the cartridge
- **Partition –** The partition number

6.19.2.3.1.1 Filtering by Barcode Label

To filter the list based on barcode label, enter characters in the filter box and then click **Search**.

3. Click **Filter On**.

   The search box is displayed.

4. Enter characters into the search box and then click **Search**.

   The characters can be anywhere in the barcode label. The search characters are not case sensitive. There are no wildcards.

To disable filtering, click **Filter Off**.

6.19.2.3.1.2 Listing Just Drives or Cartridges

To limit the list to tape drives, click **Drives**.

To limit the list to cartridges, click **Cartridges**.

To see all elements, click **Partition** or **Slots**.

6.19.2.3.1.3 Viewing Elements by Group

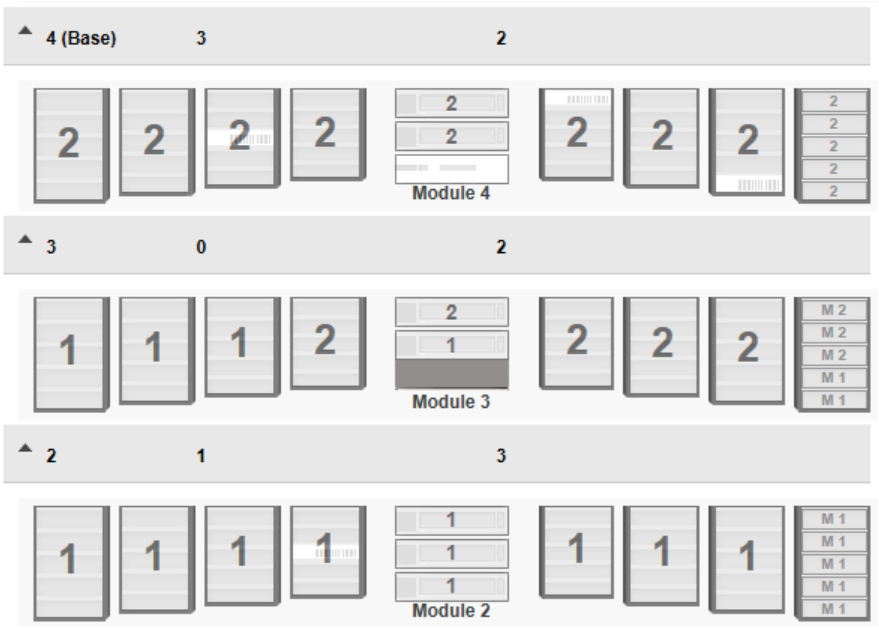
When the list is grouped, you can expand or contract the list for each group by clicking the triangle next to the number in the first column. Grouping is enabled by default.

To disable grouping, click **Group Off**.

To enable grouping, click **Group On**.

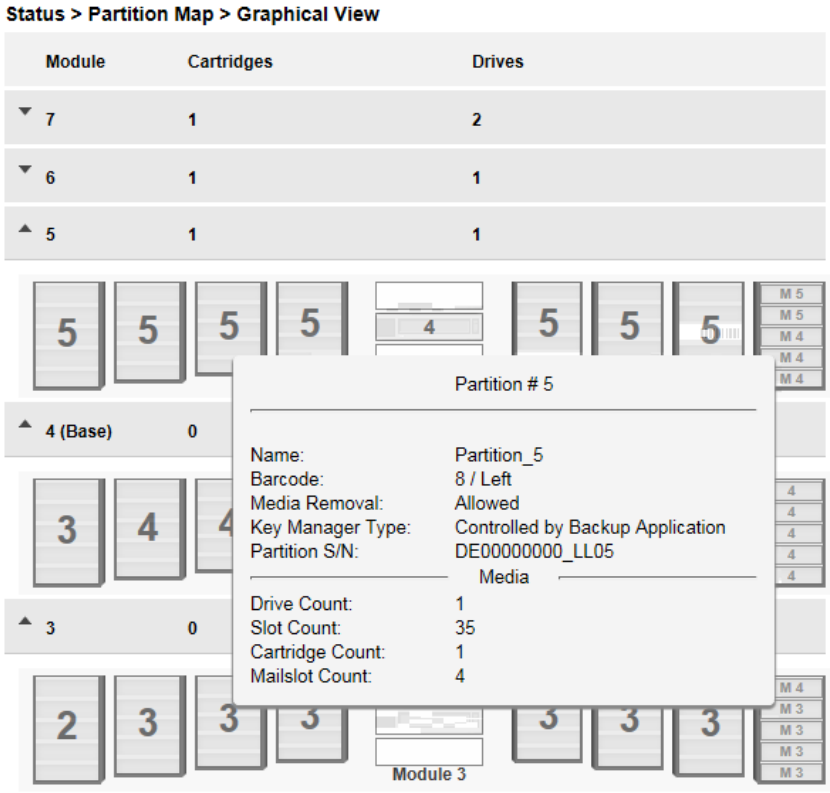
6.19.2.3.2 Graphical View

The graphical view of the partition map displays the partition number for every magazine. Magazines that can be configured as mailslots, display single slots. When mailslots are configured, the slot number gets a leading ‘M’.



Moving the mouse over a partition layer will display additional information:

- **Name** – Partition name
- **Barcode** – Barcode orientation
- **Media Removal** – Indicates whether media removal is allowed or prevented by the host
- **Key Manager Type** – Encryption type
- **Partition S/N** – Serial number of the partition
- **Drive Count** – Number of drives in this partition
- **Slot Count** – Number of slots in this partition
- **Media Count** – Number of cartridges in this partition
- **Mailslot Count** – Number of mailslots in this partition

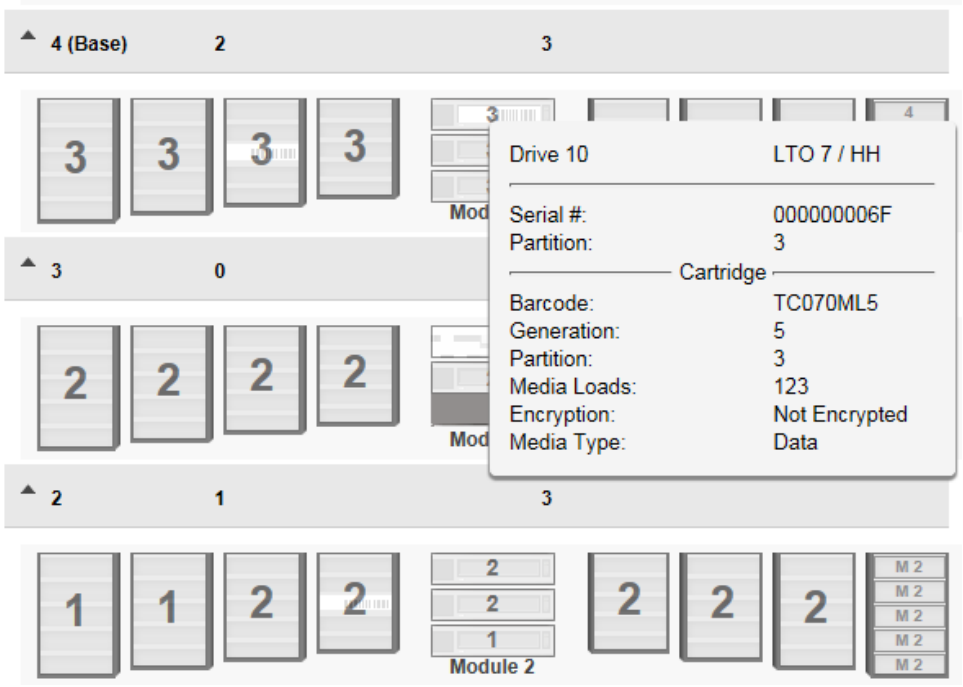


Moving the mouse over a drive will display additional information such as:

- **Drive** – LTO generation of drive and format (Full Height or Half Height)
- **Drive #** - The drive number
- **Serial #** - Serial number of the drive
- **Partition** – The partition number

If a cartridge is loaded in this drive additional information about the cartridge is displayed such as:

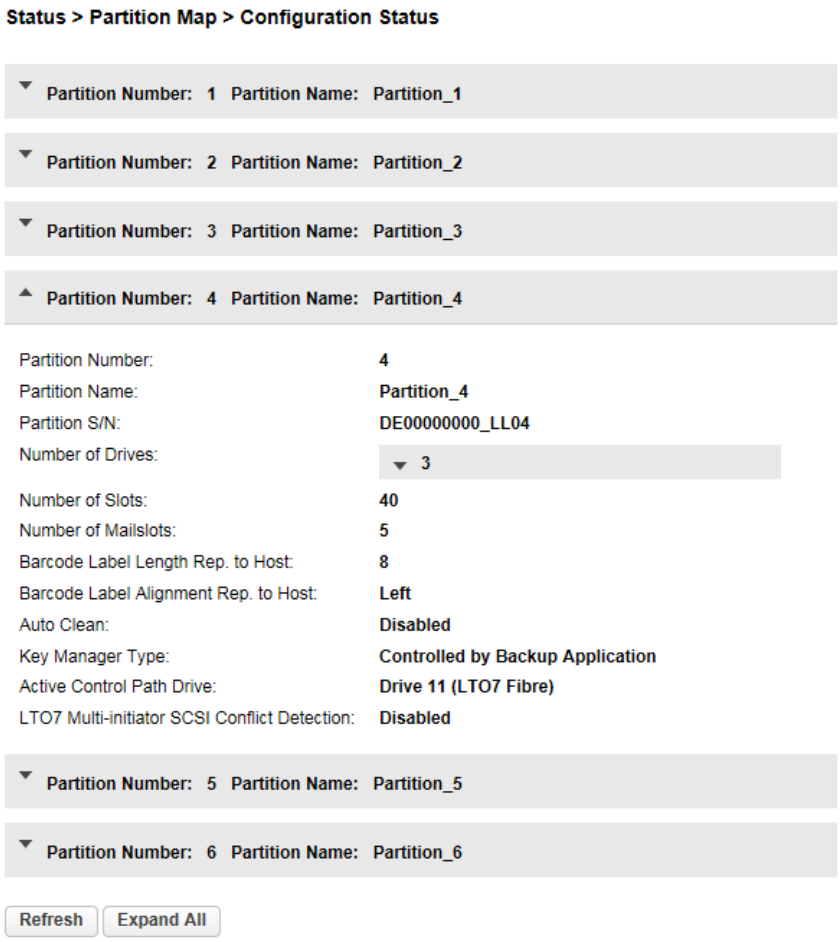
- **Barcode** – Barcode data on label
- **Generation** – LTO generation of cartridge
- **Partition** – The partition number
- **Media Loads** – Number of loads
- **Encryption** – Encryption status
- **Media Type** – Data cartridge, Cleaning Cartridge



6.19.2.3.3 Partition Map Configuration Status

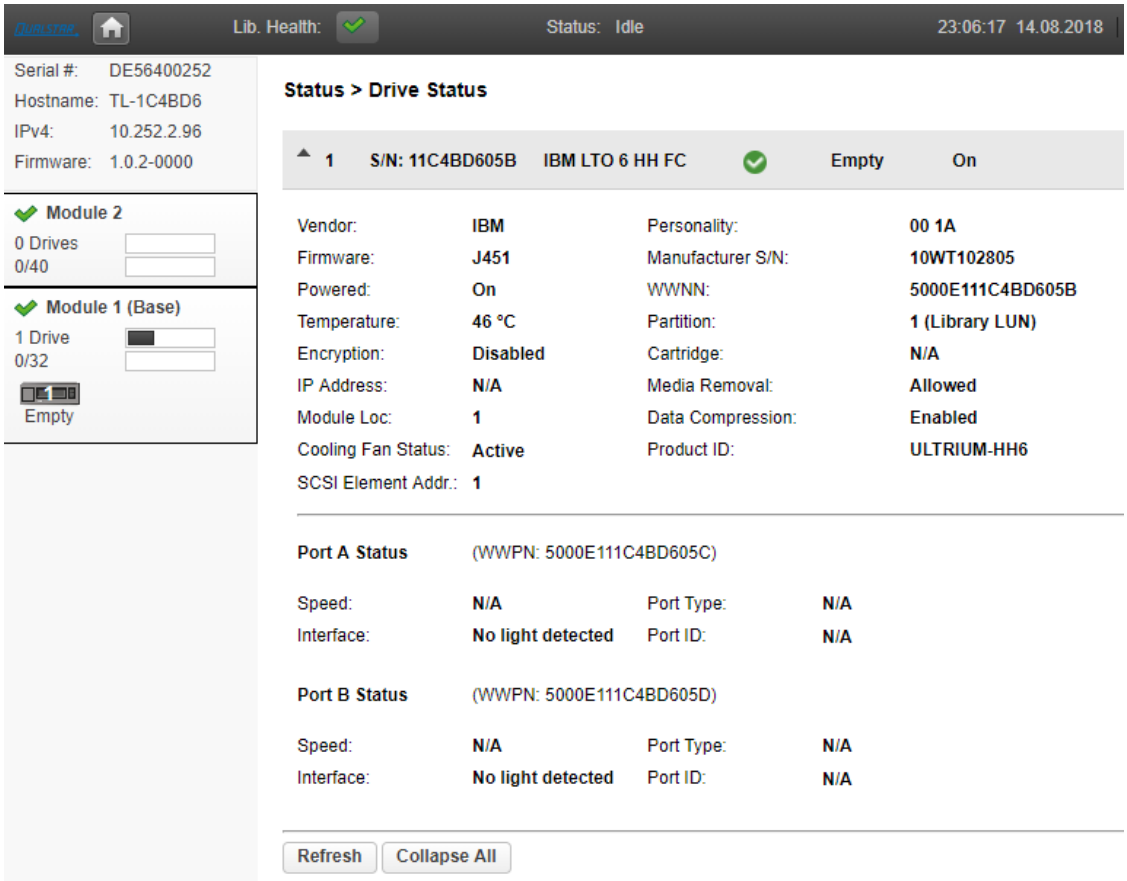
To see the configuration of a partition, navigate to the **Status >Partition Map >Configuration Status** page.

- **Partition Number** – The partition number
- **Partition Name** – The partition name
- **Partition S/N** – The partition serial number
- **Number of Drives** – Number of drives in this partition
- **Number of Slots** – Number of slots in this partition
- **Number of Mailslots** – Number of mailslots in this partition
- **Barcode Label Length Rep. to Host** – Barcode length reported to the host
- **Barcode Label Alignment Rep. to Host** – Barcode alignment reported to the host
- **Auto Clean** – Indicates whether automatic cleaning of drives is enabled or disabled
- **Key Manager Type** – Encryption type
- **Active Control Path Drive** – LUN drive for this partition
- **LTO7 Multi-initiator SCSI Conflict Detection** – Indicates whether Multi-initiator Conflict Detection is enabled or disabled



6.19.2.4 Drive Status

To see the configuration and status of each tape drive installed in the library navigate to the **Status> Drive Status** page.

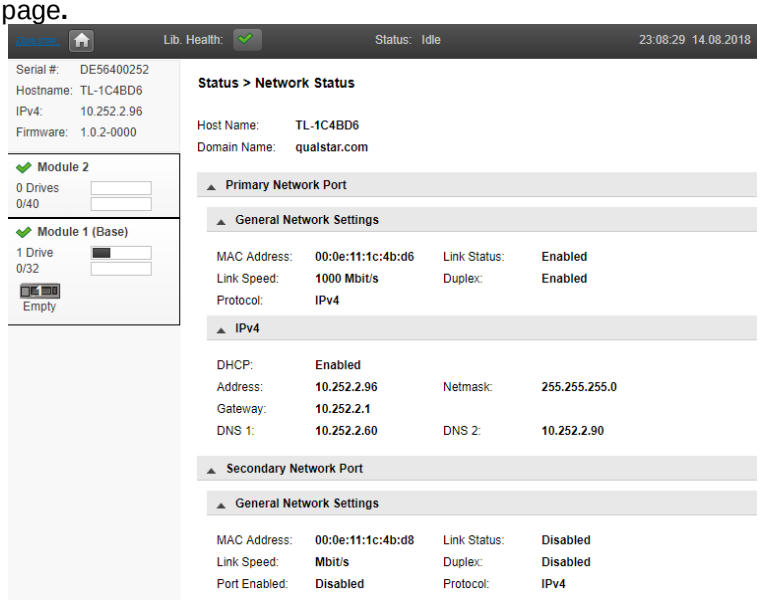


On the drive status page you can see:

- Drive number – Drives are numbered from the bottom of the library up beginning with one. The drive currently hosting the SCSI communication for the library is designated with (LUN).
- Serial Number – The serial number assigned to the tape drive by the library. This serial number is reported to host applications. The serial number cannot be modified. Please note: this is not the serial number of the drive. The tape drive serial number is shown in the Manufacturer S/N field.
- LTO generation
- Drive interface
- Drive state (loaded, empty)
- Drive powered on or off
- The version of firmware currently installed on the drive.
- The tape drive serial number. Use this serial number when working with Qualstar Technical Support.
- Port status

6.19.2.5 Network Status

To see the configuration and status of the library's network settings navigate to the **Status > Network Status** page**.**



On the network status page you can see:

- **Host Name** – Library hostname
- **Domain Name**
- **Protocol** – IPV4 or IPv6
- **MAC Address** – A unique identifier for the library controller network interface
- **Link Status** – Enabled or disabled
- **Link Speed** – Speed of the Ethernet connection to the library
- **Duplex** – Enabled or disabled

IPv4 settings

- **DHCP** – When Enabled, the library requests an IP address from a DHCP server each time the library is powered on.
- **Address** – IP address in use by the library. If DHCP is enabled, this address was obtained from the DHCP server. When DHCP is not enabled, the address was configured.
- **Netmask** – The network mask of the library controller used when DHCP is not enabled.
- **Gateway** – The gateway used when DHCP is not enabled.
- **DNS 1**
- **DNS 2**

IPv6 settings

- **Stateless Addressing** – When Enabled, the device will generate an address for itself based on the routing information obtained from a router advertisement and the MAC address. The device can manage up to five global addresses at the same time, which can be assigned from different routers.
- **Static Addressing** – When Enabled, the library will use a statically-configured address.
- **Static Assigned Address** – The IPv6 address when Static Addressing Enabled is On.

7 Upgrading and Servicing the Library

7.1 Possible Tools Needed

- #2 Phillips Screwdriver – securing or removing the round-hole rack adapter bracket, securing retention inserts in square-hole racks
- Small Flat Head or Torx Screwdriver – retracting the locking screen when moving a library cover, using the magazine manual release
- T10 Torx Screwdriver – removing drive bay covers
- Small Flat Head Screwdriver – removing a magazine access door
- Clip Nut Installation Tool – inserting or removing clip nuts in square-hole racks while installing or removing rack rails

7.2 Identifying a Failed Component

Using the RMI:

1. Activate the UID (Unit Identification) LEDs from the **Maintenance > UID LED Control** screen on the RMI. This will illuminate the blue LED on the front and rear of the Base Module to identify the library containing the failed component.
2. Identify the module within the library that contains the failed component:
    - In the upper left corner of the Home screen, locate the module that indicates an error.
    - Click or tap the module for information on the failed component.

7.3 Installing or Replacing a Tape Drive

WARNING Read all troubleshooting documentation and procedures before proceeding with repair or upgrade procedures. Hazardous moving parts exist inside this product. Do not insert tools or any portion of your body into the drive bay openings.

7.3.1 Removing a Tape Drive

If you are replacing a tape drive:

- Make sure the tape cartridge has been removed from the tape drive. Use the operator control panel (OCP) or the remote management interface (RMI) to move the cartridge to a storage slot or mailslot.
- If you are replacing the tape drive in a single drive unit or the master drive in a multi-drive unit, verify that backups are not occurring on the drive you are replacing. If backups are occurring on the master drive, verify that the autoloader or library will not be accessed through this drive while the drive is being replaced.

1. Use the OCP or RMI to power off the tape drive.
2. Verify that the tape drive assembly LED is off, and then remove the FC or SAS cable from the tape drive.

3. Loosen the blue captive thumbscrews on the tape drive and pull straight back on the tape drive handle while supporting the bottom of the drive to remove it from the unit.

CAUTION Support the bottom of the tape drive when removing it to avoid damaging any of the internal connections.

7.3.2 Removing a Drive Bay Cover

If you are adding at tape drive:

1. Identify the location for the tape drive. If this is the first tape drive, install it in the bottom drive bay. Otherwise, install the new drive in the next higher drive location.
2. Using a Philips screwdriver, remove one half-height drive bay cover to install one half-height drive.

7.3.3 Installing a Tape Drive

1. Align and slowly insert the new tape drive into the drive bay while supporting the drive assembly. The tape drive should be flush with the back panel of the device.
2. Tighten the captive thumbscrews with your fingers until the tape drive is secure.

7.3.4 Connecting a SAS Cable

1. Attach the one end of the SAS cable into the connector on the HBA. If you are using a SAS fanout cable, the end of the cable with only one connector should be plugged into the HBA.
2. Connect the other end of the cable into the drive.
    - If you are using a SAS fanout cable, attach one mini-SAS connector into one connector on each tape drive. Coil and secure any unused connectors to the rack to minimize stress on the used connectors.

NOTE Each of the tape drives use one channel and the fanout cable recommended for use with the library maps each of the four channels from the HBA to one channel on the drive end. You can plug any of the four drive connectors into any of the tape drives.

TIP If you are not using a SAS cable specified for the library, do not force a SAS cable's mini-SAS connector into the tape drive mini-SAS connector because it might be keyed differently.

NOTE SAS signal rates require clean connections between the HBA and tape drive. Do not use adapters or converters between the HBA and the tape drive. For reliable operation, use a maximum SAS cable length of six meters.

7.3.5 Connecting a Fibre Channel Cable

1. Remove the FC port caps if necessary. Attach one end of the FC cable to port A on the tape drive.
2. Attach the other end of the FC cable to a switch or HBA.

TIP

It is recommended that you leave the FC port at the default settings of **Port Speed: Automatic** and **Port Type: Auto Detect**. With these settings, the tape drive should automatically use the appropriate configuration.

7.3.6 Verifying the Installation

1. Power on the drive from the OCP or RMI, if necessary.
2. Confirm that the library recognizes the new tape drive by checking the OCP or RMI. The new drive should appear in the module status overview area on the left side of the screen.
3. Use the RMI or OCP to verify that the tape drive has the current firmware. Update the firmware if necessary.

7.4 Adding an Expansion Module

WARNING

Product Weight

Each Q40 module weighs more than 44 lbs (20 kg) without drives or tapes and more than 77 lbs (35 kg) with 3 tape drives and 40 tapes.

Risk of personal injury

Before moving or lifting a module:

- Observe local health and safety requirements and guidelines for manual material handling.
- Remove all tapes to reduce the weight and to prevent cartridges from falling into the robotics path and damaging the library.
- Remove all tape drives to reduce the weight.
- Obtain adequate assistance to lift and stabilize the module during installation or removal.

Risk of damage to devices

When placing a module into or removing the module from a rack:

- Extend the rack's levelling jacks to the floor.
- Ensure that the full weight of the rack rests on the levelling jacks.
- Install stabilizing feet on the rack.
- Extend only one rack component at a time.

CAUTION

Static Sensitive

Risk of damage to devices

- A discharge of static electricity damages static-sensitive devices or micro circuitry.
- Proper packaging and grounding techniques are necessary precautions to prevent damage.

7.4.1 Overview

To install an Expansion Module, you will:

1. Clear space in the rack, if necessary, and then install the rack rails.
2. Transfer the library top or bottom cover to the Expansion Module.
3. Install the Expansion Module in the rack and align the module with the library.
4. Plug in the cables and verify the installation.

You will need a small flat head or Torx screwdriver and a #2 Phillips screwdriver.

7.4.2 Powering Off the Library

Power off the library from the front panel. Press and hold the power button for 3 seconds. If the library does not perform a soft shutdown, press and hold the power button for 10 seconds.

Verify that the robotic assembly is in its parked position.

Verify that all host processes are idle.

7.4.3 Moving a Cover to a New Module

The library has removable top and bottom covers. When adding a module, you must move either the top or the bottom cover to the new module. See "Preparing the Top and Bottom Modules" for details; while this procedure refers to moving a cover from the Base Module, the information is the same for moving a cover from an Expansion Module.

7.4.4 Installing the Module in the Rack

See "**Installing Modules in a Rack**" for details

7.4.5 Aligning and Connecting the Module

Aligning the new module with the library ensures that the robot can move freely between the modules. The library will not operate unless the alignment mechanism is in the locked position. See "**Aligning and Connecting Modules**" for details.

7.4.6 Verifying the Installation and Configuration

Verify that the library powers on and initializes correctly, and that the status is Ready. From the OCP or RMI, verify that the new module is visible.
Update the library configuration settings related to the additional storage slots, mailslots, and tape drives. The expansion module will operate using the existing library firmware.

7.5 Removing the Library

When removing a library module from a rack, care must be taken to avoid injury and damage to the library.

WARNING

Product Weight

Each Q40 module weighs more than 44 lbs (20 kg) without drives or tapes and more than 77 lbs (35 kg) with 3 tape drives and 40 tapes.

Risk of personal injury

Before moving or lifting a module:

- Observe local health and safety requirements and guidelines for manual material handling.
- Remove all tapes to reduce the weight and to prevent cartridges from falling into the robotics path and damaging the library.
- Remove all tape drives to reduce the weight.
- Obtain adequate assistance to lift and stabilize the module during installation or removal.

Risk of damage to devices

When placing a module into or removing the module from a rack:

- Extend the rack's levelling jacks to the floor.
- Ensure that the full weight of the rack rests on the levelling jacks.
- Install stabilizing feet on the rack.
- Extend only one rack component at a time.

To remove a module from a rack:

1. Save the library configuration.
2. Remove the tape cartridges from the tape drives and magazines, and power off the library.
3. Disconnect the power cords and cables, and unlock the alignment mechanisms.

CAUTION

Failure to disconnect all cables can result to damage to the cable and/or the mating electronic assembly in the library.

4. Remove the modules from the rack.
5. Remove the rack rails from the rack.

7.6 Replacing a Power Supply

CAUTION

Static Sensitive

Risk of damage to devices

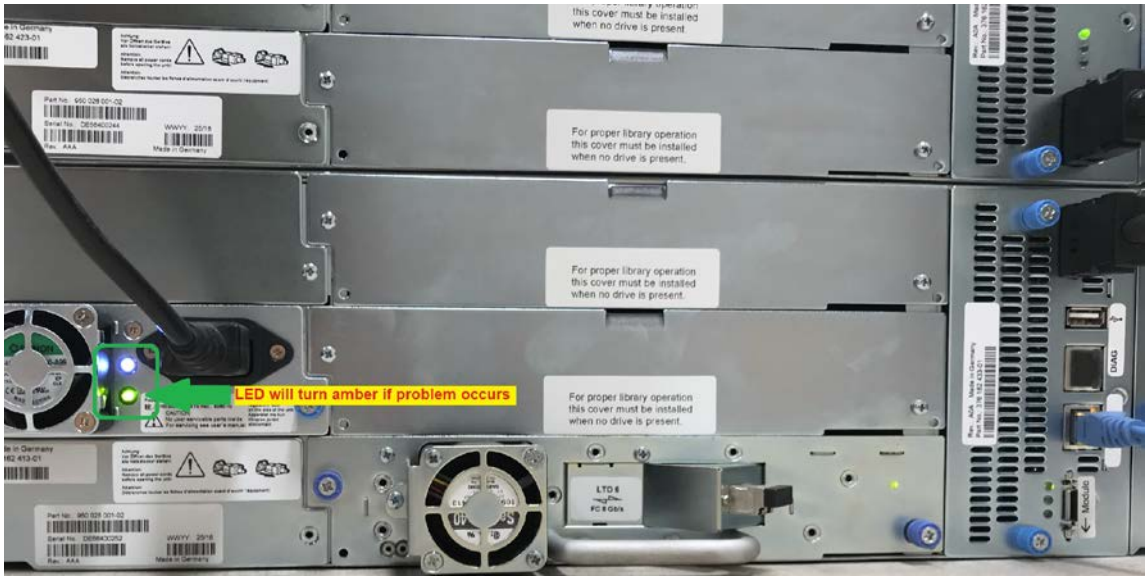
- A discharge of static electricity damages static-sensitive devices or micro circuitry.
- Proper packaging and grounding techniques are necessary precautions to prevent damage.

7.6.1 Identifying the Failed Component

See the OCP or RMI Home screen to identify the failed component. Activate the UID LEDs from the **Maintenance > UID LED Control** screen to locate the library in the data center. For detailed instructions, see "**Identifying a Failed Component**".

7.6.2 Preparing to Remove the Power Supply

1. Locate the failed power supply on the rear of the library by the LEDs; either an amber LED will be lit or both LEDs will be unlit.



2. Unplug the AC power cord from the power supply you are replacing.

7.6.3 Removing the Power Supplies

1. Loosen the two blue captive thumbscrews with your fingers on the power supply.
2. Using the thumbscrews (one on each side), slowly pull the power supply approximately 10 cm (4 inches) from the back of the module.
3. Use one hand to completely remove the power supply from the module while using the other hand to support the bottom.

7.6.4 Installing the New Power Supply

1. Position the new power supply onto the alignment rails.
2. Slide the power supply into the module until it is flush with the back panel of the module.
3. Tighten the blue captive thumbscrews with your fingers to secure it to the module.
4. Attach the AC power cord to the new power supply.

7.6.5 Verifying the Power Supply Installation and Operation

1. Verify that the new power supply is operating properly by checking the power supply LEDs:
   - The white LED should be lit.
   - The amber LED should be unlit.
   - Using the OCP or RMI, confirm that the power supply is operating correctly; the event that indicated the power supply was faulty should be cleared.
   - If the UID LEDs are still illuminated, deactivate them using the RMI.

7.7 Replacing a Controller Board

7.7.1 Identifying the Failed Component

CAUTION

- Parts can be damaged by electrostatic discharge. Keep parts in electrostatic containers until needed. Ensure you are properly grounded when touching static sensitive components.
- To prevent any damage, power off the library to install or replace the Controller Board.

! Important

Do not replace the Base chassis and the Base Module controller at the same time. The library will not operate if both components are replaced at the same time. The library WWID and serial number are saved in the controller and the chassis. When one is replaced, the data from the original component is transferred to the replacement component. If replacing both the Base chassis and Base controller, you must install one component and power cycle the library before installing the second component.

See the OCP or RMI Home screen to identify the failed component. Activate the UID LEDs from the **Maintenance > UID LED Control** screen on the RMI to locate the library in the data center. For detailed instructions, see **"Identifying a Failed Component"**.

7.7.2 Saving the Configuration

The library configuration settings are stored within the library chassis and will be restored automatically when the controller is replaced. However, it is recommended to save the configuration settings before removing the controller board. See **"Saving the Library Configuration to a File"** for instructions on saving configuration settings to a file or USB flash drive via the RMI.

7.7.3 Powering Off the Library

Power off the library from the front panel. Press and hold the power button for 3 seconds. If the library does not perform a soft shutdown, press and hold the power button for 10 seconds.

Verify that the robotic assembly is in its parked position.

Verify that all host processes are idle.

7.7.4 Preparing to Remove the Controller Board

1. Unplug the AC power cables from the module containing the failed controller.
2. Remove the expansion interconnect cables that connect the module with the failed controller to any other modules.
3. Remove any Ethernet cable.

7.7.5 Removing the Base or Expansion Module Controller

1. Loosen the two blue captive thumbscrews on the controller.

2. Using the thumbscrews, slowly remove the controller from the module.

7.7.6 Installing the Base or Expansion Module Controller

1. Position the new controller on the alignment rails.
2. Slide the controller slowly into the module until it is flush with the back panel of the module.
3. Tighten the blue captive thumbscrews with your fingers to secure it to the module.
4. Replace the expansion interconnect cables, the Ethernet cable, and the USB device removed previously.
5. Plug in the AC power cables.

7.7.7 Verifying the Base or Expansion Module Controller Installation

1. Using the OCP or RMI, click or tap **Status > Library Status > Module x** to view the controller status.
2. Using the OCP or RMI, check for events; the event that indicated the controller was faulty should be cleared.
3. If replacing the Base Module controller, restore the previous settings by restoring them from a file of saved settings, or by entering them using the OCP or RMI.
4. If the UID LEDs are still illuminated, deactivate them using the RMI.
5. Resume the host applications.

7.7.8 Powering on the Library

Power on the library by pressing the power button on the Base Module just below the OCP; the green light will illuminate. When the library is powered on, it inventories the tape cartridges in the magazines, checks the firmware version of all modules, configures the tape drives, confirms the presence of the existing modules, and searches for any new modules.

7.8 Installing or Replacing a Drive Power Board

	**CAUTION**	Parts can be damaged by electrostatic discharge. Keep parts in electrostatic containers until needed. Ensure you are properly grounded when touching static sensitive components.

7.8.1 Identifying the Failed Component

See the OCP or RMI Home screen to identify the failed component. Activate the UID LEDs from the **Maintenance > UID LED Control** screen to locate the library in the data center. For detailed instructions, see **"**Identifying a Failed Component**"**.

7.8.2 Powering off the Library

Power off the library from the front panel. Press and hold the power button for 3 seconds. If the library does not perform a soft shutdown, press and hold the power button for 10 seconds.

Verify that the robotic assembly is in its parked position.

Verify that all host processes are idle.

7.8.3 Preparing to Remove the Drive Power Board

Unplug the AC power cords from the module containing the failed drive power board.

7.8.4 Removing the Library/Expansion Controller and Drive Power boards

1. Loosen the two blue captive thumbscrews on the library/expansion controller.

2. Using the thumbscrews, slowly remove the library/expansion controller from the module.
3. Disconnect the Drive Power board by pushing down the blue latch on the board.

4. Slowly slide out the Drive Power board out of the module.

7.8.5 Installing the New Drive Power Board

1. Position the new drive power board onto the alignment rails.
2. Slide the drive power board into the module until seated firmly.
3. Push the latch up until it snaps into place.
4. Slide the controller slowly into the module until it is flush with the back panel of the module.
5. Tighten the blue captive thumbscrews with your fingers to secure it to the module.
6. Plug in the AC power cords.

7.8.6 Powering On the Library

Power on the library by pressing the power button on the Base Module just below the OCP; the green light will illuminate. When the library is powered on, it inventories the tape cartridges in the magazines, checks the firmware version on all modules, configures the tape drives, confirms the presence of the existing modules, and searches for any new modules.

7.8.7 Verifying the Drive Power Board Installation

1. From the back of the library, verify that the green LED on each drive is illuminated.
2. Verify that the new drive power board is operating properly by checking the OCP or RMI; the event that indicated the drive power board was faulty should be cleared.
3. If the UID LEDs are still illuminated, deactivate them using the RMI.
4. Resume all host applications.

7.9 Replacing a Module (Base or Expansion)

WARNING

Product Weight

Each Q40 module weighs more than 44 lbs (20 kg) without drives or tapes and more than 77 lbs (35 kg) with 3 tape drives and 40 tapes.

Risk of personal injury

Before moving or lifting a module:

- Observe local health and safety requirements and guidelines for manual material handling.
- Remove all tapes to reduce the weight and to prevent cartridges from falling into the robotics path and damaging the library.
- Remove all tape drives to reduce the weight.
- Obtain adequate assistance to lift and stabilize the module during installation or removal.

Risk of damage to devices

When placing a module into or removing the module from a rack:

- Extend the rack's levelling jacks to the floor.
- Ensure that the full weight of the rack rests on the levelling jacks.
- Install stabilizing feet on the rack.
- Extend only one rack component at a time.

CAUTION

Parts can be damaged by electrostatic discharge. Keep parts in electrostatic containers until needed. Ensure you are properly grounded when touching static sensitive components.

7.9.1 Overview

To replace the module, you will:

- Save the library configuration.
- Remove tape cartridges and power off the library.
- Disconnect all cables and power cords.
- Remove tape drives.
- Remove the module from the rack.
- Install the replacement module into the rack.
- Replace the tape drives, cables, and power cords.
- Power on the library, and verify operation.
- Replace the tape cartridges.

You will need a T-10 Torx screwdriver to remove the drive bay covers and a small flat head screwdriver to remove the cover. Have several static safe bags available for the boards being moved to the replacement chassis.

Before beginning this replacement procedure

Ensure that the rack is level side to side and front to back.

Verify that all applications using the library are idle.

CAUTION If the temperature in the room where the replacement module will be installed varies by 30° F (15° C) from the room where it was stored, allow it to acclimate to the surrounding environment for at least 12 hours before unpacking it from the shipping container.

7.9.2 Saving the Configuration

The library configuration settings are stored within the library chassis and will need to be restored after the replacement module is installed. Therefore, it is recommended to save the configuration settings before removing the original module. See "Saving the library configuration to a file" for instructions on saving configuration settings to a file or USB flash drive via the RMI.

7.9.3 Unlocking the Magazine

Unlock the magazines using the magazine unlock buttons or RMI. If these methods fail, or if a magazine needs to be removed when the power to the device is off, you can release the magazine manually. Only one magazine can be open at a time. For detailed instructions, see "Unlocking the magazine".

NOTE As a best practice, perform this procedure while applications are idle. While the magazine is pulled or removed, the library robotic assembly cannot move media.

7.9.4 Removing the Tape Cartridges

Remove the tape cartridges noting their locations within the magazine. You will place them in the same locations in the new magazine after it is installed.

7.9.5 Powering Off the Library

Power off the library from the front panel. Press and hold the power button for 3 seconds. If the library does not perform a soft shutdown, press and hold the power button for 10 seconds.

Verify that the robotic assembly is in its parked position.

Verify that all host processes are idle.

7.9.6 Removing the Module Cables

1. Remove the power cords from the module being replaced.
2. Remove the expansion interconnect cables from the module being replaced and from the modules connected to it.

NOTE Completely removing the cables from both ends prevents damaging the expansion interconnect cables during module removal and replacement.

3. Remove any SAS, FC, or Ethernet cables from the module being replaced.

7.9.7 Removing the Tape Drives

Remove any tape drives from the module being replaced. The library tracks the drive locations and will issue events if the drives aren't in the expected locations. Note the drive locations so they can be replaced in the same order.

Use your fingers to loosen the blue captive thumbscrews on the tape drive.

Pull straight back on the tape drive handle while supporting the bottom of the drive to remove it from the module.

CAUTION	Support the bottom of the tape drive when removing it to avoid damaging any of the internal connections.

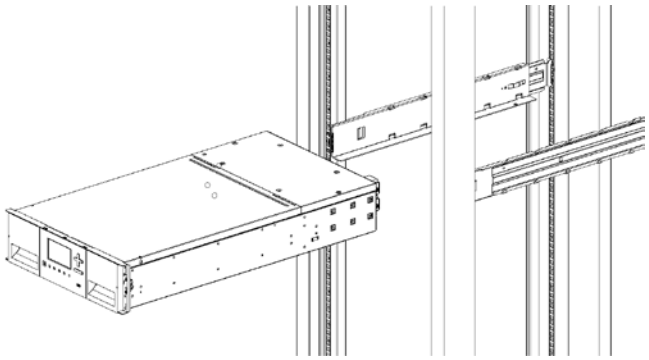
7.9.8 Removing the Module from the Rack

Obtain assistance to lift and stabilize the module during removal and replacement.

1. Go to the front of the library, use a Phillips #2 screwdriver to loosen the screws two full turns on the target module and any adjacent modules.

2. Go to the back of the library, unlock the alignment mechanisms connecting the module with the adjacent modules.

3. Go back to the front of the library, use a Phillips #2 screwdriver to loosen the captive screws fully on the module to be removed and slide the module out of the rack



7.9.9 Moving Library Cover Plates

Unpack the replacement module and place it on a sturdy work surface. Save the packaging materials to return the empty module.

The library has removable top and bottom cover plates. The two covers are identical and the process for removing and installing them is the same for the top and bottom of the module. See "**Preparing the Top and Bottom Modules**" for details; while this example refers to moving a cover from a Base Module, the information is the same for moving a cover from an Expansion Module.

The replacement module is shipped with a bottom cover plate but not a top cover plate. Move the cover plates as necessary so the replacement module has the cover plates in the same location as the empty module and the empty module has a bottom cover plate.

7.9.10 Installing the Module into the Rack

See "**Installing Modules in a Rack**" for details

7.9.11 Replacing the Module Components and Cables

Replace the module components by reversing the removal procedures. Align the components carefully in the guide slots and only tighten thumbscrews with your fingers. If the thumbscrews cannot be tightened easily, verify that the component is aligned properly.

1. Install the tape drives in the same locations.

	TIP	To assist in aligning the drive, only remove the drive bay covers for one drive at a time.

2. Reconnect any SAS, FC, expansion interconnect, and Ethernet cables removed earlier.
3. Reattach the power cords.

7.9.12 Verifying the Library Configuration

1. Power on the library by pressing the button just below the OCP.
2. Verify that the library initializes correctly and that the status is Ready. Verify that the replacement module is visible in the OCP or RMI.

3. Under normal operation the library configuration is saved on the Base Module controller.
4. Replace the tape cartridges in the same locations.

7.10 Replacing the Robotic Assembly and Spooling Mechanism

CAUTION Parts can be damaged by electrostatic discharge. Keep parts in electrostatic containers until needed. Ensure you are properly grounded when touching static sensitive components.

! IMPORTANT Under normal circumstances, when the library is powered off using the front power button, the robot automatically parks and locks into the Base Module behind the OCP.

7.10.1 Powering Off the Library

Power off the library from the front panel. Press and hold the power button for 3 seconds. If the library does not perform a soft shutdown, press and hold the power button for 10 seconds.

Verify that the robotic assembly is in its parked position.

Verify that all host processes are idle.

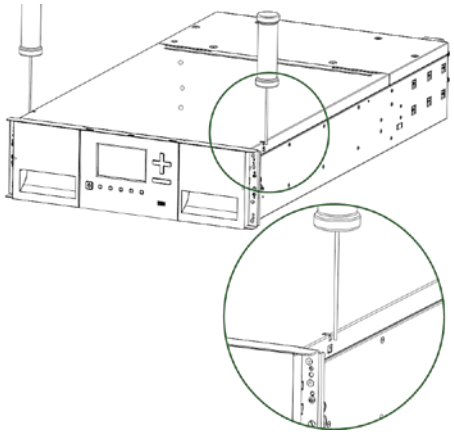
7.10.2 Preparing to Remove the Robotic Assembly and Spooling Mechanism from the Base Module

WARNING To reduce the risk of personal injury or damage to equipment when extending a module from the library:

- Extend the rack leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Verify that the rack is level side to side and front to back.
- Install the rack stabilizer kit on the rack.
- Extend only one rack component at a time. Racks may become unstable if more than one component is extended.

1. Move the robot to the base module by navigating to **Maintenance > Move Robot to Base Module**
2. Loosen the front captive thumbscrews that connect the Base Module to the rack two full turns.
3. Loosen the front captive thumbscrews two full turns on any adjacent expansion modules.
4. Go to the back of rack, move the alignment mechanisms into the unlocked position.

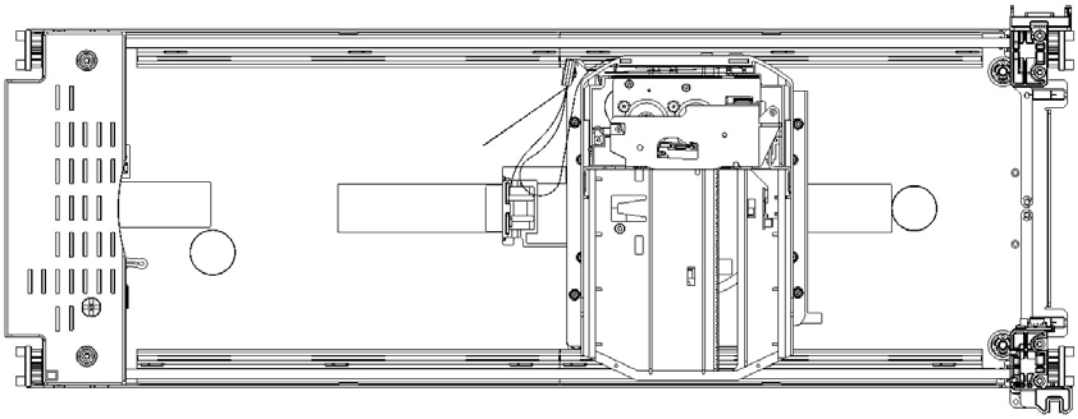
5. Disconnect and completely remove the expansion interconnect cables from the Base Module and from the adjacent modules. Removing the expansion interconnect cables completely prevents damaging the cables when moving the module in and out of the rack.
6. Disconnect the power cords.
7. Disconnect the Ethernet, SAS, and Fibre Channel cables from the Base Module.
8. Completely loosen the front captive thumbscrews of the Base Module.
9. Slowly extend the Base Module from the front of the rack until the rails lock into place.
10. Remove the top library cover plate, if present:
    a. Unlock the top cover using two small screwdrivers.
    b. Remove the cover from the module.



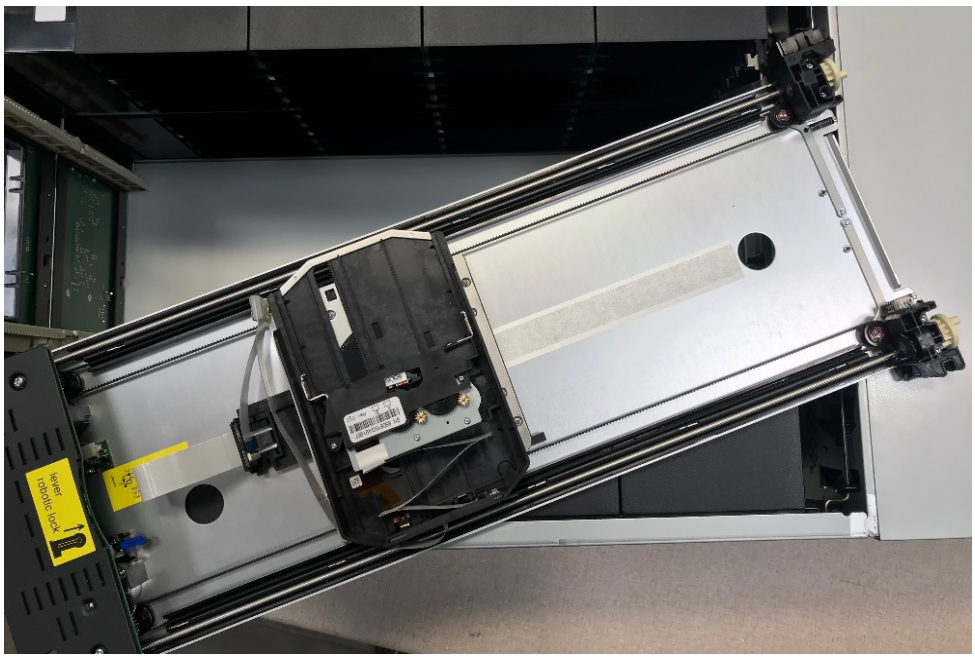
7.10.3 Removing the Robotic Assembly and Spooling Mechanism from the Base Module

1. Slide the gripper toward the center of the robotic assembly to access the robot locking lever.
2. Standing at the front of the module, unlock the robot by moving the blue lever to the left, then toward you, then to the right.
3. Place your fingers into the large holes on the robotic assembly and pull up slowly.

NOTE The robotic assembly will offer resistance. Lift the robotic assembly no faster than 12 mm (0.5 inch) per second.

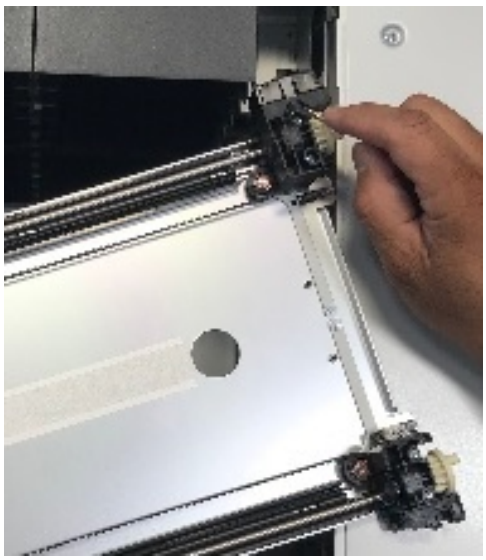


4. Lift the robotic assembly gently from the module and place it on top of the module on the right side (opposite the spooling mechanism) and slightly to the front. Take care not to damage the spooling cable.

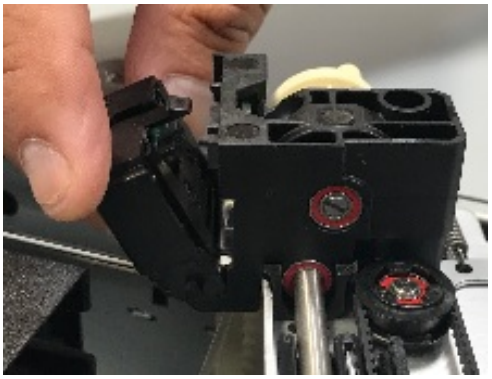
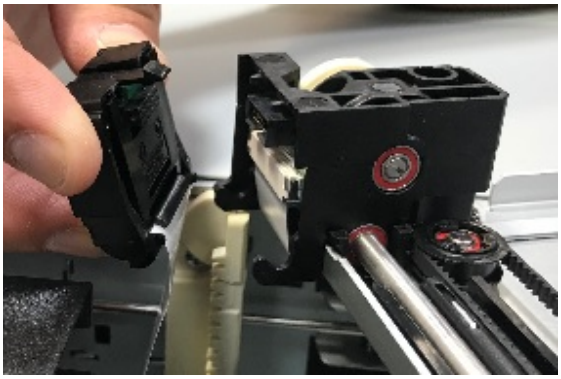


5. On the top of the robotic assembly where the spooling cable is attached, use a small flat head or Torx screwdriver driver to press and push the small latch that unlocks the spooling cable.

NOTE Note where the end of the spooling cable pivots in the robotic assembly. This is important to know when you attach the new spooling cable to the robotic assembly.



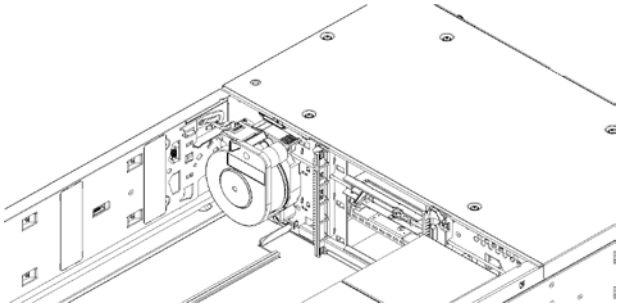
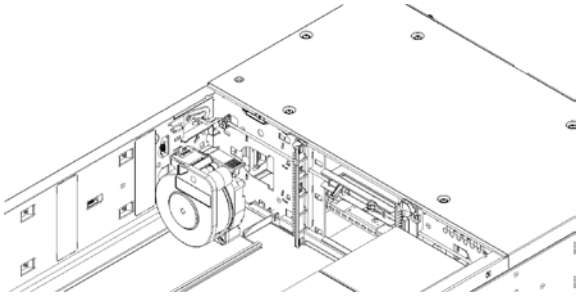
6. Lift the spooling cable from the robotic assembly and place it in its cradle at the top of the spooling mechanism.

7. Place the spooling connector to the park position.
8. Set aside the robotic assembly.

! IMPORTANT If there is a tape cartridge still in the gripper, remove the cartridge by lifting it straight up; you may need to move the cartridge slightly from side to side.

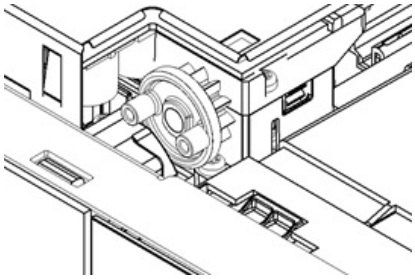
9. Extend the left magazine out of the rack by approximately 15 cm (6 inch).
10. While pressing the latch near the top of the spooling mechanism, pull the entire spooling mechanism gently up until you see it clear the narrow part of the keyhole in the back left of the metal wall. It may help to push up from the bottom with your other hand.
11. Pull the spooling mechanism toward the front of the module until it disconnects and remove it from the module.

7.10.4 Installing the Robotic Assembly and Spooling Mechanism into the Base Module

1. Hold the spooling mechanism so that the end of the spooling cable that attaches to the robotic assembly is pointing up.
2. Align the tab on the back of the spooling mechanism with the keyhole in the back left of the metal wall.
3. Push the spooling mechanism in and down until it snaps into place.
4. The robotic assembly is shipped with the robot in the unlocked position. Verify that it is unlocked. If the robot is locked, unlock it; standing at the front of the module, move the blue lever to the left, then toward you, then to the right.

5. Each corner of the robotic assembly has a gear with two protruding pins. Rotate one of the gears on the robotic assembly so that the two pins are aligned horizontally.
6. Place the gears of the robotic assembly into the grooves on the inside corners of the module. Confirm that all of the pins are touching the outside of the grooves.

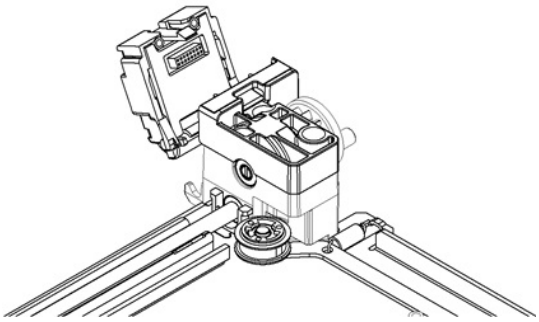


7. Push the robotic assembly down slowly until the platform of the robotic assembly is approximately 10 cm (4 inch) lower than the top of the module.

CAUTION Lower the robotic assembly no faster than 12 mm (0.5 inch) per second. If the robotic assembly is not aligned properly or you push too hard or too quickly, damage to the robotic assembly and the module may occur.

NOTE The robotic assembly should drop smoothly when applying gentle force. If it does not, check the alignment of the gears.

8. Lock the robot; standing at the front of the module, move the blue lever to the left, then away from you, then to the right.
9. Standing at the right side of the module, remove the end of the spooling cable that connects to the robotic assembly from its cradle.
10. Place the spooling cable into the grooves where it attaches to the robotic assembly and rotate until it snaps into place.



TIP If the end of the spooling cable drops into the module, unlock the robotic assembly, remove it from the module, return the end of the spooling cable to its cradle, return the robotic assembly to its previous position in the module, relock the robotic assembly, and repeat the procedure.

7.10.5 After the Robotic Assembly and Spooling Mechanism Installation

1. Push the left magazine back into the module until it locks into place.
2. Replace the top cover on the Base Module if you removed one
3. Slide the module into the rack.
4. If there are no adjacent modules, tighten the front screws.
5. If there are adjacent modules:

   Set the alignment mechanisms to the lock position. If you encounter resistance, adjust the upper module so the pin in the alignment mechanism moves into the hole in the lower module.
6. Reconnect the expansion interconnect cables.
7. Reconnect the Ethernet, SAS, and Fibre Channel cables to the Base Module.
8. Reconnect the power cords.
9. Pack the failed robotic assembly and spooling mechanism to return to Qualstar Technical Support.

7.10.6 Powering On the Library

Power on the library by pressing the power button on the Base Module just below the OCP; the green light will illuminate. When the library is powered on, it inventories the tape cartridges in the magazines, checks the firmware version on all modules, configures the tape drives, confirms the presence of the existing modules, and searches for any new modules.

7.10.7 Verifying the Installation

1. To verify that the library powers on and initializes correctly, check that the status LED is Ready.
2. If the UID LEDs are still illuminated, deactivate them using the RMI.
3. Resume all host applications.

7.11 Replacing the Front Bezel or OCP

	**CAUTION**	Parts can be damaged by electrostatic discharge. Keep parts in electrostatic containers until needed. Ensure you are properly grounded when touching static sensitive components.

7.11.1 Powering Off the Library

Power off the library from the front panel. Press and hold the power button for 3 seconds. If the library does not perform a soft shutdown, press and hold the power button for 10 seconds.

Verify that the robotic assembly is in its parked position.

Verify that all host processes are idle.

7.11.2 Removing the Bezel

Remove the magazines.

Insert a small flat head or Torx screwdriver into the bezel release holes at bottom of the unit.

Push the screwdriver until the bezel is released.

Pull the bezel up

	**NOTE**	If removing a Base Module bezel, pull gently to avoid damaging the OCP cable. Note where the OCP cable is located, routed and attached.

7.11.3 Installing the Bezel

Place the top tabs of the bezel into the slots in the top slots of the module.

Rotate the bezel and snap in at the bottom

7.11.4 Powering On the Library

Power on the library by pressing the power button on the Base Module just below the OCP; the green light will illuminate. When the library is powered on, it inventories the tape cartridges in the magazines, checks the firmware version on all modules, configures the tape drives, confirms the presence of the existing modules, and searches for any new modules.

8 Library Troubleshooting

CAUTION This library is designed to operate when installed in a rack using the rack rail kit. Operating the library without installing it in the rails, such as on a table or rack shelf, could result in library errors. Placing any weight on top of the library might also cause errors.

8.1 Fibre Channel Connection Problems

Navigate to the **Status> Drive Status** page to check the link connection for your tape drive.

Each tape drives should report its connection Speed, Port Type, Interface Status and Port ID.

If any of the items are missing, go to the **Configuration > Drives** page and verify that Speed and Port Type are set to Automatic.

If there are still issues:

- Check the Speed and Port Type setting on the FC switch (if connected to switch) and the host HBA. In some instances, speed or port type matching between drive and host may not be compatible. You may need to select the proper speed and port type on both drive and host to obtain a connection.
- Disconnect and reconnect the FC cable. Check to see if the cable is damaged. FC cables are delicate. If the cable has been bent or twisted sharply, it might be broken and must be replaced.

If you are connected to a Loop port:

- Try selecting Soft for the Loop mode to allow the system to select an available address each time the tape drive connects to the FC fabric. If your server configuration does not support changing addresses, try using the Hard Auto-Select option for the Loop mode. This allows the system to select an available address when it first connects, and then retain that address for future connections.

8.2 Detection Problems after Installing a SAS Drive

Problems encountered after installation are often caused by improper SAS cable connections, application software configuration errors, or an incorrectly configured operating system. If the application software or operating system does not communicate with the library after installation, determine the extent of the detection problem:

- Does the application software detect the tape drive?
- Does the application software detect the library?
- Does the operating system detect the tape drive?
- Does the operating system detect the library?
- Does the operating system detect the library, but list it as a generic device? Based on the extent of the detection problem, check the following:
- If neither the application software nor operating system detects the tape drive:
    - Verify that all SAS cables are securely connected on both ends. Mini-SAS connectors are keyed can only be connected one way. If you feel resistance when connecting the cable,

make sure that the connectors are oriented in the correct alignment. The mini-SAS connector on the tape drive is keyed at location four, which is the standard location for end devices. If the connector on the cable is keyed in a different location, not only will the connector not plug in, but the cable probably will not work.

- Check the length and integrity of your SAS cabling. For reliable operation, do not use a SAS cable longer than six meters. Do not use a cable adapter or converters between the HBA and the library.
- Check the SAS connectors for damage or debris.
- Verify that your HBA is supported by the host computer.
- Verify that the SAS host adapter is installed correctly. Refer to the manual that came with your host adapter for installation and troubleshooting instructions. Pay particular attention to any steps describing configuration settings. Make sure that the host adapter is properly seated in the motherboard slot and the operating system correctly detects the host adapter.
- Verify that the proper device driver is installed for the SAS host adapter.
- Verify that your HBA has the latest firmware.

- If the application software or operating system detects the tape drive, but not the library:
  - Verify that multiple LUN support is enabled on the HBA. The library uses two Logical Unit Numbers (LUNs) to control the tape drive (LUN 0) and library (LUN 1). The library requires an HBA with multiple LUN support and multiple LUN support must be enabled on the host computer. When multiple LUN support is not enabled, the host computer can see the tape drive, but not the library.

NOTE Many RAID or array controllers do not provide multiple LUN support.

- If the library is detected by the operating system, but not by the application software:
  - Refer to the documentation included with your backup application for instructions on how to verify proper installation. Some backup software packages require an additional module to communicate with the robotics.
- If the library is detected by the operating system, but is listed as an unknown or generic device:
  - Make sure that the proper device driver, if applicable, is installed for the device. Check your software provider's website for the latest drivers and patches.

NOTE Many backup applications require their own drivers. Before installing a driver, make sure it is not in conflict with the application software.

If you continue to have problems with a SAS library, check the following:

- Ensure that the library is compatible with the backup application you plan to use.
- Verify that your HBA is supported by the host computer and qualified with the library.
- Ensure you are using a compatible, high-quality cable.

8.3 Operation Problems

Table 14: Power Problems

Problem	Solution
Device does not power on.	Check all power cord connections. Check the LEDs on the power supplies. Make sure the power button on the front panel has been pressed, and the green **Ready** LED is lit. Make sure the outlet has power. Try another working outlet. Replace the power cord.
No message appears on the OCP display.	Check all power cord connections. Check the LEDs on the power supplies. Make sure the power button on the front panel has been pressed, and the green **Ready** LED is lit. Make sure the outlet has power. Try another working outlet.

Table 15: Failure/Attention Indications Displayed on the Front Panel

Problem	Solution
The LCD displays a warning or error icon.	Tap the icon to see more information about the event on the LCD.
The LCD displays an error code.	Look up the error code, try to resolve the failure, and power cycle the library (see **Event Codes**).

Table 16: Tape Movement Problems

Problem	Solution
Tape stuck in drive.	Try the following steps, in this order, to remove the stuck tape. **NOTE:** The tape drive must rewind the tape before ejecting it. This can take as long as five minutes, depending on how much tape must be rewound. Once the tape is rewound, the eject cycle will take fewer than 16 seconds. The **Ready** light flashes while the tape rewinds. Wait for the tape to finish rewinding before attempting another operation. Attempt to unload the tape from your backup software. Shut down the backup software and stop the operating system's removable storage services. From the **Operation > Move Media** screen, attempt to unload or move the tape to a slot. Power down the library, disconnect the cable from the drive, power up the library, and wait until the tape drive is idle or ready. From the **Operation > Move Media** screen, attempt to unload or move the tape to a slot. From the **Operation > Force Drive Media Eject** screen, attempt a force eject or emergency unload operation.

Problem	Solution
Tape stuck in drive (continued).	**IMPORTANT:** Inspect the tape cartridge that was stuck. Damage or misplaced labels on the cartridge could have caused the load/unload failure. Discard any tape cartridge found to have issues.
Tape cannot be removed from storage slot	If the OCP or RMI is still operational: Unlock the magazine from the **Operation > Open Magazine** screen and extend it to access the storage slot. Grasp the cartridge and remove it from the storage slot. Check the barcode label and verity that it is secure to the cartridge. Check the cartridge for damage. Check the storage slot for damage.

Table 17: Media Problems

Problem	Solution
Cleaning or data cartridge incompatible with drive.	• Check the event log to see which cartridge is incompatible. • Make sure you are using data and cleaning cartridges that are compatible with the drive and model of your device and that you are using the correct cartridge type for the operation. The device automatically unloads incompatible cartridges, the **Attention** LED flashes. Export the media.
Cannot write to or read from tape.	• Make sure that the cartridge is not a WORM cartridge that has already been used. • Make sure that the cartridge is write enabled (move the write-protect switch to the enabled position). • Make sure the data cartridge is compatible with the drive model. • Make sure you are using an Ultrium cartridge that has not been degaussed. **Do not degauss Ultrium cartridges!** • Make sure that the cartridge has not been exposed to harsh environmental or electrical conditions and is not physically damaged in any way. • Many backup applications do not read or write to cartridges that were created using a different backup application. In this case, you may have to perform an erase, format, or label operation on the cartridge. • Make sure you understand any data protection or overwrite protection schemes that your backup application may be using, which could prevent you from writing to a given cartridge. • Retry the operation with a different, known good tape. • Clean the tape drive from the **Operation > Clean Drive** screen.

Table 18: Attention LED is Lit

Problem	Solution
Both the Attention and Cleaning LEDs are lit.	This is most likely caused by a dirty drive that cannot read a tape and marks the tape invalid. Log into the OCP or RMI and check the event log to see which drive has reported that it needs cleaning. Clean the drive with an approved Ultrium cleaning cartridge.
A particular cartridge sets off the cleaning light.	Remove the cartridge from the library.
A cartridge recently imported from a different environment is causing issues.	Media that is moved from one environment to another can cause issues until it has acclimated to the new conditions. A cartridge should be acclimated for at least 24 hours before being used, particularly if it has been stored at a substantially different temperature or level of humidity than the device.
The Attention LED is lit but the Cleaning LED is not lit after a cartridge load.	The library was unable to complete the requested operation with the selected tape cartridge. • Use only cartridges that are compatible with the drive type • Use the correct type of cartridges for the operation. For example, use a cleaning cartridge for cleaning. • Make sure you are using a Universal cleaning cartridge
The Cleaning LED is lit after using a cleaning cartridge.	The cleaning cartridge has expired. A cleaning cartridge will expire after approximately 50 cleaning cycles.
A particular cartridge sets off the Attention LED and possibly the Cleaning LED.	Retry the operation with a different cleaning cartridge. If the Attention LED is cleared and the drive has been cleaned, and then immediately re-displays each time a particular cartridge is reloaded, that cartridge should be suspected as being defective. • Export the cartridge and load a known good cartridge. In some cases, a cartridge can be worn out. • Any cartridge that is suspected of being defective or contaminated should NOT be reused in any drive. • If the bad cartridge is a cleaning cartridge, it might be expired.

Table 19: Inventory Problems

Problem	Solution
The library displays incorrect bar codes.	• Verify that the label is properly applied. • Verify that the label is not damaged. • Verify that labels are valid. See Labeling Cartridges for details.

Table 20: RMI Network Connection Issues

Problem	Solution
Cannot connect to the RMI.	• Verify that the Ethernet cable is connected to the Base Module's controller board and to the LAN. • Verify that the link LED on the RJ45 (LAN) connector is lit when the device is powered up. If the LED is not lit, the device is not communicating with the LAN. See your network administrator for help. • Verify that the device has been configured with a valid static network address or DHCP has been enabled so the device can obtain a network address. If using DHCP, write down the device's network address from the OCP login screen. If the device did not obtain a valid address via DHCP, verify that the DHCP server is up and the library has network access to it. If necessary, set a static network address instead. • Enter the library's IP address into the address bar of a web browser connected to the same LAN as the device. If the RMI web page does not display, ping the device's IP address. If the ping fails, verify that the device has a valid network address and that there are no firewalls or other obstructions to network traffic between the computer with the web browser and the device. See your network administrator for help.

Table 21: Cleaning Problems

Problem	Solution
Cannot load the cleaning cartridge.	• Make sure you are using a Universal Ultrium cleaning cartridge. • Make sure the cleaning cartridge has not expired. A cleaning cartridge will expire after approximately 50 cleaning cycles. • Power cycle the library.

8.4 Performance Problems

The process of backing up files involves many system components, from the files in the file system on the disk drives, through the backup server, and out to the library. This is all managed by software running on an operating system. The backup process can only run as fast as the slowest component in the system.

Performance issues are solved by identifying and addressing performance limitations in your system. See sections below for the following potential performance limitations:

- Average File Size
- File System Type
- Connection from the Backup/Archive Host Server to the Disks
- Backup/Archive Server
- Backup/Archive Software and Method
- Connection from the Backup/Archive Host Server to the Device
- Media

8.4.1 Average File Size

The hard drive must seek to the position of a file before it can start reading. The more seeks a drive must perform will lower the overall performance of the drive. Therefore, if the average file size is small, the read performance will be slower.

To determine the average file size, divide the size of the backup by the number of files.

If the average file size is small (64 KB or less), consider using a sequential, image, or block backup method that backs up the whole hard drive or LUN image instead of individual files. The tradeoff for using one of these methods is that you might only be able to restore the entire image instead of individual files.

NOTE File fragmentation will also cause excessive drive seeking, which lowers performance, so ensure that files are regularly defragmented.

8.4.2 File Storage System

The file storage system determines the organization of the files on the disks. Using RAID controllers to spread files over multiple disks can improve performance because some disks can be seeking while others are reading. Storing files on a single non-RAID disk results in the slowest performance while storing files on a high-end disk array results in the fastest performance.

Converting standalone disks to RAID can improve performance.

8.4.3 Connection from the Backup/Archive Host Server to the Disk Array

The connection between the host server and the disks determines how much data can be transferred from the disks to the host computer at a time. A connection with insufficient bandwidth cannot provide enough data for the tape drives to write at full speed. For optimum performance, the storage subsystem must be able to provide data at the tape drive's maximum transfer rate.

Backup systems using a lower speed Ethernet network should use multiple network connections.

8.4.4 Backup/Archive Server

The backup server must have enough RAM and processor power to transfer the files from the disk to the tape drive, in addition to running the backup or archive software and any other processes.

Check the RAM and processor usage during a backup operation. If they are operating at capacity, adding RAM or processor capability can improve performance.

8.4.5 Backup/Archive Software and Method

Each backup method has its own impact on performance, depending on how well it can keep data streaming to the tape drive. In most cases, native applications don't have the features required to maximize performance for LTO tape drives. It is recommended to use a full-featured backup or archive application with this library.

File-by-file backup or archive methods provide the best restore performance if you only need to restore individual files. However, if the average file size is small, file-by-file methods will significantly reduce performance.

Disk image, flash, or sequential backup methods provide the fastest performance because they back up an entire disk, partition, or LUN, which minimizes disk seeking. The disadvantage is that backup and

restore operations work on an entire disk, partition, or LUN. You might not be able to back up a subset of files or restore a single file. If you can restore a single file, the restore process will be slow.

Database backup performance will vary. To improve performance when backing up data from a database:

- Use specific backup agents for the database.
- Use the latest versions of the databases.
- Do not back up individual mailboxes.
- Do not back up specific records or do a record-by-record backup.
- Do not back up when the database is in heavy use.

8.4.6 Connection from the Archive/Backup Host Server to the Library

For best performance, the connection from the host server to the library must have enough bandwidth to keep all of the tape drives streaming. Current LTO tape drives take advantage of some of the fastest interfaces available so the type of interface used to connect the library to the host server is not likely to be the cause of a performance issue. However, issues with cables and connectors can limit performance.

Do not exceed recommended cable lengths.

8.5 Finding Event Information

You can find error codes by viewing log files from the **Maintenance > Logs and Traces > View Logs** page or downloading logs from the **Maintenance > Logs and Traces > Download Logs and Traces** page. See "**Viewing Log Files**" or "**Saving Log Files**."

8.6 Unlocking the Magazine

It is recommended that you unlock the magazine using the unlock buttons or RMI. If these methods fail, or if a magazine needs to be removed when the power to the device is off, you can release the magazine manually. Only one magazine can be open at a time.

NOTE Perform this procedure while applications are idle. While the magazine is extended, the library robotic assembly cannot move media

8.6.1 Using the Magazine Unlock Button

Press and hold the button for more than 3 seconds. This will start the unlock operation for the magazine, indicated by the LED slowly flashing.
When the magazine is unlocked the LED starts flashing quickly
Pull out the magazine from the library. As soon as the magazine is pulled out, the LED turns OFF.

NOTE

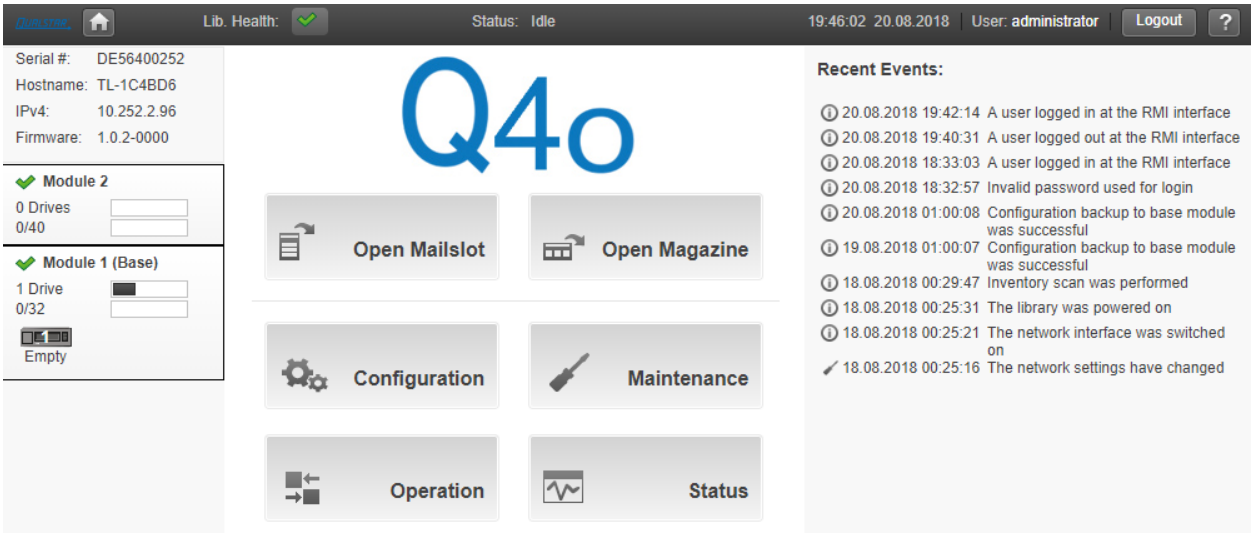
- Opening a magazine will take the library offline.
- The magazine will relock after 30 seconds.

! IMPORTANT Wait before pulling out the magazine until the LED is quickly flashing and a message on the OCP states that magazine is unlocked.

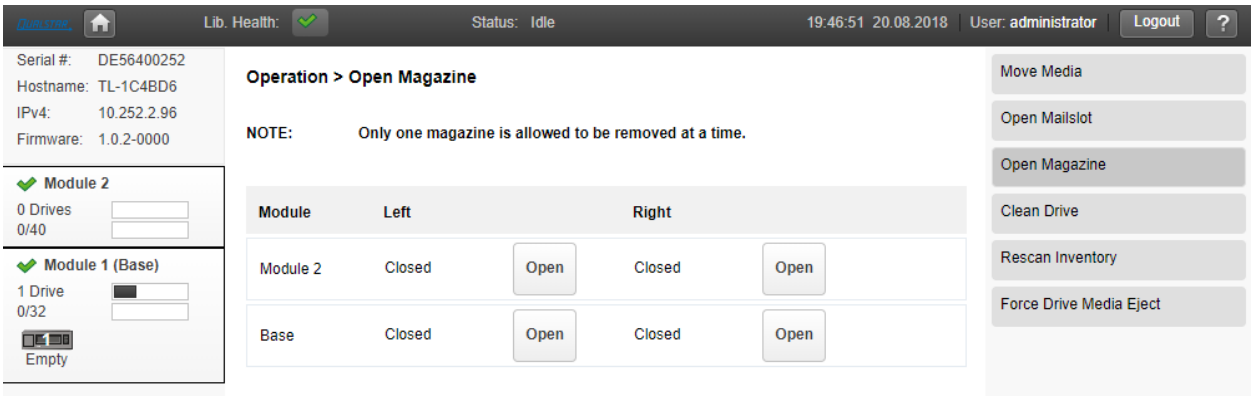
8.6.2 Using the RMI

Log in as an administrator.

On the Home screen, click **Open Magazine**.



Click **Open** in the left or right magazine column within the module containing the magazine to be opened.



- A message box indicates when the magazine has been unlocked.
- The Open Magazine page will show that the magazine is now unlocked.

NOTE If not removed, the magazines and the mailslot will relock after 30 seconds.

8.6.3 Using the Manual Release

To manually release the magazine, insert a small flat head screwdriver into the appropriate magazine release hole and gently push the tab.

!	**IMPORTANT**	Do not exert force once you encounter resistance. Doing so can damage the device.

8.7 Unloading a Stuck Tape

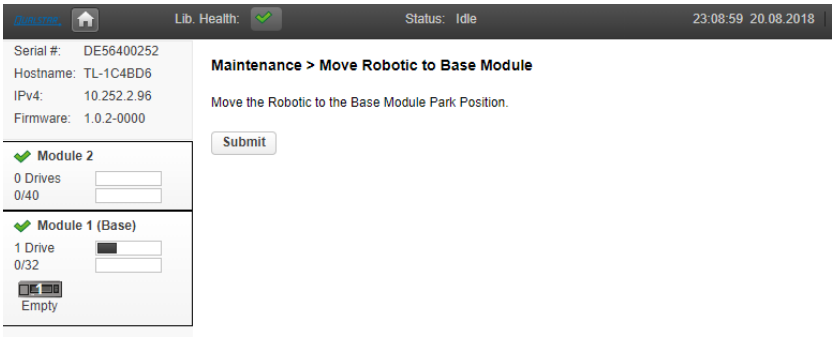
If a tape is stuck in a tape drive, eject the tape from the drive from the **Operation > Force Drive Media Eject** screen. Before performing this option, it is recommended that you attempt to eject the tape using the backup software or library move media operation.

If a tape is stuck in a magazine, open the magazine, grasp the cartridge, and pull it out of the storage slot.

8.8 Returning the Robotic Assembly to the Base Module

When the Q40 is powered off the robotic assembly should return to its parked position in the Base Module behind the OCP. If the robotic assembly does not return to its parked position:

- Power on the library by pressing the power button on the Base Module just below the OCP.
- From the RMI, navigate to the **Maintenance > Move Robotic to Base Module** page. Select the Submit button to initiate the move.

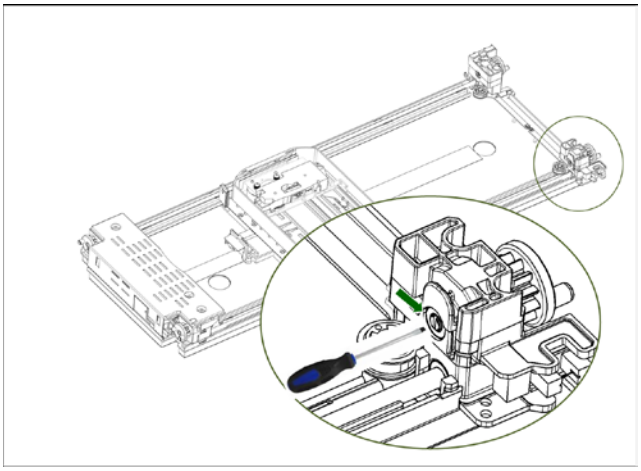


- Power off the library by pressing and holding the power button on the Base Module for 3 seconds.

If the robotic assembly is still not in the Base Module, use one of the procedures in the following two sections.

8.8.1 The Robotic Assembly is stopped in an Expansion Module that is near the Base Module or is Stopped Directly between Two Modules

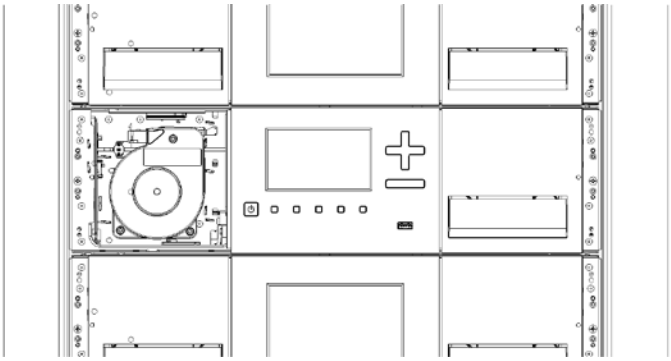
- Remove the front bezel from the Base Module, the Expansion Module containing the robotic assembly, and any modules in between as needed; see **"Removing the Bezel"**.
- Insert a small flat head screwdriver into the screwdriver relief on the right rear bearing block of the robotic assembly.



- Turn the screwdriver to manually operate the robotic assembly gear train and move the robotic assembly into the Base Module.
- Lock the robotic assembly; standing at the front of the module, move the blue lever to the left, then away from you, then to the right.
- Reinstall the bezels previously removed; see **"Installing the Bezel"**.
- Remove the robotic assembly and spooling mechanism; see **"Preparing to Remove the Robotic Assembly and Spooling Mechanism from the Base Module".**
- Install the new robotic assembly and spooling mechanism; see **"Installing the Robotic Assembly and Spooling Mechanism into the Base Module".**
- Slide the Base Module back into the rack; see **"After the Robotic Assembly and Spooling Mechanism Installation".**

8.8.2 The Robotic Assembly is stopped in an Expansion Module that is not near the Base Module or it Cannot Move Vertically

- Power off the library. Disconnect all power cords from all of the modules.
- Remove the left magazine of the Base Module.
- Using plastic-handled scissors reach through the left magazine opening of the Base Module and carefully cut the spooling cable.



- Extend the expansion module containing the robotic assembly while carefully guiding the free spooling cable; see **"Preparing to Remove the Robotic Assembly and Spooling Mechanism from the Base Module"**. While there may be minor differences, these instructions for a Base Module will also apply to an Expansion Module.
- Remove the robotic assembly from the Expansion Module using Step 1 through Step 7 in **"Removing the Robotic Assembly and Spooling Mechanism from the Base Module"**.
- Slide the Expansion Module back into the rack; see **"After the Robotic Assembly and Spooling Mechanism Installation"**. While there may be minor differences, these instructions for a Base Module will also apply to an Expansion Module.
- Extend the Base Module; see **"Preparing to Remove the Robotic Assembly and Spooling Mechanism from the Base Module"**.
- Remove the spooling mechanism from the Base Module using Step 8 through Step 10 in **"Removing the Robotic Assembly and Spooling Mechanism from the Base Module"**.
- Install the new robotic assembly and spooling mechanism; see **"Installing the Robotic Assembly and Spooling Mechanism into the Base Module"**.
- Slide the Base Module back into the rack; see **"After the Robotic Assembly and Spooling Mechanism Installation"**.

8.9 Running Library Tests

The library provides tests to verify library operations.

- Wellness Test – Performs a general health check of the library by running the following partial tests:
  - Basic Hardware Review
  - Robotics Initialization Test
  - Barcode Scanning Test
  - Move Media Test
- System Test – Verifies the overall functionality of the library by moving cartridges within the library. Cartridges are returned to their original location. See "**System Test**".
- Slot to Slot Test – Verifies robotic functionality by randomly exchanging cartridges within the library. Cartridges are NOT returned to their original locations. See **"Slot to Slot Test"**.
- Element to Element Test – Can verify the functionality of specific location by moving a cartridge to a specific element and then returning it to its original location. See **"Element to Element Test"**.
- Robotics Test – Verifies all robotic assembly movements and sensors. See **"Robotics Test"**.
- OCP Test – Illuminates each of the front panel LEDs. See **"OCP Test"**.

9 Acronyms and Abbreviations

FC	Fibre Channel
GUI	Graphical User Interface
HBA	Host Bus Adapter
HH	Half Height
LUN	Logical Unit Number
OCP	Operator Control Panel
RMI	Remote Management Interface
SAN	Storage Area Network
SAS	Serial Attached SCSI
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SSL	Secure Socket Layer
UID	Unit Identification
USB	Universal Serial Bus
WORM	Write Once, Read Many
WWPN	World-Wide Port Name

10 Event Codes

Table 22: Error Events

Event Code	Message Text and Description	Details and Solution
2000	Failed to move cartridge.	Verify the source and destination elements and retry the move operation.
2002	The initial module discovery (detection of expansion modules) failed.	Verify that all expansion modules are powered on and that the expansion interconnect cables are properly installed.
2003	The library's temperature has exceeded the critical limit.	1) the chassis fan is functioning in each module 2) the drive cover plates are installed where needed 3) all power supplies are installed, 4) the ambient room temperature is within limits.
2004	Library Startup Failure.	Verify that magazines are closed, cartridges are fully seated, and that there are no robotic assembly obstructions. Verify all modules are powered and any expansion modules are cabled correctly with the inter module cable. Verify there is a top and bottom cover. Verify the module alignment locks are in the proper position. If the robot moves front to back, but not vertically, the robot shipping lock could be positioned incorrectly and should be moved to either the fully locked or fully unlocked position. If the error persists, review library events for more information and/or reboot the library.
2005	Robotic spooling cable failure.	Ensure that the spooling cable is fully seated in the base module and connected correctly to the robotic assembly.
2006	Cable to spooling mechanism has failed.	Ensure that the spooling mechanism is fully seated in the base module and connected correctly to the robotic assembly.
2009	Library test failed due to robotics assembly problem.	Review test requirements and retry the test, if the test continues to fail check for robotic obstructions or other robotic problems. For proper operation the robot must be able to reach the very bottom of the library. Verify there are no obstructions at the bottom of the library or on the bottom cover of the library. To check for obstructions at the bottom of the library, first power off the library by pressing the front power button for 5 seconds and select the Default Park location. Once the library is powered off, remove the left magazine of the lowest library module, and verify the entire area of the bottom cover is free of any obstructions. Clear any obstructions, replace the magazine, power the library on and verify no further critical events are generated.

Event Code	Message Text and Description	Details and Solution
2010	Library test failed due to spooling mechanism defect.	Ensure that the spooling mechanism is fully seated in the base module and connected correctly to the robotic assembly.
2011	Drive Power Board has failed.	Ensure the drive power board is fully seated in the module and power cycle the library.
2012	Multiple bottom covers detected.	Remove all bottom covers except from the bottom module in the library.
2013	Multiple top covers detected.	Remove all top covers except for the top module in the library.
2014	Bottom cover is missing.	Install the bottom cover on the bottom module of the library, also check the module interconnect cable and module power cords. If the base module cannot detect both a top and bottom cover the robot will not move.
2015	Top cover is missing.	Install the top cover on the top module of the library. Check the module interconnect cable and module power cords. If the base module cannot detect both a top and bottom cover the robot will not move.
2016	Module alignment mechanism is not locked properly.	Ensure that the alignment mechanism is engaged in every module that is above another module in the library.
2017	A communication problem between modules was detected.	Ensure that all modules are powered and have the interconnect cable properly attached. Also, ensure that the module alignment locks are in the correct positions.
2018	Too many unit position transmitter/detector failures.	Ensure that the alignment mechanism is engaged in every module that is above another module in the library. Perform a power cycle.
2021	Database access error.	Restore a configuration backup and perform a power cycle.
2022	Drive has been hot removed while in active status as LUN master.	Reinstall the removed drive at the same position as it was removed.
2023	Internal software error.	Contact Technical Support for firmware upgrade.
2024	Exception thrown by application not handled.	Contact Technical Support for firmware upgrade.
2027	Move failed pulling cartridge from slot.	Check for labels or cartridge misalignments. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events were generated.

Event Code	Message Text and Description	Details and Solution
2028	Move failed inserting cartridge to slot.	Check for labels or cartridge misalignments. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events were generated.
2029	Initialization failure due to robot front to back positioning error.	Check for obstructions in the pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Check if the robotics assembly is stuck to the lock mechanism, move robotics assembly apart from lock mechanism and enable lock mechanism correctly.
2032	Initialization failure due to robot rotation positioning error.	Check for obstructions in the vertical pathway of the robot such as a cartridge sitting in the shuttle of the robot or any other obstruction to robotic movement.
2033	Initialization failure due to robot vertical positioning error.	Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events are generated.
2034	Cable to spooling mechanism has failed during initialization.	Ensure that the spooling mechanism is fully seated in the base module and connected correctly to the robotic assembly.
2035	Initialization failure due to robot gripper positioning error.	Check for obstructions in the vertical pathway of the robot such as a cartridge sitting in the shuttle of the robot or any other obstruction to robotic movement.
2036	Unintended termination of application process.	Reboot or power cycle system.
2037	Robotics firmware version upgrade failed.	Reboot or power cycle system.
2038	Lost connection to Module.	Ensure that all modules are powered on and have the interconnect cable properly connected. Reboot or power cycle the system.
2039	Cartridge left in robot gripper, unable to be moved to any open location.	Enable Mailslots and ensure that some of them are free. Then power cycle library. If still failing, open covers and remove cartridge manually from gripper.
2040	Wellness test failed with critical error.	Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events are generated.

Event Code	Message Text and Description	Details and Solution
2041	Wellness test failed because of unit lock failed.	Ensure that the alignment mechanism is engaged in every module that is above another module in the library.
2042	Wellness test failed because top cover is missing.	Install the top cover on the top module of the library. Check the module interconnect cable and module power cord. If the base module cannot detect both a top and bottom cover the robot will not move.
2043	Wellness test failed because bottom cover is missing.	Install the bottom cover on the bottom module of the library. Check the module interconnect cable and module power cord. If the Base Module cannot detect both a top and bottom cover the robot will not move.
2044	Wellness test failed because drive power board has failed.	Ensure the drive power board is fully seated in the module and power cycle the library.
2045	Wellness test failed because move media test failed.	The minimum requirements for the Wellness test are at least one unloaded drive and one data cartridge compatible with that unloaded drive. If there are no available drives or compatible media, the test will fail and an error event will be generated. To view event details from the RMI, click on the event, and then view all of the event details to see what elements were involved in the move failure. Additionally, check for obstructions in the pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Check if the robotics assembly is stuck in the lock mechanism, move robotics assembly apart from lock mechanism and enable lock mechanism correctly.
2046	Wellness test failed because drive communication test failed.	Remove and reseat the drive canister to ensure that the drive is fully seated. If the issue persists then reset the drive.
2047	Wellness test failed because the barcode scanning test failed.	Verify that there is no obstruction in front of the barcode scanning module located on the robotics assembly. If the error persists replace the robotics assembly. Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events are generated.
2051	Wellness test failed because of the failing robotic test.	Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Ensure that the spooling cable is fully seated in the Base Module and connected correctly to the robotic assembly.

Event Code	Message Text and Description	Details and Solution
2052	An open magazine was detected in one or more modules and as a result the system was taken offline.	Ensure that all magazines are completely inserted and properly locked. Do not open magazines using the emergency release while the library is operating and the robot is moving.
2053	An open top cover was detected and as a result the system was taken offline.	Ensure that the top cover is completely inserted and properly locked. Do not open the top cover while the library is operating and the robot is moving.
2054	An open bottom cover was detected and as a result the system was taken offline.	Ensure that the bottom cover is completely inserted and properly locked. Do not open bottom cover while the library is operating and the robot is moving.
2055	An open unit lock was detected and as a result the system was taken offline.	Ensure that all unit locks are properly locked. Do not open unit locks using while the library is operating and the robot is moving.
2056	Initialization failure due to picker push pull positioning error.	Check for obstructions in the horizontal pathway of the robotics assembly such as a cartridge sticking out or a cable impeding progress.
2057	Robotics shipping lock in incorrect position.	Get access to the picker assembly and manually move the shipping lock lever to either locked or unlocked position. After moving the shipping lock to the correct position, reboot the library.
2061	Move failed pulling cartridge from drive.	Check for labels or cartridge misalignments that would prevent the cartridge from coming out of the drive.
2062	Move failed inserting cartridge to drive.	Check for labels or cartridge misalignments that would prevent the cartridge from coming out of the drive.
2063	Move failed positioning picker in front of drive.	Check for obstructions in the vertical or horizontal pathway of the robotic assembly. Examples could include a cartridge that is not seated properly, a robotics assembly that is not level, or a problem with the robotic spooling cable that is impeding progress.
2064	Library test failed with critical error.	Check for obstructions in the vertical or horizontal pathway of the robotic assembly. Examples could include a cartridge that is not seated properly, a robotics assembly that is not level, or a problem with the robotic spooling cable that is impeding progress.
2065	Library startup process failed because of robotics initialization issue.	Check for obstructions in the vertical or horizontal pathway of the robotic assembly. Examples could include a cartridge that is not seated properly, a robotics assembly that is not level, or a problem with the robotic spooling cable that is impeding progress.

Event Code	Message Text and Description	Details and Solution
2066	Library startup process failed during inventory scan.	Check for obstructions in the vertical or horizontal pathway of the robotic assembly. Examples could include a cartridge that is not seated properly, a robotics assembly that is not level, or a problem with the robotic spooling cable that is impeding progress.
2067	For safety reason the robot movement was halted in place.	Ensure that all magazines, top or bottom covers and unit locks are completely inserted and properly locked. Do not open magazines using the emergency release or remove covers or unit locks while the library is operating and the robot is moving. Ensure that all modules are powered and have the inter connect cable properly attached.
2068	An emergency stop condition was detected in one or more modules and prevented the robotic from initialization.	Ensure that all magazines, top or bottom covers and unit locks are completely inserted and properly locked. Ensure that all modules are powered and have the interconnect cable properly connected.
2069	Initialization failure due to barcode reader error.	Verify that there is no obstruction in front of the barcode scanning module located on the robotics assembly. If the error persists replace the robotics assembly. Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events are generated.
2070	Inventory scan failed because of Elevator axis problem.	Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events are generated.
2071	Cartridge on picker when trying to scan.	Verify that there is no obstruction in front of the barcode scanning module located on the robotics assembly. If the error persists replace the robotics assembly. Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events are generated.
2072	Bottom cover detected at an incorrect position.	Review the stack assembly and place all covers to the proper position.
2073	Top cover detected at an incorrect position.	Review the stack assembly and place all covers to the proper position.

Event Code	Message Text and Description	Details and Solution
2074	The library startup failed due to a GPIO error.	Reboot or power cycle system.
2075	The library startup failed due to an error when trying to open the robotics serial port.	Reboot or power cycle system.
2076	I2C bus signals invalid.	Remove all drive canisters of the affected chassis and reboot the library. If the problem persists, replace the chassis. If not, add one drive after the other until the problem comes back. Replace the last drive added before it failed again.
2077	Failed to store Calibration Data to Chassis.	Reboot or power cycle system.
2078	Incompatible Robotics Assembly without Encoder detected.	Replace Robotics Assembly with a compatible model with Encoder or upgrade Firmware to a version which supports Encoder-less control.
2079	Could not upgrade barcode reader firmware.	Reboot the library and if the error persists replace the robotics.
2080	Cartridge lost while inserting it into slot/drive.	Check the source/destination element and ensure that there are no obstructions in the pathway of the robot.
2081	I2C port expander read write error.	Reboot the library and if the error persists replace the chassis. Prior to replacing the chassis, ensure you remove all of your tape cartridges. If magazines need to be removed to get access to the tape cartridges, first power down the device and then manually release each magazine. Only one magazine should ever be opened at a time.
2083	Drive Power Board is not compatible to this Library and does not match to the installed power supply.	Remove incompatible Drive Power Board. Only install Drive Power Boards that are compatible with the library.
2084	Lost connection to Module, possibly due to abnormal network activity.	Ensure that all modules are powered on and have the interconnect cable properly attached. If this event is seen on multiple modules, ensure that the network that the Base Module is connected to is not experiencing broadcast storms or other abnormal activity. Reboot or power cycle the system to re-discover the modules.
2085	Communication failure to the Base Module controller board I2C port expander component.	Until this issue is resolved, the base module will not be able to discover any attached expansion modules. Reboot the library. If the error persists, power off the library and reseat the base module controller. If the error continues to persist, replace the base module controller.

Event Code	Message Text and Description	Details and Solution
2086	Communication failure to the Expansion Module controller board I2C port expander component.	Until this issue is resolved, the base module will not be able to discover any attached expansion modules. Reboot the library. If the error persists, power off the library and reseat the base module controller. If the error continues to persist, replace the base module controller.
2087	Error accessing the backplane flash memory.	Reboot the library and if the error persists replace the chassis. Prior to replacing the chassis, ensure you remove all of your tape cartridges. If magazines need to be removed to get access to the tape cartridges, first power down the device and then manually release each magazine. Only one magazine should ever be opened at a time.
2088	Failure moving to the lowest vertical position of the library, check for obstructions on the bottom cover.	Check for obstructions in the vertical pathway of the robot such as a cartridge sticking out. Verify module alignment and frame alignment. Verify there are no obstructions at the bottom of the library. Power cycle the library and verify no further critical events are generated.
2089	Incompatible Robotics Assembly detected.	An incompatible robotics assembly has been detected. The robotics assembly was not powered on to avoid damage of the library. Power off the library and replace the robotics assembly with a compatible version.
2090	Wellness test failed because incompatible drive power board detected.	Remove incompatible Drive Power Board. Only install Drive Power Boards that are compatible with the library.
2091	Display Controller of the Operator Control Panel (OCP) reports an error	Reboot the library for new initialization of the OCP controller. If the error continues to persist, replace the Operator Control Panel.

Table 23: Warning Events

Event Code	Message Text and Description	Details and Solution
4000	A reported drive canister fan speed is too slow.	Ensure there are no obstructions in the fan
4002	A drive sent a clean request.	Clean the drive with an approved cleaning cartridge.
4003	The drive configuration failed.	Remove and reseat the drive. If the drive installed is a different generation than the drive previously installed, you may need to reset defaults and reconfigure the drive as appropriate. If issue persists, contact Technical Support

Event Code	Message Text and Description	Details and Solution
4004	The drive status request failed.	Remove and reseat the drive. If the drive installed is a different generation than the drive previously installed, you may need to reset defaults and reconfigure the drive as appropriate. Use the library RMI to save a drive dump and contact Technical Support
4005	Drive is reporting a critical Tape Alert.	Power-cycle the drive, and verify whether the drive reports the same Tape Alert. Use the library RMI to save a drive dump and contact Technical Support
4006	A drive temperature reported is above the threshold.	Verify the drive fan is spinning, is not obstructed and that the ambient temperature is within specification. Also, ensure that all drive bay cover plates are installed. The drive cover plates are required for proper airflow.
4007	Cartridge error.	Remove the cartridge and inspect it for damage. Retry operation with another cartridge.
4008	Cleaning tape expired.	Discard the cleaning cartridge and retry the cleaning operation with a new cleaning cartridge.
4009	Firmware upgrade of one or multiple expansion modules failed.	The Base Module must be able to communicate with the expansion module to perform the upgrade. Reseat the expansion controller and check the interconnect cable and power cords. Retry the firmware upgrade.
4010	Drive is not compatible with this library.	Remove the incompatible drive. Only install drives that are supported by the library.
4012	Move Cartridge operation failed due to drive or media issue.	View the event details to determine which cartridge was involved. Remove the media from the library, and physically inspect the media to ensure there is no physical damage. If the media appears to be undamaged, put the media back into the library and retry the move operation. If the problem persists retry the operation with a different cartridge in the same drive. If the problem follows the media, remove the media from use. If the problem follows the drive, use the library RMI to save a drive dump and contact Technical Support
4014	Library test failed due to a drive issue.	Verify the test parameters, and retry the test. If the test fails, check the library event log for specific events associated with this drive. Use the library RMI to save a drive dump and contact Technical Support
4015	Power supply has failed. Redundancy is not available.	Ensure all power supplies are installed properly, and that each power supply is connected to a valid power source.

Event Code	Message Text and Description	Details and Solution
4016	Backup configuration data to base module failed.	Attempt to save a library configuration failed, power cycle the library and retry the operation.
4017	Restore configuration data from Chassis failed.	Attempt to restore a library configuration failed, power cycle the library and retry the operation.
4018	Firmware upgrade failed, tape drive reported an error applying the firmware file.	Verify that the firmware file is correct for the drive(s), ensure the drive(s) is/are in a healthy state with no cartridge in the drive, then retry the operation.
4019	General Drive Firmware bundle upgrade failure.	Verify that the firmware file is correct for the drive(s), ensure the drive is in a healthy state with no cartridge in the drive, then retry the operation.
4020	Database has been reset due to a problem that prevented the library from powering up.	If the library was restored to default settings, restore a saved configuration by using a previously saved configuration file. If no configuration file exists, then proceed in configuring the library.
4021	Drive has been hot removed while in active status.	Reinstall the removed drive at the same position as it was removed.
4024	One or two unit position transmitter/detector sensor failures.	Ensure that the alignment mechanism is engaged in every module that is above another module in the library. Perform a power cycle.
4025	Library test failed due to a cartridge error.	Remove the cartridge and inspect it for damage. Retry operation with another cartridge.
4028	Drive cannot use this media due to it being an unknown or unsupported format. Possibly the media is the wrong generation of media.	Check LTO generation for media and drives. Remove cartridges which are not compatible to your tape drives.
4029	Incompatible media move operation blocked by media barcode ID check.	Check if Media identifier matches the LTO generation of the drives. Replace label or remove incompatible media from your system.
4030	Move cartridge operation failed due to media error.	Remove the cartridge and inspect it for damage. Retry operation with another cartridge.
4033	Unsupported keygen policy.	Check network connection and ESKM server configuration for the specified partition. Ensure that all partitions on the library have a valid KenGenPolicy on the ESKM server. After ensuring that all partitions have a matching KeyGenPolicy, re-run the partitioning wizard for the specified partition. Use the **Status>Security** page to verify all drives and partitions are configured correctly for encryption.
4041	Wellness test failed because power supply redundancy test failed.	Ensure all power supplies are installed properly and that each power supply is connected to a valid power source.

Event Code	Message Text and Description	Details and Solution
4044	One of the Library tests failed because of a source element or destination element is currently not accessible.	Verify that a valid cartridge is located in the source element and that the destination element is empty. Check that all host applications are stopped.
4059	A drive that does not support encryption is configured in a partition with encryption enabled.	Replace Drive with a model of LTO Generation 4 or higher or disable encryption for this partition.
4060	Connection to the KMIP server failed.	Verify username and password as well as all needed SSL certificates needed for connecting to the KMIP server. Verify that the KMIP server is reachable within the network.
4061	Key not found on KMIP server.	Verify that the requested key is available on the KMIP server. Check the KMIP server logs for additional details.
4062	Key creation on KMIP server failed.	Check the KMIP server logs for additional details about why key creation failed.
4063	KMIP configuration invalid.	Use the KMIP configuration wizard to verify the KMIP configuration.
4064	KMIP feature not licensed.	Disable KMIP or install appropriate license for KMIP feature.
4065	A tape alert flag was reported by a drive.	Power-cycle the drive, and verify whether the drive reports the same Tape Alert. Use the library RMI to save a drive dump and contact Technical Support
4067	Cleaning cartridge will soon be expired and should be replaced.	Replace the cleaning cartridge.
4068	No cleaning cartridge found.	Auto cleaning is enabled, but the library contains no labeled cleaning cartridge. Install a valid and labeled cleaning cartridge into the library.
4071	Power supply fan failed.	Verify the power supply fan is spinning and ensure there are no obstructions in the fan.
4072	No cleaning cartridge in partition available for auto cleaning.	Auto cleaning is enabled, but the partition contains no labeled cleaning cartridge. Install a valid and labeled cleaning cartridge into the partition.
4073	Medium source element empty.	Check the source slot visually and rescan inventory. Additionally, check for valid and readable barcode label.
4074	Medium source element empty.	Check the source slot visually and rescan inventory. Additionally, check for valid and readable barcode label.
4075	Cartridge lost while extracting it from slot/drive.	Check the source/destination element and ensure that there are no obstructions in the pathway of the robot.

Event Code	Message Text and Description	Details and Solution
4077	Unlocking the right magazine failed.	Reboot the library and retry the operation. If the error persists replace the chassis. If the magazine needs to be removed to get access to the tape cartridges, power down the device and then release the magazine manually. Only one magazine can be opened at a time.
4078	Unlocking the left magazine failed.	Reboot the library and retry the operation. If the error persists replace the chassis. If the magazine needs to be removed to get access to the tape cartridges, power down the device and then release the magazine manually. Only one magazine can be opened at a time.
4079	Unlocking the mailslot failed.	Reboot the library and retry the operation. If the error persists replace the chassis. If the magazine needs to be removed to get access to the tape cartridges, power down the device and then release the magazine manually. Only one magazine can be opened at a time.
4080	Wellness test failed with warning.	Reboot the library and retry the operation. If the error persists contact Technical Support.
4083	Library not properly calibrated. This may cause media movement failures.	The library needs to be re-calibrated. Ensure the library firmware is up to date. If this event persists after a reboot of the library, or if calibration does not begin automatically upon restart, manually initiate calibration via **Maintenance > Auto Calibration**.
4085	Too many retries of drive command needed because of Unit Attention or Not Ready condition.	Reboot the library and retry the operation. If the error persists contact Technical Support.
4086	Move operation failed due to the inability accessing the database.	Ensure the network the library is connected to is operating normally and ensure the library is running the latest firmware. Library needs reboot.
4088	Library not properly calibrated. This may cause media movement failures.	Some calibration data does not match. Please reboot the library to initiate a re-calibration of the system. Ensure the library firmware is up to date. If this event persists after a reboot of the library, or if calibration does not begin automatically upon restart, manually initiate calibration via **Maintenance > Auto Calibration**
4089	Auto calibration of one or more modules failed. Library not properly calibrated. This may cause media movement failures.	The library needs to be re-calibrated. Ensure the library firmware is up to date. This event indicates that one or more of the gray calibration targets located on the library magazines could not be used in calibration. Inspect the calibration targets in each module and then initiate the auto-calibration routine via **Maintenance > Auto Calibration**.

Event Code	Message Text and Description	Details and Solution
4090	Auto calibration of one or more modules failed. Library not properly calibrated. This may cause media movement failures.	The library needs to be re-calibrated. Ensure the library firmware is up to date. This event indicates that one or more of the gray calibration targets located on the library magazines could not be used in calibration. Inspect the calibration targets in each module and then initiate the auto-calibration routine via **Maintenance > Auto Calibration**.
4091	Auto calibration of one or more modules failed. Library not properly calibrated. This may cause media movement failures.	The library needs to be re-calibrated. Ensure the library firmware is up to date. This event indicates that one or more of the gray calibration targets located on the library magazines could not be used in calibration. Inspect the calibration targets in each module and then initiate the auto-calibration routine via **Maintenance > Auto Calibration**.
4092	Installed robotic does not support auto calibration.	If move errors are occurring, the robotic assembly needs to be replaced with a robot that supports auto-calibration. If this event persists after replacing the robot, manually initiate calibration via **Maintenance > Auto Calibration.**
4093	Could not obtain an IP address from DHCP server.	Check the network configuration settings and check if the DHCP server is reachable. Use the network configuration menu or unplug the network cable and plug it in after a few seconds to trigger an automatic reconfiguration of the network interface.
4094	Drive interface I/O error.	Reboot the library for initialization of hardware and device drivers. If the problem persists, contact Technical Support.
4095	Library test failed. Not enough valid cartridges available for testing.	Add at least 1 valid tape cartridge to the library.
4098	System time synchronization via SNTP failed.	Check for valid SNTP server address in Time configuration. If correct, ensure that server reachable from your network and not blocked by Firewall.
4099	An unexpected reset of robotics has been detected.	Ensure that the spooling cable is fully seated in the Base Module and connected correctly to the robotic assembly. If the error re-occurs replace the robotic assembly.
4110	Drive disabled due to an incompatible Drive Power Board.	Remove incompatible Drive Power Board. Only install Drive Power Boards that are compatible with the library.
4113	Move Cartridge operation failed due to cartridge not properly taken over from Drive.	Check for labels or cartridge misalignments that would prevent the cartridge from coming out of the slot or drive.

Event Code	Message Text and Description	Details and Solution
4117	Drive disabled because no power supply available in this module.	Remove all affected Drives, insert and power up at least one power supply to the failing module. Wait 10 seconds and put the drives back into the module.
4118	Drive disabled because no drive power board available in this module.	Power down your library system. Install compatible drive power board to the failing module. Restart library system.
4119	Drive disabled because internal IP address for communication unknown.	Remove affected drive, wait 10 seconds and put it back into the module. Alternatively, reboot Library system.
4120	No empty drive available for system test.	Make sure that at least 1 valid tape drive is empty and available for testing.
4121	No compatible media available for system test.	Insert a valid and properly labelled tape cartridge into the library.
4122	No cartridge available for slot to slot test.	Insert a valid and properly labelled tape cartridge into the library.
4123	No empty slot available for slot to slot test.	Remove at least 1 tape cartridge from the library.
4124	Drive or media statistics could not be retrieved when unloading the tape.	Check for additional warning tickets. Replace media if media related tape alert flags reported.
4126	Cartridge found in inaccessible slot of lowermost unit.	Open magazine of lowermost module and remove tape cartridge from bottom row.
4127	Drive has been restarted because of canister reset.	If problem persists, contact Technical Support.
4128	An expansion module has detected an installed power supply but this power supply does not provide power.	Ensure the power supply has a power cord plugged in and is connected to a valid power source. Although power source is not available this expansion module can still be used for tape storage. Operation of tape drives is not possible.
4129	Media removal prevented by drive.	Check backup application how to allow media removal from drive. If unsuccessful try Force Drive Media Eject option in operations menu.
4130	Wellness test failed because drive not finally initialized.	Wait until drive initialization completes and run test again.
4131	Wellness test failed because drive installed to a module without power supply.	Install at least one power supply to the module where the failing drive is located or move the drive to a module with power supply.
4132	Wellness test failed because serial drive installed to a module without drive power board.	Install drive power board to the module where the failing drive is located or move the drive to a module with drive power board installed.

Table 24: Configuration Change Events

Event Code	Message Text and Description
8000	The configuration of a drive changed.
8001	The drive was added or removed from the system.
8002	A partition was added/removed or changed.
8003	A mailslot bank was enabled / disabled.
8004	Drive firmware changed due to firmware upgrade.
8005	The configuration of hostname/domain name has changed.
8006	The email configuration settings have been changed.
8007	The configuration of a date/time format changed.
8008	The system language setting changed.
8009	The time zone configuration has changed.
8010	A new partition was added.
8011	The network settings have changed.
8012	All Expansion Modules upgraded.
8013	The NTP time synchronization configuration has changed.
8014	The SSH access was enabled/disabled.
8015	Level of media generation checking has changed.
8016	Library reset default settings invoked by user.
8017	Library FW changed.
8018	The Unlabeled Media Support configuration has changed.
8019	Robotics firmware version upgraded.
8022	RMI/OCP Timeout configuration changed.
8024	Mailslot / Magazine access control configuration changed.
8025	Mailslot / Magazine automatic re-lock duration changed.
8026	Robotics change detected.
8029	The SNMP configuration changed.
8030	A SNMP target has been added.

8031	A SNMP target has been deleted.
8032	The SNMPv3 settings changed.
8033	The OCP module has been changed.
8034	A drive reboot has been requested by RMI command or REST interface. This process could cause side effects if done in parallel to running operations.
8035	Chassis calibration data has been changed.
8036	New chassis detected.
8037	Chassis has been removed.
8040	LDAP Server has been added.
8041	LDAP Server has been modified.
8042	LDAP Server has been deleted.
8043	LDAP User has been added.
8044	LDAP User has been modified.
8045	LDAP User has been deleted.
8046	Logout prevention configuration changed.
8057	New hardware component added to the Library.
8058	Hardware component removed from the Library.
8059	Hardware component of Library replaced.
8060	New Expansion Controller detected.
8061	New Base Library Controller detected.

Table 25: Informational Events

Event Code	Message Text and Description
9000	A tape alert flag was reported by a drive.
9001	A drive is present in the system but powered off.
9002	The library was powered on.
9003	Move Medium command was executed.
9004	Inventory scan was performed.

Event Code	Message Text and Description
9005	The library was powered down from Front Panel.
9006	The network interface was switched on.
9007	The network interface switched off.
9008	The System Time was synchronized with an NTP server.
9009	A magazine was unlocked and opened.
9010	A magazine was closed and locked.
9011	A mailslot bank was unlocked and opened.
9012	A mailslot bank was closed and locked.
9013	A user logged in on the RMI interface.
9014	A user logged out on the RMI interface.
9015	A user logged in on the OCP interface.
9016	A user logged out on the OCP interface.
9020	The MSL Encryption Kit password has been set.
9024	Drive support ticket created.
9025	Library test started.
9026	Library test successfully finished.
9027	Library test stopped by user.
9028	Configuration backup to Base Module was successful.
9029	Configuration restore from Base Module was successful.
9031	Library health Status changed to “Status OK”.
9032	Library health status changed to status "Warning".
9033	Library health status changed to status “Critical”.
9034	New system controller detected.
9035	New library chassis detected.
9037	The library was rebooted.
9038	The library was rebooted through user interface.
9041	Key on KMIP server created.

Event Code	Message Text and Description
9043	Drive cleaning.
9045	Library configuration data failed to duplicate on to the Base Module.
9058	Power supply fan failed.
9060	One or multiple configured DNS servers are not responding.

11 Technical Specifications

Table 26: Physical specifications

Characteristic	Product alone	Packaged
Height	268 mm	615 mm
Width	475 mm	800 mm
Depth	892 mm	1200 mm
Weight	Base module: 25 Kg Expansion module: 18 Kg	Base module: 30 Kg Expansion module: 23 Kg

Table 27: Environmental Specifications

Characteristic	Specification
Operating Temperature	5° to 35° C
Non-operating Temperature	-40° to 60° C
Recommended Operating Temperature	10° to 30° C
Temperature shock immunity - maximum rate of change	10° C per hour
Dust concentration	less than 200 microgram / cubic meter
Altitude	5000 meters (16,450 feet)
Operating Humidity	10% to 80% RH non-condensing
Non-operating Humidity	5% to 90% RH non-condensing

Table 28: Electrical Specifications

Characteristic	Specification
Current	5.0 - 3.5 A
Voltage	100 - 240 V 50/60 Hz
Power	350W

Table 29: Regulatory Specifications (CSA test conditions)

Characteristic	Tested condition or value
Equipment mobility	Stationary - rack mount
Connection to the mains	Pluggable - Type A
Operating condition	Continuous
Access location	Operator accessible
Over voltage category (OVC)	OVCII
Mains supply tolerance (%) or absolute mains supply values	-10%, +6%
Tested for IT power systems	No
IT testing, phase-phase voltage (V)	N/A
Class of equipment	Class I
Considered current rating (A)	20 A (branch circuit protection)
Pollution degree (PD)	PD 2
IP protection class	IPXO
Altitude during operation (m)	Max 2000
Altitude of test laboratory (m)	38
Mass of equipment (kg)	Max 25 kg
Manufacturer's Declared Ambient (0C)	40°C

NOTE The CSA test conditions might differ from the product specification limits.

Table 30: Default Settings

Parameter	Default Setting	Reset to Default?
User Accounts		
"User" User	User = user PW = null	NOT reset
Administrator login	User= administrator PW = adm001	NOT reset
Service Login (requires admin pwd in addition to service pwd)	User = service PW = Update001	NOT reset
Security Login	User = security PW = sec001	NOT reset
LDAP Configuration	Disabled	NOT reset
Host name	Blank	NOT reset
IP Address	DHCP Enabled	NOT reset
Subnet Mask	DHCP Enabled	NOT reset
Default Gateway	DHCP Enabled	NOT reset
Auto Negotiate	Enabled	NOT reset
Speed	Auto	NOT reset
IPV4	Enabled	NOT reset
IPV6	Disabled	NOT reset
IPv6 Prefix	Enabled	NOT reset
Static V6	Disabled	NOT reset
IPv6Method	Disabled	NOT reset
DHCPv6	Disabled	NOT reset
DNS1 and DNS2 Configuration for Ipv4	DHCP Enabled	NOT reset
DNS1 and DNS2 Configuration for IPv6	Disabled	NOT reset
Primary Network Interface	Enabled	NOT reset
SSH	Disabled	NOT reset
HTTPS	Disabled	NOT reset
Self-Signed SSL Certificate	No File	NOT reset
Internal IP	10.144.4.0/254	NOT reset

Secondary network	Definable from range	NOT reset
Default controller IP	10.144.4.1	NOT reset
Mailslots	Disabled	Yes
Magazines/Mailslots Allow user "User" access	Disbaled	Yes
Partitions	Disabled (one underlying partition)	All deleted leaving a single partition
NTP/SNTP Setting	Disabled	NOT reset
Date	Blank or existing	NOT reset
Time	Blank or existing	NOT reset
Time Zone	GMT	NOT reset
E-mail Notifications (SMTP)	Disabled	Yes
SNMP v1, v2, v3	Disabled	Yes
Encryption KMIP	Disabled	NOT reset
Screen Saver	Default image	Yes
Activation	10 minutes	Yes
Library Product ID - INQUIRY Product ID String	MULTISTAK	Yes
Library Vendor ID - INQUIRY Vendor ID String	BDT	Yes
SCSI element addressing	Starting element addresses in decimal: Slot = 1001 Drives = 1 I/E Elements = 101 Values in hex are: Slot = 0x3E9 Drives = 0x1 I/E Elements = 0x65	Yes
Barcode format returned to host	Align left	Yes
Barcode length returned to host	8 left most characters	Yes
Language settings	English	NOT reset
Auto Clean	Disabled	Yes

Media Barcode Compatibility Check	Enabled	Yes
RMI Timeout	30 minutes	Yes
RMI Restricted Login	Disabled	Yes
Drive speed and topology settings	Automatic/Automatic	Yes

Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Topics include:

- Preventing electrostatic damage
- Grounding methods

Preventing Electrostatic Damage

To prevent electrostatic damage, observe the following precautions:

Avoid hand contact by transporting and storing products in static-safe containers.

Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

Place parts on a grounded surface before removing them from their containers.

Avoid touching pins, leads, or circuitry.

Always be properly grounded when touching a static-sensitive component or assembly. See the next section.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm (± 10 percent) resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

NOTE

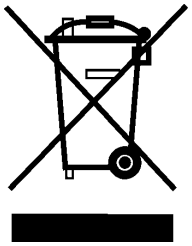
For more information on static electricity, or assistance with product installation, contact your authorized reseller.

12 Regulatory Information

NOTE

- The MultiStor library must be installed in a restricted area.
- Only personnel with technical and product safety training shall have access to the library.
- Access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location
- To comply with the regulations and standards, the library needs to be properly installed in an office or industrial environment with shielded cables and adequate grounding of SAS interface and input power.

Recycling and Disposal



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your equipment by handling it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at this 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 contact your local city office, your household waste disposal service or the shop where you purchased the product.

CE Mark

The CE mark is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA). The CE marking certifies that a product has met EU consumer safety, health or environmental requirements.

CCL Mark

CSA C22-2 No. 60950-1 – Electrical safety – UL 60950-1
68475

FCC (United States)

The computer equipment described in this manual generates and uses radio frequency (RF) energy. If the equipment is not installed and operated in strict accordance with the manufacturer's instructions, interference to radio and television reception might result.

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Part 15, Class A, of the FCC Rules, is designed to provide reasonable protection against radio and television interference in a residential installation. Although the equipment has been tested and found to comply with the allowed RF emission limits, as specified in the above-cited Rules, there is no guarantee that interference will not occur in a particular installation. Interference can be determined by turning the equipment off and on while monitoring radio or television reception. The user may be able to eliminate any interference by implementing one or more of the following measures:

- Reorient the affected device and/or its receiving antenna.
- Increase the distance between the affected device and the computer equipment.
- Plug the computer and its peripherals into a different branch circuit from that used by the affected device.
- If necessary, consult an experienced radio/television technician for additional suggestions.

Canadian Verification

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations (ICES-003, Class A).