Overland Storage

NEO® S-Series Tape Library

Users Guide

November 2014
10400645-001

Contents

1 Introduction

1.1 Document Purpose

This document provides information to install, operate, and upgrade a NEO S-Series Tape Library. It covers the NEO StorageLoader (1U), T24 (2U), and T48 (4U) libraries. The instructions are intended for the trained System Administrators and trained Users who need physical and functional knowledge of the NEO S-Series library.

1.2 Product Warranty Caution

The customer should only perform the service and repair actions on the tape library components listed in this document. Any other actions needed should only be performed by an authorized service center.

The warranty for the tape library shall not apply to failures of any unit when:

- The tape library is repaired or modified by anyone other than the manufacturer's personnel or approved agent.
- The tape library is physically abused or used in a manner that is inconsistent with the operating instructions or product specification defined by the manufacturer.
- 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 the manufacturer.
- The manufacturer's serial number tag is removed.
- The tape library is damaged because of improper packaging on return.

Warranty will become immediately void in the event of unauthorized repairs or modifications.

2 General Warnings

2.1 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.

2.2 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.

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 leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling 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.

3 Product Overview

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.

A NEO S-Series library provides a compact, high capacity, low-cost solution for simple, unattended data backup. It is compatible with most operating systems and environments with the appropriate interface card. However, the library requires either direct support from the operating system or a compatible backup application to take full advantage of its many features.

Particular emphasis of the NEO S-Series family includes:

- **Platform of the tape libraries** – independent of tape and drive form factors.
- **Configurability** – from entry level cost optimized library to a feature rich configuration.
- **Broad level of connectivity** – SCSI, FC and SAS depending upon installed tape drives.
- **Expandability** – following devices can be added in the field:
  - All units – magazines and tape drives.
  - 2U and 4U – extra library controller.
  - 4U – extra power supply.
- **Technology upgrade** – customer can upgrade tape drive technologies (such as, LTO5 to LTO6) in the field.
- **Service friendly design** – following devices are accessible for quick replacement:
  - All units – magazines, from the front of the library; tape drives, from the back of the library.
  - 2U and 4U – library controller and power supply from the back of the library.
- **Maximum up time** – through advanced error handling and recovery capability.

The NEO S-Series family includes the following features:

- The library occupies one SCSI target address and uses separate LUNs for the tape drive and library robotics.
- USB interface to enable serviceability features (library and drive firmware upgrades) and/or customized features (storage on demand) implementation.
- The library can be operated via the front Operator Control Panel (OCP) over the network via the internal Remote Management Interface (RMI) or via the storage interface connection by the host application.
- Supports industry standard management protocols such as SNMP(SMI-S future development).
- Mail slot for import/export of cartridges during library operation.
- Robotic with barcode reader.
- Encompasses rack formats and tabletop functionality for all unit heights (1U, 2U, and 4U).

3.1 Supported Configurations

The following configurations are supported:

Table 1: Supported Tape Drives

Tape library			
Form factor	1U	2U	4U
Magazines			
Magazine	2	2	4
Mail slot	0, 1	0, 1, 3	0, 1, 3
Tape slot	8	24	48
Tape drives			
Half-height drive	1	2	4
Full-height drive	0	1	2
Other devices			
Power supply	1	1	2
Library controller	1	1	1

3.2 Supported Tape Drives

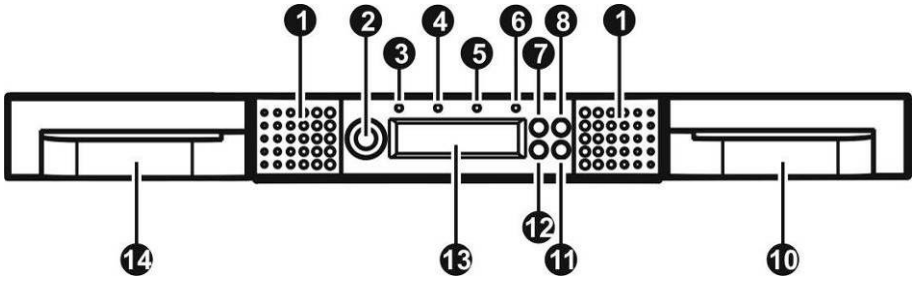
The NEO S-Series was developed to integrate industry-standard LTO Ultrium tape drives from IBM. Mixed drive generations and mixed interfaces are supported within a single library. Listed below are the tape drives that have been implemented and qualified for use in A NEO S-Series.

Table 2: Supported Tape Drives

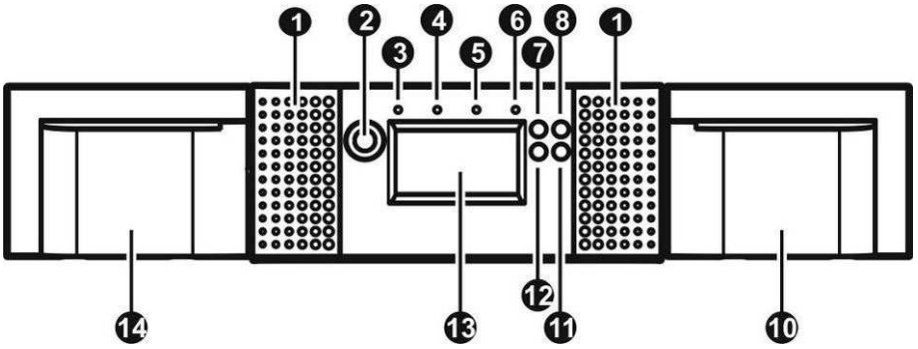
IBM LTO Drives
LTO-5 Half-Height FC
LTO-5 Half-Height SAS
LTO-6 Half-Height FC
LTO-6 Half-Height SAS

3.3 Front Panel

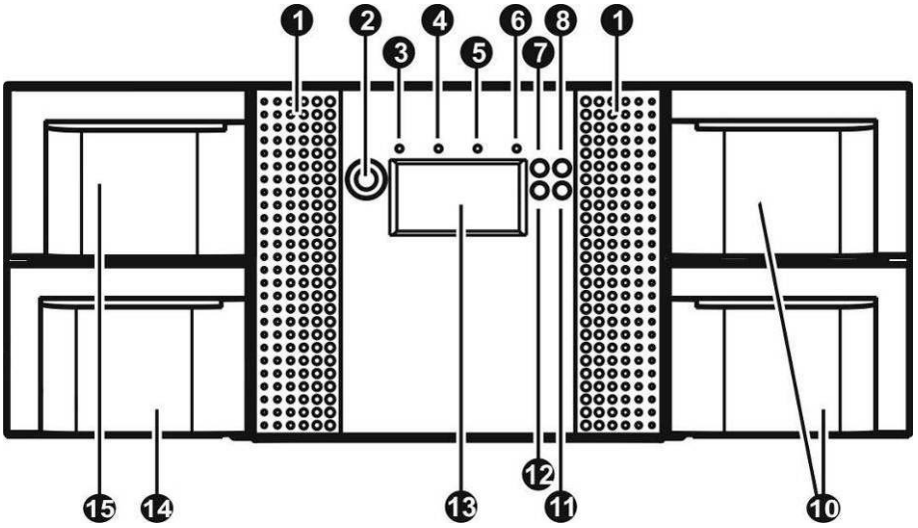
NEO StorageLoader (1U):



NEO T24 Tape Library (2U):



NEO T24 Tape Library (4U):



1	Air Vents	
2	Power Button	Pressing the button will initiate a controlled power down of the library (soft power down).
3	Ready LED, Green	Illuminated during power on; blinking during tape or library robotics activity.
4	Clean LED, Amber	Illuminated when the tape drive has determined that a cleaning tape should be used. Cleaning is only necessary when the library directs to do so. Additional cleaning is not necessary.
5	Attention LED, Amber	Illuminated when the library has detected a condition that requires attention by the operator.

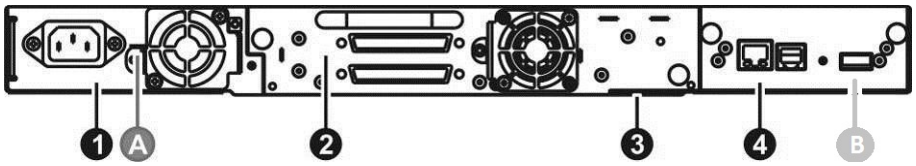
6	Error LED, Amber	Illuminated when an unrecoverable tape drive or library error occurs. A corresponding error message is shown on the LCD screen.
7	Cancel Button [✕]	Used to cancel a user action and return to the last menu item.
8	Previous Button [◄]	Used to navigate backward through menu items.
9	N/A	
10	Right Magazines	
11	Enter Button [↵]	Used to enter to a sub menu or execute an action.
12	Next Button [►]	Used to navigate forward through menu items.
13	Operator Control Panel	Consists of 128 x 64 characters. The OCP displays actions and status information, menu items or error messages equivalent to the operation mode.
14	Left Magazine with Mailslot	
15	Left Magazines	

3.4 Rear Panel

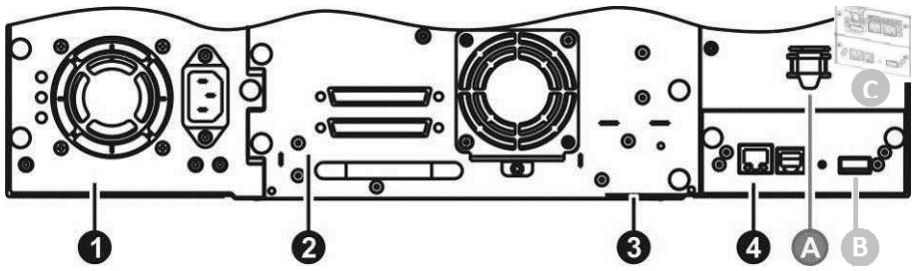
The rear panel of the NEO S-Series provides access to the drive interface connectors, the power connector, Ethernet, serial and USB ports, and the magazine release holes. All libraries support parallel SCSI, SAS, and Fibre channel tape drives.

The position of the appended devices on the rear panel is in all libraries common. The power supply is on the left side, tape drives are in the middle and the library controller is on the right side of the library.

NEO StorageLoader (1U):



NEO T24/T48 Tape Library (2U/4U):

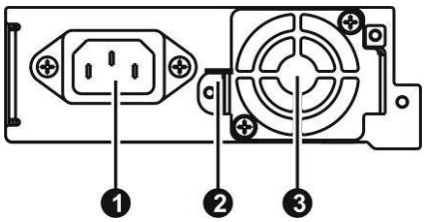


1	Power Supply	4	Library Controller
2	Tape Drives	A	Storage Location for Shipping Lock
3	Pull-out Tab with Serial Number	B	USB Port for Firmware Upgrades

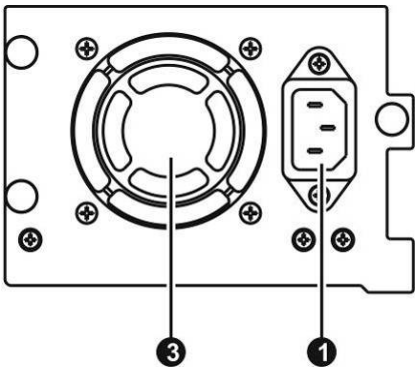
3.4.1 Power Supplies

The power supply model utilized is dependent on the library model.

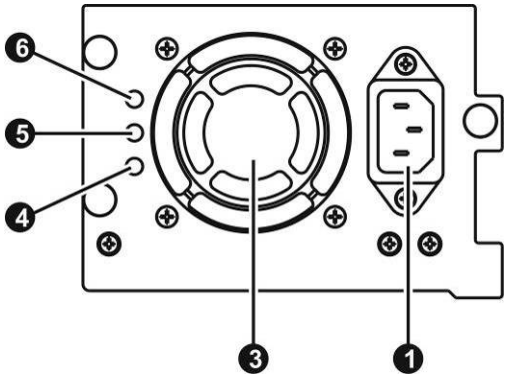
NEO StorageLoader (1U):



NEO T24 Tape Library (2U):



NEO T48 Tape Library (4U):



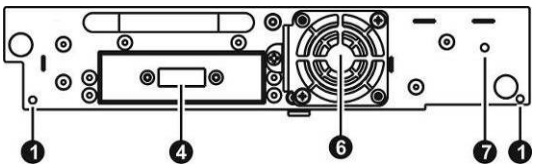
1	Power Connector (110/220 VAC)	4	LED (green) is illuminated when the power supply is producing good power for the library.
2	Storage Location for Shipping Lock	5	LED (amber) is illuminated when a fan failure occurs. The fan is running too slow or is defective.
3	Power Supply Fan Vent	6	LED (blue) is illuminated when the AC power is connected.

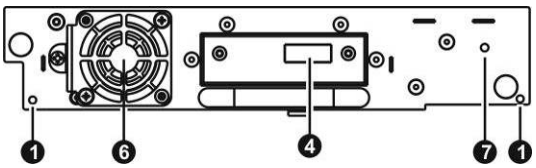
3.4.2 Tape Drive Back Panels

All figures are symbolic and the position of connectors, fan, etc. can vary on different drive types and generations.

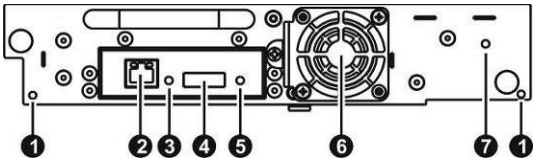
SAS connectors all LTO generations:

Half-Height Tape Drives:





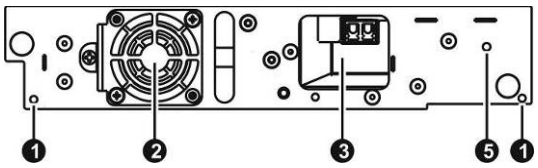
Half-Height Tape Drive with Ethernet Port:



Half-Height Tape Drive with Two SAS Connectors:

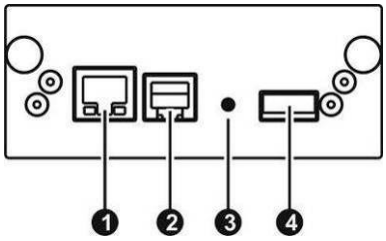
1	Magazine Release Holes	5	Error LED (Amber)
2	Ethernet Port for Service/Diagnostics (not used)	6	Drive Fan Vent
3	Ready LED (Green)	7	Tape Drive LED
4	SAS Connectors		

FC connectors all LTO generations:



1	Magazine Release Holes	3	Ethernet Port for Service/Diagnostics (not used)
2	Drive Fan Vent	4	Tape Drive LED
3	FC Connectors		

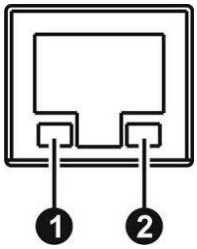
3.5.1 Library Controller



1	Ethernet Port (RMI Connection)
2	Serial Port (Engineering Diagnostics)
3	Controller LED (blinking = OK; if not blinking, failure)
3	USB Port (Firmware upgrades, key storage)

3.5.2 Ethernet Port

The Ethernet port is only available on the library controller and connect the library to a network or PC for working with the RMI. On some LTO5/6 tape drives, it is available for service/diagnostics (not used).



1	LED (amber) is illuminated when a connection is in place
2	LED (green) is illuminated when the connection is ready or in use

4 Installing the Library

This chapter provides instructions for installing a NEO S-Series tape library.

4.1 Location Requirements

NOTE

- The library was designed for rack installation and must be installed using the provided rack rails. Installation on a table top or other similar surface could result in library operation errors.
- Select a rack 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 with an appropriate # of U's (unit high) of clearance
Room temperature	10-35º C (50-95º F)
Power source	• AC power voltage: 100-127 VAC; 200-240 VAC • Line frequency: 50-60 Hz • Place the library near to an AC outlet. The AC power cord is the libraries 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
Clearance	• Back: Minimum of 15.4 cm (6 inches) • Front: Minimum of 30.8 cm (12 inches) – for mail slot Minimum of 60 cm to remove magazines (24 inches) • Sides: Minimum of 5.08 cm (2 inches)

4.2 LUN scanning

The NEO S-Series tape library uses a single SCSI ID per tape drive to control the tape drive (LUN 0) and library robotic (LUN 1).

NOTE

- The library requires an HBA that supports LUN scanning. If LUN scanning is disabled, your host system will not scan beyond LUN 0 and will fail to discover the library. It will just see the tape drive.
- Some HBAs, such as RAID controllers do not support LUN scanning.

4.3 Serial Attached SCSI (SAS)

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 gigabits per second.

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.

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, but only one channel will be used.

NOTE

- The library has a mini-SAS connector on each SAS tape drive. Mini-SAS connectors are keyed.

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.

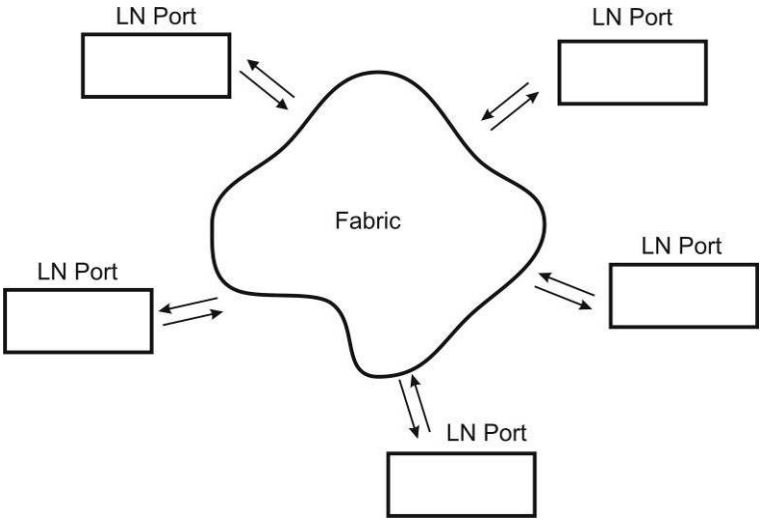
The operating system tracks the WWID for the tape drive on each HBA channel. Each of the drive connectors on the fan-out cable is associated with an HBA channel. Once a tape drive has been plugged in, it should remain on the same channel to retain the association between the HBA channel and WWID.

4.4 Fibre Channel Configuration Requirements

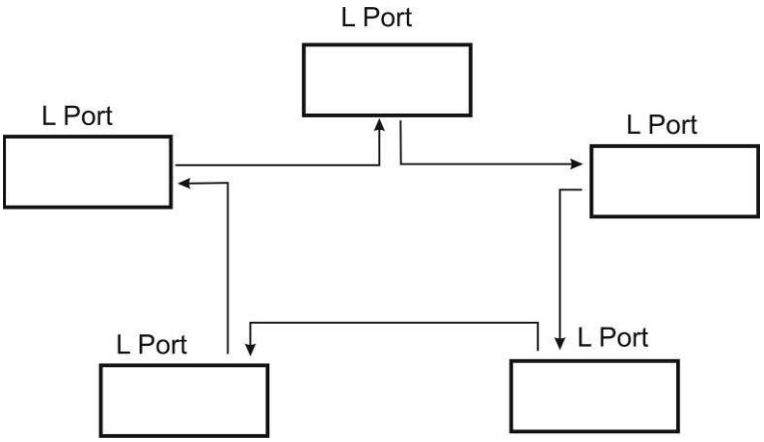
Fibre channel (FC) allows an active intelligent interconnection scheme, called a Fabric , to connect devices. Everything between the ports on FC is called the Fabric. The Fabric is most often a switch or series of switches that takes the responsibility for routing.

The library allows the selection of the following three Fibre Channel port behaviors:

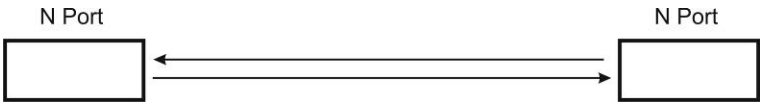
- LN Port (default setting) – an automatic configuration that tries arbitrated loop first, then switched Fabric.



- L Port – arbitrated loop



- N Port – point to point protocol in a switched Fabric topology



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).

NOTE

- Use an appropriate HBA for your tape drive due to 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.

4.5 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:

- Make sure that your backup application supports the selected HBA and tape drive interface type HBA.
- Check with a system administrator, if the host server is connected to a network, before power off.
- Install a suitably rated HBA.
- Make sure that LUN scanning is enabled on the SCSI host adapter.

4.6 Installation Precautions

WARNING

Product Weight

Risk of personal injury

Before moving or lifting a library:

- Observe local health and safety requirements and guidelines for manual material handling.
- Remove all tape cartridges to reduce the weight and to prevent cartridges from falling into the robotics path and damaging the library.
- 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 leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- Extend only one rack component at a time.

NOTE

- Do not expose the library to moisture.
- Use the library on a firm level surface free from vibration.
- Do not place anything on top of the library.

4.7 Unpacking the Library

Before unpacking the library, clear a work surface to unpack the library. Select an open rack location allowing easy access to the host server and an easily accessible power outlet.

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 the NEO S-Series Tape Library:

1. Before opening and removing the tape library from the box, inspect the container for shipping damage. If you notice any damage, report it to the shipping company immediately.
2. Open the box.
3. Carefully remove the shipping materials from the top of the library.
4. Remove the accessory package and set aside. (if included)
5. Remove the two rack rails and set aside. (if included)

6. Lift the library out of the carton and remove the bag from the loader.
   Save the packaging materials for future use.

NOTE

Do not place the library on either end or sides as this may damage the library.

4.8 Identifying Library Components

Confirm that you received the following:

1. NEO S-Series tape library
2. Library documentation

Optional components, depending on the ordered configuration:

1. Cables, for instance SAS and / or Ethernet cables
2. Power cord
3. Rack mount kit:
   - 2 rack mount rails
   - 1 bag of eight M6 screws for the rack mounting (9.5 mm square holes in the rack column)
   - 1 bag of eight M6 screws for rack mounting (6.85 mm round holes in the rack column)
   - 2 mounting brackets
   - M3x6 Torx screws to fix the mounting brackets (amount depending on the unit form factor)
   - M5 screws to secure the mounting brackets to the rack (amount depending on the unit form factor)

Required additional equipment for a successful installation:

1. Ethernet cable(s)
2. SAS or FC cable(s) depending upon drives selected
3. Terminator(s)
4. Power cord to match main connector
5. #2 Phillips screwdriver

4.9 Removing the Shipping Lock

NOTE

The shipping lock, which prevents the robotic transport mechanism from moving during shipment, must be removed before the library is powered on.

To remove and store the shipping lock:

1. Remove the yellow label that is securing the shipping lock on the top of the library.

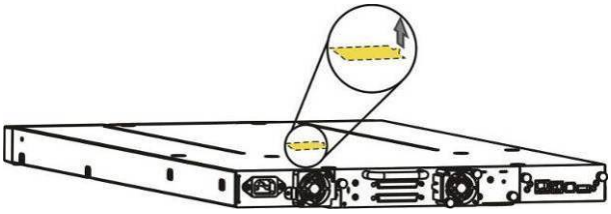


Figure 1 Remove the yellow label

2. Remove the shipping lock.

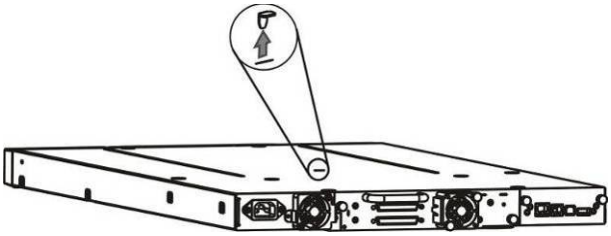


Figure 2 Remove the shipping lock

3. Store the shipping lock (in case of returning the unit see **chapter 11** replacement is required).

   For a 1U library, see **Figure** Error! Reference source not found.**, Page** Error! Bookmark not defined.**.**

   For a 2U or 4U library, see **Figure** Error! Reference source not found.**, Page** Error! Bookmark not defined.**.**

4. Replace the yellow label on the top of the library.

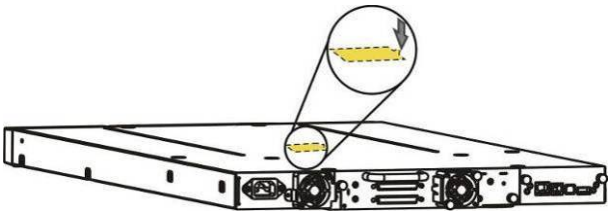


Figure 3 Replace the yellow label

4.10 Rack mounting the library

NOTE

First, read the **Chapter** Error! Reference source not found.**, Page** Error! Bookmark not defined..

The rack rail components are optional accessories depending on the ordered configuration.

Skip this chapter, when the rack rail components not available.

Required tools:

- #3 Phillips screwdriver
- T10 Torx screwdriver

Rack mounting the library:

The steps to install a library in a rack are for all unit highs common. In the following figures, a 1U library is shown as an example.

1. Determine the location and in the rack for the library to be installed.
2. Use a pencil to mark the location on each vertical rail in the rack.
3. In the rack mount kit are two sets of eight M6 screws. Determine the type of rack then choose the appropriate type of M6 screws.
4. Secure one rail to each side of the rack in your chosen rack location with a #3 Phillips screwdriver. Insure the rails are mounted level and at the same rack height on each side.
5. Secure both the front and back of each rack rail to the rack.

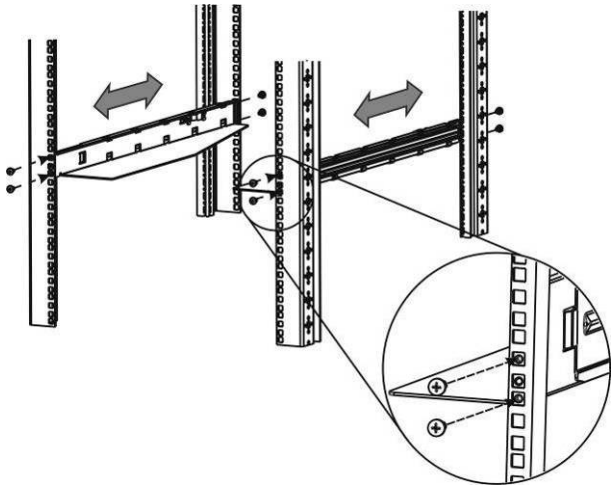


Figure 4 Install the rack rails (1U)

6. Install the mounting brackets of the library using the Torx screwsT10 included in the rack mount kit; see **Figure 5.**

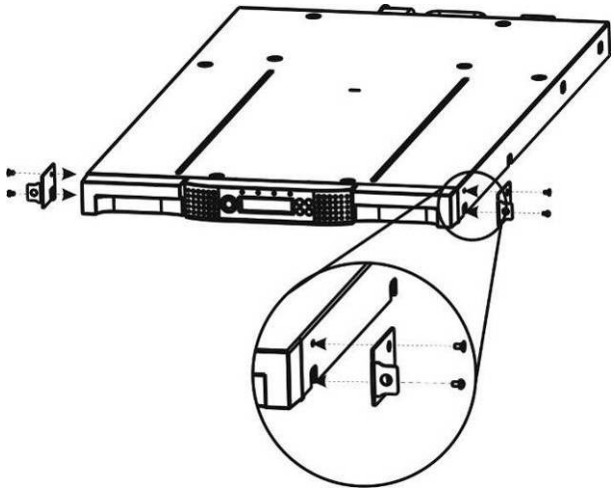


Figure 5 Install the mounting brackets (1U)

7. Slide the library onto the rack rails.
8. Secure the library to the rack using a 3# Phillips screwdriver placed through the small holes in the mounting bracket to tighten the M5 screw(s) on each side of the library.

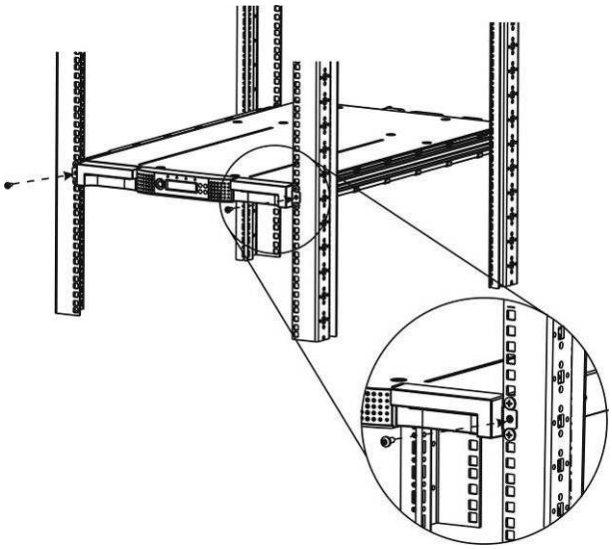


Figure 6 Secure the library to the rack (1U)

4.11 Installing a tape drive

A tape drive is installed from the rear of the library.

If the library does not already have the tape drive(s) installed, install the tape drive(s) now. If the library already has tape drives installed additional tape drives may be added after the installation of the library is complete.

Required tool:

- #2 Phillips screwdriver

To install tape drives:

1. Locate an appropriate vacant drive bay on the rear panel of the library.
   - 1U library:
     There is only one bay for 1 half-height tape drive.
   - 2U library:
     There is only bay space for either 1 full-high or 2 half-height tape drives. Always install the first tape drive in the bottom drive bay. If the first device is a half-height tape drive, you may install an additional half-height tape drive in the top bay. If only one half-height drive is being installed, you must install the block off plate over the upper empty drive position.
   - 4U library:
     Install the first tape drive in the bottom drive bay. Install each additional tape drive in the drive bay directly above the existing tape drives.
2. If available, loosen the screws of the drive bay cover and remove the screws by holding the cover in place.

3. Remove one drive bay cover to install a half-height tape drive; remove two drive bay covers to install a full-height tape drive.
4. Slightly pull out the pull-out tab for the product ID label so it does not interfere with the tape drive, see **Figure 7**

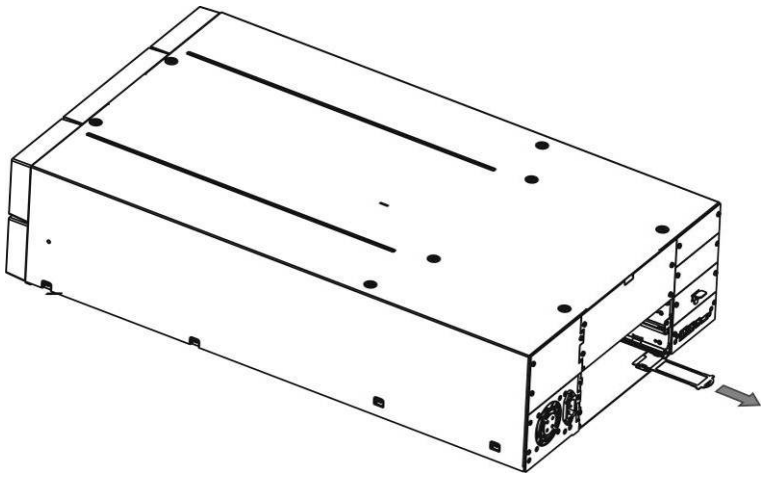


Figure 7 Pullout tab for product ID (4U)

5. Before installing the tape drive, inspect the connectors on the tape drive. Ensure that the connectors are intact, free of any foreign objects, and have no cracks or deformed or bent contacts.
6. Insert the tape drive into the drive bay, and align the connectors on the library while supporting the drive, see **Figure 8, Step 1**.

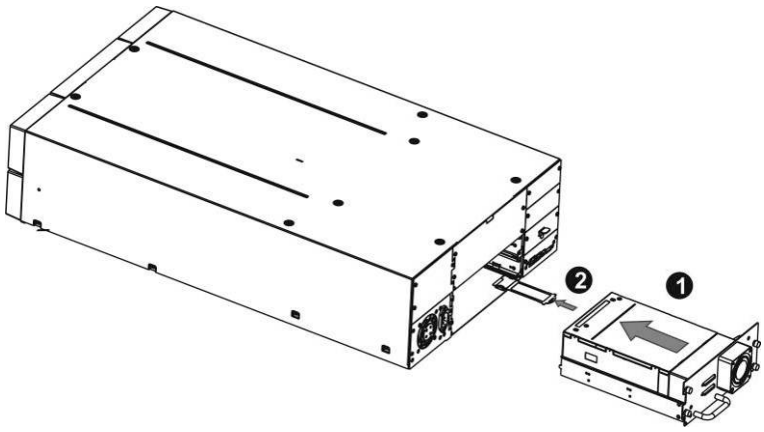


Figure 8 Install a tape drive (4U)

7. Push the tape drive into the drive bay until the tape drive seats itself against the back of the library.
8. Slightly push the pull-out tab for the product ID label back into library, see **Figure 8, Step 2**.
9. Tighten the blue captive screws with your fingers to secure the tape drive to the library.

4.12 Installing the library controller

The library controller is installed from the rear of the library.

If the library does not already have a library controller installed, install the library controller now.

Required tool:

- #2 Phillips screwdriver

To install a library controller:

1. Locate the appropriate vacant library controller bay on right side on the rear panel of the library, shown in **Chapter** Error! Reference source not found. **6.3**.
2. If available, loosen the screws of the library controller bay cover and remove the screws by holding the cover in place.
3. Before installing the library controller, inspect the connectors on the library controller. Ensure that the connectors are intact, free of any foreign objects, and have no cracks or deformed or bent contacts.
4. Insert the library controller on the alignment rails and push the library controller into the library controller bay until it seats itself against the back of the library, see **Figure 9.**
   (In the following figure, a 4U library is shown as an example.)

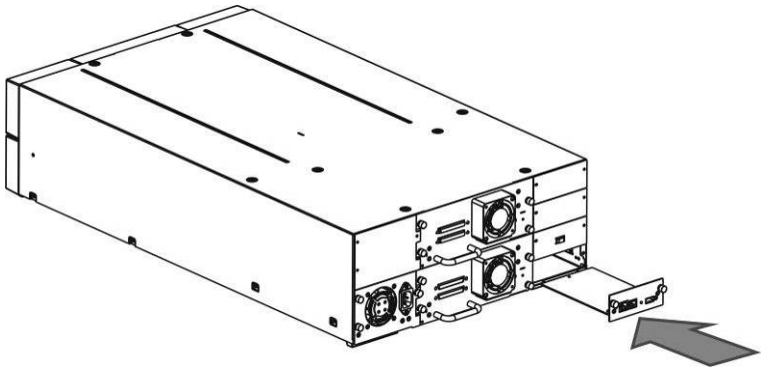


Figure 9 Install a library controller (4U)

5. Tighten the blue captive screws with your fingers to secure the library controller to the library.

4.13 Installing a power supply

NOTE

Skip this chapter for a 1U library, because a power supply is already installed and no user serviceably part.

Verify that the power to the library is off and the power cord is not attached

The power supply is installed from the rear of the library.

If the 2U or 4U library does not have a power supply installed, install the power supply in the bottom left power supply bay now.

The 4U library may be configured for a redundant power by installing a second power supply. In this case both Power supplies work parallel and in case one fails a warning will be displayed.

Required tool: #2 Phillips screwdriver

To install a power supply:

6. Locate the power supply bay on the left side of the rear panel of the library, shown in **Chapter** Error! Reference source not found. **6.3.**
   - 2U library: There is only 1 power supply bay.
   - 4U library: There are 2 power supply bays:
     Always install: Install the first power supply in the bottom left power supply bay. The unit can run with one power supply
     If redundant power supplies are desired for fault tolerance install a second
     Install a redundant power supply in the power supply bay directly above the existing power supply. Both supplies must be plugged in the AC mains to operate in failover mode.
7. If available, loosen the screws of the power supply bay cover and remove the screws by holding the cover in place.
8. Before installing the power supply, inspect the connectors on the power supply. Ensure that the connectors are intact, free of any foreign objects, and have no cracks or deformed or bent contacts.
9. Insert the power supply on the alignment rails and push the power supply into the power supply bay until it seats itself against the back of the library, see **Figure 10.**
   (In the following figures, a 4U library is shown as an example.)

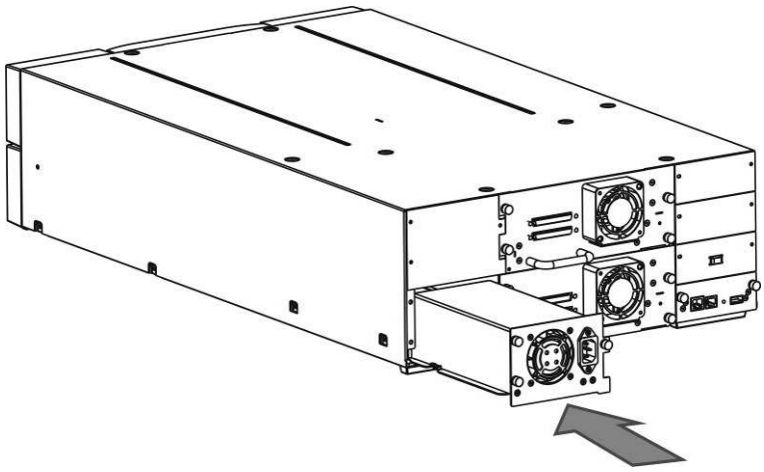


Figure 10 Install a power supply (4U)

10. Tighten the blue captive screws with your fingers to secure the power supply to the library.

4.14 Connecting the cables

4.14.1 Connecting the power cord

DANGER

High voltage

Risk of electric shock

- Use only approved power cords.
- Observe local health and safety requirements and guidelines for manual material handling.

WARNING

Usage of not approved power cords

Risk of personal injury

Risk of damage to devices

Before connecting a power cord to the library:

- Ensure that the power cord meets individual country specific safety.
- Use a sufficient conductor amp capacity to avoid overheating the library.

The manufacturer disclaims all liability in the event a non-manufacturer approved power cord is used.

To connect the power cord to the library:

1. Plug the power cord into the power connector (AC connector) on the rear panel of the power supply, see **Chapter** Error! Reference source not found.**, Page** Error! Bookmark not defined.**.**
2. Plug the power cord into the power outlet of the power supply.

4.14.2 Connecting the FC cable

NOTE

Use only cables specified for your LTO FC tape drive.

Each FC tape drive has two FC ports.

- Cable <Port A> only.
- Configure <Port B> for <Auto Detect> on <Fibre Speed> and <Port Type>.

To connect the FC cable to the tape drive:

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

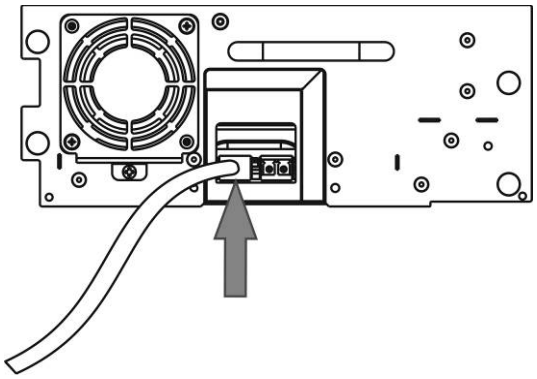


Figure 11 Connect the FC cable

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

4.14.3 Connecting the SAS cable

NOTE

Use only cables specified for your LTO SAS tape drive.

Each SAS tape drive has a mini-SAS connector.

- Mini-SAS connectors are keyed.
- Do not force a SAS cable's mini-SAS connector into the tape drive mini-SAS connector because it might be keyed differently.

SAS signal rates require clean connections and a minimum number of connections between the HBA and the library.

- Do not use adapters or converters between the HBA and the library.
- A maximum SAS cable length of six meters is recommended.

To connect the SAS cable to the tape drive:

1. Plug the HBA end of the SAS cable into the connector on the HBA.
   - If you have a SAS fan-out cable, the end of the cable with only one connector, should be plugged into the connector on the HBA.
   - If you are using a cable with a single connector on each end, plug the other end into the connector on the tape drive.
   - If you are using a SAS fan-out cable, plug one mini-SAS connector into the connector on each tape drive. The unused ends of the SAS fan-out cable are single channel and not suitable for use with disk arrays. Use the other ends to connect tape drives, or coil and secure them to the rack to minimize stress on the connectors.

4.14.4 Connecting the Ethernet cable and a USB device

To connect the Ethernet cable to the library:

The connection to the Ethernet network is via an industry stand RJ45 copper interface on the rear panel of the library. The Ethernet connection is used to access the library RMI over the network.

To connect the library to the Ethernet network, inset the Ethernet cable into the Ethernet port of the library, see **Chapter** Error! Reference source not found. **6.3.3**. When the plug is in the correct position, a click should be heard.

To connect the USB device to the library:

The USB port is on the rear of the library. It can be used for FW upgrades / Skin file updates via OCP see **Chapter** Error! Reference source not found. **6.3.3.**

4.15 Verifying the host

Depending on the server configuration, you may need to change the SCSI ID of the library.

When the host server is powered on, install the software and/or driver(s) that are compatible with the library. Backup software packages may require additional software or licensing to communicate with the library robotics.

To confirm the host server's operating system recognized the library, consult the operating system documentation.

4.16 Powering up/down the library

Press the power button on the front bezel to power up/down the NEO S-Series Tape Library. The powering up can take a few minutes including scanning the inventory and configuration (e.g. drives installed)

In the following figure, a 4U library is shown as an example.

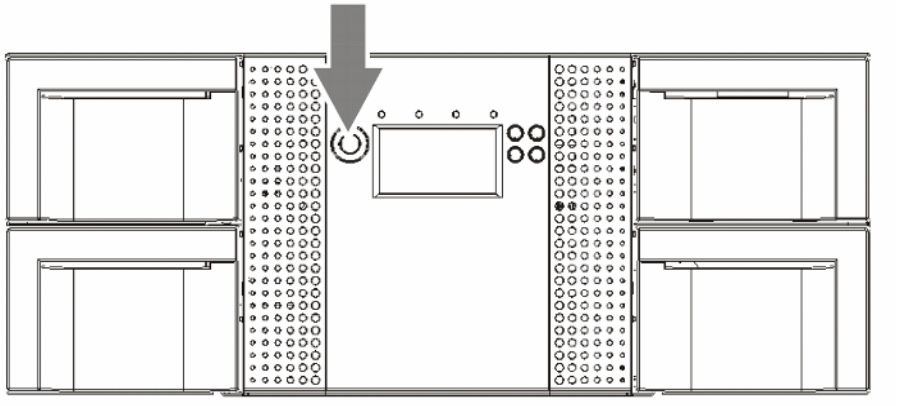


Figure 12 Power up/down the library (4U)

5 Tape Cartridges and Magazines

This chapter explains which media to use with your library, and how to label and write-protect your tape cartridges. Careful labeling and handling of the tape cartridges will prolong the life of the tape cartridges and the library.

5.1 Tape Cartridges

Use the Ultrium data and cleaning tape cartridges designed for your model of library.

Table 4: LTO-5 Tape Drive

Cartridge Type
LTO-5 Ultrium 3 TB Data Cartridge
LTO-5 Ultrium 3 TB WORM Data Cartridge
Ultrium Universal Cleaning Cartridge

Table 5: LTO-6 Tape Drive

Cartridge Type
LTO-6 Ultrium 6.25 TB Data Cartridge
LTO-5 Ultrium 6.25 TB WORM Data Cartridge
Ultrium Universal Cleaning Cartridge

NOTE LTO-3 and later tape drives support both rewriteable and WORM data cartridges. Write-Once, Read-Many (WORM) data cartridges provide an enhanced level of data security against accidental or malicious alteration of data on the tape cartridge. The WORM data cartridge can be appended to maximize the full capacity of the tape cartridge, but you will be unable to erase or overwrite data on the cartridge.

5.1.1 Using and Maintaining Tape Cartridges

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.

- 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.

5.1.2 Labeling Tape Cartridges

The device contains a bar code reader that reads the tape labels and stores the inventory data in memory. The device 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.

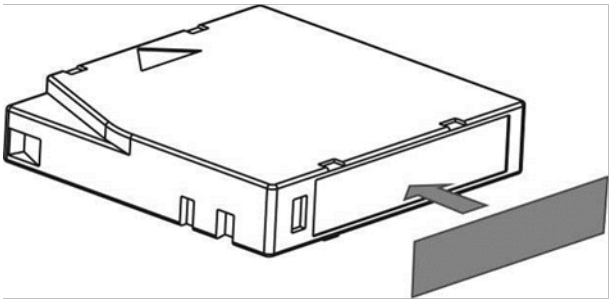
Your host software may need to keep track of the following information via the associated bar code:

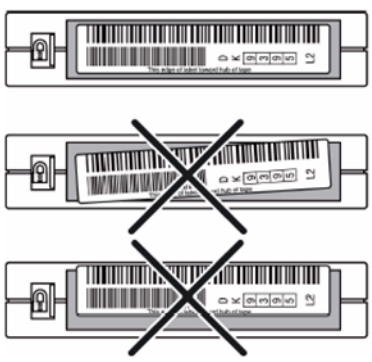
- Date of format or initialization
- Tape's media pool
- Data residing on the tape
- Age of the backup
- Errors encountered while using the tape (to determine if the tape is faulty)

NOTE

The misuse and misunderstanding of bar code technology can result in backup and restore failures. To ensure that your bar codes meet manufactures quality standards, always purchase them from an approved supplier and never print bar code labels yourself.

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:





NOTE

The bar code label should only be applied with the alphanumeric portion facing to the left- side of the tape (toward the write protect switch, see below table #3) and within the marked Barcode label area.

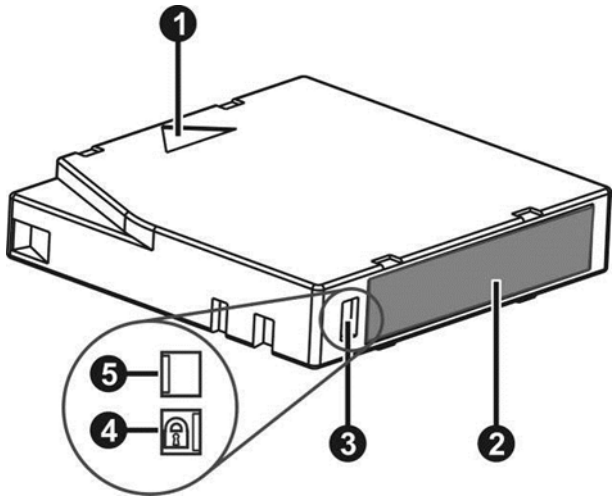
Never apply multiple labels onto a cartridge, as extra labels can cause the cartridge to jam in a tape drive.

5.1.3 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

5.1.4 Read and Write Compatibility

Table 6: Ultrium Read/Write Compatibility

	LTO-1 Drive	LTO-2 Drive	LTO-3 Drive	LTO-4 Drive	LTO-5 Drive	LTO-6 Drive
LTO-3 Media	Incompatible	Incompatible	Read/Write	Read/Write (no encryption)	Read Only	Incompatible
LTO-4 Media, Unencrypted	Incompatible	Incompatible	Incompatible	Read/Write	Read/Write	Read Only
LTO-4 Media, Encrypted	Incompatible	Incompatible	Incompatible	Read/Write with encryption key	Read/Write with encryption key	Read/Write with encryption key
LTO-5 Media, Unencrypted	Incompatible	Incompatible	Incompatible	Incompatible	Read/Write	Read/Write
LTO-5 Media, Encrypted	Incompatible	Incompatible	Incompatible	Incompatible	Read/Write with encryption key	Read/Write with encryption key
LTO-6 Media, Unencrypted	Incompatible	Incompatible	Incompatible	Incompatible	Incompatible	Read/Write
LTO-6 Media, Encrypted	Incompatible	Incompatible	Incompatible	Incompatible	Incompatible	Read/Write with encryption key

5.2 Magazines

The NEO S-Series Tape Library makes use of removable magazines in each model. Tape cartridges are stored in magazines. Magazines may be removed and inserted individually. Magazines are locked to prevent unauthorized removal when inserted in the library and unlock Magazine access may become password protected. For safety reasons, the robotic motion is stopped whenever when a magazine is removed from the library.

The magazines can be unlocked using the Operator Control Panel (OCP) or the Remote Management Interface (RMI).

OCP, see **Chapter Releasing and replacing magazines, Page 38**

RMI, see **Chapter Releasing and replacing , Page 81**

In case the OCP or RMI initiated process has failed or the library no longer has power a manual emergency release is available, see **Chapter** Error! Reference source not found.**, Page** Error! Bookmark not defined..

5.2.1 Slot numbering scheme

NOTE

In the following figures an asterisk (*) and the red circle indicates the mail slots.

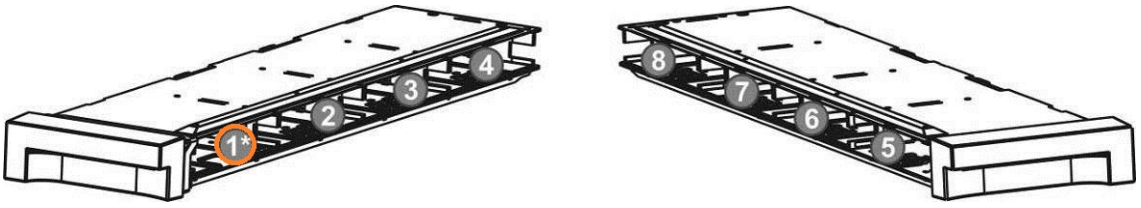


Figure 13 Slot numbering scheme (1U)

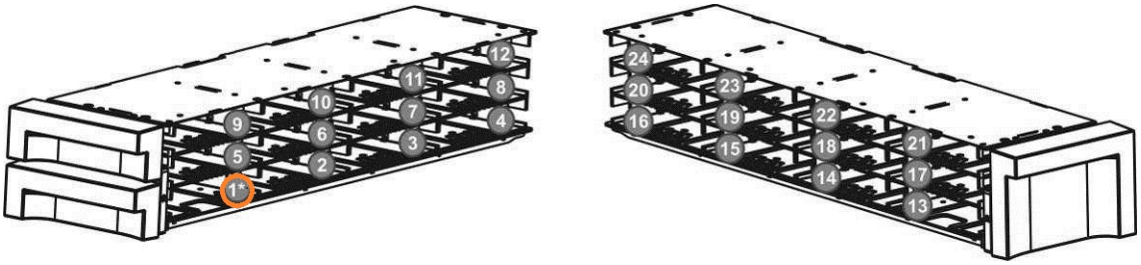


Figure 14 Slot numbering scheme (2U – Single mail slot)

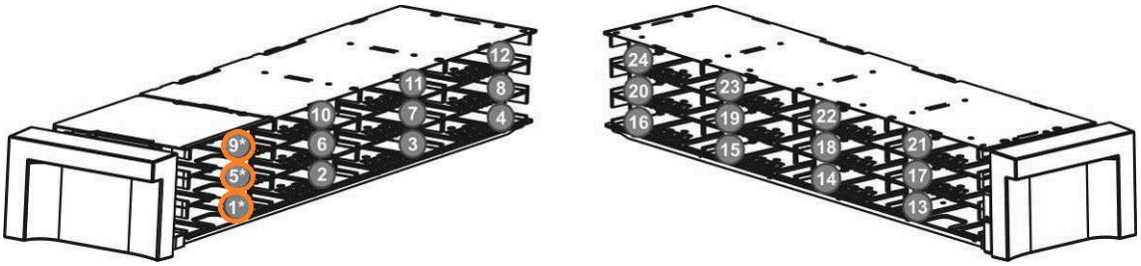


Figure 15 Slot numbering scheme (2U – Triple mail slot)

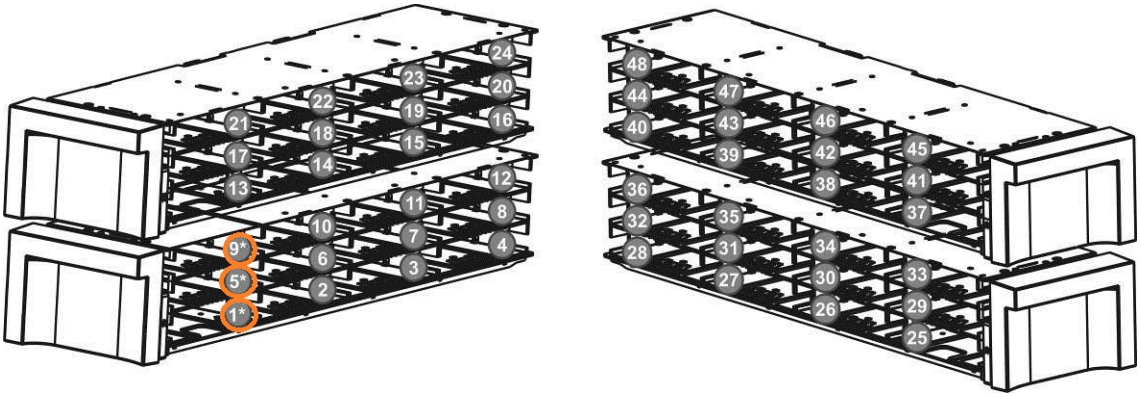


Figure 16 Slot numbering scheme (4U)

5.2.2 Mail slot

Mail slots are used to import/export individual tape cartridges without interrupting the library operation. The command to open the mail slot may be denied if the robotics is busy with some operation. In that case “Busy“ is displayed on the OCP and the command has to be repeated once the robotics operation is finished.

The 1U library provides in the bottom left position a single mail slot magazine (slot 1).

The 2U library provides in the bottom left position a single (slot 1) or triple (optional hardware; slot 1,5,9) mail slot magazine.

The 4U library provides in the bottom left position a triple mail slot magazine (slot 1,5,9).

6 Operating 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.

The OCP and RMI are similar in design and functionality.

6.1 Operator control panel (OCP)

6.1.1 Operating Modes

The OCP operates in two basic modes:

1. User interaction mode
   This mode is employed when a user is pushing buttons on the operating panel.
2. System driven mode
   This is the normal mode of operation. In this mode, the operating panel displays status associated with the actions that were caused from commands issued from the host software application. Actions like loading, rewinding or moving tape cartridges will be displayed.

Whenever an operating button is pressed and released, the operating panel automatically transitions to user interaction mode. The user interaction mode will be active until 3 minutes after the user stops pushing buttons, or the requested robotic action stops – whichever is longer. At this time, the operating panel will return to the system driven mode.

In case of administrator programed user security feature the user interaction mode is restricted to the information and login menu item, until a login with correct PIN is done.

6.1.2 OCP Philosophy

OCP operation must obey some basic rules. These rules of operation constitute a philosophy:

1. Any operational conflict between commands received over SCSI or RMI and those entered via the front panel will be avoided with a reservation mechanism on a ‘first-come, first-served’ basis.

   Any reservation by OCP is cancelled by an OCP logout or the timeout, which cancels the User Interaction Mode.
2. The library firmware will not allow a user to select an impossible request. Those situations will include, but are not limited to:
   - Moving a tape cartridge from any source to a full magazine slot
   - Moving a tape cartridge from an empty magazine slot
   - Loading a tape cartridge from any source to a full tape drive
   - Unloading a tape cartridge from an empty tape drive
3. Any error detected by the library or drive controller and not recoverable through predetermined firmware algorithms will be considered as fatal. An error code will be displayed on the LCD and the error LED will become illuminated. The error code will remain on the OCP until a push button is pressed, which will cause the OCP to return to the home screen.

4. Numeric error codes are only used for unrecoverable, fatal errors (see chapter **Main error codes, Page 145)**, otherwise text status messages are provided.

6.1.3 Moving media within the library

Choose the appropriate library model:

1U library: **Commands menu (OCP - 1U), Figure 26, Page 47**

2U and 4U library: **Commands menu (OCP - 2U, 4U), Figure 38, Page 60**

6.1.4 Cleaning tape drives

Choose the appropriate library model:

1U library: **Service menu (OCP - 1U), Figure 30, Page 51**

2U and 4Ulibrary: **Service menu 2 of 2 (OCP - 2U, 4U), Figure 41, Page 63**

6.1.5 Releasing and replacing magazines

Choose the appropriate library model:

1U library: **Commands menu (OCP - 1U), Figure 26, Page 47**

2U and 4U library: **Commands menu (OCP - 2U, 4U), Figure 38, Page 60**

6.2 1U Operator control panel (OCP)

6.2.1 Power-Up Display

When the 1U library is powered up, or is reset from power on, it goes through several internally controlled processes that allow it to be initialized and enter normal operation mode. These processes are called Power-On-Self-Test (POST). While the POST is occurring, the OCP will have appropriate progress information displayed to keep the user informed. When the library completes POST, it will display the current drive mount status in the OCP home screen. If the drive is empty, the following status will be displayed.

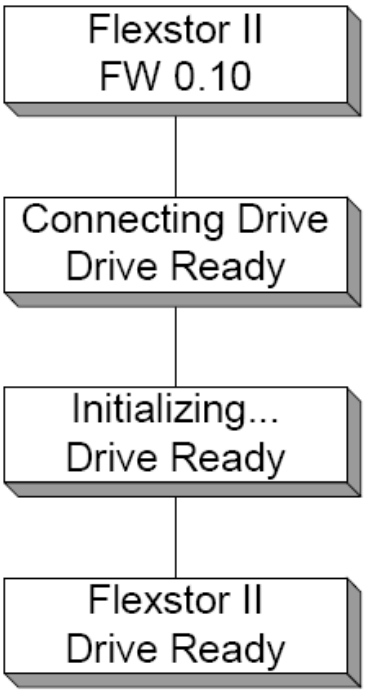


Figure 17 Home screen (OCP - 1U)

6.2.2 Note about the LED's

All LED's are updated during power up and reset sequences. Upon power up or after software reset, the library will illuminate all LED's as soon as POST allows. This will help the user to verify if all LED's are functional. When initialization starts, all LED's will be extinguished and the ready/activity LED will flash at a rate of approximately 1-second per cycle, 50% duty cycle. When the robot mechanical initialization is complete, the ready/activity LED will stop flashing and be constantly illuminated. The magazine status LED's will also show the appropriate status (locked, unlocked or removed).

If a library failure occurs, the ready/activity LED will be turned off and the error LED will be illuminated. The OCP will also display an appropriate error code to help identify the failure.

6.2.3 Input modes (OCP Navigation)

There are several modes to enter values in the different menu items within the OCP. These modes differ depending upon the menu item selected. The data entry modes are selectable predefined values, toggle values (e.g. on/off) and numerical value entry like network addresses.

Selectable predefined values

After navigating to the menu item, the various predefined values can be selected with the <PREVIOUS> and <NEXT> button. As soon as the display shows the correct value it can be entered by pressing the <ENTER> button.

Toggle values

Toggle values are used to switch between two different states like on and off. After navigating to the menu item the display shows the actual state. Pressing the <ENTER> button will switch to the possible new state. Pressing the <ENTER> button a second time will take over this new state. This procedure works vice-versa.

Numerical values

Numerical values are used for IP network addresses, PIN numerical entries and other configuration entries. After navigating to the menu item, the actual current value, will be displayed and the cursor stays on the left most significant digit. The single digit can be incremented / decremented with the <PREVIOUS> and <NEXT> buttons. After selecting the correct value pressing the <ENTER> button will enter the selected value and the cursor is moved to the next editable digit to the right. It can be edited in the same way. After pressing the <ENTER> button at the last digit the complete entry will be stored. Pressing the <CANCEL> button any time before the last digit complete entry will cancel the whole edit process and the original value will become valid again.

6.2.4 Power ON/OFF

The operator control panel contains the power on/off button. Pressing this button will initiate a controlled power down of the unit (soft landing). The following operations will take place before the unit shuts down completely, once the power button is pushed from a power on state.

- The display indicates with an appropriate message that the shutdown is in progress and provides the opportunity to abort the shutdown by pushing the <CANCEL> button within 3 seconds.
- The library controller finishes all ongoing library and drive activities.
- The robotics is moved to its home position.
- The library controller switches off the power supply’s secondary side.

6.2.5 Menu flow charts

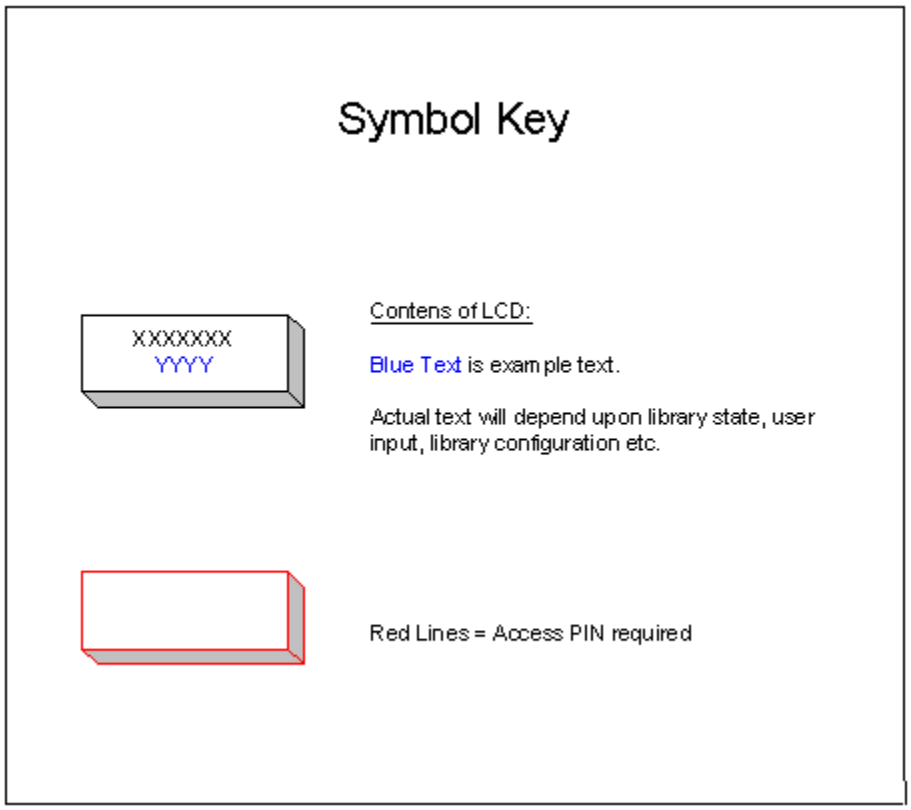


Figure 18 Menu symbol key (OCP - 1U)

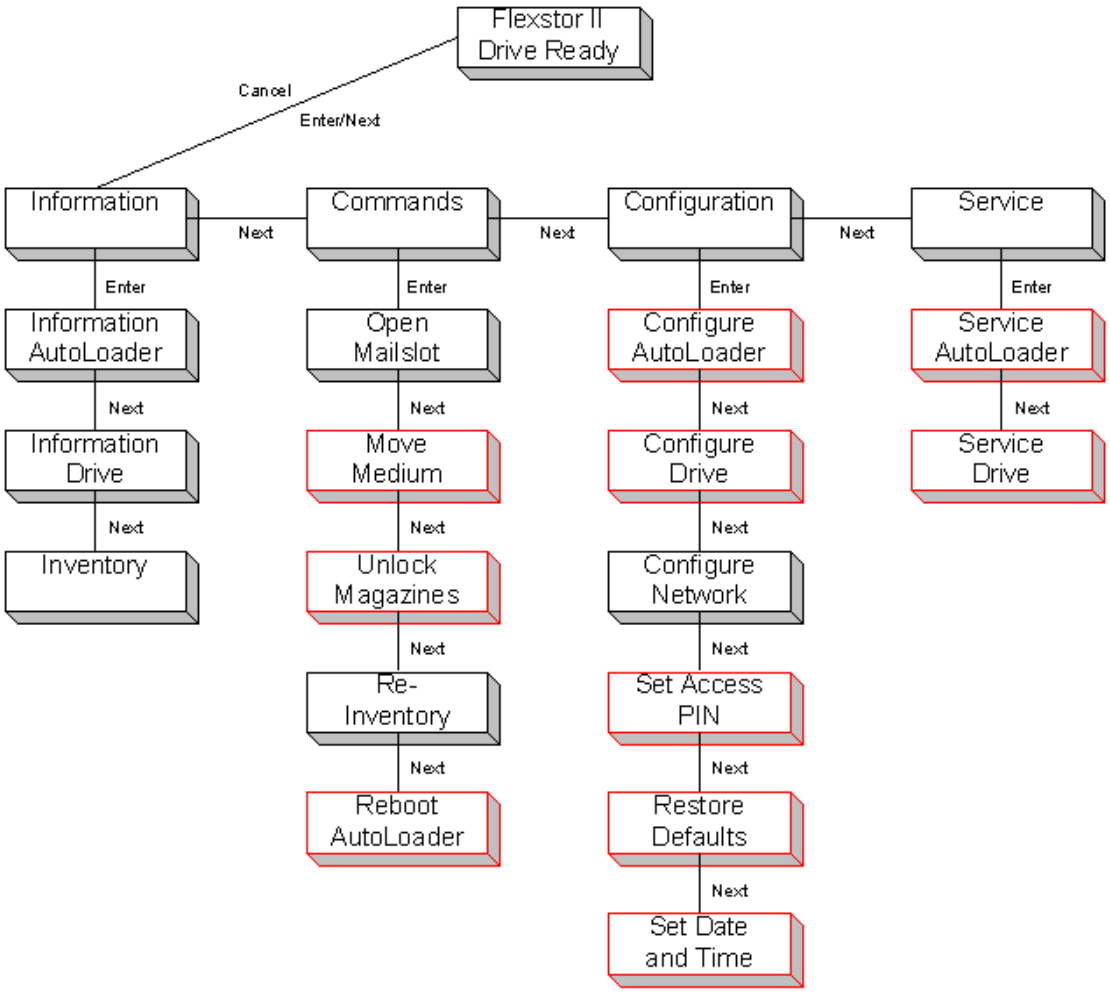


Figure 19 Main menu (OCP - 1U)

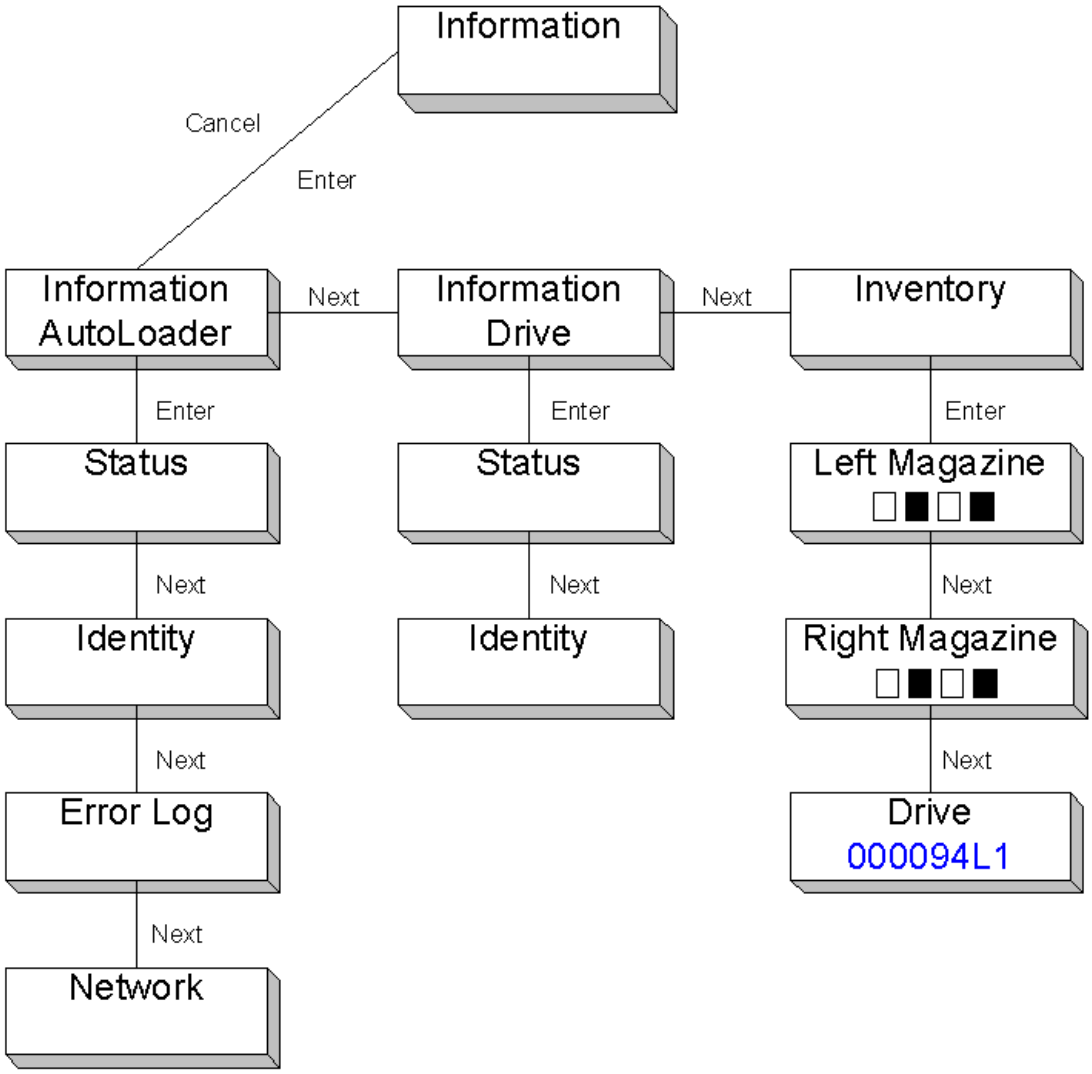


Figure 20 Information menu (OCP - 1U)

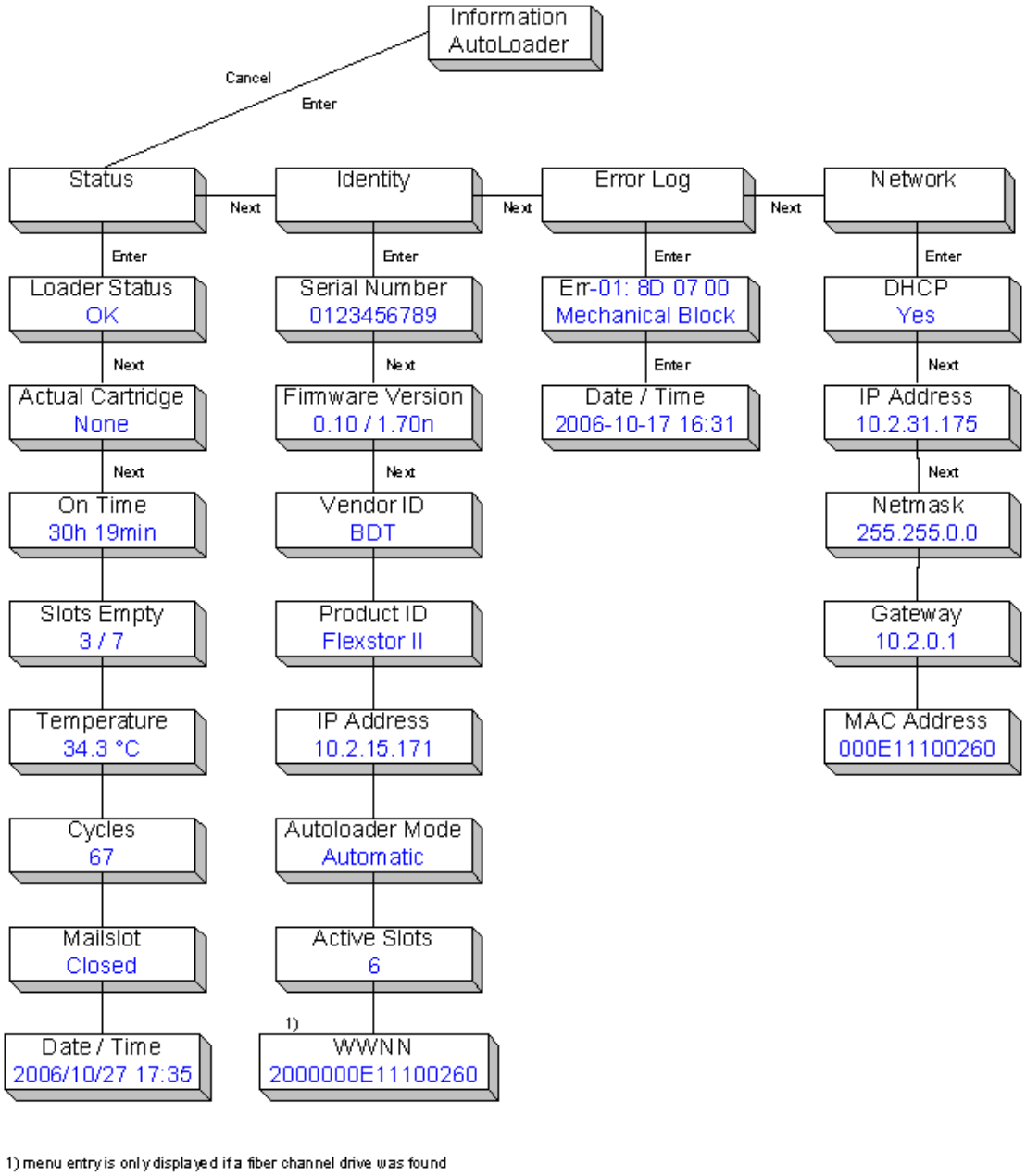


Figure 21 Library information menu (OCP - 1U)

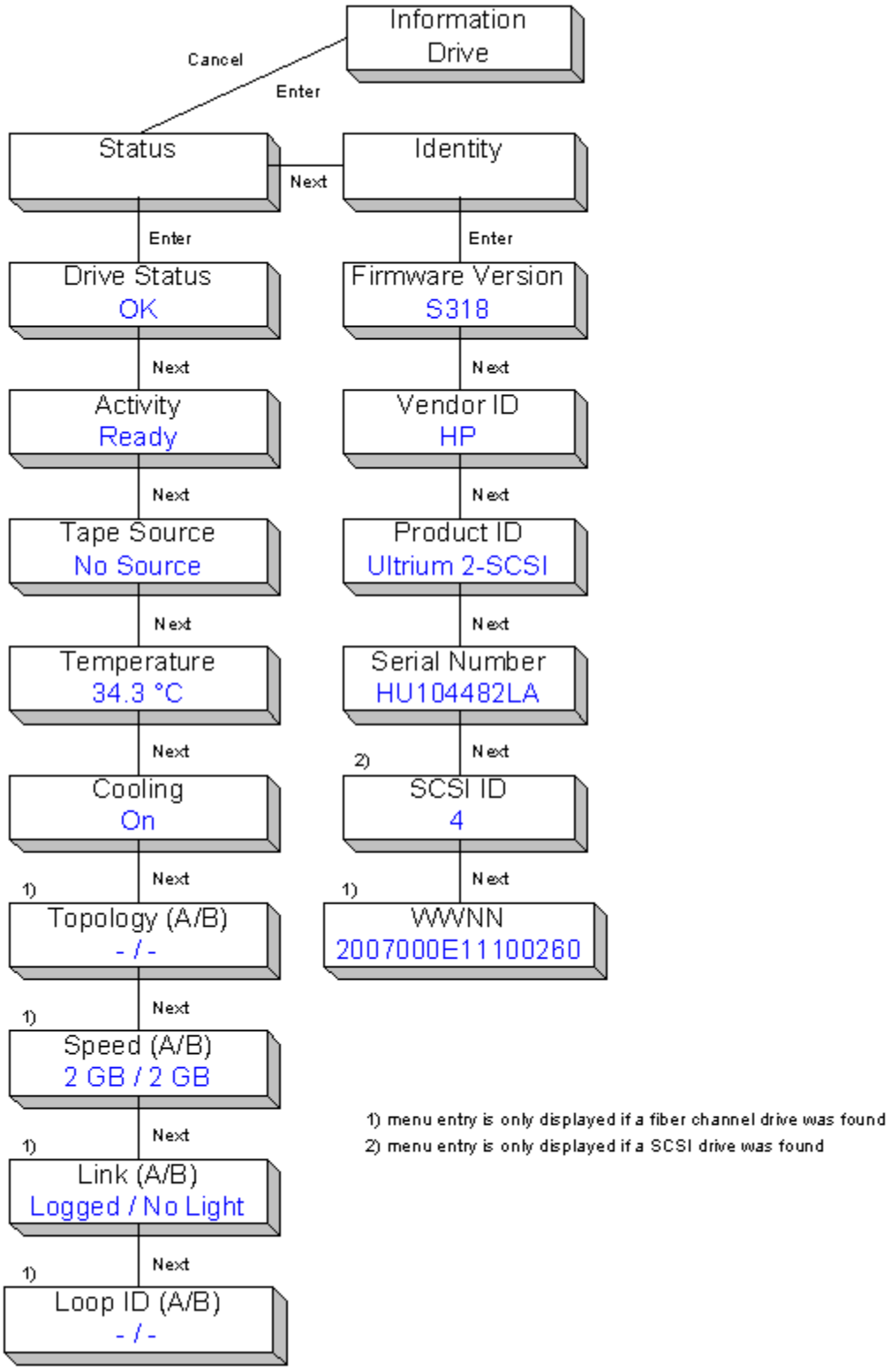


Figure 22 Drive information menu (OCP - 1U)

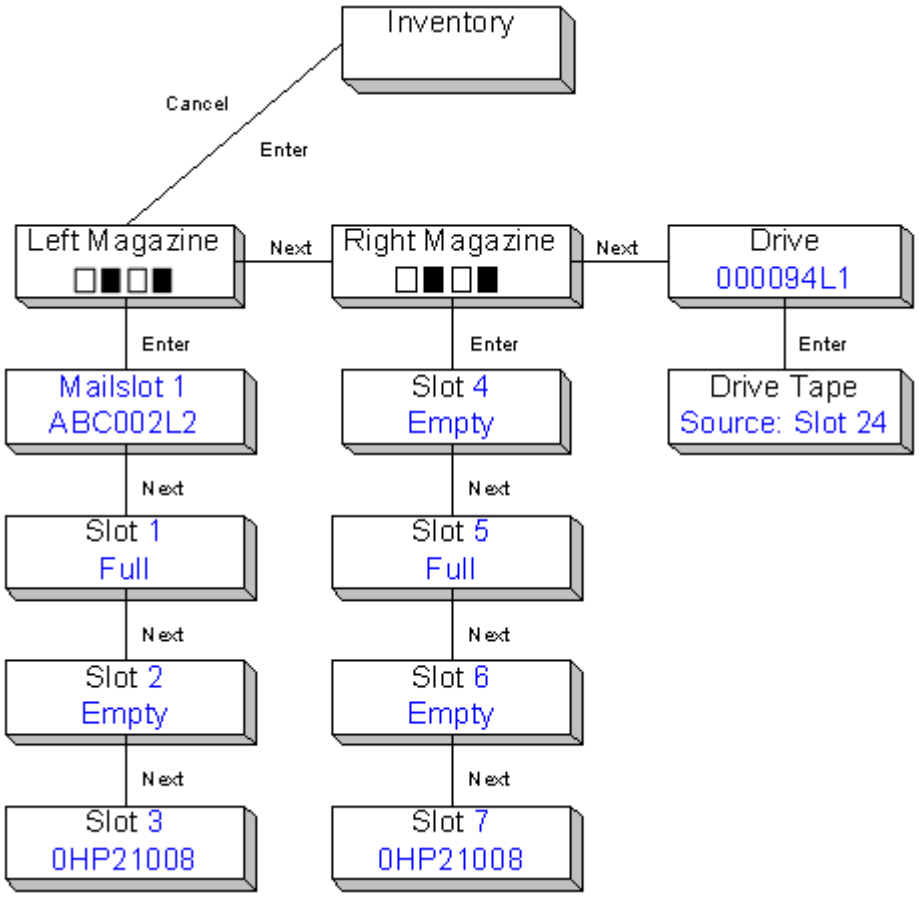


Figure 23 Inventory menu (OCP - 1U)

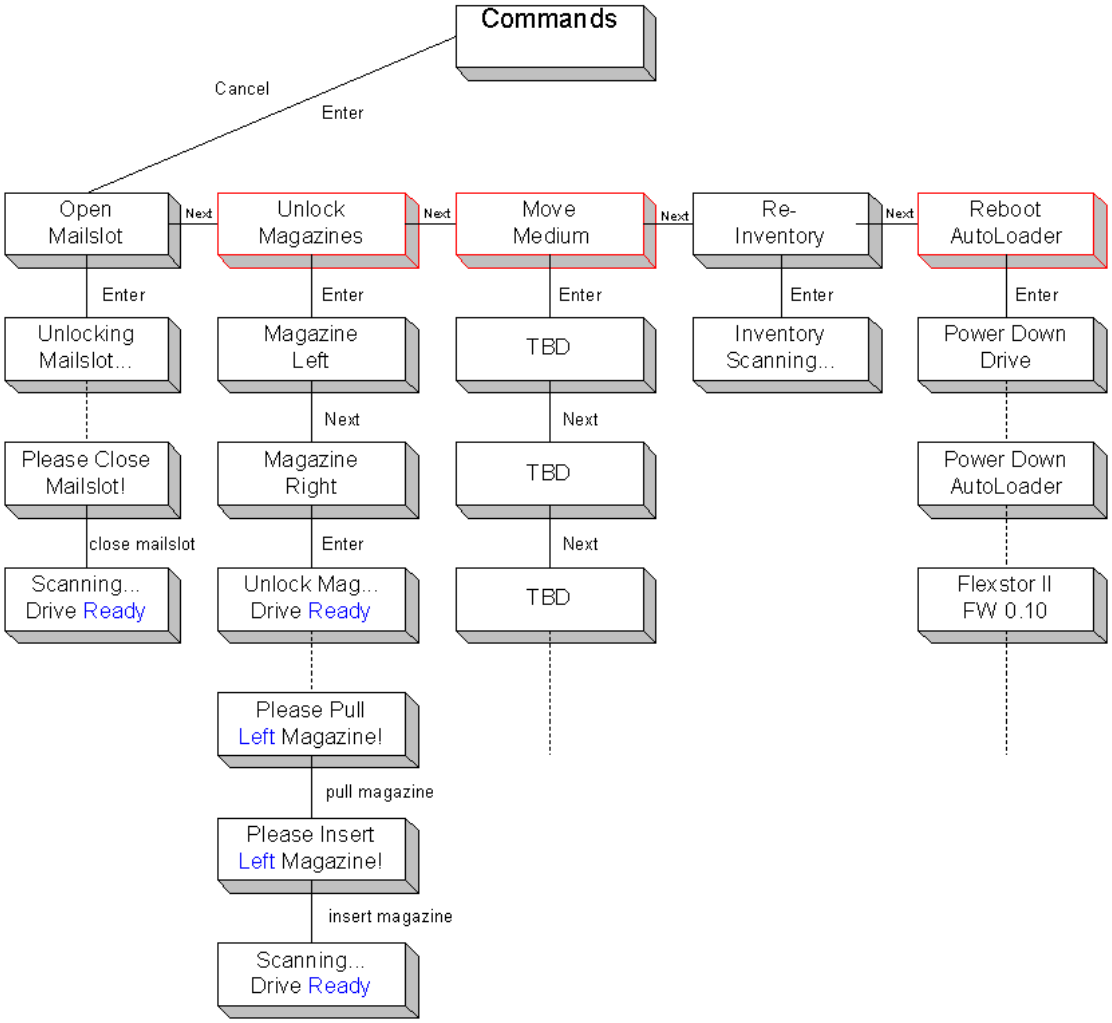


Figure 24 Commands menu (OCP - 1U)

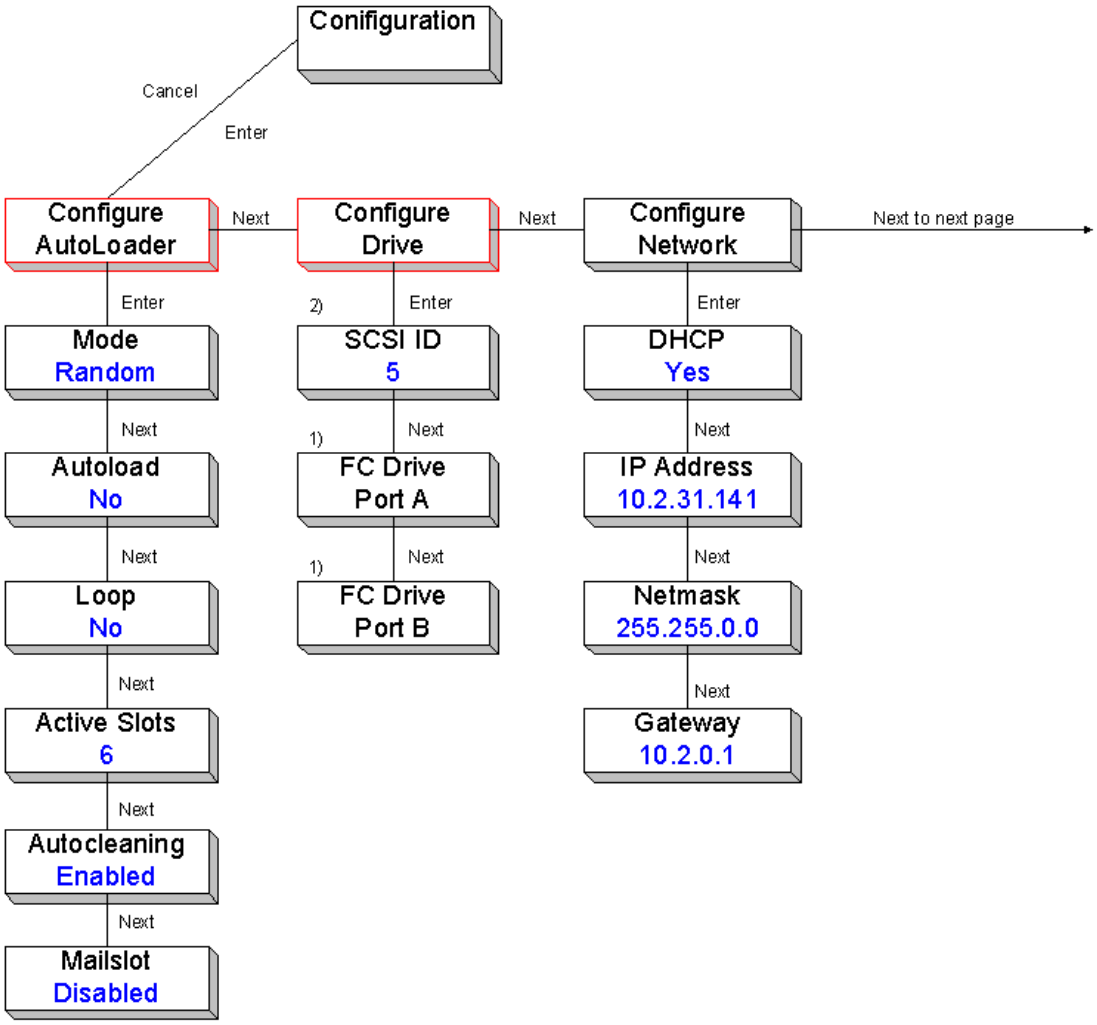


Figure 25 Configuration menu (OCP - 1U)

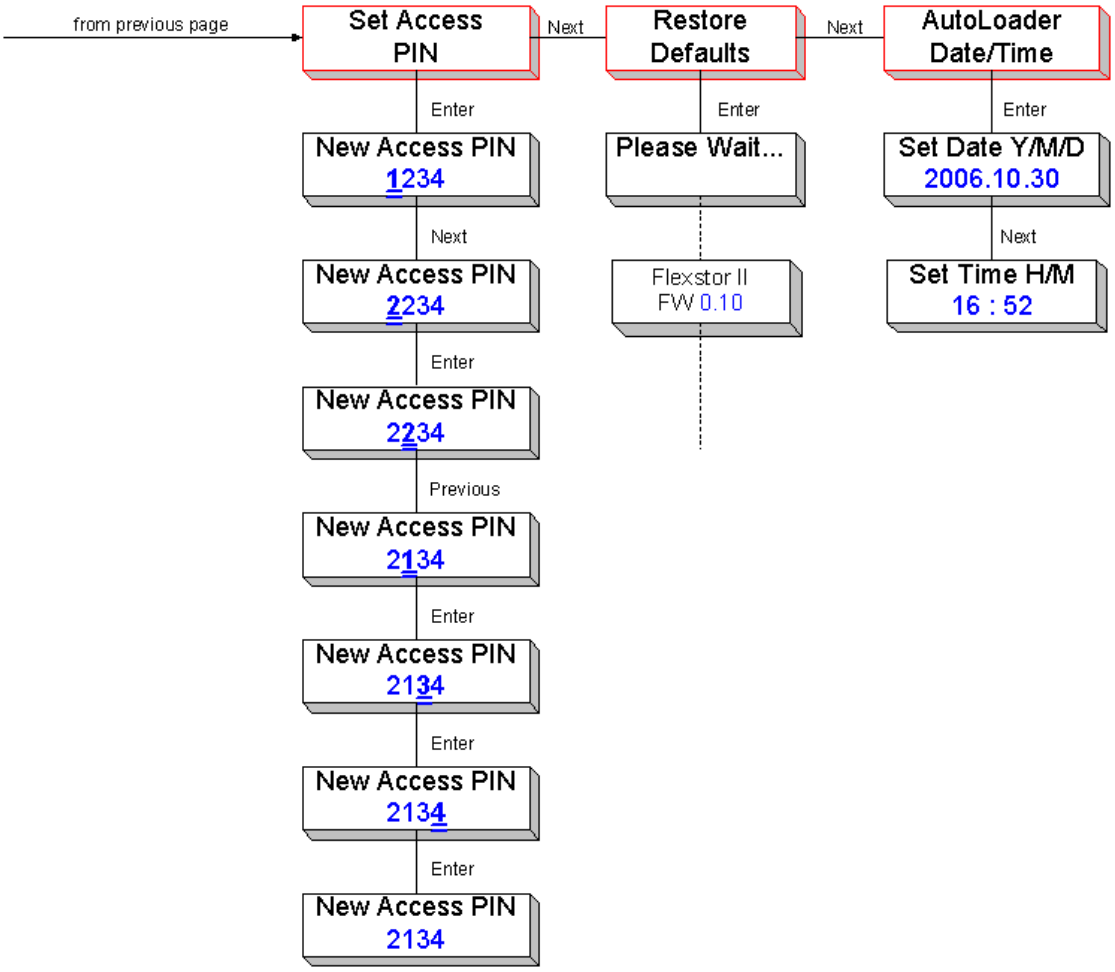


Figure 26 Configuration menu, continuation (OCP - 1U)

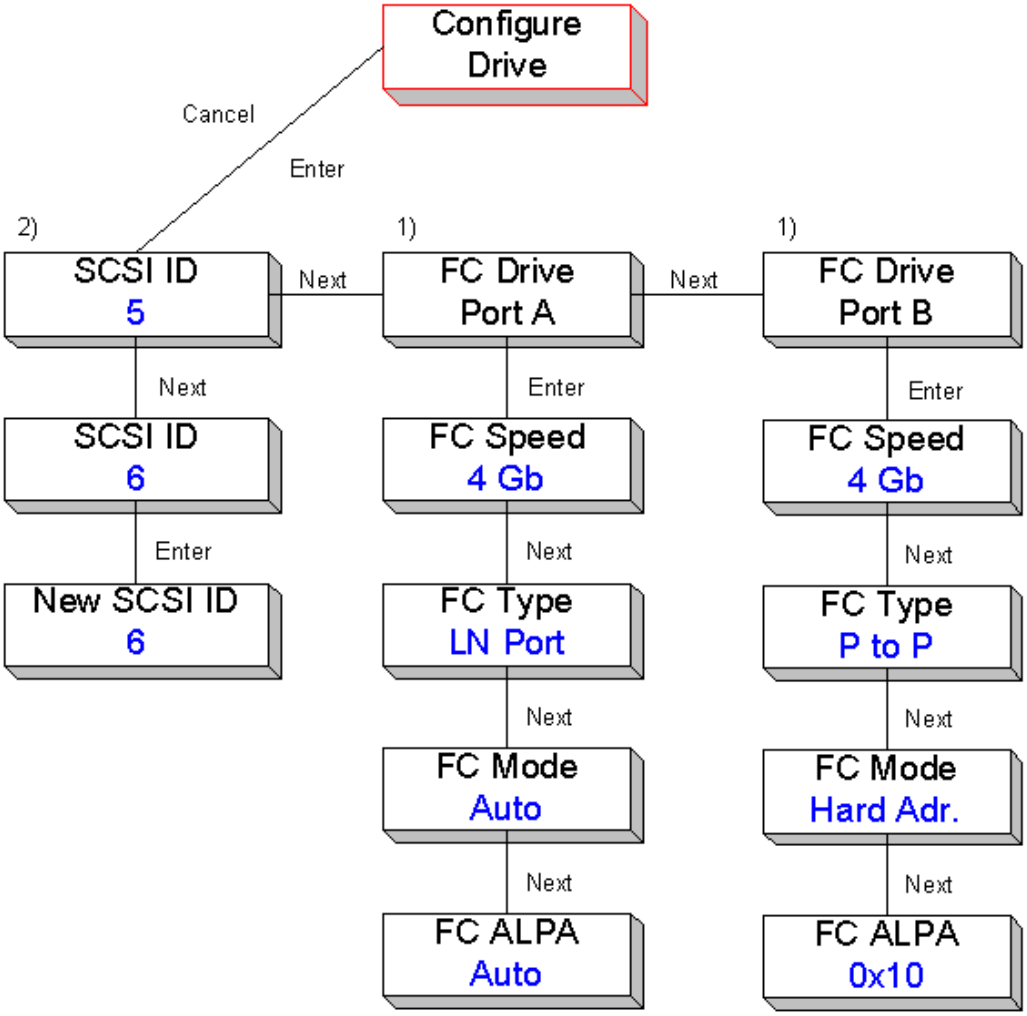


Figure 27 Drive configuration menu (OCP - 1U)

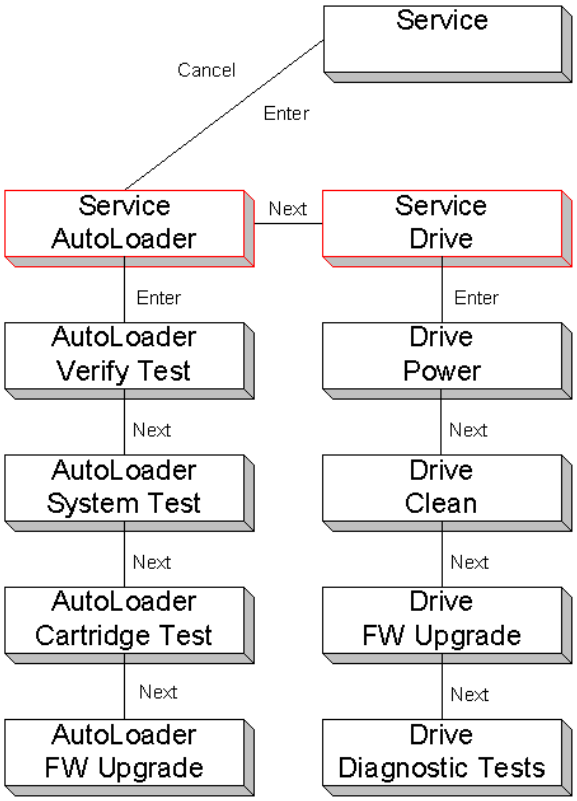


Figure 28 Service menu (OCP - 1U)

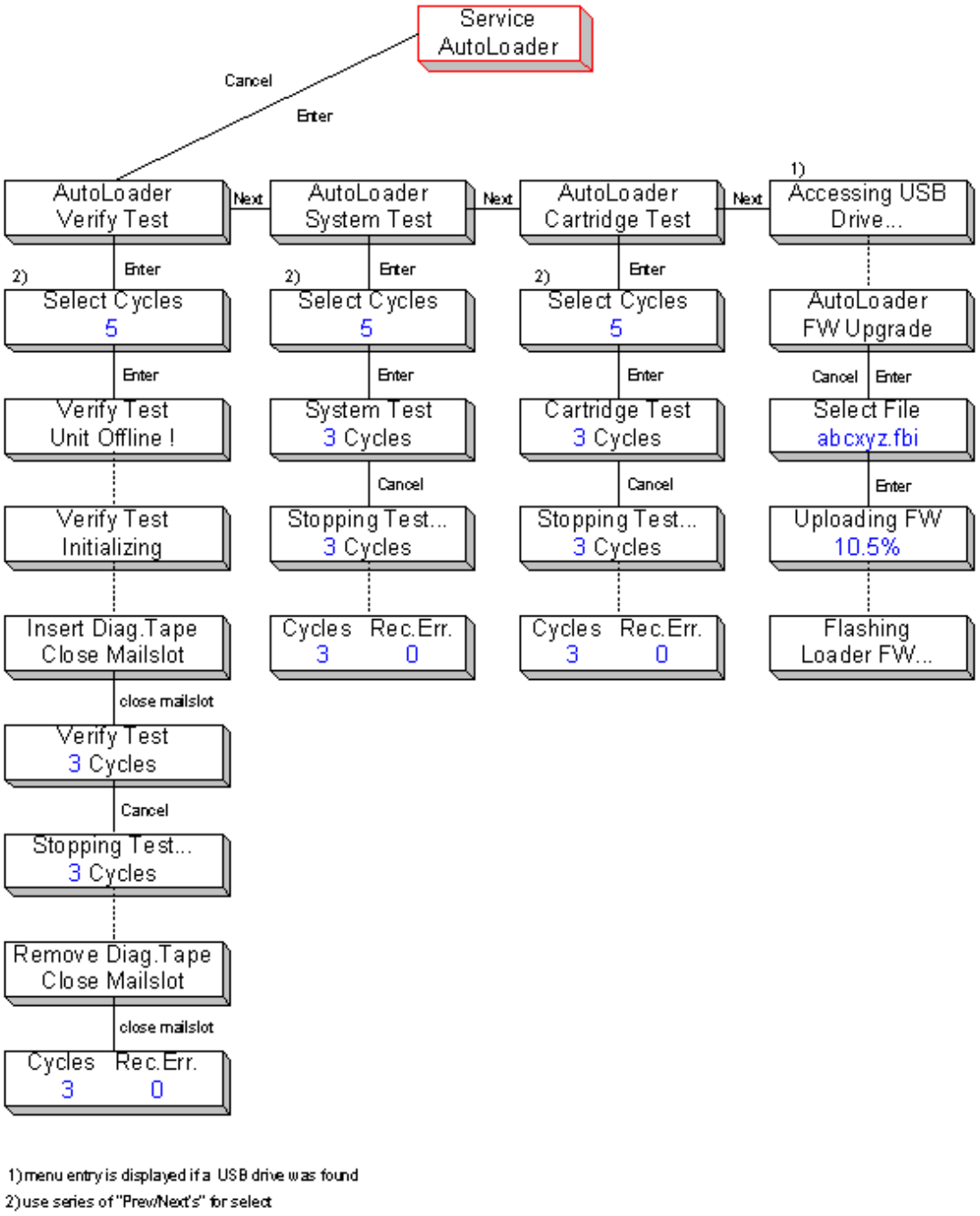


Figure 29 Library service menu (OCP - 1U)

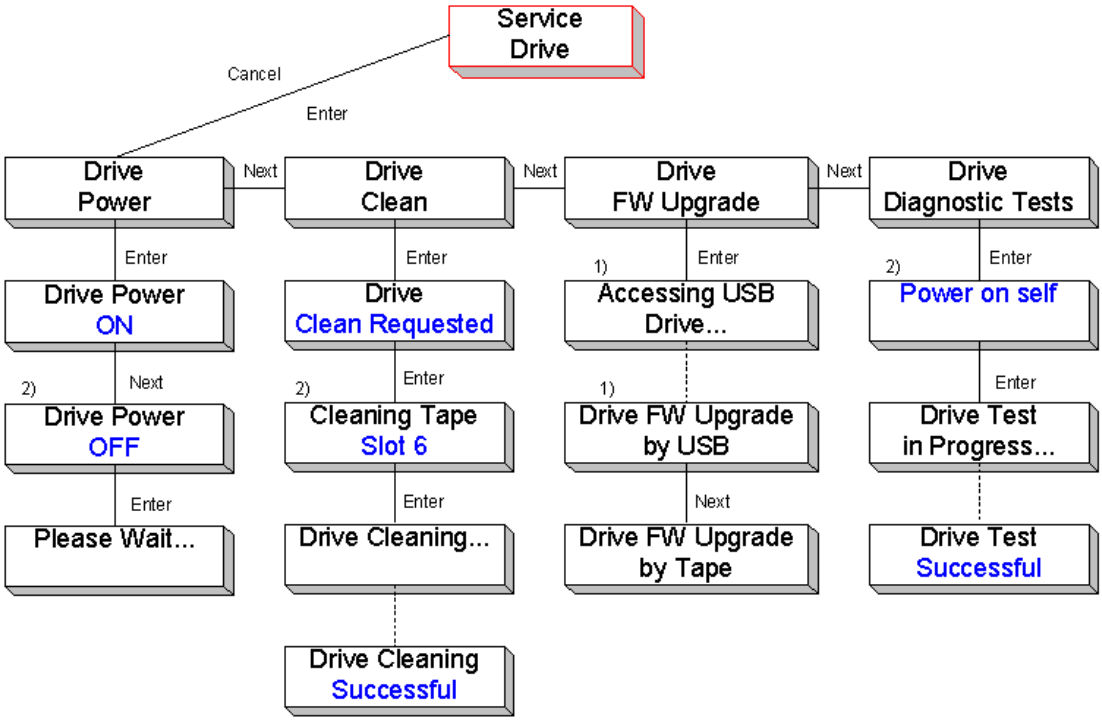


Figure 30 Drive service menu (OCP - 1U)

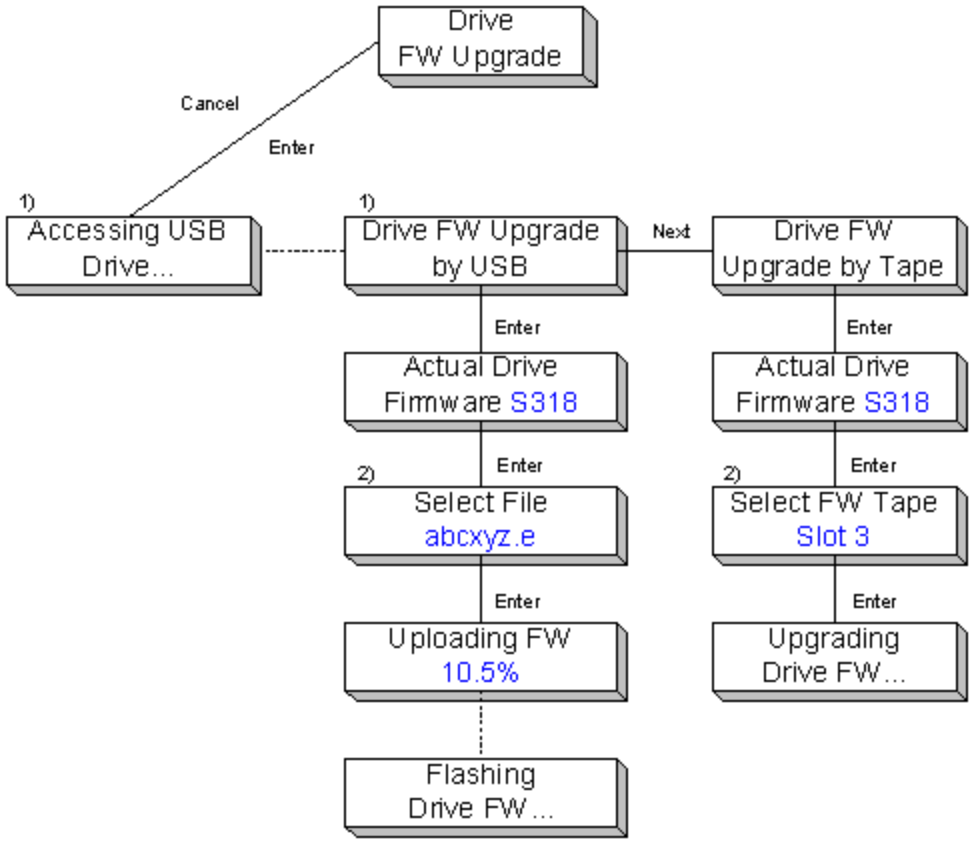


Figure 31 Drive FW Upgrade menu (OCP - 1U)

6.3 2U, 4U Operator control panel (OCP)

6.3.1 Power-Up Display

When the library powers up, or resets, it goes through several internally controlled processes that initialize and prepare the unit for normal operation. These processes are called Power-On-Self-Test (POST). While the POST is in process, the OCP will have appropriate information displayed to keep the user informed. When the library finishes POST, it will display the current library status for a defined time or until a front panel key is pressed.

After this initial status screen the home screen will be displayed until, any key is pressed. This home screen shows the overall health of the library, indicating the status of the robotic and the connected drives.

Figure 32 Home screen (OCP - 2U, 4U)

6.3.2 Note about the LED's

All LED's are updated during power up and reset sequences. Upon power up or software reset, the library will illuminate all LED's as soon as POST allows. This will help the user to verify if all LED's are functional. When initialization starts, all LED's will be extinguished and the ready/activity LED will flash at a rate of approximately 1-second per cycle, 50% duty cycle. When the mechanical initialization is complete, the ready/activity LED will stop flashing and remain constantly illuminated.

If a library failure occurs, the ready/activity LED will be turned off and the error LED will be illuminated. The OCP will also display a specific error code to help identify the failure.

The following are additional operational details of LED's.

- The <Ready/Activity> LED will be lit any time the unit is powered on and functional (i.e. successfully completed the power-on self-test). The LED will blink whenever there is any tape library or drive activity. The LED will also blink when the unit is offline.
- The <Clean> LED will only be lit when a cleaning required has been issued by one of the drives. The LED will be turned off after a successful drive cleaning operation is performed to the requesting drive.
- The <Media Attention> LED will indicate that there is a piece of LTO media which is bad/marginal, or invalid. The LED will be cleared when all marginal and invalid cartridges have been exported from the tape library.
- The <Error> LED will be lit when there is an unrecoverable (i.e. hard) drive or tape library failure. This will occur simultaneously with the hard error message displayed on the screen; the LED will remain illuminated until the error state is resolved.

6.3.3 Input Modes

There are several modes to enter values in the different menu items. These values are selectable predefined values, toggle values (e.g. on/off) and numerical values like network addresses.

Selectable predefined values

After navigating to the menu item, the various predefined values can be selected with the <NEXT> and <PREVIOUS> button. As soon as the display shows the correct value, it may be confirmed by pressing the <ENTER> button.

Toggle values

Toggle values are used to switch between two different states like on and off. After navigating to the menu item the display shows the actual state. Pressing the <ENTER> button will switch to the possible new state. Pressing <ENTER> button a second time will take over this new state.

Numerical values

Numerical values are needed for network addresses, PIN entries, and other configuration entries. After navigating to the menu item to be changed, the actual value will be displayed and the cursor stays on the first digit. The value may be incremented / decremented with the <NEXT> and <PREVIOUS> button. After pressing the <ENTER> button the cursor is set to the next editable digit. It can be changed in the same way. After pressing the <ENTER> button at the last digit the complete entry will be stored. Pressing the <CANCEL> button will cancel the whole edit process and the old value is valid again.

6.3.4 Power ON/OFF

Part of the operator control panel is the power on/off button. Pressing this button will initiate a controlled power down of the library (soft landing).

The following operations will take place before the unit shuts down completely:

- The display indicates with an appropriate message that the shutdown is in progress.
- The library controller finishes all ongoing loader and drive activities.
- The robotics is moved to its home position.
- The library controller switches off the power supply's secondary side.
- To abort the shutdown process the user has to press the <CANCEL> button within the first 3 seconds.

NOTE

The shutdown process may be aborted by pressing the cancel button within the first 3 seconds.

1.1.1 Menu flow charts

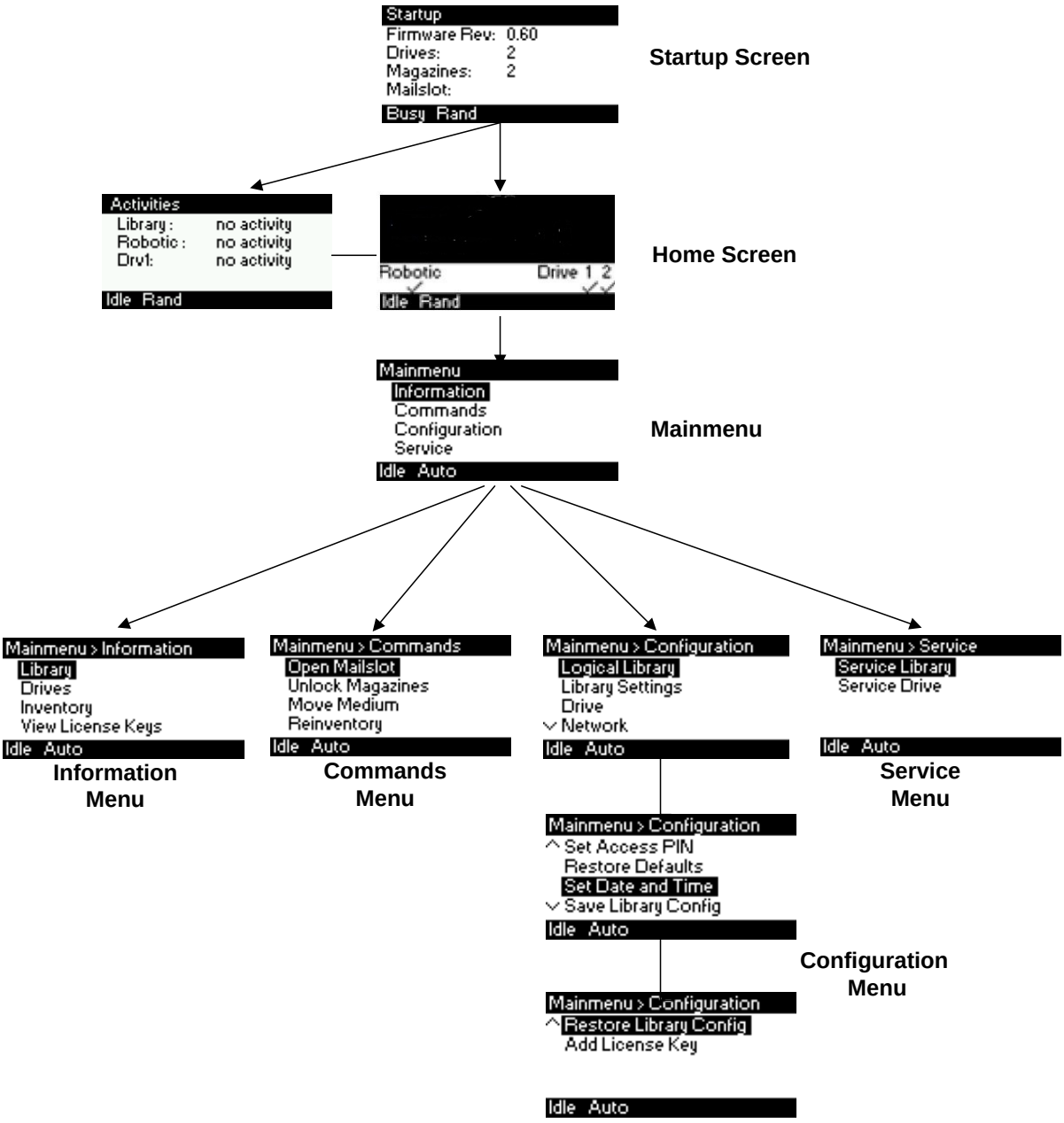


Figure 33 Main menu (OCP - 2U, 4U)

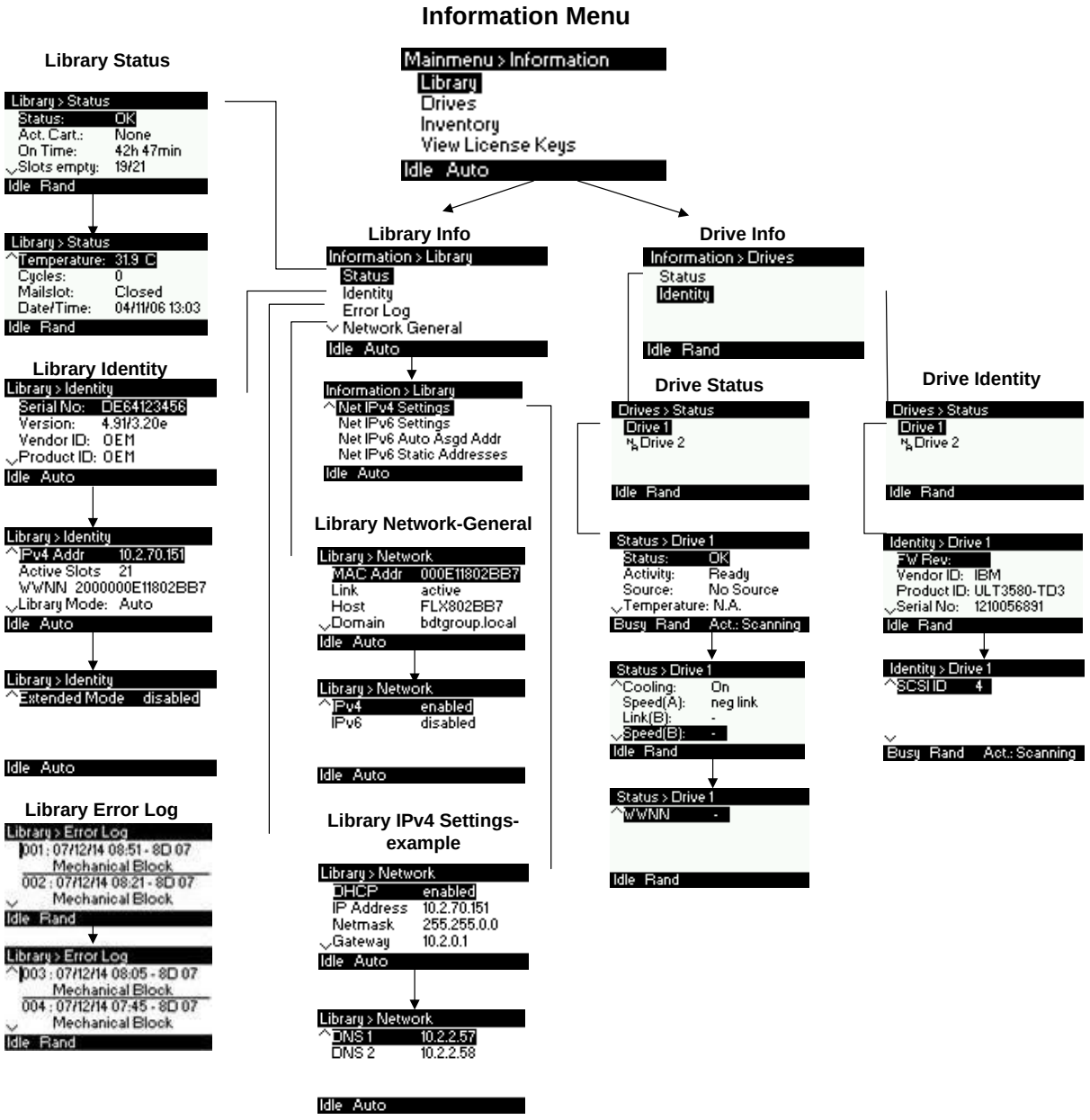


Figure 34 Information menu 1 of 2 (OCP - 2U, 4U)

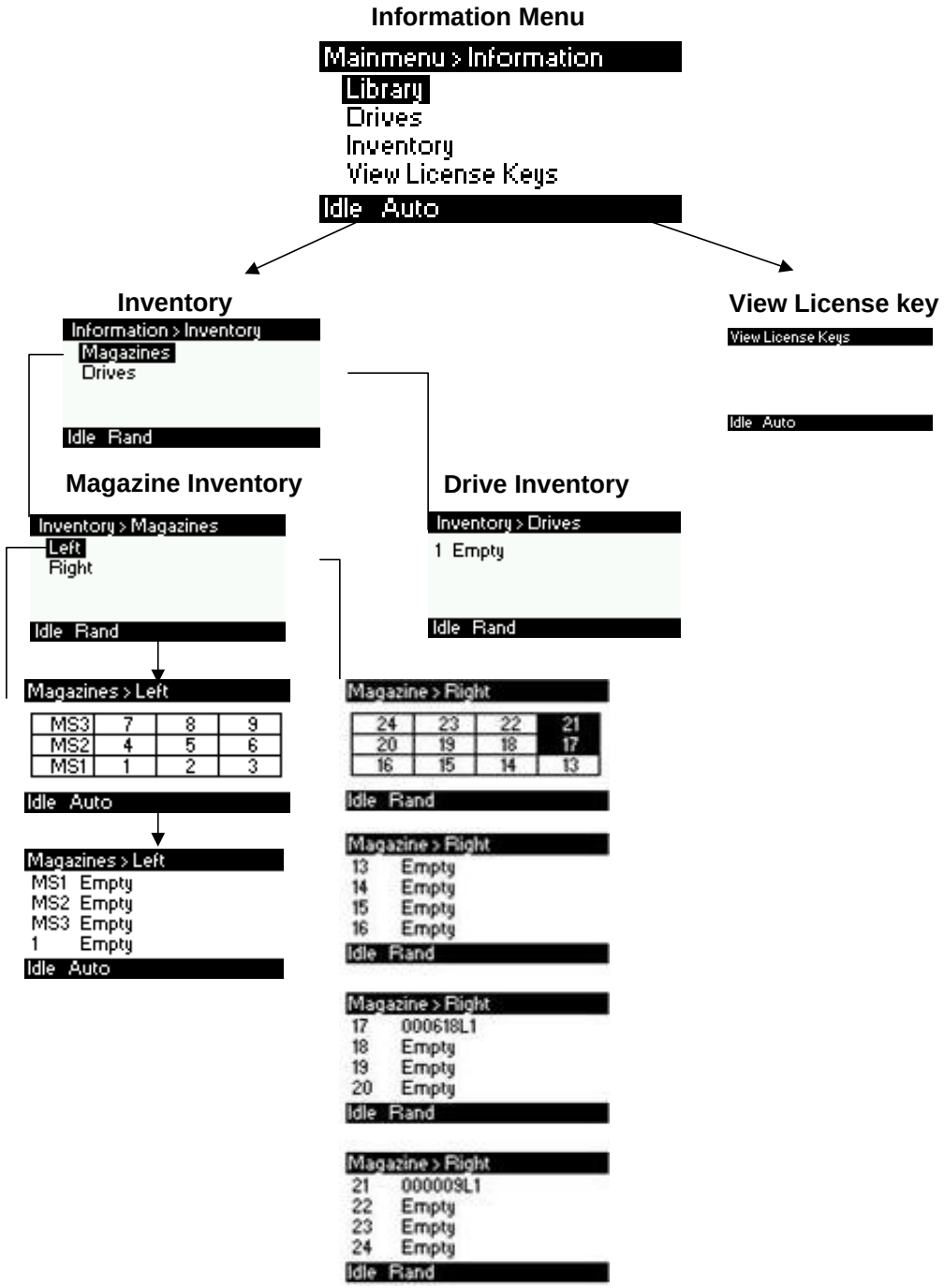


Figure 35 Information menu 2 of 2 (OCP - 2U, 4U)

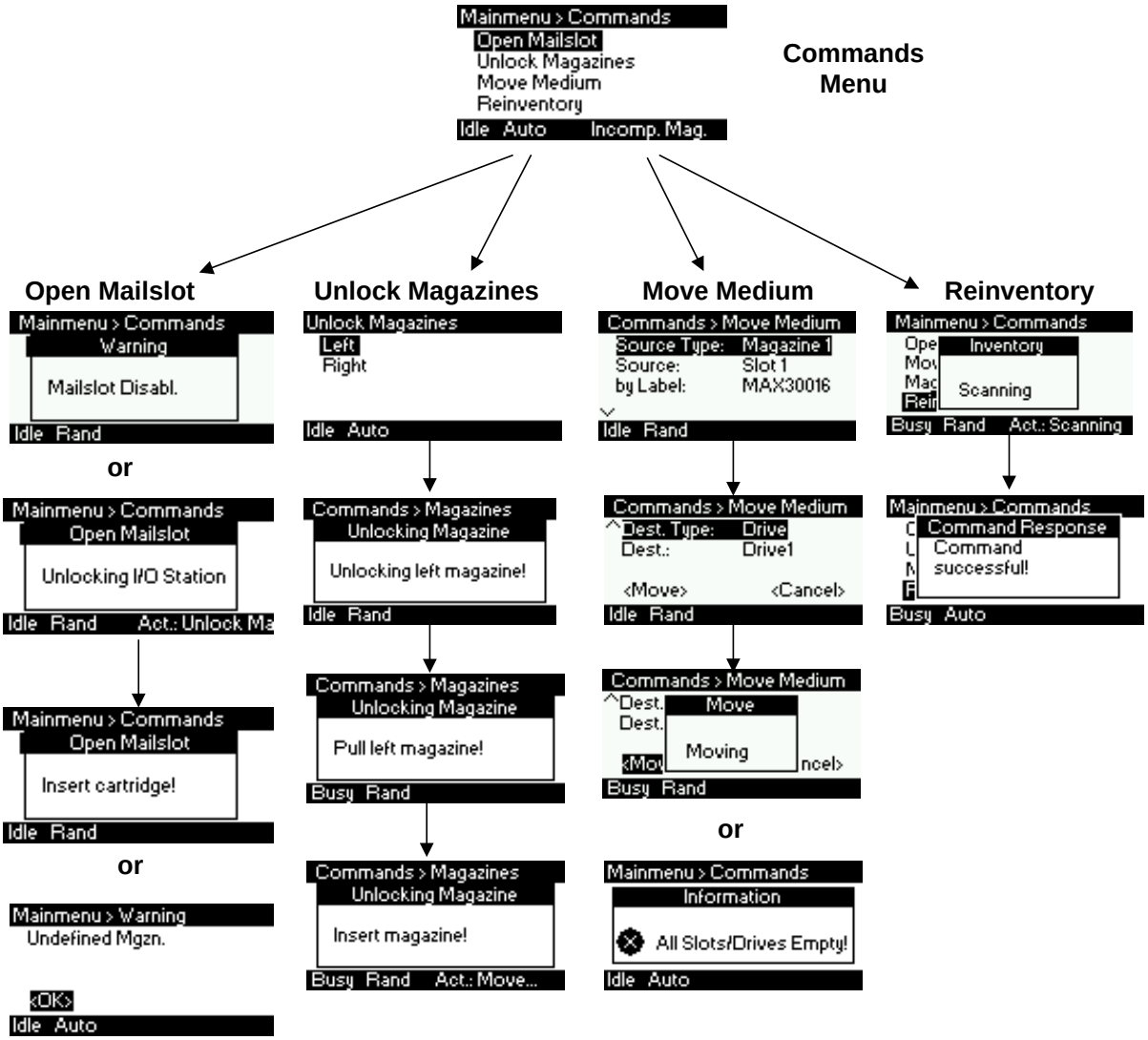


Figure 36 Commands menu (OCP - 2U, 4U)

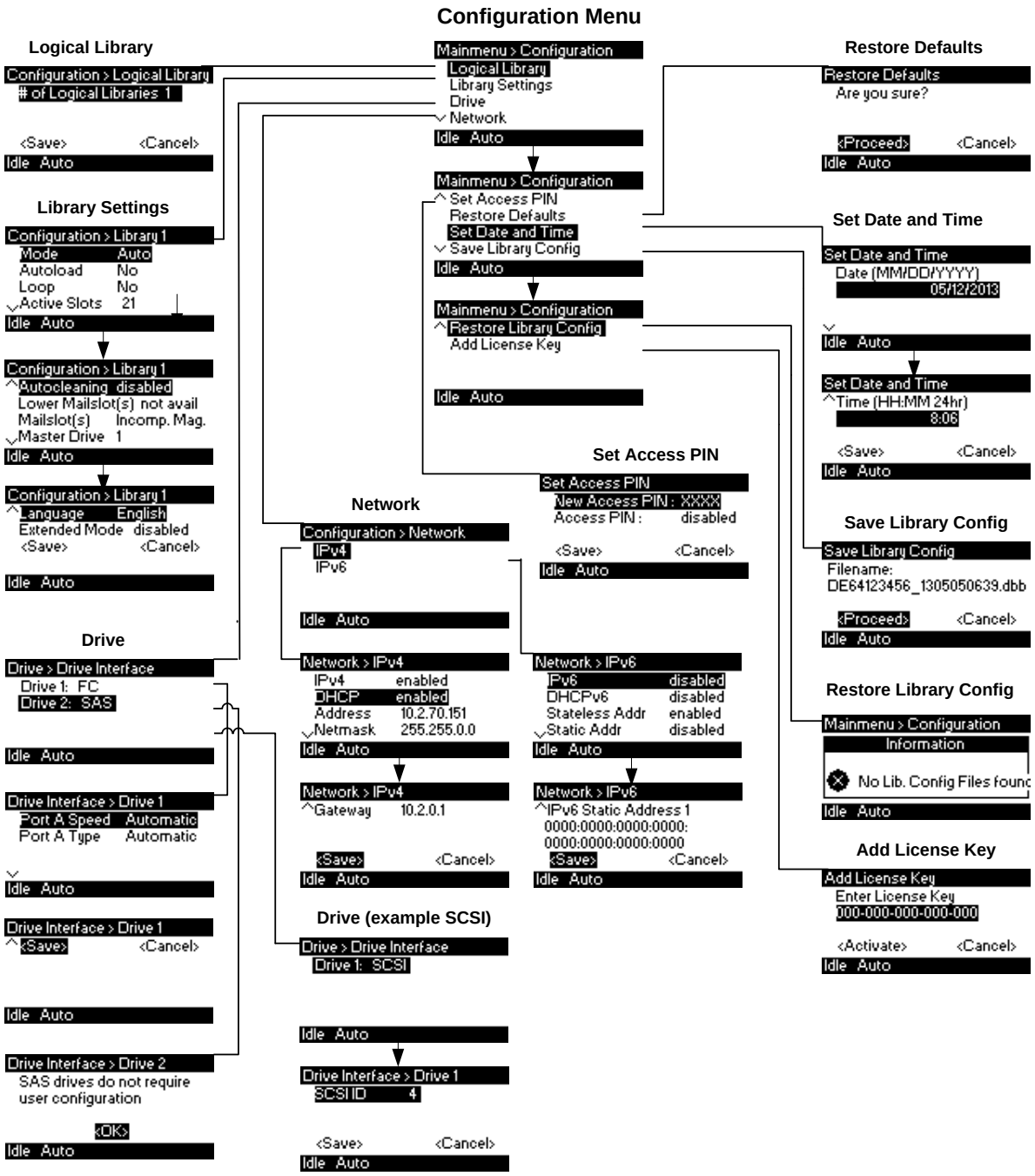


Figure 37 Configuration menu (OCP - 2U, 4U)

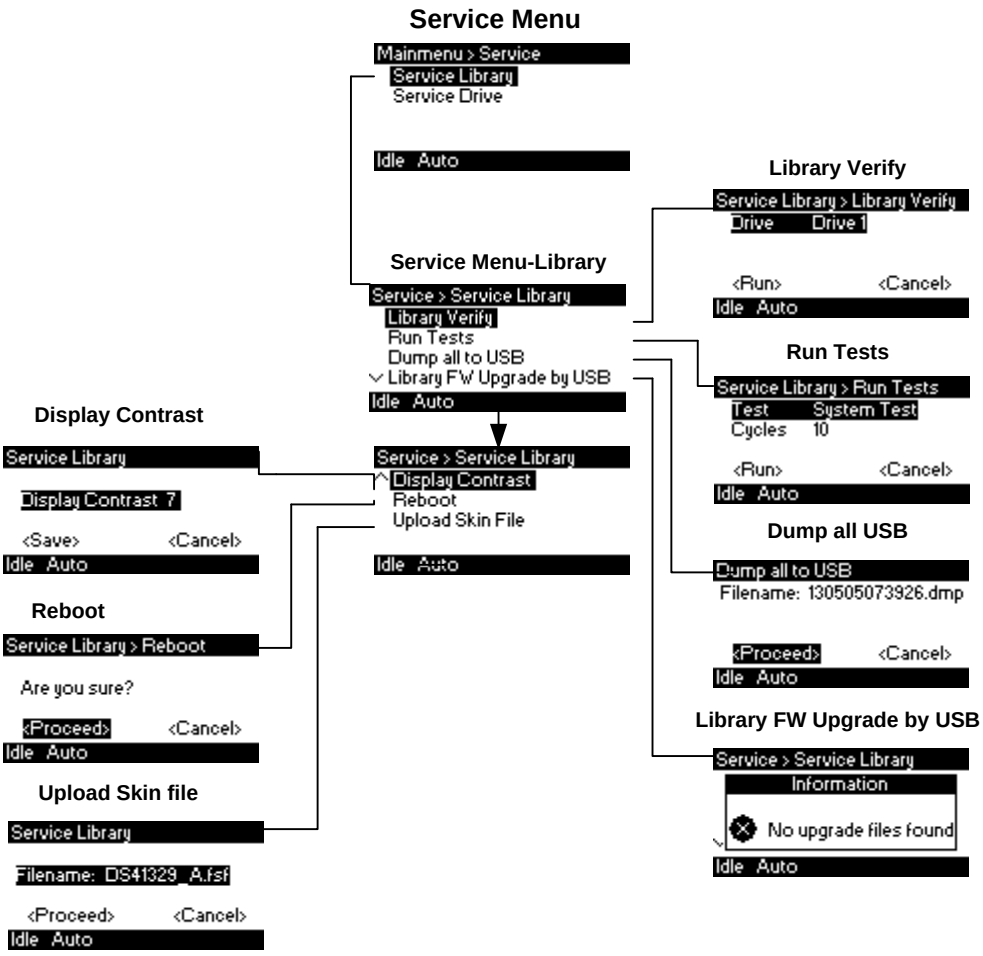


Figure 38 Service menu 1 of 2 (OCP - 2U, 4U)

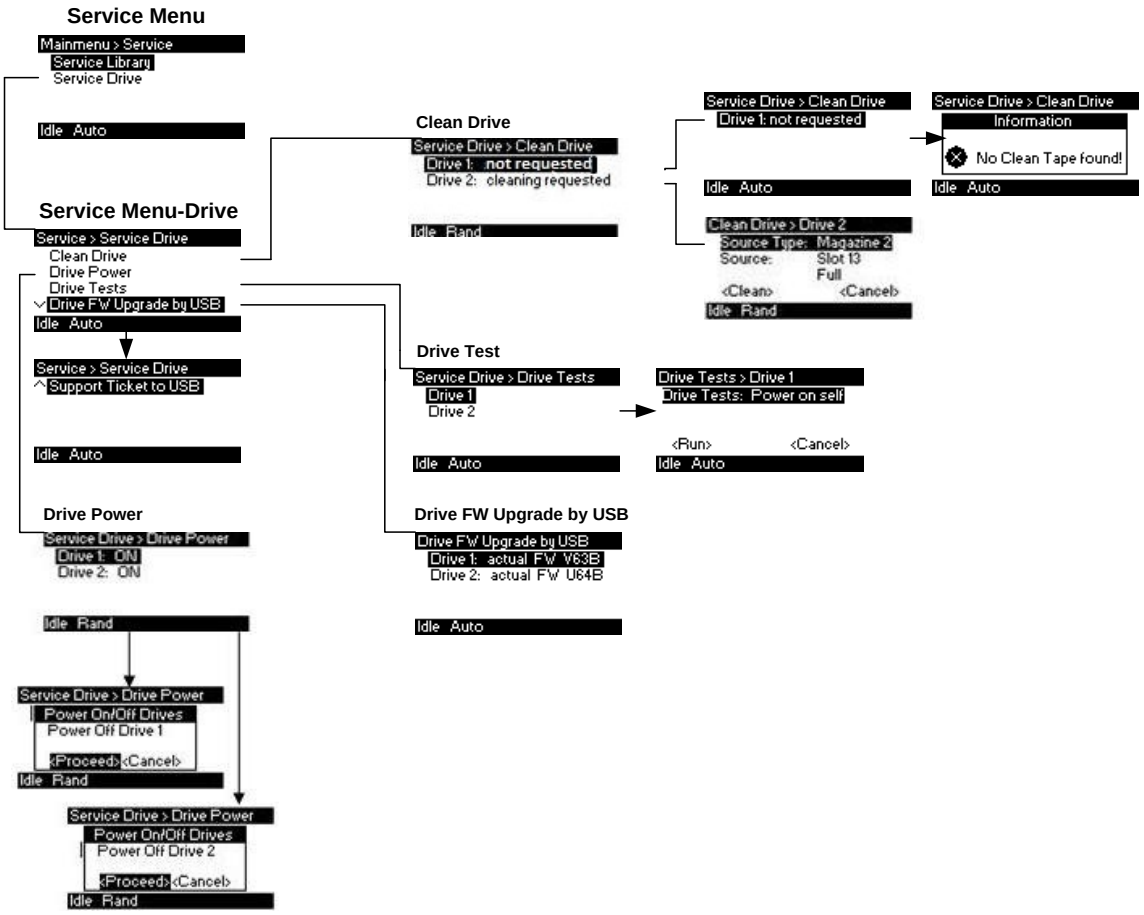


Figure 39 Service menu 2 of 2 (OCP - 2U, 4U)

FC drive dialog	Values	Comments
Firmware Revision	String	
Vendor ID	String	
Product ID	String	
Serial Number	String	
WWNN	String	
Topology A	Auto | point to point | arb loop	
Speed A	Auto | 1 | 2 | 4 | 8 Gb/s	

Loop ID A	-- | 0..127	
Topology B	Auto | point to point | arb loop	
Speed B	Auto | 1 | 2 | 4 | 8 Gb/s	
Loop ID B	-- | 0..127	
SAS drive dialog	**Values**	**Comments**
Firmware Revision	String	
Vendor ID	String	
Product ID	String	
Serial Number	String	
WWPID A	String	
WWPID B	String	
Firmware Revision	String	

Table 1 Drive X (information menu)

6.4 Remote Management Interface

6.4.1 Overview

Many of the same operations performed locally from the operator control panel can also be performed remotely using the network connected Remote Management Interface (RMI).

The RMI lets you monitor and control the library from any computer connected to your network or through the World Wide Web (WWW). The RMI hosts a dedicated, protected internet site that displays a graphical representation of the library.

After establishing a connection to the library, open any HTML browser and enter the IP address of the library.

To access the RMI, you must first set the desired static IP address at OCP or configure to use DHCP.

6.4.2 Operations through the RMI

The following operations are available through the RMI as explained below:

1. Identity

- Viewing the static library identity, Page 66
- Viewing the static drive identity, Page 66
- Viewing the static drive identity, Page 66

2. Status
   - Viewing the dynamic library identity, Page 68
   - Viewing the dynamic drive identity, Page 70
   - Viewing the tape cartridge inventory, Page 70
3. Configuration
   - Changing the System Configuration, Page 71
   - Changing the Drive configuration, Page 73
   - Changing the Network configuration, Page 74
   - Setting Date/Time, Page 77
   - Setting error Log mode, Page 78
   - Setting event for Email Notification parameters, Page 79
   - Restoring factory , Page 79
4. Operations
   - Move Media within the library, Page 80
   - Determining current media , Page 81
   - Releasing and replacing , Page 81
5. Service
   - Performing General library , Page 81
   - Determining and updating firmware, Page 82
   - Reboot of the library, Page 83
   - Viewing Library , Page 83
   - Cleaning tape drive(s), Page 84

6.4.3 Status icons as shown by the RMI

Symbol	Description for the status icons
	The green check mark for status <Ok> indicates that the library is fully operational and that no user intervention is required.
	The yellow exclamation point for status <Warning> indicates that user intervention is necessary, but that the library is still capable of performing operations.
	The red x for status <Error> indicates that user intervention is required and that the library is not capable of performing operations.

Table 2 Legend of status icons (RMI)

6.4.4 Login

NOTE

Some options of the RMI take the library offline. This inactive mode can interfere with host-based application software, causing data loss. Make sure the library is idle before attempting to perform any remote operations that will take the library offline.

To login, select the access type and enter the correct password. There are three levels of access:

- Guest
  (standard user level).
- Admin
  (administrator user level).
- Service
  (service user level,. Access by service personnel only).

Each level affects which areas you have access to and what actions you can initiate from those areas.

Details see 6.4.7.7

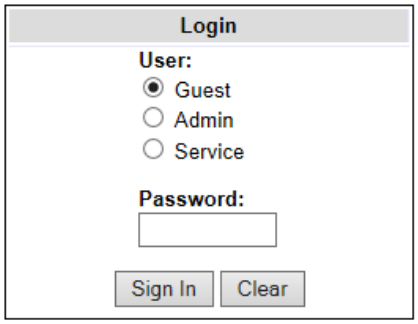


Figure 40 RMI Login

6.4.5 Identity

6.4.5.1 Viewing the static library identity

This page provides access to the static information about the system. No changes can be made from this page.

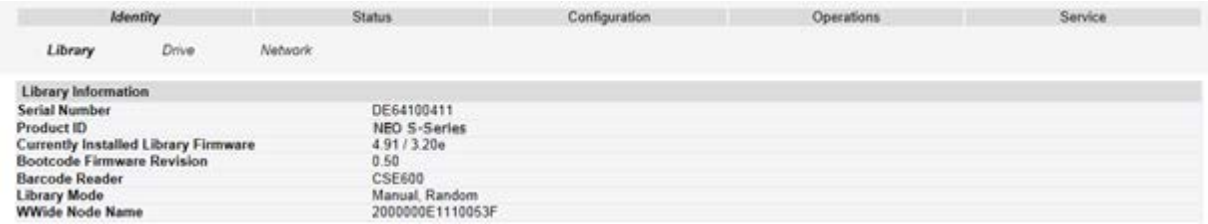


Figure 41 Library identity (RMI)

The following information is displayed:

- Library information:
  - Serial Number
  - Product ID
  - Currently Installed Library Firmware
  - Bootcode Firmware Revision
  - Bar Code Reader
  - WWide Node Name
- Extended Logical Library information's

If the unit has more than one partition, the properties shown in above figure will display for each partition.

6.4.5.2 Viewing the static drive identity

This page provides access to the static information about the drive(s). No changes can be made from this page.

If more than 1 tape drives are installed in the library, the information will be shown by selecting it from the pull down menu.

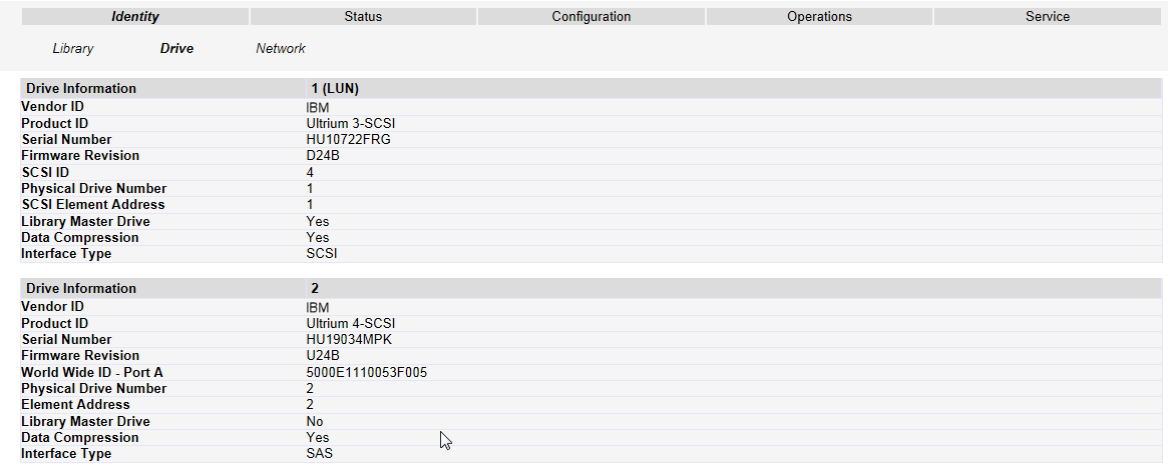


Figure 42 Drive identity (RMI)

The following information is displayed:

Drive information (up to 4 full-high or 8 half-height tape drives):

- Vendor ID= Manufacturer identification of the drive
- Product ID= Model identification of the drive
- Serial Number= Serial number of the drive
- Firmware Revision= Operating firmware level of the drive
- World Wide ID (SCSI ID)= Unique unit identifier of the drive
- Physical Drive Number= Number indicating drives physical position within the library
- Element Address= Number indicating the logical identification of the drive
- Library Master Drive= Indicates if library interface is hosted by drive
- Data Compression= Indicates if drive hardware data compression is enabled
- Interface Type (SAS; SCSI; FC) =Indicates drives physical interface connection style

6.4.5.3 Viewing the network identity

This page provides access to the network information about the connections of the library. No changes can be made from this page.

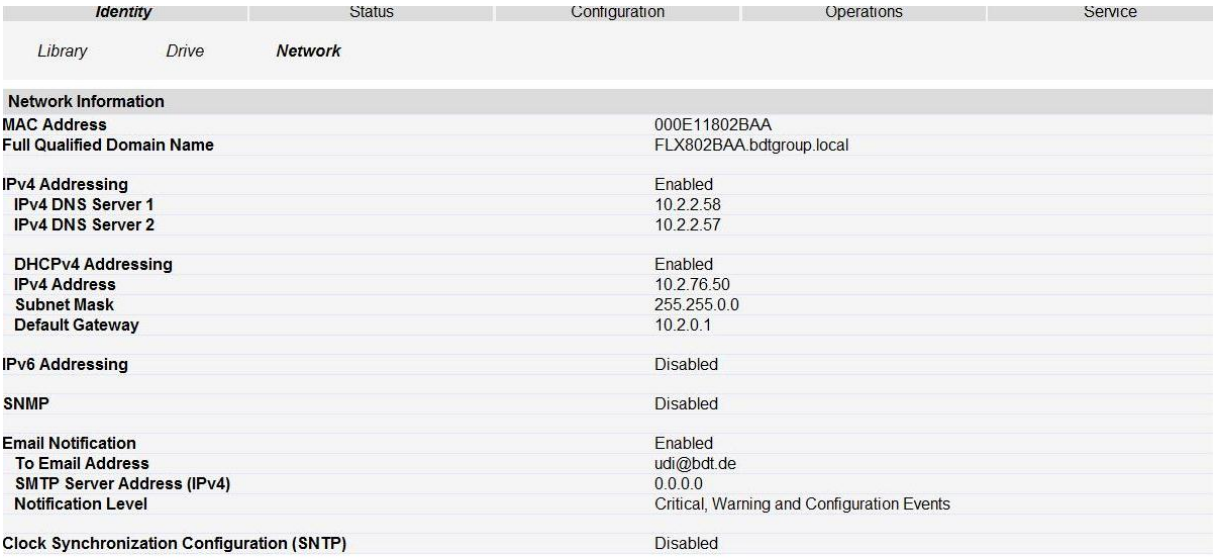


Figure 43 Network identity (RMI)

6.4.6 Status

6.4.6.1 Viewing the dynamic library identity

This page displays the dynamic information about the library, such as the current status of the components.

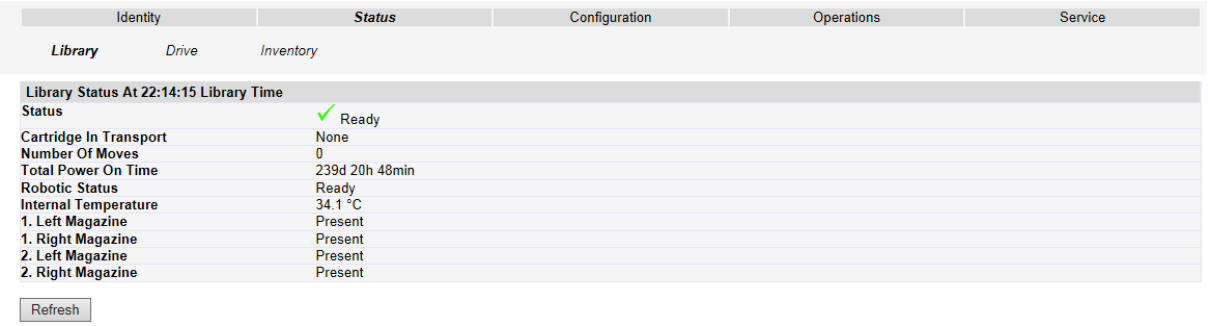


Figure 44 Library status (RMI)

Library status:

- Status =Indicates library is ready to accept commands
- Cartridge in Transport=Indicates robot has a cartridge
- Number Of Moves (Odometer)=Indicates total number of moves
- Total Power On Time= Indicates total library power on time
- Robotic Status=Indicates robot is ready to accept commands
- Internal Temperature= Indicates internal unit temperature in degrees centigrade
- Presence of Magazine(s)= Indicates presence of tape magazines

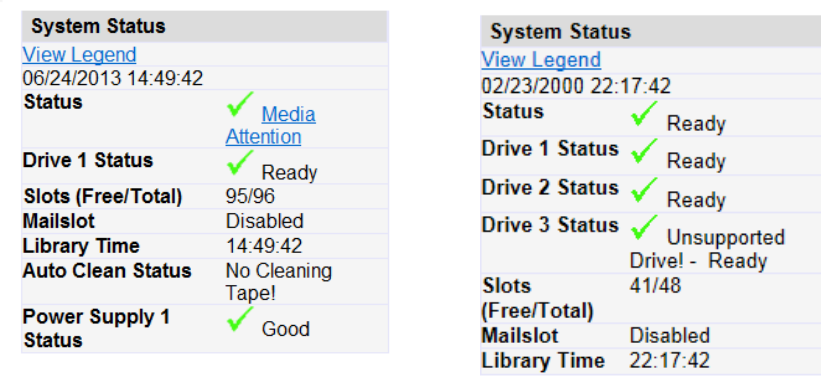


Figure 45 System status (RMI) - 2 examples depending on configuration

System status:

- Status= Overall library status
- Drive Status= Individual drive status (there will be one entry for each installed drive).
- Slots (Free/Total)= Sows the free and total slots of the library
- Mail slot= Indicates if an Import/Export mail slot is configured
- Library Time= Time stamp displayed in 24 hour format
- Auto Clean Status= Only if the Auto Clean Option enabled the status will be displayed here
- Power Supply Status= If optional redundant power supply is installed status will be displayed here

6.4.6.2 Viewing the dynamic drive identity

This page provides detailed information about all drives that are present in the library.

If multiple tape drives are installed in the library, the information will be shown by selecting it from the pull down menu.

The following information is displayed:

Drive status (up to 4 full-high or 8 half-height tape drives):

- Status
- Cartridge in Drive
- Drive Error Code
- Cooling Fan Active
- Drive Activity
- Drive Port (if present)

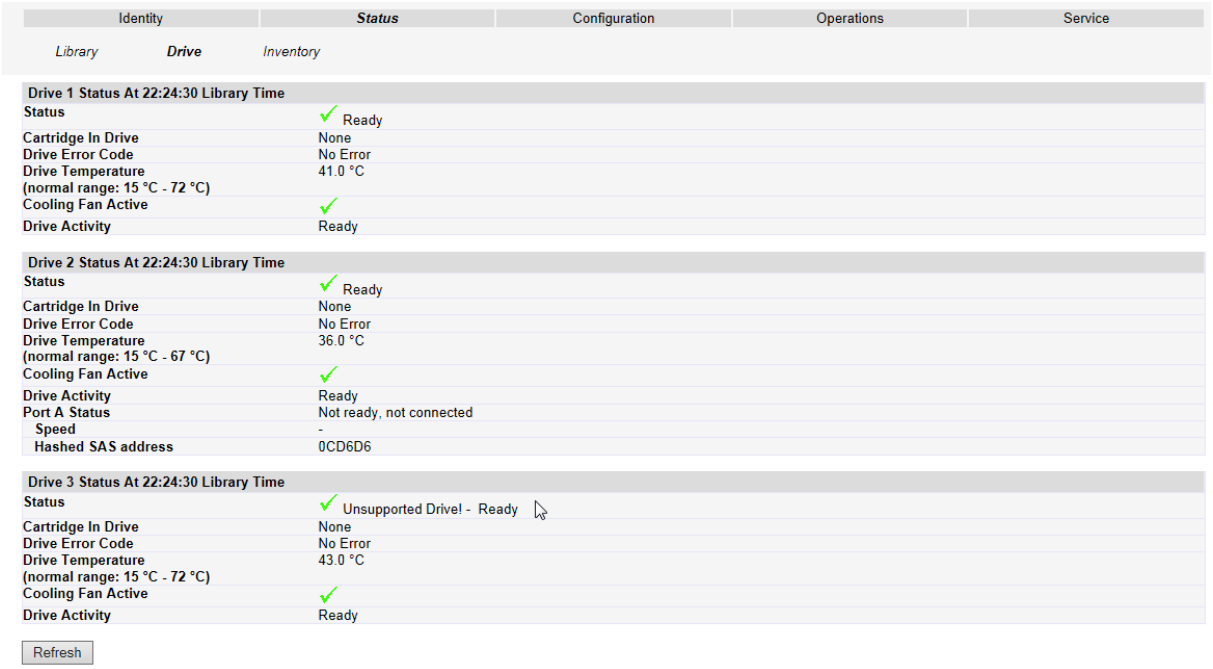
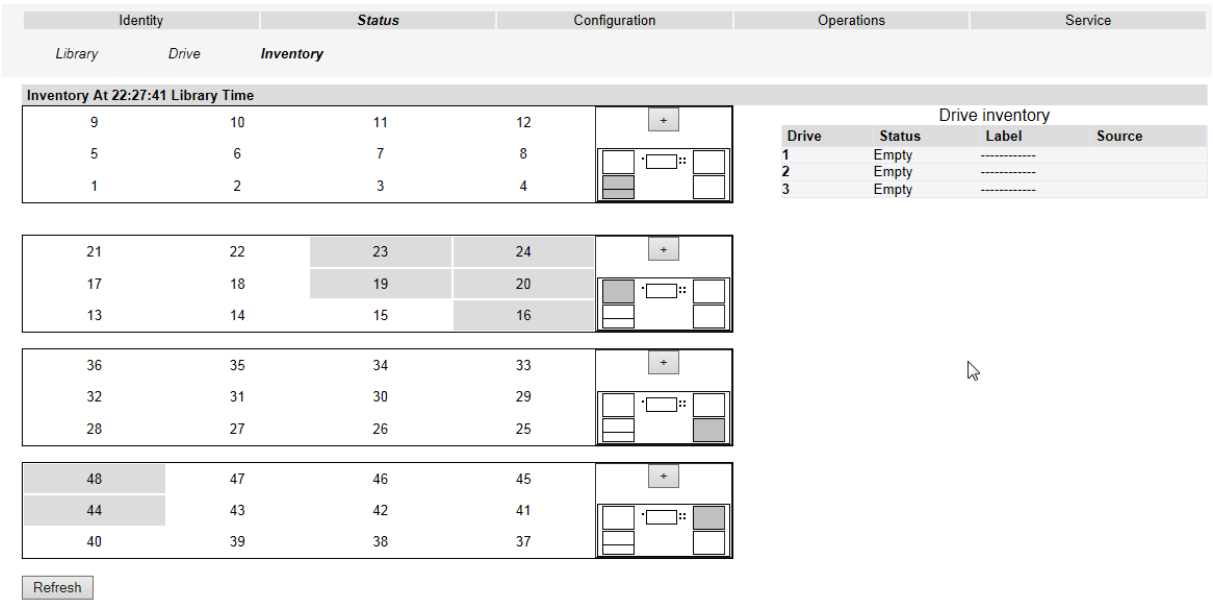


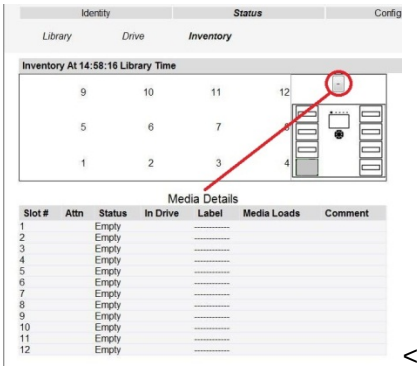
Figure 46 Drive status (RMI)

6.4.6.3 Viewing the tape cartridge inventory

This page provides detailed information about the tape inventory in the library. A summary of each magazine is shown. To get detailed information, click on the <✚> button. This will expand the display for the specified magazine and provide detailed cartridge information.

If more magazines are installed in the library, the information will be shown by selecting it from the pull down menu.





<✚> button activated

Figure 47 Tape cartridge inventory (RMI)

6.4.7 Configuration

6.4.7.1 Changing the System Configuration

This page allows the user to change the system configuration.

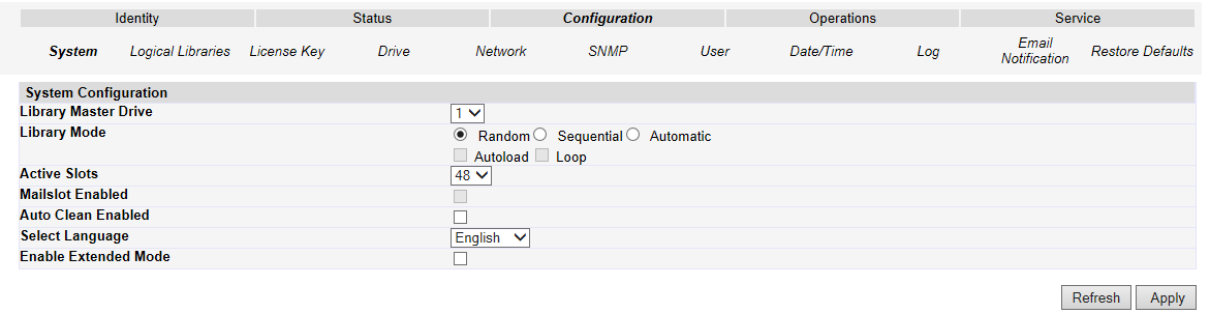


Figure 48 System Configuration (RMI)

The following information is displayed:

1 Library Master Drive = The drive number the library LUN will be hosted by (appear as a LUN of)

2 Library Mode

Specifies the library mode for the library. The library supports three behavior modes: Random, Sequential, and Automatic.

- <Random> In random mode, the library does not automatically load tapes into the tape drives. The random mode is used with a full featured or a robotics-aware backup application and is the most common mode of operation.
- <Sequential> In sequential mode, the library automatically loads and unloads tapes from the tape drive. The sequential mode is used when the backup software is not robotics-aware or was designed for standalone drives only.
- <Automatic> This is the default mode. In automatic mode, the library switches from sequential mode into random mode when it receives library SCSI commands through its unique LUN ID.

  In sequential mode, the user can set the <Loop> and <Autoload> options. In the auto load mode, the library automatically loads the tapes from the lowest-numbered full slot into the tape drive. In loop mode, the original first tape in the sequence is reloaded after the library has cycled through all available tapes.

3 Active Slots

In this field the user can select the number of slots in the library that are available to the backup software.

4 Mail slot Enabled

Enabling the mail slot in the library will reduce the total number of storage slots.

5 Auto Clean Enabled

When auto clean is enabled, the library automatically loads a cleaning cartridge when a tape drive needs to be cleaned. The library identifies a tape as a cleaning tape if it has a bar code label that starting with CLN or after an unlabeled cleaning tape has been loaded into the tape drive.

6 Select Language:

The select language menu allows the user to specify the language displayed by the RMI. The default display language is English. Possible alternate language selections are German, Italian, Spanish, and French. In order for the selection to take affect the desired language must be selected in the drop down menu and the apply button pushed. The web screen must then be refreshed.

7 Enable Extended Mode.

Is for use with the hardware based library extender option, which is not applicable for OEM's.

Changes will only be applied after the <Apply> button is selected.

After selecting, a warning page will inform the user of the impact of their proposed change. In some cases, a pop-up screen will ask the operator to confirm their change. Many changes will also require a reboot.

6.4.7.2 Logical Libraries

The logical libraries drop down allows the user to partition one library into smaller “logical libraries”. Each logical library must contain at least one tape drive. For information on this feature please see section 8.6

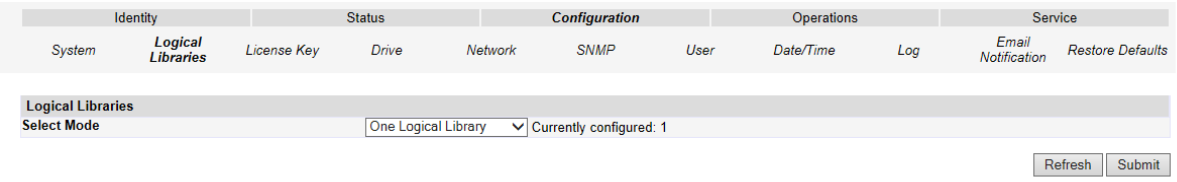


Figure 49 Logical Libraries (RMI)

6.4.7.3 Changing the License Key configuration

This page allows the user to add additional functionality to the unit by entering license key information. Please contact your supplier to see if this functionality is applicable in your model.

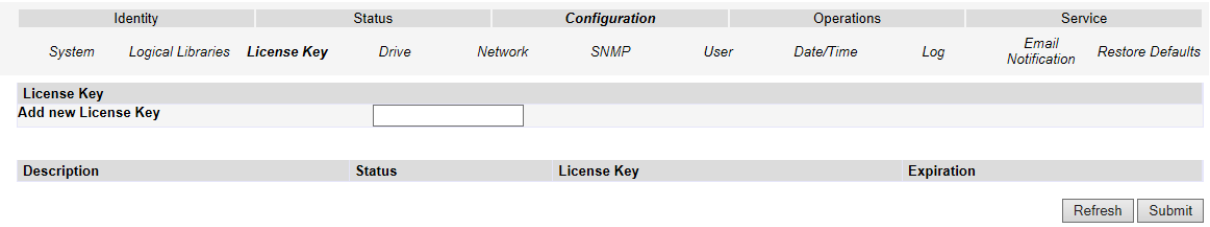


Figure 50 License key (RMI)

6.4.7.4 Changing the Drive configuration

This page shows the current configuration of all tape drives in the library and allows modification to the configuration. The user is also able to select the <Power On> check box through this page that activates the drive. In the following figure example tape drive are shown. Drive ID can be changed by using the drop down menu and selection of another ID. By pressing <Submit> the id is changed.

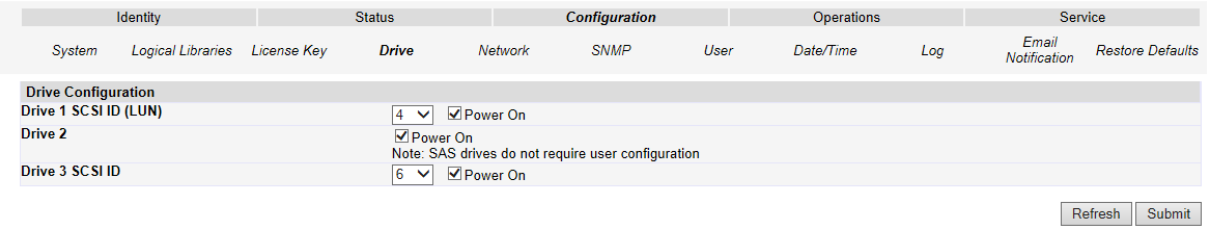


Figure 51 Drive configuration (RMI)

6.4.7.5 Changing the Network configuration

This page shows the current network configuration of the library related to the RMI access and allows modification to the configuration. When a change is requested, a pop-up window will ask to confirm the changes. Changes in this menu may affect the ability to access the RMI unless the correct IP address is resolved.

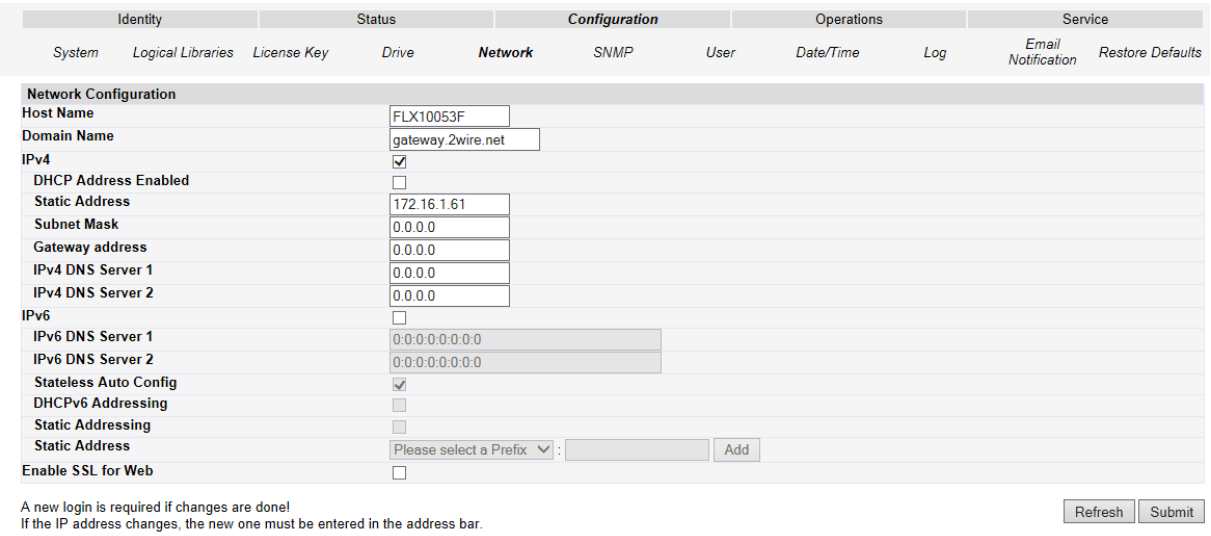


Figure 52 Network configuration (RMI)

Changes that can be made are:

- Host Name: In this box enter the name you wish to use to use to address this library in the future. It is recommended that you use a name that is relevant to its location and or its purpose.

  The Host Name may be up to 15 characters long.
  allowed characters are: [A-Z], [a-z], [0-9], hyphen [-] and period [.]
  not allowed characters are: hyphen [-] as the first character, blanks or consecutive hyphens [-]

- Domain Name: In this box is the domain the library is registered in and may be updated by editing the name and submitting the changes.

  The Domain Name may be up to 39 characters long.

  - allowed characters are: [A-Z], [a-z], [0-9], hyphen [-] and period [.]
  - not allowed characters are: hyphen [-] as the first character, blanks or consecutive hyphens [-], blanks or consecutive hyphens [-] as the first or last character of a label (A period [.] is the delimiter of domain name labels!)

  The sum of characters of the Host Name and the Domain Name may not exceed 15+39=54 characters.

- IPv4
  - DHCP Address Enabled-Used to set the RMI to seek an assigned IP address from the network's DHCP server.
  - Static Address-This field is only active with DHCP address off (unchecked), a static IP address may be programmed in this field.

  - Subnet Mask-Used to set the Network Mask, contact your Network administrator to receive this setting address if required.
  - Gateway address- Used to set the Gateway Address, contact your Network administrator to receive this setting address if required (used when an IP address does not match any other routes in the routing table)
  - IPv4 DNS Server 1 This is the IP address of your name server (DNS server). A DNS server allows the library to communicate with other network clients via their host name. If you have a DNS Server on your network, enter the IP address in this field.
  - IPv4 DNS Server 2 This is the alternate IP address of your name server (DNS server). A DNS server allows the library to communicate with other network clients via their host name. If you have a DNS server on your network, enter the IP address in this field.
  -
- IPv6
  - IPv6 DNS Server 1 This is the IP address of your name server (DNS server). A DNS server allows the library to communicate with other network clients via their host name. If you have a DNS Server on your network, enter the IP address in this field.
  - IPv6 DNS Server 2 IPv4 DNS Server 2 This is the alternate IP address of your name server (DNS server). A DNS server allows the library to communicate with other network clients via their host name. If you have a DNS server on your network, enter the IP address in this field.
  - Stateless Auto Config
  - DHCPv6 Addressing- Used to enable DHCP addressing assignment from network name server
  - Static Addressing-Used to enable a static IP address for the RMI access
  - Static Address- Setting of the static IP address for the RMI
- Enable SSL for Web

6.4.7.6 Changing the SNMP settings

If a host and domain name are entered instead of an address, the IPv4 or IPv6 address will be resolved from the DNS using that name. That address will be stored in the library rather than the name. Therefore, if the address changes, then the name or a new address will have to be entered.

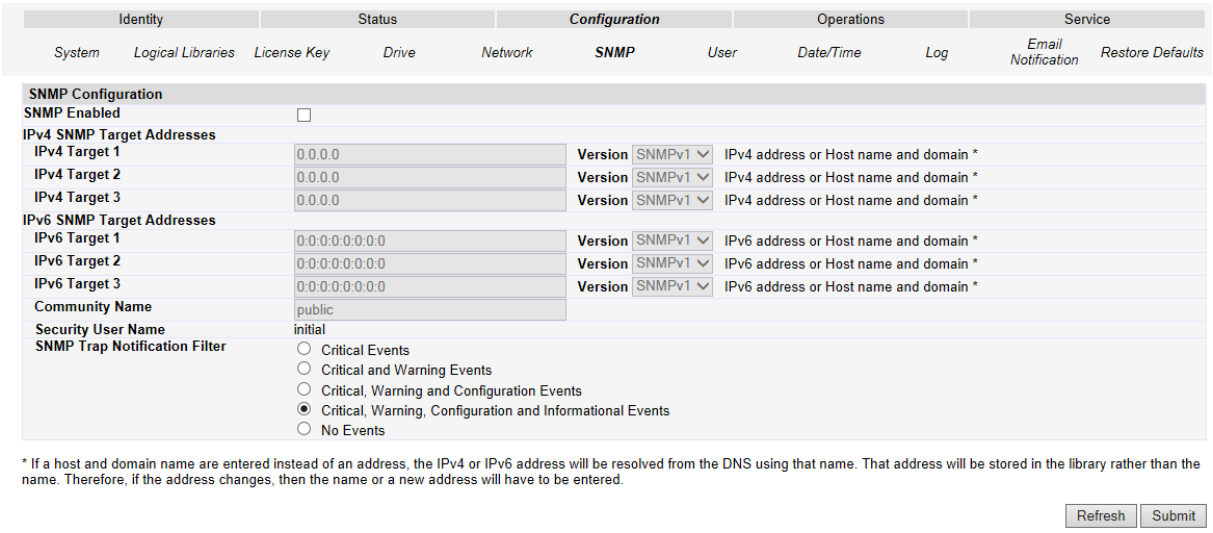


Figure 53 SNMP (RMI)

Changes that can be made are:

- SNMP
- SNMP Enabled
- IPv4 SNMP Target Addresses
  - IPv4 Target 1
  - IPv4 Target 2
  - IPv4 Target 3
- IPv6 SNMP Target Addresses
  - IPv6 Target 1
  - IPv6 Target 2
  - IPv6 Target 3
- Community name
- Security User Name
- SNMP Notification Filter
  - Critical Events
  - Critical and Warning Events
  - Critical, Warning and Configuration Events
  - Critical, Warning Configuration and Information Events
  - No Events

6.4.7.7 Modifying user accounts

This page allows the user to modify the user accounts for the 3 different access levels as follows:

- **Guest:** allows viewing of the tabs status and identity
- **Admin:** allows viewing and modification of all possible entries beside the ones mentioned on Service level

- **Service:** allows viewing and modification of all possible entries incl. on the configuration tab the Trace level and Trace filter selection options. In any other log level these are disabled.

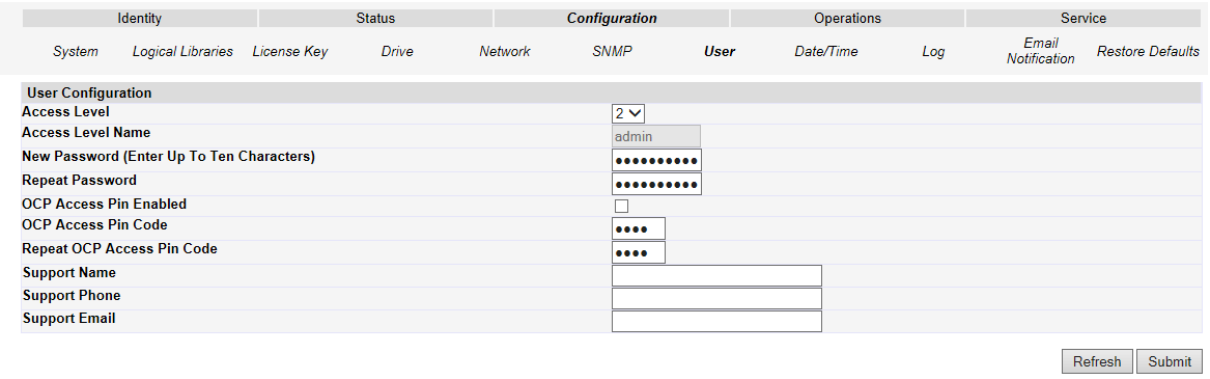


Figure 54 User settings (RMI)

Changes that can be made are:

- Access Level: Choose from 1 (Standard), 2 (Admin), or 3 (Service).
- Access Level Name: The name associated with the chosen access level.
- New Password: The password can be a maximum of ten characters.
- Repeat Password: Enter the new password again.
- OCP Access PIN Enabled: Select this item, if you would like the Operator Control Panel display to be password protected.
- OCP Access PIN Code: The password for accessing the OCP when the OCP Access PIN is enabled; max 4 characters
- Repeat OCP Access PIN Code: Enter the OCP Access PIN Code again.
- Support Name: The name of the individual within your company to contact for RMI or library support; max 30 characters
- Support Phone: The phone number of the individual within your company to contact for RMI or library support; max 30 characters
- Support Email: The email address of the individual within your company to contact for RMI or library support; max 30 characters

6.4.7.8 Setting Date/Time

This page allows the user to set the time and date, and how it will be displayed.

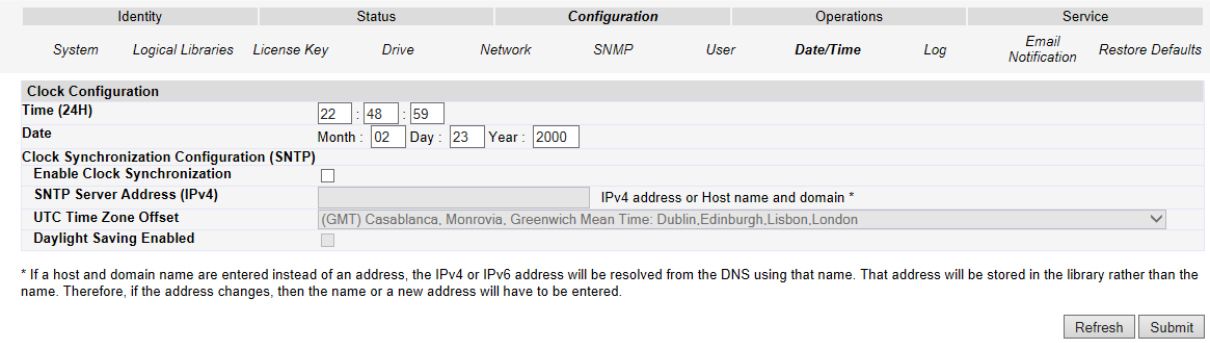


Figure 55 Date/time (RMI)

Changes that can be made are:

Clock Configuration

- Time (24 hour format) : hh:mm:ss
- Date: MM:DD:YYYY
- Clock Synchronization Configuration (SNTP):
  - Enable Clock Synchronization: check box=checked status means enabled and the unit will attempt to synchronize its clock with an external time source, the following apply;
  - SNTP Server Address (IPv4): This is the IP address of the network SNTP time server, also Host name and domain can be used and may be a maximum of 40 characters
  - UTC Time Zone Offset: This drop down menu allows the administrator to select the appropriate time zone offset from so the time is displayed in the actual local time.
  - Daylight Saving Enabled: Provides for automatic offset of daylight savings time

6.4.7.9 Setting error Log mode

NOTE Service personnel can only set the log configuration.

The Log menu can be used to set behavior of the error log collection. Your service personal may ask you to alter settings in this field during the diagnostic process. Default setting of logs is for continuous collection of logs with the most recent events overwriting the oldest events (circular buffer).

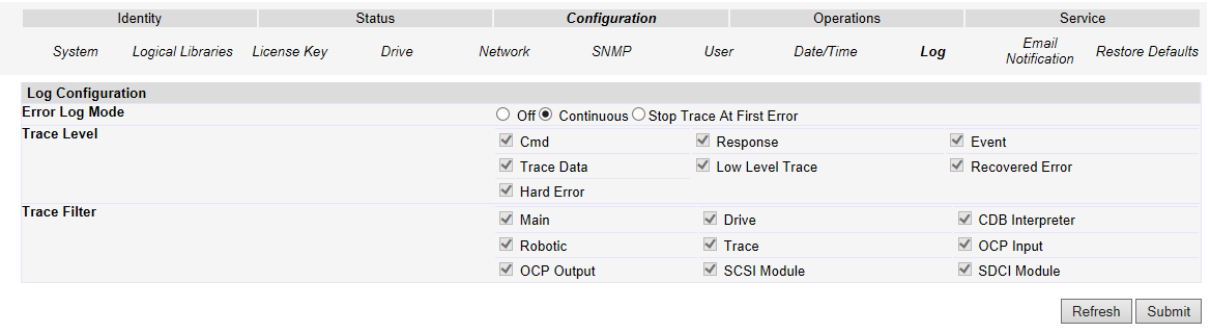


Figure 56 Error Log mode (RMI)

Selections that can be made are:

- Error Log Mode
- Trace Level
- Trace Filter

6.4.7.10 Setting event for Email Notification parameters

This page allows the user to modify the event notification parameters.

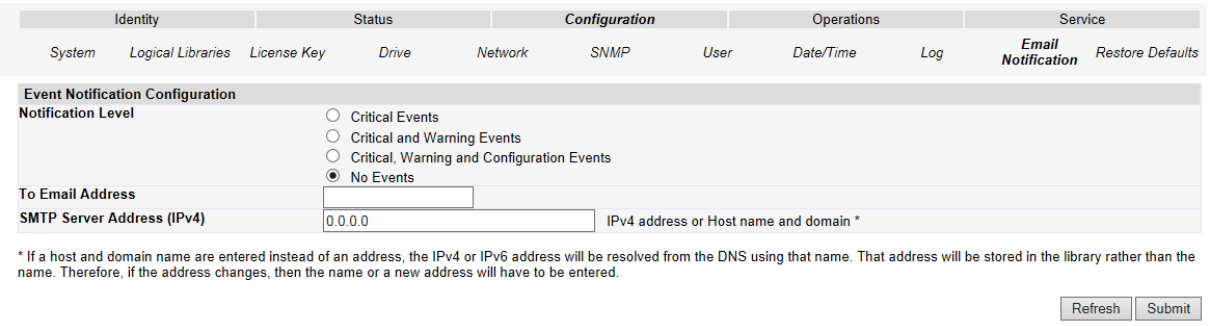


Figure 57 Event for Email Notification (RMI)

Changes that can be made are:

- Notification Level: Critical / Warning / Configuration events
- To Email Address: max 40 characters
- SMTP Server Address: IPv4 address or Host name and domain

6.4.7.11 Restoring factory Defaults

This page allows the user to reset the configuration to the factory defaults, restore vital product data, and save vital product data.

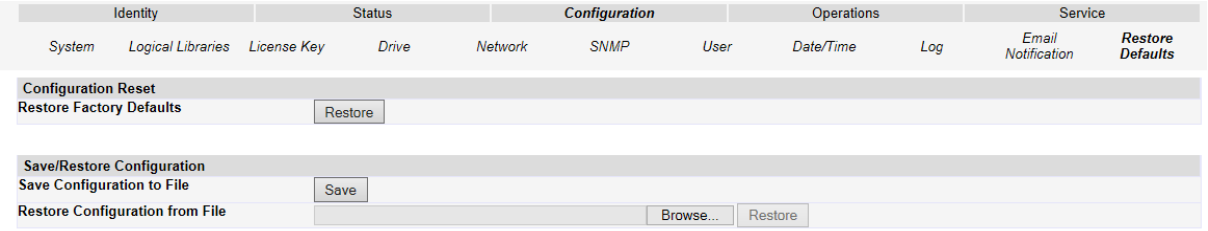


Figure 58 Factory defaults (RMI)

Selections that can be made are:

Configuration Reset

- Restore factory defaults: Selection of this button will restore all factory default settings as outlined in section 8.7. Please note that OEM library applications may require operational settings which differ from the factory default settings. Please consult your system vendor to verify proper operational settings of the unit after a restore to factory defaults.

Save/Restore Configuration

- Save Configuration to File: The save configuration button will save the current library settings to a file which can later be uploaded back to the library to restore the settings. Library configuration files have a ".dbb" file extension with a file name format structure consisting of the unique 10 character library unit serial number followed by a space, followed by a date time stamp formatted "YYMMDDTTTT" (YY= last two digits of current year, MM = month number, DD = date, TTTT= Hour/minute time stamp (24 hour time format)).
- Restore Configuration from File: The restore configuration allows the administrator to use the browse button to select a path to a previously generated configuration file. Once the correct file is located the restore button is used to upload the file back to the library

6.4.8 Operations

6.4.8.1 Move Media within the library

This page allows the user to move tape cartridges within the library.

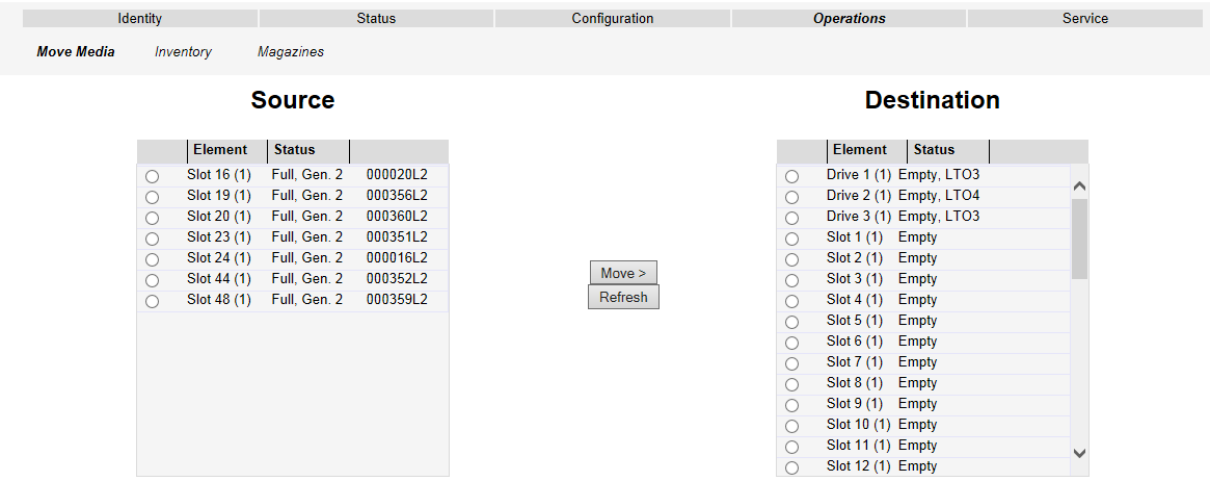


Figure 59 Move media (RMI)

Select the source and destination and then click the <Move> button to move a tape cartridge.

6.4.8.2 Determining current media Inventory

This page allows the user to rescan the library to determine the current media inventory.

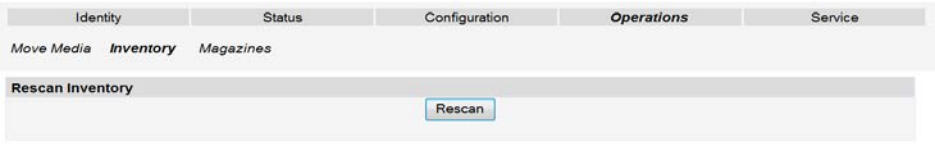


Figure 60 Media Inventory (RMI)

Inventory scan will only be applied after the <Rescan> button is selected.

6.4.8.3 Releasing and replacing Magazines

This page allows the user to release the right or left magazine(s) from the library. All magazines will be released for the side selected.

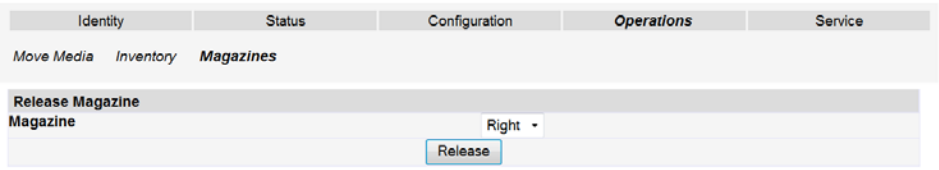


Figure 61 Release magazines (RMI)

Select the magazine in the pull down menu and then click the <Release> button.

NOTE

To release a magazine manually, see **Chapter** Error! Reference source not found.**, Page** Error! Bookmark not defined..

This manual process should only be used if the magazine cannot be released using the OCP or the RMI.

6.4.9 Service

6.4.9.1 Performing General library Diagnostics

This page provides the system administrator with general tests to verify the usability and reliability of the library.

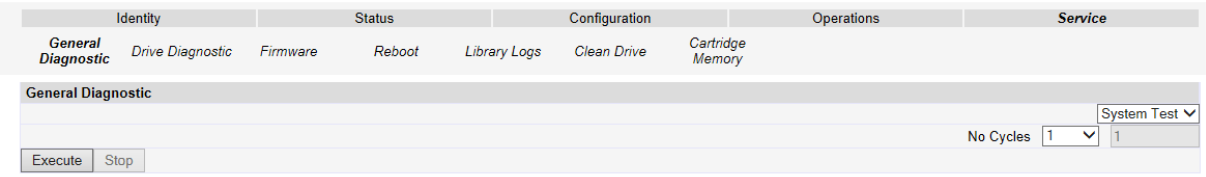


Figure 62 Library diagnostics (RMI)

Selections that can be made are:

- System Test
- Slot To Slot Test

Selects the number of test cycles (No Cycles) before starting the test. To cancel the test before it completes the cycles, select the <Stop> button.

6.4.9.2 Performing Drive Diagnostics

This page provides to the Admin / Service level information about general tests, that verify the usability and reliability of the drive(s).

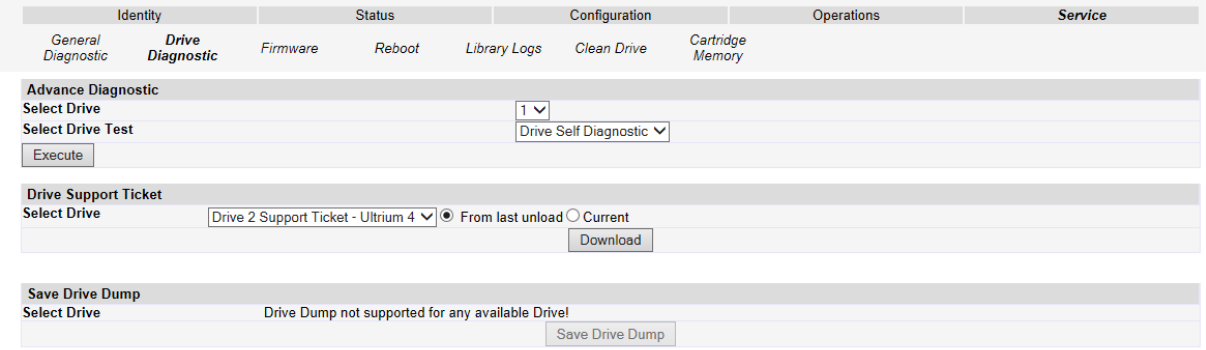


Figure 63 Drive diagnostics (RMI)

Selections that can be made are:

- Advance Diagnostic: Select Drive# and Select Drive Test possible
- Drive Support Ticket: Select Drive# and choose last / current unload
- Save Drive Dump: Select Drive (once defined)

6.4.9.3 Determining and updating firmware

NOTE After a firmware upgrade, the system restarts automatically.

This page displays the current library and for all drives the firmware versions. Firmware can be downloaded to the host then uploaded to the drive in the library by using this page. Once a FW is selected by browsing it can be loaded by the update button.

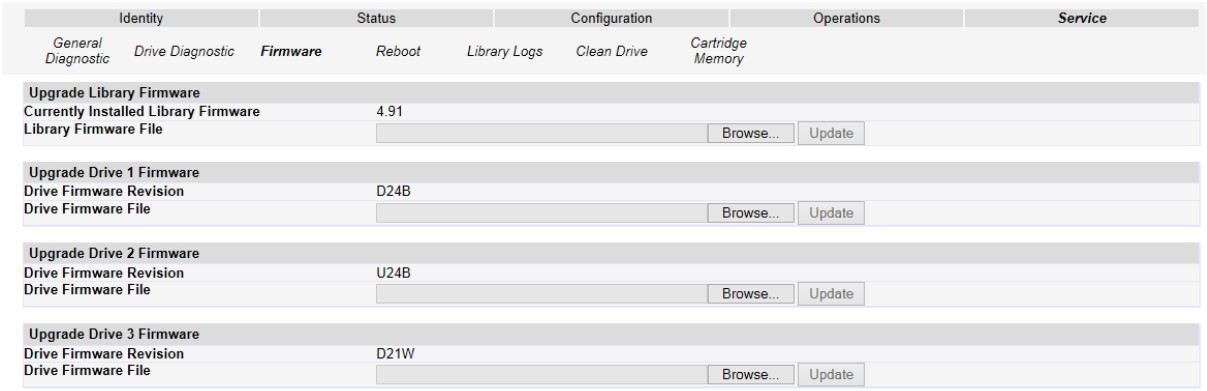


Figure 64 Firmware (RMI)

6.4.9.4 Reboot of the library

NOTE

Ensure that the library is idle before attempting to perform any remote operations that will take the library offline.

Some options of the RMI take the library offline. This inactive mode can interfere with host-based application software, causing data loss.

This page is used to perform a library reboot. There is a default time delay when the web page refreshes itself. This time should be sufficient to reload the page. During a reboot, the connection to the library may be lost. If the connection is lost, the user will have to reload the page manually.

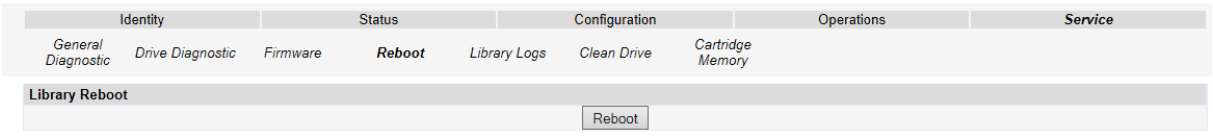


Figure 65 Reboot the library (RMI)

6.4.9.5 Viewing Library Logs

This page allows the user to view the library logs.

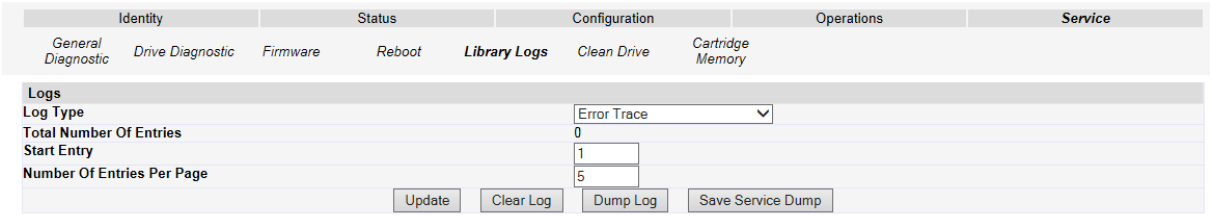


Figure 66 Library logs (RMI)

Select the appropriate logs for:

- Log Type:
  - Error Trace
  - Informational Trace
  - Warning Trace
  - Configuration Change Trace
  - Standard Trace
- Total Number Of Entries
- Start Entry
- Number Of Entries Per Page

Changes will only be applied after the <Update> button is selected. <Clear Log> erases the log.

<Dump log> creates the log and <Save Service Dump> allows the direct viewing or saving of the file.

6.4.9.6 Cleaning tape drive(s)

This page allows the user to manually clean the tape drive.

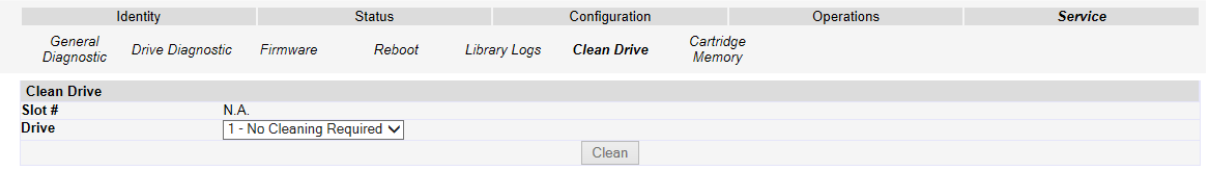
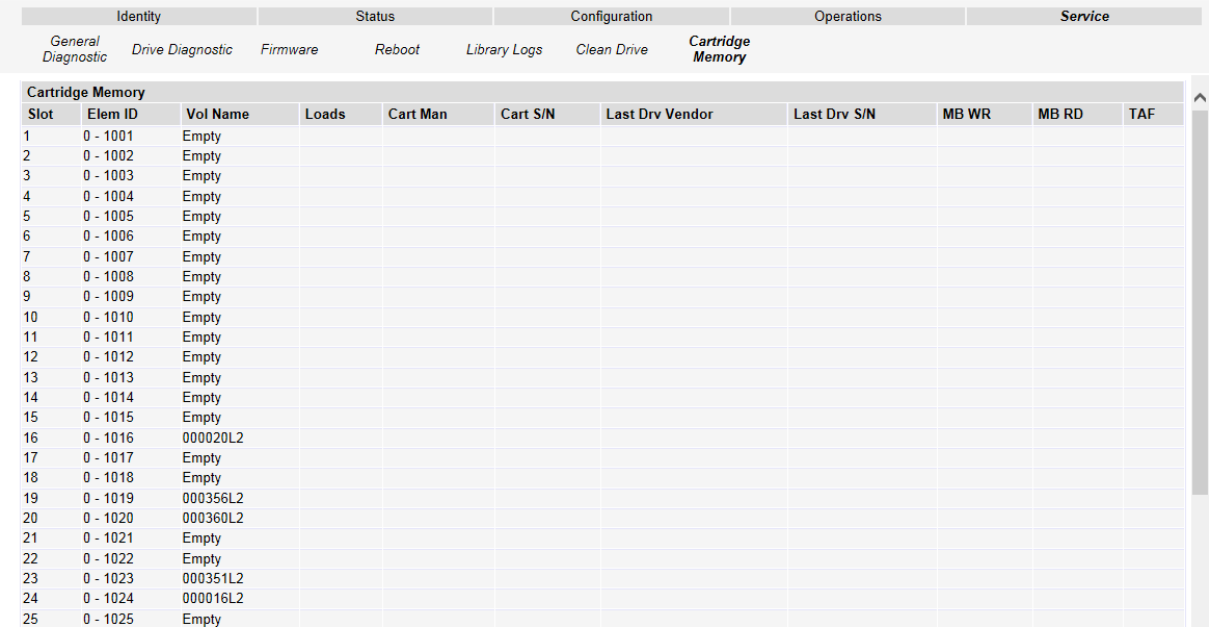


Figure 67 Clean a tape drive (RMI)

Select the magazine slot number and the tape drive in the appropriate pull down menu and then click the <Clean> button.

6.4.9.7 Cartridge Memory

Provides details of up to 96 tapes stored in the library.



Cartridge Memory

Slot	Elem ID	Vol Name	Loads	Cart Man	Cart S/N	Last Drv Vendor	Last Drv S/N	MB WR	MB RD	TAF
1	0 - 1001	Empty								
2	0 - 1002	Empty								
3	0 - 1003	Empty								
4	0 - 1004	Empty								
5	0 - 1005	Empty								
6	0 - 1006	Empty								
7	0 - 1007	Empty								
8	0 - 1008	Empty								
9	0 - 1009	Empty								
10	0 - 1010	Empty								
11	0 - 1011	Empty								
12	0 - 1012	Empty								
13	0 - 1013	Empty								
14	0 - 1014	Empty								
15	0 - 1015	Empty								
16	0 - 1016	000020L2								
17	0 - 1017	Empty								
18	0 - 1018	Empty								
19	0 - 1019	000356L2								
20	0 - 1020	000360L2								
21	0 - 1021	Empty								
22	0 - 1022	Empty								
23	0 - 1023	000351L2								
24	0 - 1024	000016L2								
25	0 - 1025	Empty								

Figure 68 Cartridge Memory (RMI)

6.5 Partitioning the library

Depending on the unit form factor, the number of drives present in the library and the utilized drive types it is possible to create up to 4 logical libraries (partitions). The logical libraries resource allocation is magazine related; this means the number of available slots correlates to the magazine borders (12 slots per magazine).

When two half-height drives are installed in a 2U library, the library firmware will support partitioning in the same way that the 4U supports partitioning with two full-high drives today. The first partition will contain the first magazine and the first drive. The second partition will contain the second magazine and the second drive. The mail slot (if configured as I/O) will be shared between the logical libraries.

6.5.1 Drive naming

When one or more half-height drives are added to a 4U library, the drive naming will change. Currently, the first full-high drive is "Drive 1" and the second full-high drive is "Drive 2".

When you consider that each full-high drive slot may contain one or two half-height drives, there are four potential drives in the space that used to occupy two.

The first half-height drive position, or the first full-high drive position, will be called "Drive 1".

The second half-height drive position will be called "Drive 2".

The third half-height drive position, or the second full-high drive position, will be called "Drive 3".

The fourth half-height drive position will be called "Drive 4".

6.5.2 Mixing of drives

The 4U library supports a mix of drives from different LTO generations in the same physical library and the same logical library. They also support a mix of SAS and FC interfaces in the same physical library and the same logical library.

Configuration of a 1-Partition-System

Contains any drives present in any drive position, and it will contain all four magazines.

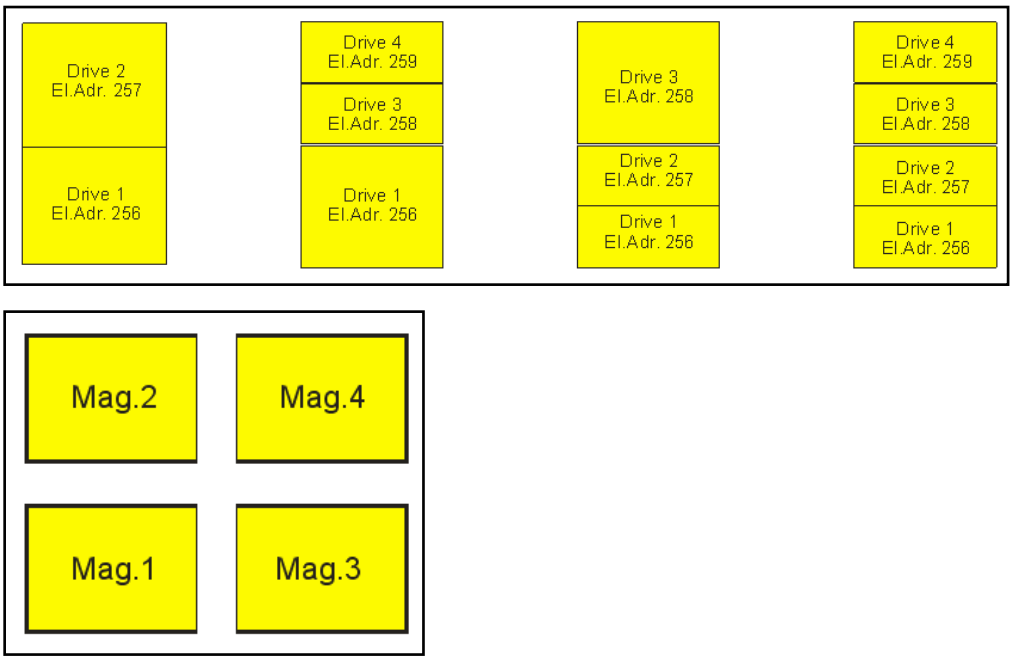


Figure 69 1-Partition-System (drives and correlated magazines)

Configuration of a 2-Partiton-System

The library must have at least two drives installed. One drive must be installed in either drive position 1 or drive position 2, and another drive must be installed in either drive position 3 or drive position 4.

Partition 1 will contain any drives in drive position 1 and drive position 2. Partition 1 will also contain magazine 1 and magazine 2.

Partition 2 will contain any drives in drive position 3 and drive position 4. Partition 2 will also contain magazine 3 and magazine 4.

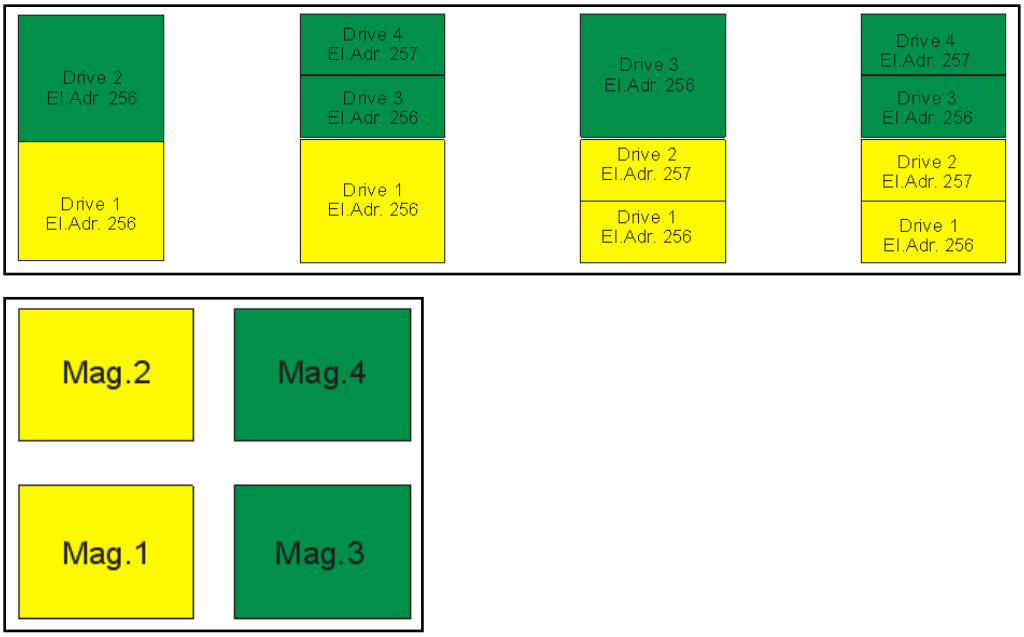


Figure 70 2-Partition-System (drives and correlated magazines)

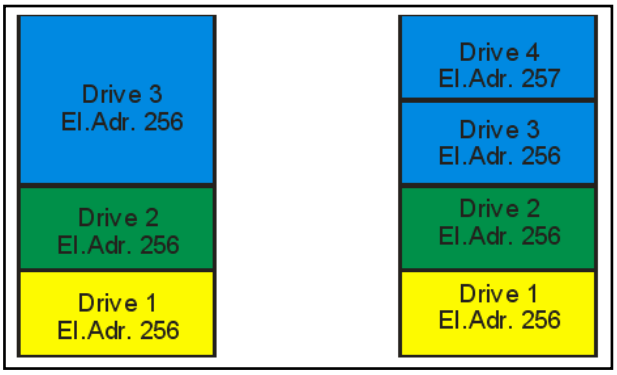
Configuration of a 3-Partition-System

Must have at least three drives installed. A drive must be installed in drive position 1, another drive must be installed in drive position 2, and another drive must be installed in either drive position 3 or drive position 4.

Partition 1 will contain the first drive and the first magazine.

Partition 2 will contain the second drive and the second magazine.

Partition 3 will contain any drives in drive position 3 and drive position 4. Partition 3 will also contain magazine 3 and magazine 4.



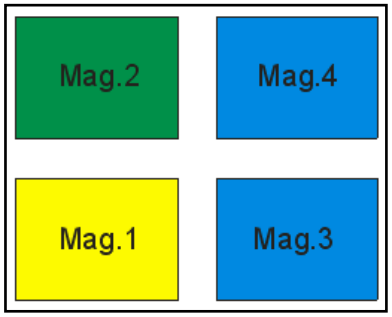


Figure 71 3-Partition-System (drives and correlated magazines)

Configuration of a 4-Partition-System

Must have four drives installed. Each partition will contain one drive and one magazine.

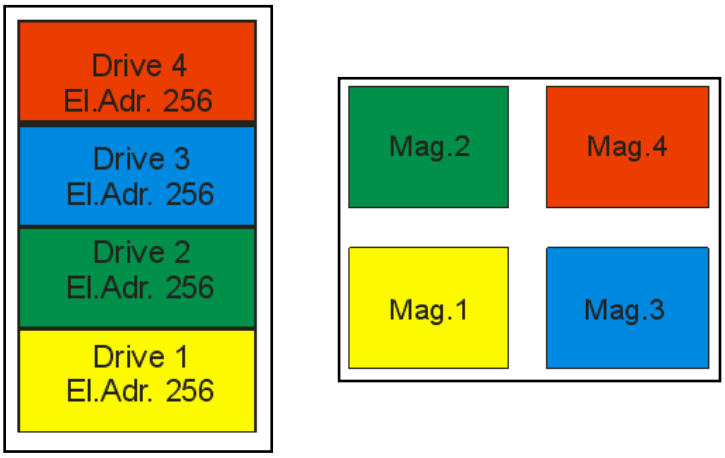


Figure 72 4-Partition-System (drives and correlated magazines)

6.5.3 SCSI element addressing

General Addressing Scheme

Every logical library starts at the first drive slot with the current assigned element start address (default value 256). It will be incremented from bottom to the top slots for every drive slot.

NOTE

The addresses used in the samples are the default addresses which are valid after manufacturing or after a “Reset to Default”. The described behavior and algorithms are also valid for different SCSI base addresses which can be changed by SCSI SMC command.

4U Unit with only FH drives (1 logical library)

SCSI Element	Slot
2	4
	3
1	2
	1

4U Unit with FH & HH drives (1 logical library)

SCSI Element	Slot
3	4
	3
2	2
1	1

6.5.4 Element reporting

The SCSI specification does not allow gaps in the SCSI element addressing. There is a special handling needed for drive slots, which are empty to fulfill the specification. Also drives which are temporary removed needs to be handled correct to not confuse the attached host and host application.

6.5.4.1 General Reporting

Generally, only drives are reported which are currently physically available or “temporary” removed. Empty slots, which are located at an edge, should not be reported, with an exception in case of a “removed” condition.

4U Unit with 3 HH drives

SCSI Element	Slot
	4
3	3
2	2
1	1

6.5.4.2 Gaps

A drive slot, which does not contain a drive and has a position between used slots, will not be reported.

4U Unit with 3 HH drives

SCSI Element	Slot
3	4
	3
2	2
1	1

In case of installing a drive in a gap, the SCSI elements will be renumbered in contiguous order without a gap.

4U Unit with 3 HH drives

SCSI Element	Slot
4	4
3	3
2	2
1	1

6.5.4.3 Removed Drives

Removed drives will report a SCSI element, which is not accessible until one of the following conditions occurs::

- A drive is inserted again in the drive slot

After this happens, the SCSI element will be reported again as accessible

- A “Reset to Default” from any UI occurs
- The logical library configuration changes (adding / removing of libraries)

After these conditions the slots will be handled as empty slots all data of removed drives are cleared.

6.6 Default settings

Setting	Default for the library
Initial admin password	adm001
Host name	Test88
Domain name	TestXXX.de
IPv4	Enabled
IPv6	Disabled
DHCP	Disabled
Mail slot configuration	Disabled
Configure reserved slots	Reserved slots = 0
SCSI master drive	The lowest physical drive is initially the LUN master drive.
OCP contrast setting	10
Library Mode	Automatic
Auto load	Disabled
Loop	Disabled
Drive power <ON/OFF>	All drives are powered <ON>
Auto clean	Disabled
SNMP	Disabled
FC tape drives	Automatic speed, auto topology
Log Tracing Configuration	All selected
Email notification	No events
Partitioning	Partitioning is turned <OFF>

Table 3 Default settings

7 Acronyms and Abbreviations

FC	Fibre Channel
FH	Full Height
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

8 Technical specifications

8.1 Hardware specifications

Form factor	1U	2U	4U
Height	Product alone: 45.6 mm Packaged: 235 mm	Product alone: 87.6 mm Packaged: 248 mm	Product alone: 175,2 mm Packaged: 330 mm
Width	Product alone: 444.5 mm Packaged: 589 mm	Product alone: 447.5 mm Packaged: 598 mm	Product alone: 447.5 mm Packaged: 585 mm
Depth	Product alone: 789.5 mm Packaged: 989 mm	Product alone: 740 mm Packaged: 993 mm	Product alone: 740 mm Packaged: 990 mm
Weight without media	1 HH drive unit: 11.4 kg	1 FH drive unit: 14.7 kg 2 HH drive unit: 15.6 kg	1 FH drive unit: 21,3 kg 2 FH drive unit: 24,3 kg 1 HH drive unit: 22,2 kg 4 HH drive unit 26,1 kg

Weight with media	1 HH drive unit: 13.1 kg	1 FH drive unit: 20.2 kg 2 HH drive unit: 21.1 kg	1 FH drive unit: 30,6 kg 2 FH drive unit: 33,6 kg 2 HH drive unit: 31,4 kg 4 FH drive unit: 35,3 kg

Table 4 Hardware specifications

8.2 Operating environment

Operating	Temperature	10°C to 35°C
	Max. temperature rise	10 °C / hour
	Humidity	20 % RH to 80 % R.H. (non-condensing)
	Maximum wet bulb	26 °C
	Max. humidity rise	10% / hour
	Altitude operating	0 to 10.000 ft. (3000 m) at 25 °C ambient
Non-Operating Storage and Shipping	Temperature	-30 °C to +60 °C
	Max. temperature rise	20°C / hour
	Humidity	10 % RH to 90% RH (non-condensing)
	Altitude	-22 to 33000 feet (-7 m to 10000 m)

Table 5 Operating environment

8.3 Maximum storage capacity and data transfer rate

Characteristics	**Specification**

NEO S-Series tape library with LTO4 drive(s)	
Maximum storage capacity (8/24/48/96 data cartridges)	Native: 6,4/19,2/38,4TB Compressed: 12,8/38,4/76,8TB (assuming 2:1 compression)

Maximum data transfer rate (single drive)	Native: 120 MB/s (432 GB/h) Compressed: 240 MB/s (864 GB/h) (assuming 2:1 compression)
Interface (drive dependent)	3 GB/s SAS 4 GB/s FC

NEO S-Series tape library with LTO5 drive(s)	
Maximum storage capacity (8/24/48/96 data cartridges)	Native 12/36/72 TB Compressed: 24/72/144 TB (assuming 2:1 compression)
Maximum data transfer rate (single drive)	Native: 140 MB/s (504 GB/h) Compressed: 280 MB/s (1,0 TB/h) (assuming 2:1 compression)
Interface (drive dependent)	6 GB/s SAS 8 GB/s FC

NEO S-Series tape library with LTO6 drive(s)	
Maximum storage capacity (8/24/48data cartridges)	Native 25/77/144 TB Compressed: 64/192/384TB (assuming 2,5:1 compression)
Maximum data transfer rate (single drive)	Native: 210 MB/s (756 GB/h) Compressed: 525 MB/s (1,9 TB/h) (assuming 2,5:1 compression)
Interface (drive dependent)	6 GB/s SAS 8 GB/s FC

Table 6 Maximum storage capacity and data transfer rate

9 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

9.1 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.

9.2 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 megaohm (± 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.

10 Regulatory Information

NOTE To comply with the following regulations and standards, the library must be properly installed in an office or industrial environment with shielded cables and adequate grounding of the SCSI bus and the input power.

10.1 Recycling and disposal

NOTE Disposal of waste equipment by users in private household in the European Union and Norway.

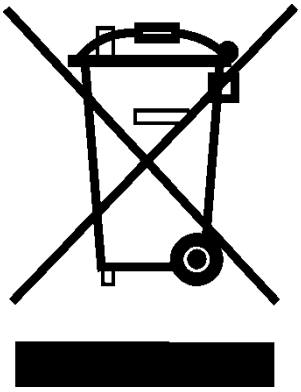


Figure 73 WEEE symbol

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.

10.2 Device standards

- ANSI Small Computer System Interface-2 (SCSI-2), X3.131 – 1994
- ANSI SCSI-3 Primary Commands, X3.301 - 1997
- ANSI Information and Technology. SCSI-3 Medium Changer Commands (SMC), NCITS.314:1998
- ANSI SCSI Parallel Interface-2 (SIP-2), X3.302:1998
- IEC 60297 Rack Standards

Standard Countries	European Community	CE scheme according to EN/IEC 60950
	USA/Canada	FCC, ETL according to UL 60950

10.3 CE mark

Figure 74 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.

10.4 ETL mark

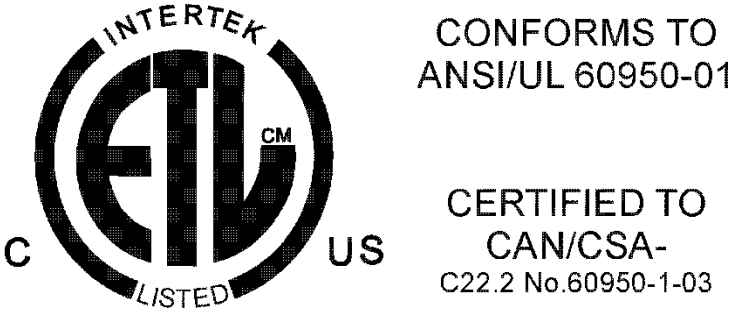


Figure 75 ETL mark

The ETL mark is alternative to the UL and CSA marks in the USA. This mark is issued by Intertek. This mark shows that your product meets all the appropriate safety and performance specifications for your market of sale (generally identical to the standards set by UL and CSA).

10.5 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.

Figure 76 FCC mark

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.

10.6 Canadian verification

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