Sun StorageTek™ SL24 Tape Autoloader and SL48 Tape Library

User and service guide

Sun microsystems

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About this guide

This guide provides information about:

- Installing a Sun StorageTek™ SL24 Tape Autoloader or SL48 Tape Library
- Configuring and operating a Sun StorageTek™ SL24 Tape Autoloader or SL48 Tape Library
- Troubleshooting a Sun StorageTek™ SL24 Tape Autoloader or SL48 Tape Library
- Upgrading and servicing a Sun StorageTek™ SL24 Tape Autoloader or SL48 Tape Library

Intended audience

This guide is intended for system administrators and other users who need physical and functional knowledge of a Sun StorageTek™ SL24 Tape Autoloader or SL48 Tape Library.

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Blue text:Table 1	Cross-reference links and e-mail addresses
Blue, underlined text: http://www.sun.com	Website addresses
Bold text	• Keys that are pressed • Text entered into a GUI element, such as a box • GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes
Italic text	Text emphasis
`Monospace` text	• File and directory names • System output • Code • Commands, their arguments, and argument values
`Monospace, italic` text	• Code variables • Command variables
`Monospace, bold` text	Emphasized monospace text

⚠ **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.

Rack stability

Racks must be stable to insure the safety of personnel and avoid equipment damage.

⚠ WARNING!

To reduce the risk of personal injury or damage to equipment:

- Extend leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- In multiple-rack installations, fasten racks together securely.
- Extend only one rack component at a time. Racks can become unstable if more than one component is extended.

Sun technical support

Telephone numbers for worldwide technical support are listed on the Sun support website: http://www.sun.com/service/contacting/solution.html.

Collect the following information before calling:

- SunSpectrum contract number
- Product serial numbers
- Product model names and numbers
- Error messages
- Operating system type and revision level
- Detailed questions

For continuous quality improvement, calls may be recorded or monitored.

Sun websites

For additional information, see the following Sun websites:

- http://www.sun.com — Sun corporate website
- http://www.sun.com/storagetek/tape_storage — Sun storage products
- http://www.sun.com/service/contacting/solution.html — Sun Support website
- http://www.sun.com/app/docs — documentation about Sun products

1 Features and overview

The Sun StorageTek™ SL24 Tape Autoloader and SL48 Tape Library provide compact, high-capacity, low-cost solutions for simple, unattended data backup. This unique design houses up to 12 tape cartridges for each U of height, with easy access to tape cartridges via removable magazines and one or more mailslots (see Table 2). Each magazine can hold up to 12 tape cartridges.

The Autoloader and Library are compatible with most operating systems. However, the Autoloader and Library require either direct support from the operating system or a compatible backup application to take full advantage of their many features.

The Autoloader and Library are customer expandable with exchangeable tape drives. The Autoloader and Library support the LTO-2 HH parallel SCSI tape drive, and the LTO-3 FH SCSI and Fibre Channel tape drives.

Table 2 Autoloader and Library capacity

	SL24	SL48
Form factor	2U	4U
Maximum cartridge slots	24	48
Mailslots	0, 1	0, 3
Maximum full-height tape drives	1	2
Maximum half-height tape drives	2	4
Maximum storage capacity: LTO-2 media	Native: 4.8 TB (24 x 200 GB) Compressed (2:1): 9.6 TB	Native: 9.6 TB (48 x 200 GB) Compressed (2:1): 19.1 TB
Maximum storage capacity: LTO-3 media	Native: 9.6 TB (24 x 400 GB) Compressed (2:1): 19.1 TB	Native: 19.1 TB (48 x 400 GB) Compressed (2:1): 38.2 TB

Maximum data transfer rates are shown in Table 3 and Table 4.

Table 3 LTO-2 HH Autoloader and Library specifications

Characteristic	Specification
Tape drive	LTO-2, half-height parallel SCSI
Maximum data transfer rate — one drive	Native: 24 MB/s (86 GB/hr.) Compressed 2:1): 48 MB/s (172 GB/hr.)
Maximum data transfer rate — two drives	Native: 48 MB/s (172 GB/hr.) Compressed (2:1): 96 MB/s (344 GB/hr.)
Maximum data transfer rate — three drives	Native: 72 MB/s (256 GB/hr.) Compressed (2:1): 144 MB/s (516 GB/hr.)
Maximum data transfer rate — four drives	Native: 96 MB/s (344 GB/hr.) Compressed (2:1): 192 MB/s (688 GB/hr.))

Table 4 LTO-3 FH Autoloader and Library specifications

Characteristic	Specification
Tape drive	LTO-3, full-height, parallel SCSI and FC
Maximum data transfer rate — one drive	Native: 80 MB/s (288 GB/hr.) Compressed (2:1): 160 MB/s (576 GB/hr.)
Maximum data transfer rate — two drives	Native: 160 MB/s (576 GB/hr.) Compressed (2:1): 320 MB/s (1152 GB/hr.)

Interface specifications and requirements for parallel SCSI drives

The parallel SCSI Autoloader and Library use the SCSI interface types described in Table 5. The Autoloader and Library use a separate SCSI ID for each tape drive, with dual LUNs on the master drive's SCSI ID to control the tape drive (LUN 0) and Library robotic (LUN 1). Sun recommends that each LTO tape drive be put on its own bus when possible.

Table 5 Parallel SCSI model and interface type

Model	SCSI Interface
LTO-2 HH	Ultra 160 SCSI LVD/SE
LTO-3 FH	Ultra 320 SCSI LVD

The parallel SCSI Autoloader and Library incorporate a wide SCSI-2 or SCSI-3 low-voltage differential (LVD) SCSI bus. Make sure your SCSI host adapter or controller supports these standards.

IMPORTANT:

The Autoloader and Library are NOT compatible with a standard differential (Diff) or high-voltage differential (HVD) SCSI bus. Do not put the Autoloader or Library on a narrow (50–pin) parallel SCSI bus because doing so will severely degrade performance.

Parallel SCSI host bus adapters (HBAs)

For optimum performance, place each tape drive on its own parallel SCSI bus with a host bus adapter that can transfer data as fast as the Library can read and write. The HBA must also be supported by your operating system.

- For LTO-3 tape drives, use an Ultra 320 HBA.
- For LTO-2 tape drives, use an Ultra 320 or Ultra 160 HBA.

IMPORTANT:

Do not connect an LTO tape drive to an SE SCSI bus, as it severely degrades Autoloader and Library performance. A single-ended SCSI host bus adapter severely degrades Autoloader and Library performance and limits cable length. Also, if any SE devices are on the SCSI bus, all of the devices on the bus slow down to SE speed, severely degrading performance.

Multiple LUN support

The Autoloader and Library use a single SCSI ID and two logical unit numbers (LUN). LUN 0 controls the tape drive and LUN 1 controls the robotic. The Autoloader and Library require an HBA that supports multiple LUNs. If multiple LUN support is not enabled, the host computer cannot scan beyond LUN 0 to discover the Autoloader or Library. It just sees the tape drive.

RAID controllers, and most on-board HBAs do not support multiple LUNs.

> **IMPORTANT:**
> The Autoloader or Library requires an HBA that supports multiple LUNs, which is also called "LUN scanning."

Default SCSI IDs

The default SCSI ID for parallel SCSI tape drives is managed by the Autoloader or Library. The default SCSI ID for all full-height tape drives is 4.

The default SCSI ID for half-height tape drives depends on the Library model.

- **SL24:** The default SCSI ID of the bottom drive bay is 4 and the default SCSI ID of the top drive bay is 5 as shown in Figure 1.

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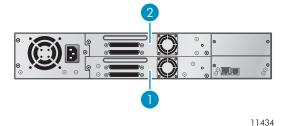
Figure 1 SL24 default SCSI IDs

1. Default SCSI ID 4

2. Default SCSI ID 5

- **SL48:** The default SCSI ID for the bottom drive of each pair is 4 and for the top drive is 5 as shown in Figure 2.

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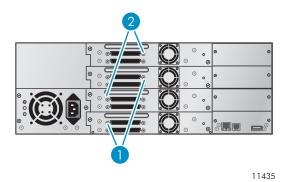
Figure 2 SL48 default SCSI IDs

1. Default SCSI ID 4

2. Default SCSI ID 5

Interface specifications and requirements for Fibre Channel drives

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

If you plan to connect the Autoloader or Library directly to the server, you will need a 2 Gb or 4 Gb Fibre Channel HBA. A 4 Gb HBA is suitable for all supported drive types. A 1 or 2 Gb HBA might result in performance degradation when backing up highly compressible data to a 4 Gb tape drive.

In a SAN installation, all switches between the host and the Autoloader or Library must be of the appropriate type. A 1 or 2 Gb switch in the path may result in performance degradation. Configure zoning so only the backup servers may access the Library.

Front panel overview

The front panel of the Autoloader or Library provides access to the power button, operator control panel, left and right magazines, LEDs, and the mailslot as shown in Figure 3 and Figure 4.

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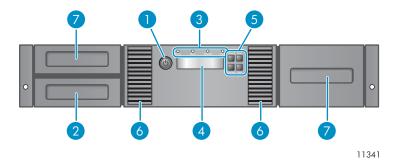
Figure 3 SL24 front panel overview

1. Power button   2. Magazine, mailslot location

3. Front panel LEDs   4. Front panel LCD screen

5. Control buttons   6. Air vents

7. Magazines

11346
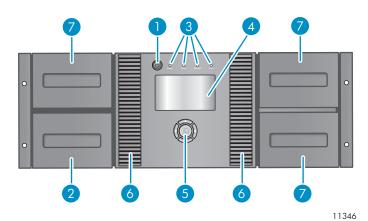
Figure 4 SL48 front panel overview

1. Power button   2. Magazine, mailslot location

3. Front panel LEDs   4. Front panel LCD screen

5. Control buttons   6. Air vents

7. Magazines

The operator control panel includes four LEDs that provide a variety of information as shown in Figure 5.

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Figure 5 Operator control panel LEDs

1. Green   **Ready**. Illuminated when power is on. Blinking when there is tape drive or robotics activity.

2. Amber   **Clean**. Illuminated when the tape drive has determined that a cleaning cartridge should be used. Cleaning is only necessary when the device directs you to do so. Additional cleaning is not necessary.

3. Amber   **Attention**. Illuminated if the device has detected a condition that requires attention by the operator.

4. Amber   **Error**. Illuminated if an unrecoverable error occurs. A corresponding error message displays on the LCD screen (see "Troubleshooting" on page 107 for more information).

Back panel overview

The back panel provides access to the drive interface connectors, the tape drives, the power connector, the Ethernet, serial and USB ports, and the magazine release holes. The Autoloader and Library support parallel SCSI and Fibre Channel tape drives. For example, Figure 6 shows an SL48 with a full-height parallel SCSI tape drives and Figure 7 shows an SL24 with a Fibre Channel tape drive.

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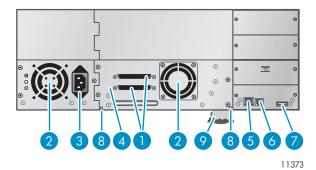
Figure 6 SL48 back panel overview with a full-height parallel SCSI tape drive

1. 68–pin parallel SCSI connector
2. Fan
3. Power connector
4. Tape drive
5. Ethernet port
6. Serial port (Factory use only)
7. USB port
8. Magazine release hole
9. Pull-out tab containing the serial number and other product information

11362
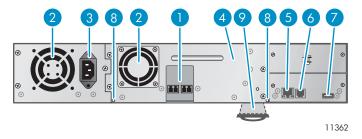
Figure 7 SL24 with a Fibre Channel drive

1. Fibre Channel ports
2. Fan
3. Power connector
4. Tape drive
5. Ethernet port
6. Serial port (Factory use only)
7. USB port
8. Magazine release hole
9. Pull-out tab containing the serial number and other product information

The device requires a 110/220 volt AC power connection.

Tape drive LED

Each tape drive has a green LED, which indicates that the tape drive is powered on (see Figure 8).

To HBA

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Figure 8 Tape drive LED

1. Tape drive LED

Power supply back panel (SL48)

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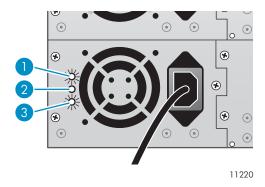
Figure 9 Power supply LEDs

1. Blue   AC power is connected.
2. Yellow   Fan failure. The fan is running too slow or is defective.
3. Green   The power supply is producing good power for the Library.

2 Installing the Autoloader or Library

This chapter contains the information you need to install and configure your Autoloader or Library. The installation steps are:

- Preparing the host
- Planning the SCSI configuration or Planning the Fibre Channel configuration
- Choosing a location
- Unpacking the device
- Identifying product components
- Removing the shipping lock
- Rackmounting the device
- Install additional tape drives
- Installing a redundant power supply
- Connecting the SCSI cable (parallel SCSI devices only)
- Connecting the Fibre Channel cables (Fibre Channel devices only)
- Configuring the device
- Verifying the connection
- Labeling and loading the tape cartridges

Preparing the host

> **IMPORTANT:**
> Use proper procedures to prevent electrostatic discharge (ESD) (see "Appendix: Electrostatic discharge" on page 169). Use wrist-grounding straps and anti-static mats when handling internal components.

Follow these general steps:

- If the host server is connected to a network, check with the system administrator before powering off the computer.
- For parallel SCSI Autoloaders or Libraries, install a parallel SCSI host bus adapter (HBA) that supports multiple LUNs. Refer to the manuals for the host computer and the HBA for installation information. See "Parallel SCSI host bus adapters (HBAs)" on page 16 for HBA requirements.
- For Fibre Channel Tape Autoloaders or Libraries, install an FC host bus adapter (HBA) or verify that you have sufficient ports available on a compatible Fibre Channel switch. See "Planning the Fibre Channel configuration" on page 23 for configuration requirements.
- Install application software and compatible drivers on the host computer. See the application software's manuals for installation and configuration information.
- For parallel SCSI Tape Libraries, make sure multiple LUN support is enabled on the HBA and operating system. See "Multiple LUN support" on page 16.

Planning the parallel SCSI configuration

If your Autoloader or Library only has one tape drive and is the only parallel SCSI device that will be connected to the host computer, skip this section and continue to "Choosing a location" on page 24.

If the host computer will have multiple parallel SCSI devices, you must decide how they will be configured into one or more parallel SCSI busses.

About parallel SCSI busses

A parallel SCSI bus consists of the host bus adapter (HBA), the parallel SCSI devices, the parallel SCSI cables, and the terminators. The HBA and devices are connected in a chain, with each device connected to the next. The last device must have a SCSI terminator. Each device in the chain must have a unique SCSI address (SCSI ID).

Complex devices, such as the Autoloader or Library, assign sub-addresses, called logical unit numbers (LUNs), to different parts of the device. The HBA and operating system must support multiple LUNs, also called LUN scanning, for the application software to operate the Autoloader or Library. Most third-party RAID controllers and many on-board SCSI controllers do not support multiple LUNs.

An HBA might have one or two channels, with each channel supporting one parallel SCSI bus. Check to see how many channels the HBA has and what devices are already connected to the HBA. Some devices, such as parallel SCSI disk drives, could be inside the server.

The devices on a parallel SCSI bus share bandwidth so be careful about which devices you put together on a bus. Also, putting a single-ended (SE) SCSI device on the bus will slow all of the devices on the bus down to SE speed. Check each device's interface specifications to see what kind of parallel SCSI interface it has.

Optimizing throughput

If possible, put each tape drive on its own parallel SCSI bus. Each LTO-3 tape drive must be on its own Ultra 320 SCSI bus. Two LTO-2 tape drives can share an Ultra 320 SCSI bus or each tape drive can be on its own Ultra 160 bus. This will give you the best performance and easiest installation.

If a tape drive must share a parallel SCSI bus with one or more other devices or the Autoloader or Library has multiple tape drives that must share a bus, follow these guidelines to plan your parallel SCSI busses for the highest performance:

- Do not put a tape drive on the same parallel SCSI bus as a disk drive because the system and backup performance will be slow when data is written from the hard drive to tape or from tape to the hard drive.
- Do not put a tape drive on the same parallel SCSI bus as a disk array because the disk and the tape drive performance will be affected, most RAID controllers do not support multiple LUNs, and the data on the disk array could become corrupted.
- Avoid putting an SE SCSI device on the same bus as a tape drive because the SE device will slow the tape drive to SE speed and reduce the allowable cable length.

SCSI addresses
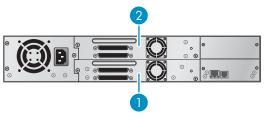
⬚ NOTE:
The HBA also has a SCSI address, which is typically 7.

Verify that each device on the bus has a unique SCSI address.

- **SL24:** For full-height tape drives the default SCSI address is 4. For half-height drives, the default SCSI address for the bottom drive is 4 and the default SCSI address for the top drive is 5 as shown in Figure 10.

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Figure 10 SL24 parallel SCSI tape drive default SCSI addresses

1. Tape drive with SCSI address 4

2. Tape drive with SCSI address 5

- **SL48:** For full-height tape drives the default SCSI address is 4. For half-height drives, the default SCSI address for the bottom drive in each full-height drive bay is 4 and the default SCSI address for the top drive is 5 as shown in Figure 11.

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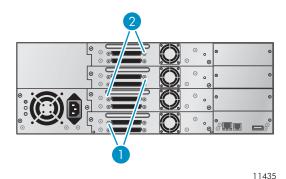
Figure 11 SL48 parallel SCSI tape drive default SCSI addresses

1. Tape drives with SCSI address 4

2. Tape drives with SCSI address 5

If these pre-configured addresses will not be unique on a bus, you will need to change the SCSI address of one or more of the tape drives during the installation process.

Planning the Fibre Channel configuration

You can connect the Library directly to the server with a host bus adapter (HBA) or through a storage area network (SAN) with a switch.

You must provide a Fibre Channel cable for each tape drive in the Autoloader or Library. The tape drive has an LC-style connector.

Each Fibre Channel tape drive in the Autoloader or Library has two Fibre Channel ports. Only one port may be used at a time, but both ports can be connected for path fail over if your application supports path fail over. If you are using only one port, you can use either port.

Direct connection

If you plan to connect the Autoloader or Library directly to the server, you will need a 2 Gb or 4 Gb FC HBA. A 4 Gb HBA is suitable for all supported tape drives. A 1 or 2 Gb HBA might result in performance degradation when backing up highly compressible data to a 4 Gb tape drive.

A server that uses Fibre Channel disks needs at least two FC ports. Using the same port for disk and tape access will cause performance degradation.

SAN connection

All switches between the host and the Autoloader or Library must be of the appropriate type. A 1 or 2 Gb switch in the path may result in performance degradation when backing up highly compressible data to a 4 Gb tape drive.

Configure zoning on the Fibre switch so only the backup servers may access the Library. See the switch manual for information on zoning.

Choosing a location

If you plan to mount the device in a rack, select an open rack location, ideally near the center of the rack or higher, with access to the host server and a power outlet.

If you plan to set the Autoloader or Library on a table installed in the tabletop conversion cover, select a level area large enough to support both edges of the device with access to the host server and a power outlet.

IMPORTANT:

The SL24 Tape Autoloader and SL48 Tape Library must be mounted in the enclosed rack rails or in the optional tabletop conversion cover. Placing the Autoloader or Library on a surface, such as a table top or rack shelf, without the tabletop conversion cover could result in Library errors.

Choose a location that meets the criteria shown in Table 6:

Table 6 Location criteria

Criteria	Definition
Tabletop requirements	The Autoloader or Library can only be placed on a flat surface if it is installed in the optional tabletop conversion cover. Select a location that is flat, sturdy, and close to the host server. Ensure that all of the plastic feet on the tabletop conversion cover will be supported. Do not place the device on the floor or other carpeted surface. Do not place the Autoloader or Library on its sides or upside down, or stack items on top of it.
Rack requirements	Racks with 10–32 threaded holes in the rack column (Sun StorEdge Expansion Cabinet), racks with M6 threaded holes in the rack column (Sun Rack 900 or 1000), racks with 9.5 mm square holes in the rack column (Sun StorageTek Rack)
Rack space requirements	SL24: 2U SL48: 4U
Room temperature	10-35° C (50-95° F)
Power source	AC power voltage: 100-127 VAC; 200-240 VAC Line frequency: 50-60 Hz Place the device near an AC outlet. The AC power cord is the product's main AC disconnect device and must be easily accessible at all times.
Weight without media	SL24: 13.6 kg (29.9 lb) — 15.6 kg (34.3 lb) SL48: 18.6 kg (40.9 lb) — 24.6 kg (54.1 lb)
Weight with media	SL24: 18.4 kg (40.5 lb) — 20.4 kg (44.9 lb) SL48: 28.2 kg (62.0 lb) — 34.2 kg (75.2 lb)
Air quality	The device should be placed 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 drives.
Humidity	20-80 percent relative humidity non-condensing
Clearance	Back: Minimum of 15.4 cm (6 inches) Front: Minimum of 30.8 cm (12 inches) Sides: Minimum of 5.08 cm (2 inches)

Unpacking the Autoloader or Library

Before you begin, clear a level work surface near where you will place the Autoloader or Library.

△ **CAUTION:**

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

Unpacking the Autoloader or Library:

1. Inspect the container for shipping damage. If you notice any damage, report it to the shipping company immediately.

2. Open the shipping container and remove the packaging foam and accessories that cover the device.

3. Lift the device out of the carton, place it on the work surface, and remove the bag from the device.
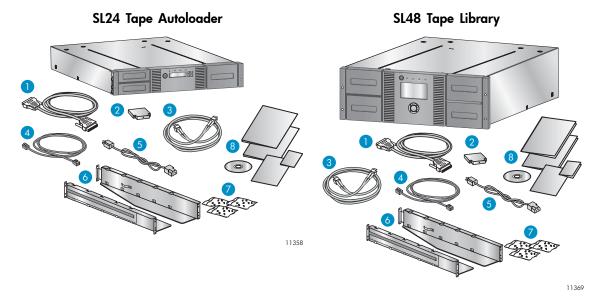
<div align="center">⚠</div> **CAUTION:**

> Do not place the Autoloader or Library on either end or its sides as this may damage it.

4. Remove any other accessories from the shipping container. Save the packaging materials for future use.

Identifying product components

Table 7 Product contents

Confirm that you received the following product components:

1. Parallel SCSI cable (parallel SCSI Libraries — ordered separately)

2. U320 parallel SCSI terminator (one per parallel SCSI drive)

3. Fibre Channel cable (Fibre Channel Libraries — ordered separately)

4. Ethernet cable (ordered separately)

5. Power cord (ordered separately)

6. Two rack rails

7. Three packets of rack hardware: Use the packets for your rack. Each packet is labeled:
   - **Standard rack hardware** packet: used for all rack types. Contains eight screws with washers and four clip nuts.
   - **10–32 threaded-hole rack** packet: used for racks having vertical mounting rails with 10–32 threaded holes in the rack column (Sun StorEdge Expansion Cabinet). Contains eight alignment pins.
   - **9.5 mm square-hole rack** packet: used racks having vertical mountain rails with 9.5 mm square holes in the rack column (Sun StorageTek Rack). Contains eight alignment pins and two clip nuts.

   NOTE:

   The Library or Autoloader can be installed into racks with M6 threaded holes in the rack column, including the Sun Rack 900 and 1000, with only the **Standard rack hardware** packet.

8. Documentation kit

Removing the shipping lock

The shipping lock prevents the robotic transport mechanism from moving during shipment. You must remove the shipping lock before powering on the device. The shipping lock is held in place with a piece of tape and is located in the top center of the device. After the shipping lock is removed, it should be stored on the back panel of the device for future use.

To remove and store the shipping lock:

1. Locate the tape and lock at the top of the device (see Figure 12.

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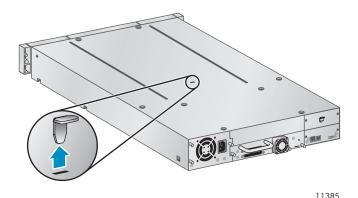
Figure 12 Shipping lock location

2. Remove the tape, then remove the lock.

3. Store the lock on the back panel of the device (see Figure 13).

11424

Figure 13 Shipping lock storage location

Mounting the Autoloader or Library in a rack

If you plan to set the Autoloader or Library on a table or rack shelf, skip ahead to "Installing the Tabletop Conversion Kit" on page 31.

⚠ WARNING!

The SL24 Tape Autoloader weighs up to 15.6 kg (34.3 lb) without media and up to 20.4 kg (44.9 lb) with media (24 cartridges). The SL48 Tape Library weighs up to 24.6 kg (54.1 lb) without media and up to 34.2 kg (75.2 lb) with media (48 cartridges).

When moving the Library, to reduce the risk of personal injury or damage to the Library: 1) observe local health and safety requirements and guidelines for manual material handing, 2) always remove all tapes to reduce the overall weight of the Library, and 3) obtain adequate assistance to lift and stabilize the Library during installation or removal.

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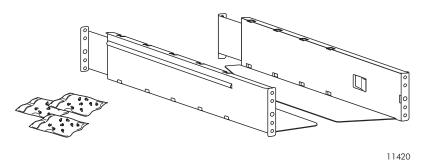
Figure 14 Rack kit

The device easily installs into racks with vertical mounting rails with 10–32 threaded holes in the rack column (Sun StorEdge Expansion Cabinet), M6 threaded holes in the rack column (Sun Rack 900 and 1000), and racks having 9.5 mm square holes in the rack column (Sun StorageTek Rack). You will need a #2 and a #3 Phillips screwdriver, a small flat screwdriver, the two rack rails, the **Standard rack hardware** packet, and the additional hardware packet, if any, for your rack.

- Racks having vertical mounting rails with 10–32 threaded holes in the rack column (Sun StorEdge Expansion Cabinet). You will need the packet of alignment pins marked **10–32 threaded-hole rack**.
- Racks having M6 threaded holes in the rack column (Sun Rack 900 and 1000). No additional hardware packet is needed.
- Racks having vertical mounting rails with 9.5 mm square holes in the rack column (Sun StorageTek Rack). You will need the packet of alignment pins and clip nuts marked **9.5 mm square-hole rack**.

To install the rails into the rack:

1. Customize the rails for your rack.

   Racks with 10–32 threaded holes in the rack column: Use a flat screwdriver to replace the two alignment pins on the front and back of each rail with the pins from the **10–32 threaded-hole rack** packet, as shown in Figure 15.

   Racks with M6 threaded holes in the rack column: Insert a clip nut from the **Standard rack hardware** packet onto the back of the large hole in the front of each rail, as shown in Figure 16.

   Racks with 9.5 mm square holes in the rack column: Use a flat screwdriver to replace the two alignment pins on the front and back of each rail with the pins from the **9.5 mm square-hole rack** packet, as shown in Figure 15. Insert a clip nut from the **Standard rack hardware** packet onto the back of the large hole in the front of each rail, as shown in Figure 16.

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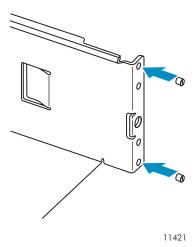
Figure 15 Replacing alignment pins

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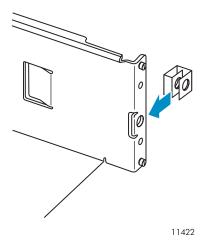
Figure 16 Attaching the clip nut to the rail

2. Using two screws with washers from the **Standard rack hardware** packet and a #3 Phillips screwdriver, secure the front of one rail to the front of the rack, as shown in Figure 17. Extend the rail and secure the back of the rail to the rack using two screws with washers from the **Standard rack hardware** packet. Secure the other rail in a similar manner.

11423
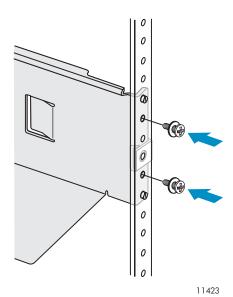
Figure 17 Securing the rails to the rack

3. Skip this step if you are installing an SL24 Autoloader or installing an SL48 Library into a rack with 10–32 threaded holes in the rack column.

    Racks having vertical mounting rails with M6 threaded holes in the rack column (Sun Rack 900 and 1000): On the front of the rack, install one clip nut from the **Standard rack hardware** packet on each side in the location shown in Figure 18. These will be used to secure the Library to the rack.

    Racks having vertical mounting rails with 9.5 mm square holes in the rack column (Sun StorageTek Rack): On the front of the rack, install one clip nut from the **9.5 mm square-hole rack** packet on each side in the location shown in Figure 18. These will be used to secure the Library to the rack.

11425
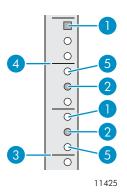
Figure 18 Clip nut location

1. Clip nut location   2. Rail screw location

3. Bottom of the Library   4. U marker

5. Alignment pin location

To install the device on the rails and into the rack:

1. Locate the captive screws on the front bezel (see Figure 19).

2. Slide the device onto the rails.

3. From the front of the device, secure the front bezel to the rack using a #2 Phillips screw driver placed through the small holes in the mounting bracket to tighten the captive screws on each side of the device.

11344
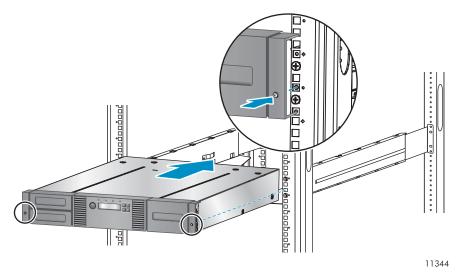
Figure 19 Securing the Tape Autoloader or Library to the rack

Installing the Tabletop Conversion Kit

The Rack to Tabletop Conversion Kit supports the edges of the Autoloader or Library, but is not a structural top.

IMPORTANT:

You may not place any weight on top of the Autoloader or Library, even with the cover installed.

To install the cover:

1. Place the cover on a flat, level surface behind the device.
2. Slide the device into the cover until the front panel of the device is aligned with the cover (see Figure 20).
3. Tighten the captive screws on the front panel until the cover is secure.

11349

Figure 20 Installing the tabletop conversion cover

Installing additional tape drives

If you purchased additional tape drives for the Autoloader or Library, you can install them now or wait until after the Autoloader or Library installation is complete.

To install additional tape drives:

1. Locate an appropriate vacant drive bay on the back of the Autoloader or Library.

- SL24: The Autoloader should have a tape drive in the bottom bay. Install the additional tape drive in the top bay.
- SL48: Install the tape drive in drive bay directly above the existing tape drives. If you leave a space and later add a drive in the space, the new drive will be assigned the next higher drive number, leaving the drives numbered out of order. If the settings are restored to the factory defaults or the Library is power-cycled, the drives will be renumbered and you might need to update the configuration of your backup servers.

Remove the face plate covering the drive bay by removing the screws holding it in place.

2. Holding the tape drive by the handle and supporting it from the bottom, slide the tape drive into the drive bay until it is flush with the back of the Autoloader or Library as shown in Figure 21.

10807

Figure 21 Installing a tape drive
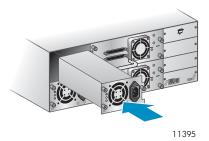
3. Tighten the blue captive screws to secure the tape drive to the chassis.

Installing a redundant power supply

If you have a redundant power supply for the SL48 Tape Library, you may install it now or wait until the installation process is complete.

To install the redundant power supply:

1. Verify that the power to the Library is off and the power cord is not attached.

2. On the back of the Library, locate the second power supply bay, which is right above the existing power supply.

3. Using a Phillips screwdriver, remove the screws that attach the bay cover to the chassis.

4. Position the new power supply on the alignment rails and push it into the Library until it is flush with the back panel, as shown in Figure 22.

11395

Figure 22 Installing the new power supply

5. Tighten the blue thumbscrews by hand to secure the power supply to the chassis as shown in Figure 23.

11263
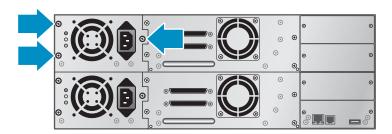
Figure 23 Redundant power supply thumbscrews

Changing the SCSI address (parallel SCSI drives only)

The pre-configured SCSI address for all full-height tape drives is 4. For half-height drives, the bottom drive of any pair has SCSI address 4 and the top drive has SCSI address 5. If these pre-configured addresses will not be unique on a bus, you must change the SCSI ID of one or more tape drives.

To change the SCSI ID:

1. Plug the power cord into the power connector on the back panel and then plug the cord into the power outlet.

2. From the front panel, push the round power button to power on the device.

3. From the front panel, set the new SCSI ID for any drives that must have a different SCSI ID. For the SL24, see "Changing the SCSI address" on page 76. For the SL48, see "Changing the drive SCSI ID (Configuration > Drive Configuration)" on page 98.

4. Power off the device by pushing the power button on the front panel.

Connecting the parallel SCSI cable (parallel SCSI devices only)

📝 **NOTE:**

LTO-3 tape drives are Ultra 320 SCSI LVD devices. Use only cables and terminators specified for Ultra 320 or labeled as MultiMode. LTO-2 tape drives are Ultra 160 SCSI LVD/SE devices; use only cables and terminators specified for Ultra 160 or labeled as MultiMode.

To connect the parallel SCSI cable to the device:

1. Sun recommends that the host server be powered down before attaching new devices.

2. Attach one end of the parallel SCSI cable (included in the accessory package) to one of the connectors on the back panel of the tape drive (see Figure 24).

10777
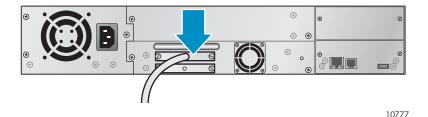
Figure 24 Attaching the parallel SCSI cable to the tape drive

3. Attach the other end of the parallel SCSI cable to the connector on the parallel SCSI host bus adapter or to the connector on the previous device on the parallel SCSI bus.

NOTE:

The host bus adapter should be Low Voltage Differential Signaling (LVDS). An Single-Ended (SE) SCSI host bus adapter works, but severely degrades performance and limits cable length. If any SE devices are on the same parallel SCSI bus, all of the devices on the parallel SCSI bus slow to SE speed, which severely degrades performance. Never attach the LTO-3 tape drive to an SE SCSI bus.

4. Attach the terminator to the remaining parallel SCSI connector on the back panel of the tape drive if the Autoloader or Library is the last or only device on the parallel SCSI bus. Otherwise, attach one end of a parallel SCSI cable to the remaining port and the other end to the next device on the parallel SCSI bus. Make sure the last device on the parallel SCSI bus is properly terminated.

Connecting the Fibre Channel cables (Fibre Channel devices only)

Each tape drive has two FC ports.

NOTE:

Sun recommends that you cable Port A only and that you configure Port B for **Auto Detect** on **Fibre Speed** and **Port Type**.

To connect the Fibre Channel cables to the Autoloader or Library:

1. Remove the FC port caps if necessary. Attach one end of the Fibre Channel cable to Port A on the tape drive as shown in Figure 25.

11207
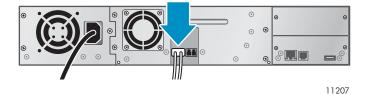
Figure 25 Attaching the Fibre Channel cable

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

Powering on the Autoloader or Library

⚠ **WARNING!**

This product can *only* be used with a Sun-approved power cord for your specific geographic region. Use of an non-Sun-approved power cord may result in: 1) not meeting individual country specific safety requirements; 2) insufficient conductor ampacity that could result in overheating with potential personal injury and/or property damage; and 3) an unapproved power cord could fracture resulting in the internal contacts being exposed, which potentially could subject the user to a shock hazard. Sun disclaims all liability in the event a non-Sun-approved power cord is used.

To power on the Autoloader or Library:

1. Connect an Ethernet cable to a working LAN connection and to the Ethernet connector on the back of the Autoloader or Library.

2. Attach the power cable to the power connector on the back panel of the Autoloader or Library (see Figure 26).

To HBA

10774
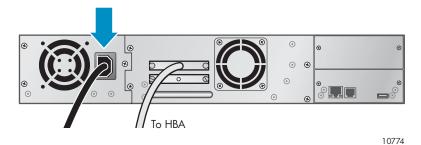
Figure 26 Attaching the power cord

3. Plug the power cable into the nearest properly grounded power outlet.

4. Power on the device using the power button. Check the LCD screen to make sure it has power. If not, check the power connections and your power source. During the Power On Self Test (POST), all four LEDs are illuminated briefly, followed by a flashing **Ready** LED. When the initialization sequence is complete, the Home screen is displayed. If the inventory takes over five minutes, the splash screen is displayed. Press any button to see the Home screen.

5. Plug in the host server and all attached devices.

6. Power on any other devices you powered off earlier.

7. Power on the server.

Configuring the Autoloader or Library

Now that the Library is connected to the host and powered on, configure it for your environment.

To configure the Autoloader or Library from the operator control panel (OCP):

1. Set the administrator password. Setting the administrator password keeps unauthorized people from taking tapes out of the device. You must set the administrator password to manage the device with the remote management interface (RMI). (For the SL24, see "Changing the administrator password" on page 75. For the SL48, see "Changing the administrator password (Configuration > Administrator Password)" on page 99.)

2. Set the date and time. The date and time are used by the Autoloader or Library to record events and should be set during the initial installation process. (For the SL24, see "Setting the date and time" on page 79. For the SL48, see "Setting the Library date and time (Configuration > Set Date/Time)" on page 100.)

3. Configure the network settings. Configuring the networking enables you to monitor, configure, and control most Autoloader or Library functions from the RMI. The device can either get an IP address from a DHCP server or you can set a static IP address. Once you have the IP address, you can manage the device from the RMI. (For the SL24, see "Configuring network settings" on page 79. For the SL48, see "Changing the network configuration (Configuration > Network Configuration)" on page 99.)

4. Configure the Fibre Channel ports (Fibre Channel tape drives only). Sun recommends leaving the Fibre Channel ports at the default settings:

   • Fibre speed: Automatic
   • Port type: Auto Detect

   The drive will choose the appropriate settings. To change the settings from the remote management interface, see "Changing the drive configuration" on page 56. To change the settings from the operator control panel, see "Changing the drive configuration (Fibre Channel drives)" on page 76 for the SL24 or "Changing the drive SCSI ID (Configuration > Drive Configuration)" on page 98 for the SL48.

Verifying the connection

To verify the connection between the host computer and the Autoloader or Library:

1. Install the application software and/or drivers that are compatible with the Autoloader or Library. Backup software packages may require additional software or licensing to communicate with the robotics.

2. Verify the connection between the Autoloader or Library and the host:

   • Confirm that the host server's operating system recognized the device in Microsoft® Windows® XP, Windows® Server 2003 or in Windows 2000® by going to: **Settings > Control Panel > System > Hardware > Device Manager > Tape Drive and/or Media Changer**.

   For more information on verifying the connection of parallel SCSI devices, consult the operating system documentation.

Labeling and loading the tape cartridges

Before using your new Autoloader or Library you must load tape cartridges into the magazines.

To prepare your tape cartridges and load them into the Autoloader or Library:

1. Obtain tape cartridges compatible with your Autoloader or Library. (See "Tape cartridges" on page 37.)

2. Label any unlabeled tape cartridges to improve inventory time. (See "Labeling tape cartridges" on page 38.)

3. Remove one of the magazines from the Autoloader or Library with the RMI or OCP:
   • RMI: see "Releasing and replacing the magazines" on page 63
   • SL24 OCP: see "Unlocking, removing, and replacing magazines" on page 81
   • SL48 OCP: see "Unlocking, removing, and replacing magazines" on page 81
   The Autoloader or Library will not perform any other action while a magazine is out of the device.

4. Insert the tape cartridges into the magazine. (See "Magazines" on page 39.)

5. Slide the magazine into the Autoloader or Library.

6. Repeat steps 2 through 5 for each of the other magazines.

3 Tape cartridges and magazines

This chapter explains which media to use with your Autoloader or 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 Autoloader or Library.

Tape cartridges

Use the Ultrium data and cleaning tape cartridges designed for your model of Autoloader or Library. You can order data and cleaning cartridges at http://www.sun.com/storagetek/tape_storage/tape_media/lto.

> **NOTE:**
>
> The LTO-3 tape drive includes support for 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. WORM data cartridges are clearly identified by their distinctive, two-tone yellow and white cartridge color.

Using and maintaining tape cartridges

> △ **CAUTION:**
>
> **Do not degauss Ultrium 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.

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.
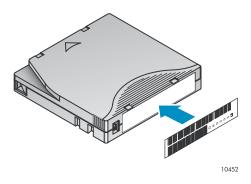
☼ **TIP:**
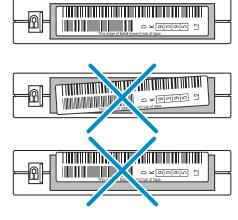
The bar code scanner must scan each tape or the back of the storage slot until it reads the bar code label for the cartridge or storage slot, or determines that the slot is empty. The bar code scanner can identify a properly labeled cartridge on the first scan. It can identify an empty slot on the second scan. It will try several more scans and then tap on the cartridge before determining that an unlabeled cartridge is in the slot, which takes about four times as long as identifying a properly labeled cartridge. Even if you do not need the bar code information, use bar code labels to speed up inventory time.

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)

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

📝 **IMPORTANT:**

The bar code label should only be applied as shown, with the alphanumeric portion facing the hub side of the tape cartridge. Never apply multiple labels onto a cartridge because extra labels can cause the cartridge to jam in a tape drive.

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 (see Figure 27, 1).

- 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 (see Figure 27, 2).

10454
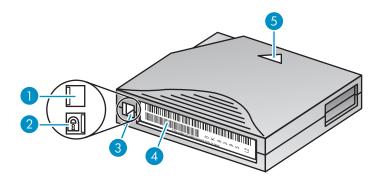
Figure 27 Write-protecting the data cartridge

1. Write-enabled
2. Write-protected
3. Write-protect switch
4. Bar code label
5. Insertion arrow

Backward read compatibility

Table 8 Backward read compatibility

	LTO-1 drive	LTO-2 drive	LTO-3 drive
LTO-1 media	Read/Write	Read/Write	Read only
LTO-2 media	No action	Read/Write	Read/Write
LTO-3 media	No action	No action	Read/Write

Magazines

The device has removable magazines. Magazine access is password protected. For safety reasons, the robotic motion is stopped when a magazine is removed.

The magazines can be released using the operator control panel (OCP), the remote management interface (RMI), or by a manual release. Sun recommends that you release the magazine using the OCP or RMI. The magazine must only be removed manually when the OCP or RMI process has failed, or the device no longer has power.

IMPORTANT:

To manually release a magazine, see "Releasing the magazines manually" on page 122. However, this manual process should only be used if the magazine cannot be released using the operator control panel or the remote management interface.

The slot numbering scheme for the SL24 is shown in Figure 28. For the slot numbering for your Autoloader or Library in its current configuration, see the RMI's "Status: Inventory page" on page 53.

10771
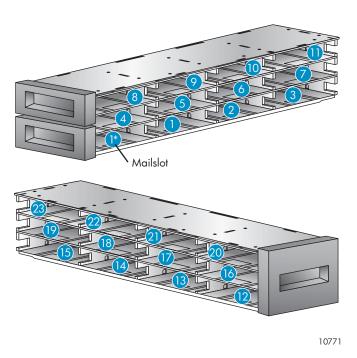
Figure 28 SL24 slot numbering with the single mailslot enabled

* When the mailslot is disabled, the mailslot becomes Slot 1 and all other slots are re-numbered accordingly.

On the SL48, the storage slots are numbered starting with the of the lower-left magazine, as shown in Figure 29.

11387
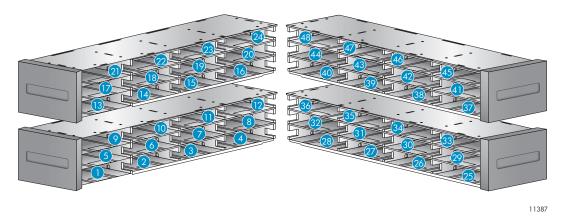
Figure 29 SL48 slot numbering with mailslot disabled

When the SL48 mailslot is enabled, all of the storage slot numbers are adjusted, as shown in Figure 30. The storage slots in the other magazines are renumbered accordingly.

11292
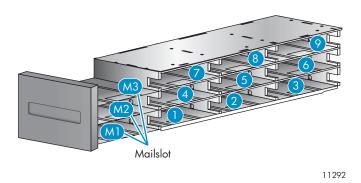
Figure 30 SL48 lower-left magazine slot numbering with mailslot enabled

4 Operating the Autoloader or Library

The Autoloader or Library can be operated by the following methods:

- **Remote management interface (RMI)** — this interface lets you monitor and control the Autoloader or Library from a web page. You can access most Autoloader or Library functions from the RMI.
- **Operator control panel (OCP)** — this interface lets you operate the device from the front panel.
- **Host backup software** — You can perform any functions provided by the backup software.

> **NOTE:**
> The device's network settings must be configured and the administrator password set to use the RMI.

Remote management interface (RMI)

Overview

The remote management interface (RMI) lets you monitor and control your device from any terminal 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 your device.

Before using the RMI, you must configure the device's networking and set the administrator password with the OCP. (See "Configuring network settings" on page 79 and "Changing the administrator password" on page 75.)

To start the RMI, open any HTML browser and enter the IP address of the device in the browser's address bar.

> **TIP:**
> Check the **Help** screens in the RMI for additional information. The help pages are updated with most firmware updates and often contain technical details that are not contained in this document. To access RMI help, click **Help** on the right side of the Web page banner, as shown in "Getting help" on page 46.

The following functions are available through the remote management interface:

- "Identity " on page 46
  - "Viewing static device information" on page 46
  - "Viewing static drive information" on page 47
- "Status" on page 50
  - "Viewing dynamic device information" on page 50
  - "Viewing dynamic drive information" on page 51
  - "Viewing the tape cartridge inventory " on page 52
- "Configuration" on page 54
  - "Changing the system configuration" on page 54
  - "Changing the drive configuration" on page 56
  - "Changing the network configuration" on page 58
  - "Changing the administrative password" on page 58
  - "Setting date/time" on page 59

Login

To login, select the **Account Type**, enter a password if required, and then click **Sign In**. See Figure 31.

Figure 31 RMI login page

The Account Types are:

- • User — no password is required (leave the password box blank).
- • Administrator — the administrator password is required. The same administrator password is used for the RMI and OCP. There is not a default administrator password; the administrator password must be set with the OCP before it can be used with the RMI. If the administrator password is lost, contact Sun technical support to generate a temporary password that will grant administrator access.
- • Service —**access to this level is by Service personnel only.** The service password is set at the factory. The same service password is used for the RMI and OCP.

The user login provides access to the Identity and Status options, but not the Configuration, Operations, and Support options. Administrator level provides access to all screens except for the Log configuration and Service screens.

Status pane

The System Status pane (see Figure 32) shows the current device and drive status. The System Status pane for the SL48 also shows the power supply status.

System Status	
View Legend	
Updated: Wednesday,3/28/2007 10:37:07	
Library Name	DEMO4048
Status	✅ Ready
Drive 1 Status	✅ Ready
Slots (Free/Total)	43/48
Mailslot	Disabled
Library Time	06-28-00 01:48

Figure 32 System Status pane

The System Status pane displays the following:

- Updated time — the day, date, and time of the most recent status view. This timestamp comes from your computer and may be different from the Autoloader or Library Time at the bottom of the pane. Click your browser's reload button to refresh the system status.
- Autoloader or Library Name — the name of the device, which was set in the Configuration: System screen.
- Status of the Autoloader or Library and tape drives

> ✅   The green **Status Ok** icon indicates that the device is fully operational and that no user intervention is required.

> ❗   The blue exclamation point **Status Warning** icon indicates that user intervention is necessary, but that the device can still perform most operations.

> ❌   The red X **Status Error** icon indicates that user intervention is required and that the device is not capable of performing some operations.

- Slots (Free/Total) — **Free** is the number of empty storage slots. **Total** is the number of storage slots available to the host software, which does *NOT* include reserved slots.
- Mailslot — shows whether the mailslot is open, closed, or disabled.
- Autoloader or Library Time — the date and time from the Autoloader or Library, which can be set from the OCP or RMI. The Autoloader or Library Time is updated when the system status is refreshed. The time of the most recent refresh is the Updated time at the top of the pane. If you call Service to request a temporary administrator password, refresh the system status with your browser reload button and then give the service engineer this Autoloader or Library Time.
- Power Supply Status (SL48 only)
  - Good. The power supply is functioning correctly.
  - Functional, fan failure. The power supply is supplying power to the Library, but the fan has failed so the power supply could fail soon. The power supply should be replaced.
  - Installed, failed. The power supply installed in the unit is not working and the Library no longer has redundant power. The power supply should be replaced.

- Removed. A power supply was installed in this location before but has been removed. Power Supply 1 will always show **Removed** when it is missing. Power Supply 2 will show **Removed** until the Library is rebooted.

Getting help

For additional information about fields on the RMI screens, click on **Help** in the upper right corner (see Figure 33). The help pages are updated with most firmware updates and often contain technical details that are not contained in this document.

Figure 33 Help button

Identity

Viewing static device information

The Identity: Library page provides static information about the device.
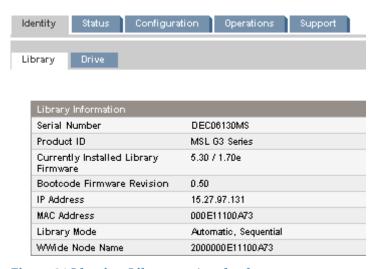
Figure 34 Identity: Library or Autoloader page

You can see, but not modify, the following:

- Serial Number — the electronic serial number for the device. It should match the serial number printed on the device's label, located on the pull out tab under the drive on the back of the device.
- Product ID — how the device identifies itself to the host computer.
- Currently Installed Autoloader or Library Firmware x.xx / y.yy
  - x.xx is the version of the autoloader or library controller firmware
  - y.yy is the version of the robotics firmware.
- Bootcode Firmware Revision
- IP Address — the Autoloader's or Library's network address
- MAC Address — a unique identifier for the autoloader or library controller's network interface
- Autoloader or Library Mode

- Automatic — the device will switch from Sequential to Random mode if it receives media changer SCSI commands.
- Manual — the device will stay in the current mode until another mode is configured by a user.
- Random — the device will not automatically load and unload tapes. Instead, it will wait for commands from the backup software or the OCP to load and unload tapes.
- Sequential — the device will automatically unload the tape in the drive when the host software sends an unload command to the drive and then automatically load the tape from the next highest sequentially numbered full slot.
- Loop — in Loop mode, the Autoloader or Library will load the tape from the lowest numbered full slot after the tape from the highest numbered full slot is unloaded. If Loop is not listed, the Autoloader or Library will stop automatically loading and unloading tapes after the tape from the last full slot is unloaded.

△ CAUTION:
Since loop mode will endlessly cycle through the tapes, it is possible to overwrite old data. Make sure that there are enough tapes in the Autoloader or Library or that the tapes are regularly rotated in and out to ensure that data you want to save is not overwritten.

- Autoload — the device will automatically load the tape from the lowest numbered full slot on power up.
- WWide Node Name — a world wide unique identifier that the Autoloader or Library reports over SCSI and may be used by operating systems or software applications to identify and track the Autoloader or Library

Viewing static drive information

The Identity: Drive page (SCSI) and Identity: Drive page (Fibre Channel) provide detailed information about a tape drive. If the Autoloader or Library has more than one drive, you can see information about the other drives by selecting the drive number. You will only see the fields that apply to the interface type of the drives installed in this Autoloader or Library.

Library | Drive

Drive Information	1 (LUN)
Vendor ID	HP
Product ID	Ultrium 3-SCSI
Serial Number	HU10612BHM
Firmware Revision	G54W
SCSI ID	3
Physical Drive Slot Number	1
SCSI Element Address	1
Library LUN Hosted By Drive	Yes
Data Compression	Yes
Interface Type	SCSI

Drive Information	2
Vendor ID	HP
Product ID	Ultrium 3-SCSI
Serial Number	HU10612BHT
Firmware Revision	G54W
SCSI ID	6
Physical Drive Slot Number	3
SCSI Element Address	2
Library LUN Hosted By Drive	No
Data Compression	Yes
Interface Type	SCSI

Figure 35 Identity: Drive page (parallel SCSI)

Drive Information	1 (LUN)
Vendor ID	HP
Product ID	Ultrium 3-SCSI
Serial Number	HU10624MYY
Firmware Revision	L57W
Physical Drive Slot Number	1
Element Address	1
Library LUN Hosted By Drive	Yes
Data Compression	Yes
Interface Type	Fibre Channel
WWide Node Name	2001000E11100A8E
Port A	
WWide Port Name	2002000E11100A8E
Port Type	Automatic
Speed	Automatic - 2 GByte/sec
Port B	
WWide Port Name	2003000E11100A8E
Port Type	Automatic
Speed	Automatic - 2 GByte/sec

Figure 36 Identity: Drive page (Fibre Channel)

You can see, but not modify, the following:

- Vendor ID — will always be HP.
- Product ID — product identification information that is given by the drive.
- Serial Number — electronic serial number of the drive. It should match the physical serial number of the drive.
- Firmware Revision — version of the currently installed drive firmware.
- SCSI ID (parallel SCSI drive only) — SCSI address of the drive. The LUN for the tape drive is 0. If a drive is removed or powered down, its number will be reserved. If a drive is added between two other drives, it is assigned the next available number. The drive numbers are persistent until the factory defaults are restored or the Autoloader or Library is power cycled.
- Physical Drive Slot Number — the physical location of the drive. By default, the drives are numbered from the bottom of the Autoloader or Library up, starting with number 1.
- SCSI Element Address (parallel SCSI drive) or Element Address (FC drive) — element address. The SCSI Element Address is set at the factory and can only be configured by a host application.
- Autoloader or Library LUN Hosted by Drive — Yes, if this drive is hosting the Autoloader or Library at LUN 1.
- Data Compression — Yes, if the host has hardware compression turned on for the drive.
- Interface Type —
- WWide Node Name (FC drive only) — world wide unique number for the drive. The Library assigns WWNames to the drive bays. When a tape drive is replaced, the WWName is re-assigned to the replacement drive.
- Port information for each configured port (FC drive only)
  - WWide Port Name — world wide unique identifier for the port. The WW Node and Port Name will be slightly different.
  - Port Type — the current setting of the drive port. Direct connected devices are typically Loop. Devices connected to a switch are typically Fabric.
  - Speed

Status

Viewing dynamic device information

The Status: Library page displays dynamic information about the device. When you click **Refresh**, the status is updated immediately.
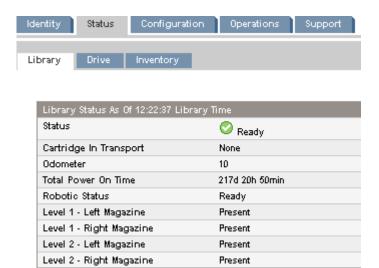
Figure 37 Status: Library or Autoloader page

You can see, but not modify, the following:

- Status — the overall status of the device

     The device is operating normally.

     The device is functional, but might have an issue that should be addressed.

     The device is in a failed state.

- Cartridge in Transport — the slot number where the tape currently in the robot originated. None if there is not a tape in the robotic.
- Odometer — the total number of moves the device has performed since its manufacture.
- Total Power On Time — the number of days, hours, and minutes that the device has been powered on since its manufacture.
- Robotic Status — the current status of the robotics and a description of the operation the robot is currently performing.
- Power Supply Status — the current status of each of the installed power supplies. (SL48)
  - Good. The power supply is functioning correctly.
  - Functional, fan failure. The power supply is supplying power to the Library, but the fan has failed so the power supply could overheat and fail soon. The power supply should be replaced.
  - Installed, failed. The power supply installed in the unit is not working and the Library no longer has redundant power. The power supply should be replaced.
  - Removed. A power supply was installed in this location before but has been removed. Power Supply 1 will always show **Removed** when it is missing. Power Supply 2 will show **Removed** until the Library is rebooted.
- Left Magazine — Present, if the device senses the presence of the left magazine. (SL24)
- Level n. Left Magazine — Present, if the Library senses the presence of the left magazine at level n. The magazine levels are numbered from the bottom of the Library to the top. For

example, Level 1. Left Magazine is the bottom magazine on the left side looking at the Library from the front. (SL48)

- Right Magazine — Present, if the device senses the presence of the right magazine. (SL24)
- Level n. Right Magazine — Present, if the Library senses the presence of the right magazine at level n. (SL48)

Viewing dynamic drive information

The Status: Drive page (parallel SCSI) and Status: Drive page (Fibre Channel) provide detailed information about the drives present in the Autoloader or Library. When you click **Refresh**, the status is updated immediately.

Identity	Status	Configuration	Operations	Support

Library	Drive	Inventory

Drive 1 Status As Of 11:21:47 Library Time

Status	✅ Ready
Cartridge In Drive	None
Drive Error Code	No Error
Internal Drive Temperature (normal range: 15 °C - 71 °C)	36.0 °C
Cooling Fan Active	On
Drive Activity	Ready

Drive 2 Status As Of 11:21:47 Library Time

Status	✅ Idle
Cartridge In Drive	Slot 21
Drive Error Code	No Error
Internal Drive Temperature (normal range: 15 °C - 71 °C)	35.0 °C
Cooling Fan Active	On
Drive Activity	Idle

Figure 38 Status: Drive page (parallel SCSI)

Figure 39 Status: Drive page (Fibre Channel)

You can see, but not modify, the following:

- Status of the drive

  - The drive is operating normally.

  - The device is functional, but might have an issue that should be addressed.

  - The drive is in a failed state.

- Cartridge in Drive — information about the cartridge, if any, currently in the drive.
- Drive Error Code — the current drive error code if the drive is in a failed state. See "Drive error codes" on page 133 for a list of drive error codes.
- Internal Drive Temperature — internal temperature reported by the drive. The normal temperature range is provided for reference and varies depending on the type of tape drive. The drive will send out errors if there is any possibility of error due to temperature.

NOTE:

This is not the temperature of the tape path in the drive nor is this the operating environment temperature.

- Cooling Fan Active — On if the cooling fan is on
- Drive Activity — the current drive activity
- Port A Status and Port B Status (Fibre Channel drives) — current status of the port
- Speed (Fibre Channel drives) — the current speed setting of the drive port
- Port Type (Fibre Channel drives only) — the current setting of the drive port. Direct connected devices are typically Loop. Devices connected to a switch are typically Fabric.
- N-Port ID (Fibre Channel drives only) — Fabric address. Only relevant when in Fabric mode.
- ALPA (Fibre Channel drives only) — Loop address. Only relevant when in Loop mode.

Viewing the tape cartridge inventory

The Status: Inventory page provides detailed information about the tapes in the tape drives, with a summary of tapes in magazine slots.
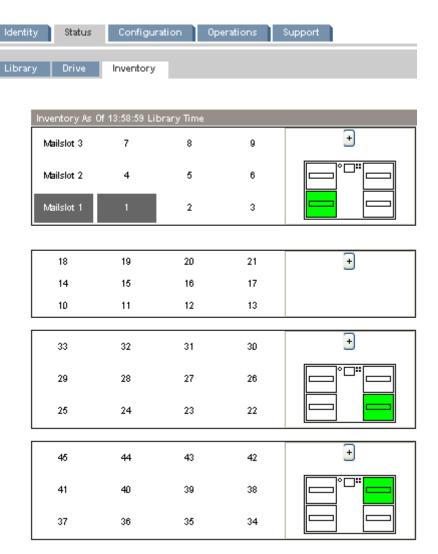
Figure 40 Status: Inventory page

A dark rectangle indicates a full slot, a yellow rectangle indicates a cartridge with a problem, and a white rectangle indicates an empty slot.

To get detailed information about the tapes in a magazine, click on the **+** button to expand the display for the magazine (see Figure 41).

Media Details						
Slot #	Attn	Status	In Drive	Label	Media Loads	Comment
Mailslot	Closed	Empty		------------		
1		Full		------------		
2		Full		DK9381L2		
3		Full		NCN930L2		
4		Empty		------------		
5		Full		DK9382L2		
6		Full		DK9380L2		
7		Full		KR2222L3		
8		Empty		------------		
9		Full		NCP401L2		
10		Full		DK9389L2		
11		Full		NCN919L2		

Figure 41 Status: Inventory: Media details pane

In the media details pane,

- Slot # — lists "Mailslot" or the index number of each slot in the magazine from lowest to highest.
- Attn — indicates an attention state for storage slots or provides information on the mailslot state.
- Status — Full or Empty.
- In Drive — shows when the tape from this slot is in a drive.
- Label — the bar code label data for the tape in the slot.
- Media Loads — the number of times this tape has been loaded into a drive in its lifetime. This field may be blank if the tape has not been loaded into a drive in this device or if the inventory has changed.
- Comment — any additional information about the tape in the slot (for example, Clean Tape if the cartridge is a cleaning tape).

Configuration

Changing the system configuration

System configuration changes are only applied after the **Apply Selections** or the **Submit** button is selected. After making the selection, a warning page informs you of the impact of the proposed change. In some cases a pop-up screen asks you to confirm the change. Many changes also require the device to reboot. (See "Configuration: System page" on page 55.)
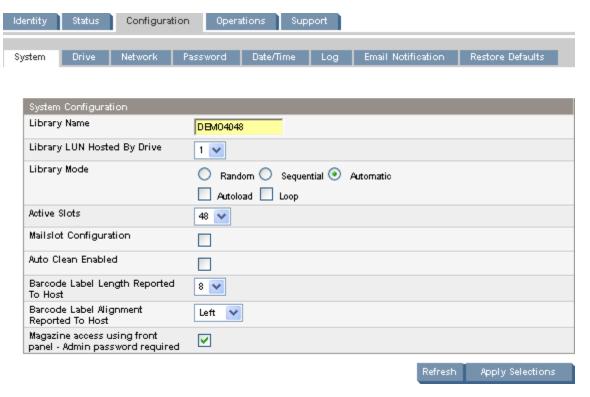
Figure 42 Configuration: System page

A list of changes that can be made are:

- Autoloader or Library Name — used as the sender of e-mail alerts and the identity of the device in SNMP messages. The name may not include spaces or special characters.

- Autoloader or Library LUN Hosted by Drive — the master drive, which provides a LUN address for the autoloader or library controller and communicates the SCSI data to and from the library controller through that drive. Only one drive may be selected to host the autoloader or library controller.

- Autoloader or Library Mode: Random, Sequential, Automatic, Autoload, Loop

  The Autoloader or Library supports three behavior modes: Random, Sequential, and Automatic. The Autoloader or Library automatically detects the required mode from the series of SCSI commands it receives; however, you can also change the mode. Choose the operating mode based on the capabilities of the software controlling the tape cartridges.

  Random mode: Random mode is used with a full featured or a robotics-aware backup application. This is the most common mode of operation. In Random mode, the device does not automatically load tapes into the drive; it waits for commands from the software. Your backup software must support robotics, which may require an additional software module.

  Sequential mode: Sequential mode is used when the backup software is NOT robotics-aware or was designed for standalone drives only. In Sequential mode, the device automatically loads and unloads tapes from the drive. The operator determines a tape to load by loading the desired tape into the tape drive.

  When a tape is unloaded for any reason, the device automatically removes the tape from the drive, puts it in its original slot, then loads the tape from the next available higher numbered slot.

  To further determine how you want tapes loaded into the tape drive while in Sequential mode, you can set **Loop** and **Autoload** options from the operator control panel.

  - When **Autoload** mode is on, the device automatically loads the cartridge from the lowest-numbered full slot into the tape drive. It then follows standard sequential operation.

  - When **Loop** mode is on, the original first cartridge in the sequence is reloaded after the device has cycled through all available cartridges. If Loop mode is off and the last cartridge has been unloaded, the device stops loading cartridges until you load another manually.

> **△ CAUTION:**
>
> Use caution when choosing Loop mode because it makes it possible to overwrite data on previously written cartridges.

Automatic mode: The default setting is Automatic mode, which allows the device to switch between Random and Sequential modes depending on the SCSI commands received. The device stays in Sequential mode until it receives media changer SCSI commands which put it in to Random mode.

- Active Slots: The number of slots that are available to the backup software. You can reserve up to nine slots. If the mailslots are enabled, the maximum number of Active Slots is reduced by three. You can also store cleaning or data tapes in the device and reduce the number of Active Slots accordingly. The slots are inactivated from the highest slot number down. The default is to make the maximum number of slots active.
- Mailslot Enabled — configures the mailslot in the lower left magazine as a mailslot or storage slots. The SL24 mailslot has one slot; the SL48 mailslot has three slots. Enabling the mailslot will reduce the total number of storage slots. The default is disabled.

> **△ CAUTION:**
>
> Since the mailslot is located where the lowest numbered storage slot would be, enabling and disabling the mailslot will re-number all of the other storage slots. After enabling or disabling the mailslot, update the backup software inventory. You might also need to re-configure the backup software to adjust the number of storage slots and presence of the mailslot.

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

  The Autoloader or Library can use a cleaning cartridge from any slot, even if the slot is not active. The Autoloader or Library keeps track of the usage count for each of the cleaning cartridges. When multiple cleaning cartridges are available, the Autoloader or Library will first choose an unknown cleaning cartridge so the Autoloader or Library can start tracking the cartridge's usage count. If the Autoloader or Library knows the usage count for all of the cleaning cartridges, the Autoloader or Library will choose the one with the highest usage count.

  Auto cleaning is disabled by default. You can enable automatic cleaning even if there are no cleaning cartridges in the device. In this case, the device will display a warning message.

> **△ CAUTION:**
>
> Only enable automatic cleaning in either the backup application or the Autoloader or Library, not both.

- Barcode Label Length Reported to Host — the number of bar code characters reported to the host application. This option provides interchange compatibility with libraries with more limited bar code reading capabilities. The default is 8.
- Barcode Label Alignment Reported to Host — configures the end of the bar code label characters to report to the host application when reporting fewer than the maximum number of characters. For example, when reporting only six characters of the bar code label `12345678`, if alignment is left, the Autoloader or Library will report `123456`. If alignment is right, the Autoloader or Library will report `345678`. The default is left.

Changing the drive configuration

This page shows the current configuration of all drives and allows modification to the configuration. You can also select **Power on** through this page. (See Configuration: Drive page (parallel SCSI) or Configuration: Drive page (Fibre Channel)).
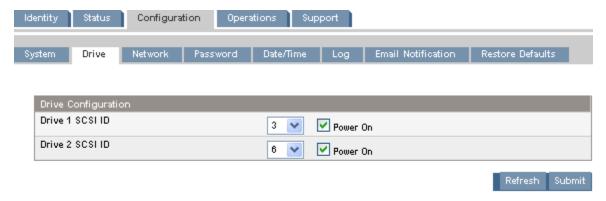
Figure 43 Configuration: Drive page (parallel SCSI)

For each parallel SCSI drive, you may change the

- SCSI ID — the SCSI address for a parallel SCSI tape drive.
- Power On — power the tape drive on or off.
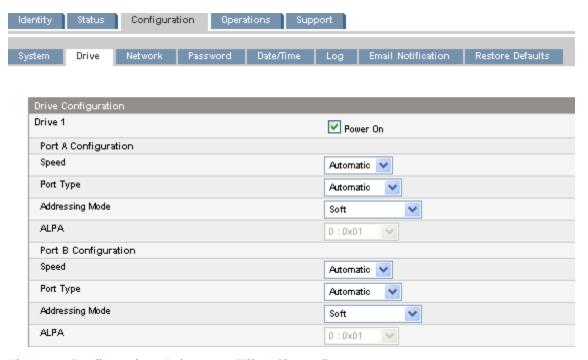
Figure 44 Configuration: Drive page (Fibre Channel)

For a Fibre Channel tape drive, you can use this screen to configure the FC ports. The port fields are:

- Speed — Automatic, 1 Gb/s, 2 Gb/s, or 4 Gb/s. The default is Automatic.
- Port Type — Automatic, Fabric (N), or Loop (NL). Direct connected devices are typically Loop. Devices connected to a switch are typically Fabric. The default is Automatic.
- Addressing Mode — addressing mode when the port type is Loop: Hard, Soft, or Hard auto-select. If the Addressing Mode is Hard, you must configure a fixed ALPA address that is unique on the loop. If the Addressing Mode is Soft, the system will assign an ALPA during fabric login. If the Addressing mode is Hard auto-select, the device will acquire an ALPA at the initial system setup and then fix that as a hard address from then on.
- ALPA — Arbitrated Loop Port Address

Changing the network configuration

Use the Configuration: Network page to see and modify the current network configuration. When you request a change, a pop-up box will ask you to confirm the changes.

From this page you can enable and configure SNMP (Simple Network Management Protocol). The device supports both SNMP configuration and SNMP traps. SNMP can only be configured with the RMI; it cannot be configured with the OCP.
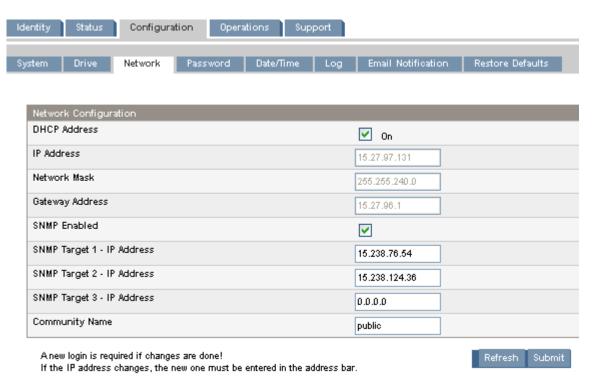
Figure 45 Configuration: Network page

You may change the:

- DHCP Address — When On, the device will get an IP address from a DHCP server each time the device is booted. The default is On.
- IP Address — configures the IP address if DHCP Address is not On.
- Network Mask — configures the network mask of the Autoloader or Library controller if DHCP Address is not On.
- Gateway Address — configures the gateway address of the Autoloader or Library if DHCP Address is not On.
- SNMP Enabled — When checked, the device can be managed by other computers running SNMP management software.
- SNMP Target IP Address — the IP addresses for up to three computers running SNMP management software. IP addresses will not be cleared if SNMP is disabled, but those targets will no longer be able to manage the Autoloader or Library and will not receive traps from the Autoloader or Library.
- Community Name — a string used to match the SNMP management station and device. It must be set the same on both the management station and the Autoloader or Library. The default community name is *public*.

Changing the administrator password

Use the Configuration: Password page to change the administrator password for the RMI and OCP.

NOTE:

You must set the administrator password with the OCP before you can access administrator functionality in the RMI. For SL24, see "Changing the administrator password" on page 75. For SL48, see "Changing the administrator password (Configuration > Administrator Password)" on page 99.
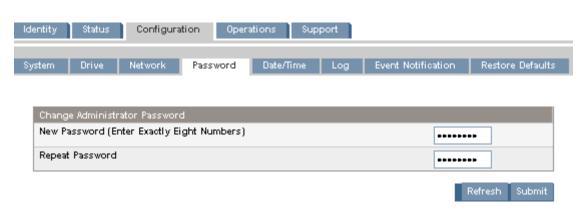
Figure 46 Configuration: Password page

The password is exactly eight numbers, each between 0 and 9.

Setting the date and time

Use the Configuration: Date/Time page to set the date and time. The time is based on a 24–hour clock, where 1:00 pm is 13:00.

Figure 47 Configuration: Date/Time page

Setting error log mode

The Configuration: Log page can only be accessed by Service personnel.

Figure 48 Configuration: Log page

Setting event notification parameters

The Configuration: Event notification page lets you configure e-mail notification of Autoloader or Library events.
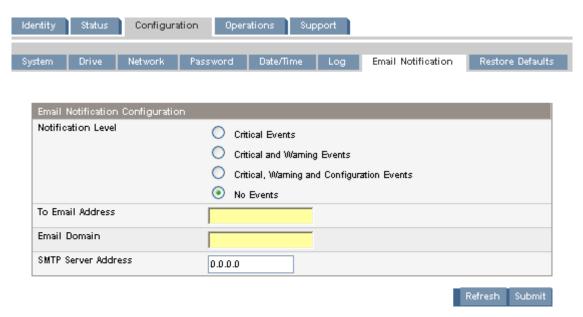
Figure 49 Configuration: Event notification page

You may change the:

- Notification Level — the types of events for which the device should send e-mail
- To Email Address — the address to which to send the reported events (e.g. firstname.lastname@example.com)
- Email Domain — domain of the return e-mail address (e.g. example.com)
- SMTP Server Address — IP address of the SMTP server

Restoring factory defaults

Use the Configuration: Restore defaults page to restore the configuration to the factory defaults or to reset the administrator password to null. The device will perform an inventory after the defaults are restored.

IMPORTANT:

Once you reset the administrator password to null, you will not be able to access the administrator functions in the RMI until you set an administrator password through the OCP. To *change* the administrator password, use "Configuration: Password page" on page 59.

Figure 50 Configuration: Restore defaults page

The restored settings are:

- SCSI addresses:
  - SL24: A full-height tape drive has SCSI ID 4. The bottom half-height tape drive has SCSI ID 4 and the top drive has SCSI ID 5.
  - SL48: All full-height tape drives have SCSI ID 4. Half-height drive slots have SCSI ID of 4, 5, 4, 5 from the bottom up.
- Fibre Channel drive configuration: Automatic speed, auto topology
- Master drive: reset to Drive 1 or the lowest numbered existing drive
- Drive power: all drives powered on
- Active slots: maximum possible
- Autoloader or Library mode: Automatic
- Loop: No
- Event log levels and filter: continuous trace and all levels and filters active (for Service use only)
- Barcode reader label length: 8
- Barcode reader alignment: Left
- Error recovery: On
- Mailslot configuration: mailslot disabled
- Auto clean: disabled
- SNMP: disabled, but saved addresses do not change
- E-mail notification: disabled, but configurations retained

The following settings are not reset:

- Administrator password
- Network settings (network is always enabled and the network addresses are retained)
- Date and time

IMPORTANT:

When the defaults are restored, the Library will rediscover and renumber the tape drives from the bottom of the Library up. If a tape drive was added between two other tape drives since the last time the drives were discovered, that tape drive and the ones above it will be renumbered. You might need to update the configuration of the backup application when tape drives are renumbered.

Operations

Moving media

Use the Operations: Move Media page to move tape cartridges within the device.

IMPORTANT:

Moving media manually can interfere with backup software operations. Ensure backups are complete before moving media.
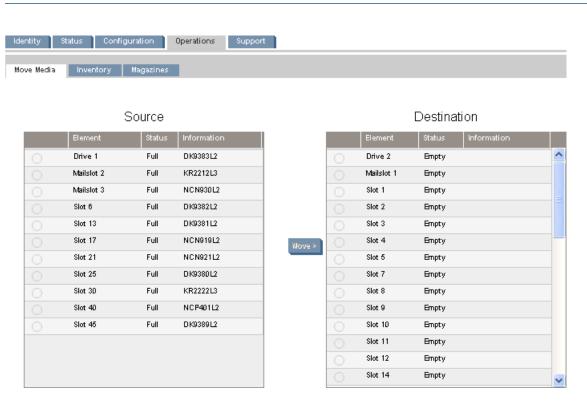
Figure 51 Operations: Move Media page

To move a tape, select the source and destination and then click the **Move** button in the center of the screen to start the move.

Updating the current media inventory

Use the Operations: Inventory page to have the device re-scan the tapes to update the media inventory.

Figure 52 Operations: Inventory page

Releasing and replacing the magazines

Use the Operations: Magazine page to release the right or left magazine. When you click **Release**, the device will unlock the magazine and display **Left Magazine Unlocked** or **Right Magazine Unlocked** on the OCP screen. The magazine does not move until you pull it out of the device. If you do not remove the magazine within a few seconds, the device will lock it. When you replace the magazine, the device will inventory the magazine's tape cartridges.

Figure 53 Operations: Magazines page

> **NOTE:**
> To manually release a magazine, see "Releasing the magazines manually" on page 122. However, this manual process should only be used if the magazine cannot be released using the operator control panel or the remote management interface.

Support

> △ **CAUTION:**
> Some RMI operations take the device offline. This inactive mode can interfere with host-based application software, causing data loss. Ensure that the device is idle before attempting to perform any remote operations that take it offline.

Performing general diagnostics

Use the Support: General Diagnostic page to run general tests to verify the usability and reliability of the device. Select the test and enter the number of test cycles before starting the test. To cancel the test early, click on the **Stop** button.

Figure 54 Support: General Diagnostic page

Service the Library - Service restricted

The Support: Service the Library page page can only be accessed by service personnel to execute detailed tests on the different components of the device or special read/write diagnostics on the drives.
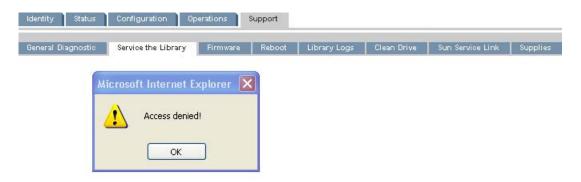
Figure 55 Support: Service the Library page

Determining and updating firmware

Use the Support: Firmware page to see the current version of the device and drive firmware, and upload new firmware. The firmware files must have a .frm file extension. You can find firmware patches on the SunSolve website: http://www.sunsolve.sun.com. After the firmware is updated, the device or tape drive with updated firmware is reset.

△ **CAUTION:**

Do not interrupt the device while a firmware update is in progress. Updating the tape drive firmware can take several minutes because the firmware is transferred through a serial connection.

Figure 56 Support: Firmware page

Rebooting the device

Use the Support: Reboot page to do a soft reset of the device, which will run the Power On Self Test (POST) and scan for a new inventory. The RMI web page will refresh itself after a short time delay. This time should be sufficient to reload the page. However, during a reboot, the connection to the device may be lost. If the connection is lost, you will have to reload the page manually.
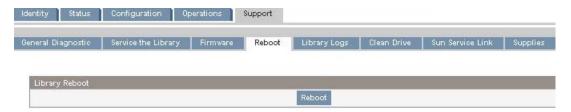
Figure 57 Support: Reboot page

Viewing logs

From the Support: Library Logs page you can see the Autoloader or Library logs. The available logs are: Error Trace, Informational Trace, Warning Trace, Configuration Change Trace, and Standard Trace.

The log entries are displayed in order of most recent to oldest. The format for the log entries is: YY.MM.DD HH.MM.SS.ss LIB/ERR<80 89 62 40

- YY.MM.DD — the date displayed as Year.Month.Day
- HH.MM.SS.ss — the time displayed as Hour.Minute.Second.Hundredths of a second
- First code — hard or soft error. The code after LIB/ERR (80 in the example) will be 80 or 40. 80 indicates a hard error, 40 indicates a soft error.
- Second code — the main error code (89 in this example). See "Error codes" on page 123 for a list of error codes and recovery procedures.
- Third code — the sub-code (62 in this example). See "Error sub-codes" on page 133 for a list of sub-codes.
- Fourth code — sub-code-specific information for factory use only
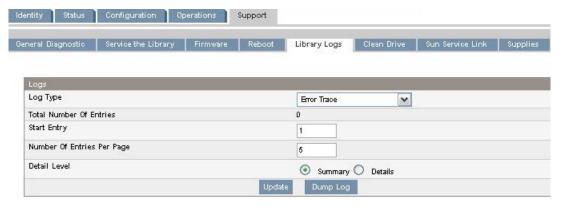
Figure 58 Support: Library Logs page

Cleaning tape drives

Use the Support: Clean Drive page to clean the tape drives.

- Slot # — select the slot number of the cleaning tape
- Drive — select the drive to be cleaned
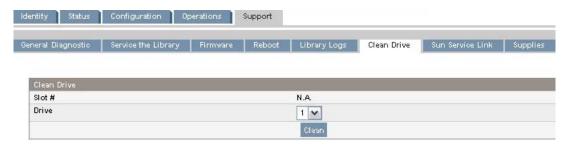
Figure 59 Support: Clean Drive page

Sun Service link

Use the Support: Sun Service Link page to find the URL for Sun Service.

Figure 60 Support: Sun Service Link page

SL24 Operator control panel (OCP)

The operator control panel on the front of the device includes a 2-line by 16-character green backlit liquid crystal display (LCD), four function keys, and four LEDs. This panel provides everything you need to monitor the Autoloader's status and control its functions.

The following functions are available through the OCP:

- "Unlocking the mailslot" on page 71
- "Status/Information" on page 71

LED indicators

The operator panel includes four LEDs that provide a summary of the device status as detailed in Figure 61.

11159

Figure 61 LEDs

1.	Green	**Ready**. Illuminated when power is on. Blinking during tape drive or robotics activity.	
2.	Amber	**Clean**. Illuminated when a cleaning cartridge should be used.	
3.	Amber	**Attention**. Illuminated if the device has detected a condition that requires attention.	
4.	Amber	**Error**. Illuminated if an unrecoverable error occurs. A corresponding error message displays on the LCD screen.	

Autoloader home screen

The first line of the Home screen displays the device's product name. The second line displays a brief status message. Drive status definitions are listed in Table 9.

Table 9 Drive status

Status	Definition
IDLE	Drive has a tape inserted, but there is no activity
RDY	Drive has no tape
RD	Drive is reading
FWD	Drive is forwarding
WR	Drive is writing
LD	Drive is loading a tape
ULD	Drive is unloading a tape
CLN	Drive is cleaning
RWD	Drive is rewinding
SEEK	Drive is seeking
ERS	Drive is erasing a tape
FORM	Drive is formatting a tape
CAL	Drive is calibrating
RMVD	Drive has been removed
OFF	Drive is disabled
No Drive	The drive is physically and logically not present.

Operator control panel buttons

The four operator control panel buttons, described in Figure 62, let you traverse the OCP menu structure and enter information.

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Figure 62 Operator control panel buttons

Cancel   Cancels the current menu option, returns to the previous menu level, or returns to the Home screen.

Enter   Enters the menu or selects the option displayed on the LCD screen.

Previous   Selects the previous item or value in the currently displayed menu.

Next   Selects the next item or value in the currently displayed menu.

Understanding the menu structure

The OCP options are organized under five menus: Unlock Mailslot, Status/Information, Configuration, Operations, and Support. From the Home screen, press **Enter** to bring up the first menu item. From a menu, use the **Previous** and **Next** keys to cycle through the menus, press **Enter** to see the first option in the menu, or press **Cancel** to return to the Home screen.

From an option, use the **Previous** and **Next** keys to cycle through the options in the menu, press **Enter** to select the option, or press **Cancel** to return to the menu list.

The menu structure is shown in Figure 63.
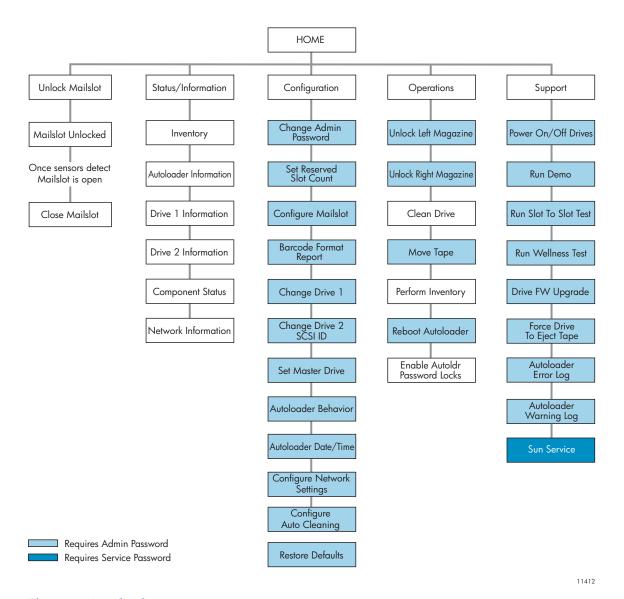
Figure 63 Autoloader menu tree

The administrator password accesses all of the available functionality, except for the Service Area. A user without the administrator password has access to the **Unlock Mailslot** and **Status/Information** menus.

Entering the administrator password

> **TIP:**
>
> By default, the administrator password is unset; all of the digits are null. You must set the administrator password from the OCP to protect the administrator functions on the OCP and enable the administrator functions in the RMI.

Options that require a password will prompt for a password before allowing access to the restricted screens. Once entered, the administrator password does not need to be entered again unless there is no user activity for five minutes or the password lock is enabled.

The number **1** should be flashing. To enter the password, do the following:

1.   From the operator control panel, press **Next** to scroll to the first number of the password.

2. Press **Enter**. The number you selected is replaced with an asterisk (*), and the cursor proceeds to the next text box.

3. Repeat steps 1 and 2 until you have entered all eight numbers. After the last number has been entered, the screen continues to the restricted area.

📝 **NOTE:**

If you forget the administrator password, you cannot enter a new password. You must call your customer service representative.

Unlocking the mailslot

The mailslot in the left magazine is used only with host system software that supports this feature. The mailslot feature allows you to insert or remove a single tape without removing the entire magazine. The benefit of using a mailslot is that the Autoloader will not inventory the rest of the slots in the magazine so the device can return to service sooner. The mailslot is in the left magazine.

To access the mailslot:

1. From the Home screen, press **Next** until the screen displays **Unlock Mailslot**. Press **Enter** to select.

2. The mailslot ejects automatically. Pull the mailslot out to access the tape (see Figure 64).

3. The screen displays **Close Mailslot**.

4. Remove the tape cartridge from the mailslot and insert a different tape cartridge.

5. Push the magazine back into the Autoloader.

11345

Figure 64 Removing a tape from the mailslot

Status/Information

The Status/Information menu provides access to the following status options:

- "Inventory" on page 72
- "Device information" on page 73
- "Drive information" on page 73
- "Component status" on page 74
- "Network information" on page 74

To access the Status/Information menu:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Status/Information**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays your selected function. Press **Enter** to select.

Inventory

This option provides information on which slots have cartridges and which are empty. The second line on the screen displays one of:

- Full (tapes without bar code labels)
- Bar code identification from the tape
- Empty

The device has the following inventory locations:

- Mailslot
- Left magazine
- Right magazine
- Drive 1
- Drive 2 (if two drives are present)

Each location provides different information:

- Drive or Mailslot: The screen display may read **Mailslot AESO32L3**, where AESO32L3 is an example of the bar code number on the tape, or it may read **Full** or **Empty.**

- Left or right magazine: The screen display may read **Left Magazine** or **Right Magazine.** The second line on the display indicates which slots have a tape or are empty. Slots in the left magazine are numbered 1-12 or 1-11, and slots in the right magazine are numbered 12-23 or 13-24. Each slot is represented by a character, as shown in Table 10.

Table 10 Display indication definitions

Character displayed	Definition
X	Slot has a tape
-	Slot is empty
m	Mailslot is enabled but does not have a tape
M	Mailslot has a tape
C	Slot has a cleaning tape
!	Media needs attention, often as a result of a damaged or incompatible cartridge

NOTE:

If the mailslot is enabled, the storage slot count is reduced.

To view more details about the contents of each slot, press **Enter** when the screen displays either **Left Magazine** or **Right Magazine**.

To view the tape inventory:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Status/Information**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Inventory**. Press **Enter** to select.

3. By using **Previous** or **Next**, you can select from the following inventory locations:

   - Mailslot
   - Left magazine
   - Right magazine
   - Drive 1
   - Drive 2 (if two drives are present)

4. Select **Left** or **Right Magazine.** The OCP will display the contents of the lowest numbered slot in the magazine. The display will show the tape bar code number, **Full**, or **Empty**.

5. Use **Previous** or **Next** to scroll through the remaining slots in the magazine. Press **Cancel** to choose another inventory location.

6. Press **Previous** or **Next** until the screen displays **Drive 1 Information** or **Drive 2 Information**. Press **Enter** to select.

7. After selecting **Drive 1 Information** or **Drive 2 Information**, the screen displays the source of the tape loaded in the drive. For example, **Drive 1 Tape Source = Slot 2**, indicates that the tape in Drive 1 was loaded from slot 2.

Autoloader information

To obtain information about your Library:

1. From the Home screen press **Previous** or **Next** until the screen displays **Status/Information**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Autoloader Information**. Press **Enter** to select.

    By using **Previous** or **Next**, you can select from the following information screens:

    -   Autoloader Time
    -   Firmware rev.
    -   Product ID
    -   Serial number
    -   SCSI ID and LUN
    -   Slots and Mailslots
    -   Master drive
    -   Odometer
    -   WWide Node Name for the FC node to which the Library is connected. (Fibre Channel devices only)

Drive information

To obtain drive information:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Status/Information**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Drive 1 Information** or **Drive 2 Information**. Press **Enter** to select.

3. By using **Previous** or **Next**, you can select from the following information screens:

    -   Serial number
    -   Drive type
    -   Firmware revision
    -   SCSI ID (parallel SCSI tape drives only)

    For a Fibre Channel tape drive, you can also select from the following information screens:

    -   The WWide Node Name for the FC node to which the tape drive is connected.
    -   The WWide Port Name and Port Type for Port A.
    -   The WWide Port Name and Port Type for Port B.

    World Wide names are assigned automatically; they cannot be configured.

Component status

To obtain component status:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Status/Information**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Component Status**. Press **Enter** to select.

3. By using **Previous** or **Next**, you can select from the following information screens:

   • Drive activity
   • Autoloader status
   • Drives status
   • Fan status

   The second line of the screen will display one of the following:

   • Good
   • Warning
   • Critical
   • Failed

Network information

To access network settings for the device:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Status/Information**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Network Information**. Press **Enter** to select.

3. By using **Previous** or **Next**, you can access the following information:

   • Static IP or DHCP Enabled
   • IP Address
   • Sub Net
   • Gateway
   • MAC Address

Configuration

The Configuration menu provides access to the following configuration functions:

To access the Configuration menu:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays your selected function. Press **Enter** to select.

Changing the administrator password

Use **Change Admin Password** to set or change the administrator password. Once the administrator password is set, you must know the administrator password or the service password to change the administrator password. Passwords consist of exactly eight numbers each between the values of 0 and 9.

Screens that require a password prompt for the password before allowing access to the restricted areas. Once entered, the administrator password does not have to be entered a second time unless there is no user activity for five minutes. Enter the administrator password if you are prompted to do so.

To change the administrator password:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Change Admin Password**. Press **Enter** to select.

3. The first number is flashing. Press **Previous** or **Next** to change the value of the flashing number. When the flashing number shows the desired value, press **Enter** to select.

4. The screen displays the second number flashing. Repeat Step 3 until you have entered all eight characters. Press **Enter** to select. After the last number has been entered, the password has been set to the new password.

> **NOTE:**
> If you forget the administrator password, you cannot enter a new password. You must call your customer service representative.

Setting the number of reserved slots

Reserved slots can be accessed by the remote management interface (RMI) and the operator control panel (OCP), but are invisible to the host and backup software. For example, you might keep a cleaning cartridge in a reserved slot if your backup software does not manage the cleaning process. You can reserve up to nine slots. Access to this feature requires the administrator password.

To set the reserved slot count:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Set Reserved Slot Count**. Press **Enter** to select.

3. Enter the administrator password if prompted.

4. Press **Previous** or **Next** to scroll through the display until the desired number of slots is displayed, then press **Enter**.

Configuring the mailslot

The mailslot is a single slot at the front of the left magazine that you can access without removing the whole magazine. Loading a tape through the mailslot is faster than opening the magazine because the device does not need to inventory the rest of the magazine slots when you use the mailslot. Also, the device can continue to function when the mailslot is open. Access to this feature requires the administrator password.

To enable or disable the mailslot:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Configure Mailslot**. Press **Enter** to select.

3. Enter the administrator password if prompted.

4. The screen displays either **Mailslot Enabled** or **Mailslot Disabled**.

5. Press **Previous** or **Next** until the screen displays **Disable Mailslot?** or **Enable Mailslot?.** Press **Enter** when the correct action is displayed.

Bar code report format

You can configure how the tape bar code is displayed in the OCP and RMI, and how it is reported to the host software. You can configure the number of characters to display and the whether the numbers should be justified to the left or right. For example, when reporting only six characters of the bar code label 12345678, if alignment is left, the Autoloader will report 123456. If alignment is right, the Autoloader will report 345678. The default configuration is **8 Left**. Access to this feature requires the administrator password.

To configure the bar code report format:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Barcode Format Report**. Press **Enter** to select.

3. Press **Previous** or **Next** until the screen displays either **Display Format** or **Host Format**. The second line displays the number of characters and the current format. To change the current format, press **Enter** to select either **Display** or **Host**. An example of the screen display is **# of characters 8**.

4. Press **Previous** or **Next** until the desired number of characters is listed. Press **Enter** to select.

5. The screen displays either **Alignment Left** or **Alignment Right**. Use **Previous** or **Next** to toggle between the two choices. Press **Enter** to select the correct alignment.

Changing the SCSI address (SCSI drives)

△ **CAUTION:**

If you change the SCSI ID, you might need to cycle power on the host server and reconfigure your backup software before you can use the device.

This option changes the SCSI address of a tape drive. The tape drive's logical unit number (LUN) will always be LUN 0 on the SCSI address. The Autoloader's SCSI address will be the same as the master drive, but will use LUN 1. Access to this feature requires the administrator password.

To change the drive SCSI address:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Change Drive 1** or **Change Drive 2**. Press **Enter** to select.

3. Enter the administrator password if prompted.

4. The screen displays the current SCSI ID. Press **Previous** or **Next** to change the SCSI ID number. Press **Enter** to select. An example of the screen display is **Drive 1 SCSI ID=6**.

Changing the drive configuration (Fibre Channel drives)

This option allows you to configure the FC ports for your tape drive.

Each drive has two ports, A and B.

📝 **NOTE:**

Sun recommends that you cable Port A only and that you configure Port B for **Auto Detect** on **Fibre Speed** and **Port Type**.

To configure the FC settings:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Change Drive 1**. Press **Enter** to select.

3. Enter the administrator password if prompted.

4. The screen displays **Port A**. Press **Enter** to select and display **Fibre Speed**.

5. Press **Enter** to display **Set Fibre Speed**. Press **Previous** or **Next** to toggle through the speed settings (Auto Detect, 1 Gb/s, 2 Gb/s, or 4 Gb/s). Press **Enter** to select the required speed.

6. The screen displays **Port Type**. Press **Enter** to display **Set Port Type**. Press **Previous** or **Next** to toggle through the port types (Fabric (N), Loop (NL), or Auto Detect). Press **Enter** to select the required port type.

7. If you selected **Fabric (N)** or **Auto Detect**, configuration is now complete; go to step 9. If you selected **Loop (NL)**, **Set Port Loop Mode** is displayed. Press **Previous** or **Next** to toggle through the loop modes (Soft, Hard, or Hard Auto Select). Press **Enter** to select the required loop mode.

8. If you selected **Soft** or **Hard Auto Select**, configuration is now complete; go to step 9. If you selected **Hard**, **Set ALPA** is displayed with the first number flashing. Press **Previous** or **Next** until the flashing number reads correctly. Press **Enter** to move to the next number. Repeat this step until all numbers in the address are correct. Press **Enter**.

9. Press **Enter** to save the settings and reset the port.

10. The screen displays **Port B**.

11. Press **Enter** to select and display **Fibre Speed**. Select **Auto Detect**. Press **Enter**.

12. Press **Enter** to select and display **Port Type**. Select **Auto Detect**. Press **Enter**.

Setting the master drive

⚠ **CAUTION:**

If you change the SCSI ID, you might need to cycle power on the host server and reconfigure your backup software before you can use the Library.

To set the master drive:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Set Master Drive**. Press **Enter** to select.

3. Enter the administrator password if prompted.

4. Press **Previous** or **Next** until the screen displays either **Master Drive, Drive 1** or **Master Drive, Drive 2**.

5. Press **Enter** to select the displayed configuration. The screen displays either **Drive 1 Set to Master**, or **Drive 2 Set to Master**.

Setting behaviors

The Autoloader supports three behavior modes: Automatic, Random, and Sequential. The Autoloader automatically detects the required mode from the series of SCSI commands it receives; however,

you can also change the mode from the Configuration menu. Choose the operating mode based on the capabilities of the software controlling the tape cartridges. Access to this feature requires the administrator password.

Automatic mode

The default setting is Automatic mode, which allows the device to switch between Random and Sequential modes depending on the SCSI command received. The device stays in Sequential mode until it detects media changer SCSI commands which put it into Random mode. You can also configure the device for Sequential or Random mode. If you do this, it remains in Sequential or Random mode until you change it back to Automatic, which can be done through the Configuration menu.

Random mode

Random mode is used with a full featured or a robotics-aware backup application. This is the most common mode of operation. In Random mode, the device does not automatically load tapes into the drive; it waits for commands from the software. Your backup software must support robotics, which may require an additional software module.

Sequential mode

Sequential mode is used when the backup software is NOT robotics-aware or was designed for standalone drives only. In Sequential mode, the device automatically loads and unloads tapes from the drive. The operator determines a tape to load by loading the desired tape into the tape drive using the operator control panel.

When a tape is full or unloaded for any reason, the device automatically removes the tape from the drive, puts it in its original slot, then loads the tape from the next available higher numbered slot.

To further determine how you want tapes loaded into the tape drive while in Sequential mode, you can set Loop and Autoload options from the operator control panel.

- When Autoload mode is on, the device automatically loads the cartridge from the lowest-numbered full slot into the tape drive. It then follows standard sequential operation.
- When Loop mode is on, the original first cartridge in the sequence is reloaded after the device has cycled through all available cartridges. If Loop mode is off and the last cartridge has been unloaded, the device stops loading cartridges until you load another manually.

△ **CAUTION:**

Use caution when choosing Loop mode because it makes it possible to overwrite data on previously written cartridges.

To set a behavior mode:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.
2. Press **Previous** or **Next** until the screen displays **Autoloader Behavior**. Press **Enter** to select.
3. Enter the administrator password if prompted.
4. Press **Previous** or **Next** until the screen displays **Autoloader Mode**. The second line on the display reads **Automatic**, **Sequential**, or **Random**. Press **Enter**.
5. Press **Previous** or **Next** to scroll through the screens for **Automatic**, **Sequential**, or **Random**. Press **Enter** to select the operating mode.
6. Press **Previous** or **Next** until the screen displays either **Autoload Mode Disabled** or **Autoload Mode Enabled**. To change the operating mode, press **Enter**.
7. The screen displays either **Disable Autoload Mode** or **Enable Autoload Mode.** Press **Previous** or **Next** to toggle between enabled and disabled screens. Press **Enter** to select the operating mode.

8. Press **Previous** or **Next** until the screen displays either **Loop Mode Disabled** or **Loop Mode Enabled**. To change loop mode, press **Enter**. The screen displays either **Enable Loop Mode** or **Disable Loop Mode**. Press **Enter** to select the loop mode.

Setting the date and time

> 📝 **NOTE:**
>
> When setting the hours, the time is based on a 24-hour clock. There is no a.m. or p.m. designation.

Use **Set Date and Time** to set the date and time used to record events. Access to this feature requires the administrator password.

To set the date:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Autoloader Date/Time**. Press **Enter** to select.

3. Enter the administrator password if prompted.

4. The screen displays **Set Yr/Month/Day 2006 / 07 / 21** with a flashing number. Press **Previous** or **Next** to change the value of the flashing number. Press **Enter** to accept the value of the flashing number and move to the next number.

5. Repeat Step 5 until all numbers in the date are correct. Press **Enter**.

6. The screen displays (example) **Set Hours / Mins 16: 52** with the first number flashing. Press **Previous** or **Next** until the flashing number reads correctly. Press **Enter** to move to the next number. Repeat this step until all numbers in the time are correct. Press **Enter**.

Configuring network settings

The device can automatically obtain an IP address from a DHCP server when the device is powered on. The device also supports user-specified fixed addresses through the front panel.

The device also supports SNMP. You can enable SNMP and configure the target addresses with the RMI. See "Changing the network configuration" on page 58.

To configure network settings:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Configure Network Settings**. Press **Enter** to select.

3. Press **Previous** or **Next** until the screen displays **DHCP Disabled** or **DHCP Enabled.** To change the DHCP condition, press **Enter**.

4. If DHCP is disabled, press **Previous** or **Next** until the screen displays **IP address**. The second line displays the current IP address.

5. To change the IP address, press **Enter**. The screen displays **Set IP Address** with the first number flashing. Press **Previous** or **Next** to change the flashing number to the correct value.

6. Press **Enter** to select the next number, until all numbers have been set. The screen displays **New IP Address.**

7. Press **Previous** or **Next** until the screen displays **Subnet Address**. To change the **Subnet Address**, press **Enter**. The screen displays **Set Subnet Address,** with the first number flashing.

8. Press **Previous** or **Next** to change the flashing number to the correct value. Press **Enter** to select the next number.

9. Repeat **Step 8** until all numbers have been set. The screen displays **New Subnet Address.**

10. Press **Previous** or **Next** until the screen displays **Gateway Address**. To change the **Gateway Address**, press **Enter**. The screen displays **Set Gateway Address,** with the first number flashing.

11. Press **Previous** or **Next** to change the flashing number to the correct value. Press **Enter** to select the next number.

12. Repeat **Step 11** until all numbers have been set. The screen displays **New Gateway Address.** Press **Enter**.

Configuring automatic cleaning

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

The Autoloader can use a cleaning cartridge from any slot, even if the slot is reserved. The Autoloaderkeeps track of the usage count for each of the cleaning cartridges. When multiple cleaning cartridges are available, the Autoloader will first choose an unknown cleaning cartridge so the Autoloader can start tracking the cartridge's usage count. If the Autoloader knows the usage count for all of the cleaning cartridges, the Autoloader will choose the one with the highest usage count.

Auto cleaning is disabled by default. You can enable automatic cleaning even if there are no cleaning cartridges in the device. In this case, the device will display a warning message.

△ **CAUTION:**

Only enable automatic cleaning in either the backup application or the Autoloader, not both.

To configure automatic cleaning:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Configure Auto Cleaning**. Press **Enter** to select.

3. Press **Previous** or **Next** until the screen displays **Auto Cleaning Disabled** or **Auto Cleaning Enabled.** To change the auto cleaning configuration, press **Enter**.

4. Press **Previous** or **Next** until the screen displays the configuration you want. Press **Enter**.

Restoring factory defaults

The device can reset most of the configurations to the factory defaults, while retaining the settings necessary to use the RMI. The device will perform an inventory after the defaults are restored. The restored settings are:

- SCSI addresses: The SCSI ID for the bottom drive is 4; the SCSI ID for the top drive is 5. The Autoloader will no longer recall a drive that has been removed.
- Master drive: reset to Drive 1 or the lowest numbered existing drive
- Drive power: all drives powered on
- Active slots: maximum possible
- Autoloader mode: Automatic
- Loop: No
- Event log levels and filter: continuous trace and all levels and filters active (for Service use only)
- Barcode reader label length: 8
- Barcode reader alignment: Left
- Error recovery: On
- Mailslot configuration: mailslot disabled
- Auto clean: disabled
- SNMP: disabled, but saved addresses to not change

- E-mail notification: disabled, but configurations retained

The following settings are not reset:

- Administrator password
- Network settings (network is always enabled)
- Date and time

To restore the factory defaults:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Configuration**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Restore Defaults**. Press **Enter** to select.

Operations

The Operations menu provides access to the following options:

- "Unlocking, removing, and replacing magazines" on page 81
- "Cleaning the tape drive" on page 81
- "Moving tapes in the device" on page 82
- "Updating tape cartridge inventory" on page 83
- "Rebooting" on page 83
- "Enabling password locks" on page 84

To access the Operations menu:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Operations**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays your selected function. Press **Enter** to select.

Unlocking, removing, and replacing magazines

These OCP options let you gain access to the left and right magazine. Access to the magazines requires the use of the administrator password.

To remove a magazine:

1. From the Home screen, press **Previous** or **Next** on the OCP until the screen displays **Operations**.

2. Press **Enter** to select.

3. Press **Previous** or **Next** until the screen displays either **Unlock Left Magazine** or **Unlock Right Magazine**.

4. Press **Enter** to select the desired magazine to unlock.

5. Enter the administrator password if requested.

6. The display reads **Left Magazine Unlocked** or **Right Magazine Unlocked**.

7. Pull the released magazine out of the device.

8. The screen now displays **Insert Left Magazine** or **Insert Right Magazine**. The device cannot perform any other operation until the magazine is replaced. After exchanging tapes in a magazine, slide the magazine completely into the device. The magazine locks into place once it is correctly installed and the device inventories the magazine.

Cleaning the tape drive

When the **Clean** drive LED is on, the tape drive needs to be cleaned. Cleaning times can range from a few seconds to a few minutes during which time the **Ready** LED blinks. Use only the designated cleaning cartridge for your tape drive model. All cartridges are available at

http://www.sun.com/storagetek/tape_storage/tape_media/lto/.Use only Ultrium Universal cleaning cartridges.

📝 **IMPORTANT:**

If the cleaning cartridge is not a valid cleaning cartridge, the LCD screen displays **Invalid Tape** and the cartridge is returned to its original location.

📝 **IMPORTANT:**

If the **Clean** drive LED or the Media **Attention** LED (on load or unload) occurs when inserting the same cartridge after you have cleaned the drive, there may be a problem with that cartridge.

If you use the operator control panel to clean the tape drive, load the cleaning cartridge into the mailslot or any other empty slot before beginning the cleaning steps. If you would like to keep a cleaning cartridge in the device, the backup software must manage tape drive cleaning or be configured to bypass the slot containing the cleaning cartridge.

Make sure a cleaning cartridge is in the mailslot or one of the magazines before beginning the cleaning steps. You must first select the drive to be cleaned and then select the slot from which you want to load the cleaning tape.

To clean the tape drive:

1. From the Home Screen, press **Previous** or **Next** until the screen displays **Operations**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Clean Drive**. Press **Enter** to select.

3. Use **Previous** or **Next** until the screen displays **Drive 1** or **Drive 2**. The second line can display either **Clean Required** or **Good** for both drives. Select the drive for **Clean Required**.

4. When the screen displays the correct drive, press **Enter**. The screen displays either **Cleaning Tape Slot 4** or **Cleaning Tape Slot XX**, where *XX* represents flashing blocks. If a slot number is displayed, the tape in that slot has a bar code label identifying the tape as a cleaning tape. If a slot number is displayed, continue to Step 6. If no slot number is displayed, it indicates that the device is not able to detect that a cleaning tape with a bar code is in the device. In this case, the operator must select the slot where a cleaning tape resides.

5. Use **Previous** or **Next** to display the location of a cleaning tape.

6. When the correct location for the cleaning tape is displayed, press **Enter** to select. While the device cleans the drive, **Cleaning Drive 1 in progress** or **Cleaning Drive 2 in progress** it displays.

7. After the cleaning cycle is complete, the screen displays either **Cleaning Drive 1 Complete**, or **Cleaning Drive 1 Failed**. If the cleaning cycle failed, press **Enter** to display the error code and message explaining the failure.

The device returns the cleaning cartridge to the original slot. If you loaded the cartridge from the front panel, you should now unload it either by using the mailslot, or by removing the magazine. When the tape drive cleaning cycle is complete, the **Clean** drive LED turns off (if previously on).

Moving tapes in the Autoloader

Use this option to move a cartridge from a tape drive, a tape slot in any magazine or the mailslot to any other location not already holding a tape. You can also load and unload tape cartridges to and from the installed tape drives. You must first select where you want to move the tape from and then indicate where you want to move the tape to. Access to **Move Media** requires the administrator password.

To move a tape:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Operations**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Move Tape**. Press **Enter** to select.

3. Enter the administrator password if prompted. Use **Previous** or **Next** to select from the possible sources:

    - Mailslot
    - Right Magazine
    - Left Magazine
    - Drive 1
    - Drive 2 (if two drives are present)

4. When the correct source is displayed, press **Enter** to select.

5. If the source selected is a magazine, use **Previous** or **Next** to select the slot (the same applies for the **Right Magazine**). Only slots with tapes are listed. The second line displays the bar code for the tape or reads **Full**.

6. Once the correct slot is displayed, press **Enter** to select.

    You have now selected the tape you would like to move. The screen now requests the destination for this tape.

7. Use **Previous** or **Next** to select from the possible destinations as follows:

    - Mailslot
    - Right Magazine
    - Left Magazine
    - Drive 1
    - Drive 2 (if two drives are present)

8. When the correct destination is displayed, press **Enter** to select.

9. If the destination selected is a magazine, use **Previous or Next** to display the slot. Only empty slots are listed.

Once the correct slot is displayed, press **Enter** to select. The device now moves the tape from the selected source, to the selected destination. While the device moves the tape, the screen displays **Moving Tape**. Once the tape has been moved, the screen displays either **Move Complete**, or **Move Failed**. If the move failed, press **Enter** to display the error code and message explaining the failure.

Updating tape cartridge inventory

This option updates the device's tape cartridge inventory. The device checks each slot and drive to determine which tape, if any, is present.

1. From the Home screen, press **Previous** or **Next** until the screen displays **Operations**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Perform Inventory**. Press **Enter** to select.

3. While the inventory is in progress, the screen displays **Scanning.**

The Library now checks the drive and each slot for the presence of a tape to update the inventory information.

📝 **NOTE:**

This command is only needed if the inventory in the device is different than the inventory displayed on the front panel, which would not happen under normal conditions.

Rebooting the Library

This option reboots the device and forces a new cartridge inventory, clearing any current error condition.

⚠ **CAUTION:**
This option interrupts the current backup or restore operation and causes the operation to fail. Use this option if the device is in an error state.

To reboot:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Operations**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Reboot Autoloader**. Press **Enter** to select.

Enabling password locks

This option locks the restricted areas. This is typically used if you do not want to wait for the time out to reset the locks. Power cycling or rebooting the device also resets the locks.

To enable the password locks:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Operations**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Enable Autoldr Password Locks**. Press **Enter** to select.

Support

The Support menu provides access to the following support options:

- "Powering a drive on or off" on page 84
- "Running the slot to slot test" on page 85
- "Running the Wellness test" on page 85
- "Running the demonstration" on page 85
- "Updating firmware" on page 86
- "Viewing logs" on page 87
- "Forcing the drive to eject a tape" on page 87

To access the Support menu:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays your selected function. Press **Enter** to select.

Powering a drive on or off

Use this option to power a drive on or off without interrupting power to the rest of the device and the second drive. This is typically used when replacing one drive in a two-drive configuration. Access to this feature requires the administrator password.

To power on or off the drive or drives:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Power On/Off Drives**. Press **Enter** to select.

3. Enter the administrator password, if prompted.

4. Press **Previous** or **Next** until the screen displays the drive you need to power on or off. The screen displays **Drive 1**. The second line in the display reads either **Power On** or **Power Off**.

5. To change the power status, press **Enter**. The screen displays either **Press Enter to Power off DRV 1**, or **Press Enter to Power on DRV 1**. Press **Enter** to select.

Running the demonstration

Use this option to run a device demonstration program. The demonstration continues until the **Cancel** button is pressed on the operator control panel. Access to this feature requires the administrator password.

To run the demonstration:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.
2. Press **Previous** or **Next** until the screen displays **Run Demo**. Press **Enter** to select.
3. Enter the administrator password if prompted.
4. While the test is running, the first line of the screen displays **Demo Test**. The second line displays the number of cycles completed and the number of errors.

NOTE:

To stop the demonstration, press **Cancel** on the operator control panel.

Running the slot to slot test

Use this option to test the robot's ability to move media in and out of each of the magazine slots.

To run the slot to slot test:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.
2. Press **Previous** or **Next** until the screen displays **Run Slot To Slot Test**. Press **Enter** to select.
3. Enter the administrator password, if prompted.
4. Press **Previous** or **Next** until the screen displays **Select Number of Cycles.** Use **Previous** or **Next** to select 270, 540, 1080, or ENDLESS. Press **Enter**.
5. While the test is running, the screen displays progress as shown: **Run Slot To Slot**. The second line on the display shows the number of cycles completed.
6. When the test is complete, the screen displays the number of cycles completed and the number of errors. If the test failed, press **Enter** to display the error and message describing the cause.

NOTE:

To stop the slot to slot test, press the **Cancel** button.

Running the wellness test

Use this option to check the health of the device for the specified number of loops. If a failure occurs during the test, check the error code and failure message for more information. Access to this feature requires the administrator password.

During the test, the device will open the mailslot and ask you to insert a tape cartridge. You can use any compatible Ultrium data tape cartridge for this test.

To run the wellness test:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.
2. Press **Previous** or **Next** until the screen displays **Run Wellness Test**. Press **Enter** to select.
3. Enter the administrator password, if prompted.

4. Press **Previous** or **Next** until the screen displays **Select Cycles.** Use **Previous** or **Next** to select a number. Press **Enter**.

5. While the test is running, the screen displays progress as shown: **Wellness test**. The second line on the display shows the number of loops completed.

6. When the test is complete, the screen displays either **Test Passed** or an error code. See "Error codes" on page 123 for a list of error codes and error messages.

📝 **NOTE:**

To stop the wellness test, press the **Cancel** button.

Upgrading firmware

The Autoloader allows two types of firmware to be upgraded — one for the tape drive and the other for the Autoloader itself. You can upgrade both types of firmware from a USB flash drive. You can also upgrade the tape drive firmware from a firmware upgrade tape. Access to this feature requires the administrator password.

To upgrade Autoloader firmware from a USB flash drive:

1. Download current Autoloader firmware from the Sun SunSolve website: http://sunsolve.sun.com. Copy the firmware onto the USB flash drive.

💡 **TIP:**

The display will only show the first 16 characters of the filename. If you have multiple firmware files on the USB drive, ensure that you can tell them apart from the first 16 characters.

---

2. Insert the USB flash drive into the USB port on the back of the device.

3. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.

4. Press **Previous** or **Next** until the screen displays **Autoloader FW upgrade**. Press **Enter** to select.

5. Enter the administrator password if prompted.

6. Press **Previous** or **Next** until the screen displays the filename of the Autoloader firmware file on the USB drive. Press **Enter** to select the firmware file.

7. If the upgrade failed, press **Enter** to display the error code and message describing the cause of the failure.

8. Remove the USB flash drive from the USB port.

To upgrade drive firmware from a USB flash drive:

1. Download current tape drive firmware from the Sun SunSolve website: http://sunsolve.sun.com. Copy the firmware onto the USB flash drive.

💡 **TIP:**

The display will only show the first 16 characters of the filename. If you have multiple firmware files on the USB drive, ensure that you can tell them apart from the first 16 characters.

---

2. Insert the USB flash drive into the USB port on the back of the device.

3. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.

4. Press **Previous** or **Next** until the screen displays **Drive FW Upgrade**. Press **Enter** to select.

5. Enter the administrator password if prompted.

6. Press **Previous** or **Next** until the screen displays the filename of the drive firmware file on the USB drive. Press **Enter** to select the firmware file.

7. If the upgrade failed, press **Enter** to display the error code and message describing the cause of the failure.

8. Remove the USB flash drive from the USB port.

To update drive firmware from a firmware upgrade tape:

1. Load a firmware upgrade tape into the mailslot or any open slot. If all slots are full, remove a data tape to make room for the firmware upgrade tape.

2. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.

3. Press **Previous** or **Next** until the screen displays **Upgrade Firmware**. Press **Enter** to select.

4. Enter the administrator password if prompted.

5. Press **Previous** or **Next** until the screen displays **Drive FW Upgrade by Tape**. Press **Enter** to select.

6. Press **Previous** or **Next** until the screen displays one of the following: **Drive 1.** The second line may read: **Firmware: G39W** or **Drive 2 Firmware: G39W** or **All Drives**. Press **Enter** to select the appropriate drive to upgrade.

7. Press **Previous** or **Next** until the display shows the correct slot location of the firmware upgrade tape installed in the device (example) **FW Tape Location Slot: Mailslot**. Press **Enter** to select the correct firmware tape location. The screen displays **Updating Drive FW**.

8. When the update is complete, the screen displays either **Success Export FW tape**, or **Drive FW Upgrade Failed**. If the upgrade failed, press **Enter** to display the error code and message describing the cause of the failure.

9. Remove the firmware upgrade tape from the device using either the mailslot or by removing the magazine where the tape has been placed.

Viewing logs

The Autoloader keeps a log of recent error and warning messages. See "Error codes" on page 123 for more information about error codes.

To access the error or warning log:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Autoloader Error Log** to see error messages or **Autoloader Warning Log** to see warnings. Press **Enter** to select.

3. Enter the administrator password, if prompted.

4. Press **Enter** to see the message description. Press **Cancel** to return to the message code.

5. Press **Next** to see the next message.

Forcing the drive to eject a tape

Use this option to make the tape drive eject the tape and place it into an open slot. Before issuing this command, attempt to eject the tape with the move command (See "Moving tapes in the device" on page 82).

To force the tape to eject:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Support**. Press **Enter** to select.

2. Press **Previous** or **Next** until the screen displays **Force Drive to Eject Tape**. Press **Enter** to select.

3. Press **Previous** or **Next** until the screen displays **Drive 1** or **Drive 2**. The second line on the display shows the bar code number of the tape or state **Full.** Press **Enter** to select the desired drive to eject the tape.

4. If the tape is successfully ejected from the drive, the screen displays the slot location where the tape was moved to.

NOTE:

If the drive has difficulty ejecting the tape, suspect bad or damaged media.

SL48 operator control panel

Overview

The front panel includes:

- A liquid crystal display (LCD) that shows Tape Library status information and is used to access the OCP menus.
- LEDs that illuminate to indicate Library conditions and alerts.
- Navigation buttons that allow you to scroll through, select, and make changes to different OCP menus and settings.

This panel provides everything you need to monitor Library status and access the OCP menus.

Operations available using the OCP

- Info menu
  - Viewing status information (Info > Status)
  - Viewing identity information (Info > Identity)
  - Viewing inventory information (Info > Inventory)
  - Viewing network information (Info > Network)
- Configuration menu
  - Changing the library configuration (Configuration > Library Configuration)
  - Changing the drive SCSI ID (Configuration > Drive Configuration)
  - Changing the network configuration (Configuration > Network Configuration)
  - Barcode reporting format (Configuration > Barcode Reporting Format)
  - Changing the administrator password (Configuration > Administrator Password)
  - Restore defaults (Configuration > Restore Defaults)
  - Setting the Library date and time (Configuration > Set Date/Time)
- Operations menu
  - Opening the mailslot (Operations > Open Mailslot)
  - Unlocking, removing and replacing magazines (Operations > Unlock Left/Right Magazines)
  - Moving Media (Operations > Move Media)
  - Performing Inventory (Operations > Inventory)
  - Enabling Password Locks (Operations > Enable Password Locks)
- Support menu
  - Powering drives on and off (Support > Power on/off Drives)
  - Cleaning the tape drive (Support > Clean Drive)
  - Running tests (Support > Run Tests)
  - Viewing logs (Support > View Logs)
  - Updating library and drive firmware (Support > FW Upgrade)

- Force ejecting a drive (Support > Force Drive Eject)
- Rebooting the tape library (Support > Reboot)

Operator control panel navigation buttons

Four menus are accessed through the operator control panel: **Info**, **Configuration**, **Operations** and **Support**. Use the navigation buttons to select menu items and work with the screen displays. The navigation buttons have different functions depending upon where you are in the menu structure (see Table 11 and Table 12).

Table 11 OCP buttons

Operator control panel buttons	Number	Description
	1.	Power button
	2.	Navigation buttons
	3.	OK button

Table 12 Navigation buttons

▶	Right	Moves to the next item at the current menu level. When a top-level menu item is highlighted, this moves to the next menu item, for example, from Info to Configuration. When a digit is highlighted on a screen field, this moves to the next digit. If there is no next item, this button is not active.
◀	Left	Moves to the previous item at the current menu level. When a top-level menu item is highlighted, this moves to the previous menu item, for example, from Configuration to Info. When a pull-down menu is displayed, the left button can be used to close or collapse that menu. When a digit is highlighted on a screen field, this moves to the previous digit. If there is no previous item, this button is not active.
▲	Up	Scrolls upwards through available choices at the current menu level. (If used on the top item it returns to the bottom item.) When a menu pull-down is displayed, this scrolls through all items for that menu. When a screen is displayed, this highlights individual lines. When editable fields are highlighted, this scrolls through available choices for that field.
▼	Down	Scrolls downwards through available choices at the current menu level. (If used on the bottom item it returns to the top item.) If used from a top-level menu item, it highlights the top selection in the sub-menu. When a sub-menu is displayed, this scrolls through all items for that menu. When a screen is displayed, this highlights individual lines. When editable fields are highlighted, this scrolls through available choices for that field.
OK	OK	Selects the highlighted menu or screen item. If used from a top-level menu item, it displays the sub-menu with no items highlighted; press OK a second time to return to the top-level menu. When a sub-menu is displayed, OK selects the highlighted menu item. In a configuration screen, the OK button toggles from navigation to editing a selection. Navigate to an option you wish to change and press OK to edit it. Once the item has been changed, press OK again to go back into navigation mode. The OK button is also used for selecting highlighted choices such as <Save> or <Cancel>.

Using the OCP

Each time the Tape Library is powered on or rebooted, or after five minutes of inactivity, a splash screen is briefly displayed, after which the OCP menu is displayed, showing current system status information.

You will be required to enter the administrator password for all functions that are password-protected.

```
Status:OK              SL 48              13:43
Info   Configuration   Operations   Support


Date                        10.08.2006
Library Status              ⊘
Library Name                MS0001234
IP Address                  192.168.000.001
Drive 1                     Ready
Drive 2                     Writing
Drive 3                     Ready
Drive 4                     Idle
Slots free/total            10/48
Mailslots                   Disabled
```
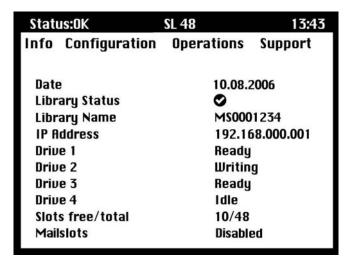
Figure 65 OCP menu, showing initial system status information

The OCP menu includes a status message bar, menu bar, and display area. Initial system status information includes basic Library, drive, and magazine status and information. All drives that have been activated are included. If drives are subsequently removed or powered down, they will still be listed on this screen until you restore defaults.

Status message bar

The highlighted line above **Info**, **Configuration**, **Operations** and **Support** is always visible. It shows the time and overall status of the Library. Status definitions are listed in Table 13.

Table 13 Library status

Status	Definition
Ready	Library is ready for normal operation
Warning	Library is in a warning condition such as a drive needs cleaning (normal operation)
Error	Library is in an error condition (normal operation)
Offline	Library is running tests
Load	Library is loading a tape
Unload	Library is unloading a tape

Menu bar

The menu bar contains four groups of menu functions:

- Info
- Configuration
- Operations
- Support
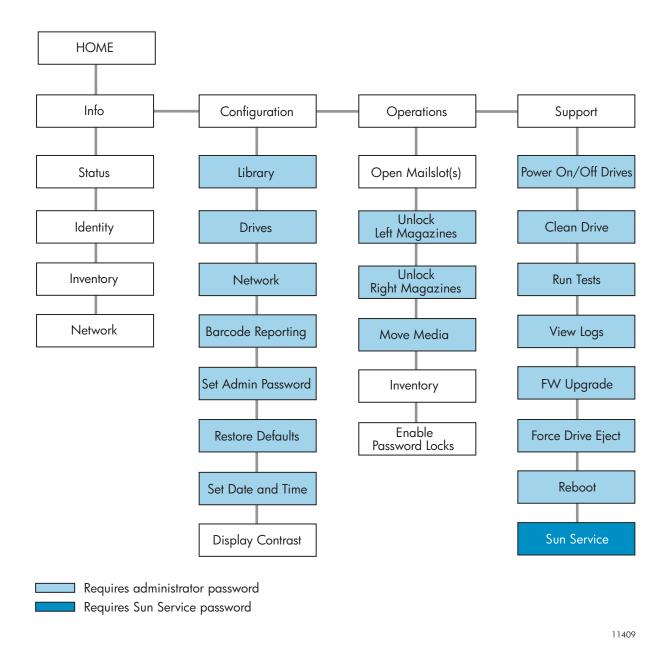
Figure 66 Operator control panel menu

Administrator password

💡 **TIP:**

By default, the administrator password is unset; all of the digits are null. You must set the administrator password from the OCP to protect the administrator functions on the OCP and enable the administrator functions in the RMI.

The administrator password grants access to all OCP functions except **Service**. A user without knowledge of the administrator password can access:

- **Info:** Status, Identity, Inventory
- **Configuration:** Network, Display Contrast
- **Operations:** Open Mailslots, Inventory, and Enable Password locks

All other **Configuration**, **Operations**, and **Support** options are locked.

After five minutes of inactivity, the OCP returns to the splash screen. To access password-protected tasks, you must reenter the administrator password.

The administrator password is originally null. Sun strongly recommends that you assign a password during the installation process, see Changing the administrator password (Configuration > Administrator Password). You will not be able to access the administrator functions of the Tape Library from the remote management interface (RMI) until the administrator password is set.

Screens that require entry of a password are indicated by a padlock icon on the menu list and prompt the user to enter the password before allowing access to the restricted screens. Once entered, the administrator password does not need to be entered a second time unless there is no user activity for five minutes or unless the password locks are re-enabled.

Passwords must be exactly eight digits consisting of the numbers 0 through 9.

To enter a password when prompted, do the following:

1. The left most digit of the password will be highlighted;
    each non-highlighted digit will appear as an X.
    Use the ▲ Up and ▼ Down buttons until the correct digit is displayed.
    Use the ◀ Left and ▶ Right buttons to select the other digits and use the ▲ Up and ▼ Down buttons to alter the values.

2. Press **OK** to submit the password. The screen continues to the restricted area.

> **NOTE:**
> If you forget the administrator password, you cannot enter a new password. You must call your customer service representative.

Illustrated menu option and navigation examples

The following examples illustrate how to use the menu options and navigation buttons to open mailslots and to move media. Subsequent menu options described in this chapter do not include step-by-step instructions.

Opening mailslots (Operations > Open Mailslots)

The mailslots are used only with host system software that supports this feature. The mailslot feature allows you to insert or remove up to three tapes.

Left magazines are available without mailslots, with one mailslot, or with three mailslots. The SL48 Tape Libraries are shipped with the 3-mailslot magazine on the lower left side. Mailslot-capable left magazines are marked with a white dot on the lower right corner that aligns with a white dot on the front bezel, as shown in Figure 67. Placing a mailslot magazine in any location other than the lower-left location will result in the magazine being treated as a magazine with no mailslots.

10848
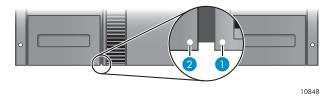
Figure 67 Mailslot-capable magazine and slot, each marked with a white dot

The Library will eject the mailslot in the lower left magazine when instructed to open mailslots. After the mailslot is closed, the Library will inventory the tapes in the mailslot, but not the rest of the tapes in the magazine, which allows the Library to resume operations sooner.

NOTE:

If you exchange the magazine in the lower-left position with one that has different mailslot capabilities, a warning appears telling you that the mailslot type is incompatible with the configuration.

To access the mailslots do the following:

1. Highlight **Operations -> Open Mailslots** and press **OK** to select it.
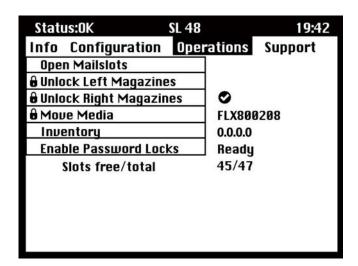
Figure 68 Operations menu

2. The mailslot located in the lower left magazine ejects automatically. Pull the magazine out until you can access the tape cartridge (see Figure 69).

11350
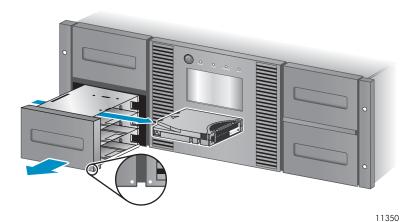
Figure 69 Removing the existing tape from the mailslot

NOTE:

The Mailslot opening message may be displayed. No button pushes are accepted during this time.

> 📝 **NOTE:**
>
> If the SCSI Prevent/Allow Media Removal bit is set, the mailslot cannot be unlocked/opened from the front panel and the following message is displayed: "Media Removal Prevented by Host Software". Press **OK** to continue and return to the open mailslot pull-down menu. Try the operation again from the backup software.

3. The message **Close Mailslot** is displayed. Remove the existing tape cartridges from the mailslot and insert new tape cartridges, as required.

4. Push the mailslot back into the Library.

Moving Media (Operations > Move Media)

This option instructs the Library to move a cartridge from a tape drive, a tape slot in any magazine or the mailslot in the left magazine to any other location not already holding a tape. This option also lets you load and unload tape cartridges to and from the installed tape drives. To use this command, you must first select where you want to move the tape from (in one of the Source fields), and then indicate where you want to move the tape to (in one of the Destinations fields).

Source Type: This toggles between all available sources: mailslot, magazines, and the active drives.

Source -> Source by Label: If appropriate, this toggles between available source cartridges. In the following example, the source type is a magazine, so you need to select a cartridge from the magazine. You can do this by selecting a specific slot (Source field) or specifying the target cartridge's barcode (Source by Label field). Only Full source slots are available for selection.

Destination Type: This toggles between all available destinations: Mailslot, Magazine and Drive.

Destination: If appropriate, this option allows you to specify the cartridge destination. For a magazine, select a slot. Only Empty destination slots are available for selection.

Access to the **Move Media** option requires the use of the administrator password.

To move a tape in the Library:

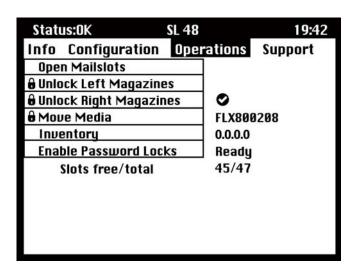1. Highlight **Operations ->** Move Media and press **OK** to select it.

Figure 70 Operations menu

2. Enter the administrator password if prompted.

3. Use the Up and Down arrows to move to the **Source Type** field and press **OK**.

4. Use the Up and Down arrows to change the value of the highlighted field. When the highlighted field shows the desired value, press **OK** to select.

5. If appropriate, move to the **Source** field and repeat step 4 to specify the source cartridge.

6. Use the Up and Down arrows to move to the **Destination Type** field and press **OK**.

7. Use the Up and Down arrows to change the value of the highlighted field. When the highlighted field shows the desired value, press **OK** to select.

8. If appropriate, move to the **Destination** field and repeat step 7 to specify the cartridge destination

9. Use the Left and Right arrows to move to the **<Move>** area and press **OK** to carry out the operation (or move to the **<Cancel>** area and press **OK** to cancel the operation).

   The Library now moves the tape from the selected source to the selected destination. While the tape is being moved, the screen displays **Moving Tape**. Once the tape has been moved, the screen displays either **Move Complete**, or **Move Failed**. If the move failed, press **OK** to display the error code and message explaining the failure.

Info menu

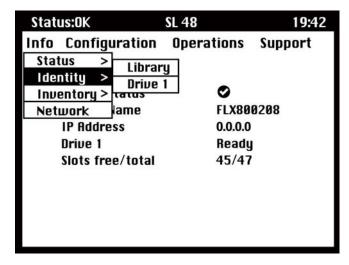The **Info** menu options provide the following options. None of these options is password protected.

Figure 71 Info menu

Viewing status information (Info > Status)

Status information can be displayed for the system, the Library, or for a specific drive.

📝 **NOTE:**

The number of drives available for selection in the Status menu depends on the number of drives that have been active in the Library. For a Library that has only two drives, the menu displays Drive 1 and Drive 2. For a Library that has four drives, the menu displays Drive 1, Drive 2, Drive 3 and Drive 4 (even though the status of some may be offline or missing).

- **System:** displays the status of the Library, its name and IP address, the status of each drive, and the number of free and total slots. This is an active screen that updates dynamically when status changes.
- **Library:** displays the status of the Library without the drives. It shows the Library status, odometer, power on time, robotic status, slot and barcode of any cartridge in transport, number of free and total slots, and status of the mailslots.
- **Drives:** displays the status of the selected drive. It shows the drive status, source slot, tape barcode, error code (if appropriate), drive temperature, status of cooling fan, and drive activity.

For Fibre Channel drives, the following additional items are displayed:

- The link status of each port may be: No Light, Logged In, Logged Out, ALPA Conflict, or Negotiation Link. No Light or ALPA Conflict indicates an error condition. See "Fibre Channel connection problems" on page 109.
- The speed for each port: 1 Gb/s, 2 Gb/s, or 4 Gb/s.

> **NOTE:**
> Use the Left or Right buttons to toggle through the status information for all drives without returning to the **Info -> Status** sub-menu.

Viewing identity information (Info > Identity)

Identity information can be displayed for the Library, or for a specific drive.

- **Library:** displays the serial number and product ID, controller and bootcode firmware revisions, IP address, Library mode, number of reserved slots, and status of the mailslots. A Fibre Channel Library also displays the WW Node Name for the FC node to which it is connected.
- **Drives:** displays the status of the selected drive. It shows the SCSI ID, physical drive number, serial number, firmware revision, element address, and whether the drive is the Library LUN host drive.

The following additional information is displayed for a Fibre Channel drive:

- WWide Node Name for the FC node to which the tape drive is connected.
- WWide Port Name and Port Type for Port A.
- WWide Port Name and Port Type for Port B.

> **NOTE:**
> Use the Left or Right buttons to toggle through the identity information for all drives without returning to the **Info -> Identity** menu.

World Wide names are assigned automatically; they cannot be configured.

Viewing inventory information (Info > Inventory)

Inventory information can be displayed for a magazine or for a drive.

- **Magazine:** The first inventory screen displays the contents of magazine number 1 (lower left). The top section of this screens shows which mailslots are occupied (shaded background) or empty (white background). If the mailslot is enabled, the storage slot count is reduced. The lower section gives more information about each slot. Mailslots are identified in the Slot column as MS1, MS2 or MS3. The label shows any barcode details. Slots containing tapes without barcodes are labeled Full. Info shows whether the tape is write-protected (WP) or if that media needs attention (!) Use the Left or Right buttons to scroll through and view the inventory for all magazines.
- **Drive:** This screen displays the contents of each drive. The Label column identifies which tape is in the drive and the Source column identifies the slot from which it came. Other information defines the type of tape (data or cleaning) and whether tapes are write-protected or valid/invalid.

Viewing network information (Info > Network)

This option provides information about the network setting for the Library. This screen will show information about the network connectivity of the Library. If DHCP is ON, the values currently being found by DHCP for IP Addr, Netmask and Gateway will be displayed.

Configuration menu
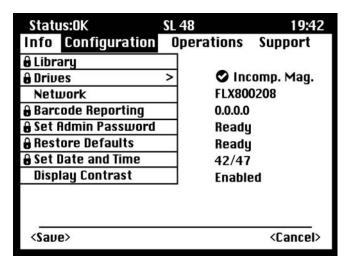
The Configuration menu provides the following options:

Figure 72 Configuration menu

Changing the Library configuration (Configuration > Library Configuration)

This option allows you to specify the drive that is assigned as master drive and the Library mode, and define how many slots are active and whether the mailslots are enabled.

Access to this feature requires the administrator password.

- **Library Master Drive:** This option designates which drive acts as the master and hosts the Library LUN.

📝 **NOTE:**

The Library's SCSI ID will be the master drive's SCSI ID with a LUN of 1.

- **Library Mode:** This option allows setting of the Library mode to Automatic, Sequential, or Random. Access to this feature requires the administrator password. The operating mode is set based on whether you have automation software controlling cartridges in the Library. By default, the Library automatically detects the required mode (Automatic mode); however, you can also change the modes from the Configuration menu. If you select Sequential, you may also wish to configure Autoload and Loop.
- **Reserved Slots:** This option sets the number of reserved slots in the Library. Reserved slots are slots that can be accessed by the remote management interface (RMI) and the operator control panel (OCP), but are invisible to the host and backup software. You can reserve up to nine slots.
- **Mailslots enabled:** This option enables or disables mailslots. All three mailslots are enabled or disabled based on this setting.
- **Auto Cleaning**: This option enables or disables automatic cleaning.

Library modes

Automatic mode

Automatic mode (default) allows the Library to switch between Random and Sequential mode depending on the SCSI command received. The Library is in Sequential mode until it detects media changer SCSI commands which put it into Random mode. You can also configure the Library for

Sequential or Random mode. If you do this, it remains in Sequential or Random mode until you revert to Automatic, which can be accessed through the Configuration menu.

Random mode

Random mode is used when there is a full featured or a robotics aware backup application in use. This is the most common mode of operation. In Random mode, the Library does not automatically load tapes into the drive; it waits for commands from the software. Your backup software must support robotics, which may require the additional installation of a Library module.

Sequential mode

Sequential mode is used when backup software is NOT robotics-aware or was designed for standalone drives only. In Sequential mode, the Library automatically loads and unloads tapes from the drive. The operator determines a tape to load by loading the desired tape into the tape drive using the operator control panel.

When a tape is full or unloaded, the Library automatically removes the tape from the drive, puts it in its original slot, then loads the next available higher numbered slot.

Autoload and Loop

To further determine how tapes are loaded into the Library's tape drive while in Sequential mode, you can set Loop and Autoload options from the Library operator control panel.

When Autoload mode is on, the Library automatically loads the cartridge from the lowest-numbered full slot into the tape drive. It then follows standard sequential operation.

When Loop mode is on, the original first cartridge in the sequence is reloaded after the Library has cycled through all available cartridges. If Loop mode is off and the last cartridge has been unloaded, the Library stops loading cartridges until you manually load another.

△ **CAUTION:**

Use caution when choosing Loop mode because it makes it possible to overwrite data on previously written cartridges.

Automatic cleaning

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

The Library can use a cleaning cartridge from any slot, even if the slot is reserved. The Library keeps track of the usage count for each of the cleaning cartridges. When multiple cleaning cartridges are available, the Library will first choose an unknown cleaning cartridge so the Library can start tracking the cartridge's usage count. If the Library knows the usage count for all of the cleaning cartridges, the Library will choose the one with the highest usage count.

Auto cleaning is disabled by default. You can enable automatic cleaning even if there are no cleaning cartridges in the device. In this case, the device will display a warning message.

△ **CAUTION:**

Only enable automatic cleaning in either the backup application or the Library, not both.

Changing the drive configuration (Configuration > Drive Configuration)

Parallel SCSI drives: This option allows you to configure the SCSI ID of the drive.

⚠ **CAUTION:**

If you change the SCSI ID, you must also cycle power on the host server and reconfigure the backup software before using the Library.

Fibre Channel drives: This option allows you to configure the Fibre Speed, Type, ALPA, and Loop mode for the drive's Fibre Channel ports. See "Changing the drive configuration" on page 56 for more information about configuring the Fibre Channel ports.

Access to this feature requires the administrator password.

To change the drive configuration:

1. Highlight the setting you want to change. Press **OK** to select the value field.
2. Press the ▲ Up or ▼ Down buttons until the correct value is displayed. Press **OK** to accept the value.
3. Press the ▲ Up or ▼ Down buttons to navigate to **<Save>**. Press **OK** to save.

Changing the network configuration (Configuration > Network Configuration)

The Library can automatically obtain an IP address from a DHCP server when the Library is powered up. The Library also supports user-specified fixed addresses through the front panel. This option allows the operator to set the network settings or allow the Library to autoconfigure using the DHCP server settings.

Access to this feature requires the administrator password.

Changing the administrator password (Configuration > Administrator Password)

This option allows you to change the administrator password. Access to this feature requires the administrator password or the Service password. Passwords consist of exactly eight characters each between the value of 0 and 9.

Restricted areas prompt for this administrator password before granting access. Once entered, the administrator password does not have to be entered a second time unless there is no user activity for five minutes. To access this screen, enter the administrator password first, if you have not already done so.

📝 **NOTE:**

If you forget the administrator password, you cannot enter a new password. You must call your customer service representative.

Barcode reporting format (Configuration > Barcode Reporting Format)
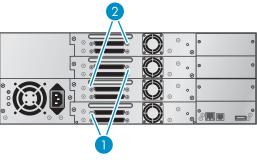
This option sets the format for displaying the tape bar codes for both the operator control panel and the host. With this option, you can configure the number of characters to display and the justification of those numbers to the left or right. Access to this feature requires the administrator password.

Restore defaults (Configuration > Restore Defaults)

This option returns the Library to its original shipping configuration, leaving the settings necessary for the RMI. Access to this feature requires the administrator password.

The following settings are reset:

- SCSI addresses:
  - For full-height tape drives the default SCSI address is 4. For half-height drives, the default SCSI address for the bottom drive in each full-height drive bay is 4 and the default SCSI address for the top drive is 5 as shown in Figure 73.

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Figure 73 SL48 parallel SCSI tape drive default SCSI addresses

1. Tape drives with SCSI address 4

2. Tape drives with SCSI address 5

The Library will no longer recall drives that have been removed.

- Master drive: reset to Drive 1 or the lowest numbered existing drive
- Drive power: all drives powered on
- Active slots: maximum possible
- Library mode: Automatic
- Loop: No
- Event log levels and filter: continuous trace and all levels and filters active (for Service use only)
- Barcode reader label length: 8
- Barcode reader alignment: Left
- Error recovery: On
- Mailslot configuration: mailslot disabled
- Auto clean: disabled
- SNMP: disabled, but saved addresses do not change
- E-mail notification: disabled, but configurations retained

The following settings are not reset:

- Administrator password
- Network settings (network is always enabled and the network addresses are retained)
- Date and time

IMPORTANT:

When the defaults are restored, the Library will rediscover and renumber the tape drives from the bottom of the Library up. If a tape drive was added between two other tape drives since the last time the drives were discovered, that tape drive and the ones above it will be renumbered. You might need to update the configuration of the backup application when tape drives are renumbered.

Setting the Library date and time (Configuration > Set Date/Time)

This option sets the date and time used by the Library to record events. Access to this feature requires the administrator password.

NOTE:

Time is based on a 24-hour clock. There is no a.m. or p.m. designation. For example: 1:00 p.m. is 13:00.

Operations menu

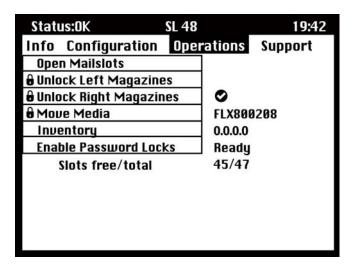The Operations menu contains the following Library operation options:

Figure 74 Operations menu

Opening the mailslot (Operations > Open Mailslot)

The mailslots are used only with host system software that supports this feature. The mailslot feature allows you to insert or remove up to three tapes.

Left magazines are available without mailslots, with one mailslot, or with three mailslots. The SL48 Tape Libraries are shipped with the 3-mailslot magazine on the lower left side. Mailslot-capable left magazines are marked with a white dot on the lower right corner that aligns with a white dot on the front bezel, as shown in Figure 75. Placing a mailslot magazine in any location other than the lower-left location will result in the magazine being treated as a magazine with no mailslots.
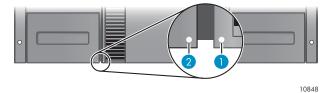
Figure 75 Mailslot-capable magazine and slot, each marked with a white dot

The Library will push the mailslot open when instructed to open mailslots. After the mailslot is closed, the Library will inventory the tapes in the mailslot, but not the rest of the tapes in the magazine, which allows the Library to resume operations sooner.

NOTE:

If you exchange the magazine in the lower-left position with one that has different mailslot capabilities, a warning appears telling you that the mailslot type is incompatible with the configuration.

Unlocking, removing and replacing magazines (Operations > Unlock Left/Right Magazines

This option grants access to the left and right magazines. After exchanging tapes in a magazine, slide the magazine completely into the Library. The magazine locks into place. Access to the magazines requires the use of the administrator password.

Once all left or right magazines are correctly installed, the Library inventories the magazines.

📝 **NOTE:**

Due to the Library design, all left or all right magazines will be unlocked. The Library will halt robotic functions until all magazines are present. It is not possible to unlock all of the magazines at once from the front panel.

Moving Media (Operations > Move Media)

This option instructs the Library to move a cartridge from a tape drive, a tape slot in any magazine or a mailslot to any other location not already holding a tape. This option also lets you load and unload tape cartridges to and from the installed tape drives. To use this command, you must first select where you want to move the tape from (in one of the Source fields), and then indicate where you want to move the tape to (in one of the Destinations fields).

Source Type: This toggles between all available mailslot, magazines. and drives.

Source -> Source by Label: If appropriate, this toggles between available source cartridges. Only Full source slots are available for selection.

Destination Type: This toggles between all available destinations: Mailslot, Magazine, and Drive.

Destination: If appropriate, this option allows you to specify the cartridge destination. For a magazine, select a slot. Only Empty destination slots are available for selection.

Access to the **Move Media** option requires the use of the administrator password.

Performing Inventory (Operations > Inventory)

This option updates the inventory status of the Library. The Library checks each slot and drive for bar codes and determines if tapes are present or not.

📝 **NOTE:**

This command is needed only if the inventory in the Library is different than the inventory displayed on the front panel, which would not happen under normal conditions.

Enabling Password Locks (Operations > Enable Password Locks)

This option locks the restricted areas. This is typically used if the operator does not want to wait for the time out to reset the locks. Power cycling or Library Reset also resets the locks.

Support menu

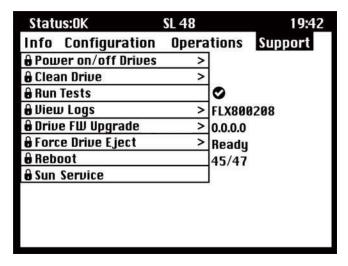The following **Support** menu options are available:

Figure 76 Support menu

Powering drives on and off (Support > Power on/off Drives)

This option allows the powering up or down of a drive without interrupting power to the rest of the Library and the other drives. This is typically used when replacing one drive. Access to this feature requires the administrator password.

Cleaning the tape drive (Support > Clean Drive)

This option allows you to clean the drives. Access to this feature requires the administrator password.

When the **Clean** drive LED is on, the tape drive needs to be cleaned. Cleaning times can range from a few seconds to a few minutes during which time the **Ready** LED blinks. Use only the designated cleaning cartridge for your tape drive model. All cartridges are available at http://www.sun.com/storagetek/tape_storage/tape_media/lto/. Use only Ultrium Universal cleaning cartridges.

IMPORTANT:

If the cleaning cartridge is not a valid cleaning cartridge, the LCD screen displays **Invalid Tape** and the cartridge is exported.

IMPORTANT:

If the **Clean** drive LED, or the Media **Attention** LED (on load or unload) occurs when inserting the same cartridge after you have cleaned the drive, there may be a problem with that cartridge.

When using the operator control panel to clean the tape drive, import the cleaning cartridge into the mailslot or any other empty slot before beginning the cleaning steps. If you would like to keep a cleaning cartridge in the Library, the backup software must manage tape drive cleaning or be configured to bypass the slot containing the cleaning cartridge.

The **Clean** drive option lets you load a cleaning tape into any active drive. To use this command, you must first select the drive to be cleaned and then select where you want to load the cleaning tape from.

- **Source Type**: This toggles between all available sources: Mailslot, Magazine.
- **Source/Source by Label**: If appropriate, this toggles between available source cartridges. Barcode abels beginning with CLN are automatically displayed at the top of the list.

After cleaning, the Library returns the cleaning cartridge to the original slot. If you loaded the cartridge from the front panel, you should now unload it from that slot either by using the mailslot, or by removing the magazine. When the tape drive cleaning is complete, the **Clean** drive LED turns off (if previously on).

Running tests (Support > Run Tests)

This option allows you to run a demo, a wellness test or a slot to slot test and to specify the number of test cycles required. You can abort the test at any time, if required. Access to this feature requires the administrator password.

📝 **NOTE:**

Abort is available only on the operator control panel. You cannot abort a test that has been started from the RMI.

Viewing logs (Support > View Logs)

This option allows you to view the following logs: Error, Warning, Informational, and All Events possible. Access to this feature requires the administrator password.

Updating Library and drive firmware

The Tape Library allows two types of firmware to be upgraded — one for the tape drives and the other for the Tape Library itself. You can upgrade both types of firmware from a USB flash drive or RMI. You can also upgrade drive firmware from a firmware upgrade tape.

Using a USB drive to upgrade firmware (Support > FW Upgrade > By USB)

This option allows you to upgrade Tape Library or drive using a USB flash drive in the Tape Library's USB port on the back panel. No operations will be available until the upgrade completes. Access to this feature requires the administrator password.

1. Download current Library firmware from the Sun SunSolve website: http://sunsolve.sun.com. Copy the firmware onto the USB flash drive.

2. Insert the USB flash drive into the USB port on the back of the device.

3. From the **Support** menu, select **FW Upgrade > By USB**.

4. Select the target for the upgrade, which will be one of the tape drives or the Library, and select the filename of the firmware.

5. Click **Upgrade**.

6. When the upgrade is complete, remove the USB flash drive from the USB port.

Using a firmware upgrade tape to update drive firmware (Support > Update Drive by Tape)

This option allows the updating of drive code using a firmware upgrade tape. No operations will be available until the update completes. Access to this feature requires the administrator password. To use this command, select the drive or drives to be upgraded, and then select where you want to load the firmware upgrade tape from.

- **Source Type**: This toggles between all available sources: magazines and drives.
- **Source**: This toggles between available source cartridges. You can select a specific slot (Source field) or specify the firmware upgrade tape's barcode (Source by Label field). Unlabeled tapes need to be accessed by their slot number.

📝 **NOTE:**

To use the **All Drives** function all the drives must be of the same type. If they are not, you are warned: "Not all drives the same. Upgrade drives individually". Press **OK** to return to the option list with All Drives highlighted.

Force ejecting a drive (Support > Force Drive Eject)

This option attempts to force the tape drive to eject the tape and place it into an open slot in the Library. Access to this feature requires the administrator password.

Before issuing this command, Sun recommends that you attempt to eject the tape using the backup software and move command on the operator control panel. While a drive is being force ejected, a window indicating the process is ongoing should appear. No operations will be available until force eject completes.

NOTE:

If the drive has difficulty ejecting the tape, suspect bad or damaged media.

Rebooting the Tape Library (Support > Reboot)

This option reboots the Tape Library and the tape drives within the Library and forces a new cartridge inventory, clearing any current error condition. It updates drive lists in sub-menus. Access to this feature requires the administrator password.

CAUTION:

This option interrupts the current backup or restore operation and causes the operation to fail. It is primarily used if the Library is in an error state.

5 Troubleshooting

⚠ CAUTION:

This Library or Autoloader is designed to operate when installed in a rack using the included rack rails. The Library and Autoloader can also be set on a flat surface when mounted in the optional Rack-to-Tabletop Conversion Kit. Operating the Library or Autoloader without one of these kits, such as on a flat surface without the Rack-to-Tabletop Conversion Kit, could result in device errors. Placing any weight on top of the device might also cause errors.

⚠ CAUTION:

Shipping Lock: The shipping lock must be removed for the robotics to work properly. The device displays a robot move error if the shipping lock is not removed (see "Removing the shipping lock" on page 27).
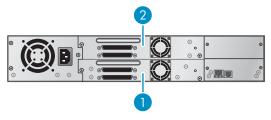
Detection problems after installing a parallel SCSI device

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

- Does the application software detect the tape drive?
- Does the application software detect the Library or Autoloader?
- Does the operating system detect the tape drive?
- Does the operating system detect the Library or Autoloader?
- Does the operating system detect the Library or Autoloader, but list it as a generic device?

Based on the extent of the detection problem, check the following:

- If neither the application software nor operating system detects the tape drive, or they do not detect both the tape drive and the Library or Autoloader:
  - Check the SCSI ID and change it if necessary. The default SCSI ID for each tape drive will be 4 or 5 depending on the Library or Autoloader model and drive slot:
    - SL24: For full-height tape drives the default SCSI address is 4. For half-height drives, the default SCSI address for the bottom drive is 4 and the default SCSI address for the top drive is 5 as shown in Figure 77.
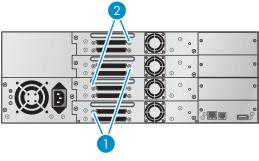
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Figure 77 SL24 parallel SCSI tape drive default SCSI addresses

1. Tape drives with SCSI address 4

2. Tape drives with SCSI address 5

- SL48: For full-height tape drives the default SCSI address is 4. For half-height drives, the default SCSI address for the bottom drive in each full-height drive bay is 4 and the default SCSI address for the top drive is 5 as shown in Figure 78.

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Figure 78 SL48 parallel SCSI tape drive default SCSI addresses

1. Tape drives with SCSI address 4

2. Tape drives with SCSI address 5

Depending on other devices attached to the same parallel SCSI bus and their SCSI IDs, you may need to change the SCSI ID before using the device. Review the manuals for the other devices on the parallel SCSI bus or your operating system to determine which SCSI IDs are currently in use. Change the SCSI ID with the OCP (for the SL24 see "Changing the SCSI address" on page 76, for the SL48 see "Changing the drive SCSI ID (Configuration > Drive Configuration)" on page 98) or RMI (see "Changing the drive configuration" on page 56).

- Verify that all parallel SCSI cables are securely connected on both ends. Check the length and integrity of your parallel SCSI cabling. Check the parallel SCSI connector for bent pins. The length of the internal parallel SCSI cabling inside the device is 0.5 m (1.6 ft). This length must be included in any calculations of cable length.
  - For LVD SCSI, the maximum length with only a single device on the parallel SCSI bus is 25 m (82 ft).
  - For Ultra 320 or multiple devices on an LVD bus, the maximum combined internal/external length is 12 m (40 ft).
  - If you have a combination of LVD and SE devices on the bus, the maximum cable length reverts to the SE specification, which for Ultra devices is 3 m (10 ft) for four or fewer devices, and 1.5 m (5 ft) for more than four devices.
- If the application software or operating system detects the tape drive, but not the Autoloader or Library:
  - Verify that multiple LUN support is enabled on the HBA. The device uses two Logical Unit Numbers (LUNs) to control the tape drive (LUN 0) and robotic (LUN 1). The device requires an HBA with multiple LUN support and multiple LUN support must be enabled on the host computer. When multiple LUN support is not enabled, the host computer can see the tape drive, but not the Autoloader or Library.

📝 **NOTE:**

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

- If the application software or operating system does not detect any devices on the HBA:
  - Verify that your parallel SCSI host adapter is installed correctly. Refer to the manual that came with your parallel SCSI host adapter for installation and troubleshooting instructions. Pay particular attention to any steps describing configuration settings. Make sure that the host adapter is properly seated in the motherboard slot and the operating system correctly

detects the host adapter. Make sure that the proper device driver is installed for the parallel SCSI host adapter.

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

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

If you continue to have problems with a parallel SCSI Autoloader or Library, check the following:

- Ensure that the device is compatible with the parallel SCSI host adapter and backup application you plan to use. For a list of compatible parallel SCSI host bus adapters and application software, check with your parallel SCSI host adapter manufacturer and backup application vendor.

NOTE:
The host bus adapter should be SCSI-3 LVDS. A single-ended parallel SCSI host bus adapter severely degrades performance. Also, if any SE devices are on the same parallel SCSI bus, all of the devices on the bus slow down to SE speed, which severely degrades performance.

The Autoloader or Library is NOT compatible with a standard differential (Diff) or high-voltage differential (HVD) SCSI bus.

- Verify that your HBA is supported by the host computer and qualified with the Autoloader or Library.
- If one of the ports on the device is not connected to another parallel SCSI device, the port must be terminated. Only the devices physically located at the beginning and end of the parallel SCSI bus should be terminated. Refer to the manuals supplied with the other devices on the parallel SCSI bus for information on enabling or disabling termination on those devices.
  - To terminate the second parallel SCSI port on the device, locate the terminator in the accessories package and press it firmly into either of the two parallel SCSI connectors on the back panel. Secure the terminator by tightening the finger-screws until snug. The supplied terminator is "dual mode" and works on both Low-Voltage Differential (LVD) and Single Ended (SE) SCSI buses. Check all parallel SCSI and power connections and confirm that the unit is attached to a valid SCSI SE or LVDS bus.

Fibre Channel connection problems

Use the Status screen to check the link connection for your tape drive.

If the screen shows Logged Out:

- Check that the Fibre speed is set to Automatic (on the RMI) or Auto Detect (on the OCP), or that the correct fibre speed is selected. If you are unsure of the speed of the HBA or switch that the Autoloader or Library is connected to, try Automatic (on the RMI) or Auto Detect (on the OCP).
- Check that the correct port type, fabric or loop, is selected. Loop requires additional configuration. If you are unsure of the correct port type, try Automatic (on the RMI) or Auto Detect (on the OCP).

If the screen shows No Link, the Speed Status is – and the Link LED on the back of the drive is off:

- The speed is probably set incorrectly. Try setting the speed to Automatic (on the RMI interface) or Auto Detect (on the OCP).
- If there are still issues, change the port type to Auto Detect.

If the screen shows No Light:

- The cable is not plugged in correctly. Check that it is connected correctly to Port A of the tape drive.
- The cable is damaged. FC cables are delicate. If the cable has been bent or twisted sharply, it may be broken and must be replaced.

If the screen shows ALPA Conflict:

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

Operation problems

Table 14 Power problems

Problem	Solution
Device does not power on.	1. Check all power cord connections. 2. Make sure the power button on the front panel has been pressed, and the green **READY** LED is lit. 3. Make sure the outlet has power. Try another working outlet. 4. Replace the power cord.
No display messages appear.	1. Make sure the power cord is connected. 2. Make sure the power button on the front panel has been pressed, and the green **READY** LED is lit. 3. Power cycle the device. 4. If the display is still blank but the Autoloader or Library appears to be powered on, try to get the Autoloader or Library status or error information from the RMI.
All power supply LEDs are off (SL48).	1. Check all power cord connections. 2. Make sure the power button on the front panel has been pressed, and the green **READY** LED on the front panel is lit. 3. Make sure the outlet has power. Try another working outlet. 4. Replace the power cord.
Blue power supply LED is lit and green power supply LED is off (SL48).	The blue LED is lit when the power supply is plugged into a good outlet. The green LED is lit when the power supply is producing good power. 1. Replace the power supply.
Yellow power supply LED is lit (SL48).	The yellow LED is lit when the power supply fan is not rotating at an acceptable speed. 1. Check the power supply fan for obstructions. 2. Replace the power supply.

Table 15 Failure/attention indications displayed on the front panel

Problem	Solution
"!" in operator panel inventory display.	Export the data cartridge marked with an **!** in the inventory. The cartridge is either damaged, incompatible with the drive, or the wrong type for the attempted operation. For the SL24, see "Operator control panel (OCP)" on page 66 for more information. For the SL48, see"Moving Media (Operations > Move Media)" on page 94.
The LCD displays an error code.	Look up the error code, try to resolve the failure, and power cycle the device (see "Error codes" on page 123). On the SL24 OCP, press **Enter** to see the error message for the error code.

Table 16 Tape movement problems

Problem	Solution
Tape stuck in drive.	Try the following steps, in this order, to remove the stuck tape. **NOTE:** The tape drive must rewind the tape before ejecting it. This can take as long as five minutes, depending on how much tape must be rewound. Once the tape is rewound, the eject cycle will take fewer than 16 seconds. The **READY** light flashes while the tape rewinds. Wait for the tape to finish rewinding before attempting another operation. 1. Attempt to unload the tape from your backup software. 2. Shut down the backup software and stop the operating system's removable storage services. From the OCP, attempt to unload or move the tape to a slot. (For SL24, see "Moving tapes in the device" on page 82. For SL48, see Moving Media (Operations > Move Media)). 3. Power down the unit, disconnect the cable from the drive, power up the unit, and wait until the tape drive is idle or ready. From the OCP, attempt to unload or move the tape to a slot. 4. From the OCP, attempt a force eject or emergency unload operation. (For SL24, see"Forcing the drive to eject a tape" on page 87. For SL48, see "Force ejecting a drive (Support > Force Drive Eject)" on page 105) **IMPORTANT:** Inspect the tape cartridge that was stuck. Damage or misplaced labels on the cartridge could have caused the load/unload failure. Discard any tape cartridge found to have issues.
Tape stuck in storage slot.	To remove a stuck tape from a storage slot: If the operator control panel or the remote management interface is still operational: 1. Move the tapes from the drives to the magazines using the **Move Tape** command. (For SL24, see "Moving tapes in the device" on page 82. For SL48, see Moving Media (Operations > Move Media).) 2. Use the magazine removal process to release the magazine and remove it from the device. To use the SL24 operator control panel, see Unlocking, removing, and replacing magazines. To use the SL48 operator control panel, see Unlocking, removing and replacing magazines (Operations > Unlock Left/Right Magazines). To use the RMI, see Releasing and replacing the magazines. If neither one of these processes works, see Releasing the magazines manually. 3. Manually remove the cartridge from the magazine by inserting a finger in the hole at the back of the magazine. Some tapes need to be inserted and removed several times to condition them for free movement in and out of the magazine.

Table 17 Media problems

Problem	Solution
Cleaning or data cartridge incompatible with drive.	Make sure you are using data and cleaning cartridges that are compatible with the drive and model of your device (see "Tape cartridges" on page 37) and that you are using the correct cartridge type for the operation. The device automatically unloads incompatible cartridges, the **Attention** LED flashes, and an exclamation point (!) displays in the inventory display for the indicated slot number. Export the media to clear the state.
Cannot write to or read from tape.	• Make sure that the cartridge is not a WORM cartridge that has already been used. • Make sure that the cartridge is write enabled (move the write-protect switch to the enabled position). • Make sure the data cartridge is compatible with the drive model. LTO tape drives can read data cartridges from two generations back and write to data cartridges one generation back. (See "Backward read compatibility" on page 39.) • Make sure you are using an Ultrium cartridge that has not been degaussed. **Do not degauss Ultrium cartridges!** • Make sure that the cartridge has not been exposed to harsh environmental or electrical conditions and is not physically damaged in any way. • Many backup applications do not read or write to cartridges that were created using a different backup application. In this case, you may have to perform an erase, format, or label operation on the cartridge. • Make sure you understand any data protection or overwrite protection schemes that your backup application may be using, which could prevent you from writing to a given cartridge. • Retry the operation with a different, known good tape. • Clean the tape drive. (For SL24, see "Cleaning tape drive" on page 66. For SL48, see Cleaning the tape drive (Support > Clean Drive).)

Table 18 Parallel SCSI device not detected

Problem	Solution
Device not detected	• Check that the HBA supports multiple LUNs and this feature is enabled. If not, only the tape drive will be detected. • Check for conflicting SCSI IDs. • Power on the device before powering on the host computer. • Make sure the Autoloader or Library does not have the drive off line and that the Autoloader or Library is not running a test. • Attach the device to an LVDS SCSI host adapter/bus. • The parallel SCSI cable length might be too long. Use a shorter cable or remove other devices from the bus. • Parallel SCSI bus not properly terminated. See "SCSI detection problems" on page 107. • Check that the device is fully powered up and is not in an error state. • Check the parallel SCSI connector and terminator for bent pins. See "SCSI detection problems" on page 107 for more detailed troubleshooting help.
Changed drive SCSI ID, but the host server does not recognize the new ID.	• Make sure that all parallel SCSI devices on the same bus have unique SCSI ID numbers. • Only SCSI IDs 0 through 7 are available on a narrow (50 pin) bus. If the Autoloader or Library is on a narrow bus and has a SCSI ID of 8 or greater, the host server will not detect the drive. If you must use SCSI IDs 8 or greater, use a wider bus. • Reboot the host server.

Table 19 Attention LED is lit

Problem	Solution
Both the Attention and Cleaning LEDs are lit.	This is most likely caused by a dirty drive that cannot read a tape and marks the tape invalid. 1. View the inventory with the RMI. Note the slots that have tapes marked with **!**. 2. Remove any magazines that contain tapes marked with **!**. 3. Remove the tapes that were marked with **!**. 4. Inspect each removed tape for damage, check that the tape is compatible with the drive, and ensure that it is not past its usage life. See "Tape cartridges" on page 37. Discard any tapes that are damaged or past their usage life. Do not use cartridges that are incompatible with the tape drive. 5. Reload the magazines with tapes that have passed inspection and new tapes to replace cartridges that did not pass inspection. 6. Replace the magazines. 7. Clean the tape drive.
A particular cartridge sets off the cleaning light.	Check the cartridge for contamination by loose debris.
A cartridge recently imported from a different environment is causing issues.	Media that is moved from one environment to another can cause issues until it has acclimated to the new conditions. A cartridge should be acclimated for at least 24 hours before being used, particularly if it has been stored at a substantially different temperature or level of humidity than the device.
The Attention LED is lit but the Cleaning LED is not lit after a cartridge load.	The Autoloader or Library was unable to complete the requested operation with the selected tape cartridge. • Use only cartridges that are compatible with the drive type (see "Tape cartridges" on page 37). • Use the correct type of cartridges for the operation. For example, use a cleaning cartridge for cleaning. • Make sure you are using an Ultrium Universal cleaning cartridge (see "Tape cartridges" on page 37).
The Cleaning LED is lit after using a cleaning cartridge.	The cleaning cartridge is expired. A cleaning cartridge will expire after 50 cleaning cycles.
A particular cartridge sets off the Attention LED and possibly the Cleaning LED.	If the Media Attention LED is cleared and the drive has been cleaned, and then immediately re-displays each time a particular cartridge is reloaded, that cartridge should be suspected as being defective. • If this occurs, export the cartridge and load a known good cartridge. In some cases, a cartridge can be worn out, have a defective Cartridge Memory, or have been formatted as a Firmware Upgrade Cartridge. • Any cartridge that is suspected of being defective or contaminated should NOT be reused in any drive. • If the bad cartridge is a cleaning cartridge, it might be expired.

Table 20 Inventory problems

Problem	Solution
The inventory labels the cartridge **Full** instead of showing its bar code	• Verify that the label is properly applied. See "Labeling and loading the tape cartridges" on page 36. • Verify that the label is not soiled.
The inventory process takes a long time	Apply high-quality labels to all tape cartridges. During the inventory process, the bar code reader attempts to read the bar code on the cartridge or the bar code on the back of the storage slot until it identifies the cartridge or determines that the slot is empty. The reader can usually identify a properly-labeled cartridge the first time, while determining that an unlabeled cartridge is in a storage slot can take four times as long.

Table 21 RMI network connection issues

Problem	Solution
Cannot connect to the remote management interface (RMI)	• Verify that the device is connected to the LAN with a CAT 5, 6, or 6E Ethernet cable. • Verify that the link LED on the RJ45 (LAN) connector is lit when the device is powered up. If the LED is not lit, the device is not communicating with the LAN. See your network administrator for help. • Verify that the device has been configured with a valid static network address or DHCP has been enabled so the device can obtain a network address. If using DHCP, write down the device's network address from the OCP Information menu. If the device did not obtain a valid address via DHCP, verify that the DHCP server is up and the device has network access to it. If necessary, set a static network address instead. • Enter the device's IP address into the address bar of a web browser connected to the same LAN as the device. If the RMI web page does not display, ping the device's IP address. If the ping fails, verify that the device has a valid network address and that there are no firewalls or other obstructions to network traffic between the computer with the web browser and the device. See your network administrator for help.

Table 22 Cleaning problems

Problem	Solution
Cannot load the cleaning cartridge.	• Make sure you are using an Ultrium Universal cleaning cartridge (see "Tape cartridges" on page 37). • Make sure the cleaning cartridge has not expired. A cleaning cartridge will expire after 50 cleaning cycles. • Contact your service representative.

Performance problems

The process of backing up files goes through many devices, from the files in the file system on the disk, through the backup server, and out to the Autoloader or Library, all managed by software running on an operating system. The backup process can only run as fast of the slowest link in this chain.

To find the performance bottlenecks in your system, check the specifications and performance of the:

- "Average file size" on page 116
- "File system type" on page 116
- "Connection from the host server to the disks" on page 117

Average file size

The hard drive must seek to the position of a file before it can start reading. The more time the disks are seeking to files, the lower the performance.

To determine the average file size, divide the size of the backup by the number of files. See the performance impact of your system's average file size in Table 23.

Table 23 Performance impact of various file sizes

Average file size	Performance impact	Recommendations
<64 k: small files	**BAD**. Lots of small files require the disk to perform many random accesses instead of a continuous read.	- If possible, do NOT use a file-by-file backup method. - For backups with an average file size <64 k, Sun recommends using a sequential/image backup that backs up the hard drive or LUN image instead of the individual files. The drawback with the sequential/image backup method is that you might only be able to restore the entire disk image and not individual files. If you can restore individual files, the restore operation will be very slow.
64 k – 1 mb: medium files	**NEUTRAL**. Performance accessing medium-sized files should be okay. The disks will still need to do a fair number of random accesses.	No change is necessary but using a sequential backup method, such as an image backup, could offer some performance gains. See above for drawbacks.
>1 mb: large files	**GOOD**. Large files let the disk do less seeking and spend more time doing continuous reads.	None.
Image or sequential backup	None. File size is irrelevant for Image or sequential backups.	None.

File system type

The file system determines the organization of the files on the disks. When the files are spread over multiple disks with multiple controllers, some disks can be seeking while others are reading. Find the performance impact of your system's file system in Table 24

Table 24 Performance impact of various file systems

File system	Performance impact	Recommendations
Disk array	**GOOD**. Disk arrays typically provide excellent access to data. They usually include many disks, which improves bandwidth.	None.
Server or workstation with RAID	**VARIABLE**. RAID uses a group of disks to improve performance, and in the case of RAID 5, provides some parity protection in case one of the drives fail.	To improve performance on a disk system, you can use faster disks or add disks. For good performance, each disk should have a sustained read speed of greater than 6 MB/s and there should be one disk per 4 MB/s of native transfer for each tape drive. The recommended number of disks per LTO tape drive is: • LTO-2 HH: 6 • LTO-3 HH: 20 Also, make sure that the server or workstation is used as little as possible during the backup, and close down programs such as virus scanners, which check each file that is opened.
Server or workstation with a single disk (spindle)	**BAD**. A single disk cannot retrieve or write data fast enough for any of the supported tape drives.	Upgrade to a disk array or RAID 5 with the minimum number of disks needed for your tape drives, or use concurrency or multithreading in the backup software to pull from more than one disk at a time. The drawback with concurrency or multithreading is that it slows the restore operation. Also, make sure that the server or workstation is used as little as possible during the backup, and close down programs such as virus scanners, which check each file that is opened.

Connection from the host server to the disks

The connection between the host server and the disks determines how much data can be transferred from the disks to the host computer at a time. A connection with insufficient bandwidth cannot provide enough data for the tape drives to write at full speed. Find the performance impact of your system's disk connection in Table 25.

Table 25 Performance impact of various disk connections

Connection type	Performance impact	Recommendations
Fibre: 1 GB	• LTO-2 HH: **GOOD**. When fully used, a 1 GB fibre connection can provide enough bandwidth for two LTO-2 HH tape drives. • LTO-3 FH: **BAD**. A 1 GB fibre connection is inadequate for an LTO-3 FH tape drive.	For good performance, use a faster connection with LTO-3 tape drives.
Fibre: 2 GB	**GOOD**. When fully used, a 2 GB fibre connection can provide enough bandwidth for the following number of tape drives: • LTO-2 HH: 4 • LTO-3 FH: 1	For good performance, use a faster connection if you have multiple LTO-3 tape drives.

Connection type	Performance impact	Recommendations
Fibre: 4 GB	**GOOD**. When fully used, a 4 GB fibre connection can provide enough bandwidth for the following number of tape drives: • LTO-2 HH: 8 • LTO-3 FH: 2	
Parallel SCSI: Ultra 320	• LTO-2 HH: **GOOD**. When fully used and assuming that the connection to the disks does not force the speed to a lower parallel SCSI type, an Ultra 320 connection can provide enough bandwidth for five LTO-2 HH tape drives. • LTO-3 FH: **GOOD**. When fully used and assuming that the connection to the disks does not force the speed to a lower parallel SCSI type, an Ultra 320 connection barely provides enough bandwidth for a single LTO-3 FH tape drive.	If cables not designed for Ultra 320 speeds are used or there are more than a couple devices on the bus, the bus may slow down to Ultra 160 speeds.
Parallel SCSI: Ultra 160	• LTO-2 HH: **GOOD**. When fully used and assuming that the connection to the disks does not force the speed to a lower parallel SCSI type, an Ultra 160 connection can provide enough bandwidth for two LTO-2 HH tape drives. • LTO-3 FH: **Marginal**. An Ultra 160 connection is barely adequate for an LTO-3 FH tape drive. The bus would be saturated when providing 2:1 compressible data to an LTO-3 FH tape drive.	Upgrade to Ultra 320 for parallel SCSI disk drives when using an LTO-3 tape drive, especially if your data is greater than 2:1 compressible.
Parallel SCSI: Ultra 2 (80)	• LTO-2 HH: **MARGINAL**. When fully used and assuming that the connection to the disks does not force the speed to a lower parallel SCSI type, an Ultra 2 (80) connection barely provides enough bandwidth for an LTO-2 HH tape drive. • LTO-3 FH: **BAD**. An Ultra 2(80) connection is inadequate for an LTO-3 FH tape drive.	Upgrade to Ultra 320 for parallel SCSI disk drives when using an LTO-3 tape drive.
Parallel SCSI: Ultra Wide, Fast Wide	**BAD**. Ultra Wide and Fast Wide are inadequate transport mechanism for LTO tape drives.	Upgrade to a faster transport medium, such as Ultra 320 SCSI.
Ethernet: 1 Gigabit	• LTO-2 HH: **MARGINAL**. A 1 Gigabit Ethernet connection barely provides enough bandwidth for an LTO-3 tape drive with two concurrent streams are used. The drawback of using concurrency is that restore operations take longer. • LTO-3 FH: **BAD**. A 1 Gigabit Ethernet connection is inadequate for an LTO-3 FH tape drive.	Upgrade to Fibre Channel if using LTO–3 tape drives.
Ethernet: 100 Base T, 10 Base T	**BAD**. 100 Base T and 10 Base T Ethernet do not have enough bandwidth to support any of the drives and would require too many streams to make concurrency practical.	Upgrade to Gigabit Ethernet or Fibre Channel.
Internal disks on backup server	**BAD**. Add-in RAID controllers, RAID on a chip (ROC), RAID on the mother board (ROMB), internal parallel SCSI, and internal IDE (non-RAID) are inadequate transport mechanisms for LTO tape drives.	Use a dedicated disk array or upgrade to RAID 5.

Operating system configuration

The operating system configuration and other programs running on the host computer can impact the ability of the host computer to transfer files from the disks to the tape drive.

Windows

To improve backup performance and improve SAN stability, shutdown and disable the Windows Removable Storage Manager unless the backup software requires it:

1. From the Windows **start** menu, select **Control Panel**.

2. In the Control Panel, select **Administrative Tools**.

3. In the Administrative Tools, select **Services**.

4. In Services, right-click **Removable Storage** and select **Stop**. The Status should be blank as shown in Figure 79.
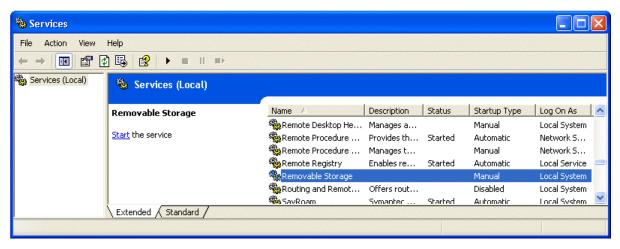
Figure 79 Removable Storage service

5. Right-click **Removable Storage** again and select **Properties**.

6. Change the **Startup type** to Disabled and click **OK**.

Stop as many programs as possible while a backup or restore is in progress. Be especially aware of monitoring applications, such as anti-virus software, which check every file that is read. If you are concerned about viruses and backup performance, perform a virus scan before starting the backup, and shut down the anti-virus software while the backup is running.

Novell

You might need to tweak some Novell operating system parameters to achieve good backup performance.

- The MAXIMUM PACKET RECEIVE BUFFERS and MINIMUM PACKET RECEIVE BUFFERS parameters may need to be increased (if currently maxed out, try setting the MINIMUM to the current MAXIMUM and then double the value for the MAXIMUM on the backup server and any remote servers that are backed up).

- The MAXIMUM DIRECTORY CACHE BUFFERS and MINIMUM DIRECTORY CACHE BUFFERS parameters may need to be increased (if currently maxed out, try setting the MINIMUM to the current MAXIMUM and then double the value for the MAXIMUM on the backup server and any remote servers that are backed up.)

- Set TCP DELAYED ACKNOWLEDGEMENTS to OFF.

- Since Novell volumes may be compressed, hardware compression may lower the performance and capacity. If the volumes are compressed, make sure that the backup software does not uncompress the data on read and has hardware and software compression disabled.

NOTE:
Disabling the hardware compression should not be necessary on LTO drives as they sense the compression ratios and can automatically adjust if they receive non-compressable data.

- Stop as many programs as possible while a backup or restore is in progress. Be especially aware of monitoring applications, such as anti-virus software, which check every file that is read. If you are concerned about viruses and backup performance, perform a virus scan before starting the backup, and shut down the anti-virus software while the backup is running.

Backup server

The backup server must have enough RAM and processor power to transfer the files from the disk to the tape drive. See Table 26 for the minimum RAM and CPU speed needed for each tape drive. In some cases, a multi-processor server may be required.

NOTE:
Processor speed numbers as based on Intel x86 type processors. Use the equivalent on a RISC or other type of processor.

Table 26 Backup server requirements

Tape drive	Minimum RAM/drive	Processor power/drive
LTO-2 HH	512 MB	1 GHz
LTO-3 FH	1 GB	2 GHz

In addition to having enough RAM and processing power, ensure that the PCI bus is at least 64 bit, has a speed of 66 MHz or better, and is not overloaded by too many high-bandwidth cards. PCI-X is preferred.

Backup type

Each type of backup has its own impact on performance, depending on how well it can keep data streaming to the tape drive.

File-by-file with a full-featured backup application

Performance impact: **VARIABLE**.

File-by-file backup with a full-featured backup application can be fast enough if the average file size is at least 64 k and there are not too many fragmented files. Full-featured backup applications also offer the best speeds for single file restores and allows for backing up only specific data.

If the average file size is less than 64 k or if the file system is very fragmented, file-by-file backup will have poor performance. If the file system has a lot of fragmentation, use a de-fragmentation utility to make the files contiguous again. If the average file size is less than 64 k, Sun recommends that you use a sequential/image backup that backups up the hard drive or LUN image instead of the individual files. The drawback with sequential/image backups is that they may only be able to restore the entire disk image and not individual files. If they can restore individual files, the restore operation will be very slow.

File-by-file with a native application

Performance impact: **BAD**.

Native backup applications based on tar, cpio, NT Backup, etc. do not have the extra features needed to manage the bandwidth requirements of the faster tape drives and should only be used to test basic functionality.

To get the best backup and restore performance, use a full-featured backup application. If the average file size is less than 64 k, use a sequential/image backup for best performance. However, a sequential/disk image backup might not allow you to restore individual files or the restore process will be very slow.

Disk image, flash, or sequential

Performance impact: **GOOD**.

A disk image or sequential backup backs up an entire disk, partition, or LUN by looking at the disk sector by sector instead of file by file. The entire disk contents is backed up contiguously, without the disk seeking, which prevents performance degradation caused by small or fragmented files.

If you are more concerned about backup performance than single-file restore, disk image or sequential backups can offer a real performance benefit. The disadvantage is that backup and restore operations work on an entire disk, partition, or LUN. You might not be able to backup a subset of files or restore a single file. If you can restore a single file, the restore process will be slow.

Database backup

Performance impact: **VARIABLE**.

To improve performance when backing up data from a database:

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

Connection from the host server to the Autoloader or Library

For the best performance, the connection from the host server to the Autoloader or Library must have enough bandwidth to provide enough data to keep the tape drive streaming.

NOTE:

Unlike most tape technologies, an LTO tape drive can write data as fast as the server can send it, even if the tape drive is not streaming.

Find the performance impact of your system's Autoloader or Library connection in Table 27

Table 27 Performance impact of various Autoloader or Library connections

Connection type	Performance impact	Recommendations
Parallel SCSI: Ultra 320	**GOOD**. When fully used, an Ultra 320 SCSI connection can provide enough bandwidth for the following number of tape drives, assuming 2:1 compression: • LTO-2 HH: 2 • LTO-3 FH: 1	Ultra 320 is an excellent transport medium, but only has enough bandwidth for one LTO-3 drive per bus. **NOTE:** If the parallel SCSI cables are not designed for Ultra 320 speeds or more than a couple devices are on the parallel SCSI bus, the bus may slow down to Ultra 160 speed.
Parallel SCSI: Ultra 160	• LTO-2 HH: **GOOD**. When fully used and assuming that the connection to the disks does not force the speed to a lower parallel SCSI type, an Ultra 160 connection can provide enough bandwidth for two LTO-2 HH tape drives. • LTO-3 FH: **MARGINAL**. An Ultra 160 connection is barely adequate for an LTO-3 FH tape drive. The bus would be saturated with 2:1 compressible data.	Ultra 160 is a good transport medium, but does not have enough bandwidth for LTO-3 tape drives. If using LTO-3, upgrade to an Ultra 320 HBA, especially if you have greater than 2:1 compressible data.
Parallel SCSI: Ultra 2 (80)	• LTO-2 HH: **MARGINAL**. Ultra 2 (80) barely has enough bandwidth for one LTO-2 HH drive. • LTO-3 FH: **BAD**. An Ultra 2 (80) connection is inadequate for an LTO-3 FH tape drive.	Upgrade to Ultra 320.
Parallel SCSI: Ultra Wide, Fast Wide	Ultra Wide and Fast Wide are inadequate for all of the currently supported tape drives.	Upgrade to Ultra 320.
Fibre channel: 1 GB	• LTO-3 FH: **BAD**. One gigabit fibre is inadequate for an LTO-3 FH tape drive.	For LTO-3 drives, upgrade to 2 or 4 GB Fibre Channel.
Fibre channel: 2 GB, 4 GB	**GOOD**. When fully used, two and four gigabit fibre channel have plenty of bandwidth for all supported tape drives.	

Media

Once the data gets to the tape drive, it must be written onto the tape. If there are no bottlenecks and the Autoloader or Library starts having performance problems:

• Try a new cartridge. A marginal cartridge can cause performance problems when the tape drive has to retry writing to bad spots on the tape.
• Clean the tape drive. See "Tape cartridges" on page 37 for instructions.

Service and repair

Releasing the magazines manually

If you cannot remove the magazines via the OCP or RMI, do the following:

1. Unplug the power cord from the device.
2. From the back of the device, find the access holes for the right and left magazines. See Figure 80.

10863
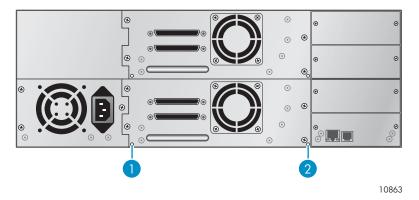
Figure 80 Access holes for the right and left magazines

1. Right magazine release

2. Left magazine release

3. To manually release a magazine, push the end of a small metal pin or straightened paper clip into the magazine access hole at the back of the device. While holding the paper clip, have a second person attempt to pull the magazine out of the front of the unit. For the SL48, all magazines on a side are released and should be removed at the same time. See Figure 81.

11342
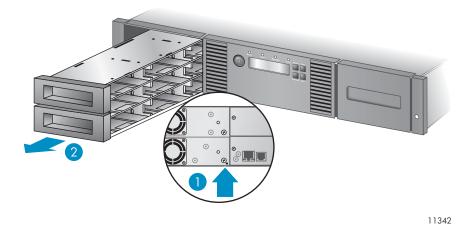
Figure 81 Releasing the magazine

1. Push a paper clip into the access hole.

2. Pull the magazine out of the front of the unit.

4. Repeat step 3 for the other magazine if necessary.

5. If other tapes are still in the device, or if you were unable to manually remove the magazines and drive, contact Sun customer service for further instructions.

Error codes

If an error occurs during operation, the device stops the current operation and displays an error code on the LCD screen. Unless otherwise noted in "Operation problems" on page 110, record the error code or error message from the LCD screen, and then try to resolve the error by cycling power to the device and retrying the operation.

To check the overall operation of the device, run the wellness test from the RMI or OCP. The wellness test exercises all robotic movements and checks the status of the electrical components and communication.

To run the wellness test from the RMI, see "Performing general diagnostics" on page 63. To run the wellness test from the SL24 OCP, see "Running the Wellness test" on page 85. To run the wellness test from the SL48 OCP, see "Running tests (Support > Run Tests)" on page 104.

If the error persists, contact support personnel.

There are three ways to obtain error codes from the device:

- on the SL24 OCP or the SL48 OCP
- on the RMI

Finding error code information on the SL24 OCP

When an error first occurs, the error message and error code are displayed on the OCP, as shown in Figure 82.

```
Robotic Failure
   Code: 9B 37
```

Figure 82 Initial OCP error message

The code **9B** is the main error code, and **37** is the error sub-code.

If you review the Error Log in the Support menu, the OCP error log displays the error code, as shown in Figure 83.

```
Err  0:9B 37 31
 Enter for text
```

Figure 83 Error code in the OCP Error Log

The code **9B** is the main error code, **37** is the error sub-code, and **31** is sub-code specific information for factory use only. When you press **Enter**, the OCP displays the error message, as shown in Figure 84.

```
Robotic Failure
```

Figure 84 Error message in the OCP Error Log

If you press **Next**, the OCP will display additional information, if available, as shown in Figure 85.

```
No More Info
```

Figure 85 No additional information in the OCP error log

If you press **Next** again, the OCP will display the date and time in the format: **YYYY-MM-DD** followed by the time in 24–hour clock format, where 1:00 pm is 13:00, as shown in Figure 86.

Figure 86 Date and time in the OCP error log

Finding error code information on the SL48 OCP

Error codes are displayed in pop-up messages when an error occurs during an operation that is initiated from the operator control panel.

The message shows the error code and a description of the error.

For example:

8D 52
Mechanical Block

where:

8D is the main error code
52 is the error sub-code.

The error log contains a list of all errors, with a separate row for each error. The log shows the Date/Time, Code, and Description.

For example,

24/06/05 01:48	**D7 50**	**System Error**

where:

24/06/05 is the date in the format DD-MM-YY
01:48 is the time in 24–hour format. For example, 1:00 pm is 13:00.
D7 is the main error code
50 is the error sub-code

Finding error code information on the RMI

You can find error codes on the RMI Support: Library Logs page. The available logs are: Error Trace, Informational Trace, Warning Trace, Configuration Change Trace, and Standard Trace.

The log entries are displayed in order of most recent to oldest. The format for the log entries is:
YY.MM.DD HH.MM.SS.ss LIB/ERR<80 89 62 40

- YY.MM.DD — the date displayed as Year.Month.Day
- HH.MM.SS.ss — the time displayed as Hour.Minute.Second.Hundredths fo a second
- First code — hard or soft error. The code after LIB/ERR (80 in the example) will be 80 or 40. 80 indicates a hard error, 40 indicates a soft error.
- Second code — the main error code (89 in this example). See "Error codes" on page 123 for a list of error codes and recovery procedures.
- Third code — the sub-code (62 in this example). See "Error sub-codes" on page 133 for a list of sub-codes.
- Fourth code — sub-code-specific information for factory use only
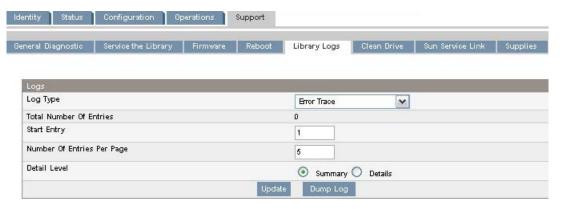
Figure 87 Support: Library Logs page

Main error code descriptions

The following table lists the main error codes with details and a solution.

Table 28 Main error codes

Error code	Description	Details and solution
80	Cannot initialize bar code reader	Power-cycle the unit and retry the operation
81	No response from bar code reader	
82	No response from EEPROM on robotic controller	
83	Robotic controller generic problem	
84	Setting of gripper[1] motor parameters failed	
85	Setting of slider[2] motor parameters failed	
86	Setting of elevator[3] motor parameters failed	
87	Setting of rotation[4] motor parameters failed	
88	Setting of sled[5] motor parameters failed	
89	Gripper[1] obstructed	• Run the wellness test. • Ensure that nothing is obstructing the gripper. • If the device was moved, verify that each of the tape cartridges is properly seated in a magazine.
8A	Slider[2] obstructed	• Run the wellness test. • If this error occurs with sub-code 43, a magazine could be misaligned. Remove the magazines, re-seat them, and try again. • Verify that nothing is obstructing the robot.
8B	Elevator[3] obstructed	Run the wellness test
8C	Rotation[4] obstructed	• Run the wellness test. • Ensure that there is nothing obstructing the gripper. • If the device was moved, verify that each of the tape cartridges is properly seated in a magazine or drive.

Error code	Description	Details and solution
8D	Sled[5] obstructed	• If this error occurs on the first power-on after unpacking or moving the device, or after replacing the chassis, ensure that the shipping lock was removed from the top and stored on the back panel (see Removing the shipping lock). • If the device was moved or shipped with tape cartridges in the magazines, verify that the cartridges did not come out of the magazines to obstruct the drive. • Ensure that nothing is stacked on top of the device because any weight on top of the device can bow the top cover down and interfere with the robotics. • Ensure that the device is either mounted in a rack with its rack kit or in a tabletop conversion cover. The device must be supported under both of its side edges or the bottom can bow and impede robotic movement. • Run the wellness test.
8E	Ends of gripper[1] movement not in expected range	Run the wellness test

8F	Ends of slider[2] movement not in expected range	• Early firmware versions were not able to use as much force to get or place media in a magazine. Upgrading the Library firmware might resolve this issue.
		• If the error consistently happens on the same slot, try different tape cartridges in that slot.
		  • If the failure remains with the same slot, the magazine may be at fault.
		  • If the failure follows the tape cartridge, the tape cartridge may be at fault.
		• If the device is performing an operation that automatically returns a tape cartridge to a certain slot, make sure another tape is not loaded in that slot.
		• Run the wellness test

90	Ends of elevator[3] movement not in expected range	Run the wellness test
91	Ends of rotation[4] movement not in expected range	• Run the wellness test. • Ensure that nothing is obstructing the plunge in and out movement of the robot.

Error code	Description	Details and solution
92	Ends of sled[5] movement not in expected range	Run the wellness test
93	Gripper[1] reached a position beyond expected range	
94	Slider[2] reached a position beyond expected range	
95	Elevator[3] reached a position beyond expected range	
96	Rotation[4] reached a position beyond expected range	
97	Sled[5] reached a position beyond expected range	
98	Cartridge present sensor not found	
99	Slider[2] home sensor not found	
9A	Rotation[4] home sensor not found	
9B	Sled[5] position sensor not found	
9C	Gripper[1] range of motion out of specification	
9D	Slider[2] range of motion out of specification	
9E	Elevator[3] range of motion out of specification	
9F	Rotation[4] range of motion out of specification	
A0	Sled[5] range of motion out of specification	
A1	Open Mailslot failed	• Retry the operation. • Ensure that nothing is obstructing the opening of the mailslot. • Remove the magazine and check for issues such as a tape label preventing the mailslot from opening.
A3	Sled motor #2 blocked.	• Run the wellness test. • If the problem continues, contact Sun customer support.
A4	Cannot find sled #2 block within the expected range.	
A5	Sled home sensor #2 not found	
B0	Command from the autoloader or library controller to robotics controller did not complete in time allotted	• Reset the device and retry the operation. • If the problem continues, contact Sun customer support.
B1	Robot controller reported format error on command from Autoloader or Library controller	• Reset the device and retry the operation. • Update the Library to the latest version.
B2	Communication to robot from Autoloader or Library controller failed	Run the wellness test.
B3	Robot stopped due to a released magazine	• Check that all magazines are completely inserted and retry the operation. • If this error was caused by a manual magazine removal, replace the magazine and try the operation again.

Error code	Description	Details and solution
B4	"Tape in gripper[1]" sensor did not report the expected value	• Remove the magazines and inspect them for a stuck tape. If no tapes are stuck in the magazines, shine a light in one of the open magazine bays to see if there is a tape in the robot or drive. If there is a tape in the robot, replace the magazines and power-cycle the device. If there is a tape in a drive, replace the magazines and run the Force Tape Eject operation. (For SL24, see Forcing the drive to eject a tape). For SL24, see Force ejecting a drive (Support > Force Drive Eject).) • Run the wellness test
B5	Robotic controller not responding to command from Autoloader or Library controller	• Reset the device and retry the operation. • Update the firmware to the latest version. • If power-cycling does not resolve the issue, contact Sun customer support.
C0	Network initialization failed	• Check the network cable. • Check that the network configuration is correct. • If DHCP is enabled, ensure that a DHCP server is up an running on the device's network. • Power cycle the device and try again.
C1	Telnet interface initialization failed	• Check the network cable. • Check that the network configuration is correct. • Power cycle the device and try again.
C2	Web server initialization failed	
C6	Ping command did not reach target	
C7	Cannot upgrade firmware from USB	• Retry the firmware upgrade. If not successful, attempt a different upgrade method, such as the RMI.
D0	ROM checksum incorrect	• Retry Autoloader or Library firmware upgrade. • If the device continues to fail, contact Sun customer support.
D1	RAM error during Power-On-Self-Test	Power-cycle the unit
D2	Read or Write to NVRAM on Autoloader or Library controller failed	
D3	Time controller failed during Power-On-Self-Test	
D4	Internal UART serial communication error	
D5	Communication to display failed	
D6	Autoloader or Library controller memory error	
D7	Fatal system error	
D8	Autoloader or Library controller data base error	
D9	No SCSI IC detected	

Error code	Description	Details and solution
DA	When running the wellness test, the bar code did not match the previous value for that tape	• Check the bar code label for proper application and damage. • Run the wellness test again.
DB	External cooling fan error. The sub-code indicates the affected fan. Sub-code 00: drive sled[5] #1. Sub-code 01:drive sled[5] #2.	Check if the fan is operational and not obstructed
DC	I2C Bus failure.	• Power-cycle the device. • On the SL48, power down the Library and re-seat the library controller from the back panel.
DD	Warning event. See DD in Warning events.	
DE	Warning event. See DE in Warning events.	
F0	Drive exceeded temperature specification	• Check ambient temperature to ensure that it is within operating specifications. • Check all fans to determine whether they are working properly.
F1	Autoloader or Library controller lost communication with the drive	• Power-cycle the device and retry the operation. • Re-seat the tape drive to ensure a good connection to the device.
F2	Drive sled[5] not present	
F3	Drive hardware error	• Cycle power, after several occurrences, • Contact technical support
F4	Time allotted for drive loading exceeded	• Check that the tape cartridge is supported and has not exceeded its usage life. Inspect it for damage. • Retry the operation. • Clean the drive. The error sub-code 00 indicates drive 1, sub-code 01 indicates drive 2, and so on.
F5	Time allotted for drive unloading exceeded	• Retry the operation. • Attempt the Force Tape Eject process. Once the tape cartridge is ejected, unlock the magazine holding the cartridge and inspect the cartridge for damage. Discard the tape cartridge if it is damaged. (For SL24, see Forcing the drive to eject a tape). For SL48, see Force ejecting a drive (Support > Force Drive Eject).)

[1]Gripper: The part of the robotics assembly that pinches media in order to grip it.
[2]Slider: The part of the robotics assembly that plunges in and out for **get** and **put** operations.
[3]Elevator: The part of the robotics assembly that moves in the vertical direction.
[4]Rotation: The part of the robotics assembly that turns the robot to face each magazine and the drive.
[5]Sled: The part of the robotics assembly that moves the robot towards the OCP or back towards the drive.

Error sub-code descriptions

Robotic error sub-codes

The following table lists the robotic error sub-codes.

Table 29 Robotic error sub-codes

Sub-code	Description
01	Mechanical initialization failure
02	Connection to slave robotic failed
03	Error motor initialization
04	Error during gripper[1] close
05	Error slider[2] home positioning
06	Error elevator[3] home movement
07	Error during sled[5] movement to rotation[4] position
08	Error during rotation[4] initialization, get range failed
09	Error elevator[3] init
0A	Error during rotation[4] to far position
0B	Error first sled[5] init, move to sensor failed
0C	Error during sled[5] movement to rotation[4] position
0D	Error during rotation[4] to slide position
0E	Error slider[2] init, get range failed
0F	Error during slider[2] forward movement
10	Error gripper[1] init, get range failed
11	Error during slider[2] home movement
12	Error during rotation[4] to FAR position
13	Error sled[5] init, move to sensor failed
20	Error inventory scan
21	Error during gripper[1] close
22	Error slider[2] home movement
23	Error during move gripper[1] to scan pos
24	Error reading bar code label
28	Error Extra inventory scan
29	Error during closing gripper[1]
2A	Error slider[2] preposition movement
2B	Error during opening gripper[1]
2C	Error during sled[5] movement up to sensor
2D	Error slider[2] preposition backwards movement
30	Error slot preposition
31	Error during sled[5] movement in FLMoveRotation
32	Command sending to robotic failed
33	Error during elevator[3] movement in FLMoveRotation function
34	Error during rotation[4] in FLMoveRotation function
35	Error during elevator[3] movement in FLMoveRotation function

Sub-code	Description
36	Error during sled^5 movement in FLMoveSled function
37	Error during sled^5 positioning to mailslot in FLMoveSled function
38	Error during sled^5 positioning to mailslot in FLMoveSled function
39	Error during sled^5 positioning without sensor
40	Movement to/from slot failed
41	Error during first slider^2 movement
42	Error during first gripper^1 movement
43	Error during second slider^2 movement
44	Error during second gripper^1 movement, get range failed
45	Error during third slider^2 movement, move home failed
50	Preposition to drive failed
51	Elevator^3 movement to home sensor failed
52	Sled^5 movement to home sensor failed
53	Error during sled^5 movement to drive position
54	Error during rotation^4 to drive position
55	Error during elevator^3 movement in drive position
56	Error during sled^5 movement to drive position.
57	Error during rotation to end position.
60	Move from/to drive failed
61	Error during first slider^2 movement
62	Error during first gripper^1 movement
63	Error during second slider^2 movement
64	Error during second gripper^1 movement, get range failed
65	Error during third slider^2 movement, move home failed
70	Release magazine failed
71	Error during sled^5 movement to rotation^4 position
72	Error during rotation^4 to unlock position
73	Error during move sled^5 to block
80	Opening mailslot failed
81	Error during movement to mailslot open position
82	Error during moving back, sensor was found
90	Movement to home position failed
91	Elevator^3 movement to home position failed
92	Error during sled^5 movement to rotation^4 position
93	Error during rotation^4 to home or far position
94	Sled^5 movement to home sensor position failed
95	Sled^5 movement to transport position failed

Sub-code	Description
A0	Movement to mailslot failed
A1	Sled[5] movement to sensor failed
A2	Sled[5] movement to rotation[4] position failed
A3	Elevator[3] movement to home position failed
A4	Error during rotation[4] to far position
A5	Sled[5] movement to mailslot position failed

[1]Gripper: The part of the robotics assembly that pinches media in order to grip it.
[2]Slider: The part of the robotics assembly that plunges in and out for **get** and **put** operations.
[3]Elevator: The part of the robotics assembly that moves in the vertical direction.
[4]Rotation: The part of the robotics assembly that turns the robot to face each magazine and the drive.
[5]Sled: The part of the robotics assembly that moves the robot towards the OCP or back towards the drive.

Device error sub-codes

The following table lists the device error sub-codes.

Table 30 Device error sub-codes

Error code	Description
81	Drive wake up failed
88	Error accessing slot status
90	Robotic load not reached Cartridge Present sensor
91	No activity after Load command
92	Time-out while loading tape
93	No activity after load command
94	Time-out drive Unload
95	Drive terminated unsuccessfully
96	Tape not ejected at robot unload
97	Slot not free at robot unload

Drive error codes

The drive error codes are displayed on the RMI drive status page.

Error code	Description
01	Drive broken
02	Temperature exceeds limit
03	Tape error
04	Cleaning cartridge is expired
05	Drive needs cleaning
06	Autoloader or Library lost communication with the drive
07	Warning that the tape is nearing its end of life

Warning events

Event code	Description	Details and Solution
60	Cleaning tape installed.	Complete the cleaning process and retry the operation.
61	Cleaning failure. Cleaning process could not be performed.	A data cartridge may have been loaded instead of a cleaning cartridge. • Check cleaning tape and exchange if necessary. • Retry the operation.
62	Cleaning tape expired.	Exchange the cleaning tape.
63	Invalid cartridge. Drive has rejected the cartridge as invalid.	• Check the cartridge for damage. It could be a defective cartridge. • Make sure that the cartridge is compatible with the drive. See Tape cartridges. • Verify that the cartridge is not a firmware upgrade tape. Initiate the firmware upgrade process before loading a firmware upgrade tape into the drive.
64	Invalid cleaning cartridge. Drive has rejected the cartridge as invalid.	• Verify that the cartridge is a cleaning cartridge. • Check the cartridge for damage. It could be a defective cartridge. • Make sure that the cartridge is compatible with the drive. See Tape cartridges. • Verify that the cartridge is not a firmware upgrade tape. Initiate the firmware upgrade process before loading a firmware upgrade tape into the drive.
65	Invalid upgrade cartridge. Drive has rejected the cartridge as invalid.	• Verify that the cartridge is a firmware upgrade cartridge, not a data or cleaning cartridge. • Check the cartridge for damage. It could be a defective cartridge. • Make sure that the cartridge is compatible with the drive. See Tape cartridges.

Event code	Description	Details and Solution
DB	External cooling fan error (fan motion has stopped). The subcode indicates which drive sled fan is affected. Subcode 00: drive sled #1 Subcode 01: drive sled #1	• Verify that the fan for the indicated fan is operational and not obstructed. • If the problem continues, contact Sun customer support.
DD	Power supply fan has failed, redundancy may be at risk.	• Verify that the fan for the indicated fan is operational and not obstructed. • Check ambient temperature conditions. • If the problem continues, contact Sun customer support.
DE	Power supply fan has failed. redundancy is not available.	• Verify that the power supply is inserted correctly and that the thumbscrews are adjusted. • Power cycle the unit. • If the problem continues, contact Sun customer support.

6 Upgrading and servicing the Autoloader or Library

△ **CAUTION:**

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

To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover the device with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep the work area free of nonconducting materials, such as ordinary plastic assembly aids and foam packing.
- Make sure you are always properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Use conductive field service tools.

⚠ **WARNING!**

The SL24 Tape Autoloader weighs up to 15.6 kg (34.3 lb) without media and up to 20.4 kg (44.9 lb) with media (24 cartridges). The SL48 Tape Library weighs up to 24.6 kg (54.1 lb) without media and up to 34.2 kg (75.2 lb) with media (48 cartridges).

⚠ **WARNING!**

To reduce the risk of personal injury or damage to equipment:

- Extend 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. Racks may become unstable if more than one component is extended.

△ **CAUTION:**

Before moving the Autoloader or Library, remove all media. During a move, the cartridges could come out of the storage slots and damage the Autoloader or Library.

Possible tools needed

To service the Autoloader or Library you may need one or more of the following tools:

- Flat-blade screwdrivers (large and small)
- Stubby #1 Phillips screwdriver
- #2 and #3 Phillips screwdrivers
- Ground strap
- Paper clip or pin (for manual magazine removal)

Installing a new tape drive

The Library and Autoloader support Sun LTO tape drives. The SL24 Tape Autoloader can support one full-height tape drive or up to two half-height tape drives. The SL48 Tape Library can support up to two full-height drives or up to four half-height drives.

To add an LTO tape drive, do the following:

1. Locate the next vacant drive bay on the back of the Library, which should be directly above the currently installed drives.

> **NOTE:**
>
> Tape drives are numbered from the bottom of the Library up starting with 1. If you leave a space and later add a drive in the space, the new drive will be assigned the next available number, leaving the drives numbered out of order. If the settings are restored to the factory defaults or the Library is power-cycled, the drives will be renumbered and you might need to update the configuration of your backup software.

Remove the face plate covering the drive bay by removing the screws holding it in place.

2. Holding the tape drive by the handle and supporting it from the bottom, slide it into the drive bay until it is flush with the back of the Autoloader or Library (see Figure 88).

10807
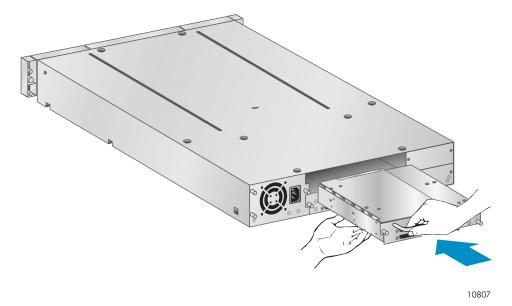
Figure 88 Installing a new tape drive

3. Tighten the blue captive screws (see Figure 89) by hand to secure the tape drive to the Library chassis.

10798
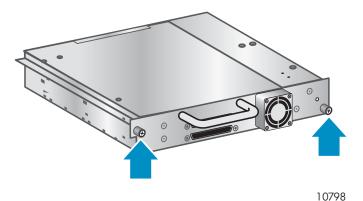
Figure 89 Tighten the blue thumbscrews

4. Plan the configuration for the new tape drive:

    • Parallel SCSI: See "Planning the SCSI configuration" on page 21. If the tape drive's SCSI address must be changed, do so before connecting the drive to the host. See "Changing the SCSI address" on page 33.
    • Fibre Channel: See "Planning the Fibre Channel configuration" on page 23.

5. Connect the tape drive to the host:

    • Parallel SCSI: Connect one of the connectors on the parallel SCSI cable to the tape drive and connect the other end of the cable to the HBA or other device on the same parallel SCSI bus. If the tape drive is the last device on the parallel SCSI bus, attach the terminator to the other parallel SCSI connector on the tape drive.
    • Fibre Channel: Plug one end of the Fibre Channel into a port on the tape drive. Plug the other end of the cable into the HBA or switch.

6. If necessary, upgrade the device and drive firmware using the RMI or a USB flash drive.

Removing and replacing a tape drive

Tape drives are installed at the back of the Autoloader or Library.

📝 **NOTE:**

This part is hot-swappable. You do not need to power down the Autoloader or Library to replace a drive.

⚠ **CAUTION:**

Powering down the master drive interrupts SCSI communication to the Library and robotics.

To remove a drive:

1. Using the remote management interface or the operator control panel, unload any tape cartridge from the drive you would like to remove, if present.

2. Power down the drive from the operator control panel or RMI. (For the SL24, see "Powering a drive on or off" on page 84. For the SL48, see "Powering drives on and off (Support > Power on/off Drives)" on page 103.)

3. Make sure the LED on the tape drive is off (see Figure 90).

10783
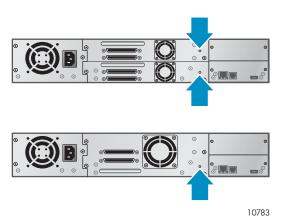
Figure 90 Drive LEDs

4. Remove the cables and terminator, if applicable, from the tape drive being removed.

5. Loosen the blue captive thumbscrews on the drive (see Figure 91). Half-height drives have two captive thumbscrews; full-height drives have four captive thumbscrews.

10798
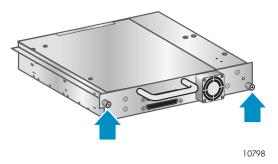
Figure 91 Captive screws on the tape drive

6. Pull straight back on the tape drive handle to remove the tape drive from the Autoloader or Library (see Figure 92).

10797
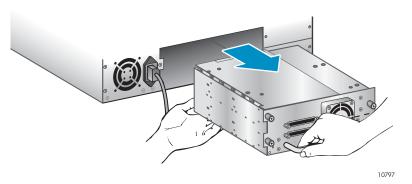
Figure 92 Removing a tape drive

To replace a tape drive:

1. Before installing the new 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.

2. Slowly insert the new tape drive into the drive bay, and align the connectors on the Autoloader or Library while supporting the drive assembly until the drive seats itself against the back of the Autoloader or Library (see Figure 93).

△ CAUTION:

Push in on the tape drive handle while supporting the bottom of the tape drive until it is properly seated. Damage to the connector pins may occur if this procedure is not followed.

10807
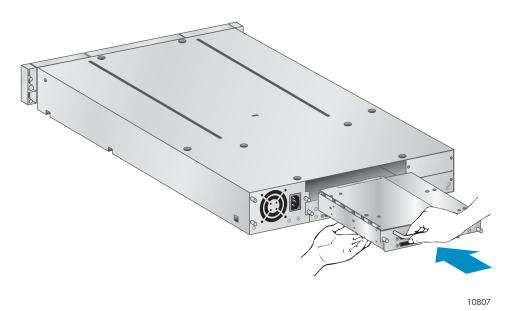
Figure 93 Installing a tape drive

3. Tighten the blue captive thumbscrews by hand until the drive is secure.

4. Attach the cords and terminator, if necessary, that you removed from the old tape drive.

5. Power on the tape drive.

6. If necessary, upgrade the device and drive firmware using the RMI or a USB flash drive.

⊘ NOTE:

If you are upgrading a parallel SCSI drive, be sure to use supported cabling configurations. See "Planning the SCSI configuration" on page 21.

⊘ NOTE:

The Library assigns the WWNames used by Fibre Channel drives to the drive locations. When you replace a tape drive, the WWName is re-assigned to the replacement drive.

Removing and replacing a magazine

△ CAUTION:

Only remove a magazine manually in an emergency or if you need to remove the magazines from both sides of the device. Failure to follow normal procedure can cause data loss and equipment damage.

If possible, the magazines should be released using the operator control panel (OCP) or the remote management interface (RMI). Sun recommends that you release the magazines using the OCP or RMI; however, if the OCP process fails, or if a magazine needs to be removed when the power to the device is off, you can release the magazines manually.

☼ **TIP:**

The SL48 has multiple magazines on each side. The Library will release all of the magazines on a side at the same time. If you want to remove more than one magazine from a side, pull the magazines that need to be removed out a few centimeters or inches immediately after the Library releases them. You can then remove the magazines from the Library one at a time.

Using the SL24 operator control panel

Removing magazines requires the administrator password.

To remove a magazine:

1. From the Home screen, press **Previous** or **Next** until the screen displays **Operations**.
2. Press **Enter** to select.
3. Press **Previous** or **Next** until the screen displays either **Unlock Left Magazine** or **Unlock Right Magazine**.
4. Press **Enter** to select the desired magazine to unlock.
5. Enter the administrator password if requested.
6. The display reads **Left Magazine Unlocked** or **Right Magazine Unlocked**.
7. Pull the released magazine out of the device.
8. The screen displays **Insert Left Magazine** or **Insert Right Magazine**. *The Autoloader cannot perform any other operation until the magazine is replaced.* After exchanging tapes in a magazine, slide the magazine completely into the Autoloader. The magazine locks into place after it is correctly installed and the Library inventories the magazine.

Using the SL48 operator control panel

Removing magazines requires the administrator password.

To remove magazines:

1. From the **Operations** menu, select **Unlock Left Magazines** or **Unlock Right Magazines**.
2. Enter the administrator password if requested.
3. Pull all the magazines you want to remove out a few centimeters or inches to move them past the latch.
4. Pull the magazines out one at a time.
5. *The Library cannot perform any other operation until the magazines are replaced.* After exchanging tapes in a magazine, slide the magazine completely into the Library. Each magazine locks into place after it is correctly installed. When all magazines are in place, the Library inventories the replaced magazines.

Using the remote management interface

To login, select the Administrator Account Type, enter the administrator password, and press **Sign In.**
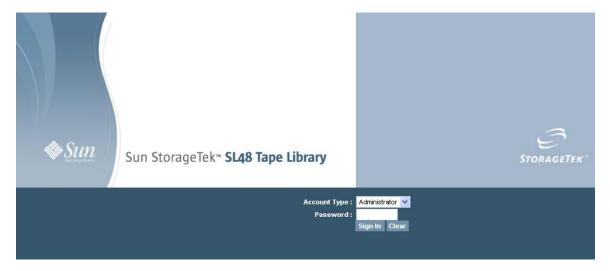
Figure 94 RMI login page

Go to the Operations: Magazines page. This page allows you to release the right or left magazines from the Library.

Figure 95 Operations: Magazines page

Using the manual release

1. From the back of the Autoloader or Library determine which magazine needs to be removed using Figure 96. The magazines are released from the magazine release holes on the bottom tape drive plate. For the SL48, the Library will release all magazines on a side at the same time.

10863
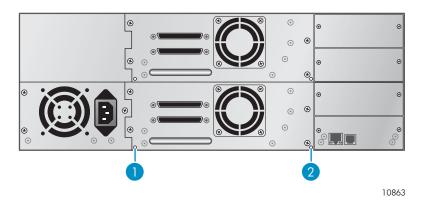
Figure 96 Manual magazine release holes

1. Right magazine release
2. Left magazine release

2. Push a small metal pin or paper clip into the appropriate release hole to push on the release latch (see Figure 97) while another person gently pulls the magazine out of the Autoloader or Library.

11342
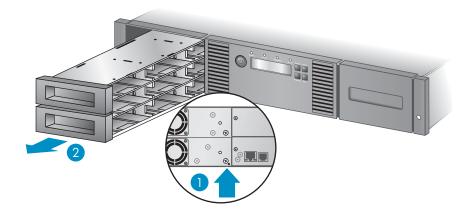
Figure 97 Removing the left magazine

1. Insert a pin into access hole

2. Release and remove the magazine

Installing a redundant power supply (SL48 only)

The SL48 Tape Library has an optional redundant power supply system, which allows the Library to continue operating when one power supply fails. With the redundant power supply system, the Library can monitor the status of each power supply and power supply fan. The redundant power supply can be installed without powering down the Library.

In this procedure you will:

- Remove the power supply bay cover.
- Install the new power supply.
- Verify the installation.

△ **CAUTION:**

Parts can be damaged by electrostatic discharge. Keep parts in electrostatic containers until needed. Ensure that you are properly grounded when touching static-sensitive components.
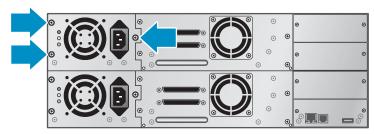
To install a redundant power supply:

1. From the back of the Library, use a Phillips screwdriver to remove the power supply bay cover. The cover is designated with a label.

2. Position the new power supply on the alignment rails and push it into the Library until it is flush with the back panel, as shown in Figure 98.

11395

Figure 98 Installing the new power supply

3. Tighten the blue thumbscrews to secure the power supply to the Library as shown in Figure 99

11263

Figure 99 Securing the power supply to the Library

4. Attach an AC power cord to the new power connector and plug into a power outlet.

5. Verify that the new power supply is operating properly. The blue and green LEDs on the power supply sled should be lit and the yellow LED should be unlit, as shown in Figure 100. Both power supplies should be listed on the OCP screen.

11220
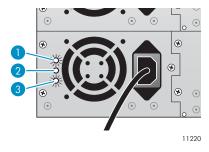
Figure 100 Power supply LEDs

1. Blue   AC power is connected.

2. Yellow   Fan failure. The fan is running too slow or is defective.

3. Green   The power supply is producing good power for the Library.

Replacing the power supply (SL48)

This process applies to the SL48 only. A redundant power supply can be replaced without powering down the Library.

In this process you will:

- Power off the Library and unplug the power cord. (Only Libraries with a single power supply.)
- Remove the old power supply.
- Install the new power supply.

- Verify the replacement.

⚠ **CAUTION:**

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

To replace a power supply:

1. If the Library only has one power supply, power off the Library from the front panel and remove the AC power cord. Otherwise, just remove the AC power cord from the power supply to be replaced.

2. Loosen the three captive thumbscrews on the power supply. Grasp a thumbscrew stem on each side of the power supply and while supporting the bottom, pull the power supply out of the Library, as shown in Figure 101).

11351
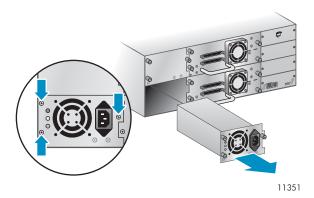
Figure 101 Removing the old power supply

3. Position the new power supply on the alignment rails and slide it into the Library until it is flush with the back panel, as shown in Figure 102. Tighten the three blue thumbscrews to secure the power supply.

11354

Figure 102 Installing the new power supply

4. Attach an AC power cord to the replaced power supply and plug into a power outlet. Power on the Tape Library, if necessary.

5. Verify that the new power supply is operating properly.

11220
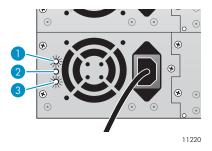
Figure 103 Power supply LEDs

1. Blue   AC power is connected.

2. Yellow   Fan failure. The fan is running too slow or is defective.

3. Green   The power supply is producing good power for the Library.

Replacing the library controller (SL48)

This process applies to the SL48 only. In this process you will:

- Record the Library settings.
- Power off the Library, unplug the power cord, and remove the Ethernet cable.
- Remove the old library controller.
- Install the new library controller.
- Verify the replacement.

△ **CAUTION:**

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

△ **CAUTION:**

This part is not hot-pluggable. You must power down the Library to replace the library controller.

To replace the library controller:

1. Record the Library's settings by writing down the values displayed in the OCP or the RMI.

2. Power off the Library from the front panel. Remove the Ethernet cable, if applicable.

3. Loosen the two captive thumbscrews on the library controller and remove it from the Library, as shown in Figure 104).

11278
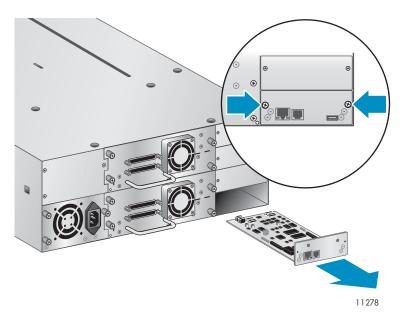
Figure 104 Removing the library controller

4. Position the new library controller on the alignment rails and slide it into the Library until it is flush with the back panel, as shown in Figure 105. Tighten the two blue thumbscrews to secure the card to the Library.

10917
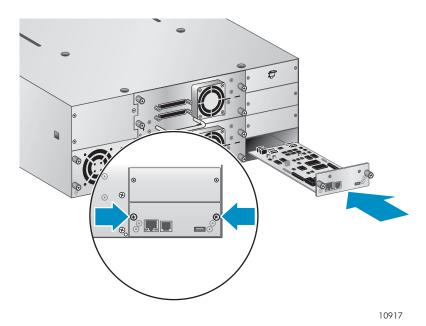
Figure 105 Installing the new library controller

5. Replace the Ethernet cable, if applicable. Power on the Tape Library.

6. Confirm that the Library recognized the new library controller by checking the System Status on the front panel, as shown in Figure 106.

```
Status:OK          SL 48          13:43
Info  Configuration  Operations  Support
System Status:

Library Status        ✓
Library Name          MS0001234
IP Address            192.168.000.001
Drive 1               Ready
Drive 2               Writing
Drive 3               Ready
Drive 4               Idle
Slots free/total      10/48
```

Figure 106 SL48 system status

7. Restore the previous settings by manually entering them in the OCP or RMI.

8. If necessary, upgrade the Library and drive firmware using the RMI or a USB flash drive.

Removing and replacing the base chassis

In this process you will:

- Record configuration settings.
- Remove the tape from the tape drive.
- Remove the cables, drives, and magazines from the Autoloader or Library.
- Remove the power supply and library controller. (SL48 only).
- Remove the Autoloader or Library from the rack or tabletop conversion cover.
- Replace the base chassis.
- Reinstall the Autoloader or Library into the rack or tabletop conversion cover.
- Replace the cables, drives and magazines.
- Replace the power supply and library controller. (SL48 only).
- Reconfigure the Autoloader or Library.

⚠ **WARNING!**

The SL24 Tape Autoloader weighs up to 15.6 kg (34.3 lb) without media and up to 20.4 kg (44.9 lb) with media (24 cartridges). The SL48 Tape Library weighs up to 24.6 kg (54.1 lb) without media and up to 34.2 kg (75.2 lb) with media (48 cartridges).

Recording configuration settings

If the OCP or RMI works, write down the system, drive, and network configuration settings. You will need these settings to re-configure the Autoloader or Library after replacing the chassis.

☼ **TIP:**

For the SL48, the configuration settings are saved on the library controller card and *should* transfer to the new chassis when you install the library controller card in the new chassis. Recording the configuration settings is a good idea in case the library controller card has a problem or is damaged during the transfer to the new chassis.

Removing the tape cartridge from the drive

Before beginning, be sure no cartridges are in the tape drives. To move a cartridge with the SL24 OCP, see "Moving tapes in the device" on page 82. To move a cartridge with the SL48 OCP, see "Moving Media (Operations > Move Media)" on page 94. To move a cartridge with the RMI, see "Moving media" on page 62.

⚠ **CAUTION:**

If you cannot remove the tape cartridge from the tape drive, handle the tape drive gently during the rest of the procedure to avoid damaging the tape and losing data.

Removing the cables, magazines, and tape drives

Power off the Library. Remove the power cord and other cables from the Autoloader or Library.

Remove the magazines from the device using the manual process (see "Releasing the magazines manually" on page 122).

To remove the tape drives:

1. Loosen the blue captive thumbscrews on the drive (see Figure 107).

10798
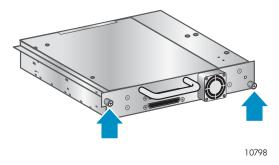
Figure 107 Captive screws on the tape drive

2. Pull straight back on the tape drive handle to remove the tape drive from the Autoloader or Library (see Figure 108).

10797
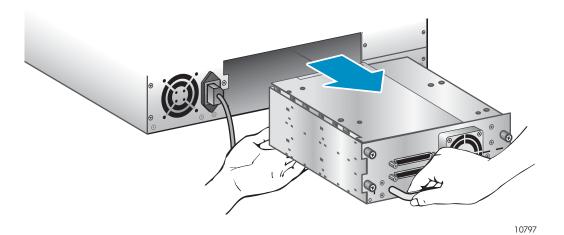
Figure 108 Removing a tape drive

3. Repeat Steps 1 and 2 for all other tape drives.

Removing the power supply and library controller (SL48 only)

On the SL48, the power supply and library controller are moved to the new chassis.

To remove the power supply:

1. Loosen the three captive thumbscrews on the power supply.

2. Grasp a thumbscrew stem on each side of the power supply. Support the bottom while pulling the power supply out of the Library, as shown in Figure 109.

11355
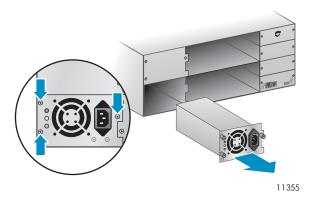
Figure 109 Removing the power supply

To remove the library controller:

1. Loosen the two blue thumbscrews on the library controller and remove it from the Library, as shown in Figure 110.

10916
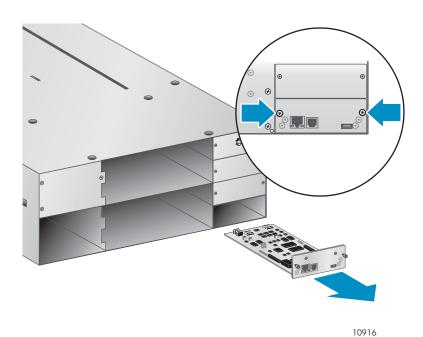
Figure 110 Removing the library controller

2. Place the library controller into a static safe bag.

Removing the base chassis from the rack or cover

You will need a #2 Phillips screwdriver to remove and replace the base chassis assembly.

⚠ **CAUTION:**

Lift the Autoloader or Library from the side edges. Lifting the Autoloader or Library from the magazine or tape drive openings can damage the Autoloader or Library.

To remove the base chassis from the rack or table top conversion cover:

1. Obtain adequate assistance to lift and stabilize the Autoloader or Library during removal and replacement.

2. From the front of the Autoloader or Library (see Figure 111, 1) loosen the screws inside the left and right front bezel (these are captive screws and cannot be removed), then 2) slide the Library out of the rack or cover using assistance.

11348
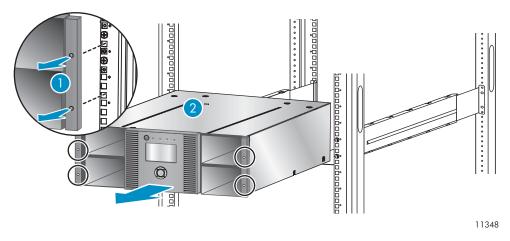
Figure 111 Removing the base chassis from the rack

Unpacking the new chassis

Unpack the new chassis and place it on a sturdy table. Save the packaging materials to return the old chassis.

Replacing the base chassis

⚠ **CAUTION:**

Lift the chassis from the side edges. Lifting the chassis from the magazine openings can damage the chassis.

To replace the Autoloader or Library components and install the base chassis in the rack or in the tabletop conversion cover:

1. The shipping lock prevents the robotic transport mechanism from moving during shipment. You must remove the shipping lock before powering on the device. The shipping lock is held in place with a piece of tape and is located in the top center of the new chassis. After the shipping lock is removed, it should be stored on the back panel of the chassis for future use.

   To remove and store the shipping lock:

   1. Locate the tape and lock at the top of the chassis (see Figure 112).

10806
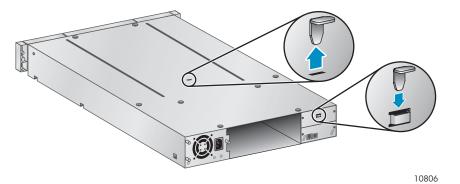
Figure 112 Shipping lock location

2. Remove the tape, then remove the lock.

3. Store the lock on the back panel of the device (see Figure 113).

10808

Figure 113 Shipping lock storage location

2. Mount the Autoloader or Library in a rack or in the tabletop conversion cover.

   To mount the Autoloader or Library in a rack:

   a. With assistance, slide the Autoloader or Library onto the metal rails that are already in position in the rack.

   b. From the front of the device, secure the front bezel to the rack using a #2 Phillips screw driver placed through the small holes in the mounting bracket to tighten the captive screws on each side of the device.

11343
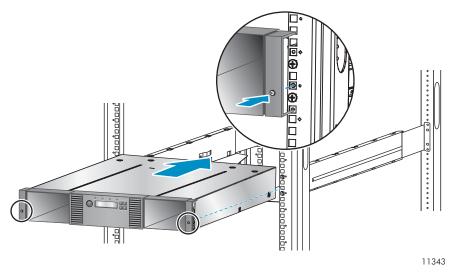
Figure 114 Securing a Tape Library to the rack

To replace the tabletop conversion cover:

    a.   Set the new base chassis on a sturdy surface in front of the cover.

    b.   Slide the chassis into the cover until the front panel of the chassis is aligned with the cover.

    c.   Tighten the captive screws on the chassis front panel until the cover is secure.

3.   Replace the drives.

4.   Replace the magazines.

5.   Replace the cords and cables.

6.   For the SL48, replace the power supply and library controller.

7.   Reconnect the cables and power cord.

8.   Power on the Autoloader or Library.

9.   Reconfigure the Autoloader or Library.

A Technical specifications

Physical specifications

Table 33 SL24 Tape Autoloader physical specifications: all models

Characteristics	Product alone	Packaged
Height	87.5 mm (3.44 inches)	250 mm (9.84 inches)
Width	445 mm (17.5 inches)	580 mm (22.83 inches)
Depth	775.5 mm (30.53 inches)	990 mm (38.97 inches)
Weight	15 kg (33.07 pounds)	25.5 (56.22 pounds)

Table 34 SL48 Tape Library physical specifications: all models

Characteristics	Product alone	Packaged
Height	174 mm (6.85 inches)	344 mm (13.54 inches)
Width	445 mm (17.5 inches)	596 mm (23.46 inches)
Depth	776 mm (30.55 inches)	994 mm (39.13 inches)
Weight	20.6 kg (45.32 pounds)	33.2 (73.04 pounds)

Environmental specifications

Table 35 Environmental specifications

Characteristic	Specification
Temperature	
Operating	10° to 35° C
Non-operating	-30° to 60° C
Recommended operating temperature	10° to 35° C
Temperature shock immunity - maximum rate of change	10° C per hour
Miscellaneous	
Dust concentration	less than 200 microgram/cubic meter
Altitude	3050 meters (10,000 ft.)
Humidity	
Operating	20% to 80% RH non-condensing
Non-operating	20% to 80% RH non-condensing

B Regulatory compliance and safety

Regulatory compliance

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique Regulatory Model Number. The RMN can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this RMN. The Regulatory Model Number should not be confused with the marketing name or model number of the product.

Regulatory compliance label location

The Regulatory Compliance label is located on the bottom of the device. To view this information, from the back of the device, tilt the device up until the label is visible.

Regulatory model number

LVLDC-0501

Emissions classification

Class A

Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (such as personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user is required to correct the interference at personal expense.

Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection

against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two 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.

For questions regarding your product, visit http://www.hp.com

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company P.O. Box 692000, Mailstop 510101 Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, Regulatory Model Number, or product number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Laser device

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light.

Laser safety warning

⚠ **WARNING!**

To reduce the risk of exposure to hazardous radiation:
- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only HP authorized service technicians to repair the laser device.

International notices and statements

Canadian notice (avis Canadien)

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union notice

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN55022 (CISPR 22) - Electromagnetic Interference
- EN55024 (IEC61000-4-2, IEC61000-4-3, IEC61000-4- 4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11) - Electromagnetic Immunity
- Power Quality:
  - EN61000-3-2 (IEC61000-3-2) - Power Line Harmonics
  - EN61000-3-3 (IEC61000-3-3) - Power Line Flicker
- EN60950-1 (IEC60950-1) - Product Safety
- Also approved under UL 60950-1/CSA C22.2 No. 60950-1, Safety of Information Technology Equipment.

BSMI notice

警告使用者:
這是甲類的資訊產品，在居住的
環境中使用時，可能會造成射頻
干擾，在這種情況下，使用者會
被要求採取某些適當的對策。

Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文を
お読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラスB情報技術装置です。この装置は、家庭環境で使用すること
を目的としていますが、この装置がラジオやテレビジョン受信機に近接して
使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に
基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Korean notices

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니
판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약
잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기
바랍니다.

B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서
주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

Safety

Taiwan battery recycling notice

廢電池請回收

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Power cords

The power cord set must meet the requirements for use in the country where the product was purchased. If the product is to be used in another country, purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00 mm² or 18 AWG, and the length of the cord must be between 1.8 m (6 ft) and 3.6 m (12 ft). If you have questions about the type of power cord to use, contact an authorized service provider.

NOTE:

Route power cords so that they will not be walked on and cannot be pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

Japanese power cord notice

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

Waste electrical and electronic equipment directive

Czechoslovakian notice

Likvidace zařízení soukromými domácími uživateli v Evropské unii

Tento symbol na produktu nebo balení označuje výrobek, který nesmí být vyhozen spolu s ostatním domácím odpadem. Povinností uživatele je předat takto označený odpad na předem určené sběrné místo pro recyklaci elektrických a elektronických zařízení. Okamžité třídění a recyklace odpadu pomůže uchovat přírodní prostředí a zajistí takový způsob recyklace, který ochrání zdraví a životní prostředí člověka.

Další informace o možnostech odevzdání odpadu k recyklaci získáte na příslušném obecním nebo městském úřadě, od firmy zabývající se sběrem a svozem odpadu nebo v obchodě, kde jste produkt zakoupili.

Danish notice

Bortskaffelse af affald fra husstande i den Europæiske Union

Hvis produktet eller dets emballage er forsynet med dette symbol, angiver det, at produktet ikke må bortskaffes med andet almindeligt husholdningsaffald. I stedet er det dit ansvar at bortskaffe kasseret udstyr ved at aflevere det på den kommunale genbrugsstation, der forestår genvinding af kasseret elektrisk og elektronisk udstyr. Den centrale modtagelse og genvinding af kasseret udstyr i forbindelse med bortskaffelsen bidrager til bevarelse af naturlige ressourcer og sikrer, at udstyret genvindes på en måde, der beskytter både mennesker og miljø. Yderligere oplysninger om, hvor du kan aflevere kasseret udstyr til genvinding, kan du få hos kommunen, den lokale genbrugsstation eller i den butik, hvor du købte produktet.

Dutch notice

Verwijdering van afgedankte apparatuur door privé-gebruikers in de Europese Unie

Dit symbool op het product of de verpakking geeft aan dat dit product niet mag worden gedeponeerd bij het normale huishoudelijke afval. U bent zelf verantwoordelijk voor het inleveren van uw afgedankte apparatuur bij een inzamelingspunt voor het recyclen van oude elektrische en elektronische apparatuur. Door uw oude apparatuur apart aan te bieden en te recyclen, kunnen natuurlijke bronnen worden behouden en kan het materiaal worden hergebruikt op een manier waarmee de volksgezondheid en het milieu worden beschermd. Neem contact op met uw gemeente, het afvalinzamelingsbedrijf of de winkel waar u het product hebt gekocht voor meer informatie over inzamelingspunten waar u oude apparatuur kunt aanbieden voor recycling.

English notice

Disposal of waste equipment by users in private household in the European Union

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 waste equipment by handing it over to a designated collection point for recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service, or the shop where you purchased the product.

Estonian notice

Seadmete jäätmete kõrvaldamine eramajapidamistes Euroopa Liidus

See tootel või selle pakendil olev sümbol näitab, et kõnealust toodet ei tohi koos teiste majapidamisjäätmetega kõrvaldada. Teie kohus on oma seadmete jäätmed kõrvaldada, viies need elektri- ja elektroonikaseadmete jäätmete ringlussevõtmiseks selleks ettenähtud kogumispunkti. Seadmete jäätmete eraldi kogumine ja ringlussevõtmine kõrvaldamise ajal aitab kaitsta loodusvarasid ning tagada, et ringlussevõtmine toimub viisil, mis kaitseb inimeste tervist ning keskkonda. Lisateabe saamiseks selle kohta, kuhu oma seadmete jäätmed ringlussevõtmiseks viia, võtke palun ühendust oma kohaliku linnakantselei, majapidamisjäätmete kõrvaldamise teenistuse või kauplusega, kust Te toote ostsite.

Finnish notice

Laitteiden hävittäminen kotitalouksissa Euroopan unionin alueella

Jos tuotteessa tai sen pakkauksessa on tämä merkki, tuotetta ei saa hävittää kotitalousjätteiden mukana. Tällöin hävitettävä laite on toimitettava sähkölaitteiden ja elektronisten laitteiden kierrätyspisteeseen. Hävitettävien laitteiden erillinen käsittely ja kierrätys auttavat säästämään luonnonvaroja ja varmistamaan, että laite kierrätetään tavalla, joka estää terveyshaitat ja suojelee luontoa. Lisätietoja paikoista, joihin hävitettävät laitteet voi toimittaa kierrätettäväksi, saa ottamalla yhteyttä jätehuoltoon tai liikkeeseen, josta tuote on ostettu.

French notice

Élimination des appareils mis au rebut par les ménages dans l'Union européenne

Le symbole apposé sur ce produit ou sur son emballage indique que ce produit ne doit pas être jeté avec les déchets ménagers ordinaires. Il est de votre responsabilité de mettre au rebut vos appareils en les déposant dans les centres de collecte publique désignés pour le recyclage des équipements électriques et électroniques. La collecte et le recyclage de vos appareils mis au rebut indépendamment du reste des déchets contribue à la préservation des ressources naturelles et garantit que ces appareils seront recyclés dans le respect de la santé humaine et de l'environnement. Pour obtenir plus d'informations sur les centres de collecte et de recyclage des appareils mis au rebut, veuillez contacter les autorités locales de votre région, les services de collecte des ordures ménagères ou le magasin dans lequel vous avez acheté ce produit.

German notice

Entsorgung von Altgeräten aus privaten Haushalten in der EU

Das Symbol auf dem Produkt oder seiner Verpackung weist darauf hin, dass das Produkt nicht über den normalen Hausmüll entsorgt werden darf. Benutzer sind verpflichtet, die Altgeräte an einer Rücknahmestelle für Elektro- und Elektronik-Altgeräte abzugeben.   Die getrennte Sammlung und ordnungsgemäße Entsorgung Ihrer Altgeräte trägt zur Erhaltung der natürlichen Ressourcen bei und garantiert eine Wiederverwertung, die die Gesundheit des Menschen und die Umwelt schützt. Informationen dazu, wo Sie Rücknahmestellen für Ihre Altgeräte finden, erhalten Sie bei Ihrer Stadtverwaltung, den örtlichen Müllentsorgungsbetrieben oder im Geschäft, in dem Sie das Gerät erworben haben.

Greek notice

Απόρριψη άχρηστου εξοπλισμού από χρήστες σε ιδιωτικά νοικοκυριά στην Ευρωπαϊκή Ένωση

Το σύμβολο αυτό στο προϊόν ή τη συσκευασία του υποδεικνύει ότι το συγκεκριμένο προϊόν δεν πρέπει να διατίθεται μαζί με τα άλλα οικιακά σας απορρίμματα. Αντίθετα, είναι δική σας ευθύνη να απορρίψετε τον άχρηστο εξοπλισμό σας παραδίδοντάς τον σε καθορισμένο σημείο συλλογής για την ανακύκλωση άχρηστου ηλεκτρικού και ηλεκτρονικού εξοπλισμού.

Η ξεχωριστή συλλογή και ανακύκλωση του άχρηστου εξοπλισμού σας κατά την απόρριψη θα συμβάλει στη διατήρηση των φυσικών πόρων και θα διασφαλίσει ότι η ανακύκλωση γίνεται με τρόπο που προστατεύει την ανθρώπινη υγεία και το περιβάλλον. Για περισσότερες πληροφορίες σχετικά με το πού μπορείτε να παραδώσετε τον άχρηστο εξοπλισμό σας για ανακύκλωση, επικοινωνήστε με το αρμόδιο τοπικό γραφείο, την τοπική υπηρεσία διάθεσης οικιακών απορριμμάτων ή το κατάστημα όπου αγοράσατε το προϊόν.

Hungarian notice

Készülékek magánháztartásban történő selejtezése az Európai Unió területén

A készüléken, illetve a készülék csomagolásán látható azonos szimbólum annak jelzésére szolgál, hogy a készülék a selejtezés során az egyéb háztartási hulladéktól eltérő módon kezelendő. A vásárló a hulladékká vált készüléket köteles a kijelölt gyűjtőhelyre szállítani az elektromos és elektronikai készülékek újrahasznosítása céljából. A hulladékká vált készülékek selejtezéskori begyűjtése és újrahasznosítása hozzájárul a természeti erőforrások megőrzéséhez, valamint biztosítja a selejtezett termékek környezetre és emberi egészségre nézve biztonságos feldolgozását. A begyűjtés pontos helyéről bővebb tájékoztatást a lakhelye szerint illetékes önkormányzattól, az illetékes szemételtakarító vállalattól, illetve a terméket elárusító helyen kaphat.

Italian notice

Smaltimento delle apparecchiature da parte di privati nel territorio dell'Unione Europea

Questo simbolo presente sul prodotto o sulla sua confezione indica che il prodotto non può essere smaltito insieme ai rifiuti domestici. È responsabilità dell'utente smaltire le apparecchiature consegnandole presso un punto di raccolta designato al riciclo e allo smaltimento di apparecchiature elettriche ed elettroniche. La raccolta differenziata e il corretto riciclo delle apparecchiature da smaltire permette di proteggere la salute degli individui e l'ecosistema. Per ulteriori informazioni relative ai punti di raccolta delle apparecchiature, contattare l'ente locale per lo smaltimento dei rifiuti, oppure il negozio presso il quale è stato acquistato il prodotto.

Latvian notice

Nolietotu iekārtu iznīcināšanas noteikumi lietotājiem Eiropas Savienības privātajās mājsaimniecībās

Šāds simbols uz izstrādājuma vai uz tā iesaiņojuma norāda, ka šo izstrādājumu nedrīkst izmest kopā ar citiem sadzīves atkritumiem. Jūs atbildat par to, lai nolietotās iekārtas tiktu nodotas speciāli iekārtotos punktos, kas paredzēti izmantoto elektrisko un elektronisko iekārtu savākšanai otrreizējai pārstrādei. Atsevišķa nolietoto iekārtu savākšana un otrreizējā pārstrāde palīdzēs saglabāt dabas resursus un garantēs, ka šīs iekārtas tiks otrreizēji pārstrādātas tādā veidā, lai pasargātu vidi un cilvēku veselību. Lai uzzinātu, kur nolietotās iekārtas var izmest otrreizējai pārstrādei, jāvēršas savas dzīves vietas pašvaldībā, sadzīves atkritumu savākšanas dienestā vai veikalā, kurā izstrādājums tika nopirkts.

Lihuanian notice

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Polish notice

Pozbywanie się zużytego sprzętu przez użytkowników w prywatnych gospodarstwach domowych w Unii Europejskiej

Ten symbol na produkcie lub jego opakowaniu oznacza, że produktu nie wolno wyrzucać do zwykłych pojemników na śmieci. Obowiązkiem użytkownika jest przekazanie zużytego sprzętu do wyznaczonego punktu zbiórki w celu recyklingu odpadów powstałych ze sprzętu elektrycznego i elektronicznego. Osobna zbiórka oraz recykling zużytego sprzętu pomogą w ochronie zasobów naturalnych i zapewnią ponowne wprowadzenie go do obiegu w sposób chroniący zdrowie człowieka i środowisko. Aby uzyskać więcej informacji o tym, gdzie można przekazać zużyty sprzęt do recyklingu, należy się skontaktować z urzędem miasta, zakładem gospodarki odpadami lub sklepem, w którym zakupiono produkt.

Portuguese notice

Descarte de Lixo Elétrico na Comunidade Européia

Este símbolo encontrado no produto ou na embalagem indica que o produto não deve ser descartado no lixo doméstico comum. É responsabilidade do cliente descartar o material usado (lixo elétrico), encaminhando-o para um ponto de coleta para reciclagem. A coleta e a reciclagem seletivas desse tipo de lixo ajudarão a conservar as reservas naturais; sendo assim, a reciclagem será feita de uma forma segura, protegendo o ambiente e a saúde das pessoas. Para obter mais informações sobre locais que reciclam esse tipo de material, entre em contato com o escritório da HP em sua cidade, com o serviço de coleta de lixo ou com a loja em que o produto foi adquirido.

Slovakian notice

Likvidácia vyradených zariadení v domácnostiach v Európskej únii

Symbol na výrobku alebo jeho balení označuje, že daný výrobok sa nesmie likvidovať s domovým odpadom. Povinnosťou spotrebiteľa je odovzdať vyradené zariadenie v zbernom mieste, ktoré je určené na recykláciu vyradených elektrických a elektronických zariadení. Separovaný zber a recyklácia vyradených zariadení prispieva k ochrane prírodných zdrojov a zabezpečuje, že recyklácia sa vykonáva spôsobom chrániacim ľudské zdravie a životné prostredie. Informácie o zberných miestach na recykláciu vyradených zariadení vám poskytne miestne zastupiteľstvo, spoločnosť zabezpečujúca odvoz domového odpadu alebo obchod, v ktorom ste si výrobok zakúpili.

Slovenian notice

Odstranjevanje odslužene opreme uporabnikov v zasebnih gospodinjstvih v Evropski uniji

Ta znak na izdelku ali njegovi embalaži pomeni, da izdelka ne smete odvreči med gospodinjske odpadke. Nasprotno, odsluženo opremo morate predati na zbirališče, pooblaščeno za recikliranje odslužene električne in elektronske opreme. Ločeno zbiranje in recikliranje odslužene opreme prispeva k ohranjanju naravnih virov in zagotavlja recikliranje te opreme na zdravju in okolju neškodljiv način. Za podrobnejše informacije o tem, kam lahko odpeljete odsluženo opremo na recikliranje, se obrnite na pristojni organ, komunalno službo ali trgovino, kjer ste izdelek kupili.

Spanish notice

Eliminación de residuos de equipos eléctricos y electrónicos por parte de usuarios particulares en la Unión Europea

Este símbolo en el producto o en su envase indica que no debe eliminarse junto con los desperdicios generales de la casa. Es responsabilidad del usuario eliminar los residuos de este tipo depositándolos en un "punto limpio" para el reciclado de residuos eléctricos y electrónicos. La recogida y el reciclado selectivos de los residuos de aparatos eléctricos en el momento de su eliminación contribuirá a conservar los recursos naturales y a garantizar el reciclado de estos residuos de forma que se proteja el medio ambiente y la salud. Para obtener más información sobre los puntos de recogida de residuos eléctricos y electrónicos para reciclado, póngase en contacto con su ayuntamiento, con el servicio de eliminación de residuos domésticos o con el establecimiento en el que adquirió el producto.

Swedish notice

Bortskaffande av avfallsprodukter från användare i privathushåll inom Europeiska Unionen

Om den här symbolen visas på produkten eller förpackningen betyder det att produkten inte får slängas på samma ställe som hushållssopor. I stället är det ditt ansvar att bortskaffa avfallet genom att överlämna det till ett uppsamlingsställe avsett för återvinning av avfall från elektriska och elektroniska produkter. Separat insamling och återvinning av avfallet hjälper till att spara på våra naturresurser och gör att avfallet återvinns på ett sätt som skyddar människors hälsa och miljön. Kontakta ditt lokala kommunkontor, din närmsta återvinningsstation för hushållsavfall eller affären där du köpte produkten för att få mer information om var du kan lämna ditt avfall för återvinning.

C Electrostatic discharge

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

Topics include:

- Preventing electrostatic damage
- Grounding methods

Preventing electrostatic damage

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly. See the next section.

Grounding methods

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

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

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

NOTE:

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

Glossary

barcode reader	A component of the robot that is used for cartridge identification and position calibration.
cartridge	The plastic housing around a cartridge tape. A plastic leader block is attached to the tape for automatic threading when loaded in transport. The spine of the cartridge contains a label listing the volume identification number.
cell	The slot in the magazine that is used to store a tape cartridge.
Class A digital device	Class A equipment is intended for commercial installation.
Class I laser product	Class 1 lasers are products where the power of the laser beam produced (the accessible emission) is always below the Maximum Permissible Exposure value. Therefore, for Class 1 lasers the output power is below the level at which it is believed eye damage will occur. Exposure to the beam of a Class 1 laser will not result in eye injury. Class 1 lasers may therefore be considered eye safe.
cleaning cartridge	A tape cartridge that contains special material to clean the tape path in a transport or drive. Ultrium cleaning cartridge labels have a CLN prefix.
CLI	Command Line Interface
daisy chaining	Parallel SCSI peripherals can be daisy chained together. Each device has a second port used to connect the next device in line. The last device in the chain must be terminated.
data cartridge	A term used to distinguish a cartridge onto which a tape drive may write data from a cartridge used for cleaning purposes.
drive	The device that the Library uses to record data onto tapes.
drive bay	The space where the drive module resides.
drive cleaning	A device feature that uses a cleaning cartridge to clean a tape drive.
drive module	The entire assembly that houses the drive, including the metal housing and connectors.
ESD	Electrostatic discharge. The release of static electricity from one conductor to another.
Ethernet	A local-area, packet-switched network technology. Originally designed for coaxial cable, it now also runs over shielded, twisted-pair cable. Ethernet is a 10 or 100 Megabytes-per-second LAN.
event	A significant device occurrence (such as drive errors, online/offline transition, drive cleaning, and other information) that is listed in an automated log.
export	The action in which the device places a cartridge into the mailslot so that the operator can remove the cartridge. Also called eject.
FC	Fibre Channel.
Fibre Channel	A network technology primarily used for storage networks.

G	Gigabyte. A unit of storage, abbreviated as G or GB, equal to 1,024 Megabytes.
get	An activity in which a robot obtains a cartridge from a slot or drive.
GUI	Graphical user interface. Software that allows the user to control the device through visual screens.
HBA	An acronym for host bus adapter, an interface card which plugs into the computer's bus and connects it to the network.
host	One or more computers that generate and communicate data to the device.
hot-plug, hot swap	The plugging in or removal of a drive into a system with the power turned on.
HVDS	High voltage differential signaling, also called differential SCSI. HVDS supports cable lengths up to 25 meters.
import	The process of placing a cartridge into the cartridge access port so that the robot can insert it into a storage slot.
inventory	The process of reading and storing in memory the bar code identification and locations of all cartridges in the Library.
LAN	Local Area Network. A computer network covering a local area, such as a home, office, or small building, that is usually based on Ethernet technology.
LCD	Liquid crystal display. A type of display that uses two sheets of polarizing material with a liquid crystal solution.
LED	Light emitting diode. An electronic device that lights up when electricity is passed through it.
LTO	An acronym for Linear Tape-Open technology. An "open format" technology, which means that users will have multiple sources of products and media.
LUN	Logical Unit Number. An address for a component of a SCSI device, similar to an apartment number. In this device, the host computer sends the SCSI commands for the Library to LUN 1 of the Master tape drive and sends SCSI commands for the tape drive itself to LUN 0.
LVDS	Low Voltage Differential Signaling. A low noise, low power, low amplitude method for high-speed (gigabits per second) data transmission over copper wire.
MAC address	Media Access Control address. A unique identifier attached to most forms of networking equipment, which is part of the Ethernet specification.
magazine	A removable array that holds cartridges and is placed into the load port of the Tape Library.
mailslot	All or part of a magazine used to import cartridges into the Library.
Megabyte	A unit of storage abbreviated as M or MB, equal to 1,024 x 1,024 = 1,048,576 bytes.
MIB	Management Information Base. A type of database used to manage the devices in a communications network.
parallel SCSI	A suite of closely related standards in which parallel SCSI devices are connected in parallel to form busses. Each parallel SCSI standard has its own bus width, clock speed, maximum throughput, maximum cable length, and maximum number of devices on the bus.

parallel SCSI devices	External parallel SCSI devices with two ports, one for the incoming cable and another for the outgoing cable to the next device. (see daisy chaining).
put	An activity in which a robot places a cartridge into a slot or drive.
RAID	Redundant Array of Inexpensive Disks. A group of disks that work together to improve performance. RAID 5 provides some parity protection in case one of the disks fails.
RMI	Remote Management Interface. A web-based interface used to monitor and control the Library. The RMI is a website that is hosted on the Library.
robot	An electro-mechanical device that transports tape cartridges to and from the magazines and drives.
robotics unit	The unit that includes the robotic components and that controls the movement of the robot between storage slots, drives, and load ports.
SCSI	Pronounced *scuzzy*, an acronym for Small Computer System Interface, a standard interface and command set for transferring data between mass storage and other devices. The host computer uses SCSI commands to operate the Tape Library.
SCSI address	See SCSI ID.
SCSI devices	Computer devices with a SCSI interface. In this document, *SCSI devices* refers to devices with a parallel SCSI interface.
SCSI ID	Each device on a parallel SCSI bus is identified by its SCSI ID, which is a number in the range 0–7 on a narrow bus and 0–15 on a wide bus.
SE	Single Ended SCSI. The original SCSI bus technology, which uses single ended signaling — where the signal is referenced to ground. SE SCSI busses have lower signal rates and much shorter allowed cable lengths. SE SCSI should not be used with LTO tape drives.
slot	The location in the magazine in which a tape cartridge is stored. Also called a cell.
tape cartridge	A container holding magnetic tape that can be processed without separating the tape from the container. The device uses data and cleaning cartridges. These cartridges are not interchangeable.
tape drive	An electro-mechanical device that moves magnetic tape and includes mechanisms for writing and reading data to and from the tape.
Terabyte	A unit of storage, abbreviated as T or TB, equal to 1,024 Gigabytes.
terminator	The last device at the end of a parallel SCSI chain must be terminated by terminator into the connector. An appropriate terminator is shipped with parallel SCSI devices.
U	A measure of chassis height. 1U in rack measurement is 44.45 millimeters (1.75 inches).
USB	Universal Serial Bus. A serial bus standard used to interface devices.
WORM	An acronym for Write Once Read Many times, a class of optical recording systems that allow recording and adding data, but not altering recorded data.

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