

ValueLoader™
LTO-1/LTO-2 Tape Autoloader

User Manual

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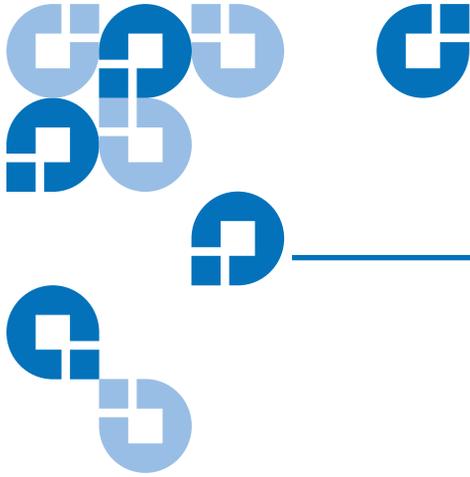
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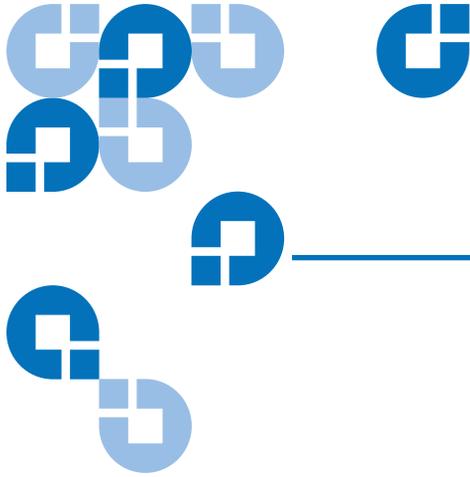
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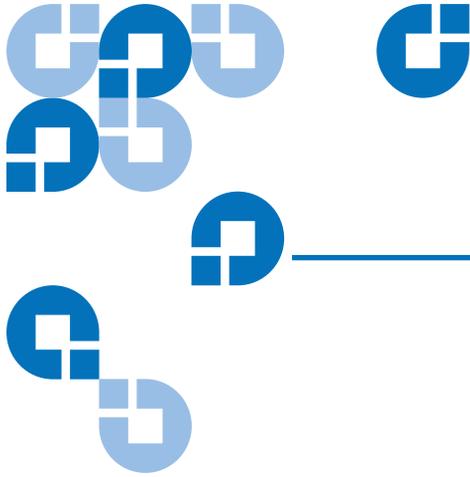
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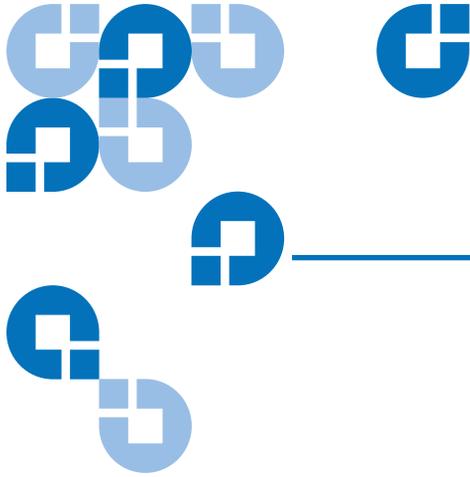
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Preface

This chapter describes the ValueLoader User Manual's audience, purpose, organization, document conventions, and product safety.

Audience

This user manual is designed and written for end users and field service engineers.

Purpose

The purpose of this manual is to provide end users with the following information:

- ValueLoader™ LTO-1 description and specifications
- ValueLoader LTO-2 description and specifications
- ValueLoader installation and configuration
- Tape cartridge description and general overview
- ValueLoader operation
- Troubleshooting
- Customer-replaceable components

**Document
Organization**

This manual is organized as follows:

- [Chapter 1, Installing the ValueLoader](#) - This chapter describes features, accessories, and installation tasks.
- [Chapter 2, Operating the ValueLoader](#) - This chapter describes the front panel menu structure, menu tree, and drive and tape operations.
- [Chapter 3, ValueLoader Administration](#) - This chapter describes how to configure, upgrade firmware, and retrieve ValueLoader information.
- [Chapter 4, Diagnostics and Troubleshooting](#) - This chapter describes how to identify and troubleshoot problems and resolve error conditions.
- [Appendix A, Technical Specifications](#) - This appendix describes environmental, operational, drive, and media specifications.
- [Appendix B, Customer Support](#) - This appendix lists support information for the ValueLoader.
- [Appendix C, Regulatory Statements](#) - This appendix includes the regulatory statements for this product.

**Notational
Conventions**

This manual uses the following conventions to designate specific elements:

Note: Notes emphasize important information related to the main topic.

Caution: Cautions indicate potential hazards to equipment and are included to prevent damage to equipment.

Warning: Warnings indicate potential hazards to personal safety and are included to prevent injury.

**SCSI-2
Specification**

The SCSI-2 communications specification is the proposed American National Standard for information systems, dated March 9, 1990. Copies may be obtained from:

Global Engineering Documents
15 Inverness Way, East
Englewood, CO 80112
(800) 854-7179 or (303) 397-2740

Contact Information

This section provides contact information for worldwide customer support.

Quantum

To order documentation for the Quantum ValueLoader or other products contact:

Quantum
Storage Systems
P.O. Box 57100
Irvine, CA 92619-7100
(949) 856-7800
(800) 284-5101

Technical Publications

To comment on existing documentation, send e-mail to:

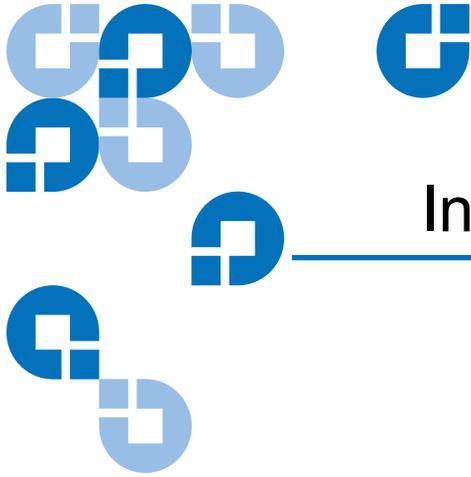
doc-comments@quantum.com

Visit the Quantum home page at:

<http://www.Quantum.com>

Customer Support

For information on support, or to access our “Frequently Asked Questions” database, visit our Web site at www.Quantum.com. Open the Support tab and select the appropriate section under Tape Libraries.



Installing the ValueLoader

Section Overview

This chapter describes the following:

- [Installation Overview](#)
- [Understanding ValueLoader Features](#)
- [Choosing a Location](#)
- [Unpacking the ValueLoader](#)
- [Identifying ValueLoader Accessories](#)
- [Installing the ValueLoader into a Rack](#)
- [Connecting the SCSI and Power Cables](#)
- [Preparing the Host and Verifying the Connection](#)

Installation Overview

Installing the ValueLoader consists of the following steps, which are explained in more detail later in this section..

- 1 Choose a location for the ValueLoader (see [page 6](#)).
- 2 Unpack and check the ValueLoader for shipping damage (see [page 7](#)).
- 3 Identify the accessories that come with the ValueLoader (see [page 8](#)).
- 4 Install the ValueLoader in a computer rack or select a table or desktop near the host server (see [page 9](#)). If installing a rack mount unit, refer to your rack *Installation Guide*.
- 5 Shut down, turn off, and remove power from the server and all devices attached to the server (see [page 12](#)).
- 6 Attach the SCSI cable to the ValueLoader and server's SCSI host adapter (see [page 12](#)).
- 7 Attach the power cable to the ValueLoader and plug in the power cable to the nearest power outlet (see [page 12](#)). Power the ValueLoader on to ensure it passes the Power-on Self Test (POST).
- 8 Set the SCSI ID for the ValueLoader (see [page 14](#)).
- 9 Set up the host and verify the connection (see [page 14](#)).

Understanding ValueLoader Features

The ValueLoader is a SCSI-2 low-voltage differential (LVD) data storage device that incorporates an HP LTO-1 tape drive or HP LTO-2 tape drive and eight tape slots. The ValueLoader occupies two SCSI target addresses, one for the tape drive and the other for the autoloader robotics.

The ValueLoader LTO-1 uses up to eight LTO Ultrium cartridges, providing a maximum formatted capacity of 1.6 Terabytes (TB) and a sustained data transfer rate as high as 1.8 Gigabytes (GB) per minute, assuming a 2:1 compression ratio.

The ValueLoader LTO-2 uses up to eight LTO-2 Ultrium cartridges, providing a maximum formatted capacity of 3.2 TB and a sustained data transfer rate as high as 3.6 GB per minute, assuming a 2:1 compression ratio.

The ValueLoader is compatible with most operating systems and environments that support the SCSI interface, but it requires either direct support from the operating system or a compatible backup application to take full advantage of its many features.

Bar Code Reader

Your ValueLoader may have come equipped with an optional bar code reader. The bar code reader is enclosed in a plastic housing that protrudes out of the back panel of the ValueLoader, just above the SCSI connectors. The bar code reader automatically scans each cartridge in the carousel upon power up, after a reset, or when a **Re-inventory** command is issued (see [Creating an Inventory of Cartridges](#) on page 33). Beyond that, there is no user interface with the bar code reader via the front panel operator controls or LCD screen. The information from each label is stored in memory and available through SCSI to the computer's operating system or backup application upon request.

If utilizing the bar code reader, you must apply bar code labels to the recessed area on the front of each cartridge. These labels must conform to ANSI/AIM BC1-1995, Uniform Symbology Specification Code 39. To obtain additional bar code labels, refer to www.Quantum.com.

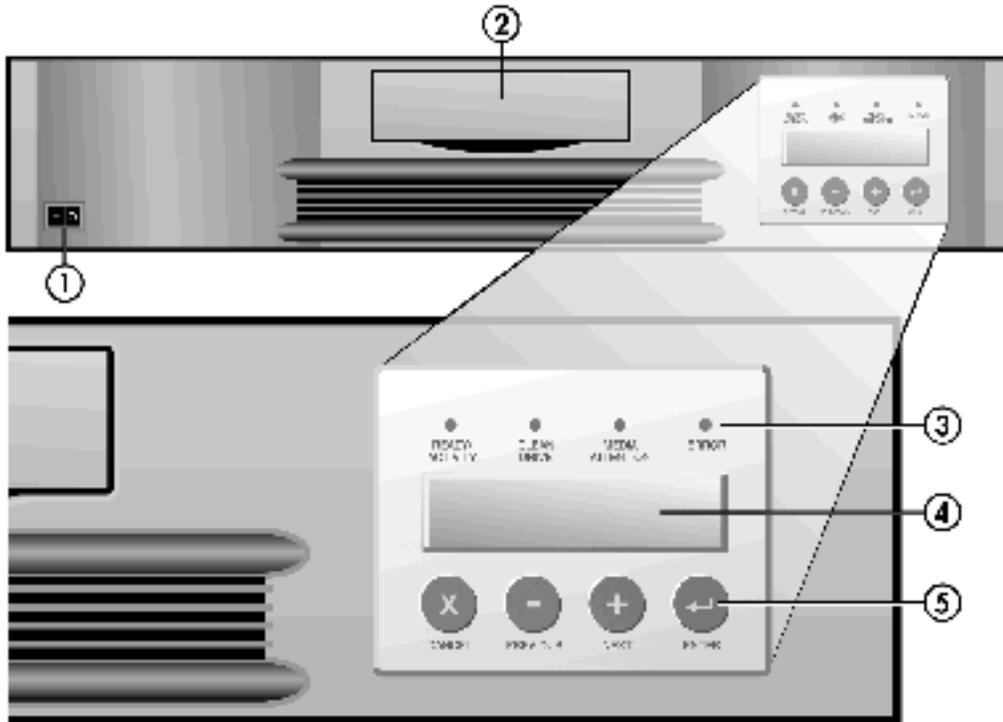
SCSI Requirements

The ValueLoader incorporates a wide SCSI-2, LVD SCSI bus. Make sure your SCSI host adapter or controller supports these standards.

The ValueLoader can be attached to a single-ended (SE) SCSI bus, but this is not recommended because it restricts performance. If you connect the ValueLoader to an SE SCSI bus, or if there are SE devices attached to the same SCSI bus, the ValueLoader's performance is limited to the maximum data transfer speed and maximum cable lengths of the SE bus. The ValueLoader is NOT compatible with a standard differential (Diff) or high-voltage differential (HVD) SCSI bus. The ValueLoader can be attached to a narrow (50-pin) SCSI bus, but this is not recommended as performance will be restricted. Attaching to a narrow (50-pin) bus requires a customer-supplied 68-pin to 50-pin adapter that terminates the unused 18 pins. These adapters are sometimes labeled high-byte termination.

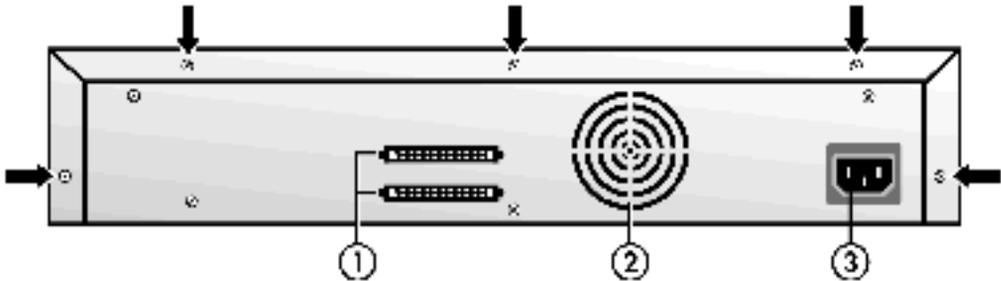
Product Overview

Figure 1 Front Panel Controls



1	Power switch
2	Import/Export slot
3	Front panel LEDs
4	Front panel LCD screen
5	Control keys

Figure 2 Back Panel
Overview



Note: The arrows indicate the screws on the back of the unit that need to be removed if you want to remove the cover. Three additional screws on each side of the unit must also be removed in order to lift the top cover.

1	68-pin SCSI connectors
2	Fan vent
3	Power connector

Choosing a Location

Choose a location that meets the following criteria (see [appendix A](#) on page 63 for more specifications.)

Table 1 Location
Criteria

Requirement	Description
Standalone requirements	Select a location that is flat, level, sturdy, and close to a host server. Do not place the ValueLoader on the floor or other carpeted surface. Caution: Do not place the ValueLoader on its side or upside down, or stack items that weigh more than 15 kg (33 lbs) on top of the ValueLoader.
Rack requirements	Standard 19-inch rack with 2U of clearance.
Room temperature	LTO-1: 10-35° C (50-95° F) LTO-2: 10-38° C (50-100° F)
Power source	AC power voltage: 100-127 VAC; 200-240 VAC Line frequency: 50-60 Hz Note: Locate the AC outlet near the ValueLoader. The AC power cable is the product's main AC disconnect device and must be easily accessible at all times.
Weight	12 kg (26 lbs)

Requirement	Description
Air quality	Minimal sources of particulate contamination. Avoid areas near frequently used doors and walkways, stacks of supplies that collect dust, printers, or smoke-filled rooms. Caution: Excessive dust or debris can damage tapes and tape drives.
Humidity	20-80% RH, non-condensing
Clearance	Back: Minimum of 15.4 cm (6 in) Front: Minimum of 30.8 cm (12 in) Sides: Minimum of 5.08 cm (2 in)

Unpacking the ValueLoader

Before you begin, clear a desk or table so you can unpack the ValueLoader. You also need to select an open 2U computer rack location or a desktop location near the server that is to be the host for the ValueLoader.

Caution: If the room temperature you are working in differs from the shipping or storage temperature by 15° C (30° F) or more, let the ValueLoader acclimate to the surrounding environment for at least 12 hours before opening the shipping carton.

Unpack and inspect the ValueLoader for shipping damage by doing the following:

- 1 Clear a table or desk so that you have room to unpack the ValueLoader.
- 2 Inspect the shipping box for damage. If you notice any damage, report it to the shipping company immediately.

- 3 Open the shipping box and remove the accessories package. Set the accessories package aside for now.
- 4 Lift the ValueLoader and padding out of the box and place it on the work surface, top facing up.

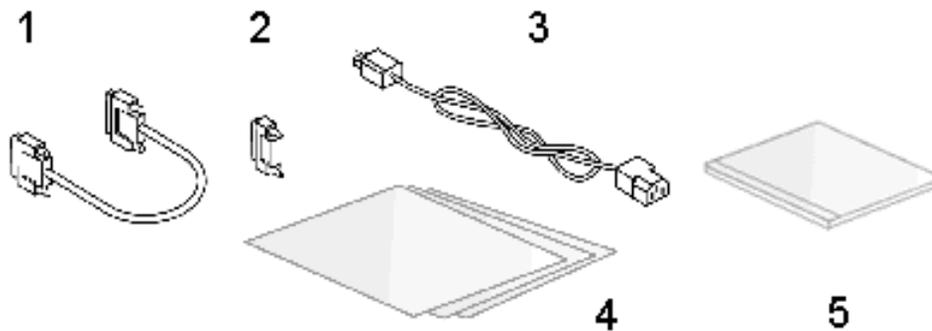
Caution: Placing the ValueLoader on its side, on end, or upside down can cause permanent damage to the unit.

- 5 Carefully remove the shipping padding from the left and right sides of the ValueLoader. Then, remove the bag from the ValueLoader.

Note: Save the packing materials in case you need to move or ship the ValueLoader in the future.

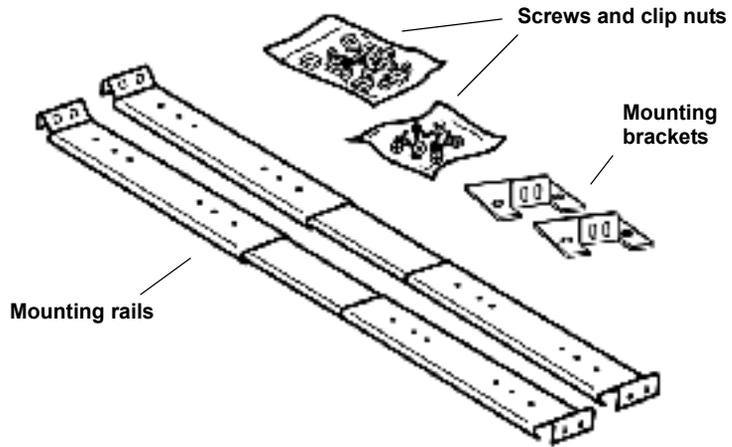
Identifying ValueLoader Accessories

Figure 3 Accessories



1	SCSI cable	3	Power cable	5	Documentation CD
2	SCSI terminator	4	Quick Start Guide		

Figure 4 Rack Kit
Components



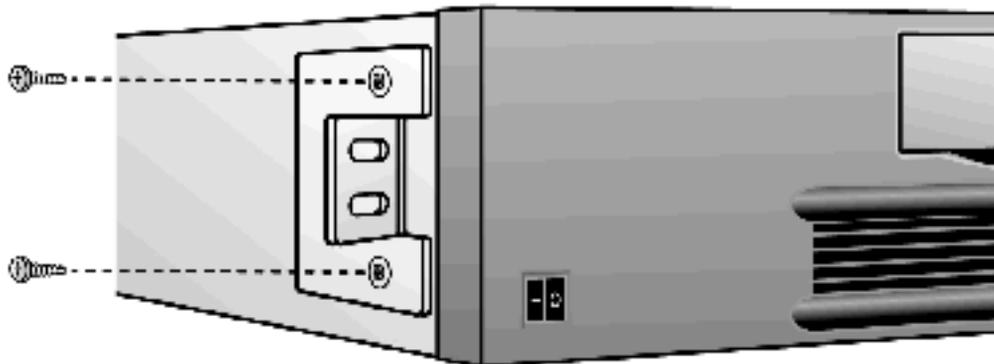
Installing the ValueLoader into a Rack

The ValueLoader fits all standard 19-inch racks, taking up 2U of space. To install the ValueLoader into a rack, you need to install the mounting brackets on both sides of the ValueLoader and the rails in the selected rack location.

To install the ValueLoader, follow these steps:

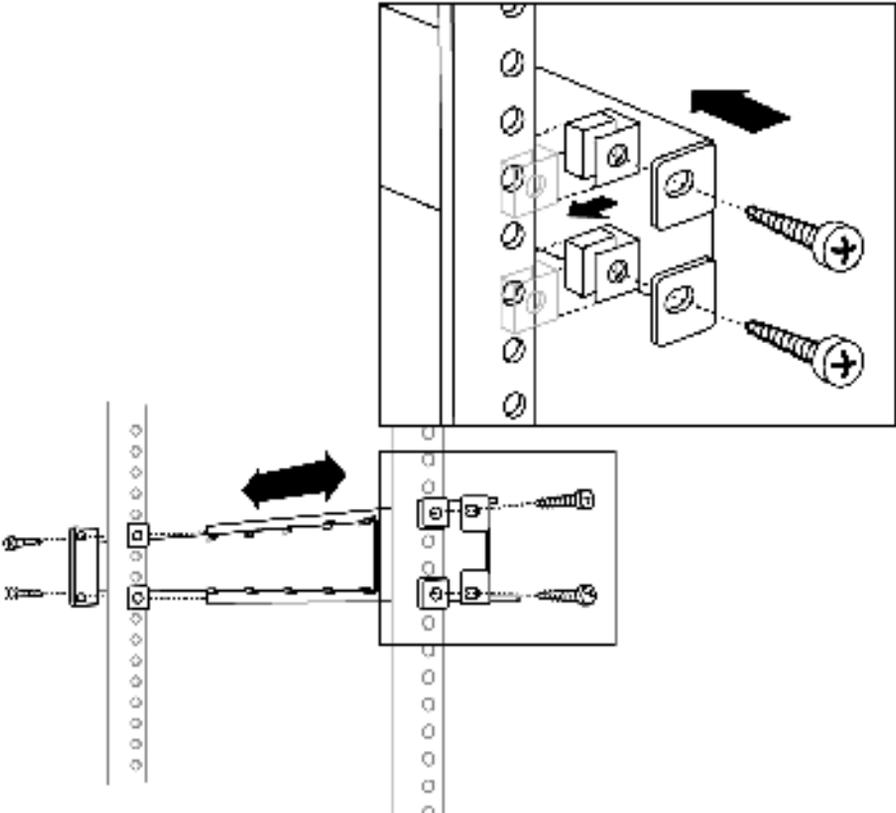
- 1** Use a screwdriver to remove the two screws near the front on each side of the ValueLoader.
- 2** Using the screws you removed in [step 1](#), secure one mounting bracket from the rack kit to each side of the ValueLoader, as shown in [figure 5](#).

Figure 5 Installing
Mounting Brackets
(Left Side Shown)



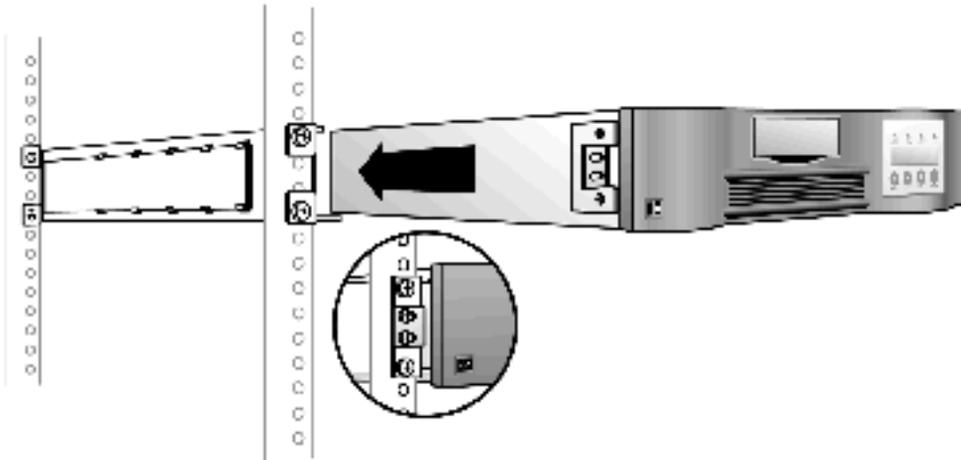
- 3 Using screws and clip nuts from the rackmount hardware package, secure one rail to each side of the rack in the location where you plan to install the ValueLoader.
 - Be sure to secure both the front and back of each rail to the rack. The rails extend to fit a variety of rack depths.
 - The correct orientation of the left rail is shown in [figure 6](#). Repeat for the right rail.

Figure 6 Installing
Rails in the Rack (Left
Side Shown)



- 4 Slide the ValueLoader onto the rails and secure the mounting bracket to the rack using the screws and clip nuts from the rackmount hardware package, as shown in [figure 7](#).

Figure 7 Sliding the ValueLoader into the Rack Slot, Securing Mounting Bracket



Connecting the SCSI and Power Cables

To connect the SCSI and power cables to the ValueLoader, follow these steps:

- 1 Shut down and turn off the selected server. Turn off all attached accessory devices, such as printers and other SCSI devices. Remove the power cables from the server and all attached accessories.

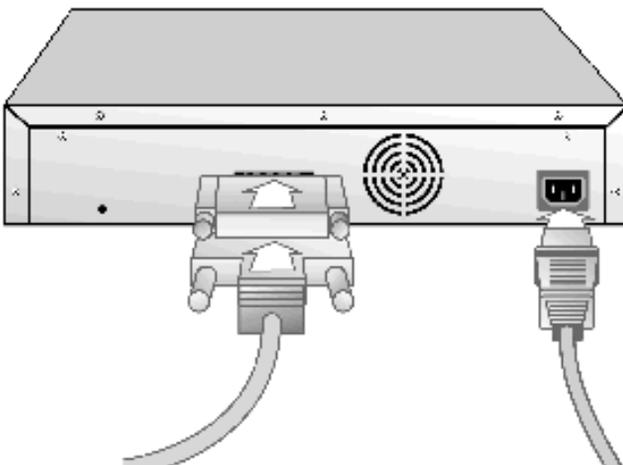
Caution: Failure to remove the power cables from these devices may result in damage to the ValueLoader.

- 2 Attach one end of the SCSI cable (included in the accessory kit) to one of the connectors on the back panel of the ValueLoader (see [figure 8](#)).
- 3 Attach the other end of the SCSI cable to the connector on the SCSI host adapter or to the connector on the previous device on the SCSI bus.

Note: If the supplied SCSI cable does not fit the connector on your SCSI host adapter, you either have an incompatible SCSI host adapter, or you need to purchase a cable adapter. Contact your service representative or SCSI host adapter manufacturer for information.

- 4 Attach the terminator to the remaining SCSI connector on the back panel of the ValueLoader (if the ValueLoader is the last or only device on the SCSI bus). Otherwise, attach the cable to the next device on the SCSI bus. Make sure the last device on the SCSI bus is properly terminated.
- 5 Attach the female connector on the power cable to the power connector on the back panel of the ValueLoader (see [figure 8](#)).

Figure 8 Attaching SCSI and Power Cables



- 6 Plug the power cable into the nearest properly grounded power outlet.

Note: To disconnect all power from the ValueLoader, remove the power cable from the outlet.

- 7 Plug in the host server or workstation and all attached devices.
- 8 Turn on the ValueLoader by setting the power switch on the front panel to the ON position. Turn on any other devices you turned off earlier. Check the LCD screen to make sure the ValueLoader is receiving power. If it is not, check the power connectors and the power source.

During the Power-on Self Test (POST), all four LEDs are illuminated briefly, followed by just the Ready/Activity LED flashing. When the initialization sequence is complete, the LCD screen displays the Home screen.

- 9 Turn on the server.

Preparing the Host and Verifying the Connection

If necessary, install a SCSI host adapter, software, and compatible driver(s). Refer to the manuals for the host computer and the SCSI host adapter for detailed instructions. In addition, follow these general guidelines:

- When the host server is powered on, install software, and/or driver(s) that are compatible with the ValueLoader (see [Installing the Device Drivers](#) on page 15). Software compatibility information is available at www.Quantum.com. Most backup software packages require an additional module to communicate with the ValueLoader robotics.
- If the host server is connected to a network, check with the system administrator before turning off power.
- Use proper procedures to prevent electrostatic discharge (ESD). Use wrist-grounding straps and anti-static mats when handling internal components.

- Make sure the host server has an open expansion slot.
- Make sure your backup application supports the SCSI host adapter.
- Depending on the server configuration, you may need to change the SCSI ID of the ValueLoader (see [Changing the SCSI ID](#) on page 36).
- Ensure that the ValueLoader is properly terminated. If the ValueLoader is the only SCSI device (other than the SCSI host adapter) on the SCSI bus, it must be terminated. Likewise, if the ValueLoader is physically the last SCSI device on the SCSI bus, it must be terminated. Only the devices physically at the beginning and end of the SCSI bus should be terminated.
- Verify the connection between the ValueLoader and host by making sure the host server's operating system recognizes the ValueLoader. To do this:
 - For Microsoft® Windows NT®, select **Settings > Control Panel > SCSI Adapter**
 - For Microsoft Windows® 2000 and Windows Server 2003, select **Settings > Control Panel > System > Hardware > Device Manager > Tape Drive** and/or **Media Changer**

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

Installing the Device Drivers

There are two device drivers associated with the ValueLoader: one for ValueLoader robotics and another for the tape drive within the ValueLoader.

Note: The device drivers supplied at www.Quantum.com are required if you intend to use the Windows 2000 or Windows Server 2003 native backup application. Commercial backup applications provide all necessary device driver support. Refer to www.Quantum.com for a list of compatible backup applications. Please note that Windows NT *does not include native support for ValueLoaders*. A backup application must be used.

Note: The following instructions assume that you have downloaded the appropriate device drivers from www.Quantum.com and have saved them in a known location on your computer system.

Tape Drive Device Driver (Windows 2000 and Windows Server 2003)

To install the tape drive device driver:

- 1 Make sure that you are logged on to the host server with Administrator privileges.
- 2 Open the device manager (please refer to your OS documentation for specific instructions). For example, right-click the **My Computer** icon on the Windows desktop, then click **Manage**, and then click **Device Manager**.
 - For LTO-1 drives, the tape drive should be listed under the ? **Other Devices** item as **HP Ultrium-1 SCSI Sequential Device**.
 - For LTO-2 drives, the tape drive should be listed under the ? **Other Devices** item as **HP Ultrium-2 SCSI Sequential Device**.
- 3 For LTO-1 drives, right-click the **HP Ultrium-1 SCSI Sequential Device**, click **Uninstall**, and then click the **OK** button to confirm that you want to remove the device.

For LTO-2 drives, right-click the **HP Ultrium-2 SCSI Sequential Device**, click **Uninstall**, and then click the **OK** button to confirm that you want to remove the device.
- 4 Click the **Action** button in the upper-left corner of the **Computer Management** dialog box.
- 5 Click **Scan for Hardware Changes**. Windows 2000 or Windows Server 2003 scan for the drive. The drive appears under ? **Other Devices** again.
- 6 For LTO-1 drives, right-click the **HP Ultrium-1 SCSI Sequential Device** listing and then click **Properties**.

For LTO-2 drives, right-click the **HP Ultrium-2 SCSI Sequential Device** listing and then click **Properties**.
- 7 Select the **Drivers** tab.

- 8 Click the **Reinstall Driver** or **Update Driver** button.
- 9 When the Upgrade Device Driver Wizard appears, click the **Next** button.
- 10 Click **Tape Drives** and then click the **Next** button.
- 11 Click the **Have Disk** button. Type the path to where you have saved the device drivers on your system, then click the **OK** button.
- 12 For LTO-1 drives, click the **LTO ValueLoader Tape Drive** entry and click the **Next** button
For LTO-2 drives, click the **LTO-2 ValueLoader Tape Drive** entry and click the **Next** button..

Note: Depending on the status of your system and the exact path taken to select the device drivers, the drivers may appear as **hplto.inf** or **hplto.sys**.

- 13 Click the **Next** button again to install the driver.
- 14 Click the **Finish** button.
- 15 Close the **Device Properties** dialog box.

The drive appears in the **Device Manager** under **Tape Drives** as either **LTO ValueLoader Tape Drive** or **LTO-2 ValueLoader Tape Drive**, depending on your drive type. It is now ready to use.

ValueLoader Device Driver (Windows 2000 and Windows Server 2003)

To install the ValueLoader device driver:

- 1 Make sure that you are logged onto the host server with Administrator privileges.
- 2 Right-click the **My Computer** icon on the Windows desktop, then click **Manage**, and then click **Device Manager**.

The tape drive should be listed under the **Medium Changers** item as **Unknown Medium Changer Device**.

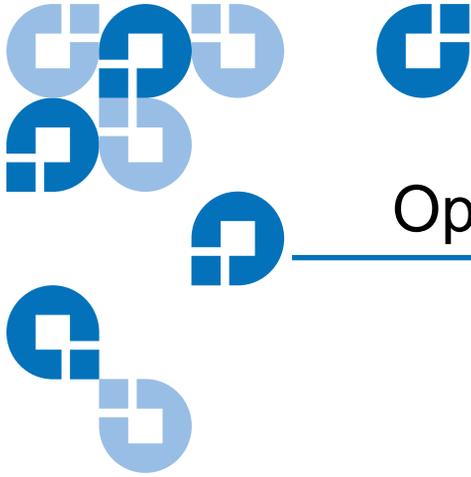
- 3 Right-click the **Unknown Medium Changer Device** listing, click **Uninstall**, and then click the **OK** button to confirm that you want to remove the device.

- 4 Click the **Action** button in the upper-left corner of the Computer Management dialog box.
- 5 Click **Scan for Hardware Changes**. Windows 2000 and Windows Server 2003 scan for the ValueLoader. The ValueLoader appears under **Medium Changers** again.
- 6 Right-click the **Unknown Medium Changer Device** listing and then click **Properties**.
- 7 Select the **Drivers** tab.
- 8 Click the **Reinstall Driver** or **Update Driver** button.
- 9 When the Upgrade Device Driver Wizard appears, click the **Next** button.
- 10 Click **Display a list...** and then click the **Next** button.
- 11 Click the **Have Disk** button. Type the path to where you have saved the device drivers on your system, then click the **OK** button.
- 12 Click the **LTO ValueLoader Medium Changer** or **LTO-2 ValueLoader Medium Changer** entry, depending on your drive type, and click the **Next** button.

Note: Depending on the status of your system and the exact path taken to select the device drivers, the drivers may appear as **ltomc.inf** or **ltovsmc.sys**.

- 13 Click the **Next** button again to install the driver.
- 14 Click the **Finish** button.
- 15 Close the **Device Properties** dialog box.

The ValueLoader appears in the **Device Manager** under **Medium Changers** as **LTO ValueLoader Medium Changer** or **LTO-2 ValueLoader Medium Changer** depending on your drive type. It is now ready to use.



Operating the ValueLoader

Section Overview

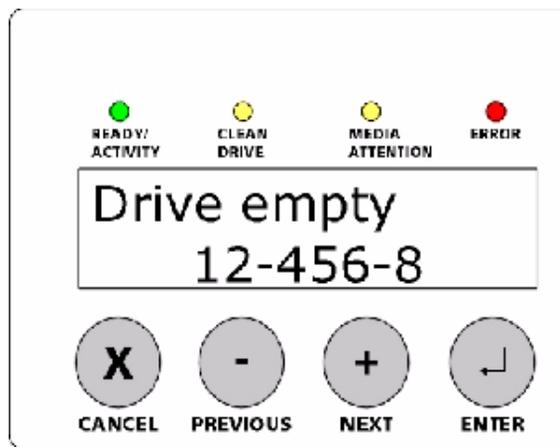
This chapter describes the following:

- [Operator's Panel Overview](#)
- [Understanding the Menu Structure](#)
- [Using Cartridges](#)
- [Cleaning the Tape Drive](#)
- [Creating an Inventory of Cartridges](#)

Operator's Panel Overview

The Operator's Panel consists of four LEDs, four buttons, and a 2-line by 16-character LCD screen. The Operator's Panel provides everything you need to monitor ValueLoader status and to control all of its functions.

Figure 9 Operator's Panel—Drive Empty



The display defaults to the Home screen. The Home screen consists of the ValueLoader status on the top line and the current cartridge inventory on the second line. If the tape drive does not have a cartridge loaded, the top line displays Drive empty.

The cartridge inventory indicates all slots that contain a cartridge by displaying the slot number. Empty slots are indicated by a dash or hyphen (-).

An exclamation point (!) displayed in the inventory indicates that the ValueLoader has identified a cartridge in the indicated slot that is either an invalid cartridge type or has had a media-related error. These conditions can be caused by faulty media, possibly due to a corrupt imbedded servo signal, or dirty read/write heads in the tape drive. The Media Attention LED is also illuminated in this case (see [LED Indicators](#) on page 23). Exporting the indicated cartridge will clear the error condition (see [Exporting Cartridges](#) on page 28). If these symptoms occur on multiple known good cartridges, consider cleaning the tape drive (see [Cleaning the Tape Drive](#) on page 31). If a particular cartridge causes error conditions repeatedly, that cartridge may be defective or invalid.

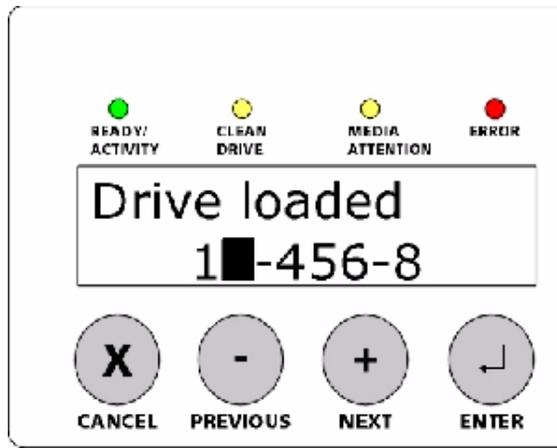
Occasionally, you may see the message In Transit, which may indicate:

- An error condition has caused a cartridge to be left between its slot and the drive. Power cycle or reset the ValueLoader to clear this condition.
- A cartridge is unexpectedly found in the Import/Export slot opening. Power cycle or reset the ValueLoader to clear this condition.

You may also see the message SEQ in the lower-right corner of the display. this message indicates that the ValueLoader is currently running in Sequential Mode (see [ValueLoader Operating Modes](#) on page 38).

If the tape drive has a cartridge loaded, the top line displays Drive loaded. The cartridge currently loaded in the drive is indicated by an alternating black block and the slot number as shown in [figure 10](#). This display can also indicate that the specified cartridge is being loaded, unloaded, imported, or exported as well as indications of read to, write to, and so on. The ValueLoader status line indicates the current operation. An example of this display is shown in [figure 10](#).

Figure 10 Operator's
Panel—Drive Loaded



LED Indicators

The Operator's Panel includes four LED indicators that provide a variety of information as detailed in [table 2](#).

Table 2 LEDs

LED	Color	Description
Ready/ Activity	Green	Illuminated when power is on. Blinking whenever there is tape drive or ValueLoader robotics activity.
Clean Drive	Amber	Illuminated when the tape drive needs to be cleaned. The LED turns off when cleaning is successfully completed (see Cleaning the Tape Drive on page 31). Regular periodic cleaning of the LTO-1 or LTO-2 tape drives is not required.
Media Attention	Amber	Illuminated if a media-related error has occurred. This condition can be the result of dirty read/write heads in the tape drive, or if an invalid or damaged cartridge is inserted. The offending cartridge will show an "!" in the cartridge inventory display for the corresponding slot. Exporting the indicated cartridge will clear the error condition (see Exporting Cartridges on page 28). If these symptoms occur on multiple known good cartridges, consider cleaning the tape drive (see Cleaning the Tape Drive on page 31). If a particular cartridge causes these symptoms regularly, that cartridge may be defective or invalid.
Error	Red	Illuminated when an unrecoverable tape drive or ValueLoader error occurs. A corresponding error message appears on the LCD screen (see ValueLoader Error Codes on page 57).

Operator's Panel Control Buttons

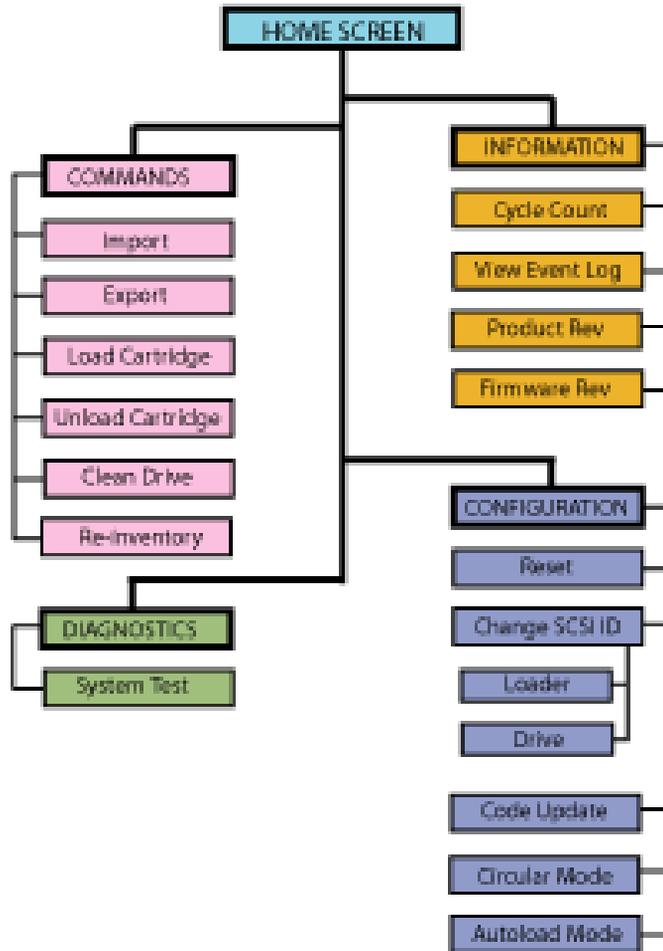
The Operator's Panel includes four buttons that provide access to all operations and information menus.

Table 3 Control
Buttons

Button	Description
Cancel	Cancels the current menu option and returns to the previous menu level or Home 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.
Enter	Executes the current menu or selects the current option displayed on the LCD panel.

Understanding the Menu Structure

Figure 11 Operator's Panel Menu Structure



Using Cartridges

Before you use the ValueLoader LTO-1 or ValueLoader LTO-2, make sure you observe these general rules:

Note: Do not degauss LTO-1 Ultrium or LTO-2 Ultrium cartridges! LTO-1 Ultrium and LTO-2 Ultrium cartridges are prerecorded with a magnetic servo signal at the factory. This signal is required in order to use the cartridge with the LTO-1 or LTO-2 drive. Keep magnetically charged objects, such as audio speakers, computer monitors, etc., out of close range.

- For ValueLoader LTO-1 units, use only LTO Ultrium cartridges. The tape drive rejects all other types of cartridges. LTO Ultrium formatted cartridges contain embedded servo code, written on the media during the cartridge manufacturing process. *LTO Ultrium cartridges cannot be bulk erased or degaussed.* You can order tape cartridges at www.Quantum.com.

For ValueLoader LTO-2 units, use only LTO-2 Ultrium cartridges. The tape drive rejects all other types of cartridges. LTO-2 Ultrium formatted cartridges contain embedded servo code, written on the media during the cartridge manufacturing process. *LTO-2 Ultrium cartridges cannot be bulk erased or degaussed.* You can order tape cartridges at www.Quantum.com.

- **Clean the tape drive when the Clean Drive LED is illuminated**, or if there is any other indication that the drive is having trouble reading or writing, such as if the Media Attention LED is illuminated, or there is an exclamation point (!) in the inventory display. Be sure to use only LTO Ultrium universal cleaning cartridges.

Importing Cartridges

The option forces the ValueLoader to import a cartridge into a specific empty slot in the carousel. To import tapes into the ValueLoader:

- 1 Make sure the write-protect switch is set as desired for each data cartridge (see [Write-Protecting Cartridges](#) on page 30). If applicable, apply a bar code label to the recessed area on the front of each cartridge (see [Bar Code Reader](#) on page 3).

- 2 From the Home screen or main menu, press the **[+]** or **[-]** button until **Commands** appears on the top line of the LCD screen.
- 3 Press the **[Enter]** button to access the available options.
- 4 Press the **[+]** or **[-]** button until **Import** appears on the LCD screen. Press **[Enter]** to select.
- 5 Press the **[+]** or **[-]** button until the desired slot number appears on the LCD screen and press the **[Enter]** button. You are not given the option to import a cartridge to an occupied slot.
- 6 When **Insert Cartridge Slot** appears on the LCD screen and the **Import/Export** slot opens, insert the desired data cartridge into the **Import/Export** slot so that the write-protect switch is facing out from the ValueLoader and towards the left.

Note: If you are using the Operator's Panel to clean the drive, import the cleaning cartridge only when the front panel indicates that cleaning is needed. You may keep a cleaning cartridge in the ValueLoader if the backup software can manage the drive cleaning.

- 7 Repeat steps [5](#) and [6](#) as needed for additional cartridges.
- 8 Press the **[Cancel]** button when you have finished importing cartridges.
- 9 Verify that the LCD screen shows that the desired slots have cartridges installed.

Figure 12 Importing a Cartridge



Exporting Cartridges

This option moves a cartridge from a specific slot to the Import/Export slot. To export one or more cartridges from the ValueLoader, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until **Commands** appears on the top line of the LCD screen. Then, press **[Enter]**.
- 2 Press the **[+]** or **[-]** button until **Export** appears on the LCD screen, and then press **[Enter]**.
- 3 Press the **[+]** or **[-]** button until the desired slot number appears on the LCD screen. Then, press the **[Enter]** button. You are not given the option to export from an empty slot.
- 4 When **Remove Cartridge** appears on the LCD screen and the cartridge is ejected through the Import/Export slot, remove the exported cartridge from the ValueLoader, and press the **[Enter]** button.
- 5 Repeat steps [3](#) and [4](#) as needed for any additional cartridges.
- 6 Press the **[Cancel]** button when you are finished exporting cartridges.
- 7 Make sure the LCD screen indicates that the desired slots are empty.

Figure 13 Exporting a Cartridge



Loading Cartridges

This option loads a cartridge from the ValueLoader carousel into the tape drive. To use this option, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until **Commands** appears on the top line of the LCD screen. Then, press **[Enter]**.
- 2 Press the **[+]** or **[-]** button until **Load Cartridge** appears on the LCD screen, and then press the **[Enter]** button to select.
- 3 Press the **[+]** or **[-]** button until the desired slot number appears on the LCD screen and press the **[Enter]** button. The slot number you select indicates the cartridge to be loaded into the tape drive.

Note: Only slot numbers that contain cartridges are displayed.

Status messages appear while the cartridge is loading. **Drive Stopped** appears when the operation is complete.

- 4 Press the **[Cancel]** button when you are finished loading the cartridge.

Unloading Cartridges

This option unloads the cartridge from the tape drive into its original slot. To use this option, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until **Commands** appears on the top line of the LCD screen. Then, press **[Enter]**.
- 2 Press the **[+]** or **[-]** button until **Unload Cartridge** appears on the LCD screen. Then, press the **[Enter]** button to unload the cartridge from the tape drive.

Status messages appear while the cartridge is unloading. **Drive Empty** appears when the operation is complete.

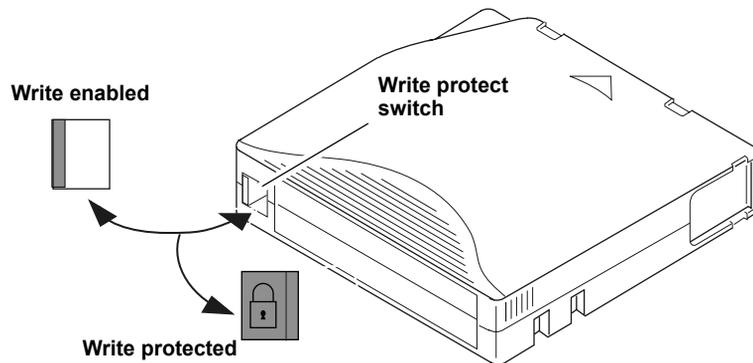
- 3 Press the **[Cancel]** button when you are finished unloading the cartridge.

Write-Protecting Cartridges

All cartridges have a write-protect switch to prevent accidental erasure or overwriting of data ([figure 14](#)). Before loading a cartridge into the ValueLoader, make sure the write-protect switch on the front of the cartridge is positioned as desired:

- Slide the switch to the **right** to write-protect the cartridge. The standard “locked” symbol will be visible on the switch.
- Slide the switch to the **left** to allow the ValueLoader to write data to the cartridge. The standard “unlocked” symbol will be visible on the switch.

Figure 14 Write-Protect Switch



Maintaining Cartridges

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

Note: Do not degauss LTO-1 Ultrium or LTO-2 Ultrium cartridges! LTO-1 Ultrium and LTO-2 Ultrium cartridges are prerecorded with a magnetic servo signal at the factory. This signal is required in order to use the cartridge with the LTO-1 or LTO-2 drive. Keep magnetically charged objects, such as audio speakers, computer monitors, etc., out of close range.

- Do not drop or strike a cartridge. Excessive shock can displace the tape leader, making the cartridge unusable and possibly damaging the ValueLoader.
- Store cartridges in their storage cases.

- Do not expose cartridges to direct sunlight or sources of heat, including portable heaters and heating ducts.
- The operating temperature range for cartridges is 10° C to 35° C (50° F to 95° F). The storage temperature range is 16° C to 32° C (60° F to 90° F). Always store cartridges in their storage cases.
- If a cartridge has been exposed to temperatures outside the ranges specified above, stabilize the cartridge at room temperature for the same amount of time as it was exposed to the extreme temperature or 24 hours, whichever is less.
- Store cartridges in a dust-free environment in which relative humidity is always between 20% and 80%, non-condensing. The ideal relative humidity is 40% ± 20%.
- Do not place 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 on cartridges and the embedded servo codes, written on the media by the cartridge manufacturer, rendering the cartridge unusable.
- Apply identification or bar code labels only to the recessed area on the front of the cartridge.

Cleaning the Tape Drive

LTO-1 and LTO-2 tape drives utilize an internal head cleaner brush. The head cleaner brush is used as part of error recovery algorithms, after a tape unthread, if more than 150 thousand meters of tape have been pulled since the last use of the head cleaner brush, and when a cleaning cartridge is used. A scheduled maintenance/cleaning program is not required. A cleaning cartridge should only be used when the ValueLoader prompts for one.

Cleaning the tape drive with a cleaning cartridge can take as long as five minutes, during which the Ready LED blinks. Each cleaning cartridge can be used for 15 cleanings. The drive will automatically reject a cleaning cartridge after it has been used 15 times. You may also refer to your backup software documentation for information on enabling automatic cleanings with the use of a dedicated cleaning slot.

Note: Use only LTO Ultrium cleaning cartridges in the ValueLoader, available at www.Quantum.com. Use of any other type of cleaning cartridge could damage the read/write head in the tape drive. Therefore, if you load any other type of cleaning cartridge, the ValueLoader will automatically export the tape within approximately 25 seconds.

Note: If you are using Operator's Panel commands to clean the drive, import the cleaning cartridge only after you have selected the **Clean Drive** command. If you would like to keep a cleaning cartridge in the ValueLoader, the backup software must manage drive cleaning.

To clean the tape drive, follow these steps:

- 1 From the Home screen or main menu, press the **[+]** or **[-]** button until **Commands** appears on the top line of the LCD screen, then press **[Enter]**.
- 2 Press the **[+]** or **[-]** button until **Clean Drive** appears on the LCD screen, and then press **[Enter]**.
- 3 If the carousel is full, the LCD screen displays **No slot free for transfer**. Press the **[Cancel]** button repeatedly until the main menu or Home screen is displayed. Export a cartridge to make room for the cleaning cartridge (see [Exporting Cartridges](#) on page 28), then return to [step 1](#) to clean the tape drive.
- 4 If the carousel is not full, the ValueLoader will select the first available slot and prompt you to insert a cleaning cartridge.
- 5 Insert the cleaning cartridge into the ValueLoader Import/Export slot.

During the cleaning process, which can take up to five minutes, the LCD screen displays Drive Cleaning.

Note: If the cartridge is not a valid cleaning cartridge, the LCD screen will display Bad clean tape and the cartridge is exported.

- 6 When tape drive cleaning is complete, the Clean Drive LED turns off (if previously on) and the ValueLoader unloads and exports the cleaning cartridge. Remove the cleaning cartridge, and press **[Enter]** when the LCD screen prompts you to do so.

Note: If the Clean Drive or Media Attention LED is illuminated again when you insert another cartridge immediately after cleaning, see [Troubleshooting](#) on page 46.

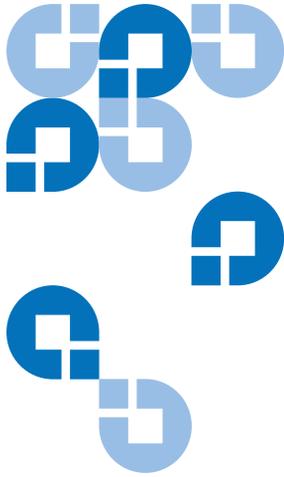
- 7 If you had to remove a data cartridge to import the cleaning cartridge, import that data cartridge to its original slot (see [Importing Cartridges](#) on page 26).

Creating an Inventory of Cartridges

This option builds a new inventory of cartridges in the ValueLoader. If using a bar code reader, this option also scans the bar code label on each cartridge in the carousel (see [Bar Code Reader](#) on page 3). To use this option, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Commands appears on the top line of the LCD screen.
- 2 Press the **[Enter]** button to access the available options.
- 3 Press the **[+]** or **[-]** button until Re-inventory appears on the LCD screen. Then, press **[Enter]**.

The ValueLoader then checks the drive and each slot for the presence of a tape in order to update inventory information.



ValueLoader Administration

Section Overview

This chapter describes the following:

- [Configuring the ValueLoader](#)
- [Updating Firmware](#)
- [Running the ValueLoader System Test](#)
- [Retrieving Information About the ValueLoader](#)

Configuring the ValueLoader

The **Configuration** menu provides access to the following ValueLoader configuration options:

- Resetting the ValueLoader
- Setting SCSI IDs
- ValueLoader Operating Modes
- Updating firmware

To access the **Configuration** menu from the Home Screen or main menu, press the **[+]** or **[-]** button until Configuration appears on the top line of the LCD screen. Press the **[Enter]** button and then **[+]** or **[-]** to access the available options. Press the **[Enter]** button to execute the displayed menu option.

Resetting the ValueLoader

This option resets the ValueLoader robotics and the tape drive within the ValueLoader, forces a new cartridge inventory, and clears any current error condition.

Note: This option is primarily used if the ValueLoader is in an error state.

To access this option, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Configuration appears on the top line of the LCD screen, and then press the **[Enter]** button to select.
- 2 Press the **[+]** or **[-]** button until Reset appears on the LCD screen.
- 3 Press **[Enter]** to reset the ValueLoader.

After initialization, the ValueLoader returns to normal operation and displays the Home screen.

Changing the SCSI ID

This option changes the SCSI ID of the ValueLoader and/or tape drive. The ValueLoader occupies two SCSI IDs (target addresses), one for the tape drive and the other for the ValueLoader robotics.

The default SCSI IDs for the ValueLoader are **6** for the tape drive and **5** for the robotics. You should only need to change the SCSI IDs if there are other devices on the SCSI bus using the same SCSI ID.

To access this option, follow these steps:

- 1** From the Home Screen or main menu, press the **[+]** or **[-]** button until Configuration appears on the top line of the LCD screen, and then press the **[Enter]** button to select.
- 2** Press the **[+]** or **[-]** button until Change SCSI ID appears on the LCD screen, and then press **[Enter]** to select.
- 3** Press the **[+]** or **[-]** button until the desired device is displayed, either Loader or Drive.
- 4** Press the **[Enter]** button to select. The LCD will then display either Change Loader ID or Change Drive ID depending on which device was selected. The second line displays New SCSI ID: xx where xx is the current SCSI ID for that device.
- 5** Press the **[+]** or **[-]** button until the desired SCSI ID is displayed.
- 6** Press the **[Enter]** button to select the new ID number. The LCD screen indicates Please Cycle Power. If you need to change the SCSI ID for the other device, go back to [step 4](#).
- 7** Once both SCSI IDs are set correctly and the Please Cycle Power message is displayed, turn off the ValueLoader. After a few seconds, turn it back on again.

The selected SCSI ID is now in effect.

Note: If you changed the SCSI ID, you may also need to reboot the host server and reconfigure your backup software before you can use the ValueLoader. Consult your hardware and software manuals for more information.

ValueLoader Operating Modes

The operating mode is set based on whether you have automation software controlling cartridges in the ValueLoader or if you are manually loading and unloading cartridges using the ValueLoader Operator's Panel commands. The ValueLoader always operates in Autodetect Mode, which is transparent to you. In Autodetect Mode, the ValueLoader automatically assumes that you *are not* using an automation software package to control cartridge or drive activity. This is called Stacker or Sequential Mode. If the ValueLoader detects that an automation software package is controlling tape/drive activity, it will automatically switch to Random Mode.

Random Mode

This is the normal mode of operation when a backup software application is being used. In Random Mode, the ValueLoader does not automatically load tapes into the drive; instead, it waits for commands from the software. To use Random Mode, you do not need to configure anything from the ValueLoader front panel, but your backup software package must support autoloaders, which often requires the additional installation of an autoloader/library software module.

Sequential Mode

Sequential Mode is useful when an adequate software application is not available. In Sequential Mode, the ValueLoader automatically loads and unloads tapes from the drive. The operator determines the first tape to load by loading the desired tape into the tape drive using the ValueLoader's front panel controls (see [Loading Cartridges](#) on page 29). When the first tape is full or unloaded for any other reason, the ValueLoader automatically removes the tape from the drive, puts it in its original slot, then loads the cartridge in the next available higher numbered slot, continuing this sequence with each available higher numbered slot. To further determine how you want tapes loaded into the ValueLoader's tape drive while in Sequential Mode, you may set **Circular** and **Autoload** options from the autoload front panel. When the ValueLoader is in Sequential Mode, the LCD will display SEQ in the lower-right corner of the display.

Circular Mode On/Off. This option turns Circular Mode on or off, and is used only when in Sequential Mode. When Circular Mode is on, after the ValueLoader has cycled through all available cartridges, it then reloads the original first cartridge in the sequence. If Circular Mode is turned off and the last cartridge has been unloaded, the ValueLoader stops loading cartridges until you manually load another cartridge.

Caution: Use caution when choosing Circular Mode as it makes it possible to overwrite data on previously written cartridges.

To access this option, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Configuration appears on the top line of the LCD screen, and then press the **[Enter]** button to select.
- 2 Press the **[+]** or **[-]** button until Circular Mode appears on the LCD screen. The second line on the LCD screen indicates the current status of this mode, either On or Off.
- 3 Press **[Enter]** to select. The LCD screen indicates whether you are about to turn Circular Mode on or off.
- 4 Press the **[Enter]** button to accept the change to Circular Mode or press **[Cancel]** to exit and not save the changes.

Autoload Mode On/Off. This option turns Autoload Mode on or off, and is only used when in Sequential Mode. When Autoload Mode is on, the ValueLoader automatically loads the cartridge from the lowest numbered full slot into the tape drive when powered on. It then follows standard sequential operation as described in [Sequential Mode](#) on page 38.

To access this option, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Configuration appears on the top line of the LCD screen, and then press the **[Enter]** button to select.
- 2 Press the **[+]** or **[-]** button until Autoload Mode appears on the LCD screen. The second line on the LCD screen displays the current status, either On or Off.

- 3 Press the **[Enter]** button. The LCD screen indicates whether you are about to turn Autoload Mode on or off.
- 4 Press the **[Enter]** button to accept the change to Autoload Mode or press **[Cancel]** to exit and not save the changes.

Updating Firmware

Caution: Regardless of the firmware update technique, **do not power cycle or reset the ValueLoader during the upgrade process.** Doing so could cause the ValueLoader to become inoperable.

Note: After a firmware update, the firmware revision displayed on the LCD may not be updated until the ValueLoader is power cycled.

Using SCSI

Quantum has the files and instructions necessary to update both the drive and ValueLoader firmware via SCSI. Refer to www.Quantum.com for details.

Running the ValueLoader System Test

The System Test option cycles the ValueLoader through the process of loading, calibrating, and unloading all cartridges in the carousel. Running a System Test verifies the operational soundness of both the ValueLoader and tape drive. The System Test continues indefinitely until you press the **[Cancel]** button. All regular backup and restore operations are suspended while a System Test is in progress.

Note: At least one cartridge must be present in the carousel in order to run System Test.

To run a System Test:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Diagnostics appears on the top line of the LCD screen.
- 2 When System Test appears on the LCD screen, press the **[Enter]** button to begin the test.

The Test Count displays the number of load-unload cycles that have been completed during the test.

- 3 Press the **[Cancel]** button to end the test.

Retrieving Information About the ValueLoader

The **Information** menu provides access to information about the ValueLoader, including the cycle count, event log, and firmware revision.

Cycle Count

This option displays the total system cycle count, incrementing each time a tape is loaded into the drive or exported from the ValueLoader.

To use this option:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Information appears on the top line of the LCD screen. Press the **[Enter]** button to access the available options.

- 2 Press the **[+]** or **[-]** button until Cycle Count appears on the LCD screen.
The LCD screen displays the total cycle count.
- 3 Press the **[Cancel]** button when finished.

View Event Log

This option provides access to the most recent ValueLoader errors and events (see [table 5](#) on page 58).

To use this option:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Information appears on the top line of the LCD screen, and then press the **[Enter]** button to access the available options.
- 2 Press the **[+]** or **[-]** button until View Event Log appears on the LCD screen. The LCD screen also displays the quantity of errors and events currently stored in the event log.
- 3 Press the **[Enter]** button to access the most recently logged event.
- 4 Press the **[+]** or **[-]** button to display each event in the log.
- 5 Press **[Cancel]** when done.

Product Revision

This option displays the product revision of the ValueLoader.

To use this option:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Information appears on the top line of the LCD screen, and then press the **[Enter]** button to access the available options.
- 2 Press the **[+]** or **[-]** button until Product Rev appears on the LCD screen.
The LCD screen displays the revision of the firmware currently installed in the ValueLoader.
- 3 Press the **[Cancel]** button when finished.

Firmware Revision

This option displays the revision of the firmware currently installed in the ValueLoader.

Note: The tape drive and ValueLoader firmware are a single image, but the image displays as three firmware numbers on the front panel, Drive SCSI Controller, Robotics Controller Firmware, and Robotics SCSI Controller Firmware.

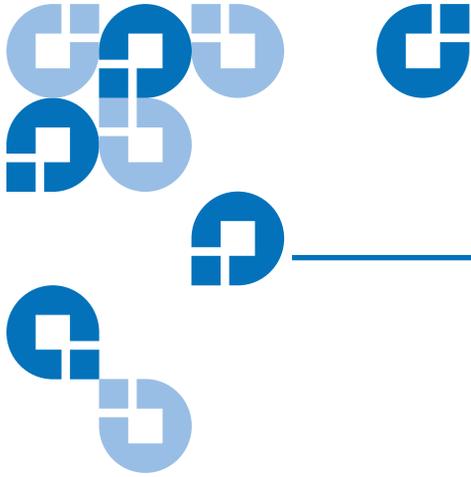
To use this option:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Information appears on the top line of the LCD screen, and then press the **[Enter]** button to access the available options.
- 2 Press the **[+]** or **[-]** button until Firmware Rev appears on the LCD screen.

The LCD screen displays the revision of the firmware currently installed in the ValueLoader.

- 3 Press the **[Cancel]** button when finished.

Note: After a firmware update, the firmware revision displayed on the LCD may not be updated until the ValueLoader is power cycled.



Chapter 4 Diagnostics and Troubleshooting

Section Overview

This section contains some general suggestions to aid you in solving problems. It also includes information on error codes and diagnostics.

- [Troubleshooting](#)
- [Removing Stuck Cartridges](#)
- [ValueLoader Error Codes](#)

Troubleshooting

Installation Problems

Problems encountered during the installation of the ValueLoader are usually caused by improper SCSI bus configuration, application software configuration errors, or an incorrectly configured operating system. If the application software that you are using is not communicating with the ValueLoader after installation, check the following:

- **SCSI ID:** The ValueLoader occupies two SCSI IDs: one for the tape drive and one for the ValueLoader robotics. Depending on other devices attached to the same SCSI bus and their SCSI IDs, you may need to change the SCSI ID of either the ValueLoader or tape drive before you can use the ValueLoader. Select an unused SCSI ID. See the manuals for the other devices on the SCSI bus or your operating system to determine which SCSI IDs are currently in use. If the ValueLoader is attached to a narrow (50-pin) SCSI bus, only SCSI IDs 0 through 7 are available (see [Changing the SCSI ID](#) on page 36).
- **SCSI Cabling:** Verify that all SCSI cables are securely connected at both ends. Check the length and integrity of your SCSI cabling. The total length of all cables must not exceed the following lengths:
 - SCSI-1 SE bus: 6 m (19 ft)
 - Fast or Ultra SCSI (Narrow or Wide) SE bus: 3 m (10 ft)
 - LVD bus with multiple devices: 12 m (40 ft)
 - LVD bus with a single device: 25 m (82 ft)

The length of the SCSI cabling inside the ValueLoader is 60 cm (2 ft). This length must be included in any calculations of total cable length. Try replacing suspect SCSI cables with known good cables. Note that it is not recommended to connect the ValueLoader to a narrow (50-pin) or SE SCSI bus as performance will be restricted.

- **Termination:** If the ValueLoader is the only SCSI device (other than the SCSI host adapter) on the selected SCSI bus, it must be terminated. Likewise, if the ValueLoader is physically the last SCSI device on the SCSI bus, it must be terminated. Likewise, if the ValueLoader is physically the last SCSI device on the SCSI bus, it must be terminated. Only the devices physically at the beginning and end of the SCSI bus should be terminated. Refer to the manuals supplied with the other devices on the SCSI bus for termination on enabling or disabling termination on those devices.

To terminate the ValueLoader, locate the terminator in the accessories package and press it firmly into either of the two SCSI connectors on the back panel of the ValueLoader. Secure the terminator by tightening the finger-screws until snug. The supplied terminator is “dual mode” and will work on both LVD and SE SCSI buses. A green LED on the terminator indicates that the unit is attached to a SCSI bus running in LVD mode. A red LED on the terminator indicates that the unit is attached to a SCSI bus running in SE mode. If the LED is not on, check all SCSI and power connections and confirm that the unit is attached to a valid SCSI bus.

- **Compatibility:** Ensure that the ValueLoader and tape drive are compatible with the SCSI host adapter and backup application you plan to use. For a list of compatible SCSI adapters and application software, check with your SCSI host adapter manufacturer, backup application vendor, or the Quantum support web site at www.Quantum.com.
- **SCSI Host Adapter Installation:** Verify that you have installed your SCSI host adapter correctly. Refer to the manual that came with your SCSI host adapter for installation and troubleshooting instructions. Pay particular attention to any steps describing the settings of various jumpers and/or switches on the host adapter or, on newer adapters, the setup application for the adapter. 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 SCSI host adapter.
- **Backup Application Installation:** Refer to the documentation included with your backup application for instructions on how to verify proper installation. Most backup software packages require an additional module to communicate with the ValueLoader robotics.

- **Device Driver Installation:** Make sure that the proper device driver, if applicable, is installed for both the ValueLoader and tape drive (see [Installing the Device Drivers](#) on page 15). Also refer to www.Quantum.com for more information.

Note: Many backup applications use their own drivers for the ValueLoader and drive. Before installing a driver, make sure it will not be in conflict with the software.

Troubleshooting Table

Table 4 Common
ValueLoader
Problems

Problem	Solution
Power	
ValueLoader does not power on.	<ul style="list-style-type: none">• Check all power cord connections.• Make sure the power switch on the front panel is in the ON position.• Make sure there is power to the outlet. Try another working outlet.• Replace the power cable.• Contact your service representative.
No display messages appear.	<ul style="list-style-type: none">• Make sure the power cable is connected.• Make sure the power switch is on.• Power cycle the ValueLoader.• Download ValueLoader firmware.• Contact your service representative.

Problem	Solution
Tape Movement	
Tape stuck in drive.	<ul style="list-style-type: none"> • Power cycle the ValueLoader, allow it to complete initialization (which in rare cases can take as long as 10 minutes), and then retry unloading the tape using the ValueLoader Operator's Panel controls. • Allow the tape drive to complete all operations, and then retry unloading the tape using the ValueLoader Operator Panel controls. This may take as long as 10 minutes if you reset or power cycle the ValueLoader while the cartridge is positioned at the physical end of the media. • Make sure that the backup software is not reserving the slot or preventing the tape drive from ejecting the cartridge. The backup software needs to cancel the reservation and any hold it has on the tape drive. Temporarily disconnecting the ValueLoader from the host server eliminates the host and its software as a problem source. • Contact your service representative.
Tape stuck in storage slot.	<ul style="list-style-type: none"> • See Removing Stuck Cartridges on page 53.
Media	
Cleaning or data cartridge incompatible with drive	<ul style="list-style-type: none"> • Make sure you are using cleaning and data cartridges that are compatible with the tape drive. The ValueLoader automatically unloads incompatible cartridges to their original slot. <p>Note: Use the LTO Ultrium1 Cleaning Cartridge with both the LTO-1 and LTO-2 drives.</p>

Problem	Solution
<p>Cannot write to, or read from a tape</p>	<ul style="list-style-type: none"> • Make sure the cartridge is write enabled (move the write-protect switch to the enabled position). • <i>For ValueLoader LTO-1</i>, make sure the cartridge is an LTO Ultrium-1 cartridge. • <i>For ValueLoader LTO-2</i>, make sure the cartridge is an LTO Ultrium-2 cartridge. • Make sure 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 (see Cleaning the Tape Drive on page 31).
SCSI ID	
<p>Change drive or robotic ID, but the host server does not recognize the new ID</p>	<ul style="list-style-type: none"> • Make sure all SCSI devices on the same bus have a unique ID number. • If the SCSI bus is narrow (50-pin), only SCSI IDs 0 through 7 are available. • Make sure to power cycle the ValueLoader after changing the SCSI ID. • Reboot the host server.

Problem	Solution
ValueLoader Performance	
<p>The ValueLoader is not efficiently backing up data.</p>	<ul style="list-style-type: none"> • Check the network bandwidth from the host computer. If you are backing up data over a network, consider comparing to a local-only backup. • Make sure the ValueLoader is on its own SCSI bus and not daisy-chained to another tape drive or to the hard drive being backed up. • Clean the tape drive (see Cleaning the Tape Drive on page 31). • Try a new cartridge. A marginal cartridge can cause performance problems due to bad spots on the tape requiring retries. • Make sure the data is being compressed. • Check the size of the files. Small files can impact performance. • Confirm that the backup application is utilizing block sizes of at least 32 KB, preferably 64 KB. Refer to your application's documentation for details.
Cleaning	
<p>Recurring cleaning message.</p>	<ul style="list-style-type: none"> • Make sure you are using an LTO Ultrium1 cleaning cartridge. • Replace the existing cleaning cartridge with a new one. • If the Media Attention LED is cleared using a cleaning cartridge and then immediately reappears after a particular data cartridge is reloaded, that data cartridge may be contaminated. If this occurs, check that the data cartridge can be read, back up data from the suspect cartridge to another cartridge, and then discard the suspect cartridge.
<p>The Clean Drive LED is illuminated.</p>	<ul style="list-style-type: none"> • Indicates that the LTO drive has determined that a cleaning cartridge should be used. • Clean the tape drive (see Cleaning the Tape Drive on page 31).
<p>Cannot load the cleaning cartridge.</p>	<ul style="list-style-type: none"> • Make sure you are using an LTO Ultrium1 cleaning cartridge (see Cleaning the Tape Drive on page 31). • Contact your service representative.

Problem	Solution
Media Compatibility	
Media format invalid for drive type.	<ul style="list-style-type: none"> You attempted to load damaged or incompatible media into the tape drive. Ensure the media is compatible with LTO tape drive (see Using Cartridges on page 26). <p>For ValueLoader LTO-1, use only LTO Ultrium-1 cartridges. For ValueLoader LTO-2, use only LTO Ultrium-2 cartridges.</p>
Media Attention LED Issues	
Contamination by loose debris.	<ul style="list-style-type: none"> Avoid contamination by ensuring that the ValueLoader is installed in a clean, contamination-free environment. Cartridges should be stored vertically in their plastic cases. Continue cleaning the tape drive as needed.
Contamination by head staining (caused by adhesion of chemicals present in tape media to the head surface).	<ul style="list-style-type: none"> One or two passes with the cleaning cartridge should resolve the Media Attention LED caused by normal head staining. If a cleaning cartridge is unsuccessful in resolving a cleaning light after three or more attempts, discard it and use a new cleaning cartridge.
Non-acclimated media.	<ul style="list-style-type: none"> A cartridge should be acclimated for a minimum of 24 hours before being used, particularly if it has been stored at a substantially different temperature or level of humidity than the ValueLoader.
Wrong cleaning cartridge.	<ul style="list-style-type: none"> Make sure you are using an LTO Ultrium1 cleaning cartridge.
Bad/ defective/ contaminated media.	<ul style="list-style-type: none"> If the Media Attention LED is cleared using a cleaning cartridge and then immediately reappears each time a particular cartridge is reloaded, and you have confirmed that the suspect cartridge is not invalid, that cartridge should be suspected as being contaminated. If this occurs, export the cartridge, clean the tape drive again, and then load a known good cartridge. In some cases, a cartridge can be worn out, or have a damaged embedded servo signal.
Expired cleaning cartridge.	<ul style="list-style-type: none"> If the existing cleaning cartridge has been used 15 times, replace it with a new cleaning cartridge.

Problem	Solution
Errors Displayed on the Front Panel	
<p>“!” in ValueLoader Operator’s Panel inventory display</p>	<ul style="list-style-type: none"> An exclamation point (!) displayed in the inventory means that the ValueLoader has identified a cartridge in the indicated slot that is either an invalid or faulty cartridge has had a media-related error. The Media Attention LED is also illuminated in this case (see LED Indicators on page 23). Exporting the indicated cartridge will clear the error condition (see Exporting Cartridges on page 28). If errors occur on multiple known good cartridges, consider cleaning the tape drive (see Cleaning the Tape Drive on page 31). If a particular cartridges fails repeatedly, it may be defective or invalid.
<p>There is an error code on the LCD display</p>	<ul style="list-style-type: none"> Look up the error code, try to resolve the failure, and power cycle (see ValueLoader Error Codes on page 57).

Removing Stuck Cartridges

If the ValueLoader experiences a severe mechanical problem or if you need to remove cartridges because of power failure or other circumstance in which the ValueLoader is unable to export the cartridges in the carousel, follow these steps:

Note: Contact Quantum Customer Support if a cartridge is stuck in the drive.

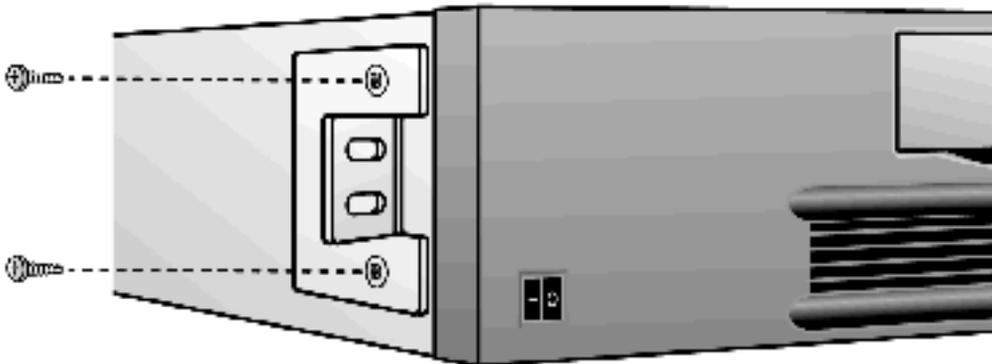
- 1 Move the power switch on the front panel to the OFF position. You may need to use the tip of a pen or similar item to move the power switch.

- 2 Remove the power cable and SCSI cables from their connectors on the back panel of the ValueLoader.

Warning: To prevent injury, disconnect the power and SCSI cables before removing the ValueLoader cover and keep fingers away from the fan.

- 3 Remove the ValueLoader from its rack slot, if applicable, and place it on a table or other flat work surface.
- 4 If a rackmounted unit, use a screwdriver to remove the front cover screws that secure the mounting brackets from both sides of the ValueLoader, as shown in [figure 15](#). In a table top unit, remove the front cover screws – there are no mounting brackets.

Figure 15 Removing
Mounting Brackets
(Left Side Shown)



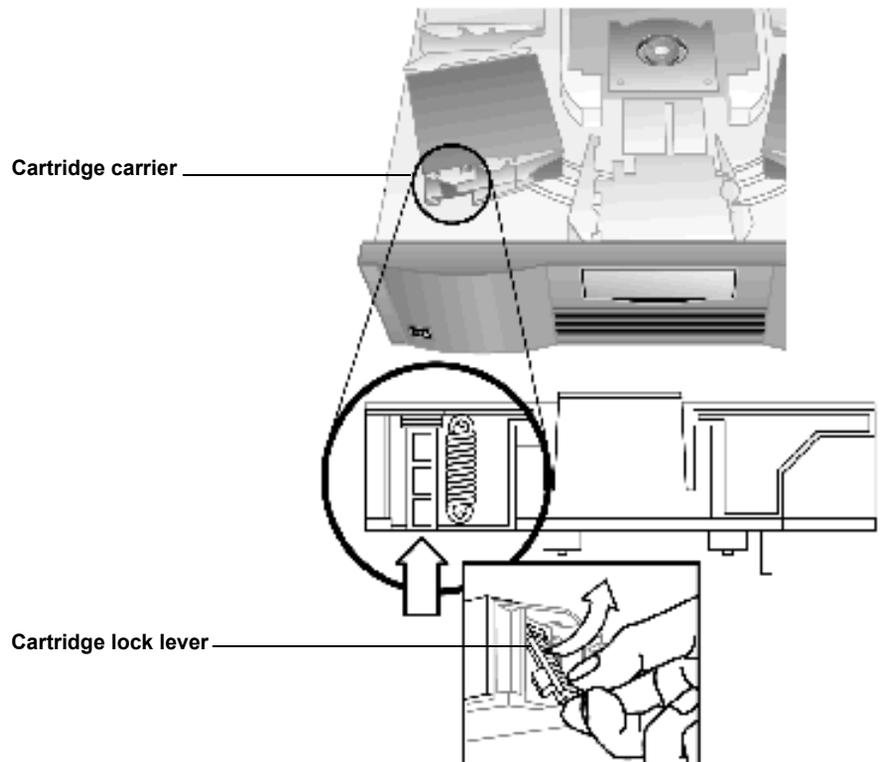
- 5 If the ValueLoader has mounting brackets (rackmount unit), remove the five screws on the back of the ValueLoader, and two additional screws, one on each side of the ValueLoader, to loosen the ValueLoader cover. In a table top unit, remove the front cover screws and three additional screws from each side of the unit.
- 6 Slide the top cover towards the back of the unit before attempting to lift the cover. Remove the top cover by lifting it from the back and easing it out from under the front panel display cover.

- 7 Lift the cartridge carrier, with each cartridge you want to remove, straight up from the ValueLoader. If the cartridge carrier has a pin at the bottom, you may have to rotate the cartridge carrier, then lift it straight up from the ValueLoader.

Note: To remove the carrier directly in front of the Import/Export slot, gently rotate the carousel counterclockwise by moving the belt or carriers, approximately 1/2 inch, until the carrier is no longer in front of the Import/Export slot.

- 8 On each carrier, carefully pull the cartridge lock lever away from the carrier, allowing the cartridge to slide out of the carrier as shown in [figure 16](#).

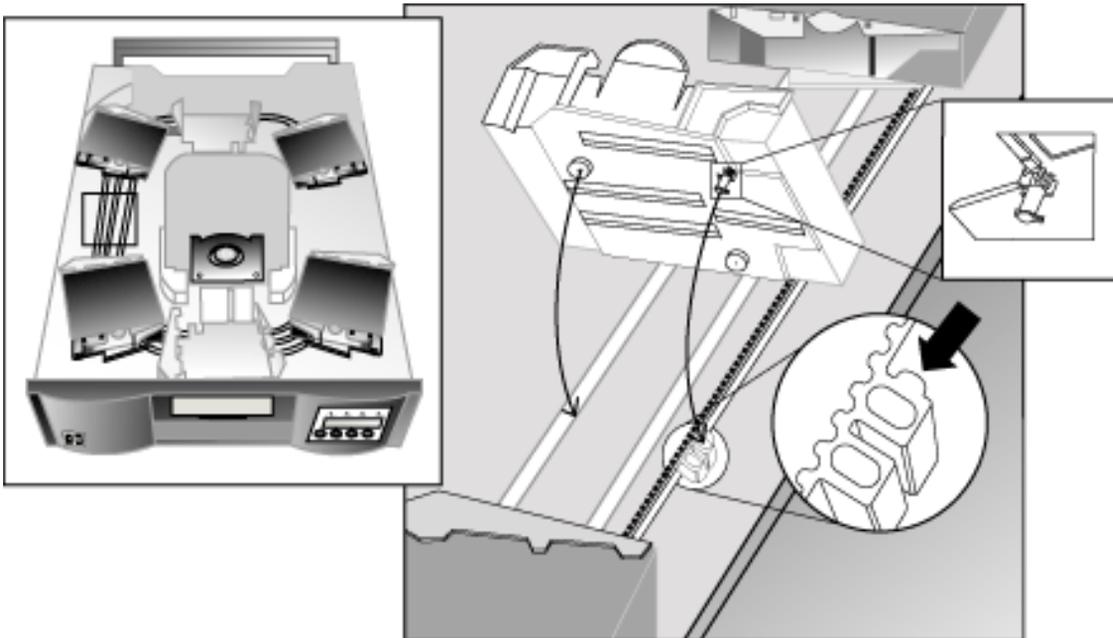
Figure 16 Pulling the Cartridge Release Lever



- 9 After removing the cartridges from the desired carriers, reinstall each carrier on the ValueLoader belt ([figure 17](#)):
 - Make sure that the rollers on the bottom of the carrier are aligned in the carrier tracks.
 - Make sure that the belt post beneath each carrier is inserted into the proper ValueLoader belt loop.

Note: There are unused loops on the belt. The proper belt loops have an extra bump on the outside of the loop (see [figure 17](#)).

Figure 17 Installing the Carrier



- 10 Insert the peg on the bottom of the cartridge carrier into the slot in the belt, then gently turn the cartridge carrier in place to lock it in the belt (see [figure 17](#)).

Ensure the carrier is properly installed on the belt by gently pressing on the top of the carrier and sliding it back and forth. If it is properly attached to the belt, it should not move. If it moves, reinstall the carrier.

- 11 Replace the top cover of the ValueLoader and reinstall the cover screws and mounting brackets (if rackmounted).

ValueLoader Error Codes

If an error occurs during operation of the ValueLoader, the ValueLoader stops the current operation and displays an error code on the top line of the LCD screen. Unless otherwise noted in [table 5](#), attempt to resolve the error by resetting or power cycling the ValueLoader and retrying the last operation. If the error persists, contact support personnel.

To view the error log, follow these steps:

- 1 From the Home Screen or main menu, press the **[+]** or **[-]** button until Information appears on the top line of the LCD screen, and then press the **[Enter]** button to access the available options.
- 2 Press the **[+]** or **[-]** button until View Event Log appears on the LCD screen. The LCD screen also displays the quantity of errors and events stored in the error log.
- 3 Press the **[Enter]** button to access the most recently logged error message.
- 4 Press the **[+]** or **[-]** button to display each error in the log.
- 5 Press **[Cancel]** when done.

[Table 5](#) provides a description of each of the error codes.

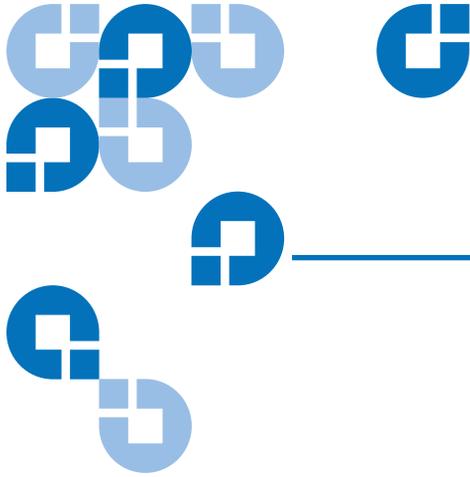
Table 5 Error Codes

Error Code	Description	Details
3 0 81	Invalid Command Error.	This error indicates that the ValueLoader received an undefined command or an invalid parameter with a command.
3 0 82	Device Status Not Suitable To Execute This Command.	If the robotics are busy, some commands cannot be executed at the same time. This error indicates a probable violation. This is not an error condition, but it does result in busy being reported to the host for the requested SCSI command.
3 0 83	Inventory Not Valid.	The cartridge inventory is not valid because of manual changes or previous fatal errors. Update the inventory using the Re-inventory option in the Configuration menu (see Creating an Inventory of Cartridges on page 33) or power cycle.
3 0 84	Source Empty.	There is no cartridge in the location from which a cartridge move was issued.
3 0 85	Destination Full.	The location to which a cartridge move was issued already contains a cartridge.
3 0 86	Import/Export Slot Access Rejected.	User attempted to access the Import/Export slot, but media removal was prevented by the host.
3 0 87	Operation Timeout.	A command did not complete in the required amount of time.
3 0 88	Communications Error During Loop-back.	Cycle power on the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 89	System Test Timeout.	There was a communication timeout between the drive and loader during the System Test.

Error Code	Description	Details
3 0 8F	Recovered Loader Error.	Loader error recovery successful. Your diagnostic tool can provide details of the original loader error.
3 0 90	Mechanical Initialization Failure.	The robotics were not able to move to the safe mechanical initialization position. Manual intervention is necessary.
3 0 91	Inventory Scan Failure.	Fatal robotic error occurred during the inventory scan.
3 0 92	Preposition Failed.	Belt positioning error occurred during Preposition command.
3 0 93	Cartridge Load Error.	A failure occurred while trying to load a cartridge from a slot to the drive.
3 0 94	Cartridge Unload Error.	A failure occurred while trying to unload a cartridge from the drive to its slot.
3 0 95	Import Error.	An error occurred while trying to import a data cartridge to a carousel slot.
3 0 96	Export Error.	An error occurred while trying to export a data cartridge from its carousel slot. This can be caused by an empty slot that is expected to be full.
3 0 A0	Carousel Motion Failure.	An error occurred during carousel movement (position not found). Could be caused by a missing or misaligned cartridge carrier, an obstruction, or an unexpected cartridge in either the carousel path or the import/export slot.
3 0 A1	Cartridge Transport Position Error.	The cartridge transport element is unable to reach its desired position. Failure occurred while trying to place a cartridge into or remove a cartridge from the drive or a slot.
3 0 A2	Gripper Position Error.	Gripper unable to reach position.

Error Code	Description	Details
3 0 A3	Cartridge Pick Error.	An error occurred while trying to pull a cartridge from the drive or a carousel slot.
3 0 A4	Import/Export Slot Position Error.	The Import/Export slot door was not in the requested position during device operation. Can be caused by manually opening the door or a cartridge or other obstruction is blocking the door. Try removing the cartridge or obstruction, then power cycle or reset the ValueLoader.
3 0 A5	Fan Error.	The ValueLoader processor has detected a fan error.
3 0 B0	ROM Error.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 B1	RAM Error.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 B2	NVRAM Error.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 B3	Controller Timer Failure.	An unrecoverable failure has occurred in the controller timer circuit.
3 0 B4	Loader to Drive Communication IC Error.	A failure in IC handling loader to drive communication has occurred.
3 0 B5	Display Error.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 B6	Memory Error.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.

Error Code	Description	Details
3 0 B7	Timeout on ValueLoader Command.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 BA	Drive Load Timeout.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 BB	Drive Unload Timeout.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 BC	Overtemperature problem.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 BD	No connection to drive.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 BE	Generic drive response error.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.
3 0 BF	Fatal Error.	Power cycle the ValueLoader and attempt the operation again. If the error recurs, contact Quantum Technical Support.



Appendix A Technical Specifications

This appendix contains the following ValueLoader specifications:

- Physical Specifications
- Operating Specifications
- Environmental Specifications
- Tape Drive Specifications
- Media Specifications

Table 6 Physical Specifications

Characteristic	Product Alone	Product in Package
Height	8.4 cm (3.34 in)	20.5 cm (8.0 in)
Width	41.9 cm (16.5 in)	60 cm (23.6 in)
Depth	60.9 cm (24 in) 65 cm (25.6 in) with bar code reader	74.3 cm (29.2 in)
Weight	10 kg (22 lb)	11.35 kg (24.9 lb)

Table 7 Operating Specifications

Characteristic	LTO-1 Specification	LTO-2 Specification
Maximum storage capacity	Native: 800 GB Compressed: 1.6 TB (assuming 2:1 compression ratio)	Native: 1.6 TB Compressed 3.2 TB (assuming 2:1 compression ratio)
Maximum data transfer rate	Native: 15 MB/s Compressed: 30 MB/s (assuming 2:1 compression ratio)	Native 35 MB/s Compressed 70 MB/s (assuming 2:1 compression ratio)
Drive type	1 HP LTO Ultrium-1 drive	1 HP LTO Ultrium-2 drive
Number of slots	8	8
MTBF	250,000 hours	250,000 hours
Interface	LVD ultra wide SCSI-2, 16 bits wide, 68-pin HD connector	LVD ultra wide SCSI-2, 16 bits wide, 68-pin HD connector

Table 8 ValueLoader Environmental Specifications

Characteristic	LTO-1 Specification	LTO-2 Specification
Temperature/humidity		
Operating	10° to 35° C	10° to 38° C
Non-operating	-40° to 65° C	-40° to 64° C'
Recommended operating temperature	20° to 30° C	20° to 30° C
Temperature shock immunity - maximum rate of change	10° C per hour	10° C per hour

Characteristic	LTO-1 Specification	LTO-2 Specification
Humidity		
Operating	20% to 80% RH non-condensing	20% to 80% RH non-condensing
Non-operating	5% to 95% RH non-condensing	5% to 95% RH non-condensing
Altitude		
Operating	0 to 4000 m	0 to 4000 m
Nonoperating	0 to 9144 m	0 to 9144 m
Vibration		
Maximum acceleration to operating	0.25 g RMS (random)	0.25 g RMS (random)
Frequency range	500 Hz	500 Hz

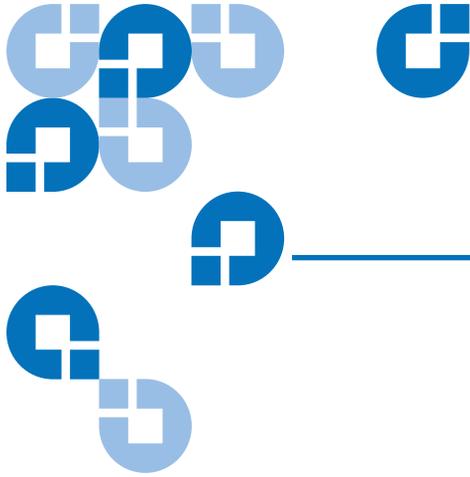
Table 9 HP LTO-1 and HP LTO-2 Drive Specifications

Characteristic	LTO-1 Specification	LTO-2 Specification
Read/write transfer rate, maximum sustained	Native: 15 MB/s Compressed (2:1 typical): 30 MB/s	Native: 35.0 MB/s Compressed (2:1 typical): 70.0 MB/s
Burst transfer rate	80 MB/s	160 MB/s
Average access time	71 seconds	49 seconds
Loading time to BOT (for previously written tape)	< 25 seconds (average)	< 15 seconds (average)
Unloading time from BOT	< 13 seconds (average)	< 15 seconds (average)

Characteristic	LTO-1 Specification	LTO-2 Specification
MTBF	250,000 hours	250,000 hours
Interface type	Low-Voltage Differential (LVD) Ultra 2 SCSI	Ultra-160 SCSI LVD

Table 10 Media Specifications

Characteristic	LTO Ultrium-1 Specification	LTO Ultrium-2 Specification
Formatted capacity	100 GB (noncompressed) 200 GB (compressed; 2:1 typical)	200 GB (noncompressed) 400 GB (compressed; 2:1 typical)
Basic description	Advanced metal particle	Advanced metal particle
Tape Length	609 m (1998 ft)	609 m (1998 ft)
Cartridge dimensions	10.2 x 10.54 x 2.15 cm (4 x 4.15 x 0.85 in)	10.2 x 10.54 x 2.15 cm (4 x 4.15 x 0.85 in)
Shelf life	30 years minimum @ 20° C 40% RH (non-condensing)	30 years minimum @ 20° C 40% RH (non-condensing)
Cartridge life	1,000,000 passes (any point on the tape passing the recording head in either direction)	1,000,000 passes (any point on the tape passing the recording head in either direction)
LTO Ultrium1 Cleaning cartridge life	15 uses	15 uses



Appendix B Customer Support

This appendix provides a list of information you should have before contacting Quantum or a backup software vendor for technical support.

Information Needed for Support

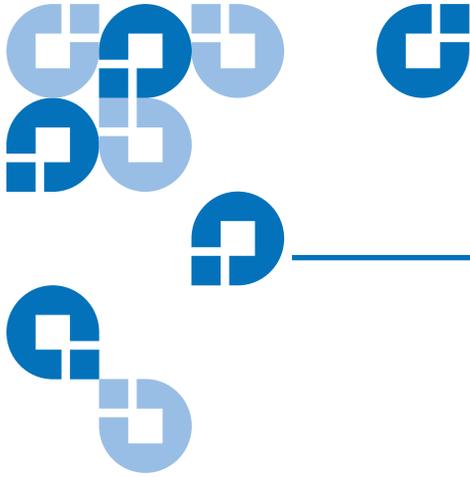
Before contacting technical support, please have the following information ready:

- Model number for your ValueLoader
- Serial number
- Media type and format
- Recent error codes
- Revision number for ValueLoader and tape drive firmware
- Brand and model of your host computer
- Brand and model of your SCSI host adapter
- ValueLoader drivers and backup software that you are using and the version number(s)

Backup Software Support

While the ValueLoader itself is supported by Quantum, software products used with the ValueLoader are supported by individual software vendors. Before contacting the software vendor, make sure you have the following information:

- Your name and telephone number
- Product name, firmware revision, operating system, build, and serial number
- Detailed list of error messages reported
- Configuration files and log files related to the problem
- Screen dumps, if applicable
- Explanation of how to reproduce the problem, if possible
- Events that may have contributed to the problem, recent operator actions, recent events in the software or the system, and recent changes to the computer system, software, or network environment.



Appendix C

Regulatory Statements

UL and CUL Listing

This information technology equipment is UL-Listed and CUL-Listed for use with UL-Listed personal computers that have installation instructions detailing user installation of card cage accessories.

CE Compliance

Electromagnetic Compatibility

This device complies with the following standards in accordance with the European Directives 89/336/EEC.

- Immunity EN 55024;1998
- Emission EN 55022, Class B:1994 + A1:1995 + A2:1997

Safety (Low Voltage Directive)

This device complies with the following standards in accordance with European Directives 73/23/EEC.

- EN 60950:2000

These definitions are classified as per safety standard:

- EN 60950:2000
- SELV: Safety Extra Low Voltage

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 subpart B 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 instruction manual, may cause harmful interference to radio communications.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

This device complies with Part 15 subpart B of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operations.

Industry Canada (Digital Apparatus)

Reference: *Interference-Causing Equipment Standard ICES-003 Issue 2*

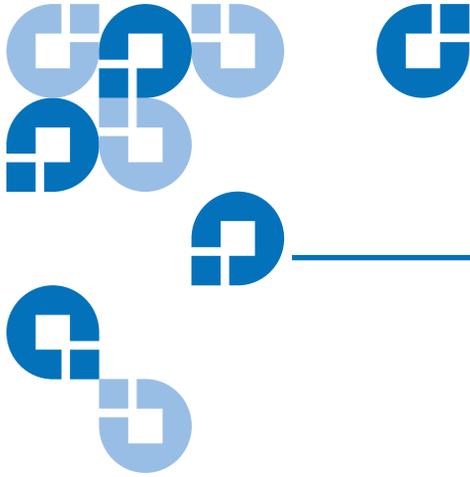
This class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte les toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Manufacturer Declaration

This certifies that this product is in compliance with EU Directive 89/336/EEC, using the EMC standards EN55022 (Class B) and EN55024. This product also meets or exceeds EN60950 safety requirements. This product has been tested and verified to meet CISPR-2002 Class B requirements.

Manufacturer Declaration



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