hp StorageWorks 1/8 Tape Autoloader:

Ultrium 230, Ultrium 460, DLT VS80, SDLT 320

This user and service guide provides an overview, instructional information for configuration, and basic troubleshooting of the HP StorageWorks 1/8 Ultrium 230, Ultrium 460, DLT VS80, and SDLT 320 Tape Autoloaders.

Designed for basic data protection, the HP StorageWorks 1/8 Tape Autoloader provides a cost-effective, reliable, and easy-to-install unattended backup.

hp
i n v e n t

Contents

About This Guide

This user and service guide provides information to help you:

■ Install the HP StorageWorks 1/8 Tape Autoloader

■ Configure and operate the HP StorageWorks 1/8 Tape Autoloader

■ Troubleshoot the HP StorageWorks 1/8 Tape Autoloader

"About This Guide" topics include:

■ Conventions, page 8

■ Rack Stability, page 11

■ Getting Help, page 12

Conventions

Conventions consist of the following:

- Document Conventions
- Text Symbols
- Equipment Symbols

Document Conventions

The document conventions included in Table 1 apply in most cases.

Table 1: Document conventions

Element	Convention
Cross-reference links	Blue text: Figure 1
Key and field names, menu items, buttons, and dialog box titles	**Bold**
File names, application names, and text emphasis	*Italics*
User input, command and directory names, and system responses (output and messages)	`Monospace font` `COMMAND NAMES` are uppercase monospace font unless they are case sensitive
Variables	*<monospace, italic font>*
Website addresses	Blue, underlined sans serif font text: http://www.hp.com

Text Symbols

The following symbols may be found in the text of this guide. They have the following meanings:

> ⚠ **WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.

> ⚠ **Caution:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

> **Note:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

Equipment Symbols

The following equipment symbols may be found on hardware for which this guide pertains. They have the following meanings:

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of personal injury from a hot component, allow the surface to cool before touching.

Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of personal injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Rack Stability

Rack stability protects personnel and equipment.

⚠️ **WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- In single rack installations, the stabilizing feet are attached to the rack.
- In multiple rack installations, the racks are coupled.
- Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.

Getting Help

If you still have a question after reading this guide, contact an HP authorized service provider or access our website: http://www.hp.com.

HP Technical Support

Telephone numbers for worldwide technical support are listed on the following HP website: http://www.hp.com/support. From this website, select the country of origin.

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

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP Storage Website

The HP website has the latest information on this product, as well as the latest drivers. Access storage at:
http://www.hp.com/country/us/eng/prodserv/storage.html.
From this website, select the appropriate product or solution.

HP Authorized Reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP website for locations and telephone numbers: http://www.hp.com/support.

Installing the Autoloader

1

Chapter Overview

This chapter describes:

- Autoloader Features and Requirements, page 14
- Autoloader Product Overview, page 17
- Installing the Autoloader into a Rack (Optional), page 22
- Connecting the SCSI and Power Cables, page 25
- Preparing the Host and Verifying the Connection, page 28

Autoloader Features and Requirements

The unique design of the 1/8 Tape Autoloader has the drive in the center with slots rotating around it. This design houses up to eight cartridges in a compact 2U form factor.

The HP StorageWorks 1/8 Ultrium 230, Ultrium 460, and SDLT 320 Tape Autoloaders occupy two SCSI target addresses: one for the tape drive and the other for the autoloader robotic. The 1/8 Tape Autoloader model DLT VS80 occupies one SCSI target address.

The 1/8 Tape Autoloader is compatible with most operating systems and environments that support the SCSI interface, but requires either direct support from the operating system or a compatible backup application to take full advantage of its many features.

The HP StorageWorks 1/8 Tape Autoloader utilizes the following interface for your specific model type:

Table 2: Model and interface type

Model	Interface
Ultrium 230	Ultra2 SCSI LVD/SE
Ultrium 460	Ultra3 SCSI LVD/SE
DLT VS80	Ultra2 SCSI LVD/SE
SDLT 320	Ultra2 SCSI LVD/SE

Maximum Storage Capacity and Data Transfer Rate

Maximum storage capacity and maximum data transfer rates for each 1/8 Tape Autoloader model are as follows:

1/8 Ultrium Tape Autoloaders

Table 3: Ultrium 230 Tape Autoloader specifications

Characteristic	Specification
Maximum storage capacity	Native: 800 GB Compressed: 1.6 TB (2:1 compression)
Maximum data transfer rate	Native: 15 MB/s (54 GB/hr.) Compressed: 30 MB/s (108 GB/hr.) (2:1 compression)

Table 4: Ultrium 460 Tape Autoloader specifications

Characteristic	Specification
Maximum storage capacity	Native: 1.6 TB Compressed: 3.2 TB (2:1 compression)
Maximum data transfer rate	Native: 30 MB/s (108 GB/hr.) Compressed: 60 MB/s (216 GB/hr.) (2:1 compression)

1/8 DLT and SDLT Tape Autoloaders

Table 5: DLT VS80 Tape Autoloader specifications

Characteristic	Specification
Maximum storage capacity	Native: 320 GB Compressed: 640 GB (2:1 compression)
Maximum data transfer rate	Native: 3 MB/s (10.8 GB/hr.) Compressed: 6 MB/s (21.6 GB/hr)(2:1 compression)

Table 6: SDLT 320 Tape Autoloader specifications

Characteristic	Specification
Maximum storage capacity	Native: 1.28 TB Compressed: 2.56 TB (2:1 compression)
Maximum data transfer rate	Native: 16 MB/s (57.6 GB/hr.) Compressed: 32 MB/s (115.2 GB/hr.) (2:1 compression)

SCSI Requirements

The autoloader incorporates a wide SCSI-2 or SCSI-3 (see Table 2 on page 14 for your specific model) Low-Voltage Differential (LVD) SCSI bus, but may also be attached to a Single-Ended (SE) SCSI bus. Make sure your SCSI host adapter or controller supports these standards. If you connect the autoloader to an SE SCSI bus, or if there are SE devices attached to the same SCSI bus, the autoloader's performance is limited to the maximum data transfer speed and maximum cable lengths of the SE bus. For these reasons, HP strongly recommends that you do not use a SE SCSI bus with the 1/8 Tape Autoloader.

The 1/8 Tape Autoloader is **NOT** compatible with a standard differential (Diff) or High-Voltage Differential (HVD) SCSI bus. The autoloader is compatible with a narrow (50-pin) SCSI bus using a 68-pin to 50-pin adapter that terminates the unused 18 pins (**NOT** included with the autoloader). These adapters are sometimes labeled high-byte termination.

Autoloader Product Overview

Figure 1: Front panel overview
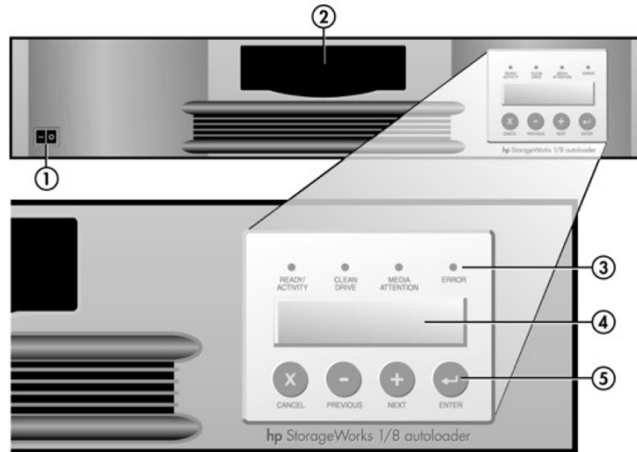
Number	Description
❶	Power switch
❷	Mailslot
❸	Front panel LEDs
❹	Front panel LCD screen
❺	Control keys

Figure 2: Rear panel overview
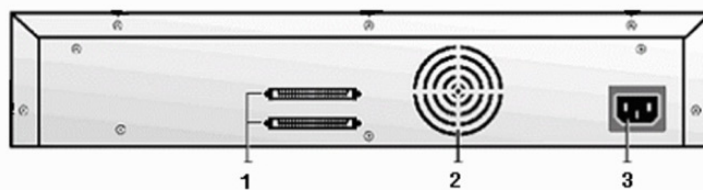
Number	Description
❶	68-pin HD SCSI connectors
❷	Fan vent
❸	Power connector

Choosing a Location

Choose a location that meets the following criteria:

Table 7: Location criteria

Criteria	Definition	
Standalone requirements	Select a location that is flat, sturdy, level, and close to a host server. Do not place the autoloader on the floor or other carpeted surfaces. Do not place the autoloader on its side, upside down, or stack items on top of the autoloader.	
Rack requirements	Standard 19-inch rack with 2U of clearance	
Room temperature	10-35° C (50-95° F)	
Power source	AC power voltage: 100-127 VAC; 200-240 VAC Line frequency: 50-60 Hz Locate the AC outlet near the autoloader. The AC power cord is the product's main AC disconnect device and must be easily accessible at all times.	
Weight	26 lbs (12 kg)	
Air quality	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% RH 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

Before you begin, clear a work surface to unpack the autoloader. Select an open 2U computer rack location or choose a desktop location near the host server.

> ⚠️ **Caution:** If the temperature in the room where the autoloader will be installed varies by 30 degrees F (15 degrees C) from the room where the autoloader was stored, allow the autoloader to acclimate to the surrounding environment for at least 12 hours before opening the shipping container.

Unpacking the autoloader:

1. Before opening and removing the autoloader from the shipping container, inspect the container for shipping damage. If you notice any damage, report it to the shipping company immediately.

2. Open the shipping container; remove and set aside the accessory package.

> ⚠️ **Caution:** Do not set the autoloader on either end or sides.

3. Lift the autoloader and padding out of the container and place it on the work surface, top facing up.

4. Carefully remove the shipping materials from the left and right sides of the autoloader. Remove the bag from the autoloader. Save the packing materials in case you need to move or ship the autoloader in the future (see Figure 3).

Figure 3: Removing the autoloader from the shipping container

---
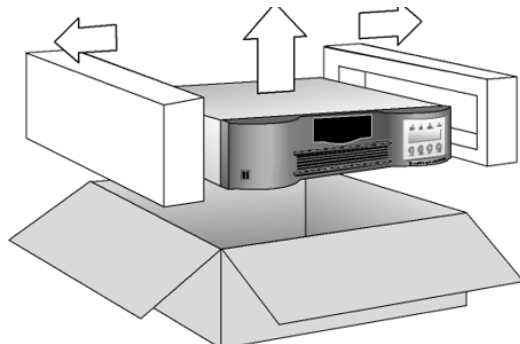
Identifying Product Components

Confirm that you have received the following:

- SCSI cable
- SCSI terminator
- Power cable
- Documentation kit
  - Documentation CD
  - Installation Poster
  - HP OpenView Storage Data Protector Installation Instructions
  - HP Worldwide Warranty
  - HP Safety Guide

Rack Mount Kit (Optional)

If you purchased the optional rack mount kit, verify that you have received the following components:

Figure 4: Rack mount kit components
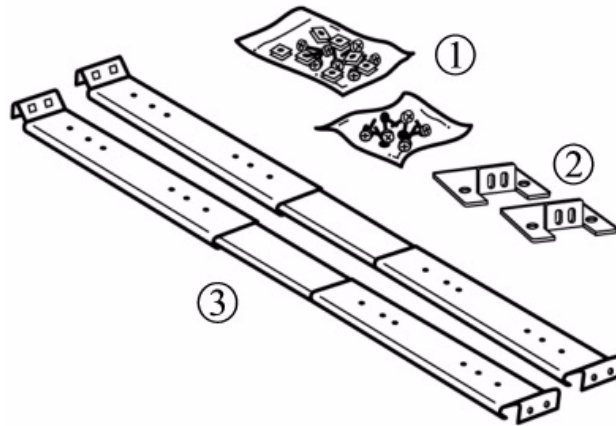
Number	Description
❶	Screws and clip nuts
❷	Mounting brackets
❸	Mounting rails

Installing the Autoloader into a Rack (Optional)

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

To install the autoloader:

1. Use a medium-sized Phillips screwdriver to remove the two screws near the front on each side of the autoloader cover (see Figure 5).

2. Using the screws you removed in step 1, secure one mounting bracket (from the rack mount kit) to each side of the autoloader as shown in Figure 5.

Figure 5: Installing mounting brackets (left side shown)
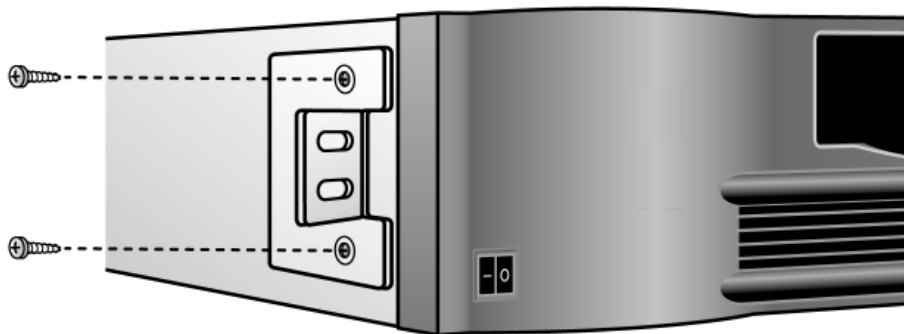
3. Using the screws and clip nuts from the rack mount kit, secure one rail to each side of the rack in the location in which you plan to install the autoloader.

   — Be sure to secure both the front and rear 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 this procedure for the right rail.

Figure 6: Installing rails in the rack (left side shown)
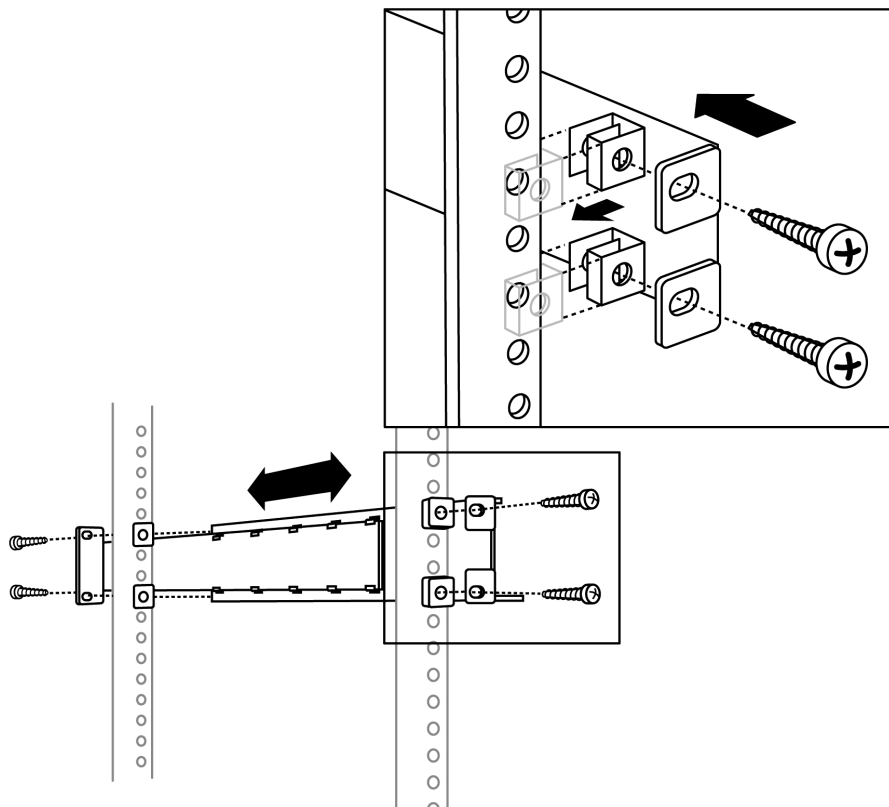
4. Slide the autoloader onto the rails and secure the mounting bracket to the rack using the screws and clip nuts from the rack mount kit (see Figure 7).

Figure 7: Sliding the autoloader into the rack slot and securing the mounting bracket

1/8 Tape Autoloader: Ultrium 230, Ultrium 460, DLT VS80, SDLT 320 User and Service Guide
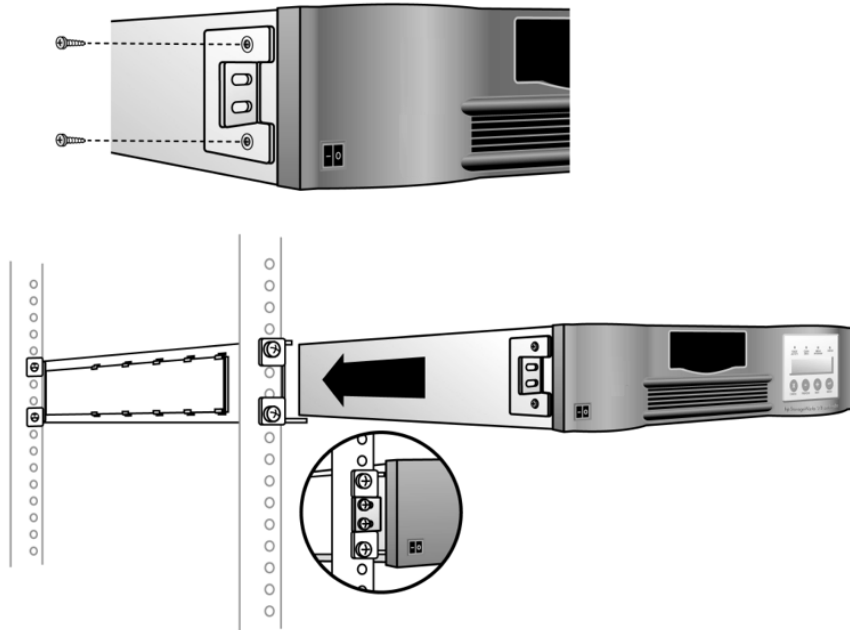
Connecting the SCSI and Power Cables

Note: The HP StorageWorks 1/8 Ultrium 460 Tape Autoloader is an Ultra3 SCSI LVD/SE device. Only cables and terminators specified for Ultra3 use or labeled as MultiMode should be used.

⚠ **WARNING:** This product can ONLY be used with an HP approved power cord for your specific geographic region. Use of a non-HP 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. HP disclaims all liability in the event a non-HP approved power cord is used.

To connect the SCSI and power cables to the autoloader:

1. Shut down and turn off the selected server. Turn off all attached 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 could result in damage to the autoloader.

2. Attach one end of the SCSI cable (included in the accessory package) to one of the connectors on the rear panel of the autoloader (see Figure 8 on page 26).

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

Note: The host bus adapter should be LVDS. A single ended SCSI host bus adapter will work, but will severely degrade performance. If there are any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed and severely degrade performance.

Figure 8: Attaching the SCSI and power cables
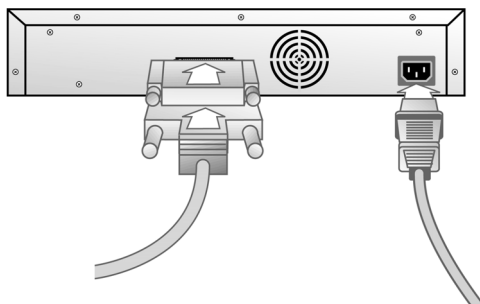
Note: If the supplied SCSI cable does not fit the connector on your SCSI host adapter, you either have an incompatible SCSI host adapter or you need to purchase a cable adapter or a different cable. Contact your service representative or your SCSI host adapter manufacturer for information.

4. Attach the terminator to the remaining SCSI connector on the rear panel of the autoloader (if the autoloader is the last or only device on the SCSI bus). Otherwise, attach the cable to the next device on the SCSI bus. Make sure that the last device on the SCSI bus is properly terminated.

5. Attach the power cable to the power connector on the rear panel of the autoloader.

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

> **Caution:** To disconnect all power from the autoloader, remove the power cord from the outlet. The power switch only puts the power on stand-by.

7. Plug in the host server or workstation and all attached devices.

8. Turn on the autoloader by setting the power switch on the front panel to the **ON** position. You will need to use the tip of a pen or similar item to move the switch to the desired position. Check the LCD display to make sure the autoloader is receiving power. If it is 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/Activity LED. When the initialization sequence is complete, the LCD displays the Home screen.

9. Turn on any other devices you turned off earlier.

10. 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 SCSI host adapter for detailed instructions. In addition, follow these general guidelines:

Note: The host bus adapter used with the HP StorageWorks 1/8 Ultrium 460 Tape Autoloaders should be SCSI-3 LVDS. A single ended SCSI host bus adapter will work, but will severely degrade performance. Also, if there are any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed and severely degrade performance.

- When the host server is powered on, install software and/or driver(s) that are compatible with the autoloader. Software compatibility information is available at www.hp.com/go/automated. Most backup software packages require an additional module to communicate with the autoloader 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) (see "Electrostatic Discharge" on page 95). Use wrist-grounding straps and anti-static mats when handling internal components.
- Make sure that the host server has an open expansion slot.
- Make sure that your backup application supports the SCSI host adapter.
- Depending on the server configuration, you may need to change the SCSI IDs of the autoloader (see "Changing the SCSI ID" on page 49).
- Ensure the autoloader is properly terminated. If the autoloader is the only SCSI device, other than the SCSI host adapter on the selected SCSI bus, it must be terminated. Likewise, if the autoloader is physically the last SCSI device on the SCSI bus, it must be terminated. Only the devices physically located at the beginning and end of the SCSI bus should be terminated.
- Verify the connection between the autoloader and host by:
  — Installing the HP Library & Tape Tools diagnostic/installation check utility available at www.hp.com/support/TapeTools. Install this utility onto the host server. This utility verifies that the autoloader is connected and communicating with the host server. It also verifies that the autoloader is functioning and provides diagnostic information.

— Confirm the host server's operating system recognized the autoloader in Microsoft® **Windows**® **NT**® by going to:
Settings > Control Panel > SCSI Adapter,
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 SCSI devices, consult the operating system documentation.

Operating the Autoloader

2

Chapter Overview

This chapter describes:

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 autoloader status and control all of its functions.

The display defaults to the Home screen. The Home screen consists of the autoloader 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 (see Figure 9).

Note: SEQ may appear next to the front panel inventory when the autoloader is in Sequential mode. Nothing will appear when the autoloader is in Random mode.

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

Figure 9: Home screen, drive empty
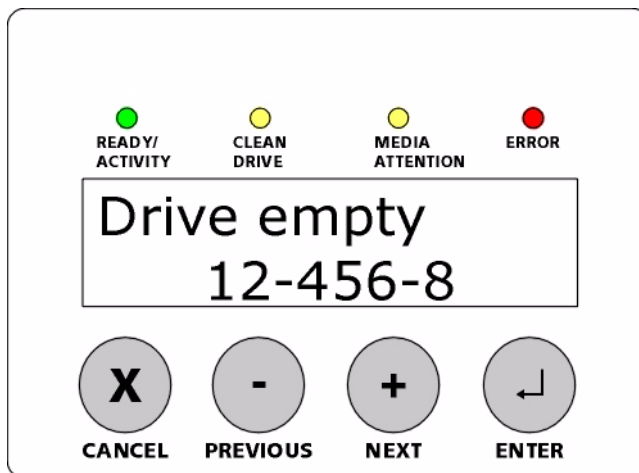
An exclamation point (!) displayed in the inventory indicates that the autoloader has identified a cartridge in the indicated slot that is either an invalid cartridge type or has had a media-related error. These can be caused by faulty media or dirty read/write heads in the tape drive. The Media Attention LED is also illuminated in this case. See "LED Indicators" on page 34 for more information.

Exporting the indicated cartridge will clear the error condition. See "Exporting Tape Cartridges" on page 38. If these symptoms occur on multiple known good cartridges, consider cleaning the tape drive. See "Cleaning the Tape Drive" on page 43. If a particular cartridge causes these symptoms repeatedly, that cartridge may be defective or invalid.

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. This display can also indicate that the specified cartridge is being loaded, unloaded, imported, or exported. The autoloader status line indicates the current operation. An example of this display is shown in Figure 10.

Figure 10: Home screen, drive loaded
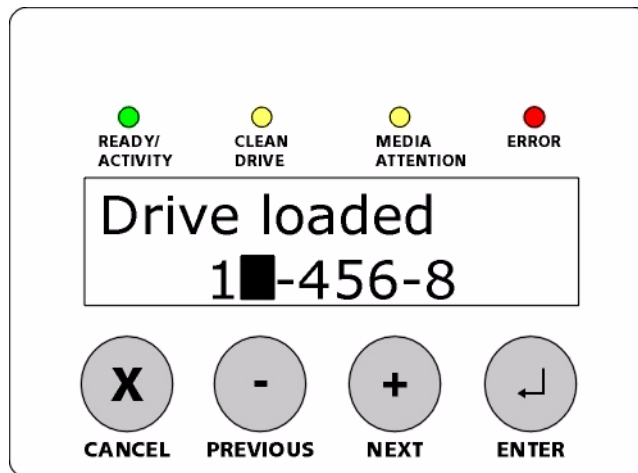
LED Indicators

The operator's panel includes four LED indicators that provide a variety of information as detailed in the following table:

Table 8: LEDs

LED	Color	Description
Ready/Activity	Green	Illuminated when power is on. Blinking when there is tape drive or autoloader robotics activity.
Clean Drive	Amber	Illuminated when the tape drive has determined that a cleaning cartridge should be used. See "Cleaning the Tape Drive" on page 43. Cleaning is only necessary when the Tape Autoloader directs you to do so. Additional cleaning is not necessary.
Media Attention	Amber	Illuminated if the tape drive has detected a cartridge or tape fault. Recommended action is to export the cartridge from the autoloader. Doing so turns off the LED. See "Exporting Tape Cartridges" on page 38. If a particular cartridge causes these symptoms repeatedly, that cartridge may be defective.
Error	Red	Illuminated if an unrecoverable tape drive or autoloader error occurs. A corresponding error message displays on the LCD screen (see "Autoloader Error Codes" on page 71 for more information).

Operator's Panel Control Buttons

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

Table 9: 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
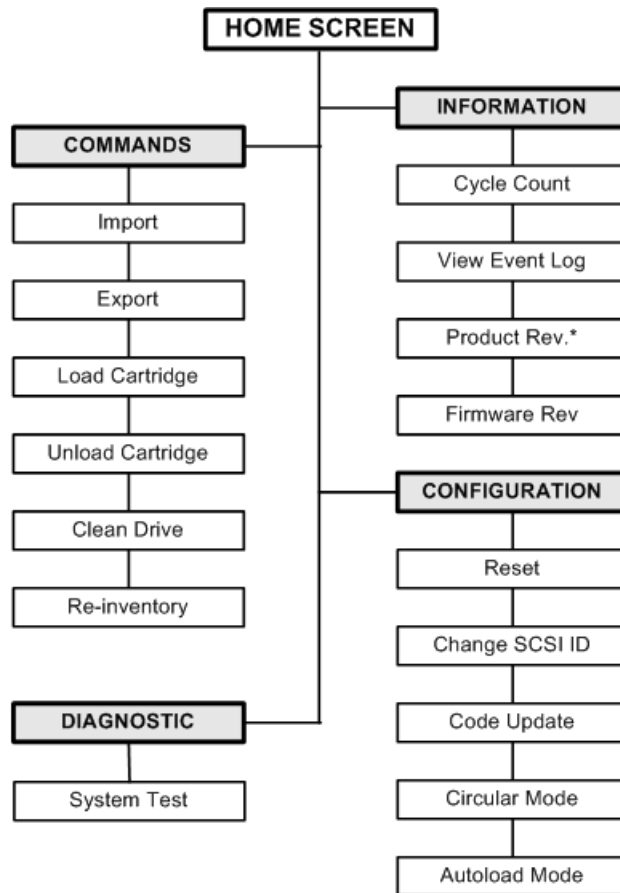
* This option is not available on the VS80 1/8 Tape Autoloader

---

Note: Circular and Autoload Mode are only available when the autoloader is in Sequential mode.

Using Tape Cartridges

> ⚠️ **Caution:** **Do not degauss HP Ultrium 400 GB (Ultrium-2) data cartridges!** Ultrium 400 GB data cartridges are pre-recorded with a magnetic servo signal. This signal is required in order to use the cartridge with the Ultrium 460 tape drive. Keep magnetically charged objects out of close range.

Before you use the autoloader, make sure you observe these general rules:

■ Use only the data cartridges that are designated for your model of tape autoloader (see "Cartridge Type" on page 37).

■ You can order data cartridges at www.hp.com/go/storagemedia.

■ Clean the tape drive when the Clean Drive LED is illuminated.

— Be sure to use only Ultrium Universal cleaning cartridges in the 1/8 Ultrium 230 and Ultrium 460 Tape Autoloaders.

— Be sure to use only the DLT VS cleaning cartridge for the 1/8 DLT VS80 Tape Autoloader.

— Be sure to use only SDLT cleaning cartridges in the 1/8 SDLT 320 Tape Autoloader.

■ You can order cleaning cartridges at www.hp.com/go/storagemedia.

> **Note:** If you are using the operator's panel to clean the drive, import the cleaning cartridge only when the operator's panel requests it. You may keep a cleaning cartridge in the autoloader if the backup software can manage the drive cleaning.

Cartridge Type

Table 10: Ultrium 230 tape autoloader

Cartridge Type	Part Number
HP Ultrium 200 GB data cartridge Ultrium 1, blue	C7971A
HP Ultrium universal cleaning cartridge, (15 cleans), orange	C7978A

Table 11: Ultrium 460 tape autoloader

Cartridge Type	Part Number
HP Ultrium 400 GB data cartridge Ultrium 2, red	C7972A
HP Ultrium universal cleaning cartridge, (15 cleans), orange	C7978A

Table 12: DLT VS80 tape autoloader

Cartridge Type	Part Number
HP DLTtape IV data cartridge, brown	C5141F
HP DLT VS cleaning cartridge (20 cleans)	C7998A

Table 13: SDLT 320 tape autoloader

Cartridge Type	Part Number
HP Super DLTtape 1 data cartridge 220/320GB, green	C7980A
HP SDLT cleaning cartridge (20 cleans)	C7982A

Importing Tape Cartridges

⚠ **Caution:** Importing or exporting media during a data backup may result in adverse results that could include backup failure or other errors.

This option forces the autoloader to import a cartridge into a specific empty slot on the carousel. To import tapes into the autoloader:

1. Make sure the write-protect switch is set as desired for each data cartridge (see "Write-Protecting Tape Cartridges" on page 40).

2. From the Home Screen or Main menu, press **+** or **-** until `Commands` displays on the top line of the LCD screen. Press **Enter** to access the available options.

3. Press **+** or **-** until `Import` displays on the LCD screen. Press **Enter** to select.

4. Press **+** or **-** until the desired slot number displays on the LCD screen and press **Enter**. You are not given the option to import a cartridge to an occupied slot.

5. When `Insert Cartridge Slot` displays on the LCD screen and the mail slot opens, insert the desired data cartridge into the mail slot so that the write-protect switch is facing out from the autoloader (see Figure 12).

6. Repeat steps 5 and 6 as needed for any additional cartridges.

7. Press **Cancel** when you have finished importing cartridges.

8. Verify that the LCD screen shows that the desired slots have cartridges installed.

Figure 12: Importing a cartridge
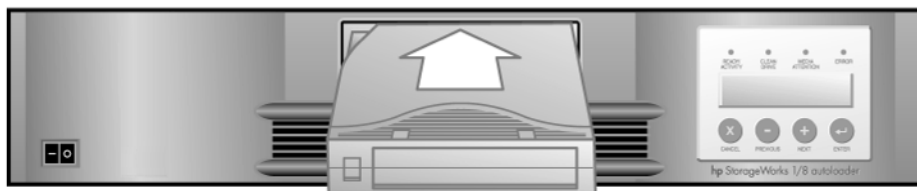
Exporting Tape Cartridges

> **Caution:** Importing or exporting media during a data backup may result in adverse results that could include backup failure or other errors

This option moves a cartridge from a specific slot to the mailslot. To export one or more cartridges from the autoloader:

1. From the Home Screen or Main menu, press **+** or **-** until `Commands` displays on the top line of the LCD screen**.** Press **Enter** to select.

2. Press **+** or **-** until `Export` displays on the LCD screen. Press **Enter** to select.

3. Press **+** or **-** until the desired slot number displays on the LCD screen and press **Enter**. You are not given the option to export from an empty slot, and you cannot export directly from the drive.

When `Remove Cartridge` displays on the LCD screen and the cartridge is ejected through the mailslot, remove the exported cartridge from the autoloader and press **Enter**. (See Figure 13.)

4. Repeat steps 3 and 4 as needed for any additional cartridges.

5. Press **Cancel** when you have finished exporting cartridges.

6. Check the LCD screen to verify that the desired slots no longer contain cartridges.

Figure 13: Exporting a cartridge

Loading Tape Cartridges

This option loads a cartridge from the autoloader slots into the tape drive. To use this option:

1. From the Home Screen or Main menu, press **+** or **-** until `Commands` displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until `Load Cartridge` displays on the LCD screen. Press **Enter** to select.

3. Press **+** or **-** until the desired slot number displays on the LCD screen and press **Enter**. The slot number you select indicates the cartridge to be loaded into the tape drive.

Note: Only slot numbers containing cartridges are displayed.

---

4. Status messages will be displayed while the cartridge is loading. `Drive Stopped` will be displayed when the operation is complete.

Unloading Tape Cartridges

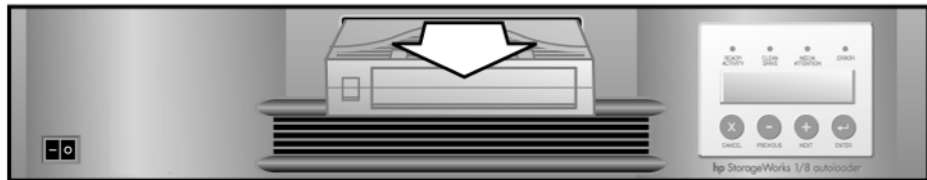This option unloads the cartridge from the tape drive into its original slot. To use this option:

1. From the Home Screen or Main menu, press **+** or **-** until Commands displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until Unload Cartridge displays on the LCD screen. Press **Enter** to unload the cartridge from the tape drive.

3. Status messages will be displayed while the cartridge is unloading. Drive Empty will be displayed when the operation is complete.

Write-Protecting Tape Cartridges

All cartridges have a write-protect switch to prevent accidental erasure or overwriting of data. Before loading a cartridge into the autoloader, make sure the write-protect switch on the front of the cartridge is positioned as desired:

Ultrium 400 GB and 200 GB Cartridges

■ Slide the switch to the **right** to write-protect the cartridge. A small pad-lock is visible indicating that the cartridge is write-protected (see Figure 14).

■ Slide the switch to the **left** to allow the autoloader to write data to the cartridge (see Figure 14).

Note: When a write-protected cartridge is loaded into the drive, a *WP* will be displayed on the bottom line of the LCD screen next to the inventory information. This message will be displayed until the cartridge is unloaded from the drive.

Figure 14: Write-protecting a 200 GB or 400 GB Ultrium data cartridge
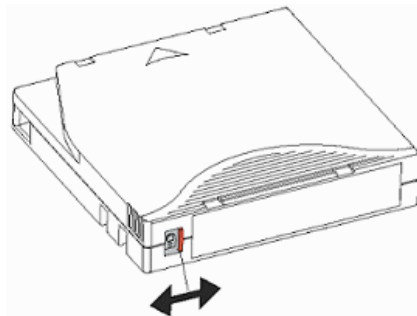
DLTtape IV and Super DLTtape 1 Cartridges

■ Slide the switch to the **left** to write-protect the cartridge. A small orange rectangle is visible indicating that the cartridge is write-protected (see Figure 15).

■ Slide the switch to the **right** to allow the autoloader to write data to the cartridge (see Figure 15).

Figure 15: Write-protecting a DLTtape IV or Super DLTtape 1 cartridge
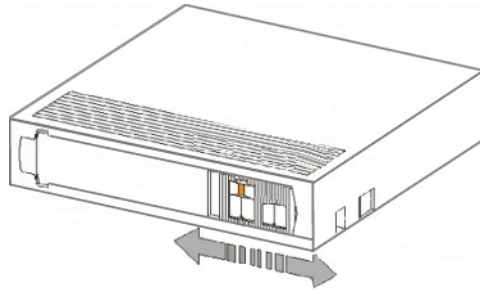
Maintaining Cartridges

⚠️ **Caution:** **Do not degauss HP Ultrium 400 GB (Ultrium-2) data cartridges!** These data cartridges are pre-recorded with a magnetic servo signal. This signal is required in order to use the cartridge with the Ultrium 460 tape drive. Keep magnetically charged objects out of close range.

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

■ Do not drop a cartridge. Excessive shock can damage the internal contents of the cartridge, or the cartridge case itself, making that cartridge unusable.

■ Do not expose your data cartridges to direct sunlight or sources of heat, including portable heaters and heating ducts.

■ The operating temperature range for your data cartridges is 10 to 35 degrees C. The storage temperature range is 16 to 32 degrees C in a dust-free environment in which relative humidity is always between 20% and 80% (non-condensing).

■ If an data cartridge has been exposed to temperatures outside the ranges specified above, stabilize the cartridge at room temperature for the same amount 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.

Cleaning the Tape Drive

When the Clean Drive LED is on, the autoloader's 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.

> **Caution:** Use only Ultrium Universal cleaning cartridges in the 1/8 Ultrium 320 and 460 Tape Autoloaders available at www.hp.com/go/storagemedia.

> **Caution:** Use only DLT VS cleaning cartridges in the 1/8 DLT VS80 Tape Autoloader available at www.hp.com/go/storagemedia.

> **Caution:** Use only SDLT cleaning cartridges in the 1/8 SDLT 320 Tape Autoloader available at www.hp.com/go/storagemedia.

> **Note:** If you are using the operator's panel 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 autoloader, the backup software must manage drive cleaning.

To clean the tape drive:

1. From the Home Screen or Main menu, press **+** or **-** until Commands displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until Clean Drive displays on the LCD screen. Press **Enter** to select.

3. If the carousel is full, the LCD screen displays No slot free for transfer. Press **Cancel** repeatedly until the Main menu or Home Screen is displayed. Export a cartridge to make room for the cleaning cartridge. See "Exporting Tape Cartridges" on page 38 for instructions, then return to step 1 to clean the tape drive.

4. If the carousel is not full, the autoloader will select the first available slot and prompt you to insert a cleaning cartridge. Insert the cleaning cartridge into the autoloader mailslot. During the cleaning process, which can take several minutes, the LCD screen displays Drive Cleaning.

> **Caution:** If the cartridge is not a valid cleaning cartridge, the LCD screen will display Invalid Tape and the cartridge will be exported.

5. When tape drive cleaning is complete, the Clean Drive LED turns off (if previously on) and the autoloader 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 LED, or the Media Attention LED (on export or import) occurs when inserting the same cartridge after you have cleaned the drive, there may be a problem with that cartridge (see "Troubleshooting" on page 61).

6. If you had to remove a data cartridge to import the cleaning cartridge, import the tape to its original slot. See "Importing Tape Cartridges" on page 37 for more information.

Updating Cartridge Inventory

This option will analyze the slots and drives in the autoloader. To update the inventory information:

1. From the Home Screen or Main menu, press **+** or **-** until Commands displays on the top line of the LCD screen. Press **Enter** to access the available options.

2. Press **+** or **-** until Re-inventory displays on the LCD screen. Press **Enter** to select.

The autoloader will now check the drive and each slot for the presence of a tape in order to update the inventory information.

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

Autoloader Administration

3

Chapter Overview

This chapter describes the following:

- Configuring the Autoloader, page 48
- Autoloader Operating Modes, page 51
- Updating Firmware, page 53
- Running the Autoloader System Test, page 55
- Retrieving Information About the Autoloader, page 56

Configuring the Autoloader

The Configuration menu provides access to the following autoloader configuration options:

- Resetting the autoloader
- Changing SCSI IDs
- Setting autoloader mode to Circular/Autoload
- Updating firmware

To access the Configuration menu:

1. From the Home screen or Main menu, press **+** or **-** until `Configuration` displays on the top line of the LCD screen.
2. Press **Enter** and then **+** or **-** to access the available options.
3. Press **Enter** to execute the displayed menu option.

Resetting the Autoloader

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

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

To access this option:

1. From the Home screen or Main menu, press **+** or **-** until `Configuration` displays on the top line of the LCD screen. Press **Enter** to select.
2. Press **+** or **-** until `Reset` displays on the LCD screen. Press **Enter** to reset the autoloader.

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

Changing the SCSI ID

This option changes the SCSI IDs that the autoloader uses. The autoloader occupies two SCSI IDs, one ID is assigned to the autoloader's SCSI controller and the second ID is assigned to the tape drive.

The default SCSI ID for the autoloader's SCSI controller is 0. The default SCSI ID for the tape drive is 5. Change a SCSI ID only if there is another device, or devices, already assigned to one of these IDs.

Changing the SCSI ID of the Tape Autoloader

To change the SCSI ID of the autoloader controller:

1. From the Home screen or Main menu, press **+** or **-** until Configuration displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until Change SCSI ID displays on the top line of the LCD screen. Press **Enter** to select.

3. Press **+** or **-** until Loader displays on the bottom line of the LCD screen. Press **Enter** to select.

4. Press **+** or **-** until the desired SCSI ID is displayed. Press **Enter**. The LCD screen displays Cycle Power for New SCSI ID.

5. Turn off the autoloader, wait 30 seconds, then 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 cycle power on the host server and reconfigure your backup software before you can use the autoloader. Consult your hardware and software manuals for more information.

Changing the SCSI ID of the Tape Drive: Ultrium 230, Ultrium 460 and SDLT 320 Models Only

To change the SCSI ID of the tape drive:

1. From the Home screen or Main menu, press **+** or **-** until `Configuration` displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until `Change SCSI ID` displays on the top line of the LCD screen. Press **Enter** to select.

3. Press **+** or **-** until `Drive` displays on the bottom line of the LCD screen. Press **Enter** to select.

4. Press **+** or **-** until the desired SCSI ID is displayed. Press **Enter**. The LCD screen displays `Cycle Power for New SCSI ID`.

5. Turn off the autoloader, wait 30 seconds, then 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 cycle power on the host server and reconfigure your backup software before you can use the autoloader. Consult your hardware and software manuals for more information.

Autoloader Operating Modes

Overview

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

Random Mode

Random mode is used when there is a full-featured or a robotics-aware backup application in use. This is the normal mode of operation. In Random mode, the autoloader will not automatically load tapes into the drive; it waits for commands from the software. Your backup software must support autoloaders, which often requires the additional installation of an autoloader/library software module.

Sequential Mode

Sequential mode is used when the backup software is NOT robotics-aware or was designed for standalone drives only. Sequential Mode is useful when a software application is not available. In Sequential mode, the autoloader 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 autoloader front panel (see "Importing Tape Cartridges" on page 37 for instructions).

When the first tape is full or unloaded for any reason, the autoloader automatically removes the tape from the drive, puts it in its original slot, then loads the next available higher numbered slot. To further determine how you want tapes loaded into the autoloader's tape drive while in Sequential mode, you can set Circular and Autoload options from the autoloader front panel.

Note: SEQ may appear next to the front panel inventory when the autoloader is in Sequential mode. Nothing will appear when the autoloader is in Random mode. This may no longer be applicable with future upgrades.

Circular Mode On/Off

This option turns Circular mode on or off and is only used when in Sequential mode. When Circular mode is on, the original first cartridge in the sequence is reloaded after the autoloader has cycled through all available cartridges. If Circular mode is off and the last cartridge has been unloaded, the autoloader stops loading cartridges until you manually load another.

> ⚠ **Caution:** Use caution when choosing Circular mode as it makes it possible to overwrite data on previously written cartridges.

To access this option:

1. From the Home screen or Main menu, press **+** or **-** until `Configuration` displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until `Circular Mode` displays on the LCD screen. The second line on the LCD screen indicates the current status, either `On` or `Off`. Press **Enter**. The LCD screen indicates whether you are about to turn Circular mode on or off.

3. Press **Enter** to accept the change to Circular mode or **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 autoloader automatically loads the cartridge from the lowest numbered full slot into the tape drive. It then follows standard sequential operation.

To access this option:

1. From the Home screen or Main menu, press **+** or **-** until `Configuration` displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until `Autoload Mode` displays on the LCD screen. The second line on the LCD screen indicates the current status, `On` or `Off`. Press **Enter**. The LCD screen indicates whether you are about to turn Autoload mode on or off.

3. Press **Enter** to accept the change to Autoload mode or **Cancel** to exit and not save the changes.

Updating Firmware

Caution: Do not power cycle or reset the autoloader during the upgrade process. Doing so could cause the autoloader to become inoperable.

Using HP Library & Tape Tools

You can download autoloader and drive firmware using the HP Library & Tape Tools diagnostic utility. This utility may already be installed on your server. If not, download it from www.hp.com/support/TapeTools. Online help and instructions are included with HP Library & Tape Tools. The firmware download procedure involves these simple steps:

1. After downloading and installing Tape Tools, run the HP Library & Tape Tools utility.

2. If prompted to download new firmware from the website, select **Yes**, otherwise, select **Get Firmware from Web** under the **File** menu.

3. Click the desired firmware revisions for the autoloader that you would like to download firmware to, and then click **Download**. The firmware file is copied into the HP Library & Tape Tools firmware folder.

4. Close the firmware window.

5. Select the autoloader in the **By Product** device list tab, and then select **Firmware**. The latest revision available for the autoloader is automatically selected.

6. Select **Start Update** to update the firmware for the autoloader.

Using a Firmware Upgrade Tape

This option performs a firmware code update to the drive only using a firmware upgrade cartridge.

Note: The code update operation assumes the upgrade tape is imported as part of the procedure. Do not import the firmware update cartridge before starting this procedure.

Note: To update the firmware for the autoloader robotics, a SCSI diagnostic utility is needed, such as HP Library & Tape Tools.

To use this option:

1. From the Home screen or Main menu, press **+** or **-** until `Configuration` displays on the top line of the LCD screen. Press **Enter** to select.

2. Press **+** or **-** until `Code Update` displays on the LCD screen. Press **Enter**.

3. If the carousel is full, the LCD screen displays `No slot free for transfer`. Press **Cancel** repeatedly until the Main menu or Home screen is displayed. Export a cartridge to make room for the firmware update cartridge (see "Exporting Tape Cartridges" on page 38). Return to Step 1 to update the firmware.

4. If the carousel is not full, the autoloader will select the first available slot and prompt you to insert the code update cartridge. Select **Firmware**.

5. Insert the code update cartridge into the mailslot.

6. During the firmware update, which can take several minutes, the LCD screen displays `CODE UPDATE IN PROGRESS`. When complete, the autoloader resets, then unloads and exports the code update cartridge. Remove the code update cartridge and press **Enter** when the LCD screen prompts you to do so.

7. If you exported a data cartridge to make room for the code update cartridge, be sure to import the cartridge to its original slot. See "Importing Tape Cartridges" on page 37 for instructions.

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

Running the Autoloader System Test

The System Test option cycles the autoloader through the process of loading, calibrating, and unloading all cartridges in the carousel. Running a System Test verifies the basic operational soundness of the autoloader and tape drive. In the DLT VS80 Tape Autoloader, the System Test continues indefinitely until you press **Cancel**. With the Ultrium 230, Ultrium 460 and SDLT 320 Tape Autoloaders you have the option to `Select Cycles:` `270, 540, 1080` or `endless`.

All regular backup or restore operations are suspended while a System Test is in progress.

To run a System Test:

1. From the Home screen or Main menu, press **+** or **-** until `Diagnostics` displays on the top line of the LCD screen. Press **Enter** to select. `System Test` will now be displayed.

2. For the **DLT VS80 Tape Autoloader**, Press **Enter** to begin the test.

3. For the **Ultrium 230, Ultrium 460 and SDLT 320 Tape Autoloaders,** select the number of cycles by choosing: **Select Cycles: 270, 540, 1080** or **endless**.

4. The `Test Cycles` displays the number of load-calibrate-unload cycles that have been completed during the test.

5. Press **Cancel** to end the test.

Retrieving Information About the Autoloader

The Information menu provides access to information about the autoloader, 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 autoloader.

To use this option:

1. From the Home screen or Main menu, press **+** or **-** until Information displays on the top line of the LCD screen. Press **Enter** to access the available options.

2. Press **+** or **-** until Cycle Count displays on the LCD screen. The LCD screen displays the total cycle count.

3. Press **Cancel**.

View Event Log

This option provides access to the most recent autoloader errors and events (see Table 15 on page 71 for a description of error codes).

To use this option:

1. From the Home screen or Main menu, press **+** or **-** until Information displays on the top line of the LCD screen. Press **Enter** to access the available options.

2. Press **+** or **-** until View Event Log displays on the LCD screen. The LCD screen also displays the errors and events currently stored in the event log. Press **Enter** to access the most recently logged event.

3. Press **+** or **-** to display each event in the log.

4. Press **Cancel**.

Note: The most recent entry is number 0, older entries are negative numbers.

Product Revision

Note: This option is not applicable to the DLT VS80 Tape Autoloader.

For the Ultrium 230, Ultrium 460 and SDLT 320 Tape Autoloaders, the Product Revision option displays the drive and robotics firmware versions.

To use this option:

1. From the Home screen or Main menu, press **+** or **-** until Information displays on the top line of the LCD screen. Press **Enter** to access the available options.

2. Press **+** or **-** until Product Rev displays on the LCD screen. The LCD screen displays the version of the drive and robotics firmware currently installed in the autoloader.

3. Press **Cancel**.

Firmware Revision

This option displays the version of the firmware currently installed in the autoloader.

There are three firmware images in the autoloader. The revision information for these images is displayed on the bottom line of the LCD display in this order: Ultrium Tape Drive Controller, Autoloader SCSI Controller, and Autoloader Robotics Controller.

To use this option:

1. From the Home screen or Main menu, press **+** or **-** until Information displays on the top line of the LCD screen. Press **Enter** to access the available options.

2. Press **+** or **-** until Firmware Rev displays on the LCD screen. The LCD screen displays the version of the firmware currently installed in the autoloader.

3. Press **Cancel**.

Note: The firmware revision displayed on the LCD may not be updated until the autoloader is power cycled.

Diagnostics and Troubleshooting

4

Chapter Overview

This chapter describes the following:

- Using HP Library & Tape Tools to Diagnose Problems, page 60
- Troubleshooting, page 61
- Removing Stuck Tapes From Slots, page 68
- Autoloader Error Codes, page 71

Using HP Library & Tape Tools to Diagnose Problems

With HP Library & Tape Tools installed on the host server

- Identify all SCSI devices connected to your system
- View detailed configuration, identification, inventory, and drive information for the autoloader
- Easily update autoloader and drive firmware
- Run advanced diagnostic tests, including connectivity, read/write, media validation, and testing the functionality of the autoloader
- View autoloader and drive error logs
- Generate a detailed support file that can be e-mailed or faxed to your support representative for analysis

The HP Library & Tape Tools diagnostic provides an intuitive graphical user interface with integrated context-sensitive help. It can be downloaded free of charge from www.hp.com/support/TapeTools.

Figure 16: HP Library & Tape Tool interface
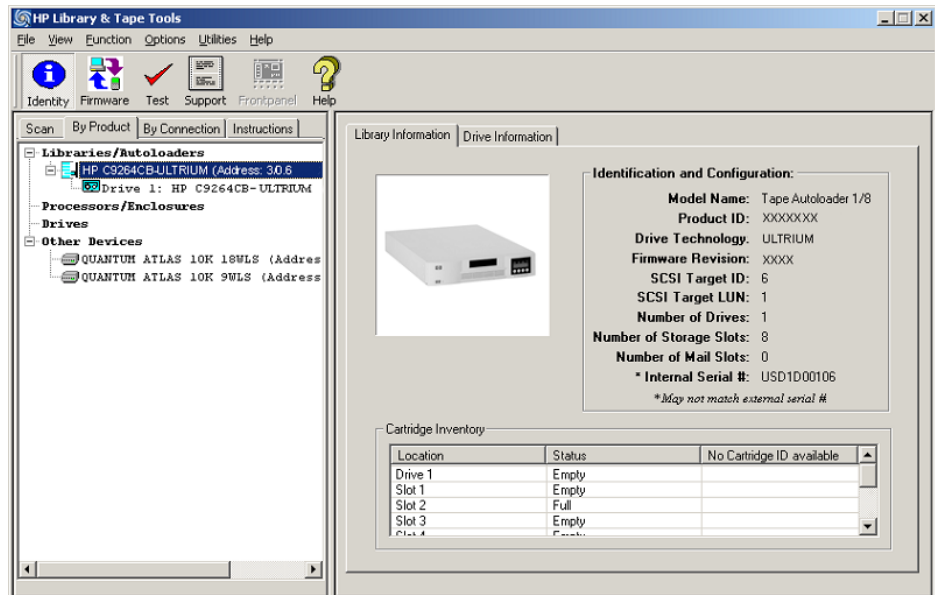
Troubleshooting

Installation Problems

Problems encountered during the installation of the autoloader 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 autoloader after installation, check the following:

- **SCSI ID - Models Ultrium 230, Ultrium 460, and SDLT 320 Only**: The autoloader uses one SCSI ID for the tape drive and another SCSI ID for the autoloader robotics. Depending on other devices attached to the same SCSI bus and their SCSI IDs, you may need to change the SCSI ID of the autoloader or tape drive before you can use the autoloader, by selecting and assigning unused SCSI IDs. Review the manuals for the other devices on the SCSI bus or your operating system to determine which SCSI IDs are currently in use. See "Changing the SCSI ID" on page 49 for instructions.

- **SCSI Cabling:** Verify that all SCSI cables are securely connected at both ends. Check the length and integrity of your SCSI cabling. Check the SCSI connector for bent pins. The total length of all cables connected to a SCSI bus must not exceed 19 feet (6 meters) for a SCSI-1 SE bus, 10 feet (3 meters) for a Fast SCSI (Narrow or Wide) or an Ultra SCSI (Narrow or Wide) SE bus, 40 feet (12 meters) for an LVD bus with multiple devices, or 82 feet (25 meters) for an LVD bus with a single device. The length of the internal SCSI cabling inside the autoloader is 2 feet (60 cm). This length must be included in any calculations of cable length.

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

  — To terminate the autoloader, locate the terminator in the accessories package and press it firmly into either of the two SCSI connectors on the rear panel of the autoloader. Secure the terminator by tightening the finger-screws until snug. The supplied terminator is "dual mode" and will

work on both Low-Voltage Differential (LVD) and Single Ended (SE) SCSI buses. Check all SCSI and power connections and confirm that the unit is attached to a valid SCSI SE or LVDS bus.

■ **Compatibility:** Ensure that the autoloader is 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 HP support website at www.hp.com/support.

Note: The host bus adapter for the 1/8 Ultrium 460 and 320 Tape Autoloaders should be SCSI-3 LVDS. A single ended SCSI host bus adapter will work, but will severely degrade performance. Also, if there are any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed and severely degrade performance.

■ **SCSI Host Adapter Installation:** Verify that your SCSI host adapter is installed 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, if applicable. 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. Some backup software packages require an additional module to communicate with the autoloader robotics.

■ **Device Driver Installation:** Make sure that the proper device driver, if applicable, is installed for the autoloader. Contact your support representative for more information.

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

Troubleshooting Table

Table 14: Troubleshooting table

Problem	Solution
Power	
Autoloader does not power on.	■ 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 cord. ■ Contact your service representative.
No display messages appear.	■ Make sure the power cord is connected. ■ Make sure the power switch is on. ■ Power cycle the autoloader. ■ Download autoloader firmware. ■ Contact your service representative.
Tape Movement	
Tape stuck in drive.	■ Power cycle the autoloader, allow it to complete initialization, which in rare cases can take as long as 10 minutes, and then retry unloading the tape using the autoloader operator's panel controls. ■ Allow the tape drive to complete all operations. This may take as long as ten minutes if you reset or cycle power on the autoloader 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 autoloader from the host server eliminates the host and its software as a problem source. ■ Contact your service representative.
Tape stuck in storage slot.	See "Removing Stuck Tapes From Slots" on page 68.

Problem	Solution
Media	
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 autoloader (see Appendix A, "Technical Specifications" on page 77). The autoloader automatically unloads incompatible cartridges, the Media Attention LED flashes, and an exclamation point (!) displays in the inventory display for the indicated slot number. You will need to export the media in order to clear the state.
Cannot write to or read from tape.	■ Make sure that the cartridge is write enabled (move the write-protect switch to the enabled position). ■ If you have the 1/8 Ultrium 460 Tape Autoloader, 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. See "Cleaning the Tape Drive" on page 43. ■ Make sure you have the appropriate data cartridge for your 1/8 Tape Autoloader model.
Device Not Detected on SCSI Bus	
Connected to a high voltage differential SCSI bus/host adapter	■ Attach device to a LVDS SCSI host adapter/bus. ■ SCSI cable length exceeded, use shorter cable, or remove other devices from the bus. ■ Device not properly terminated. See "Installation Problems" on page 61. ■ Power on device before powering on the host computer. ■ Check that the device has been powered on and is not in an error state. ■ Check the SCSI connector for bent pins.

Problem	Solution
SCSI ID	
Changed drive SCSI ID, but the host server does not recognize the new ID.	■ Make sure that all SCSI devices on the same bus have unique ID numbers. ■ If the SCSI bus is narrow (50-pin) only SCSI IDs 0 through 7 are available. ■ Make sure that you cycle power on the autoloader after changing the SCSI ID. ■ Reboot the host server.
Autoloader Performance	
The autoloader is not efficiently backing up data.	■ 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 autoloader and tape drive are on their own SCSI bus and not daisy-chained to another tape drive or to the hard drive being backed up. ■ Make sure the autoloader is connected to a LVDS SCSI bus and there are no SE devices on the same bus, because this will cause the entire bus to negotiate down to SE speed. ■ Try a new cartridge. A marginal cartridge can cause performance problems due to bad spots on the tape requiring retries. ■ Backing up data that compresses poorly or is already compressed will lower performance. ■ Check the size of the files. Small file size can impact performance. ■ Confirm that the backup application is utilizing block sizes of at least 32KB, preferably 64KB. Refer to the backup application documentation for details. ■ Make sure the backup server has enough memory to handle the bandwidth of the backup or restore. ■ Clean the tape drive. See "Cleaning the Tape Drive" on page 43 for instructions.

Problem	Solution
Cleaning	
Cannot load the cleaning cartridge.	■ For the 1/8 Ultrium 460 and 320 Tape Autoloaders, make sure you are using an Ultrium universal cleaning cartridge. (See "Cleaning the Tape Drive" on page 43.) ■ For the 1/8 SDLT 320 Tape Autoloader, make sure you are using the Super DLTtape cleaning cartridge. (See "Cleaning the Tape Drive" on page 43.) ■ For the 1/8 DLT VS80 Tape Autoloader, make sure you are using the DLT VS cleaning cartridge. (See "Cleaning the Tape Drive" on page 43.) ■ Contact your service representative.
Media Attention LED Issues	
Contamination by loose debris.	Avoid contamination by ensuring that the autoloader is installed in a clean, contamination-free environment. Cartridges should be stored vertically in their plastic cases. Continue cleaning the tape drive as needed.
Non-acclimated media	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 autoloader.
Cleaning cartridge is incompatible	■ For the 1/8 Ultrium 460 and 320 Tape Autoloaders, make sure you are using an Ultrium universal cleaning cartridge. (See "Cleaning the Tape Drive" on page 43.) ■ For the 1/8 SDLT 320 Tape Autoloader, make sure you are using the Super DLTtape cleaning cartridge. (See "Cleaning the Tape Drive" on page 43.) ■ For the 1/8 DLT VS80 Tape Autoloader, make sure you are using the DLT VS cleaning cartridge. (See "Cleaning the Tape Drive" on page 43.)
Expired cleaning cartridge	A cleaning cartridge is good for: ■ 1/8 Ultrium 460 and 320 Tape Autoloaders: 15 cleans ■ 1/8 SDLT 320 Tape Autoloader: 20 cleans ■ 1/8 DLT VS80 Tape Autoloader: 20 cleans

Problem	Solution
Bad/defective/contaminated media	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 it is not an invalid cleaning cartridge. ■ 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.
Errors Displayed on Front Panel	
"!" in autoloader operator panel inventory display	See "Operator's Panel Overview" on page 32 for more information.
There is an error code on the LCD display	Look up the error code, try to resolve the failure, and power cycle (see "Autoloader Error Codes" on page 71).

Removing Stuck Tapes From Slots

> **Note:** Contact your HP support representative if a cartridge is stuck in the drive.

In the event of a severe mechanical problem with the autoloader or circumstances require you to remove cartridges:

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 autoloader.

> ⚠ **WARNING:** To prevent injury, disconnect the power and SCSI cables before removing the autoloader cover and keep fingers away from the fan.

3. Remove the autoloader from its rack slot, if applicable, and place it on a table or other clear work surface.

4. Use a screwdriver to remove the screws that secure the mounting brackets (if the autoloader is rackmounted) from both sides of the autoloader (see Figure 5 on page 22).

5. Remove the five screws on the back and the three screws on each side of the autoloader to remove the autoloader cover.

6. Remove the top cover by lifting it from the back and easing it from under the front panel display cover.

> **Note:** Use caution and light force when removing the cartridge carrier as the tab is fragile and could be damaged in this procedure.

7. To remove a cartridge carrier, gently lift the cartridge carrier just above the belt and rotate it approximately 90 degrees counterclockwise to disengage the tab from the belt (see Figure 17 and Figure 18). Continue lifting the carrier straight up to remove it from the autoloader. If the carrier is directly in front of the mailslot, gently rotate the carousel counterclockwise by moving the belt or carriers until the carrier is no longer in front of the mailslot.

Figure 17: Cartridge carrier tab
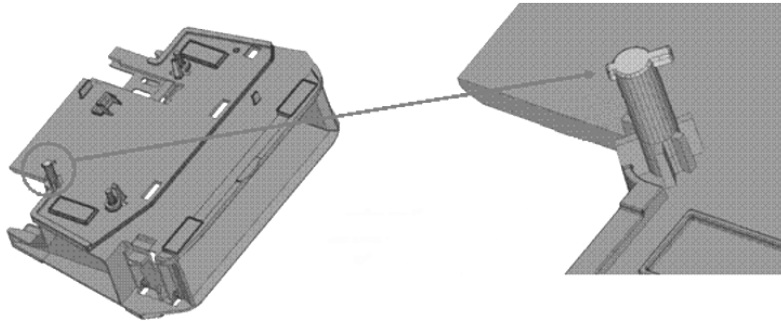
Figure 18: Cartridge carrier placement in the autoloader
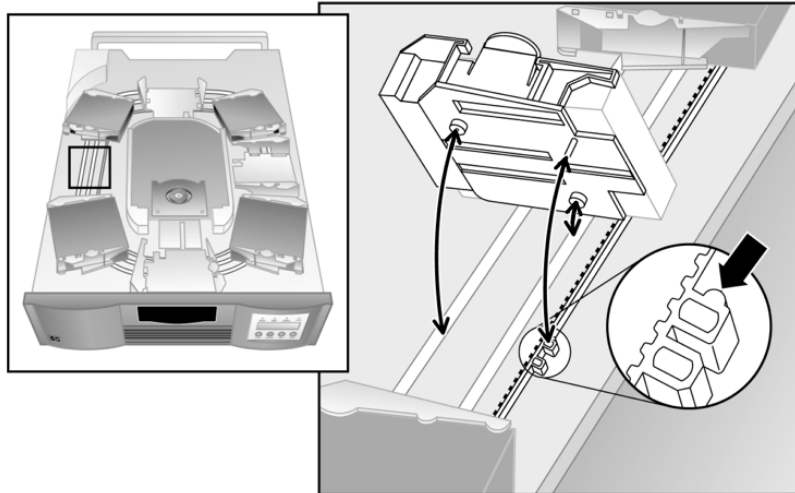
8. Carefully pull the cartridge lock release lever as shown in Figure 19 away from the cartridge carrier allowing the cartridge to slide out of the carrier.

Figure 19: Pull cartridge lock release lever
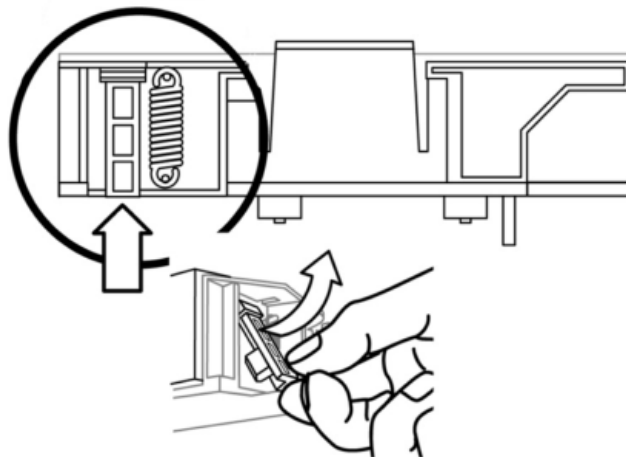
9. After removing the cartridges from the desired carriers, reinstall each carrier by placing it on the belt and rotating it clockwise until the tab engages with the belt.

    — Make sure that the rollers on the bottom of the carrier are aligned in the carrier tracks.

    — Make sure that the belt tab beneath each carrier is inserted into the proper autoloader 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 18 on page 69).

---

10. 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 the carrier moves, reinstall the carrier.

11. Replace the top cover of the autoloader and reinstall the eleven cover screws and mounting brackets.

Autoloader Error Codes

If an error occurs during operation of the autoloader, the autoloader stops the current operation and displays an error code on the top line of the LCD screen. Unless otherwise noted in Table 15, try to resolve the error by cycling power on the autoloader and retrying the last operation. If the error persists, contact support personnel.

To view the error log:

1. From the Home Screen or Main menu, press **+** or **-** until `Information` displays on the top line of the LCD screen. Press **Enter** to access the available options.

2. Press **+** or **-** until `View Event Log` displays on the LCD screen. Press **Enter** to access the most recently logged error message.

3. Press **+** or **-** to display each error in the log.

4. Press **Cancel** when done.

A description of each of the error codes is provided in the following table.

Table 15: Error codes

Error Code	Description	Details
81H	Invalid command error	This error indicates that the autoloader received an undefined command or an invalid parameter to a command. This is most likely caused by software, diagnostic or the driver.
82H	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 does result in **busy** being reported to the host for the requested SCSI command.
83H	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 "Updating Cartridge Inventory" on page 45 or power cycle.
84H	Source element not ready	There is no cartridge in the location where a cartridge move was issued.
85H	Destination element not ready	The location where a cartridge move was issued already contains a cartridge.

Table 15: Error codes

Error Code	Description	Details
86H	Mailslot access rejected	User attempted to access the mailslot, but media removal was prevented by the host. This is usually caused by software restricting access to the unit.Try to export the cartridge using the software. If that fails, disconnect the SCSI cable, reboot, then try the operation again. Once successful, reconnect the SCSI cable and reboot the backup server.
87H	Operation time-out	A command did not complete in the required amount of time. Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
88H	Communications error during loop-back	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
89H	System test time-out	There was a communication timeout between the drive and loader during the System Test. Using invalid media or getting a SCSI bus reset can cause this error.
8FH	Recovered loader error	Loader error recovery successful. HP Library & Tape Tools can provide details of the original loader error. Retrys are often associated with bus resets since it takes longer to complete a command that was retried. It may also indicate parts that are marginal or wearing out.
90H	Mechanical Initialization failure	The robotics were not able to move to the safe mechanical initialization position. Manual intervention is necessary.
91H	Inventory scan failure	Fatal robotic error occurred during the inventory scan. Power cycle the autoloader and see if the error repeats.
92H	Preposition failed	Belt positioning error occurred during 'Preposition' command.

Table 15: Error codes

Error Code	Description	Details
93H	Cartridge load error	A failure occurred while trying to load a cartridge from its slot to the drive.
94H	Cartridge unload error	A failure occurred while trying to unload a cartridge from the drive to its slot.
95H	Import error	An error occurred while trying to import a data cartridge to a carousel slot.
96H	Export error	An error occurred while trying to export a data cartridge from its carousel slot. Can be caused by an empty slot that is expected to be full.
A0H	Carousel motion failure	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 the carousel path.
A1H	Cartridge transport position error	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.
A2H	Gripper position error	Gripper unable to reach position.
A3H	Cartridge pick error	Error occurred while trying to pull a cartridge from the drive or a carousel slot.
A4H	Mailslot position error	The mailslot 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 autoloader.
A5H	Fan Error	Autoloader processor detected a fan error. Check that the rear fan is operational and not obstructed.
BA	Load Time-out	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.

Table 15: Error codes

Error Code	Description	Details
BB	Unload Time-out	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
B0H	ROM error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
B1H	RAM error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
B2H	NVRAM error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
B3H	Controller timer failure	An unrecoverable failure has occurred in the mail controller timer circuit.
B4H	Loader to drive communication IC error	Failure in IC handling loader to drive communication.
B5H	Display error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
B6H	Memory error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
B7H	Timeout on autoloader command	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
BCH	Drive has recorded an over-temperature condition	Cycle power on the autoloader. Verify that the fan is operational and that the ambient or room temperature is within the standards as stated in "Tape Drive Specifications" on page 80. If the error recurs, contact your technical support representative.

Table 15: Error codes

Error Code	Description	Details
BDH	No connection to drive	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representation.
BEH	Generic Drive response error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
BFH	Fatal error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.

Technical Specifications

A

Physical Autoloader Specifications

1/8 Tape Autoloader: All Models

Table 16: 1/8 Tape Autoloader Physical Specifications

Characteristic	Product Alone	Packaged
Height	8.6 cm (3.4 in)	24 cm (9.4 in)
Width	42 cm (16.5 in)	60 cm (23.6 in)
Depth	61.7 cm (24.3 in)	79 cm (31.1 in)
Weight	11.3 kg (24.9 lb.)	12 kg (26 lb)

Autoloader Operation Specifications

Table 17: Operation Specifications

Characteristic	Specification
1/8 Tape Autoloader Ultrium 230	
Maximum storage capacity	Native: 800 GB
	Compressed: 1.6 TB (assuming 2:1 compression)
Maximum data transfer rate	Native: 15 MB/s (54 GB/hr.)
	Compressed: 30 MB/s (108 GB/hr.) (assuming 2:1 compression)
Drive type	HP Ultrium 230 drive
Number of slots	8
MSBF	250,000 swaps
Interface	Ultra2 SCSI LVD/SE
1/8 Tape Autoloader Ultrium 460	
Maximum storage capacity	Native: 1.6 TB
	Compressed: 3.2 TB (assuming 2:1 compression)
Maximum data transfer rate	Native: 30 MB/s (108 GB/hr.)
	Compressed: 60 MB/s (216 GB/hr.) (assuming 2:1 compression)
Drive type	HP Ultrium 460 drive
Number of slots	8
MSBF	250,000 swaps
Interface	Ultra3 SCSI LVD/SE
1/8 Tape Autoloader DLT VS80	
Maximum storage capacity	Native: 320 GB
	Compressed: 640 GB (assuming 2:1 compression)
Maximum data transfer rate	Native: 3 MB/s (10.8 GB/hr.)
	Compressed: 6 MB/s (21.6 GB/hr.) (assuming 2:1 compression)
Drive type	DLT VS80
Number of slots	8
MSBF	250,000 swaps
Interface	Ultra2 SCS LVD/SE

Table 17: Operation Specifications

Characteristic	Specification
1/8 Tape Autoloader SDLT 320	
Maximum storage capacity	Native: 1.28 TB
	Compressed: 2.56 TB (assuming 2:1 compression)
Maximum data transfer rate	Native: 16 MB/s (57.6 GB/hr.)
	Compressed: 32 MB/s (115.2 GB/hr.) (assuming 2:1 compression)
Drive type	SDLT 320
Number of slots	8
MSBF	250,000 swaps
Interface	Ultra2 SCS LVD/SE

Tape Drive Specifications

Table 18: Drive specifications

Characteristic	Specification
1/8 Tape Autoloader Ultrium 230	
Read/write transfer rate: maximum sustained	Non-compressed mode: 15 MB/s
	Compressed (2:1 typical): 30 MB/s
Burst transfer rate	80 MB/s
Average access time	71 seconds
Loading time to BOT (for previously written tape)	25 seconds
Unloading time from BOT	13 seconds
MTBF	250,000 hours
1/8 Tape Autoloader Ultrium 460	
Read/write transfer rate: maximum sustained	Non-compressed mode:30 MB/s
	Compressed (2:1 typical): 60 MB/s
Burst transfer rate	160 MB/s
Average access time	52 seconds
Loading time to BOT (for previously written tape)	< 19 seconds
Unloading time from BOT	< 19 seconds
MTBF	250,000 hours
1/8 Tape Autoloader DLT VS80	
Read/write transfer rate: maximum sustained	Non-compressed mode: 3.0 MB/s
	Compressed (2:1 typical): 6.0 MB/s
Burst transfer rate	16 MB/s
Average access time	68 seconds
Loading time to BOT (for previously written tape)	< 19 seconds
Unloading time from BOT	< 19 seconds
MTBF	100,000 hours

Table 18: Drive specifications

Characteristic	Specification
1/8 Tape Autoloader SDLT 320	
Read/write transfer rate: maximum sustained	Non-compressed mode: 16 MB/s Compressed (2:1 typical): 32 MB/s
Burst transfer rate	80 MB/s
Average access time	52 seconds
Loading time to BOT (for previously written tape)	< 19 seconds
Unloading time from BOT	< 19 seconds
MTBF	250,000 hours

Data Cartridge Specifications

Table 19: Cartridge specifications

Characteristic	Specification
1/8 Tape Autoloader Ultrium 230	
Ultrium-1, 200 GB	100 GB (non-compressed), 200 GB (2:1 typical compression)
Cartridge dimensions	10.2 x 10.54 x 2.15 cm (4 x 4.15 x.85 in)
Shelf life	30 years minimum @ 20° C, 40% RH (non-condensing)
Cartridge life	1,000,000 passes (approximately 2000 full backup or restore operations)
Cleaning cartridge life	15 uses
1/8 Tape Autoloader Ultrium 460	
Ultrium-2, 400 GB	200 GB (non-compressed), 400 GB (2:1 typical compression)
Cartridge dimensions	10.2 x 10.54 x 2.15 cm (4 x 4.15 x.85 in)
Shelf life	30 years minimum @ 20° C, 40% RH (non-condensing)
Cartridge life	1,000,000 passes (approximately 2000 full backup or restore operations)
Cleaning cartridge life	15 uses
1/8 Tape Autoloader DLT VS80	
DLT1, DLT Type IV	40 GB (non-compressed), 80 GB (2:1 typical compression)
Cartridge dimensions	10.4 x 10.4 x 2.5 cm (4.1 x 4.1 x 1.0 in)
Shelf life	30 years minimum @ 20° C, 40% RH (non-condensing)
Cartridge life	1,000,000 passes (approximately 2000 full backup or restore operations)
Cleaning cartridge life	20 uses
1/8 Tape Autoloader SDLT 320	
Super DLTtape 1, 220 - 320 GB data cartridge	160 GB (non-compressed), 320 GB (2:1 typical compression)
Cartridge dimensions	10.4 x 10.4 x 2.5 cm (4.1 x 4.1 x 1.0 in)
Shelf life	30 years minimum @ 20° C, 40% RH (non-condensing)
Cartridge life	1,000,000 passes (approximately 2000 full backup or restore operations)
Cleaning cartridge life	20 cleans

Cartridge Type and Part Number

Table 20: Cartridge type and part number

Cartridge Type	Part Number
1/8 Tape Autoloader Ultrium 230	
HP Ultrium 200 GB data cartridge Ultrium 1, blue	C7971A
HP Ultrium universal cleaning cartridge, orange	C7978A
1/8 Tape Autoloader Ultrium 460	
HP Ultrium 400 GB data cartridge Ultrium 2, red	C7972A
HP Ultrium universal cleaning cartridge, orange	C7978A
1/8 Tape Autoloader DLT VS80	
HP DLT IV data cartridge, brown	C5141F
HP DLT1 cleaning cartridge, beige	C5142A
1/8 Tape Autoloader SDLT 320	
HP Super DLTtape 1 data cartridge 220/320 GB, green	C7980A
HP SDLT cleaning cartridge, gray	C7982A

Environmental Specifications

Table 21: Autoloader Environmental Specifications

Characteristic	Specification
Temperature	
Operating	10° to 35° C
Non-operating	-40° to 60° C
Recommended operating temperature	20° to 30° C
Temperature shock immunity - maximum rate of change	10° C per hour
Humidity	
Operating	20% to 80% RH non-condensing
Non-operating	20% to 80% RH non-condensing

Customer Support

Registering Your Product

Registering your product at www.register.hp.com ensures fast and easy access to Hewlett-Packard Customer Support. HP customers who register join a select group registered to receive:

■ Technical support updates

■ Special Hewlett-Packard offers

■ Direct-to-you details on:

— Ideas and ways to use your new HP StorageWorks 1/8 Autoloader

— Other exciting HP products

— News on emerging technologies

Information Needed for Support

Before contacting your HP service representative, please have the following information ready:

Model number of your autoloader	
Serial number	
Media type and format	
Hardware and software error codes, if applicable	
Revision number for autoloader and drive firmware	
Brand and model of your host computer	
Brand and model of your SCSI host adapter	
Autoloader drivers and/or backup software that you are using and the version number(s)	

Backup Software Support

While the autoloader product itself is supported by Hewlett-Packard, all software products are supported by individual software vendors. When contacting the software vendor for support, you will need the following information:

Your name and telephone number	
Product name, release number, 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.	

Supplies and Accessories

A full range of computer supplies may be ordered through a Hewlett-Packard authorized dealer or sales office, or by contacting HP Direct.

■ Call 1-800-752-0900 for the location of the nearest authorized Hewlett-Packard dealer.

■ To phone HP Direct, call 1-800-538-8787 or write to HP Direct at the following address:

HP Direct
Hewlett-Packard
Attn: Mail Order
P.O. Box 1145
Roseville, CA 95678

■ Visit the Customer Care website at www.hp.com/support.

Regulatory Compliance Notices

C

Regulatory Compliance

Regulatory compliance includes the following topics:

- Federal Communications Commission Notice, page 89
- Regulatory Compliance Identification Numbers, page 91
- Regulatory Compliance Label Location, page 91
- Power Cords, page 92

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 (for example, 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 the classification (A or B) of the equipment. Class B devices have an FCC logo or FCC ID on the label. The HP StorageWorks 1/8 Tape Autoloader is a Class B device (see Class B Equipment).

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 this FCC declaration, contact us by mail:

Hewlett-Packard Company
825 14th Street SW
Building E, MS E200
Loveland, CO 80537-6391

To identify this product, refer to the part, series, or model 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.

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique HP series number. The series number 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 series number. The series number should not be confused with the marketing name or model number of the product.

Regulatory Compliance Label Location

The Regulatory Compliance label for the HP StorageWorks 1/8 Tape Autoloader is located on the bottom of the autoloader. To view this information, carefully turn the autoloader until the regulatory compliance label is visible.

Power Cords

⚠ **WARNING:** This product can ONLY be used with an HP approved power cord for your specific geographic region. Use of a non-HP 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. HP disclaims all liability in the event a non-HP approved power cord is used.

The power cord included with the HP StorageWorks 1/8 Tape Autoloader meets the requirements for use in the country where this product was purchased. If this tape library is to be used in another country, purchase an HP-approved 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 mm^2 or 18 AWG. If you have questions about the type of power cord to use, contact an HP 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.

International Notices

International notices include the following:

Canadian Notice (Avis Canadien)

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 with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (the equivalent international standards are in parenthesis):

- EN55022 (CISPR 22) - Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) - Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) - Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) - Power Line Flicker
- EN60950 (IEC950) - Product Safety

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。

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。

Electrostatic Discharge

D

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 covered in this appendix include:

■ Preventing Electrostatic Damage, page 96
■ Grounding Methods, page 97

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 HP authorized reseller install the part.

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

Index