

# hp StorageWorks vs80 1/8 autoloader

user's guide



**Part Number: C9265-90001**

**Edition 2**

**September 2002**

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## Typographical Conventions and Terms

*Italics*                      Menu choices and screens on the autoloader.

**[Bold]:**                      Front panel keys to press on the autoloader.

This table format indicates the menus you need to enter on the autoloader front panel:

<b>Main Menu -&gt; Command -&gt; Import</b>
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**Note**                      Notes explain significant concepts or operating instructions.

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**Caution**                  Cautions call attention to an operating procedure or practice that could damage the product if not correctly performed. Do not proceed until you understand and meet these required conditions.

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**WARNING**                Warnings call attention to a procedure or practice that could result in personal injury if not correctly performed. Do not proceed until you fully understand and meet the required conditions.

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## In This Manual

- Chapter 1**                  **Installing the Autoloader:**  
Describes autoloader features, autoloader accessories, and installation tasks.
- Chapter 2**                  **Operating the Autoloader:**  
Describes the front panel menu structure, menu tree, and drive and tape operations.
- Chapter 3**                  **Autoloader Administration:**  
Describes how to configure the autoloader, upgrade firmware, and retrieve autoloader information.
- Chapter 4**                  **Troubleshooting:**  
Describes how to identify and troubleshoot autoloader problems and resolve error conditions.
- Appendix A**                **Technical specifications:**  
Describes the environmental, autoloader, drive, and media specifications.
- Appendix B**                **Customer support:**  
Includes support information for the autoloader.

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## Revision History

- Edition 1**                  **December 2001: C9265-90000**  
Initial release
- Edition 2**                  **September 2002: C9265-90001**  
Revised for rebranding updates.

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## Updates

For the most current version of this manual, and other information regarding your tape autoloader, visit the HP Customer Care web site:

<http://www.hp.com/support/storage>

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# Installing the Autoloader

# 1

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## Chapter Overview

This chapter describes the following:

- **Installation Overview** on page 8
- **Understanding Autoloader Features** on page 9
- **Choosing a Location** on page 12
- **Unpacking the Autoloader** on page 13
- **Identifying Product Components** on page 14
- **Installing the Autoloader into a Rack** on page 16
- **Connecting the SCSI and Power Cables** on page 19
- **Preparing the Host and Verifying the Connection** on page 21

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## Installation Overview

Installing the autoloader consists of the following steps, which are explained in more detail later in this chapter:

1. Choose a location for the autoloader ([page 12](#)).
2. Unpack and check the autoloader for shipping damage ([page 13](#)).
3. Identify the accessories that come with the autoloader ([page 14](#)).
4. Install the autoloader in a computer rack or select a table or desktop near the host server ([page 16](#)).
5. Shut down, turn off, and remove power from the server and all devices attached to the server ([page 19](#)).
6. Attach the SCSI cable to the autoloader and server's SCSI host adapter ([page 19](#)).
7. Attach the power cable to the autoloader and plug in the power cable to the nearest power outlet ([page 19](#)). Power the autoloader on to ensure it passes the power-on self test.
8. Set the SCSI ID for the autoloader (if necessary, [page 41](#)).
9. Set up the host and verify the connection ([page 21](#)).



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## Understanding Autoloader Features

The autoloader is a SCSI-2 Low-Voltage Differential (LVD) data storage device that incorporates a Benchmark Storage Innovations DLT vs80 tape drive and eight tape slots. The autoloader operates as a single SCSI device with two Logical Unit Numbers (LUNs), one for the tape drive (0) and the other for the autoloader robotics (1). The autoloader uses up to eight DLTtape IV data cartridges, providing a maximum formatted capacity of 640 Gigabytes and a sustained data transfer rate as high as 360 MB per minute, assuming a 2:1 compression ratio.

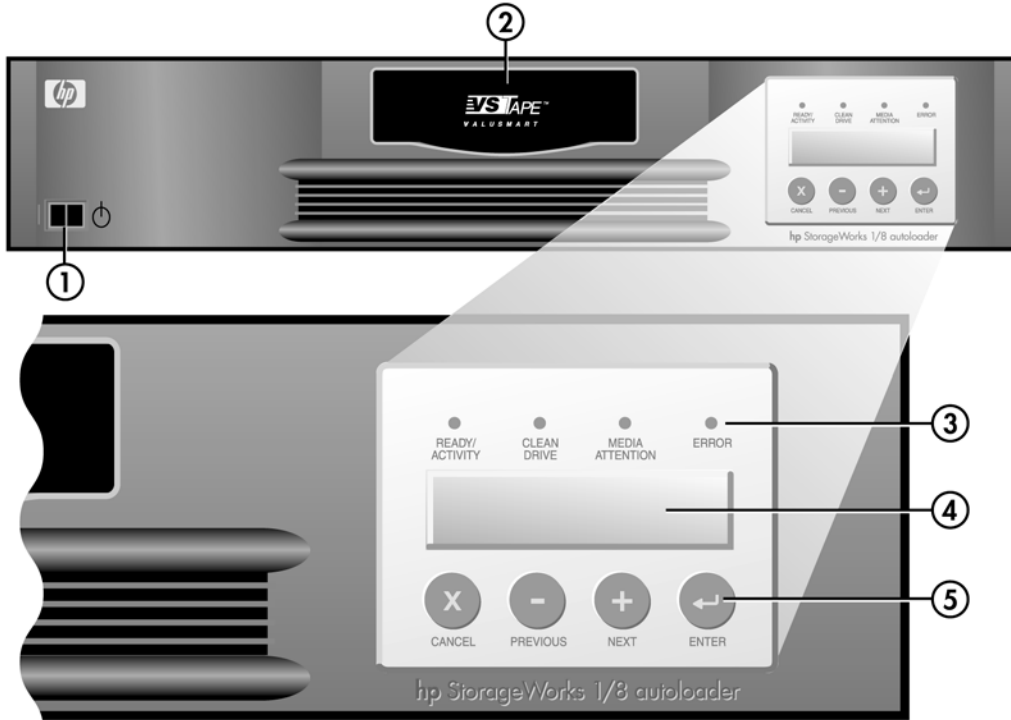
The autoloader is compatible with most operating systems and environments that support the SCSI interface, but requires either direct support from the operating system or a compatible backup application to take full advantage of its many features.

### SCSI Requirements

The autoloader incorporates a wide SCSI-2, 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. The autoloader is NOT compatible with a standard differential (Diff) SCSI bus, also known as High-Voltage Differential (HVD) SCSI. The autoloader is compatible with a narrow (50-pin) SCSI bus using a customer-supplied 68-pin to 50-pin adapter that terminates the unused 18 pins. These adapters are sometimes labeled high-byte termination.

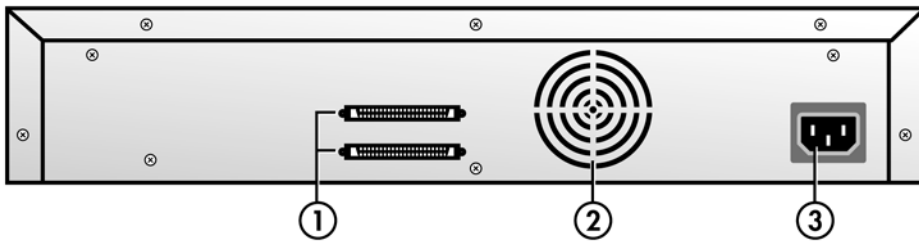
# Product Overview

**Figure 1** Front Panel Controls



1	Power switch (recessed)
2	Mailslot
3	Front panel LEDs
4	Front panel LCD screen
5	Control keys

**Figure 2** Rear Panel Overview



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

---

## Choosing a Location

Choose a location that meets the following criteria (see **Technical Specifications** on page 71 for more information on specifications):

**Table 1** Location Criteria

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. <b>CAUTION:</b> <i>Do not place the autoloader on its side or upside down or stack items that weigh more than 15 KG on top of the autoloader.</i>
Rack requirements	Standard 19-inch rack with 2U of clearance.
Room temperature	10-35° C (50-95° F)
Humidity	20-80% RH (non condensing)
Power source	<ul style="list-style-type: none"><li>■ AC power voltage: 100-127 VAC; 200-240 VAC</li><li>■ Line frequency: 50-60 Hz</li></ul> <b>NOTE:</b> <i>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.</i>
Weight	10 kg (22 lbs)
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. <b>CAUTION:</b> <i>Excessive dust and debris can damage tapes and tape drives.</i>
Clearance	Back                      Minimum of 15 cm (6 inches) Front                     Minimum of 31 cm (12 inches) Sides                     Minimum of 5 cm (2 inches)

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## Unpacking the Autoloader

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

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

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

1. Clear a table or desk so that you have room to unpack the autoloader.
2. Inspect the shipping box for damage. If you notice any damage, report it to the shipping company immediately.
3. Open the shipping box and remove the accessories package. Set the accessories package aside for now.
4. Lift the autoloader and padding out of the box and place it on the work surface, top facing up.

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

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5. Carefully remove the shipping padding from the left and right sides of the autoloader. Then remove the bag from the autoloader.

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**Note** Save the packing materials in case you need to move or ship the autoloader in the future.

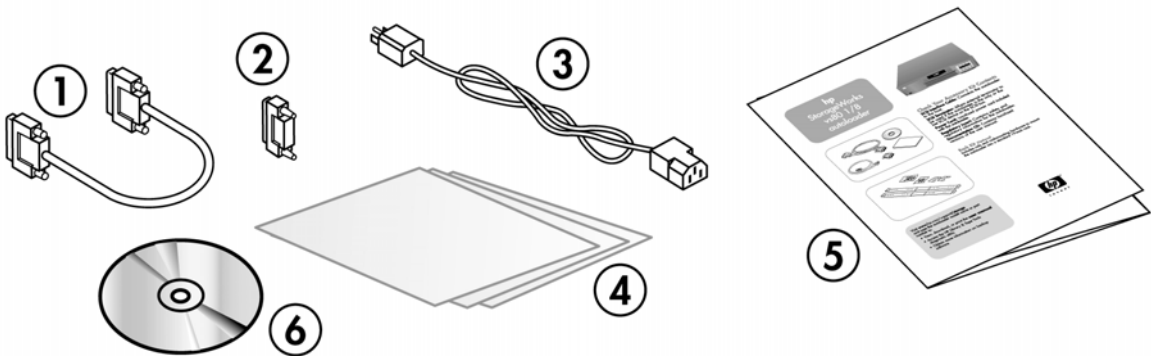
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# Identifying Product Components

## Accessories

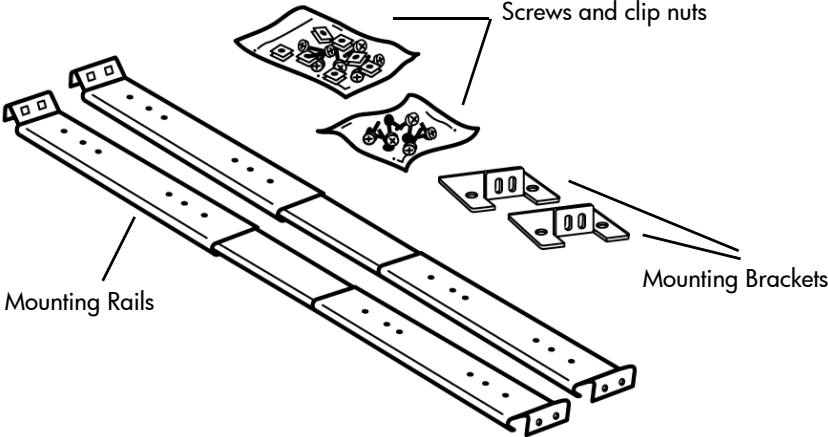
**Figure 3** Accessories



1	SCSI Cable
2	SCSI Terminator
3	Power Cable
4	ISV and Regulatory Information
5	Getting Started Poster
6	CD containing localized versions of this manual

# Rack Kit Components (if rackmount unit)

**Figure 4** Rack Kit Components



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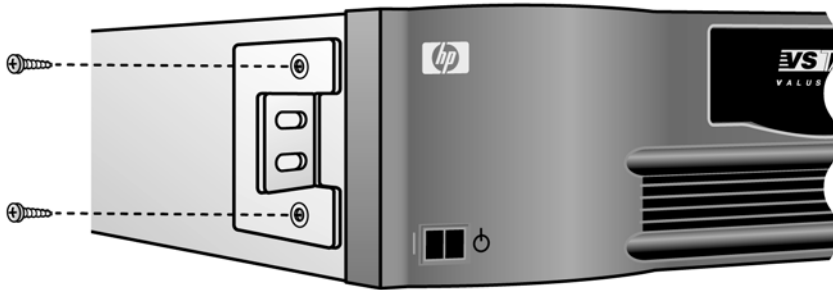
## Installing the Autoloader into a Rack

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

To install the autoloader, follow these steps:

1. Use a medium-sized standard screwdriver to remove the two screws near the front on each side of the autoloader cover.
2. Using the screws you removed in step 1, secure one mounting bracket (from the rackmount kit) to each side of the autoloader as shown below.

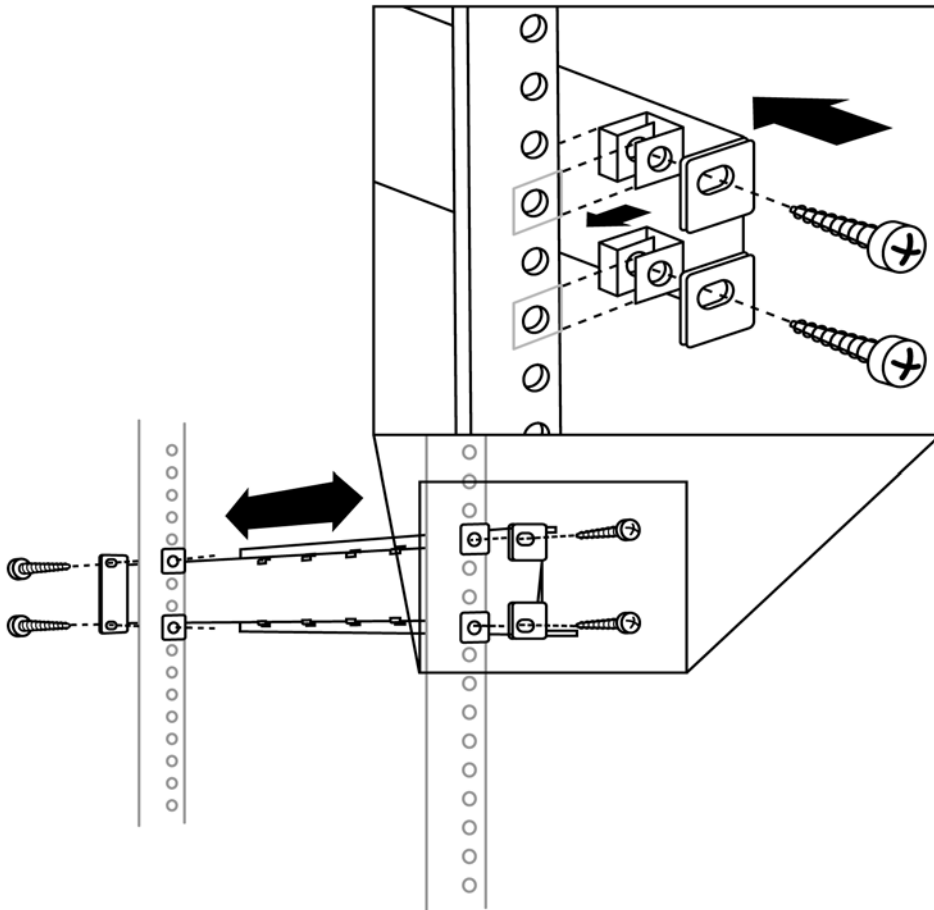
**Figure 5** Installing Mounting Brackets (left side shown)





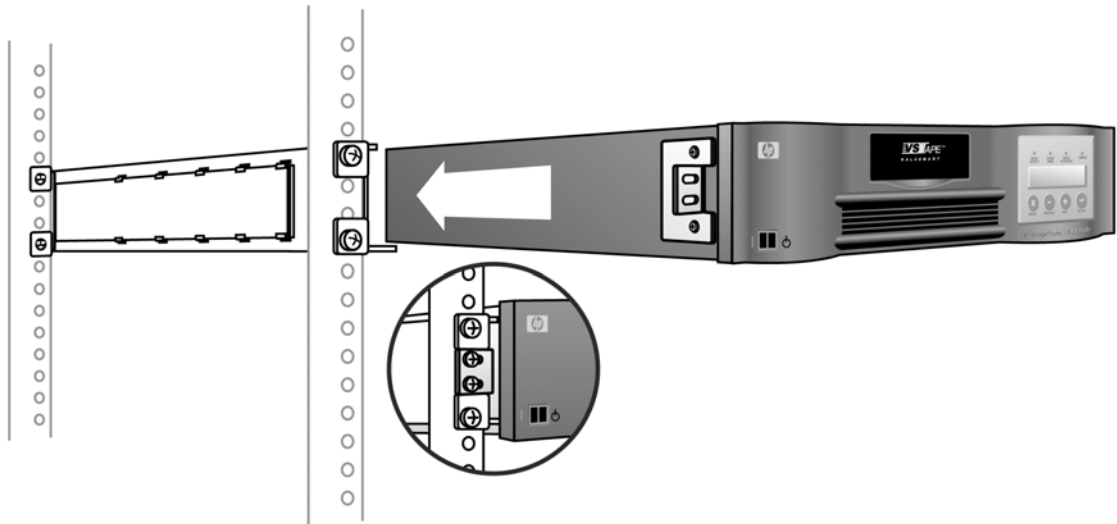
3. Using the screws and clip nuts from the rackmount hardware package, secure one rail to each side of the rack in the location in which you plan to install the autoloader.
  - Be sure to secure both the front and rear of each rail to the rack. The rails extend to fit a variety of rack depths.
  - The correct orientation of the left rail is shown below. Repeat for the right rail.

**Figure 6** Installing Rails on Rack (left side shown)



- Slide the autoloader onto the rails and secure the mounting bracket to the rack using the screws and clip nuts from the rackmount hardware package.

**Figure 7** Sliding the Autoloader into the Rack Slot, Securing Mounting Bracket



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## Connecting the SCSI and Power Cables

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

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

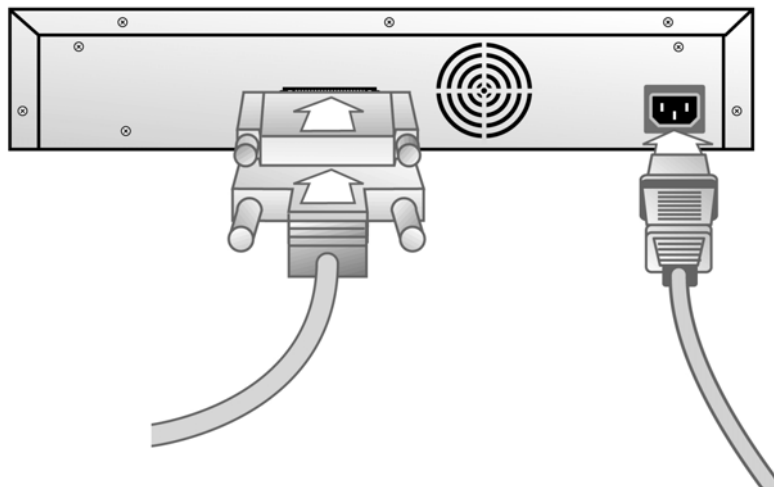
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**Caution** Failure to remove the power cables from these devices could result in damage to the autoloader.

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2. Attach one end of the SCSI cable (included in the accessory kit) to one of the connectors on the rear panel of the autoloader.
3. Attach the other end of the SCSI cable to the connector on the SCSI host adapter or to the connector on the previous device on the SCSI bus.

**Figure 8** Attaching SCSI and Power Cables



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

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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, and ensure that the last device on the SCSI bus is properly terminated.
5. Attach the female connector on the power cable to the power connector on the rear panel of the autoloader.
6. Plug in the power cable to the nearest properly grounded power outlet.

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**WARNING** To disconnect all power from the autoloader, remove the power cord from the outlet.

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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. Turn on any other devices you turned off earlier. 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 just the Ready/Activity LED flashing. When the initialization sequence is complete, the LCD screen displays the Home screen.

9. Turn on the server.

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## 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:

- 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:  
<http://www.hp.com/go/automated>  
Most backup software packages require an additional module to communicate with the autoloader robotics.
  - Drivers may be needed for the autoloader to operate properly with your operating system. To see if drivers are needed for your operating system, visit HP Customer Care at:  
<http://www.hp.com/go/support>  
Select your product, and then click on **[download drivers and software]**.
- If the host server is connected to a network, check with the system administrator before turning off power.
- Use proper procedures to prevent electrostatic discharge (ESD). Use wrist-grounding straps and anti-static mats when handling internal components.
- Make sure that the host server has an open expansion slot.
- Make sure that both your operating system and server supports the SCSI host adapter.
- Depending on the server configuration, you may need to change the SCSI ID of the autoloader. See **Changing the SCSI ID** on page 41 for more information.
- 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 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 <http://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.
  - Making sure that the host server's operating system recognizes the autoloader by going to **Settings -> Control Panel -> SCSI Adapter** in Windows NT or **Settings -> Control Panel -> System -> Hardware -> Device Manager -> Tape Drive and/or Media Changer** in Windows 2000. For more information on verifying the connection of SCSI devices, consult the operating system documentation.

# Operating the Autoloader

## 2

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## Chapter Overview

This chapter describes the following:

- **Operator's Panel Overview** on page 24
- **Understanding the Menu Structure** on page 28
- **Using Cartridges** on page 29
- **Cleaning the Tape Drive** on page 36
- **Creating an Inventory of Cartridges** on page 38

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## 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 to 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* (Figure 9 on page 24).

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 (DLTape III cartridge or non-DLT1 cleaning cartridge) or has had a media-related error. These can be caused by faulty or improperly degaussed media, media that has been previously written in an invalid format such as DLT 7000 or DLT 8000, or dirty read/write heads in the tape drive. The Media Attention LED is also illuminated in this case. See **LED Indicators** on page 26 for more information.



Exporting the indicated cartridge will clear the error condition. See **Exporting Cartridges** on page 31. If these symptoms occur on multiple known good cartridges, consider cleaning the tape drive. See **Cleaning the Tape Drive** on page 36. If a particular cartridge causes these symptoms repeatedly, that cartridge may be defective or invalid.

Occasionally you may see the message *In Transit*, which indicates:

- An error condition has caused a cartridge to be left between its slot and the drive. (Power cycle or reset the autoloader to clear this condition.)
- A cartridge is unexpectedly found in the mail slot opening. (Power cycle or reset the autoloader to clear this condition. For information on resetting the autoloader, see **Resetting the Autoloader** on page 40.)

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 below.

**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 2** LEDs

LED	Color	Description
<b>Ready/Activity</b>	Green	Illuminated when power is on. Blinking whenever there is tape drive or autoloader robotics activity.
<b>Clean Drive</b>	Amber	Illuminated when the tape drive needs to be cleaned. Indicates that 250 tape motion hours have passed since the last cleaning. The LED turns off when cleaning is successfully completed. See <b>Cleaning the Tape Drive</b> on page 36.
<b>Media Attention</b>	Amber	<p>Illuminated if a media-related error has occurred. The offending cartridge will also show a "!" in the cartridge inventory display for the corresponding slot.</p> <p>This condition can be the result of:</p> <ul style="list-style-type: none"> <li>■ faulty or improperly degaussed media</li> <li>■ media that has been previously written in an invalid format such as DLT 7000 or DLT 8000</li> <li>■ dirty read/write heads in the tape drive</li> <li>■ an invalid cartridge (DLTape III or non-DLT1) being inserted</li> </ul> <p>If these symptoms occur on multiple known good cartridges, consider cleaning the tape drive. See <b>Cleaning the Tape Drive</b> on page 36. If a particular cartridge causes these symptoms repeatedly, that cartridge may be defective or invalid, and should be discarded.</p>
<b>Error</b>	Red	Illuminated if an unrecoverable tape drive or autoloader error occurs. A corresponding error message appears on the LCD screen. For more information, see <b>Diagnostics and Troubleshooting</b> on page 51.

## Operator's Panel Control Buttons

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

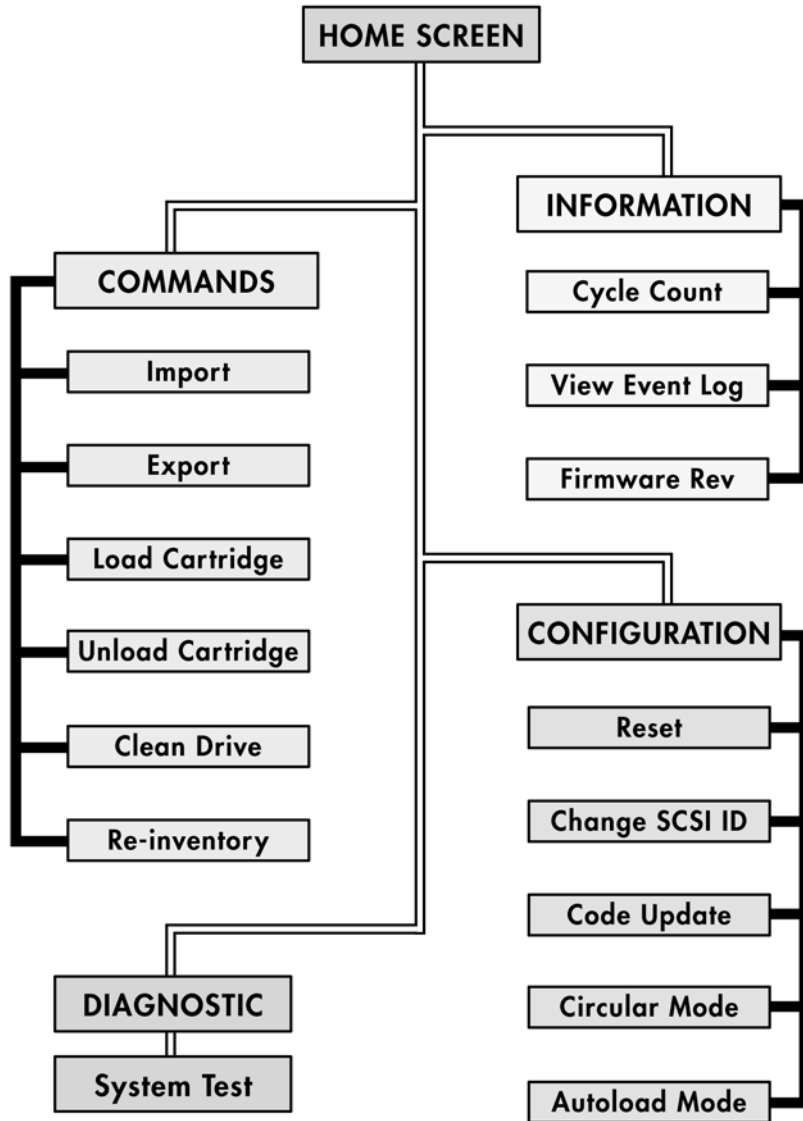
**Table 3** Control Buttons

Button	Description
[Cancel] X	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



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## Using Cartridges

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

- **Use only DLTape IV cartridges.** The tape drive in the autoloader can read, but not write DLTape IV cartridges that are written in the DLT 4000 format. You can order tape cartridges at <http://www.hp.com/go/storagemedia>. Make sure all cartridges that you want to use for writing have either never been written to, have been thoroughly degaussed, or have been written to by the vs80 tape drive in the autoloader or another vs80 or DLT1 tape drive. The tape drive rejects all other formats. If you want to reuse cartridges that have been formatted with another manufacturer's drive, use a magnetic bulk eraser to prepare the cartridges for use with the autoloader. Many common degaussers are not adequate for DLT media. Contact your support representative for proper degaussing recommendations.
- **Clean the tape drive when the Clean Drive LED is illuminated** or if there is any other indication that the drive is having trouble reading or writing, such as if the Media Attention LED is illuminated or if there is an exclamation point (!) in the inventory display. Be sure to use only DLT 1 compatible cleaning cartridges. The tape drive rejects all other types of cleaning cartridges.

---

**Note** The autoloader automatically unloads any other cartridge types and any cartridges whose format it cannot read. If you experience any failures with reused Quantum DLT formatted (degaussed) cartridges, the degaussing may not have been sufficient to fully erase the data. If this happens, use another cartridge (preferably a new, unformatted DLTape IV cartridge) before suspecting other system components.

---

## Importing Cartridges

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**Caution** Performing an import or export of media during a data backup may result in adverse results, which 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 Cartridges** on page 34).
2. From the Home Screen or main menu, press the **[+]** or **[-]** button until *Commands* appears on the top line of the LCD screen.
3. Press the **[Enter]** button to access the available options.
4. Press the **[+]** or **[-]** button until **Import** appears on the LCD screen. Press **[Enter]** to select.
5. Press the **[+]** or **[-]** button until the desired slot number appears on the LCD screen and press the **[Enter]** button. You are not given the option to import a cartridge to an occupied slot.
6. When *Insert Cartridge Slot* appears on the LCD screen and the mailslot opens, insert the desired data cartridge into the mailslot so that the write-protect switch is facing out from the autoloader.

---

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

---

7. Repeat steps 5 and 6 as needed for any additional cartridges.
8. Press the **[Cancel]** button to return to the Home screen when you are done importing cartridges.
9. Verify that the Home screen shows that the desired slots have cartridges installed.

**Figure 12** Importing a Cartridge



## Exporting Cartridges

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**Caution** Performing an import or export of media during a data backup may result in adverse results, which 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, follow these steps:

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

**Figure 13** Exporting a Cartridge



## Loading Cartridges

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

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

---

**Note** Only slot numbers that contain cartridges are displayed.

---

5. Status messages will be displayed while the cartridge is loading. *Drive Stopped* will be displayed when the operation is complete.
6. Press the **[Cancel]** button to return to the Home screen when you are done loading cartridges.



## Unloading Cartridges

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

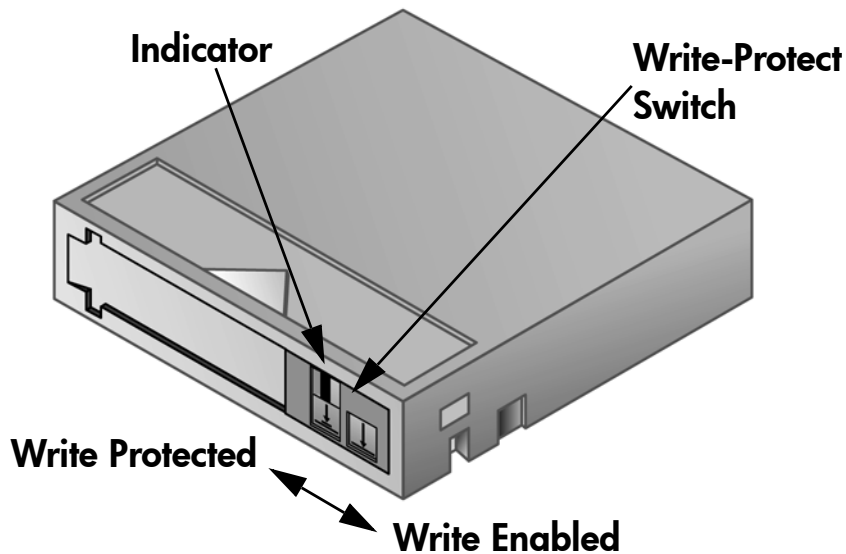
1. From the Home Screen or main menu, press the **[+]** or **[-]** button until *Commands* appears on the top line of the LCD screen. Press **[Enter]** to select.
2. Press the **[+]** or **[-]** button until *Unload Cartridge* appears on the LCD screen. Press the **[Enter]** button to unload the cartridge 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.
4. Press the **[Cancel]** button to return to the Home screen when you are done loading/unloading cartridges.

## Write-Protecting Cartridges

All cartridges have a write-protect switch to prevent accidental erasure 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:

- Slide the switch to the **left** to write-protect the cartridge. A small orange rectangle is visible, indicating that the cartridge is write-protected.
- Slide the switch to the **right** to allow the autoloader to write data to the cartridge.

**Figure 14** Write-Protecting a Cartridge



## Maintaining Cartridges

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

- Do not drop or strike a cartridge. Excessive shock can displace the tape leader, making the cartridge unusable and possibly damaging the autoloader.
- Store your DLTape IV cartridges in their storage cases.
- Do not expose your DLTape IV cartridges to direct sunlight or sources of heat, including portable heaters and heating ducts.
- The operating temperature range for your DLTape IV cartridges is 50° F to 104° F (10° C to 40° C). The storage temperature range is 60° F to 90° F (16° C to 32° C). Always store your DLTape IV cartridges in their storage cases.
- If a DLTape IV 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.
- Store your DLTape IV cartridges in a dust-free environment in which relative humidity is always between 20% and 80% (noncondensing). The ideal storage relative humidity is 40%,  $\pm$  20%.
- Do not place DLTape IV cartridges near sources of electromagnetic energy or strong magnetic fields, such as computer monitors, electric motors, speakers, or X-ray equipment. Exposure to electromagnetic energy or magnetic fields can destroy data on cartridges.
- Place identification labels only in the slide-in slot on the front of the cartridge.

---

## Cleaning the Tape Drive

When the Clean Drive LED is on, the autoloader's tape drive needs to be cleaned. An illuminated Media Attention LED or an exclamation point (!) in the inventory display may also indicate that the tape drive needs to be cleaned. Cleaning typically takes several minutes, during which the Ready LED blinks.

Each cleaning cartridge has an approximate life of 20 cleanings. The cleaning cartridge includes a label with 20 small boxes printed on it. Always place a check mark in a box each time you use the cartridge to clean the drive. Replace the cleaning cartridge when all boxes are checked.

The drive cannot keep track of how many times a cartridge has been used. Therefore, if you are using backup software to manage cleaning, then you must monitor the software logs to determine when you need to replace the cleaning tape. Refer to the backup software documentation for more information.

---

**Caution** Use only DLT 1 cleaning cartridges in the autoloader, available at <http://www.hp.com/go/storagemedia>. Use of any other type of cleaning cartridge can damage the read/write head in the tape drive. If you load any other type of cleaning cartridge or method, the autoloader will unload it within approximately 25 seconds.

---

---

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

---

To clean the tape drive, follow these steps:

1. From the Home Screen or main menu, press the **[+]** or **[-]** button until *Commands* appears on the top line of the LCD screen. Press **[Enter]**.
2. Press the **[+]** or **[-]** button until *Clean Drive* appears on the LCD screen. Press **[Enter]**.
3. If the carousel is full, the LCD screen displays *No slot free for transfer*. Press the **[Cancel]** button repeatedly until the main menu or Home Screen is displayed. Export a cartridge to make room for the cleaning cartridge. See **Exporting Cartridges** on page 31 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.
5. Insert the cleaning cartridge into the autoloader mailslot.

During the cleaning process, which can take several minutes, the LCD screen displays *Drive Cleaning*.

---

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

---

6. When tape drive cleaning is complete, the Clean Drive LED turns off and the autoloader unloads and exports the cleaning cartridge. Remove the cleaning cartridge, and press the **[Enter]** button when the LCD screen prompts you to do so.

---

**Note** If the Clean Drive or Media Attention LED illuminates again when you insert another cartridge immediately after cleaning, see **Table 4** on page 55 to troubleshoot.

---

7. If you had to remove a data cartridge to import the cleaning cartridge, import the tape to its original slot. See **Importing Cartridges** on page 30 for more information.

---

## Creating an Inventory of Cartridges

This option will build a new inventory of cartridges in the autoloader. To use this option, follow these steps:

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

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

# Autoloader Administration

# 3

---

## Chapter Overview

This chapter describes the following:

- **Configuring the Autoloader** on page 40
- **Updating Firmware** on page 45
- **Running the Autoloader System Test** on page 48
- **Retrieving Information About the Autoloader** on page 49

---

## Configuring the Autoloader

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

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

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

## Resetting the 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, follow these steps:

1. From the Home Screen or main menu, press the **[+]** or **[-]** button until *Configuration* appears on the top line of the LCD screen.
2. Press **[Enter]** to select.
3. Press the **[+]** or **[-]** button until *Reset* appears on the LCD screen.
4. Press the **[Enter]** button 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 ID the autoloader uses. The autoloader operates as a single SCSI device with two Logical Unit Numbers (LUNs): one LUN (0) is for the tape drive, and the other (1) is for the autoloader robotics.

The default SCSI ID is 5. You should only need to change the SCSI ID if there is another device on the SCSI bus with the same SCSI ID.

To access this option, follow these steps:

1. From the Home Screen or main menu, press the **[+]** or **[-]** button until *Configuration* appears on the top line of the LCD screen.
2. Press the **[Enter]** button to select.
3. Press the **[+]** or **[-]** button until *Change SCSI ID* appears on the LCD screen. The second line displays the current SCSI ID.
4. Press the **[Enter]** button. The second line on the LCD screen displays *New ID:*.
5. Press the **[+]** or **[-]** button until the desired SCSI ID is displayed.
6. Press the **[Enter]** button. The LCD screen displays *Please Cycle Power*.

---

**Note** The autoloader will not respond to input from the operator panel until the power has been cycled.

---

7. Turn off the autoloader. After a few seconds, turn it back on again.  
The selected SCSI ID is now in effect.

---

**Note** If you changed the SCSI ID, you may also need to cycle power on the host server and reconfigure your backup software before you can use the autoloader. Consult your hardware and software documentation for more information.

---

## Setting the Autoloader Operating Mode

The autoloader operating mode is determined by whether or not you are using backup software that can control the autoloader robotics. If you are using such software, then the autoloader operates in Random mode. If you are not, then the autoloader operates in Sequential mode.

### Random Mode

If you are using software that can control the autoloader's robotics, the autoloader will detect this and switch to Random mode. In Random mode, the autoloader will not automatically load tapes into the drive; instead it will wait for commands from the software.

---

**Note** Your backup software must support the autoloader's robotics, which may require the additional installation of an autoloader software module. For more information, refer to your backup software documentation.

---

### Sequential Mode

The autoloader initially assumes that you *are not* using a backup software package to control cartridge or drive activity, and consequently operates in Sequential mode. With sequential mode, 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, and then loads the next available higher numbered slot.

Operating in Sequential mode also allows you to determine the behavior for how tapes are loaded into the autoloader's tape drive. This is done from the autoloader front panel by setting:

- Circular Mode options (see **Circular Mode** on page 43)
- Autoload Mode options (see **Autoload Mode** on page 44)

## Circular Mode

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**Note** Circular mode is only applicable when the autoloader is in Sequential mode.

---

This option turns Circular mode on or off. When Circular mode is on, the autoloader automatically reloads the first cartridge in the sequence into the tape drive after unloading the last cartridge in the sequence. If Circular mode is turned off and the last cartridge has been unloaded, the autoloader stops loading cartridges until you manually load another cartridge.

---

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

---

To access this option, follow these steps:

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

## Autoload Mode

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**Note** Autoload mode is only applicable if the autoloader is in Sequential mode.

---

This option turns Autoload mode on or off. When the autoloader is powered on and Autoload mode is on, the autoloader automatically loads the cartridge from the lowest numbered full slot into the tape drive. When Autoload mode is off, no cartridges are automatically loaded at power on.

To access this option, follow these steps:

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

---

## Updating Firmware

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**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, you can download it from <http://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]** from the **File** menu.
3. Click on the desired firmware revisions, and then click the **[Download]** button. The firmware file is copied into the HP Library & Tape Tools firmware folder.
4. When the download is completed, close the **Get Firmware from Web** window.
5. Select the autoloader in the **[By Product]** device list tab, and then select the **[Firmware]** button. 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

---

**Note** The preferred method to update firmware is by using HP Library & Tape Tools (see [Using HP Library & Tape Tools](#) on page 45). A firmware upgrade tape can only be obtained by an HP service representative.

---

This option performs a firmware code update on the autoloader using a firmware upgrade tape.

---

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

---

To use this option, follow these steps:

1. From the Home Screen or main menu, press the **[+]** or **[-]** button until *Configuration* appears on the top line of the LCD screen.
2. Press the **[Enter]** button to select.
3. Press the **[+]** or **[-]** button until *Code Update* appears on the LCD screen. Press the **[Enter]** button to select.
4. If the carousel is full, the LCD screen displays *No slot free for transfer*. Press the **[Cancel]** button repeatedly until the main menu or Home Screen is displayed. Export a cartridge to make room for the firmware update cartridge. See [Exporting Cartridges](#) on page 31 for instructions. Then return to step 1 to update the firmware.
5. If the carousel is not full, the autoloader will select the first available slot and prompt you to insert the code update cartridge.
6. Insert the code update cartridge into the mailslot.

---

**Note** If the cartridge is not a valid code update cartridge, the LCD will temporarily display error code “BC,” the autoloader will reset, the cartridge will be exported, and the LCD will display *Bad upgrade tape*.

---

7. During the firmware update, which can take several minutes, the LCD screen displays *CODE UPDATE IN PROGRESS*. When firmware update is complete, the autoloader resets, then unloads and exports the code update cartridge. When the LCD screen prompts you, remove the code update cartridge and press the **[Enter]** button to close the door.
8. 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 Cartridges** on page 30 for instructions.

---

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

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## Running the Autoloader System Test

---

**Caution** Running the system test for extended periods of time will reduce the life of your autoloader. To maximize product life, use only when necessary.

---

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 operational soundness of the autoloader and tape drive. The System Test continues indefinitely until you press the **[Cancel]** button. 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 the **[+]** or **[-]** button until *Diagnostic* appears on the top line of the LCD screen.
2. Press the **[Enter]** button to select. *System Test* will now be displayed.
3. Press the **[Enter]** button to begin the test.

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

4. Press the **[Cancel]** button to end the test.



---

## Retrieving Information About the Autoloader

The Information menu provides access to information about the autoloader, including the cycle count, error 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, follow these steps:

1. From the Home Screen or main menu, press the **[+]** or **[-]** button until *Information* appears on the top line of the LCD screen.
2. Press the **[Enter]** button to access the available options.
3. Press the **[+]** or **[-]** button until *Cycle Count* appears on the LCD screen. The LCD screen displays the total cycle count.
4. Press the **[Cancel]** button when done.

### View Event Log

This option provides access to the most recent autoloader errors and events (see **Table 5** on page 66 for a description of error codes).

To use this option, follow these steps:

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

---

**Note** Errors will show as "X X YY". "YY" represents the specific error code, and "X X" represents non pertinent address codes. Additionally, errors range from 0 to -63, where 0 is the newest error and -63 is the oldest.

---

## Firmware Revision

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

---

**Note** The tape drive and autoloader firmware is a single image, but displays as three firmware numbers on the front panel. (An example is 5000 8000 0102.)

---

To use this option, follow these steps:

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

---

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

---

# Diagnostics and Troubleshooting

## 4

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### Chapter Overview

This chapter describes the following:

- **Using HP Library & Tape Tools to Diagnose Problems** on page 52
- **Troubleshooting Installation Problems** on page 53
- **Troubleshooting Common Problems** on page 55
- **Autoloader Error Codes** on page 66

---

## Using HP Library & Tape Tools to Diagnose Problems

With HP Library & Tape Tools installed on the host server, you can do the following:

- 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 <http://www.hp.com/support/TapeTools>.

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## Troubleshooting Installation Problems

Problems encountered during the installation of the autoloader are usually caused by improper SCSI bus configuration, application software configuration errors, or by 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:

The autoloader uses one SCSI ID and two Logical Unit Numbers (LUNs): one LUN for the tape drive (0) and one for the autoloader robotics (1). 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 before you can use the autoloader. Select an unused SCSI ID. See the manuals for the other devices on the SCSI bus or your operating system to determine which SCSI IDs are currently in use. If the autoloader is attached to a narrow (50-pin) SCSI bus, only SCSI IDs 0 through 7 are available. See **Changing the SCSI ID** on page 41 for instructions.

### ■ SCSI Cabling:

Verify that all SCSI cables are securely connected at both ends. Check the length and integrity of your SCSI cabling. The total length of all cables connected to a SCSI bus must not exceed 6 meters (19 feet) for a SCSI-1 SE bus, 3 meters (10 feet) for a Fast SCSI (Narrow or Wide) or an Ultra SCSI (Narrow or Wide) SE bus, 12 meters (40 feet) for an LVD bus with multiple devices, or 25 meters (82 feet) for an LVD bus with a single device. The length of the internal SCSI cabling inside the autoloader is 30 cm (1 ft). This length must be included in any calculations of cable length. Try replacing suspect cables with known good cables.

### ■ 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 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. A green LED on the terminator indicates that the unit is attached to a SCSI bus running in LVD mode. A red LED on the terminator indicates that the unit is attached to a SCSI bus running in SE mode. If the LED is not on, check all SCSI and power connections and confirm that the unit is attached to a valid SCSI bus.

■ **Compatibility:**

Ensure that the 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 <http://www.hp.com/go/support>.

■ **SCSI Host Adapter Installation:**

Verify that you have installed your SCSI host adapter correctly. Refer to the manual that came with your SCSI host adapter for installation and troubleshooting instructions. Pay particular attention to any steps describing the settings of various jumpers and/or switches on the host adapter. 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. Many backup software packages require an additional module to communicate with the autoloader robotics.

■ **Device Driver Installation:**

If applicable, make sure that the proper ISV and/or autoloader driver is installed. For more information, see **Preparing the Host and Verifying the Connection** on page 21.

---

## Troubleshooting Common Problems

This section includes information on troubleshooting common autoloader problems. If these procedures fail, contact your service representative for further assistance.

**Table 4** Troubleshooting Table

Problem	Solution
<b>Power</b>	
Autoloader does not power on.	<ul style="list-style-type: none"><li>■ Check all power cord connections.</li><li>■ Make sure the power switch on the front panel is in the ON position.</li><li>■ Make sure there is power to the outlet. Try another working outlet.</li><li>■ Try a known good power cord.</li><li>■ Contact your service representative.</li></ul>
No display messages appear.	<ul style="list-style-type: none"><li>■ Make sure the power cord is connected.</li><li>■ Make sure the power switch is on.</li><li>■ Power cycle the autoloader.</li><li>■ Download autoloader firmware.</li><li>■ Contact your service representative.</li></ul>
<b>Tape movement</b>	
Tape stuck in storage slot.	<ul style="list-style-type: none"><li>■ See <b>Removing Stuck Cartridges</b> on page 62.</li></ul>

**Table 4** Troubleshooting Table

<b>Problem</b>	<b>Solution</b>
Tape stuck in drive.	<ul style="list-style-type: none"><li>■ Power cycle the autoloader, allow it to complete initialization (may take as long as 10 minutes), and then retry unloading the tape using the autoloader Operator's Panel controls.</li><li>■ 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 and power-cycling the autoloader eliminates the host and its software as a problem source.</li><li>■ If these procedures do not resolve the issue, contact your service representative.</li></ul>
<b>Media</b>	
Failures with reused Quantum DLT formatted (degaussed) cartridges.	<ul style="list-style-type: none"><li>■ The degaussing may not have been sufficient to fully erase the data. If this happens, use another cartridge, preferably a new, unformatted DLT Type IV cartridge, before suspecting other system components.</li></ul>
Cleaning or data cartridge incompatible with drive.	<ul style="list-style-type: none"><li>■ Make sure you are using cleaning and data cartridges that are compatible with the drive. The autoloader automatically unloads incompatible cartridges to their original slots, the Media Attention LED flashes, and an exclamation point (!) appears in the inventory display for the indicated slot number.</li></ul>



**Table 4** Troubleshooting Table

Problem	Solution
Cannot write to or read from tape.	<ul style="list-style-type: none"><li>■ Make sure that the cartridge is write enabled (move the write-protect switch to the enabled position).</li><li>■ Make sure that the cartridge is a DLTapeIV that has not been written using an incompatible format. The drive can read, but not write a DLT 4000 formatted tape.</li><li>■ Make sure that the cartridge has not been exposed to harsh environmental or electrical conditions and is not physically damaged in any way.</li><li>■ 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.</li><li>■ 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.</li><li>■ Retry the operation with a different, known good tape.</li><li>■ Clean the tape drive. See <b>Cleaning the Tape Drive</b> on page 36.</li></ul>

**Table 4** Troubleshooting Table

Problem	Solution
<b>SCSI ID</b>	
Changed drive SCSI ID, but the host server does not recognize the new ID.	<ul style="list-style-type: none"><li>■ Make sure that all SCSI devices on the same bus have unique ID numbers.</li><li>■ If the SCSI bus is narrow (50-pin) only SCSI IDs 0 through 7 are available.</li><li>■ Make sure that you cycle power on the autoloader after changing the SCSI ID.</li><li>■ Reboot the host server.</li></ul>
<b>Autoloader performance</b>	
The autoloader is not efficiently backing up data.	<ul style="list-style-type: none"><li>■ Check the network bandwidth from the host computer if you are backing up data over a network. Consider comparing to a local-only backup.</li><li>■ Make sure that the autoloader is on its own SCSI bus and not daisy-chained to another tape drive or to the hard drive being backed up.</li><li>■ Clean the tape drive. See <b>Cleaning the Tape Drive</b> on page 36 for instructions.</li><li>■ Try a new cartridge. A marginal cartridge can cause performance problems due to bad spots on the tape requiring retries.</li><li>■ Make sure that the data is being compressed.</li><li>■ Check the size of the files. Small file size can impact performance.</li><li>■ Confirm that the backup application is utilizing block sizes of at least 32KB, preferably 64KB. Refer to the backup application documentation for details.</li></ul>

**Table 4** Troubleshooting Table

Problem	Solution
<b>Cleaning</b>	
Recurring cleaning message or media attention light.	<ul style="list-style-type: none"><li>■ Make sure you are using a DLT vs80 compatible cleaning cartridge.</li><li>■ Replace the existing cleaning cartridge with a new one.</li><li>■ If the Media Attention LED is cleared using a cleaning cartridge and then immediately reappears after a particular data cartridge is reloaded, that data cartridge might be contaminated. If this occurs, check that the data cartridge can be read, back up data from the suspect cartridge to another cartridge, and then discard the suspect cartridge.</li></ul>
The Clean Drive LED is illuminated.	<ul style="list-style-type: none"><li>■ Indicates that 250 tape motion hours have passed since you last cleaned the tape drive.</li><li>■ Clean the tape drive. See <b>Cleaning the Tape Drive</b> on page 36 for instructions.</li></ul>
Cannot load the cleaning cartridge.	<ul style="list-style-type: none"><li>■ Make sure you are using a DLT vs80 compatible cleaning cartridge. (See <b>page 36.</b>)</li><li>■ Contact your service representative.</li></ul>
<b>Media Compatibility</b>	
Media format invalid for drive type.	<ul style="list-style-type: none"><li>■ You attempted to load incompatible media into the tape drive. Ensure your media and format is compatible with a DLT vs80 tape drive. See <b>page 29</b> for more information.</li></ul>
Media is labeled as write protected by the host server, but restore from tape successful.	<ul style="list-style-type: none"><li>■ Media with the DLT 4000 format was loaded into the tape drive. The data is readable, but the media must be bulk erased before the tape drive can write to this cartridge.</li></ul>

**Table 4** Troubleshooting Table

Problem	Solution
Media is rejected by the tape drive. Restore from tape NOT successful.	<ul style="list-style-type: none"> <li>■ You attempted to load media with an invalid format (DLT 7000 or DLT 8000), an improperly degaussed cartridge, an invalid cartridge type (DLTape III or non-DLT1 cleaning cartridge), or the tape drive read/write head is dirty. The tape drive rejects the cartridge in these cases. If the cartridge format or cartridge type is invalid, replace the cartridge. If the read/write head is suspected as being dirty, clean the drive. If the format is invalid, or the tape is improperly degaussed, the media must be thoroughly degaussed before the DLT vs80 tape drive can use this tape.</li> </ul>
<b>Media Attention LED Issues</b>	
Contamination by loose debris.	<ul style="list-style-type: none"> <li>■ 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.</li> </ul>
Contamination by head staining. (Caused by adhesion of chemicals that are present in the tape media to the head surface.)	<ul style="list-style-type: none"> <li>■ One or two passes with a cleaning cartridge should resolve the Media Attention LED caused by normal head staining. If a cleaning cartridge is unsuccessful in resolving a cleaning light after 3 or more attempts, the cleaning cartridge may be contaminated, and should NOT be used in another drive.</li> </ul>
Non-acclimated media	<ul style="list-style-type: none"> <li>■ A cartridge should be acclimated for a minimum of 24 hours before being used, particularly if it has been stored at a substantially different temperature or level of humidity than the tape library.</li> </ul>
Wrong cleaning cartridge	<ul style="list-style-type: none"> <li>■ Use only the vs80 compatible cleaning cartridge specifically designated for the autoloader.</li> </ul>
Expired cleaning cartridge	<ul style="list-style-type: none"> <li>■ A cleaning cartridge is good for 20 uses.</li> </ul>

**Table 4** Troubleshooting Table

Problem	Solution
Bad/defective/contaminated media	<ul style="list-style-type: none"><li>■ If the Media Attention LED is cleared using a cleaning cartridge and then immediately reappears each time a particular cartridge is reloaded, and you have confirmed that the suspect cartridge is not an invalid cleaning cartridge (DLTape III or non-DLT1), that cartridge should be suspected as being contaminated.<ul style="list-style-type: none"><li>— If this occurs, export the cartridge, clean the tape drive again and then load a known good cartridge. In some cases, a cartridge can be worn out, have been improperly degaussed, have bad calibration tracks, or have a bad tape directory recorded by another drive type such as DLT 7000 or DLT 8000.</li><li>— Any cartridge that is suspected of being defective or contaminated should NOT be reused in any drive. Cartridges that are suspected as being improperly degaussed or containing incompatible formats such as DLT 7000 or DLT 8000 must be thoroughly degaussed before use.</li></ul></li></ul>
<b>Errors Displayed on Front Panel</b>	
"!" in autoloader operator panel inventory display	<ul style="list-style-type: none"><li>■ See <b>Operator's Panel Overview</b> on page 24 for more information.</li></ul>
There is an error code on the LCD display	<ul style="list-style-type: none"><li>■ Look up the error code, try to resolve the failure, and power cycle (see <b>page 66</b>).</li></ul>

## Removing Stuck Cartridges

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

---

**Caution** Contact your HP support representative if a cartridge is stuck in the drive.

---

1. Move the power switch on the front panel to the OFF position. You may need to use the tip of a pen or similar item to move the recessed power switch.
2. Remove the power cable and SCSI cables from their connectors on the back panel of the autoloader.

---

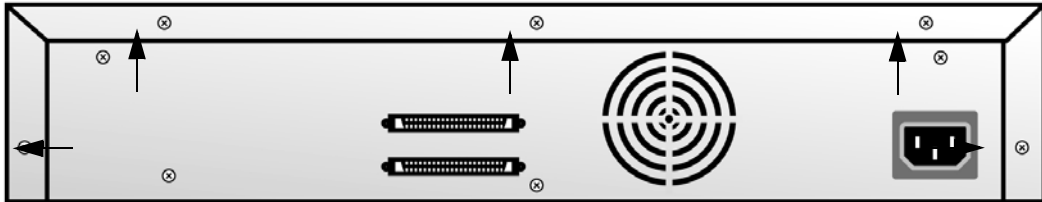
**WARNING** To prevent injury, disconnect the power and SCSI cables before removing the autoloader cover and keep fingers away from the fan.

---

3. If applicable, remove the autoloader from its rack slot and place it on a table or other clear work surface.
4. If the autoloader is rackmounted, use a screwdriver to remove the front cover screws, that secure the mounting brackets, from both sides of the autoloader (see **Figure 5** on page 16).

5. Loosen the autoloader cover by removing the five screws on the back of the autoloader, and the screws on each side of the autoloader.

**Figure 15** Remove Indicated Back Cover Screws



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

7. Remove the cartridge carrier that contains the tape you want to remove by lifting the carrier up and out of the autoloader.

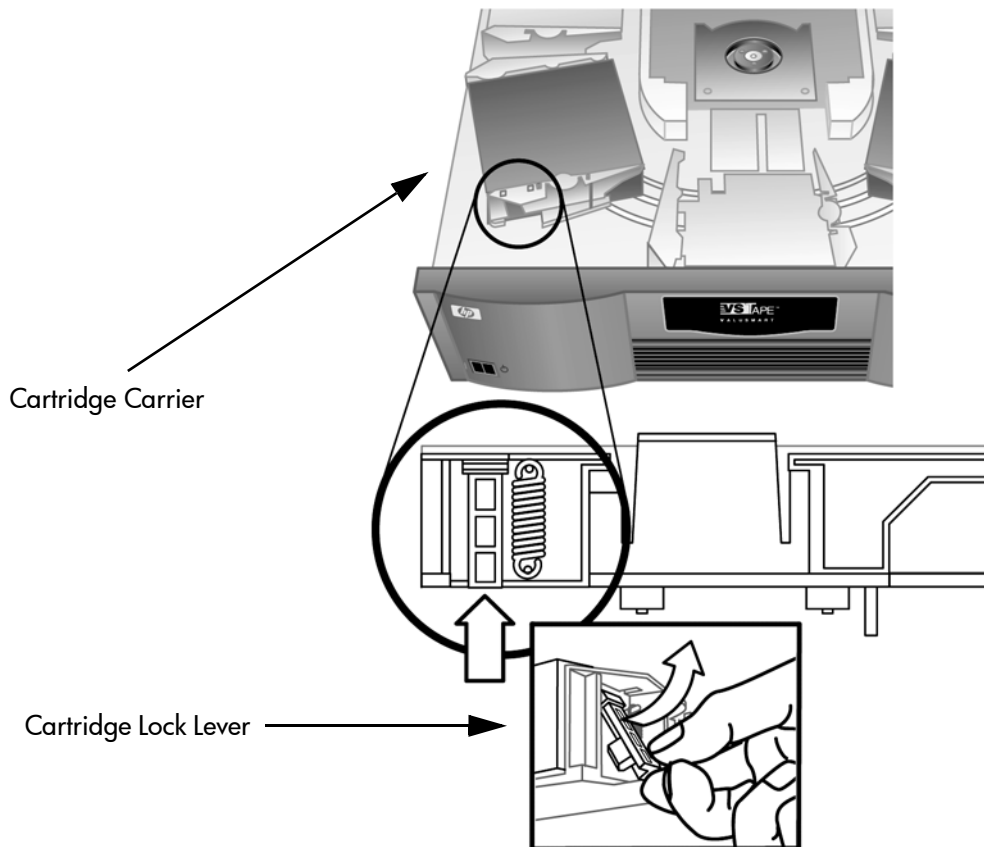
---

**Note** To remove the carrier directly in front of the mail slot, gently rotate the carousel counterclockwise by moving the belt or carriers until the carrier is no longer in front of the mail slot.

---

8. On each carrier, carefully pull the cartridge lock lever away from the carrier, allowing the cartridge to slide out of the carrier.

**Figure 16** Pull Cartridge Release Lever





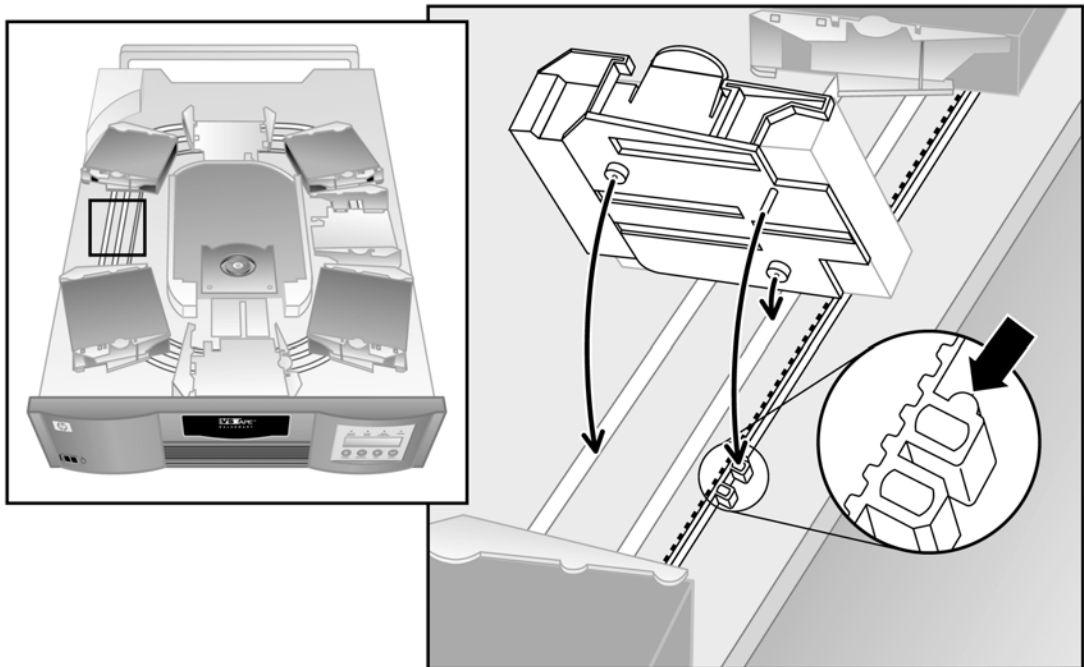
9. After removing the cartridges from the desired carriers, reinstall each carrier on the autoloader belt (see **Figure 17**).
  - Make sure that the rollers on the bottom of the carrier are aligned in the carrier tracks.
  - Make sure that the belt post beneath each carrier is inserted into the proper 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 17**.

---

**Figure 17** Installing the Carrier



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 it does, 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 5**, attempt to resolve the error by cycling power on the autoloader and retrying the last operation. If the error persists, contact support personnel.

---

**Note** When the error appears on the LCD screen, it will show as error "81", for example. When you view the error from within the error log, it will show as "3 0 81".

---

To view the error log follow these steps:

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

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

**Table 5** Error Codes

Error Code	Description	Details
3 0 81	Invalid command error.	This error indicates that the autoloader received an undefined command or an invalid parameter with a command.
3 0 82	Device status not suitable to execute this command.	If the robotics are busy, some commands cannot be executed at the same time. This error indicates a probable violation. This is not an error condition, but does result in <b>busy</b> being reported to the host for the requested SCSI command.

**Table 5** Error Codes

<b>Error Code</b>	<b>Description</b>	<b>Details</b>
<b>3 0 83</b>	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 <b>page 38</b> or power cycle.
<b>3 0 84</b>	Source empty.	There is no cartridge in the location where a cartridge move was issued.
<b>3 0 85</b>	Destination full.	The location where a cartridge move was issued already contains a cartridge.
<b>3 0 86</b>	Mail slot access rejected.	User attempted to access the mail slot, but media removal was prevented by the host.
<b>3 0 87</b>	Operation timeout.	A command did not complete in the required amount of time.
<b>3 0 88</b>	Communications error during loop-back.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 89</b>	System test timeout.	There was a communication timeout between the drive and loader during the System Test.
<b>3 0 8F</b>	Recovered loader error.	Loader error recovery successful. Your diagnostic tool can provide details of the original loader error.
<b>3 0 90</b>	Mechanical Initialization failure.	The robotics were not able to move to the safe mechanical initialization position. Manual intervention is necessary.
<b>3 0 91</b>	Inventory scan failure.	Fatal robotic error occurred during the inventory scan.
<b>3 0 92</b>	Preposition failed.	Belt positioning error occurred during 'Preposition' command.
<b>3 0 93</b>	Cartridge load error.	A failure occurred while trying to load a cartridge from the drive to its slot.

**Table 5** Error Codes

<b>Error Code</b>	<b>Description</b>	<b>Details</b>
<b>3 0 94</b>	Cartridge unload error.	A failure occurred while trying to unload a cartridge from the drive to its slot.
<b>3 0 95</b>	Import error.	An error occurred while trying to import a data cartridge to a carousel slot.
<b>3 0 96</b>	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.
<b>3 0 A0</b>	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.
<b>3 0 A1</b>	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.
<b>3 0 A2</b>	Gripper position error.	Gripper unable to reach position.
<b>3 0 A3</b>	Cartridge pick error.	Error occurred while trying to pull a cartridge from the drive or a carousel slot.
<b>3 0 A4</b>	Mail slot position error.	The mail slot door was not in the requested position during device operation. Can be caused by manually opening the door or a cartridge or other obstruction is blocking the door. Try removing the cartridge or obstruction, then power cycle or reset the autoloader.
<b>3 0 A5</b>	Fan Error.	Autoloader processor detected a fan error.
<b>3 0 B0</b>	ROM error.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.

**Table 5** Error Codes

<b>Error Code</b>	<b>Description</b>	<b>Details</b>
<b>3 0 B1</b>	RAM error.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 B2</b>	NVRAM error.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 B3</b>	Controller timer failure.	An unrecoverable failure has occurred in the mail controller timer circuit.
<b>3 0 B4</b>	Loader to drive communication IC error.	Failure in IC handling loader to drive communication.
<b>3 0 B5</b>	Display error.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 B6</b>	Memory error.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 B7</b>	Timeout on autoloader command	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 BC</b>	Drive bug-checked.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 BD</b>	Autoloader has loaded a cartridge but drive is empty.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 BE</b>	Autoloader did not load the cartridge that is currently in the tape drive.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.
<b>3 0 BF</b>	Fatal error.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact your technical support representative.



# Technical Specifications



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## Appendix Overview

This appendix describes the following:

- **Autoloader Specifications** on page 72
- **Environmental Specifications** on page 73
- **Tape Drive Specifications** on page 74
- **Media Specifications** on page 75

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# Autoloader Specifications

**Table 6** Autoloader Specifications

Characteristic	Specification
Height	
Packaged	205 mm (8.0 in)
Unpackaged	84 mm (3.34 in)
Width	
Packaged	600 mm (23.6 in)
Unpackaged	419 mm (16.5 in)
Depth	
Packaged	743 mm (29.2 in)
Unpackaged	610 mm (24 in)
Weight	
Packaged	11.35 kg (24.9 lb)
Net	10 kg (22 lb)
Maximum storage capacity	Native: 320 GB Compressed: 640 GB (assuming 2:1 compression)
Number of slots	8
Loading time to BOT (for previously written tape)	59 seconds (average)
Unloading time from BOT	17 seconds (average)
MSBF	250,000 swaps
Interface	LVD ultra wide SCSI-2, 16 bits wide, 68-pin HD connector
Power requirements	100 - 240V AC, 50 - 60 Hz



# Environmental Specifications

**Table 7** Environmental Specifications

Characteristic	Specification
<b>Temperature/humidity</b>	
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
Operating	20% to 80% RH (non condensing)
Non-operating	10% to 90% RH (non-condensing)
<b>Altitude</b>	
Operating	-152 to 9144 m
Non-operating	-152 to 9144 m
<b>Vibration (5-500 Hz)</b>	
Maximum acceleration to operating	0.21 Grms (random)
Frequency range	500 Hz

---

## Tape Drive Specifications

**Table 8** DLT vs80 Drive Specifications

Description	DLT1 (vs80)
Read/write transfer rate: maximum sustained (DLT Type IV media)	Non-compressed mode: 3.0 MB/second Compressed (2:1 typical): 6.0 MB/second
Burst transfer rate	16 MB/second
Average access time	68 seconds
MTBF	100,000 hours
Interface	Wide Ultra SCSI-2, LVD

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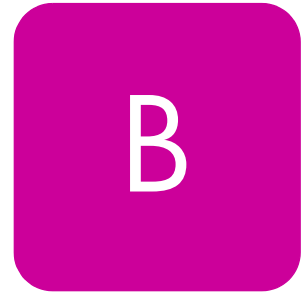
# Media Specifications

**Table 9** Media Specifications

Characteristic	DLT Type IV Media
DLT1 formatted capacity	40 GB (non-compressed) 80 GB (2:1 typical compression)
Basic description	0.5 inch (metal particle)
Tape length	557 meters (1828 feet)
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 (any point on the tape passing the recording head in either direction)
Cleaning cartridge life	20 uses
Supported media	Data Cartridges: — DLT IV, DLT1 or DLT VS media Cleaning Cartridges: — DLT1 or DLT VS cleaning cartridges



# Customer Support



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## Appendix Overview

This appendix describes the following:

- **Registering Your Product** on page 78
- **Service Options** on page 79
- **Contacting HP Customer Support** on page 80
- **Warranty Information** on page 85

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## Registering Your Product

Registering your product ensures fast and easy access to Hewlett-Packard Customer Support.

- On our web site:  
<http://www.register.hp.com>

HP Customers who register join a select group who register to receive:

- Technical support updates
- Special Hewlett-Packard offers
- Direct-to-you details on:
  - Ideas and ways to use your new HP StorageWorks vs80 1/8 Autoloader
  - Other exciting HP products
  - News on emerging technologies

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## Service Options

HP service options upgrade the warranty on your tape autoloader. A wide range of warranty options are available to meet your business uptime needs.

## SupportPacks

SupportPacks are available *within* 180 days of your purchase. If you choose to purchase one, your warranty will be upgraded. Once your warranty has expired, post-warranty SupportPacks are also available. Table 10 lists HP SupportPack service options.

**Table 10** SupportPacks

SupportPack Number	Description
H2667A/E	2-year express exchange
H2698A/E	3-year express exchange
H4619A/E	3-year on-site, next-day
H5526A/E	3-year on-site, same-day
H4624A/E	3-year on-site, 24 x 7

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**Note** To order HP SupportPacks, visit <http://www.hp.com/hps/support/supportpack>, or contact your support or sales representative.

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## Contacting HP Customer Support

If your autoloader fails during the warranty period and the suggestions in the documentation do not solve the problem, you can receive support by doing the following:

- Access HP Support on the World Wide Web at <http://www.hp.com/support/storage>
- Contact your authorized HP dealer or Authorized Service Provider
- Call the HP Customer Care Center in your region

If you purchased a service contract through HP or an authorized reseller, make sure that you register your autoloader immediately. Failure to register may result in slower response time. Registering allows the local repair office to prepare for the proper response level needed. If your library fails while under the support contract period, contact the appropriate support number included in your contract information.

If your autoloader fails after the warranty period, contact your authorized HP dealer or distributor, or the nearest HP sales and service office. Customers in the US and Europe can use a credit card for phone assistance.

## Information Needed for Support

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

- Model number for your autoloader
- Serial number
- Media type and format
- Error codes
- 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 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.

## HP Telephone Support

To obtain technical assistance, call the support representative nearest you.

### North and South America

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**Note** For the latest list of phone numbers for HP Customer Support, see <http://www.hp.com/go/support>. Phone charges may apply.

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- Argentina  
(541) 778 8380
- Brazil  
(011) 829 6612
- Canada  
905-206-4663
- Chile  
800 360 999
- Mexico  
800 427 6684

- United States  
(970) 635-1500; Monday - Friday,  
7 am - 5pm Mountain Time
- Venezuela  
800 47 888 (Caracas 207 8488)

## European Customer Support Centers

Monday - Friday, 8:30 - 18:00 (C.E.T)

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**Note** For the latest list of phone numbers for HP Customer Support, see <http://www.hp.com/go/support>. Phone charges may apply.

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- Austria  
+ 43 (0) 7114 201080
- Belgium, Dutch  
+ 32 (0) 2 626 8806
- Belgium, French  
+ 32 (0) 2 626 8807
- Denmark  
+ 45 39 29 4099
- English  
International + 44 (0) 171 512 52 02
- Finland  
+ 358 (0) 203 47 288
- France  
+ 33 (0) 1 43 62 34 34
- Germany  
+49 (0) 180 52 58 143
- Ireland  
+ 353 (0) 1 662 5525
- Israel  
+ 972 (0) 9 9524848
- Italy  
+ 39 02 264 10350

- Netherlands  
+ 31 (0) 20 606 8751
- Norway  
+ 47 22 11 6299
- Portugal  
+ 351 (0)1 318 00 65
- Spain  
+ 34 902 321 123
- Sweden  
+ 46 (0) 8 619 2170
- Switzerland  
+ 41 (0) 848 80 11 11
- Turkey  
+ 90 212 224 59 25
- United Kingdom  
+ 44 (0) 171 512 52 02

## Asia Pacific Customer Support Centers

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**Note** For the latest list of phone numbers for HP Customer Support, see <http://www.hp.com/go/support>. Phone charges may apply.

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- Australia  
+ 61 3 8877 8000
- China  
+ 86 (0) 10 6564 5959
- Hong Kong  
800 96 7729
- India  
+ 91 11 682 6035
- Indonesia  
+ 62 21 350 3408
- Japan  
+ 81 3 3335 8333

- Korea  
+ 82 2 3270 0700
- Outside Seoul  
080 999 0700
- Malaysia  
+ 60 3 295 2566
- New Zealand  
+ 64 9 356 6640
- Penang  
1 300 88 00 28
- Philippines  
+ 63 2 867 3551
- Singapore  
+ 65 272 5300
- Taiwan  
+ 886 2 717 0055
- Thailand  
+ 66 2 661 4000
- Vietnam  
+ 84 (0) 8 823 4530

### **Elsewhere**

Contact your authorized HP dealer/distributor or the nearest HP sales and service office.

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## Warranty Information

HP Products: HP StorageWorks vs80 1/8 Autoloader

Duration of limited warranty: One year

1. HP warrants HP hardware, accessories, and supplies against defects in materials and workmanship for the period specified above. If Hewlett-Packard receives notice of such defects during the warranty period, Hewlett-Packard will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.
2. HP warrants that HP software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media that does not execute its programming instructions due to such defects.
3. HP does not warrant that the operation of HP products will be uninterrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.
4. HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.
5. The warranty period begins on the date of delivery or on the date of installation if installed by HP. If customer schedules or delays HP installation more than 30 days after delivery, warranty begins on the 31st day from delivery.
6. Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by HP, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the products, or (e) improper site preparation or maintenance.
7. TO THE EXTENT ALLOWED BY LOCAL LAW, THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTY OR CONDITION, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED AND HP SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, AND FITNESS FOR A PARTICULAR PURPOSE.
8. HP will be liable for damage to tangible property per incident up to the greater of \$300,000 or the actual amount paid for the product that is the subject of the claim, and for damages for bodily injury or death, to the extent that all such damages are determined by a court of competent jurisdiction to have been directly caused by a defective HP product.

TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL HP OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE.

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