

reference  
guide

# hp StorageWorks DLT80 tape drive

Fourth Edition (January 2003)

**Part Number:** 185292-004

This guide is to be used as step-by-step instructions for installation and as a reference for operation, troubleshooting, and future upgrades.



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DLT80 Tape Drive Reference Guide  
Fourth Edition (January 2003)  
Part Number: 185292-004



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## about this guide

This reference guide provides information to help you:

- Install the DLT80 tape drive
- Install the software drivers
- Operate the DLT80 tape drive
- Troubleshoot the DLT80 tape drive
- Update the firmware on the DLT80 tape drive

About this Guide topics include:

- [Overview](#), page 8
- [Conventions](#), page 9
- [Rack Stability](#), page 11
- [Getting Help](#), page 12

## Overview

This section covers the following topics:

- [Intended Audience](#)
- [Prerequisites](#)
- [Conventions](#)

## Intended Audience

This book is intended for use by technicians who are experienced with installing and operating HP tape drives.

## Prerequisites

Before you install the DLT80 tape drive, make sure you consider the items below.

- Review the installation instructions and gather all required tools.
- Review the installation instructions to be sure your installation location meets the required environmental conditions.

## 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	<a href="#">Figure 1</a>
Key and field names, menu items, buttons, and dialog box titles	<b>Bold</b>
File names, application names, and text emphasis	<i>Italics</i>
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	Underlined sans serif font text: <a href="http://www.hp.com">http://www.hp.com</a>

## 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 personal 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

In North America, call technical support at 1-800-652-6672, available 24 hours a day, 7 days a week.

---

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

---

Outside North America, call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP website under support: <http://www.hp.com>.

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>. From this website, select the appropriate product or solution.

## HP Authorized Reseller

For the name of your nearest HP authorized reseller:

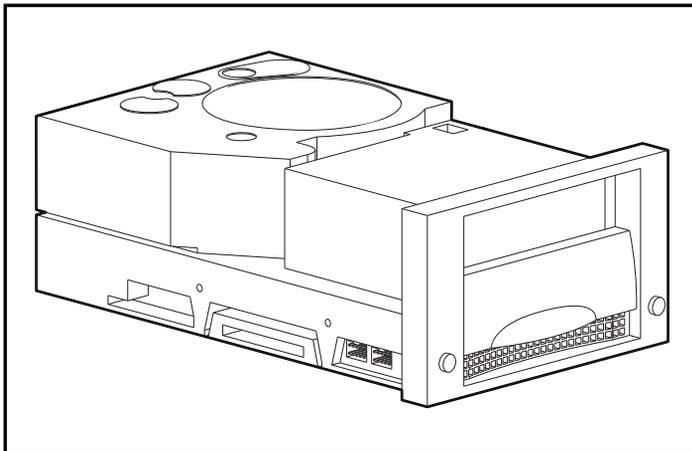
- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP website for locations and telephone numbers:  
<http://www.hp.com>.



# Overview

# 1

The HP StorageWorks DLT80 tape drive is a high-capacity, high-performance streaming tape drive designed for use with HP ProLiant servers and with HP AlphaServers. The drive has a multi-channel read/write head, uses a Digital Lempel-Ziv (DLZ) high efficiency data compression algorithm, and has a filing system to maximize data while minimizing data access time.



**Figure 1: DLT80 tape drive**

## Software Included

The DLT80 tape drive ships with a CD that contains drivers that support the following operating systems:

- Microsoft Windows NT
- Microsoft Windows 2000
- Novell NetWare

The following operating systems are also supported using their native drivers:

- HP Tru64 UNIX
- Open VMS

Multiple software utilities are also available to customers through the HP website and can be downloaded free of charge.

## System Requirements

HP recommends equipping the server with a Fast Wide SCSI-2 Controller or higher. See [Table 2](#) for the recommended controller interfaces that can be used with the DLT80 drive. Install and configure the controller before beginning the drive installation, using the documentation included with the controller.

[Table 2](#) shows which controllers support the DLT80 drive and which ones are recommended.

**Table 2: Supported Controllers**

Controller	Recommended
Fast SCSI-2 (Narrow)	No
Fast SCSI-2 (Wide)	Yes
Wide-Ultra SCSI	Yes
Ultra-2 SCSI	Yes
<b>Note:</b> The DLT80 tape drive supports both single ended (SE) and low voltage differential (LVD). It does not support high voltage differential (HVD).	

## Data Compression

The DLT80 drive reads and writes both uncompressed (native) and Digital Lempel-Div (DLZ) compressed data. The DLT80 drive features a native formatted capacity of 40 GB and a sustained native data transfer of 6.0 MB/s.

When operating in compressed mode, data capacity is affected by how much the data can be compressed. Most data can be compressed at an approximate 2:1 ratio. This would provide the DLT80 drive with a compressed capacity of 80 GB and a compressed data transfer up to 12 MB/s.

The DLT80 drive ships from the factory with data compression enabled for writing. In this mode, data is always compressed when writing to the tape, but the drive is capable of reading both compressed and uncompressed tapes. For the drive to write uncompressed data, the data compression setting must be changed through the software. To change it, consult the backup application software documentation for the data compression enabling and disabling procedure.

Using the **Density Select** button on the front panel can also disable/enable data compression but is only effective per session. See "Front Panel LEDs and Buttons" in Chapter 5 for more information.

---

**Note:** Capacity may vary based upon actual stored data. Data transfer rate can vary depending on actual data.

---



# Installing an Internal DLT80 Tape Drive



This chapter describes the procedure to install an HP StorageWorks DLT80 tape drive into an HP ProLiant server.

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**Note:** If installing a DLT80 tape drive on an HP AlphaServer, see Chapter 3.

---

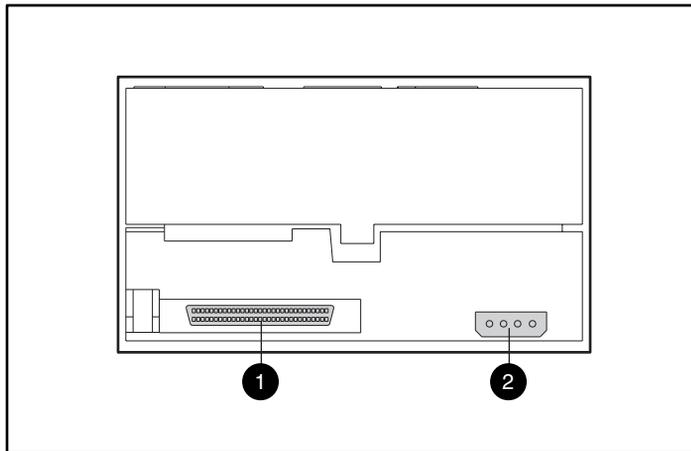
Installing the drive involves the following steps:

1. Setting the SCSI ID on the DLT80 drive
2. Shutting down the server and all peripheral devices
3. Installing the DLT80 drive
4. Reassembling the server
5. Powering on the peripherals
6. Powering on the server
7. Completing the installation

## Software and Tool Requirements

The following items may be required for DLT drive installations:

- Torx T-15 screwdriver
- Type 1A, Phillips screwdriver
- SmartStart and Support Software CD (ProLiant servers only)
- HP Storage Management Solutions CDs



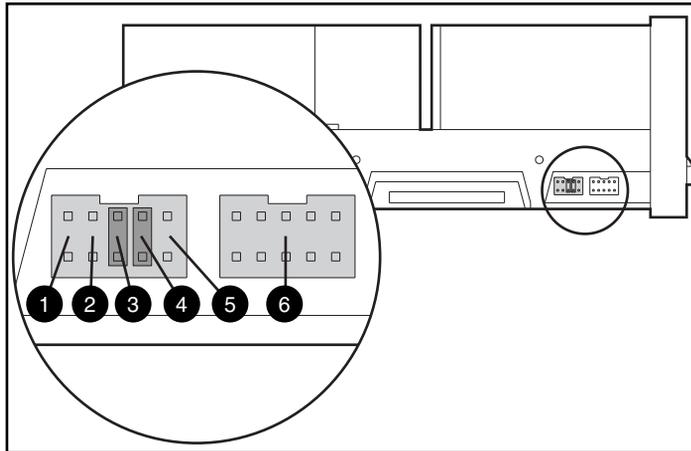
**Figure 2: Rear view of an internal DLT80 drive**

- ❶ 68-pin SCSI connector
- ❷ Power connector

## Setting the SCSI ID

Before beginning the installation process, the SCSI ID must be set. Each SCSI device on the same SCSI bus must have a unique SCSI ID. Use the jumper block located on the left side of the tape drive (see [Figure 3](#)). The default SCSI ID is 6.

**Note:** SCSI ID 7 is reserved for the SCSI controller.



**Figure 3:** SCSI ID and Library Controller jumper blocks on the left side

- |                     |                            |
|---------------------|----------------------------|
| ❶ Remote ID present | ❷ SCSI Bit 1               |
| ❸ Reserved          | ❸ SCSI Bit 0               |
| ❹ SCSI Bit 2        | ❹ Library Controller block |



**Caution:** Do not change the settings on the Library Controller block.

**Note:** If a SCSI ID other than the default is used, the Remote ID pin must have a jumper installed on it.

The SCSI ID settings are shown in [Figure 4](#).

To set the SCSI ID, position the jumpers as shown in [Figure 4](#).

SCSI ID Settings			
SCSI ID	Bit 2	Bit 1	Bit 0
0	○	○	○
1	○	○	■
2	○	■	○
3	○	■	■
4	■	○	○
5	■	○	■
6	■	■	○

**Key** ○ Jumper NOT Installed  
 ■ Jumper Installed

**Figure 4: Setting the SCSI ID jumpers on an internal DLT80 drive**

## Terminator Power

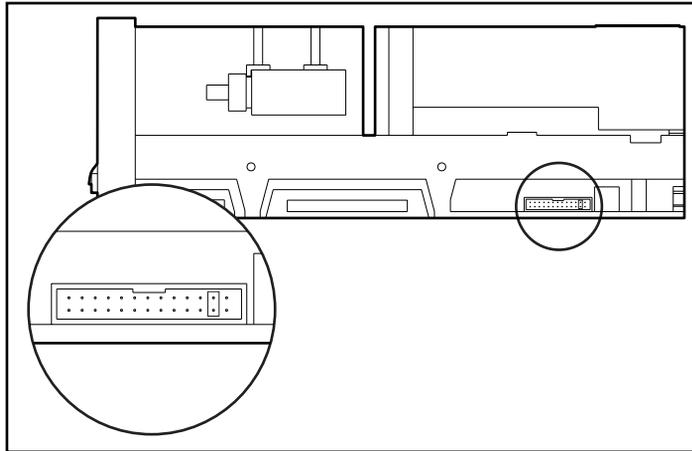
The DLT80 tape drive ships from the factory with terminator power (TERM PWR) disabled. This allows only the controller to provide power for SCSI termination.

---

**Note:** Make sure that the controller provides terminator power.

---

If enabled, the TERM PWR setting allows the drive in addition to the controller to provide the termination power. To enable TERM PWR a jumper must be placed on the 3 and 4 pin of the termination block located on the right side of the tape drive. The termination power setting is shown in [Figure 5](#).



**Figure 5:** Termination power jumper block on the right side

## Preparing the Server

To prepare the server for installation:



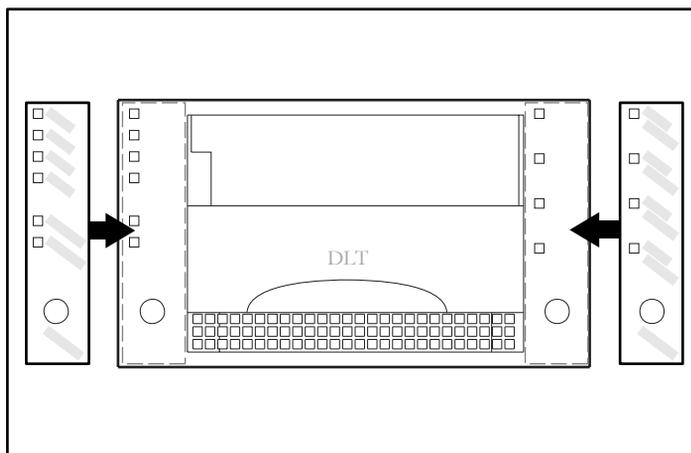
**Caution:** Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before beginning this procedure. See Appendix B, "Electrostatic Discharge" for further information.

---

1. Perform a normal system shutdown.
2. Turn OFF the server and all peripheral devices.
3. Disconnect the AC main power cord from the outlet, then from the server and from all peripheral devices.
4. Disassemble the system to expose the drive bay. Refer to the user manual that came with your server.

## Preparing the Tape Drive

Choose the right and left front panel labels from the labels provided in the kit. Place them over the existing front panel.



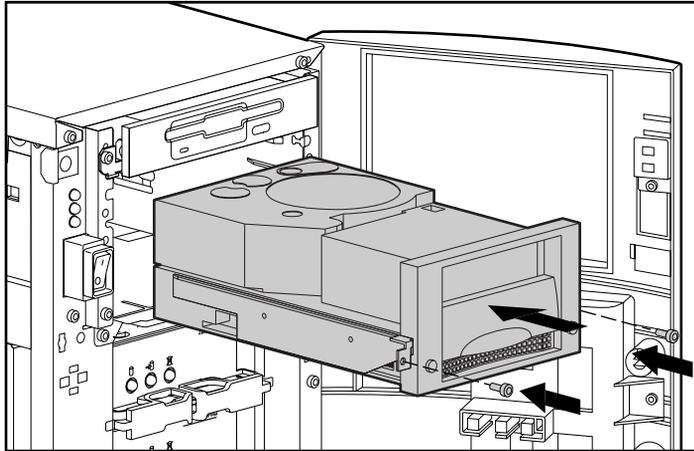
**Figure 6: Adhering the front labels**

## Installing the DLT80 Tape Drive

**Note:** Your server may differ from the following illustrations; refer to the documentation included with your server.

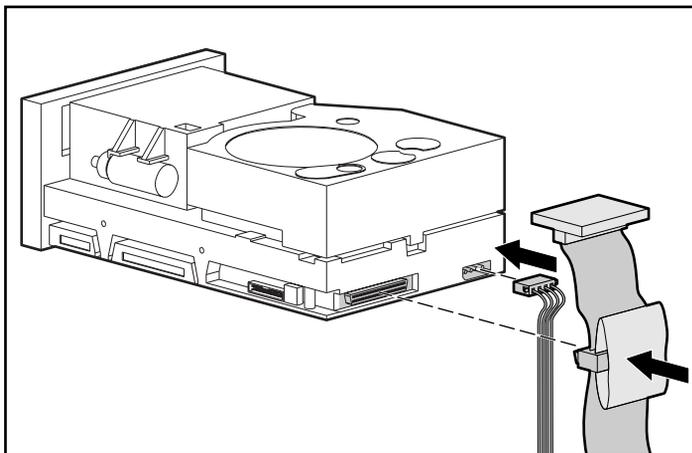
To install a DLT80 tape drive with drive rails:

1. Adhere the front labels as described in “Preparing the Tape Drive.”
2. Install the tape drive into two adjacent available media bays.



**Figure 7: Installing a DLT80 drive with drive rails**

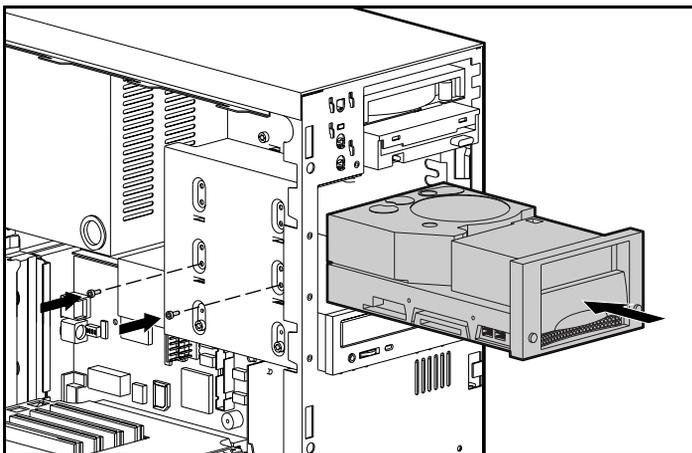
3. Insert two screws in the front plate using a Torx T-15 screwdriver.
4. Connect an available power cable and the wide SCSI signal cable.



**Figure 8: Connecting power and signal cables**

To install a DLT80 tape drive without drive rails:

1. Adhere the front labels as described in “Preparing the Tape Drive.”
2. Remove screws from drive rails using a Type 1A, Phillips screwdriver.
3. Slide the tape drive into two adjacent available media bays.



**Figure 9: Installing a DLT80 drive without drive rails**

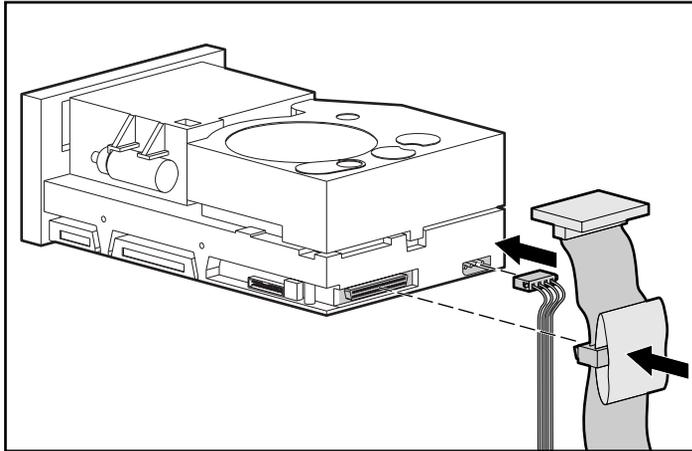
4. Use the screws that were removed from the drive rails; insert two into the threaded mounting holes on each side.

---

**Note:** Some servers may not be accessible on both sides. Secure the side(s) that are accessible.

---

5. Connect an available power cable and the wide SCSI signal cable.



**Figure 10: Connecting power and signal cables**

## Reassembling the Server

To reassemble the server:

1. Replace the access panel.
2. Reconnect the peripheral devices to the server.



**WARNING:** To reduce the risk of electric shock or damage to your equipment, do not disable the power cord grounding feature. This equipment is designed for connection to a grounded (earthed) power outlet. The grounding plug is an important safety feature.

---

3. Plug the AC main power cord into the server, then plug the cord into a grounded AC outlet.
4. Turn ON all peripheral devices.
5. Turn ON the server.

## Completing the Installation

Install the device drivers to complete the installation of the DLT80 drive. See Chapter 4, "Installing Software Drivers," for specific driver installation information.

# Connecting an External DLT80 Tape Drive

## 3

This chapter describes the procedure for connecting an HP StorageWorks DLT80 external tape drive to an HP ProLiant server or an HP AlphaServer. When installing be sure to place the DLT80 drive on a flat, sturdy surface such as a desk or tabletop.

---

**Note:** Do not place the unit on the floor. Allow enough space for proper ventilation and easy access to the front and rear of the DLT80 drive. Allow at least 3 inches (7.6 cm) between the rear of the unit and the wall.

---



**WARNING:** Risk of electrical shock. Do not attempt to open this product. There are no user-serviceable parts inside. Refer all service to an HP authorized service provider.

---

Connecting the drive involves the following steps:

1. Setting the SCSI ID on the DLT drive
2. Shutting down the server and all peripherals devices
3. Connecting the DLT drive
4. Powering on the peripherals
5. Powering on the server

## Software Requirements

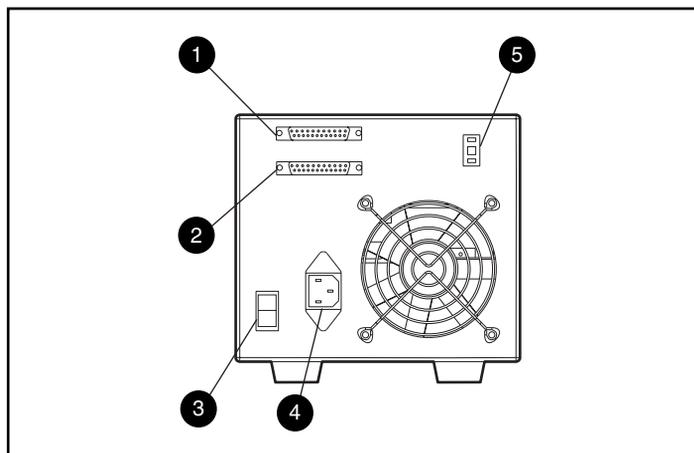
The following items may be required for DLT drive installations:

- SmartStart and Support Software CD (ProLiant servers only)
- HP Storage Management Solutions CDs

---

**Note:** The CDs are not required when connecting the DLT drive to an AlphaServer.

---



**Figure 11: Rear view of an external DLT80 drive**

- |                  |                      |
|------------------|----------------------|
| ❶ SCSI connector | ❷ SCSI ID switch     |
| ❸ SCSI connector | ❹ AC power connector |
| ❹ Power switch   |                      |

## Setting the SCSI ID

Each SCSI device on the same SCSI bus must have a unique SCSI ID. Avoid duplicating the SCSI ID when assigning it to the DLT drive. Use the factory-set default SCSI ID 6.

To change the SCSI ID, press the switch on the rear panel of the drive above or below the number display to set the desired number.

---

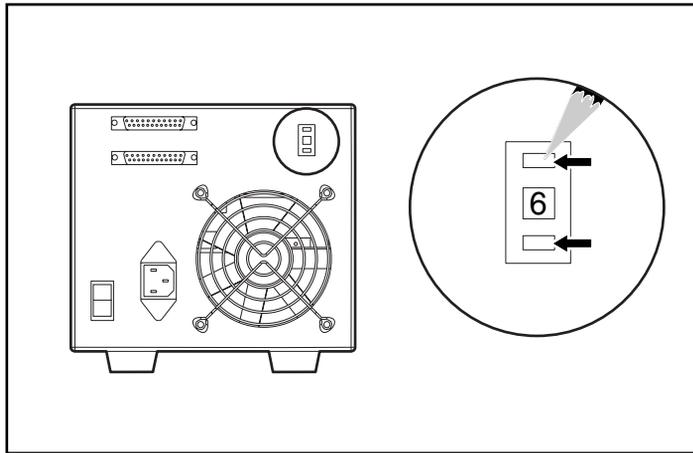
**Note:** The SCSI ID can be set up to 15 but a SCSI ID above 6 is not recommended.

---

---

**Note:** SCSI ID 7 is reserved for the controller.

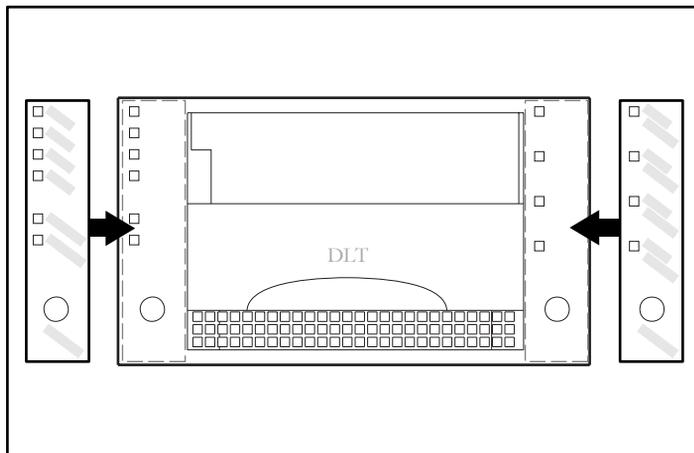
---



**Figure 12: Setting the SCSI ID switch on an external DLT80 drive**

## Connecting a Single Drive

1. Choose the right and left front panel labels from the labels provided in the kit. Place them over the existing front panel.



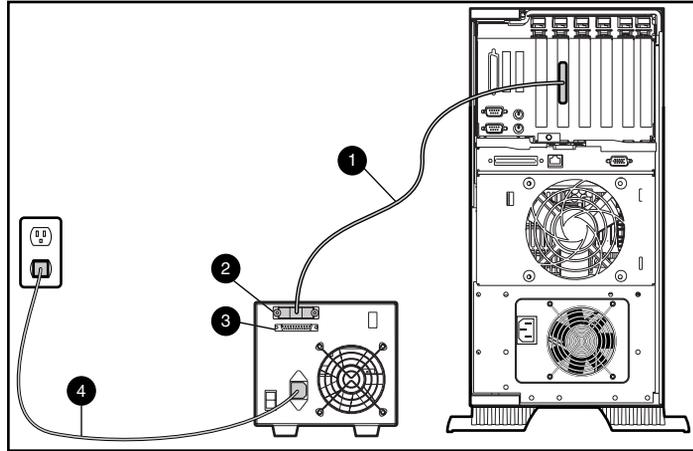
**Figure 13: Adhering the front labels**

2. Turn OFF the server and all peripheral devices.
3. Locate the external SCSI port on the rear of the server.

---

**Note:** Your server may differ from the following illustrations; refer to the documentation included with your server.

---



**Figure 14: Connecting a single external DLT80 drive**

4. Attach the SCSI signal cable ❶ to the SCSI connector ❷ located on the rear panel of the DLT drive and then to the external SCSI-2 port on the server.
5. Turn thumbscrews into place to secure the cable to the connector.
6. Attach the terminator (not shown) to the SCSI connector ❸.



**WARNING:** To reduce the risk of electric shock or damage to your equipment, do not disable the power cord grounding feature. This equipment is designed for connection to a grounded (earthed) power outlet. The grounding plug is an important safety feature.

7. Plug the drive's AC power cord ❹ into the drive, then into a grounded AC outlet.
8. Turn ON all peripheral devices.
9. Turn ON the server.

## Connecting Multiple Drives

Two DLT80 drives can be connected to the same SCSI channel at the same time.

- Do not connect more than two external units per SCSI controller.
- Use no more than a 6-ft (1.8-m) cable to attach the initial unit, then use a 3-ft (0.9-m) cable to daisy chain the additional unit.

## Daisy-Chaining Storage Devices Together

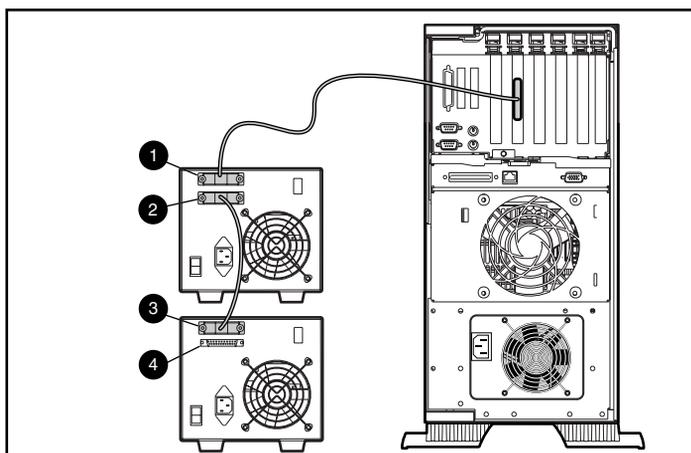
This procedure assumes that one external DLT80 drive is already connected to the server.

1. Choose the right and left front panel labels from the labels provided in the kit. Place over the existing front panel. See [Figure 13](#).
2. If the first drive unit has a terminator on the SCSI connector ②, remove it.
3. Connect the tape drives by placing a SCSI cable between the SCSI connector ② of the first drive to the SCSI connector ③ of the second drive.

---

**Note:** Each drive must have a unique SCSI ID. See "Setting the SCSI ID" for more information.

---



**Figure 15: Connecting multiple external DLT drives**

4. Place the terminator (not shown) on the SCSI connector ④ of the second drive.
5. Power ON all peripheral devices.
6. Power ON the server.

## Completing the Installation

Install the device drivers to complete the installation of the DLT80 drive. See Chapter 4, "Installing Software Drivers," for specific driver installation information.



# Installing Software Drivers

## 4

The following operating environments support the HP StorageWorks DLT80 drives:

- Windows NT
- Windows 2000
- Novell NetWare
- HP Tru64 UNIX
- OpenVMS

## Device Drivers

Device drivers for Intel-based systems can be downloaded from the HP website:

<http://www1.pro.compaq.com/support/TSSD2/default.asp>.

Under Tape Drives, select your model.

1. Download the SoftPaq to a directory on your hard drive. The SoftPaq file that is downloaded is a self-extracting executable with a file name based on the SoftPaq Number above.
2. Execute the downloaded file and follow the on-screen instructions. Press the Space Bar to confirm the unpacking of files into the download directory.
3. After the files have been unpacked, you may delete the self-extracting SoftPaq file downloaded in step 1.
4. For installation instructions, refer to *README.TXT* in the created directory.
5. After the installation is completed, you may delete the files unpacked in step 2.

## Microsoft Windows NT and Windows 2000

---

**Note:** Before starting the driver installation, verify that your tape drive is properly connected. Windows NT 4.0 only allows you to install tape device drivers sequentially. If you have other tape devices installed without drivers, install those drivers before attempting the following procedure, or click Cancel to bypass each tape device.

---

If Web access is unavailable, you can use the drivers included on the CD that shipped with your tape device. Insert the CD and follow the instructions.

## Novell NetWare

If Web access is unavailable, you can use the drivers included on the CD that shipped with your tape device. Insert the CD and follow the instructions.

Be sure to load the drivers in conjunction with the HP controller. There are additional driver issues if you want to use applications requiring the Advanced SCSI Programming Interface (ASPI) support. For more information see the following section.

## ASPI Support

The README.COM on the Novell Software Support Diskette (NSSD) outlines the specific drivers you need to support ASPI tape backup applications.

If you are using a tape backup application that uses the ASPI, such as ARCserve provided by HP or Seagate BackupExec, refer to the information provided with your application NLM to determine whether it uses ASPI.

The HP ASPI drivers, CPQSASPI.NLM Device Driver Functional Specification (DDFS) and NWASPI.NLM NetWare Peripheral Architecture (NWP), provide ASPI support for the HP SCSI architecture for applications that require this interface.

All required drivers for ASPI tape support are provided on the Novell Software Support Diskette (NSSD). The Support Software ships with each server or can be downloaded from the HP website.

The SCSI.RDM file on the NSSD diskette gives complete instructions on how to load these drivers and troubleshoot any problems.

## HP Tru64 UNIX

The HP Tru64 UNIX operating system uses Dynamic Device Recognition (DDR) which allows the operating system to recognize the DLT tape drive.

If the Tru64 UNIX system does not have a DDR entry to identify the DLT tape drive, the system defaults to a generic SCSI device and to the default settings of the tape drive.

## OpenVMS

The OpenVMS operating system uses native SCSI recognition for locally attached SCSI drives, which allows the operating system to recognize the DLT drive. Recognition of the DLT drive allows non-default settings, such as the density setting, to be used.

The DLT drive provides compression (called compaction in OpenVMS terminology) so that the storage capability for tapes can be effectively doubled when the DLT drive has been instructed to turn on compaction. This is known as hardware compaction and should be used instead of the software compaction that is sometimes provided by software products. The DLT drive is instructed by the user to turn on hardware compaction through use of the OpenVMS `INITIALIZE` and `MOUNT` commands. (See these two commands using Open VMS help from the \$ prompt).

The format for the `INITIALIZE` command is:

```
INITIALIZE
/MEDIA_FORMAT
/MEDIA_FORMAT= [NO] COMPACTION
```

The `INITIALIZE` command controls whether data records are automatically compacted and blocked together on any device that supports data compaction. Data compaction and record blocking increase the amount of data that can be stored on a single tape cartridge.

---

**Note:** Once data compaction or non-compaction has been selected for a given cartridge, that same status applies to the entire cartridge.

---

The format for the MOUNT command is:

```
MOUNT
    /MEDIA_FORMAT
    COMPACTION
```

## Example 1

```
$ MOUNT/FOREIGN/MEDIA_FORMAT=COMPACTION MKA400: BOOKS
```

This command performs a foreign mount of a tape with data compaction and record blocking enabled and assigns the logical name BOOKS to the tape.

## Example 2

```
$ INIT/MEDIA_FORMAT=NOCOMPACTION MKA400: BOOKS
$ MOUNT/MEDIA_FORMAT=COMPACTION MKA400: BOOKS
```

This MOUNT command attempts a Files-11 mount of a tape labeled BOOKS with data compaction and record blocking enabled. Because the tape was initialized with compaction disabled, the MOUNT qualifier /MEDIA\_FORMAT=COMPACTION has no effect.

# Operating the DLT80 Tape Drive



This chapter describes:

- Power-On-Self-Test (POST)
- Approved Cartridges
- Operating the DLT Drive
- Front Panel LEDs and Buttons
- Write-Protecting a Cartridge
- Cartridge Handling and Storage

## Power-On-Self-Test (POST)

When power is initially applied, the DLT80 drive performs a Power-On Self-Test (POST). This self-test starts a sequence of events indicated by the front panel LEDs. After you power up the DLT80 drive:

1. All left-side LEDs illuminate for approximately three seconds, then shut off.
2. The Operate Handle, the Write Protect, and the Use Cleaning Tape LEDs turn off.
3. The Tape in Use LED blinks while the cartridge drive initializes.
4. After initializing, if a cartridge is not loaded in the drive, the Tape in Use LED turns off, and the Operate Handle LED illuminates.

---

**Note:** POST will not complete until the Operate Handle is in the down position. If POST is waiting for the handle to be put down, the Operate Handle LED will flash.

---

The drive is now ready for operation.

## Approved Cartridges

The following describes HP-approved cartridges:

**Table 3: Cartridge Types and Formats**

Cartridge Type	Cartridge Formats
HP DLT Tape III	10.0 GB
HP DLT Tape IIIXT	15.0 GB
HP DLT Tape IV	20.0 GB, 35.0 GB, 40.0 GB
<b>Note:</b> DLT 2.6 GB and 6.0 GB tape formats are not supported.	

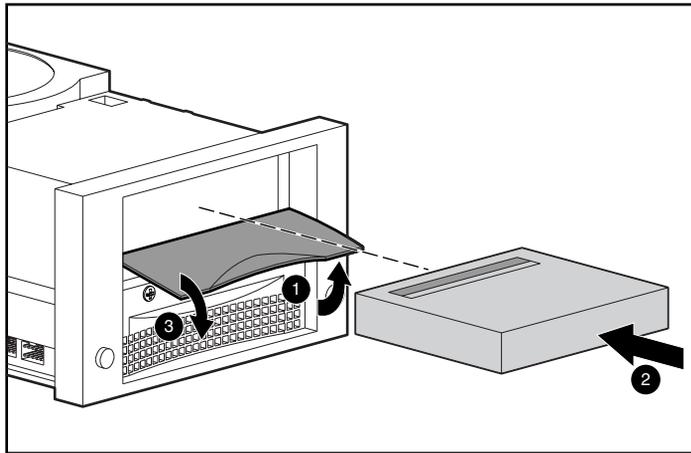
## Operating the DLT80 Drive



**Caution:** When loading or unloading a cartridge, the Operate Handle LED must be illuminated.

### Loading a Cartridge

1. When the Operate Handle LED is illuminated, lift the cartridge insert/release handle ❶.
2. Insert the cartridge ❷.
3. Push the cartridge completely into the drive.
4. Lower the handle ❸ to lock the cartridge in place.



**Figure 16: Loading a cartridge sequence**

Once a cartridge is inserted, the cartridge initialization process begins and the Tape in Use LED flashes. When the cartridge is at the beginning of tape (BOT) marker, the Tape in Use LED illuminates. The cartridge is now ready for use.

## Unloading a Cartridge

Press the Unload button or issue an eject command in the software application.

When the Operate Handle LED illuminates, lift the handle, remove the cartridge, and lower the handle.

## Selecting Drive Density

Drive density can be selected by using any of the following:

- On a write from Beginning of Tape (BOT), change the cartridge density by:
  - Pressing the **Density Select** button multiple times until the desired Density LED flashes. Using the Density Select button always overrides a host selection.
  - Making a programmable host selection through the operating system. (The Density LED is off, indicating automatic or host density selection.)
  - Allowing the drive to default to the density of the cartridge that has been loaded with the data compression ON (assuming the **Density Select** button or the host selection was not used.) If a previous written cartridge is inserted, the drive defaults to the previous density.
- On a prerecorded cartridge, the drive uses the recorded density for all read operations and appended write operations.



**Caution:** If reusing a prerecorded cartridge and writing from BOT, all prerecorded data is lost. Density changes are also lost since they only occur when writing from BOT.

---

Table 4 shows the results of density selection.

**Table 4: Results of Density Selection**

If	Then
The <b>Density Select</b> button wasn't pressed,	The LEDs show the actual density when the cartridge is reading and writing. The LEDs are illuminated steadily and Density LED is off.
The <b>Density Select</b> button was pressed, and if the actual cartridge density is the same as the density selected,	The actual density and the Density LEDs are illuminated. For example, if the actual cartridge density is 20.0 and the selected cartridge density is 20.0, then the 20.0 LED will be illuminated.
The <b>Density Select</b> button was pressed, and if the actual cartridge density differs from the density selected,	<ol style="list-style-type: none"> <li>1. The LED with the actual density is illuminated steadily.</li> <li>2. The LED with the selected density blinks.</li> <li>3. Density LED is illuminated steadily.</li> </ol> <p>For example, if the actual cartridge density is 35.0 and the selected density is 20.0, the 35.0 LED is illuminated steadily, the 20.0 LED blinks, and the Density LED is illuminated steadily.</p>

## Density Select Example

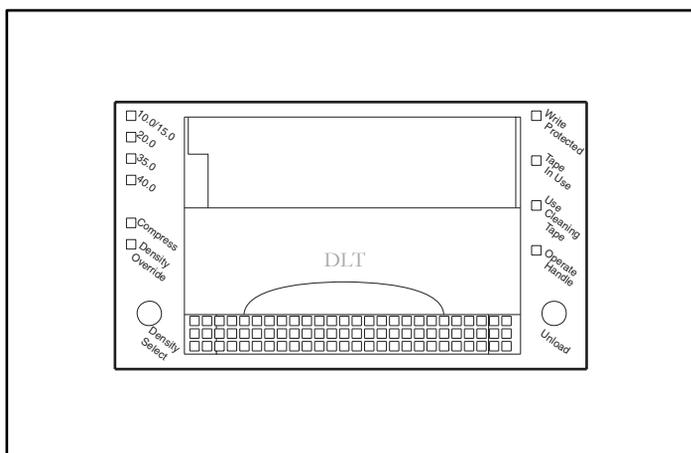
If a cartridge with a prerecorded 20.0 density has been loaded and the Density Select button was pressed to select 35.0 density:

- The 20.0 LED remains illuminated pending the change in density.
- The 35.0 LED flashes indicating a change in density is pending.
- The Density LED illuminates.

When the write from BOT occurs:

- The 20.0 LED shuts off.
- The 35.0 LED changes to on.
- The Density LED remains illuminated.

## Front Panel LEDs and Buttons



**Figure 17: Identifying the front panel**

The following table describes and explains the front panel LEDs:

**Table 5: Front Panel LEDs**

LEDs	Actions	Explanation
Write Protected	ON	Tape is write-protected.
	OFF	Tape is write-enabled.
Tape in Use	Blinking	Tape is moving.
	ON	Tape is loaded; ready for use.
Use Cleaning Tape	ON	A cleaning cartridge is requested.
	OFF	No cleaning required.
Operate Handle	ON	OK to operate the cartridge insert/release handle.
	Blinking	POST not complete. Do not insert cartridge. Place handle down.
	OFF	Do not operate the cartridge insert/release handle.

**Table 5: Front Panel LEDs**

LEDs	Actions	Explanation
10.0/15.0	ON	Tape is recorded in either 10.0 or 15.0 format.
	Blinking	Tape is recorded in another density. This density is selected for a write from BOT.
20.0	ON	Tape is recorded in 20.0 format.
	Blinking	Tape is recorded in another density. This density is selected for a write from BOT.
35.0	ON	Tape is recorded in 35.0 format.
	Blinking	Tape is recorded in another density. This density is selected for a write from BOT.
40.0	ON	Tape is recorded in 40.0 format.
	Blinking	Tape is recorded in another density. This density is selected for a write from BOT.
Compress	ON	Compression mode is enabled. (Compression can be done in all densities.)
	OFF	Compression mode is disabled.
Density Override	ON	Density was selected from the front panel.
	Blinking	In density selection mode.
	OFF (default)	Density to be selected from host.
All right-side or left-side lights	ON	POST is starting.
	Blinking	An error has occurred. See Chapter 7, "Troubleshooting," for more information.

The following table describes the front panel buttons:

**Table 6: Front Panel Buttons**

Control Button	Description
Unload	<p>Starts the cartridge unload sequence. The cartridge must be completely rewound before the cartridge can be removed. When the Unload button is pressed, the DLT drive waits until an active write to cartridge is completed before beginning the unload sequence. If the drive is in an error state (all right-side and left-sided lights are flashing on the front panel), pushing the Unload button causes the drive to reset and unload the tape if possible.</p> <p><b>Note:</b> The cartridge cannot be manually unloaded if there is no power to the DLT drive.</p>
Density Select	<p>Selects desired density. After density is selected, pressing this button turns compression on or off.</p>
Cartridge Insert/Release Handle	<p>The handle lifts to load or eject a cartridge. Lowering the handle locks the cartridge into position.</p> <p><b>Note:</b> When the drive is first powered on, the Cartridge Insert/Release Handle must be in the down position. Operate the Handle only when the Operate Handle LED is illuminated.</p>



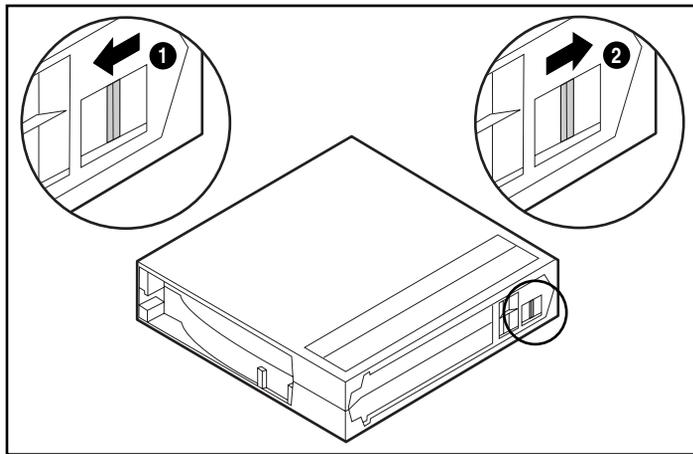
**Caution:** Inserting a cartridge while the Operate Handle LED is flashing may damage the tape drive.

---

## Write-Protecting a Cartridge

The cartridge has a write-protect switch to prevent accidental erasure of data. Before loading the cartridge into the drive, position the write-protect switch on the front of the cartridge. By moving the switch to the left **1**, the cartridge is write-protected and by moving the switch to the right **2**, the cartridge is write-enabled.

If you move the cartridge write-protect switch to the left while the cartridge is in the DLT80 drive, the drive illuminates the write protect LED immediately. If the drive is writing to the cartridge, write-protect does not begin until the current write command completes.

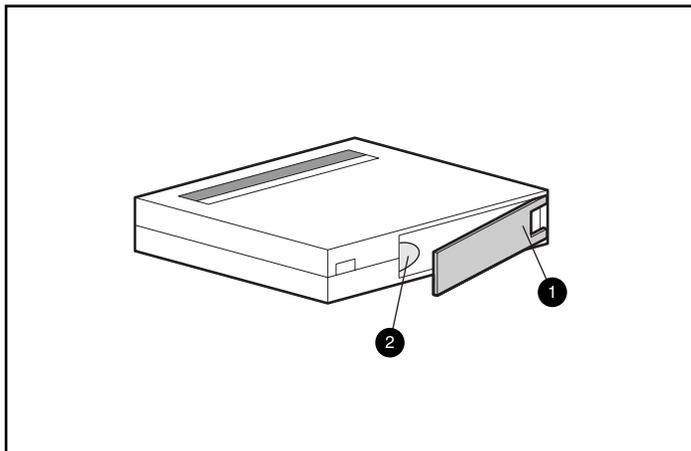


**Figure 18:** Cartridge write-protect switch

## Cartridge Handling and Storage

For longer life of recorded or unrecorded cartridges, store cartridges in a clean environment with these conditions:

- Use cartridge in temperatures between 10°C and 40°C (50°F to 104°F).
- If the cartridge has been exposed to extreme heat or cold, stabilize the cartridge at room temperature for the same amount of time it was exposed up to 24 hours.
- Do not place cartridges near electromagnetic interference sources, such as terminals, motors, and video or X-ray equipment. Data on the cartridge can be altered.
- Store cartridge in a dust-free environment where the relative humidity is between 20% and 80%. For longer cartridge life, store the cartridge at 20% to 40% relative humidity.
- If the cartridge is dropped or damage is suspected, shake the cartridge:
- If it rattles, it is damaged. Restore the data on the cartridge by another means other than using the DLT80 tape drive, and discard the damaged cartridge.
- If it doesn't rattle, check the tape leader ❷ inside the cartridge. To do this, open the door on the rear of the cartridge by releasing the door lock ❶. The tape leader should be in the position shown in [Figure 19](#).



**Figure 19: Checking the tape leader**

# Tape Drive Cleaning



Reliable backup of your system is the product of at least four components:

- A reliable tape drive
- Quality cartridge
- Regular backup schedule with backup media stored offsite
- Tape drive maintenance

## When to Clean the DLT Tape Drive

Routine cleaning of the DLT80 drive is not necessary and can even damage it. The following table describes when the tape drive needs to be cleaned.

**Table 7: When Use Cleaning Tape LED is Illuminated**

If	Then	Action
The Use Cleaning Tape LED is illuminated.	<ol style="list-style-type: none"><li>1. The tape drive needs cleaning.</li><li>2. The data cartridge is bad.</li></ol>	Clean the tape drive using a cleaning cartridge.
After cleaning the drive, using a data cartridge causes the Use Cleaning Tape LED to illuminate.	The data cartridge may be damaged.	Back up the data from the damaged cartridge to a new cartridge and discard the damaged one.*
After cleaning the drive the Use Cleaning Tape LED remains illuminated.	The cleaning is not done and the cleaning cartridge has expired.	Use another cleaning cartridge and discard the old one.
* Using a damaged cartridge may cause unnecessary cleaning of the tape drive.		

---

**Note:** The cleaning cartridge expires after 20 uses.

---

## Importance of HP-Approved Cartridges

HP-approved cartridges are thoroughly tested to meet high-quality standards. Before HP recommends a cartridge the quality and reliability of the magnetic media and the cartridge are evaluated. Do not use unapproved cartridges; they may not be compatible with HP tape drives. See the section "Approved Cartridges" in Chapter 5 for a list of HP-approved cartridges.

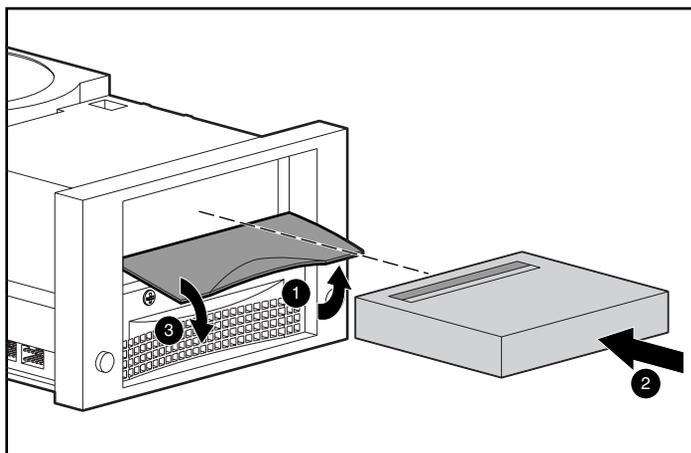
## Cleaning with the Cleaning Cartridge



**Caution:** To clean the heads of the DLT drive, use only cleaning cartridges compatible with the DLT drive.

---

1. When the Operate Handle LED is illuminated, lift the cartridge insert/release handle ❶.
2. Insert the cartridge ❷.
3. Push the cartridge completely into the drive.
4. Lower the handle ❸ to lock the cartridge in place.



**Figure 20: Loading a cleaning cartridge**

When the cleaning cartridge has completed, the Operate Handle LED illuminates.

1. Lift the cartridge insert/release handle ❶.
2. Remove the cartridge.
3. Lower the handle ❷.
4. Record the use of cleaning cartridge by filling the check box on the cartridge label.

---

**Note:** Discard the cleaning cartridge after 20 uses.

---



# Troubleshooting



If the HP StorageWorks DLT80 tape drive fails during POST or operation, use [Table 8](#) to determine the problem and the action to take:

**Table 8: Troubleshooting Chart**

If	Then	Action
The system does not recognize the DLT80 drive,	The system might not be configured to see the SCSI ID.	Configure the system to see the ID.
	The SCSI ID might not be unique.	Change the SCSI ID and reconfigure the system. The new ID is effective at the next power-on.
	The parameters for the SCSI adapter might be incorrect.	Check the SCSI ID adapter installation.
	The SCSI signal cable might be loose.	Make sure the connector on each end of the cable is seated.



**Table 8: Troubleshooting Chart**

If	Then	Action
Fatal or nonfatal errors occur for which a cause cannot be determined,	Determine if the tape drive recognized an error.	Run the Basic Health Check (BHC) test.
	The bus termination or SCSI signal cable connections might be incorrect.	Ensure the SCSI bus is terminated.
	The AC main power source grounding might be incorrect	Ensure the SCSI bus is terminated.

After taking the action listed in [Table 8](#), power ON the DLT80 drive to rerun POST. If all right-side or left-side LEDs blink again, hardware failure is likely.

## Basic Health Check (BHC) Test

The BHC uses the tape drive system's firmware to check the various EEROM-based information packets for log entries of events that occurred in the previous 120 hours of operation. Based on that information, the system can report on its "health." This test is pass/fail only.

To run the BHC:

1. Press and hold the **Density Select** button for five seconds. The Density Override LED flashes for five seconds. After the five seconds, the top two density LEDs will illuminate.

---

**Note:** If the **Density Select** button is held for less than five seconds, the BHC test will not run and the density LEDs return to their original state.

---

2. Release, then momentarily hold the **Density Select** button. The top two density LEDs will flash, indicating that the BHC test is running. The two density LEDs continue to flash while the test proceeds.

---

**Note:** If the **Density Select** button is not released then momentarily pressed again, the BHC test will not run and the density LEDs return to their original state.

---

3. If the test passes, the top four density LEDs illuminate steadily for five seconds, then return to their original state.
4. If the test fails, the top four density LEDs flash on and off for five seconds, then return to their original state.

If the BHC test fails, hardware failure is likely. Contact the HP Technical Support Center for help. See the "About This Guide" section for information on contacting the support center.

## Upgrading Firmware

The HP Library and Tape Tool (L&TT) is a tape management and diagnostic tool to help you install and support your HP storage product. In addition to the diagnostic and troubleshooting ability of L&TT, it offers useful information about your products and provides automated firmware update checks from the Internet, with the ability to retrieve the latest firmware versions.

Complete instructions and download of L&TT are available at:

[www.hp.com/support/tapetools](http://www.hp.com/support/tapetools)

# Regulatory Compliance Notices



## 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 (i.e., personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

### Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

## Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

## 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.

## Declaration of Conformity for products marked with the FCC logo - United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 530113  
Houston, Texas 77269-2000

Or, call

1-800- 652-6672

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 510101  
Houston, Texas 77269-2000

Or, call

(281) 514-3333

To identify this product, refer to the Part, Series, or Model number found on the product.

## **Canadian Notice (Avis Canadien)**

### **Class A Equipment**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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

### **Class B Equipment**

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

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

## European Union Notice



Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

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

- EN 55022 (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
- EN 60950 (IEC 60950) - Product Safety

## China Taiwan Notice

### 警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。



# Electrostatic Discharge



## B

To prevent damage to 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.

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.

## 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  $\pm$  10 percent resistance in the ground cords. To provide proper grounding, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

---

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

---

# Specifications



## Dimensions and Weight

Table 9: Dimensions and Weight

Dimension	Internal Drive without rails	External Drive
Height	3.40 in (86.3 mm)	6.3 in (160.02 mm)
Width	5.87 in (149.0 mm)	6.9 in (175.26 mm)
Depth	9.60 in (243.8 mm)	12.8 in (325.12 mm)
Weight	6.44 lbs (2.9 kg)	14.0 lbs (6.35 kg)

## Altitude

Table 10: Altitude

Action	Feet
Operating	-500 to 40,000 feet

## Acoustic Emissions

Acoustic - declared values per ISO9296 and ISO 7779/EN27779.

**Table 11: Acoustic Emissions**

	Sound Power Level $L_{WA,d,B}$		Sound Pressure Level $L_{pMax}$ dBA (bystander position)	
	Idle	Operate (streaming)	Idle	Operate (streaming)
Internal Drive	N/A	5.7	N/A	45
External Drive	5.2	5.5	37	41
<b>Note:</b> Current values for specific configurations are available from HP representatives. 1 B = 10dBA.				

## Temperature and Humidity Ranges

**Table 12: Temperature and Humidity Ranges**

Actions	Temperatures	Humidity
Operating	50° to 104° F (10° to 40° C)	20% to 80% RH, noncondensing Maximum wet bulb temperature = 25° C (77° F)
Non-operating (mech.)	50° to 104° F (10° to 40° C)	10% to 90% RH, noncondensing Maximum wet bulb temperature = 25° C (77° F)

## Power Requirements

**Table 13: Power Requirements - Internal Drives**

Voltage	Typical	Maximum
+5 V (+/-5%) bus*	2.8 A	4.35 A
+12 V (+/-5%) bus*	1.2 A	4.5 A
* Voltage is measured at the power bus connector pins.		

**Table 14: Power Requirements - External Drive**

Voltage	Maximum Power
100-240V VAC	56 W

## Air Cooling Requirement

**Table 15: Air Cooling Requirement**

Ambient Temperature	Air flow velocity of 125 linear feet per minute
<b>Note:</b> Air flow is measured directly in front of the bezel.	



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