

LTO Ultrium Tape Drives Getting Started Guide

Abstract

This guide describes how to install an LTO Ultrium tape drive and is intended for system administrators who need to install an internal tape drive in a server or attach an external tape drive to a server.

Legal and notice information

© Copyright 2014 Hewlett-Packard Development Company, L.P.
The information contained herein is subject to change without notice.

Acknowledgments

Windows® is a U.S. registered trademarks of the Microsoft group of companies.

UNIX® is a registered trademark of The Open Group.

Contents

1 Overview.....	5
2 Installing an internal tape drive.....	7
Before you start.....	7
Mounting requirements.....	7
Remove the server cover.....	7
Attach mounting hardware.....	8
Mounting rails.....	8
Mounting screws.....	8
SCSI internal tape drives — check the SCSI ID.....	9
Install the tape drive.....	10
Connect data and power cords.....	11
SAS tape drives.....	11
SCSI tape drives.....	14
Where should the SCSI terminator be?.....	15
Secure the drive.....	16
Mounting hardware used.....	16
No mounting hardware used.....	17
3 Installing an external tape drive.....	19
Connecting an external SCSI tape drive.....	19
Check the SCSI ID.....	19
Connect the SCSI cable.....	19
Does the tape drive need a terminator?.....	20
Connect the power cable.....	21
Connecting an external SAS tape drive.....	21
4 Verifying the installation.....	23
5 Specifications and requirements.....	25
A Regulatory information.....	27
Belarus Kazakhstan Russia marking.....	27

1 Overview

With LTO Ultrium tape drives you can back up large quantities of data onto removable tape cartridges. The tape drives employ dynamic data rate matching to adjust to the speed of the host, reducing wear and tear on both the drive and media and increasing performance, even on slower hosts.

2 Installing an internal tape drive

Before you start

Installing an internal tape drive requires that the server has an available SAS port that supports tape drives. In most cases you will need to purchase and install an additional SAS host bus adapter (HBA) or locate an unused SAS port on an existing SAS HBA that supports tape drives.

You will need a cable to connect the tape drive to the HBA SAS port. The tape drive has an SFF-8482 port. Check with the manufacturer for recommended cables suitable for your server's SAS port.

Mounting requirements

You need one industry-standard, 5¼-inch full-height or half-height bay in which to install the LTO Ultrium tape drive.

For many servers, no mounting tray or rails are required. Devices simply slide into the server's chassis and are fixed with screws. Other servers have built-in trays or rails. Rail kits for a number of industry-standard servers may be available.

Some servers use non-standard mounting rails and do not include spares. If this is the case with your system, you will have to order these accessories from the server manufacturer before you can install the tape drive.

Remove the server cover

WARNING! To avoid personal injury or damage to the server or tape drive, ensure that the server is disconnected from the mains power supply while you install the drive.

CAUTION: Static electricity can damage electronic components. Always wear an antistatic wriststrap if one is available. If not, after you have disconnected power from the server and removed the cover, touch a bare metal part of the chassis. Similarly, touch a bare metal part of the drive before installing it.

1. Assemble the necessary tools and materials:
 - Phillips screwdriver
 - Flat-bladed screwdriver (if your server uses slotted screws)
 - Torx screwdriver (if your server uses torx screws)
 - Your server manuals (for reference during installation)
2. Perform a normal system shutdown and turn off the server and any connected peripherals. Ensure that the server is disconnected from the mains power supply.
3. Remove the cover and front panel from the server, as detailed in your server's documentation.

As you work inside the server, you may have to disconnect other signal cables or power cords from other devices to maneuver the new drive into place. If you have to do this, make a note of their position and connections so you can put them back correctly later.

NOTE: For a full-height drive, the server must provide forced cooling and be capable of drawing 6 cfm (0.17 m³/minute or 10.08 m³/hour) of air through the tape drive at 35° C ambient operation. This rises to 8 cfm at 40° C ambient operation.

For a half-height drive, the server must provide forced cooling and be capable of drawing 6 cfm (0.17 m³/minute or 10.08 m³/hour) of air through the tape drive at up to 40° C ambient operation. This reduces to 4 cfm at 35° C ambient operation.

Ensure that empty bays have the appropriate blanking plates installed so that airflow is maintained.

4. Remove the filler panel from a spare 5¼-inch bay of your server, as described in your server's documentation. With some servers you must also remove the half-height device divider.

Attach mounting hardware

If your server requires special rails or other hardware to install the tape drive, mount them on the tape drive now.

If your server does not require special mounting hardware, proceed to Install drive (page 10) now.

NOTE: If mounting hardware is supplied with your tape drive, it may not be exactly the same as shown in the illustrations.

Different models of server require different mounting methods. The server may also incorporate a locking mechanism to hold the tape drive in place. See Secure the drive (page 16).

Refer to your server documentation to ascertain the correct method of mounting, and to check whether mounting hardware is provided with the server.

Mounting rails

Some servers require mounting rails. These may be metal or plastic rails attached to the server's drive bay filler panel. Some servers have snap-on mounting rails attached to the filler panel. These can be removed and attached to the tape drive with screws.

Use a regular Phillips screwdriver to attach the appropriate rails. Use the 4mm M3 screws provided with the tape drive, in the screw pack labeled 'General Mounting Screws', as shown below.

If you cannot tighten the screws, use the washers provided in the pack.

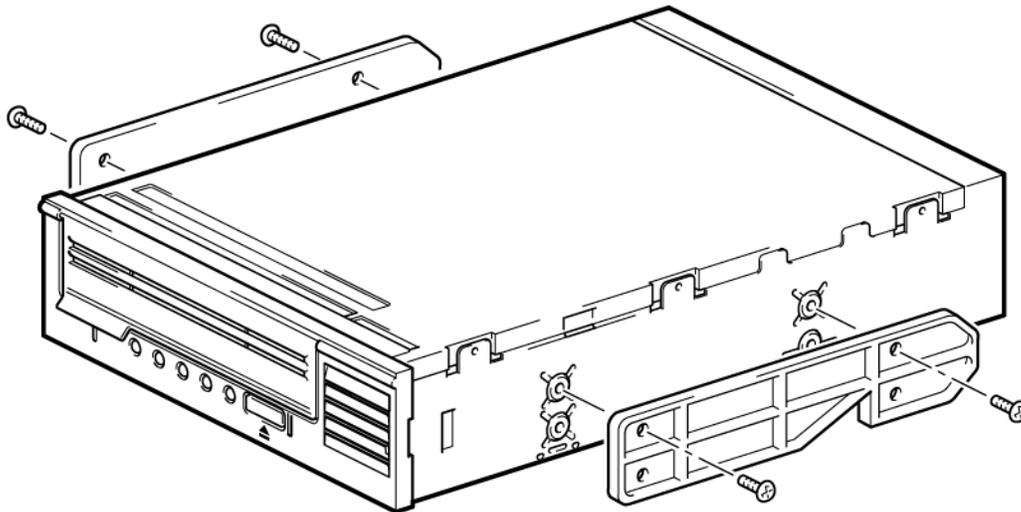


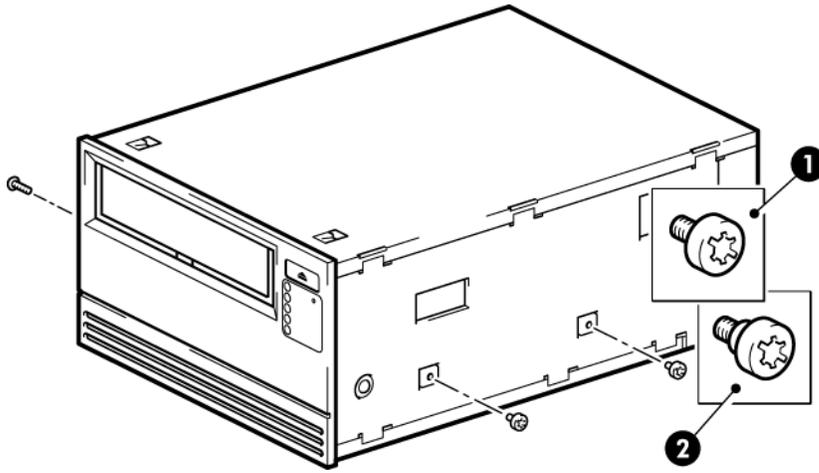
Figure 1 Attaching mounting rails

CAUTION: Ensure you use the 4mm M3 screws provided. The rails may be attached to the filler panel by screws of a different thread/size type and these should **not** be used. If the screws are too long, they may penetrate the mechanism and void the warranty.

Mounting screws

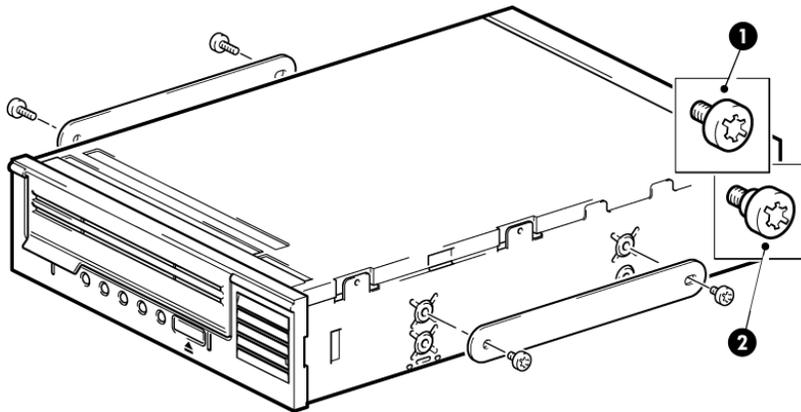
Some servers use special locating screws without a mounting rail.

Use a T8 Torx screwdriver to attach the appropriate screws. Locate both screws lightly in position before tightening, as shown in the following figure.



1. 3mm mounting screws
2. Shoulder mounting screws

Figure 2 Attaching locating screws on a full-height drive



1. 3mm mounting screws
2. Shoulder mounting screws

Figure 3 Attaching locating screws on a half-height drive

SCSI internal tape drives — check the SCSI ID

The LTO tape drive is shipped with a default SCSI ID of 3. Each device on the SCSI bus must have a unique SCSI ID number. The drive can be assigned any *unused* ID between 0 and 15. Do not use SCSI ID 7, which is reserved for the SCSI controller. SCSI ID 0 is typically assigned to the boot disk and should also not be used unless the tape drive is on a dedicated SCSI bus.

CAUTION: Static electricity can damage electronic components. Always wear an antistatic wriststrap if possible. If not, to equalize the electromagnetic charges, touch a bare metal part of the server (such as the back plate) before you remove the tape drive from its bag.

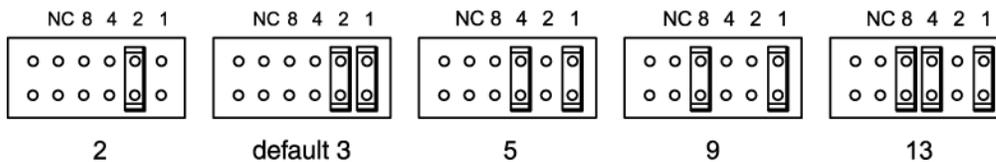
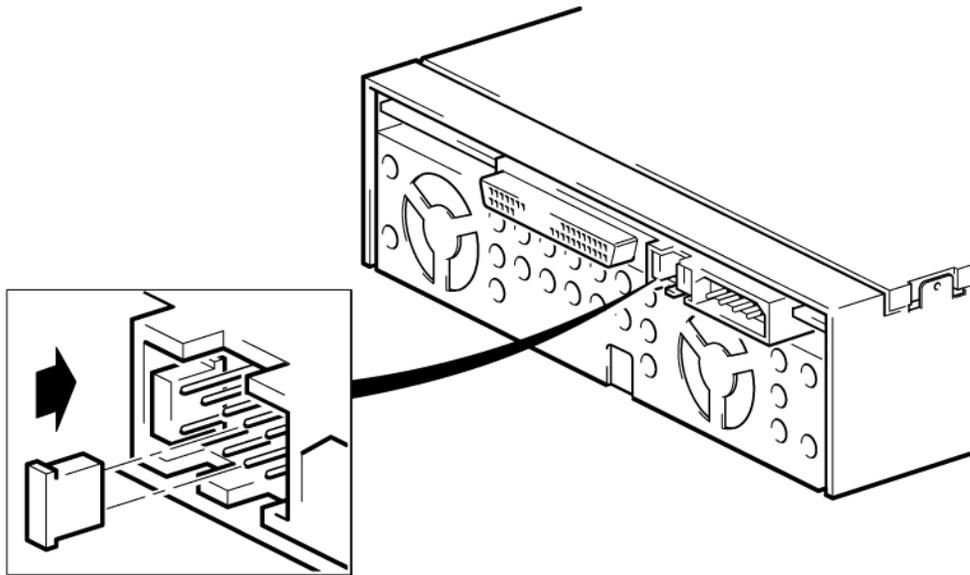


Figure 4 Checking the SCSI ID

1. Determine whether you need to change the SCSI ID from the default of 3.
2. Change the tape drive's SCSI ID, if necessary.

The SCSI ID is set using jumpers on a set of pins at the rear of the drive, as shown in the above diagram. Use tweezers or small pliers to move the jumpers to the pattern corresponding to the ID you want. Spare jumpers are provided with the drive.

Install the tape drive

NOTE: If cable access for the tape drive bay is awkward, it may be easier to access power and other connections if the tape drive is installed in the top bay. You may need to move other devices to lower bays to achieve this. Refer also to your server documentation.

Slide the tape drive into the open bay, aligning the tray or rails with the slots in the bay.

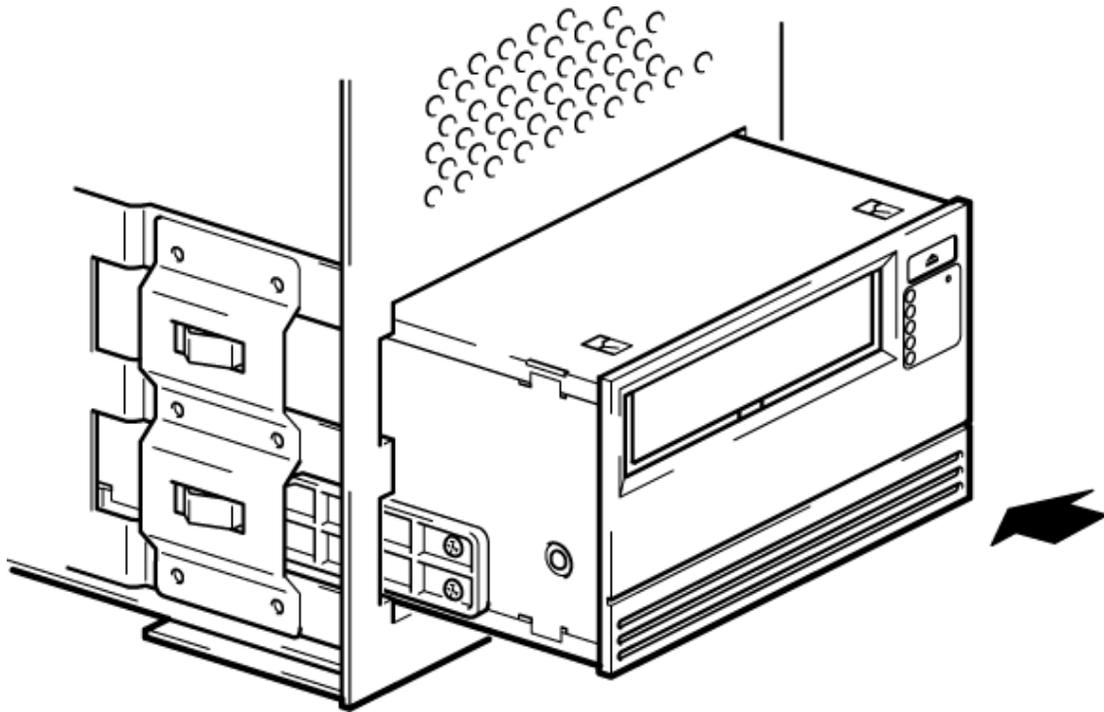


Figure 5 Installing the tape drive

NOTE: The illustration shows a server that uses mounting rails. If your server does not use mounting hardware, check that the holes in the chassis are aligned with the holes in the side of the tape drive.

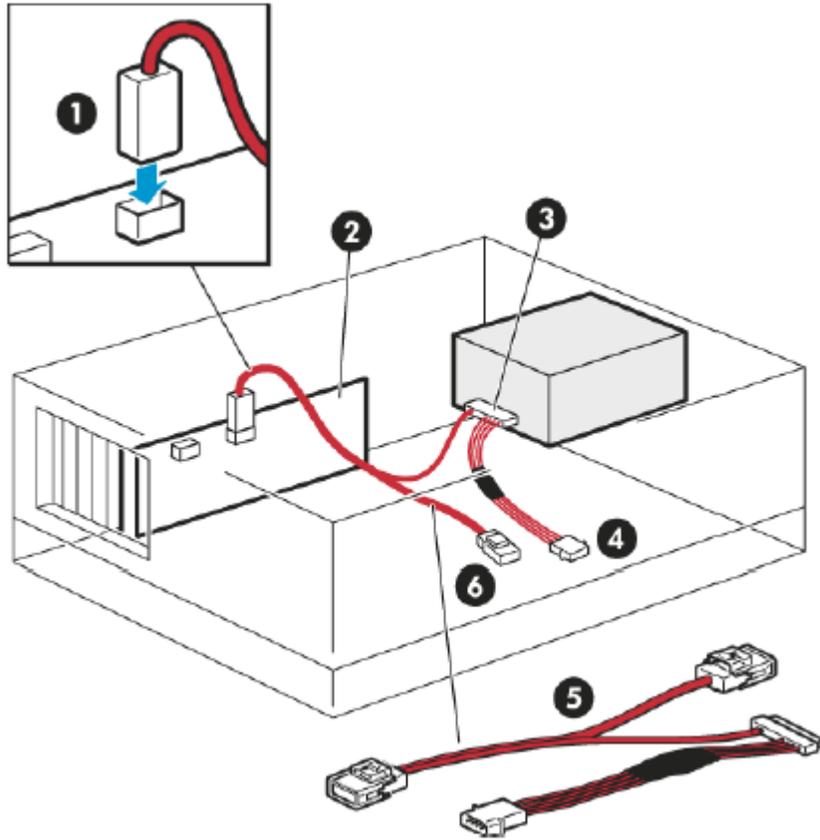
Do not secure the drive at this point because you may have to move the drive to get the cables into place.

Connect data and power cords

SAS tape drives

The following instructions are valid **ONLY IF** you have purchased and installed an additional HBA. Refer to the server documentation if you are connecting the tape drive to an unused port on a SAS controller.

1. If necessary, install a new HBA. Follow the instructions supplied with the HBA to install it and its driver.
2. Connect the HBA end of the SAS cable to the new HBA.

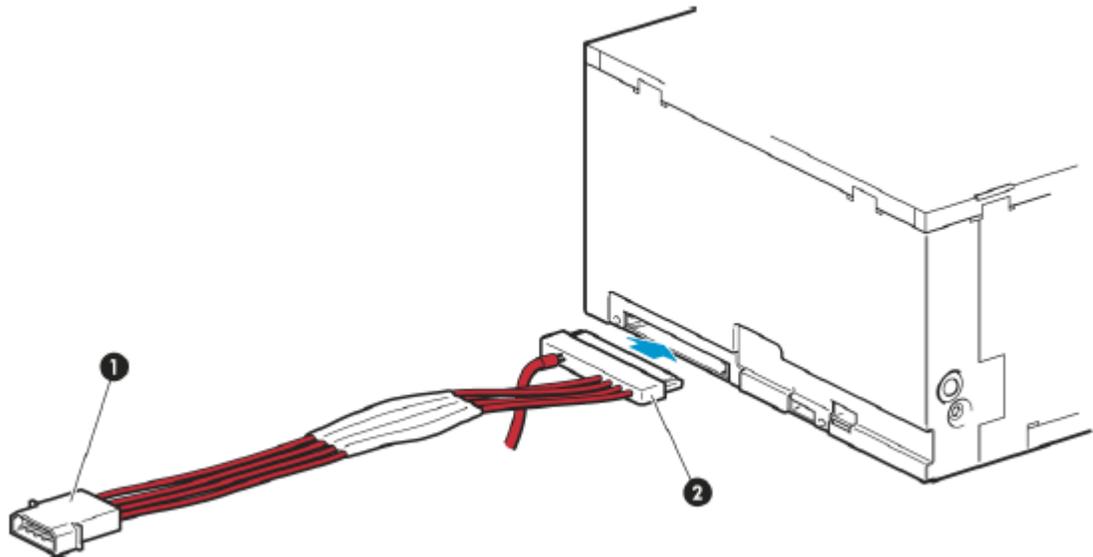


- | | | | |
|----|---|----|---|
| 1. | Remove plastic cover and connect SAS cable to new HBA | 2. | New SAS HBA |
| 3. | SAS connector to tape drive | 4. | Power connector to server (LTO-6 and LTO-5 only) |
| 5. | Example SAS cable (not included in product) | 6. | Unused connector on SAS cable (do not remove plastic cover) |

Figure 6 Cabling to a new HBA

3. Connect the other end of the SAS cable to the tape drive.

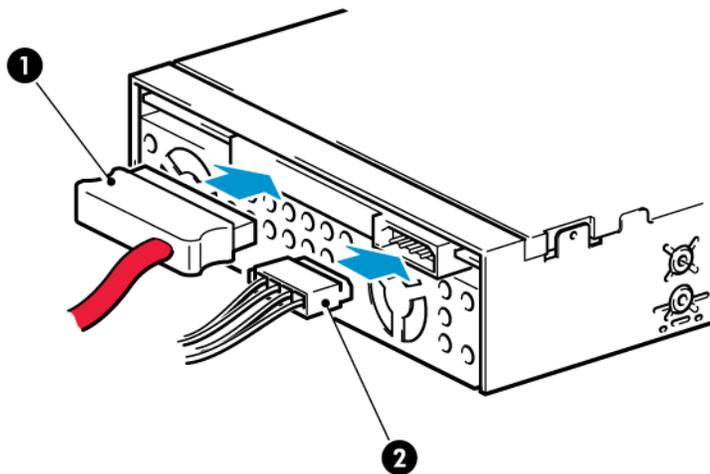
LTO-6 and LTO-5 tape drives: Connect a spare power cable from the server's internal power supply to the power connector on the SAS data cable.



1. Power connector
2. SAS connector to tape drive

Figure 7 Connecting cables to the LTO-6 and LTO-5 tape drive

All other LTO Ultrium tape drives: Connect a spare power cord from the server's internal power supply to the power connector on the tape drive.



1. SAS connector
2. Power connector

Figure 8 Connecting cables to all other LTO Ultrium tape drives

CAUTION: Never use a cable where power is supplied through the SAS connector because this may damage the drive. Always use a spare power cord from the server's internal power supply. This caution does not apply to LTO-6 and LTO-5 tape drives.

4. This will leave unused SAS cabling within the server because the other SAS connector is not required in this configuration. Coil and secure the unused cabling so that it does not interfere with other components inside the server.

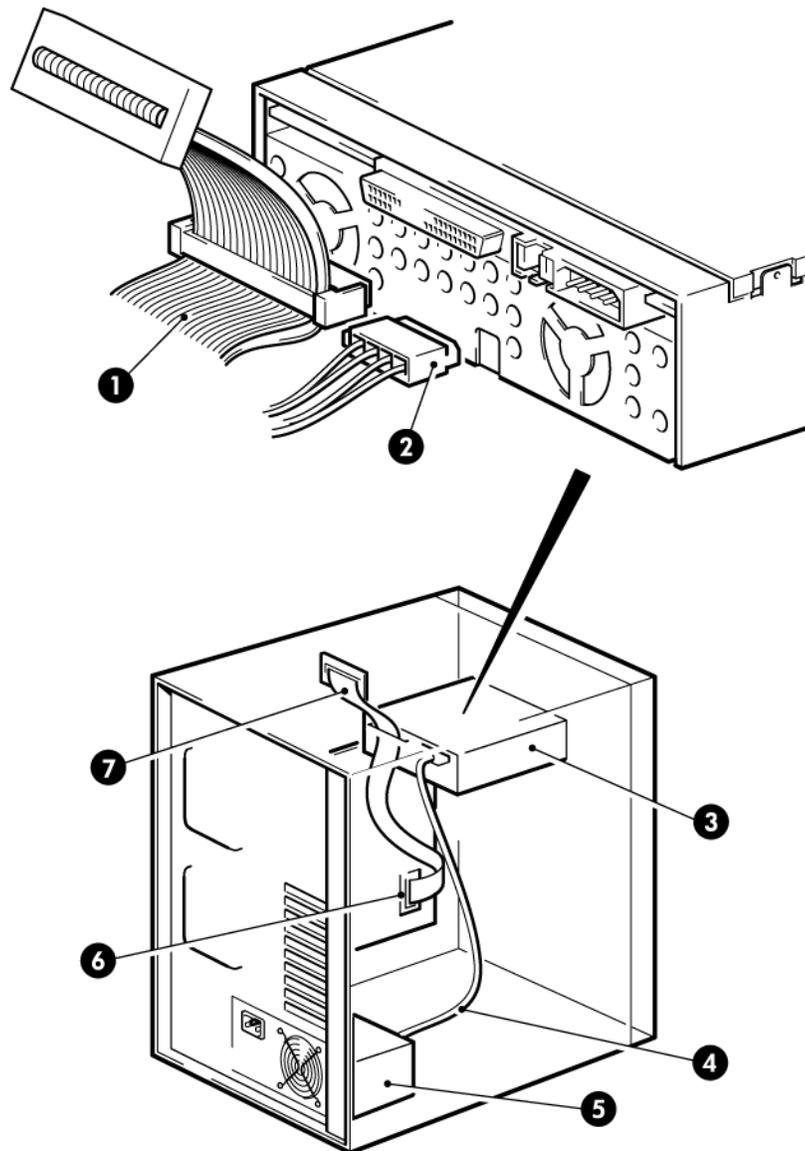
SCSI tape drives

To support the high performance of the tape drive it is important that you connect to a recommended SCSI bus and use a suitably-rated SCSI cable.

1. Check your server or HBA documentation to ensure that the SCSI bus and cabling supports the tape drive's bus speeds: Ultra320 for LTO-4 and LTO-3 tape drives, Ultra160 for LTO-2 tape drives.
2. Attach the SCSI ribbon cable supplied with the tape drive to the SCSI host bus adapter and connect it to the SCSI connector of the drive.
3. Attach a spare power cable from the server's internal power supply to the power connector.
4. Attach a spare connector on the server's built-in SCSI bus or HBA's SCSI ribbon cable to the SCSI connector of the drive.

5. If the drive is the last device on the SCSI chain, make sure that the SCSI cable is terminated correctly.

Daisy-chaining two devices is not recommended. If you do so, do not mix drive families (only daisy-chain with other Ultrium tape drives) and do not daisy chain any Ultra320 devices.



- 1 and 7 terminated SCSI cable
- 2 and 4 power cable
- 3 tape drive
- 5 server's power supply
- 6 SCSI controller

Figure 9 Connecting power and SCSI cables

Where should the SCSI terminator be?

Termination must be present at two and ONLY two positions on the SCSI bus—at the beginning of the SCSI bus and at the end of the SCSI bus. Termination is normally enabled by default on the HBA and most internal SCSI cables have a terminator attached. This will usually be a small, rectangular block of plastic attached to the cable end and marked 'SCSI Terminator'.

Therefore, assuming the HBA is the first device on the bus, you should check that the second terminator is placed after the last device.

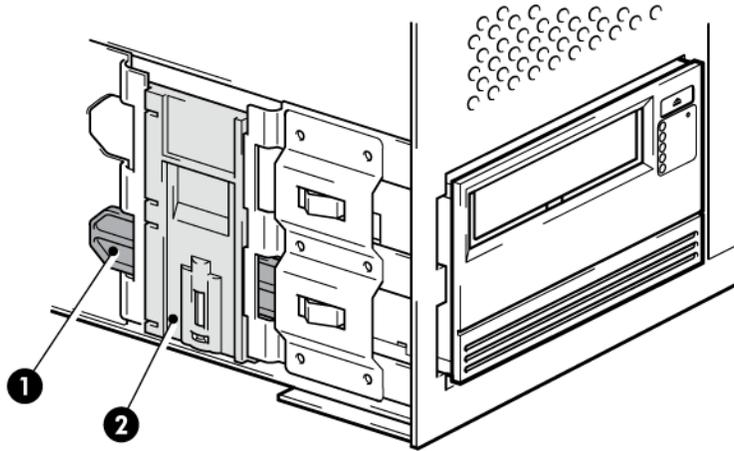
Secure the drive

NOTE: The server latches and side views of your server model may not be exactly the same as shown in the illustrations. See the server documentation.

Mounting hardware used

Ensure that you use the correct mounting rails or locating screws, as described in Attach mounting hardware - some servers (page 8). The server used in the illustration below has a locking mechanism to hold the tape drive in place.

1. Push the server latch down to lock the tape drive into position, as shown in the following figure.



1. Plastic rail
2. Server latch

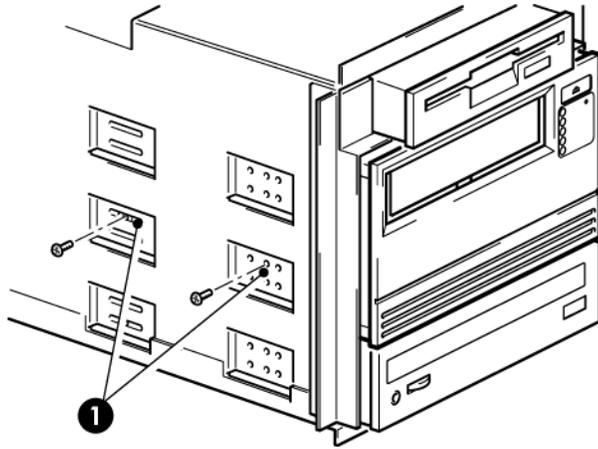
Figure 10 Securing the drive, mounting hardware used

2. Ensure blanking plates are in place over empty bays and replace the cover on the server.

No mounting hardware used

1. Use the 4mm M3 screws provided with the tape drive. Check that the holes in the chassis are aligned with the holes in the sides of the drive and use a regular Phillips screwdriver to secure the M3 screws, as shown in the following figure.

If you cannot tighten the screws, use the washers provided in the pack.



1. M3 screws, supplied with tape drive

Figure 11 Securing the tape drive, no mounting hardware used

2. Ensure blanking plates are in place over empty bays and replace the cover on the server.

3 Installing an external tape drive

This chapter describes how to connect your tape drive to an external port on the host controller or new HBA.

You will need a cable to connect the tape drive to the external port. The SAS tape drive has an SFF-8088 port. Check with the manufacturer for recommended cables suitable for your server's SAS port.

Connecting an external SCSI tape drive

Check the SCSI ID

The LTO tape drive is shipped with a default SCSI ID of 3. Each device on the SCSI bus must have a unique SCSI ID number. The drive can be assigned any *unused* ID between 0 and 15. Do not use SCSI ID 7, which is reserved for the SCSI controller. SCSI ID 0 is typically assigned to the boot disk and should also not be used unless the tape drive is on a dedicated SCSI bus.

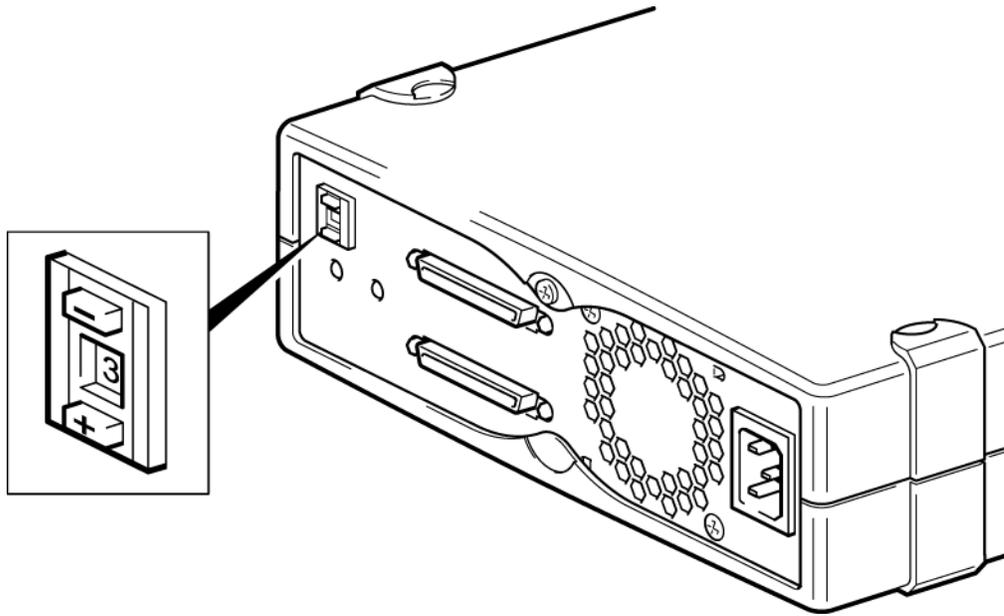


Figure 12 Setting the SCSI ID

1. Determine whether you need to change the SCSI ID from the default of 3.
2. Change the tape drive's SCSI ID, if necessary.

Use a small screwdriver or a ball-point pen to press the indented SCSI ID selector buttons on the rear panel until the required value is displayed. Do not use a pencil because small bits of graphite could contaminate the drive.

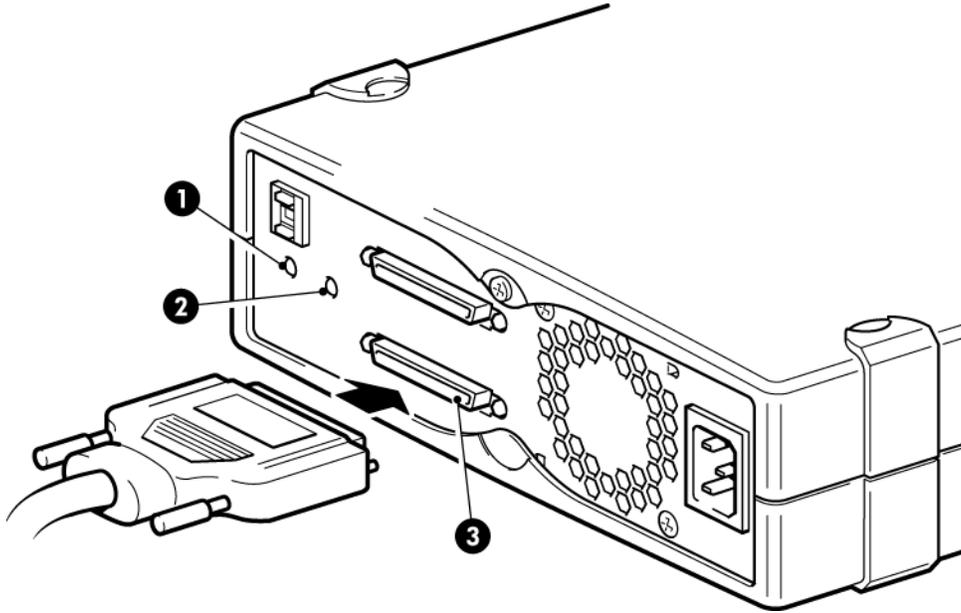
NOTE: The server and the tape drive SCSI IDs are only checked at power-on. To change the SCSI ID after installation, power down both the server and the tape drive, change the drive's SCSI ID, power up the tape drive, and then power up the server.

Connect the SCSI cable

A 68-pin, wide VHD-to-HD SCSI cable is required to connect your LTO tape drive to a VHD SCSI port on an LVD SCSI bus. If your server has an HD SCSI port, you must either purchase and install a VHD-to-HD adapter or use an HD-to-HD cable instead of the supplied cable. Refer to the manufacturer's web site for recommended products.

CAUTION: To avoid damaging the computer or tape drive, ensure that both are powered off while you attach the SCSI cable.

1. Make sure you are connecting to a recommended SCSI bus type. For optimum performance your tape drive should only be connected to a SCSI bus that can transfer data at a rate that supports the tape drive's maximum burst transfer speed. Do **not** connect the tape drive to a single-ended SCSI bus or to a RAID controller. For optimum performance, we recommend that your LTO tape drive is installed on a dedicated SCSI bus. If it is not, do not connect it to the same bus as your disk drive.
2. Perform a normal system shutdown and turn off the server and any connected peripherals.
3. Attach the VHD connection on the SCSI cable to the server's external SCSI connector and secure it by tightening the screws.



- 1 Act TERM LED
- 2 Fan/Power LED
- 3 SCSI-IN connector

Figure 13 Connecting the SCSI cable

4. Attach the HD connection on the SCSI cable to the SCSI-IN connector on the rear panel of the tape drive and secure it by tightening the screws. Do **not** connect the cable to the SCSI-OUT connector.

NOTE: The SCSI-OUT connector is only used when daisy-chaining two devices. This is not recommended. If you do so, do not mix drive families (only daisy-chain with other LTO tape drives) and do not daisy chain Ultra320 tape drives.

Does the tape drive need a terminator?

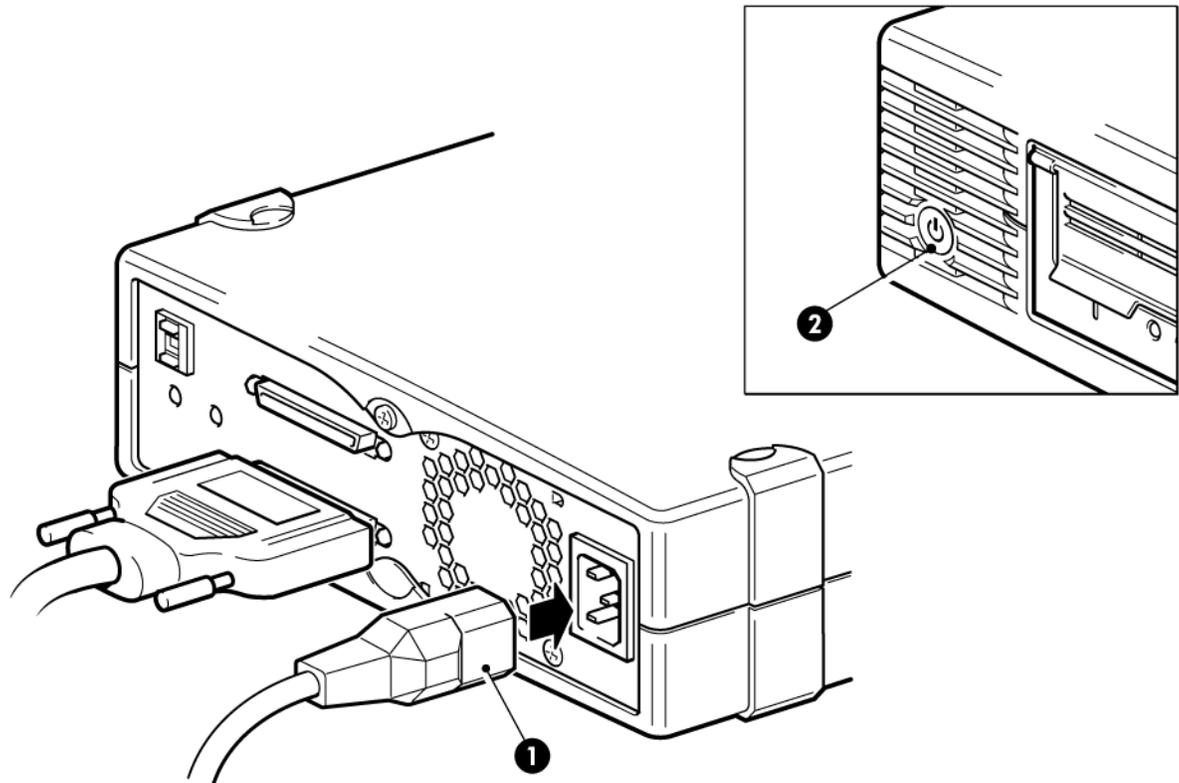
If the tape drive is on a dedicated SCSI bus, it does not require a terminator. When the cable is connected to the SCSI-IN connector, the enclosure provides active termination.

If it is not the only device on the SCSI bus, you must make sure that the SCSI bus is terminated. You can do this in two ways:

- Place the tape drive at the end of the chain and attach the HD connection on the SCSI cable to the SCSI-IN connector; the enclosure provides active termination.
- Attach the HD connection on the SCSI cable to the SCSI-IN connector and use the SCSI-OUT connector on the tape drive to connect to the next device in the chain. Make sure that the last device in the chain is terminated with an LVD multimode terminator

Connect the power cable

1. Plug the power cable securely into the socket on the rear panel of the drive.
2. Plug the other end of the power cable into the power outlet. The power on/off switch is on the front panel, see Figure 14 (page 21).



- 1 Power cable
- 2 Power on/off switch

Figure 14 Connecting the power cable

Connecting an external SAS tape drive

This installation connects the tape drive directly to the external port.

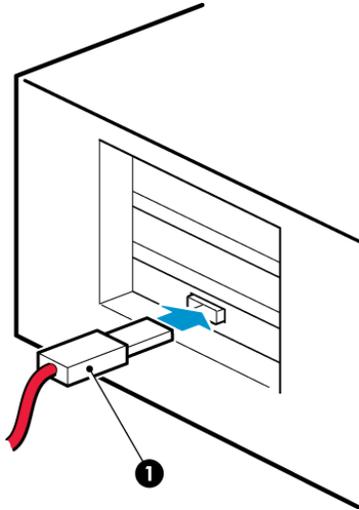
If the server does not have an active external port, you must purchase and install an additional HBA that supports external connection. If you are installing a new HBA, a spare PCI slot is required for the new HBA.

WARNING! Use of an unapproved power cord may result in: 1) not meeting individual country specific safety requirements; 2) insufficient conductor ampacity that could result in overheating with potential personal injury and/or property damage; and 3) an unapproved power cord could fracture resulting in the internal contacts being exposed, which potentially could subject the user to a shock hazard. The manufacturer disclaims all liability in the event an unapproved power cord is used.

NOTE: If you use a recommended cable to attach directly to the external SAS port and the tape drive does not function, one possible cause is that the port is inactive or not supported for external tape devices. See your server documentation for information on supported configurations.

1. If installing a new HBA, follow the instructions supplied with the HBA to install it and its driver.

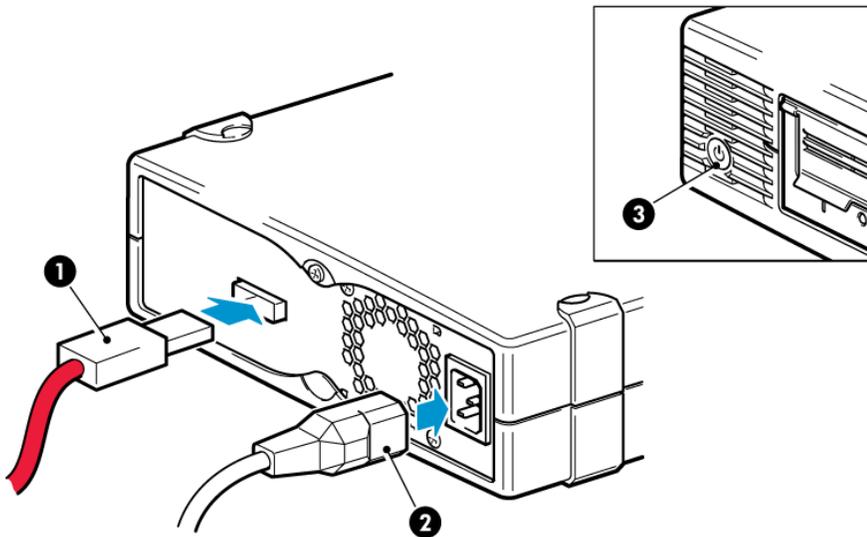
2. Connect the HBA end of the SAS cable to the external SAS connector on the host SAS controller or new HBA.



1. SAS connector on server

Figure 15 Connecting the SAS cable to the server

3. Connect the SAS and power cords to the tape drive and plug the other end of the power cord into the power outlet.



1. SAS connector

2. Power connector

3. Power on/off switch

Figure 16 Connecting the cables to the tape drive

4 Verifying the installation

Once you have installed the drive hardware, power on the tape drive and server, check that drivers have been installed correctly and you have the correct version of backup software, and verify that the tape drive is functioning properly before you store your valuable data.

1. Power on the tape drive and then the server. The tape drive power on/off switch is on the front panel.

Watch the boot screen carefully after installation. If there are any error or unexpected messages check the SAS cabling.

If this does not resolve the problem, see the user guide for further troubleshooting information

2. The tape drive will run its hardware self-test, which takes about 5 seconds. If the self-test passes, the green Ready LED flashes and then shows steady green. If the test fails, the Drive Error and Tape Error LEDs flash, while the Ready and Clean LEDs are off. This continues until the drive is reset.

- **If you installed drivers before connecting the tape drive (Windows only)**

The tape drive should be detected automatically and the correct drivers used. If the **Windows Found New Hardware** wizard runs, cancel it - you can use Device Manager to check that the driver is installed.

- **Installing drivers after connecting the tape drive (Windows only)**

If you have not already installed drivers, the **Windows Found New Hardware** wizard will run when you power on the server and tape drive. Follow the on-screen instructions to search for the required driver on your server. If necessary, download the driver from the manufacturer's website.

- **Installing drivers (other operating systems)**

Drivers are included with the operating system and should be loaded automatically. To upgrade drivers we recommend that you patch to the latest version of the operating system.

NOTE: Some backup applications require the use of their own tape driver.

3. Verify that the tape drive installation was successful.
4. For all operating systems ensure that you have downloaded any upgrades necessary for your backup application. Check the manufacturer's website for software compatibility information and install any recommended upgrades.
5. Carry out a backup and restore test to check that the drive can write data to tape. Use a blank cartridge.

Windows Backup or UNIX native backup applications can be used to check basic tape drive operation, but they will not support all the advanced features of your tape drive. We recommend that you upgrade your software application before running this test.

5 Specifications and requirements

Table 1 Physical specifications for full-height drives

	Internal	External
Physical (HxWxD)	8.3 x 14.6 x 20.7 cm	12.0 x 21.8 x 29.7 cm
Shipping (HxWxD)	27.0 x 27.0 x 33 cm	28 x 31 x 39 cm
Weight, out of box	2.24 kg	5.57 kg
Weight, shipping	3.6 kg	7.3 kg

Table 2 Physical specifications for half-height drives

	Internal	External
Physical (HxWxD)	4.1 x 14.5 x 20.6 cm	12.0 x 21.8 x 29.7 cm
Shipping (HxWxD)	24 x 31 x 39 cm	24 x 31 x 39 cm
Weight, out of box	1.45 kg	4.65 kg
Weight, shipping	2.3 kg	5 kg

Table 3 Environmental specifications for LTO Ultrium tape drives

Characteristic	Specification
Temperature	
Operating	10° to 35° C if 6 CFM airflow is provided 10° to 40° C if 8 CFM airflow is provided for full-height drives, 5 CFM airflow is provided for half-height drives
Storage	-40° to 66° C
Humidity	
Operating	20 to 80% RH (non-condensing, max wet bulb temperature = 26C)
Non-operating	10 to 95% RH (non-condensing, max wet bulb temperature = 26C)
Miscellaneous	
Altitude	4000 meters
Dust concentration	less than 200 microgram / cubic meter

Table 4 Power specifications for LTO Ultrium half-height tape drives

	LTO-6 Ultrium	LTO-5 Ultrium	LTO-4 Ultrium	Ultrium LTO-3
Power consumption	4.5 Watts idle (hibernate) 29 Watts typical (writing) 42 Watts maximum	7.5 Watts idle 24 Watts typical 40 Watts maximum	13 Watts idle 20 Watts typical 33 Watts maximum	13 Watts idle 20 Watts typical 33 Watts maximum
Power requirements	+5V @ 3.5A typical +5V @ 4.0A maximum +12V @ 0.6A typical	+5V @ 3.5A typical +5V @ 3.7A maximum +12V @ 0.7A typical	+5V @ 2.5A typical +5V @ 2.5A maximum +12V @ 0.7A typical	+5V @ 2.5A typical +5V @ 2.5A maximum +12V @ 0.7A typical

Table 4 Power specifications for LTO Ultrium half-height tape drives (continued)

	LTO-6 Ultrium	LTO-5 Ultrium	LTO-4 Ultrium	Ultrium LTO-3
	+12V @ 2.5A maximum	+12V @ 1.9A maximum	+12V @ 2.1A maximum	+12V @ 2.1A maximum)
Power requirements, external tape drives	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A maximum	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A maximum	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A maximum	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A maximum

Table 5 Power specifications for LTO Ultrium full-height tape drives

	LTO-6 Ultrium	LTO-5 Ultrium
Power consumption	4.5 Watts idle (hibernate) 29 Watts typical (writing) 42 Watts maximum	7.5 Watts idle, 24 Watts typical, 40 Watts maximum
Power requirements	+5V @ 3.5A typical +5V @ 3.9A maximum +12V @ 0.6A typical +12V @ 2.5A maximum	+5V @ 3.6A typical +5V @ 3.7A maximum +12V @ 0.7A typical +12V @ 2.2A maximum
Power requirements, external tape drives	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A maximum	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A maximum

Table 6 Performance and capacity specifications

	LTO-6 Ultrium	LTO-5 Ultrium	LTO-4 Ultrium	LTO-3 Ultrium
Capacity	2.5 TB Native 6.25 TB Compressed	1.5 TB Native 3 TB Compressed	800 GB Native 1.6 TB Compressed	400 GB Native 800 GB Compressed
Sustained transfer rate	160 MB/s Native 400 MB/s Compressed	140 MB/s Native 280 MB/s Compressed	80 MB/s Native 160 MB/s Compressed	60 MB/s Native 120 MB/s Compressed
Media compatibility	LTO Ultrium 4 (read only) LTO Ultrium 5 (read and write) LTO Ultrium 6 (read and write)	LTO Ultrium 3 (read only) LTO Ultrium 4 (read and write) LTO Ultrium 5 (read and write)	LTO Ultrium 2 (read only) LTO Ultrium 3 (read and write) LTO Ultrium 4 (read and write)	LTO Ultrium 1 (read only) LTO Ultrium 2 (read and write) LTO Ultrium 3 (read and write)

A Regulatory information

Table 7 Regulatory model numbers

Product	Regulatory Model Number	FCC and CISPR classification
LTO-6 Ultrium FH SAS	BRSLA-1202-AC	Class A
LTO-6 Ultrium HH SAS	BRSLA-1204-AC	Class A
LTO-5 Ultrium FH SAS	BRSLA-0902-AC	Class B
LTO-5 Ultrium HH SAS	BRSLA-0904-AC	Class A
LTO-4 Ultrium HH SAS	BRSLA-0703-AC	Class A
LTO-4 Ultrium HH SCSI	BRSLA-0704-AC	Class A
LTO-3 Ultrium HH SAS	BRSLA-0705-AC	Class B
LTO-3 Ultrium HH SCSI	BRSLA-0605-AC	Class B

For important safety, environmental, and regulatory information, see *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at <http://www.hp.com/support/Safety-Compliance-EnterpriseProducts>.

Belarus Kazakhstan Russia marking



Manufacturer and Local Representative Information

Manufacturer's information:

- Hewlett-Packard Company, 3000 Hanover Street, Palo Alto, California 94304, U.S.

Local Representative information Russian:

- **HP Russia:** ЗАО "Хьюлетт-Паккард А.О.", 125171, Россия, г. Москва, Ленинградское шоссе, 16А, стр.3, тел./факс: +7 (495) 797 35 00, +7 (495) 287 89 05
- **HP Belarus:** ИООО «Хьюлетт-Паккард Бел», 220030, Беларусь, г. Минск, ул. Интернациональная, 36-1, офис 722-723, тел.: +375 (17) 392 28 18, факс: +375 (17) 392 28 21
- **HP Kazakhstan:** ТОО «Хьюлетт-Паккард (К)», 050040, Казахстан, г. Алматы, Бостандыкский район, ул. Тимирязева, 28В, 1 этаж, тел./факс: +7 (727) 355 35 50, +7 (727) 355 35 51

Local Representative information Kazakh:

- **HP Kazakhstan:** ЖШС «Хьюлетт-Паккард (К)», Қазақстан, Алматы қ., Бостандық ауданы, Тимирязев к-сі, 28В, тел./факс: +7 (727) 355 35 50, +7 (727) 355 35 51

Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (HP serial number format for this product)

Valid date formats include:

- YWW, where Y indicates the year counting from within each new decade, with 2000 as the starting point; for example, 238: 2 for 2002 and 38 for the week of September 9. In addition, 2010 is indicated by 0, 2011 by 1, 2012 by 2, 2013 by 3, and so forth.
- YYWW, where YY indicates the year, using a base year of 2000; for example, 0238: 02 for 2002 and 38 for the week of September 9.

