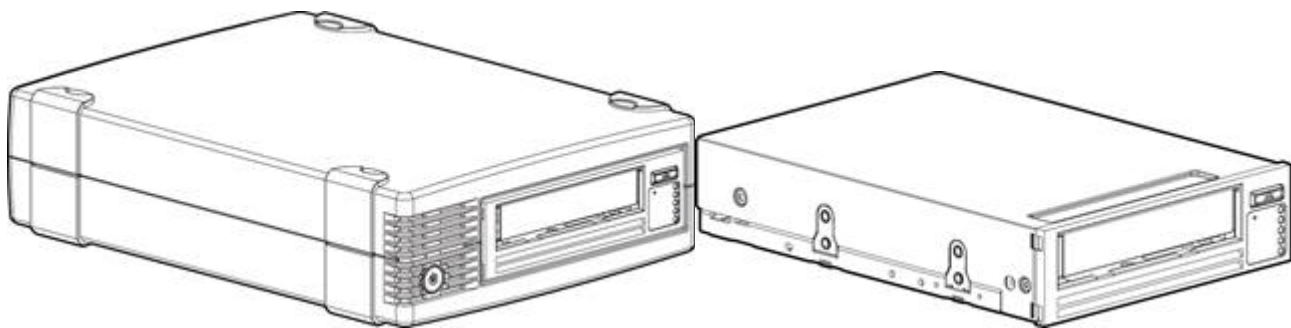Overview

HPE StoreEver LTO Ultrium Tape Drives

The family of HPE LTO Ultrium tape drives is Hewlett Packard Enterprise's premier line of backup and archive devices. Based on the LTO Ultrium format, an open standard with a well-defined twelve-generation roadmap, LTO Ultrium tape drives offer customers the best choice for investment protection. With ultimate reliability and of use in mind, even at 100% duty cycles, HPE's rugged design builds on superior LTO technology and adds advanced features like hardware data encryption to create a new level of data protection. The tape drives employ dynamic data rate matching to adjust to the speed of the host, reducing wear and tear on both drive and media and increasing performance, even on slower hosts.
The family of tape drives also features support for HPE Library and Tape Tools which provides diagnostics and performance optimization. If data is critical to your business, protect it with an HPE LTO Ultrium tape drive.

HPE StoreEver LTO Ultrium Half-Height Tape Drives

HPE StoreEver LTO-7 Ultrium 15000 Tape Drive
The HPE LTO-7 Ultrium 15000 tape drive represents Hewlett Packard Enterprise's seventh-generation of LTO tape drive technology capable of storing up to 15TB (compressed 2.5:1) per cartridge while providing ease of use with support for LTFS and AES 256-bit hardware data encryption easy-to-enable security to protect the most sensitive data and prevent unauthorized access of tape cartridges. Capable of data transfer rates up to 300 MB/sec (native), its Speed Matching feature further optimizes performance by matching speed of host to keep drives streaming increase the reliability of the drive and media. HPE LTO Ultrium half-height drives are designed for server cust in direct attached storage (DAS) environments. For IT organizations with stringent, long-term data retention requirements, the Ultrium 15000's WORM (Write-Once, Read-Many) data protection feature offers a simple and secure method for archiving records as part of a compliance solution to meet the toughest of industry regulatic The Ultrium 15000 tape drives provide investment protection with full read and write backward support with LTO-6 media, and the ability to read LTO-5 cartridges.
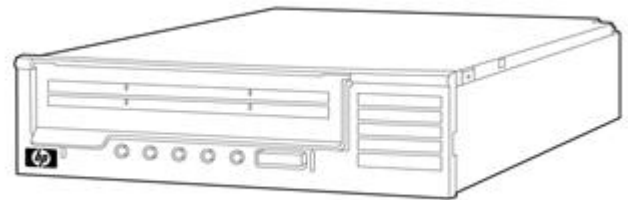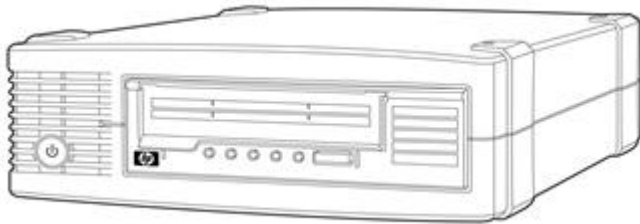

HPE StoreEver LTO-7 Ultrium 15000 External Tape Drive   HPE StoreEver LTO-7 Ultrium 15000 Internal Tape Drive

Overview

HPE StoreEver LTO-6 Ultrium 6250 Tape Drive

The HPE LTO-6 Ultrium 6250 tape drive represents HPE's sixth-generation of LTO tape drive technology capable storing up to 6.25TB (compressed 2.5:1) per cartridge while providing ease of use with support for LTFS and AES 256-bit hardware data encryption easy-to-enable security to protect the most sensitive data and prevent unauthorized access of tape cartridges. Capable of data transfer rates up to 1.44TB/Hour (compressed 2.5:1), HPE's exclusive Data Rate Matching feature further optimizes performance by matching speed of host to keep drives streaming and increase the reliability of the drive and media. HPE LTO Ultrium half-height drives are designed for server customers in direct attached storage (DAS) environments. For IT organizations with stringent long-term data retention requirements, the Ultrium 6250's WORM (Write-Once, Read-Many) data protection featu offers a simple and secure method for archiving records as part of a compliance solution to meet the toughest of industry regulations. The Ultrium 6250 tape drives provide investment protection with full read and write backward support with LTO-5 media, and the ability to read LTO-4 cartridges.
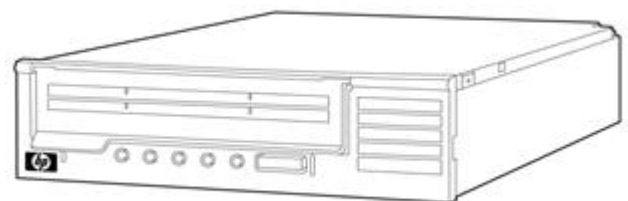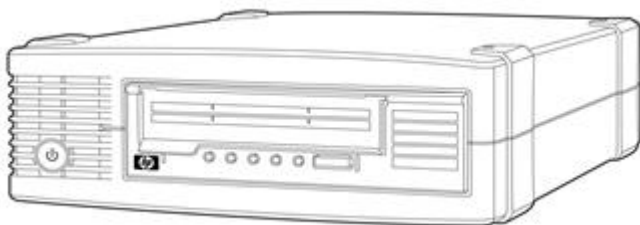
HPE StoreEver LTO-6 Ultrium 6250 External Tape Drive

HPE StoreEver LTO-6 Ultrium 6250 Internal Tape Drive

HPE StoreEver LTO-5 Ultrium 3000 Tape Drive

The HPE LTO-5 Ultrium 3000 represents Hewlett Packard Enterprise's fifth-generation of LTO tape drive technolo capable of storing up to 3TB per cartridge while providing ease of use with support for LTFS and AES 256-bit hardware data encryption easy-to-enable security to protect the most sensitive data and prevent unauthorized access of tape cartridges. Capable of data transfer rates up to 1TB/Hour. HPE's exclusive Data Rate Matching feature further optimizes performance by matching speed of host to keep drives streaming and increase the reliability of the drive and media. HPE LTO Ultrium half-height drives are designed for server customers in direct attached storage (DAS) environments. For IT organizations with stringent, long-term data retention requirements, the Ultrium 3000's WORM (Write-Once, Read-Many) data protection feature offers a simple and secure method for archiving records as part of a compliance solution to meet the toughest of industry regulations. The Ultrium 3000 provides investment protection with full read and write backward support with LTO-4 media, and the ability to read LTO-3 cartridge.

HPE StoreEver LTO-5 Ultrium 3000 External Tape Drive

HPE StoreEver LTO-5 Ultrium 3000 Internal Tape Drive

Product Highlights

LTO Ultrium Technology	Linear Tape-Open technology was developed by three leaders in the storage industry - Hewlett Packard Enterprise, IBM, and Quantum - who brought together their combined expertise in tape technology to develop an entirely new format based on the best of existing technologies. Because LTO Ultrium technology was a new format, it required no cumbersome support of legacy formats, so it could be designed without compromising on reliability or performance. The LTO Program, a consortium of the three technology provider companies, has developed a well-defined twelve-generation roadmap.

Ultrium LTO-5 and LTO-6 tape drive technologies from Hewlett Packard Enterprise use a linear format of 1280 tracks and 2176 tracks (respectively), writing sixteen tracks simultaneously. Ultrium LTO-7 tape drive features a breakthrough in recording technology by writing thirty-two tracks simultaneously on a linear format of 3584 tracks. The data is written in a serpentine pattern; the tape reverses direction after each set of tracks is written. This provides higher density recording, enabling customers to lower costs and increase efficiency by storing more data on a single tape in an industry standard format.

The LTO standard for backward compatibility is to write back one generation and read back two generations; therefore:

- First-generation LTO Ultrium drives (HPE Ultrium 230, HPE Ultrium 232) read and write LTO-1 media
- Second-generation LTO Ultrium drives (HPE Ultrium 460, HPE Ultrium 448) read and write LTO-1 and LTO-2 media.
- Third-generation LTO Ultrium drives (HPE Ultrium 920, Ultrium 960) read and write LTO-2 and LTO-3 media and also read LTO-1 media.
- Fourth-generation LTO Ultrium drives (Ultrium 1840, Ultrium 1760) read and write LTO-3 and LTO-4 media and also read LTO-2 media.
- Fifth-generation LTO Ultrium drives (Ultrium 3280, Ultrium 3000) read and write LTO-4 and LTO-5 media and also read LTO-3 media.
- Sixth-generation LTO Ultrium drives (Ultrium 6650, Ultrium 6250) read and write LTO-5 and LTO-6 media and also read LTO-4 media.
- Seventh-generation LTO Ultrium drives (Ultrium 15000) read and write LTO 6 and LTO-7 media and also read LTO-5 media

As part of the LTO open standard, all HPE tape drives and media offer the same standards of compatibility with tape drives and media manufactured by other LTO vendors.

LTO data compression (LTO-DC) is an enhanced version of Advanced Lossless Data Compression (ALDC) hardware compression. Compression is automatically turned off if the compressed data would cause an overall expansion in data size, hence optimizing the available capacity on the media. Data compression is also turned off if data is found to be uncompressible; thus, allowing for better data scans. The system is used in all LTO Ultrium tape drives.

The decision about which tape technology you should buy next should be based on your future, not your past, investment. Choose the LTO Ultrium format when you need the following advantages:

- Maximum reliability, capacity and performance
- Compatibility with a broad range of operating systems and servers (e.g., a mixed system environment)
- A legacy-free technology that uses the best attributes from a wide range of tape technologies without any compromises for backward compatibility requirements
- A solid roadmap for future generations of the technology
- An open format available from multiple vendors

Product Highlights

- Lowest media cost of any 'superdrive' tape technology

Hardware Based Encryption

Since LTO generation 4, HPE LTO Ultrium tape drives support hardware-based encryption to enable greater levels of security:

- AES 256-bit Encryption
  - Easy-to-enable encryption for a secure backup
  - Helps prevent unauthorized accessed of tape media if cartridges are lost or stolen
  - Eliminates the need to purchase and manage additional h/w

- No loss in performance of backup

Linear Tape File System (LTFS)

LTFS makes tape self-describing, file-based, and easy-to-use, it also provides users with the ability to use standard file operations on tape media for accessing, managing and sharing files with an interface that behaves just like a hard disk. In addition, LTFS provides the ability to share data across platforms, as you would with a USB drive or memory stick. Simply load a tape into the drive, mount it into the file system, and it becomes visible as a disk.

For more information, including user guide, downloads and compatibility, visit: **http://www.hpe.com/storage/ltfs**

HPE StoreOpen Standalone

HPE StoreOpen Standalone is a free software application that helps LTFS users to use and manage single tape drives.

Available for Windows and Mac environments, it provides a native GUI with a familiar look and feel. It is installed automatically as part of the LTFS package and it completely removes the need for low-level terminal commands by guiding users through the full process of select, prepare and mount an LTFS cartridge.

For more information, including user guide, downloads and compatibility, visit: **http://www.hpe.com/storage/StoreOpen**

Data Rate Matching

Data Rate Matching combines sophisticated buffer management with HPE's exclusive Variable Tape Speed technology to allow the tape drive to match its transfer rate to the host speed dynamically and continuously across the wide range of transfer rates. This feature ensures that the tape drive continues to stream data regardless of the environment, and brings two big advantages:

- It optimizes backup performance, regardless of the speed of the host or the network
- It minimizes rewinding and repositioning of the tape, reducing wear and increasing reliability

WORM (Write-Once, Read-Many) Drive and Media Support

Critical to the success of data retention policies in highly regulated environments is the ability to store and manage data in an unalterable state. Following stringent guidelines set forth by regulatory agencies such as the SEC and HIPPA, IT organizations must now integrate new solutions and policies that can verify the integrity of stored data for periods that can extend well beyond seven years.

Product Highlights

LTO generation 3 and higher tape drives feature the ability to archive and store data in a non-rewriteable format that meets the most stringent regulatory guidelines. Using a combination of integrated fail-safe features in the drive firmware, cartridge memory, and tape formatting, LTO Ultrium drives can archive large amounts of data for periods of up to 30 years in a secure, untampered state. Since all LTO generation 3 and higher tape drives include support for both rewritable and WORM media, IT organizations can now easily integrate a secure, long-term archiving solution into their current data protection strategy. As compared to other technologies that feature support for WORM storage, LTO tape drives offers the advantages of:

- A single drive to support all backup and archiving needs
- Two distinctive tape cartridges to easily distinguish and manage both rewriteable and WORM data cartridges
- A specially designed WORM data cartridge with multiple integrated fail-safe features to prevent accidental or intentional overwriting of data
- High-capacity, low-cost HPE WORM media that can store up to 15TB (LTO-7) of data on a single data cartridge
- Support from many backup and archiving software vendors, providing the most comprehensive and mainstream support in the industry
- The LTO open standard that offers greater choice and compatibility across all third- and later generation Ultrium products

NOTE: While all HPE LTO generation 3 and higher tape drives support LTO Ultrium WORM media, some third-generation LTO Ultrium tape drives from other manufacturers may not include read and write support for LTO Ultrium WORM media. For non-HPE LTO 3 and LTO-4 tape drives, please check the manufacturers' specifications to ensure this support is provided if you are using your WORM media. If WORM support is not provided, the drive will eject the WORM tape cartridge immediately upon insertion into to the tape drive.

HPE Ultrium Storage Media

Hewlett Packard Enterprise branded Linear Tape Open (LTO) Ultrium cartridges are designed, manufactured and tested to provide outstanding reliability for backing up, archiving and restoring your data. We continuously monitor the quality of our branded tapes using what we believe is the industry's most comprehensive and forensic specification for quality and reliability. Using real life conditions and both Hewlett Packard Enterprise and non-HPE drives, we supplement extensive in-process QA parametric testing with ongoing drive based scrutiny, to make sure performance is excellent for any combination of device, duty cycle and environment.

Because HPE is a leading supplier of both LTO tape devices and media, we have the ability to re-create many different scenarios mirroring how customers use their cartridges. And many of HPE's protocols are either unique in nature or scale, such as the HPE 'Green Tape', and HPE 'Environmental Interchange' tests, or far surpass industry standards, for example, HPE's 'Locate/Rewind/Append' test. Since the beginning of 2016, almost 700 million meters of media have been pulled and over 40 million gigabytes of data have been written in HPE's demanding GTT protocol. All of these ongoing tests are intended to ensure HPE LTO Ultrium media is the most reliable you can find. Your best choice for ease of support and maximum dependability is to use HPE-branded Ultrium cartridges at all times.

Diagnostics

HPE LTO Ultrium tape drives and automation are supported by HPE Library and Tape Tools (LTT). This tool is intended to help in the installation and maintenance of HPE tape drives and devices, including:

- Verifies installation of the drive
- Test/verify the health of the drive and media

Product Highlights

- Provides Hewlett Packard Enterprise support with detailed device information
- Multiple options for finding and upgrading new firmware
- Performance optimization and recommendations
- Included with each Ultrium tape drive and available via free download supporting all HPE tape products

Instructions and downloads of HPE Library and Tape Tools are available at:
http://www.hpe.com/suppport/tapetools

Compatibility

Hewlett Packard Enterprise extensive compatibility testing program assures that your HPELTO Ultrium tape drive works with leading servers, operating systems, and backup applications - and not just those sold by Hewlett Packard Enterprise. HPE LTO Ultrium tape drives work seamlessly on many platforms, making them especially suitable if you have a mixed system environment. For the latest list of servers, workstations, operating systems, and backup software that support HPE Ultrium tape drives, check the tape backup compatibility pages on our Web site at: **http://www.hpe.com/storage/DAPRcompatibility**

Server Compatibility	HPE Ultrium tape drives are supported on the following classes of HPE systems: • HPE ProLiant DL servers • HPE ProLiant ML servers • HPE Integrity servers • HPE 9000 servers • HPE Apollol Servers • HPE Inc. workstations HPE Ultrium tape drives are also supported on server platforms from third-party manufacturers including: • Dell • IBM • Sun For details of which tape drive models work with which systems, including third-party systems, visit: **http://www.hpe.com/storage/DAPRcompatibility** for the latest hardware compatibility information.
OS Support	Microsoft® Windows, HPE-UX, Tru64, Red Hat Linux, SUSE Linux, IBM-AIX, Sun Solaris and other operating systems. **NOTE:** Please visit: **http://www.hpe.com/storage/DAPRcompatibility** for the latest compatibility information.
Backup Software Support	Supported with Micro Focus Data Protector, ARCserve Backup, EMC NetWorker, EMC Retrospect, IBM Tivoli Storage Manager, Veritas NetBackup, Veritas Backup Exec, Symantec Backup Exec, BakBone NetVault, Commvault Simpana, Tolis Group BRU, Archiware P5, Qstar Archive Manager and others. **NOTE:** Please visit: **http://www.hpe.com/Storage/DAPRcompatibility** for the latest compatibility information.
SAS Installation	HPE SAS tape drives are available as internal and external models. Both models are supplied with SAS cables that allows you to connect to an internal port (if available) on the embedded SAS controller inside the server. Some server models will allow direct connect to a spare SAS connector on the native SAS controller. Other servers which do not have a spare connector might require you to reconfigure hard disk drive bays and in a few instances, you may also lose the use of one of the hard disk drive bays and will need to rebuild your RAID configuration. In these configurations the simple, recommended solution is connecting to an option SAS host bus adapter and optional SAS cable. For the most up-to-date information about recommended SAS HBAs and supported cabling configurations with your make and model of server, always refer to: **http://www.hpe.com/Storage/DAPRcompatibility**

Compatibility

Cables and Termination	All cables required for a typical internal and external connection to Hewlett Packard Enterprise servers are provided with your tape drive. For non-Hewlett Packard Enterprise servers, please consult your manufacturers' server specifications to determine if the cable provided with your LTO Ultrium tape drive is appropriate for use with that server. SAS-based HPE LTO Ultrium models ship with SAS cable which allows direct attach from embedded SAS controller. **NOTE:** Visit: **http://www.hpe.com/Storage/DAPRcompatibility** for the latest compatibility information.

Performance Tuning Use HPE Library and Tape tools to assist in this area at:
http://www.hpe.com/storage/tapetools

Device performance test - will run data to an LTO drive direct from memory to prove the drive is capable of high performance if the data supply rate is fast enough.

System performance test for backup will read data from your primary storage device e.g. EVA disk array, and tell you how fast the array can supply multiple streams of data

System performance test for restore, this tool generates data of a known size and compressibility for benchmarking purposes.

Service and Support, HPE Support, and Warranty Information

Warranty and Services Included with the Product	Hewlett Packard Enterprise provides a 3-year, next-day, product exchange, limited warranty for all the Ultrium Tape Drives, plus 9x5 phone support for the duration of the warranty. For more information about Hewlett Packard Enterprise's Global Limited Warranty and Technical Support, visit: **http://www.hpe.com/storage/warranty**

HPE Support Services: Packaged server and storage services for increased uptime, productivity and ROI
When you buy HPE server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HPE Support Services for servers and storage.

Protect your business beyond warranty
When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HPE Support Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

HPE Support Services: Upgrading or extending standard server and storage warranties cost effectively
HPE Support Services offer a standard reactive hardware and software support services suite sold separately. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive Care Service and Proactive Care Advanced. In addition with HPE Proactive Select, you can acquire the specific proactive constancy and technical services. HPE Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HPE server and storage lifecycle support services offers a full spectrum of customer care—from technology support to complex migrations to complete managed services. HPE Factory Express provides customization, integration and deployment services for turnkey solutions. HPE Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HPE Financial solutions extend innovative financing and cost-effective asset management programs-from purchase to equipment retirement.

Learn more: **http://www.hpe.com/services/storage**

NOTE: Support Services availability may vary by product and country.

HPE Support Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from Hewlett Packard Enterprise or an enterprise reseller are quoted using Hewlett Packard Enterprise order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Support Services at **http:// www.hpe.com/services/storage**

Recommended HPE Support Services for optimal satisfaction with your HPE product.

Recommended HPE Foundation Care 24x7 connects you to Hewlett Packard Enterprise 24 hours a day, seven

Service and Support, HPE Support, and Warranty Information

Support	days a week for assistance on resolving issues - hardware onsite response within four hours and software call back within two hours after opening your case. Three years' coverage recommended with HPE Support Service.
	HPE Foundation Care 24x7 connects you to Hewlett Packard Enterprise 24 hours a day, seven days a week for assistance on resolving issues - hardware onsite response within four hours and software call back within two hours after opening your case. Three years' coverage recommended with HPE Support Service.

Important Notice for Tape Drives Installed in a 1U or 3U Rack Mount Kit	**NOTE:** These services do not apply to Tape Drives mounted in a 1U or 3U Rack Mount Kit. The HPE Rack Mount Kit Support Service covers the all possible configurations of Tape Drives. Hence the services for 1U & 3U Rack Mount Kit covers all encumbering drives. Please follow the following url for the correct Support Services and descriptions: **https://www.hpe.com/h20195/v2/GetDocument. aspx?docname=c04154496**
Important Notice for Internal Tape Drives Installed in an HPE Server	**NOTE:** These services do not apply to Internal Tape Drives because they do not have support associated with them if they are mounted in an HPE Server. HPE Server support covers all enclosed drives. Please follow the following url for the correct Support Services and descriptions: For ProLiant use: **http://h18000.www1.hpe.com/products/QuickSpecs/ProductBulletin.html** For BCS use: **http://h18000.www1.hpe.com/products/QuickSpecs/ProductBulletin.html**

Recommended Deployment	**HPE Installation Service**
	For smooth startup and better business outcomes, HPE Hardware Installation - this service provides initial hardware installation of your product into your technology environment (system configuration is not included). In today's new era of business technology- customers can trust the services professionals at Hewlett Packard Enterprise to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- Allows your IT resources to stay focused on their core tasks and priorities
- Reduces implementation time, impact and risk to your storage environment

https://www.hpe.com/h20195/v2/GetPDF.aspx/5981-9356ENE.pdf

eSupport	HPE eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The Hewlett Packard Enterprise support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Service and Support, HPE Support, and Warranty Information

Access to certain features of the support portal requires a Hewlett Packard Enterprise service agreement. To access the support portal, visit: **http://www.hpe.com/support**

Customer Technical Training	HPE Education Services In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, Hewlett Packard Enterprise offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.
HPE Services Awards	HPE Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.
Additional Services Information	To learn more on HPE ProLiant servers, HPE BladeSystem servers and HPE storage products, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Or visit: **http://www.hpe.com/services/proliant** or **http://www.hpe.com/services/bladesystem** or **http://www.hpe.com/services/storage**

Options

HPE LTO Ultrium Half-Height Tape Drives

	Model Name/Kit Contents Description	Part Number
LTO-7 Ultrium 15000 tape drives	LTO-7 Ultrium 15000 SAS Internal	
	• HPE StoreEver LTO-7 Ultrium 15000 Internal Tape Drive	BB873A
	• HPE LTO-7 Ultrium 15 TB RW Data Cartridge	
	• mini-SAS SFF8482 to SFF8087 cable	
	• Documentation	
	NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	
	LTO-7 Ultrium 15000 SAS Internal TAA Compliant	BB953A
	• HPE StoreEver LTO-7 Ultrium 15000 Internal Tape Drive	
	• HPE LTO-7 Ultrium 15 TB RW Data Cartridge	
	• mini-SAS SFF8482 to SFF8087 cable	
	• Documentation	
	NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	
	LTO-7 Ultrium 15000 SAS External	BB874A
	• HPE StoreEver LTO-7 Ultrium 15000 External Tape Drive	
	• HPE LTO-7 Ultrium 6.25 TB RW Data Cartridge	
	• mini-SAS High Density to SFF8088 cable	
	• Documentation	
	NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	
LTO-6 Ultrium 6250 tape drives	LTO-6 Ultrium 6250 SAS Internal	
	• HP StoreEver LTO-6 Ultrium 6250 Internal Tape Drive	EH969A
	• HP LTO-6 Ultrium 6.25 TB RW Data Cartridge	
	• mini-SAS SFF8482 to SFF8087 cable	
	• Documentation	
	NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	
	LTO-6 Ultrium 6250 SAS External	
	• HP StoreEver LTO-6 Ultrium 6250 External Tape Drive	EH970A
	• HP LTO-6 Ultrium 6.25 TB RW Data Cartridge	
	• power cord	
	• mini-SAS High Density to SFF8088 cable	
	• Documentation	
	HP StoreEver LTO-6 Ultrium 6250 Tape Drive in 1U Rack-mount Kit	C0L99A
	• 6Gb SAS rack-mountable enclosure (1U) with power supply and fan rail kit	
	• one internal LTO-6 Ultrium 6250 SAS tape drive	
	• power cord	
	• HPE LTO-6 Ultrium 6.25 TB RW Data Cartridge	
	• Documentation	
	NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.	
LTO-5 Ultrium 3000 tape drives	LTO-5 Ultrium 3000 SAS Internal	
	• HP StoreEver LTO-5 Ultrium 3000 SAS Internal Tape Drive	EH957B
	• HP LTO5 Ultrium 3 TB RW Data Cartridge	

Options

- mini-SAS SFF8482 to SFF8087 cable
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.

LTO-5 Ultrium 3000 SAS External

- HP StoreEver LTO-5 Ultrium 3000 SAS External Tape Drive   EH958B
- HP LTO5 Ultrium 3 TB RW Data Cartridge
- power cord
- mini-SAS High Density to SFF8088 cable
- Documentation

HP StoreEver LTO-5 Ultrium 3000 SAS Tape Drive in 1U Rack-mount   EJ014B

- 6Gb SAS rack-mountable enclosure (1U) with power supply and fan
- rail kit
- one internal LTO-5 Ultrium 3000 SAS tape drive
- power cord
- HPE LTO5 Ultrium 3 TB RW Data Cartridge
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.

Host Bus Adapters, Controllers, and Accessories for ProLiant Servers	HPE E208e-p Host Bus Adapter **NOTE:** Recommended SAS HBA for connecting External LTO Ultrium tape drives to Gen10 ProLiant servers.	804398-B21
	HPE E208i Host Bus Adapter **NOTE:** Recommended SAS HBA for connecting Internal LTO Ultrium tape drives to Gen10 ProLiant servers.	804394-B21
	HPE H241 Host Bus Adapter **NOTE:** Recommended SAS HBA for connecting External LTO Ultrium tape drives to Gen9 ProLiant servers.	726911-B21
	HPE H240 Host Bus Adapter **NOTE:** Recommended SAS HBA for connecting Internal LTO Ultrium tape drives to Gen9 ProLiant servers.	726907-B21
	HPE H222 Host Bus Adapter **NOTE:** Recommended SAS HBA for connecting LTO Ultrium tape drives to Gen8 ProLiant servers.	650926-B21
	HP Smart Array P222/512 FBWC 6Gb 1-port Int/1-port Ext SAS Controller **NOTE:** SAS HBA for connecting LTO Ultrium tape drives to Gen8 ProLiant servers.	631667-B21

Media	HP LTO1 Ultrium 200GB RW Data Tape **NOTE:** Write and read support for Ultrium 230, Ultrium 232, Ultrium 448 and Ultrium 460. Read support for Ultrium 920 and Ultrium 960.	C7971A
	HP LTO2 Ultrium 400GB RW Data Tape **NOTE:** Write and read support for Ultrium 448, Ultrium 460, Ultrium 920 and Ultrium 960. Read support for LTO-4 Ultrium1840 and Ultrium 1760.	C7972A
	HP LTO-3 Ultrium 800 GB Re-writable Data Cartridge **NOTE:** Write and read only support for Ultrium 920 and Ultrium 960, LTO-4 Ultrium 1840 and Ultrium 1760. Read support for LTO-5 Ultrium 3280 and Ultrium 3000.	C7973A

Options

HP LTO-3 Ultrium 800 GB WORM Data Cartridge	C7973W
NOTE: This data cartridge supports Write-Once recording format for LTO-3 and LTO-4 drives, and Read-Many for LTO-3, LTO-4 and LTO-5 drives. Data recorded to this data cartridge cannot be overwritten.	
HP LTO4 Ultrium 1.6TB Read/Write Data Cartridge	C7974A
NOTE: Write and read support for LTO-4 Ultrium 1840, LTO-4 Ultrium 1760, LTO-5 Ultrium 3280 and LTO-5 Ultrium 3000.	
HP LTO4 Ultrium 1.6TB WORM Data Tape Cartridge	C7974W
NOTE: This data cartridge supports Write-Once Read-Many recording format for LTO-4 and LTO-5 drives. Data recorded to this data cartridge cannot be overwritten.	
HP LTO-5 Ultrium 3TB RW Data Cartridge	C7975A
NOTE: Write and read support for LTO-5 Ultrium 3280 and Ultrium 3000.	
HP LTO-5 Ultrium 3TB WORM Data Cartridge	C7975W
NOTE: This data cartridge only supports Write-Once Read-Many recording format for LTO-5 drives. Data recorded to this data cartridge cannot be overwritten.	
HP LTO-6 Ultrium 6.25TB MP RW Data Cartridge	C7976A
NOTE: Write and read support for LTO-6 Ultrium 6650 and Ultrium 6250	
HP LTO-6 Ultrium 6.25TB BaFe RW Data Cartridge	C7976B
NOTE: Write and read support for LTO-6 Ultrium 6650 and Ultrium 6250.	
HP LTO-6 Ultrium 6.25TB MP WORM Data Cartridge	C7976W
NOTE: This data cartridge only supports Write-Once Read-Many recording format for LTO-6 drives. Data recorded to this data cartridge cannot be overwritten.	
HP LTO-6 Ultrium 6.25TB BaFe WORM Data Cartridge	C7976BW
NOTE: This data cartridge only supports Write-Once Read-Many recording format for LTO-6 drives. Data recorded to this data cartridge cannot be overwritten.	
HPE LTO-7 Ultrium 15TB RW Data Cartridge	C7977A
NOTE: Write and read support for LTO-7 Ultrium 15000	
HPE LTO-7 Ultrium 15TB WORM Data Cartridge	C7977W
NOTE: This data cartridge only supports Write-Once Read-Many recording format for LTO-7 drives. Data recorded to this data cartridge cannot be overwritten	
HPE LTO-1 Ultrium 200GB Storage Media Kit	C8013A
HP LTO-2 Ultrium 400GB Storage Media Kit	C8014A
HP Ultrium Universal Cleaning Cartridge	C7978A

Rack-mount Options	HP StoreEver 1U SAS Rack-mount Kit	AE459B
	NOTE: For racked servers. No drives included. Accommodates up to two internal SAS half-height drives (such as LTO-5 Ultrium 3000, LTO-6 Ultrium 6250 and LTO-7 Ultrium 15000).	
	NOTE: Please refer to web page for further information:	
	https://www.hpe.com/storage/1Urackmount	

Cables and Adapters	HP 1m SAS Cable	AE490A
	NOTE: Use this cable to connect HPE Ultrium LTO 2, 3 and 4 SAS internal tape drives to SAS 4i (SFF8484) connectors.	

Options

HP 1m with Power SAS Cable	AE491A
NOTE: Use this cable to connect HPE Ultrium SAS internal tape drives to SAS 4i (SFF8484) connectors.	
HP Mini-SAS Cable for LTO Internal Tape Drive	AP746A
NOTE: Use this cable to connect HPE LTO Ultrium internal tape drives to Mini-SAS (SFF8087) ports.	
HP SAS External-Min 1x-2M Cable Assembly Kit	AE466A
NOTE: Use this cable to connect HPE SAS external tape devices to HPE SAS controllers with Infiniband (SFF8470) connectors.	
HP 1U SAS Ext-Min 1x-4M Cable Assembly Kit	AE468A
NOTE: Use this cable to connect HPE SAS external tape devices to HPE SAS controllers with Infiniband (SFF8470) connectors.	
HP SAS Min-Min 1x-2M Cable Assembly Kit	AE470A
NOTE: Use this cable to connect HPE SAS external tape devices to HPE SAS controllers with external Mini-SAS (SFF8088) connectors.	
HP SAS MIN-MIN 1X-4M Cable Assembly Kit	AE465A
NOTE: Use this cable to connect HPE SAS external tape devices to HPE SAS controllers with external Mini-SAS (SFF8088) connectors.	
HP 1U SAS TP I-E 3HDDs X 1Tape Drive X4M Server Cable Assembly Kit	AE464A
NOTE: This split cable connects internally to SAS Hard Drive Cage (3x) and externally to the tape device (1x) with other connector attaching to HPE SAS controllers with SAS 4i (SFF8484) connectors. The 1x cable occupies additional PCI slot on the server.	
HP 2.0m External Mini SAS High Density to Mini SAS Cable	716191-B21
NOTE: Use this cable to connect HPE SAS external LTO tape devices to HPE SAS controllers with external Mini-SAS high density connectors as used by HPE H241 Host Bus Adapter.	

Technical Specifications

		Ultrium 3000	Ultrium 6250	Ultrium 15000
Dimensions	**Form Factor**	5¼-inch half-height	5¼-inch half-height	5¼-inch half-height
	Physical (HxWxD) **Internal**	1.6 x 5.7 x 8.1 in (4.1 x 14.5 x 20.6 cm)	1.6 x 5.7 x 8.1 in (4.1 x 14.5 x 20.6 cm)	1.6 x 5.7 x 8.1 in (4.1 x 14.5 x 20.6 cm)
	Physical (HxWxD) **External**	3 x 8.8 x 11.7 in (7.7 x 22.3 x 29.5 cm)	3 x 8.8 x 11.7 in (7.7 x 22.3 x 29.5 cm)	3 x 8.8 x 11.7 in (7.7 x 22.3 x 29.5 cm)
	Physical (HxWxD) **1U Rack-mount**	1.7 x 16.88 x 25.25 in (4.32 x 42.88 x 64.14 cm)	1.7 x 16.88 x 25.25 in (4.32 x 42.88 x 64.14 cm)	N/A
	Physical (HxWxD) **3U Rack-mount**	N/A	N/A	N/A
	Shipping (HxWxD) **Internal**	7.9 x 9.4 x 11.4 in (24 x 31 x 39 cm)	7.9 x 9.4 x 11.4 in (24 x 31 x 39 cm)	7.9 x 9.4 x 11.4 in (24 x 31 x 39 cm)
	Shipping (HxWxD) **External**	9.4 x 12.2 x 15.4 in (24 x 31 x 39 cm)	9.4 x 12.2 x 15.4 in (24 x 31 x 39 cm)	9.4 x 12.2 x 15.4 in (24 x 31 x 39 cm)
	Shipping (HxWxD) **1U Rack-mount**	12.0 x 23.5 x 33.5 in (30.5 x 59.7 x 85.1 cm)	12.0 x 23.5 x 33.5 in (30.5 x 59.7 x 85.1 cm)	N/A
	Shipping (HxWxD) **3U Rack-mount**	N/A	N/A	N/A
Weight	**Out of box, Internal**	3.2 lb (1.45 kg)	3.2 lb (1.45 kg)	3.2 lb (1.45 kg)
	Out of box, External	10.3 lb (4.65 kg)	10.3 lb (4.65 kg)	10.3 lb (4.65 kg)
	Out of box, 1U Rack-mount	21.0 lb (9.52 kg)	21.0 lb (9.52 kg)	N/A
	Out of box, 3U Rack-mount	N/A	N/A	N/A
	Shipping, Internal	5.1 lb (2.3kg)	5.1 lb (2.3kg)	5.1 lb (2.3kg)
	Shipping, External	11 lb (5 kg)	11 lb (5 kg)	11 lb (5 kg)
	Shipping, 1U Rack-mount	32.9 lb (14.8 kg)	32.9 lb (14.8 kg)	N/A
	Shipping, 3U Rack-mount	N/A	N/A	N/A
Capacity	**Native**	1.5 TB	2.5TB	6TB
	Compressed (assumes 2:1 data compression for LTO-5; 2.5:1 compression for LTO-6 and higher))	3 TB	6.25TB	15TB
	Buffer Size	256 MB	512MB	1024MB
Performance	**Sustained transfer rate, native**	140 MB/s	160MB/s	300MB/s

Technical Specifications

	Sustained transfer rate, compressed (assumes 2:1 data compression for LTO-5; 2.5:1 compression for LTO-6 and higher)	280 MB/s	400MB/s	
	Burst transfer rate	600 MB/s (with 6Gb/s SAS)	600 MB/s with 6Gb/s SAS	600 MB/s with 6Gb/s SAS
	Data rate matching range	47-140 MB/s (native)	54-160 MB/s (native)	100-300 MB/s (native)
	Data access time (from BOT)	52 s typical for a 1.5 TB tape (native)	50 seconds typical for LTO 6 media	60 seconds for LTO 7 media
	Average load time	>19 s	24s	12s
	Average unload time	19 s	19s	17s
	Rewind time from EOT	96 s (1.5 TB tape)	98s (2.5TB tape)	114 s (6TB tape)
	Rewind tape speed	9.0 m/s	9.0 m/s	9.0 m/s
Reliability	**MTBF**	250,000 hours at 100% duty cycle	250,000 hours at 100% duty cycle	250,000 hours at 100% duty cycle
	Uncorrected Error Rate	1 in 1×10^{17} bits	1 in 1×10^{17} bits	1 in 1×10^{19} bits
Media Compatibility		LTO Ultrium 3 (Read only); LTO Ultrium 4 (Read and Write); LTO Ultrium 5 (Read and Write)	LTO Ultrium 4 (Read only); LTO Ultrium 5 (Read and Write); LTO Ultrium 6 (Read and write)	LTO Ultrium 5 (Read only); LTO Ultrium 6 (Read and Write); LTO Ultrium 7 (Read and write)
Tape Format	**Recording method**	16-channel linear serpentine	16-channel linear serpentine	32-channel linear serpentine
	Recording format	LTO Ultrium 5 LTO Ultrium 4 (for 800 GB tape)	LTO Ultrium 6 LTO Ultrium 5 (for 1.5 TB tape)	LTO Ultrium 7 LTO Ultrium 6 (for 2.5 TB tape)
	Data compression	LTO DC dual mode compression (an enhanced version of ALDC)	LTO DC dual mode compression (an enhanced version of ALDC)	LTO DC dual mode compression (an enhanced version of ALDC)
	Error detection/ correction	Reed-Solomon	Reed-Solomon	Reed-Solomon

Technical Specifications

	Read channel technology	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)
	Data encoding method	RLL 32/33	RLL 32/33	RLL 32/33

Interface	Interface type	6Gb/sec Dual Port SAS	6Gb/sec Dual Port SAS	6Gb/sec Dual Port SAS
	SCSI connector	N/A	N/A	N/A
	SAS connector	SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088	SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088	SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088

		Ultrium 3000	**Ultrium 6250**	**Ultrium 15000**
Power Specifications	**Power requirements, Internal** (including rack-mount model)	5V@3.5A (typical) +5V@3.7A (max) +12V@0.7A (typical) +12V@1.9A (max)	5V@3.5A (typical) +5V@4.0A (max) +12V@0.6A (typical) +12V@2.5A (max)	5V@4.0A (typical) +5V@4.5A (max) +12V@1.0A (typical) +12V@3.5A (max)
	Power requirements, External	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A max
	Power consumption	7 Watts idle 24 Watts typical 34 Watts max	4.1 Watts idle 24.5 Watts typical 39 Watts max	11 Watts idle 31Watts(typical)

Environmental Specifications	**Temperature range**	Operating: 50° F to 95° F (10° C to 35° C) if 6 CFM airflow is provided 50° F to 104° F (10° C to 40° C) if 8CFM airflow is provided for Full-Height, 5CFM airflow for Half-Height
		Non-Operating: -40° F to 151° F (-40° C to 66° C, -40° C to 60° C for LTO-7)
	Non-condensing humidity range	Operating: 20 to 80% RH (Non-condensing, max wet bulb temperature = 26C)
		Non-Operating: 10 to 95% (90% for LTO-7)RH (Non-condensing, max wet bulb temperature = 26C)

Technical Specifications

Standards Compliance	CSA Certification to C22.2, No.60950 (cCSAus) TUV EN60950 (IEC 60950 and EN60950) CE Declaration of Conformity FCC 47 CFR Parts 15 NOM VCCI C-TICK RRL BSMI GOSH CB Certificate and Report (IEC 60950)

Front Panel LED Indicators

HPE LTO Ultrium 3 and 4 tape drives have four LED indicators on the front panel:

- Ready
- Drive
- Tape
- Clean

HPE LTO Ultrium 5, 6 and 7 tape drives have five LED indicators on the front panel:

- Ready
- Drive
- Tape
- Clean
- Encryption

Please consult your HPE Ultrium Tape Drive "Getting Started Guide" for more information on how to use these LED indicators for ascertaining drive status and for help in troubleshooting your HPE LTO Ultrium tape drive.

Summary of Changes

Date	Version History	Action	Description of Change
04-Dec-2017	From Version 28 to 29	Changed	Overview, Product Highlights, Compatibility, Options, and Technical Specifications were revised.
04-Sept-2017	From Version 27 to 28	Changed	Changes made throughout the QuickSpecs
07-Aug-2017	From Version 26 to 27	Changed	Changes made throughout the QuickSpecs
11-Jul-2017	From Version 25 to 26	Changed	Removed LTO-3 Ultrium 920 Tape Drives & Ultrium Full-Height Drives
11-Mar-2016	From Version 24 to 25	Changed	Changes made to the options section
19-Feb-2016	From Version 23 to 24	Changed	Changed a reference in the Option Section, Descriptions updated.
17-Dec-2015	From Version 22 to 23	Changed	Changes made in the Overview and standard features sections
01-Dec-2015	From Version 21 to 22	Changed	Changes made throughout the QuickSpecs
3-Apr-2015	From Version 20 to 21	Changed	Remove 0D1 for internal drives into rackmount kits, SKUs descriptions were updated.
7-Nov-2014	From Version 19 to 20	Changed	Changes made throughout the QuickSpecs.
9-May-2014	From Version 18 to 19	Removed	LTO-4 Ultrium 1840 Tape Drives were removed.
2-May-2014	From Version 17 to 18	Changed	Recommended Support was revised and Optional HPE Support Services was removed.
7-Mar-2014	From Version 16 to 17	Changed	Image correction.
21-Feb-2014	From Version 15 to 16	Changed	Added images.
23-Dec-2013	From Version 14 to 15	Changed	HPE StoreEver LTO-2 Ultrium 448 Tape Drives were removed Performance was revised for LTO-6 Ultrium 6650
13-Sep-2013	From Version 13 to 14	Changed	Changes were made to the following sections: Product Highlights Service and Support Options Technical Specifications
21-Dec-2012	From Version 12 to 13	Changed	Changes were made to the following sections: Options: updated part # COL98A in HPE LTO Ultrim Full Height Tape Drives Technical Specifications: updated Capacity section
4-Dec-2012	From Version 11 to 12	Changed	Changes made throughout the QuickSpecs.
19-Oct-2012	From Version 10 to 11	Changed	Change was made to URL in Service and Support, HPE Support, and Warranty Information section.
13-Aug-2012	From Version 9 to 10	Changed	Changes were made in Overview, Features, Product Highlights, Compatability and Options sections.
28-Oct-2011	From Version 8 to 9	Added	HPE StoreOpen Standalone was added to Product Highlights.
23-Sep-2011	From Version 7 to 8	Changed	Updated the following: Linear Tape File Systems (LTFS) updated URL
8-Jun-2011	From Version 6 to 7	Removed	Removed StorageWorks throughout the document.
27-May-2011	From Version 5 to 6	Removed	HPE StorageWorks Ultrium 232 Tape Drive was removed.
29-Apr-2011	From Version 4 to 5	Changed	Updated the following: replaced "Go Connect" link with the "SPOCK" link throughout the entire document.
29-Oct-2010	From Version 3 to 4	Removed	Tape Array 5300 and Redundant, hot-swap power supply and fan for Tape Array 5300 were removed from Rack-mount Options.
27-Sep-2010	From Version 2 to 3	Changed	Key Features and Customer Benefits were moved into Features Software in the Box was changed to Included Software in Product Highlights Related was changed to Optional for the HPE Support Services that will enhance your HPE product experience

Summary of Changes

			descriptions and Customer Technical Training, HPE Service Awards and Additional Services Information were completely revised in Service and Support, HPE Support and Warranty Information Software was changed to Upgrade included software to Data Protector Express in Options Value was added to Customer Benefits HPE Data Protector Express Basic was added to Backup Software Support Part numbers were removed from Models
18-Jun-2010	From Version 1 to 2	Changed	Changes made within the Media section of Options.