# QuickSpecs

Overview

The family of HP LTO Ultrium tape drives is HP's premier line of backup devices. Based on the LTO Ultrium format, an open standard with a well-defined eight-generation roadmap, HP LTO Ultrium tape drives offer customers the best choice for investment protection. With ultimate reliability and ease of use in mind, even at 100% duty cycles, HP'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. HP's ultra-durable soft-load feature automatically positions the data cartridge together with the highly reliable HP leader-capture mechanism make your backup and restore operations more reliable. Support for HP One-Button Disaster Recovery provides the easiest way to restore data in the event of a disaster.

The family of tape drives also features support for HP Library and Tape Tools which provides HP TapeAssure health monitoring, diagnostics, and performance optimization. Included with the HP LTO Ultrium tape drives is the option to download Yosemite Server Backup Basic backup and recovery software providing a backup application to protect a single server. If data is critical to your business, protect it with an HP LTO Ultrium tape drive.
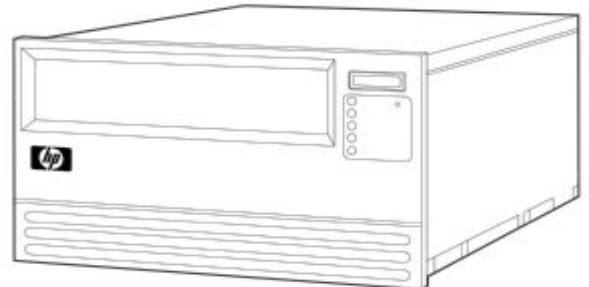
HP StoreEver LTO Ultrium Full-Height Tape Drives

HP StoreEver LTO-6 Ultrium 6650 Tape Drive

HP LTO-6 Ultrium 6650 Tape Drive sets new standards for capacity, performance, usability and manageability. The Ultrium 6650 tape drive represents HP's sixth-generation of LTO tape drive technology capable of storing up to 6.25TB (compressed 2.5:1) per cartridge while providing enterprise tape drive monitoring and management capabilities with HP TapeAssure, 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 400MB/sec (compressed 2.5:1), HP'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. The Ultrium 6650 provides investment protection with full read and write backward support with LTO-5 media, and the ability to read LTO-4 cartridges. By more than doubling the compressed capacity of previous generation Ultrium drives, HP customers now require fewer data cartridges to meet their storage needs, significantly reducing their IT costs and increasing their ROI.
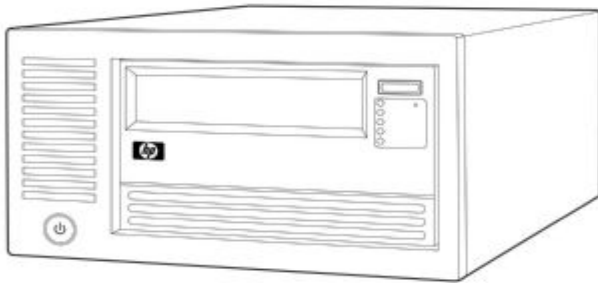
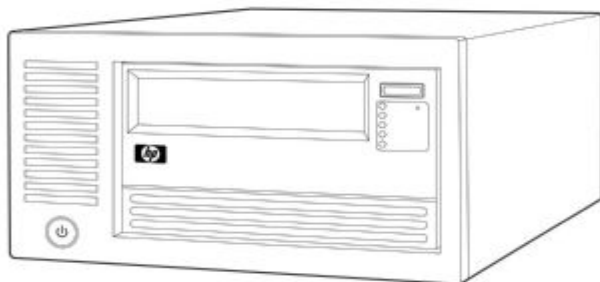**HP StoreEver LTO-6 Ultrium 6650 External Tape Drive**

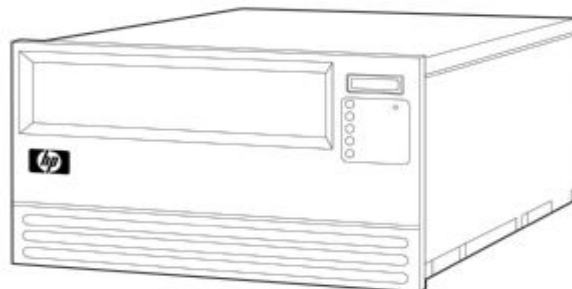**HP StoreEver LTO-6 Ultrium 6650 Internal Tape Drive**

Overview

HP StoreEver LTO Ultrium Full-Height Tape Drives

HP StoreEver LTO-5 Ultrium 3280 Tape Drive

The Ultrium 3280 represents HP's fifth-generation of LTO tape drive technology capable of storing up to 3TB per cartridge while providing enterprise tape drive monitoring and management capabilities with HP TapeAssure, 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 280MB/sec, HP'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. The Ultrium 3280 provides investment protection with full read and write backward support with LTO-4 media, and the ability to read LTO-3 cartridge. By nearly doubling the capacity of previous generation Ultrium drives, HP customers now require fewer data cartridges to meet their storage needs, significantly reducing their IT costs and increasing their ROI.

Ultrium 3280 External Tape Drive   **Ultrium 3280 Internal Tape Drive**

HP StoreEver LTO-4 Ultrium 1840 Tape Drive

HP LTO-4 Ultrium 1840 Tape represents HP's fourth-generation of LTO tape drive technology capable of storing up to 1.6TB per cartridge while providing hardware-based data encryption to enable greater levels of security and unprecedented performance. AES 256-bit hardware data encryption provides easy-to-enable security to protect the most sensitive data and prevent unauthorized access of tape cartridges. By using Ultrium 1840 hardware data encryption, not only is data fully capable of being compressed therefore maximizing capacity, encrypted backups are completed without a loss in performance. Capable of data transfer rates up to 240MB/sec, HP'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. The Ultrium 1840 provides investment protection with full read and write support with LTO-3 media, and the ability to read LTO-2 cartridge. By doubling the capacity of previous generation Ultrium drives, HP customers now require fewer data cartridges to meet their storage needs, significantly reducing their IT costs and increasing their ROI.
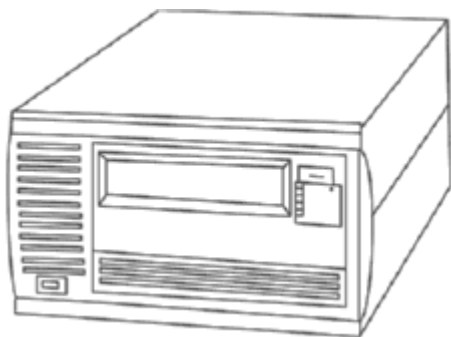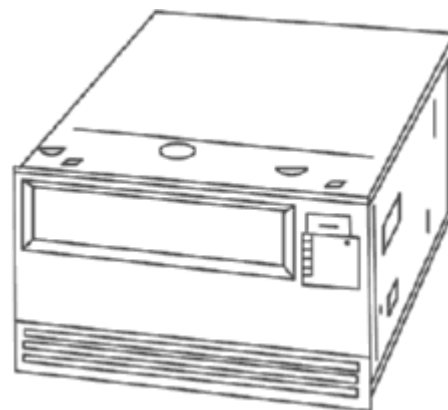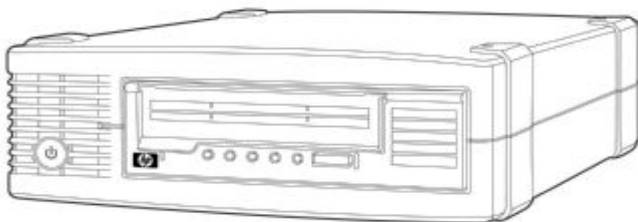

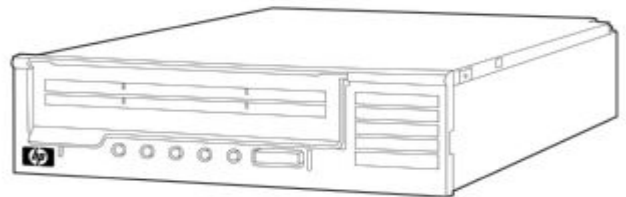**Ultrium 1840 External Tape Drive**   **Ultrium 1840 Internal Tape Drive**

Models

HP StoreEver LTO-6 Ultrium 6250 Tape Drive

The HP LTO-6 Ultrium 6250 tape drive represents HP's sixth-generation of LTO tape drive technology capable of storing up to 6.25TB (compressed 2.5:1) per cartridge while providing enterprise tape drive monitoring and management capabilities with HP TapeAssure, 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), HP'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. HP LTO Ultrium half-height drives are designed for server customers in direct attached storage (DAS) environments where hard disk and system bottlenecks can impede data transfer rates. The Ultrium 6250 tape drives provides investment protection with full read and write backward support with LTO-5 media, and the ability to read LTO-4 cartridges. By more than doubling the compressed capacity of previous generation Ultrium drives, HP customers now require fewer data cartridges to meet their storage needs, significantly reducing their IT costs and increasing their ROI.

HP StoreEver LTO-6 Ultrium 6250 External Tape Drive   **HP StoreEver LTO-6 Ultrium 6250 Internal Tape Drive**

HP StoreEver LTO-5 Ultrium 3000 Tape Drive

The HP LTO-5 Ultrium 3000 represents HP's fifth-generation of LTO tape drive technology capable of storing up to 3TB per cartridge while providing enterprise tape drive monitoring and management capabilities with HP TapeAssure 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 HP'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. HP LTO Ultrium half-height drives are designed for server customers in direct attached storage (DAS) environments where hard disk and system bottlenecks can impede data transfer rates. 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. By nearly doubling the capacity of previous generation Ultrium drives, HP customers now require fewer data cartridges to meet their storage needs, significantly reducing their IT costs and increasing their ROI.
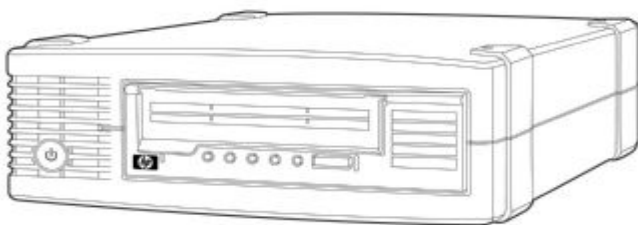
LTO-5 Ultrium 3000 External Tape Drive   **LTO-5 Ultrium 3000 Internal Tape Drive**
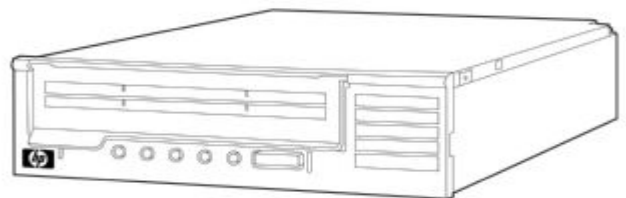
QuickSpecs

Models

HP StoreEver LTO-4 Ultrium 1760 Tape Drive

The HP LTO-4 Ultrium 1760 Tape Drive is HP's fourth-generation of half-height LTO tape drive technology capable of storing up to 1.6 TB per cartridge in under 3 hours. Available in both SCSI and SAS models, HP Ultrium half-height drives are designed for server customers in direct attached storage (DAS) environments where hard disk and system bottlenecks can impede data transfer rates. To further protect the most sensitive data, AES 256-bit hardware data encryption provides easy-to-enable security to prevent unauthorized access of tape cartridges. By using LTO-4 hardware data encryption, not only is data fully capable of being compressed therefore maximizing capacity, encrypted backups are completed without a loss in performance. Capable of data transfer rates up to 160 MB/sec, HP's exclusive Data Rate Matching feature further optimizes performance by matching speed of host to keep drives streaming and enabling the fastest performance of any tape drive in the industry. The Ultrium 1760 provides investment protection with full read and write support with LTO-4 and LTO-3 media, and the ability to read LTO-2 cartridge. By doubling the capacity of previous generation Ultrium drives, HP customers now require fewer data cartridges to meet their storage needs, significantly reducing their IT costs and increasing their ROI.
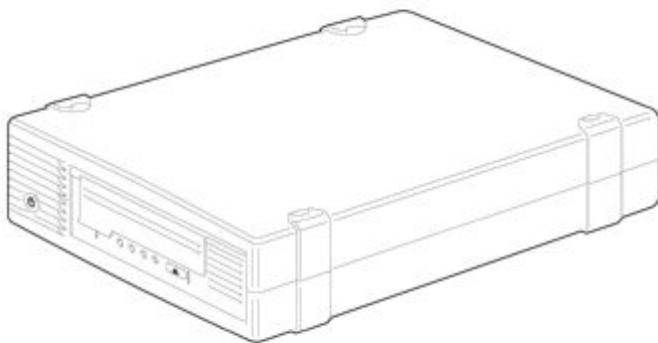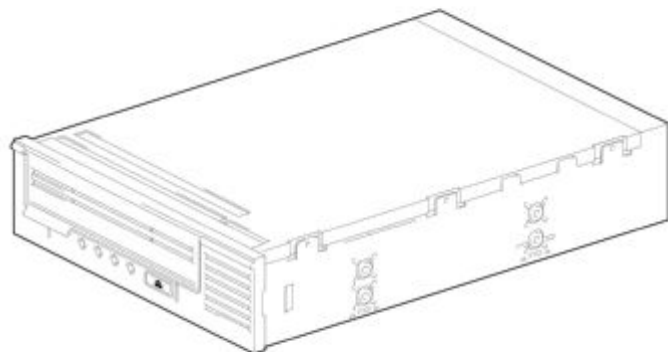
LTO-4 Ultrium 1760 External Tape Drive **LTO-4 Ultrium 1760 Internal Tape Drive**

HP StoreEver LTO-3 Ultrium 920 Tape Drive

The HP LTO-3 Ultrium 920 tape drive is HP's third generation of half-height LTO tape drive technology. The Ultrium 920 delivers a compressed storage capacity of 800 GB per data cartridge and a compressed data transfer rate of 432 GB per hour, two and a half times faster than the previous generation Ultrium 448 tape drive. Available in both SCSI and SAS models, the Ultrium 920 is ideal for midrange and departmental servers. The Ultrium 920 Tape Drive is fully read and write compatible with all second-generation Ultrium drives and media and offers further investment protection through its backward-read compatibility with first-generation Ultrium media. For IT organizations with stringent, long-term data retention requirements, the Ultrium 920'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.

Models

LTO-3 Ultrium 920 External Tape Drive   **LTO-3 Ultrium 920 Internal Tape Drive**

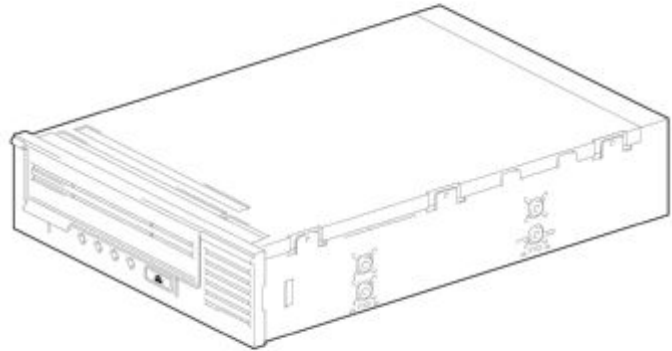## HP StoreEver LTO-2 Ultrium 448 Tape Drive

The HP LTO-2 Ultrium 448 tape drive is HP's second generation of half-height LTO tape drive technology. Offering a choice of both SCSI and SAS models, this midrange capacity, low cost tape drive delivers a compressed storage capacity of 400 GB per data cartridge and a compressed data transfer rate of 172 GB per hour, double the capacity and one and a half times the performance of the Ultrium 232 tape drive. The Ultrium 448 tape drive is fully read and write compatible with all first- and second-generation Ultrium drives and media. These features, combined with low pricing, make the Ultrium 448 the ideal direct-attach and network backup solution for entry-level and midrange servers where capacity and low cost of ownership are critical. New SAS-based models allow for direct connect to SAS-based HP ProLiant servers via embedded SAS controller or SAS HBA.
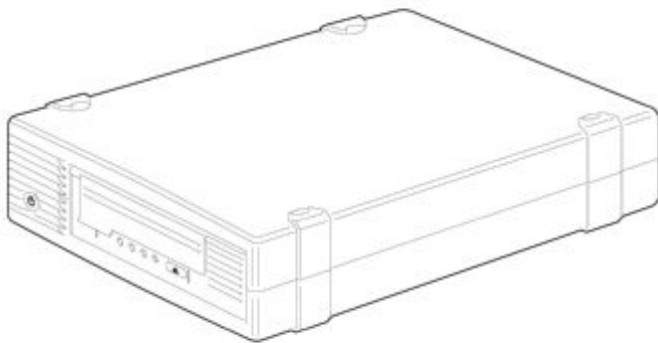
LTO-2 Ultrium 448 External Tape Drive   **LTO-2 Ultrium 448 Internal Tape Drive**
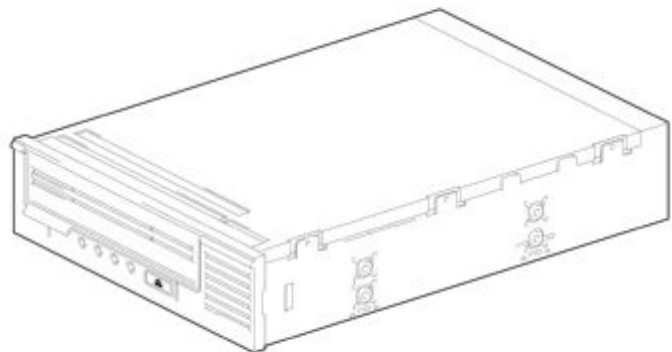
Features

Key Features

- **High-Capacity:** Large-capacity drive capable of storing up to 6.25TB (with LTO-6) of compressed storage on a single cartridge, requiring fewer data cartridges to meet storage needs, significantly reducing IT and archiving costs
- **Ease of use with LTFS and HP StoreOpen** - providing a self-describing file system with HP LTO-5 and LTO-6 cartridges, which enables the combined archiving benefits of application independence, transportability and protection from obsolescence.
- **Secure:** AES 256 bit data encryption and support for WORM media provide a secure method for long-term retention of critical data records
- **Fast:** Fast data transfer rate up to 400MB/sec (LTO-6 compressed) to meet demands of even the tightest backup window
- **Manageable:** HP Library and Tape Tools (LTT) provides HP TapeAssure health monitoring and operational information on performance and utilization for peace of mind and to allow you to optimize your configuration to get the most out of your drives and media as well as help with installation and troubleshooting Affordable: high capacity combined with low media cost delivers an exceptionally low cost of ownership and ensures a faster return on investment
- **Reliable:** HP's exclusive data rate matching feature automatically adjusts the drive's read and write speed based on the server and network environment, which increases performance, reduces mechanical wear on the drive, and extends tape life. Soft-load feature automatically takes the data cartridge and moves it into the load position. Advanced tape leader capture design ensures fail-safe cartridge loading. Active head cleaning provides automated cleaning that increases head life and reduces the need for using the cleaning cartridge. Lower power consumption for maximum reliability with minimum environmental costs
- **Compatible:** qualified/tested on all industry-leading operating systems, backup software and servers. Fully read-and-write compatible with LTO Ultrium drives and media from other manufacturers
- **Agile:** choice of models including internal, external, array module, and rack-mount to meet your backup configuration needs inside and outside of the server
- **Value:** Includes the option to download Yosemite Server Backup Basic backup and recovery software, see: www.barracudaware.com/ysbbasic
- **Investment Protection:** delivers a compelling technology roadmap that offers higher capacity and performance tape solutions with backward read and write compatibility for previous drive generations
- **Open:** based on the LTO technology open standard, delivering customers a greater choice of vendors and solutions without compromising compatibility across Ultrium products

Product Highlights

LTO Ultrium Technology

Linear Tape-Open technology was developed by three leaders in the storage industry - HP, 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 six-generation roadmap.

Ultrium LTO-2 tape drive technologies from HP use a linear format of 384 tracks and 512 tracks (respectively), writing eight tracks simultaneously. Ultrium LTO-3, LTO-4, LTO-5 and the new LTO-6 tape drive features a breakthrough in recording technology by writing sixteen tracks simultaneously on a linear format of 704 tracks, 896 tracks 1280 tracks and 2176 tracks (respectively). 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 (HP Ultrium 230, HP Ultrium 232) read and write LTO 1 media
- Second-generation LTO Ultrium drives (HP Ultrium 460, HP Ultrium 448) read and write LTO 1 and LTO 2 media.
- Third-generation LTO Ultrium drives (HP 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.

As part of the LTO open standard, all HP 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
- Lowest media cost of any 'superdrive' tape technology

Product Highlights

Hardware Based Encryption

HP LTO-4, 5 and 6 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
- The Yosemite Server Backup Basic backup and recovery software supports LTO-4, LTO-5 and LTO-6 encryption and makes writing encrypted backups simple. A passphrase is entered and Yosemite Server Backup Basic creates and manages the encryption key. For more information visit: http://www.hp.com/go/encryption

TapeAssure

HP TapeAssure makes managing, optimizing and archiving on the HP LTO Ultrium tape drives easier. This tool provides additional management and monitoring capabilities including:

- Life and health information for media and drives
- Information on media and drive utilization and operational performance
- Notifications of drive and media characteristics that fall below HP recommended standards

TapeAssure health reports and alerts give you peace of mind knowing the condition of the drives, the tapes and the data on each tape. TapeAssure monitors every backup to ensure the highest standards of reliability, sends alerts when these standards are not met, and ensures that you can maintain the drives and tapes used in an archive environment to have the highest integrity.

HP TapeAssure is included as part of HP Library and TapeTools for Windows users from LTT 5.0 onwards. Instructions and downloads of HP Library and Tape Tools are available at: http://www.hp.com/suppport/tapetools

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: www.hp.com/go/ltfs

HP StoreOpen Standalone

HP 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.hp.com/go/HPStoreOpen

Product Highlights

Data Rate Matching	Data Rate Matching combines sophisticated buffer management with HP's exclusive Variable Adaptive 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.

LTO-3, 4 and 5 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-3, 4 and 5 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-3, 4 and 5 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 HP WORM media that can store 800GB (LTO-3), 1.6TB (LTO-4) or 3TB (LTO-5) 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-generation Ultrium products

NOTE: While all HP LTO-3, 4 and 5 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-HP 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.

HP OBDR (One-Button Disaster Recovery)	One-Button Disaster Recovery is an HP exclusive feature that provides fast and simple disaster recovery through the use of an HP tape drive. OBDR is a firmware-driven utility that can restore a server's operating system, software applications, and data using a single tape cartridge. Depending on the size of the data set, OBDR can provide system recovery in less than one hour, reducing the recovery window by more than 50 percent and minimizing the risks and costs associated with downtime. There's no longer a need to search for software disks and manuals or make a new set of disaster recovery disks each time the network configuration is altered or a peripheral is added. The sheer simplicity of OBDR means less human error. Backup and disaster recovery preparation, previously two separate tasks, now become one process. For more information about OBDR, visit the HP website at: http://www.hp.com/go/obdr.

For a current list of servers, workstations, and software that support OBDR, check the tape backup compatibility pages on the HP website at: http://www.hp.com/storage/SPOCK.

Product Highlights

Included Software

The HP Ultrium tape drives provide the option to download Yosemite Server Backup Basic backup and recovery software. It is an easy-to-use backup and recovery application that is installed in minutes and includes all the features needed to protect a single machine by backup to a HP tape drive. Yosemite Server Backup Basic includes pre-defined and customizable media rotation schemes so you can define when you backup and how long your backups are retained, while easily managing your LTO data cartridges. Up to 4 parallel data streams keep the high-speed Ultrium tape drives streaming. Yosemite Server Backup Basic supports all the features of the Ultrium tape drives. LTO-4, LTO-5 and LTO-6 data encryption can be specified for any backup job and is configured using the easy-to-manage interface. The Yosemite Server Backup Basic Bare Metal Disaster Recovery (BMDR) feature supports the One Button Disaster Recovery capability of the Ultrium tape drives for fast and automated recovery of a ProLiant server after a major disaster. Backup to LTO WORM media is supported. Backup data compression can be turned on or off as part of the backup job specifications.

For more information please visit:

www.barracudaware.com/ysbbasic

NOTE: Yosemite Server Backup Basic comes with 30 days of free Maintenance and Support. After that time, customers have the option to upgrade to a retail version with Maintenance and Support.

NOTE: Yosemite Server Backup Basic replaces Data Protector Express Basic as the Backup & Recovery software option with HP LTO Ultrium tape drives.

If the HP Ultrium tape drive is for a large environment that requires UNIX support and/or enterprise class application and feature support then HP Data Protector is the recommended backup and recovery software. There is no upgrade path from Yosemite Server Backup Basic or Data Protector Express Basic or Data Protector Express to Data Protector. If current or future requirements will require Data Protector, this software should be installed from day 1. For more information and evaluation software please visit: http://www.hp.com/go/dataprotector.

HP Ultrium Storage Media

HP recommends that you use HP-branded cartridges in your HP Ultrium tape drive to assure the highest level of protection for your valuable data. Our test program for HP Ultrium media is the most thorough and comprehensive in the industry.

All HP cartridges must satisfy an exhaustive battery of additional tests that relate directly to real life situations, where real data and real businesses are at stake. The benefit of the HP brand specification for media is consistent quality. Through the testing of thousands of HP drives and HP cartridges, the ideal formulation for backup performance is defined and then continuously monitored. This hugely resource-intensive process is unique to HP and affords deep insight into the HP+HP backup solution for a wide range of environments and duty cycles. Your best choice for ease of support and maximum dependability is to use HP-branded Ultrium cartridges at all times.

QuickSpecs

Product Highlights

Diagnostics

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

- Verifies installation of the drive
- Test/verify the health of the drive and media
- Provides HP 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 HP tape products

Instructions and downloads of HP Library and Tape Tools are available at:
http://www.hp.com/suppport/tapetools
HP Library and TapeTools includes HP TapeAssure monitoring for Windows users from LTT 5.0 onwards.

Compatibility

HP's extensive compatibility testing program assures that your HP Ultrium tape drive works with leading servers, operating systems, and backup applications - and not just those sold by HP. HP 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 HP Ultrium tape drives, check the tape backup compatibility pages on our Web site at: http://www.hp.com/storage/SPOCK

Server Compatibility	HP Ultrium tape drives are supported on the following classes of HP systems: ● HP ProLiant DL servers ● HP ProLiant ML servers ● HP Integrity servers ● HP 9000 servers ● HP AlphaServers ● HP workstations HP 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.hp.com/storage/SPOCK for the latest hardware compatibility information.
OS Support	Microsoft® Windows, HP-UX, Tru64, Red Hat Linux, SUSE Linux, IBM-AIX, Sun Solaris and other operating systems. **NOTE:** Please visit: http://www.hp.com/storage/SPOCK for the latest compatibility information.
Backup Software Support	Supported with HP Data Protector, Yosemite Server Backup Basic, HP Data Protector Express Basic , HP Data Protector Express, CA ARCserve Backup, EMC NetWorker, EMC Retrospect, IBM Tivoli Storage Manager, Symantec NetBackup, Symantec Backup Exec, BakBone NetVault, Commvault Galaxy, Tolis Group BRU and Yosemite Backup **NOTE:** Please visit: http://www.hp.com/storage/SPOCK for the latest compatibility information.
SAS Installation	HP 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.hp.com/storage/SPOCK

Compatibility

Cables and Termination All cables required for a typical internal and external connection to HP servers are provided with your tape drive. For non-HP 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.

No terminator is required for SCSI internal models (assumes use of terminated cable). The SCSI external model features "auto-termination" - no terminator is required.

SAS-based Ultrium models ship with SAS cable which allows direct attach from embedded SAS controller.

NOTE: Visit: http://www.hp.com/storage/SPOCK for the latest compatibility information.

Performance Tuning Use HP Library and Tape tools to assist in this area at: http://www.hp.com/support/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, HP Care Pack, and Warranty Information

Warranty and Services Included with the Product	Hewlett-Packard 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 HP's Global Limited Warranty and Technical Support, visit: ftp://ftp.compaq.com/pub/products/storageworks/warranty/EN_321708-008.pdf

HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI
When you buy HP 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 HP Care Pack 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 HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively
HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP 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.

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

Learn more: www.hp.com/services/servers and www.hp.com/services/storage

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at http://www.hp.com/go/lookuptool

Service and Support, HP Care Pack, and Warranty Information

Recommended HP Care Pack Services for optimal satisfaction with your HP product.

Recommended Support	**3-Year HP Support Plus 24** For a higher return on your storage investment, HP Support Plus 24 provides integrated hardware and software support services designed specifically for your technology. Available 24x7, this 3-year combined reactive support option delivers onsite hardware support and over-the-phone software support around-the-clock. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure. ● Improve uptime with responsive hardware and software services ● Enjoy consistent service coverage across geographically dispersed sites ● Update HP software at a predictable cost ● Increase customer satisfaction-with no interoperability gaps http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EEE
Important Notice for Tape Drives Installed in a 1U or 3U Rack Mount Kit	**NOTE:** These Care Packs do not apply to Tape Drives mounted in a 1U or 3U Rack Mount Kit. The HP Rack Mount Kit Care Pack covers the all possible configurations of Tape Drives. Hence the Care Packs for 1U & 3U Rack Mount Kit covers all encumberant drives. Please follow the following url for the correct Care Pack Services and descriptions: http://h18000.www1.hp.com/products/quickspecs/10854_div/ 10854_div.pdf
Important Notice for Internal Tape Drives Installed in an HP Server	**NOTE:** These Care Packs do not apply to Internal Tape Drives because they do not have Care Packs associated with them if they are mounted in an HP Server. Hence the Care Packs for the HP Server covers all encumberant drives. Please follow the following url for the correct Care Pack Services and descriptions: For ProLiant use: http://h18000.www1.hp.com/products/quickspecs/ProductBulletin.html For BCS use: http://h18000.www1.hp.com/products/quickspecs/ProductBulletin.html
Important Notice for Tape Drive Modules Installed in an HP Tape Array	**NOTE:** These Care Packs do not apply to Tape Drives mounted in an HP Tape Array because they do not have Care Packs associated with them. Hence the Care Packs for the HP Tape Array covers all encumberant drives. Please follow the following url for the correct Care Pack Services and descriptions: http://h18000.www1.hp.com/products/quickspecs/11878_div/ 11878_div.pdf
Recommended Deployment	**HP Installation Service** For smooth startup and better business outcomes, HP 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 HP 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 http://h71028.www7.hp.com/ERC/downloads/5981-9356EN.pdf

Service and Support, HP Care Pack, and Warranty Information

Optional HP Care Pack Services that will enhance your HP product experience.

Related Services

5-Year HP Support Plus 24

As an alternative to our recommended support level, for customers who need to improve uptime with responsive 24x7 product support:

HP Support Plus 24 helps you increase performance and availability with comprehensive, consistent hardware and software services. Working with your IT team, HP Services engineers deliver onsite hardware support and over-the-phone software support around-the-clock 365 days per year. Service coverage encompasses HP products and selected multivendor hardware and software.

In addition, this convenient HP Care Pack packaged service makes software updates available to you at substantial savings.

Choose Support Plus 24 when you need to:

- Improve uptime with responsive hardware and software services available anytime
- Cost-effectively obtain expert 24x7 multivendor hardware and software support
- Enjoy consistent service coverage across geographically dispersed sites
- Update HP and selected third-party software at a predictable cost
- Take advantage of subscription savings on software updates

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf

eSupport

HP 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 HP 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

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support

Customer Technical Training

HP 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, HP 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.

Service and Support, HP Care Pack, and Warranty Information

HP Services Awards   HP 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 HP ProLiant servers, HP BladeSystem servers and HP storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: www.hp.com/services/proliant or www.hp.com/services/bladesystem or http://www.hp.com/services/storage

Options

HP LTO Ultrium Full-Height Tape Drives

Model Name/Kit Contents Description	Part Number

LTO-6 Ultrium 6650 tape drives

LTO-6 Ultrium 6650 SAS internal

- HP LTO-6 Ultrium 6650 SAS Internal Tape Drive   **EH963A**
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP LTO-6 Ultrium 6.25 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- mini-SAS SFF8482 to twin SFF8087 cable
- performance tuning poster
- Documentation

NOTE: 0D1 will appear after this part number on your sales order if factory integration into a server or rack-mount enclosure is indicated.

LTO-6 Ultrium 6650 SAS External

- HP LTO-6 Ultrium 6650 SAS External Tape Drive   **EH964A**
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP LTo-6 Ultrium 6.25 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- power cord
- mini-SAS SFF8088 to SFF8088 cable
- performance tuning poster
- Documentation

LTO-5 Ultrium 3280 tape drives

LTO-5 Ultrium 3280 SAS Internal

- HP StoreEver LTO-5 Ultrium 3280 SAS Internal Tape Drive   **EH899B**
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP Ultrium 3 TB Data Cartridge; Ultrium Cleaning Cartridge
- multi-language labels
- mini-SAS SFF8482 to SFF8087 cable
- performance tuning poster
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration into a server or rack-mount enclosure is indicated.

LTO-5 Ultrium 3280 SAS External

- HP StoreEver LTO-5 Ultrium 3280 SAS External Tape Drive   **EH900B**
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers);
- Yosemite Server Backup Basic (option to download)
- HP Ultrium 3 TB Data Cartridge;
- Ultrium Cleaning Cartridge;
- multi-language labels;
- power cord;
- mini-SAS SFF8088 to SFF8088 cable;
- performance tuning poster;
- Documentation

HP StoreEver LTO-5 Ultrium 3280 SAS Tape Drive in 3U Rack-mount   **EJ013B**

- 3U 6Gb SAS rack-mount enclosure kit with power supply and fan
- one internal LTO-5 Ultrium 3280 SAS Tape Drive;
- power cord;
-

Options

- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP Ultrium 3 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- Documentation

NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.

Model Name/Kit Contents Description	Part Number

LTO-4 Ultrium 1840 tape drives

LTO-4 Ultrium 1840 SAS Internal

EH860B

- HP StoreEver LTO-4 Ultrium 1840 SAS Internal Tape Drive
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP Ultrium 1.6 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- mini-SAS SFF8482 to SFF8087 cable
- performance tuning poster
- Documentation
.
NOTE: 0D1 will appear after this part number on your sales order if factory integration into a server or rack-mount enclosure is indicated.

LTO-4 Ultrium 1840 SAS External

- HP StoreEver LTO-4 Ultrium 1840 SAS External Tape Drive   EH861B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP Ultrium 1.6 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- power cord
- mini-SAS SFF8088 to SFF8088 cable
- performance tuning poster
- Documentation

LTO-4 Ultrium 1840 SCSI Internal

- HP StoreEver LTO-4 Ultrium 1840 SCSI Internal WW Tape Drive   EH853B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP Ultrium 1.6 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- internal SCSI cable
- performance tuning poster
- Documentation

NOTE: 0D1 will appear after this part number on your sales order if factory integration into a server or rack-mount enclosure is indicated.

LTO-4 Ultrium 1840 SCSI External

- HP StoreEver LTO-4 Ultrium 1840 SCSI External WW Tape Drive   EH854B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
-
-

Options

- HP Ultrium 1.6 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- power cord
- 68-pin HD to 68-pin VHDCI multi-mode SCSI cable
- performance tuning poster
- Documentation

HP StoreEver LTO-4 Ultrium 1840 SCSI (1) in 3U Rack-mount Kit   EH926B

- Wide SCSI LVD 3U SCSI rack-mount enclosure kit with power supply and fan
- one internal LTO-4Ultrium 1840 SCSI Tape Drive
- power cord
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities, user manuals and Windows drivers)
- Yosemite Server Backup Basic (option to download)
- HP Ultrium 1.6 TB Data Cartridge
- Ultrium Cleaning Cartridge
- multi-language labels
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.

NOTE: Yosemite Server Backup Basic replaces Data Protector Express Basic as the software (downloadable) included with the HP LTO Ultrium tape drives.

HP LTO Ultrium Half-Height Tape Drives

Model Name/Kit Contents Description	Part Number

LTO-6 Ultrium 6250 tape drives   LTO-6 Ultrium 6250 SAS Internal

- HP StoreEver LTO-6 Ultrium 6250 Internal Tape Drive   EH969A
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- 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 Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO-6 Ultrium 6.25 TB RW Data Cartridge
- power cord
- mini-SAS SFF8088 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
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO-6 Ultrium 6.25 TB RW Data Cartridge
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory

Options

LTO-5 Ultrium 3000 tape drives	LTO-5 Ultrium 3000 SAS Internal	
	● " HP StoreEver LTO-5 Ultrium 3000 SAS Internal Tape Drive	EH957B
	● HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)	
	● Yosemite Server Backup Basic (option to download)	
	● HP LTO5 Ultrium 3 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-5 Ultrium 3000 SAS External

- ● HP StoreEver LTO-5 Ultrium 3000 SAS External Tape Drive — EH958B
- ● HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- ● Yosemite Server Backup Basic (option to download)
- ● HP LTO5 Ultrium 3 TB RW Data Cartridge
- ● power cord
- ● mini-SAS SFF8088 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
- ● HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- ● Yosemite Server Backup Basic (option to download)
- ● HP 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.

Model Name/Kit Contents Description	**Part Number**
LTO-4 Ultrium 1760 tape drives LTO-4 Ultrium 1760 SAS Internal	

- ● HP StoreEver LTO-4 Ultrium 1760 SAS Internal WW Tape Drive — EH919B
- ● HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- ● Yosemite Server Backup Basic (option to download)
- ● HP LTO4 Ultrium 1.6 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-4 Ultrium 1760 SAS External

- ● HP StoreEver LTO-4 Ultrium 1760 SAS External Tape Drive — EH920B
- ● HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- ● Yosemite Server Backup Basic (option to download)
- ● HP LTO4 Ultrium 1.6 TB RW Data Cartridge
- ● power cord
- ● mini-SAS SFF8088 to SFF8088 cable
- ● Documentation

LTO-4 Ultrium 1760 SCSI Internal

- ● HP StoreEver LTO-4 Ultrium 1760 SCSI Internal Tape Drive — EH921B
- ● HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- ● Yosemite Server Backup Basic (option to download)
- ●
- ●

Options

- HP LTO4 Ultrium 1.6 TB RW Data Cartridge)
- internal SCSI cable
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.

LTO-4 Ultrium 1760 SCSI External

- HP StoreEver LTO-4 Ultrium 1760 SCSI External Tape Drive   EH922B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO4 Ultrium 1.6 TB RW Data Cartridge
- power cord
- 68-pin HD to 68-pin VHDCI multi-mode SCSI cable
- Documentation

Model Name/Kit Contents Description	Part Number

LTO-3 Ultrium 920 tape drives

LTO-3 Ultrium 920 SCSI Internal

- HP StoreEver LTO-3 Ultrium 920 SCSI Internal Tape Drive   EH841B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO3 Data Cartridge (800 GB)
- internal SCSI cable
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.

LTO-3 Ultrium 920 SCSI External

- HP StoreEver LTO-3 Ultrium 920 SCSI External Tape Drive   EH842B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO3 Data Cartridge (800 GB)
- power cord
- 68-pin HD to 68-pin VHDCI multi-mode SCSI cable
- Documentation

HP StoreEver LTO-3 Ultrium 920 SCSI in 1U Rack-mount Kit

- Wide SCSI LVD rack-mountable enclosure (1U) with power supply and fan; rail kit   EH903C
- one internal Ultrium 920 SCSI tape drive; power cord
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO3 Data Cartridge (800 GB)
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.

LTO-3 Ultrium 920 SAS Internal

- HP StoreEver LTO-3 Ultrium 920 SAS Internal Tape Drive   EH847B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO3 Data Cartridge (800 GB)
- mini-SAS SFF8482 to SFF8087
- Documentation
  NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.

LTO-3 Ultrium 920 SAS External

- HP StoreEver LTO-3 Ultrium 920 SAS External Tape Drive   EH848B
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Options

- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO3 Data Cartridge (800 GB)
- power cord
- mini-SAS SFF8088 to SFF8088 cable
- Documentation

Model Name/Kit Contents Description	Part Number

LTO-2 Ultrium 448 tape drives

LTO-2 Ultrium 448 SCSI Internal

- HP StoreEver LTO-2 Ultrium 448 SCSI Internal Tape Drive — DW016B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO2 Data Cartridge (400 GB)
- internal SCSI cable
- Documentation

NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.

LTO-2 Ultrium 448 SCSI External

- HP StoreEver LTO-2 Ultrium 448 SCSI Internal Tape Drive — DW017C
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO2 Data Cartridge (400 GB)
- power cord
- 68-pin HD to 68-pin VHDCI multi-mode SCSI cable
- Documentation

HP StoreEver LTO-2 Ultrium 448 SCSI in 1U Rack-mount Kit

- Wide SCSI LVD rack-mountable enclosure (1U) with power supply and fan — DW028D
- rail kit
- one internal Ultrium 448 SCSI tape drive
- power cord
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO2 Data Cartridge (400 GB)
- Documentation

NOTE: 0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.

LTO-2 Ultrium 448 SAS Internal

- HP StoreEver LTO-2 Ultrium 448 SAS Internal Tape Drive — DW085B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO2 Data Cartridge (400 GB)
- 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-2 Ultrium 448 SAS External

- HP StoreEver LTO-2 Ultrium 448 SAS External Drive — DW086B
- HP Tape CD-ROM (contains HP Library and Tape Tools utilities and localized user manuals)
- Yosemite Server Backup Basic (option to download)
- HP LTO2 Data Cartridge (400 GB)
- mini-SAS SFF8088 to SFF8088 cable
- Documentation

QuickSpecs

HP LTO Ultrium Tape Drives

Options

Host Bus Adapters, Controllers, and Accessories for ProLiant Servers	HP SC11Xe Host Bus Adapter **NOTE:** Recommended SCSI HBA for connecting Ultrium tape drives to G6/G7/Gen8 ProLiant servers.	412911-B21
	HP H222 Host Bus Adapter **NOTE:** Recommended SAS HBA for connecting Ultrium tape drives to Gen8 ProLiant servers.	650926-B21
	HP Smart Array P222 **NOTE:** SAS HBA for connecting Ultrium tape drives to Gen8 ProLiant servers.	631667-B21
	HP Smart Array P212 **NOTE:** Recommended SAS HBA for connecting Ultrium tape drives to G6/G7 ProLiant servers.	462828-B21
	Please visit: http://www.hp.com/storage/SPOCK for a complete list of Ultrium tape drive compatibility with ProLiant servers and other industry standard servers.	
Media	HP LTO-1 Ultrium 200 GB Data Cartridge **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 LTO-2 Ultrium 400GB Data Cartridge **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
	HP LTO-3 Ultrium 800 GB WORM Data Cartridge **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.	C7973W
	HP LTO-4 Ultrium 1.6TB Read/Write Data Cartridge **NOTE:** Write and read support for LTO-4 Ultrium 1840, LTO-4 Ultrium 1760, LTO-5 Ultrium 3280 and LTO-5 Ultrium 3000.	C7974A
	HP LTO-4 Ultrium 1.6TB WORM Data Cartridge **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.	C7974W
	HP LTO-5 Ultrium 3 TB RW Data Cartridge **NOTE:** Write and read support for LTO-5 Ultrium 3280 and Ultrium 3000.	C7975A
	HP LTO-5 Ultrium 3TB WORM Data Cartridge **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.	C7975W
	HP LTO-6 Ultrium 6.25TB MP RW Data Cartridge **NOTE:** Write and read support for LTO-6 Ultrium 6650 and Ultrium 6250	C7976A
	HP LTO-1 Ultrium 200GB Storage Media Kit	C8013A
	HP LTO-2 Ultrium 400GB Storage Media Kit	C8014A
	HP Ultrium Universal Cleaning Cartridge	C7978A

QuickSpecs

Options

Rack-mount Options	HP StoreEver 1U SCSI Rack-mount Kit **NOTE:** For racked ProLiant servers. No drives included. Accommodates up to two internal half-height drives (such as the LTO-2 Ultrium 448, LTO-3 Ultrium 920 and LTO-4 Ultrium 1760,)). **NOTE:** Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/1urackmount/index.html	A7445C
	HP StoreEver 1U SAS Rack-mount Kit **NOTE:** For racked ProLiant servers. No drives included. Accommodates up to two internal SAS half-height drives (such as the LTO-2 Ultrium 448, LTO-3Ultrium 920, LTO-4 Ultrium 1760, LTO-5 Ultrium 3000 and LTO-6 Ultrium 6250)). **NOTE:** Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/1urackmount/index.html	AE459B
	HP StoreEver 3U SAS Rack-mount Kit **NOTE:** For racked SAS-based ProLiant servers. No drives included. Accommodates up to four internal half-height drives (such as the LTO-2 Ultrium 448 SAS, LTO-3Ultrium 920 SAS, LTO-4 Ultrium 1760, LTO-5 Ultrium 3000 and LTO-6 Ultrium 6250) or two full-height drives (such as the LTO-4 Ultrium 1840 SAS, LTO-5 Ultrium 3280 or LTO-6 Ultrium 6650). **NOTE:** Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/3urackmount/index.html **NOTE:** #0D1 will appear after this part number on your sales order if factory integration into a rack is indicated.	AG576B

Cables and Adapters	VHDCI/Wide 12 Ft. Cable **NOTE:** for external drives	341177-B21
	5m Wide Differential SCSI Cable 68 pin **NOTE:** for external drives	328215-001
	10m Wide Differential SCSI Cable 68 pin **NOTE:** for external drives	328215-002
	HP Ultra 320 SCSI Cable Kit **Note:** for installing Ultra320 SCSI tape drives in the 3U and 5U Rack-Mount Kits)	DW063B
	SAS cable, Int. Drive SFF8482, split to 2 x Internal SFF8484, 1m **NOTE:** Use this cable to connect HP Ultrium 448, 920, 960, 1760, and1840 SAS internal tape drives to SAS 4i (SFF8484) connectors.	AE490A
	HP 1m with Power SAS Cable **NOTE:** Use this cable to connect HP Ultrium 3280 and 3000 SAS internal tape drives to SAS 4i (SFF8484) connectors.	AE491A
	HP Mini-SAS Cable for LTO Internal Tape Drive **NOTE:** Use this cable to connect HP LTO Ultrium internal tape drives to Mini-SAS (SFF8087) ports.	AP746A
	HP SAS External-Min 1x-2M Cable Assembly Kit **NOTE:** Use this cable to connect HP SAS external tape devices to HP SAS controllers with Infiniband (SFF8470) connectors.	AE466A
	HP 1U SAS Ext-Min 1x-4M Cable Assembly Kit **NOTE:** Use this cable to connect HP SAS external tape devices to HP SAS controllers with Infiniband (SFF8470) connectors.	AE468A
	HP SAS Min-Min 1x-2M Cable Assembly Kit **NOTE:** Use this cable to connect HP SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE470A
	HP SAS MIN-MIN 1X-4M Cable Assembly Kit **NOTE:** Use this cable to connect HP SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE465A

Options

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 HP SAS
controllers with SAS 4i (SFF8484) connectors. The 1x cable occupies additional
PCI slot on the server.

HP SAS MIN-MIN 3X1X-5M Cable Assembly Kit   AG452A
NOTE: This split cable connects internally to SAS Hard Drive Cage (3x) and
externally to the tape device (1x) with other connector attaching to the Smart
Array P400i controller inside a DL360 G5 or DL365 G5 server. The 1x cable
occupies additional PCI slot on the server.

Technical Specifications

		LTO-4 Ultrium 1840	LTO-5 Ultrium 3280	LTO-6 Ultrium 6650
Dimensions	**Form Factor**	5¼-inch full-height	5¼-inch full-height	5¼-inch full-height
	Physical (HxWxD) **Internal**	3.3 x 5.7 x 8.2 in (8.5 x 14.5 x 20.7cm)	3.3 x 5.7 x 8.2 in (8.3 x 14.6 x 20.7 cm)	3.3 x 5.7 x 8.2 in (8.3 x 14.6 x 20.7 cm)
	Physical (HxWxD) **External**	4.7 x 8.6 x 11.7 in (12.0 x 21.8 x 29.7 cm)	4.7 x 8.6 x 11.7 in (12.0 x 21.8 x 29.7 cm)	4.7 x 8.6 x 11.7 in (12.0 x 21.8 x 29.7 cm)
	Physical (HxWxD) **Rack-mount**	5.2 x 16.8 x 23.0 in (13.2 x 42.7 x 58.4 cm)	5.2 x 16.8 x 23.0 in (13.2 x 42.7 x 58.4 cm)	5.2 x 16.8 x 23.0 in (13.2 x 42.7 x 58.4 cm)
	Shipping (HxWxD) **Internal**	10.6 x 10.6 x 13 in (27.0 x 27.0 x 33 cm)	10.6 x 10.6 x 13 in (27.0 x 27.0 x 33 cm)	10.6 x 10.6 x 13 in (27.0 x 27.0 x 33 cm)
	Shipping (HxWxD) **External**	11 x 12.2 x 15.4 in (28 x 31 x 39 cm)	11 x 12.2 x 15.4 in (28 x 31 x 39 cm)	11 x 12.2 x 15.4 in (28 x 31 x 39 cm)
	Shipping (HxWxD) **Rack-mount**	15.75 x 23.75 x 33.5 in (40.0 x 60.3 x 85.1 cm)	15.75 x 23.75 x 33.5in (40.0 x 60.3 x 85.1 cm)	15.75 x 23.75 x 33.5in (40.0 x 60.3 x 85.1 cm)
Weight	**Out of box, Internal**	4.94 lb (2.24 kg)	4.94 lb (2.24 kg)	4.94 lb (2.24 kg)
	Out of box, External	12.28 lb (5.57 kg)	12.28 lb (5.57 kg)	12.28 lb (5.57 kg)
	Out of box, Rack-mount	31.6 lb (14.4 kg)	31.6 lb (14.4 kg)	31.6 lb (14.4 kg)
	Shipping, Internal	7.9 lb (3.6 kg)	7.9 lb (3.6 kg)	7.9 lb (3.6 kg)
	Shipping, External	16.1 lb (7.3 kg)	16.1 lb (7.3 kg)	16.1 lb (7.3 kg)
	Shipping, Rack-mount	56 lb (25 kg)	56 lb (25 kg)	56 lb (25 kg)
Capacity	**Native**	800 GB	1.5 TB	2.5TB
	Compressed (assumes 2:1 data compression for LTO-4 and 5; 2.5:1 compression for LTO-6)	1.6 TB	3 TB	6.25TB
	Buffer Size	128 MB	256 MB	512MB
Performance (1Kb = 1,000 bytes)	**Native Data transfer rate**	120 MB/s with LTO 4 media 80 MB/s with LTO 3 media 35.6 MB/s with LTO 2 media	140 MB/s with LTO 5 media 120 MB/s with LTO 4 media 80 MB/s with LTO 3 media	160MB/s with LTO 6 media 140 MB/s with LTO 5 media 120 MB/s with LTO 4 media
	Data transfer rate, compressed (assumes 2:1 data compression for LTO-4 and 5; 2.5:1 compression for LTO-6)	240 MB/s with LTO 4 media 160 MB/s with LTO 3 media 71.2 MB/s with LTO 2 media	280 MB/s with LTO 5 media 240 MB/s with LTO 4 media 160 MB/s with LTO 3 media	400MB/s with LTO-6 media 280 MB/s with LTO 5 media 240 MB/s with LTO 4 media
	Burst transfer rate	Ultra320 SCSI: 190 MB/s 3Gb/sec SAS: 240 MB/s	600 MB/s with 6Gb/s SAS	600 MB/s with 6Gb/s SAS
	Data rate matching range	40-120 MB/s	47-140 MB/s	54-160 MB/s
	Data access time (from BOT)	46 seconds typical for LTO 2 media 52 seconds typical for LTO 3 media 62 seconds typical for LTO 4 media	42 seconds typical for LTO 3 media 50 seconds typical for LTO 4 media 52 seconds typical for LTO 5 media	50 seconds typical for LTO 6 media

Technical Specifications

	Rewind time from EOT	< 92 seconds for LTO 2 media < 102 seconds for LTO 3 media < 124 seconds for LTO 4 media	< 78 seconds for LTO 3 media < 93 seconds for LTO 4 media < 96 seconds for LTO 5 media	<98s for LTO 6 media
	Rewind tape speed	7 m/s for (LTO 4 and LTO 3 media)	9 m/s for (LTO 5 and LTO 4 media)	9 m/s for (LTO 6, LTO 5 and LTO 4 media)
	Average load time	<19 seconds (RW) 22 seconds (WORM-initialized) Uninitialized WORM media can take up to 70 seconds	<19 seconds (RW) 22 seconds (WORM-initialized) Uninitialized WORM media can take up to 70 seconds	22 seconds (RW)
	Average unload time	<19 seconds (RW) 22 seconds (WORM-initialized) Uninitialized WORM media can take up to 70 seconds	<19 seconds (RW) 22 seconds (WORM-initialized) Uninitialized WORM media can take up to 70 seconds	19 seconds (RW)
Security	**Encryption**	AES 256 bit	AES 256 bit	AES 256 bit
	WORM media support	LTO 4 media	LTO-5 media	LTO-6 media
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 1x10 [17] bits	1 in 1x10 [17] bits	1 in 1x10 17 bits
Rewriteable Media Compatibility	**Read**	LTO Ultrium 4 LTO Ultrium 3 LTO Ultrium 2	LTO Ultrium 5 LTO Ultrium 4 LTO Ultrium 3	LTO Ultrium 6 LTO Ultrium 5 LTO Ultrium 4
	Write	LTO Ultrium 4 LTO Ultrium 3 [unencrypted]	LTO Ultrium 5 LTO Ultrium 4	LTO Ultrium 6 LTO Ultrium 5
WORM Media Compatibility	**Read**	LTO Ultrium 4 WORM LTO Ultrium 3 WORM	LTO Ultrium 5 WORM LTO Ultrium 4 WORM LTO Ultrium 3 WORM	LTO Ultrium 6 WORM LTO Ultrium 5 WORM LTO Ultrium 4 WORM
	Write	LTO Ultrium 4 WORM LTO Ultrium 3 WORM	LTO Ultrium 5 WORM LTO Ultrium 4 WORM	LTO Ultrium 6 WORM LTO Ultrium 5 WORM
Tape Format	**Recording method**	16-channel linear serpentine	16-channel linear serpentine	16-channel linear serpentine
	Recording format	LTO Ultrium 4 LTO Ultrium 3 [unencrypted]	LTO Ultrium 5 LTO Ultrium 4	LTO Ultrium 6 LTO Ultrium 5
	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
	Read Channel Technology	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)
	Data Tracks	896	1280	2176
	Data Encoding Method	RLL 0,13/11	RLL 32/33	RLL 32/33
Interface	**Interface type**	Ultra320 SCSI (LVDS) or 3Gb/sec SAS	6Gb/s Dual Port SAS	6Gb/s Dual Port SAS
	SCSI connector	SCSI Internal: 68-pin LVDS		

Technical Specifications

	SCSI External: 68-pin HD LVDS SCSI Array module: 80-pin SCA (SCSI and power) SCSI Rack-mount: 68-pin HD LVDS		
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

		LTO-4 Ultrium 1840	**LTO-5 Ultrium 3280**	**LTO-6 Ultrium 6650**
Power Specifications	**Power requirements, Internal** (including rack-mount model)	+5V@4.2A (typical) +5V@4.5A (max) +12V@0.75A (typical) +12V@2.5A (max)	+5V@3.6A (typical) +5V@3.7A (max) +12V@0.7A (typical) +12V@2.2A (max)	+5V@3.5A (typical) +5V@3.9A (max) +12V@0.6A (typical) +12V@2.5A (max)
	Power requirements, External	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A 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	12 Watts idle 30 Watts typical 52 Watts max	7 Watts idle 24 Watts typical 41 Watts max	4.1 Watts idle 24 Watts typical 42 Watts max

		Ultrium 448	**Ultrium 920**	**Ultrium 1760**	**Ultrium 3000**	**Ultrium 6250**
Dimensions	**Form Factor**	5¼-inch half-height	5¼-inch half-height	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)	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)	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)	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)	1.7 x 16.88 x 25.25 in (4.32 x 42.88 x 64.14 cm)
	Physical (HxWxD) **3U Rack-mount**	N/A	N/A	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)	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)	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)	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)	12.0 x 23.5 x 33.5 in (30.5 x 59.7 x 85.1 cm)
	Shipping (HxWxD) **3U Rack-mount**	N/A	N/A	N/A	N/A	N/A

Technical Specifications

Weight	**Out of box, Internal**	3.2 lb (1.45 kg)	3.2 lb (1.45 kg)	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)	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)	21.0 lb (9.52 kg)	21.0 lb (9.52 kg)	21.0 lb (9.52 kg)
	Out of box, 3U Rack-mount	N/A	N/A	N/A	N/A	N/A
	Shipping, Internal	5.1 lb (2.3kg)	5.1 lb (2.3kg)	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)	11 lb (5 kg)	11 lb (5 kg)
	Shipping, 1U Rack-mount	32.9 lb (14.8 kg)	32.9 lb (14.8 kg)	32.9 lb (14.8 kg)	32.9 lb (14.8 kg)	32.9 lb (14.8 kg)
	Shipping, 3U Rack-mount	N/A	N/A	N/A	N/A	N/A
Capacity	**Native**	200 GB	400 GB	800 GB	1.5 TB	2.5TB
	Compressed (assumes 2:1 data compression for LTO-4 and 5; 2.5:1 compression for LTO-6))	400 GB	800 GB	1.6 TB	3 TB	6.25TB
	Buffer Size	64 MB	64 MB	128 MB	256 MB	512MB
Performance	**Sustained transfer rate, native**	24 MB/s	60 MB/s	80 MB/s	140 MB/s	160MB/s
	Sustained transfer rate, compressed (assumes 2:1 data compression for LTO-4 and 5; 2.5:1 compression for LTO-6)	48 MB/s	120 MB/s	160 MB/s	280 MB/s	400MB/s
	Burst transfer rate	160 MB/s (with Ultra3 SCSI wide); 300 MB/s (with 3Gb/sec SAS)	320 MB/s (with Ultra320 SCSI); 300 MB/s (with 3Gb/sec SAS)	300 MB/s (with 3Gb/sec SAS)	600 MB/s (with 6Gb/s SAS)	600 MB/s with 6Gb/s SAS
	Data rate matching range	0-24 MB/s (native)	20-60 MB/s (native)	33-80 MB/s (native)	47-140 MB/s (native)	54-160 MB/s (native)
	Data access time (from BOT)	64 s typical for a 200 GB tape (native)	64 s typical for a 200 GB tape (native)	64 s typical for a 800 GB tape (native)	52 s typical for a 1.5 TB tape (native)	50 seconds typical for LTO 6 media
	Average load time	>19 s	>19 s	>19 s	>19 s	24s
	Average unload time	19 s	19 s	19 s	19 s	19s
	Rewind time from EOT	121 s (200 GB tape)	121 s (400 GB tape)	124 s (800 GB tape)	96 s (1.5 TB tape)	98s (2.5TB tape)
	Rewind tape speed	5.0 m/s	5.0 m/s	7.0 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	250,000 hours at 100% duty cycle	250,000 hours at 100% duty cycle
	Uncorrected Error Rate	1 in 1x10 [17] bits	1 in 1x10 [17] bits	1 in 1x10 [17] bits	1 in 1x10 [17] bits	1 in 1x10 17 bits
Media Compatibility		LTO Ultrium 1 (Read and Write);	LTO Ultrium 1 (Read only); LTO Ultrium 2	LTO Ultrium 2 (Read only); LTO Ultrium 3	LTO Ultrium 3 (Read only); LTO Ultrium 4	LTO Ultrium 4 (Read only); LTO Ultrium 5

Technical Specifications

		LTO Ultrium 2 (Read and Write)	(Read and Write); LTO Ultrium 3 (Read and Write)	(Read and Write); LTO Ultrium 4 (Read and Write)	(Read and Write); LTO Ultrium 5 (Read and Write)	(Read and Write); LTO Ultrium 6 (Read and write)
Tape Format	**Recording method**	8-channel linear serpentine	16-channel linear serpentine	16-channel linear serpentine	16-channel linear serpentine	16-channel linear serpentine
	Recording format	LTO Ultrium 2 LTO Ultrium 1 (for 100 GB tape)	LTO Ultrium 3 LTO Ultrium 2 (for 200 GB tape)	LTO Ultrium 4 LTO Ultrium 3 (for 400 GB tape)	LTO Ultrium 5 LTO Ultrium 4 (for 800 GB tape)	LTO Ultrium 6 LTO Ultrium 5 (for 1.5 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)	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	Reed-Solomon	Reed-Solomon
	Read channel technology	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)
	Data encoding method	RLL 0,13/11	RLL 0,13/11	RLL 0,13/11	RLL 32/33	RLL 32/33
Interface	**Interface type**	Wide Ultra3 SCSI (LVDS) or 3Gb/sec SAS	Ultra320 SCSI (LVDS) or 3Gb/sec SAS	Ultra320 SCSI (LVDS) or 3Gb/sec SAS	6Gb/sec Dual Port SAS	6Gb/sec Dual Port SAS
	SCSI connector	SCSI Internal: 68-pin LVDS SCSI External: 68-pin HD LVDS SCSI Array module: 80-pin SCA (SCSI and power) SCSI Rack-mount: 68-pin HD LVDS	SCSI Internal: 68-pin LVDS SCSI External: 68-pin HD LVDS SCSI Rack-mount: 68-pin HD LVDS	SCSI Internal: 68-pin LVDS SCSI External: 68-pin HD LVDS	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	SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088	SAS Internal: mini-SAS SFF8482 SAS External: mini-SAS SFF8088

Technical Specifications

		Ultrium 448	Ultrium 920	Ultrium 1760	Ultrium 3000	Ultrium 6250
Power Specifications	**Power requirements, Internal** (including rack-mount model)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	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)
	Power requirements, External	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.7A max	100 to 240 VAC, 50-60 Hz, auto-ranging, 0.8A max
	Power requirements, Array Module	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	+5V@2.5A (typical) +5V@2.5A (max) +12V@0.7A (typical) +12V@2.1A (max)	N/A	N/A	N/A
	Power consumption	13 Watts idle 20 Watts typical 33 Watts max	13 Watts idle 20 Watts typical 33 Watts max	13 Watts idle 20 Watts typical 33 Watts max	7 Watts idle 24 Watts typical 34 Watts max	4.1 Watts idle 24.5 Watts typical 39 Watts max

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)
	Non-condensing humidity range	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)

Standards Compliance CSA Certification to C22.2, No.60950 (cCSAus)
TÜV 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)

QuickSpecs

Technical Specifications

Front Panel LED Indicators

HP LTO Ultrium 2,3 and 4 tape drives have four LED indicators on the front panel:

- Ready
- Drive Error
- Tape Error
- Clean

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

- Ready
- Drive Error
- Tape Error
- Clean
- Encryption

Please consult your HP 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 HP LTO Ultrium tape drive.