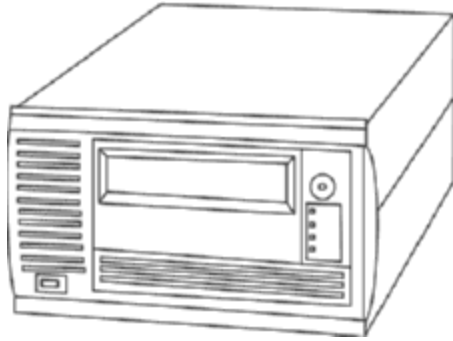


Overview

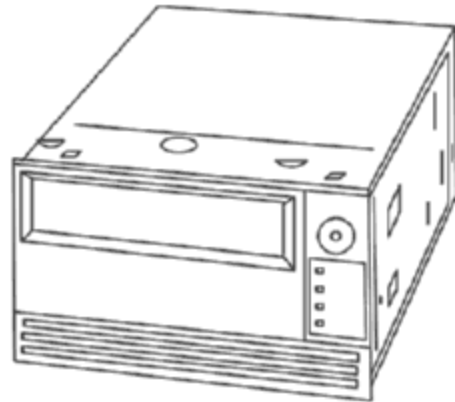
The family of HP StorageWorks Ultrium tape drives is HP's premier line of backup devices. Based on the LTO Ultrium format, an open standard with a well-defined four-generation roadmap, HP Ultrium tape drives offer customers the best choice for investment protection. With ultimate reliability and ease of use in mind, even at 100% duty cycles, HP's rugged design builds on superior LTO technology and adds advanced features 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, and the highly reliable HP leader-capture mechanism virtually eliminates lost leaders, increasing the success of your backup and restore operations. Support for HP One-Button Disaster Recovery provides the easiest way to restore data in the event of a disaster. The StorageWorks family of tape drives also features support for HP Library and Tape Tools which provides a single application for drive management, diagnostics, and performance optimization. If data is critical to your business, protect it with an HP StorageWorks Ultrium tape drive.

HP StorageWorks Ultrium 230 Tape Drive

The HP StorageWorks Ultrium 230 tape drive is the first-generation superdrive in the HP Ultrium family. The Ultrium 230 tape drive offers an excellent range of features for mid-range servers requiring a direct-attach backup solution. The Ultrium 230 stores 200 GB of compressed data on a single tape at speeds of up to 30 MB/sec, backing up 108 GB per hour.



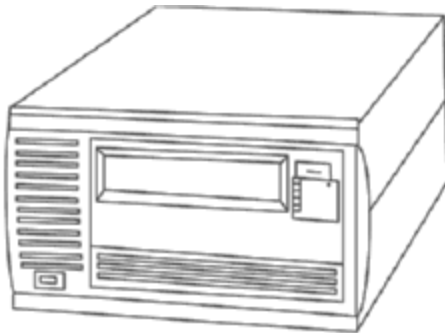
HP Ultrium 230 External Tape Drive



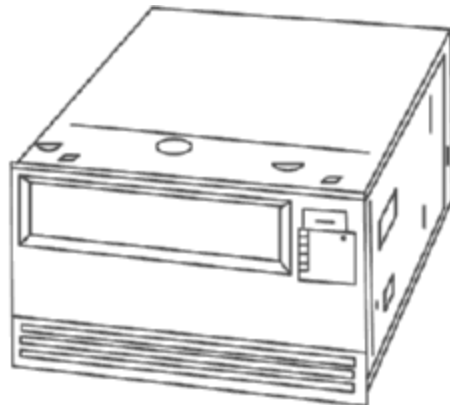
HP Ultrium 230 Internal Tape Drive

HP StorageWorks Ultrium 460 Tape Drive

The HP StorageWorks Ultrium 460 tape drive is the second generation of HP's Ultrium tape drive family, delivering a capacity of 400 GB of compressed data on a single cartridge. With a compressed transfer rate of 60 MB/sec, the Ultrium 460 is the ideal choice for mid-range servers with enterprise-class data protection needs. The Ultrium 460 tape drive is fully read and write compatible with the first generation of Ultrium tape drives.



HP Ultrium 460 External Tape Drive

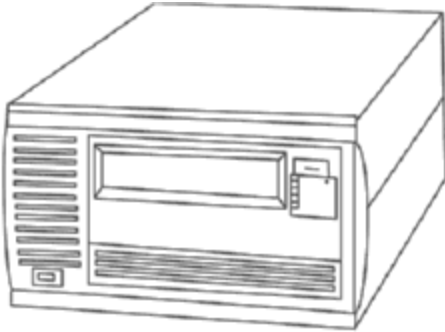


HP Ultrium 460 Internal Tape Drive

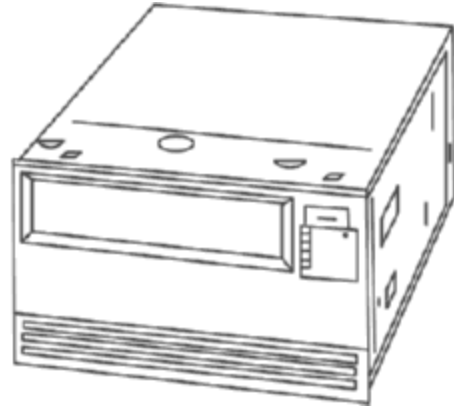
Overview

HP StorageWorks Ultrium 960 Tape Drive

The HP StorageWorks Ultrium 960 tape drive is the latest generation of HP's Ultrium tape drive family, setting new benchmarks for Ultrium capacity, performance, compatibility, and data security. The Ultrium 960 delivers a capacity of 800 GB of compressed data on a single cartridge. With the storage industry's fastest data transfer rate of 160MB/sec, the Ultrium 960 is the best HP solution for enterprise servers and small hard drive arrays, particularly where the backup window is shrinking. The Ultrium 960 tape drive is fully read and write compatible with second-generation Ultrium data cartridges, and offers a further degree of investment protection through its backward-read compatibility with first-generation Ultrium media. For IT organizations with stringent, long-term data retention requirements, the Ultrium 960'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.



HP Ultrium 960 External Tape Drive



HP Ultrium 960 Internal Tape Drive

Models

Ultrium 230 Tape Drive	Ultrium 230, Internal (carbon)	Q1515A*
	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a server or rack enclosure is indicated.</i>	
	Ultrium 230, External (carbon)	Q1517A
	Ultrium 230, Array Module (carbon)	C7470B*
	NOTE: Offline hot-swap tape drive for HP StorageWorks Tape Array 5300	
Ultrium 460 Tape Drive	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration is indicated.</i>	
	Ultrium 230 Rack-mount (carbon)	350545-B21*
	NOTE: Single drive installed in a 3U Rack-mount kit	
	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.</i>	
	<hr/>	
Ultrium 460 Tape Drive	Ultrium 460, Internal (carbon)	Q1518A*
	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a server or rack enclosure is indicated.</i>	
	Ultrium 460, External (carbon)	Q1520A
	Ultrium 460, Array Module (carbon)	Q1512B*
	NOTE: Offline hot-swap tape drive for HP StorageWorks Tape Array 5300.	
Ultrium 960 Tape Drive	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration is indicated.</i>	
	Ultrium 460 Rack-mount (carbon)	350546-B21*
	NOTE: Single drive installed in a 3U Rack-mount kit.	
	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.</i>	
	<hr/>	
Ultrium 960 Tape Drive	Ultrium 960, Internal (carbonite)	Q1538A*
	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a server or rack enclosure is indicated.</i>	
	Ultrium 960, External (carbonite)	Q1539A
	Ultrium 960, Array Module (carbonite)	Q1540A*
	NOTE: Offline hot-swap tape drive for HP StorageWorks Tape Array 5300.	
Ultrium 960 Tape Drive	<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration is indicated.</i>	
	Ultrium 960 Rack-mount (carbonite)	Q1595A*
	NOTE: Single drive installed in a 3U Rack-mount kit.	
<i>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.</i>		

Key Features

- High-capacity drive that stores 200 GB (Ultrium 230), 400 GB (Ultrium 460), or 800 GB (Ultrium 960) on a single cartridge with 2:1 compression
- High-speed data transfer rate that can backup up to 576 GB/hour (using an Ultrium 960 tape drive) with 2:1 compression
- Data rate matching 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
- Fully read-and-write compatible with Ultrium drives and media from other manufacturers
- Internal, external, array module and rack-mounted models available
- 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 at minimum cost
- Includes a single-server version of both HP OpenView Data Protector (license to download) and Yosemite TapeWare XE (CD) backup software with disaster recovery option
- HP One-Button Disaster Recovery (OBDR) restores your entire system at the touch of a button
- HP StorageWorks Library and Tape Tools (LTT) included to help with installation, management, performance optimization, and troubleshooting
- Support for WORM media (using an Ultrium 960 tape drive) providing a simple and secure method for archiving compliant data to meet regulatory agency requirements

Models

Customer Benefits

- **High-Capacity:** choose from a range of drive options to fit all your data on a single cartridge
- **Fast:** high-performance data transfer that reduces backup windows while reducing the use of server and network resources
- **Affordable:** high capacity combined with low media cost delivers an exceptionally low cost of ownership and ensures a faster return on investment
- **Agile:** choice of models including internal, external, array module, and rack-mount to meet your backup configuration needs inside and outside of the server
- **Reliable:** high-integrity data path including read and write DRAM that protects your data
- **Compatible:** qualified/tested on all industry-leading operating systems, backup software and servers
- **Easy:** supports One-Button Disaster Recovery (OBDR), simply the easiest way to restore data in the event of a disaster
- **Manageable:** includes superior management capabilities through Library and Tape Tools (LTT), making your drive easy to install, use and support
- **Future-Proof:** delivers a compelling technology roadmap that offers higher capacity and performance tape solutions with backward read and write compatibility for previous drive generations
- **Secure:** supports WORM media (using the Ultrium 960) providing a fail-safe method for permanently storing data records
- **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 Seagate - 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 four-generation roadmap, which has been executed right on schedule, with the first generation of Ultrium drives and media released in 2000, the second generation in 2002, and the latest third generation in 2004.

Ultrium 1 tape drive technology uses a linear format of 384 tracks, writing eight tracks simultaneously. Ultrium 2 tape drive technology uses a linear format of 512 tracks, writing eight tracks simultaneously. The new Ultrium 3 tape drive features a breakthrough in recording technology by writing sixteen tracks simultaneously on a linear format of 704 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 Ultrium drives, such as HP Ultrium 230 and HP Ultrium 215, read and write LTO 1 media
- Second-generation Ultrium drives, such as HP Ultrium 460, read and write LTO 1 and LTO 2 media.
- Third-generation Ultrium drives, such as the new Ultrium 960, read and write LTO 2 and LTO 3 media and also read LTO 1 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 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 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

Data Rate Matching

An exclusive feature of HP Ultrium tape drives, data rate matching allows the tape drive to adjust its transfer rate to the speed of the host dynamically and continuously. This feature, coupled with the Ultrium buffer management technology within the data path, ensures that the tape drive continues to stream data, reducing the need to rewind the tape back and forth to wait for the host. This feature brings two big advantages:

- It optimizes performance, getting the best performance possible for the environment, regardless of the speed of the host or the network.
 - It reduces wear and tear on drive and media, thus increasing reliability.
-

Product Highlights

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.

The new Ultrium 960 tape drive features 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, the Ultrium 960 can archive large amounts of data for periods of up to 30 years in a secure, untampered state. Since all Ultrium 960 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, the Ultrium 960 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 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
- In-the-box software support for Ultrium 960 WORM provided by both HP OpenView Data Storage Protector and Yosemite TapeWare
- The LTO open standard that offers greater choice and compatibility across all third-generation Ultrium products

NOTE: While all HP Ultrium 960 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 third-generation LTO Ultrium 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 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/go/connect>.

Product Highlights

Software in the Box

HP StorageWorks Ultrium tape drives include a choice of backup software applications which each drive, providing a complete solution in the box. Two backup applications are provided with the tape drive, allowing you to choose the one that best suits your environment: HP Data Protector or Yosemite TapeWare. By using these backup software applications, customers are assured of getting the best performance from an HP Ultrium tape drive. Additionally, both software applications enable you to use HP One-Button Disaster Recovery.

A license to use HP OpenView Storage Data Protector Single-Server Edition for Windows allows you to download this sophisticated software package from the web. HP Data Protector provides data protection and disaster recovery for your enterprise. It ensures recovery from any disruption-from instant recovery through system or site disaster recovery-and is scalable from a single server to enterprise, across applications, operating environments, storage, and data protection approaches. HP Data Protector works with HP StorageWorks Ultrium tape drives to automate the routine tasks of the backup and recovery process, maximizing the effectiveness of your data protection staff. It keeps track of all media and copies of data, so that you can easily recover information in case of a system failure, disaster or accidental deletion. Note that support for this software is not included under the contract purchased with your tape drive, nor is it included in the post-warranty Support PLUS option for the tape drive. HP recommends that you purchase phone and update support for your Data Protector product. Phone support is available for either standard business hours or 24x7.

Yosemite Technologies TapeWare XE single-server edition is suitable for small to medium-sized business customers looking for an easy-to-use backup application. TapeWare XE offers entry-level support for a single server in a Windows, Linux or NetWare environment. Also included is Yosemite's Disaster Recovery option that fully integrates HP's OBDR (One-Button Disaster Recovery) feature. This single-server edition can be upgraded with options for backing up PC clients, multiple servers, SQL databases, or Microsoft Exchange.

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.

Management

HP Ultrium tape drives and automation are supported by HP StorageWorks 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 Library and Tape Tools are available at:
http://www.hp.com/country/us/eng/software_drivers.html

Compatibility

HP's extensive compatibility testing program assures that your HP StorageWorks 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/go/connect>.

Server Compatibility

HP StorageWorks 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 StorageWorks 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/go/connect> for the latest hardware compatibility information.

Cables and Termination

All cables required for 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 Ultrium tape drive is appropriate for use with that server. No terminator is required for internal models (assumes use of terminated cable). The external model features "auto-termination" - no terminator is required.

Performance Tuning

You will need to connect the drive to a dedicated SCSI Host Bus Adaptor (HBA) that is Ultra 160 HBA or higher. To supply data to the drive fast enough to achieve full performance from an Ultrium 460 or Ultrium 960 tape drive, you will need at least eight disks as part of a RAID 5 array with read cache enabled. You can test the speed of your system with tools provided at <http://www.hp.com/support/pat> or with HP's StorageWorks Library and Tape Tools application.

To achieve full performance from your tape drive, do not use the native backup application within the operating system (e.g., NT® Backup, Windows® 2000 Backup). For full details of supported backup applications, see <http://www.hp.com/products1/storage/compatibility/tapebackup/index.html>

OS Support

Microsoft® Windows, Novell NetWare, HP-UX, Tru64, Red Hat Linux, United Linux, IBM-AIX, Sun Solaris and other operating systems. The Ultrium 215 tape drive also qualified with Microsoft Windows 98 and XP Pro.

NOTE: Please visit <http://www.hp.com/go/connect> for the latest compatibility information.

Backup Software Support

Supported with HP OpenView Storage Data Protector, VERITAS Backup Exec, BrightStor ARCserve IT, Yosemite Technologies TapeWare IT 2000, Legato Networker, Dantz Retrospect, Tivoli TSM, NovaBackup, UltraBac and other backup applications

NOTE: Please visit <http://www.hp.com/go/connect> for the latest compatibility information.

Service and Support, HP Care Pack, and Warranty Information

Warranty 3-year parts exchange, next business day response, 9x5 phone support

Warranty Upgrade Options To simplify installation, maximize uptime, and increase ROI, HP provides a range of optional service upgrades:

- Installation and start up
- On-site support
- Extended coverage hours
- Enhanced response times
- System management and performance services

Fixed HP Care Pack Services	Description	Order Number* for Standalone Drives	Order Number* for 3U Rack-Mounted Drives
	Tape Installation	U2090A	U2090A
	Tape Installation, Electronic	U2090E	U2090E
	HW, 3-year, next-day, 9 x 5, on-site	H3157A	U6335A
	HW, 3-year, next-day, 9 x 5, on-site, Electronic	H3157E	U6335E
	HW, 3-year, 4-hour, 13 x 5, on-site	H4617A	U6336A
	HW, 3-year, 4-hour, 13 x 5, on-site, Electronic	H4617E	U6336E
	HW, 3-year, 4-hour, 24 x 7, on-site	H4622E	U6337E
	HW, 3-year, 4-hour, 24 x 7, on-site, Electronic	H4622E	U6337E

* 'A' signifies a physical Care Pack, 'E' signifies an electronic HP Care Pack

Flexible HP Care Pack Services	Description	Order Number	Standalone Drives		3U Rack-Mounted Drives	
			Band Code	Installation Band	Band Code	Installation Band
	Tape Installation	HA113A1	450	596	6DL	5DU
	HW, 3-year, next-day, 13 x 5, on-site	HA101A3	450	N/A	6DL	N/A
	HW, 3-year, 4-hour, 13 x 5, on-site	HA103A3	450	N/A	6DL	N/A
	HW, 3-year, 4-hour, 24 x 7, on-site	HA104A3	450	N/A	6DL	N/A

Warranty Upgrade Recommendations Hewlett-Packard recommends that customers take advantage of the installation service (U2090A/E or HA113A1) when incorporating this product into their system. This service will ensure that the product is configured and usable for backup in the minimum possible time. To maximize ROI and product uptime and minimize the cost of ownership, HP recommends the 3-year, 24x7 service options. These offerings will ensure that product issues can be tackled when they occur (most backup issues will occur outside standard business hours) and that the service covers the minimum expected life of the host system.

For more information on HP storage services, please visit <http://www.hp.com/hps/storage/>

Options

Fan Option	Internal Cooling Fan Kit NOTE: When purchasing an internal Ultrium 230 for use in a HP ProLiant ML530, HP ProLiant ML530 G2, HP ProLiant ML570, or a HP ProLiant ML570 G2, a cooling fan also needs to be ordered. The fan kit comes with installation instructions. * NOTE: OD1 will appear after this part number on your sales order if factory integration is indicated.	344257-B21*
Host Bus Adapters, Controllers, and Accessories for ProLiant Servers	Smart Array 6i Controller (integrated on system board) N/A NOTE: This controller is integrated on HP ProLiant DL380 G3 and HP ProLiant DL380 G4 servers. Integrated Single Channel Ultra320 SCSI Controller N/A NOTE: This controller is integrated on HP ProLiant ML330 G3 server Integrated Dual Channel Ultra320 SCSI Controller N/A NOTE: This controller is integrated on HP ProLiant ML350 G3, HP ProLiant ML350 G4, HP ProLiant ML 370 G3, HP ProLiant ML370 G4, HP ProLiant ML530 G2, and HP ProLiant ML570 G2 servers 64-Bit/133-MHz Dual Channel Ultra320 SCSI Adapter 268351-B21 64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2 374654-B21 NOTE: This controller may also be used for connecting HP Ultrium tape drives to 3rd party server platforms such as Dell, IBM, and Sun. Please refer to the HP Tape Backup Products Compatibility website at http://www.hp.com/go/connect for more information. 64-Bit/66-MHz Dual Channel Wide Ultra3 SCSI Adapter, Alternate OS 284688-B21 NOTE: For maximum tape drive performance, HP recommends an Ultra320 SCSI controller for use with the Ultrium 960 tape drive. NOTE: This SCSI host bus adapter supports the following operating systems: OpenUNIX, Solaris, OS/2, Novell NetWare 3.2/4.2/5, Unixware 2.x/7.x. Some of these operating system may not be supported on other HP Ultra320 SCSI host bus adapters. Please check the appropriate controller QuickSpecs for support details.	
Host Bus Adapters, Controllers, and Accessories for HP PA-RISC and IPF servers	64-Bit/133-MHz Dual Channel Ultra320 SCSI Adapter A7173A 64-Bit/66-MHz Dual Channel Ultra3 SCSI Adapter A6829A NOTE: For maximum tape drive performance, HP recommends the Ultra320 SCSI adapter for use with the Ultrium 960 tape drive. 64-Bit/66-MHz Single Channel Ultra3 SCSI Adapter A6828A NOTE: For maximum tape drive performance, HP recommends the Ultra320 SCSI adapter for use with the Ultrium 960 tape drive. Please refer to the HP Tape Backup Products Compatibility website at http://www.hp.com/go/connect for more information on support for HP PA-RISC and IPF servers.	
Host Bus Adapters, Controllers, and Accessories for HP AlphaServers	32-Bit PCI to Single Channel Wide-Ultra2 SCSI Adapter 3X-KZPCA-AA Triple-Function Combo Adapter: LVD / SCSI II, 10/100 UTP Ethernet, and 2D Graphics 3X-DEPVZ-AA Dual Channel 64/66-MHz PCI-to-SCSI Ultra 160 Host Bus Adapter 3X-KZPEA-DB	
Host Bus Adapters, Controllers, and Accessories for 3rd Party servers and workstations	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2 374654-B21 NOTE: This SCSI controller supports a wide range of connectivity to non-HP 32-bit servers. Please refer to the HP Tape Backup Products Compatibility website at http://www.hp.com/go/connect for more information on support for non-HP 32-bit server platforms using your HP Ultrium tape drive. HP Ultrium tape drives are supported on a wide range of non-HP server using third-party SCSI controllers and host bus adapters. Please refer to the HP Tape Backup Products Compatibility website at http://www.hp.com/go/connect for more information on Ultrium support for non-HP servers using third-party controllers and adapters.	

Options

Media	HP Ultrium 200 GB Data Cartridge	C7971A
	NOTE: Write and read support for Ultrium 215, Ultrium 230, and Ultrium 460. Read support for Ultrium 960 only.	
	HP Ultrium 400 GB Data Cartridge	C7972A
	NOTE: Write support for Ultrium 460 and Ultrium 960 only.	
	HP Ultrium 800 GB RW Data Cartridge	C7973A
NOTE: Write support for Ultrium 960 only.		
HP Ultrium 800 GB WORM Data Cartridge	C7973W	
NOTE: Supports Ultrium 960 only.		
NOTE: This data cartridge only supports Write-Once Read-Many recording format for LTO 3 drives. Data recorded to this data cartridge can not be overwritten.		
HP Ultrium Universal Cleaning Cartridge	C7978A	
<hr/>		
Rack-mount Options	3U Rack-mount Kit, Worldwide	274338-B21*
	NOTE: For racked ProLiant and AlphaServers. No drives included. Accommodates up to four internal half-height drives (such as the Ultrium 215) or two full-height drives (such as the Ultrium 230, Ultrium 460, or Ultrium 960). If installing an Ultrium 960 Internal Tape Drive, the Ultra320 SCSI Cable Kit (DW063A) is required.	
	NOTE: Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/3urackmount/index.html	
	*NOTE: OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.	
	5U Rack-mount Kit, Worldwide	274339-B21
NOTE: For racked ProLiant and AlphaServers. No drives included. Accommodates up to four internal full-height drives (such as Ultrium 230, Ultrium 460, or Ultrium 960). If installing an Ultrium 960 Internal Tape Drive, the Ultra320 SCSI Cable Kit (DW063A) is required.		
NOTE: Please refer to web page for further information: http://h18006.www1.hp.com/products/storageworks/5urackmount/index.html		
Tape Array 5300	C7508A*	
NOTE: For racked HP-UX or ProLiant servers and other industry-standard racks. Holds up to four offline hot-swap half-height drives (such as the Ultrium 215 array module or a DVD-ROM drive) or up to two offline hot-swap full-height drives (such as the Ultrium 230, Ultrium 460, or Ultrium 960 array modules).		
NOTE: Please refer to web page for further information: http://www.hp.com/products1/storage/products/tapebackup/tapearrays/tapearray5300/index.html		
*NOTE: For the factory racked version, please order C7508AZ		
Redundant, hot-swap power supply and fan for Tape Array 5300	C7496A	
<hr/>		
Cables and Adapters	68-pin HD/68-pin VHDCI, 12 ft/3.66 m SCSI cable for external drives	341177-B21
	68-pin HD/68-pin HD, 16.40 ft/5 m SCSI cable for external drives	328215-001
	68-pin HD/68-pin HD, 32.81 ft/10 m SCSI cable for external drives	328215-002
	68-pin HD/VHDCI LVD SCSI cable kit (for use with 3U and 5U Rack-Mount Kits)	168048-B21
	68-Pin HD/68-Pin HD SCSI cable kit (for use with 3U and 5U Rack-Mount Kits)	242381-B21
	Ultra320 SCSI Cable Kit (for installing Ultra320 SCSI tape drives in the 3U and 5U Rack-Mount Kits)	DW063A
	1.5m external SCSI cable (68-pin high density to 68-pin high density, LVD/SE)	C5742A
	68-pin HD to 68-pin VHDCI, LVD/SE Ultra2 SCSI adapter plug	C7434A
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Kit Contents		

Options

Model Name	Kit Contents Description	Part Number
Ultrium 230 tape drives		
Ultrium 230 Internal (carbon)	<p>HP Ultrium 230 Internal Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 200 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; internal SCSI cable; mounting rails for legacy HP ProLiant servers; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a server or rack-mount enclosure is indicated.</p>	Q1515A*
Ultrium 230 External (carbon)	<p>HP Ultrium 230 External Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 200 GB 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.</p>	Q1517A
Ultrium 230 Array Module (carbon) --- works with HP StorageWorks Tape Array 5300	<p>HP Ultrium 230 offline hot-swap array module; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 200 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration is indicated.</p>	C7470B*
Ultrium 230 Rack-mount (carbon) - single drive installed in a 3U Rack-mount kit	<p>Wide SCSI LVD rack-mountable enclosure (3U) with power supply and fan; one internal Ultrium 230 Tape Drive; power cord; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 200 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.</p>	350545-B21*

Options

Model Name	Kit Contents Description	Part Number
Ultrium 460 tape drives		
Ultrium 460 Internal (carbon)	<p>HP Ultrium 460 Internal Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 400 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; internal SCSI cable; mounting rails for legacy HP ProLiant servers; performance tuning poster; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a server or rack-mount enclosure is indicated.</p>	Q1518A*
Ultrium 460 External (carbon)	<p>HP Ultrium 460 External Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 400 GB 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.</p>	Q1520A
Ultrium 460 Array Module (carbon) - works with HP StorageWorks Tape Array 5300	<p>HP Ultrium 460 offline hot-swap array module; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 400 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration is indicated.</p>	Q1512B*
Ultrium 460 Rack-mount (carbon) - single drive installed in a 3U Rack-mount kit	<p>Wide SCSI LVD rack-mountable enclosure (3U) with power supply and fan; one internal Ultrium 460 Tape Drive; power cord; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 400 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.</p>	350546-B21*

Options

Model Name	Kit Contents Description	Part Number
Ultrium 960 tape drives		
Ultrium 960 Internal (carbon)	<p>HP Ultrium 960 Internal Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 800 GB Data Cartridge; HP Ultrium Cleaning Cartridge; multi-language labels; internal SCSI cable; performance tuning poster; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a server or rack-mount enclosure is indicated.</p>	Q1538A*
Ultrium 960 External (carbon)	<p>HP StorageWorks Ultrium 960 External Tape Drive; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 800 GB 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.</p>	Q1539A
Ultrium 960 Array Module (carbon) - works with HP StorageWorks Tape Array 5300	<p>HP Ultrium 960 offline hot-swap array module; HP StorageWorks Tape CD-ROM (includes HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 800 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration is indicated.</p>	Q1540A*
Ultrium 960 Rack-mount (carbon) - single drive installed in a 3U Rack-mount kit	<p>Wide SCSI LVD rack-mountable enclosure (3U) with power supply and fan; one internal Ultrium 960 Tape Drive; power cord; HP StorageWorks Tape CD-ROM (contains HP StorageWorks Library and Tape Tools utilities, user manuals and Windows drivers); HP OpenView Storage Data Protector for Windows (SSE) license-to-use (installation via download); TapeWare backup software on CD-ROM; HP Ultrium 800 GB Data Cartridge; Ultrium Cleaning Cartridge; multi-language labels; documentation.</p> <p>*NOTE: OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.</p>	Q1595A*

Technical Specifications

		Ultrium 230	Ultrium 460	Ultrium 960	
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 20.7 cm)	3.3 x 5.7 x 8.2 in (8.5 x 14.5 x 20.7 cm)	3.3 x 5.7 x 8.2 in (8.3 x 14.6 x 20.3 cm)	
	Physical (HxWxD) External	4.8 x 8.2 x 11.5 in (12.2 x 20.8 x 29.2 cm)	4.8 x 8.2 x 11.5 in (12.2 x 20.8 x 29.2 cm)	4.7 x 8.6 x 11.7 in (12.0 x 21.8 x 29.7 cm)	
	Physical (HxWxD) Array Module	3.3 x 6.1 x 11.2 in (8.5 x 15.5 x 28.5 cm)	3.3 x 6.1 x 11.2 in (8.5 x 15.5 x 28.5 cm)	3.3 x 6.1 x 11.2 in (8.5 x 15.5 x 28.5 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	13.4 x 17.7 x 12.2 in (34.0 x 45.0 x 31.0 cm)	13.4 x 17.7 x 12.2 in (34.0 x 45.0 x 31.0 cm)	13.4 x 17.7 x 12.2 in (34.0 x 45.0 x 31.0 cm)	
	Shipping (HxWxD) External	15.2 x 18.7 x 15.2 in (38.5 x 47.5 x 38.5 cm)	15.2 x 18.7 x 15.2 in (38.5 x 47.5 x 38.5 cm)	15.2 x 18.7 x 15.2 in (38.5 x 47.5 x 38.5 cm)	
	Physical (HxWxD) Array Module	13.4 x 17.7 x 12.2 in (34.0 x 45.0 x 31.0 cm)	13.4 x 17.7 x 12.2 in (34.0 x 45.0 x 31.0 cm)	13.4 x 17.7 x 12.2 in (34.0 x 45.0 x 31.0 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 33.5 in (40.0 x 60.3 x 85.1 cm)	15.75 x 23.75 x 33.5 in (40.0 x 60.3 x 85.1 cm)	
	Weight	Out of box, Internal	4.4 lb (2.0 kg)	4.6 lb (2.1 kg)	4.94 lb (2.24 kg)
		Out of box, External	11.8 lb (5.35 kg)	11.8 lb (5.35 kg)	12.28 lb (5.57 kg)
		Out of box, Array Module	6.3 lb (2.85 kg)	6.4 lb (2.9 kg)	6.5 lb (2.97 kg)
		Out of box, Rack-mount	31.2 lb (14.2 kg)	31.6 lb (14.4 kg)	31.6 lb (14.4 kg)
		Shipping, Internal	7.7 lb (3.5 kg)	7.7 lb (3.5 kg)	7.9 lb (3.6 kg)
Shipping, External		15.9 lb (7.2 kg)	15.87 lb (7.2 kg)	16.1 lb (7.3 kg)	
Shipping, Array Module		9.5 lb (4.3 kg)	9.5 lb (4.3 kg)	9.7 lb (4.4 kg)	
Shipping, Rack-mount		56 lb (25 kg)	56 lb (25 kg)	56 lb (25 kg)	

Technical Specifications

Capacity	Native	100 GB	200 GB	400 GB
	Compressed (assumes 2:1 data compression)	200 GB	400 GB	800 GB
Performance	Buffer Size	16 MB	64 MB	128 MB
	Data transfer rate, native	15 MB/s with Ultrium 1 media	30 MB/s with Ultrium 2 media 20 MB/s with Ultrium 1 media	80 MB/s with Ultrium 3 media 30MB/s with Ultrium 2 media 20MB/s with Ultrium 1 media
	Data transfer rate, compressed (assumes 2:1 data compression)	30 MB/s	60 MB/s with Ultrium 2 media 40 MB/s with Ultrium 1 media	160 MB/s with Ultrium 3 media 60MB/s with Ultrium 2 media 40MB/s with Ultrium 1 media
	Burst transfer rate	80 MB/s (with Ultra2 SCSI wide)	160 MB/s (with Ultra3 SCSI wide)	320 MB/s (with Ultra320 SCSI wide)
	Data rate matching range	6-15 MB/s	10-30 MB/s	27-80 MB/s
	Data access time (from BOT)	71s typical for a 100 GB tape (native)	46s typical for a 200 GB tape (native)	46 seconds typical for LTO 1 and LTO 2 media 53 seconds typical for LTO 3 media
	Rewind time from EOT	142 seconds (100 GB tape)	88 seconds (200 GB tape)	< 98 seconds for LTO 3 media < 88 seconds for LTO 2 media
	Rewind tape speed	4.1 m/s	7.0 m/s	7 m/s for (LTO 3 and LTO 2 media)
Reliability	Average load time	25 seconds	19 seconds	<19 seconds
	Average unload time	13 seconds	13 seconds	<19 seconds
	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	1x10 ¹⁷ bits read	1x10 ¹⁷ bits read	1x10 ¹⁷ bits read
Rewriteable Media Compatibility	Read	LTO Ultrium 1	LTO Ultrium 2 LTO Ultrium 1	LTO Ultrium 3 LTO Ultrium 2 LTO Ultrium 1
	Write	LTO Ultrium 1	LTO Ultrium 2 LTO Ultrium 1	LTO Ultrium 3 LTO Ultrium 2
WORM Media Compatibility	Read	N/A	N/A	LTO Ultrium 3 WORM
	Write	N/A	N/A	LTO Ultrium 3 WORM
Tape Format	Recording method	8-channel linear serpentine	8-channel linear serpentine	16-channel linear serpentine
	Recording format	LTO Ultrium 1	LTO Ultrium 2 LTO Ultrium 1	LTO Ultrium 3 LTO Ultrium 2
	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
Interface	Data encoding method	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)	Partial Response Maximum Likelihood (PRML)
	Interface type	Wide Ultra2 SCSI (LVDS)	Wide Ultra3 SCSI (LVDS)	Ultra320 SCSI (LVDS)
	SCSI connector	Internal: 68-pin LVDS External: 68-pin HD LVDS Array module: 80-pin SCA (SCSI and power)	Internal: 68-pin LVDS External: 68-pin HD LVDS Array module: 80-pin SCA (SCSI and power)	Internal: 68-pin LVDS External: 68-pin HD LVDS Array module: 80-pin SCA (SCSI and power) Rack-mount: 68-pin HD LVDS

Technical Specifications

Power Specifications

	Ultrium 230	Ultrium 460	Ultrium 960
Power requirements, Internal (including rack-mount model)	+5V@3.5A (typical) +5V@4.0A (max) +12V@1.0A (typical) +12V@1.9A (max)	+5V@3.5A (typical) +5V@4.0A (max) +12V@1.0A (typical) +12V@3.0A (max)	+5V@3.5A (typical) +5V@4.5A (max) +12V@1.0A (typical) +12V@2.0A (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, 0.8A max
Power requirements, Array Module	+5V@3.5A (typical) +5V@4.0A (max) +12V@1.0A (typical) +12V@1.9A (max)	+5V@3.5A (typical) +5V@4.0A (max) +12V@1.0A (typical) +12V@3.0A (max)	+5V@3.5A (typical) +5V@4.5A (max) +12V@1.0A (typical) +12V@2.0A (max)
Power consumption	11 Watts idle 21 Watts typical 32 Watts max	11 Watts idle 25 Watts typical 38 Watts max	12 Watts idle 30 Watts typical 35 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 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)

Front Panel LED Indicators

HP Ultrium tape drives have four LED indicators on the front panel:

- Ready
- Drive Error
- Tape Error
- Clean

Please consult your HP StorageWorks 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 Ultrium tape drive.

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