

## Overview

HP Ultrium tape technology has been designed to deliver exceptional reliability and performance at the lowest cost per GB. The Ultrium format builds on the best of existing technologies; open standards increase innovation and widen customer choice in terms of performance, capacity, and form factor. Backed by HP's exhaustive media qualification process, HP Ultrium data cartridges support all HP StorageWorks and non HP Ultrium tape devices. Assuming 2:1 compression, the latest fourth Generation products minimize interruption to network and SAN backup by being capable of protecting 864GB/hour of data and storing up to 1.6 TB on one piece of media (double the capacity of HP LTO3 Ultrium tapes).

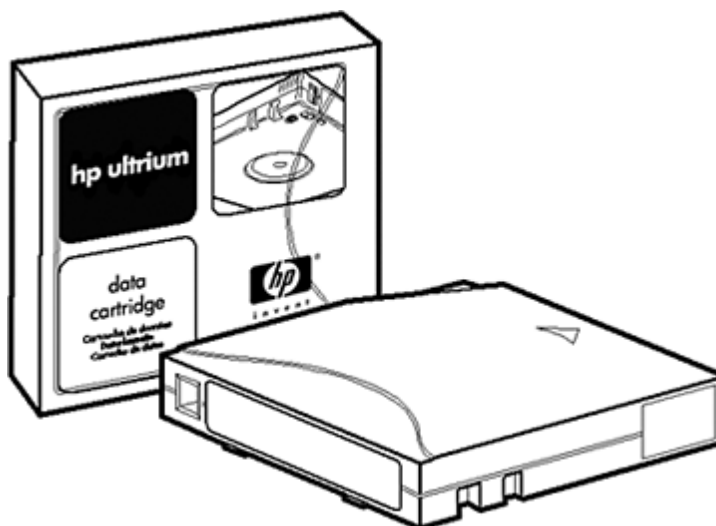
### HP's Labeled Data Cartridges:

HP sells both Labeled and Unlabeled LTO Ultrium data cartridges. For automation customers that require labeled data cartridges, customers can order either HP Custom Labeled Data Cartridges or HP Non-Custom Labeled Data Cartridges. HP's Custom Labeled Data Cartridges allow customers to place a custom order with HP and specifically define the exact barcode sequence printed on each label. Customers should expect a longer lead time for custom order processing. HP Custom Labeled Data Cartridges are sold in 20 packs in the USA and Europe.

HP's Non-Custom Labeled Data Cartridges allow customers to receive labeled data cartridges fast because no customization process is required. These products are perfect for customers that require labeled media but do not need to define the exact sequence printed on each label. Each HP Non-Custom Labeled Data Cartridge will have a unique, pre-defined barcode sequence printed on each label (no duplicate codes). HP's Non-Custom Labeled Data Cartridges are sold in 20 packs and are available worldwide.

### HP's Ultrium Storage Media Kits:

HP Storage Media Kits provide customers an easy way to purchase a comprehensive portfolio of storage media products in one easy to buy bundled solution. The convenience and bundle pricing of the Storage Media kits has been extended to include the LTO3 Ultrium 800 GB product. Each Media Kit includes twenty LTO1 Ultrium 200GB (C7971A), LTO2 Ultrium 400GB (C7972A), or LTO3 Ultrium 800 GB (C7973A) Data Cartridges, one HP Ultrium Universal Cleaning Cartridge (C7978A), twenty colored labels, and a protective carrying case that can be used to securely store or transport data cartridges, one free copy of "The Essentials of Successful Tape Backup," and one free copy of HP's Storage Works Data Protector Express 3.1 Evaluation Software (60 day free trial).



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<b>Models</b>	HP LTO4 Ultrium 1.6 TB RW Data Cartridge	C7974A
	HP LTO4 Ultrium 1.6TB RW Custom Labeled Data Cartridge (20 pk)	C7974AL
	HP LTO4 Ultrium 1.6 TB WORM Data Cartridge	C7974W
	HP LTO4 Ultrium 1.6TB Non Custom Labeled Data Cartridge (20 pk)	C7974AN
	HP LTO4 Ultrium 1.6 TB WORM Custom Labeled Data Cartridge (20 pk)	C7974WL
	HP LTO3 Ultrium 800 GB RW Data Cartridge	C7973A
	HP LTO3 Ultrium 800 GB RW Custom Labeled Data Cartridge (20 pk)	C7973AL
	HP LTO3 Ultrium 800 GB Non Custom Labeled Data Cartridge (20 pk)	C7973AN
	HP LTO3 Ultrium 800 GB WORM Data Cartridge	C7973W
	HP LTO3 Ultrium 800 GB WORM Custom Labeled Data Cartridge (20 pk)	C7973WL
	HP LTO2 Ultrium 400 GB Data Cartridge	C7972A
	HP LTO2 Ultrium 400 GB Custom Labeled Data Cartridge (20 pk)	C7972AL
	HP LTO2 Ultrium 400 GB Non Custom Labeled Data Cartridge (20 pk)	C7972AN
	HP LTO1 Ultrium 200 GB Data Cartridge	C7971A
	HP LTO1 Ultrium 200 GB Custom Labeled Data Cartridge (20 pk)	C7971AL
	HP LTO1 Ultrium 200 GB Non Custom Labeled Data Cartridge (20 pk)	C7971AN
	HP LTO Ultrium Universal Cleaning Cartridge	C7978A
	HP LTO1 Ultrium Bar Code label pack	Q2001A
	HP LTO2 Ultrium Bar Code label pack	Q2002A
	HP LTO3 Ultrium RW Bar Code label pack	Q2007A
	HP LTO3 Ultrium WORM Bar Code label pack	Q2008A
	HP LTO4 Ultrium RW Bar Code label pack	Q2009A
	HP LTO4 Ultrium WORM Bar Code label pack	Q2010A

## Key Features & Benefits

- Up to 1.6 TB compressed capacity.
- Supports transfer speeds of 120 MB/s (native), 240 MB/s (2:1) with Generation 4
- For use in all HP and non-HP LTO Ultrium products.
- Unique colored cartridge to assist with identification in mixed media environments.
- Superior 'smart grabber' mechanism and mechanical interlock to prevent the leader pin from being pulled inside the tape housing (a key weakness of DLT media). Sensors detect proper connection and prevent leader loss that would ruin the tape.
- Simplified tape path to reduce wear and tear.
- Very low media cost per GB.
- LTO cartridge memory in media to improve access time and provide enhanced media monitoring.
- Durable cartridge designed to minimize wear and debris (important in automation).
- Tested to extremes in HP's media laboratory, to a level of specification unique to Hewlett-Packard. Many of the test procedures required for HP Brand qualification (e.g. load/unload, shoeshine, drop testing and environmental stress testing) are not required for the Ultrium logo.
- HP LTO4 Ultrium offers data encryption for enhanced data security.
- HP's offers both labeled (Custom Labeled and Non-Custom Labeled) and non-labeled data cartridges.
- Custom labeled offerings allow automation customers the ability to customize their label to their specific needs. This includes the ability to define the barcode label type and to specify an exact label sequence. Custom labels are pre-attached to the media before shipment. Available in Europe and the USA. Europe requires a Minimum Order Quantity of 5 units or 100 total data cartridges (5 units X 20 cartridges).
- HP Non-Custom Labeled media allows automation customers the ability to receive labeled media

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without having to wait for a custom labeled solution. Barcode sequences are pre-determined by HP and are guaranteed to be unique. LTO-1 and LTO-2 products utilize the double barcode format whereas LTO3 and LTO4 utilize the single barcode format. HP Non-Custom Labeled media is available worldwide.

- All labeled solutions are shipped in 20 packs.

## Product Highlights

### Proven Reliability

HP ensures the highest level of quality with media specifications that far exceed industry standards.

- HP has 20 custom-built testing chambers that are in use 24 hours per day, 365 days per year.
- It is doubtful if any other media supplier carries out such exhaustive qualification of the drive and media as they are used in the field. This is because no media supplier is exposed to support of hardware in the field and has a vested interest in reducing media-induced hardware issues.
- In 2005, HP LTO Ultrium media was used to conduct in excess of 235,000 individual tests, equivalent to almost 1 million test hours.
- HP testing includes procedures like drop testing, load/unload, environmental stress tests and archival simulation that are not required to gain the LTO Ultrium logo.

LTO Ultrium tape technology uses a "best of breed" technology approach, taking the best features from other tape technologies and combining them into a single new technology without the need for design compromises to accommodate legacy compatibility requirements. Designed for the demanding environment of large-scale libraries, Ultrium media is certified for 1 million passes or 260 full back ups and has a 30-year archival storage life.

### HP Branded Media Specification

HP believes that its test program for HP Ultrium media is the most thorough and comprehensive in the industry. In order to carry the HP Brand, designated cartridges must satisfy an exhaustive battery of additional procedures that relate directly to how the product is used in real life situations when real data and real businesses are at stake. Some of these procedures - e.g. "five corner" environmental interchange, load/unload for automation, ageing simulation and drop testing are not found in the standard logo test. Over 1 million test hours on media and drives per year ensures that HP Ultrium media will always offer maximum reliability even in the most extreme conditions.

### HP LTO4 Ultrium Tape Technology

HP LTO4 Ultrium tape drive technology uses a linear format of 896 tracks, writing sixteen (16) tracks simultaneously. The data is written in a serpentine pattern; the tape reverses direction after each set of sixteen tracks is written.

LTO Ultrium formats are open standards. This means that data written on any HP StorageWorks LTO Ultrium tape drive for ProLiant servers, autoloaders, MSL, EML or ESL can be interchanged directly with Ultrium tape drives from other vendors.

### 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.

### Compatibility Testing

HP LTO Ultrium data cartridges are fully supported and compatible with HP StorageWorks LTO Ultrium tape products. Because HP LTO Ultrium media is LTO Ultrium logo compliant, it may be used with any other non-HP device that bears the LTO Ultrium logo.

### Backward Read Compatible

	LTO1 Drive	LTO2 Drive	LTO3 Drive	LTO4 Drive
LTO1 Media	Read/Write	Read/Write	Read Only	Not Compatible
LTO2 Media	Not Compatible	Read/Write	Read/Write	Read Only
LTO3 Media	Not Compatible	Not Compatible	Read/Write	Read/Write
LTO4 Media	Not Compatible	Not Compatible	Not Compatible	Read/Write

## Product Highlights

### Why Buy LTO?

If you have not yet standardized on a large-tape format then LTO Ultrium tape technology is the preferred choice offering:

- Highest reliability through no compromise design and innovative features like Data Rate Matching.
- High capacity to meet the challenges of data deluge
- High performance - even on slower hosts
- An industry standard - Linear Tape-Open format
- Investment protection - with a six-generation roadmap with plans to deliver a compressed capacity of 6.4 TB and a compressed transfer rate of up to 540 MB/s.

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### Warranty and Support

Includes a limited lifetime warranty, fully supported by a worldwide network of resellers and service providers as well as toll-free 24 X 7 technical phone support during the warranty period. For full details on warranty and support for pre-labeled media, please go to:

<http://www.hp.com/products1/storage/products/storagemedia/index.html>.

## Options

### Related Hardware Options

**NOTE:** This is a list of supported hardware options. Some may be discontinued.

HP StorageWorks MSL5030 Tape Library	MSL5030, 0 DRV, RM Library	301897-B21
	MSL5030, 1 DRV, LTO Ultrium 230, RM Library	301897-B22
	MSL5030, 2 DRV, LTO Ultrium 230, RM Library	301897-B23
	MSL5030, 1 DRV, LTO Ultrium 230, embedded Fibre, RM Library	301897-B24
	MSL5030, 2 DRV, LTO Ultrium 230, embedded Fibre, RM Library	301897-B25
	MSL5030, 1 DRV, LTO Ultrium 230, TT Library	301898-B21
	MSL5030, 2 DRV, LTO Ultrium 230, TT Library	301898-B22
	MSL5000 LTO Ultrium 230 upgrade drive in hot plug canister	301901-B21
HP StorageWorks MSL5060 Tape Library	MSL5060, 0 DRV, Ultrium 230, RM Library	301899-B21
	MSL5060, 2 DRV, Ultrium 230, TT Library	301900-B21
	MSL5060, 2 DRV, Ultrium 230, RM Library	301899-B22
	MSL5060, 2 DRV, Ultrium 230, embedded Fibre, RM Library	301899-B23
HP StorageWorks MSL6030 Tape Library	MSL6030, 0 DRV, RM Library	330731-B21
	MSL6030, 1 DRV, LTO Ultrium 460, RM Library	330731-B22
	MSL6030, 2 DRV, LTO Ultrium 460, RM Library	330731-B23
	MSL6030, 1 DRV, LTO Ultrium 460, embedded Fibre, RM Library	330731-B24
	MSL6030, 2 DRV, LTO Ultrium 460, embedded Fibre, RM Library	330731-B25
	MSL6030, 1 DRV, LTO Ultrium 460, TT Library	330788-B21
	MSL6030, 2 DRV, LTO Ultrium 460, TT Library	330788-B22
HP StorageWorks MSL6060 Tape Library	MSL6060, 0 DRV, Ultrium 460, RM Library	331196-B23
	MSL6060, 2 DRV, Ultrium 460, TT Library	331195-B21
	MSL6060, 2 DRV, Ultrium 460, RM Library	331196-B21
	MSL6060, 2 DRV, Ultrium 460, embedded Fibre, RM Library	331196-B22
HP StorageWorks ESL9322 Tape Library	ESL9322 Base Library, 0 drive library, 222 slots	330832-B21
	ESL9322 Extended Tape Library, 0 drive library, 222 slots	343377-B21
	<b>NOTE:</b> Model includes Interface Manager (card cage), Command View ESL (management software).	
	ESL9000 Ultrium 460 Drive Upgrade Kit	330834-B21
	ESL9000 Ultrium 230 Drive Upgrade Kit	301930-B21
HP StorageWorks ESL9595 Tape Library	ESL9595 Base Library, 400 slot, 0 drive, Enterprise Library	330833-B21
	ESL9595 Extended Tape Library, 400 slot, 0 drive, Enterprise Library	343378-B21
	<b>NOTE:</b> Model includes Interface Manager (card cage), Command View ESL (management software).	
	ESL9000 Ultrium 460 Drive Upgrade Kit	330834-B21
	ESL9000 Ultrium 230 Drive Upgrade Kit	301930-B21
HP StorageWorks Ultrium 215 Tape Drive	Ultrium 215, Array Module, Worldwide (flint grey)	C7492A
	Ultrium 215, Internal (carbon)	Q1543A
	Ultrium 215, External (carbon)	Q1545A

## Options

HP StorageWorks Ultrium 230 Tape Drive	Ultrium 230, Array Module (flint grey)	C7470A
	<b>NOTE:</b> Offline hot-swap tape drive for HP StorageWorks Tape Array 5300.	
	Ultrium 230, Internal (carbon)	Q1515A
	Ultrium 230 for ProLiant, External, International (carbon)	Q1517A
HP StorageWorks Ultrium 232 Tape Drive	Ultrium 232, Internal (carbon)	DW064A
	Ultrium 232, External (carbon)	DW065B
HP StorageWorks Ultrium 448 Tape Drive	Ultrium 448, Internal (carbon)	DW016A
	Ultrium 448, External (carbon)	DW017B
HP StorageWorks Ultrium 460 Tape Drive	Ultrium 460, Array Module (flint grey)	Q1512A
	<b>NOTE:</b> Offline hot-swap tape drive for HP StorageWorks Tape Array 5300	
	Ultrium 460, Internal (carbon)	Q1518A
	Ultrium 460, External (carbon)	Q1520A
HP StorageWorks Ultrium 960 Tape Drive	HP StorageWorks Ultrium 960 Internal Tape Drive	Q1538A
	HP StorageWorks Ultrium 960 External Tape Drive	Q1539A
	HP StorageWorks Ultrium 960 Array Module	Q1540A
	HP StorageWorks Ultrium 960 Rack-mount	Q1595A
HP StorageWorks 1/8 Tape Autoloader	1/8 Ultrium 230 Tape Autoloader	C9572CB
	<b>NOTE:</b> One Ultrium 230 drive, eight slot autoloader, desktop model; autoloader can be rack-mounted with optional rack-mount kit.	
HP StorageWorks SSL1016 Tape Autoloader	SSL1016 Ultrium 460 Tape Autoloader	330821-B21
	<b>NOTE:</b> One Ultrium 460 drive, 16-slot autoloader, rack-ready model; includes remote management card, barcode reader and tabletop conversion kit.	

## Technical Specifications

	LTO1 Ultrium	LTO2 Ultrium	LTO3 Ultrium	LTO4 Ultrium	Ultrium CC
<b>Magnetic Material</b>	Metal Particle	Metal Particle	Metal Particle	Metal Particle	Metal Particle
<b>Recording Density</b>	124 kbits/inch	188 kbits/inch	245 kbits/inch	343 kbits/inch	N/A
<b>Number of Data Tracks</b>	384	512	704	896	N/A
<b>Recording Capacity</b>	100/200 GB	200/400 GB	400/800 GB	800GB/1.6 TB	N/A
<b>Coercivity</b>	1800 - 1900 Oe	2100 - 2400 Oe	2500 - 2700 Oe	2500 - 2700 Oe	N/A
<b>Tape Width (mm)</b>	12.65	12.65	12.65	12.65	12.65
<b>Tape Thickness (um)</b>	8.9	8.9	8.0	6.6	8.0
<b>Tape Length (m)</b>	609	609	680	820	319
<b>External Dimensions</b>	1.8 x 4.45 x 4.37 in (2.1 x 11.3 x 11.1 cm)	1.8 x 4.45 x 4.37 in (2.1 x 11.3 x 11.1 cm)	1.8 x 4.45 x 4.37 in (2.1 x 11.3 x 11.1 cm)	1.8 x 4.45 x 4.37 in (2.1 x 11.3 x 11.1 cm)	1.8 x 4.45 x 4.37 in (2.1 x 11.3 x 11.1 cm)
<b>Cartridge Weight</b>	0.63 lb (285.2 g)	0.63 lb (285.2 g)	0.63 lb (285.2 g)	0.63 lb (285.2 g)	0.63 lb (285.2 g)
<b>Durability</b>	1,000,000 passes on any area of tape, equates to over 20,000 end-to-end passes/260 full tape backups				
<b>Archival Life</b>	30 years	30 years	30 years	30 years	N/A
<b>Environmental Requirements</b>	<b>Operating Temperature</b>	50° to 113° F (10° to 45° C)			
<i>(Media should not be used outside of these parameters)</i>	<b>Day to Day Storage Temperature</b>	60° to 90° F (16° to 32° C)			
	<b>Long Term Storage Temperature - Ambient</b>	41° to 73° F (5° to 23° C)			
	<b>Maximum Wet Bulb Temperature</b>	79° F (26° C)			
	<b>Non Condensing Relative Humidity</b>	10 to 80% (Operating) 20 to 60% (Archival)			

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