

## 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 fifth Generation products minimize interruption to network and SAN backup by being capable of protecting 1TB/hour of data and storing up to 3.0 TB on one piece of media (almost double the capacity of HP LTO-4 Ultrium tapes).

### HP's Bar Code and RFID Labeled Data Cartridges:

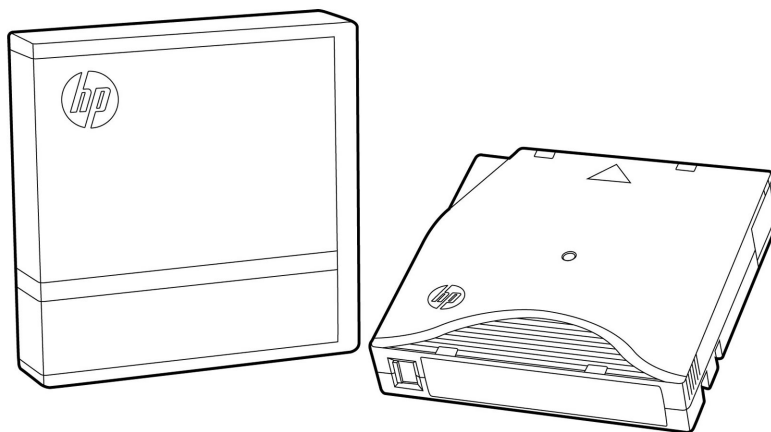
HP sells both Labeled and Unlabeled LTO Ultrium data cartridges for automation customers requiring bar code and RFID labeled storage media.

HP's Custom Bar Code and RFID 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 Bar Code and RFID 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. Each Media Kit includes twenty LTO-1 Ultrium 200GB (C7971A), LTO-2 Ultrium 400GB (C7972A), or LTO-3 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).



### Overview

Models	HP LTO-5 Ultrium 3TB RW Data Cartridge	C7975A
	HP LTO-5 Ultrium 3TB RW Custom Labeled Data Cartridge 20 Pack	C7975AL
	HP LTO-5 Ultrium 3TB WORM Data Cartridge	C7975W
	HP LTO-5 Ultrium Non-custom Labeled Data Cartridge 20 Pack	C7975AN
	HP LTO-5 WORM Custom Labeled Cartridge 20 Pack	C7975WL
	HP LTO-5 RW Custom Labeled No Case Data Cartridge 20 Pack	C7975AC
	HP LTO-5 Ultrium 3.0 TB RFID Custom Labeled Data Cartridge (20 pack)	C7975AF
	HP LTO-5 Ultrium 3.0 TB RFID Non Custom Labeled Data Cartridge (20 pack)	C7975AJ
	HP LTO-5 Ultrium 3.0 TB RFID Eco Pack (No Case) Data Cartridge (20 pack)	C7975AK
	HP LTO-4 Ultrium 1.6 TB RW Data Cartridge	C7974A
	HP LTO-4 Ultrium 1.6TB RW Custom Labeled Data Cartridge (20 pack)	C7974AL
	HP LTO-4 Ultrium 1.6 TB WORM Data Cartridge	C7974W
	HP LTO-4 Ultrium 1.6TB Non Custom Labeled Data Cartridge (20 pack)	C7974AN
	HP LTO-4 Ultrium 1.6 TB WORM Custom Labeled Data Cartridge (20 pack)	C7974WL
	HP LTO-4 Ultrium 1.6 TB RFID Custom Labeled Data Cartridge (20 pack)	C7974AF
	HP LTO-4 Ultrium 1.6 TB RFID Non Custom Labeled Data Cartridge (20 pack)	C7974AJ
	HP LTO-4 Ultrium 1.6 TB RFID Eco Pack (No Case) Data Cartridge (20 pack)	C7974AK
	HP LTO-3 Ultrium 800 GB RW Data Cartridge	C7973A
	HP LTO-3 Ultrium 800 GB RW Custom Labeled Data Cartridge (20 pack)	C7973AL
	HP LTO-3 Ultrium 800 GB Non Custom Labeled Data Cartridge (20 pack)	C7973AN
	HP LTO-3 Ultrium 800 GB WORM Data Cartridge	C7973W
	HP LTO-3 Ultrium 800 GB WORM Custom Labeled Data Cartridge (20 pack)	C7973WL
	HP LTO-3 Ultrium 800 GB RFID Custom Labeled Data Cartridge (20 pack)	C7973AF
	HP LTO-3 Ultrium 800 GB RFID Non Custom Labeled Data Cartridge (20 pack)	C7973AJ
	HP LTO-3 Ultrium 800 GB RFID Eco Pack (No Case) Data Cartridge (20 pack)	C7973AK
	HP LTO-2 Ultrium 400 GB Data Cartridge	C7972A
	HP LTO-2 Ultrium 400 GB Custom Labeled Data Cartridge (20 pack)	C7972AL
	HP LTO-2 Ultrium 400 GB Non Custom Labeled Data Cartridge (20 pack)	C7972AN
	HP LTO-1 Ultrium 200 GB Data Cartridge	C7971A
	HP LTO-1 Ultrium 200 GB Custom Labeled Data Cartridge (20 pack)	C7971AL
	HP LTO-1 Ultrium 200 GB Non Custom Labeled Data Cartridge (20 pack)	C7971AN
	HP LTO Ultrium Universal Cleaning Cartridge	C7978A
	HP LTO-1 Ultrium Bar Code label pack	Q2001A
	HP LTO-2 Ultrium Bar Code label pack	Q2002A
	HP LTO-3 Ultrium RW Bar Code label pack	Q2007A
	HP LTO-3 Ultrium WORM Bar Code label pack	Q2008A
	HP LTO-4 Ultrium RW Bar Code label pack	Q2009A
	HP LTO-4 Ultrium WORM Bar Code label pack	Q2010A
	HP LTO-5 Ultrium RW Bar Code Label Pack	Q2011A
	HP LTO-5 Ultrium WORM Bar Code Label Pack	Q2012A



## Overview

### Key Features & Benefits

- Up to 3.0 TB compressed capacity.
- Supports transfer speeds of 140 MB/s (native), 280 MB/s (2:1) with Generation 5
- 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 LTO-4 and LTO-5 Ultrium offers data encryption for enhanced data security.
- HP's offers both labeled (Custom Labeled and Non-Custom Labeled) and non-labeled Tri Optic and RFID 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 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 products from LTO-3 onwards utilize the single barcode format. HP Non-Custom Labeled media is available worldwide.
- HP LTO Ultrium RFID Storage Media provides a faster, more flexible and secure alternative to traditional barcode identification solutions. Rewritable RFID labels enable cartridges to be accurately tracked in real time, anywhere in the world. HP RFID labels are tested to extremes, support worldwide radio frequencies and comply with global data security standards.
- 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 2009, 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.

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### 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.

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### HP LTO-5 Ultrium Tape Technology

The latest HP LTO-5 Ultrium tape drive technology uses a linear format of 1,280 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.

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### 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.

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### 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.

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## Product Highlights

Backward Read Compatible	LTO-1 Drive	LTO-2 Drive	LTO-3 Drive	LTO-4 Drive	LTO-5 Drive
LTO-1 Media	Read/Write	Read/Write	Read Only	Not Compatible	Not Compatible
LTO-2 Media	Not Compatible	Read/Write	Read/Write	Read Only	Not Compatible
LTO-3 Media	Not Compatible	Not Compatible	Read/Write	Read/Write	Read Only
LTO-4 Media	Not Compatible	Not Compatible	Not Compatible	Read/Write	Read/Write
LTO-5 Media	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Read/Write

## 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 an eight-generation roadmap with plans to deliver a compressed capacity of 32 TB and a compressed transfer rate of up to 1.18 GB/s.

## 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>.

## Related Hardware Options

For full details of all media and hardware compatibility between HP LTO Ultrium storage media and HP StorageWorks tape drives, autoloaders and libraries, please go to: [www.hptapecompat.com](http://www.hptapecompat.com).



Options

## Related Hardware Options

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

HP StorageWorks MSL8096 Tape Library	HP StorageWorks MSL8096 2 LTO-5 Ultrium 3280 FC Tape Library	BL533A
	HP StorageWorks MSL8096 4 LTO-5 Ultrium 3280 FC Tape Library	BL534A
	HP StorageWorks MSL8096 2 LTO-5 Ultrium 3000 SAS Tape Library	BL539A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 Fibre Channel Tape Library	AJ040A
	HP StorageWorks MSL8096 4 LTO-4 Ultrium 1840 Fibre Channel Tape Library	AN974A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1760 SAS Tape Library	AK382A
	HP StorageWorks MSL8096 4 LTO-3 Ultrium 960 Fibre Channel Tape Library	AN973A

HP StorageWorks MSL4048 Tape Library	HP StorageWorks MSL4048 1 LTO-5 3280 FC Tape Library	BL532A
	HP StorageWorks MSL4048 2 LTO-5 Ultrium 3000 SAS Tape Library	BL538A
	HP StorageWorks MSL4048 2 LTO-5 Ultrium 3000 Fibre Channel Tape Library	BL543A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 Fibre Channel Tape Library	AJ036A
	HP StorageWorks MSL4048 2 LTO-4 Ultrium 1840 Fibre Channel Tape Library	AJ038A
	HP StorageWorks MSL4048 2 LTO-4 Ultrium 1840 Tape Library	AJ037A
	HP StorageWorks MSL4048 2-drive LTO-4 Ultrium 1760 SCSI Tape Library	AJ818A
	HP StorageWorks MSL4048 2 LTO-4 Ultrium 1760 SAS Tape Library	AK380A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 920 Drive Tape Library	AH171A
HP StorageWorks MSL4048 0-Drive Tape Library	AK381A	

HP StorageWorks MSL2024 Tape Library	HP StorageWorks MSL2024 1 LTO-5 3280 FC Tape Library	BL531A
	HP StorageWorks MSL2024 1 LTO-5 Ultrium 3000 SAS Tape Library	BL537A
	HP StorageWorks MSL2024 1 LTO-5 Ultrium 3000 Fibre Channel Tape Library	BL542A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 Fibre Channel Tape Library	AJ034A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 Tape Library	AJ033A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library	AK378A
	HP StorageWorks MSL2024 1-drive LTO-4 Ultrium 1760 SCSI Tape Library	AJ817A
	HP StorageWorks MSL2024 LTO-3 Ultrium 920 SAS Tape Library	AH559A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 Drive Tape Library	AH169A
	HP StorageWorks MSL2024 0-Drive Tape Library	AK379A

Ultrium 3000 Tape Drive	HP StorageWorks LTO-5 Ultrium 3000 SAS Internal	EH957A*
	* OD1 will appear after this part number on your sales order if factory integration is indicated.	
	HP StorageWorks LTO-5 Ultrium 3000 SAS External Tape Drive	EH958A
	HP StorageWorks LTO-5 Ultrium 3000 SAS Rack-mount	EJ014A*
	* OD1 will appear after this part number on your sales order if factory integration into a rack is indicated.	
	<b>NOTE:</b> Single drive bundled with a 1U Rack-mount enclosure.	



## Options

<b>Ultrium 1760 Tape Drive</b>	HP StorageWorks LTO-4 Ultrium 1760 SAS Internal * OD1 will appear after this part number on your sales order if factory integration is indicated.	EH919A*
	HP StorageWorks LTO-4 Ultrium 1760 SAS External Tape Drive	EH920A
	HP StorageWorks LTO-4 Ultrium 1760 SAS Rack-mount * OD1 will appear after this part number on your sales order if factory integration into a rack is indicated. <b>NOTE:</b> Single drive bundled with a 1U Rack-mount enclosure.	EH946A*
	HP StorageWorks LTO-4 Ultrium 1760 SCSI Internal * OD1 will appear after this part number on your sales order if factory integration is indicated.	EH921A*
	HP StorageWorks LTO-4 Ultrium 1760 SCSI External Tape Drive	EH922A
<b>Ultrium 920 Tape Drive</b>	HP StorageWorks Ultrium 920 SCSI Internal * OD1 will appear after this part number on your sales order if factory integration is indicated.	EH841A*
	HP StorageWorks Ultrium 920 SCSI External	EH842A*
	HP StorageWorks Ultrium 920 SCSI Rack-mount * OD1 will appear after this part number on your sales order if factory integration into a rack is indicated. <b>NOTE:</b> Single drive bundled with a 1U Rack-mount enclosure.	EH903B
	HP StorageWorks Ultrium 920 SAS Internal * OD1 will appear after this part number on your sales order if factory integration is indicated.	EH847A*
	HP StorageWorks Ultrium 920 SAS External Tape Drive	EH848A
<b>Ultrium 448 Tape Drive</b>	HP StorageWorks Ultrium 448 SCSI Internal * OD1 will appear after this part number on your sales order if factory integration is indicated.	DW016A*
	HP StorageWorks Ultrium 448 SCSI External Tape Drive	DW017B
	HP StorageWorks Ultrium 448 SCSI Array Module * OD1 will appear after this part number on your sales order if factory integration is indicated. <b>NOTE:</b> Offline hot-swap tape drive for HP StorageWorks Tape Array 5300.	DW019A*
	HP StorageWorks Ultrium 448 SCSI Rack-mount * OD1 will appear after this part number on your sales order if factory integration into a rack is indicated. <b>NOTE:</b> Single drive bundled with a 1U Rack-mount enclosure.	DW028B*
	HP StorageWorks Ultrium 448 SAS Internal * OD1 will appear after this part number on your sales order if factory integration is indicated.	DW085A*
	HP StorageWorks Ultrium 448 SAS External Drive	DW086A



## Options

Ultrium 232 Tape Drive	HP StorageWorks Ultrium 232 SCSI Internal	DW064A*
	<i>* 0D1 will appear after this part number on your sales order if factory integration is indicated.</i>	
	HP StorageWorks Ultrium 232 SCSI External Tape Drive	DW065B
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HP StorageWorks Ultrium 960 Tape Drive	HP StorageWorks Ultrium 960 Internal Tape Drive	Q1538A
	HP StorageWorks Ultrium 960 Array Module	Q1540A





## Technical Specifications

	LTO-1 Ultrium	LTO-2 Ultrium	LTO-3 Ultrium	LTO-4 Ultrium	LTO-5 Ultrium
<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	343 kbits/inch
<b>Number of Data Tracks</b>	384	512	704	896	1,280
<b>Recording Capacity</b>	100/200 GB	200/400 GB	400/800 GB	800GB/1.6 TB	1.5 TB/3.0 TB
<b>Coercivity</b>	1800 - 1900 Oe	2100 - 2400 Oe	2500 - 2700 Oe	2500 - 2700 Oe	2,500 - 2,700 Oe
<b>Tape Width (mm)</b>	12.65	12.65	12.65	12.65	12.65
<b>Tape Thickness (µm)</b>	8.9	8.9	8.0	6.6	6.4
<b>Tape Length (m)</b>	609	609	680	820	846
<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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