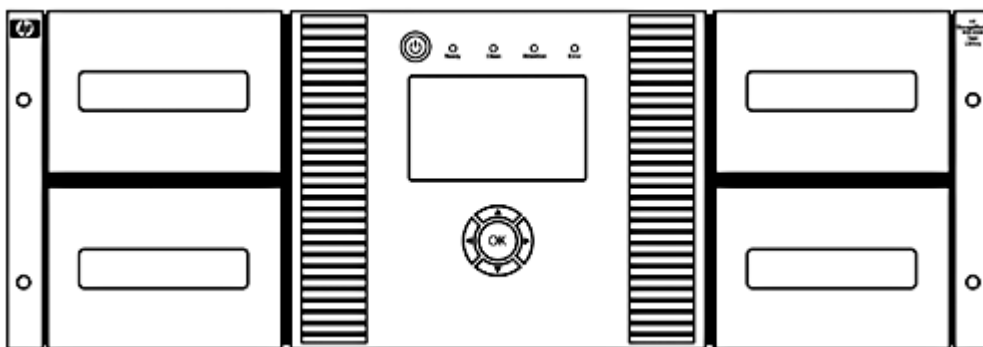


### Overview

**This QS has been replaced by 13258 HP StorageWorks MSL Tape Libraries**

The HP StorageWorks MSL4048 Tape Library will meet a broad range of demanding data storage needs including unattended backup, archive and disaster recovery for small to medium businesses, workgroups, or remote offices. The MSL4048 offers up to 76.8 TB of compressed (2:1) storage capacity in only a 4U form factor and your choice of LTO-4 or LTO-3 Ultrium tape drives. The library is also available with a wide choice of interfaces including Fibre Channel, SCSI and SAS to allow installation of the library into any IT environment. The MSL4048 enables you to easily manage your media both in and out of the library with a standard bar code reader, a configurable three-slot mail slot and four 12-slot removable magazines. With unique HP web-based remote management, the MSL4048 is easily managed from across the room, or across the globe. The enhanced HP operator control panel is a full quarter VGA screen with an easy to navigate interface for easy onsite operator interaction.



### What's New

- Integration of the HP StorageWorks LTO-4 Ultrium 1760 SCSI Tape Drive.
- IPv6 network protocol support. Libraries can now be connected over both IPv6 and IPv4 networks. Libraries have obtained the IPv6 Ready, Phase-2 logo.
- Configure library into multiple partitions for maximum flexibility.
- LTO-4 Ultrium library-enabled encryption to protect your data from unauthorized access.
- HTTPS support for authenticated and encrypted transfers over the Internet.

### Key Features

- Exceptional storage density with up to 76.8 TB of compressed capacity (2:1 compression) in 4U
- Easy-to-use HP unique web-based remote management
- Integrated bar code reader
- Tool-free tape drive upgrades
- Customer upgradeable redundant power supply
- Multiple interface choices available (SCSI, SAS or FC)
- Removable magazines with three user-configurable mail slots
- Easy-to-enable AES 256-bit embedded hardware encryption with compression
- Extensive OS and software compatibility testing
- Proven high reliability

### Overview

#### Customer Benefits

- Provides a large amount of data storage without consuming valuable rack space.
- Manage, configure and use the library from across the room or across the globe with web-based remote management interface.
- Easily manage your media with standard bar code reader and four 12-slot removable magazines.
- Choose from a broad range of HP LTO Ultrium Tape Drives including LTO-4 Ultrium 1840, LTO-4 Ultrium 1760, LTO-3 Ultrium 960, and LTO-3 Ultrium 920. As your data protection needs change or increase, you can increase capacity and/or performance easily with tool-free drive upgrades.
- With the addition of the redundant power supply option, the user can attain, and maintain, even higher system reliability and up-time.
- SCSI, SAS and FC interfaces provide options for installing the tape library into a SCSI, SAS or SAN into any environment.
- For dedicated import/export of media cartridges, each library includes three user-enabled mail slots. The library also includes removable magazines for bulk loading of media, and provides a convenient bulk storage unit for moving media off-site.
- Provides highest level of encryption security, with compression, for strong backup data privacy to secure confidential information and address compliance quickly. Encryption key management support via HP Data Protector Software and other ISV backup applications.
- Works with industry-leading servers, operating systems and backup software.  
(<http://www.hp.com/go/ebs>)
- Peace of mind knowing that the MSL4048 provides reliable backups and automatically changes tapes with a robotics rating of 2 million Mean Swaps Between Failures (MSBF).

Family Comparison	MSL4048 LTO-4 Ultrium 1840 Tape Library	MSL4048 LTO-4 Ultrium 1760 Tape Library	MSL4048 LTO-3 Ultrium 960 Tape Library	MSL4048 LTO-3 Ultrium 920 Tape Library
Drive Technology	LTO-4 Ultrium 1840	LTO-4 Ultrium 1760	LTO-3 Ultrium 960	LTO-3 Ultrium 920
Number of Drives	1 or 2	2 to 4	1 or 2	1 to 4
Capacity (2:1 compression)	76.8 TB	76.8 TB	38.4 TB	38.4 TB
Maximum Data Transfer (2:1 compression)	1.7 TB/hr (two drives)	2.3 TB/hr (four drives)	1.1 TB/hr (two drives)	1.7 TB/hr (four drives)
Drive Interface	4Gb Native Fibre Channel Ultra320 LVD SCSI	Ultra320 LVD SCSI 3Gb/sec SAS	4Gb Native Fibre Channel Ultra320 LVD SCSI	Ultra320 LVD SCSI 3Gb/sec SAS

### Product Highlights

#### Manageability

The MSL4048 Tape Library allows web-based remote manageability; the unit can be monitored and managed from across the room or across the globe. Functions included in the management tool include:

- Status information on the drive and system
- System configuration operations and reporting
- System error and status logs
- Library and drive firmware upgrade capabilities
- Diagnostic tests and information
- Cartridge movement for maintenance and management purposes
- Cleaning cartridge support
- Security and access control
- SNMP support for IP communications
- Partitioning and Encryption management

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#### Easy Installation

The MSL4048 Tape Library is shipped as a rack-ready unit. The rack mount hardware included with the library allows installation in a variety of HP racks which include the 10000 series, 9000 series, 5000 series or System/E racks.

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#### Partitioning

The MSL4048 now includes the ability to be configured as a partitioned library. The MSL4048 may be configured as up to one partition per drive; four partitions if four drives are installed. Partitioning allows each partitioned library to be presented to the host as an independent library, separate from other partitions in the library. Hosts for each partition own independent sets of media and can use ISV software that is different from the other partitions allowing maximum flexibility and utilization of the MSL4048.

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#### Proven Reliability

With a rating of 2,000,000 robot load/unload cycles, the MSL4048 Tape Library provides necessary high reliability for today's demanding environment. To improve reliability and longevity, all HP Ultrium products feature Data Rate Matching (DRM). This allows the tape drive to dynamically and continuously adjust the speed of the drive, to match the speed of the host or network. This increases performance, reduces mechanical wear on the tape drive and extends tape life.

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#### Data Privacy

To greatly enhance data privacy, HP StorageWorks MSL4048 Tape Libraries are now available with LTO-4 Ultrium hardware encrypting tape drives for secure high performance backups meeting consortium specifications for LTO-4. HP Data Protector Software can enable the drive encryption and provide basic key management capabilities. Additional ISV supporting hardware encryption information is available on the HP StorageWorks Enterprise Backup Solution website at: <http://www.hp.com/go/ebs>. The encryption on LTO-4 media occurs with or without compression, and without speed or capacity penalties. You can read LTO-2 and LTO-3 tapes, and write LTO-3 tapes, but hardware encryption is not supported in these formats.

LTO-4 uses the Advanced Encryption Standard (AES) with the longest and most secure keys -- 256 bits. AES-256 is implemented within Galois Counter Mode (GCM). This is a method of increasing AES security by efficiently adding Message Authentication Codes to ensure the integrity of the backup data stored on tape. The HP LTO-4 Ultrium Tape Drives are designed to be compliant with the emerging standard for tape drive security (IEEE 1619.1).

### Product Highlights

#### Encryption

The HP Secure Advantage portfolio is expanding to include a new offering intended for data protection in small to medium businesses. The HP StorageWorks 1/8 G2 & MSL LTO-4 Encryption Kit provides a library-enabled encryption solution that greatly enhances data privacy, confidentiality, and integrity of your critical business data while supporting compliance requirements. While there are a wide range of encryption solutions available, the HP StorageWorks 1/8 G2 & MSL LTO-4 Encryption Kit is intended to be an easy and affordable library-enabled solution for small businesses.

Protect the confidentiality and integrity of your data:

The encryption kit includes two USB key server tokens, product documentation, and firmware support. One encryption kit is needed per library or autoloader and it must be physically accessible so that the USB token can be inserted into the automation device. One of the two tokens will plug into the USB port in the autoloader or library and will generate and maintain encryption keys for the LTO-4 drives/libraries. The USB key server token uses a hardware random number generator, a cryptographic module running on FIPS 140-2 Level 3 validated hardware, password authentication, and digital envelopes for strong encryption keys and security operations. The second USB token is intended to provide a backup to the first. The keys are transferred securely token-to-token for backup or export, with no exposure to insecure PCs, servers, or networks. The encryption kit provides a self-contained solution for MSL libraries with no additional software, PCs, or servers required or involved.

Protect IT resources and meet compliance requirements:

With the HP StorageWorks 1/8 G2 & MSL LTO-4 Encryption Kit, users can enable or disable encryption, configure the USB key server tokens, restore encrypted data, as well as a variety of other tasks. In addition, the LTO-4 tape drives use the Advanced Encryption Standard (AES) with the longest and most secure keys -- 256 bits. AES-256 encryption is implemented using the Galois Counter Mode (GCM). This method adds Message Authentication Codes to ensure the integrity as well as privacy of the backup data stored on tape. The HP LTO-4 Ultrium Tape Drives are designed to be compliant with the emerging standard for tape media security (IEEE 1619.1).

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#### Serviceability

Modular in design, the MSL4048 Tape Library has easily replaceable components minimizing the Mean-Time-to-Repair on the unit. Replaceable components include the tape drive, the magazines, the power supply, the controller board and the chassis (includes robotics). HP StorageWorks Library and Tape Tools (L&TT) provides easy access to the MSL4048 error log, generates support tickets, and enables firmware downloads. L&TT can be downloaded for free at: <http://www.hp.com/support/tapetools>.

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#### LTO Ultrium Technology

HP StorageWorks LTO (Linear Tape Open) Ultrium Tape Drives use best of breed technology. By taking the best features from other tape technologies and combining them into a single new technology, Ultrium tape drives are in a league of their own. Inclusion of innovative features such as Adaptive Tape Speed (ATS) ensure that Ultrium drives can meet the performance and reliability demands of a library environment. LTO technology is an open industry standard format; thus data written on HP StorageWorks Ultrium Tape Drives can be interchanged directly with Ultrium Tape Drives from other vendors.

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### 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 and maximizes overall efficiency, allowing the drive to respond immediately to any speed changes from the host
- It minimizes rewinding and repositioning of the tape, significantly reducing physical wear and increasing reliability
- It minimizes the power requirements for the drive by reducing the number of repositions needed

LTO Ultrium Tape Drive	ATS data transfer rate range (native)
HP LTO-4 Ultrium 1840	40 to 120 MB/s
HP LTO-4 Ultrium 1760	27 to 80 MB/s
HP LTO-3 Ultrium 960	35 to 80 MB/s
HP LTO-3 Ultrium 920	26 to 60 MB/s

#### HP Ultrium WORM

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 HIPAA, 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 LTO-4 Ultrium and LTO-3 Ultrium tape drives 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 tape drives can archive large amounts of data for periods of up to 30 years in a secure, untampered state. Since all LTO-4 Ultrium and LTO-3 Ultrium 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 tape drives offer 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 1.6 TB (2:1 compression) of data on a single data cartridge
- Support from many backup and archiving software vendors, providing the most comprehensive and mainstream support in the industry
- The LTO open standard that offers greater choice and compatibility across all third- and fourth-generation Ultrium products

**NOTE:** While all HP LTO-4 Ultrium and LTO-3 Ultrium tape drives support LTO Ultrium WORM media, some third- and fourth-generation LTO Ultrium tape drives from other manufacturers may not include read and write support for LTO Ultrium WORM media. For non-HP third- and fourth-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.

### Product Highlights

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#### HP StorageWorks Library and Tape Tools

The MSL4048 Tape Library is supported on HP's industry-leading diagnostic tool - HP StorageWorks Library and Tape Tools (L&TT). L&TT is a single, convenient program that is easy to install and simple to operate. L&TT's intuitive user interface eliminates the need for training and deploys in less than five minutes. This robust diagnostic tool is designed for both the experienced professional and the untrained administrator. It ensures product integrity through self-diagnostics and fast resolution to device concerns. Additional information on L&TT plus download information can be found at:

<http://www.hp.com/support/tapetools>.

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#### HP Storage Media

HP recommends that you use HP-branded cartridges in the MSL4048 Tape Library to assure the highest level of protection for your valuable data. The test program for HP 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.

HP strongly encourages the use of bar code labels on tapes to track media and ensure optimum library performance and usability. Correctly labeling your media will allow the library to quickly determine media and drive compatibility.

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#### Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed. Customization must comply with all relevant product specifications and factory supported configurations.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, and HP 9000 servers as well as MSA, VA7xxx, EVA, and XP disk arrays, rackable tape libraries and configurable network switches.

Type of service support varies by platform and product family. For more information on Factory Express services for your specific server model or storage device please contact your sales representative or go to: <http://www.hp.com/go/factory-express>.

### Compatibility

HP's extensive compatibility testing program assures that your HP StorageWorks MSL4048 Tape Library works with leading servers, operating systems, and backup applications - and not just those sold by HP. The MSL4048 works seamlessly in many environments, 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 the MSL4048, check the HP StorageWorks Enterprise Backup Solution compatibility matrix at: <http://www.hp.com/go/ebs>.

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**Server Compatibility**      The MSL4048 is supported on a wide range of HP systems. For details of which MSL4048 works with which systems, including third-party systems, reference the EBS compatibility matrix at: <http://www.hp.com/go/ebs> for the latest hardware compatibility information.

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**OS Support**                Reference the EBS compatibility matrix for the most up-to-date OS compatibility information at: <http://www.hp.com/go/ebs>.

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**Software Support**        Reference the EBS compatibility matrix for the most up-to-date software compatibility information at: <http://www.hp.com/go/ebs>.

### Service and Support, HP Care Pack, and Warranty Information

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**Warranty** The warranty for this product consists of 1-year parts exchange, next business day.

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**Warranty Upgrade Options**

- Response - Upgrade on-site response from next business day to same day 4-hours
- Coverage - Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration - Select duration of coverage for a minimum period of 1 year or multiple years

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**HP Care Pack Information** HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.

- HP Care Pack is not available for less than the products warranty duration.
- HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the warranty start date (delivery date to end user customer). Proof of purchase may be required.
- HP Care Pack services are prepaid.

For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL: <http://www.hp.com/hps/carepack/>.

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**Hardware Product Services**

- Installation services
- On-site Maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- RAID setup and performance consulting via statement of work

For additional hardware installation and maintenance information, please refer to the URL listed below: <http://www.hp.com/hps/hardware/>

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**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>

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### Service and Support, HP Care Pack, and Warranty Information

#### Support Services

HP Services provides up to a three-year, limited warranty, fully supported by a worldwide network of resellers and service providers and 9x5 hardware technical phone support during the warranty period. In addition, available service offerings include a full range of optional packaged hardware and software services:

- Installation and start up
- Extended coverage hours and enhanced response times
- System management and performance services
- Availability and recovery services

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#### Components

The following brick level options/components do not have individual HP Care Pack Services. These items will be included in product HP Care Pack Services into which they are installed.

Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs	Adapters
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling	Fans

### Configuration Information

**NOTE:** The HP StorageWorks MSL4048 Tape Library comes standard with one or two drives, a 48-slot unit which is shipped rack-ready; a racking kit is included in the box. Each library includes a US power cord (C13, 10A) and PDU power cord (C13/C14, 10A). For additional or specific regional power cord requirements, a separate power cord must be ordered.

### Step 1 – Base Configuration

Select one:

Model Name	Model Description	Part Number
HP StorageWorks	HP MSL4048 1 LTO-4 Ultrium 1840 FC Tape Library	AJ036A
MSL4048 Tape Library	HP MSL4048 2 LTO-4 Ultrium 1840 FC Tape Library	AJ038A
	HP MSL4048 1 LTO-4 Ultrium 1840 SCSI Tape Library	AJ035A
	HP MSL4048 2 LTO-4 Ultrium 1840 SCSI Tape Library	AJ037A
	HP MSL4048 2 LTO-4 Ultrium 1760 SCSI Tape Library	AJ818A
	HP MSL4048 2 LTO-4 Ultrium 1760 SAS Tape Library	AK380A
	HP MSL4048 2 LTO-3 Ultrium 960 FC Tape Library	AG325B
	HP MSL4048 1 LTO-3 Ultrium 960 SCSI Tape Library	AG322A
	HP MSL4048 2 LTO-3 Ultrium 960 SCSI Tape Library	AG323A
	HP MSL4048 1 LTO-3 Ultrium 920 SCSI Tape Library	AH171A
	HP MSL4048 2 LTO-3 Ultrium 920 SCSI Tape Library	AH172A
	HP MSL4048 1 LTO-3 Ultrium 920 SAS Tape Library	AH560A
	HP MSL4048 0-Drive, 48 Slot Tape Library	AK381A

**NOTE:** For channel configuration in EMEA only.

Kit Contents (for each library):

- **SCSI Models:**
  - One 1.83M US Power Cord, C13, 10A
  - One 2.5M PDU Power Cord, C13/C14, 10A
  - One 6 ft VHDCI to HDTS68 SCSI cable per SCSI tape drive
  - One HDTS68 SCSI terminator per SCSI tape drive
  - One RJ-45 Ethernet cable
  - Rack mount hardware
  - Documentation kit including User & Service Guide (CD) and Getting Started Poster
- **SAS Model:**
  - One 1.83M US Power Cord, C13, 10A
  - One 2.5M PDU Power Cord, C13/C14, 10A
  - One RJ-45 Ethernet cable
  - Rack mount hardware
  - Documentation kit including User & Service Guide (CD) and Getting Started Poster
- **Fibre Channel Models:**
  - One 1.83M US Power Cord, C13, 10A
  - One 2.5M PDU Power Cord, C13/C14, 10A
  - One RJ-45 Ethernet cable
  - Rack mount hardware
  - Documentation kit including User & Service Guide (CD) and Getting Started Poster
- **0-Drive Models:**
  - One 1.83M US Power Cord, C13, 10A
  - One 2.5M PDU Power Cord, C13/C14, 10A
  - One RJ-45 Ethernet cable

### Configuration Information

- Rack mount hardware
- Documentation kit including User & Service Guide (CD) and Getting Started Poster

## Step 2 – Additional Options

Select each required option with quantities specified:

Power Cord	Description	Quantity	Part Number
	Power Cord, US, C13, 10A, 1.83m <b>NOTE:</b> This cord ships standard with each MSL4048 Tape Library; can be used to connect the rack-mounted device to PDUs with NEMA 5-15R receptacles.	1 each	AF556A
	PDU Power Cord, C13/C14, 10A, 2.5m <b>NOTE:</b> This cord ships standard with each MSL4048 Tape Library, can be used to connect the rack-mounted device to PDUs with IEC-320 receptacles.	1 each	142257-002
	Power Cord, Euro, C13, 10A, 1.83m	1 each	AF568A
	Power Cord, UK, C13, 10A, 1.83m	1 each	AF570A
	Power Cord, Danish, C13, 10A, 1.83m	1 each	AF566A
	Power Cord, Swiss, C13, 10A, 1.83m	1 each	AF565A
	Power Cord, Italian, C13, 10A, 1.83m	1 each	AF571A
	Power Cord, South Africa, C13, 10A, 2.5m	1 each	AF567A
	Power Cord, Taiwan, C13, 12A, 1.83m	1 each	AF561A
	Power Cord, China, C13, 10A, 1.83m	1 each	AF557A
	Power Cord, Japan, C13, 12A, 2.0m	1 each	AF572A
	Power Cord, Australia, C13, 10A, 2.5m	1 each	AF569A
	Power Cord, Argentina, C13, 10A, 2.5m	1 each	AF558A
	Power Cord, Brazil, C13, 10A, 1.83m	1 each	AF559A
	Power Cord, Korea, C13, 10A, 1.83m	1 each	AF560A
	Power Cord, Israel, C13, 10A, 1.83m	1 each	AF564A
	<b>NOTE:</b> One power cord is required; please select the correct power cord for your geographical location. <b>WARNING:</b> This product can ONLY be used with an HP approved power cord for your specific geographic region. Use of a non-HP approved power cord may result in: 1) not meeting individual country specific safety requirements; 2) insufficient conductor amperage that could result in overheating with potential personal injury and/or property damage; and 3) an unapproved power cord could fracture resulting in the internal contacts being exposed, which potentially could subject the user to a shock hazard. HP disclaims all liability in the event a non-HP approved power cord is used.		

### Related Options

<b>Factory Racking</b>	<p>Factory integrate the MSL4048 Tape Library with other HP products such as HP ProLiant Servers.</p> <p><b>NOTE:</b> #0D1 will appear after the MSL4048 Tape Library part number on the sales order if HP factory integration is indicated.</p>	#0D1
<b>Tape Drives</b>	<p>HP MSL 2024/4048 LTO-2 Ultrium 448 SCSI Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-2 Ultrium 448 SCSI Tape Library; maximum of four LTO-2 Ultrium 448 SCSI drives per MSL4048 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.</p>	AG118A
	<p>HP MSL 2024/4048 LTO-3 Ultrium 920 SCSI Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-3 Ultrium 920 SCSI Tape Library; maximum of four LTO-3 Ultrium 920 SCSI drives per MSL4048 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.</p>	AH173A
	<p>HP MSL 2024/4048/8096 LTO-3 Ultrium 920 SAS Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-3 Ultrium 920 SAS Tape Library; maximum of four LTO-3 Ultrium 920 SAS drives per MSL4048 Tape Library. Drive kit includes a tape drive and documentation.</p>	AH562A
	<p>HP MSL 2024/4048/8096 LTO-3 Ultrium 960 SCSI Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-3 Ultrium 960 SCSI Tape Library; maximum of two LTO-3 Ultrium 960 SCSI drives per MSL4048 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.</p>	AG327A
	<p>HP MSL 2024/4048/8096 LTO-3 Ultrium 960 FC 4Gb Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-3 Ultrium 960 FC Tape Library; maximum of two LTO-3 Ultrium 960 FC drives per MSL4048 Tape Library. Drive kit includes a tape drive and documentation.</p>	AG328B
	<p>HP MSL2024/4048 LTO-4 Ultrium 1760 SCSI Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-4 Ultrium 1760 SCSI Tape Library; maximum of four LTO-4 Ultrium 1760 SCSI drives per MSL4048 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.</p>	AJ819A
	<p>HP MSL2024/4048/8096 LTO-4 Ultrium 1760 SAS Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-4 Ultrium 1760 SAS Tape Library; maximum of four LTO-4 Ultrium 1760 SAS drives per MSL4048 Tape Library. Drive kit includes a tape drive and documentation.</p>	AK383A
	<p>HP MSL2024/4048/8096 LTO-4 Ultrium 1840 SCSI Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-4 Ultrium 1840 SCSI Tape Library; maximum of two LTO-4 Ultrium 1840 SCSI drives per MSL4048 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.</p>	AJ041A
	<p>HP MSL2024/4048/8096 LTO-4 Ultrium 1840 4Gb FC Drive Upgrade Kit</p> <p><b>NOTE:</b> For use with the MSL4048 LTO-4 Ultrium 1840 FC Tape Library; maximum of two LTO-4 Ultrium 1840 FC drives per MSL4048 Tape Library. Drive kit includes a tape drive and documentation.</p>	AJ042A

### Related Options

Magazines	HP MSL4048/8096 Ultrium Left Magazine Kit <b>NOTE:</b> For use in the MSL4048 Tape Libraries in either the upper or lower left position. When used in the lower left position, mail slots can be enabled when configured by the user at either 0 or 3 slots.	AG330A
	HP MSL2024/4048/8096 Ultrium Right Magazine Kit <b>NOTE:</b> For use in either the MSL2024,MSL4048 or MSL8096 Tape Libraries. For the MSL4048 Tape Libraries the Right Magazine Kit is used in either the upper or lower right position.	AG120A
Redundant Power Supply Upgrade Kit	HP MSL4048/8096 Redundant Power Supply Upgrade Kit <b>NOTE:</b> For use in the MSL4048 Tape Library to add a second customer-installable power supply into the unit. Includes a US power cord (C13, 10A); all other regions must order an appropriate power cord.	AH220A
Rack-to-Tabletop Conversion Kits	HP MSL4048 Rack-to-Tabletop Conversion Kit <b>NOTE:</b> for use in converting the rack-ready MSL4048 Tape Library into a desktop model.	AG329A
Encryption	HP 1/8 G2 & MSL Tape Library LTO-4 Encryption Kit <b>NOTE:</b> For use with new or installed LTO-4 Ultrium 1/8 G2 Tape Autoloaders and MSL2024/4048/8096 Tape Libraries. The encryption token will generate and retain encryption keys for HP LTO-4 Ultrium tape drives in the autoloader or library.	AM495A
Host Bus Adapters	HP SC44Ge Host Bus Adapter <b>NOTE:</b> Serial-attached SCSI (SAS) HBA that enables HP StorageWorks MSL Tape Libraries to connect with HP ProLiant servers.	416096-B21
	HP U320e SCSI Host Bus Adapter <b>NOTE:</b> Dual channel PCI-Express (PCI-e) SCSI Ultra320 HBA that enables HP StorageWorks MSL Tape Libraries to connect with HP ProLiant servers. Reference the EBS compatibility matrix for the most up-to-date HBA compatibility information at: <a href="http://www.hp.com/go/ebs">http://www.hp.com/go/ebs</a>	AH627A

### Related Options

Cable Kits	6 ft VHDCI/HDTS68 SCSI Cable Kit	341176-B21
	12 ft VHDCI/HDTS68 SCSI Cable Kit	341177-B21
	2m External Infiniband (SFF8470) to 4 Mini SAS (SFF8088) 1x SAS Cable Kit	AH587A
	<b>NOTE:</b> One cable is required for every four drives.	
	2m External Mini-SAS to 4x1 Mini-SAS Cable Kit	AN975A
	<b>NOTE:</b> One cable is required for every four drives.	
	4m External Mini-SAS to 4x1 Mini-SAS Cable Kit	AN976A
	<b>NOTE:</b> One cable is required for every four drives.	
	2m SW LC/SC FC Cable Kit	221691-B21
	5m SW LC/SC FC Cable Kit	221691-B22
	15m SW LC/SC FC Cable Kit	221691-B23
	2m SW LC/LC FC Cable Kit	221692-B21
	5m SW LC/LC FC Cable Kit	221692-B22
15m SW LC/LC FC Cable Kit	221692-B23	

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Rack Cabinets	10622 (22U) Universal Rack Cabinet - Shock Pallet	AF022A
	10636 (36U) Universal Rack Cabinet - Shock Pallet	AF012A
	10636 (36U) Universal Rack Cabinet with extension - Shock Pallet	AF014A
	10642 (42U) Universal Rack Cabinet - Shock Pallet	AF002A
	10642 (42U) Universal Rack Cabinet with extension - Shock Pallet	AF004A
	<b>NOTE:</b> The MSL4048 Tape Library is certified to ship in HP 10000 series racks which include a shock pallet. It is mandatory to use a shock pallet in order to ship racks with equipment installed.	
	5642 (42U) Rack Cabinet	358254-B21
	<b>NOTE:</b> this rack ships unassembled and boxed on a standard size pallet. It is an industry standard 19" wide rack with side panels and rear doors; it does not ship with the front door or casters.	
	<b>NOTE:</b> for additional HP ProLiant rack information, visit: <a href="http://h18004.www1.hp.com/products/servers/proliantstorage/racks/index.html">http://h18004.www1.hp.com/products/servers/proliantstorage/racks/index.html</a>	

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### Related Options

<b>Media</b>	HP LTO4 Ultrium 1.6TB RW Data Cartridge (1 pack)	C7974A
	HP LTO4 Ultrium 1.6TB WORM Data Cartridge (1 pack)	C7974W
	HP Ultrium 800GB RW Data Cartridge (1 pack)	C7973A
	HP Ultrium 800GB WORM Data Cartridge (1 pack)	C7973W
	HP Ultrium 400GB data cartridge (1 pack)	C7972A
	HP Ultrium Universal Cleaning Cartridge (1 pack)	C7978A
	HP LTO4 Ultrium RW Bar Code Labels (100 pack)	Q2009A
	HP LTO4 Ultrium WORM Bar Code Labels (100 pack)	Q2010A
	HP Ultrium 3 RW Bar Code Labels (100 pack)	Q2007A
	HP Ultrium 3 WORM Bar Code Labels (100 pack)	Q2008A
	HP Ultrium 2 Bar Code Labels (100 pack)	Q2002A
	<b>Non-Custom Labeled Data Cartridges</b>	
	<b>NOTE:</b> Non-Custom labels will come pre-labeled with a pre-determined number sequence.	
	HP LTO4 Ultrium 1.6TB RW Non-Custom Labeled Data Cartridge (20 pack)	C7974AN
	HP Ultrium 800GB RW Non-Custom Labeled Data Cartridge (20 pack)	C7973AN
	HP Ultrium 400GB Non-Custom Labeled Data Cartridge (20 pack)	C7972AN
	HP Ultrium 200GB Non-Custom Labeled Data Cartridge (20 pack)	C7971AN
	<b>Custom Labeled Data Cartridges</b>	
	<b>NOTE:</b> Custom labeled products allow customers to customize a specific sequence printed on each label.	
	HP LTO4 Ultrium 1.6TB RW Custom Labeled Data Cartridge (20 pack)	C7974AL
	HP LTO4 Ultrium 1.6TB WORM Custom Labeled Data Cartridge (20 pack)	C7974WL
	HP Ultrium 800GB RW Custom Labeled Data Cartridge (20 pack)	C7973AL
	HP Ultrium 800GB WORM Custom Labeled Data Cartridge (20 pack)	C7973WL
	HP Ultrium 400GB Custom Labeled Data Cartridge (20 pack)	C7972AL
	HP Ultrium 200GB Custom Labeled Data Cartridge (20 pack)	C7971AL
	<b>Storage Media Kits</b>	
	<b>NOTE:</b> Kit includes 20 data cartridges, one cleaning cartridge, 20 colored labels, a protective carrying case that can be used to securely store or transport data cartridges, one copy of "The Essentials of Successful Tape Backup," and one copy of HP StorageWorks Data Protector Express Evaluation Software (60 day free trial).	
	HP Ultrium 800GB Storage Media Kit	C8017A
	HP Ultrium 400GB Storage Media Kit	C8014A
	HP Ultrium 200GB Storage Media Kit	C8013A

### Related Options

#### HP Care Pack Options

#### Same Day Response

Warranty upgrade to 1-year, 13x5, 4 hour response/onsite, electronic	UD830E
Warranty upgrade to 1-year, 24x7, 4 hour response/onsite, electronic	UD831E
Warranty upgrade to 1-year, 24x7, call-to-repair, 6 hour response/onsite, electronic	UD832E
Warranty upgrade to 3-year, 13x5, 4 hour response/onsite, electronic	UD834E
Warranty upgrade to 3-year, 24x7, 4 hour response/onsite, electronic	UD835E
Warranty upgrade to 3-year, 24x7, call-to-repair, 6 hour response/onsite, electronic	UE307E
Warranty upgrade to 4-Year, 13x5, 4 hour response/onsite, electronic	UD837E
Warranty upgrade to 4-Year, 24x7, 4 hour response/onsite, electronic	UD838E
Warranty upgrade to 5-year, 13x5, 4 hour response/onsite, electronic	UD839E
Warranty upgrade to 5-year, 24x7, 4 hour response/onsite, electronic	UD840E
Warranty upgrade to 1-year, 13x5, 4 hour response/onsite, electronic	UD830E
Warranty upgrade to 1-year, 24x7, 4 hour response/onsite, electronic	UD831E
Warranty upgrade to 1-year, 24x7, call-to-repair, 6 hour response/onsite, electronic	UD832E

#### Next Business Day Response

Warranty upgrade to 3-year next business day/parts exchange, electronic	UE286E
Warranty upgrade to 3-year next business day/onsite, electronic	UD833E

#### Hardware Services

Installation services, electronic	U4823E
SAN installation & startup service, electronic	UA871E

**NOTE:** In order to maximize ROI and product uptime, and minimize the cost of ownership, Hewlett-Packard recommends the 3-year, 24 x 7 service options. These offerings will ensure that any product issue can be tackled when they occur (most back up issues will occur outside standard business hours) and that the service coverage regarding period, covers the minimum expected life of the host system.

### Technical Specifications

		MSL4048 LTO-4 Ultrium 1840	MSL4048 LTO-4 Ultrium 1760	MSL4048 LTO-3 Ultrium 960	MSL4048 LTO-3 Ultrium 920
<b>Drive Technology</b>		LTO-4 Ultrium 1840	LTO-4 Ultrium 1760	LTO-3 Ultrium 960	LTO-3 Ultrium 920
<b>Number of Drives</b>		1 or 2	2 to 4	1 or 2	1 to 4
<b>Number of Slots</b>		48	48	48	48
<b>Drive Interface</b>		4Gb Native Fibre Channel Ultra320 LVD SCSI	Ultra320 LVD SCSI 3Gb/sec SAS	4Gb Native Fibre Channel Ultra320 LVD SCSI	Ultra320 LVD SCSI 3Gb/sec SAS
<b>Capacity</b>	<b>Native</b>	38.4 TB	38.4 TB	19.2 TB	19.2 TB
	<b>Compressed (2:1)</b>	76.8 TB	76.8 TB	38.4 TB	38.4 TB
<b>Maximum Transfer Rate</b>	<b>Native</b>	432 GB/hr (one drive) 864 GB/hr (two drives)	576 GB/hr (two drives) 1.1 TB/hr (four drives)	288 GB/hr (one drive) 576 GB/hr (two drives)	216 GB/hr (one drive) 864 GB/hr (four drives)
	<b>Compressed (2:1)</b>	864 GB/hr (one drive) 1.7 TB/hr (two drives)	1.1 TB/hr (two drives) 2.3 TB/hr (four drives)	576 GB/hr (one drive) 1.1 TB/hr (two drives)	432 GB/hr (one drive) 1.7 TB/hr (four drives)
<b>Dimensions</b>		Out-of-Box (HxWxD)	6.9 x 18.9 x 31.7 in (17.5 x 48 x 80.6 cm)		
		Shipping (HxWxD)	13.7 x 23.2 x 38.9 in (34.8 x 58.9 x 98.7 cm)		
<b>Weight</b>		Out-of-Box	47.2 lbs (21.4 kg)		
		Shipping	74.7 lbs (33.9 kg)		
<b>Reliability</b>		MSBF (mean swaps between failures)	2 Million robot load/unload cycles		
		MTBF (mean time between failures)	100,000 hours (based on 1M MSBF)		
<b>Average Cartridge Swap Time</b>		45 seconds (drive to slot, slot to drive)			
<b>Initialization Time</b>		80 to 120 seconds			
<b>Inventory Time</b>		2:15 minutes (using bar code labeled cartridges)			
<b>Connectors</b>		Mini-SAS (located on back of MSL4048 SAS model only) 68-pin HDTS (located on back of MSL4048 SCSI models only) LC Optical Fibre (located on back of MSL4048 FC models only)  (1) RJ-45 (located on back of MS4048) (1) USB port (located on back of MSL4048)			
<b>Inventory Time</b>		4 minutes			
<b>LED Indicators (on front panel)</b>		Ready LED (Green): shows ready status information Clean LED (Amber): shows fault status information Attention LED (Amber): shows fault status information Error LED (Amber): shows fault status information			
<b>Management Interface</b>		10/100 Mbytes/second, auto-configuring interface. RJ-45 connection. Https configurable.			
<b>Power</b>		312 Watts (max)			
<b>Input Requirements</b>		100 to 240 VAC, 50 to 60 Hz, 2.0 Amperes			

### Technical Specifications

<b>Relative Humidity</b> (non-condensing)	Operating	20% to 80%
	Shipping	20% to 90%
<b>Temperature Range</b> (wet bulb)	Operating	50° to 95° F (10° to 35° C)
	Shipping	-22° to 140° F (-30° to 60° C)
	<b>NOTE:</b> Library operating temperature limits are based on the industry standard tape limit.	
<b>Altitude</b>	Operating	10,000 ft (3048 m)
	Shipping	35,000 ft (10,675 m)

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For tape drives and media, 1 GB = 1 billion bytes. Actual formatted capacity is less.