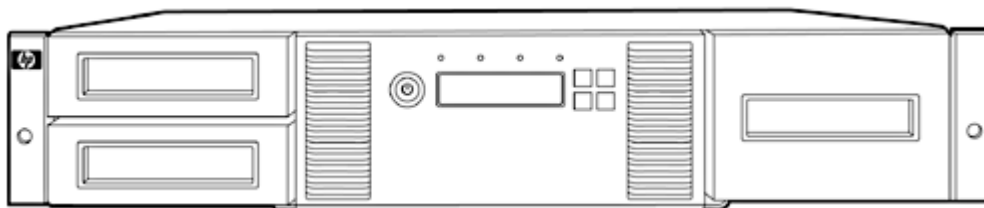# QuickSpecs

Overview

The HP StorageWorks MSL2024 Tape Library is the ideal entry-level tape library that provides tape library capacity and extensive features in the compact form of a tape autoloader. With compressed capacity (2:1) of up to 38.4 TB using, the MSL2024 can easily tackle backup and recovery jobs typically handled by mid-range tape libraries. Utilizing a 2U form factor, the MSL2024 provides a large amount of data storage without consuming a large amount of valuable rack space. The unique HP web-based management feature reduces the dependencies on local IT resources, allowing multiple sites to be supported centrally. The MSL2024 offers customers the choice of purchasing a library equipped with LTO Ultrium tape drives and either a SCSI, SAS or Fibre Channel interface. Each library includes two removable 12-slot magazines, and one user-configurable mail slot dedicated for import/export of data cartridges. A barcode reader is part of the standard configuration for facilitating media management.

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

- 38.4 TB of compressed storage capacity (2:1) in a 2U form factor
- HP unique web-based remote management functionality
- Integrated barcode reader
- Removable magazines with one user-configurable mail slot
- Upgradeable from one to two LTO-4 Ultrium 1760, LTO-3 Ultrium 920 or LTO-2 448 tape drives
- Multiple interface choices available (SCSI, SAS or FC)
- Easy-to-enable AES 256-bit embedded hardware encryption with compression
- Customer replaceable components
- Extensive OS and software compatibility testing
- Proven high reliability

Overview

Customer Benefits	• Provides an amazing amount of backup and recovery storage without consuming valuable rack space. • Allows a remote administrator to control, configure, monitor and troubleshoot the device, thus relieving the customer of requiring onsite IT resources. • Standard bar code reader provides faster inventory times and facilitates tracking of media. • Offers single cartridge or bulk loading of media, as well as providing for bulk storage of media off-site. • Upgrade the performance of the tape library through the addition of a second LTO-4 Ultrium 1760, LTO-3 Ultrium 920 or LTO-2 Ultrium 448 tape drive. • SCSI, SAS and FC interfaces provide options for installing the tape library into a SCSI, SAS or SAN environment. • LTO-4 Ultrium configurations provide 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. • Modular design of tape library allows for quick repair of unit to reduce product downtime. • Works with industry-leading servers, operating systems and backup software. • Provides reliable backups and automatically changes tapes with a robotics rating of 2 million Mean Swaps Between Failures (MSBF).

Family Comparison	MSL2024 LTO-4 Ultrium 1840 Tape Library	MSL2024 LTO-4 Ultrium 1760 Tape Library	MSL2024 LTO-3 Ultrium 960 Tape Library	MSL2024 LTO-3 Ultrium 920 Tape Library	MSL2024 LTO-2 Ultrium 448 Tape Library
Drive Technology	LTO-4 Ultrium 1840	LTO-4 Ultrium 1760	LTO-3 Ultrium 960	LTO-3 Ultrium 920	LTO-2 Ultrium 448
Number of Drives	1	1 or 2	1	1 or 2	1 or 2
Capacity (compressed 2:1)	38.4 TB	38.4 TB	19.2 TB	19.2 TB	9.6 TB
Maximum Data Transfer (compressed 2:1)	864 GB/hr	1.152 TB/hr (2 drives)	576 GB/hr	864 GB/hr (2 drives)	345.6 GB/hr (2 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	Ultra160 LVD SCSI

Product Highlights

Manageability	The MSL2024 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

Easy Installation	The MSL2024 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 and System/E racks.

Partitioning	The MSL2024 now includes the ability to be configured as a partitioned library. The MSL2024 may be configured as up to one partition per drive; two partitions if two 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 MSL2024.

Proven Reliability	With a rating of 2,000,000 robot load/unload cycles, the MSL2024 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.

Data Privacy	To greatly enhance data privacy, HP StorageWorks MSL2024 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 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).

Serviceability

Modular in construction, the MSL2024 Tape Library has easily replaceable components minimizing the Mean-Time-to-Repair on the unit. Replaceable components include the tape drive, the magazines, and the chassis (includes robotics, power supply, and controller board). HP StorageWorks Library and Tape Tools (L&TT) provides easy access to the MSL2024 error log, generates support tickets, and enables firmware downloads. L&TT can be downloaded for free at: http://www.hp.com/support/tapetools.

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.

Product Highlights

Data Rate Matching

Data Rate Matching combines sophisticated buffer management with The HP 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 three big advantages:

- It optimizes 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 LTO-2 Ultrium 448	10 to 24 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 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 LTO-4 Ultrium and LTO-3 Ultrium tape drives feature the ability to archive and store data in a non-rewriteable format that meets the most stringent regulatory guidelines. Using a combination of integrated fail-safe features in the drive firmware, cartridge memory, and tape formatting, 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 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 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 to the tape drive.

Product Highlights

HP StorageWorks Library and Tape Tools	The MSL2024 Tape Library is supported on the HP 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.
HP Storage Media	HP recommends that you use HP-branded cartridges in the MSL2024 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. |
| 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

The HP extensive compatibility testing program assures that your HP StorageWorks MSL2024 Tape Library works with leading servers, operating systems, and backup applications - and not just those sold by HP. The MSL2024 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 MSL2024, check the HP StorageWorks Enterprise Backup Solution compatibility matrix at: http://www.hp.com/go/ebs.

Server Compatibility	The MSL2024 is supported on a wide range of HP systems. For details of which MSL2024 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.
OS Support	Reference the EBS compatibility matrix for the most up-to-date OS compatibility information at: http://www.hp.com/go/ebs.
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

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

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

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/.

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/

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

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

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 MSL2024 Tape Library comes standard as a one or two drive, 24-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 MSL2024 1 LTO-4 Ultrium 1840 FC Tape Library	AJ034A
MSL2024 Tape Library	HP MSL2024 1 LTO-4 Ultrium 1840 SCSI Tape Library	AJ033A
	HP MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library	AK378A
	HP MSL2024 1 LTO-4 Ultrium 1760 SCSI Tape Library	AJ817A
	HP MSL2024 1 LTO-3 Ultrium 960 FC Tape Library	AG326B
	HP MLS2024 1 LTO-3 Ultrium 960 SCSI Tape Library	AG115A
	HP MSL2024 1 LTO-3 Ultrium 920 SAS Tape Library	AH559A
	HP MSL2024 1 LTO-3 Ultrium 920 SCSI Tape Library	AH169A
	HP MSL2024 2 LTO-3 Ultrium 920 SCSI Tape Library	AH170A
	HP MSL2024 1 LTO-2 Ultrium 448 SCSI Tape Library	AG116A
	HP MSL2024 0-drive, 24 Slot Tape Library	AK379A

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 tape drive
  - One .5M LVD HDTS to LVD HDTS daisy chain cable (2 drive LTO-2 Ultrium 448 configuration only)
  - 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

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

Step 2 – Required Options

Select each required option with quantities specified:

Power Cord	Description	Quantity	Part Number
	Power Cord, US, C13, 10A, 1.83m	1 each	AF556A
	NOTE: This cord ships standard with each MSL2024 Tape Library; can be used to connect the rack-mounted device to PDUs with NEMA 5-15R receptacles.		
	PDU Power Cord, C13/C14, 10A, 2.5m	1 each	142257-002
	NOTE: This cord ships standard with each MSL2024 Tape Library; can be used to connect the rack-mounted device to PDUs with IEC-320 receptacles.		
	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
	Power Cord, India, C13, 10A, 2.0m	1 each	AF562A

NOTE: One power cord is required; please select the correct power cord for your geographical location.

WARNING: 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

Factory Racking	Factory integrate the MSL2024 Tape Library with other HP products such as HP ProLiant Servers. NOTE: #0D1 will appear after the MSL2024 Tape Library part number on the sales order if HP factory integration is indicated.	#0D1

Tape Drives	HP MSL2024/4048 LTO-2 Ultrium 448 SCSI Drive Upgrade Kit NOTE: For use with the MSL2024 LTO-2 Ultrium 448 Drive Library; maximum of two LTO-2 Ultrium 448 SCSI drives per MSL2024 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.	AG118A
	HP MSL2024/4048 LTO-3 Ultrium 920 SCSI Drive Upgrade Kit NOTE: For use with the MSL2024 LTO-3 Ultrium 920 Drive Library; maximum of two LTO-3 Ultrium 920 SCSI drives per MSL2024 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.	AH173A
	HP MSL2024/4048/8096 LTO-3 Ultrium 920 SAS Drive Upgrade Kit NOTE: For use with the MSL2024 LTO-3 Ultrium 920 SAS Drive Library; maximum of two LTO-3 Ultrium 920 SAS drives per MSL2024 Tape Library. Drive kit includes a tape drive and documentation.	AH562A
	HP MSL2024/4048/8096 LTO-3 Ultrium 960 SCSI Drive Upgrade Kit NOTE: For use with the MSL2024 Tape Library to upgrade to LTO-3 Ultrium 960 SCSI tape technology; maximum of one LTO-3 Ultrium 960 SCSI drive per MSL2024 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.	AG327A
	HP MSL2024/4048/8096 LTO-3 Ultrium 960 4Gb FC Drive Upgrade Kit NOTE: For use with the MSL2024 Tape Library to upgrade to LTO-3 Ultrium 960 4Gb FC tape technology; maximum of one LTO-3 Ultrium 960 4Gb FC drive per MSL2024 Tape Library. Drive kit includes a tape drive and documentation.	AG328B
	HP MSL2024/4048 LTO-4 Ultrium 1760 SCSI Drive Upgrade Kit NOTE: For use with the MSL2024 Tape Library to upgrade to LTO-4 Ultrium 1760 tape technology; maximum of two LTO-4 Ultrium 1760 SCSI drives per MSL2024 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.	AJ819A
	HP MSL2024/4048/8096 LTO-4 Ultrium 1760 SAS Drive Upgrade Kit NOTE: For use with the MSL2024 Tape Library to upgrade to LTO-4 Ultrium 1760 tape technology; maximum of two LTO-4 Ultrium 1760 SAS drives per MSL2024 Tape Library. Drive kit includes a tape drive and documentation.	AK383A
	HP MSL2024/4048/8096 LTO-4 Ultrium 1840 SCSI Drive Upgrade Kit NOTE: For use with the MSL2024 Tape Library to upgrade to LTO-4 Ultrium 1840 tape technology; maximum of one LTO-4 Ultrium 1840 drive per MSL2024 Tape Library. Drive kit includes a tape drive, SCSI cable, SCSI terminator, and documentation.	AJ041A
	HP MSL2024/4048/8096 LTO-4 Ultrium 1840 4Gb FC Drive Upgrade Kit NOTE: For use with the MSL2024 Tape Library to upgrade to LTO-4 Ultrium 1840 4Gb FC tape technology; maximum of one LTO-4 Ultrium 1840 4Gb FC drive per MSL2024 Tape Library. Drive kit includes a tape drive and documentation.	AJ042A

Related Options

Magazine Kits	HP MSL2024 Ultrium Left Magazine Kit	AG119A
	NOTE: For use only on the left side of the MSL2024; additional 12-slot magazine which includes an import/export slot.	
	HP MSL2024/4048/8096 Ultrium Right Magazine Kit	AG120A
	NOTE: For use only on the right side of the MSL2024; additional 12-slot magazine.	
Rack-to-Tabletop Conversion Kit	HP MSL2024 Rack-to-Tabletop Conversion Kit	AG121A
	NOTE: For use in converting the rack-ready MSL2024 Tape Library into a tabletop model.	
Fibre Connectivity	HP N1200-320 4Gb Network Storage Router	AG314A
	NOTE: For use in connecting a MSL2024 SCSI Tape Library to a SAN; reference the EBS compatibility matrix for the most up-to-date configuration information at: http://www.hp.com/go/ebs.	
Encryption	HP 1/8 G2 & MSL Tape Library LTO-4 Encryption Kit	AM495A
	NOTE: 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.	
Host Bus Adapters	HP SC44Ge Host Bus Adapter	416096-B21
	NOTE: Serial-attached SCSI (SAS) HBA that enables HP StorageWorks MSL Tape Libraries to connect with HP ProLiant servers.	
	HP U320e SCSI Host Bus Adapter	AH627A
	NOTE: 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: http://www.hp.com/go/ebs.	
Cable Kits	6 ft VHDCI/HDTS68 SCSI Cable Kit	341176-B21
	12 ft VHDCI/HDTS68 SCSI Cable Kit	341177-B21
	0.5m HDTS68/HDTS68 Daisy Chain Cable Kit	C2978B
	NOTE: This cable ships standard with every MSL2024 2 drive LTO-2 Ultrium 448 configuration.	
	2m External Infiniband (SFF8470) to 4 Mini SAS (SFF8088) 1x SAS Cable Kit	AH587A
	NOTE: One cable is required for every four drives.	
	2m External Mini-SAS to 4x1 Mini-SAS Cable Kit	AN975A
	NOTE: One cable is required for every four drives.	
	4m External Mini-SAS to 4x1 Mini-SAS Cable Kit	AN976A
	NOTE: 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

Related Options

5m SW LC/LC FC Cable Kit	221692-B22
15m SW LC/LC FC Cable Kit	221692-B23

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

NOTE: The MSL2024 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

NOTE: 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.

NOTE: For additional HP ProLiant rack information, visit:
http://h18004.www1.hp.com/products/servers/proliantstorage/racks/index.html

Media		
	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 200GB Data Cartridge (1 pack)	C7971A
	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
	HP Ultrium 1 Bar Code Labels (100 pack)	Q2001A

Non-Custom Labeled Data Cartridges
NOTE: 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

Custom Labeled Data Cartridges
NOTE: 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

Related Options

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

Storage Media Kits
NOTE: 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

HP Care Pack Options

Same Day Response

Warranty upgrade to 1-year, 13x5, 4 hour response/onsite, electronic	UE290E
Warranty upgrade to 1-year, 24x7, 4 hour response/onsite, electronic	UE291E
Warranty upgrade to 1-year, 24x7, call-to-repair, 6 hour response/onsite, electronic	UE292E
Warranty upgrade to 3-year, 13x5, 4 hour response/onsite, electronic	UE295E
Warranty upgrade to 3-year, 24x7, 4 hour response/onsite, electronic	UE296E
Warranty upgrade to 3-year, 24x7, call-to-repair, 6 hour response/onsite, electronic	UE308E
Warranty upgrade to 4-year, 13x5, 4 hour response/onsite, electronic	UE298E
Warranty upgrade to 4-year, 24x7, 4 hour response/onsite, electronic	UE299E
Warranty upgrade to 5-year, 13x5, 4 hour response/onsite, electronic	UE300E
Warranty upgrade to 5-year, 24x7, 4 hour response/onsite, electronic	UE301E

Next Business Day Response

Warranty upgrade to 1-year next business day/onsite, electronic	UE289E
Warranty upgrade to 3-year next business day/parts exchange, electronic	UE293E
Warranty upgrade to 3-year next business day/onsite, electronic	UE294E

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

	MSL2024 LTO-4 Ultrium 1840	MSL2024 LTO-4 Ultrium 1760	MSL2024 LTO-3 Ultrium 960	MSL2024 LTO-3 Ultrium 920	MSL2024 LTO-2 Ultrium 448
Drive Technology	LTO-4 Ultrium 1840	LTO-4 Ultrium 1760	LTO-3 Ultrium 960	LTO-3 Ultrium 920	LTO-2 Ultrium 448
Number of Drives	1	1 or 2	1	1 or 2	1 or 2
Number of Slots	24	24	24	24	24
Drive Interface	4Gb Native Fibre Channel Ultra320 LVD SCSI	3Gb/sec SAS Ultra320 LVD SCSI	4Gb Native Fibre Channel Ultra320 LVD SCSI	3Gb/sec SAS Ultra320 LVD SCSI	Ultra160 LVD SCSI
Capacity — Native	19.2 TB	19.2 TB	9.6 TB	9.6 TB	4.8 TB
Capacity — Compressed (2:1)	38.4 TB	38.4 TB	19.2 TB	19.2 TB	9.6 TB
Maximum Transfer Rate — Native	432 GB/hr	288 GB/hr (1 drive) 576 GB/hr (2 drives)	288 GB/hr	216 GB/hr (1 drive) 432 GB/hr (2 drives)	86.4 GB/hr (1 drive) 172.8 GB/hr (2 drives)
Maximum Transfer Rate — Compressed (2:1)	864 GB/hr	576 GB/hr (1 drive) 1.152 TB/hr (2 drives)	576 GB/hr	432 GB/hr (1 drive) 864 GB/hr (2 drives)	172.8 GB/hr (1 drive) 345.6 GB/hr (2 drives)

Dimensions	Out-of-Box (HxWxD)	3.4 x 18.9 x 31.7 in (8.7 x 48 x 80.6 cm)
	Shipping (HxWxD)	10.7 x 23.2 x 38.9 in (27.1 x 58.9 x 98.7 cm)
Weight	Out-of-Box	32.9 lb (14.9 kg)
	Shipping	56.9 lb (25.8 kg)
Reliability	MSBF (mean swaps between failures)	2 Million robot load/unload cycles
	MTBF (mean time between failures)	100,000 hours (based on 1M MSBF)
Cartridge Swap Time	45 sec (drive to slot, slot to drive)	
Initialization Time	65 to 80 seconds	
Inventory Time	1:20 minutes (using bar code labeled cartridges)	
Connectors	Mini-SAS (located on back of MSL2024 SAS models only) 68-pin HDTS (located on back of MSL2024 SCSI models only) LC Optical Fibre (located on back of MSL2024 FC model only) (1) RJ-45 (located on back of MSL2024) (1) USB port (located on back of MSL2024)	
LED Indicators (on front panel)	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	
Management Interface	10/100 Mbytes/second, auto-configuring interface. RJ-45 connection. Https configurable.	
Power	168 Watts (max)	
Input Requirements	100 to 240 VAC, 50 to 60 Hz, 1.3 to 0.7 Amperes	

Technical Specifications

Relative Humidity (non-condensing)	Operating	20% to 80%
	Shipping	20% to 90%
Temperature Range (wet bulb)	Operating	50° to 95° F (10° to 35° C)
	Shipping	-22° to 140° F (-30° to 60° C)
	NOTE: Library operating temperature limits are based on the industry standard tape limit.	
Altitude	Operating	15,000 ft (4,575 m)
	Shipping	35,000 ft (10,675 m)

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