Overview
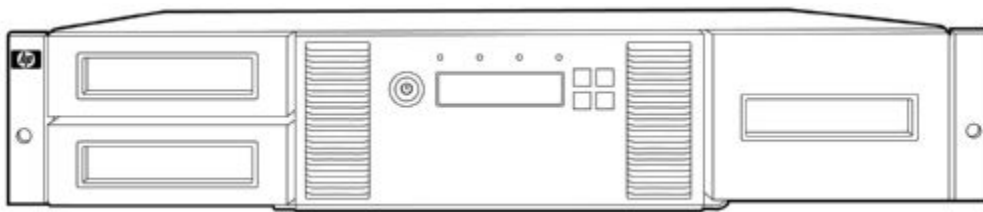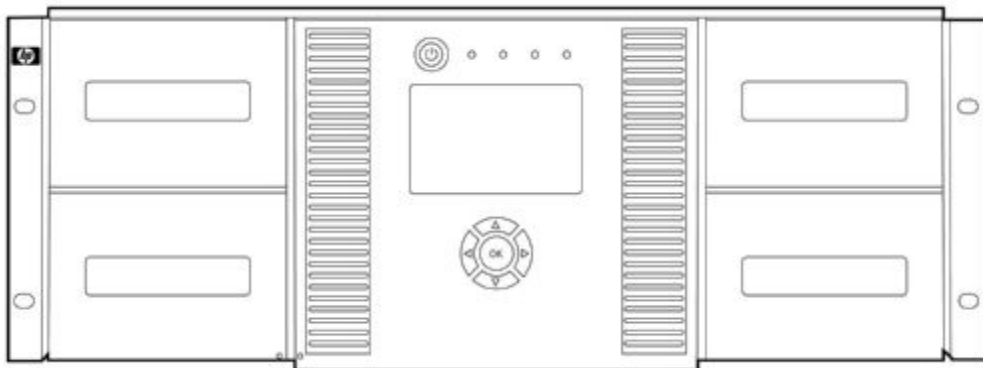
The HP StorageWorks MSL Tape Libraries meet demanding storage requirement of businesses needing unattended backup, disaster recovery, or archive capability. The MSL Libraries offer a broad choice of storage capacity and interfaces with LTO-5, LTO-4, or LTO-3 Ultrium tape drives. Web-based remote management makes the MSL Libraries easily managed from across the room or across the globe, eliminating the need for remote office IT staff. Quickly and simply manage the tape media both in and out of the library with the standard bar code reader, configurable mail slots, and multiple 12-slot removable magazines. If a tape were lost or stolen, protect important business data from unauthorized access with the library-based encryption option. Library investment and uncertain data growth are easily managed with MSL accessory kits. Quickly increase capacity and/or performance with tool-free drive upgrades, slot license capacity upgrades, or library expandability. Now with TapeAssure to monitor drive and media utilization, monitor operational performance, report life and health information as well as provide notifications of drive and tape parameters that fall below HP recommended standards
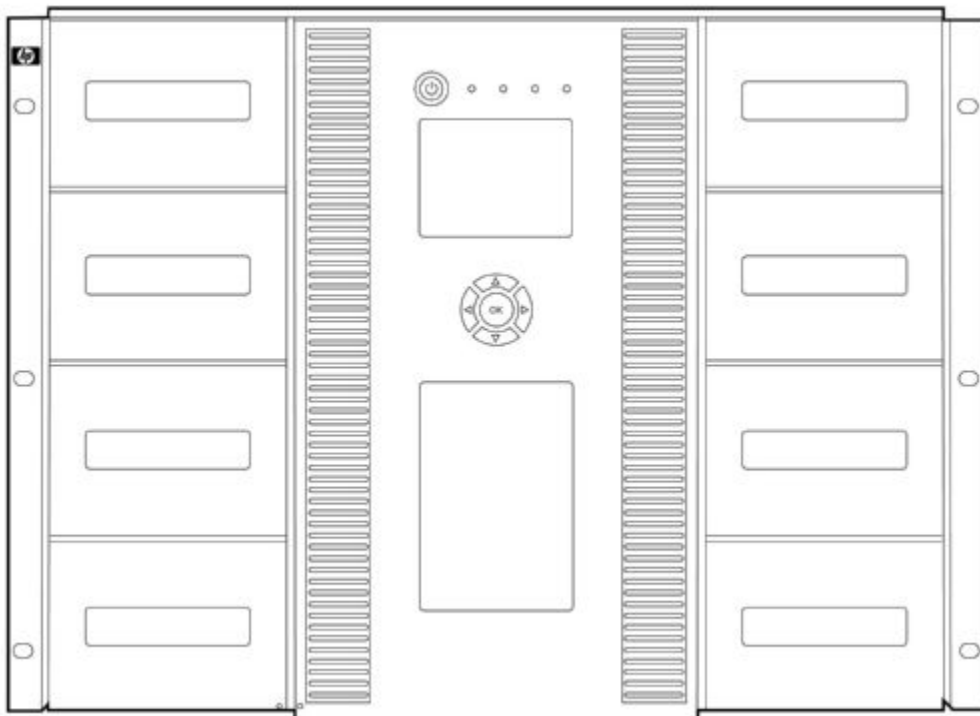

HP StorageWorks MSL2024 Tape Library

HP StorageWorks MSL4048 Tape Library

Overview

HP StorageWorks MSL8048/8096 Tape Library

What's New

- LTO-5 Ultrium 3000 SAS tape drives are now available in the MSL tape library family.

Key Features

- Exceptional storage density from 4.8 TB (2024) up to 288 TB of compressed capacity (2:1) in 8096
- Achieve up to 432 TB of storage capacity with the MSL Library Extender Kit
- Easy-to-use web-based remote management
- Integrated bar code reader
- Tool-free tape drive upgrades
- Customer upgradeable redundant power supply in the MSL 4048, 8048, or 8096 libraries.
- Multiple interface choices available (SCSI, SAS or FC)
- Removable magazines with user-configurable mail slots
- Easy-to-enable AES 256-bit embedded hardware encryption with compression
- Extensive OS and software compatibilitytesting
- Proven high reliability
- Proactive drive and media health and operational performance reporting with TapeAssure.

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.
- Choose from a broad range of HP LTO Ultrium Tape Drives including LTO-5 Ultrium 3280, LTO-5 Ultrium 3000, LTO-4 Ultrium 1840, LTO-4 Ultrium 1760, LTO-3 Ultrium 960, LTO-3 Ultrium 920, or LTO-2 Ultrium 448 Tape Drives. As your data protection needs change or increase, you can increase capacity and/or performance easily with tool-free drive upgrades.
- Achieve the highest level of encryption security to secure confidential business information while meeting compliance guidelines with the HP StorageWorks 1/8 G2 & MSL Encryption Kit.
- Proactively monitor utilization, operational performance, and overall life and health of the drives and media with TapeAssure.
- Leverage library investment to upgrade to higher performance and capacity points using the MSL Library Extender.
- Grow library capacity without adding additional hardware with the MSL8048 slot license upgrade option. Quick, easy, and affordable capacity growth.
- With the addition of the redundant power supply option achieve, even higher system reliability and up-time.
- SAS, FC and SCSI interfaces provide options for installing the tape library into any environment.
- For dedicated import/export of media cartridges, each library includes user-configurable mail slots. The library also includes removable magazines for bulk loading of media. The magazines can also be used for convenient bulk storage of media off-site.
- Easily manage your media with standard bar code reader and removable magazines.
- Works with industry-leading servers, operating systems and backup software. (http://www.hp.com/go/ebs)

Family Comparison	MSL2024	MSL4048	MSL8048/8096
Drive Technology	LTO-5 Ultrium 3280 LTO-5 Ultrium 3000 LTO-4 Ultrium 1840 LTO-4 Ultrium 1760 LTO-3 Ultrium 960 LTO-3 Ultrium 920 LTO-2 Ultrium 448	LTO-5 Ultrium 3280 LTO-5 Ultrium 3000 LTO-4 Ultrium 1840 LTO-4 Ultrium 1760 LTO-3 Ultrium 960 LTO-3 Ultrium 920	LTO-5 Ultrium 3280 LTO-5 Ultrium 3000 LTO-4 Ultrium 1840 LTO-4 Ultrium 1760 LTO-3 Ultrium 960
Number of Drives	1-2	1-4	1 to 4
Maximum Capacity (2:1 compression)	72 TB (LTO-5) 38.4 TB (LTO-4) 19.2 TB (LTO-3) 9.6 TB (LTO-2)	144 TB (LTO-5) 76.8 TB (LTO-4) 38.4 TB (LTO-3)	288 TB (LTO-5) 153.6 TB (LTO-4) 76.8 TB (LTO-3)
Maximum Data Transfer (2:1 compression)	1.0 TB/hr (LTO-5/one 3280 or 3000) 2.0 TB/hr (two LTO-5 3000) 864 GB/hr (LTO-4/one 1840) 1.15 TB/hr (LTO-4/two 1760) 576 GB/hr (LTO-3/one 960) 864 GB/hr (LTO-3/two 920) 345.6 GB/hr (LTO-2/two 448)	2.0 TB/hr (LTO-5/two 3280 or 3000) 4.0 TB/hr (four LTO-5 3000) 1.7 TB/hr (LTO-4/two1840) 2.3 TB/hr (LTO-4/four1760) 1.1 TB/hr (LTO-3/two 960) 1.7 TB/hr (LTO-3/four 920)	4.0 TB/hr (LTO-5/four 3280 or 3000) 3.4 TB/hr (LTO-4/four 1840) 2.3 TB/hr (LTO-3/four 960)
Drive Interface	8 Gb Native Fibre Channel 4 Gb Native Fibre Channel 6 Gb/sec SAS 3 Gb/sec SAS Ultra320 LVD SCSI	8 Gb Native Fibre Channel 4 Gb Native Fibre Channel 6 Gb/sec SAS 3 Gb/sec SAS Ultra320 LVD SCSI	8 Gb Native Fibre Channel 4 Gb Native Fibre Channel 6 Gb/sec SAS 3 Gb/sec SAS Ultra320 LVD SCSI

Product Highlights

Manageability

The MSL Tape Libraries come with web-based remote manageability so they can be easily 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 communication
- Partitioning and Encryption management
- HTTPS capable
- IPv6 and IPv4 network protocol support

TapeAssure

HP StorageWorks TapeAssure makes managing, optimizing and archiving on the HP MSL 2024, 4040, 8048 or 8096 libraries faster and easier. TapeAssure provides comprehensive summaries and detailed information about the status, performance, utilization, and health of all tape drives and tapes for HP MSL libraries. TapeAssure utilization and performance reporting features allow you to optimize the use of your existing HP MSL tape libraries to make informed purchasing decisions if an increase in capacity is needed. With TapeAssure data you can:

- Modify backup schedules to make best use of the drives and tapes available and evenly distribute their workload
- Predict and prevent failures through early warnings and recommended service actions
- Determine if each drive and each tape is experiencing a high (or low) rate of usage
- Know when to retire tapes
- Find out the compression ratios actually achieved

TapeAssure health reports and alerts give you peace of mind knowing the condition of the drives, the tapes and the data on each tape. TapeAssure monitors every backup to ensure the highest standards of reliability, sends alerts when these standards are not met, and ensures that you can maintain the drives and tapes used in an archive environment to have the highest integrity.

TapeAssure builds a database of drive and tape history information that you can export as .CSV (comma-separated-value) files and import into Excel or other tools to create pivot-charts, pie charts and bar charts for graphical presentation or further analysis. This data can be automatically exported on a schedule or on demand and written to a local or network drive where analysis scripts can also be run.

TapeAssure real time alerts notify instantly if drive and data quality standards are not being achieved:

- In-depth analysis pinpoints if drive, tape or data characteristics fall below HP backup and archiving standards
- View alerts and statistics is real-time in the Command View TL GUI

NOTE: an alert does not imply that a failure has occurred as HP backup and archiving standards are very high. This allows you to treat many of the alerts as predictive and to follow up on the recommended service actions at a time that is least disruptive.

Product Highlights

Easy Installation

The MSL Tape Libraries are 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.

Partitioning

The MSL Tape Libraries now include the ability to be configured as a partitioned library. Most MSL Libraries 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 MSL library.
NOTE: The MSL 8048 can only be partitioned into a maximum of two partitions, while the MSL8096 can be partitioned into four partitions.

Proven Reliability

With a rating of 2,000,000 robot load/unload cycles, the MSL Tape Libraries 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 Encryption

The HP StorageWorks 1/8 G2 & MSL Encryption Kit provides a library-enabled encryption solution providing data privacy, confidentiality, and integrity of your critical business data while supporting compliance requirements. The HP StorageWorks 1/8 G2 & MSL Encryption Kit is an easy and affordable library-enabled encryption 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. One USB key server token is installed in the USB port of the library to enable encryption. The token must remain in the tape library or tape autoloader while encryption is enabled. The USB key server token generates and stores keys for the LTO-5 or LTO-4 Ultrium drives. 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. A second USB key server token is provided in the kit to be used as a backup token which can be stored in a secure location. The keys are transferred securely token-to-token for backup or export, with no exposure to insecure PCs, servers, or networks. An option is also provided to save the token contents to a secure file. You may now also save the most recently added keys on the token to a file to enable you to seed new tokens with keys from other tokens. 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 Encryption Kit, users can enable or disable encryption, configure and manage the USB key server tokens, restore encrypted data, as well as a variety of other tasks. In addition, the LTO-5 and LTO-4 Ultrium 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-5 and LTO-4 Ultrium Tape Drives are designed to be compliant with the emerging standard for tape media security (IEEE 1619.1).

Product Highlights

Slot license upgrade

Leverage the MSL8048 library investment to address both current and future data requirements with the MSL 48 to 96 slot license upgrade option. Using all the same features of the MSL8096, the MSL8048 will ship with 96 slots physically installed but only 48 are usable, until you decide yo need more. As your data grows, simply enable the remaining 48 slots with a slot license upgrade.

The MSL8048 will ship with the four left 12-slot magazines enabled and ready for use, including 3 mail slots. Once additional slots are needed, the library will need the MSL 48 to 96 slot license upgrade (product # TA739A) to quickly and easily double capacity from 48 to 96 slots. The slot license upgrade entitlement certificate will direct you to the HP Webware site for access to your license key. Insert the license key into the library GUI interface and the remaining four right 12-slot magazines, with additional mail slot capability, will now be enabled for use. No reconfiguring a rack or installing new hardware. In addition, once all 96 slots have been enabled, additional capacity and performance can be added using the MSL Library Extender. The HP MSL8048 makes capacity growth easy, quick, and affordable.

Library Extender

Leverage the investment in your MSL Library, now or in the future, to increase both capacity and performance as data needs change. The HP StorageWorks MSL Library Extender Kit can be used to connect two MSL libraries to create one larger, logical library. The stacked libraries appear to the host as a single library. The Extender Kit can be used with MSL2024, 4048, or 8096 libraries and is compatible with both new and currently installed libraries. The Extender Kit is customer installable in under 60 minutes.

The Library Extender occupies the lowest half-height drive bay in the top library and the upper half-height drive bay of the lower library. No additional external power or communication cabling is necessary. The upper Library (MSL4048 or MSL8096) controls the extended library. Any drive in the extended library may host the library interface. Only the operator control panel (OCP), USB port, and Ethernet connection of the upper library are used in the extended mode.

The Library Extender Kit does not support combining two MSL2024 or two MSL8096 libraries. The Extended Library will not support partitioning.

Possible configurations include:

Extended Library Configurations		Slot Numbers (without mail slots enabled)	
Lower Library	Master Library	Lower Library	Master Library
MSL2024	MSL4048	1-24	25-72
MSL4048	MSL4048	1-48	49-96
MSL2024	MSL8096*	1-24	25-120
MSL4048	MSL8096*	1-48	49-144

*In configurations with an 8U library, the 8U must always be the top library
NOTE: An MSL8048 must have all 96 slots enabled before using the Library Extender. Once all 96 slots are usable, configurations are the same as the MSL8096.

Serviceability

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

Product Highlights

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.

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-5 Ultrium 3280/3000	47 to 140 MB/s
HP LTO-4 Ultrium 1840	40 to 120 MB/s
HP LTO-4 Ultrium 1760	35 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-5, 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-5, LTO-4 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 up to 3.0 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

Product Highlights

NOTE: While all HP LTO-5, LTO-4, and LTO-3 Ultrium tape drives support LTO Ultrium WORM media, some LTO Ultrium tape drives from other manufacturers may not include read and write support for LTO Ultrium WORM media. For non-HP 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.

Software in the Box

The MSL2024 and MSL4048 include HP Data Protector Express Single Server Edition backup and recovery software. HP Data Protector Express Single Server Edition is based on HP Data Protector Express and is only available with HP StorageWorks tape drives, tape autoloaders and MSL2024 and MSL4048 tape libraries. It includes many of the features of HP Data Protector Express, such as support for HP LTO-5 and LTO-4 Ultrium data encryption. Using Data Protector Express Single Server Edition you can easily backup a single Windows, Linux or NetWare server to a single drive MSL tape library. You can also, at no risk, evaluate, Data Protector Express as a solution for protecting multiple servers by backup to a multi-drive MSL tape library.

As well as Data Protector Express Single Server Edition, the HP StorageWorks MSL tape library solutions also include the Data Protector Express Bare Metal Disaster Recovery option. This enables DR support for the protected server in the event of a disk failure or other serious incident.

Once registered, Data Protector Express Single Server Edition and the Data Protector Express Bare Metal Disaster Recovery option are licensed for permanent use. This is not trialware. However, should you decide to upgrade from Data Protector Express Single Server Edition to Data Protector Express you can purchase Data Protector Express at a significant discount to the regular buy price. This is made possible by a special part number, only available for registered users of Data Protector Express Single Server Edition. Upgrading to Data Protector Express allows network backup of servers and Windows desktops, enables unlimited disk-to-disk backup capacity and permits the additions of options for online backup of Microsoft Exchange and Microsoft SQL Server and other more advanced features. For more information about Data Protector Express Single Server Edition please visit:
http://www.hp.com/go/dataprotectorexpress/sse.

If the HP StorageWorks MSL Tape Library is to protect an environment with UNIX servers and/or enterprise class applications, such as Oracle or SAP, then HP Data Protector is the recommended backup and recovery software. For more information and evaluation software please visit: http://www.hp.com/go/dataprotector.

NOTE: HP Data Protector Express and HP Data Protector Express Single Server Edition are neither upgradable nor compatible with HP Data Protector and HP Data Protector, Single Server Edition.

Product Highlights

HP Data Protector software

HP Data Protector software automates high performance backup and recovery, from disk or tape, over unlimited distances, to enable 24x7 business continuity and improve IT resource utilization. Data Protector software responds to the pressure for lower IT costs and greater operational efficiency by offering acquisition and deployment costs which are 30 - 70 % less than competition. The license model is very simple and easy to understand, helping to reduce complexity. Extensive scalability and features for continuous backup and recovery operations enable growth with a single product. A superb solution, no other software can integrate better with the HP market-leading line of StorageWorks disk and tape family of products, as well as with other heterogeneous storage infrastructures. As an integral component of the fast-growing HP StorageWorks software portfolio, which includes storage resource management, archiving, replication, and device management software, Data Protector software also fully integrates with the HP management solutions, allowing managing data protection as an essential element of an overall IT service. This solution offers the unique advantage of being able to source hardware, software, and award winning service offerings from a single, trusted source.

Data Protector software simplifies the use of complex backup and recovery procedures with the fastest installation, automated routine tasks, and easy-to-use features. The centralized multi-site management easily allows implementing multi-site changes, adapting in real time to changing business requirements. Appropriate for medium and large companies in any industry, Data Protector software is the ideal solution to reduce IT costs and complexity while remaining reliable and scalable to grow from single server environments to the largest distributed enterprise infrastructures.

If you are using HP Data Protector software with your MSL8048 or MSL8096 tape library, a FREE 61-250 slot License-to-Use entitlement certificate is included in the box.

For further information, please visit our web page at: http://www.hp.com/go/dataprotector

HP StorageWorks Library and Tape Tools

The MSL Tape Libraries are 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.

HP Storage Media

HP recommends that you use HP-branded cartridges in the MSL Tape Libraries 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.

Product Highlights

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 MSL Tape Libraries work with leading servers, operating systems, and backup applications - and not just those sold by HP. The MSL libraries work 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 MSL tape libraries, check the HP StorageWorks Enterprise Backup Solution compatibility matrix at: http://www.hp.com/go/ebs.

Server Compatibility	The MSL Tape Library is supported on a wide range of HP systems. For details of which MSL Libraries work 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	MSL2024: The warranty for this product consists of 1-year parts exchange, next business day
	MSL4048: The warranty for this product consists of 1-year parts exchange, next business day
	MSL8048: The warranty for this product consists of 1-year onsite, next business day.
	MSL8096: The warranty for this product consists of 1-year onsite, next business day.

NOTE: The HP MSL Tape Libraries warranty includes support for Customer Self Repair (CSR). The tape library cartridges, terminators, external cables, drives, magazines, controller board and power supplies are mandatory customer self repair parts. This means both the removal and replacement of the above parts are designed for easy replacement; the on-site warranty does not extend to these parts. However, customers may request HP Services to replace these replaceable units (RUs) for an additional charge. Also, customers who purchase an HP Support Agreement have the option to perform CSR or receive onsite support.

Please refer to HP's Limited Warranty Statement for further details:
http://h18006.www1.hp.com/products/storageworks/warranty.html

For increased uptime, productivity and ROI -HP Care Pack packaged services for Storage

These days, you need to get the most out of your storage investment-you can't afford not to. When you buy HP storage products and solutions, it's also a good time to think about what levels of service and support you may need. To help take the worry out of deploying, designing, maintaining, and managing your environment, we've designed a portfolio of service options that are as: flexible, reliable and scalable as your storage. Unlike storage-only vendors, we take a holistic approach to your entire environment, bridging storage, servers, blades, software and network infrastructures with our HP Care Pack packaged services for Storage.

Protect your business beyond the warranty

When it comes to robustness and reliability, standard warranties on today's computing equipment have matured just as the technologies have matured. Good news on some fronts-but also a source of potential problems and subsequent consequences that come from depending on standard warranties alone. Standard warranty protects against product defects and some causes of downtime- but not the business. By using a standard approach to warranty uplifts, such as HP Care Pack Services, you can reduce downtime risks and be more certain of operational consistency for both mission-critical and standard business computing. Simply put, HP Care Pack Services normalize the warranty of combined products - helping you proactively guard against unplanned downtime.

Extending warranties with HP Care Pack Services

For cost-effective upgrading or extending your standard warranty, HP Care Pack Services offer a suite of standard reactive hardware and software support services that are sold separately, or combined as with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition, with HP Proactive Select we offer an innovative approach to service delivery that gives you the flexibility to acquire the specific proactive services you need today, then add services as your needs evolve. HP Proactive Select offers a broad set of technical or per-event type service options - including server, storage, and network, SAN device, and software, environment, installation and education services. Services that you can mix and match depending on your specific requirements, from preliminary planning and equipment delivery to installation, configuration, integration, and testing, through every level of ongoing support. Our HP Care Pack packaged services for Storage assures help when you need it most. And for many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

HP Storage Services: Offering reliability, flexibility and value-just like your storage

HP Storage Services offers a full spectrum of customer care, from technology support to complex migrations to complete completely managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education offers flexible, comprehensive training on storage networking, disk storage systems, and storage software to help your IT staff get the most out of your investments. And HP Financial solutions extend innovative financing and asset management programs to cost-effective buy, manage and eventually retire your older equipment.

Service and Support, HP Care Pack and Warranty Information

HP Storage Services, the trusted business technology experts who manage your technology in action, because when technology works, business works. http://www.hp.com/hps/storage

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at http://www.hp.com/go/lookuptool

Recommended Services	**3-Year HP Support Plus 24** For a higher return on your storage investment, HP Support Plus 24 provides integrated hardware and software support services designed specifically for your technology. Available 24x7, this 3-year combined reactive support option delivers onsite hardware support and over-the-phone software support around-the-clock. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- Improve uptime with responsive hardware and software services
- Enjoy consistent service coverage across geographically dispersed sites
- Update HP software at a predictable cost
- Increase customer satisfaction-with no interoperability gaps

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf

HP StorageWorks ESL, MSL Tape Libraries Installation and Startup
Deployment of your HP StorageWorks Midrange Storage Library (MSL) products in SAN environments, including the installation of a Fibre Channel Interface Controller.

- System installation and setup by an HP technical specialist
- Verification prior to installation that all service prerequisites are met
- Delivery of the service at a mutually scheduled convenient time
- Provides product installation according to the product specifications
- Offers deployment activities that are designed to bring the Fibre Channel-based tape library into operation
- Helps improve performance
- Makes the most of the value of the HP StorageWorks ESL, MSL, and EML libraries in an IT environment by leveraging HP knowledge in implementing Fibre Channel-based systems and solutions
- Helps reduce implementation-related disruptions in the IT environment
- Helps increase system reliability and provides more effective data management

http://h20195.www2.hp.com/v2/GetPDF.aspx/5981-7355EN.pdf

HP Backup and Recovery Solution Service
Rapid recovery from system downtime can hinge on the efficiency of your backup and recovery management environment - and on how well that environment is integrated with your storage infrastructure. But integration processes can be time-consuming and complex, and your IT resources are already stretched thin. Where can you find the expert help you need?

For fast, effective integration of your backup solution into an existing or new storage infrastructure, turn to the storage experts at HP Services. Our Backup and Recovery Solution Service (BRSS) provides end-to-end management of your backup integration process. The BRSS team works with you to analyze your business and IT environment; develop a comprehensive integration plan and timetable; design an architecture that suits your critical requirements; install backup software;

Service and Support, HP Care Pack and Warranty Information

implement your solution; and validate your configuration.

- By engaging HP to implement HP Data Protector, customers' IT staff can stay focused on their core tasks and priorities, resulting in less impact to your business
- Professional backup and recovery planning that aligns with customer's business needs and implementation that reduces project execution time and risk to the storage environment
- HP's expertise with backup and recovery helps ensure issues are avoided

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-7442EN.pdf

Optional Services	**5-Year HP Support Plus 24** As an alternative to our recommended support level, for customers who need to improve uptime with responsive 24x7 product support: HP Support Plus 24 helps you increase performance and availability with comprehensive, consistent hardware and software services. Working with your IT team, HP Services engineers deliver onsite hardware support and over-the-phone software support around-the-clock 365 days per year. Service coverage encompasses HP products and selected multivendor hardware and software. In addition, this convenient HP Care Pack packaged service makes software updates available to you at substantial savings. Choose Support Plus 24 when you need to:

- Improve uptime with responsive hardware and software services available anytime
- Cost-effectively obtain expert 24x7 multivendor hardware and software support
- Enjoy consistent service coverage across geographically dispersed sites
- Update HP and selected third-party software at a predictable cost
- Take advantage of subscription savings on software updates

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf

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

Customer Technical Training	Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. www.hp.com/learn/storage
HP Services Awards	HP Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction. For a list of all our awards, please visit: http://h20219.www2.hp.com/services/cache/433028-0-0-225-121.htm
Additional Services Information	For more information about HP Care Pack Services for Storage, please visit: http://www.hp.com/hps/storage
	If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" http://www.hp.com

Configuration Information

Step 1 - Base Configuration

HP StorageWorks MSL2024 Tape Library	MSL2024 Model Description	Part Number
	HP StorageWorks MSL2024 1 LTO-5 Ultrium 3280 FC Tape Library	BL531A
	HP StorageWorks MSL2024 1 LTO-5 Ultrium 3000 SAS Tape Library	BL537A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 FC Tape Library	AJ034A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 SCSI Tape Library	AJ033A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library	AK378A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SCSI Tape Library	AJ817A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 960 FC Tape Library	AG326B
	HP StorageWorks MLS2024 1 LTO-3 Ultrium 960 SCSI Tape Library	AG115A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Tape Library	AH559A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SCSI Tape Library	AH169A
	HP StorageWorks MSL2024 2 LTO-3 Ultrium 920 SCSI Tape Library	AH170A
	HP StorageWorks MSL2024 1 LTO-2 Ultrium 448 SCSI Tape Library	AG116A
	HP StorageWorks MSL2024 0-drive, 24 Slot Tape Library	AK379A

NOTE: The HP StorageWorks MSL2024 Tape Library comes standard with either one or two drives and a 24-slot library 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.

Kit Contents (for each library):

- **Zero-drive 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
- **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
  - HP Data Protector Express Software CD (for use in downloading the Single Server Edition for Windows/Linux/NetWare)
- **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
  - HP Data Protector Express Software CD (for use in downloading the Single Server Edition for Windows/Linux/NetWare)
- **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
  - HP Data Protector Express Software CD (for use in downloading the Single Server Edition for Windows/Linux/NetWare)

HP StorageWorks MSL4048 Tape Library	MSL4048 Model Description	Part Number
	HP StorageWorks MSL4048 1 LTO-5 Ultrium 3280 FC Tape Library	BL532A
	HP StorageWorks MSL4048 2 LTO-5 Ultrium 3000 SAS Tape Library	BL538A

Configuration Information

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

NOTE: The HP StorageWorks MSL4048 Tape Library comes standard with either one or two drives, and a 48-slot library 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.

Kit Contents (for each library):

- **Zero-drive 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
- **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
    - HP Data Protector Express Software CD (for use in downloading the Single Server Edition for Windows/Linux/NetWare)
- **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
    - HP Data Protector Express Software CD (for use in downloading the Single Server Edition for Windows/Linux/NetWare)
- **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
    - HP Data Protector Express Software CD (for use in downloading the Single Server Edition for Windows/Linux/NetWare)

HP StorageWorks MSL8048 Tape Library	MSL8048 Model Description	Part Number
	HP StorageWorks MSL8048 0-Drive, 48 Slot Tape Library	AU300A

NOTE: The HP StorageWorks MSL8048 Tape Library comes with zero drives, and 48 of the 96 physical slot enabled for use. To upgrade from 48 to 96 slots, the 48 to 96 slot upgrade license must be purchased (TA739A). Drive kits must be ordered separately

NOTE: The MSL8048 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

Configuration Information

separate power cord must be ordered.

HP StorageWorks MSL8048 48 to 96 slot license	TA739A

NOTE: For use with MSL8048 to upgrade from 48 to 96 slots using a license key. All 96 slots must be enabled prior to using the MSL Library Extender Kit.

MSL8048 Kit Contents:

- **Zero-drive 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
  - HP Data Protector software 61-250 slot License-to-Use entitlement certificate. Warranty for 61-250 slot LTU will need to be purchased separately

HP StorageWorks MSL8096 Tape Library

MSL8096 Model Description	Part Number
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 FC Tape Library	AJ040A
HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 SCSI Tape Library	AJ039A
HP StorageWorks MSL8096 4 LTO-4 Ultrium 1840 FC Tape Library	AN974A
HP StorageWorks MSL8096 2 LTO-4 Ultrium 1760 SAS Tape Library	AK382A
HP StorageWorks MSL8096 2 LTO-3 Ultrium 960 FC Tape Library	AH218A
HP StorageWorks MSL8096 4 LTO-3 Ultrium 960 FC Tape Library	AN973A

NOTE: The HP StorageWorks MSL8096 Tape Library comes standard with two drives, and a 96-slot library 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.

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
  - HP Data Protector software 61-250 slot License-to-Use entitlement certificate. Warranty for 61-250 slot LTU will need to be purchased separately
- **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
  - HP Data Protector software 61-250 slot License-to-Use entitlement certificate. Warranty for 61-250 slot LTU will need to be purchased separately
- **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
  - HP Data Protector software 61-250 slot License-to-Use entitlement certificate. Warranty for 61-250 slot LTU will need to be purchased separately

Configuration Information

Step 2 - Additional Options

Select each option as required with quantities specified:

PDU Power Cords	Description	Quantity	Part Number
	Power Cord, C13, 10A, 1.83m	1 each	AF556A

NOTE: This cord ships standard with each MSL 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 MSL Tape Library; can be used to connect the rack-mounted device to PDUs with IEC-320 receptacles.

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.

Regional Power Cords	Description	Quantity	Part Number
	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 ampacity 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 MSL Tape Libraries with other HP products such as HP ProLiant Servers. **NOTE:** #0D1 will appear after the Tape Library part number on the sales order if HP factory integration is indicated.	#0D1
Tape Drives	HP StorageWorks MSL LTO-5 Ultrium 3280 FC Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	BL535A
	HP StorageWorks MSL LTO-5 Ultrium 3000 SAS Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	BL540A
	HP StorageWorks MSL LTO-4 Ultrium 1840 4Gb FC Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AJ042A
	HP StorageWorks MSLLTO-4 Ultrium 1840 SCSI Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AJ041A
	HP StorageWorks MSL LTO-4 Ultrium 1760 SAS Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AK383A
	HP StorageWorks MSL LTO-4 Ultrium 1760 SCSI Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AJ819A
	HP StorageWorks MSL LTO-3 Ultrium 960 FC 4Gb Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AG328B
	HP StorageWorks MSL LTO-3 Ultrium 960 SCSI Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AG327A
	HP StorageWorks MSL LTO-3 Ultrium 920 SCSI Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AH173A
	HP StorageWorks MSL LTO-3 Ultrium 920 SAS Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AH562A
	HP StorageWorks MSL LTO-2 Ultrium 448 SCSI Drive Upgrade Kit **NOTE:** For use with the MSL 2024, 4048, 8048, or 8096 libraries. Drive kit includes a tape drive and documentation.	AG118A
Magazine Kits	HP StorageWorks MSL 2024 Ultrium Left Magazine Kit **NOTE:** For use in the MSL 2024tape Libraries in either the upper or lower left position. User-enabled mail slots can be configured at either 0 or 3 slots.	AG119A
	HP StorageWorks MSL Ultrium Left Magazine Kit **NOTE:** For use in the MSL 4048, 8048, or 8096 tape Libraries in either the upper or lower left position. When used in the lower left position, user-enabled mail slots can be configured at either 0 or 3 slots.	AG330A
	HP StorageWorks MSL Ultrium Right Magazine Kit **NOTE:** For use only on the right side of the MSL 2024, 4048, 8048, or 8096 Tape Libraries; additional 12-slot magazine for either the right upper or lower position.	AG120A

Related Options

Redundant Power Supply Upgrade Kit	HP StorageWorks MSL Redundant Power Supply Upgrade Kit **NOTE:** For use in the MSL4048, 8048 or 8096 Tape Libraries 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
Slot License Upgrade	HP StorageWorks MSL8048 48 to 96 slot license **NOTE:** For use with MSL8048 to upgrade from 48 to 96 slots using a license key. All 96 slots must be enabled prior to using the MSL Library Extender Kit.	TA739A
Encryption	HP StorageWorks 1/8 G2 & MSL Tape Library Encryption Kit **NOTE:** For use with new or installed LTO-5 or LTO-4 MSL2024/4048/8048/8096 Tape Libraries. The Encryption Kit key server token will generate and retain encryption keys for HP LTO-5 or LTO- 4 Ultrium tape drives in the library. Does not require support from ISV.	AM495A
Library Extender	HP StorageWorks MSL Library Extender Kit **NOTE:** For use with the MSL2024, 4048 or 8096 libraries to physically connect two libraries together creating one larger logical library. Supported configurations can be found in the Library Extender section of this QuickSpec. Library Extender is installed into a drive bay of each library and should take about 60 minutes for installation and configuration. Configurations that are NOT supported include two MSL2024s or two MSL8096s. **NOTE:** An MSL8048 must have all 96 slots enabled prior to using the MSL Library Extender Kit.	AQ746A
Table Top Conversion Kits	HP StorageWorks MSL2024 Rack to Tabletop Conversion Kit	AG121A
	HP StorageWorks MSL4048 Rack to Tabletop Conversion Kit	AG329A
SAS Host Bus Adapters	HP StorageWorks SC44Ge SAS Host Bus Adapter **NOTE:** Serial-attached SCSI (SAS) HBA that enables HP StorageWorks MSL Tape Libraries to connect with HP ProLiant G5 servers. PCI-Express SAS HBA with one external SFF8470 port.	416096-B21
	HP P212 Smart Array Controller Zero Memory **NOTE:** Recommended for ProLiant G6 SAS tape automation connect. 256MB or larger write cache recommended for more than two tape drives.	462828-B21
	HP P212 Smart Array Controller: 256MB Memory **NOTE:** Recommended for ProLiant G6 SAS tape automation connect.	462834-B21
	HP P411 Smart Array Controller 256MB **NOTE:** Recommended for ProLiant G6 SAS tape automation connect.	462830-B21
	HP P411 Smart Array Controller 512MB **NOTE:** Recommended for ProLiant G6 SAS tape automation connect.	462832-B21
	HP P700m Smart Array Controller 256MB **NOTE:** Recommended for C series blade enclosure tape automation connect.	507925-B21
	HP P700m Smart Array Controller 512MB **NOTE:** Recommended for C series blade enclosure tape automation connect.	508226-B21
SCSI Host Bus Adapters	HP SC11Xe SCSI Host Bus Adapter **NOTE:** Single channel PCI-Express (PCI-e) SCSI Ultra 320 HBA that enables HP StorageWorks MSL Tape Libraries to connect to HP ProLiant servers.	412911-B21
	HP StorageWorks U320e SCSI Host Bus Adapter **NOTE:** Dual channel PCI-Express (PCI-e) SCSI Ultra320 HBA that enables HP StorageWorks MSL Tape Libraries to connect with HP ProLiant servers.	AH627A

Related Options

Reference the EBS compatibility matrix for the most up-to-date HBA compatibility information at: http://www.hp.com/go/ebs.

Cable Kits (SCSI, SAS, FC)	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 **NOTE:** One cable is required for every four drives. Use this cable to connect HP StorageWorks MSL SAS Tape Libraries to HP SAS controllers with Infiniband (SFF8470) connectors.	AH587A
	2m External mini-SAS to 4x1 mini-SAS Cable Kit **NOTE:** One cable is required for every four drives. Use this cable to connect HP StorageWorks MSL SAS Tape Libraries to Mini-SAS (SFF8088) ports.	AN975A
	4m External mini-SAS to 4x1 mini-SAS Cable Kit **NOTE:** One cable is required for every four drives. Use this cable to connect HP StorageWorks MSL SAS Tape Libraries to Mini-SAS (SFF8088) ports.	AN976A
	2m SFF8088-to-SFF8088 1x SAS Cable Kit **NOTE:** One SAS tape drive only. Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE470A
	4m SFF8088-to-SFF8088 1x SAS Cable Kit **NOTE:** One SAS tape drive only. Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE465A
	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

Controller/HBA & Cable Recommendation Matrix	Recommended HBA/ Controller for tape automation	HBA/ Controller Product Number	Recommended Cables	Cable Product Number
SAS	**HP StorageWorks SC44Ge SAS Host Bus Adapter** **NOTE:** Recommended for Proliant G5 SAS tape automation connect.	416096-B21	2m SFF8470-to-4 SFF8088 1x SAS Cable Kit	AH587A
	HP P212 Smart Array Controller Zero Memory **NOTE:** Recommended for Proliant G6 SAS tape automation connect. 256MB or larger write cache recommended for more than two tape drives.	462828-B21	For one tape drive: • **AE470A** -- 2m SFF8088-to-SFF8088 1x SAS Cable Kit **NOTE:** one SAS tape drive only. • **AE465A** -- 4m SFF8088-to-SFF8088 1x SAS Cable Kit **NOTE:** one SAS tape drive only.	
	HP P212 Smart Array Controller 256MB Memory **NOTE:** Recommended for Proliant G6 SAS tape automation connect.	462834-B21	For two or more tape drives: • **AN975A** -- 2m SFF8088-to-4 SFF8088 1x SAS Cable Kit NOTE: One cable is required for every	

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Related Options

	HP P411 Smart Array Controller 256MB NOTE: Recommended for Proliant G6 SAS tape automation connect.	462830-B21	NOTE: One cable is required for every four drives. ● **AN976A** -- 4m SFF8088-to-4 SFF8088 1x SAS Cable Kit NOTE: One cable is required for every four drives.	
	HP P411 Smart Array Controller 512MB NOTE: Recommended for Proliant G6 SAS tape automation connect.	462832-B21		
	HP P700m Smart Array Controller 256MB NOTE: Recommended for C series blade enclosure tape automation connect.	507925-B21		
	HP P700m Smart Array Controller 512MB NOTE: Recommended for C series blade enclosure tape automation connect.	508226-B21		
SCSI	**HP SC11Xe SCSI Host Bus Adapter** NOTE: Single channel PCI-Express (PCI-e) SCSI Ultra 320 HBA.	412911-B21	6 ft VHDCI/HDTS68 SCSI Cable Kit	341176-B21
			12 ft VHDCI/HDTS68 SCSI Cable Kit	341177-B21
	HP StorageWorks U320e SCSI Host Bus Adapter NOTE: Dual channel PCI-Express (PCI-e) SCSI Ultra 320 HBA.	AH627A	6 ft VHDCI/HDTS68 SCSI Cable Kit	341176-B21
			12 ft VHDCI/HDTS68 SCSI Cable Kit	341177-B21

Controller information (both SAS and SCSI) are located in two locations:
Smart Array:
http://h18004.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html
HBA: http://h18004.www1.hp.com/products/servers/proliantstorage/adapters/index.html

Reference the EBS compatibility matrix for the most up-to-date HBA compatibility information at:
http://www.hp.com/go/ebs

You may also visit: www.hp.com/go/ProLiant, and click on the Storage link

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PCI Expansion Blade	HP StorageWorks PCI Expansion Blade NOTE: Ships with one pre-installed PCI-X connect board. Also includes one PCIe connect board which requires installation.	448018-B21
	HP BladeSystem c-Class customers who have a c3000 or c7000 blade enclosure but don't have fibre infrastructure have the option to connect an MSL SAS Tape Library to the enclosure utilizing a PCI Expansion Blade. Configuration requires an HP SC44Ge HBA (416096-B21) installed inside the PCI Expansion Blade which resides next to the partner server blade (backup server) in the blade enclosure. Please visit the "SAS HBAs" section of the Enterprise Backup Solution (EBS) compatibility matrix at: www.hp.com/go/ebs for further compatibility details. Please visit: www.hp.com/go/blades for further details about the HP PCI Expansion Blade.	341177-B21

Related Options

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 MSL Tape Libraries are 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 LTO-5 Ultrium 3TB RW Data Cartridge (1 pack)	C7975A
	HP LTO-5 Ultrium 3TB WORM Data Cartridge (1 pack)	C7975W
	HP LTO-4 Ultrium 1.6TB RW Data Cartridge (1 pack)	C7974A
	HP LTO-4 Ultrium 1.6TB WORM Data Cartridge (1 pack)	C7974W
	HP LTO-3 Ultrium 800GB RW Data Cartridge (1 pack)	C7973A
	HP LTO-3 Ultrium 800GB WORM Data Cartridge (1 pack)	C7973W
	HP LTO-2 Ultrium 400GB data cartridge (1 pack)	C7972A
	HP Ultrium Universal Cleaning Cartridge (1 pack)	C7978A

Bar Code Labels

HP LTO-5 Ultrium RW Bar Code Labels (100 pack)	Q2011A
HP LTO-5 Ultrium WORM Bar Code Labels (100 pack)	Q2012A
HP LTO-4 Ultrium RW Bar Code Labels (100 pack)	Q2009A
HP LTO-4 Ultrium WORM Bar Code Labels (100 pack)	Q2010A
HP LTO-3 Ultrium 3 RW Bar Code Labels (100 pack)	Q2007A
HP LTO-3 Ultrium 3 WORM Bar Code Labels (100 pack)	Q2008A
HP LTO-2 Ultrium 2 Bar Code Labels (100 pack)	Q2002A

Non-Custom Labeled Data Cartridges
NOTE: Non-Custom labels will come pre-labeled with a pre-determined number sequence.

HP LTO-5 Ultrium 3.0TB Non-Custom Labeled Data Cartridge (20 pack)	C7975AN
HP LTO-4 Ultrium 1.6TBNon-Custom Labeled Data Cartridge (20 pack)	C7974AN
HP LTO-3 Ultrium 800GB Non-Custom Labeled Data Cartridge (20 pack)	C7973AN
HP LTO-2 Ultrium 400GB Non-Custom Labeled Data Cartridge (20 pack)	C7972AN
HP LTO-1 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 LTO-5 Ultrium 3.0TB RW Custom Labeled Data Cartridge (20 pack)	C7975AL
HP LTO-5 Ultrium 3.0TB RW Eco Pack (no case) Data Cartridge (20 pack)	C7975AC
HP LTO-5 Ultrium 3.0TB WORM Custom Labeled Data Cartridge (20 pack)	C7975WL
HP LTO-4 Ultrium 1.6TB RW Custom Labeled Data Cartridge (20 pack)	C7974AL
HP LTO-4 Ultrium 1.6TB WORM Custom Labeled Data Cartridge (20 pack)	C7974WL
HP LTO-3 Ultrium 800GB RW Custom Labeled Data Cartridge (20 pack)	C7973AL

Related Options

HP LTO-3 Ultrium 800GB WORM Custom Labeled Data Cartridge (20 pack)	C7973WL
HP LTO-2 Ultrium 400GB Custom Labeled Data Cartridge (20 pack)	C7972AL
HP LTO-2 Ultrium 200GB Custom Labeled Data Cartridge (20 pack)	C7971AL

HP Care Pack Options	**Same Day Response**	
	Warranty upgrade to 1-year, 13x5, 4 hour response/onsite, electronic	UF835E
	Warranty upgrade to 1-year, 24x7, 4 hour response/onsite, electronic	UF836E
	Warranty upgrade to 1-year, 24x7, call-to-repair, 6 hour response/onsite, electronic	UF837E
	Warranty upgrade to 3-year, 13x5, 4 hour response/onsite, electronic	UF839E
	Warranty upgrade to 3-year, 24x7, 4 hour response/onsite, electronic	UF840E
	Warranty upgrade to 3-year, 24x7, call-to-repair, 6 hour response/onsite, electronic	UF841E
	Warranty upgrade to 4-year, 13x5, 4 hour response/onsite, electronic	UF842E
	Warranty upgrade to 4-year, 24x7, 4 hour response/onsite, electronic	UF843E
	Warranty upgrade to 5-year, 13x5, 4 hour response/onsite, electronic	UF844E
	Warranty upgrade to 5-year, 24x7, 4 hour response/onsite, electronic	UF845E
	Next Business Day Response	
	Warranty upgrade to 3-year next business day/onsite, electronic	UF838E
	Hardware Services	
	Installation services, electronic	U4824E
	SAN installation & startup service, electronic	UA872E

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	MSL4048	MSL8048/8096
Drive Technology		LTO-5 Ultrium 3280 LTO-5 Ultrium 3000 LTO-4 Ultrium 1840 LTO-4 Ultrium 1760 LTO-3 Ultrium 960 LTO-3 Ultrium 920 LTO-2 Ultrium 448	LTO-5 Ultrium 3280 LTO-5 Ultrium 3000 LTO-4 Ultrium 1840 LTO-4 Ultrium 1760 LTO-3 Ultrium 960 LTO-3 Ultrium 920	LTO-5 Ultrium 3280 LTO-5 Ultrium 3000 LTO-4 Ultrium 1840 LTO-4 Ultrium 1760 LTO-3 Ultrium 960
Number of Drives		1 to 2	1 to 4	1 to 4
Number of Slots		24	48	48 (MSL8048) 96 (MSL8096)
Drive Interface		8 Gb Native Fibre Channel 4 Gb Native Fibre Channel 6 Gb/sec SAS 3 Gb/sec SAS Ultra320 LVD SCSI	8 Gb Native Fibre Channel 4 Gb Native Fibre Channel 6 Gb/sec SAS 3 Gb/sec SAS Ultra320 LVD SCSI	8 Gb Native Fibre Channel 4 Gb Native Fibre Channel 6 Gb/sec SAS 3 Gb/sec SAS Ultra320 LVD SCSI
Maximum Capacity	**Native**	36 TB (LTO-5) 19.2 TB (LTO-4) 9.6 TB (LTO-3) 4.8 TB (LTO-2)	72 TB (LTO-5) 38.4 TB (LTO-4) 19.2 TB (LTO-3)	72 TB (LTO-5, 48 slots) 144 TB (LTO-5, 96 slots) 38.4 TB (LTO-4, 48 slots) 19.2 TB (LTO-3, 48 slots) 76.8 TB (LTO-4, 96 slots) 38.4 TB (LTO-3, 96 slots)
	Compressed (2:1)	72 TB (LTO-5) 38.4 TB (LTO-4) 19.2 TB (LTO-3) 9.6 TB (LTO-2)	144 TB (LTO-5) 76.8 TB (LTO-4) 38.4 TB (LTO-3)	144 TB (LTO-5, 48 slots) 288 TB (LTO-5, 96 slots) 76.8 TB (LTO-4, 48 slots) 38.4 TB (LTO-3, 48 slots) 153.6 TB (LTO-4, 96 slots) 76.8 TB (LTO-3, 96 slots)
Maximum Transfer Rate	**Native**	504 GB/hr (one 3280/3000) 432 GB/hr (one 1840) 576 GB/hr (two 1760) 288 GB/hr (one 960) 432 GB/hr (two 920) 172.8 GB/hr (two 448)	1.0 TB/hr (two 3280/3000) 850 GB/hr (two 1840) 1.15 TB/hr (four 1760) 55 GB/hr (two 960) 850 GB/hr (four 920)	2.0 TB/hr (four 3280/3000) 1.7 TB/hr (four 1840) 1.15 TB/hr (four 960)
	Compressed (2:1)	1 TB/hr (one 3280/3000) 2 2.0 TB/hr (two 3000) 864 GB/hr (two 1840) 1.15 TB/hr (four 1760) 576 GB/hr (two 960) 864 GB/hr four 920) 345.6 GB/hr (four 448)	3.0 TB/hr (two 3280/3000) 4.0 TB/hr (four 3000) 1.7 TB/hr (two 1840) 2.3 TB/hr (four 1760) 1.1 TB/hr (two 960) 1.7 TB/hr (four 920)	4.0 TB/hr (four 3280/3000) 3.4 TB/hr (four 1840) 2.3 TB/hr (four 960)

Technical Specifications

		MSL2024	MSL4048	MSL8048/8096
Dimensions	Out-of-Box (HxWxD)	3.4 x 18.9 x 31.7 in (8.7 x 48 x 80.6 cm)	6.9 x 18.9 x 31.7 in (17.5 x 48 x 80.6 cm)	13.9 X 18.9 X 31.7 in (35.2 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)	13.7 x 23.2 x 38.9 in (34.8 x 58.9 x 98.7 cm)	26 X 25.8 X 40.1 in (68.5 x 65.5 x 102.5 cm)
Weight	Out of box	32.9 lb (14.9 kg)	47.2 lbs (21.4 kg)	102.7 lbs (46.6 kg)
	Shipping	56.9 lb (25.8 kg)	74.7 lbs (33.9 kg)	164 lbs (74.4 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)		
Average Cartridge Swap Time (drive to slot, slot to drive)		45 seconds	45 seconds	50 seconds
Initialization Time		80 to 120 seconds		
Inventory Time		1:20 minutes (using bar code labeled cartridges)	2:15 minutes (using bar code labeled cartridges)	4:30 minutes (using bar code labeled cartridges)
Average Cartridge Swap Time in Extended Libraries (drive to slot, slot to drive)	**Extended Library Configuration**			**Average Swap Time**
	2024/4048			100 seconds
	4048/4048			98 seconds
	2024/8096			110 seconds
	4048/8096			110 seconds
	NOTE: Two MSL2024s or two MSL8096s are not supported configurations MSL8048 must have all 96 slots enabled prior to using the Library Extender. Once all 96 slots have been enabled for use, the supported configurations are the same as 8096s.			
Connectors		Mini-SAS (located on back of MSL SAS model only) 68-pin HDTS (located on back of MSL SCSI models only) LC Optical Fibre (located on back of MSL FC models only) (1) RJ-45 (located on back of MSL Library) (1) USB port (located on back of MSL Library)		
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		MSL2024: 168 Watts (max) MSL4048/MSL8048/MSL8096: 312 Watts (max)		
Input Requirements		100 to 240 VAC, 50 to 60 Hz, 2.5 Amperes		
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 (3048 m)		
	Shipping	35,000 ft (10,675 m)		

Technical Specifications

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