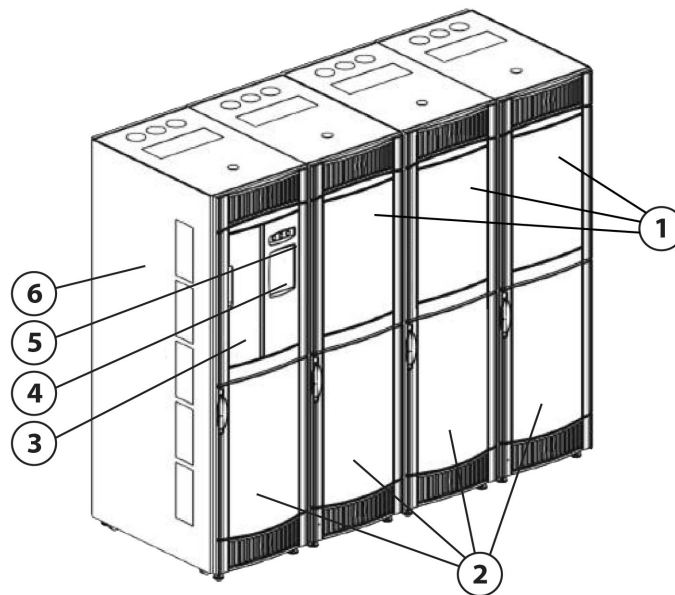## Overview

Meeting enterprise data growth challenges head-on, HP ESL G3 Tape Libraries deliver enormous scalability to keep pace with unpredictable data growth. Choose from a range of base configurations and scale up to over 7104 tape cartridges in increments of 100 slots for capacity on demand. Incorporating between 1 and 96 tape drives you can consolidate and store up to 21.3PB (compressed 2:1) of enterprise data.

Supporting data growth is only part of the story: the HP ESL G3 also delivers high availability through dual-robotics capability and redundant power supplies, while host path connectivity failover provides optimal library performance. Management and control of multiple tape libraries is delivered by an intelligent single pane of glass command GUI. Leading library management tools and HP TapeAssure enables predictive and proactive monitoring of tape drives, media and library health. Hardware data encryption solutions provide added data security.

1. expansion module
2. access doors
3. Import/Export station
4. touch screen
5. operator panel
6. control module

What's New

- Dual robotics upgrade for new and existing ESL G3 customers, the smallest library footprint for dual-robotics capability
- License key support for SafeNet KMIP compliant encryption key manager
- ESL G3 now supports up to 16 frames and 7104 slots (maximum slot configuration). Please contact your HP sales contact for ordering assistance.

Overview

Standard Features

1. **Scalability**
   a. Capacity on demand from 100 to 7104 tape cartridges and 1 to 96 tape drives
   b. Scale from a choice of base configurations in increments of 100 slots
   c. Bulk import/export station for faster cartridge load and unload
   d. Library frames/modules are in a standard 19-inch rack form factor
2. **High Availability**
   a. Dual-robotics for continual access to data
   b. Redundant power supplies
   c. Protect against connectivity failover through Control Path and Data Path failover
   d. 3 million MSBF
3. **Manageability**
   a. Manage multiple libraries from a single pane of glass using Command View TL
   b. Intuitive web GUI
   c. Receive predictive and proactive status and alerts from TapeAssure, monitoring drives, library and media health for dependable data storage
   d. Leading library management tools for monitoring, configuration, upgrading, and troubleshooting
   e. Automated Media Pool delivers flexible partitioning to meet data growth requirements without reconfiguring software applications
4. **Security**
   a. Hardware based data encryption through HP's Enterprise Secure Key Manager (ESKM), or by license to SafeNet's KMIP compliant encryption key manager

Customer Benefits

1. **Capacity on demand**
   ○ Only buy what you need today and add storage capacity as you need it
   ○ Investment protection - scale up to 21.3PBs without disruption to ongoing data protection
   ○ More storage capacity in less floor space
   ○ Tape consolidation through capacity, performance, partitioning and high availability results in a lower total cost of ownership.
2. **Continuous data protection**
   ○ The Libraries' dual-robotics capability means you can have continuous access to your active data; the ESL G3 is the smallest form factor dual-robotics library available today.
   ○ Increased library uptime by providing library LUN control failover and drive port to port failover
   ○ High SAN availability since management traffic stays out of the data path
3. **Reduced cost of ownership**
   ○ Easier to manage multiple libraries from a single pane of glass
   ○ Enhanced manageability from any location.
   ○ Proactive and predictive library maintenance supported by HP TapeAssure and HP Library and Tape Tools
   ○ Delivers best-in-class interoperability with Enterprise Backup Solutions (EBS) without "special" work-a-rounds
   ○ Flexible partitioning means that media can be assigned to partitions as data storage needs grow without reconfiguring software applications
4. **Enhanced data security**
   ○ Provides a high level of encryption security, with compression, for strong backup data privacy to secure confidential information and address compliance quickly. A range of KMIP compliant encryption key management solutions add to confidence and ease of use.
   ○ A Secure Manager option minimizes uncertainty in complex SAN environments by allowing only authorized servers to access tape drives and critical data.

Overview

- ○ Supports WORM media (using the LTO-5 Ultrium 3280 FC or LTO-4 Ultrium 1840 FC) providing a fail-safe method for permanently storing data records.

Family Comparison

	ESL G3
Scalability	Scales horizontally with linear robot
Drive Technology	LTO-5 Ultrium 3280 FC, LTO-4 Ultrium 1840 FC
Capacity range	100 slots in a single frame/module 7104 slots in a max configuration of 16 frames/modules
Maximum Drive Count	1-16 in a single frame/module 96 in maximum configuration
Maximum Capacity (compressed 2:1)	300TB using LTO-5 media (min100 slots in1 frame) 21.3PB using LTO-5 media (max 7104 slots in16 frames)
Maximum Throughput (compression 2:1)	12TB/hr (12 LTO-5 drives) 97 TB/hr (96 LTO-5 drives)
Management	HP Command View TL and library touch screen control panel
Advanced Reporting	TapeAssure
Standard Form-factor	Yes: each frame (module) is in standard 19-inch rack form factor
Dual robotics	Available in a future release
Data & library security	Data encryption and a range of encryption key management solutions

Features in more detail

Scalability to meet uncertain data growth

Buy only what you need today for backup and archive, and then expand the library for higher capacity and performance as your data grows.

The HP ESL G3 Tape Library provides a modular architecture in a standard 19" rack form factor to scale up over 50x from the initial capacity without disrupting ongoing performance and delivery; it is scalable from 100 to over 7104 slots or from 80TBs to 21.3PB21.3PBs in increments of 100 slots.

The library configuration can accommodate:

- 1 control module
- 0 to 11 expansion modules
- 102 to 5316 cartridges maximum
- And 1 to 96 LTO-4 or LTO-5 Ultrium Tape Drives

NOTE: Adding extra drives often reduces the total slot count unless Expansion Modules and/or Capacity Upgrade Licenses are added. The ESL G3 is designed for easy scalability to meet a variety of needs, and your HP sales representative can provide additional details.

High Availability to support 24/7 and mission critical applications

To provide continual access to your data, the HP ESL G3 includes dual-robotics capability in active/passive operation without reducing library capacity. It offers the following unique features:

- Smallest footprint for dual robots
- Fastest service for unit replacement
- Non-disruptive to application
- Wireless communication improves reliability and enables future scalability

NOTE: An upgrade is available so that existing ESL G3 customers can also benefit from dual robotics capability.

To make the most of your library performance, the HP ESL G3 includes a number of other failover features:

- Space for up to two power supplies in each of the first eight frames.
- Both library LUN control failover and drive port to port failover help support ongoing host and SAN connectivity under a variety of adverse conditions:
  - Control Path Failover: reduces host command failures due to SAN issues
    - Connectivity: Integrated Fibre-channel (FC Bridging)
    - Configure a Primary and Failover Drive
    - Partitioning: Failover for each partition
  - Data Path Failover: reduces read/write issues due to SAN issues
    - Full failover on each tape drive, each drive has two FC ports

Integrated on drive with native FC connections

Features in more detail

Advanced manageability for lower TCO

The HP ESL G3 allows the operator to manage multiple libraries from a single pane of glass control screen, anytime and anywhere.

The operator control panel provides either a home screen in physical view showing:

- Name
- IP address
- Slots and drives
- Simple performance chart

Or an alternate view of one of the partitions showing:

- Physical representation of drives and media
- Color coded by partitions
- Up to 16 partitions
- As small as 6 storage slots, 6 I/E slots and 1 tape drive

Note that partitions can be setup with individual security access.

A setup wizard is provided for normal configuration processes, including:

- Licenses
- Partitioning
- Date/time
- Network setup

And a Partition Wizard enables the user to create, modify and delete partitions and also to manage the setup of:

- Automated Media Pool (AMP)
- Library Control Path
- Control Path Failover (CPF)
- Data Path Failover (DPF)

Additional Library Management functionality is available through licensing HP Command View TL and other licensable features. (see details below)

Features in more detail

TapeAssure for intelligent reporting and alerts

HP TapeAssure provides comprehensive summaries and detailed information about the status, performance, utilization, and health of all tape drives and tapes for HP ESL G3 libraries so that you can proactively manage the health of your backup and archive.

Utilization and performance reporting features allow you to optimize the use of your HP ESL G3 tape libraries to make informed purchasing decisions if an increase in capacity is needed. With the data provided by TapeAssure 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 and read/write throughput 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 HP's TapeAssure Analysis Template (via Excel) to create graphs and tables that help answer important questions about drive and tape health, performance, and utilization. . 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

Best in class reliability

As data becomes more and more mission critical, and downtime becomes more costly to the enterprise, customers are requiring high availability consolidated storage solutions which offer hot-plug components and redundancies of key operating subsystems (tape drives and power supplies). With redundant power distribution and power supplies the HP ESL Tape Libraries offer the best in high availability for continuous operation. HP ESL G3 also offers 3 million MSBF (mean swaps between failure) for both single and multi-frame solutions.

Additional reliability features are delivered by the HP LTO Ultrium tape technology with dynamic data rate matching functionality - see below.

Features in more detail

Dual Robot for high availability

To greatly increase HP ESL G3 high availability, dual robots are now available. During operations if one robot were to need repair, a second robot could take its place ensuring the backup or recovery continues without disruption to the application. All currently installed HP ESL G3 libraries are upgradeable to accommodate dual robots.

With the purchase of a dual robot kit, a Parking Module will be included and will need to be installed to the left of the Control Module.

Beginning June 2012, there will be a hardware change to both the Control Module and Expansion Module and will be notated with a "HW Revision 2" on the library management console (LMC).

- The front panel of the ESL G3 library will display HW Revision for reference. (If no HW REV is shown, then by default it is HW Revision 1).
- Libraries purchased and installed prior to June 2012 will continue to be supported and will continue to purchase HW REV 1 expansion modules.
- Libraries purchased and installed after June 2012 will be receive HW REV 2 control modules and expansion modules.
- All drives, licenses and other accessories will be supported in both HW REV 1 & HW REV 2 Control Modules and Expansion Modules.

Dual Robot Kits:

- HW Revision 2 libraries will order product number B4J74A. This kit includes the 2nd robot and a parking module.
- HW Revision 1 will need to be converted to HW REV 2 and will need to order product number B4J75A. (includes gear rails, cables, and controller-board upgrades for both the Control Module and all Expansion Modules, to allow a second fail-over robot to be added to ESL G3. Also includes two new "Hardware Revision 2" robots and a Parking Module)

Please reference the table below to ensure the correct Dual Robot Kit is ordered.

NOTE: The front panel of the ESL G3 library will display HW Revision for reference. (If no HW REV is shown, then by default it is HW Revision 1).

ESL G3 HW Revision	Dual Robot Kit to Order
HW Revision 1	B4J75A (includes gear rails, cables, and controller-board upgrades for both the Control Module and all Expansion Modules, to allow a second fail-over robot to be added to ESL G3. Also includes two new "Hardware Revision 2" robots and a Parking Module)
HW Revision 2	B4J74A (Includes: one "Hardware Revision 2" robot and parking module)

Features in more detail

Hardware Data Encryption for added security	To greatly enhance data privacy, HP ESL G3 Tape Libraries are now available with LTO-5 Ultrium 3280 and LTO-4 Ultrium 1840 hardware encrypting tape drives for secure high performance backups meeting consortium specifications for LTO-5 and LTO-4. HP Data Protector Software can enable the drive encryption and provide basic key management capabilities. Additional information regarding ISV's supporting hardware encryption is available on the HP Enterprise Backup Solution website at: www.hp.com/go/ebs. The encryption on LTO-5 and LTO-4 media occurs with or without compression, and without speed or capacity penalties.

LTO-5 and 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-5 Ultrium 3280 and LTO-4 Ultrium 1840 tape drive(s) are designed to be compliant with the emerging standard for tape drive security (IEEE 1619.1).

Encryption key management support via HP Data Protector Software and other ISV backup applications, through HP's Enterprise Secure Key Manager (ESKM) appliance or by license to SafeNet's 'KeySecure' - a KMIP compliant encryption key manager. Licenses to other select 3rd party KMIP compliant encryption key management solutions will become available in the coming months.

ESKM: HPs Enterprise Secure Key Manager reduces your risk of a costly data breach and reputation damage while improving regulatory compliance with a secure centralized encryption key management solution for HP LTO-5 and LTO-4 enterprise tape libraries (EML & ESL). In addition, the ESKM provides strong auditable security and reliable lifetime key archival. The ESKM and LTO-5/LTO-4 drive encryption in the ESL G3 Tape Library provides a complete and secure privacy solution to protect customers' confidential data.

For further information on the ESKM please visit: www.hp.com/go/eskm |
| **Partitioning with the Automated Media Pool for enhanced scalability** | A physical library has limitations. A customer may have mixed backup software environments where sharing the library becomes difficult. To manage this currently, the operator will create partitions (virtual libraries) and have each application assigned to one or more partitions. These partitions are fixed, and Applications mapped into one partition can't claim media and storage space from partitions not assigned to them.

This method can be inflexible and require a good deal of management overhead to reconfigure and support.

However, with the ESL G3 Automated Media Pool (AMP) a "ghost" partition acts as a flexible media pool where media can be assigned to or removed from partitions as needs change - all without forcing application reconfigurations. |

Features in more detail

Bulk media import/export for significant time savings

An extended import/export station creates a logical bulk load/unload capability inside the library for faster imports and exports. A 72-media slot mailbox provides one of the largest bulk load/unload in the industry offering the ability to load or unload media without having to take the library offline or stop currently-running backup jobs (as would be required when opening the whole front door).

The library I/E Station configuration can accommodate:

- 1 to 8 24-slot Import/Export (I/E) stations in the control module and first 7 expansion modules. OR
- 1 24-slot I/E in the control module and up to 7 72-slot I/E stations in first 7 expansion modules.

HP LTO Ultrium Technology

HP 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 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 (ATS) 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	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

Features in more detail

WORM (Write-Once, Read-Many) Drive and Media Support

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 Ultrium 3280 and LTO-4 Ultrium 1840 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-5 Ultrium 3280 and LTO-4 Ultrium 1840 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 3TB (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-5 Ultrium 3280 and LTO-4 Ultrium 1840tape 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.

Features in more detail

HP Ultrium Storage Media HP recommends that you use HP-branded cartridges in the HP ESL G3 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 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.

HP Library and Tape Tools (L&TT) The ESL G3 Tape Library configurations are supported on HP's industry-leading diagnostic tool - HP Library and Tape Tools (L&TT). L&TT is a single, convenient program that's a snap 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.

Extended Tape Library Architecture (ETLA) The HP Extended Tape Library Architecture (ETLA) will save library and SAN administrators time and money by simplifying library setup, configuration, and troubleshooting. HP's architecture increases reliability and robustness of libraries in the SAN, and integrates with leading enterprise management applications. Advanced features such Secure Manager further increase backup performance and reliability.

As a key component of the HP Converged Infrastructure strategy, ETLA delivers tape libraries that are self-aware - self-managed, automatically maintained, continuously available, network-aware, resilient, secure, and adaptable. HP's high-end tape libraries provide the reliability, interoperability, and advanced functionality required for your enterprise SAN environment all integrated into the ESL G3 libraries.

Features in more detail

HP Command View for Tape Libraries	HP Command View TL for Tape Libraries aggregates multiple HP tape libraries for centralized management. It is also the nerve center for TapeAssure data collection and analysis and, importantly it is able to manage existing ESL E-Series, EML, MSL and the new ESL G3 libraries.

With Command View TL and the new ESL G3 Library Management Console (LMC) you can manage your tape libraries -- monitor backup logs, check drive status, receive trouble alerts, diagnose problems, and much more -- through a simple browser interface from anywhere in the world.

Set up and configure your tape library in the SAN in less than two hours with configuration wizards and graphical interface:

- Select from a list of multiple supported libraries to manage
- View asset information for the library system
- View health summaries for all components of the library system
- View library inventory: slots, media, and drives
- Search for media by barcode label
- View details on drives and robotics, including WWNs, speeds, and connection types
- Configure hosts/HBA-to-drive mapping and masking settings with Secure Manager
- Automatically discover hosts and HBAs on the SAN or add your own for access control and security purposes
- Upgrade firmware on all library components
- Configure SNMP and email trap/event destinations to receive alerts asynchronously
- View persistent event logs for the library system
- Set up partitions and other advanced features

Linear Tape File System (LTFS)	HP LTFS makes tape self-describing, file-based, and easy-to-use, it also provides users with the ability to use standard file operations on tape media for accessing, managing and sharing files with an interface that behaves just like a hard disk. In addition, LTFS provides the ability to share data across platforms, as you would with a USB drive or memory stick. Simply load a tape into the drive, mount it into the file system, and it becomes visible as a disk. For more information, including user guide, downloads and compatibility, visit: http://www.hp.com/go/ltfs

HP StoreOpen Automation	HP StoreOpen Automation is a free downloadable application that extends the LTFS capability to HP Autoloaders ,HP MSL and ESL Tape Libraries. By simply mounting the tape autoloader or library as a file system, the intuitive HP StoreOpen Automation interface makes it easier to copy, rename, create or move files. When a cartridge folder is selected for use, that tape is automatically moved to an available tape drive.

When two drives are present, HP StoreOpen Automation supports tape-to-tape operations. HP StoreOpen Automation takes advantage of other standard HP Tape Library features including data encryption and HP TapeAssure.

For more information, including user guide, downloads and compatibility, visit:
http://www.hp.com/go/HPStoreOpen

Features in more detail

HP ESL G3 Secure Manager License

HP ESL G3 Secure Manager License is an optional software feature that provides an additional level of security that lets you control access to the tape library by authorizing specific servers to access the library's drives and robotics. Secure Manager increases backup reliability by blocking disruptive traffic from unauthorized hosts to the library, which is one of the main causes of failed or incomplete backups.

- Easily configure device-level security settings
- Allow only authorized servers to access tape drives and critical data
- Manage access control from a single pane of glass, through the library itself
- Paths to robotics can be separated between two independent SANs for isolation purposes

Secure Manager allows you to:

- create host access groups
- add and modify host information
- map devices to access
- allows a disable feature when switch zoning is desired

Encryption Key Management

HP ESL G3 is integrated with HP's Enterprise Secure Key Manager (ESKM), version 2.1 and above to deliver:

- Centralized encryption key management for HP Enterprise Tape Libraries
  - Automatic policy-based key generation and management supporting key/cartridge granularity
  - ISV transparent key archival and retrieval for multiple libraries
  - Extensible to emerging open standards
- Strong auditable security for encryption keys
  - Hardened server appliance
  - Secure identity-based access, administration and logging
  - Designed for FIPS 140-2 validation
- Reliable lifetime key archival
  - Automatic multi-site clustering, key replication and failover
  - Comprehensive backup and restore functionality for keys
  - Redundant device components and active alerts

NOTE: For upgrades from version ESKM 2.1 to any later ESKM version, contact your key management vendor for additional details.

  - HP ESL G3 is also supported via a key license with SafeNet's 'KeySecure' KMIP compliant encryption key management solution. Refer to configuration information for details of how to obtain a license.

Features in more detail

HP Storage Management Pack for Microsoft System Center

The HP Management Pack for Systems Center Operations Manager provides seamless integration with Microsoft Systems Center Operations Manager and now System Center Essentials by integrating predefined discovery and state monitoring policies, event processing rules and tasks, and diagram and topology views for the storage system.

For more information:

http://h18000.www1.hp.com/products/quickspecs/14249_div/14249_div.html

HP Storage Management Pack can be downloaded free from the following website:
https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=SCOM

Compatibility

HP's Enterprise Backup Solutions (EBS) assures that your HP ESL G3 Tape Library works with leading servers, operating systems, and backup applications - and not just those sold by HP. Based on a foundation of extensive interoperability testing, EBS 1-2-3 provides a step-by-step methodology for designing, configuring, and implementing your SAN ensuring HP ESL G3 tape libraries work seamlessly in many environments. HP ESL G3 libraries are especially suitable if you have a mixed system environment. For the latest list of servers, workstations, operating systems, and backup software that support HP ESL G3, check the tape backup compatibility pages on our web site at: http://www.hp.com/go/ebs.

HP Server Compatibility   The HP ESL G3 Tape Libraries are supported on the following classes of HP systems:

- HP ProLiant servers
- HP-UX Servers
- HP AlphaServers

NOTE: For details on interoperability, including third-party systems, visit: http://www.hp.com/go/ebs for the latest hardware compatibility information.

OS Support   The HP ESL G3 Tape Libraries are supported on the following operating systems:

- HP-UX
- AIX
- Linux
- NetWare
- OVMS
- Tru64
- Solaris
- Windows

NOTE: Please visit: http://www.hp.com/go/ebs for the latest compatibility information.

Software Support   The HP ESL G3 Tape Libraries are supported on the following ISV's:

- HP Data Protector
- Computer Associates ARCserve
- EMC Legato Networker
- IBM Tivoli Storage Manager
- Symantec VERITAS Backup Exec
- Symantec VERITAS NetBackup

NOTE: Please visit: http://www.hp.com/go/ebs for the latest compatibility information.

Service and Support, HP Care Pack, and Warranty Information

Warranty Included with the Product	**ESL G3 Hardware**: The warranty for this product consists of 1-year onsite, next business day. **NOTE:** The HP ESL Enterprise Tape Library 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 **ESL G3 Software**: HP warrants that the Software media will be free of physical defects for a period of ninety (90) days from delivery. HP provides 1-year, 9x5 phone support to enhance the performance and availability of your software. Experienced Response Center engineers provide trustworthy advice on issues such as software features and use, problem diagnosis and resolution, and software defect identification. For business-critical requirements, the level of support may be increased through a full range of upgrade products. You can learn more about HP's Global Limited Warranty and Technical Support by visiting: http://h18006.www1.hp.com/products/warranty.html
Service and Support	**Technology Services for increased uptime, productivity and ROI** TRUST HP storage technology experts for every level of service and support. Our integrated portfolio of Services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. Capitalizing on HP Storage Systems' capabilities requires a service partner who understands your increasingly complex environment. Team with the people who know HP infrastructure hardware and software best-the experienced professionals at HP Services. **Protect your business beyond warranty** Warranty protects against manufacturer defects, however warranty uplifts, such as HP Care Pack Services protect the business-by reducing downtime risks and providing operational consistency for mission-critical and standard business computing. **What HP Storage Technology Services can do for you** HP Storage Technology Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. HP storage lifecycle support services offers a full spectrum of customer care-from technology support to complex migrations to complete managed services. **Choose the right level of support, deployment and integration services** HP support recommendations are designed to help you enhance technology operations and lower risk-and make it easier for you to seek the right balance between affordability and service-level commitments. Depending on your individual support needs, choose from three levels of care that cover the entire lifecycle to better address your needs-Optimized Care, Standard Care, and Basic Care. If none of our support recommendations meet your needs, we can tailor a service solution for your unique support requirements. Only HP brings together deep expertise, proactive and business critical support and a strong partner network-plus, a full set of infrastructure services designed to power a Converged Infrastructure.

Service and Support, HP Care Pack, and Warranty Information

Optimized Care- delivers best performance and stability through deployment and proactive management practices	**HP Proactive Care 24x7-** for a higher return on your storage investment, Proactive Care delivers hardware and software support services designed specifically for your technology; rapid access to Advanced Solution Center Specialists plus, Firmware/Software management and best practice advice. Customers can optimize the return on their IT investment and realize the advantage of running their business critical applications on virtualized/x86 infrastructure. **Plus,40 credits per year,** select from an extensive menu of consultancy and technical services, such as onsite firmware upgrades, health checks, assessments, and education.
Standard Care-maintains high level of uptime, along with expert help to cut the cost and complexity of implementation and support	**HP Proactive Care 24x7-** for a higher return on your storage investment, Proactive Care delivers hardware and software support services designed specifically for your technology; rapid access to Advanced Solution Center Specialists plus, Firmware/Software management and best practice advice. Customers can optimize the return on their IT investment and realize the advantage of running their business critical applications on virtualized/x86 infrastructure. **Plus,40 credits per year,** select from an extensive menu of consultancy and technical services, such as onsite firmware upgrades, health checks, assessments, and education.
Basic Care-Minimum recommended support	**Support Plus 24-**For a higher return on your server and 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. **Plus, 10 credits per year,** select from an extensive menu of consultancy and technical services, such as onsite firmware upgrades, health checks, assessments, and education
Implementation	Installation: Installation and start up service for ESL: This comprehensive service provides for the implementation of HP Storage ESL (Enterprise Storage Library). Datasheet - http://athp.hp.com/portal/go/5981-7355
Remote Support Tools	HP Insight Remote Support-: Available at no additional cost to all warranty, HP Care Pack Service and service agreement customers, uses proven technology to deliver secure, reliable 24x7 remote monitoring, diagnosis and problem resolution. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-4676ENW.pdf

Service and Support, HP Care Pack, and Warranty Information

For more information   www.hp.com/services/storage
To learn more on HP Storage Services, please contact your HP sales representative or HP Authorized Channel Partner

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 www.hp.com/go/lookuptool

Configuration Information

Step 1 - "Product" - Base Configurations

Select one:

All library bundles include:

- Ethernet crossover cable for service/diagnostics
- HP ESL G3 Tape Library Unpacking and Installation instructions
- HP LTO-4 / LTO-5 RW barcode label sample kits
- HP LTO-4 / LTO-5WORM barcode label sample kits

Model	Part Number
HP ESL G3 100 slot Tape Library	QN998A

- Includes one control module with 24-slot I/E station, zero drives, and 100 slots enabled
- **NOTE:** As drives are added, additional Expansion Modules may be required to maintain desired slot count. Please use the HP Sizing Tool, or other configuration tools to ensure desired capacity is achieved

Model	Part Number
HP ESL G3 300 slot Tape Library	QN999A

- Includes one control module with 24-slot I/E station, zero drives, and 300 slots enabled
- **NOTE:** As drives are added, additional Expansion Modules may be required to maintain desired slot count. Please use the HP Sizing Tool, or other configuration tools to ensure desired capacity is achieved

Model	Part Number
HP ESL G3 700 slot Tape Library	QP001A

- Includes one control module with 24-slot I/E station, one expansion module, zero drives, and 700 slots enabled
- **NOTE:** As drives are added, additional Expansion Modules may be required to maintain desired slot count. Please use the HP Sizing Tool, or other configuration tools to ensure desired capacity is achieved

Model	Part Number
HP ESL G31500 slot Tape Library	QP002A

- Includes one control module with 24-slot I/E station, three expansion modules, zero drives, and 1500 slots enabled
- **NOTE:** As drives are added, additional Expansion Modules may be required to maintain desired slot count. Please use the HP Sizing Tool, or other configuration tools to ensure desired capacity is achieved

Model	Part Number
HP ESL G3 3000 slot Tape Library	QP003A

- Includes one control module with 24-slot I/E station, seven expansion modules, zero drives, and 3000 slots enabled
- **NOTE:** As drives are added, additional Expansion Modules may be required to maintain desired slot count. Please use the HP Sizing Tool, or other configuration tools to ensure desired capacity is achieved

Model	Part Number
HP ESL G3 5000 slot Tape Library	QP004A

- Includes one control module with 24-slot I/E station, eleven expansion modules, zero drives, and 5000 slots enabled
- **NOTE:** As drives are added, additional Expansion Modules may be required to maintain desired slot count. Please use the HP Sizing Tool, or other configuration tools to ensure desired capacity is achieved

NOTE:

Configuration Information

- Customers are required to also purchase the necessary number of drives, host bus adapters, Fibre Channel cables, tape media, power cords and applications software licenses in order to complete the library solution.
- Installation services will be quoted as part of each library order.
- The Control Module in each Base Configuration includes 1 power supply as part of the Drive 1-6 Readiness Kit (QQ002A) for that module.
- Expansion Modules that contain tape drives will include 1 power supply as part of the Drive 1-6 Readiness Kit (QQ002A) for that module.
- Expansion Modules with no drives do not require or include a power supply.
- 1 Redundant Power Supply (QP008A) can be added to each frame/module that already has a standard power supply

Step 2 - Required Options

Select each required option with quantities specified.

Model Name	Part Number
HP ESL G3 LTO-5 Ultrium 3280 FC Drive Kit	QP005A

Quantity: 1 to 12 drives per frame; up to 96 drives maximum

Single tape drive. Parts shipped include:

- Installation Poster
- One cross-over Ethernet cable for internal drive/library connection

Model Name	Part Number
HP ESL G3 LTO-4 Ultrium 1840 FC Drive Kit	QP006A

Quantity: 1 to 12 drives per frame; up to 96 drives maximum

Single tape drive. Parts shipped include:

- Installation Poster
- One cross-over Ethernet cable for internal drive/library connection

NOTE: For each frame/module that contains 1 to 6 drives, a QQ002A HP ESL G3 Drive 1-6 Readiness Kit must be quoted. For each frame/module that contains 7 to 12 drives, a QQ003A HP ESL G3 Drive 7-12 Readiness Kit must be quoted. Frames without drives do not contain Drive Readiness Kits.

Step 3 - Additional Options

Select each option with quantities specified.

Model Name	Part Number
HP ESL G3 Dual Robot Expansion and Conversion Kit	B4J75A

NOTE: For libraries purchased before June 2012 (HW Revision 1, with Control Module SKU QQ007A). Please check library front panel for HW Revision number. If no "HW Revision" is displayed, this indicates Revision 1.
Only one kit per library is needed regardless of library size.
Kit Includes: Includes gear rails, cables, and controller-board upgrades for both the Control Module and all Expansion Modules, to allow a second fail-over robot to be added to ESL G3. Also includes two new "Hardware Revision 2" robots and a Parking Module

Configuration Information

HP ESL G3 Dual Robot Expansion Kit   B4J74A

> **NOTE:** For libraries purchased after June 2012 (HW Revision 2, with Control Module SKU QQ007B). Please check library front panel for HW Revision number. If no "HW Revision" is displayed, this indicates Revision 1.
> Only one kit per library is needed regardless of library size.
> Kit Includes: One Parking Module and one Hardware Revision 2 robots

HP ESL G3 Expansion Module (For HW Revision 1)   QP007A

> Quantity: Up to 11 EM frames maximum per library
> 1 add-on frame to expand the number of storage slots, I/E stations, and/or tape drives beyond the Base Configurations above.
> **NOTE:** For libraries purchased before June 2012 (HW Revision 1, with Control Module SKU QQ007A). Please check library front panel for HW Revision number. If no "HW Revision" is displayed, this indicates Revision 1.
> **NOTE:** Does not include dual robotics capability

HP ESL G3 Expansion Module (For HW Revision 2)   QP007B

> Quantity: Up to 11 EM frames maximum per library
> 1 add-on frame to expand the number of storage slots, I/E stations, and/or tape drives beyond the Base Configurations above.
> **NOTE:** For libraries purchased after June 2012 (HW Revision 2 and used with Control Module SKU QQ007B).
> **NOTE:** Does not include dual robotics capability

HP ESL G3 100-Slot Capacity Upgrade License   TC345A

> Quantity: One license for every 100 slots
>
> Base Configurations above ship with the specified number of slots (100, 300, 700, etc.) already enabled. To enable additional slots beyond the Base Configuration number, order 1 license for each additional 100 slots you want to enable. Each license enables approximately 100 slots, until the physical maximum number of slots is reached.

ESL G3 Redundant (2N) Power Supply   QP008A

> Quantity: 1 per frame
>
> One redundant power supply can be added to a Control Module or any Expansion Module which has one power supply already installed. (Note: Expansion Modules with no tape drives do not include or require a power supply)

HP ESL G3 24-Slot Import/Export station   QP009A

> Quantity: 1 per frame (choose 24- or 72-slot)
>
> The Control Module in each Base Configuration above comes standard with a 24-slot Import/Export station. Expansion frames do not include an Import/Export station. Either a 24-slot or 72-slot Import/Export station can be added to each Expansion Module

HP ESL G3 72-Slot Import/Export station   QP010A

> Quantity: 1 per frame (choose 24- or 72-slot)
>
> The Control Module in each Base Configuration above comes standard with a 24-slot Import/Export station. Expansion frames do not include an Import/Export station. Either a 24-slot or 72-slot Import/Export station can be added to each Expansion Module

Configuration Information

HP ESL G3 Licenses

HP ESL G3 Command View TL License   TC347A

> One per library

> Provides management and control through a single pane of glass, while TapeAssure provides comprehensive summaries and detailed information about the status, performance, utilization, and health of all tape drives and tape media. Utilization and performance reporting features allow you to optimize the use of your HP ESL G3 Tape Libraries and Tape Drives

> Parts shipped:

> - Instructions to obtain and install a License key
> - End-User License Agreement

HP ESL G3 Secure Manager License   TC346A

> One per library

> Provides an additional level of security that lets you control access to the tape library by authorizing specific servers to access the library's drives and robotics. Secure Manager increases backup reliability by blocking disruptive traffic from unauthorized hosts to the library, which is one of the main causes of failed or incomplete backups

> Parts shipped:

> - Instructions to obtain and install a License key
> - End-User License Agreement

HP ESL G3 Automated Media Pool License   TC342A

> Permanent License for the Automated Media Pool. Enables the creation of a virtual partition to dynamically allocation to other, previously-created partitions, all without disrupting backup application operation.

> **NOTE:** The TC343A Partitioning License must be installed before Automated Media Pool will function

> Parts shipped:

> - Instructions to obtain and install a License key
> - End-User License Agreement

HP ESL G3 Partitioning License   TC343A

> One per library

> Permanent License for Library Partitioning. Enables the creation of up to 16 virtual partitions. Note that I/E station slots can be split and shared among different partitions. Each partition must be allocated at least 1 tape drive

> Parts shipped:

> - Instructions to obtain and install a License key
> - End-User License Agreement

HP ESL G3 ESKM Encryption Key License   TC344A

Configuration Information

One per library

Permanent License for Encryption Key (ESKM). Enables the library to request encryption keys from HP's Enterprise Secure Key Manager (ESKM) version 2.1 and above, for strong encryption management.

Parts shipped:

- Instructions to obtain and install a License key
- End-User License Agreement

HP ESL G3 KMIP License for SafeNet   B4J73A

One per library

Enables the library to request encryption keys from SafeNet's KeySecure 460 key manager, for encryption management

Parts shipped:

- Instructions to obtain and install a License key
- End-User License Agreement

HP ESL G3 Control Path Failover License   TC348A

One per library

Permanent License for Control Path Failover. Enables failover of the robotics control path if a cable or path failure is detected

Parts shipped:

- Instructions to obtain and install a License key
- End-User License Agreement

HP ESL G3 Data Path Failover License   TC349A

One per library

Permanent License for Data Path Failover. Enables automatic failover between two Fibre ports on each drive, if a cable or path failure is detected.

Parts shipped:

- Instructions to obtain and install a License key
- End-User License Agreement

Related Options

Media		
	HP LTO-5 Ultrium 3TB RW Data Cartridge	C7975A
	HP LTO-5 Ultrium 3TB WORM Data Cartridge	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 Ultrium Universal Cleaning Cartridge 1 pack	C7978A
	Bar Code Labels	
	HP LTO-5 Ultrium RW Bar Code Label Pack	Q2011A
	HP LTO-5 Ultrium WORM Bar Code Label Pack	Q2012A
	HP LTO-4 Ultrium RW Bar Code Labels 100 pack	Q2009A
	HP LTO-4 Ultrium WORM Bar Code Labels 100 pack	Q2010A
	Non-Custom Labeled Data Cartridges	
	NOTE: Non-Custom labels will come pre-labeled with a pre-determined number sequence.	
	HP LTO-5 Ultrium Non-custom Labeled Data Cartridge 20 Pack	C7975AN
	HP LTO-4 Ultrium 1.6TB RW Non-Custom Labeled Data Cartridge 20 pack	C7974AN
	Custom labeled Data Cartridges	
	NOTE: Custom labeled products allow customers to customize a specific sequence printed on each label.	
	HP LTO-5 RW Custom Labeled Data Cartridge 20 Pack	C7975AL
	HP LTO-5 RW Custom Labeled No Case Data Cartridge 20 Pack	C7975AC
	HP LTO-5 WORM Custom Labeled 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

Host Bus Adapters and Controllers	**NOTE:** For a complete list of supported HBA's, please visit: http://www.hp.com/go/ebs.

Fibre Channel Cables	**NOTE:** Fibre Channel Cables are required. Order one or two cables per drive, selecting cable length and converter type to match the appropriate environment.	
	HP LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
	HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
	HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

Related Options

Power Cord

WARNING: Use of a non-HP approved power cord may result in (1) use of a power cord that does not meet individual country specific safety requirements; (2) a power cord with insufficient conductor ampacity that could result in overheating with potential personal injury and/or property damage; and/or (3) an unapproved power cord could fracture resulting in the internal contacts being exposed which potentially could subject the user to a shock hazard. Use ONLY an HP approved power cord for your particular country. HP disclaims all liability in the event a non-HP approved power cord is used.

HP ESL G3 North American 220v Power Cord	QQ005A
HP ESL G3 International 240v Power Cord	QQ006A

- All power cords are 14 feet (4.26m) in length
- Specifications for "North America" power cord: Single phase, 50-60Hz, 208V, 30A max, NEMA L6-30 connector
- Specifications for "International" power cord: Single phase, 50-60Hz, 240V, 16A max, IEC60309 2P+E connector

Power Calculator

The power calculator is available on line at below link, it will allow to estimate the power required based on the given ESL G3 configuration.
http://h18004.www1.hp.com/products/solutions/power/index.html?jumpid=reg_R1002_USEN

- Please open the above link and on the right hand side column under "Additional Tools" please click on the "Power Calculators: G4 and before".
- Please scroll down to the bottom and click on ESL G3 (under Storage products), after accepting the license agreement power calculator will be displayed on your screen.

QuickSpecs

Technical Specifications

Dimensions	Form Factor	Free standing
	Control module - Physical (HxWxD)	77.4 x 24.3 x 38.3 inches (196.6 x 61.7 x 97.4 cm)
	Expansion Module - Physical (HxWxD)	77.4 x 23.6 x 38.3 inches (196.6 x 59.9 x 97.4 cm)
	Control Module - Shipping (HxWxD)	77.4 x 24.3 x 38.3 inches (196.6 x 61.7 x 97.4 cm)
	Expansion Module Shipping (HxWxD)	77.4 x 23.6 x 38.3 inches (196.6 x 59.9 x 97.4 cm)

Weight		
Control Module	**Out of box**	lbs 899 (407.8 kg)
	Shipping	lbs 1135 (514.8 kg)
Expansion Module	**Out of box**	lbs 885 (401.4 kg)
	Shipping	lbs 1121 (508.5 kg)
Storage Only Expansion Module	**Out of box**	lbs 777 (352.4 kg)
	Shipping	lbs 1013 (459.5 kg)

NOTE: The Control & Expansion module weight includes, 12 drives, redundant power & full of media. Storage Only Expansion Modules includes only Media.

SCSI Identification	Product ID	ESL G3
	Vendor ID	HP

Control Panel	Library Status
	Load Port controls
	Library Diagnostics
	Basic Library Operations

Drive Host Interface	Fibre Channel, 8Gb/4Gb/2Gb Multi-mode optical, LC connector (LTO-5) or 4Gb/2Gb/1Gb Multi-mode optical, LC connector (LTO-4)
Robotic and Host Interface	Fibre Channel, 4Gb/2Gb/1Gb Multi-mode optical, LC connector
Library Management Interface	One RJ-45 Ethernet port, 10/100Base-T.

Drive Performance (1Kb = 1,000 bytes)		LTO-5 Ultrium 3280 FC	LTO-4 Ultrium 1840 FC
	Native Data transfer rate	140 MB/s with LTO 5 media 120 MB/s with LTO 4 media	120 MB/s with LTO 4 media
	Data transfer rate, compressed (assumes 2:1 data compression)	280 MB/s with LTO 5 media 240 MB/s with LTO 4 media	240 MB/s with LTO 4 media
	Data rate matching range **Data access time** (from BOT)	47-140 MB/s	40-120 MB/s 62 seconds typical for LTO 4 media

Technical Specifications

	Average load time	<19 seconds (RW) <22 seconds (WORM	<19 seconds (RW) 22 seconds (WORM-initialized) Uninitialized WORM media can take up to 70 seconds
	Average unload time	<19 seconds (RW) <22 seconds (WORM-initialized) Uninitialized	<19 seconds (RW) 22 seconds (WORM-initialized) Uninitialized WORM media can take up to 70 seconds
Maximum Storage Capacity	**Native Capacity**	7.5PB	3.75PB
	Compressed Capacity	21.3PB	7.5PB
	NOTE: Compressed data listed above is assuming 2:1 compression.		
Bulk load unload station	528 slots	Maximum number of I/E Slots	
	NOTE: Minimum of 24 slot I/E station comes with each library. An additional 24-slot or 72-slot I/E station can be added to any of the Expansion Modules up to a maximum of 528 slots.		
Initialization (cartridge inventory) **time**	Less than 3 minutes, fully loaded with labeled cartridges		
Cartridge Swap Time	18 to 20 seconds, consisting of two Move Medium commands		
Input Requirements	Auto-range to domestic and international AC voltages		
	Nominal / Range Line Frequency	50 Hz / 60Hz	
	Range Line Voltage	200 VAC to 240 VAC	
	Typical Input Current	8A max	
Power Consumption	VA max 1600W (Standard 2N power)		
Connectors	FC	LC Connector	
Drives Supported	Native Fibre Drives: LTO-5 Ultrium 3280 FC and LTO-4 Ultrium 1840 FC		
Maximum Number of Drives	12 drives in a single frame up to maximum of 96 drives with multiple expansion frames		
Acoustic Noise	Sound Power Level	Operating 7.3 Bel Idle 7.3 Bel	
Reliability (Library Only)	**MTBF**	250,000 power-on hours 100% duty cycle	
	MSBF	3 million load/unload cycles (rated)	
	MTTR	Less than 30 minutes	
Relative Humidity (non-condensing)	**Operating**	Operating: 20% to 80% non-condensing	
	Shipping	Shipping & Storage: 5% to 95% non-condensing	
Temperature Range	**Operating**	Dry Bulb: 15° to 32° C/59° to 90° F Wet Bulb: 25° C (77° F) maximum	
	Shipping	Dry Bulb: -40° to 66° C/-40° to 151° F Wet Bulb: 46° C (115° F) maximum	
Regulatory Compliance	**Safety**	UL60950-1:2003,1st ED. (USA); IEC 60950:1999 3rd ED; 60950:2000 (international)	
	EMC	CISPR 22/class A, CISPR 24, FCC/Class A	

Technical Specifications

Country Regulatory Compliance   For country specific compliance contact your local sales representative.

Regulatory Model Number LVLDC–0301