IBM TS4300 Tape Library for Lenovo
Product Guide

IBM TS4300 Tape Library for Lenovo (Machine Type 6741) combines IBM enterprise tape automation and reliability with open system affordability. It is a high-density, highly scalable, easy-to-manage solution designed to keep data securely stored long-term, while helping reduce the costs associated with data center space and utilities.

The TS4300 utilizes modular design to meet growing long-term storage requirements. Starting with a single 3U base module, customers can scale the tape library by adding up to six 3U expansion modules for the overall capacity of up to 280 LTO cartridges. Each 3U base or expansion module can house up to 40 cartridges in two removable magazines.

Each 3U module can accommodate up to three half-high tape drives or a combination of one half-high tape drive and one full-high tape drive. The choice of the tape drives includes IBM LTO Ultrium 8, Ultrium 7, and Ultrium 6 tape drives with SAS or Fibre Channel host connectivity interfaces.

The TS4300 is an ideal solution if you need a larger capacity or higher performance tape backup. This library is an excellent choice for tape automation for Lenovo servers running Windows and Linux operating systems.

Figure 1. IBM TS4300 Tape Library for Lenovo: Base module (bottom) with one expansion module (top)

Did you know?

Featuring the latest LTO Ultrium 8 technology, the TS4300 Tape Library provides up to 3.36 PB of native backup storage.

With IBM LTO Tape offerings that are available from Lenovo, Lenovo can be your trusted partner that offers "one stop shop" and single point of contact for delivery of leading edge technologies and innovations from Lenovo and other leading IT vendors. These offerings can satisfy the wide range of your end-to-end IT infrastructure needs, including end-user devices, servers, storage, networking, services, management software, and financing.

Key features

The TS4300 tape library offers the following features:

- Scalable tape library that is designed for high capacity, high performance, and high reliability.

- Adherence to LTO specifications.

- Support for half-high (HH) or full-high (FH) LTO Ultrium 8, Ultrium 7, or Ultrium 6 tape drives with 6 Gb SAS or 8 Gb Fibre Channel interfaces.

- Support for up to three half-high tape drives or a combination of one full-high tape drive and one half-high tape drive in each 3U module. The maximum number of drives in the tape library ranges from up to 7 full-high and up to 7 half-high to up to 21 half-high tape drives.

- Native data transfer rate of up to 360 MB/s (Ultrium 8 FH), 300 MB/s (Ultrium 8 HH or Ultrium 7), or up to 160 MB/s (Ultrium 6) per tape drive.

- Native cartridge capacity of up to 12 TB (Ultrium 8), 9 TB (Ultrium 7 initialized LTO 8 Type M), 6 TB (Ultrium 7), or 2.5 TB (Ultrium 6).

- Two removable magazines in each 3U module that can house up to 20 data cartridges each for a total of up to 280 cartridges in the tape library to enable quick population of the tape library and ease the storage needs for media.

- Flexibility in configuring a 5-slot I/O Station for each module, or one I/O Station can be accessed by several modules to help support continuous library operations, while importing and exporting media with little or no disruption to library operation.

- A standard high-speed bar code reader with which you can operate the TS4300 in random access mode. Sequential mode is not currently supported.

- Mixed media support, including IBM LTO Ultrium 8, 7, and 6 WORM (Write Once Read Many) media (not available from Lenovo).

- Remote management capabilities to allow for remote administration of the TS4300 through a web interface.

- Multi-path feature to allow sharing of the library robotics across heterogeneous applications independently of each other. The library can be partitioned into up to 21 logical libraries (each partition must have at least one drive). It also can provide each logical library its own separate and distinct drives, storage slots, and control paths.

- Optional Library Managed Encryption on LTO Ultrium 8, Ultrium 7, and Ultrium 6 tape drives by using the IBM Security Key Lifecycle Manager software (not available from Lenovo).

- Optional Path Failover that enables the host device driver to transparently switch to an alternative path if there is a communication path failure to the application.

- Extra power supplies for redundant operations.

- 6 Gb SAS or 8 Gb Fibre Channel attachments for connection to Lenovo servers that run Microsoft Windows or Linux server operating systems.

- Support from an extensive ecosystem of backup software vendors.

The IBM LTO Ultrium Tape Drives includes the following other IBM LTO Ultrium features:

- Dual-stage head actuator
  The 16-channel actuator (LTO Ultrium 6) or 32-channel actuator (LTO Ultrium 7 and Ultrium 8) provides precision head alignment to help support higher track density and improved data integrity.

- Independent tape loader and threader motors and positive pin retention
  These technologies help improve the reliability of loading and unloading a cartridge, and to retain the pin even if tension is dropped. An independent loader motor, coupled with the positive pin retention, causes the tape to thread with a higher level of reliability.

- Graceful dynamic braking
  If there is a power failure, reel motors maintain tension and gradually decelerate instead of stopping abruptly, which helps reduce tape breakage, stretching, or loose tape wraps during a sudden power outage.

- Servo and track layout technology
  There are 6656 data tracks in Ultrium 8, 3584 data tracks in Ultrium 7, and 2176 data tracks in Ultrium 6. The high-bandwidth servo system features a low mass servo to help more effectively track servo bands and improve data throughput with damaged media in less-than-optimal shock and vibration environments.

- Surface Control Guiding Mechanism
  The IBM patented Surface Control Guiding Mechanism guides the tape along the tape path in the Ultrium 8, 7, and 6 Tape Drives. This method uses the surface of the tape (rather than the edges) to control tape motion. This configuration helps reduce tape damage (especially to the edges of the tape) and tape debris, which comes from the damaged edges and can accumulate in the head area.

- Giant magnetoresistive (GMR) head design (LTO Ultrium 7 and 6 tape drives)
  IBM LTO Ultrium 7 and 6 Tape Drives use GMR head technology with beveled contouring for reducing striction and friction. This head design was demonstrated in enterprise tape products to help minimize contact, edge damage, debris accumulation, and wear on the tape as it moves over the read/write heads.

- Tunneling magnetoresistive (TMR) head technology (LTO Ultrium 8 tape drives)
  IBM LTO Ultrium 8 Tape Drives use TMR head technology, which helps achieve increased storage capacity and high data integrity.

- Digital speed matching
  The LTO Ultrium Tape Drives perform dynamic speed matching to adjust the drive's native data rate as closely as possible to the net host data rate (after data compressibility is factored out). This matching helps reduce the number of backhitch repositions and improve throughput performance.

- Robust drive components optimized for automation environments
  To help enhance reliability and prolong the life of the drives, some of the most robust components available are used such as an all metal clutch, steel ball bearings in loader, robust leader block design, and a single circuit card.

- Power management
  The power management function of the Ultrium 8, 7, and 6 Tape Drives controls the drive electronics to be completely turned off or in a low-power mode when the circuit functions are not needed for drive operation.

- Adaptive read equalization
  This equalization automatically compensates for dynamic changes in readback signal response.

- Dynamic amplitude asymmetry compensation
  This compensation dynamically optimizes readback signals for linear readback response from MR read head transducers.

- Separate writing of multiple filemarks
  Separate writing of multiple filemarks evokes any write command of two or more filemarks to cause a separate data set to be written that contains all filemarks after the first. It helps improve performance if a subsequent append overwrites somewhere after the first filemark. This change helps prevent having to rewrite data sets that contain customer data and the first filemark, if such an append occurs.

- LTO Data Compression (LTO-DC)
  The Ultrium LTO uses LTO-DC, which is an implementation of a Lempel-Ziv class 1 (LZ-1) data compression algorithm. LTO-DC is an extension of Adaptive Lossless Data Compression (ALDC) and an improvement over previous IBM lossless compression algorithms. IBM patented "Scheme-Swapping" compression looks ahead at incoming data and determines the most efficient storage method (ALDC or pass-through mode) to help optimize data compression and increase data throughput. The compression ratio is up to 2.5 to 1 for LTO Ultrium 8, 7, and 6.

- LTO Cartridge Memory (LTO-CM)
  Contained within the LTO Ultrium data cartridge is the LTO-CM, which is a passive, contactless silicon storage device that is physically a part of the cartridge. The LTO-CM holds information about that specific cartridge, the media in the cartridge, and the data on the media. The storage capacity of the Generation 8, 7, and 6 LTO-CM is 16320 bytes. Communication between the drive and the LTO-CM is via a low-level RF field transmitted by the drive to the cartridge.

- Statistical Analysis and Reporting System (SARS)
  The Ultrium Tape Drive uses SARS to help isolate failures between media and hardware. SARS uses the cartridge performance history that is saved in the CM module and the drive performance history that is kept in the drive flash EEPROM to help determine the likely cause of failure. SARS causes the drive to request a cleaner tape, mark the media as degraded, and indicate that the hardware degraded.

- Highly integrated electronics that uses IBM engineered copper technology
  This technology reduces the total number of components in the drive, helps lower chip temperatures, and reduces power requirements to deliver a more reliable drive. The sixth-generation drive electronics provide error correction of soft errors in the memory arrays in data and control paths.

Components and connectors

The following figure shows the front of the TS4300 Tape Library base module.
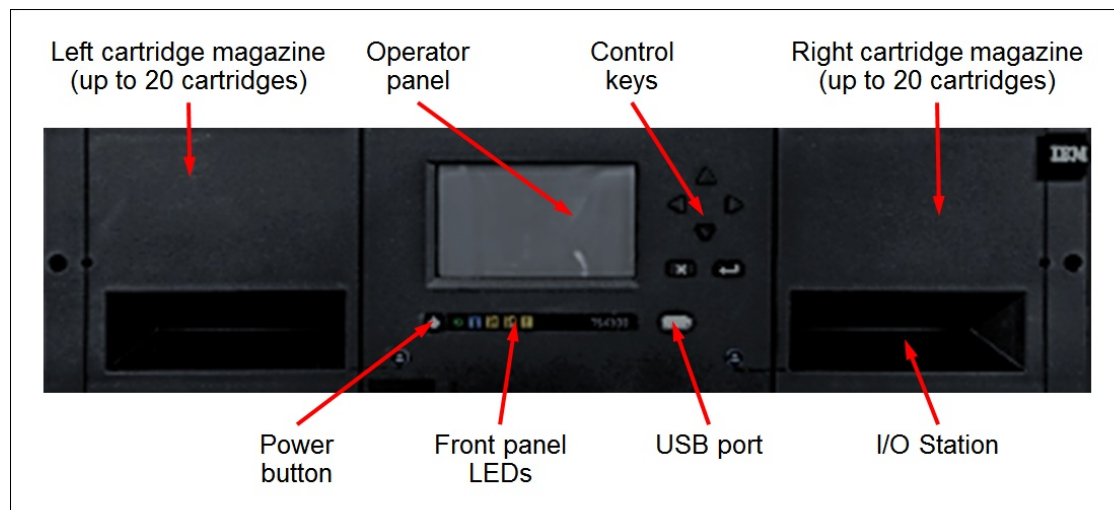

Figure 2. Front view of the TS4300 Tape Library base module

The following figure shows the front of the TS4300 Tape Library expansion module.

Figure 3. Front view of the TS4300 Tape Library expansion module

The following figure shows the rear of the TS4300 Tape Library base module with the half-high Fibre Channel drive sled and half-high SAS drive sled.
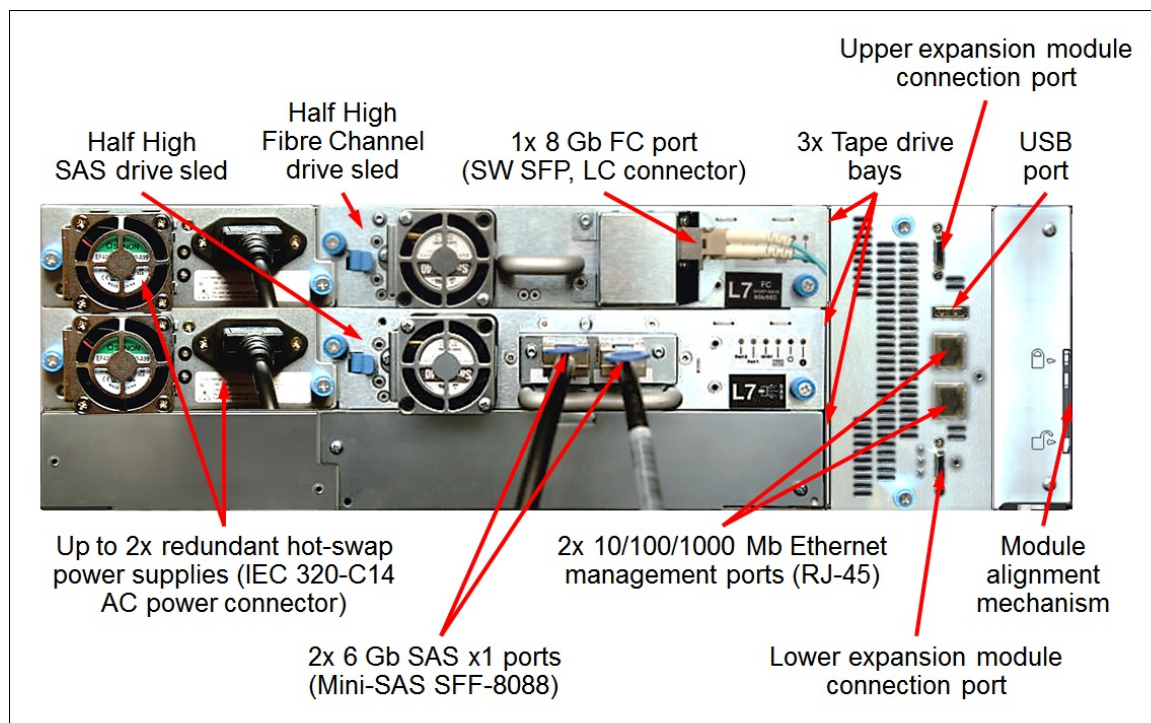

Figure 4. Rear view of the TS4300 Tape Library base module

The following figure shows the rear of the TS4300 Tape Library expansion module with the full-high Fibre Channel drive sled.
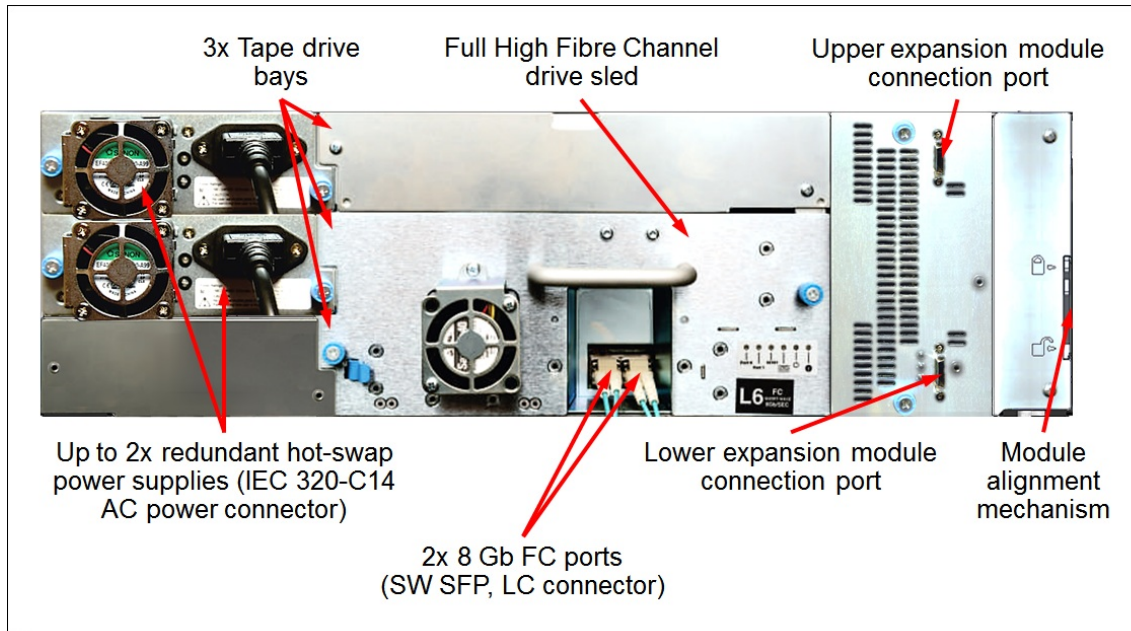

Figure 5. Rear view of the TS4300 Tape Library expansion module

System specifications

The following table lists the TS4300 Tape Library system specifications.

Table 1. System specifications

Attribute	Specification
Form factor	- Base module: 3U rack-mount or stand-alone. - Expansion module: 3U rack-mount; up to 6 expansion modules. 7-module library: 21U rack-mount.
Drive technology	LTO Ultrium 8, LTO Ultrium 7, and LTO Ultrium 6 Full-High (FH) and Half-High (HH) tape drives.
Drive interface	- Half-High SAS tape drive: 2x 6 Gb SAS x1 ports (Mini-SAS SFF-8088). - Half-High FC tape drive: 1x 8 Gb FC port (short-wave [SW], LC connector). - Full-High FC tape drive: 2x 8 Gb FC ports (short-wave, LC connector).
Maximum number of drives	- Per module: Up to 1x full-high and 1x half-high tape drives, or up to 3x half-high tape drives. - Per 7-module library: From up to 7x full-high and 7x half-high tape drives to up to 21x half-high tape drives.
Number of cartridge slots	- Per module: 40. - Per 7-module library: 280.
Configurable I/O station slots	- Per module: 5. - Per 7-module library: 35.
Native cartridge capacity	- LTO 8 (L8): 12 TB. - LTO 7 initialized LTO 8 Type M (M8): 9 TB. - LTO 7 (L7): 6 TB. - LTO 6 (L6): 2.5 TB.

Attribute	Specification
Native backup storage capacity	Per module: • LTO 8 (L8): Up to 480 TB. • LTO 7 (M8): Up to 360 TB. • LTO 7 (L7): Up to 240 TB. • LTO 6 (L6): Up to 100 TB. Per 7-module library: • LTO 8 (L8): Up to 3.36 PB. • LTO 7 (M8): Up to 2.52 PB. • LTO 7 (L7): Up to 1.68 PB. • LTO 6 (L6): Up to 700 TB.
Native data transfer rate	Per drive: • LTO 8 FH: Up to 360 MB/s. • LTO 8 HH, LTO7: Up to 300 MB/s. • LTO 6: Up to 160 MB/s.
Software features	Library partitioning, Path Failover (optional), Library Managed Encryption (optional).
Security features	Secure Socket Layer (SSL), user level security, LDAP, LTO encryption (optional).
Management interfaces (Base module)	• Operator panel. • 2x 10/100/1000 Mb Ethernet ports (UTP, RJ-45) for remote management: Web-based GUI; SNMP and email notifications. • 2x USB ports (service technician use only).
Cooling	Fixed fans on the tape drives and power supplies.
Power supplies	Up to two redundant hot-swap 230 W AC 80 PLUS Silver power supplies (IEC 320-C14 power connector): • Base module: The first power supply is included; the second power supply is optional. • Expansion module: The first power supply is optional; the second power supply is optional. The first power supply is required if the expansion module contains a tape drive.
Hot-swap parts	SAS and Fibre Channel drive sleds, power supplies.
Dimensions	Base or expansion module: • Width: 446 mm (17.6 in.). • Depth: 873 mm (34.4 in.). • Height: 133 mm (5.2 in.).
Weight	• Base module: 21 kg (46.3 lb). • Expansion module: 13 kg (28.7 lb).
Warranty	Three-year customer-replaceable unit (CRU) limited warranty with 9x5 next business day parts delivered.
Service and support	Optional warranty service upgrades are available through Lenovo Services: onsite coverage, 24x7 coverage, 2-hour or 4-hour response time, 6-hour or 24-hour committed service repair (select countries), 1-year or 2-year warranty extensions.
Host operating systems*	Microsoft Windows Server 2012, 2012 R2, and 2016; Red Hat Enterprise Linux (RHEL) 6 and 7; SUSE Linux Enterprise Server (SLES) 12.
ISV backup software compatibility	Arcserve Backup, ASG Time Navigator, CommVault Simpana, Dell NetVault Backup, EMC NetWorker, IBM Spectrum Protect, HPE/Micro Focus Data Protector, Microsoft System Center Data Protection Manager, and Symantec NetBackup

* The operating systems shown are for Lenovo servers. The TS4300 might support other operating systems. For a full list of supported operating systems, refer to the System Storage Interoperation Center: http://ibm.com/systems/support/storage/ssic.

Models

The following table lists the ordering information for the TS4300 Tape Library models.

Table 2. TS4300 models

Description	Part number	Machine Type-Model	Feature code
IBM TS4300 3U Tape Library-Base Unit	6741A1F	6741L1U	B16H
IBM TS4300 3U Tape Library-Expansion Unit	6741A3F	6741L3U	B16J

The TS4300 Tape Library models include the following items:

- One TS4300 module with the following components:
    - Power supply (base module only)
    - Bar code reader (base module only)
    - Expansion cable (expansion module only)
- Two removable 20-cartridge magazines
- Documentation package

Notes:

- Tape drives are not included; at least one tape drive must be ordered with the TS4300 unit (See Tap drives for details).

- A power cable is not included. A rack power cable or a line cord must be ordered with the TS4300 unit (See Power supplies and cables for details).

- Rack mount kit is not included; it should be ordered with the TS4300 unit, if required (see the following table for details). Rack mount kit is required for each module if the configuration contains more than one module.

The following table lists the rack mount kit for the TS4300 units.

Table 3. Rack mount kit

Description	Part number	Feature code	Maximum quantity per module
Rack Mount Kit	01KP930	B16N	1

The following figure shows connectivity topology for the TS4300 tape library.
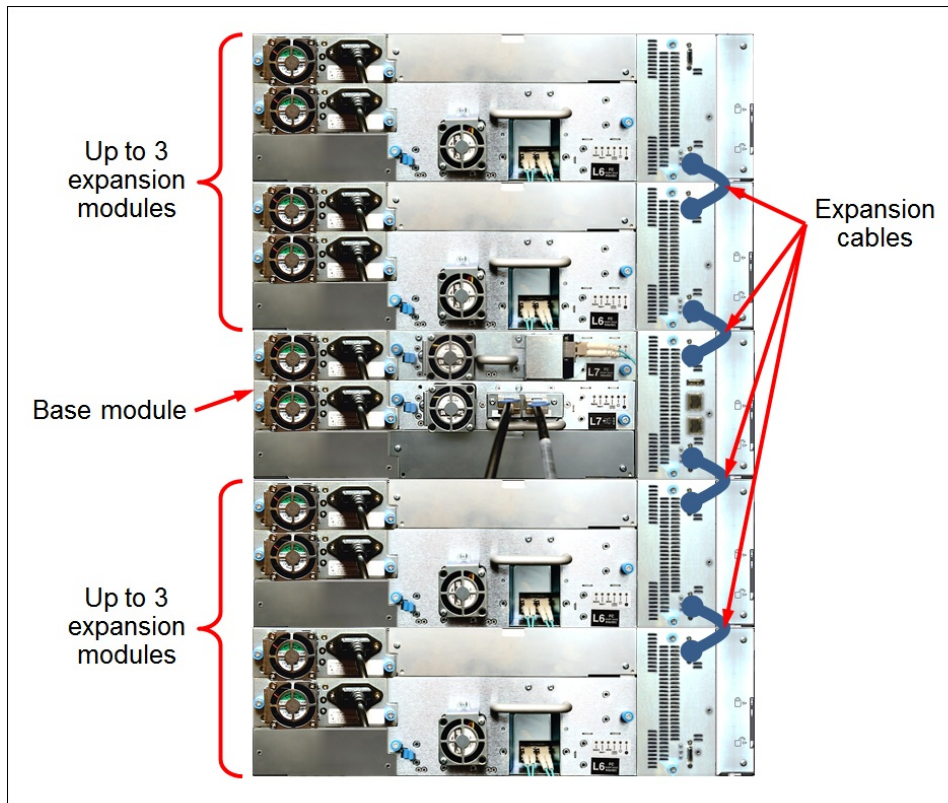
Figure 6. TS4300 tape library connectivity topology

Tape drives

Each TS4300 module (base or expansion) can accommodate up to three LTO Ultrium half-high tape drives or a combination of one LTO Ultrium half-high tape drive and one LTO Ultrium full-high tape drive.

The following table lists the supported tape drives for the TS4300.

Table 4. Tape drive options

Description	Part number	Feature code	Maximum quantity per module
Full High 8 Gb Fibre Channel			
LTO 8 FH Fibre Channel Drive	01KP954	B1ET	1
LTO 7 FH Fibre Channel Drive	01KP938	B16Y	1
LTO 6 FH Fibre Channel Drive	01KP935	B16V	1
Half High 8 Gb Fibre Channel			
LTO 8 HH Fibre Channel Drive	01KP952	B1ER	3
LTO 7 HH Fibre Channel Drive	01KP936	B16W	3
LTO 6 HH Fibre Channel Drive	01KP933	B16T	3
Half High 6 Gb SAS			
LTO 8 HH SAS Drive	01KP953	B1ES	3
LTO 7 HH SAS Drive	01KP937	B16X	3

Description	Part number	Feature code	Maximum quantity per module
LTO 6 HH SAS Drive	01KP934	B16U	3
Tape drive support (Wrap tool)			
Fibre Tape Drive Support (Wrap Tool)	01KP939	B16R	7
SAS Tape Drive Support (Wrap Tool)	01KP940	B16S	7

Configuration note: Tape drive support options provide wrap tools (loopback connectors) to isolate drive sled issues. The Fibre Tape Drive Support is required when at least one Fibre Channel tape drive is installed in the tape library, and the SAS Tape Drive Support is required when at least one SAS tape drive is installed in the tape library.

A SAS cable or Fibre Channel cable is required to attach a tape drive in the TS4300 Tape Library to a host. The following table lists supported cable options.

Table 5. Cable options

Description	Part number	Feature code	Maximum quantity per drive
SAS connectivity cables - Mini-SAS (SFF-8088 host) to Mini-SAS (SFF-8088 tape)			
Mini-SAS/Mini-SAS 4x Interposer (from HBA with SFF-8088 to max 4 cables with SFF-8088)	00NA077	AS0Y	1*
2 m Mini-SAS/Mini-SAS 1x Cable (host SFF-8088 to target SFF-8088)	00NA009	AS0Z	2
SAS connectivity cables - Mini-SAS HD (SFF-8644 host) to Mini-SAS (SFF-8088 tape)			
HD-SAS Cable to Mini-SAS (4 m)	00NV419	AS10	2
Y SAS HD to Mini-SAS Cable (3 m)	00NV420	AS12	2**
Fibre Channel connectivity cables			
10 m LC-LC Fibre Cable	01KP929	B16M	2
25 m LC-LC Fibre Cable	00NA087	6025	2

* The interposer is used on the host side to connect up to four SAS tape drives to a single Mini-SAS x4 port on a SAS HBA with up to four 2 m Mini-SAS to Mini-SAS cables (part number 00NA009).
** The Y SAS HD cable is used to connect up to two SAS tape drives to a single Mini-SAS HD x4 port on a SAS HBA.

Tape media

The TS4300 3U module supports up to 40 data cartridges and comes standard with two removable tape magazines with 20 cartridge slots each. More removable tape magazines can be ordered for the TS4300, if needed.

Note: The first release of the TS4300 tape library supported up to 32 cartridge slots, including up to four I/O station slots, in the single-module configurations and in the lowest module in the multi-module configurations. The second release of the TS4300 tape library supports up to 40 cartridge slots, including up to five I/O station slots, in the single-module configurations and in the lowest module in the multi-module configurations. Please contact a Lenovo service representative in your area for additional details.

The following table lists tape media options and extra magazines that can be ordered for the TS4300.

Table 6. Tape media and extra magazines

Description	Part number	Feature code	Supported tape drive types
Cleaning cartridge			
Ultrium Cleaning Cartridge (universal)	00NA017	AS1E	LTO 8, LTO 7, LTO 6
Data cartridges			
Ultrium 8 Data Cartridges 5-Pack	01KP955	B1EW	LTO 8
LTO M8 Uninitialized Data Cartridges 5-Pack	02JH005	B5XL	LTO 8
Ultrium 7 Data Cartridges 5-Pack	00WF771	ATNZ	LTO 8, LTO 7
Ultrium 6 Data Cartridges 5-Pack	00NA025	AS24	LTO 7, LTO 6
Optional magazines			
Right Side Magazine	01KP931	B16P	LTO 8, LTO7, LTO6
Left Side Magazine	01KP932	B16Q	LTO 8, LTO7, LTO6

LTO Ultrium tape drives support the following backward compatibility for previous generations of tape media:

- LTO Ultrium 8 tape drives can read and write LTO Ultrium 8, LTO Ultrium 7, and LTO 7 initialized LTO 8 Type M data cartridges.

- LTO Ultrium 7 tape drives can read and write LTO Ultrium 7 and Ultrium 6 data cartridges, and can read Ultrium 5 data cartridges.

- LTO Ultrium 6 tape drives can read and write LTO Ultrium 6 and Ultrium 5 data cartridges, and can read Ultrium 4 data cartridges.

Configuration notes:

- A 5-Pack of the Ultrium 6, 7, or 8 Data Cartridges includes five unattached barcode labels.

- An LTO 7 initialized LTO 8 Type M data cartridge is a new (unused) LTO 7 data cartridge labelled and initialized to support 9 TB native storage capacity in the LTO 8 tape drive. Once initialized, an LTO 8 Type M cartridge cannot be used in the LTO 7 tape drives, and it cannot be changed back to a 6 TB LTO 7 cartridge.

- LTO M8 Uninitialized Data Cartridges 5-Pack (02JH005) includes five uninitialized LTO 7 data cartridges and five M8 barcode labels. These cartridges will be automatically initialized by the tape library firmware while under the control of ISV applications that recognize the M8 barcode label.

Software

The functionality of the TS4300 can be expanded with the following optional software features:

- Path Failover
- Library Managed Encryption

The TS4300 offers an optional path failover feature that enables the host device driver to resend the command to an alternative control path for the same logical library to ensure smooth library operations if there is a communication error. With control path failover, the alternative control path can include another HBA, SAN, or library control path drive. The device driver starts error recovery and continues the operation on the alternative control path without interrupting the application.

IBM Ultrium 8, Ultrium 7, and Ultrium 6 tape drives are encryption-capable, and they support the following modes of encryption management:

- Library Managed: Available for Linux and Windows; requires the IBM Security Key Lifecycle Manager (SKLM).
- Application Managed: Available with third-party software such as IBM Spectrum Protect.

Library Managed Encryption requires an optional encryption license. Application Managed Encryption does not require a license.

The following table lists ordering information for optional software features for the TS4300.

Table 7. Optional software features for TS4300

Description	Part number	Feature code	Maximum quantity per library
6741 Path Failover	01KP984	B21P	1
6741 LTO Library Managed Encryption	01KP985	B21Q	1

Power supplies and cables

The TS4300 modules support up to two redundant hot-swap 230 W AC power supplies. The base module comes with one power supply, and the second power supply can be ordered for redundancy. The expansion module comes without power supplies, and the first power supply is required when at least one tape drive is installed in the expansion module.

The following table lists the power supply options for the TS4300.

Table 8. Power supply options for TS4300

Description	Part number	Feature code	Maximum quantity per module
First Power Supply	01KP928	B16L	1
Additional Power Supply	01KP927	B16K	1

The TS4300 modules and the power supply options ship without power cables. The power cables for the TS4300 are listed in the following table.

Table 9. Power cables

Description	Part number	Feature code	Maximum quantity per module
Line cords			
2.8m, 10A/120V, C13 to NEMA 5-15P (US) Line Cord	00NA027	AS29	2
2.8m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord	00NA029	AS2A	2
2.8m, 10A/230V, C13 to DK2-5a (Denmark) Line Cord	00NA031	AS2B	2
2.8m, 10A/230V, C13 to BS 1363/A (UK) Line Cord	00NA033	AS2C	2
2.8m, 10A/230V, C13 to SI 32 (Israel) Line Cord	00NA035	AS2D	2
2.8m, 10A/230V, C13 to SEV 1011-S24507 (Sws) Line Cord	00NA037	AS2E	2
2.8m, 10A/230V, C13 to SABS 164 (South Africa) Line Cord	00NA039	AS2F	2
2.8m, 10A/230V, C13 to CEI 23-16 (Italy) Line Cord	00NA041	AS2G	2
2.8m, 10A/230V, C13 to AS/NZS 3112 (Aus/NZ) Line Cord	00NA043	AS2H	2
2.8m, 10A/208V, C13 to NEMA 6-15P (US) Line Cord	00NA045	AS2J	2
2.8m, 10A/220V, C13 to IRAM 2073 (Argentina) Line Cord	00NA047	AS2K	2
2.8m, 10A/220V, C13 to CNS 10917-3 (Taiwan) Line Cord	00NA049	AS2L	2
2.8m, 10A/220V, C13 to GB 2099.1 (China) Line Cord	00NA051	AS2M	2
2.8m, 10A/110V, C13 to CNS 10917-3 (Taiwan) Line Cord	00NA053	AS2N	2
2.8m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord	00NA055	AS2P	2
2.8m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord	00NA057	AS2Q	2
2.8m, 10A/240V, C13 to IS 6538 (India) Line Cord	00NA059	AS2R	2
2.8m, 10A/220V, C13 to NBR 6147 (Brazil) Line Cord	00NA061	AS2T	2
Rack power cord			
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	00NA063	AS2U	2

Physical specifications

The 3U module of the TS4300 Tape Library has the following dimensions and weight (approximate):

- Width: 446 mm (17.6 in.)
- Depth: 873 mm (34.4 in.)
- Height: 133 mm (5.2 in.)
- Weight:
    - Base module: 21 kg (46.3 lb)
    - Expansion module: 13 kg (28.7 lb)

Operating environment

The TS4300 Tape Library is supported in the following environment:

- Air temperature:
    - Operating: 15 °C - 32 °C (59 °F - 90 °F)
    - Non-operating: 5 °C - 45 °C (41 °F - 113 °F)
    - Maximum altitude: 3,050 m (10,000 ft)
- Humidity:
    - Operating: 20% - 80%
    - Non-operating: 8% - 80%
- Electrical power:
    - 100 V AC - 240 V AC (5.0 A to 3.5 A)
    - Frequency: 50 Hz / 60 Hz
    - Power consumption: 350 watts

Warranty services and upgrades

The TS4300 Tape Library has a three-year Customer Replaceable Unit (CRU) warranty with 9x5/next business day (NBD) parts delivered.

Some countries might have different warranty terms and conditions than the standard warranty. This is due to local business practices or laws in the specific country. Local service teams can assist in explaining country-specific terms when needed. Examples of country-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

Also available are Lenovo Services warranty upgrades and post-warranty maintenance agreements, with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

Lenovo warranty service upgrade offerings are country-specific. Not all warranty service upgrades are available in every country. For information about Lenovo warranty service upgrade offerings that are available in your country or area, refer to the following resources:

- Service part numbers in Lenovo Data Center Solution Configurator (DCSC):
  http://dcsc.lenovo.com/#/services
- Lenovo Services Availability Locator
  https://lenovolocator.com/

In general, the following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
  - 3, 4, or 5 years of warranty service coverage
  - 1-year or 2-year post-warranty extensions
  - Foundation Service: 9x5 service coverage with next business day onsite response
  - Essential Service: 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select countries)
  - Advanced Service: 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select countries)
- Premier Support
  Premier Support service offers single point of contact for end-to-end problem resolution and collaborative third-party software support with direct access to Lenovo's most advanced technicians for faster troubleshooting.

For service definitions, country-specific details, and service limitations, please refer to the following documents:

- Lenovo Statement of Limited Warranty for Data Center Group (DCG) Servers and System Storage
  http://datacentersupport.lenovo.com/us/en/solutions/ht503310
- Lenovo Data Center Services Agreement
  http://support.lenovo.com/us/en/solutions/ht116628

Regulatory compliance

The TS4300 Tape Library conforms to the following regulations:

- FCC: Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003/NMB-03, Class A
- CISPR 32, Class A
- EN 55032, Class A
- Japan VCCI Class A statement
- People's Republic of China Class A Electronic Emission statement
- Taiwan Class A compliance statement
- Korea KCC Class A statement
- Russia Electromagnetic Interference (EMI) Class A Statement

Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The TS4300 Tape Library supports attachment to Lenovo servers by using SAS or Fibre Channel connectivity.

Note: Tables that are provided in this section are for ordering reference purposes only. End-to-end storage configuration support (including adapters, network switches, and operating systems) *must* be verified through the System Storage Interoperation Center (SSIC) for the TS4300: http://ibm.com/systems/support/storage/ssic

SAS HBAs

The following table lists currently available Lenovo SAS adapters that are compatible with the TS4300 SAS tape drives (direct attach). Other SAS HBAs also might be supported (for more information, see the System Storage Interoperation Center).

Table 10. SAS adapters

Description	Part number
ThinkSystem SAS HBAs	
ThinkSystem 430-8e SAS/SATA 12Gb HBA (9400-8e, 2x Mini-SAS HD x4 SFF-8644 ports)	7Y37A01090
ThinkSystem 430-16e SAS/SATA 12Gb HBA (9400-16e, 4x Mini-SAS HD x4 SFF-8644 ports)	7Y37A01091
System x SAS HBAs	
N2225 SAS/SATA HBA (12 Gb SAS, 2x Mini-SAS HD x4 SFF-8644 ports)	00AE912
N2226 SAS/SATA HBA(12 Gb SAS, 4x Mini-SAS HD x4 SFF-8644 ports)	00AE916
ThinkServer SAS HBAs	
ThinkServer 9300-8e PCIe 12Gb 8 Port SAS Adapter by LSI (2x Mini-SAS HD x4 SFF-8644 ports)	4XB0F28703

Fibre Channel HBAs

The TS4300 supports FC switch-based attachments. Brocade and Cisco SAN switches can be used to provide FC connectivity for the TS4300.

The Lenovo FC SAN adapters that are listed in the following table are compatible with the TS4300. Other HBAs also might be supported (for more information, see the System Storage Interoperation Center).

Table 11. FC adapters

Description	Part number
ThinkSystem HBAs: 32 Gb FC	
ThinkSystem Emulex LPe32000-M2-L PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	7ZT7A00517
ThinkSystem Emulex LPe32002-M2-L PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	7ZT7A00519
ThinkSystem QLogic QLE2740 PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	7ZT7A00516
ThinkSystem QLogic QLE2742 PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	7ZT7A00518
System x HBAs: 16 Gb FC	
Emulex 16Gb Gen6 FC Single-port HBA (LPe31000)	01CV830
Emulex 16Gb Gen6 FC Dual-port HBA (LPe31002)	01CV840
Emulex 16Gb FC Single-port HBA (LPe16000)	81Y1655
Emulex 16Gb FC Dual-port HBA (LPe16002)	81Y1662

Description	Part number
QLogic 16Gb Enhanced Gen5 FC Single-port HBA (QLE2690)	01CV750
QLogic 16Gb Enhanced Gen5 FC Dual-port HBA (QLE2692)	01CV760
QLogic 16Gb FC Single-port HBA (QLE2660)	00Y3337
QLogic 16Gb FC Dual-port HBA (QLE2662)	00Y3341
System x HBAs: 8 Gb FC	
Emulex 8Gb FC Single-port HBA (LPe12000)	42D0485
Emulex 8Gb FC Dual-port HBA (LPe12002)	42D0494
QLogic 8Gb FC Single-port HBA (QLE2560)	42D0501
QLogic 8Gb FC Dual-port HBA (QLE2562)	42D0510
Flex System HBAs: 8 Gb FC	
Flex System FC3172 2-port 8Gb FC Adapter	69Y1938
Flex System HBAs: 16 Gb FC	
Flex System FC5052 2-port 16Gb FC Adapter	95Y2386
Flex System FC5054 4-port 16Gb FC Adapter	95Y2391

Fibre Channel SAN switches

The following tables list currently available Fibre Channel rack-mount switches and embedded switches for Flex System that are currently offered by Lenovo that can be used with the TS4300 in IT solutions.

Table 12. Fibre Channel rack-mount switches

Description	Part number
8 Gb FC	
Lenovo B300, E_Port License, 8 ports licensed, 8x 8Gb SWL SFPs, 1 PS, Rail Kit, 1Yr FW	3873AR6
Lenovo B300, 8 ports licensed, 8x 8Gb SWL SFPs, 1 PS, Rail Kit, 3Yr FW	3873AR3
16 Gb FC	
Lenovo B6505, 12 ports licensed, 12x 16Gb SWL SFPs, 1 PS, Rail Kit, 1Yr FW	3873ER1
Lenovo B6510, 24 ports licensed, 24x 16Gb SWL SFPs, 2 PS, Rail Kit, 1Yr FW	3873IR1
Lenovo B6510, 24 ports licensed, 24x 16Gb SWL SFPs, 2 PS, Rail Kit, 3Yr FW	3873BR3

Table 13. Fibre Channel embedded switches for Flex System

Description	Part number
16 Gb FC	
Lenovo Flex System FC5022 16Gb SAN Scalable Switch	88Y6374
Lenovo Flex System FC5022 24-port 16Gb SAN Scalable Switch (includes two 16 Gb SFPs)	00Y3324
Lenovo Flex System FC5022 24-port 16Gb ESB SAN Scalable Switch	90Y9356

For more information, see the list of Product Guides in the following categories:

- Rack SAN Switches:
  http://lenovopress.com/storage/switches/rack#rt=product-guide
- Blade Storage Modules:
  http://lenovopress.com/servers/blades/storagemodule#rt=product-guide

Operating systems

The TS4300 supports host attachments to the Lenovo servers with the following operating systems:

- Microsoft:
  - Microsoft Windows Server 2016
  - Microsoft Windows Server 2016
  - Microsoft Windows Server 2012 R2
- Red Hat:
  - Red Hat Enterprise Linux 7.6
  - Red Hat Enterprise Linux 7.5
  - Red Hat Enterprise Linux 6.10
  - Red Hat Enterprise Linux 6.9
- SUSE:
  - SUSE Linux Enterprise Server 15
  - SUSE Linux Enterprise Server 12 SP4
  - SUSE Linux Enterprise Server 12 SP3

Note: The LTO tape drives are supported when attached and run from the host operating system, however, in virtualization environments (for example, Hyper-V, KVM, Xen), the tape drives are not supported in the guest operating systems.

ISV backup software compatibility

The Independent Software Vendors (ISVs) indicate support for the TS4300 Tape Library for the following backup software:

- Acronis Backup Advanced
- Arcserve Backup
- ASG Time Navigator
- CommVault Simpana
- Dell/EMC NetWorker
- HPE/Micro Focus Data Protector
- IBM Spectrum Archive
- IBM Spectrum Protect
- Microsoft System Center Data Protection Manager
- Veritas Backup Exec
- Veritas NetBackup
- Quest NetVault
- Veeam Backup and Retention

For more information, see the ISV matrix for IBM LTO that is available at this website:
https://www.ibm.com/downloads/cas/ORLZ7EMG

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used with the TS4300 tape library in IT solutions.

Table 14. Rack cabinets

Description	Part number
25U S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072RX
25U Static S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072PX
42U S2 Standard Rack (1000 mm deep; 6 sidewall compartments)	93074RX
42U 1100mm Enterprise V2 Dynamic Rack (6 sidewall compartments)	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack (6 sidewall compartments)	93634EX
42U 1200mm Deep Dynamic Rack (6 sidewall compartments)	93604PX
42U 1200mm Deep Static Rack (6 sidewall compartments)	93614PX
42U Enterprise Rack (1105 mm deep; 4 sidewall compartments)	93084PX
42U Enterprise Expansion Rack (1105 mm deep; 4 sidewall compartments)	93084EX

For more information, see the list of Product Guides in the Rack cabinets category:
http://lenovopress.com/servers/options/racks#rt=product-guide

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used with the TS4300 tape library in IT solutions.

Table 15. Power distribution units

Description	Part number
0U Basic PDUs	
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord	00YJ778
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779
Switched and Monitored PDUs	
0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord	00YJ781
0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord	00YJ780
0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782
0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord	00YJ783
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)	46M4002
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003
1U 12 C13 Switched and Monitored DPI PDU (without line cord)	46M4004
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
Ultra Density Enterprise C19/C13 PDU Module (without line cord)	71762NX
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU

Description	Part number
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
DPI C13 Enterprise PDU+ (without line cord)	39M2816
DPI Single Phase C13 Enterprise PDU (without line cord)	39Y8941
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
DPI Single Phase C19 Enterprise PDU (without line cord)	39Y8948
DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord	39Y8923
Front-end PDUs (3x IEC 320 C19 outlets)	
DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord	39Y8938
DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord	39Y8939
DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8934
DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8940
DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8935
Universal PDUs (7x IEC 320 C13 outlets)	
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443
NEMA PDUs (6x NEMA 5-15R outlets)	
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905
Line cords for PDUs that ship without a line cord	
DPI 30a Line Cord (NEMA L6-30P)	40K9614
DPI 32a Line Cord (IEC 309 P+N+G)	40K9612
DPI 32a Line Cord (IEC 309 3P+N+G)	40K9611
DPI 60a Cord (IEC 309 2P+G)	40K9615
DPI 63a Cord (IEC 309 P+N+G)	40K9613
DPI Australian/NZ 3112 Line Cord (32A)	40K9617
DPI Korean 8305 Line Cord (30A)	40K9618

For more information, see the list of Product Guides in the PDU category:
http://lenovopress.com/servers/options/pdu#rt=product-guide

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are currently offered by Lenovo that can be used with the TS4300 Tape Library in IT solutions.

Table 16. Uninterruptible power supply units

Description	Part number
Worldwide models	
RT1.5kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA5-15R 12A outlets)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A outlets)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-20R 16A outlets)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC) (6x NEMA5-20R 16A, 1x NEMA L5-30R 24A outlets)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55949PX
ASEAN, HTK, INDIA, and PRC models	
ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943KT
ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943LT
ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	55946KT
ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	5594XKT

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category:
http://lenovopress.com/servers/options/ups#rt=product-guide

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Related publications and links

For more information, see the following resources:

- Lenovo Tape Storage product page:
  https://www3.lenovo.com/us/en/data-center/storage/tape-storage/c/storage-tape
- Lenovo Data Center Solution Configurator (DCSC):
  http://dcsc.lenovo.com
- System Storage Interoperation Center (SSIC):
  http://ibm.com/systems/support/storage/ssic

Related product families

Product families related to this document are the following:

- Tape Autoloaders and Libraries
- Backup Units

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