Lenovo IBM TS3100 and TS3200 Tape Libraries User Guide

Contents

Lenovo IBM TS3100 and TS3200 Tape Libraries

Product Guide (withdrawn product)
IBM TS3100 and TS3200 Tape Libraries for Lenovo (Machine Type 6173) combine IBM tape and automation reliability at a cost effective price. Both libraries support entry-level, unattended backup, open system attachment flexibility, and enhanced capacity and performance.

The TS3100 is a 2U rack mount library that can accommodate up to two Ultrium half-high tape drives or one Ultrium full-high tape drive with 24 cartridge slots in two removable magazines, including a standard one-cartridge I/O station, a remote management unit, and a barcode reader.

The TS3200 is a 4U rack mount library that can accommodate up to four Ultrium half-high tape drives or two Ultrium full-high tape drives with 48 data cartridge slots in four removable magazines, including a standard three-cartridge I/O station, a remote management unit, and a barcode reader.

The choice of the tape drives for the TS3100 and TS3200 tape libraries includes IBM LTO Ultrium 7, Ultrium 6, and Ultrium 5 Half High (HH) and Full High (FH) tape drives with SAS or Fibre Channel host connectivity interfaces.

The TS3100 and TS3200 are ideal solutions if you need an entry-level larger capacity or higher performance tape backup with or without random access. These libraries are excellent choices for tape automation for Lenovo servers.

The TS3100 Tape Library is shown in the following figure.

Did you know?

Featuring the latest LTO Ultrium 7 technology, the TS3100 and TS3200 Tape Libraries provide up to 360 TB and

720 TB of 2.5:1 compressed backup storage, respectively.
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 to satisfy the wide range of your end-to-end IT infrastructure needs, including handheld devices, notebooks, personal computers, servers, storage, networking, services, management software, and financing.

IBM TS3100 and TS3200 Tape Libraries for Lenovo (withdrawn product)

Key features

The TS3100 and TS3200 deliver the following features:

- Entry-level tape libraries that are designed for high capacity, high performance, and high reliability. Adherence to LTO specifications.
- Support for half-high or full-high LTO Ultrium 7, Ultrium 6, or Ultrium 5 tape drives with SAS or Fibre Channel interfaces.
- Support for one full-high or up to two half-high tape drives in the TS3100; support for up to two full-high, or up to four half-high, or a combination of one full-high and up to two half-high tape drives in the TS3200.
- Native data transfer rate of up to 300 MB/s (Ultrium 7), up to 160 MB/s (Ultrium 6), or up to 140 MB/s (Ultrium 5).
- Native cartridge capacity of up to 6 TB (Ultrium 7), up to 2.5 TB (Ultrium 6), or up to 1.5 TB (Ultrium 5).
- Two (TS3100) or four (TS3200) removable magazine that can house up to 12 data cartridges to enable quick population of the tape library and ease the storage needs for media.
- A 1-slot I/O station (TS3100) or a 3-slot I/O station (TS3200) to help support continuous library operations, while importing and exporting media with little or no disruption to library operation.
- A standard bar code reader with which you can operate the TS3100 or TS3200 in sequential or random access mode.
- Mixed media support, including IBM LTO Ultrium 7, 6, and 5 WORM (Write Once Read Many) media.
- Remote management capabilities to allow for remote administration of the TS3100 and TS3200 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 four 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 System Managed and Library Managed Encryption on LTO Ultrium 7, Ultrium 6, and Ultrium 5 tape drives with a Transparent LTO Encryption feature.
- 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.
- An optional rack mount kit, an extra power supply for the TS3200 and more cartridge magazines. 3 Gb or 6 Gbps SAS, or 4 Gb or 8 Gb Fibre Channel attachments for connection to select Lenovo servers that run Microsoft Windows and Linux server operating systems.
- Support from an extensive ecosystem of backup software vendors.

The TS3200 Tape Library is shown in the following figure.

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

- Dual-stage head actuator
- The 16-channel actuator (LTO Ultrium 5 and 6) or 32-channel actuator (LTO Ultrium 7) 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 helps 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 3584 data tracks in Ultrium 7, 2176 data tracks in Ultrium 6, and 1280 data tracks in Ultrium 5. 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 7, 6, and 5 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 Magneto Resistive (GMR) head design
- IBM LTO Ultrium 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.
- 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 7 and Ultrium 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.
- 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 7 and 6 LTO-CM is 16320 bytes, which is double the capacity of
- Generation 5 LTO-CM 8160 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 TS3100 Tape Library.

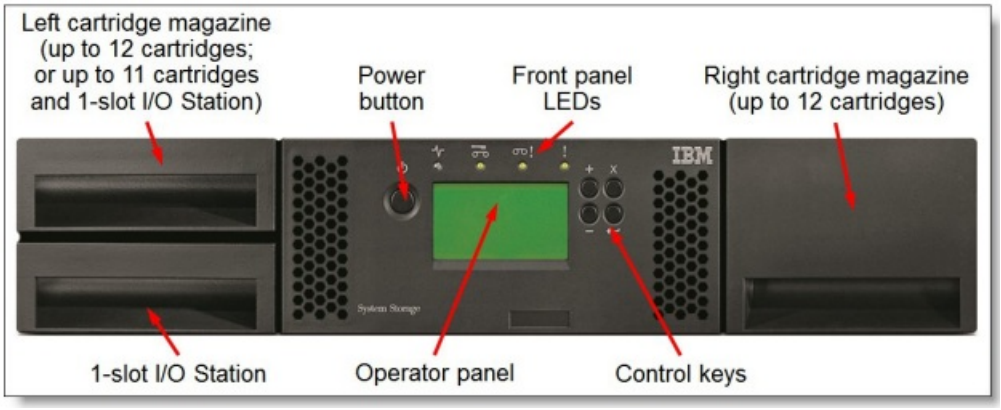


Figure 4. Front view of the TS3200 Tape Library

The following figure shows the rear of the TS3100 Tape Library with the full high SAS drive sled.

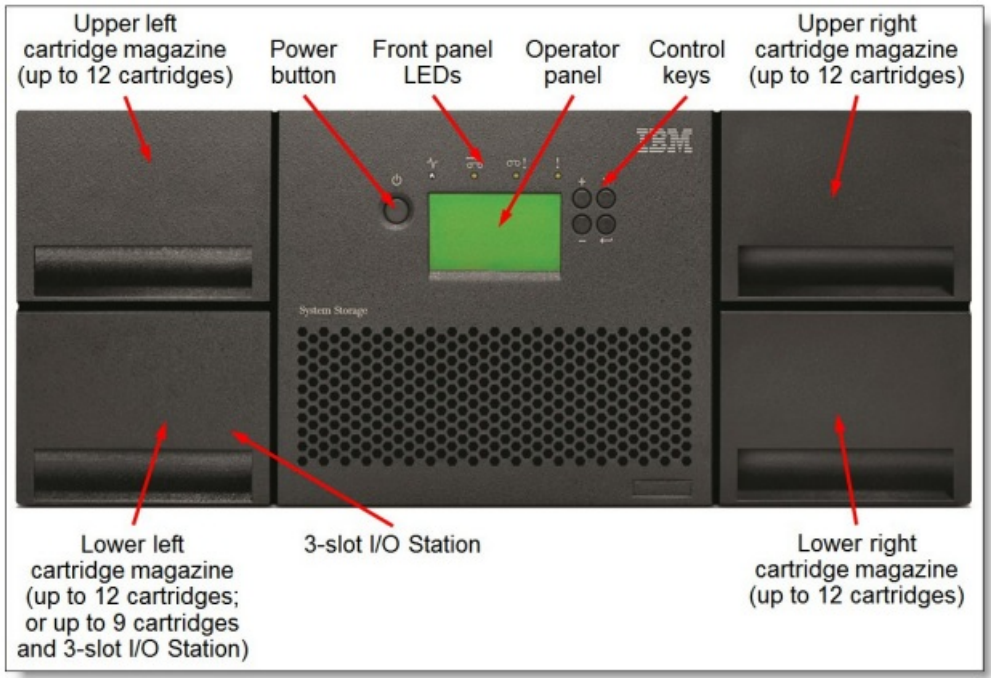


Figure 5. Rear view of the TS3100 Tape Library

The following figure shows the rear of the TS3200 Tape Library with the full high and half high Fibre Channel drive sleds, and the half high SAS drive sled.

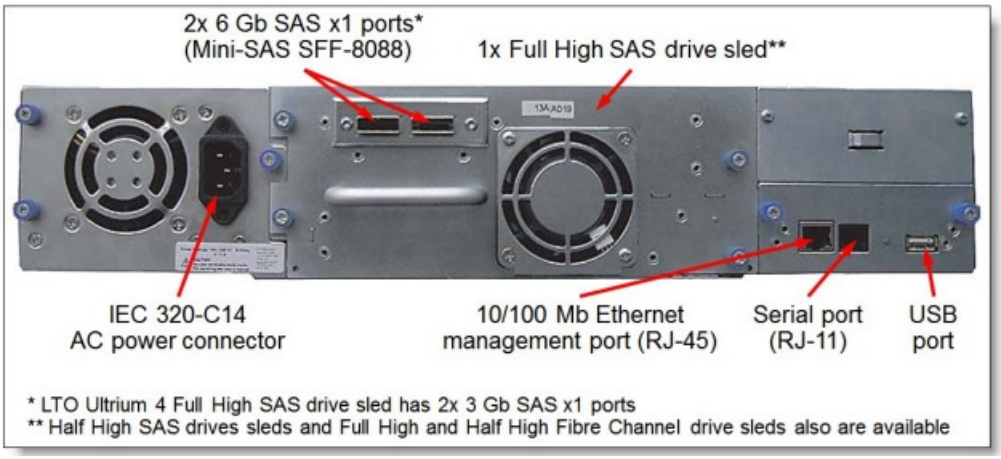
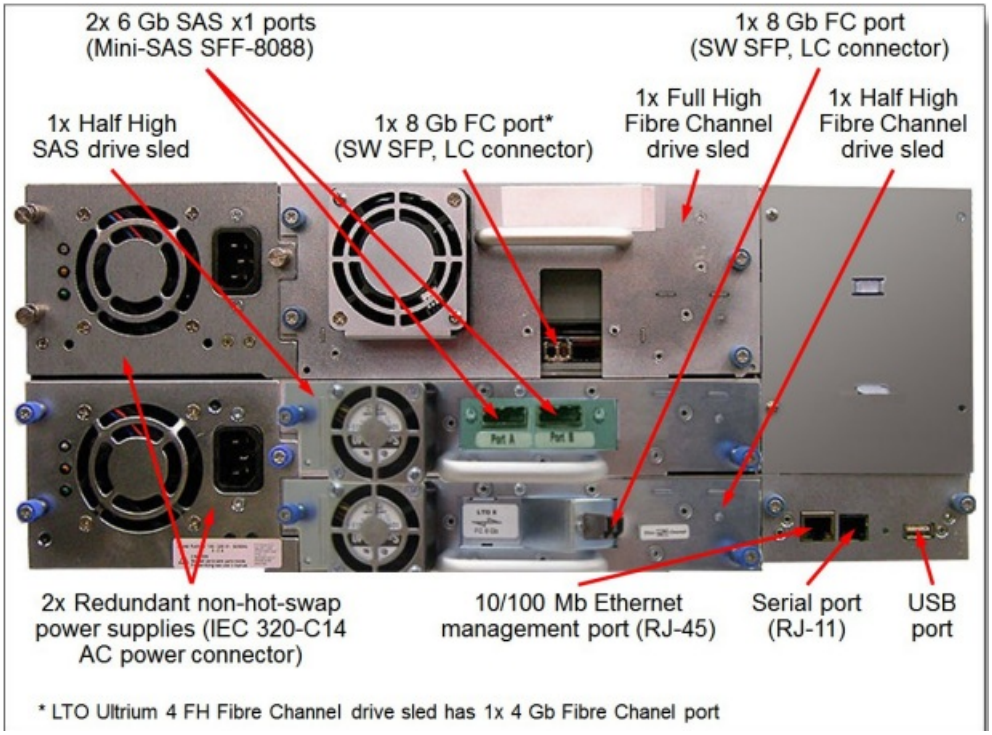


Figure 6. Rear view of the TS3200 Tape Library



System specifications

The following table lists the TS3100 and TS3200 Tape Libraries system specifications.
Table 1. System specifications

Components	Specification
Form factor	TS3100: 2U rack mount or stand-alone TS3200: 4U rack mount or stand-alone
Drive technology	LTO Ultrium 7, LTO Ultrium 6, and LTO Ultrium 5 Full-High (FH) and Half-High (HH) drives
Drive interface	Ultrium 7, Ultrium 6, and Ultrium 5 FH and HH drives (per one drive): 2x 6 Gb SAS x1 ports (Mini-SAS SFF-8088) 1x 8 Gb FC port (SFP SW optics, LC connector)
Number of drives	TS3100: Up to 1 FH drive, or up to 2 HH drives TS3200: Up to 2 FH drives, or up to 4 HH drives, or a combination of 1 FH drive and up to 2 HH drives
Number of cartridge slots	TS3100: 24 TS3200: 48
Cartridge capacity	LTO7: 6 TB native; up to 15 TB compressed (with 2.5:1 compression ratio) LTO6: 2.5 TB native; up to 6.25 TB compressed (with 2.5:1 compression ratio) LTO5: 1.5 TB native; up to 3.0 TB compressed (with 2:1 compression ratio)

Total backup capacity	TS3100: LTO7: Up to 144 TB native; up to 360 TB compressed (with 2.5:1 compression) LTO6: Up to 60 TB native; up to 150 TB compressed (with 2.5:1 compression) LTO5: Up to 36 TB native; up to 72 TB compressed (with 2:1 compression) TS3200: LTO7: Up to 288 TB native; up to 720 TB compressed (with 2.5:1 compression) LTO6: Up to 120 TB native; up to 300 TB compressed (with 2.5:1 compression) LTO5: Up to 72 TB native ; up to 144 TB compressed (with 2:1 compression)
Data transfer rate	Per one drive: LTO7: Up to 300 MB/s native; up to 750 MB/s compressed (with 2.5:1 compression) LTO6: U p to 160 MB/s native; up to 400 MB/s compressed (with 2.5:1 compression) LTO5: Up to 140 MB/s native; up to 280 MB/s compressed (with 2:1 compression) Per TS3100 with 2 drives: LTO7: Up to 600 MB/s native; up to 1.5 GB/s compressed (with 2.5:1 compression) LTO6: U p to 320 MB/s native; up to 800 MB/s compressed (with 2.5:1 compression) LTO5: Up to 280 MB/s native; up to 560 MB/s compressed (with 2:1 compression) Per TS3200 with 4 drives: LTO7: Up to 1.2 GB/s native; up to 3 GB/s compressed (with 2.5:1 compression) LTO6: Up t o 640 MB/s native; up to 1.6 GB/s compressed (with 2.5:1 compression) LTO5: Up to 560 M B/s native; up to 1.12 GB/s compressed (with 2:1 compression)
Software features	Multi-path (Library partitioning), Path Failover (optional), Transparent LTO encryption (option al)
Security features	Secure Socket Layer (SSL), user level security, LTO encryption (optional)
Management interfaces	Operator panel 1x 10/100 Mb Ethernet port (UTP, RJ-45) for remote management: Web-based GUI; SNMP and email notifications
Cooling	Fixed internal fans
Power supplies	TS3100: One fixed 250 W AC fixed power supply with IEC 320-C14 power connector TS320 0: Up to two redundant non-hot-swap 250 W AC power supplies with IEC 320- C14 power c onnector (the second power supply is optional)

Components	Specification
Hot-swap parts	SAS and Fibre Channel drive sleds
Dimensions	Width: Rack mount 448 mm (17.6 in.), standalone 448 mm (17.6 in.) Depth: Rack mount 740 mm (29.1 in.), standalone 810 mm (31.9 in.) Height: TS3100: Rack mount 87 mm (3.4 in.), standalone 98 mm (3.8 in.) TS3200: Height: Rack mount 175 mm (6.9 in.), standalone 185 mm (7.3 in.)
Weight	TS3100: 15 kg (33 lb) without rack mount kit TS3200: 21.3 kg (47 lb) without rack mount kit
Warranty	Three-year customer-replaceable unit and onsite warranty with 9×5 next business day terms
Service and sup port	Optional warranty service upgrades are available through Lenovo Services: 24×7 coverage, 4- hour response time, 1-year or 2-year warranty extensions, up to 5 years of Remote Techn ical Support (RTS)
Host operating s ystems	Microsoft Windows Server 2008, 2008 R2, 2012, 2012 R2, and 2016; Red Hat Enterprise Li nux (RHEL) 5, 6, and 7; SUSE Linux Enterprise Server (SLES) 10, 11, and 12.
ISV backup soft ware compatibilit y	Arcserve Backup, ASG Time Navigator, Barracuda Yosemite Backup, CommVault Simpana, Dell NetVault Backup, EMC NetWorker, IBM Spectrum Protect, HP OpenView Storage Data Protector, Microsoft System Center Data Protection Manager, Symantec Backup Exec, and Symantec NetBackup

Models
The following table lists the ordering information for the TS3100 and TS3200 Tape Library models.

Product availability: The IBM TS3100 and TS3200 Tape Libraries for Lenovo are withdrawn and no longer available for ordering. The replacement product is IBM TS4300 Tape Library for Lenovo .

Table 2. Part numbers and feature codes for ordering TS3100 and TS3200 models

Description	Part num ber	Feature code (6173-L2U)*	Feature code (6173-L4U)*
TS3100 Tape Library Model L2U	61732UL	AS5W	None
TS3200 Tape Library Model L4U	61734UL	None	AS5X

Machine Type (first four digits); Model (last three digits and letters)
The part numbers for the TS3100 and TS3200 Tape Library models include the following items:

- One TS3100 or TS3200 Tape Library with one power supply and with the Bar Code Reader
- Two (TS3100) or four (TS3200) removable 12-cartridge magazines
- Warranty information
- Documentation CD that includes Setup, Operator, and Service Guide

Notes

- Tape drives are not included; at least one tape drive must be ordered with the TS3100 or TS3200 unit (for ordering information, see Table 4).
- Rack mount kit is not included; it must be ordered with the TS3100 or TS3200 unit, if required (for ordering information, see Table 3).
- A power cable is not included. A 10A/100-250V, C13 to IEC 320-C14 rack power cable, or a line cord must be ordered with the TS3100 or TS3200 unit (for ordering information, see Table 8).

The TS3200 unit supports redundant power with the optional second power supply that can be ordered with the unit. A power cable is not included with the optional power supply (for ordering information, see Table 8).

The following table lists the rack mount kit for the TS3100 and TS3200 units and the optional power supply for the TS3200 unit.

Table 3. Rack mount kit and power supply

Description	Part number	Feature code	Maximum quantity
Rack mount kit (for both TS3100 and TS3200)			
6173 Rack Mount Kit	00NA089	AS1B	1
Additional power supply (for TS3200 only)			
Additional Power Supply for TS3200	00NA071	AS0W	1

Tape drive options

The TS3100 Tape Library can accommodate up to two LTO Ultrium half-high tape drives or one LTO Ultrium full-high tape drive. The TS3200 Tape Library can accommodate up to four LTO Ultrium half-high tape drives, up to two LTO Ultrium full-high tape drives, or a combination of up to two LTO Ultrium half-high tape drives and one LTO Ultrium full-high tape drive.

The following table lists ordering information for the tape drives for the TS3100 and TS3200.

Table 4. Tape drive options

Description	Part number	Feature code	Maximum qty per one TS3100 / TS3200
Half High 8 Gb Fibre Channel			
6173 LTO Ultrium 7 Half High Fibre Drive Sled	00WF769	ATP2	2 / 4
6173 LTO Ultrium 6 Half High Fibre Drive Sled	00NA119	AS21	2 / 4
6173 LTO Ultrium 5 Half High Fibre Drive Sled	00NA113	AS1W	2 / 4
Full High 8 Gb Fibre Channel			
6173 LTO Ultrium 7 Fibre Channel Drive	00WF765	ATP0	1 / 2
6173 LTO Ultrium 6 Fibre Channel Drive	00NA115	AS1Y	1 / 2
6173 LTO Ultrium 5 Fibre Channel Drive	00NA107	AS1S	1 / 2
Half High 6 Gb SAS			
6173 LTO Ultrium 7 Half High SAS Drive Sled	00WF767	ATP1	2 / 4
6173 LTO Ultrium 6 Half High SAS Drive Sled	00NA117	AS1Z	2 / 4
6173 LTO Ultrium 5 Half High SAS Drive Sled	00NA111	AS1U	2 / 4
Full High 6 Gb SAS			
6173 LTO Ultrium 5 SAS Drive Sled	00NA109	AS1T	1 / 2

A SAS cable or Fibre Channel cable is required to attach a tape drive in the TS3100 or TS3200 Tape Library to a host. One cable is required per one drive. The following table lists supported cable options.

Table 5. Cable options

Description	Part number	Feature code	Maximum qty per one TS3100 / TS3200
SAS connectivity cables – Mini-SAS (SFF-8088 host) to Mini-SAS (SFF-8088 tape)			
Mini-SAS/Mini-SAS 4x Interposer	00NA077	AS0Y	1 / 1**
2 m Mini-SAS/Mini-SAS 1x Cable (host SFF-8088 to target SFF-8088)	00NA009	AS0Z	2 / 4
Mini-SAS to Mini-SAS Cable (5.5 m)	00NV418	AS11	2 / 4
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 / 4
Y SAS HD to Mini-SAS Cable (3 m)	00NV420	AS12	1 / 2*
Fibre Channel connectivity cables			
13 m LC-LC Fibre Cable	00NA085	AS1A	2 / 4
25 m LC-LC Fibre Cable	00NA087	6025	2 / 4

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). 5.5 m Mini-SAS to Mini-SAS cables (part number 00NV418) are not supported with the interposer.
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
LTO Ultrium tape drives support the following backward compatibility for previous generations of tape media:

- 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.
- LTO Ultrium 5 tape drives can read and write LTO Ultrium 5 and Ultrium 4 data cartridges, and can read Ultrium 3 data cartridges.

The TS3100 supports up to 24 data cartridges and comes standard with two removable tape magazine with 12 cartridge slots each. The TS3200 supports up to 48 data cartridges and comes standard with four removable tape magazines with 12 cartridge slots each. More removable tape magazines can be ordered with the TS3100 or TS3200, if needed.

The following table lists tape media options and extra magazines that can be ordered for the TS3100 and TS3200.
Table 6. Tape media and extra magazines

Description	Part number	Feature code	Supported tape drive types
Cleaning cartridge			
Ultrium Cleaning Cartridge (universal)	00NA017	AS1E	LTO7, LTO6, LTO5
Data cartridges			
Ultrium 7 Data Cartridges 5-Pack	00WF771	ATNZ	LTO7
Ultrium 6 Data Cartridges 5-Pack	00NA025	AS24	LTO7, LTO6
Ultrium 5 Data Cartridges 5-Pack	00NA023	AS23	LTO7 (read-only), LTO6, LTO5
Optional magazines for TS3100			
6173 Right Side Tape Magazine	00NA091	AS1F	LTO7, LTO6, LTO5
6173 Left Side 2U Tape Magazine	00NA097	AS1J	LTO7, LTO6, LTO5
Optional magazines for TS3200			
6173 Right Side Tape Magazine	00NA091	AS1F	LTO7, LTO6, LTO5
6173 Left Upper 4U Tape Magazine	00NA093	AS1G	LTO7, LTO6, LTO5
6173 Left Lower 4U Tape Magazine	00NA095	AS1H	LTO7, LTO6, LTO5

Note: A 5-Pack of the Ultrium 5, 6, or 7 Data Cartridges includes five unattached loose labels.

Software options

The functionality of the TS3100 and TS3200 can be expanded with the following optional software features:

- Path Failover
- Transparent LTO Encryption

The TS3100 and TS3200 offer 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 7, Ultrium 6, and Ultrium 5 tape drives are encryption-capable and they support the following modes of encryption management:

- System Managed: Available Linux and Windows; uses IBM device driver on a host system to setup encryption
- Library Managed: Available for Linux and Windows; requires an Extensible Key Management (EKM) server
- Application Managed: Available with third-party software such as IBM Spectrum Protect

System Managed and Library Managed Encryption requires an optional Transparent LTO Encryption license. Application Managed Encryption does not require a license.

The following table lists ordering information for optional software features.
Table 7. Optional software features for TS3100 and TS3200

Description	Part number	Feature code	Maximum quantity
6173 Path Failover	00NA069	AS0R	1
6173 Transparent LTO Encryption	00NA083	AS18	1

Power cables

The TS3100 and TS3200 ship standard without power cables. The part numbers and feature codes to order the power cables are listed in the following table.

Table 8. Part numbers and feature codes for ordering power cables

Description	Part number	Feature code	Maximum qty per one TS3100 / TS3200
Line cords			
2.8m, 10A/120V, C13 to NEMA 5-15P (US) Line Cord	00NA027	AS29	1 / 2*
2.8m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord	00NA029	AS2A	1 / 2*
2.8m, 10A/230V, C13 to DK2-5a (Denmark) Line Cord	00NA031	AS2B	1 / 2*
2.8m, 10A/230V, C13 to BS 1363/A (UK) Line Cord	00NA033	AS2C	1 / 2*
2.8m, 10A/230V, C13 to SI 32 (Israel) Line Cord	00NA035	AS2D	1 / 2*
2.8m, 10A/230V, C13 to SEV 1011-S24507 (Sws) Line Cord	00NA037	AS2E	1 / 2*
2.8m, 10A/230V, C13 to SABS 164 (South Africa) Line Cord	00NA039	AS2F	1 / 2*
2.8m, 10A/230V, C13 to CEI 23-16 (Italy) Line Cord	00NA041	AS2G	1 / 2*
2.8m, 10A/230V, C13 to AS/NZS 3112 (Aus/NZ) Line Cord	00NA043	AS2H	1 / 2*
2.8m, 10A/208V, C13 to NEMA 6-15P (US) Line Cord	00NA045	AS2J	1 / 2*
2.8m, 10A/220V, C13 to IRAM 2073 (Argentina) Line Cord	00NA047	AS2K	1 / 2*
2.8m, 10A/220V, C13 to CNS 10917-3 (Taiwan) Line Cord	00NA049	AS2L	1 / 2*
2.8m, 10A/220V, C13 to GB 2099.1 (China) Line Cord	00NA051	AS2M	1 / 2*
2.8m, 10A/110V, C13 to CNS 10917-3 (Taiwan) Line Cord	00NA053	AS2N	1 / 2*
2.8m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord	00NA055	AS2P	1 / 2*
2.8m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord	00NA057	AS2Q	1 / 2*
2.8m, 10A/240V, C13 to IS 6538 (India) Line Cord	00NA059	AS2R	1 / 2*
2.8m, 10A/220V, C13 to NBR 6147 (Brazil) Line Cord	00NA061	AS2T	1 / 2*
Rack power cord			
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	00NA063	AS2U	1 / 2*

Physical specifications

The TS3100 and TS3200 Tape Libraries have the following dimensions and weight (approximate):

- **Width:** Rack mount 448 mm (17.6 in.), stand-alone 448 mm (17.6 in.)
- **Depth:** Rack mount 740 mm (29.1 in.), stand-alone 810 mm (31.9 in.)
- **Height:**
  - **TS3100:** Rack mount 87 mm (3.4 in.), stand-alone 98 mm (3.8 in.)
  - **TS3200:** Height: Rack mount 175 mm (6.9 in.), stand-alone 185 mm (7.3 in.)
- **Weight:**
  - **S3100:** 15 kg (33 lb) without rack mount kit

- **TS3200:** 21.3 kg (47 lb) without rack mount kit

Operating environment

The TS3100 and TS3200 Tape Libraries are supported in the following environment:

Air temperature

- Operating: 10 °C – 35 °C (50 °F – 95 °F)
- Non-operating: -30 °C – 60 °C (-22 °F – 140 °F)
- Maximum altitude: 2,500 m (8,200 ft)

Humidity

- Operating: 15% – 80%
- Non-operating: 10% – 90%

Electrical power

- 100 V AC – 240 V AC (4.0 A to 2 A)
- Frequency: 50 Hz – 60 Hz
- Power consumption: 100 watts

Acoustical noise emission

- 6.6 bels (idling)
- 6.8 bels (operating)

Warranty

The TS3100 and TS3200 Tape Libraries have a three-year Customer Replaceable Unit (CRU) and onsite warranty with 9×5/next business day (NBD) terms. Lenovo offers the service upgrades through warranty maintenance 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 region-specific. Not all warranty service upgrades are available in every region. For more information about Lenovo warranty service upgrade offerings that are available in your region, refer to the Lenovo Enterprise Solutions Configurator (LESC):
http://lesc.lenovo.com

The warranty service definitions for the TS3100 and TS3200 Tape Libraries are listed in the following table.
Table 9. Warranty service definitions

Term	Description
On-site service	A service technician arrives at the client's location for equipment service.
24x7x4 hour	A service technician is scheduled to arrive at the client's location within four hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
9×5 next business day	A service technician is scheduled to arrive at the client's location on the business day after remote problem determination is completed. Lenovo provides service 8:00 am – 5:00 pm in the client's local time zone, Monday – Friday, excluding Lenovo holidays. Calls received after 4:00 pm local time require an extra business day for service dispatch. Next business day service is not guaranteed.

In general, the following types of Lenovo warranty service upgrades for the TS3100 and TS3200 Tape Libraries are available:

- **Warranty and maintenance service upgrades:**
  - Up to five years of 9×5 or 24×7 service coverage
  - Onsite response from next business day to 4 hours
  - Up to five years of warranty extension for all service levels in one year increments
- Remote Technical Support Services (RTS) for up to five years
- RTS provides comprehensive technical call center support. RTS can reduce problem resolution time, which decreases the cost to address technical problems and increasing uptime.

Regulatory compliance

The TS3100 and TS3200 Tape Libraries conform to the following regulations:

- FCC: Verified to comply with Part 15 of the FCC Rules, Class A Australia and New Zealand Class A statement
- Canada ICES-003, Class A
- European Union Council Directive 2004/108/EC
- EN 55022, 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 TS3100 and TS3200 support attachment to Lenovo servers by using SAS or Fibre Channel (FC) connectivity.
Note: Tables that are provided in this section are for ordering reference purposes only. End-to-end storage configuration support must be verified through the System Storage Interoperation Center (SSIC):
http://ibm.com/systems/support/storage/ssic
SAS connectivity
The following table lists currently available Lenovo SAS adapters that are compatible with the TS3100 and TS3200 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 (2x Mini-SAS HD x4 SFF-8644 external ports)	7Y37A01090
ThinkSystem 430-16e SAS/SATA 12Gb HBA (4x Mini-SAS HD x4 SFF-8644 external ports)	7Y37A01091
System x SAS HBAs	
N2225 SAS/SATA HBA (12 Gb SAS, 2x Mini-SAS HD x4 SFF-8644 external ports)	00AE912
N2226 SAS/SATA HBA(12 Gb SAS, 4x Mini-SAS HD x4 SFF-8644 external ports)	00AE916
ThinkServer SAS HBAs	
Lenovo ThinkServer 9300-8e PCIe 12Gb 8 Port External SAS Adapter by LSI (2x Mini-SAS HD x4 SFF-8644 external ports)	4XB0F28703

Fibre Channel connectivity

The TS3100 and TS3200 support FC switch-based attachments. Brocade and QLogic SAN switches can be used to provide FC connectivity with the TS3100 and TS3200.
The Lenovo FC adapters that are listed in the following table are compatible with the TS3100 and TS3200. Other HBAs also might be supported (for more information, see the System Storage Interoperation Center).
Table 12. 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
QLogic 16Gb Enhanced Gen5 FC Single-port HBA (QLE2690)	01CV750

Description	Part number
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
ThinkServer HBAs: 16 Gb FC	
ThinkServer LPe16000B Single Port 16Gb FC HBA by Emulex	4XB0F28653
ThinkServer LPe16002B Dual Port 16Gb Fiber Channel HBA by Emulex	4XB0F28650
ThinkServer LPe16002B-M6-L PCIe 16Gb 2 Port FC HBA by Emulex	4XB0F28705
ThinkServer LPm16002-M6-L AnyFabric 16Gb 2 Port FC HBA by Emulex	4XB0F28706
ThinkServer HBAs: 8 Gb FC	
ThinkServer QLE2562 Dual Port 8Gb Fibre Channel HBA by Qlogic	0C19482
ThinkServer LPe16002B-M8-L PCIe 8Gb 2 Port FC HBA by Emulex	4XB0F28704
Flex System HBAs: 8 Gb FC	
Flex System FC3052 2-port 8Gb FC Adapter	95Y2375
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
Flex System FC5172 2-port 16Gb FC Adapter	69Y1942

Networking switches

The following table lists currently available FC rack-mount switches that are offered by Lenovo that can be used in TS3100 and TS3200 solutions.
Table 13. FC rack-mount switches

Description	Part number
8 Gb FC	
Lenovo B300, 8 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR3
Lenovo B6505, 12 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR4
Lenovo B6510, 24 ports activated w/ 8Gb SWL SFPs, 2 PS, Rail Kit	3873BR2
16 Gb FC	
Lenovo B6505, 12 ports activated w/ 16Gb SWL SFPs, 1 PS, Rail Kit	3873AR5
Lenovo B6510, 24 ports activated w/ 16Gb SWL SFPs, 2 PS, Rail Kit	3873BR3
32 Gb FC	
Lenovo ThinkSystem DB620S, 24 Ports Activated, 24x 32Gb SWL SFPs, 2 PS, Rail Kit	6415G11
Lenovo ThinkSystem DB620S, 48 Ports Activated, 48x 32Gb SWL SFPs, 2 PS, Rail Kit	6415G2A
Lenovo ThinkSystem DB400D 32Gb FC Director, up to 192 ports, 8U, Enterprise SW	6684B2A
Lenovo ThinkSystem DB800D 32Gb FC Director, up to 384 ports, 14U, Enterprise SW	6682B1A

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

- Top-of-rack Switches: **http://lenovopress.com/servers/options/switches?rt=product-guide**
- Rack SAN Switches: **http://lenovopress.com/storage/switches/rack?rt=product-guide**

The following table lists currently available FC embedded switches and pass-thru modules for Flex System that can be used in TS3100 and TS3200 solutions.
Table 14. FC embedded switches for Flex System

Description	Part number
8 Gb FC	
Lenovo Flex System FC3171 8Gb SAN Switch	69Y1930
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
Pass-thru modules (require a compatible external switch)	
Lenovo Flex System FC3171 8Gb SAN Pass-thru	69Y1934

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

- **Blade Network Modules:** http://lenovopress.com/servers/blades/networkmodule Blade Storage

- **Modules:** http://lenovopress.com/servers/blades/storagemodule

Operating systems

The TS3100 and TS3200 support host attachments to the Lenovo servers with the following operating systems:

Microsoft

- Microsoft Windows Server 2016
- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2012
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008

Red Hat

- Red Hat Enterprise Linux 7
- Red Hat Enterprise Linux 6
- Red Hat Enterprise Linux 5

SUSE

- SUSE Linux Enterprise Server 12
- SUSE Linux Enterprise Server 11
- SUSE Linux Enterprise Server 10

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 TS3100 and TS3200 Tape Libraries for the following ISV backup software:

- Arcserve Backup
- ASG Time Navigator
- Barracuda Yosemite Backup
- CommVault Simpana
- Dell NetVault Backup
- EMC NetWorker
- HP OpenView Storage Data Protector
- IBM Spectrum Protect
- Microsoft System Center Data Protection Manager Symantec Backup Exec
- Symantec NetBackup

For more information, see the ISV matrix for IBM LTO that is available at this website:

http://www.ibm.com/systems/resources/lto_isv_matrix.pdf

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used in TS3100 and TS3200 Tape Libraries solutions.

Table 16. Rack cabinets

Description	Part number
25U S2 Standard Rack	93072RX
25U Static S2 Standard Rack	93072PX
42U S2 Standard Rack	93074RX
42U 1100mm Enterprise V2 Dynamic Rack	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack	93634EX
42U 1200mm Deep Dynamic Rack	93604PX
42U 1200mm Deep Static Rack	93614PX
42U Enterprise Rack	93084PX
42U Enterprise Expansion Rack	93084EX

For more information, see the list of Product Guides in the Rack cabinets category:
http://lenovopress.com/servers/options/racks

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used in TS3100 and TS3200 Tape Libraries solutions.

Table 17. 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	40K9617

Uninterruptible power supply units

The following table list the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used in TS3100 and TS3200 Tape Libraries solutions.
Table 18. Uninterruptible power supply units

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category:

http://lenovopress.com/servers/options/ups

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Documents / Resources

	Lenovo IBM TS3100 and TS3200 Tape Libraries [pdf] User Guide IBM TS3100 and TS3200 Tape Libraries, IBM TS3100, TS3200 Tape Libraries, Tape Libraries, Libraries

References

- IBM System Storage Interoperation Center (SSIC)
- IBM TS4300 Tape Library Product Guide > Lenovo Press
- Blade Networking Modules > Lenovo Press
- Blade Storage Modules > Lenovo Press
- Rack Cabinets > Lenovo Press
- Top-of-Rack Switches > Lenovo Press
- Uninterruptible Power Supplies > Lenovo Press
- Rack SAN Switches > Lenovo Press
- DCSC - Data Center Solution Configurator
- Enterprise Storage Server Solutions for Your Data Center | Lenovo US
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- Power Distribution Units > Lenovo Press
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