



IBM TS2900 Tape Autoloader for Lenovo

Product Guide

IBM TS2900 Tape Autoloader for Lenovo (Machine Type 6171) is an entry-level compact 1U tape unit that offers IBM tape reliability, density, and performance for entry-level and compact tape libraries at a cost-effective price.

With a capacity of nine cartridges, the TS2900 Tape Autoloader is a rack-mountable or desktide unit that contains a single IBM LTO Ultrium half-high SAS tape drive. The choice of the tape drives includes IBM LTO Ultrium 8 Half-High SAS Tape Drive (Model S8H), IBM LTO Ultrium 7 Half-High SAS Tape Drive (Model S7H), IBM LTO Ultrium 6 Half-High SAS Tape Drive (Model S6H), or IBM LTO Ultrium 5 Half-High SAS Tape Drive (Model S5H).

The TS2900 is an ideal solution if you need an entry-level larger capacity or higher performance tape backup with or without random access. The TS2900 is an excellent choice for tape automation for Lenovo servers.

The TS2900 Tape Autoloader is shown in the following figure.



Figure 1. TS2900 Tape Autoloader

Did you know?

The TS2900 Tape Autoloader uses patented high-density slot technology that allows you to maximize available backup storage capacity by offering the nine-cartridge magazine in only 1U of rack space.

Featuring the latest LTO Ultrium 8 technology, the TS2900 Tape Autoloader provides up to 270 TB of 2.5:1 compressed backup storage capacity.

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 handheld devices, notebooks, personal computers, servers, storage, networking, services, management software, and financing.

Key features

The TS2900 delivers the following features:

- An entry-level and compact tape library for high capacity, high performance, and high reliability.
- Adherence to LTO specifications.
- Support for one half-high LTO Ultrium 8, Ultrium 7, Ultrium 6, Ultrium 5, or Ultrium 6 SAS 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), up to 2.5 TB (Ultrium 6), or up to 1.5 TB (Ultrium 5).
- Native data transfer rate of up to 300 MB/s (Ultrium 8 or Ultrium 7), up to 160 MB/s (Ultrium 6), or up to 140 MB/s (Ultrium 5).
- One removable magazine that houses nine data cartridges (including one I/O station) to enable quick population of the tape library and ease the storage needs for media.
- A single I/O station 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 TS2900 in sequential (autoloader) or random (library) access mode.
- Mixed media support, including IBM LTO Ultrium 8, 7, 6, and 5 Write Once Read Many (WORM) media.
- Remote management capabilities to allow for administration of the TS2900 through a web interface.
- Optional Library Managed Encryption on LTO Ultrium 8, 7, 6, and 5 SAS tape drives with a Transparent LTO Encryption feature.
- Optional rack-mount kits, deskside covers, and extra cartridge magazines.
- A 6 Gbps SAS attachment 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 IBM LTO Ultrium Tape Drives include the following IBM LTO Ultrium features:

- Dual-stage head actuator
The 16-channel actuator (LTO Ultrium 5 and 6) or 32-channel actuator (LTO Ultrium 7 and 8) provide 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 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, 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
IBM patented Surface Control Guiding Mechanism guides the tape along the tape path in the Ultrium 8, 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 (LTO Ultrium 7, 6, and 5 tape drives)
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.
- 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 the 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 filemark. It helps improve performance if a subsequent append overwrites somewhere after the first filemark. This change helps prevent the need 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 8, 7, and 6 LTO-CM is 16320 bytes, which is double 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 is degraded.

Components and connectors

The following figure shows the front of the TS2900 Tape Autoloader.



Figure 2. Front view of the TS2900 Tape Autoloader

The following figure shows the rear of the TS2900 Tape Autoloader.

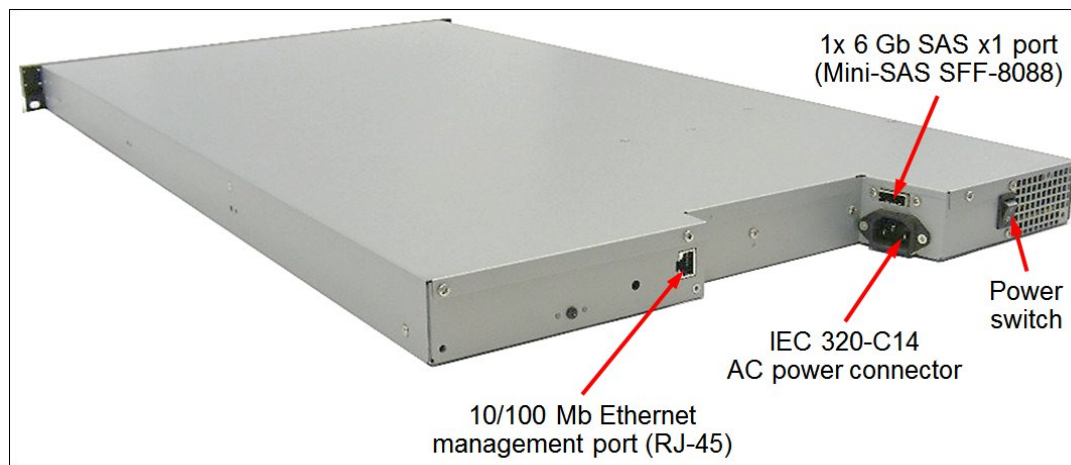


Figure 3. Rear view of the TS2900 Tape Autoloader

System specifications

The following table lists the TS2900 Tape Autoloader system specifications.

Table 1. System specifications

Attribute	Specification
Form factor	1U rack mount or standalone
Drive technology	LTO Ultrium 8, LTO Ultrium 7, LTO Ultrium 6, or LTO Ultrium 5 half-high drives
Drive interface	1x 6 Gb SAS x1 port (Mini-SAS SFF-8088)
Number of drives	1
Number of cartridge slots	9
Cartridge capacity (native / compressed)	<ul style="list-style-type: none">• LTO 8 (L8): 12 TB / 30 TB*• LTO 7 initialized LTO 8 Type M (M8): 9 TB / 22.5 TB*• LTO 7 (L7): 6 TB / 15 TB*• LTO 6 (L6): 2.5 TB / 6.25 TB*• LTO 5 (L5): 1.5 TB / 3.0 TB compressed**

Attribute	Specification
Total backup capacity (native / compressed)	<ul style="list-style-type: none"> • LTO 8 (L8): Up to 108 TB / up to 270 TB* • LTO 7 (M8): Up to 81 TB / up to 202.5 TB* • LTO 7 (L7): Up to 54 TB / up to 135 TB* • LTO 6 (L6): Up to 22.5 TB / up to 56.25 TB* • LTO 5 (L5): Up to 13.5 TB / up to 27.0 TB**
Data transfer rate (native / compressed)	<ul style="list-style-type: none"> • LTO 8: Up to 300 MB/s / up to 750 MB/s* • LTO 7: Up to 300 MB/s / up to 750 MB/s* • LTO 6: Up to 160 MB/s / up to 400 MB/s* • LTO 5: Up to 140 MB/s / up to 280 MB/s**
Software features	Transparent LTO encryption (optional).
Security features	Secure Socket Layer (SSL), user level security, LTO encryption (optional).
Management interfaces	<ul style="list-style-type: none"> • Operator panel • 1x 10/100 Mbps Ethernet port (UTP, RJ-45) for remote management: Web-based GUI; SNMP and email notifications
Cooling	Fixed internal fans
Power supply	One 82 W AC fixed power supply with IEC 320-C14 power connector
Hot-swap parts	None
Dimensions	Height: 44 mm (1.7 in.); width: 483 mm (19.0 in.), depth: 850 mm (33.5 in.)
Weight	13 kg (28.7 lb)
Warranty	One-year customer-replaceable unit and onsite warranty with 9x5 next business day terms.
Service and support	Optional warranty service upgrades are available through Lenovo Services: 24x7 coverage, 2-hour or 4-hour response time, committed repair (select countries), up to 5 years of warranty extension, installation services.
Host operating systems***	Microsoft Windows Server 2008 R2, 2012, 2012 R2, and 2016; Red Hat Enterprise Linux (RHEL) 6 and 7; SUSE Linux Enterprise Server (SLES) 11 and 12.
ISV backup software compatibility	Arcserve Backup, ASG Time Navigator, Barracuda Yosemite Backup, CommVault Simpana, Dell NetVault Backup, EMC NetWorker, IBM Spectrum Protect, Microsoft System Center Data Protection Manager, Symantec Backup Exec, Symantec NetBackup

* With 2.5:1 compression ratio.

** With 2:1 compression ratio.

*** The operating systems shown are for Lenovo servers. The TS2900 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 TS2900 Tape Autoloader models.

Table 2. TS2900 models

Description	Part number	Machine Type-Model	Feature code
IBM TS2900 Tape Autoloader w/LTO8 HH SAS	6171S8R	6171-S8H	B1EU
IBM TS2900 Tape Autoloader w/LTO7 HH SAS	6171S7R	6171-S7H	ATNY
IBM TS2900 Tape Autoloader w/LTO6 HH SAS	6171S6R	6171-S6H	AS5V
IBM TS2900 Tape Autoloader w/LTO5 HH SAS	6171S5R	6171-S5H	AS5U

The part numbers for the TS2900 Tape Autoloader models include the following items:

- One TS2900 Tape Autoloader with the half-high LTO SAS tape drive (LTO 8, LTO 7, LTO 6, or LTO 5) and with the Bar Code Reader
- One removable nine-cartridge magazine
- Documentation package

Configuration notes:

- Rack mount kit or standalone installation kit are not included; one of the kits must be ordered with the TS2900 unit (for ordering information, see the following table).
- Rack mount kit includes one 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable, and a line cord also can be ordered, if needed (for ordering information, see [Power cables](#)).
- Standalone kit does not include a power cable; it must be ordered with the TS2900 unit (for ordering information, see [Power cables](#)).

The following table lists the rack mount and stand-alone (deskside) kits for the TS2900 unit (one of the kits must be ordered with the autoloader).

Table 3. Rack mount and standalone kits

Description	Part number	Feature code	Maximum quantity
6171 Rack Mount Kit	00NA013	7006	1
6171 Deskside Covers	00NA015	AS1D	1

A SAS cable is required to attach a TS2900 Tape Library with an LTO Ultrium SAS Tape Drive to a host SAS adapter. The following table lists the supported cable options.

Table 4. SAS cables

Description	Part number	Feature code	Maximum quantity
SAS connectivity cables: SAS (SFF-8470 host) to Mini-SAS (SFF-8088 tape)			
2 m SAS/Mini-SAS 1x Cable (host SFF-8470 to target SFF-8088)	00NA007	5402	1
SAS connectivity cables: Mini-SAS (SFF-8088 host) to Mini-SAS (SFF-8088 tape)			
2 m Mini-SAS/Mini-SAS 1x Cable (host SFF-8088 to target SFF-8088)	00NA009	AS0Z	1
Mini-SAS to Mini-SAS Cable (5.5 m)	00NV418	AS11	1*
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	1

* Not supported with the TS2900 with the LTO 8 tape drive.

Tape media

The TS2900 ships with one removable tape magazine with nine cartridge slots that include a single I/O station (if enabled). Extra removable tape magazines can be ordered with the TS2900, if needed.

The following table lists tape media options and extra magazines that can be ordered for the TS2900.

Table 5. Tape media and additional magazines

Description	Part number	Feature code	Supported tape drive types
Cleaning cartridge			
Ultrium Cleaning Cartridge (universal)	00NA017	AS1E	LTO 8, LTO 7, LTO 6, LTO 5
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
Ultrium 5 Data Cartridges 5-Pack	00NA023	AS23	LTO 7 (read-only), LTO 6, LTO 5
Optional magazine			
6171 Additional Tape Magazine	00NA019	AS1K	LTO 8, LTO 7, LTO 6, LTO 5

LTO Ultrium tape drives support the following backward compatibility for the 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.
- LTO Ultrium 5 tape drives can read and write LTO Ultrium 5 and Ultrium 4 data cartridges, and can read Ultrium 3 data cartridges.

Configuration notes:

- A 5-Pack of the Ultrium 5, 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

IBM Ultrium 8, Ultrium 7, Ultrium 6, and Ultrium 5 SAS tape drives are encryption-capable and support the following modes of encryption management:

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

Application Managed Encryption does not require a license. Library Managed Encryption requires an optional Transparent LTO Encryption license that is listed in the following table.

Table 6. Software options

Description	Part number	Feature code	Maximum quantity
6171 Transparent LTO Encryption	00NA011	AS19	1

Power cables

If the TS2900 is ordered with the rack mount kit, it includes one 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable. A line cord also can be ordered, if needed.

If the TS2900 is ordered with the stand-alone (deskside) kit, it does not include a power cable. A line cord or a rack power cable must be ordered with the TS2900.

The part numbers and feature codes to order the power cables (one power cable per TS2900) are listed in the following table.

Table 7. Power cables

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

Description	Part number	Feature code
Rack power cord		
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	00NA063	AS2U

Physical specifications

The TS2900 Tape Autoloader has the following dimensions and weight (approximate):

- Height: 44 mm (1.7 in.)
- Width: Bezel: 483 mm (19.0 in.); chassis: 445 mm (17.5 in.)
- Depth: 850 mm (3.5 in.)
- Weight: 13 kg (28.7 lb)

Operating environment

The TS2900 Tape Autoloader is supported in the following environment:

- Air temperature:
 - Operating: 10 °C - 38 °C (50 °F - 100 °F)
 - Non-operating: 1 °C - 60 °C (34 °F - 140 °F)
 - Maximum altitude: 2,500 m (8,202 ft)
- Humidity:
 - Operating: 20% - 80%
 - Non-operating: 10% - 90%
- Electrical power:
 - 100 V AC - 240 V AC (4.0 A to 1.5 A)
 - Frequency: 50 Hz / 60 Hz
 - Power consumption: 110 watts
- Acoustical noise emission:
 - 6.6 bels (idling)
 - 6.8 bels (operating)

Warranty services and upgrades

The TS2900 Tape Autoloader has a one-year CRU and onsite limited warranty with 9x5/next business day (NBD) terms.

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 spares 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 (LESC):
<http://dcsc.lenovo.com/#/services>
- Lenovo Services Availability Locator
<http://lenovolocator.com/>

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

- Warranty and maintenance service upgrades:
 - 1, 2, 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)
- Hardware Installation Services
Lenovo experts can seamlessly manage the physical installation of your server, storage, or networking hardware. Working at a time convenient for you (business hours or off shift), the technician will unpack and inspect the systems on your site, install options, mount in a rack cabinet, connect to power and network, check and update firmware to the latest levels, verify operation, and dispose of the packaging, allowing your team to focus on other priorities.

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://pcsupport.lenovo.com/us/en/solutions/ht503310>
- Lenovo Data Center Services Agreement
<http://support.lenovo.com/us/en/solutions/ht116628>

Regulatory compliance

The TS2900 Tape Autoloader conforms to the following regulations:

- FCC: Verified to comply with Part 15 of the FCC Rules, Class A
- 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 statement
- Taiwan Class A statement
- Korea KCC Class A statement

Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The TS2900 Tape Autoloader supports attachment to Lenovo servers by using SAS storage connectivity.

Note: Tables that are provided in this section are for ordering reference purposes only. End-to-end storage configuration support (including adapters and operating systems) *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 TS2900 Tape Autoloader. Other SAS HBAs also might be supported (see the Interoperation Center for details).

Table 8. 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

Operating systems

The TS2900 Tape Autoloader supports 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
- Red Hat:
 - Red Hat Enterprise Linux 7
 - Red Hat Enterprise Linux 6
- SUSE:
 - SUSE Linux Enterprise Server 12
 - SUSE Linux Enterprise Server 11

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) indicated support for the TS2900 Tape Autoloader for the following ISV backup software:

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

For more information, see the Independent Software Vendor matrix for IBM LTO, which is available at:

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 with the TS2900 Tape Autoloader in IT solutions.

Table 9. 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 TS2900 Tape Autoloader in IT solutions.

Table 10. 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
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

Description	Part number
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 TS2900 Tape Autoloader in IT solutions.

Table 11. 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>

Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region specific offers please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website:
<http://www.lenovofs.com>

Related publications and links

For more information, see the following resources:

- Lenovo Storage product page:
<http://www.lenovo.com/systems/storage>
- US Announcement Letter - IBM TS2900 Tape Autoloader for Lenovo with LTO Ultrium 7 Drive:
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS115-155>
- US Announcement Letter - IBM TS2900 Tape Autoloader for Lenovo:
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS114-131>
- 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](#)

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
1009 Think Place - Building One
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

© Copyright Lenovo 2020. All rights reserved.

This document, TIPS1303, was created or updated on September 3, 2019.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
<http://lenovopress.com/TIPS1303>
- Send your comments in an e-mail to:
comments@lenovopress.com

This document is available online at <http://lenovopress.com/TIPS1303>.

Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at <https://www.lenovo.com/us/en/legal/copytrade/>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo Services

Lenovo®

System x®

ThinkServer®

ThinkSystem

The following terms are trademarks of other companies:

Linux® is a trademark of Linus Torvalds in the United States, other countries, or both.

Hyper-V®, Microsoft®, Surface®, Windows Server®, and Windows® are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.