

Lenovo ThinkServer TD350 (E5-2600 v4) Product Guide (withdrawn product)

The Lenovo ThinkServer TD350 allows you to balance high performance and massive storage capacity without the need to invest in a rack infrastructure. Now with the new Intel Xeon E5-2600 v4 processors, this high-performance tower supports up to 1 TB of 2400 MHz DDR4 memory, and up to 245 TB of internal storage.

Suggested uses: business-critical workloads, distributed databases, IT infrastructure, virtualization, point of sale

The ThinkServer TD350 is shown in the following figure.



Figure 1. ThinkServer TD350

Did you know?

The new Thinkserver TD350 with Intel Xeon v4 processors now supports faster DDR4 memory (up to 2400 MHz) and larger DIMM capacities (now up to 64GB). Processor core counts have also increased and the TD350 now supports up to 20 cores per processor, up from 16 cores in the v3 processors.

The TD350 is now also better managed with new support for Lenovo XClarity Administrator. Improved systems management means greater remote management capabilities for increased reliability and uptime.

Key features

The TD350 is a versatile 4U two-socket business-critical tower server that offers improved performance and pay-as-you-grow flexibility along with new features that improve server management capabilities. This powerful system is designed for your most important business applications and cloud deployments.

Combining balanced performance and flexibility, the TD350 is a great choice for small and medium businesses. It can provide outstanding uptime to keep business-critical applications and cloud deployments running safely. Ease of use and comprehensive systems management tools help make deployment easier. Outstanding reliability, availability, and serviceability (RAS) and high-efficiency design improve your business environment and help save operational costs.

Scalability and performance

The TD350 offers numerous features to boost performance, improve scalability, and reduce costs:

- Improves productivity by offering superior system performance with up to two 20-core processors, each with up to 50 MB of L3 cache and up to 9.6 GT/s QPI interconnects links.
- Supports up to two processors, 40 cores, and 80 threads to maximize the concurrent execution of multithreaded applications.
- Intelligent and adaptive system performance with energy-efficient Intel Turbo Boost Technology allows CPU cores to run at maximum speeds during peak workloads by temporarily going beyond processor thermal design power (TDP).
- Intel Hyper-Threading Technology boosts performance for multithreaded applications by enabling simultaneous multithreading within each processor core with two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better utilize the hardware for virtualization workloads.
- Intel Advanced Vector Extensions 2.0 (AVX 2.0) enable acceleration of enterprise-class workloads such as databases, enterprise resource planning, and others.
- Up to 2400 MHz memory speeds with two DIMMs per channel running at 2400 MHz to help maximize system performance.
- Up to 1 TB of memory capacity using 64 GB LRDIMMs.
- The 12 Gbps SAS internal storage connectivity doubles the data transfer rate compared to 6 Gb SAS solutions to maximize performance of storage I/O-intensive applications.
- Flexible and scalable internal storage configurations provide for up to 245 TB of storage capacity (using 15x 10TB drives) in a 4U rack form factor.
- The use of solid-state drives (SSDs) instead of, or along with, traditional spinning drives (HDDs) can significantly improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.
- The server offers up to seven PCI Express (PCIe) 3.0 I/O expansion slots.
- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E5 family. This helps to dramatically reduce I/O latency and increase overall system performance.
- Ideal for location in a small office, the TD350 features whisper quiet acoustics, as low as 37 decibels (33% quieter than a normal conversation)

Availability and serviceability

The TD350 provides many features to simplify serviceability and increase system uptime:

- Toolless cover removal provides easy access to upgrades and serviceable parts, such as processors, DIMMs, and adapter cards.
- The server offers hot-swap drives that support RAID redundancy for data protection and greater system uptime.
- The server offers redundant hot-swap power supplies and redundant fans to provide availability for business-critical applications.

- Able to convert from tower to rack-mount for more flexibility.
- Solid-state drives (SSDs) offer significantly better reliability than traditional mechanical HDDs, for greater uptime.
- Built-in ThinkServer System Manager (TSM) continuously monitors system parameters and triggers alerts to minimize downtime.
- One- or three-year customer replaceable unit (CRU) and onsite limited warranty (depending on model), next business day 9x5. Optional service upgrades are available.

Manageability and security

Powerful systems management features simplify local and remote management of the TD350:

- Support for Lenovo XClarity Administrator, providing auto-discovery, inventory tracking, monitoring, and call home capabilities.
- Includes ThinkServer System Manager (TSM) to monitor server availability and perform remote management. Optional TSM Premium adds remote control and remote media.
- Support for Lenovo XClarity Energy Manager, which captures real-time power and temperature data from the server and provides automated controls to lower energy costs.
- Embedded ThinkServer Deployment Manager (TDM) provides a complete set of provisioning capabilities from a single interface, automating many of the tasks associated with server provisioning.
- An optional Trusted Platform Module (TPM) enables advanced cryptographic functionality such as digital signatures and Windows BitLocker encryption, a Windows data protection feature. The server supports TPM 2.0 or TPM 1.2 depending on the TPM option selected.
- Intel Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing an application to run in its own isolated space, protected from all other software running on a system.

Energy efficiency

The TD350 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to a green environment:

- Energy-efficient planar components help lower operational costs.
- Energy Star 2.0 certified.
- High-efficiency power supplies with 80 PLUS Platinum and Titanium certifications.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.
- Low-voltage Intel Xeon processors draw less energy to satisfy the demands of power and thermally constrained data centers and telecommunication environments.
- Low-voltage 1.2 V DDR4 memory DIMMs consume up to 20% less energy compared to 1.35 V DDR3 DIMMs.
- Solid-state drives (SSDs) consume less power than traditional spinning HDDs.
- Lenovo XClarity Energy Manager provides advanced data center power notification and management to help achieve lower heat output and reduced cooling needs.

Locations of key components and connectors

The TD350 is available either with 3.5-inch hot-swap drive bays or 2.5-inch hot-swap drive bays or 3.5-inch easy-swap drive bays. The following figure shows the front of the server.

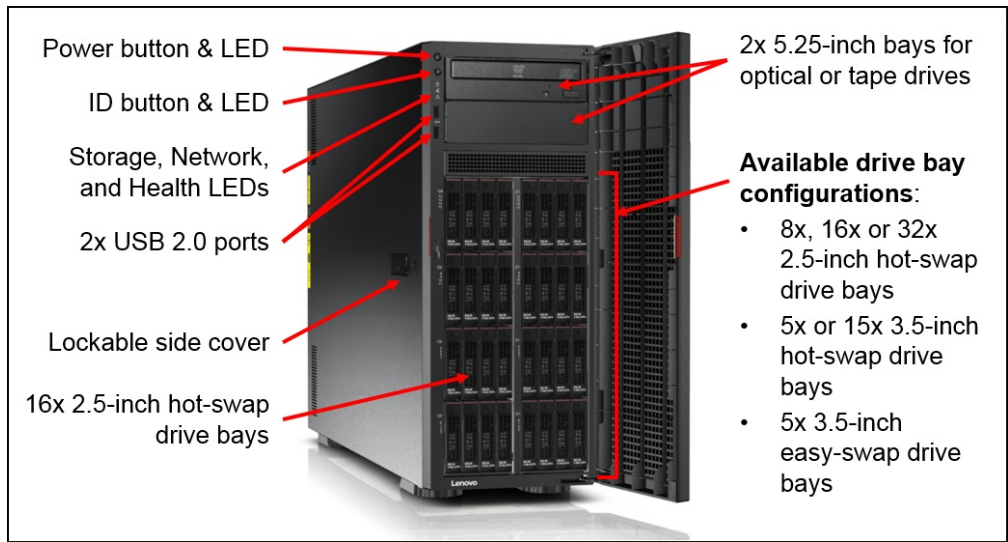


Figure 2. Front view of the ThinkServer TD350 (16x 2.5-inch drive-bay model)

The following figure shows the rear of the TD350 server.

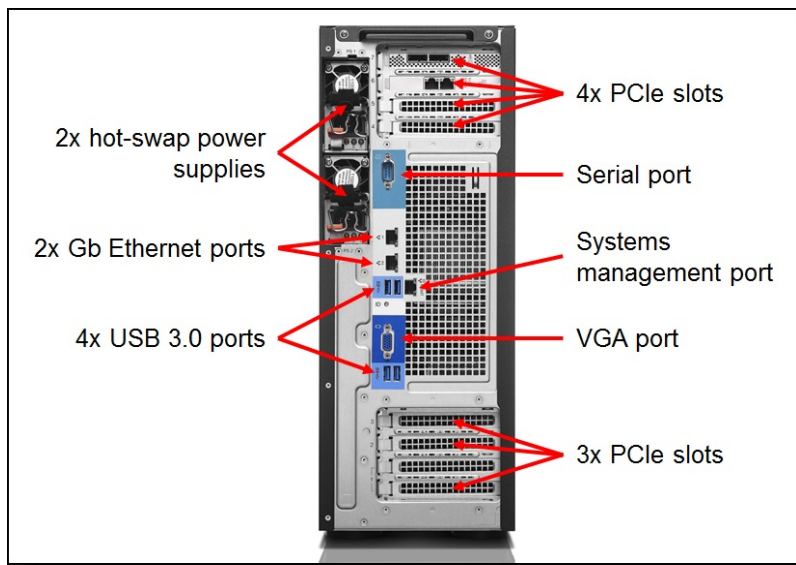


Figure 3. Rear view of the ThinkServer TD350

The following figure shows the inside of the TD350 server.

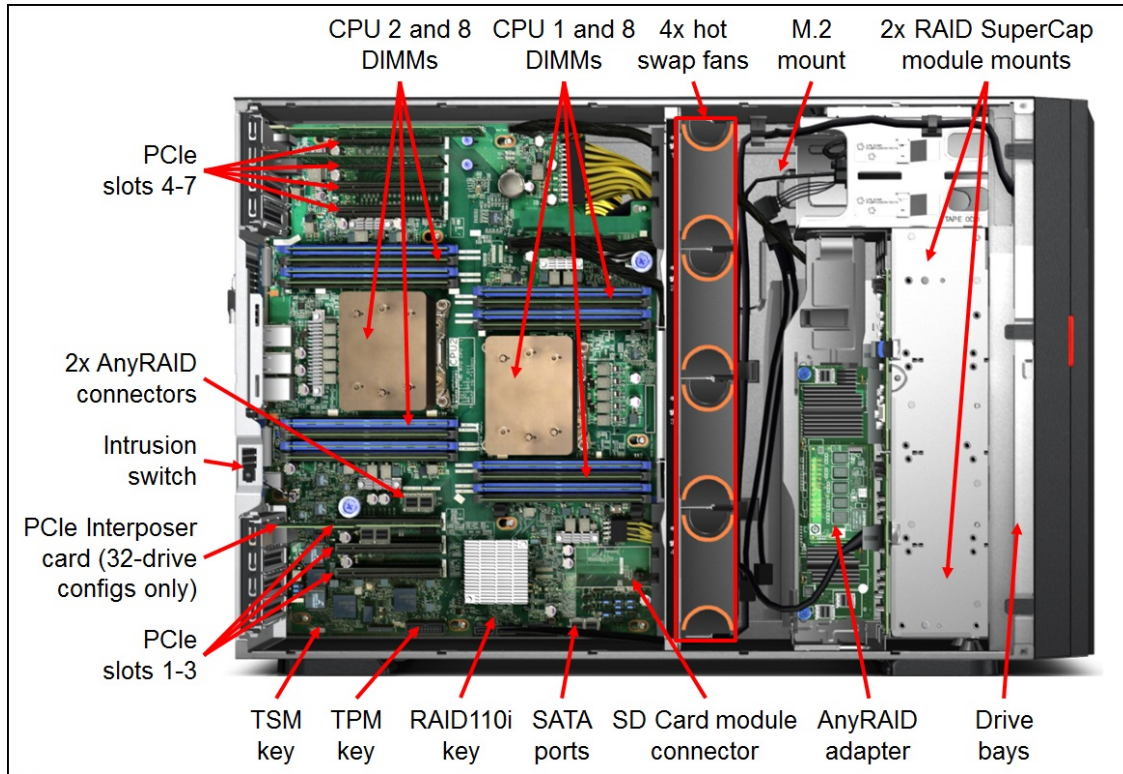


Figure 4. Inside view of the ThinkServer TD350

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

| Components | Specification |
|-------------------|--|
| Machine type | 70DG, 70DH (3.5-inch drives) 70DJ, 70DK (2.5-inch drives) 70DL, 70DM (3.5-inch drives, rack conversion kit) 70DN, 70DQ (2.5-inch drives, rack conversion kit) |
| Form factor | Tower (convertable to 4U rack-mount) |
| Processor | Up to two Intel Xeon E5-2600 v4 Series CPUs, with up to 135 W SKUs and up to 20 cores per CPU |
| Chipset | Intel C610 |
| Memory | Up to 16 DDR4 DIMM sockets (8 DIMMs per processor). RDIMMs and Load Reduced DIMMs (LRDIMMs) are supported. Memory types cannot be intermixed. Memory speed up to 2400 MHz |
| Memory maximums | <ul style="list-style-type: none"> With RDIMMs: Up to 512 GB with 16x 32 GB RDIMMs and two processors With LRDIMMs: Up to 1 TB with 16x 64 GB LRDIMMs and two processors |
| Memory protection | ECC, Patrol Scrubbing, Demand Scrubbing, Sparing, Mirroring, and Lockstep Mode |

| Components | Specification |
|--------------------------|--|
| Disk drive bays | <p>Internal drive bay options (mutually exclusive):</p> <ul style="list-style-type: none"> • 8x, 16x or 32x 2.5-inch hot-swap drive bays • 5x or 15x 3.5-inch hot-swap drive bays • 5x 3.5-inch easy-swap drive bays <p>Two M.2 SSDs and an optional M.2 storage module with a dedicated connector. Two SDHC Cards and an optional SD module installed with a dedicated connector.</p> |
| Maximum internal storage | <ul style="list-style-type: none"> • 245 TB using 32x 7.68 TB Enterprise Capacity SAS SSDs, or • 180 TB using 15x 12 TB 3.5-inch NL SAS HDDs, or • 64 TB using 32x 2 TB 2.5-inch NL SATA HDDs <p>Intermix of SAS/SATA is supported.</p> |
| Storage controller | <p>Supports an AnyRAID adapter installed in a dedicated slot on the drive backplane or a PCIe RAID adapter installed in a standard PCIe slot:</p> <ul style="list-style-type: none"> • AnyRAID 110i 6 GB SATA RAID 0/1/10 with optional RAID 5. This is a pass-through card that routes the embedded controller in the Intel C610 PCH to the backplane. Maximum 6 SATA drives. • AnyRAID 510i 6 GB SAS & SATA RAID 0/1/10 with optional RAID 5/50. Maximum 8 drives. • AnyRAID 720i 12Gb RAID 0/1/5/6/10/50/60 with optional 1 GB cache (without flash), or 1 GB, 2 GB or 4 GB cache each with CacheVault (flash), CacheCade, and FastPath support. Maximum 8 drives. • AnyRAID 720ix 12 GB RAID 0/1/5/6/10/50/60 with optional 1 GB cache (without flash), or 1 GB, 2GB or 4GB cache each with CacheVault (flash), CacheCade, and FastPath support. Includes SAS Expander to support up to 16 drives. • 2x AnyRAID 720ix controllers for support of 32 drives (also requires a PCIe Expander Card to be installed in PCIe Slot 3). • RAID 520i PCIe 12 GB SAS & SATA RAID 0/1/10 with optional RAID 5/50. Maximum 8 drives. • RAID 720i PCIe 12Gb RAID 0/1/5/6/10/50/60 with optional 1 GB cache (without flash), or 1 GB, 2 GB or 4 GB cache each with CacheVault (flash), CacheCade, and FastPath support. Maximum 8 drives. |
| Optical drive bays | One or two optional slimline drives, one standard in some models. Support for DVD-ROM or Multiburner. |
| Tape drive bays | One optional LTO6 tape drive. Requires AnyRAID 720ix controller. |
| Network interfaces | Two integrated RJ-45 Gigabit Ethernet 1000BASE-T ports (Intel i210) for the operating system. Port 1 can be configured as shared with systems management. Dedicated Gigabit Ethernet port for systems management. |
| PCI Expansion slots | <p>Up to seven slots, depending on the number of processors installed. The slots are numbered as follows (see the rear view in Locations of key components and connectors for slot locations):</p> <ol style="list-style-type: none"> 1. PCIe 3.0 x16 FH/FL (supports double-width cards) 2. PCIe 3.0 x8 (x16 mechanical) FH/FL 3. PCIe 3.0 x8 (x16 mechanical) FH/FL 4. PCIe 3.0 x8 (x16 mechanical) FH/FL (requires CPU 2) 5. PCIe 3.0 x16 FH/FL (requires CPU 2) 6. PCIe 3.0 x8 (x16 mechanical) FH/FL (requires CPU 2) 7. PCIe 3.0 x8 (x16 mechanical) FH/FL (requires CPU 2) |

| Components | Specification |
|-----------------------------|--|
| Ports | <ul style="list-style-type: none"> • Front: 2x USB 2.0 • Rear: 4x USB 3.0, 1x DB-15 VGA video, 1x RJ-45 systems management port, 2x RJ-45 GbE network ports, 1x DB-9 serial port • Internal: 2x SD Card slots (optional, with SD Card module), 2x M.2 SSD slots (optional, with M.2 module) |
| Cooling | Four hot-swap system fans, 3 + 1 redundant. |
| Power supply | Up to two redundant hot-swap 450W, 550 W, 750 W, or 1100 W High Efficiency Platinum AC Power Supplies (all 110-240V), or 750 W High Efficiency Titanium AC Power Supply (220-240V) |
| Hot-swap parts | Drives, fans and power supplies |
| Systems management | UEFI, ThinkServer System Management (TSM) based on ASPEED AST2400, IPMI 2.0-compliant baseboard management controller (BMC), and support for Lenovo XClarity Administrator. Optional TSM Premium Upgrade software feature for remote presence. ThinkServer Deployment Manager. Lenovo XClarity Energy Manager (activated with TSM Premium or separate license). |
| Security features | Power-on and administrator password. Optional Trusted Platform Module (TPM) 2.0 or 1.2. Chassis intrusion switch standard on some models, not available on others. |
| Video | Onboard Aspeed AST2400 with 16MB memory, one VGA port on rear. Maximum resolution: 1920x1200@60Hz |
| Operating systems supported | Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi, Citrix XenServer. See the Operating system support section for specifics. |
| Limited warranty | One- or three-year limited onsite service with 9x5 Next Business Day |
| Service and support | Optional service upgrades are available through Lenovo Services |
| Dimensions | <p>Tower form factor:</p> <ul style="list-style-type: none"> • Width: 173 mm (6.8 inches) • Height: 459 mm (18.1 inches) with foot stands • Depth: 685 mm (27.0 inches) including the front door <p>Rack form factor:</p> <ul style="list-style-type: none"> • Width: 482 mm (19.0 inches) with rack handles • Height: 173 mm (6.8 inches) • Depth: 664 mm (26.1 inches) |
| Weight | Minimum configuration: 22 kg (48.5 lb), maximum 41.5 kg (91.5 lb) |

Models

ThinkServer TD350 models are region-specific; that is, each region may define their own server models, and not all server models are available in every region.

Machine types for the TD350 are 70DG, 70DH, 70DJ, 70DK, 70DL, 70DM, 70DN, and 70DQ.

Tip: These are the same machine types as the TD350 with E5-2600 v3 processors.

For a list of the TD350 models available in the US or EMEA, see PSREF:

http://psref.lenovo.com/Product/ThinkServer_TD350

For models in other regions, contact a local Lenovo or Lenovo Business Partner representative.

The TD350 server models are shipped with the following items:

- Rail kit (some models)
- Cable management arm (some models)
- One or two rack power cords or power cords (model specific)
- Documentation package

Processor options

The TD350 supports up to two Intel Xeon E5-2600 v4 series processors. The following table lists the supported processor options. When two processors are installed, they must be identical.

Note: This product guide covers the TD350 with E5 v4 processors. For information about TD350 models with v3 processor support, see [Lenovo ThinkServer TD350 \(E5-2600 v3\)](#).

Table 2. Processor options (TB = Turbo Boost, VT = Virtualization Technology, HT = Hyper-Threading Technology)

| Part number | Description | Memory speed | L3 cache | TB | VT | HT |
|-------------|---|--------------|----------|----|----|----|
| 4XG0G89088 | ThinkServer TD350 Intel Xeon E5-2603 v4 (6C, 85W, 1.7GHz) Processor | 1866 MHz | 15 MB | N | Y | N |
| 4XG0G89083 | ThinkServer TD350 Intel Xeon E5-2609 v4 (8C, 85W, 1.7GHz) Processor | 1866 MHz | 20 MB | N | Y | N |
| 4XG0G89078 | ThinkServer TD350 Intel Xeon E5-2620 v4 (8C, 85W, 2.1GHz) Processor | 2133 MHz | 20 MB | Y | Y | Y |
| 4XG0G89093 | ThinkServer TD350 Intel Xeon E5-2623 v4 (4C, 85W, 2.6GHz) Processor | 2133 MHz | 10 MB | Y | Y | Y |
| 4XG0G89073 | ThinkServer TD350 Intel Xeon E5-2630 v4 (10C, 85W, 2.2GHz) Processor | 2133 MHz | 25 MB | Y | Y | Y |
| 4XG0G89103 | ThinkServer TD350 Intel Xeon E5-2630L v4 (10C, 55W, 1.8GHz) Processor | 2133 MHz | 25 MB | Y | Y | Y |
| 4XG0G89046 | ThinkServer TD350 Intel Xeon E5-2637 v4 (4C, 135W, 3.5GHz) Processor | 2400 MHz | 15 MB | Y | Y | Y |
| 4XG0G89068 | ThinkServer TD350 Intel Xeon E5-2640 v4 (10C, 90W, 2.4GHz) Processor | 2133 MHz | 25 MB | Y | Y | Y |
| 4XG0G89043 | ThinkServer TD350 Intel Xeon E5-2643 v4 (6C, 135W, 3.4GHz) Processor | 2400 MHz | 20 MB | Y | Y | Y |
| 4XG0G89063 | ThinkServer TD350 Intel Xeon E5-2650 v4 (12C, 105W, 2.2GHz) Processor | 2400 MHz | 30 MB | Y | Y | Y |
| 4XG0G89098 | ThinkServer TD350 Intel Xeon E5-2650L v4 (14C, 65W, 1.7GHz) Processor | 2400 MHz | 35 MB | Y | Y | Y |
| 4XG0G89058 | ThinkServer TD350 Intel Xeon E5-2660 v4 (14C, 105W, 2.0GHz) Processor | 2400 MHz | 35 MB | Y | Y | Y |
| 4XG0G89040 | ThinkServer TD350 Intel Xeon E5-2667 v4 (8C, 135W, 3.2GHz) Processor | 2400 MHz | 25 MB | Y | Y | Y |
| 4XG0G89055 | ThinkServer TD350 Intel Xeon E5-2680 v4 (14C, 120W, 2.4GHz) Processor | 2400 MHz | 35 MB | Y | Y | Y |
| 4XG0G89052 | ThinkServer TD350 Intel Xeon E5-2683 v4 (16C, 120W, 2.1GHz) Processor | 2400 MHz | 40 MB | Y | Y | Y |
| 4XG0G89037 | ThinkServer TD350 Intel Xeon E5-2690 v4 (14C, 135W, 2.6GHz) Processor | 2400 MHz | 35 MB | Y | Y | Y |
| 4XG0G89049 | ThinkServer TD350 Intel Xeon E5-2695 v4 (18C, 120W, 2.1GHz) Processor | 2400 MHz | 45 MB | Y | Y | Y |
| 4XG0G89034 | ThinkServer TD350 Intel Xeon E5-2698 v4 (20C, 135W, 2.2GHz) Processor | 2400 MHz | 50 MB | Y | Y | Y |

Xeon E5-2600 v4 processors improves on the v3 generation in the following ways:

- Manufacturing process technology has transitioned from 22 nm to 14 nm
- Maximum TD350 core count is increased from 16 to 20 cores per processor
- Server thread count for TD350 is increased from 32 to 40
- Maximum last level per-processor cache for TD350 is increased from 30 MB to 50 MB
- Supports DDR4 memory at up to 2400 MT/s.
- New and increased Resource Monitoring and Allocation capabilities
- Enhanced hardware assisted Security features

Memory options

The ThinkServer TD350 supports DDR4 memory. DDR4 memory offers many benefits over previous generation DDR3 memory. DDR4 operates at a lower voltage than DDR3 (1.2V vs. 1.35V or 1.5V) and as a result, offers significant power savings. In addition, the DDR4 memory DIMMs used with Xeon E5 v4 processors have higher memory transfer speeds (up to 2400 MT/s), depending on the processor(s) used and the memory configuration.

Lenovo offers Registered DIMMs (RDIMM), as well as Load Reduced DIMMs (LRDIMM) that use a buffer to reduce memory bus loading and enable greater memory capacities to be achieved.

The following table lists the DDR4 memory options and ordering information.

2133 MHz memory support: the TD350 with Intel Xeon E5-2600 v4 processors supports both 2133 MHz and 2400 MHz memory options, however the 2133 MHz memory DIMMs will not operate at 2400 MHz, even if the processor selected supports that speed. 2133 MHz DIMMs operate at speeds only up to 2133 MHz.

Table 3. Memory Options

| Part number | Description | Maximum supported* |
|-------------------------|--|--------------------|
| 2400 MHz memory options | | |
| 4X70G88318 | Lenovo ThinkServer 8GB DDR4-2400MHz (1Rx4) RDIMM | 8 / 16 |
| 4X70G88319 | Lenovo ThinkServer 16GB DDR4-2400MHz (2Rx4) RDIMM | 8 / 16 |
| 4X70G88330 | Lenovo ThinkServer 16GB DDR4-2400MHz (2Rx8) RDIMM | 8 / 16 |
| 4X70G88320 | Lenovo ThinkServer 32GB DDR4-2400MHz (2Rx4) RDIMM | 8 / 16 |
| 4X70G88321 | Lenovo ThinkServer 64GB DDR4-2400MHz (4Rx4) LRDIMM | 8 / 16 |
| 2133 MHz memory options | | |
| 4X70F28588 | Lenovo ThinkServer 4GB DDR4-2133MHz (1Rx8) RDIMM | 8 / 16 |
| 4X70F28589 | Lenovo ThinkServer 8GB DDR4-2133MHz (1Rx4) RDIMM | 8 / 16 |
| 4X70F28590 | Lenovo ThinkServer 16GB DDR4-2133MHz (2Rx4) RDIMM | 8 / 16 |
| 4X70G88311 | Lenovo ThinkServer 32GB DDR4-2133MHz (2Rx4) RDIMM | 8 / 16 |
| 4X70F28591 | Lenovo ThinkServer 32GB DDR4-2133MHz (4Rx4) LRDIMM | 8 / 16 |

* Maximum supported with 1 processor installed / 2 processors installed

The server supports up to 8 DIMMs when one processor is installed and up to 16 DIMMs when two processors are installed. Each processor has four memory channels, and there are two DIMMs supported per channel.

The following table shows the characteristics of the supported DIMMs. All configurations allow the DIMMs to operate at rated speed, provided the CPU selected also supports that speed. Tables cells highlighted with a gray background indicate that the server supports higher memory frequencies than the Intel processor specification.

Table 4. Maximum memory speeds

| DIMM specification | RDIMM | | LRDIMM |
|--------------------------------|-------------------|--|--------------------|
| | Single rank | Dual rank | Quad rank |
| Part numbers | 4X70G88318 (8 GB) | 4X70G88319 (16 GB) 4X70G88320 (32 GB) | 4X70G88321 (64 GB) |
| Rated speed | 2400 MHz | 2400 MHz | 2400 MHz |
| Rated voltage | 1.2 V | 1.2 V | 1.2 V |
| Maximum quantity supported* | 16 | 16 | 16 |
| Maximum DIMM capacity | 8 GB | 32 GB | 64 GB |
| Maximum memory capacity | 128 GB | 512 GB | 1024 GB |
| Maximum memory at rated speed | 64 GB | 64 GB | 1 TB |
| Maximum operating speed | | | |
| 1 DIMM per channel | 2400 MHz | 2400 MHz | 2400 MHz |
| 2 DIMMs per channel | 2400 MHz | 2400 MHz | 2400 MHz |

* The maximum quantity supported is shown for two processors installed.

Protection against data loss is provided through the following memory RAS features:

- ECC
- Patrol and Demand Scrubbing
- Sparing
- Mirroring

- Lockstep Mode

Configuration Guidelines

Memory can be configured to meet various needs and workloads subject to the following general rules:

- Mixing memory type (RDIMM, LRDIMM) is not supported.
- DIMM capacities and rank can be mixed.

When you are populating for the various RAS modes the following rules apply:

- If memory mirroring or lockstep is used, DIMMs must be installed in pairs (minimum of one pair per each CPU), and both DIMMs in a pair must be identical in type, size, and rank.
- If memory sparing is used, one rank of a DIMM in each populated channel is reserved as spare memory; therefore, Single Rank DIMMs cannot be used. DIMMs in a pair must be identical in type, size, and rank.

Memory Optimization

The memory subsystem can be optimized for various factors, including performance, capacity, or power consumption. Refer to the following guidelines when you are selecting memory options:

- Guidelines for maximum memory performance:
 - Use all available memory channels (four per processor, eight total per system).
 - Use identical DIMM populations in size and speed across channels.
 - Populate both processors with equal amounts of memory.
 - Populate the same number of ranks per channel.
 - Have at least two ranks available on each channel.
- Guidelines for lowest memory energy consumption
 - Use fewer, higher capacity DIMMs. For example, a configuration of 8x 16 GB DIMMs often has lower power requirements than a configuration of 16x 8 GB DIMMs, despite the same capacity.
 - Populating more DIMMs per channel—but using fewer channels (the opposite of the preceding bullet)—further reduces overall system energy use, but at the cost of significant performance reduction.

Internal storage

The TD350 supports chassis configurations with either 2.5-inch drive bays or 3.5-inch drive bays. Some configurations also support one optical drive, two optical drives, or one optical and one tape drive.

The six available drive configurations are shown in the following figure. The configurations are:

- 8x 2.5-inch hot-swap drive bays
- 16x 2.5-inch hot-swap drive bays
- 32x 2.5-inch hot-swap drive bays
- 5x 3.5-inch hot-swap drive bays
- 15x 3.5-inch hot-swap drive bays
- 5x 3.5-inch easy-swap drive bays

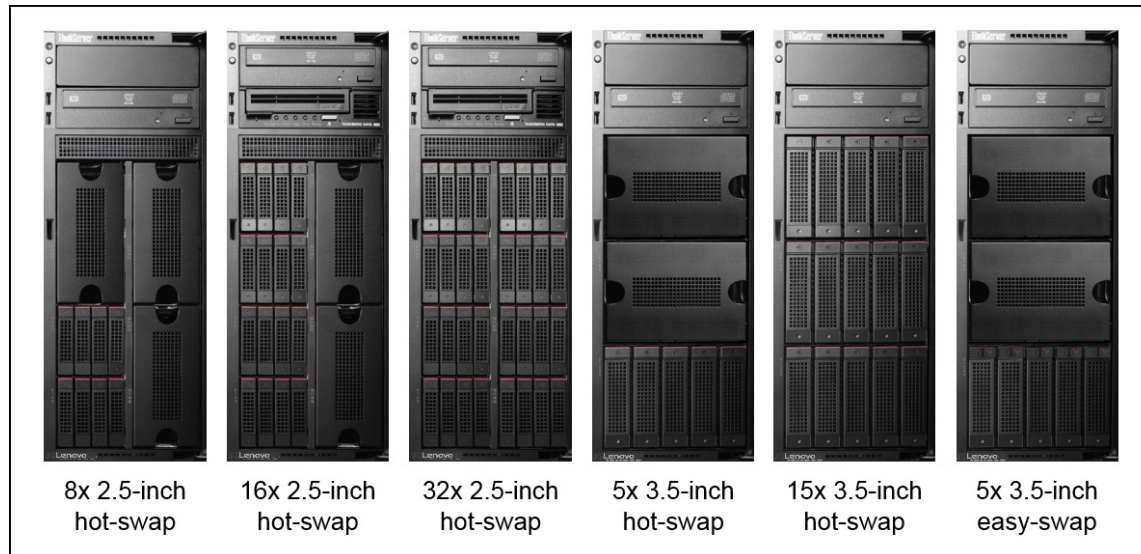


Figure 5. Available drive bay configurations

Note: A tape drive is supported only with hot-swap drive configurations and only with the addition of the AnyRAID 720ix controller.

There are four hot-swap backplanes used in TD350 configurations:

- 8x 2.5-inch hot-swap backplane (for 8-drive configurations only; no bay upgrades)
- 8x 2.5-inch hot-swap backplane with AnyRAID support (for 8, 16 or 32-drive configurations)
- 5x 3.5-inch hot-swap backplane (for 5-drive configurations only; no bay upgrades)
- 15x 3.5-inch hot-swap backplane with AnyRAID support (for 5-drive and 15-drive configurations)

A configuration with 8x 2.5-inch drives with AnyRAID support can be upgraded to 16 drive bays by adding one additional backplane. A configuration with 16x 2.5-inch drives can be upgraded to 32 drive bays by adding an upgrade kit. These options are listed in the following table.

Configurations notes:

- Only configurations with AnyRAID support can be upgraded using these backplane kits. A configuration with 8x 2.5-inch drive bays without AnyRAID support cannot be upgraded.
- As shown in [Table 7](#), when upgrading from 8x 2.5-inch drives to 16x 2.5-inch drive bays, you will need an AnyRAID 720ix adapter in addition to the 8-Drive Backplane Kit (4XF0G45886).
- The 32-to-16 drive upgrade kit (4XF0G88928) includes the additional AnyRAID 720ix adapter and PCIe Expander Card needed to support 32 drives. The PCIe Expander Card requires an available PCIe slot.

Table 5. Backplane options

| Part Number | Description | Maximum supported |
|-------------|---|-------------------|
| 4XF0G45886 | Lenovo ThinkServer Gen 5 Tower 2.5" 8-Drive Backplane Kit Contains: <ul style="list-style-type: none"> • 8-drive backplane • Drive-bay blanks | 1 |
| 4XF0G88928 | Lenovo ThinkServer TD350 2.5" 32-Drive Upgrade Kit from 16-Drive. Contains: <ul style="list-style-type: none"> • Two 8-drive backplanes • PCIe Expander Card • AnyRAID 720ix adapter • Cables | 1 |

The server also supports an M.2 module which installs into a dedicated connector on the system board and supports two M.2 cards. The use of the M.2 module requires the use of the AnyRAID 720ix controller. See the [M.2 storage options](#) section for information.

The server also supports an optional SD Card module which installs into a dedicated connector on the system board and supports two SDHC cards. See the [SD Card storage options](#) section for information. SD cards can be configured redundantly by using the operating system. The SD cards are enabled via a USB port from the system board Platform Controller Hub (PCH) and do not require a RAID controller.

Controllers for internal storage

The TD350 supports one or two AnyRAID RAID controllers for all internal drives. The AnyRAID adapters are installed in dedicated slots directly on the drive backplane. The TD350 also supports RAID 520i and RAID 720i which are standard PCIe form-factor adapters.

The supported controllers are listed in the following table.

Table 6. Supported RAID controllers and expanders

| Part number | Description | Maximum supported |
|--------------------|---|-------------------|
| AnyRAID adapters | | |
| None* | Lenovo ThinkServer RAID 110i AnyRAID Adapter | 1 |
| 4XC0G88837 | Lenovo ThinkServer RAID 510i AnyRAID Adapter | 1 |
| 4XC0G88838 | Lenovo ThinkServer RAID 720i AnyRAID Adapter | 1 |
| 4XC0G88839 | Lenovo ThinkServer RAID 720ix AnyRAID Adapter with Expander | 2 |
| PCIe RAID adapters | | |
| Embedded | Lenovo ThinkServer RAID 110i (embedded controller) | 1 |
| 4XC0G88850 | Lenovo ThinkServer RAID 520i PCIe Adapter | 1 |
| 4XC0G88849 | Lenovo ThinkServer RAID 720i PCIe Adapter | 1 |

* Configure-to-order (CTO) only

Supported controllers are as follows:

- AnyRAID 110i offers a low-cost solution for light workloads with limited users. It supports 6 GB SATA drives with RAID 0/1/10 with optional RAID 5. The AnyRAID 110i is a pass-through card that routes the embedded controller in the Intel C610 PCH to the backplane. Supports SATA drives only. RAID support only with 6 drives; remaining 2 drives (if installed) must be configured as single drives (AHCI mode).
- AnyRAID 510i is an IOC-based RAID card that offers an affordable hardware controller that delivers performance and reliability. It supports 6 GB SAS & SATA drives and RAID 0/1/10 with optional RAID 5/50. Maximum 8 drives.
- AnyRAID 720i is a RoC-based 12Gb SAS/SATA controller that offers advanced RAID configurations,

protection, and software. It supports RAID 0/1/5/6/10/50/60 with optional 1 GB cache (without flash), or 1 GB, 2 GB or 4 GB cache each with CacheVault (flash), CacheCade, and FastPath support. Maximum 8 drives.

- AnyRAID 720ix is similar to the 720i but also includes a SAS Expander to support up to 16 drives in the TD350. It is a 12 GB SAS/SATA controller with support for RAID 0/1/5/6/10/50/60. Cache is required, either 1 GB cache (without flash), or 1 GB, 2GB or 4GB cache each with CacheVault (flash), CacheCade, and FastPath support.
- RAID 110i offers a low-cost solution for light workloads with limited users. It supports 6 GB SATA drives with RAID 0/1/10 with optional RAID 5. Supports SATA drives only. The RAID 110i is a controller embedded in the Intel C610 PCH. The SATA ports on the system board are connected to the drive backplane via a cable. RAID support only with 6 drives; remaining 2 drives (if installed) must be configured as single drives (AHCI mode).
- RAID 520i PCIe is an IOC-based RAID card that delivers 12 Gb performance and reliability. It supports 12 GB SAS & SATA drives and RAID 0/1/10 with optional RAID 5/50. Maximum 8 drives.
- RAID 720i PCIe is a 12 Gb adapter similar to the AnyRAID 720i but in a regular PCIe form factor. It supports RAID 0/1/5/6/10/50/60 with optional 1 GB cache (without flash), or 1 GB, 2 GB or 4 GB cache each with CacheVault (flash), CacheCade, and FastPath support. Maximum 8 drives.

Note: If the server configuration includes an internal LTO6 tape drive or M.2 module, the AnyRAID 720ix is required. It is not supported to have both an LTO6 tape drive and M.2 module installed in a system.

The following table lists which controllers are supported in each of the drive-bay configurations.

Table 7. Controllers supported with each drive-bay configuration

| Configuration | AnyRAID 110i | AnyRAID 510i | AnyRAID 720i | AnyRAID 720ix | RAID 110i | RAID 520i | RAID 720i |
|---|--------------|--------------|--------------|---------------|-----------|-----------|-----------|
| Drive bays | | | | | | | |
| 8x 2.5-inch hot-swap (no bay upgrades) | No | No | No | No | Supported | Supported | Supported |
| 8x 2.5-inch hot-swap | Supported* | Supported | Supported | No | No | No | No |
| 16x 2.5-inch hot-swap | No | No | No | Supported | No | No | No |
| 32x 2.5-inch hot-swap | No | No | No | Supported† | No | No | No |
| 5x 3.5-inch hot-swap (no bay upgrades) | No | No | No | No | Supported | Supported | Supported |
| 5x 3.5-inch hot-swap | Supported | Supported | Supported | Supported | No | No | No |
| 15x 3.5-inch hot-swap | No | No | No | Supported | No | No | No |
| 5x 3.5-inch easy-swap | Supported | No | No | Supported | No | No | No |
| Additional connected storage devices | | | | | | | |
| LTO6 tape drive | No | No | No | Supported** | No | No | No |
| M.2 module | No | No | No | Supported** | No | No | No |

* With the 110i and the 8x2.5 configuration, 6 drives can be configured as RAID; the remaining 2 drives are JBOD only

† Two AnyRAID 720ix controllers are required for 32-drive support; see below.

** LTO6 and M.2 support are mutually exclusive

For 32-drive bay configurations, two AnyRAID 720ix controllers are required and both are connected to the the drive backplanes, one controller to each pair of 8-drive backplanes. The first AnyRAID controller is connected to the standard AnyRAID connectors on the system board (see [Locations of key components and connectors](#)). The second AnyRAID controller is connected to a PCIe Expander Card that is installed in PCIe slot 3.

Note: If you are upgrading a 16-bay configuration to 32-bays using the upgrade kit described in the [Internal Storage](#) section, the upgrade kit includes the second AnyRAID 720ix adapter as well as the PCIe Expander Card.

The following table summarizes the features and specifications of supported RAID controllers.

Table 8. RAID controller features and specifications summary

| Feature | AnyRAID 110i | RAID 110i | AnyRAID 510i | RAID 520i | AnyRAID 720i | AnyRAID 720ix | RAID 720i |
|-----------------------------|--------------------------------------|--------------------------------------|---|---|--|--------------------------------|---|
| Part number | None | None | 4XC0G88837 | 4XC0G88850 | 4XC0G88838 | 4XC0G88839 | 4XC0G88849 |
| Form factor | AnyRAID (passthru) | Embedded | AnyRAID | PCIe Low profile | AnyRAID | AnyRAID | PCIe Low profile |
| Controller chip | Intel PCH | Intel PCH | LSI SAS2008 | LSI SAS3008 | LSI SAS3108 | LSI SAS3108 | LSI SAS3108 |
| Host interface | Not applicable | Not applicable | PCIe 2.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 |
| Port interface | 6 Gbps SATA | 6 Gbps SATA | 6 Gbps SAS | 12 Gbps SAS | 12 Gbps SAS | 12 Gbps SAS | 12 Gbps SAS |
| Drive interface | SATA | SATA | SAS, SATA | SAS, SATA | SAS, SATA | SAS, SATA | SAS, SATA |
| Includes SAS expander | No | No | No | No | No | Yes | No |
| Drive type | HDD, SSD | HDD, SSD | HDD, SSD | HDD, SSD | HDD, SSD | HDD, SSD | HDD, SSD |
| Number of drives | 8* | 8* | 8 | 8 | 8 | 32 | 8 |
| RAID levels | 0/1/10 Optional 5 (4XB0F28690) | 0/1/10 Optional 5 (4XB0F28690) | 0/1/10 Optional 5/50 (4XB0F28692) | 0/1/10 Optional 5/50 (4XC0G88841) | 0/1/10/5/50 Optional 6/60 with cache upgrade | 0/1/10/5/50/6/60 | 0/1/10/5/50 Optional 6/60 with cache upgrade |
| JBOD mode | Yes | Yes | Yes | Yes | Yes (without cache) | Yes (with 1GB no-backup cache) | Yes (without cache) |
| Cache | No support | No support | No support | No support | Optional | Required | Optional |
| Cache options | None | None | None | None | 1 GB non-backed (4XB0F28695) 1 GB flash-backed (4XB0F28696) 2 GB flash-backed (4XB0F28697) 4 GB flash-backed (4XB0F28698) | | |
| FastPath | No | No | No | No | Yes (with flash-backed cache) | | |
| CacheCade 2.0 | No | No | No | No | Yes (with flash-backed cache) | | |
| Internal tape drive support | No | No | No | No | No | Yes | No |
| M.2 support | No | No | No | No | No | Yes | No |

* Up to 6 drives can be configured in a RAID array, and the remaining two drives operate in JBOD mode.

The following table summarizes the available RAID controller upgrades for the supported controllers.

Table 9. RAID controller upgrades

| Part number | Description |
|--|---|
| AnyRAID 110i and RAID 110i upgrade | |
| 4XB0F28690 | Lenovo ThinkServer RAID 110i RAID 5 Upgrade |
| AnyRAID 510i upgrade | |
| 4XB0F28692 | Lenovo ThinkServer RAID 510i RAID 5 Upgrade |
| RAID 520i upgrade | |
| 4XC0G88841 | Lenovo ThinkServer RAID 520i RAID 5 Upgrade |
| RAID 720i, AnyRAID 720i and AnyRAID 720ix upgrades | |
| 4XB0F28695 | Lenovo ThinkServer RAID 720i 1GB Modular DRAM Upgrade |
| 4XB0F28696 | Lenovo ThinkServer RAID 720i 1GB Modular Flash and Supercapacitor Upgrade |
| 4XB0F28697 | Lenovo ThinkServer RAID 720i 2GB Modular Flash and Supercapacitor Upgrade |
| 4XB0F28698 | Lenovo ThinkServer RAID 720i 4GB Modular Flash and Supercapacitor Upgrade |

Internal drive options

The following tables list the hard disk drive and solid-state drive options for the internal disk storage of the server.

- Table 10: [2.5-inch hot-swap 12 Gb SAS HDDs](#)
- Table 11: [2.5-inch hot-swap 6 Gb SAS/SATA HDDs](#)
- Table 12: [2.5-inch hot-swap 12 Gb SAS SSDs](#)
- Table 13: [2.5-inch hot-swap 6 Gb SAS/SATA SSDs](#)
- Table 14: [3.5-inch hot-swap 12 Gb SAS HDDs](#)
- Table 15: [3.5-inch hot-swap 6 Gb SAS/SATA HDDs](#)
- Table 16: [3.5-inch hot-swap 12 Gb SAS SSDs](#)
- Table 17: [3.5-inch hot-swap 6 Gb SAS/SATA SSDs](#)
- Table 18: [3.5-inch easy-swap 6 Gb SAS/SATA HDDs](#)

Table 10. 2.5-inch hot-swap 12 Gb SAS HDDs

| Part number | Description | Maximum supported |
|--|---|-------------------|
| 2.5-inch hot-swap HDDs - 12 Gb SAS 10K | | |
| 4XB0G88732 | ThinkServer Gen 5 2.5" 300GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 32 |
| 4XB0G88734 | ThinkServer Gen 5 2.5" 600GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 32 |
| 4XB0G88735 | ThinkServer Gen 5 2.5" 900GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 32 |
| 4XB0G88736 | ThinkServer Gen 5 2.5" 1.2TB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 32 |
| 4XB0G88737 | ThinkServer Gen 5 2.5" 1.8TB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 32 |
| 2.5-inch hot-swap HDDs - 12 Gb SAS 15K | | |
| 4XB0G88739 | ThinkServer Gen 5 2.5" 300GB 15K Enterprise SAS 12Gbps Hot Swap Hard Drive | 32 |
| 4XB0G88765 | ThinkServer Gen 5 2.5" 600GB 15K Enterprise SAS 12Gbps Hot Swap Hard Drive | 32 |
| 4XB0K12397 | ThinkServer Gen 5 2.5" 900GB 15K Enterprise SAS 12Gbps 512e Hot Swap Hard Drive | 32 |

Table 11. 2.5-inch hot-swap 6 Gb SAS/SATA HDDs

| Part number | Description | Maximum supported |
|---------------------------------------|---|-------------------|
| 2.5-inch hot-swap HDDs - 6 Gb NL SATA | | |
| 4XB0G45721 | ThinkServer Gen 5 2.5" 1TB 7.2K Enterprise SATA 6Gbps Hot Swap Hard Drive | 32 |
| 4XB0G88774 | ThinkServer Gen 5 2.5" 2TB 7.2K Enterprise SATA 6Gbps Hot Swap Hard Drive | 32 |

Table 12. 2.5-inch hot-swap 12 Gb SAS SSDs

| Part number | Description | Maximum supported |
|---|---|-------------------|
| 2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Capacity | | |
| 4XB0K12387 | ThinkServer 2.5" 3.84TB PM1633a Enterprise Capacity SAS 12Gbps HS SSD | 32 |
| 4XB0K12402 | ThinkServer 2.5" 7.68TB PM1633a Enterprise Capacity SAS 12Gb HS SSD | 32 |
| 2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Mainstream (3-5 DWPD) | | |
| 4XB0K12403 | ThinkServer 2.5" 400GB PM1635a Enterprise Mainstream SAS 12Gb HS SSD | 32 |
| 4XB0K12404 | ThinkServer 2.5" 800TB PM1635a Enterprise Mainstream SAS 12Gb HS SSD | 32 |
| 4XB0K12405 | ThinkServer 2.5" 1.6TB PM1635a Enterprise Mainstream SAS 12Gb HS SSD | 32 |
| 4XB0K12258 | ThinkServer 2.5" 400GB PM1635 Enterprise Mainstream 12Gb SAS Hot Swap Solid State Drive | 32 |
| 4XB0K12259 | ThinkServer 2.5" 800GB PM1635 Enterprise Mainstream 12Gb SAS Hot Swap Solid State Drive | 32 |
| 4XB0K12260 | ThinkServer 2.5" 1.6TB PM1635 Enterprise Mainstream 12Gb SAS Hot Swap Solid State Drive | 32 |

Table 13. 2.5-inch hot-swap 6 Gb SAS/SATA SSDs

| Part number | Description | Maximum supported |
|--|---|-------------------|
| 2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Performance (10+ DWPD) | | |
| 4XB0K12409 | ThinkServer Gen 5 2.5" 400GB Enterprise Performance SAS 12Gb HS SSD | 32 |
| 4XB0K12410 | ThinkServer Gen 5 2.5" 800GB Enterprise Performance SAS 12Gb HS SSD | 32 |
| 4XB0K12411 | ThinkServer Gen 5 2.5" 1.6TB Enterprise Performance SAS 12Gb HS SSD | 32 |
| 2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD) | | |
| 4XB0K12441 | ThinkServer Gen 5 2.5" 480GB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12442 | ThinkServer Gen 5 2.5" 960GB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12443 | ThinkServer Gen 5 2.5" 1.92TB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12444 | ThinkServer Gen 5 2.5" 3.84TB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12326 | ThinkServer Gen 5 2.5" 240GB S3520 Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12329 | ThinkServer Gen 5 2.5" 480GB S3520 Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12332 | ThinkServer Gen 5 2.5" 960GB S3520 Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12435 | ThinkServer Gen 5 2.5" 800GB S3520 Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12437 | ThinkServer Gen 5 2.5" 1.2TB S3520 Entry SATA 6Gbps Hot Swap SSD | 32 |
| 4XB0K12439 | ThinkServer Gen 5 2.5" 1.6TB S3520 Entry SATA 6Gbps Hot Swap SSD | 32 |

Table 14. 3.5-inch hot-swap 12 Gb SAS HDDs

| Part number | Description | Maximum supported |
|--|---|-------------------|
| 3.5-inch hot-swap HDDs - 12 Gb SAS 15K | | |
| 4XB0G88740 | ThinkServer Gen 5 3.5" 300GB 15K Enterprise SAS 12Gbps Hot Swap Hard Drive | 15 |
| 4XB0G88746 | ThinkServer Gen 5 3.5" 600GB 15K Enterprise SAS 12Gbps Hot Swap Hard Drive | 15 |
| 4XB0K12396 | ThinkServer Gen 5 2.5" 900GB 15K Enterprise SAS 12Gbps 512e Hot Swap Hard Drive with 3.5 tray | 15 |
| 3.5-inch hot-swap HDDs - 12 Gb SAS 10K | | |
| 4XB0G88733 | ThinkServer Gen 5 3.5" 300GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 15 |
| 4XB0G88761 | ThinkServer Gen 5 3.5" 600GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 15 |
| 4XB0G88762 | ThinkServer Gen 5 3.5" 900GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 15 |
| 4XB0G88763 | ThinkServer Gen 5 3.5" 1.2TB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 15 |
| 4XB0G88738 | ThinkServer Gen 5 3.5" 1.8TB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive | 15 |
| 3.5-inch hot-swap HDDs - 12 Gb NL SAS | | |
| 4XB0G88715 | ThinkServer Gen 5 3.5" 6TB 7.2K Enterprise SAS 12Gbps HS HDD (512e) | 15 |
| 4XB0K12254 | ThinkServer Gen 5 3.5" 8TB 7.2K Enterprise SAS 12Gbps Hot Swap Hard Drive (512e) | 15 |
| 4XB0K12312 | ThinkServer Gen 5 3.5" 10TB 7.2K Enterprise SAS 12Gbps HS 512e HDD | 15 |
| 4XB0K12270 | ThinkServer Gen5 3.5" 1TB 7.2K Enterprise SAS 12Gbps HS HDD (512n) | 15 |
| 4XB0K12278 | ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SAS 12Gbps HS HDD (512n) | 15 |
| 4XB0K12279 | ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SAS 12Gbps HS HDD (512n) | 15 |

Table 15. 3.5-inch hot-swap 6 Gb SAS/SATA HDDs

| Part number | Description | Maximum supported |
|---------------------------------------|---|-------------------|
| 3.5-inch hot-swap HDDs - 6 Gb NL SATA | | |
| 4XB0F28712 | ThinkServer Gen 5 3.5" 1TB 7.2K Enterprise SATA 6Gbps Hot Swap Hard Drive | 15 |
| 4XB0F28713 | ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SATA 6Gbps Hot Swap Hard Drive | 15 |
| 4XB0G45715 | ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SATA 6Gbps Hot Swap Hard Drive | 15 |
| 4XB0G88713 | ThinkServer Gen 5 3.5" 6TB 7.2K Enterprise SATA 6Gbps HS HDD | 15 |
| 4XB0K12255 | ThinkServer Gen 5 3.5" 8TB 7.2K Enterprise SATA 6Gbps HS HDD | 15 |
| 4XB0K12313 | ThinkServer Gen 5 3.5" 10TB 7.2K Enterprise SATA 6Gbps HS 512e HDD | 15 |
| 4XB0N68532 | ThinkServer Gen 5 3.5" 12TB 7.2K Enterprise SATA 6Gbps Hot Swap 512e HDD | 15 |

Table 16. 3.5-inch hot-swap 12 Gb SAS SSDs

| Part number | Description | Maximum supported |
|--|---|-------------------|
| 3.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Capacity | | |
| 4XB0K12388 | ThinkServer 3.5" 3.84TB PM1633a Enterprise Capacity SAS 12Gbps HS SSD | 15 |
| 3.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Performance (10+ DWPD) | | |
| 4XB0K12412 | ThinkServer Gen 5 3.5" 400GB Enterprise Performance SAS 12Gb HS SSD | 15 |
| 4XB0K12413 | ThinkServer Gen 5 3.5" 800GB Enterprise Performance SAS 12Gb HS SSD | 15 |
| 4XB0K12414 | ThinkServer Gen 5 3.5" 1.6TB Enterprise Performance SAS 12Gb HS SSD | 15 |
| 3.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Mainstream (3-5 DWPD) | | |
| 4XB0K12406 | ThinkServer 3.5" 400GB PM1635a Enterprise Mainstream SAS 12Gb HS SSD | 15 |
| 4XB0K12407 | ThinkServer 3.5" 800GB PM1635a Enterprise Mainstream SAS 12Gb HS SSD | 15 |
| 4XB0K12408 | ThinkServer 3.5" 1.6TB PM1635a Enterprise Mainstream SAS 12Gb HS SSD | 15 |
| 4XB0K12261 | ThinkServer 3.5" 400GB PM1635 Enterprise Mainstream 12Gb SAS Hot Swap Solid State Drive | 15 |
| 4XB0K12262 | ThinkServer 3.5" 800GB PM1635 Enterprise Mainstream 12Gb SAS HS SSD | 15 |
| 4XB0K12263 | ThinkServer 3.5" 1.6TB PM1635 Enterprise Mainstream 12Gb SAS Hot Swap Solid State Drive | 15 |

Table 17. 3.5-inch hot-swap 6 Gb SAS/SATA SSDs

| Part number | Description | Maximum supported |
|---|---|-------------------|
| 3.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD) | | |
| 4XB0N68491 | ThinkServer Gen 5 3.5" 480GB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0N68493 | ThinkServer Gen 5 3.5" 960GB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0N68495 | ThinkServer Gen 5 3.5" 1.92TB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0N68496 | ThinkServer Gen 5 3.5" 3.84TB 5100 Enterprise Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0K12327 | ThinkServer Gen 5 3.5" 240GB S3520 Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0K12330 | ThinkServer Gen 5 3.5" 480GB S3520 Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0K12333 | ThinkServer Gen 5 3.5" 960GB S3520 Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0K12436 | ThinkServer Gen 5 3.5" 800GB S3520 Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0K12438 | LTS Gen 5 3.5" 1.2TB S3520 Entry SATA 6Gbps Hot Swap SSD | 15 |
| 4XB0K12440 | LTS Gen 5 3.5" 1.6TB S3520 Entry SATA 6Gbps Hot Swap SSD | 15 |

Table 18. 3.5-inch easy-swap 6 Gb SAS/SATA HDDs

| Part number | Description | Maximum supported |
|--|--|-------------------|
| 3.5-inch easy-swap HDDs - 6 Gb NL SATA | | |
| 4XB0F28708 | ThinkServer Gen 5 3.5" 1TB 7.2K Enterprise SATA 6Gbps Easy Swap Hard Drive | 5 |
| 4XB0F28709 | ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SATA 6Gbps Easy Swap Hard Drive | 5 |
| 4XB0F28711 | ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SATA 6Gbps Easy Swap Hard Drive | 5 |
| 4XB0G88726 | ThinkServer Gen 5 3.5" 6TB 7.2K Enterprise SATA 6Gbps EasySwap Hard Drive | 5 |
| 4XB0K12314 | ThinkServer Gen 5 3.5" 10TB 7.2K Enterprise SATA 6Gbps EasySwap 512e HDD | 5 |
| 4XB0N68534 | ThinkServer Gen 5 3.5" 12TB 7.2K Enterprise SATA 6Gbps NHS 512e HDD | 5 |

SD Card storage options

The TD350 supports SD memory cards, which can be used to boot the operating system. The TD350 supports two SD memory cards via an optional module that is connected to the system board. See [Locations of key components and connectors](#) for the location. SD cards can be configured redundantly in the operating system. The SD cards are enabled via a USB port from the system board Platform Controller Hub (PCH), and do not require a RAID controller.

Table 19. SD Card options

| Part Number | Description | Maximum supported |
|-------------|--|-------------------|
| 4XF0G88933 | ThinkServer SDHC Flash Assembly Module (supports 2 SDHC cards) | 1 |
| 4X70F28592 | ThinkServer 8GB SD Card | 2 |
| 4X70F28593 | ThinkServer 32GB SD Card | 2 |

M.2 storage options

The TD350 also supports M.2 SSDs as an alternative to SD Cards for booting an operating system. M.2 is an enterprise class SSD form factor and is more robust than SD card options.

M.2 offers better performance than SD cards and protects data better with features such as:

- Capacitor-based power loss protection
- Support of Advanced Encryption Standard (AES)
- Hardware-based RAID 1 (with two M.2 SSDs installed)

The following table shows the ordering information for the M.2 options.

Table 20. M.2 options

| Part Number | Description | Maximum supported |
|-------------|--|-------------------|
| 4XF0G45893 | Lenovo Thinkserver TD350 M.2 Enablement Kit to RAID720ix | 1 |
| 4XB0F28656 | Lenovo ThinkServer M.2 120GB Value Read-Optimized SATA 6Gbps Solid State Drive | 2 |
| 4XB0G88741 | Lenovo ThinkServer M.2 80GB Value Read-Optimized SATA 6Gbps Solid State Drive | 2 |

The following figure shows the M.2 module and SSD options.

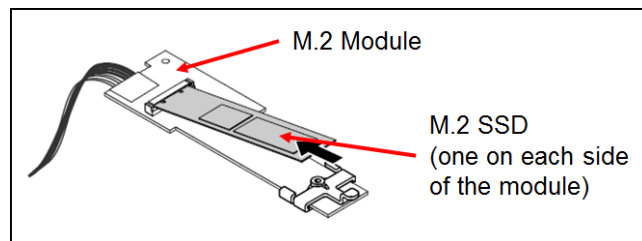


Figure 6. M.2 options

Note: The use of M.2 in the TD350 requires the AnyRAID 720ix controller to be installed, but is mutually exclusive with the use of an LTO6 tape drive.

Internal backup units

The TD350 supports an internal LTO6 tape drive in one of the 5.25-inch bays. To support a tape drive, the AnyRAID 720ix RAID controller must be used. The SAS connection for the tape drive is routed from the RAID controller.

The following table lists the part numbers for tape support.

Table 21. Internal LTO6 tape drive options

| Part number | Description |
|-------------|--|
| 4XF0G45866 | Lenovo ThinkServer LTO-6 Linear Tape Drive Kit by Tandberg |
| 4XB0F28689 | 2.5 TB LTO6 Tape Cartridge |

The tape drive kit includes the necessary cables and mounting hardware to install the tape drive in the server.

Optical drives

The TD350 server supports the optical drive options listed in the following table.

Table 22. Optical drives

| Part number | Description | Maximum supported |
|-------------|--|-------------------|
| 4XA0F28605 | Lenovo ThinkServer Half High SATA DVD-RW Optical Disk Drive | 2 |
| 4XA0F28606 | Lenovo ThinkServer Half High SATA DVR-ROM Optical Disk Drive | 2 |
| 4XA0G88611 | Lenovo ThinkServer Slim SATA DVD-RW Optical Disk Drive | 2 |
| 4XA0G88612 | Lenovo ThinkServer Slim SATA DVD-ROM Optical Disk Drive | 2 |

I/O expansion options

The TD350 supports up to seven slots, depending on the number of processors installed. The slots are numbered as follows:

1. PCIe 3.0 x16 full height/full length (supports double-width cards)
2. PCIe 3.0 x8 (x16 mechanical) full height/full length
3. PCIe 3.0 x8 (x16 mechanical) full height/full length
4. PCIe 3.0 x8 (x16 mechanical) full height/full length (requires CPU 2)
5. PCIe 3.0 x16 full height/full length (requires CPU 2)
6. PCIe 3.0 x8 (x16 mechanical) full height/full length (requires CPU 2)
7. PCIe 3.0 x8 (x16 mechanical) full height/full length (requires CPU 2)

The following figure shows the location of the slots, as seen from the rear of the server.

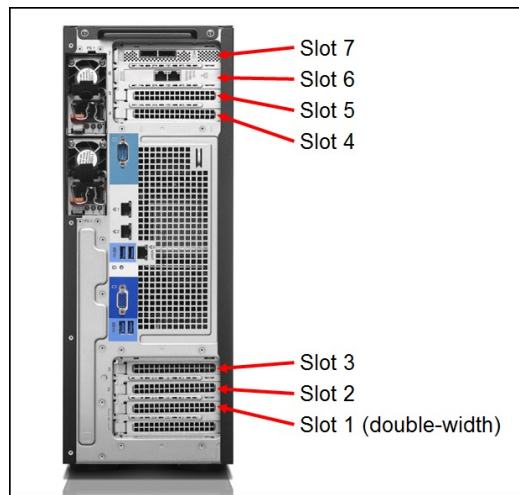


Figure 7. Slot numbering

Network adapters

The TD350 supports two integrated Gigabit Ethernet ports controlled by a single integrated network interface controller (NIC):

- Based on the Intel i210 controller
- Two Gigabit Ethernet ports
- NIC Teaming (load balancing and failover)
- Port 1 supports NCSI to enable shared access to the management controller
- Supports Wake-on-LAN (WOL)
- Ethernet features:
 - Compliant with 1 Gb Ethernet IEEE 802.3, 802.3u, and 802.3ab PHY specifications
 - Integrated PHY for 10/100/1000 Mbps for multispeed, full, and half-duplex autonegotiation
 - Automatic MDI crossover
 - IEEE 802.3x-compliant flow control support
 - IEEE 1588 protocol and 802.1AS time synchronization implementation
 - IEEE802.3az - Energy Efficient Ethernet (EEE)
 - IEEE 802.1q Virtual Local Area Network (VLAN) tagging support

- Stateless offload and performance features:
 - TCP, IP, and User Datagram Protocol (UDP) checksum offload
 - TCP segmentation offload (TCO)
 - Large Send Offload (LSO)
 - Receive Side Scaling (RSS) and Transmit Side Scaling (TSS)
 - Message Signal Interrupt (MSI) and Message Signal Interrupt Extension (MSI-X) support
 - Support for jumbo frames up to 9600 bytes

Note: iSCSI offload and iSCSI boot are not supported

The following table lists additional supported network adapters.

Table 23. Supported Ethernet adapters

| Part number | Description | Maximum supported* |
|-----------------------|---|--------------------|
| 1 Gb Ethernet | | |
| 4XC0F28724 | ThinkServer OCe14102-NX 10Gbps Dual Port Ethernet Adapter by Emulex | 3 / 7 |
| 4XC0F28730 | Lenovo ThinkServer I350-T2 PCIe 1Gb 2 Port Base-T Ethernet Adapter by Intel | 3 / 7 |
| 4XC0F28731 | Lenovo ThinkServer I350-T4 PCIe 1Gb 4 Port Base-T Ethernet Adapter by Intel | 3 / 7 |
| 10 Gb Ethernet | | |
| 4XC0F28732 | Lenovo ThinkServer X540-T2 PCIe 10Gb 2 Port Base-T Ethernet Adapter by Intel | 3 / 7 |
| 4XC0F28733 | Lenovo ThinkServer X520-SR2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter by Intel | 3 / 7 |
| 4XC0F28734 | Lenovo ThinkServer X520-DA2 PCIe 10Gb 2 Port SFP+ Ethernet Adapter by Intel | 3 / 7 |
| 4XC0G88855 | Lenovo ThinkServer X550-T1 PCIe 10Gb 1 Port Base-T Ethernet Adapter by Intel | 3 / 7 |
| 4XC0G88856 | Lenovo ThinkServer X550-T2 PCIe 10Gb 2 Port Base-T Ethernet Adapter by Intel | 3 / 7 |
| 4XC0G88852 | Lenovo ThinkServer X710-DA2 PCIe 10Gb 2 port Ethernet Adapter by Intel | 3 / 7 |
| 4XC0G88854 | Lenovo ThinkServer X710-DA4 PCIe 10Gb 4 port Ethernet Adapter by Intel | 3 / 7 |
| 4XC0F28735 | Lenovo ThinkServer 10Gb Optical Module by Intel (for use with Intel SFP+ adapters) | 2 per card |
| 4XC0F28736 | Lenovo ThinkServer OCe14102-UX-L PCIe 10Gb 2 Port SFP+ Converged Network Adapter by Emulex | 3 / 7 |
| 4XC0F28737 | Lenovo ThinkServer 10Gb Optical Module by Emulex (for use with 4XC0F28736) | 2 per card |
| 40 Gb Ethernet | | |
| 4XC0F28738 | Lenovo ThinkServer OCe14401-UX-L PCIe 40Gb 1 Port QSFP+ Converged Network Adapter by Emulex | 3 / 7 |
| 4XC0F28739 | Lenovo ThinkServer 40Gb Optical Module by Emulex (for use with 4XC0F28738) | 3 / 7 |

* Maximum supported for 1 CPU / 2 CPU installed.

For more information, see the list of Product Guides in the Ethernet category:

<https://lenovopress.com/servers/options/ethernet>

SAS adapters for external storage

The following table lists the supported SAS HBAs and RAID adapters.

Table 24. Supported SAS HBAs and RAID adapters

| Part number | Description | Max Supported (1 CPU / 2 CPU) |
|---------------------------------------|---|----------------------------------|
| SAS HBAs for external storage | | |
| 4XB0G88727 | Lenovo ThinkServer 8885e PCIe 12Gb 8 port external SAS Adapter by PMC | 3 / 7 |
| 4XB0F28703 | Lenovo ThinkServer 9300-8e PCIe 12Gb 8 Port External SAS Adapter by LSI | 3 / 7 |
| RAID controllers for external storage | | |
| 4XB0F28699 | ThinkServer 9286CV-8e PCIe 6Gb 8 Port External SAS RAID Adapter by LSI | 2 / 6 |
| Options for the 9286CV-8e controller | | |
| 4XB0F28702 | Lenovo ThinkServer RAID CacheCade Pro 2.0 Key | 1 per card |
| 4XB0G45761 | Lenovo ThinkServer CacheVault Data Protection Upgrade II | 1 per card |

The following table compares the features of the RAID controllers and HBAs.

Table 25. Features of RAID controllers and SAS HBAs

| Feature | 9286CV-8e | 9300-8e | 8885e |
|-----------------------------------|------------------------|---------------------------|---------------------------|
| Adapter type | RAID controller | SAS HBA | SAS HBA |
| Part number | 4XB0F28699 | 4XB0F28703 | 4XB0G88727 |
| Form factor | Low profile | Low profile | Low profile |
| Controller chip | LSI SAS2208 | LSI SAS3008 | PMC PM8063 |
| Host interface | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 |
| Port interface | 6 Gbps SAS | 12 Gbps SAS | 12 Gbps SAS |
| Number of external ports | 8 | 8 | 8* |
| External port connectors | 2x Mini-SAS (SFF-8088) | 2x Mini-SAS HD (SFF-8644) | 2x Mini-SAS HD (SFF-8644) |
| Drive interface | SAS, SATA | SAS, SATA | SAS, SATA |
| Drive type | HDD, SSD | HDD, SSD | HDD, SSD |
| Maximum number of devices | 240 | 1024 | 256 |
| Maximum number of expansion units | 8 | 8 | 8 |
| RAID levels | 0/1/10/5/50/6/60 | None | None |
| JBOD mode | No | Yes | Yes |
| Cache | 1 GB | None | 1 GB |
| CacheVault cache protection | Optional (4XB0G45761) | None | None |
| FastPath | Included | None | None |
| CacheCade Pro 2.0 | Optional (4XB0F28702) | None | None |

* In addition to eight external ports, the ThinkServer 8885e adapter has eight internal ports.

Fibre Channel host bus adapters

The following table lists the supported Fibre Channel HBAs.

Table 26. Supported host bus adapters

| Part number | Description | Max Supported (1 CPU / 2 CPU) |
|---------------------------------|--|-------------------------------|
| 16 Gb Fibre Channel HBAs | | |
| 4XB0F28704 | Lenovo ThinkServer LPe16002B-M8-L PCIe 8Gb 2 Port Fibre Channel Adapter by Emulex | 3 / 7 |
| 4XB0F28705 | Lenovo ThinkServer LPe16002B-M6-L PCIe 16Gb 2 Port Fibre Channel Adapter by Emulex | 3 / 7 |
| 4XC0F28745 | Lenovo ThinkServer QLE2672 PCIe 16Gb 2 Port Fibre Channel Adapter by QLogic | 3 / 7 |
| 4XB0F28654 | ThinkServer QLE2670 Single Port 16Gb Fibre Channel HBA by QLogic | 3 / 7 |
| 4XB0F28653 | ThinkServer LPe16000B Single Port 16Gb Fibre Channel HBA by Emulex | 3 / 7 |
| 8 Gb Fibre Channel HBAs | | |
| 0C19478 | ThinkServer LPe12002 Dual Port 8Gb fibre Channel HBA by Emulex | 3 / 7 |
| 0C19482 | ThinkServer QLE2562 Dual Port 8Gb fibre Channel HBA by QLogic | 3 / 7 |
| 4XB0F28649 | ThinkServer QLE2560 Single Port 8Gb fibre Channel HBA by QLogic | 3 / 7 |
| 4XB0F28652 | ThinkServer LPe16000B Single Port 8Gb Fibre Channel HBA by Emulex | 3 / 7 |

For more information, see the list of Lenovo Press Product Guides in the Host bus adapters category: <https://lenovopress.com/servers/options/hba>

PCIe Flash Storage adapters

The TD350 supports the following PCIe Flash Storage adapters.

Table 27. PCIe Flash Storage adapters

| Part number | Description | Max supported (1 CPU / 2 CPU) |
|-------------|--|-------------------------------|
| 4XB0G88747 | LTS 1.6TB ioMemory SX350 Performance PCIe 2.0 SSD by Sandisk | 0 / 2 |
| 4XB0G88748 | LTS 3.2TB ioMemory SX350 Performance PCIe 2.0 SSD by Sandisk | 0 / 2 |

GPU adapters

The TD350 currently does not support any GPU adapters.

Power supplies

The TD350 supports up to two redundant hot-swap AC power supplies. Power supplies are 80 PLUS certified. The server ships with power cords.

The power supplies that are available for the TD350 are highly efficient with 80 PLUS Platinum and Titanium supplies. Several power supply options are available and they can be selected to match the workload and configuration of the server for even greater efficiencies. All power supplies that are used in the TD350 are common across the ThinkServer next-generation server portfolio, which simplifies management across large installations.

Power supplies are auto-sensing and support both 110V and 220V AC power. In China only, the power supplies also support 240V DC. The power supplies feature a line-cord retention mechanism to prevent unintended disconnects.

The available power supply options for TD350, including their operating characteristics, efficiency ratings, and ordering information are listed in the following table

Table 28. Power supply options

| Part number | Power rating | 80 PLUS rating | Voltage range | Efficiency at rated load - 110V | | | Efficiency at rated load - 220V | | |
|-------------|--------------|----------------|---------------|---------------------------------|-----|------|---------------------------------|-----|------|
| | | | | 20% | 50% | 100% | 20% | 50% | 100% |
| 4X20G87845 | 450 W | Platinum | 100 - 240 AC | 90% | 92% | 89% | 90% | 94% | 91% |
| 4X20F28579 | 550 W | Platinum | 100-240 AC | 90% | 92% | 89% | 89% | 94% | 91% |
| 4X20F28575 | 750 W | Platinum | 100 - 240 AC | 90% | 92% | 89% | 90% | 94% | 91% |
| 4X20F28576 | 750 W | Titanium | 200 - 240 AC | No support | | | 94% | 96% | 91% |
| 4X20F28577 | 1100 W | Platinum | 100 - 240 AC | 90% | 92% | 89% | 90% | 94% | 91% |

Use the ThinkServer Power Planner to estimate power usage for a specific configuration:

<http://support.lenovo.com/us/en/downloads/ds101155>

Configuration rules:

- 1 or 2 powers supplies are supported.
- If two power supplies are installed, they must be identical
- If two power supplies are installed, they form a redundant pair
- Both active-active and active-passive forms of redundancy are supported and they are configurable through IPMI (command-line interface)

Power supply options do not ship with a power cable. Cables can be ordered as needed, as listed in the following table.

Table 29. Power cables

| Part number | Description |
|-------------|---|
| 4X90F92964 | ThinkServer C13-C14 WW 250V 10A 1.8m Jumper Cord |
| 4X90F92965 | ThinkServer C13-NEMA_5-15P US 125V 10A 1.8m Power Cord |
| 4X90F92966 | ThinkServer C13-JIS_C8303 Japan 125V 7A 1.8m Power Cord |
| 4X90F92970 | ThinkServer C13-BS_1363A UK 250V 10A 1.8m Power Cord |
| 4X90F92971 | ThinkServer C13-DK_2.5A Denmark 250V 10A 1.8m Power Cord |
| 4X90F92974 | ThinkServer C13-CEE_7.7 Europe 250V 10A 1.8m Power Cord |
| 4X90F92975 | ThinkServer C13-CE123_50 Italy 250V 10A 1.8m Power Cord |
| 4X90F92976 | ThinkServer C13-NRB_14136 Brazil 250V 10A 1.8m Power Cord |
| 4X90F92977 | ThinkServer C13-IRAM_2073 LA 250V 10A 1.8m Power Cord |
| 4X90F92981 | ThinkServer C13-GB1002 PRC 250V 10A 1.8m Power Cord |
| 4X90F92973 | ThinkServer C13-SI_32 Israel 250V 10A 1.8m Power Cord |
| 4X90F92978 | ThinkServer C13-SABS_164 South Africa 250V 6A 1.8m Power Cord |
| 39Y7938 | IEC C13 to C20 jumper power cable 2.8m |
| 46M2593 | 10A/100V C13 to JIS C-8302 power cable 2.8m |

Integrated virtualization

The TD350 offers an optional SD Card solution and an optional M.2 solution for operating systems. See the [SD Card storage options](#) section and [M.2 storage options](#) for information.

Operating system support

The server supports the following operating systems:

- Citrix XenServer 6.5.1
- Microsoft Windows 8 (32bit and 64bit)
- Microsoft Windows 8.1 (x86 and x64)
- Microsoft Windows 8.1 Professional (x86 and x64)
- Microsoft Windows 8 Professional (32bit and 64bit)
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2016
- Microsoft Windows Server, version 1709
- Red Hat Enterprise Linux 6.7 32-bit
- Red Hat Enterprise Linux 6.7 x64
- Red Hat Enterprise Linux 6.8 32-bit
- Red Hat Enterprise Linux 6.8 x64
- Red Hat Enterprise Linux 6.10 x64
- Red Hat Enterprise Linux 7.2
- Red Hat Enterprise Linux 7.3
- Red Hat Enterprise Linux 7.4
- Red Hat Enterprise Linux 7.5
- Red Hat Enterprise Linux 7.6
- Red Hat Enterprise Linux 7.7
- Red Hat Enterprise Linux 7.8
- Red Hat Enterprise Linux 7.9
- SUSE Linux Enterprise Server 11 x64 SP4
- SUSE Linux Enterprise Server 11 x86 SP4
- SUSE Linux Enterprise Server 12 SP1
- SUSE Linux Enterprise Server 12 SP2
- SUSE Linux Enterprise Server 12 SP3
- SUSE Linux Enterprise Server 12 SP4

- SUSE Linux Enterprise Server 12 Xen SP2
- SUSE Linux Enterprise Server 12 Xen SP3
- SUSE Linux Enterprise Server 12 Xen SP4
- VMware ESXi 5.5 U3
- VMware ESXi 6.0 U1
- VMware ESXi 6.0 U2
- VMware ESXi 6.0 U3
- VMware ESXi 6.5
- VMware ESXi 6.5 U1
- VMware ESXi 6.5 U2
- VMware ESXi 6.5 U3
- VMware ESXi 6.7
- VMware ESXi 6.7 U1
- VMware ESXi 6.7 U2
- VMware ESXi 6.7 U3

Note: The use of embedded RAID (RAID 110i) is not supported by virtualization hypervisors, including VMware ESXi, Linux KVM, Xen, and Microsoft Hyper-V. AHCI mode (non-RAID) of the controller does support hypervisors, however.

For a complete list of supported, certified and tested operating systems, plus additional details and links to relevant web sites, see the Operating System Interoperability Guide: <https://lenovopress.com/osig#servers=td350-e5-v4&support=all>

Systems management

A significant factor in the total cost of a server's ownership is the processes that are used for administering the system hardware, software, and support over the life of the server. ThinkServer system management offerings are based on industry standards, which enable integration into existing IT environments. Lenovo's tools emphasize powerful and simplified provisioning and operational management, which form a large portion of the system cost. Optional upgrades provide more management capabilities to optimize performance and usage of the servers.

Lenovo XClarity Administrator

Lenovo XClarity Administrator is centralized resource management solution aimed at reducing complexity, speeding response, and enhancing the availability of Lenovo server systems and solutions.

Lenovo XClarity Administrator provides agent-free hardware management for ThinkServer, System x and Flex System servers. The administration dashboard, shown in the following figure, is based on HTML 5 and enables fast location of resources so tasks can be run quickly.

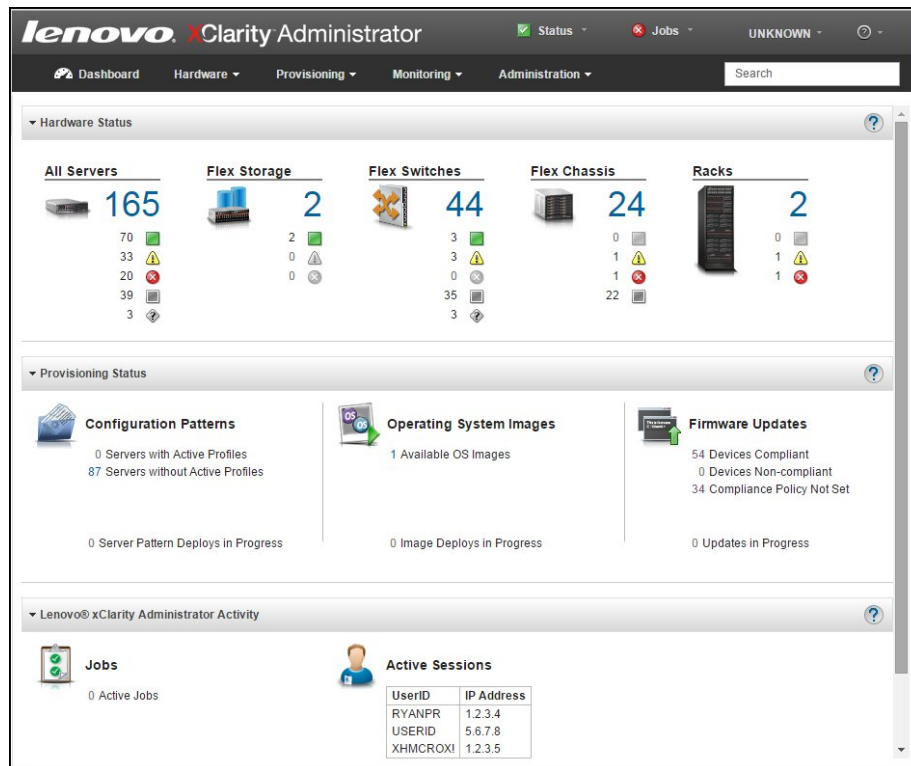


Figure 8. Lenovo XClarity Administrator dashboard

Because Lenovo XClarity Administrator does not require any agent software to be installed on the managed endpoints, there are no CPU cycles spent on agent execution and no memory is used, which means that up to 1GB of RAM and 1 - 2% CPU usage is saved, compared to a typical managed system where an agent is required.

Lenovo XClarity Administrator currently supports only a subset of function with ThinkServer systems:

- Discovery
- Inventory
- Monitoring & alerting
- Call home

Functions that are not currently supported are:

- Centralized user management
- Cryptography modes, server certificates, and encapsulation
- Configuration patterns
- Operating system deployment
- Firmware updates
- Rack view for tower-based servers

For more information about Lenovo XClarity Administrator, including ordering part numbers, see the Lenovo XClarity Administrator Product Guide:

<https://lenovopress.com/tips1200-lenovo-xclarity-administrator>

ThinkServer System Manager

ThinkServer System Manager (TSM), Lenovo's integrated systems management technology, is standard on the ThinkServer TD350. TSM operates independently of the server. It provides hardware-based, out-of-band remote access and management to ThinkServer systems, regardless of the server's power state or the condition of the operating system.

TSM is a fully featured management solution that is built on open industry standards that can help reduce related IT expenses by increasing a server administrator’s productivity. TSM provides important health and status information to systems administrators. It also enables administrators to remotely perform most functions that otherwise require a visit to the server.

TSM can be used as part of any server systems management infrastructure and is well-suited for customers who are deploying servers in remote branches, limited-access data centers, and where one-on one remote-control capability is required. Lenovo’s design advancements address key system management concerns. In particular, TSM is a low-cost solution that supports heterogeneous environments, provides full remote management capability, and supports remote deployment.

Remote access to TSM is via a dedicated systems management Ethernet port on the rear of the server. Alternatively, you can use UEFI to configure the first of the two system Gigabit Ethernet ports to be shared between TSM and the installed operating system.

TSM provides the following key features:

- Remote server management through the following industry standard interfaces:
 - Secure HTML5 browser-based UI that is suitable for today’s mobile devices and tablets
 - IPMI 2.0
 - DCMI 1.0
 - WS-MAN
 - SMASH-CLP
 - SNMP v3 (Gets only)
- A PowerShell CLI provides increased flexibility and scripting capabilities
- Automatic out-of-band notification and alerts from:
 - SNMP Traps
 - SMTP (email) CIM indications
- Configurable via web and PowerShell CLI, IPMI, WS-Man, and SMASH-CLI interfaces

ThinkServer System Manager Premium, which is available as an optional hardware upgrade key, enables the following advanced features:

- A remote console that provides complete remote control of the server. A video viewer enables graphical console, keyboard, and mouse redirection of the server.
- Remote media capability that enables the attachment of local CD-ROMs, DVD-ROMs, USB mass storage devices, ISO images, and IMG images (which are created from local folders) to the remote server.
- License for Lenovo XClarity Energy Manager.

The following table lists ThinkServer System Manager Premium ordering information.

Table 30. ThinkServer System Manager Premium

| Description | Part number | Maximum supported |
|--|-------------|-------------------|
| Lenovo ThinkServer System Manager Premium Module | 4XF0G45867 | 1 |

Lenovo XClarity Energy Manager

Lenovo XClarity Energy Manager (formerly ThinkServer Energy Manager) is an agentless, web-based console that provides power management for ThinkServer and System x servers. It enables server density and data center capacity to be increased through the use of power capping.

Lenovo XClarity Energy Manager is a licensed product. A single-node XClarity Energy Manager license is included with ThinkServer System Manager Premium. If your server does not have a TSM Premium module, Energy Manager licenses can be ordered as shown in the following table.

Table 31. Lenovo XClarity Energy Manager

| Description | Part number | Maximum supported |
|-------------|--|-------------------|
| 4L40E51621 | Lenovo XClarity Energy Manager Node License | 1 node |
| 4L40E51622 | Lenovo XClarity Energy Manager Node License Pack | 5 nodes |
| 4L40E51623 | Lenovo XClarity Energy Manager Node License Pack | 50 nodes |

ThinkServer Deployment Manager

Embedded within every Lenovo next-generation ThinkServer system, ThinkServer Deployment Manager is a tools suite that provides a complete set of provisioning capabilities from a single interface. ThinkServer Deployment Manager automates many of the tasks that are associated with server provisioning, including hardware configuration, operating system deployment, device driver (for operating system installation), firmware updates, and server cloning. Because ThinkServer Deployment Manager is integrated into the UEFI pre-boot environment, the tools operate independently of the server and are available regardless of system's operational state. Formatting a system drive or reinstalling the operating system does not remove the tools, and there are no CDs or DVDs to retrieve or store, which affects user experience and productivity.

Security

The TD350 supports the following security features.

Trusted Platform Module (TPM)

The TD350 provides an optional Trusted Platform Module (TPM) to securely store the passwords, certificates, and encryption keys that might be used to authenticate the platform. TPM is a hardware-based system security feature that supports Trusted Computing Group (TCG) 2.0 or 1.2 depending on the option selected. TPM supports Windows BitLocker Drive encryption, which is a Windows data protection feature. BitLocker uses the TPM to protect user data and to ensure that a Windows server was not tampered with.

The Trusted Platform Module ordering information is listed in the following table.

The table also lists the Trusted Cryptographic Module (TCM) which is the equivalent v1.2 component for use in China.

Table 32. Trusted Platform Module ordering information

| Part number | Description | Maximum Supported |
|-------------|---|-------------------|
| 4XF0G88938 | Lenovo ThinkServer Trusted Platform Module v2.0 | 1 |
| 4XF0G45868 | ThinkServer Trusted Platform Module (v1.2) (not for use in China) | 1 |
| 4XF0G45869 | ThinkServer Gen 5 Trusted Cryptographic Module (China only) | 1 |

Chassis intrusion switch

The intrusion switch informs you that the server cover is not properly installed or closed by creating an event in the system event log (SEL). The following figure shows where the switch is installed.



Figure 9. Chassis intrusion switch

Some models include the chassis switch and cable. For custom configurations, the SBB part number can be selected.

Table 33. Chassis intrusion cable ordering information

| Part number | Description | Maximum Supported |
|-------------|-----------------------------------|-------------------|
| SBB 0E76159 | Chassis Intrusion Cable for TD350 | 1 |

Rack installation

The TD350 can be configured as a 4U rack-mount server, either by selecting a preconfigured model with the rack kit included, or using the option 4XF0G45870. The server door is removed as part of the conversion. The rack kit is shown in the following figure.



Figure 10. Lenovo ThinkServer TD350 4-Post Static Rack Kit

The following table lists the available rack options.

Table 34. Rack conversion for the TD350

| Part number | Description |
|-----------------------|--|
| TD350 rack components | |
| 4XF0G45870 | Lenovo ThinkServer TD350 4-Post Static Rack Kit <ul style="list-style-type: none">● Rail kit (rails, hardware)● Left/right rack handles● Filler plugs for door holes |
| 4XF0G45876 | Lenovo ThinkServer Gen 5 Cable Management Bar |

The supported rail kit has the specifications listed in the following table.

Table 35. Rail kit specifications

| Option name | Lenovo ThinkServer TD350 4-Post Static Rack Kit |
|--|---|
| Option part number | 4XF0G45870 |
| Supported servers | TD350 |
| Rail type | Static rail |
| Supported rack type | Four-post Lenovo standard rack, complying with the IEC standard |
| Service on rack | No |
| Cable management arm (CMA) or cable management bracket (CMB) support | CMB |
| 1U PDU support | Yes |
| 0U PDU support | Yes |
| Supported mounting holes (square) | Unthread square hole: 9.5 mm x 9.5 mm (0.37 inches x 0.37 inches) |
| Supported mounting holes (round) | Unthread round hole: 7.1 mm (0.28 inches) in diameter |
| Thickness of mounting flanges | 2 mm to 3.18 mm (0.08 to 0.125 inches) |
| Distance between the front and rear mounting flanges | 610 to 900 mm (24 to 35.43 inches) |
| Rail length (measured when mounted on the rack, starting from the front surface of the front mounting flange to the rear most point of the rail) | 641 mm (25.23 inches) |

Physical, thermal and acoustic specifications

Tower form factor:

- Width: 173 mm (6.8 inches)
- Height: 459 mm (18.1 inches) with foot stands
- Depth: 685 mm (27.0 inches) including the front door

Rack form factor:

- Width: 482 mm (19.0 inches) with rack handles
- Height: 173 mm (6.8 inches)
- Depth: 664 mm (26.1 inches)

Weight:

- Minimum configuration: 22 kg (48.5 lb)
- Maximum 41.5 kg (91.5 lb)

Thermal specifications are listed in the following table.

Table 36. Thermal specifications

| | ASHRAE class A2 | ASHRAE class A3 | ASHRAE class A4 |
|------------------------------|---|-----------------------------|-----------------------------|
| Air temperature (operating)* | 10°C to 35°C (50°F to 95°F) | 5°C to 40°C (41°F to 104°F) | 5°C to 45°C (41°F to 113°F) |
| Air temperature (storage) | -40°C to 60°C (-40°F to 140°F) in original shipping package | | |
| Humidity (operating) | 8% to 80% | 8% to 85% | 8% to 90% |
| Humidity (storage) | 8% to 90% | 8% to 90% | 8% to 90% |
| Altitude* | 0 to 3,048 m (0 to 10,000 ft) | | |

* Maximum allowable ambient temperatures must be derated at altitudes above 950 m (3117 ft):

- ASHRAE A2: Max temperature decreases by 1°C with every 300 m (984 ft) of altitude increase
- ASHRAE A3: Max temperature decreases by 1°C with every 175 m (574 ft) of altitude increase

- ASHRAE A4: Max temperature decreases by 1°C with every 125 m (410 ft) of altitude increase

The TS350 complies with ASHRAE levels based on the components installed in the server:

- The TD350 complies with class A4 if the following requirements are met:
 - Easy-swap-drive bays or eight 2.5-inch-drive bays
 - Processors: Maximum 120W TCP and no L-type processors
 - No internal tape drive
 - Two power supplies required
 - PCIe cards cannot exceed 15 W power consumption
- The TD350 complies with class A3 if the following requirements are met:
 - 16 or fewer drives
 - Neither the QLogic QLE2560 nor QLogic QLE2562 HBAs are installed
- The TD350 otherwise complies with class A2

The following table shows the acoustic performance (noise levels) of the server.

Table 37. Acoustic performance

| Configuration | Idle | CPU 50% loaded | HDD 100% random load |
|--|----------|----------------|----------------------|
| Minimum configuration | 3.5 bels | 3.7 bels | 4.7 bels |
| Typical configuration with 2.5-inch drives | 3.5 bels | - | 3.9 bels |
| Typical configuration with 3.5-inch drives | 3.7 bels | - | 4.9 bels |
| Maximum configuration | 5.8 bels | 6.1 bels | 6.1 bels |

The values listed in the table are the upper limit sound power level calculated per section 4.4.1 of ISO9296 (1988) and measured in accordance to ISO7779 (2010). Columns in the table are as follows:

- Idle: system is running in its operating system but no other specific activity, reference ISO7779 (2010) definition 3.1.7
- CPU 50% loaded: The SPECJbb testing software is run on the server at 50% processor loading
- HDD 100% random load: IOMeter is run on the server at 100% random read to stress the disk drives

Warranty

The server has a three-year or one-year warranty (model dependent) with 24x7 standard call center support and 9x5 next business day onsite coverage. Lenovo offers services warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, and length of service coverage.

The Lenovo QuickPick tool helps locate compatible accessories and services and warranty information. Services offered may vary by geographic location. Access the tool via the following URL:
<http://lenovoquickpick.com>

The following table explains warranty service definitions in more detail.

Table 38. Warranty service definitions

| Term | Description |
|-----------------------|---|
| On-site service | A service technician will go to 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. |
| 24x7x8 hour | A service technician is scheduled to arrive at the client's location within eight hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays. |
| 9x5x4 hour | A service technician is scheduled to arrive at the client's location within four business hours 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. For example, if a customer reports an incident at 3:00 pm on Friday, the technician will arrive by 10:00 am the following Monday. |
| 9x5 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. |

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
 - Three, four, or five years of 9x5 or 24x7 service coverage
 - Onsite response time from next business day to 4 hour same-day
 - Warranty extension of up to 5 years
 - Post warranty extensions offered in 1-year increments
- Priority Technical Support
Lenovo's Priority Support Offering enhances our award-winning call center support to provide top priority queue assignment to specialized Lenovo technicians. Priority support accelerates call center troubleshooting to get your problems resolved quickly, and includes other value-added support for Lenovo provided software tools. Priority support can be purchased stand alone to match the base warranty of your system or in convenient bundles with our same-day response services.
- Keep Your Drive Multi-Drive
Lenovo's Keep Your Drive Multi-Drive service is a multi-drive hard drive retention offering that ensures your data is always under your control, regardless of the number of hard drives that are installed in your Lenovo server. In the unlikely event of a hard drive failure, you retain possession of your hard drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. Keep Your Drive Multi-Drive covers multiple drives and multiple failures with one service offering at one value price. This service can be purchased stand-alone to match the base warranty of your system or in convenient bundles with our same-day response services.

Regulatory compliance

The TD350 conforms to the following standards:

- Energy Star 2.0
- FCC class A: USA FCC 47 CFR Part 15-Subpart B; ANSI C63.4
- ICES class A: Canada ICES-003 Issue 5
- CB
- UL/cTUVus
- Germany GS
- Russia EAC
- Argentina AR-S
- Mexico NOM
- EU CE: EN55022; EN55024; EN61000-3-2;EN61000-3-3;
- International: CISPR22; CISPR 24
- Brazil (voluntary)
- China CCC: GB 9254
- CECP
- CELP
- Green Guard

External drive enclosures

The server supports attachment to external drive enclosures using a RAID controller with external ports or a SAS host bus adapter. Adapters supported by the server are listed in the [SAS adapters for external storage](#) section.

The following table lists the 6 Gbps SAS external drive enclosures that are offered by Lenovo that can be used with the server for storage expansion.

Table 39. E1012 and E1024 external drive enclosure models

| Part number | Description |
|-------------|---|
| 64111B1 | Lenovo Storage E1012 LFF Disk Expansion Single SAS IO Module, Rail Kit, 9x5 NBD |
| 64111B2 | Lenovo Storage E1012 LFF Disk Expansion Dual SAS IO Module, Rail Kit, 9x5 NBD |
| 64111B3 | Lenovo Storage E1024 SFF Disk Expansion Single SAS IO Module, Rail Kit, 9x5 NBD |
| 64111B4 | Lenovo Storage E1024 SFF Disk Expansion Dual SAS IO Module, Rail Kit, 9x5 NBD |

For details about supported drives and cables for the Lenovo Storage E1012 and E1024, see the Lenovo Press Product Guide:

<http://lenovopress.com/lp0043>

The following table lists the 12 Gbps SAS external drive enclosures offered by Lenovo that can be used with the server for storage expansion.

Note: Information provided in this section is for ordering reference purposes only. For the operating system and adapter support details, refer to the interoperability matrix for a particular storage enclosure that can be found on the Lenovo Data Center Support web site:

<http://datacentersupport.lenovo.com>

Table 40. External drive enclosures

| Description | Part number | | |
|--|-------------|---------|---------|
| | Worldwide | Japan | PRC |
| Lenovo Storage D1212 LFF Disk Expansion with Dual SAS IO Modules | 4587A11 | 4587A1J | 4587A1C |
| Lenovo Storage D1224 SFF Disk Expansion with Dual SAS IO Modules | 4587A31 | 4587A3J | 4587A3C |
| Lenovo Storage D3284 4TB x 84 HD Expansion Enclosure | 641311F | | |
| Lenovo Storage D3284 6TB x 84 HD Expansion Enclosure | 641312F | | |
| Lenovo Storage D3284 8TB x 84 HD Expansion Enclosure | 641313F | | |
| Lenovo Storage D3284 10TB x 84 HD Expansion Enclosure | 641314F | | |

For details about supported drives, adapters, and cables, see the following Lenovo Press Product Guides:

- Lenovo Storage D1212 and D1224
<http://lenovopress.com/lp0512>
- Lenovo Storage D3284
<http://lenovopress.com/lp0513>

External storage systems

Lenovo offers the ThinkSystem DE Series, ThinkSystem DG Series and ThinkSystem DM Series external storage systems for high-performance storage. See the DE Series, DG Series and DM Series product guides for specific controller models, expansion enclosures and configuration options:

- ThinkSystem DE Series Storage
<https://lenovopress.com/storage/thinksystem/de-series#rt=product-guide>
- ThinkSystem DM Series Storage
<https://lenovopress.com/storage/thinksystem/dm-series#rt=product-guide>
- ThinkSystem DG Series Storage
<https://lenovopress.com/storage/thinksystem/dg-series#rt=product-guide>

External backup units

The following table lists the external backup options that are offered by Lenovo.

Table 41. External backup options

| Part number | Description |
|---|---|
| External RDX USB drives | |
| 4T27A10725 | ThinkSystem RDX External USB 3.0 Dock |
| External SAS tape backup drives | |
| 6160S7E | IBM TS2270 Tape Drive Model H7S |
| 6160S8E | IBM TS2280 Tape Drive Model H8S |
| 6160S9E | IBM TS2290 Tape Drive Model H9S |
| External SAS tape backup autoloaders | |
| 6171S7R | IBM TS2900 Tape Autoloader w/LTO7 HH SAS |
| 6171S8R | IBM TS2900 Tape Autoloader w/LTO8 HH SAS |
| 6171S9R | IBM TS2900 Tape Autoloader w/LTO9 HH SAS |
| External tape backup libraries | |
| 6741A1F | IBM TS4300 3U Tape Library-Base Unit |
| 6741A3F | IBM TS4300 3U Tape Library-Expansion Unit |
| Full High 8 Gb Fibre Channel for TS4300 | |
| 01KP938 | LTO 7 FH Fibre Channel Drive |
| 01KP954 | LTO 8 FH Fibre Channel Drive |
| 02JH837 | LTO 9 FH Fibre Channel Drive |
| Half High 8 Gb Fibre Channel for TS4300 | |
| 01KP936 | LTO 7 HH Fibre Channel Drive |
| 01KP952 | LTO 8 HH Fibre Channel Drive |
| 02JH835 | LTO 9 HH Fibre Channel Drive |
| Half High 6 Gb SAS for TS4300 | |
| 01KP937 | LTO 7 HH SAS Drive |
| 01KP953 | LTO 8 HH SAS Drive |
| 02JH836 | LTO 9 HH SAS Drive |

For more information, see the list of Product Guides in the Backup units category:

<https://lenovopress.com/servers/options/backup>

Top-of-rack Ethernet switches

The following table lists the Ethernet LAN switches that are offered by Lenovo.

Table 42. Ethernet LAN switches

| Part number | Description |
|--------------------------------------|--|
| 1 Gb Ethernet Rack switches | |
| 7Y810011WW | Lenovo ThinkSystem NE0152T RackSwitch (Rear to Front) |
| 7Z320011WW | Lenovo ThinkSystem NE0152TO RackSwitch (Rear to Front, ONIE) |
| 7159BAX | Lenovo RackSwitch G7028 (Rear to Front) |
| 7159CAX | Lenovo RackSwitch G7052 (Rear to Front) |
| 7159G52 | Lenovo RackSwitch G8052 (Rear to Front) |
| 7165H1X | Juniper EX2300-C PoE Switch |
| 7165H2X | Juniper EX2300-24p PoE Switch |
| 1 Gb Ethernet Campus switches | |
| 7Z340011WW | Lenovo CE0128TB Switch (3-Year Warranty) |
| 7Z360011WW | Lenovo CE0128TB Switch (Limited Lifetime Warranty) |
| 7Z340012WW | Lenovo CE0128PB Switch (3-Year Warranty) |
| 7Z360012WW | Lenovo CE0128PB Switch (Limited Lifetime Warranty) |
| 7Z350021WW | Lenovo CE0152TB Switch (3-Year Warranty) |
| 7Z370021WW | Lenovo CE0152TB Switch (Limited Lifetime Warranty) |
| 7Z350022WW | Lenovo CE0152PB Switch (3-Year Warranty) |
| 7Z370022WW | Lenovo CE0152PB Switch (Limited Lifetime Warranty) |
| 10 Gb Ethernet switches | |
| 7159A1X | Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front) |
| 7159B1X | Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front) |
| 7Z330011WW | Lenovo ThinkSystem NE1064TO RackSwitch (Rear to Front, ONIE) |
| 7159C1X | Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front) |
| 7159CRW | Lenovo RackSwitch G8272 (Rear to Front) |
| 7159GR6 | Lenovo RackSwitch G8296 (Rear to Front) |
| 7159BR6 | Lenovo RackSwitch G8124E (Rear to Front) |
| 25 Gb Ethernet switches | |
| 7159E1X | Lenovo ThinkSystem NE2572 RackSwitch (Rear to Front) |
| 7Z210021WW | Lenovo ThinkSystem NE2572O RackSwitch (Rear to Front, ONIE) |
| 7Z330021WW | Lenovo ThinkSystem NE2580O RackSwitch (Rear to Front, ONIE) |
| 100 Gb Ethernet switches | |
| 7159D1X | Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front) |
| 7Z210011WW | Lenovo ThinkSystem NE10032O RackSwitch (Rear to Front, ONIE) |

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

- 1 Gb Ethernet switches: <http://lenovopress.com/networking/tor/1gb?rt=product-guide>
- 10 Gb Ethernet switches: <http://lenovopress.com/networking/tor/10gb?rt=product-guide>
- 25 Gb Ethernet switches: <http://lenovopress.com/networking/tor/25gb?rt=product-guide>
- 40 Gb Ethernet switches: <http://lenovopress.com/networking/tor/40gb?rt=product-guide>
- 100 Gb Ethernet switches: <https://lenovopress.com/networking/tor/100Gb?rt=product-guide>

Fibre Channel SAN switches

Lenovo offers the ThinkSystem DB Series of Fibre Channel SAN switches for high-performance storage expansion. See the DB Series product guides for models and configuration options:

- ThinkSystem DB Series SAN Switches:
<https://lenovopress.com/storage/switches/rack#rt=product-guide>

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo.

Table 43. Uninterruptible power supply units

| Part number | Description |
|--|--|
| Tower UPS units - 100-125VAC | |
| 7DD6A000WW | T1kVA Tower UPS-G2 (100-125VAC) |
| 55951AX | T1kVA Tower UPS (100-125VAC) |
| 7DD6A002WW | T1.5kVA Tower UPS-G2 (100-125VAC) |
| 55952AX | T1.5kVA Tower UPS (100-125VAC) |
| Tower UPS units - 200-240VAC | |
| 7DD6A001WW | T1kVA Tower UPS-G2 (200-240VAC) |
| 55951KX | T1kVA Tower UPS (200-240VAC) |
| 7DD6A003WW | T1.5kVA Tower UPS-G2 (200-240VAC) |
| 55952KX | T1.5kVA Tower UPS (200-240VAC) |
| Rack-mounted or tower UPS units - 100-125VAC | |
| 7DD5A001WW | RT1.5kVA 2U Rack or Tower UPS-G2 (100-125VAC) |
| 55941AX | RT1.5kVA 2U Rack or Tower UPS (100-125VAC) |
| 55942AX | RT2.2kVA 2U Rack or Tower UPS (100-125VAC) |
| 7DD5A003WW | RT3kVA 2U Rack or Tower UPS-G2 (100-125VAC) |
| 55943AX | RT3kVA 2U Rack or Tower UPS (100-125VAC) |
| Rack-mounted or tower UPS units - 200-240VAC | |
| 7DD5A002WW | RT1.5kVA 2U Rack or Tower UPS-G2 (200-240VAC) |
| 55941KX | RT1.5kVA 2U Rack or Tower UPS (200-240VAC) |
| 55942KX | RT2.2kVA 2U Rack or Tower UPS (200-240VAC) |
| 7DD5A005WW | RT3kVA 2U Rack or Tower UPS-G2 (200-240VAC) |
| 55943KX | RT3kVA 2U Rack or Tower UPS (200-240VAC) |
| 7DD5A007WW | RT5kVA 3U Rack or Tower UPS-G2 (200-240VAC) |
| 55945KX | RT5kVA 3U Rack or Tower UPS (200-240VAC) |
| 7DD5A008WW | RT6kVA 3U Rack or Tower UPS-G2 (200-240VAC) |
| 55946KX | RT6kVA 3U Rack or Tower UPS (200-240VAC) |
| 55948KX | RT8kVA 6U Rack or Tower UPS (200-240VAC) |
| 7DD5A00AWW | RT11kVA 6U Rack or Tower UPS-G2 (200-240VAC) |
| 55949KX | RT11kVA 6U Rack or Tower UPS (200-240VAC) |
| 55943KT† | ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets) |
| 55943LT† | ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets) |
| 55946KT† | ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output) |
| 5594XKT† | ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output) |
| Rack-mounted or tower UPS units - 380-415VAC | |
| 55948PX | RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) |
| 55949PX | RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) |

† Only available in China and the Asia Pacific market.

For more information, see the list of Product Guides in the UPS category:

<https://lenovopress.com/servers/options/ups>

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo.

Table 44. Power distribution units

| Part number | Feature code | Description | ANZ | ASEAN | Brazil | EET | MEA | RUCIS | WE | HTK | INDIA | JAPAN | LA | NA | PRC |
|---------------------------------------|--------------|--|-----|-------|--------|-----|-----|-------|----|-----|-------|-------|----|----|-----|
| 0U Basic PDUs | | | | | | | | | | | | | | | |
| 4PU7A93176 | C0QH | 0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU v2 | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y |
| 4PU7A93169 | C0DA | 0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y |
| 4PU7A93177 | C0QJ | 0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU v2 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 4PU7A93170 | C0D9 | 0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y |
| 00YJ776 | ATZY | 0U 36 C13/6 C19 24A 1 Phase PDU | N | Y | Y | N | N | N | N | N | N | Y | Y | Y | N |
| 00YJ779 | ATZX | 0U 21 C13/12 C19 48A 3 Phase PDU | N | N | Y | N | N | N | Y | N | N | Y | Y | Y | N |
| 00YJ777 | ATZZ | 0U 36 C13/6 C19 32A 1 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | N | Y | Y |
| 00YJ778 | AU00 | 0U 21 C13/12 C19 32A 3 Phase PDU | Y | Y | N | Y | Y | Y | Y | Y | Y | N | N | Y | Y |
| 0U Switched and Monitored PDUs | | | | | | | | | | | | | | | |
| 4PU7A93181 | C0QN | 0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU v2 (60A derated) | N | Y | N | N | N | N | N | Y | N | Y | N | Y | N |
| 4PU7A93174 | C0D5 | 0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU (60A derated) | N | Y | N | N | N | N | N | Y | N | N | N | Y | N |
| 4PU7A93178 | C0QK | 0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU v2 | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y |
| 4PU7A93171 | C0D8 | 0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y |
| 4PU7A93182 | C0QP | 0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU v2 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 4PU7A93175 | C0CS | 0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y |
| 4PU7A93180 | C0QM | 0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU v2 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 4PU7A93173 | C0D6 | 0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y |
| 4PU7A93179 | C0QL | 0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU v2 (30A derated) | N | Y | N | N | N | N | N | Y | N | Y | N | Y | N |
| 4PU7A93172 | C0D7 | 0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU(30A derated) | N | Y | N | N | N | N | N | Y | N | N | N | Y | N |
| 00YJ783 | AU04 | 0U 12 C13/12 C19 Switched and Monitored 48A 3 Phase PDU | N | N | Y | N | N | N | Y | N | N | Y | Y | Y | N |
| 00YJ781 | AU03 | 0U 20 C13/4 C19 Switched and Monitored 24A 1 Phase PDU | N | N | Y | N | Y | N | Y | N | N | Y | Y | Y | N |
| 00YJ782 | AU02 | 0U 18 C13/6 C19 Switched and Monitored 32A 3 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | N | Y |
| 00YJ780 | AU01 | 0U 20 C13/4 C19 Switched and Monitored 32A 1 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | N | Y |
| 1U Switched and Monitored PDUs | | | | | | | | | | | | | | | |
| 4PU7A90808 | C0D4 | 1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 ETL | N | N | N | N | N | N | N | Y | N | Y | Y | Y | N |

| Part number | Feature code | Description | ANZ | ASEAN | Brazil | EET | MEA | RUCIS | WE | HTK | INDIA | JAPAN | LA | NA | PRC |
|---|--------------|--|-----|-------|--------|-----|-----|-------|----|-----|-------|-------|----|----|-----|
| 4PU7A81117 | BNDV | 1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL | N | N | N | N | N | N | N | N | N | N | N | Y | N |
| 4PU7A90809 | C0DE | 1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 CE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y |
| 4PU7A81118 | BNDW | 1U 18 C19/C13 switched and monitored 48A 3P WYE PDU – CE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y |
| 4PU7A90810 | C0DD | 1U 18 C19/C13 Switched and monitored 80A 3P Delta PDU V2 | N | N | N | N | N | N | N | Y | N | Y | Y | Y | N |
| 4PU7A77467 | BLC4 | 1U 18 C19/C13 Switched and Monitored 80A 3P Delta PDU | N | N | N | N | N | N | N | N | N | Y | N | Y | N |
| 4PU7A90811 | C0DC | 1U 12 C19/C13 Switched and monitored 32A 3P WYE PDU V2 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 4PU7A77468 | BLC5 | 1U 12 C19/C13 switched and monitored 32A 3P WYE PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 4PU7A90812 | C0DB | 1U 12 C19/C13 Switched and monitored 60A 3P Delta PDU V2 | N | N | N | N | N | N | N | Y | N | Y | Y | Y | N |
| 4PU7A77469 | BLC6 | 1U 12 C19/C13 switched and monitored 60A 3P Delta PDU | N | N | N | N | N | N | N | N | N | N | N | Y | N |
| 46M4002 | 5896 | 1U 9 C19/3 C13 Switched and Monitored DPI PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 46M4004 | 5894 | 1U 12 C13 Switched and Monitored DPI PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 46M4003 | 5897 | 1U 9 C19/3 C13 Switched and Monitored 60A 3 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 46M4005 | 5895 | 1U 12 C13 Switched and Monitored 60A 3 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1U Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets) | | | | | | | | | | | | | | | |
| 71763NU | 6051 | Ultra Density Enterprise C19/C13 PDU 60A/208V/3PH | N | N | Y | N | N | N | N | N | N | Y | Y | Y | N |
| 71762NX | 6091 | Ultra Density Enterprise C19/C13 PDU Module | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1U C13 Enterprise PDUs (12x IEC 320 C13 outlets) | | | | | | | | | | | | | | | |
| 39M2816 | 6030 | DPI C13 PDU+ | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8941 | 6010 | Enterprise C13 PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1U C19 Enterprise PDUs (6x IEC 320 C19 outlets) | | | | | | | | | | | | | | | |
| 39Y8948 | 6060 | Enterprise C19 PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8923 | 6061 | Enterprise C19 3 phase PDU (60a) | N | N | Y | N | N | N | Y | N | N | N | Y | Y | N |
| 1U Front-end PDUs (3x IEC 320 C19 outlets) | | | | | | | | | | | | | | | |
| 39Y8938 | 6002 | DPI 30amp/125V Front-end PDU with NEMA L5-30P | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8939 | 6003 | DPI 30amp/250V Front-end PDU with NEMA L6-30P | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8934 | 6005 | DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8940 | 6004 | DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd connector | Y | N | Y | Y | Y | Y | Y | N | N | Y | Y | Y | N |
| 39Y8935 | 6006 | DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd connector | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1U NEMA PDUs (6x NEMA 5-15R outlets) | | | | | | | | | | | | | | | |
| 39Y8905 | 5900 | DPI 100-127v PDU with Fixed Nema L5-15P line cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

| Part number | Feature code | Description | ANZ | ASEAN | Brazil | EET | MEA | RUCIS | WE | HTK | INDIA | JAPAN | LA | NA | PRC |
|---|--------------|---|-----|-------|--------|-----|-----|-------|----|-----|-------|-------|----|----|-----|
| Line cords for 1U PDUs that ship without a line cord | | | | | | | | | | | | | | | |
| 40K9611 | 6504 | DPI 32a Cord (IEC 309 3P+N+G) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9612 | 6502 | DPI 32a Cord (IEC 309 P+N+G) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9613 | 6503 | DPI 63a Cord (IEC 309 P+N+G) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9614 | 6500 | DPI 30a Cord (NEMA L6-30P) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9615 | 6501 | DPI 60a Cord (IEC 309 2P+G) | N | N | Y | N | N | N | Y | N | N | Y | Y | Y | N |
| 40K9617 | 6505 | 4.3m, 32A/230V, Souriau UTG to AS/NZS 3112 (Aus/NZ) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9618 | 6506 | 4.3m, 32A/250V, Souriau UTG Female to KSC 8305 (S. Korea) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

For more information, see the Lenovo Press documents in the PDU category:
<https://lenovopress.com/servers/options/pdu>

Rack cabinets

The following table lists the rack cabinets offered by Lenovo that can be used with the TD350.

Table 45. Rack cabinets

| Description | Part number |
|---|-------------|
| 11U Rack Office Enablement Kit | 201886X |
| 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:
<https://lenovopress.com/servers/options/racks>

KVM console options

The following table lists the supported KVM consoles, keyboards, and KVM switches.

Table 46. Console keyboards

| Part number | Description |
|-------------------|---|
| Consoles | |
| 17238BX | 1U 18.5" Standard Console (without keyboard) |
| Console keyboards | |
| 00MW310 | Lenovo UltraNav Keyboard USB - US Eng |
| 46W6713 | Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2 |

| Part number | Description |
|------------------------------|---|
| 46W6714 | Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2 |
| 46W6715 | Keyboard w/ Int. Pointing Device USB - Chinese/US 467 RoHS v2 |
| 46W6716 | Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2 |
| 46W6717 | Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2 |
| 46W6718 | Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2 |
| 46W6719 | Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2 |
| 46W6720 | Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2 |
| 46W6721 | Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2 |
| 46W6722 | Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2 |
| 46W6723 | Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2 |
| 46W6724 | Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2 |
| 46W6725 | Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2 |
| 46W6726 | Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2 |
| 46W6727 | Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2 |
| 46W6728 | Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2 |
| 46W6729 | Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2 |
| 46W6730 | Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2 |
| 46W6731 | Keyboard w/ Int. Pointing Device USB - Portuguese 163 RoHS v2 |
| 46W6732 | Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2 |
| 46W6733 | Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2 |
| 46W6734 | Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2 |
| 46W6735 | Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2 |
| 46W6736 | Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2 |
| 46W6737 | Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2 |
| 46W6738 | Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2 |
| 46W6739 | Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2 |
| 46W6740 | Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2 |
| 46W6741 | Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2 |
| Console switches | |
| 1754D2X | Global 4x2x32 Console Manager (GCM32) |
| 1754D1X | Global 2x2x16 Console Manager (GCM16) |
| 1754A2X | Local 2x16 Console Manager (LCM16) |
| 1754A1X | Local 1x8 Console Manager (LCM8) |
| Console switch cables | |
| 43V6147 | Single Cable USB Conversion Option (UCO) |
| 39M2895 | USB Conversion Option (4 Pack UCO) |
| 46M5383 | Virtual Media Conversion Option Gen2 (VCO2) |
| 46M5382 | Serial Conversion Option (SCO) |

For more information, see the list of Product Guides in the KVM Switches and Consoles category:
<http://lenovopress.com/servers/options/kvm>

Lenovo Financial Services

Why wait to obtain the technology you need now? No payments for 90 days and predictable, low monthly payments make it easy to budget for your Lenovo solution.

- **Flexible**

Our in-depth knowledge of the products, services and various market segments allows us to offer greater flexibility in structures, documentation and end of lease options.

- **100% Solution Financing**

Financing your entire solution including hardware, software, and services, ensures more predictability in your project planning with fixed, manageable payments and low monthly payments.

- **Device as a Service (DaaS)**

Leverage latest technology to advance your business. Customized solutions aligned to your needs. Flexibility to add equipment to support growth. Protect your technology with Lenovo's Premier Support service.

- **24/7 Asset management**

Manage your financed solutions with electronic access to your lease documents, payment histories, invoices and asset information.

- **Fair Market Value (FMV) and \$1 Purchase Option Leases**

Maximize your purchasing power with our lowest cost option. An FMV lease offers lower monthly payments than loans or lease-to-own financing. Think of an FMV lease as a rental. You have the flexibility at the end of the lease term to return the equipment, continue leasing it, or purchase it for the fair market value. In a \$1 Out Purchase Option lease, you own the equipment. It is a good option when you are confident you will use the equipment for an extended period beyond the finance term. Both lease types have merits depending on your needs. We can help you determine which option will best meet your technological and budgetary goals.

Ask your Lenovo Financial Services representative about this promotion and how to submit a credit application. For the majority of credit applicants, we have enough information to deliver an instant decision and send a notification within minutes.

Related publications and links

For more information, see these resources:

- ThinkServer TD350 product page
<https://www3.lenovo.com/us/en/towers/ThinkServer-TD350/p/77LS7TD350D>
- ThinkServer TD350 User Guide and Hardware Maintenance Manual
https://download.lenovo.com/ibmdl/pub/pc/pccbbs/thinkservers/td350_ug_hmm_en.pdf
- Lenovo Quick Pick
<http://www.lenovoquickpick.com/usa/system/thinkserver/td-series/thinkserver-td350>
- Lenovo Think Option Compatibility Matrix (OCM):
<http://www.lenovo.com/accessoriesguide>
- Lenovo Support for the TD350
<http://support.lenovo.com/us/en/products/servers/thinkserver-tower-servers/thinkserver-td350>
- ThinkServer Power Planner
<http://support.lenovo.com/us/en/downloads/ds101155>
- Lenovo PSREF - Product Specifications Reference
http://psref.lenovo.com/Product/ThinkServer_TD350

Related product families

Product families related to this document are the following:

- [2-Socket Tower Servers](#)

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.
8001 Development Drive
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 2025. All rights reserved.

This document, LP0053, was created or updated on February 3, 2018.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
<https://lenovopress.lenovo.com/LP0053>
- Send your comments in an e-mail to:
comments@lenovopress.com

This document is available online at <https://lenovopress.lenovo.com/LP0053>.

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®

System x®

ThinkServer®

ThinkSystem®

UltraNav®

XClarity®

The following terms are trademarks of other companies:

Intel® and Xeon® are trademarks of Intel Corporation or its subsidiaries.

Linux® is the trademark of Linus Torvalds in the U.S. and other countries.

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

IBM® is a trademark of IBM in the United States, other countries, or both.

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