Lenovo ThinkServer TS460 (Intel Xeon E3-1200 v5, Core i3, Pentium G Series Processors)

Product Guide (withdrawn product)

The Lenovo ThinkServer TS460 is the ideal server for small and medium businesses, remote or branch offices, and retail environments. It features the latest Intel Xeon processor E3-1200 v5 product family with four cores and support for up to 64 GB of 2133 MHz DDR4 UDIMM memory. Also, it offers an integrated dual-port 1 GbE NIC and additional PCIe expansion slots for advanced RAID protection, network scalability (including 10 GbE network connectivity), and external storage connectivity (SAS or iSCSI). Up to 96 TB of internal enterprise-class storage supports storage-intensive workloads, such as office applications, web, e-mail and file and print serving, and provides growth capacity.

The following figure shows the Lenovo ThinkServer TS460.

Figure 1. Lenovo ThinkServer TS460

Did you know?

The ThinkServer TS460 offers enterprise-class reliability features such as error correcting code (ECC), hot-swap components, and advanced RAID protection with flexible storage configurations at an affordable price.

The ThinkServer Management Module built into the ThinkServer TS460 offers easy-to-use, enterprise-class manageability to monitor server availability and perform remote management.

The ThinkServer TS460 offers office-quiet acoustics, and it fits under or beside an office desk.

Key features

The ThinkServer TS460 is a tower server that has been optimized to provide enterprise-class features to growing small-to-medium-sized businesses, retail stores, and distributed enterprises.

Scalability and performance

The ThinkServer TS460 offers numerous features to boost performance, improve scalability, and reduce costs:

- The Intel Xeon processor E3-1200 v5 improves productivity by offering affordable single-socket system performance with 4-core processors with up to 3.7 GHz core speeds and up to 8 MB cache.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows processor 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, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better use the hardware for virtualization workloads.
- Up to four 2133 MHz DDR4 ECC UDIMMs provide speed and capacity of up to 64 GB.
- The server offers PCI Express 3.0 I/O expansion capabilities that increase the theoretical maximum bandwidth by almost 100% (8 GTps per link using 128b/130b encoding) compared to the PCI Express 2.0 (5 GTps per link using 8b/10b encoding).
- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E3-1200 v5 product family. Such integration reduces I/O latency and increases overall system performance.
- Up to 16x 2.5-inch, or 8x 3.5-inch, or a combination of 8x 2.5-inch and 4x 3.5-inch hot-swap (HS) drive bays, including support for 2.5-inch SSDs in a 3.5-inch conversion tray, provide flexible internal storage configurations and capacity.
- The use of solid-state drives (SSDs) instead of, or along with, traditional spinning drives (hard disk drives or HDDs) can significantly improve I/O performance.

Availability and serviceability

The ThinkServer TS460 provides many features to simplify serviceability and increase system uptime:

- The server supports UDIMM memory with ECC protection which provides error correction not available in PC-class "servers" that use parity memory. Avoiding system crashes (and data loss) due to soft memory errors means greater system uptime.
- Tool-less cover removal provides easy access to upgrades and serviceable parts, such as memory and adapter cards.
- A choice of affordable onboard SATA RAID or advanced hardware RAID redundancy offers data protection and greater system uptime.
- The use of SSDs can provide better reliability than the use of traditional HDDs, for greater uptime.
- Built-in ThinkServer Management Module (TMM) continuously monitors system parameters, sends alerts, and enables administrators to perform remote recovery actions to minimize downtime.
- The ThinkServer Diagnostics software speeds up troubleshooting tasks to reduce service time.
- One-year or three-year customer-replaceable unit (CRU) and onsite limited warranty with next business day response. Optional service upgrades are available.

Manageability and security

Powerful systems management features simplify local and remote management of the ThinkServer TS460:

- ThinkServer Management Module monitors server availability and enables administrators to perform remote management.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- The ThinkServer EasyStartup tool simplifies the process of configuring RAID and installing supported Microsoft Windows and Linux operating systems, VMware hypervisors, and device drivers on a ThinkServer system.
- Optional Trusted Platform Module (TPM) enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Administrator's and power-on passwords help protect from unauthorized access to the server.
- Optional server locks such as a padlock, cable lock, or lockable front cover help prevent unauthorized access to the internal components of the server, and the intrusion switch (select models) informs about the removed or improperly installed server cover.

Energy efficiency

The ThinkServer TS460 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to a green environment:

- 80 PLUS Gold-certified power supplies enable greater energy savings while providing flexibility to meet your business needs.
- The ThinkServer Power Planner tool provides information about the power consumption and electric current calculation for the different configurations of servers and other devices, which helps plan deployment of servers and devices in an efficient way.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.

Components and connectors

The following figure shows the front of the ThinkServer TS460.

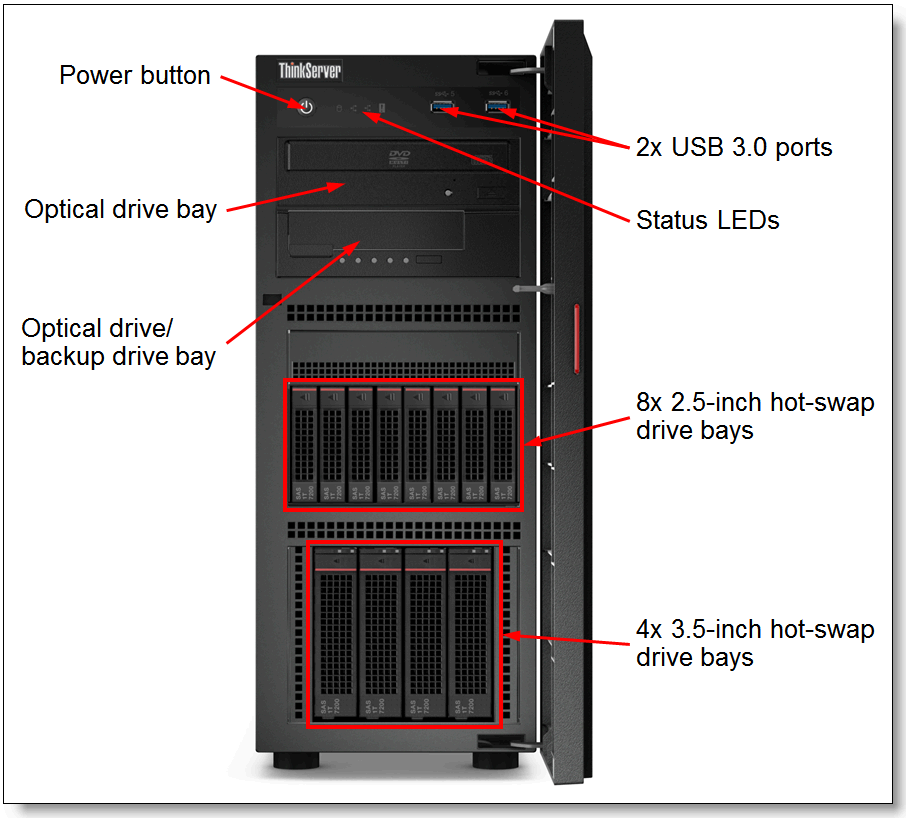

Figure 2. ThinkServer TS460 front view (with 4x 3.5-inch + 8x 2.5-inch hot-swap drive bays)

The following figure shows the rear of the ThinkServer TS460.

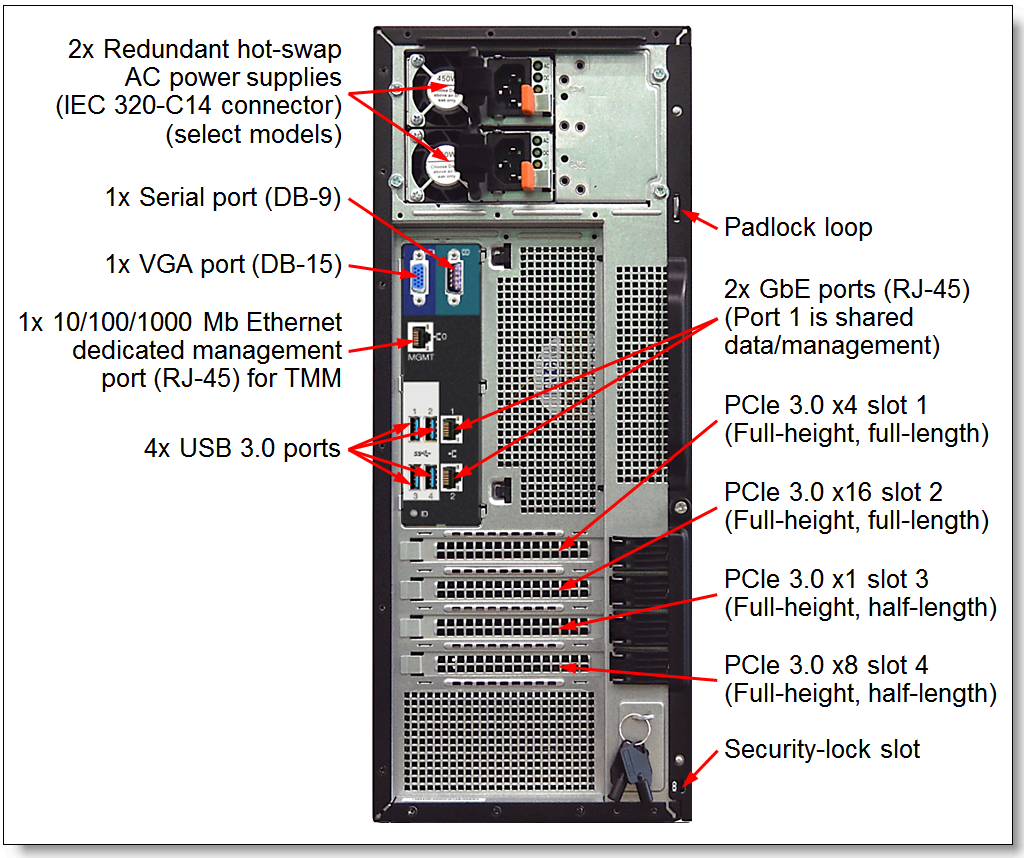

Figure 3. ThinkServer TS460 rear view

The following figure shows the internal components of the ThinkServer TS460.

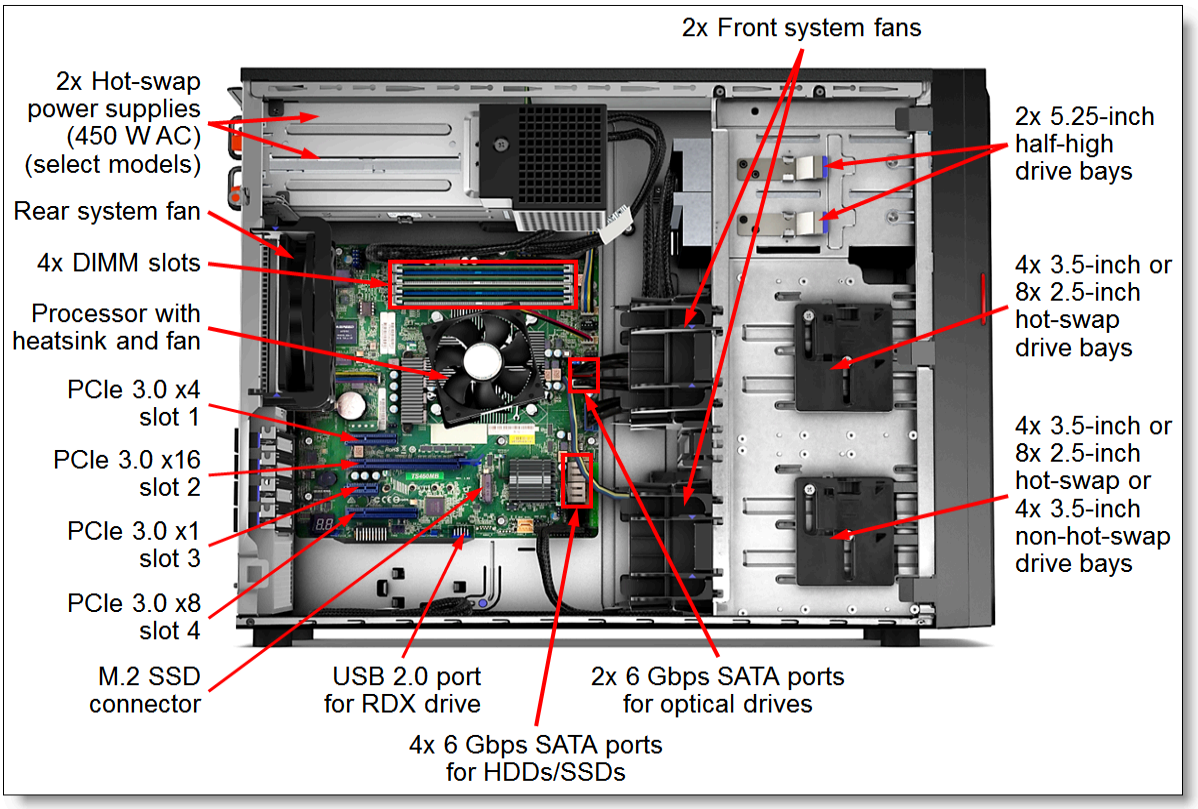

Figure 4. ThinkServer TS460 internal view

System specifications

The following table lists the system specifications.

Table 1. System specifications

Components	Specification
Form factor	Tower or 5U rack-mount (4U chassis mounted on a 1U shelf)
Processor	One processor: • Intel Xeon processor E3-1200 v5 product family with four cores up to 3.7 GHz, 8 MB cache, and up to 2133 MHz memory speed; or • Intel Core i3 processor 6100/6300 product families with two cores up to 3.9 GHz, up to 4 MB cache, and 2133 MHz memory speed; or • Intel Pentium processor G4400/G4500 product families with two cores up to 3.6 GHz, 3 MB cache, and up to 2133 MHz memory speed.
Chipset	Intel C232.
Memory	Four DIMM sockets. Support for ECC UDIMMs. DIMM speeds up to 2133 MHz.
Memory capacity	Up to 64 GB with four 16 GB UDIMMs.
Memory protection	Error-correcting code (ECC) memory.
Drive bays	The following drive bay configurations are available: • 4x 3.5-inch non-hot-swap SATA drive bays • 4x 3.5-inch (standard) + 4x 3.5-inch (optional) hot-swap SATA drive bays • 8x 2.5-inch (standard) + 8x 2.5-inch (optional) hot-swap SATA drive bays • 4x 3.5-inch (standard) + 8x 2.5-inch (optional) hot-swap SATA drive bays 1x M.2 SSD connector.
Drive types	3.5-inch non-hot-swap drives: • NL SATA HDDs up to 12 TB 3.5-inch hot-swap drives: • SAS HDDs (2.5-inch HDD in a 3.5-inch tray) up to 1.8 TB • NL SAS HDDs up to 8 TB • NL SATA HDDs up to 12 TB • SATA SSDs (2.5-inch SSD in a 3.5-inch tray) up to 3.84 TB 2.5-inch hot-swap drives: • SAS HDDs up to 1.8 TB • Nearline (NL) SATA HDDs up to 2 TB • SATA SSDs up to 3.84 TB M.2 SSD up to 128 GB. Intermix of SAS/NL SAS and SATA HDDs and SSDs is supported within a system, but not within a RAID array.

Components	Specification
Storage capacity	3.5-inch non-hot-swap drives: • Up to 48 TB with 4x 12 TB NL SATA HDDs 3.5-inch hot-swap drives: • Up to 64 TB with 8x 8 TB NL SAS HDDs • Up to 96 TB with 8x 12 TB NL SATA HDDs • Up to 14.4 TB with 8x 1.8 TB SAS HDDs • Up to 30.7 TB with 8x 3.84 GB SATA SSDs 2.5-inch hot-swap drives: • Up to 32 TB with 16x 2 TB NL SATA HDDs • Up to 28.8 TB with 16x 1.8 TB SAS HDDs • Up to 61.4 TB with 16x 3.84 GB SATA SSDs
Storage controller	6 Gbps SATA: • Non-RAID with the onboard SATA controller. • RAID 0, 1, 10, and 5 with ThinkServer RAID 121i (Onboard software RAID feature). 12 Gbps SAS/6 Gbps SATA: • RAID 0, 1, 10 with ThinkServer RAID 520i. Optional RAID 5, 50 upgrade. • RAID 0, 1, 10, 5, 50 with ThinkServer RAID 720i. Optional RAID 6, 60 with cache.
Optical drive bays	Two without a backup drive or one with a backup drive. Support for DVD-ROM or DVD-RW.
Backup drive bays	One. Support for the optional RDX or LTO-6 backup drive.
Network interfaces	• 2x GbE (10/100/1000 Mbps) RJ-45 ports (Intel I210); Port 1 is a shared port for management and data. • 1x GbE (10/100/1000 Mbps) dedicated management port (RJ-45) for TMM.
I/O expansion slots	• Slot 1: PCIe 3.0 x4 (x4-wired); full-height, full-length • Slot 2: PCIe 3.0 x16 (x16-wired); full-height, full-length • Slot 3: PCIe 3.0 x1 (x1-wired); full-height, half-length • Slot 4: PCIe 3.0 x8 (x8-wired); full-height, half-length
Ports	• Front: 2x USB 3.0 ports. • Rear: 4x USB 3.0 ports, 1x DB-15 VGA port, and 1x DB-9 serial port. • Internal: 1x USB 2.0 port for RDX backup drive.
Cooling	Three fixed system fans.
Power supply	One fixed 300 W AC (100 - 240 V) power supply (80 PLUS Bronze) or up to two redundant hot-swap 450 W AC (100 - 240 V) power supplies (80 PLUS Gold).
Hot-swap parts	HDDs and SSDs (select models); power supplies (select models).
Systems management	UEFI, system LEDs, ThinkServer Management Module (TMM) (also known as Baseboard Management Controller [BMC]; based on ASPEED AST2400) with remote presence (graphics, keyboard and mouse, virtual media), ThinkServer EasyStartup, ThinkServer Diagnostics, and ThinkServer Power Planner. Optional Lenovo XClarity for discovery, inventory, monitoring and events.
Security features	Power-on password, administrator's password, Intrusion Switch (select models), lockable front door, security-lock slot, and padlock loop. Optional Trusted Platform Module (TPM) 1.2 or 2.0.
Video	Graphic adapter with 16 MB memory integrated into the ThinkServer Management Module. Maximum resolution is 1920x1200 at 60 Hz.
Operating systems	Microsoft Windows Server 2012 R2 and 2016; Red Hat Enterprise Linux (RHEL) Server 6 and 7; SUSE Linux Enterprise Server (SLES) 11 and 12; VMware vSphere (ESXi) 6.0 and 6.5.
Warranty	One-year or three-year (model dependent) customer-replaceable unit (CRU) and on-site limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades (country-specific) are available through Lenovo Services offerings: technician-installed parts, 4-hour or 2-hour response time, warranty extension up to 5 years, post-warranty extensions, YourDrive YourData, and Preferred Access (Priority support).

Components	Specification
Dimensions	Height: 430 mm (16.9 in.), width: 173 mm (6.8 in.), depth: 566 mm (22.3 in.)
Weight	Minimum: 18.0 kg (39.7 lb); maximum: 26.5 kg (57.3 lb)

Models

ThinkServer TS460 models are region-specific; that is, each region may define their own server models, and not all server models are available in every region.

For a list of the ThinkServer TS460 relationship models (Machine Types 70TQ and 70TS) or TopSeller models (Machine Types 70TR and 70TT), contact a Lenovo or Lenovo Business Partner representative in your region or refer to the ThinkServer TS460 PSREF webpage:
http://psref.lenovo.com/Product/ThinkServer_TS460

The ThinkServer TS460 models are shipped with the following items:

- *Read Me First* Flyer
- *Electronic Publications* Flyer
- *ThinkServer EasyStartup Quick Start Guide* printed publication
- One (fixed power supply models) or two (hot-swap power supply models) line cords (select models)

Processors

The ThinkServer TS460 supports one processor. The following table lists the specifications of the processors that are available for the server.

Table 2. Processor specifications (Hyper-Threading [HT], Turbo Boost [TB], Virtualization Technology [VT])

Processor model	Core frequency (Base / TB Max)	Cores / Threads	Cache	Max DDR4 frequency	TDP	HT	TB	VT-x	VT-d
Intel Xeon processors									
E3-1220 v5	3 / 3.5 GHz	4 / 4	8 MB	2133 MHz	80 W	No	Yes	Yes	Yes
E3-1230 v5	3.4 / 3.8 GHz	4 / 8	8 MB	2133 MHz	80 W	Yes	Yes	Yes	Yes
E3-1240 v5	3.5 / 3.9 GHz	4 / 8	8 MB	2133 MHz	80 W	Yes	Yes	Yes	Yes
E3-1270 v5	3.6 / 4 GHz	4 / 8	8 MB	2133 MHz	80 W	Yes	Yes	Yes	Yes
E3-1280 v5	3.7 / 4 GHz	4 / 8	8 MB	2133 MHz	80 W	Yes	Yes	Yes	Yes
Intel Core processors									
i3-6100	3.7 GHz	2 / 4	3 MB	2133 MHz	51 W	Yes	No	Yes	Yes
i3-6100T	3.2 GHz	2 / 4	3 MB	2133 MHz	35 W	Yes	No	Yes	Yes
i3-6300	3.8 GHz	2 / 4	4 MB	2133 MHz	51 W	Yes	No	Yes	Yes
i3-6300T	3.3 GHz	2 / 4	4 MB	2133 MHz	35 W	Yes	No	Yes	Yes
i3-6320	3.9 GHz	2 / 4	4 MB	2133 MHz	51 W	Yes	No	Yes	Yes
Intel Pentium processors									
G4400	3.3 GHz	2 / 2	3 MB	2133 MHz	54 W	No	No	Yes	Yes
G4400T	2.9 GHz	2 / 2	3 MB	2133 MHz	35 W	No	No	Yes	Yes
G4500	3.5 GHz	2 / 2	3 MB	2133 MHz	51 W	No	No	Yes	Yes
G4500T	3 GHz	2 / 2	3 MB	2133 MHz	35 W	No	No	Yes	Yes
G4520	3.6 GHz	2 / 2	3 MB	2133 MHz	51 W	No	No	Yes	Yes

Note: The ThinkServer TS460 does not support Intel HD Graphics integrated into select processors. The server uses graphics integrated into the ThinkServer Management Module.

Memory

Lenovo DDR4 memory is compatibility tested and tuned for optimal ThinkServer performance and throughput. From a service and support standpoint, Lenovo memory automatically assumes the system warranty, and Lenovo provides service and support worldwide.

The ThinkServer TS460 has four DIMM slots, and it supports DDR4 UDIMMs with ECC memory protection. The processor has two memory channels and supports two DIMMs per channel.

The following rules apply when selecting the memory configuration:

- The ThinkServer TS460 supports memory configurations with 1, 2, 3, or 4 UDIMMs.
- The ThinkServer TS460 supports up to 2133 MHz memory speeds for one DIMM per channel and two DIMMs per channel configurations, provided that the processors support this memory speed (see the Processor options table in Processors for details).

The following table summarizes memory speeds and capacities that are supported by the ThinkServer TS460.

Table 3. Maximum memory speeds and capacities

	UDIMM	
DIMMs per channel	**Memory bus speed**	**Maximum capacity**
1 DPC	2133 MHz	32 GB (2x 16 GB)
2 DPC	2133 MHz	64 GB (4x 16 GB)

The following table lists the memory options that are available for the ThinkServer TS460.

Table 4. Memory options

Description	**Part number**	**Maximum supported**
ThinkServer 8GB 2RX8 PC4-2133-E CL15 DDR4-2133 ECC-UDIMM for 1P	4X70G88331	4
ThinkServer 16GB 2RX8 PC4-2133-E CL15 DDR4-2133 ECC-UDIMM for 1P	4X70G88332	4

Internal storage

The ThinkServer TS460 supports the following internal storage configurations:

1. 4x 3.5-inch non-hot-swap drive bays + optical drive bay + optical or backup drive bay
2. 4x 3.5-inch + 4x 3.5-inch hot-swap drive bays + optical drive bay + optical or backup drive bay
3. 8x 2.5-inch + 8x 2.5-inch hot-swap drive bays + optical drive bay + optical or backup drive bay
4. 4x 3.5-inch + 8x 2.5-inch hot-swap drive bays + optical drive bay + optical or backup drive bay

These configurations are shown in the following figure.

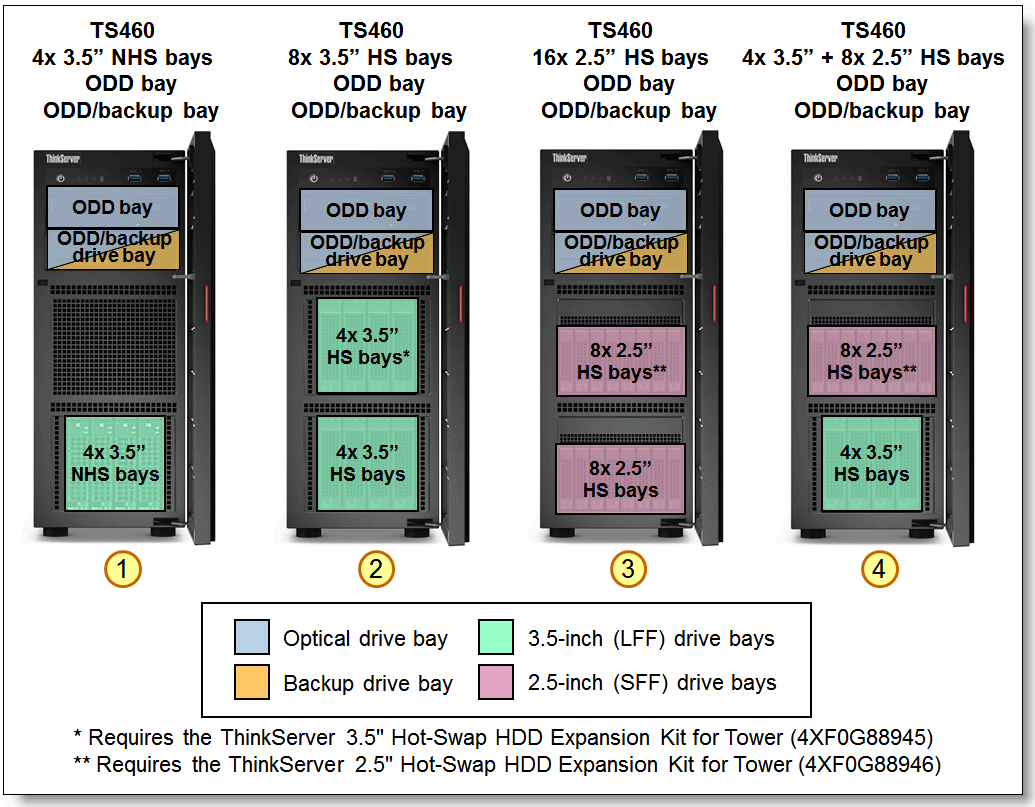

Figure 5. Internal storage configurations

The ThinkServer TS460 also supports up to one internal M.2 SSD.

The following table lists the internal storage expansion options that are available for the ThinkServer TS460.

Table 5. Internal storage expansion options

Description	Part number	Maximum supported
ThinkServer 3.5" Hot-Swap HDD Expansion Kit for Tower	4XF0G88945	1
ThinkServer 2.5" Hot-Swap HDD Expansion Kit for Tower	4XF0G88946	1

Configuration notes:

- The 3.5" Hot-Swap HDD Expansion Kit (4XF0G88945) adds 4x 3.5-inch hot-swap drive bays to the ThinkServer TS460 models with 4x 3.5-inch hot-swap drive bays for a total of eight drive bays.
- The 2.5" Hot-Swap HDD Expansion Kit (4XF0G88946) adds 8x 2.5-inch hot-swap drive bays to the following ThinkServer TS460 models:
  - Models with 8x 2.5-inch hot-swap drive bays for a total of 16 SFF drive bays.
  - Models with 4x 3.5-inch hot-swap drive bays for hybrid 4x LFF + 8x SFF storage configurations.
- The 2.5" Hot-Swap HDD Expansion Kit requires the RAID Expander Card (4XC0G88843).
- If an M.2 SSD is used, the maximum quantity of optical drives is limited to one.

Controllers for internal storage

The following table lists the internal RAID controllers and the additional options that are used for the internal disk storage of the ThinkServer TS460.

Table 6. Controllers for internal storage

Description	Part number	Maximum supported	I/O slots supported
Non-RAID internal storage controllers			
Onboard SATA controller (Non-RAID Intel SATA AHCI mode)	None*	1	-
RAID controllers			
ThinkServer RAID 121i Controller	None**	1	-
ThinkServer RAID 520i PCIe Adapter	4XC0G88840	1	2, 4
ThinkServer RAID 720i PCIe Adapter	4XC0G88831	1	2, 4
RAID 5 upgrade for the RAID 520i			
ThinkServer RAID 520i RAID 5 Upgrade	4XC0G88841	1	-
Cache upgrades for the RAID 720i			
ThinkServer RAID 720i 1GB Modular DRAM Upgrade	4XB0F28695	1	-
ThinkServer RAID 720i 1GB Modular Flash and Supercapacitor Upgrade	4XB0F28696	1	-
ThinkServer RAID 720i 2GB Modular Flash and Supercapacitor Upgrade	4XB0F28697	1	-
ThinkServer RAID 720i 4GB Modular Flash and Supercapacitor Upgrade	4XB0F28698	1	-
SAS expander adapters			
ThinkServer 12Gb RAID Expander Card	4XC0G88843	1	1

* The non-RAID Intel SATA AHCI mode of the onboard SATA controller
** The RAID 121i is a hardware-assist RAID feature of the onboard SATA controller.

Important: The RAID 121i controller is not supported by virtualization hypervisors, including VMware vSphere (ESXi), Linux KVM, Xen, and Microsoft Hyper-V.

The following table summarizes features of supported internal storage controllers.

Table 7. Internal storage controller features and specifications summary

Feature	Onboard SATA Non-RAID (AHCI)	RAID 121i	RAID 520i	RAID 720i
Part number	None	None	4XC0G88840	4XC0G88831
Form factor	Onboard	Onboard	Low profile	Low profile
Controller chip	Not applicable*	Not applicable**	LSI SAS3008	LSI SAS3108
Host interface	Not applicable*	Not applicable**	PCIe 3.0 x8	PCIe 3.0 x8
Port interface	6 Gbps SATA	6 Gbps SATA	12 Gbps SAS	12 Gbps SAS
Number of ports	4	4	8	8
Port connectors	2x Custom SATA	2x Custom SATA	2x Mini-SAS HD x4 (SFF-8643)	2x Mini-SAS HD x4 (SFF-8643)
Drive interface	SATA	SATA	SAS, SATA	SAS, SATA
Drive type	HDD	HDD, SSD	HDD, SSD	HDD, SSD
Non-hot-swap drive support	Yes	Yes	No†	No
Hot-swap drive support	No	Yes	Yes	Yes
Maximum drives	4	4	16#	16#
RAID levels	None	0/1/10/5	0/1/10, Optional 5/50 (4XC0G88841)	0/1/10/5/50, Optional 6/60 with a cache upgrade
JBOD mode	Yes	Yes	Yes	Yes (without cache)
Cache	None	None	None	Optional: • 1 GB non-backed (4XB0F28695) • 1 GB flash-backed (4XB0F28696) • 2 GB flash-backed (4XB0F28697) • 4 GB flash-backed (4XB0F28698)
Cache protection	None	None	None	Yes (with flash backup)
FastPath	None	None	None	Yes (with flash backup)
CacheCade Pro 2.0	None	None	None	Yes (with flash backup)

* The non-RAID Intel SATA AHCI mode of the SATA controller integrated into the Intel C232 Platform Controller Hub (PCH)
** The RAID 121i is a hardware-assist, software RAID feature (Intel Rapid Storage Technology Enterprise [RSTe]) integrated into the Intel C232 PCH.
† The RAID 520i does not support non-hot-swap HDDs and SSDs in the ThinkServer TS460; however, the RAID 520i might support non-hot-swap HDDs and SSDs in other servers (for example, in the TS150 server).
# Support for up to 16 HDDs or SSDs requires the RAID Expander Card (4XC0G88843). Without the RAID Expander Card, up to eight HDDs or SSDs are supported.

The following table lists drive types and internal drive bay configurations that are supported by the internal RAID controllers.

Table 8. Storage controllers, drive types, and internal drive bays

Storage controller	Drive type	4x 3.5" NHS	4x 3.5" HS	8x 3.5" HS	8x 2.5" HS	16x 2.5" HS	4x 3.5" + 8x 2.5" HS
Onboard SATA Non-RAID (AHCI)	SAS/NL SAS HDD	No support	No support	No support	No support	No support	No support
	NL SATA HDD	Yes	No support	No support	No support	No support	No support
	SATA SSD	Not applicable	No support	No support	No support	No support	No support
RAID 121i	SAS/NL SAS HDD	No support	No support	No support	No support	No support	No support
	NL SATA HDD	Yes	Yes	No support	No support	No support	No support
	SATA SSD	Not applicable	Yes	No support	No support	No support	No support
RAID 520i	SAS/NL SAS HDD	No support	Yes	Yes	Yes	Yes*	Yes*
	NL SATA HDD	No support	Yes	Yes	Yes	Yes*	Yes*
	SATA SSD	No support	Yes	Yes	Yes	Yes*	Yes*
RAID 720i	SAS/NL SAS HDD	No support	Yes	Yes	Yes	Yes*	Yes*
	NL SATA HDD	No support	Yes	Yes	Yes	Yes*	Yes*
	SATA SSD	No support	Yes	Yes	Yes	Yes*	Yes*

* Support for more than eight drives requires the RAID Expander Card (4XC0G88843).

Drives for internal storage

The ThinkServer TS460 supports the internal drive options listed in the following tables.

Table 9. Internal storage: 3.5-inch non-hot-swap drives

Description	Part number	Maximum supported
3.5-inch non-hot-swap HDDs - NL SATA 6 Gbps		
ThinkServer TS460 Gen 5 3.5" 1TB 7.2K Enterprise SATA 6Gbps NHS HDD	4XB0K12335	4
ThinkServer TS460 Gen 5 3.5" 2TB 7.2K Enterprise SATA 6Gbps NHS HDD	4XB0K12336	4
ThinkServer TS460 Gen 5 3.5" 4TB 7.2K Enterprise SATA 6Gbps NHS HDD	4XB0K12337	4
ThinkServer TS460 Gen 5 3.5" 6TB 7.2K Enterprise SATA 6Gbps NHS 512e HDD	4XB0K12338	4
ThinkServer TS460 Gen 5 3.5" 8TB 7.2K Enterprise SATA 6Gbps NHS 512e HDD	4XB0K12347	4
ThinkServer 3.5" 12TB 7.2K Enterprise SATA 6Gbps NHS 512e HDD	4XB0N68536	4

Table 10. Internal storage: 3.5-inch hot-swap drives

Description	Part number	Maximum supported
3.5-inch hot-swap HDDs (2.5-inch HDD in 3.5-inch drive tray) - SAS 12 Gbps		
ThinkServer Gen 5 2.5" 300GB 10K Enterprise SAS 12Gbps HS HDD with 3.5" Tray	4XB0K12340	8
ThinkServer Gen 5 2.5" 600GB 10K Enterprise SAS 12Gbps HS HDD with 3.5" Tray	4XB0K12341	8
ThinkServer Gen 5 2.5" 900GB 10K Enterprise SAS 12Gbps HS HDD with 3.5" Tray	4XB0K12342	8
ThinkServer Gen 5 2.5" 1.2TB 10K Enterprise SAS 12Gbps HS HDD with 3.5" Tray	4XB0K12343	8
ThinkServer Gen 5 2.5" 1.8TB 10K Enterprise SAS 12Gbps HS 512e HDD w/3.5" Tray	4XB0K12344	8
3.5-inch hot-swap HDDs - NL SAS 12 Gbps		
ThinkServer Gen 5 3.5" 1TB 7.2K Enterprise SAS 12Gbps HS HDD	4XB0K12270	8
ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SAS 12Gbps HS HDD	4XB0K12278	8
ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SAS 12Gbps HS HDD	4XB0K12279	8
ThinkServer Gen 5 3.5" 6TB 7.2K Enterprise SAS 12Gbps HS 512e HDD	4XB0K12339	8
ThinkServer Gen 5 3.5" 8TB 7.2K Enterprise SAS 12Gbps HS 512e HDD	4XB0K12254	8
3.5-inch hot-swap HDDs - NL SATA 6 Gbps		
ThinkServer Gen 5 3.5" 1TB 7.2K Enterprise SATA 6Gbps HS HDD	4XB0F28712	8
ThinkServer Gen 5 3.5" 2TB 7.2K Enterprise SATA 6Gbps HS HDD	4XB0F28713	8
ThinkServer Gen 5 3.5" 4TB 7.2K Enterprise SATA 6Gbps HS HDD	4XB0G45715	8
ThinkServer Gen 5 3.5" 6TB 7.2K Enterprise SATA 6Gbps HS 512e HDD	4XB0G88713	8
ThinkServer Gen 5 3.5" 8TB 7.2K Enterprise SATA 6Gbps HS 512e HDD	4XB0K12348	8
ThinkServer Gen 5 3.5" 12TB 7.2K Enterprise SATA 6Gbps Hot Swap 512e HDD	4XB0N68532	8
3.5-inch hot-swap SSDs (2.5-inch SSD in 3.5-inch drive tray) - 5100 Enterprise Mainstream SATA 6 Gbps		
ThinkServer Gen 5 3.5" 240GB 5100 Enterprise Mainstream SATA 6Gbps HS SSD	4XB0K12421	8
ThinkServer Gen 5 3.5" 480GB 5100 Enterprise Mainstream SATA 6Gbps HS SSD	4XB0K12423	8
ThinkServer Gen 5 3.5" 960GB 5100 Enterprise Mainstream SATA 6Gbps HS SSD	4XB0K12425	8
3.5-inch hot-swap SSDs (2.5-inch SSD in 3.5-inch drive tray) - 5100 Enterprise Entry 6 Gbps SATA		
ThinkServer Gen 5 3.5" 480GB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0N68491	8

Description	Part number	Maximum supported
ThinkServer Gen 5 3.5" 960GB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0N68493	8
ThinkServer Gen 5 3.5" 1.92TB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0N68495	8
ThinkServer Gen 5 3.5" 3.84TB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0N68496	8
3.5-inch hot-swap SSDs (2.5-inch SSD in 3.5-inch drive tray) - Enterprise Entry SATA 6 Gbps		
ThinkServer Gen 5 3.5" 240GB S3520 Entry SATA 6Gbps Hot Swap SSD	4XB0K12327	8
ThinkServer Gen 5 3.5" 480GB S3520 Entry SATA 6Gbps Hot Swap SSD	4XB0K12330	8
ThinkServer Gen 5 3.5" 960GB S3520 Entry SATA 6Gbps Hot Swap SSD	4XB0K12333	8

Table 11. Internal storage: 2.5-inch hot-swap drives

Description	Part number	Maximum supported
2.5-inch hot-swap HDDs - SAS 12 Gbps		
ThinkServer Gen 5 2.5" 300GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive	4XB0G88732	16
ThinkServer Gen 5 2.5" 600GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive	4XB0G88734	16
ThinkServer Gen 5 2.5" 900GB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive	4XB0G88735	16
ThinkServer Gen 5 2.5" 1.2TB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive	4XB0G88736	16
ThinkServer Gen 5 2.5" 1.8TB 10K Enterprise SAS 12Gbps Hot Swap Hard Drive	4XB0G88737	16
2.5-inch hot-swap HDDs - NL SATA 6 Gbps		
ThinkServer Gen 5 2.5" 1TB 7.2K Enterprise SATA 6Gbps HS HDD	4XB0G45721	16
ThinkServer Gen 5 2.5" 2TB 7.2K Enterprise SATA 6Gbps HS 512e HDD	4XB0G88774	16
2.5-inch hot-swap SSDs - 5100 Enterprise Mainstream SATA 6 Gbps		
ThinkServer Gen 5 2.5" 240GB 5100 Enterprise Mainstream SATA 6Gbps HS SSD	4XB0K12416	16
ThinkServer Gen 5 2.5" 480GB 5100 Enterprise Mainstream SATA 6Gbps HS SSD	4XB0K12417	16
ThinkServer Gen 5 2.5" 960GB 5100 Enterprise Mainstream SATA 6Gbps HS SSD	4XB0K12418	16
2.5-inch hot-swap SSDs - 5100 Enterprise Entry 6 Gbps SATA		
ThinkServer Gen 5 2.5" 480GB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12441	16
ThinkServer Gen 5 2.5" 960GB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12442	16
ThinkServer Gen 5 2.5" 1.92TB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12443	16
ThinkServer Gen 5 2.5" 3.84TB 5100 Enterprise Entry SATA 6Gbps HS SSD	4XB0K12444	16
2.5-inch hot-swap SSDs - S3520 Enterprise Entry SATA 6 Gbps		
ThinkServer Gen 5 2.5" 240GB S3520 Entry SATA 6Gbps Hot Swap SSD	4XB0K12326	16
ThinkServer Gen 5 2.5" 480GB S3520 Entry SATA 6Gbps Hot Swap SSD	4XB0K12329	16
ThinkServer Gen 5 2.5" 960GB S3520 Entry SATA 6Gbps Hot Swap SSD	4XB0K12332	16

Table 12. Internal storage: M.2 SSDs

Description	Part number	Maximum supported
M.2 SSDs		
ThinkServer M.2 32GB Value Read-Optimized SATA 6Gbps Solid State Drive	4XB0K12310	1
ThinkServer M.2 128GB Value Read-Optimized SATA 6Gbps Solid State Drive	4XB0K12311	1

Optical drives

The ThinkServer TS460 supports the optical drive options listed in the following table.

Table 13. Optical drive options

Description	Part number	Maximum supported
Internal optical drives		
ThinkServer Half High SATA DVD Rambo Optical Disk Drive	4XA0G88618	2
ThinkServer Half High SATA DVD-ROM Optical Disk Drive	4XA0G88619	2
External optical drives		
ThinkServer External USB DVD RW Optical Disk Drive	4XA0G88615	1

The Optical Disk Drives support the following types of media: CD-R, CD-ROM, CD-RW, DVD-R, DVD-R (dual-layer recording), DVD-RW, DVD+R, DVD+R (dual-layer recording), and DVD+RW.

Configuration notes: If two internal optical drives are used, an internal backup unit is not supported.

Internal backup units

The ThinkServer TS460 supports the internal backup unit options listed in the following table.

Table 14. Internal backup unit options

Description	Part number	Maximum supported
Internal RDX backup unit (USB)		
ThinkServer Internal RDX Tape Drive	4XF0G88944	1
Cartridges for RDX backup unit		
ThinkServer 1TB SATA 3Gbps RDX Cartridge	4XB0F28660	1
ThinkServer 2TB SATA 3Gbps RDX Cartridge	4XB0G88711	1
Internal LTO-6 tape drive (SAS)		
ThinkServer LTO-6 Linear Tape Drive	4XF0G88943	1
Cartridges for LTO-6 tape drive		
ThinkServer 2.5TB SAS 6Gbps LTO-6 Tape	4XB0F28689	1

Configuration notes:

- If an internal backup unit is used, a maximum of one optical drive is supported.
- The LTO-6 tape drive requires the RAID 520i adapter.
- If the LTO-6 tape drive is used, the maximum number of internal drives is limited to four.

I/O expansion

The ThinkServer TS460 has four I/O expansion slots:

- Slot 1: PCIe 3.0 x4 (x4-wired); full-height, full-length
- Slot 2: PCIe 3.0 x16 (x16-wired); full-height, full-length
- Slot 3: PCIe 3.0 x1 (x1-wired); full-height, half-length
- Slot 4: PCIe 3.0 x8 (x8-wired); full-height, half-length

The following adapter types are supported:

- RAID controllers for internal storage(Refer to Controllers for internal storage)
- Network adapters (Refer to Network adapters)
- Serial and parallel port adapters (Refer to the following table)

The ThinkServer TS460 supports the serial and parallel port adapter options listed in the following table.

Table 15. Serial and parallel port adapter options

Description	Part number	Maximum supported	I/O slots supported
ThinkServer Dual Serial Port PCIe Adapter	4XC0G88860	1	3, 1, 4, 2
ThinkServer Single Parallel Port PCIe Adapter	4XC0G88859	1	3, 1, 4, 2

Network adapters

The ThinkServer TS460 has two integrated Gigabit Ethernet ports based on the Intel I210 NIC. The integrated GbE ports have the following features:

- 1 Gb Ethernet IEEE 802.3, 802.3u, and 802.3ab PHY specifications compliant
- Integrated PHY for 10/100/1000 Mbps with speed and duplex auto-negotiation
- IEEE 802.3x and 802.3z flow control with software-controllable Rx thresholds and Tx pause frames
- Automatic cross-over detection function (MDI/MDI-X)
- Energy Efficient Ethernet (IEEE 802.3az)
- Wake on LAN
- VLAN tagging (IEEE 802.1Q)
- Class of Service (CoS) priority (IEEE 802.1p) marking
- TCP/UDP, IPv4 checksum offloads (Rx/ Tx/Large-send); extended Tx descriptors
- Receive Side Scaling
- Jumbo Frames (up to 9.5 KB)
- Timing and Synchronization (IEEE 802.1as / IEEE 1588)
- Load balancing and failover teaming support:
    - Adapter fault tolerance (AFT)
    - Switch fault tolerance (SFT)
    - Adaptive load balancing (ALB)
    - Virtual Machine load balancing (VMLB)
    - Link aggregation (static, IEEE 802.3ad)

The following table lists the network adapter options for the ThinkServer TS460 server.

Table 16. Network adapter options

Description	Part number	Maximum supported	I/O slots supported
ThinkServer I350-T2 PCIe 1Gb 2 Port Base-T Ethernet Adapter by Intel (2x RJ-45 ports)	4XC0F28730	2	1, 4, 2
ThinkServer I350-T4 PCIe 1Gb 4 Port Base-T Ethernet Adapter by Intel (4x RJ-45 ports)	4XC0F28731	2	1, 4, 2
ThinkServer X550-T1 PCIe 10Gb 1 Port Base-T Ethernet Adapter by Intel (1x RJ-45 port)	4XC0G88855	2	1, 4, 2
ThinkServer X550-T2 PCIe 10Gb 1 Port Base-T Ethernet Adapter by Intel (2x RJ-45 ports)	4XC0G88856	2	1, 4, 2

Power supplies

The ThinkServer TS460 supports one 300 W AC (100-240 V) fixed power supply (80 PLUS Bronze) or up to two redundant hot-swap 450 W AC (100-240 V) power supplies (80 PLUS Gold). The following table lists the hot-swap power supply options.

Table 17. Hot-swap power supply options

Description	Part number	Maximum supported
ThinkServer 450W Hot Swap Redundant Power Supply	4X20G87846	2

Important: To ensures that the correct power supply is chosen for optimal performance, it is highly recommended to validate system configuration for specific power requirements by using the latest version

of the ThinkServer Power Planner, which is available at this website:
http://support.lenovo.com/us/en/downloads/ds101155

One (fixed power supply models) or two (hot-swap power supply models) line cords are included with select server models. For other models, line cords and rack power cables that are listed in the following table can be ordered, if needed.

Table 18. Power cable options

Description	Part number	Maximum supported*
Rack power cables		
ThinkServer C13-C14 WW 250V 10A 1.8m Jumper Cord	4X90F92964	1 / 2
2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable	39Y7938	1 / 2
Line cords		
ThinkServer C13-AS3112_3 ANZ 250V 10A 1.8m Power Cord	4X90F92979	1 / 2
ThinkServer C13-BS_1363A UK 250V 10A 1.8m Power Cord	4X90F92970	1 / 2
ThinkServer C13-CE123_50 Italy 250V 10A 1.8m Power Cord	4X90F92975	1 / 2
ThinkServer C13-CEE_7.7 Europe 250V 10A 1.8m Power Cord	4X90F92974	1 / 2
ThinkServer C13-CNS_690 Taiwan 125V 7A 1.8m Power Cord	4X90F92968	1 / 2
ThinkServer C13-DK_2.5A Denmark 250V 10A 1.8m Power Cord	4X90F92971	1 / 2
ThinkServer C13-IRAM_2073 LA 250V 10A 1.8m Power Cord	4X90F92977	1 / 2
ThinkServer C13-IS_1293 India 250V 6A 1.8m Power Cord	4X90F92969	1 / 2
ThinkServer C13-KSC_8305 Korea 250V 7A 1.8m Power Cord	4X90F92967	1 / 2
ThinkServer C13-NEMA_5-15P US 125V 10A 1.8m Power Cord	4X90F92965	1 / 2
ThinkServer C13-NRB_14136 Brazil 250V 10A 1.8m Power Cord	4X90F92976	1 / 2
ThinkServer C13-SABS_164 South Africa 250V 6A 1.8m Power Cord	4X90F92978	1 / 2
ThinkServer C13-SEV_1011 Switzerland 250V 10A 1.8m Power Cord	4X90F92972	1 / 2
ThinkServer C13-SI_32 Israel 250V 10A 1.8m Power Cord	4X90F92973	1 / 2
Japan 12A/125V C13 to JIS C-8303 2.8m Line Cord	46M2593	1 / 2

* One power supply / two power supplies

Systems management

The ThinkServer TS460 supports the following systems management tools:

- Lenovo ThinkServer Management Module
- Lenovo Software Tools
- Lenovo XClarity Administrator

ThinkServer Management Module

The ThinkServer TS460 contains the ThinkServer Management Module (TMM), which provides service-processor control, monitoring, and alerting functions. The TMM offers the following capabilities:

- Gathering and viewing system information and inventory
- Monitoring system status and health
- Alerting and notifications
- Event logging
- Configuring TMM network connectivity and security
- Updating TMM firmware

- Remotely control server power (Power on, Power off, Restart)

As a standard feature, the TMM also provides virtual presence for remote server management capabilities. The TMM virtual presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1920x1200 at 60 Hz with up to 24 bits per pixel colors
- Remotely accessing the system by using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the system

The TMM can be accessed through a dedicated 10/100/1000 Mb Ethernet management port, and it provides remote server management through the following industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Embedded Web UI via HTTP/HTTPS
- Simple Network Management Protocol (SNMP) alerts

Lenovo Software Tools

Lenovo offers the following software tools that can help you set up, use, and maintain the server at no additional cost:

- ThinkServer EasyStartup

  The ThinkServer EasyStartup tool simplifies the process of configuring RAID and installing supported Microsoft Windows and Linux operating systems, VMware hypervisors, and device drivers on a ThinkServer system.

- ThinkServer Diagnostics

  The ThinkServer Diagnostics software speeds up troubleshooting tasks to reduce service time by diagnosing server problems, performing diagnostic tests, and collecting system information and logs.

Lenovo XClarity Administrator

Lenovo XClarity is a centralized systems management solution that helps administrators deliver infrastructure faster. This solution integrates easily with Lenovo x86 rack servers, Flex System, and RackSwitch switches, providing automated agent-less discovery, monitoring, firmware updates, configuration management, and bare metal deployment of operating systems and hypervisors across multiple systems.

Lenovo XClarity Administrator is an optional software component for the ThinkServer TS460 which can be downloaded and used at no charge to discover and monitor the server.

If software support is required for Lenovo XClarity Administrator, Lenovo XClarity Pro software subscription should be ordered. Lenovo XClarity Pro is licensed on a per managed system basis, that is, each managed Lenovo system requires a license.

The following table lists the geo-specific Lenovo XClarity software license options.

Table 19. Lenovo XClarity software options

Description	Part number (NA, AP, Japan)*	Part number (EMEA, LA)**	Quantity
Lenovo XClarity Pro, per Mngd Server w/1 Yr SW S&S	00MT201	00MT207	1
Lenovo XClarity Pro, per Mngd Server w/3 Yr SW S&S	00MT202	00MT208	1
Lenovo XClarity Pro, per Mngd Server w/5 Yr SW S&S	00MT203	00MT209	1

* NA = North America; AP = Asia Pacific
** EMEA = Europe, Middle East, Africa; LA = Latin America

Lenovo XClarity Administrator offers the following standard features that are available at no charge for ThinkServer systems:

- Auto-discovery and monitoring of Lenovo x86 servers, RackSwitch switches, and Flex System chassis
- External alerts and notifications via SNMP traps, syslog remote logging, and e-mail
- Secure connections to managed endpoints
- NIST 800-131A or FIPS 140-2 compliant cryptographic standards between the management solution and managed endpoints
- Integration into existing higher level management systems such as cloud automation and orchestration tools through REST APIs, providing extensive external visibility and control over hardware resources
- An intuitive, easy-to-use GUI
- Scripting with Windows PowerShell, providing command-line visibility and control over hardware resources

For more information, refer to the Lenovo XClarity Administrator Product Guide:
http://lenovopress.com/tips1200

Security

The ThinkServer TS460 offers the following security features:

- Administrator's and power-on password
- Trusted Platform Module (TPM) version 1.2 or 2.0 (optional; available worldwide except China)
- Intrusion switch (select models)
- Lockable front cover
- Security-lock slot
- Padlock loop

The following table lists the TPM options.

Table 20. TPM options

Description	Part number	Maximum supported
Lenovo ThinkServer Gen 5 Trusted Platform Module v1.2	4XF0G45868	1
Lenovo ThinkServer Trusted Platform Module v2.0	4XF0G88938	1

Rack installation

The ThinkServer TS460 can be mounted in a rack cabinet by using the tower to rack conversion kit that is listed in the following table. The tower to rack conversion kit includes a shelf on which the server is placed, sliding rails for mounting a shelf, and a cable management arm (CMA).

Table 21. Rack installation options

Description	Part number	Maximum supported
Lenovo ThinkServer Tower to Rack Conversion Kit V2.0	4XF0G88937	1

Operating systems

The ThinkServer TS460 supports the following operating systems:

- Microsoft
  - Windows Server 2012 R2 Foundation, Essentials, Standard, Hyper-V
  - Windows Storage Server 2012 R2 Standard
  - Windows Server 2016 Essentials, Standard, Hyper-V
  - Windows Storage Server 2016 Standard
  - Windows Storage Server 2016 Workgroup
- Red Hat
  - Red Hat Enterprise Linux Server 6.8 (x64)
  - Red Hat Enterprise Linux Server 7.3
- SUSE
  - SUSE Linux Enterprise Server 11 SP4 (x64)
  - SUSE Linux Enterprise Server 12 SP2
- VMware
  - VMware vSphere 6.0 (ESXi) Update 2
  - VMware vSphere 6.5 (ESXi)

Important: The RAID 121i controller is not supported by virtualization hypervisors, including VMware vSphere (ESXi), Linux KVM, Xen, and Microsoft Hyper-V.

For the latest information about the specific versions and service levels that are supported and any other prerequisites, see the Operating System Interoperability Guide: http://lenovopress.com/redposig.

Physical specifications

The ThinkServer TS460 has the following dimensions and weight (approximate):

- Height:
  - Without foot stands: 430 mm (16.9 in.)
  - With foot stands: 444 mm (17.5 in.)
- Width: 173 mm (6.8 in.)
- Depth: 566 mm (22.3 in.) including the front bezel
- Weight:
  - Minimum: 18.0 kg (39.7 lb)
  - Maximum: 26.5 kg (57.3 lb)

Operating environment

The ThinkServer TS460 server is supported in the following environment:

- Air temperature:
  - Operating: 5 °C - 35 °C (41 °F - 95 °F); decrease the maximum system temperature by 1 °C for every 300-m (1000-ft) increase in altitude.
  - Storage: -40 °C - 60 °C (-40 °F - 140 °F) in the original shipping package
- Altitude: 0 m - 3,048 m (0 ft - 10,000 ft) in an unpressurized environment
- Humidity:
  - Operating: 8% - 80% (non-condensing)
  - Storage: 10% - 90% (non-condensing)
- Electrical:

    - 100 - 127 (nominal) V AC; 50 Hz or 60 Hz
    - 200 - 240 (nominal) V AC; 50 Hz or 60 Hz
- Acoustic level (maximum):
    - 43.6 dB (operating)
    - 33 dB (idle)

Regulatory compliance

The ThinkServer TS460 conforms to the following regulations:

- AS/NZS CISPR 22/24, Class A (Australia/New Zealand)
- BSMI CNS 13438, Class A; CNS 14336-1 (Taiwan)
- CCC GB 4943.1, GB 17625.1, GB 9254 Class A (China)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3) (European Union)
- EAC (Russia)
- Energy Star 2.1 (models with redundant hot-swap power supplies)
- FCC Part 15, Subpart B, Class A (United States)
- ICES-003, Issue 6, Class A (Canada)
- IS13252 Part 1 (India)
- KN22, Class A; KN24 (Korea)
- NOM (Mexico)
- Reduction of Hazardous Substances (ROHS)
- TUV-GS (EN60950-1/IEC60950-1, EK1-ITB 2000) (Germany)
- VCCI, Class A (Japan)
- UL/IEC/EN60950-1

Warranty

The ThinkServer TS460 has a one-year or three-year customer-replaceable unit (CRU) and onsite (for field-replaceable units [FRUs] only) limited warranty with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered. Also available are Lenovo Services warranty maintenance upgrades and post-warranty maintenance agreements, with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

Lenovo warranty service upgrade offerings are region-specific. Not all warranty service upgrades are available in every region. For more information about Lenovo warranty service upgrade offerings that are available in your region, visit the Lenovo Quick Pick website:
http://lenovoquickpick.com

The following table explains warranty service definitions in more detail.

Table 22. Warranty service definitions

Term	Description
Onsite Service	If a problem with your product cannot be resolved via telephone, a Service Technician will be dispatched to arrive at your location.
Parts Delivered	If a problem with your product cannot be resolved via telephone and a CRU part is required, Lenovo will send a replacement CRU to arrive at your location. If a problem with your product cannot be resolved via telephone and a FRU part is required, a Service Technician will be dispatched to arrive at your location.
Technician Installed Parts	If a problem with your product cannot be resolved via telephone, a Service Technician will be dispatched to arrive at your location.
Hours of coverage	• 9x5: 9 hours per day, 5 days per week, during normal business hours, excluding local public and national holidays • 24x7: 24 hours per day, 7 days per week, 365 days per year.
Response time target	2 hours, 4 hours, or Next Business Day: The time period from when the telephone based troubleshooting is completed and logged, to the delivery of the CRU or arrival of a Service Technician and part at the Customer's location for repair.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
  - One, three, four, or five years of 9x5 or 24x7 service coverage
  - Parts delivered or technician installed parts from next business day to 4 or 2 hours
  - Warranty extension of up to 5 years
  - Post warranty extensions
- YourDrive YourData
  Lenovo's YourDrive YourData service is a multi-drive retention offering that ensures your data is always under your control, regardless of the number of drives that are installed in your Lenovo server. In the unlikely event of a drive failure, you retain possession of your drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The YourDrive YourData service can be purchased in convenient bundles with Lenovo warranty upgrades and extensions.
- Hardware Support Preferred Access (Priority support)
  Lenovo's Hardware Support Preferred Access 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.

External storage systems

The ThinkServer TS460 can be attached to external storage systems using the following storage connectivity protocols:

- 1 Gb or 10 Gb Ethernet (NAS storage)
- 1 Gb or 10 Gb iSCSI with an iSCSI software initiator in the operating system

The following table lists the external storage systems that are currently offered by Lenovo that can be used with the ThinkServer TS460 in storage solutions.

Table 23. External storage systems

Description	Part number
Lenovo ThinkSystem DS Series Storage (iSCSI connectivity)	
Lenovo ThinkSystem DS2200 LFF FC/iSCSI Dual Controller Unit (US English documentation)	4599A31*
Lenovo ThinkSystem DS2200 LFF FC/iSCSI Dual Controller Unit (Simplified Chinese documentation)	4599A3C^
Lenovo ThinkSystem DS2200 LFF FC/iSCSI Dual Controller Unit (Japanese documentation)	4599A3J**
Lenovo ThinkSystem DS2200 SFF FC/iSCSI Dual Controller Unit (US English documentation)	4599A11*
Lenovo ThinkSystem DS2200 SFF FC/iSCSI Dual Controller Unit (Simplified Chinese documentation)	4599A1C^
Lenovo ThinkSystem DS2200 SFF FC/iSCSI Dual Controller Unit (Japanese documentation)	4599A1J**
Lenovo ThinkSystem DS4200 LFF FC/iSCSI Dual Controller Unit (US English documentation)	4617A31*
Lenovo ThinkSystem DS4200 LFF FC/iSCSI Dual Controller Unit (Simplified Chinese documentation)	4617A3C^
Lenovo ThinkSystem DS4200 LFF FC/iSCSI Dual Controller Unit (Japanese documentation)	4617A3J**
Lenovo ThinkSystem DS4200 SFF FC/iSCSI Dual Controller Unit (US English documentation)	4617A11*
Lenovo ThinkSystem DS4200 SFF FC/iSCSI Dual Controller Unit (Simplified Chinese documentation)	4617A1C^
Lenovo ThinkSystem DS4200 SFF FC/iSCSI Dual Controller Unit (Japanese documentation)	4617A1J**
Lenovo ThinkSystem DS6200 SFF FC/iSCSI Dual Controller Unit (US English documentation)	4619A11*

Description	Part number
Lenovo ThinkSystem DS6200 SFF FC/iSCSI Dual Controller Unit (Simplified Chinese documentation)	4619A1C^
Lenovo Storage S Series (iSCSI connectivity)	
Lenovo Storage S2200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64114B1
Lenovo Storage S2200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64114B2
Lenovo Storage S2200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64114B3
Lenovo Storage S2200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64114B4
Lenovo Storage S3200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B1
Lenovo Storage S3200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B2
Lenovo Storage S3200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B3
Lenovo Storage S3200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B4
Lenovo Storage V Series (iSCSI connectivity)	
Lenovo Storage V3700 V2 LFF Control Enclosure	6535C1D
Lenovo Storage V3700 V2 LFF Control Enclosure (TopSeller)	6535EC1
Lenovo Storage V3700 V2 SFF Control Enclosure	6535C2D
Lenovo Storage V3700 V2 SFF Control Enclosure (TopSeller)	6535EC2
Lenovo Storage V3700 V2 XP LFF Control Enclosure	6535C3D
Lenovo Storage V3700 V2 XP LFF Control Enclosure (TopSeller)	6535EC3
Lenovo Storage V3700 V2 XP SFF Control Enclosure	6535C4D
Lenovo Storage V3700 V2 XP SFF Control Enclosure (TopSeller)	6535EC4
Lenovo Storage V5030 LFF Control Enclosure 3Yr S&S	6536C12
Lenovo Storage V5030 LFF Control Enclosure 5Yr S&S	6536C32
Lenovo Storage V5030 SFF Control Enclosure 3Yr S&S	6536C22
Lenovo Storage V5030 SFF Control Enclosure 5Yr S&S	6536C42
Lenovo Storage V5030F SFF Control Enclosure 3Yr S&S	6536B1F
Lenovo Storage V5030F SFF Control Enclosure 5Yr S&S	6536B2F
IBM Storwize for Lenovo (iSCSI connectivity)	
IBM Storwize V3500 3.5-inch Dual Control Storage Controller Unit	6096CU2^
IBM Storwize V3500 2.5-inch Dual Control Storage Controller Unit	6096CU3^
IBM Storwize V3700 3.5-inch Storage Controller Unit	6099L2C
IBM Storwize V3700 2.5-inch Storage Controller Unit	6099S2C
IBM Storwize V7000 SFF Control Enclosure, 3YR SWMA	6195C32†
IBM Storwize V7000 SFF Control Enclosure, 3YR SWMA, LA	6195C3L‡
IBM Storwize V7000 SFF Control Enclosure, 5YR SWMA	6195C52†
IBM Storwize V7000 SFF Control Enclosure, 5YR SWMA, LA	6195C5L‡
Lenovo Storage DX8200 Series (NAS or iSCSI connectivity)	
Lenovo Storage DX8200D Storage Virtualization Entry, 4TB, 3yr SW S&S	5135A2x#
Lenovo Storage DX8200D Storage Virtualization Entry, 4TB, 4yr SW S&S	5135J2x#
Lenovo Storage DX8200D Storage Virtualization Entry, 4TB, 5yr SW S&S	51351Vx#
Lenovo Storage DX8200D Storage Virtualization Mid, 16TB, 3yr SW S&S	5135B2x#
Lenovo Storage DX8200D Storage Virtualization Mid, 16TB, 4yr SW S&S	5135L2x#
Lenovo Storage DX8200D Storage Virtualization Mid, 16TB, 5yr SW S&S	51352Vx#

Description	Part number
Lenovo Storage DX8200D Storage Virtualization High, 64TB, 3yr SW S&S	5135C3x#
Lenovo Storage DX8200D Storage Virtualization High, 64TB, 4yr SW S&S	5135M3x#
Lenovo Storage DX8200D Storage Virtualization High, 64TB, 5yr SW S&S	51353Wx#
Lenovo Storage DX8200D ServerSAN Entry, 8TB, 3yr SW S&S	5135D2x#
Lenovo Storage DX8200D ServerSAN Entry, 8TB, 4yr SW S&S	5135N2x#
Lenovo Storage DX8200D ServerSAN Entry, 8TB, 5yr SW S&S	51354Vx#
Lenovo Storage DX8200D ServerSAN Mid, 16TB, 3yr SW S&S	5135F2x#
Lenovo Storage DX8200D ServerSAN Mid, 16TB, 4yr SW S&S	5135P2x#
Lenovo Storage DX8200D ServerSAN Mid, 16TB, 5yr SW S&S	51355Vx#
Lenovo Storage DX8200D ServerSAN High, 32TB, 3yr SW S&S	5135G3x#
Lenovo Storage DX8200D ServerSAN High, 32TB, 4yr SW S&S	5135Q3x#
Lenovo Storage DX8200D ServerSAN High, 32TB, 5yr SW S&S	51356Wx#
Lenovo Storage DX8200N with 1x N2226 HBA (Requires a supported external drive enclosure)	5128A1x#
Lenovo Storage DX8200N with 2x N2226 HBAs (Requires a supported external drive enclosure)	5128A2x#
Lenovo Storage DX8200 Series (S3 cloud storage)	
Lenovo Storage DX8200C 56TB (14x 4TB HDDs) with Cloudian HyperStore - 3yr HW/SW S&S	5120C1x#
Lenovo Storage DX8200C 84TB (14x 6TB HDDs) with Cloudian HyperStore - 3yr HW/SW S&S	5120C3x#
Lenovo Storage DX8200C 112TB (14x 8TB HDDs) with Cloudian HyperStore - 3yr HW/SW S&S	5120C2x#
Lenovo Storage DX8200C 140TB (14x 10TB HDDs) with Cloudian HyperStore - 3yr HW/SW S&S	5120C4x#

* Available worldwide (except China and Japan).
^ Available only in China.
** Available only in Japan.
† Available worldwide except Latin America.
‡ Available only in Latin America.
# x represents a geo-specific letter (for example: U = North America, G = EMEA). Ask a Lenovo representative for specifics.

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

- Lenovo DS Series, S Series, and V Series storage:
  http://lenovopress.com/storage/san/lenovo?rt=product-guide
- IBM Storwize for Lenovo storage:
  http://lenovopress.com/storage/san/ibm?rt=product-guide
- Lenovo NAS storage:
  http://lenovopress.com/storage/nas?rt=product-guide
- Lenovo Cloud storage:
  http://lenovopress.com/storage/cloud?rt=product-guide

Ethernet LAN switches

The following table lists the Ethernet LAN switches that are offered by Lenovo that can be used in ThinkServer TS460 solutions.

Table 24. Ethernet LAN switches

Description	Part number
1 Gb Ethernet switches	
Juniper EX2300-C PoE Switch	7165H1X
Juniper EX2300-24p PoE Switch	7165H2X
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX
Lenovo RackSwitch G7052 (Rear to Front)	7159CAX
Lenovo RackSwitch G8052 (Rear to Front)	7159G52
10 Gb Ethernet switches	
Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)	7159A1X
Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)	7159B1X
Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)	7159C1X
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6
Lenovo RackSwitch G8264 (Rear to Front)	7159G64
Lenovo RackSwitch G8264CS (Rear to Front)	7159DRX
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6
25 Gb Ethernet switches	
Lenovo ThinkSystem NE2572 RackSwitch (Rear to Front)	7159E1X
40 Gb Ethernet switches	
Lenovo RackSwitch G8332 (Rear to Front)	7159BRX
100 Gb Ethernet switches	
Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front)	7159D1X

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

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used in ThinkServer TS460 solutions.

Table 25. Rack cabinets

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

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

KVM switches and consoles

The following table lists the KVM switches and consoles that are offered by Lenovo that can be used in ThinkServer TS460 solutions.

Table 26. KVM switch and console options

Description	Part number
Consoles	
1U 18.5" Standard Console (without keyboard)	17238BX
Console keyboards	
Lenovo UltraNav Keyboard USB - US Eng	00MW310
Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2	46W6713
Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2	46W6714
Keyboard w/ Int. Pointing Device USB - Chinese/US 467 RoHS v2	46W6715
Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2	46W6716
Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2	46W6717
Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2	46W6718
Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2	46W6719
Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2	46W6720
Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2	46W6721
Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2	46W6722
Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2	46W6723
Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2	46W6724
Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2	46W6725

Description	Part number
Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2	46W6726
Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2	46W6727
Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2	46W6728
Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2	46W6729
Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2	46W6730
Keyboard w/ Int. Pointing Device USB - Portugese 163 RoHS v2	46W6731
Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2	46W6732
Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2	46W6733
Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2	46W6734
Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2	46W6735
Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2	46W6736
Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2	46W6737
Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2	46W6738
Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2	46W6739
Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2	46W6740
Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2	46W6741
Console switches	
Global 4x2x32 Console Manager (GCM32)	1754D2X
Global 2x2x16 Console Manager (GCM16)	1754D1X
Local 2x16 Console Manager (LCM16)	1754A2X
Local 1x8 Console Manager (LCM8)	1754A1X
Console cables	
Single Cable USB Conversion Option (UCO)	43V6147
USB Conversion Option (4 Pack UCO)	39M2895
Virtual Media Conversion Option Gen2 (VCO2)	46M5383
Serial Conversion Option (SCO)	46M5382

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

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used in ThinkServer TS460 solutions.

Table 27. Uninterruptible power supply units

Description	Part number
Tower UPS units	
T1kVA Tower UPS (100-125VAC)	55951AX
T1kVA Tower UPS (200-240VAC)	55951KX
T1.5kVA Tower UPS (100-125VAC)	55952AX
T1.5kVA Tower UPS (200-240VAC)	55952KX
Rack or Tower UPS units	
RT1.5kVA 2U Rack or Tower UPS (100-125VAC)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)	55949PX

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

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used in ThinkServer TS460 solutions.

Table 28. Power distribution units

Description	Part number
0U Basic PDUs	
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord	00YJ778
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779
Switched and Monitored PDUs	
0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord	00YJ781
0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord	00YJ780
0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782
0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord	00YJ783
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)	46M4002
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003
1U 12 C13 Switched and Monitored DPI PDU (without line cord)	46M4004
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
Ultra Density Enterprise C19/C13 PDU Module (without line cord)	71762NX
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
DPI C13 Enterprise PDU+ (without line cord)	39M2816
DPI Single Phase C13 Enterprise PDU (without line cord)	39Y8941
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
DPI Single Phase C19 Enterprise PDU (without line cord)	39Y8948
DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord	39Y8923
Front-end PDUs (3x IEC 320 C19 outlets)	
DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord	39Y8938
DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord	39Y8939
DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8934
DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8940
DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8935
Universal PDUs (7x IEC 320 C13 outlets)	
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443
NEMA PDUs (6x NEMA 5-15R outlets)	
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905
Line cords for PDUs that ship without a line cord	
DPI 30a Line Cord (NEMA L6-30P)	40K9614
DPI 32a Line Cord (IEC 309 P+N+G)	40K9612

Description	Part number
DPI 32a Line Cord (IEC 309 3P+N+G)	40K9611
DPI 60a Cord (IEC 309 2P+G)	40K9615
DPI 63a Cord (IEC 309 P+N+G)	40K9613
DPI Australian/NZ 3112 Line Cord (32A)	40K9617
DPI Korean 8305 Line Cord (30A)	40K9618

For more information, see the list of Product Guides in the Power Distribution Units category: http://lenovopress.com/servers/options/pdu

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Related publications and links

For more information, see these resources:

- ThinkServer TS460 product page
  https://www3.lenovo.com/us/en/data-center/servers/towers/ThinkServer-TS460/p/77LS7TS460M
- ThinkServer TS460 PSREF page
  http://psref.lenovo.com/Product/ThinkServer_TS460
- ThinkServer TS460 documentation
  http://datacentersupport.lenovo.com/us/en/products/servers/thinkserver/thinkserver-ts460/documentation
- Lenovo Support for ThinkServer TS460
  http://datacentersupport.lenovo.com/us/en/products/servers/thinkserver/thinkserver-ts460
- Lenovo Quick Pick for ThinkServer TS460
  http://www.lenovoquickpick.com/usa/system/thinkserver/ts-series/ts460
- ThinkServer Power Planner
  http://support.lenovo.com/us/en/downloads/ds101155

Related product families

Product families related to this document are the following:

- 1-Socket Tower Servers

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