# Lenovo ThinkSystem ST250 Server (E-2100)
## Product Guide

The Lenovo ThinkSystem ST250 is a mainstream 1-socket tower server that also be rack mounted as a rack server. It is ideal for small-to-medium businesses, remote offices, branch offices, banking and public sector. The server supports one Intel Xeon E-2100 Series processor (formerly codenamed "Coffee Lake") and up to 128GB of 2666 MHz TruDDR4 ECC memory.

Figure 1 shows the Lenovo ThinkSystem ST250.




Figure 1. Lenovo ThinkSystem ST250

## Did you know?

The ThinkSystem ST250 is an enterprise-grade server with enterprise-level management features and support for hot-swap power supplies and drives. It offers full support of Lenovo XClarity Administrator for comprehensive systems management and includes the next generation UEFI-based Lenovo XClarity Provisioning Manager for system setup and diagnosis, and the Lenovo XClarity Controller management processor for ongoing systems management and alerting. These tools make the ST250 easy to deploy, integrate, service, and manage.

## Key features

The ThinkSystem ST250 is a office-friendly tower server that has been optimized to provide enterprise-class features to small businesses, retail, educational institutions and branch offices.

**Scalability and performance**

The ST250 offers the following features to boost performance, improve scalability, and reduce costs:

- The Intel Xeon E-2100 Series processors improves productivity by offering affordable single-socket system performance with 6-core processors with up to 3.8 GHz core speeds.
- 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 2666 MHz DDR4 ECC or non-ECC UDIMMs provide speed and capacity of up to 128GB.
- 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 E-2100 Series processors. Such integration reduces I/O latency and increases overall system performance.
- 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 storage configurations support either 2.5-inch or 3.5-inch hot-swap drive bays or a combination of the two (hybrid configuration). Drive bays support SAS and SATA HDDs and SSDs.
    - Up to 16x 2.5-inch hot-swap drive bays
    - Up to 8x 3.5-inch hot-swap drive bays
    - Up to 4x 3.5-inch + 8x 2.5-inch drive bays
    - Up to 8x 3.5-inch simple-swap drive bays
- The use of solid-state drives (SSDs) instead of, or along with, traditional hard disk 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.
- New high-speed RAID controllers from Broadcom provide 12 Gb SAS connectivity to the drive backplanes. A variety of RAID adapters are available, with cache up to 4 GB and support for 20 drives on a single controller.
- Offers two 5.25-inch media bays with support for optical drives or backup drives.
- Supports a single M.2 drive as an additional storage/boot device.
- The server has two integrated Gigabit Ethernet ports.
- The server offers PCI Express 3.0 I/O expansion capabilities that improve the theoretical maximum bandwidth by almost 100% (8 GT/ps per link using 128b/130b encoding) compared to the previous generation of PCI Express 2.0 (5 GT/s per link using 8b/10b encoding).
- The server offers up to four PCIe 3.0 I/O expansion slots
- Support for a NVIDIA graphics processing unit (GPU) to enhanced graphics.

**Availability and serviceability**

The ST250 provides the following features to simplify serviceability and increase system uptime:

- The ST250 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.
- The server offers hot-swap (HS) SSDs and HDDs, and supports RAID redundancy for data protection and greater system uptime.
- Much like hot-swap drives, simple-swap drives are mounted on an easy-to-remove tray and work with the same RAID options. Simple-swap require a system power-down before adding or replacing, however simple-swap drives are less expensive than hot-swap drives.
- The server supports hot-swap power supplies; with two installed, they form a redundant pair to provide availability for business-critical applications.
- 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.
- The built-in XClarity Controller continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures to minimize downtime.
- Allows preventive actions in advance of possible failure, thereby increasing server uptime and application availability with Proactive Platform Alerts (including PFA and SMART alerts) for memory, internal storage (SAS/SATA HDDs and SSDs, NVMe SSDs, M.2 SSDs), RAID controllers, and server ambient and sub-component temperatures.
- Built-in diagnostics in UEFI, using Lenovo XClarity Provisioning Manager, speed up troubleshooting tasks to reduce service time.
- Lenovo XClarity Provisioning Manager supports diagnostics and can save service data to a USB key drive or remote CIFS share folder for troubleshooting and reduce service time.
- Support for the XClarity Administrator Mobile app running on a supported smartphone and connected to the server through the service-enabled USB port, enables additional local systems management functions.
- Auto restart in the event of a momentary loss of AC power (based on power policy setting in the XClarity Controller service processor)
- 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**

The following powerful systems management features simplify local and remote management of the ST250:

- The server includes an XClarity Controller (XCC) to monitor server availability. Optional upgrade to XCC Advanced to provide remote control (keyboard video mouse) functions. Optional upgrade to XCC Enterprise enables the additional support for the mounting of remote media files (ISO and IMG image files), boot capture, and power capping.
- Lenovo XClarity Administrator offers comprehensive hardware management tools that help to increase uptime, reduce costs and improve productivity through advanced server management capabilities.
- New UEFI-based Lenovo XClarity Provisioning Manager, accessible from F1 during boot, provides system inventory information, graphical UEFI Setup, platform update function, RAID Setup wizard, operating system installation function, and diagnostic functions.
- 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.
- Integrated Trusted Platform Module (TPM) 2.0 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- Intel Execute Disable Bit functionality can prevent certain classes of malicious buffer overflow attacks when

combined with a supported 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.
- Protects application code and data from disclosure or modification with Intel Software Guard Extensions (SGX), enabling high-assurance security use cases, such as blockchain, identity and records privacy, secure browsing, and digital rights management (DRM).
- Physical security measures to prevent unauthorized access: Loop for a padlock to prevent the side panel from being opened and a slot at the rear of the server for a Kensington Cable Lock. Optional additional physical security features are a lockable front security door and a chassis intrusion switch (included in some models).

**Energy efficiency**

The ST250 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to the green environment:

- Energy-efficient planar components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Platinum and Titanium certifications. Energy Star 2.1 certified.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed to reduce power draw.
- Low-voltage 1.2 V DDR4 memory DIMMs use up to 20% less energy compared to 1.35 V DDR3 DIMMs.
- SSDs use as much as 80% less power than traditional spinning 2.5-inch HDDs.
- The server uses hexagonal ventilation holes, which can be grouped more densely than round holes, providing more efficient airflow through the system.
- Optional Lenovo XClarity Energy Manager provides advanced data center power notification, analysis, and policy-based management to help achieve lower heat output and reduced cooling needs.

## Components and connectors

The following figure shows the front of the server.

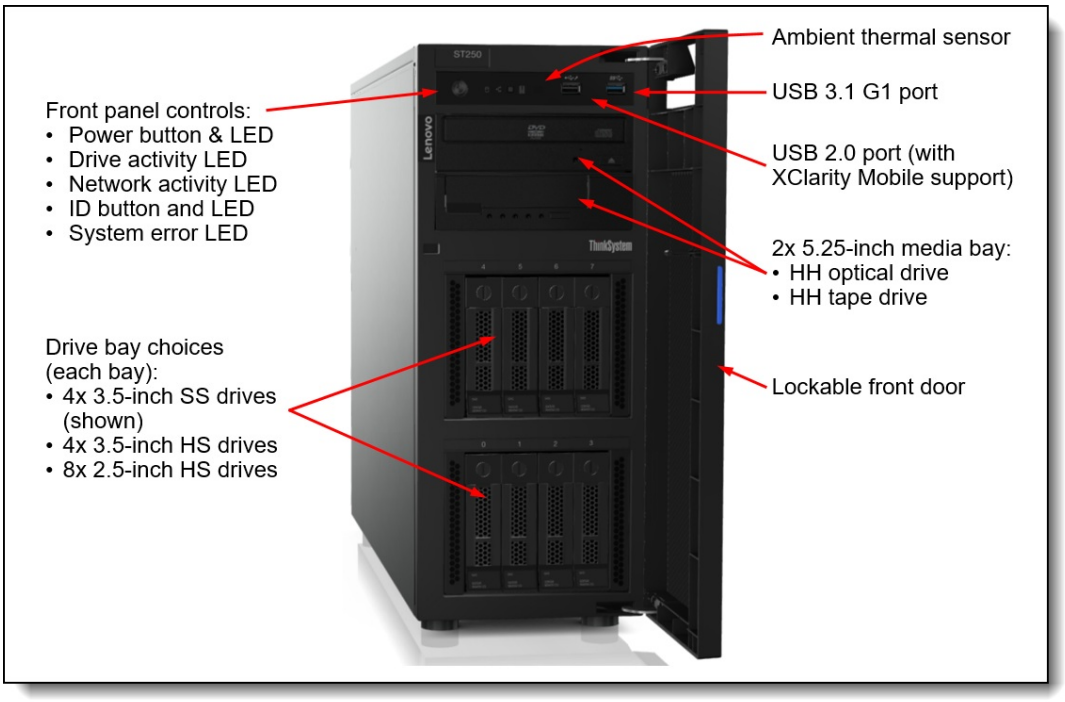



Figure 2. Front view of the ThinkSystem ST250 server

The following figure shows the rear of the server.

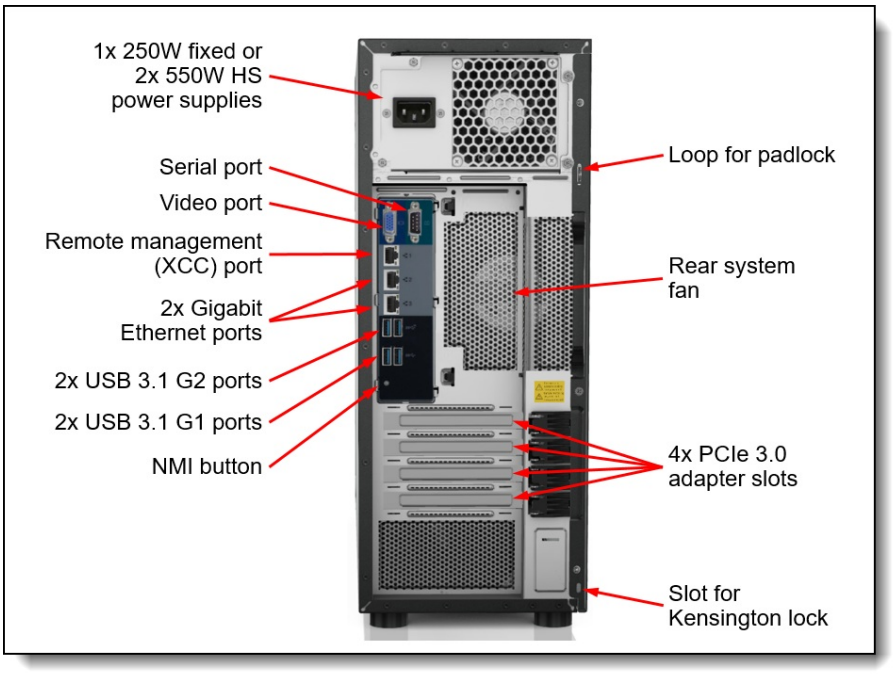



Figure 3. Rear view of the ThinkSystem ST250 server

The following figure shows the locations of key components inside the server.

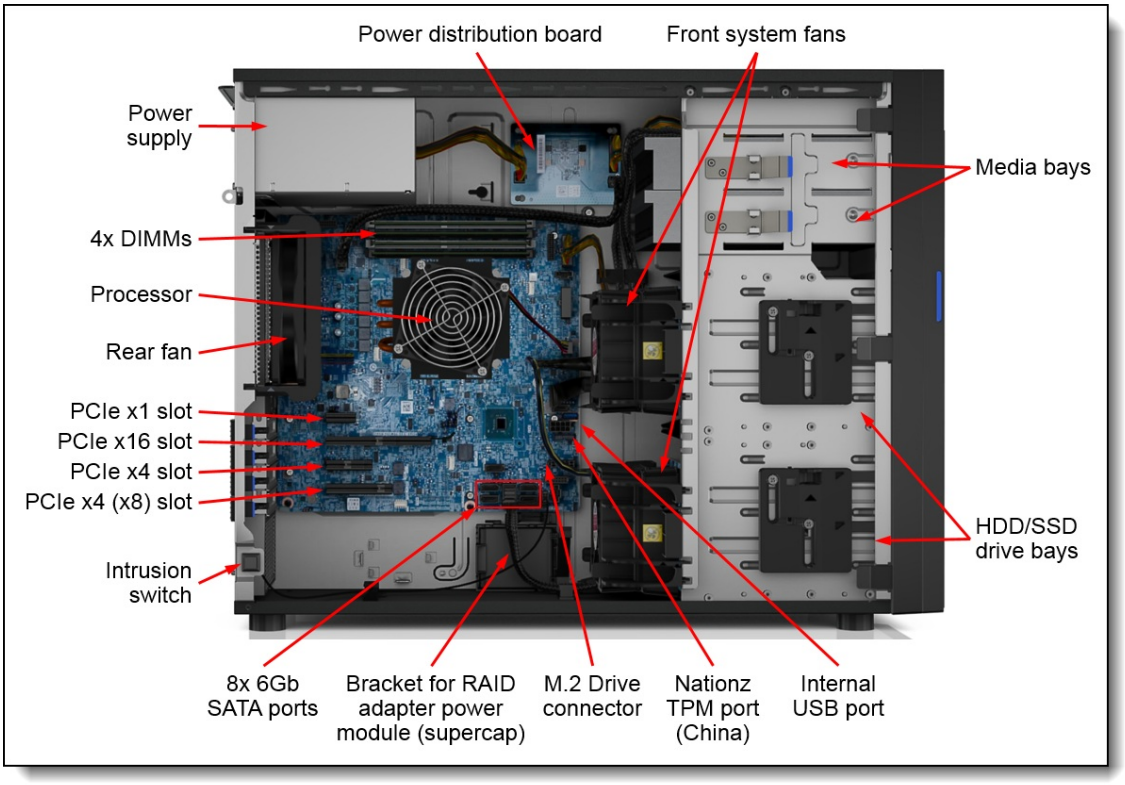



Figure 4. Internal view of the ThinkSystem ST250 server

## System architecture

The following figure shows the architectural block diagram of the ST250, showing the major components and their connections.

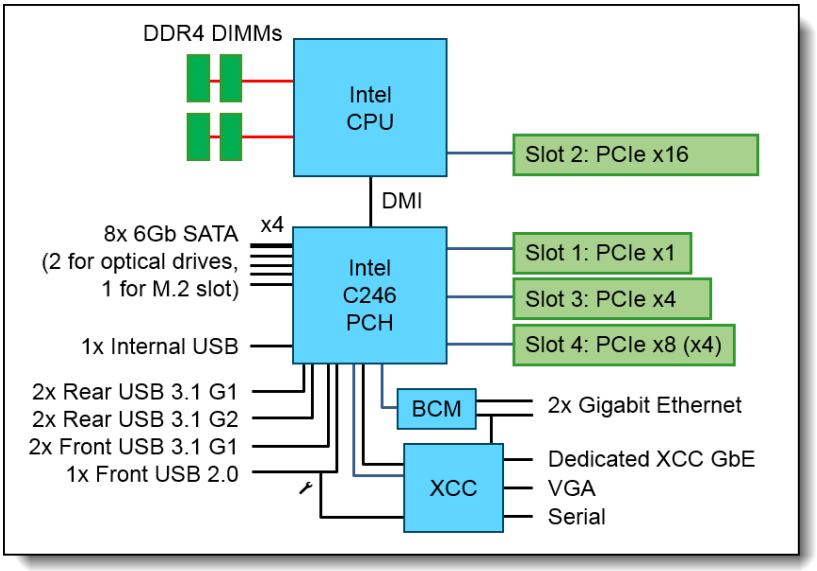



Figure 5. ST250 system architectural block diagram

A closer look at the SATA ports for use with SATA drives, optical drives and an M.2 drive, see the Internal storage section.

## Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

| Components | Specification |
|---|---|
| Machine type | 7Y46 - 1 year warranty<br>7Y45 - 3 year warranty |
| Form factor | Tower (can be installed in a rack with the available Rack Mount Kit) |
| Processor | One Intel processor (formerly codenamed "Coffee Lake"). Choose from:<br>• Intel Xeon E-2100 Series processor up to 3.8 GHz<br>• Intel Core i3-8100/8300 Series processor up to 4 GHz<br>• Intel Pentium G5400/G5500/G5600 Series processor up to 3.9 GHz |
| Chipset | Intel C246 chipset |
| Memory | Four DIMM sockets supporting Lenovo TruDDR4 DIMMs at 2666 MHz. Support ECC UDIMMs. |
| Memory maximum | Up to 128GB with 4x 32GB UDIMMs |
| Memory protection | Error-correcting code (ECC) |
| Disk drive bays | Available configurations:<br>• 8x or 16x 2.5-inch SAS/SATA hot-swap drive bays<br>• 4x or 8x 3.5-inch SAS/SATA hot-swap drive bays<br>• Both 4x 3.5-inch + 8x 2.5-inch SAS/SATA hot-swap drive bays<br>• 8x 3.5-inch simple-swap drive bays<br>In addition, the ST250 supports one M.2 Drive via an onboard connector. **Note**: If the onboard SATA controller is used to connect the drive bays, then only 6 drives can be installed if an M.2 drive is installed. |
| Maximum internal storage | • 61.44TB using 16x 3.84TB SAS/SATA SSDs<br>• 38.4TB using 16x 2.4TB 2.5-inch HDDs<br>• 144TB using 8x 18TB 3.5-inch HDDs<br>• 30.72TB using 8x 3.84TB 3.5-inch SAS/SATA SSDs<br>• Intermix of SAS and SATA is supported. |
| Storage controller | • Onboard 6 Gb SATA for simple-swap drive configurations, using embedded Intel RSTe software RAID, supporting RAID 0, 1, 10, 5, 50<br>• 12 Gb SAS/SATA RAID for hot-swap drive configurations:<br>  ◦ RAID 530i (cacheless) supports RAID 0, 1, 10, 5, 50<br>  ◦ RAID 730-8i with 1GB cache supports RAID 0, 1, 10, 5, 50<br>  ◦ RAID 930-8i with 2GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60<br>  ◦ RAID 930-16i and 24i with 4GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60<br>• 12 Gb SAS/SATA non-RAID: 430-8i and 430-16i HBAs |
| Optical drive bays | Two half-height 5.25-inch bays for optical or tape drives. Supports SATA DVD-ROM or DVD-RW (multiburner). **Note**: If the onboard SATA controller is used to connect the drive bays, then only 6 drives can be installed if an optical drive is installed. |
| Tape drive bays | Two half-height 5.25-inch bays for optical or tape drives. Support for one RDX drive or one LTO tape drive. |
| Network interfaces | Two integrated Gigabit Ethernet 1000BASE-T ports (RJ-45) based on Broadcom BCM5720 embedded controller, one can be shared with XCC for systems management. Third dedicated Gigabit Ethernet port for XCC systems management. |
| PCI Expansion slots | Four PCIe slots as follows:<br>• Slot 1: PCIe 3.0 x1 full-height, half-length<br>• Slot 2: PCIe 3.0 x16 full-height, half-length<br>• Slot 3: PCIe 3.0 x4 full-height, half-length<br>• Slot 4: PCIe 3.0 x4 full-height, half-length (x8 physical slot) |

| Components | Specification |
|---|---|
| Ports | • Front:<br>  ◦ One USB 3.1 G1 (5 Gb/s) port<br>  ◦ One USB 2.0 port (supports XClarity Mobile connectivity for local systems management)<br>• Rear:<br>  ◦ Two USB 3.1 G1 (5Gb/s) ports<br>  ◦ Two USB 3.1 G2 (10Gb/s) ports<br>  ◦ One VGA video<br>  ◦ One RJ-45 systems management<br>  ◦ Two RJ-45 GbE network ports<br>  ◦ One serial port<br>• Internal:<br>  ◦ One internal USB 3.0 port for RDX drive |
| Cooling | Supports ASHRAE A2 environments. Certain configurations support ASHRAE A3. Two or three fixed system fans depending on the drive bay configuration. Additional fans attached to the processor heat sink and in the power supplies. |
| Power supply | Two choices, model dependent:<br>• One fixed power supply, 250W. 80 PLUS Platinum certified.<br>• Two redundant hot-swap power supplies, each 550W. For China customers, the 550W power supplies support 240V DC input. 80 PLUS Platinum certified. Energy Star 2.1 compliant. |
| Hot-swap parts | Hard drives and 550W power supplies |
| Systems management | Operator panel with status LEDs. XClarity Controller embedded management, XClarity Administrator centralized infrastructure delivery, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. Optional XClarity Controller Advanced to enable remote control functions. |
| Security features | Power-on password, administrator's password, Trusted Platform Module, supporting TPM 1.2 or TPM 2.0. In China only, optional Nationz TPM 2.0 module. Optional chassis intrusion switch. Padlock loop and Kensington cable slot and optional lockable front door for physical security. |
| Video | G200 graphics with 16 MB memory, integrated into the XClarity Controller. For use with local Administrator functions (not designed for workstation use). Maximum resolution is 1920x1200 32bpp at 60Hz. |
| Operating systems supported | Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the Operating system support section for specifics. |
| Limited warranty | Three-year or one-year (model dependent) customer-replaceable unit and onsite limited warranty with 9x5 next business day (NBD). |
| Service and support | Optional service upgrades are available through Lenovo Services: 4-hour or 2-hour response time, 6-hour fix time, 1-year or 2-year warranty extension, software support for Lenovo hardware and some third-party applications. |
| Dimensions | Width: 176 mm (6.9 in.), height: 444 mm (17.5 in.), depth: 578 mm (22.8 in.). SeePhysical and electrical specifications for details. |
| Weight | Fully configured: 23.56 kg (51.94 lb) |

The ST250 server is shipped with the following items:

- Documentation flyer
- Power cords (model and region dependent)
- Mouse & keyboard (model dependent)

## Models

ThinkSystem ST250 models can be configured by using the Lenovo Data Center Solution Configurator (DCSC).

Configure-to-order (CTO) models are used to create models with factory-integrated server customizations. For CTO models, two base CTO models are available for the ST250 as listed in the following table, CTO1WW and CTOLWW:

- The CTO1WW base CTO model is for general business and is selectable by choosing **General Purpose** mode in DCSC.
- The CTOLWW base model is intended for High Performance Computing (HPC) and Artificial Intelligence (AI) configurations and solutions, including configurations for Lenovo Scalable Infrastructure (LeSI), and is enabled using either the **HPC & AI LeSI Solutions** mode or **HPC & AI ThinkSystem Hardware** mode in DCSC. CTOLWW configurations can also be built using System x and Cluster Solutions Configurator (x-config).

Preconfigured server models may also be available for the ST250, however these are region-specific; that is, each region may define their own server models, and not all server models are available in every region.

The following table lists the base CTO models of the ThinkSystem ST250 server.

Table 2. Base CTO models

| Description | Machine Type/Model General purpose | Machine Type/Model for HPC and AI |
|---|---|---|
| ThinkSystem ST250 - 3 year Warranty | 7Y45CTO1WW | 7Y45CTOLWW |
| ThinkSystem ST250 - 1 year Warranty | 7Y46CTO1WW | 7Y46CTOLWW |

The following tables list the available models, grouped by region.

- Models for Australia and New Zealand
- Models for South East Asian countries (ASEAN)
- Models for Hong Kong, Taiwan, Korea (HTK)
- Models for Japan

Refer to the Specifications section for information about standard features of the server.

## Models for Australia and New Zealand

Table 3. Models for Australia and New Zealand

| Model | Intel processor† | Memory | Drive Controller | Drive bays Drives | Optical | Power supply | Pwr cord | XCC | Sec. door | Intru sw. | Op Sys |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard models with a 3-year model (machine type 7Y45) | | | | | | | | | | | |
| 7Y45A01LAU | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | Onboard AHCI | 8x 2.5-in HS* / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01QAU | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | Onboard AHCI | 4x 3.5-in HS / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01RAU | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | Onboard AHCI | 4x 3.5-in HS / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01TAU | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | Onboard AHCI | 8x 2.5-in HS* / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01WAU | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | Onboard AHCI | 4x 3.5-in HS / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01NAU | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 16GB | Onboard AHCI | 8x 2.5-in HS* / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01PAU | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 16GB | Onboard AHCI | 4x 3.5-in HS / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01UAU | Xeon E-2176G 6+2C 80W 3.7GHz | 1x 16GB | Onboard AHCI | 8x 2.5-in HS* / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |
| 7Y45A01MAU | Xeon E-2186G 6+2C 95W 3.8GHz | 1x 16GB | Onboard AHCI | 8x 2.5-in HS* / Open bay | Open | 1x 550W HS / 2 | Yes | Ent | Option | Option | Not incl. |

† Processor detail: Model, compute core count + graphics core count, TDP, core frequency
* A maximum of 6 drives can be installed in configurations that have the onboard SATA controller and have an internal optical drive installed.
‡ Includes Windows Server 2019 to Windows Server 2016 Downgrade Kit

### Models for South East Asian countries (ASEAN)

Table 4. Models for South East Asian countries (ASEAN)

| Model | Intel processor† | Memory | Drive Controller | Drive bays Drives | Optical | Power supply | Pwr cord | XCC | Sec. door | Intru sw. | Op Sys |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TopSeller models with a 3-year model (machine type 7Y45) | | | | | | | | | | | |
| 7Y45A00SSG | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A014SG | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A018SG | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00YSG | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01CSG | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01HSG | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A015SG | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01FSG | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01JSG | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01ZSG | Xeon E-2134 4C 71W 3.5GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A020SG | Xeon E-2136 6C 80W 3.3GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00USG | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00ZSG | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A013SG | Xeon E-2146G 6+2C 80W 3.5GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01KSG | Xeon E-2146G 6+2C 80W 3.5GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00PSG | Xeon E-2174G 4+2C 71W 3.8GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A017SG | Xeon E-2174G 4+2C 71W 3.8GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |

† Processor detail: Model, compute core count + graphics core count, TDP, core frequency
* A maximum of 6 drives can be installed in configurations that have the onboard SATA controller and have an internal optical drive installed.
‡ Includes Windows Server 2019 to Windows Server 2016 Downgrade Kit

### Models for Hong Kong, Taiwan, Korea (HTK)

Table 7. Models for Hong Kong, Taiwan, Korea (HTK)

| Model | Intel processor† | Memory | Drive Controller | Drive bays Drives | Optical | Power supply | Pwr cord | XCC | Sec. door | Intru sw. | Op Sys |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TopSeller models with 3 year warranty (machine type 7Y45) | | | | | | | | | | | |
| 7Y45A00SCN | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A014CN | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A018CN | Xeon E-2104G 4+2C 65W 3.2GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00YCN | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01CCN | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01HCN | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A015CN | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01FCN | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01JCN | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01YCN | Xeon E-2134 4C 71W 3.5GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01XCN | Xeon E-2136 6C 80W 3.3GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00UCN | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00ZCN | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A013CN | Xeon E-2146G 6+2C 80W 3.5GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A01KCN | Xeon E-2146G 6+2C 80W 3.5GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A00PCN | Xeon E-2174G 4+2C 71W 3.8GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |
| 7Y45A017CN | Xeon E-2174G 4+2C 71W 3.8GHz | 1x 8GB | RAID 530-8i | 4x 3.5-in HS / Open bay | 1x DVD-RW | 1x 550W HS / 2 | No | Std | Option | Option | Not incl. |

† Processor detail: Model, compute core count + graphics core count, TDP, core frequency
* A maximum of 6 drives can be installed in configurations that have the onboard SATA controller and have an internal optical drive installed.
‡ Includes Windows Server 2019 to Windows Server 2016 Downgrade Kit

### Models for Japan

Included with all Japan models:

- ThinkSystem Optical Wheel Mouse - USB
- ThinkSystem Preferred Pro II USB Keyboard - Japanese

Table 8. Models for Japan

| Model | Intel processor† | Memory | Drive Controller | Drive bays Drives | Optical | Power supply | Pwr cord | XCC | Sec. door | Intru sw. | Op Sys |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard models with 1 year warranty (machine type 7Y46) | | | | | | | | | | | |
| 7Y46A02TJP | Xeon E-2124 4C 71W 3.3GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A030JP | Xeon E-2124 4C 71W 3.3GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A036JP | Xeon E-2124 4C 71W 3.3GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A037JP | Xeon E-2124 4C 71W 3.3GHz | 1x 16GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02DJP | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02LJP | Xeon E-2124G 4+2C 71W 3.4GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A026JP | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02GJP | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A03XJP | Xeon E-2126G 6+2C 80W 3.3GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A029JP | Xeon E-2134 4C 71W 3.5GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02EJP | Xeon E-2134 4C 71W 3.5GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A038JP | Xeon E-2134 4C 71W 3.5GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A039JP | Xeon E-2134 4C 71W 3.5GHz | 1x 16GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |

| Model | Intel processor† | Memory | Drive Controller | Drive bays Drives | Optical | Power supply | Pwr cord | XCC | Sec. door | Intru sw. | Op Sys |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7Y46A043JP | Xeon E-2134 4C 71W 3.5GHz | 1x 16GB | RAID 530-8i | 8x 2.5-in HS / 2x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A044JP | Xeon E-2134 4C 71W 3.5GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A02FJP | Xeon E-2136 6C 80W 3.3GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02JJP | Xeon E-2136 6C 80W 3.3GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A03YJP | Xeon E-2136 6C 80W 3.3GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A02PJP | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02QJP | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A03AJP | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 16GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A03BJP | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 8GB | RAID 530-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A03VJP | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A041JP | Xeon E-2144G 4+2C 71W 3.6GHz | 1x 16GB | RAID 530-8i | 8x 2.5-in HS / 2x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A02KJP | Xeon E-2146G 6+2C 80W 3.5GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02NJP | Xeon E-2146G 6+2C 80W 3.5GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A042JP | Xeon E-2146G 6+2C 80W 3.5GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A02MJP | Xeon E-2174G 4+2C 71W 3.8GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |

| Model | Intel processor† | Memory | Drive Controller | Drive bays Drives | Optical | Power supply | Pwr cord | XCC | Sec. door | Intru sw. | Op Sys |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7Y46A02WJP | Xeon E-2174G 4+2C 71W 3.8GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A040JP | Xeon E-2174G 4+2C 71W 3.8GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A02SJP | Xeon E-2176G 6+2C 80W 3.7GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A031JP | Xeon E-2176G 6+2C 80W 3.7GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A045JP | Xeon E-2176G 6+2C 80W 3.7GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A02UJP | Xeon E-2186G 6+2C 95W 3.8GHz | 1x 8GB | Onboard RSTe | 4x 3.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| 7Y46A02ZJP | Xeon E-2186G 6+2C 95W 3.8GHz | 1x 8GB | RAID 930-8i | 8x 2.5-in HS / Open bay | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Option | Option | Not incl. |
| TopSeller models with 1 year warranty (machine type 7Y46) | | | | | | | | | | | |
| 7Y46A03UJP | Xeon E-2124 4C 71W 3.3GHz | 1x 16GB | Onboard RSTe | 4x 3.5-in HS / 2x 1TB SATA HDD | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A03WJP | Xeon E-2124 4C 71W 3.3GHz | 1x 16GB | RAID 730-8i 2GB | 4x 3.5-in HS / 2x 1TB SATA HDD | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A03ZJP | Xeon E-2124 4C 71W 3.3GHz | 1x 16GB | RAID 730-8i 2GB | 8x 2.5-in HS / 3x 300GB 10K | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |
| 7Y46A046JP | Xeon E-2124 4C 71W 3.3GHz | 1x 16GB | RAID 530-8i | 4x 3.5-in HS / 2x 1TB SATA HDD | 1x DVD-ROM | 1x 550W HS / 2 | Yes | Adv | Yes | Option | WS19 Std Preload |

† Processor detail: Model, compute core count + graphics core count, TDP, core frequency
* A maximum of 6 drives can be installed in configurations that have the onboard SATA controller and have an internal optical drive installed.
‡ Includes Windows Server 2019 to Windows Server 2016 Downgrade Kit

## Processors

The ST250 supports one processor from the Intel product family formerly known by the codename "Coffee Lake". This includes processors from the Intel Xeon E, Core i3 and Pentium families.

**E-2200 processors**: The ST250 also supports Xeon E-2200 processors. For details, see https://lenovopress.com/lp1275.

The server supports the processors that are listed in the following table.

All supported processors have the following characteristics:

- 14 nm semiconductor process technology
- 8 GT/s DMI3 bus speed
- Two DDR4 memory channels
- 16 PCIe 3.0 I/O lanes

**Integrated graphics and management**: Xeon processors with a G suffix include integrated graphics, however, this functionality is not used in the ST250. Instead, graphics support is provided by XClarity Controller (XCC), or by an GPU add-in card. Similarly system management of the ST250 is handled by XCC and as a result, the AMT management processor is disabled.

Table 11. Processor selections

| Feature code | Intel processor | TDP | Cores / Threads | Base core speed | Cache | Memory bus speed | ECC | HT | Turbo Boost / Max speed | VT | Intel SGX* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B357 | Core i3-8100 | 65W | 4 / 4 | 3.6 GHz | 6 MB | 2400 MHz | Yes | No | No | Yes | No |
| B359 | Core i3-8100T | 35W | 4 / 4 | 3.1 GHz | 6 MB | 2400 MHz | Yes | No | No | Yes | No |
| B35C | Pentium G5400 | 58W | 2 / 4 | 3.7 GHz | 4 MB | 2400 MHz | Yes | Yes | No | Yes | No |
| B35G | Pentium G5400T | 35W | 2 / 4 | 3.1 GHz | 4 MB | 2400 MHz | Yes | Yes | No | Yes | No |
| B354 | Xeon E-2104G | 65W | 4 / 4 | 3.2 GHz | 8 MB | 2666 MHz | Yes | No | No | Yes | No |
| B353 | Xeon E-2124 | 71W | 4 / 4 | 3.3 GHz | 8 MB | 2666 MHz | Yes | No | Yes / 4.30 GHz | Yes | No |
| B352 | Xeon E-2124G | 71W | 4 / 4 | 3.4 GHz | 8 MB | 2666 MHz | Yes | No | Yes / 4.50 GHz | Yes | No |
| B351 | Xeon E-2126G | 80W | 6 / 6 | 3.3 GHz | 12 MB | 2666 MHz | Yes | No | Yes / 4.50 GHz | Yes | No |
| B350 | Xeon E-2134 | 71W | 4 / 8 | 3.5 GHz | 8 MB | 2666 MHz | Yes | Yes | Yes / 4.50 GHz | Yes | No |
| B34Z | Xeon E-2136 | 80W | 6 / 12 | 3.3 GHz | 12 MB | 2666 MHz | Yes | Yes | Yes / 4.50 GHz | Yes | No |
| B34Y | Xeon E-2144G | 71W | 4 / 8 | 3.6 GHz | 8 MB | 2666 MHz | Yes | Yes | Yes / 4.50 GHz | Yes | No |
| B34X | Xeon E-2146G | 80W | 6 / 12 | 3.5 GHz | 12 MB | 2666 MHz | Yes | Yes | Yes / 4.50 GHz | Yes | No |
| B34W | Xeon E-2174G | 71W | 4 / 8 | 3.8 GHz | 8 MB | 2666 MHz | Yes | Yes | Yes / 4.70 GHz | Yes | Yes |
| B34V | Xeon E-2176G | 80W | 6 / 12 | 3.7 GHz | 12 MB | 2666 MHz | Yes | Yes | Yes / 4.70 GHz | Yes | Yes |
| B34U | Xeon E-2186G | 95W | 6 / 12 | 3.8 GHz | 12 MB | 2666 MHz | Yes | Yes | Yes / 4.70 GHz | Yes | Yes |

* Intel SGX support requires UEFI V1.03 (ISE110C) or later.

## Memory options

The ST250 server supports Lenovo TruDDR4 memory. TruDDR4 memory uses the highest-quality components sourced from Tier 1 DRAM suppliers and only memory that meets strict requirements is selected. It is compatibility-tested and tuned to maximize performance and reliability.

TruDDR4 memory has a unique signature programmed into the DIMM, which enables ThinkSystem servers to verify whether the memory installed is qualified and supported. From a service and support standpoint, TruDDR4 memory automatically assumes the system's warranty, and service and support provided worldwide.

The ST250 supports up to 4 DIMMs. The processors have 2 memory channels and support 2 DIMMs per channel.

All DIMMs operate at a speed of 2666 MHz. However, if the processor selected has a lower memory bus speed (eg 2400 MHz - see the Processor table), then all DIMMs will operate at that lower speed.

The following table lists the memory options that are available for the ST250 server.

Table 12. Memory options

| Part number | Feature code | Description | Maximum supported |
|---|---|---|---|
| ECC UDIMMs | | | |
| 4ZC7A08696 | B35J | ThinkSystem 8GB TruDDR4 2666MHz (1Rx8, 1.2V) ECC UDIMM | 4 |
| 4ZC7A08699 | B35K | ThinkSystem 16GB TruDDR4 2666MHz (2Rx8, 1.2V) ECC UDIMM | 4 |
| 4ZC7A15142‡ | B96E | ThinkSystem 32GB TruDDR4 2666MHz (2Rx8, 1.2V) ECC UDIMM | 4 |

‡ Requires UEFI firmware upgrade, version 2.00 (ISE114H) or later.

The following rules and recommendations apply when selecting the memory configuration:

- The server only supports UDIMMs
- The use of the 32GB DIMM is only supported with Xeon processors. It is not supported with Core or Pentium processors.
- The use of the 32GB DIMM requires the server UEFI firmware be updated to Version 2.00 (ISE114H) or later.
- All DIMMs must be identical. Mixing DIMMs is not supported.
- For best performance when installing two DIMMs, install one in each memory channel

## Internal storage

The ST250 supports 2.5-inch hot-swap, 3.5-inch hot-swap, and 3.5-inch simple-swap drives in a variety of drive bay configurations.

In this section:


- Backplanes and drive bays
- Adapters and cabling
- Field upgrades
- M.2 drives
- SED encryption key management with ISKLM


### Drive bays and backplanes

The server supports up to 16 drive bays:

- Up to 16x 2.5-inch hot-swap drives
- Up to 8x 3.5-inch drives hot-swap drives
- Up to 8x 3.5-inch simple-swap drives
- A combination of 8x 2.5" hot-swap and 4x 3.5" hot-swap drives.

Hot-swap configurations SAS and SATA drives depending on the controller used (the onboard SATA controller supports SATA drives only). Simple-swap drive configurations support SATA drives only. NVMe PCIe drives are not supported with any configuration.

The different drive bay configurations supported are shown in the following figure. The server also supports one M.2 drive, installed in a slot on the system board as shown in the internal view of the server.

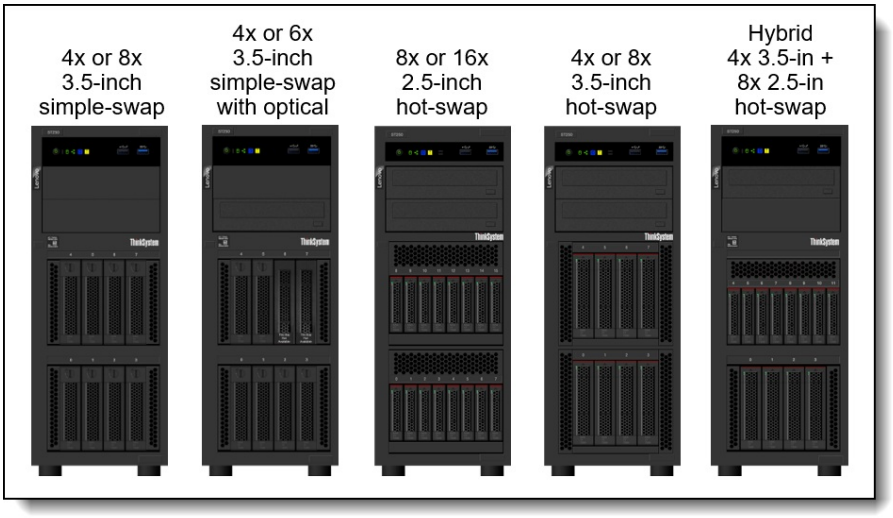



Figure 6. Internal drive bay configurations

The following table lists the available hot-swap backplanes and simple-swap backplates. The feature codes are used for configure-to-order and the option part numbers are for field installations & upgrades. See the Field upgrades section for details

Table 13. Backplanes

| Option part number | Feature code | Description |
|---|---|---|
| 4M17A12790 | B41E | ThinkSystem ST250 2.5" SATA/SAS 8-Bay Backplane Kit |
| 4M17A12788 | B41D | ThinkSystem ST250 3.5" SATA/SAS 4-Bay Backplane Kit |
| 4M17A12789 | B4LP | ThinkSystem ST250 3.5" SATA 4-Bay Simple Swap Bracket Plate Kit |

Configuration notes regarding drive bays with the use of the onboard SATA controller:

- If the onboard SATA controller is used, then up to 8 drives can be connected (hot-swap or simple-swap) provided no optical drive or M.2 drive is installed.
- If the onboard SATA controller is used and an optical drive or an M.2 drive is installed, then at most 6 drives can be installed. The last two drives (drive bays 6 and 7, where the first drive bay is bay 0) will not connected and should remain empty (and in the case of simple-swap drives, the SATA connections to the bays 6 & 7 should be disconnected)
- If the onboard SATA controller is used in RAID mode and an M.2 drive is installed, the M.2 cannot be used as a boot device to boot Windows.
- If the onboard SATA controller is used in RAID mode and eight drives are installed, the last two drives (drive bays 6 and 7, where the first drive bay is bay 0) cannot be used as a boot device to boot Windows.

### Adapters and cabling

This section describes the adapter and cabling requirements for each drive bay configuration.

The ST250 has an onboard SATA controller for drive, optical drive and M.2 connectivity. For the drives, connections are via 5 connectors on the system board: four single-lane SATA connectors and one mini-SAS HD connector with 4 lanes.

When using the onboard SATA controller, SATA ports 6 and 7 are shared between drive bays 6 & 7, the two optical drive bays, and the M.2 connector. The connections are as follows, shown in the figure below:

- SATA ports 0, 1, 2 and 3 are connected to the first 4 drive bays (bays 0-3). These are routed to a single mini-SAS HD connector on the system board.
- SATA ports 4 and 5 are connected to bays 4 and 5
- SATA port 6 is either connected to drive bay 6 or optical drive bay 0 (lower bay).
- SATA port 7 is either connected to drive bay 7 or optical drive bay 1 (upper bay) or to the onboard M.2 connector. When an M.2 drive is inserted into the M.2 connector, it automatically connects to the SATA port and any connected drives (drive bay 7 or ODD1) are automatically disconnected.

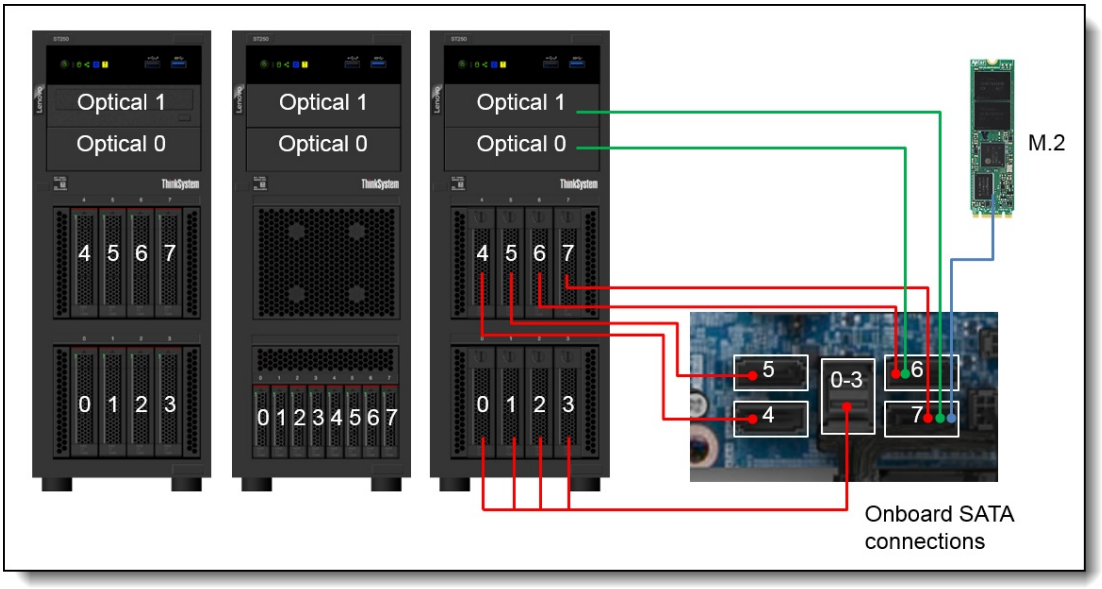



Figure 7. Onboard SATA connections

In summary, the following combinations are supported with the onboard SATA controller:

- 8x SATA drives
- 6x SATA drives + M.2
- 6x SATA drives + M.2 + 1x optical drive
- 6x SATA drives + 2x optical drives

The ST250 also supports the use of a RAID adapter or SAS host bus adapter to support the use of SAS drives plus offering higher performance features and RAID functionality.

Configurations guidance is as follows:

- For 8-bay configurations, use one of the supported 8-port RAID adapters or HBA
- For 12-bay or 16-bay configurations, use the RAID 930-16i adapter
- It is supported to add any one of the following combinations to a RAID adapter/HBA configuration:
  - 1x SATA optical drive
  - 1x SATA optical drive + M.2 drive
  - 2x SATA optical drive

  It is not supported to add 2x SATA optical drives + M.2 drive to a RAID adapter or HBA configuration.

### Field upgrades

The following table shows the upgrades you can perform to the ST250 after initial purchase to add additional drive bays or to change the controller.

If you are planning to do a field upgrade to add a RAID adapter or HBA for connectivity to the drives, you will need to order the RAID/HBA Cable & Flash Module Mechanical Kit, 4Z57A14087. This kit contains the cable which connects the adapter to the four SATA drives, replacing the existing four SATA cables. For the RAID 930-8i adapter, the kit also contains the bracket for the RAID adapter's flash power module. For CTO and preconfigured models in the configurator tool, the cable and flash power module bracket are automatically added if needed.

Table 14. Upgrading the internal drive bays in the field

| Starting configuration | Required configuration | Controller to add | Cable Kit | Backplane & Cage Kit |
|---|---|---|---|---|
| Upgrading Onboard SATA to RAID Adapter/HBA (1 Drive Cage) | | | | |
| 4x3.5" HS SW RAID | 4x3.5" HS HW RAID | Add 8-port RAID adapter/HBA | 4Z57A14087 | Not needed |
| 8x3.5" HS SW RAID | 8x3.5" HS HW RAID | Add 8-port RAID adapter/HBA | 4Z57A14087 | Not needed |
| 8x2.5" HS SW RAID | 8x2.5" HS HW RAID | Add 8-port RAID adapter/HBA | 4Z57A14087 | Not needed |
| Upgrading Onboard SATA to RAID Adapter/HBA + Adding Upper Drive Cage | | | | |
| 4x3.5" HS SW RAID | 8x3.5" HS HW RAID | Add 8-port RAID adapter/HBA | 4Z57A14087 | 4M17A12788 |
| 4x3.5" HS SW RAID | 4x3.5" HS + 8x2.5" HW RAID | Add 16-port RAID adapter or 2x 8-port RAID adapters/HBAs | 4Z57A14087 | 4M17A12790 |
| 8x2.5" HS SW RAID | 16x2.5" HS HW RAID | Add 16-port RAID adapter or 2x 8-port RAID adapters/HBAs | 4Z57A14087 | 4M17A12790 |
| Replacing a RAID adapter/HBA with a RAID 930i adapter (requiring a bracket for the flash power module) | | | | |
| Any HBA or RAID adapter without flash-backed cache | RAID with flash-backed cache | Replace existing adapter with RAID 930-8i or RAID 930-16i | 4Z57A14087 | Not needed |
| Adding Upper Drive Cage (No change to controller) | | | | |
| 4x3.5" SS SW RAID | 8x3.5" SS SW RAID* | No change (onboard SATA) | None | 4M17A12789 |
| 4x3.5" HS SW RAID | 8x3.5" HS SW RAID* | No change (onboard SATA) | None | 4M17A12788 |
| 4x3.5" HS HW RAID | 8x3.5" HS HW RAID | No change (RAID adapter) | None | 4M17A12788 |
| 4x3.5" HS HW RAID | 4x3.5" HS + 8x2.5" HW RAID | Add second 8-port RAID adapter/HBA or replace existing 8-port with 16-port RAID | None | 4M17A12790 |
| 8x 2.5" HS HW RAID | 16x 2.5" HS HW RAID | Add second 8-port RAID adapter/HBA or replace existing 8-port with 16-port RAID | None | 4M17A12790 |

* If you have an optical drive or M.2 drive installed, you are limited to 6 drives

The following table lists the contents of the cable and backplane kits needed for the upgrades.

Table 15. Cable and backplane kits

| Part number | Description and list of included components |
|---|---|
| 4Z57A14087 | ThinkSystem ST250 RAID/HBA Cable & Flash Mech Kit<br>• 2x ST250 RAID HS HDD Signal Cable<br>• 1x Bracket for flash power module (supercap) for RAID 930 adapter |
| 4M17A12790 | ThinkSystem ST250 2.5" SATA/SAS 8-Bay Backplane Kit<br>• 1x 8x2.5" SATA/SAS backplane<br>• 1x cage assembly<br>• 2x SAS cables<br>• 1x power cable<br>• 8x 2.5" drive bay fillers<br>• 1x front fan and cable |
| 4M17A12788 | ThinkSystem ST250 3.5" SATA/SAS 4-Bay Backplane Kit<br>• 1x 4x3.5" SATA/SAS backplane<br>• 1x cage assembly<br>• 1x MiniSAS HD cable with 4 connectors to system board<br>• 1x MiniSAS HD cable with 2 connectors to system board (use with optical drive)<br>• 1x power cable<br>• 4x 3.5" drive bay fillers<br>• 1x front fan and cable |
| 4M17A12789 | ThinkSystem ST250 3.5" SATA 4-Bay Simple Swap Bracket Plate Kit<br>• 1x 4x3.5" SATA backplate + cable with 4 SATA connections<br>• 1x 4x3.5" SATA backplate + cable with 2 SATA connections (use with optical drive)<br>• 1x cage assembly<br>• 4x 3.5" drive bay fillers<br>• 1x front fan and cable |

### M.2 drive

The ST250 server supports one M.2 form-factor SATA drive. The M.2 drive is installed in a slot directly on the system board as shown in the following figure.

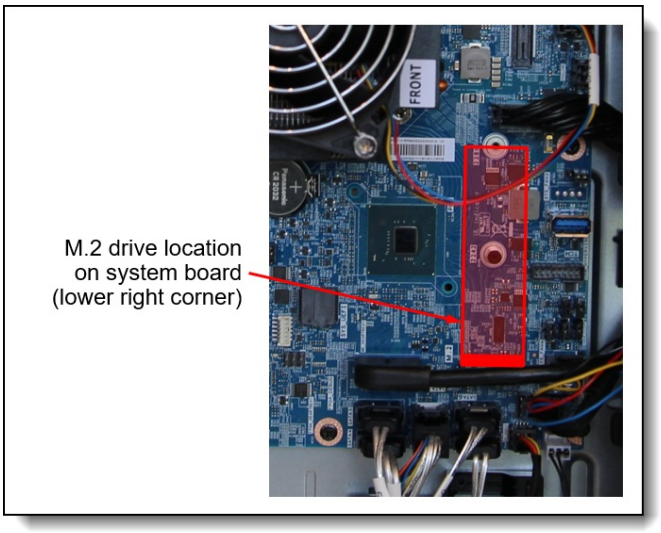



Figure 8. Location of the M.2 Drive on the ST250 system board

Supported drives are listed in the Internal drive options section.

Configuration notes:

- With an M.2 drive installed, if the onboard SATA controller is used to connect 2.5" or 3.5" drives, then only six drives can be installed. The other two drive bays must remain empty or disconnected.
- Only one optical drive can be installed if an M.2 drive is used. The use of two optical drives + M.2 is not supported.
- With an M.2 drive installed, if the onboard SATA controller is used to connect 2.5" or 3.5" drives and the controller is in RAID mode, then the M.2 cannot be used as a boot device to boot Windows.
- Configurations with an M.2 drive + optical drive + backup drive (either RDX or tape) is only supported as a field upgrade. Such configurations are not supported configure-to-order (CTO).

For details about M.2 components, see the *ThinkSystem M.2 Drives and M.2 Adapters* product guide: https://lenovopress.com/lp0769-thinksystem-m2-drives-adapters

**Tip**: The ThinkSystem M.2 Enablement Kit and ThinkSystem M.2 with Mirroring Enablement Kit that are supported in other ThinkSystem servers are not supported with the ST250.

## Controllers for internal storage

The ST250 uses two onboard 6Gb SATA ports to connect the four or eight drives. Hot-swap and simple-swap SATA drives are supported. These onboard SATA ports support RSTe mode for RAID functionality or AHCI mode for JBOD support.

**Virtualization support**: The onboard SATA ports can be used with virtualization hypervisors, including VMware ESXi, Linux KVM, Xen, and Microsoft Hyper-V, however support is limited to AHCI (non-RAID) mode. RSTe mode is not supported with virtualization hypervisors.

**Windows support**: Windows only supports a RSTe-based RAID array of no more than 6 drives.

In addition to the onboard SATA controller, the ST250 with hot-swap drives supports the use of an internal RAID adapter or HBA. The following table lists the supported adapters.

Table 16. Controllers for internal storage - hot-swap drive support

| Part number | Feature code | Description | Number of ports | Maximum supported | Slots supported |
|---|---|---|---|---|---|
| SAS/SATA HBA | | | | | |
| 7Y37A01088 | AUNL | ThinkSystem 430-8i SAS/SATA 12Gb HBA | 8 | 3 | 2,3,4 |
| 7Y37A01089 | AUNM | ThinkSystem 430-16i SAS/SATA 12Gb HBA | 16 | 1 | 2,3,4 |
| RAID adapters | | | | | |
| 7Y37A01082 | AUNG | ThinkSystem RAID 530-8i PCIe 12Gb Adapter | 8 | 2 | 2,3,4 |
| 7Y37A01083* | AUNH* | ThinkSystem RAID 730-8i 1GB Cache PCIe 12Gb Adapter | 8 | 2 | 2,3,4 |
| 4Y37A09722 | B4RQ | ThinkSystem RAID 730-8i 2GB Flash PCIe 12Gb Adapter | 8 | 1 | 2,3,4 |
| 7Y37A01084 | AUNJ | ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter | 8 | 1 | 2,3,4 |
| 7Y37A01085 | AUNK | ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter | 16 | 1 | 2,3,4 |

* The RAID 730-8i adapter is not available in USA and Canada

The following two tables compare the functions of the storage adapters and the onboard SATA.

Table 17. Comparison of internal storage controllers - RAID controllers

| Feature | RAID 530-8i | RAID 730-8i 1G* | RAID 730-8i 2G | RAID 930-8i | RAID 930-16i |
|---|---|---|---|---|---|
| Adapter type | RAID controller | RAID controller | RAID controller | RAID controller | RAID controller |
| Part number | 7Y37A01082 | 7Y37A01083 | 4Y37A09722 | 7Y37A01084 | 7Y37A01085 |
| Form factor | PCIe HHHL | PCIe low profile | PCIe low profile | PCIe HHHL | PCIe HHHL |
| Controller chip | LSI SAS3408 | LSI SAS3108 | LSI SAS3108 | LSI SAS3508 | LSI SAS3516 |
| Host interface | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 | PCIe 3.0 x8 |
| Port interface | 12 Gb SAS | 12 Gb SAS | 12 Gb SAS | 12 Gb SAS | 12 Gb SAS |
| Number of ports | 8 | 8 | 8 | 8 | 16 |
| Port connectors | 2x Mini-SAS HD x4 (SFF-8643) | 2x Mini-SAS HD x4 (SFF-8643) | 2x Mini-SAS HD x4 (SFF-8643) | 2x Mini-SAS HD x4 (SFF-8643) | 4x Mini-SAS HD x4 (SFF-8643) |
| Drive interface | SAS, SATA | SAS, SATA | SAS, SATA | SAS, SATA | SAS, SATA |
| Drive type | HDD, SED, SSD | HDD, SSD | HDD, SED, SSD | HDD, SED, SSD | HDD, SED, SSD |
| Hot-swap drives | Yes | Yes | Yes | Yes | Yes |
| Max devices | 8 | 8 | 8 | 8 | 16 |
| RAID levels | 0, 1, 10, 5, 50 | 0, 1, 10, 5, 50 | 0, 1, 10, 5, 50, 6, 60 | 0, 1, 10, 5, 50, 6, 60 | 0, 1, 10, 5, 50, 6, 60 |
| JBOD mode | Yes | Yes | Yes | Yes | Yes |
| Cache | None | 1GB (Standard) | 2GB (Standard) | 2GB (Standard) | 4GB or 8GB (Standard) |
| CacheVault cache protection | No | No | Yes (Flash) | Yes (Flash) | Yes (Flash) |
| Performance Accelerator (FastPath) | Yes | No | Yes | Yes | Yes |
| SSD Caching (CacheCade Pro 2.0) | No | No | No | No | No |
| SED support† | Yes | No | Yes | Yes | Yes |

* The RAID 730-8i adapter is not available in USA and Canada
† SED support by RAID controllers is provided using the built-in MegaRAID SafeStore functionality of the adapter.

Table 18. Comparison of internal storage controllers - HBAs and NVMe Switch Adapter

| Feature | Intel RSTe | 430-8i | 430-16i |
|---|---|---|---|
| Adapter type | Software RAID | HBA | HBA |
| Part number | None | 7Y37A01088 | 7Y37A01089 |
| Form factor | Onboard | PCIe low profile | PCIe low profile |
| Controller chip | Intel PCH (RSTe) | LSI SAS3408 | LSI SAS3416 |
| Broadcom equivalent | Not applicable | HBA 9400-8i | HBA 9400-16i |
| Host interface | Not applicable | PCIe 3.0 x8 | PCIe 3.0 x8 |
| Port interface | 6 Gb SATA | 12 Gb SAS | 12 Gb SAS |
| Number of ports | Varies | 8 | 16 |
| Port connectors | Onboard | 2x Mini-SAS HD x4 (SFF-8643) | 4x Mini-SAS HD x4 (SFF-8643) |
| Drive interface | SATA | SAS, SATA | SAS, SATA |
| Drive type | HDD, SSD | HDD, SSD, SED** | HDD, SSD, SED** |
| Hot-swap drives | Yes | Yes | Yes |
| Max devices | 8 | 8 | 16 |
| RAID levels | 0, 1, 10, 5 | No RAID | No RAID |
| JBOD mode | Yes | Yes | Yes |
| Cache | None | No | No |
| CacheVault cache protection | No | No | No |
| Performance Accelerator (FastPath) | No | No | No |
| SSD Caching (CacheCade Pro 2.0) | No | No | No |
| SED support | No | Yes** | Yes** |

** SED support of the SAS HBAs is by using software on the server (SED commands are passed through the HBA to the drives).

## Internal drive options

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

2.5-inch hot-swap drives:

- 2.5-inch hot-swap 12 Gb SAS HDDs
- 2.5-inch hot-swap 6 Gb SATA HDDs
- 2.5-inch hot-swap 6 Gb SATA SSDs

3.5-inch hot-swap drives:

- 3.5-inch hot-swap 12 Gb SAS HDDs
- 3.5-inch hot-swap 6 Gb SATA HDDs
- 3.5-inch hot-swap 6 Gb SATA SSDs

Simple-swap drives:

- 3.5-inch simple-swap 6 Gb SATA HDDs
- 3.5-inch simple-swap 6 Gb SATA SSDs

M.2 drives:

- M.2 SATA drives

**M.2 drive support**: The use of M.2 drives requires an additional adapter as described in the M.2 drives subsection.

Table 19. 2.5-inch hot-swap 12 Gb SAS HDDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 2.5-inch hot-swap HDDs - 12 Gb SAS 10K | | | |
| 7XB7A00024 | AULY | ThinkSystem 2.5" 300GB 10K SAS 12Gb Hot Swap 512n HDD | 16 |
| 7XB7A00025 | AULZ | ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD | 16 |
| 7XB7A00026 | AUM0 | ThinkSystem 2.5" 900GB 10K SAS 12Gb Hot Swap 512n HDD | 16 |
| 7XB7A00027 | AUM1 | ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD | 16 |
| 7XB7A00028 | AUM2 | ThinkSystem 2.5" 1.8TB 10K SAS 12Gb Hot Swap 512e HDD | 16 |
| 7XB7A00069 | B0YS | ThinkSystem 2.5" 2.4TB 10K SAS 12Gb Hot Swap 512e HDD | 16 |
| 2.5-inch hot-swap HDDs - 12 Gb SAS 15K | | | |
| 7XB7A00021 | AULV | ThinkSystem 2.5" 300GB 15K SAS 12Gb Hot Swap 512n HDD | 16 |
| 7XB7A00022 | AULW | ThinkSystem 2.5" 600GB 15K SAS 12Gb Hot Swap 512n HDD | 16 |
| 7XB7A00023 | AULX | ThinkSystem 2.5" 900GB 15K SAS 12Gb Hot Swap 512e HDD | 16 |
| 2.5-inch hot-swap HDDs - 12 Gb NL SAS | | | |
| 7XB7A00034 | AUM6 | ThinkSystem 2.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD | 16 |
| 7XB7A00035 | AUM7 | ThinkSystem 2.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD | 16 |
| 2.5-inch hot-swap SED HDDs - 12 Gb SAS 10K | | | |
| 7XB7A00030 | AUM4 | ThinkSystem 2.5" 300GB 10K SAS 12Gb Hot Swap 512n HDD SED | 16 |

Table 20. 2.5-inch hot-swap 6 Gb SATA HDDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 2.5-inch hot-swap HDDs - 6 Gb NL SATA | | | |
| 7XB7A00036 | AUUE | ThinkSystem 2.5" 1TB 7.2K SATA 6Gb Hot Swap 512n HDD | 16 |
| 7XB7A00037 | AUUJ | ThinkSystem 2.5" 2TB 7.2K SATA 6Gb Hot Swap 512e HDD | 16 |

Table 21. 2.5-inch hot-swap 6 Gb SATA SSDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 2.5-inch hot-swap SSDs - 6 Gb SATA - Mixed Use/Mainstream (3-5 DWPD) | | | |
| 4XB7A17125 | BA7Q | ThinkSystem 2.5" S4620 480GB Mixed Use SATA 6Gb HS SSD | 16 |
| 4XB7A17127 | BA4U | ThinkSystem 2.5" S4620 1.92TB Mixed Use SATA 6Gb HS SSD | 16 |
| 4XB7A17087 | B8J1 | ThinkSystem 2.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17088 | B8HY | ThinkSystem 2.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17089 | B8J6 | ThinkSystem 2.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17090 | B8JE | ThinkSystem 2.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A13633 | B49L | ThinkSystem 2.5" Intel S4610 240GB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A13634 | B49M | ThinkSystem 2.5" Intel S4610 480GB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A13635 | B49N | ThinkSystem 2.5" Intel S4610 960GB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A10237 | B488 | ThinkSystem 2.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD | 16 |
| 2.5-inch hot-swap SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD) | | | |
| 4XB7A17072 | B99D | ThinkSystem 2.5" S4520 240GB Read Intensive SATA 6Gb HS SSD | 16 |
| 4XB7A17101 | BA7G | ThinkSystem 2.5" S4520 480GB Read Intensive SATA 6Gb HS SSD | 16 |
| 4XB7A17102 | BA7H | ThinkSystem 2.5" S4520 960GB Read Intensive SATA 6Gb HS SSD | 16 |
| 4XB7A17104 | BK77 | ThinkSystem 2.5" S4520 3.84TB Read Intensive SATA 6Gb HS SSD | 16 |
| 4XB7A17105 | BK78 | ThinkSystem 2.5" S4520 7.68TB Read Intensive SATA 6Gb HS SSD | 16 |
| 4XB7A38271 | BCTC | ThinkSystem 2.5" Multi Vendor 240GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A38272 | BCTD | ThinkSystem 2.5" Multi Vendor 480GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A38273 | BCTE | ThinkSystem 2.5" Multi Vendor 960GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A38274 | BCTF | ThinkSystem 2.5" Multi Vendor 1.92TB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A38275 | BCTG | ThinkSystem 2.5" Multi Vendor 3.84TB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17075 | B8HV | ThinkSystem 2.5" 5300 240GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17076 | B8JM | ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17077 | B8HP | ThinkSystem 2.5" 5300 960GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17078 | B8J5 | ThinkSystem 2.5" 5300 1.92TB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A17079 | B8JP | ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A38185 | B9AC | ThinkSystem 2.5" 5210 960GB Entry SATA 6Gb Hot Swap QLC SSD | 16 |
| 4XB7A10247 | B498 | ThinkSystem 2.5" Intel S4510 240GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A10248 | B499 | ThinkSystem 2.5" Intel S4510 480GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A10249 | B49A | ThinkSystem 2.5" Intel S4510 960GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A10195 | B34H | ThinkSystem 2.5" PM883 240GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A10196 | B34J | ThinkSystem 2.5" PM883 480GB Entry SATA 6Gb Hot Swap SSD | 16 |
| 4XB7A10197 | B34K | ThinkSystem 2.5" PM883 960GB Entry SATA 6Gb Hot Swap SSD | 16 |

Table 22. 3.5-inch hot-swap 12 Gb SAS HDDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 3.5-inch hot-swap HDDs - 12 Gb SAS 15K | | | |
| 7XB7A00038 | AUU2 | ThinkSystem 3.5" 300GB 15K SAS 12Gb Hot Swap 512n HDD | 8 |
| 7XB7A00039 | AUU3 | ThinkSystem 3.5" 600GB 15K SAS 12Gb Hot Swap 512n HDD | 8 |
| 7XB7A00040 | AUUC | ThinkSystem 3.5" 900GB 15K SAS 12Gb Hot Swap 512e HDD | 8 |
| 3.5-inch hot-swap HDDs - 12 Gb NL SAS | | | |
| 7XB7A00041 | AUU4 | ThinkSystem 3.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD | 8 |
| 7XB7A00042 | AUU5 | ThinkSystem 3.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD | 8 |
| 7XB7A00043 | AUU6 | ThinkSystem 3.5" 4TB 7.2K SAS 12Gb Hot Swap 512n HDD | 8 |
| 7XB7A00044 | AUU7 | ThinkSystem 3.5" 6TB 7.2K SAS 12Gb Hot Swap 512e HDD | 8 |
| 7XB7A00045 | B0YR | ThinkSystem 3.5" 8TB 7.2K SAS 12Gb Hot Swap 512e HDD | 8 |
| 7XB7A00067 | B117 | ThinkSystem 3.5" 12TB 7.2K SAS 12Gb Hot Swap 512e HDD | 8 |
| 4XB7A13911 | B7EZ | ThinkSystem 3.5" 16TB 7.2K SAS 12Gb Hot Swap 512e HDD | 8 |
| 4XB7A38266 | BCFP | ThinkSystem 3.5" 18TB 7.2K SAS 12Gb Hot Swap 512e HDD | 8 |

Table 23. 3.5-inch hot-swap 6 Gb SATA HDDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 3.5-inch hot-swap HDDs - 6 Gb NL SATA | | | |
| 7XB7A00049 | AUUF | ThinkSystem 3.5" 1TB 7.2K SATA 6Gb Hot Swap 512n HDD | 8 |
| 7XB7A00050 | AUUD | ThinkSystem 3.5" 2TB 7.2K SATA 6Gb Hot Swap 512n HDD | 8 |
| 7XB7A00051 | AUU8 | ThinkSystem 3.5" 4TB 7.2K SATA 6Gb Hot Swap 512n HDD | 8 |
| 7XB7A00052 | AUUA | ThinkSystem 3.5" 6TB 7.2K SATA 6Gb Hot Swap 512e HDD | 8 |
| 7XB7A00053 | AUU9 | ThinkSystem 3.5" 8TB 7.2K SATA 6Gb Hot Swap 512e HDD | 8 |
| 7XB7A00068 | B118 | ThinkSystem 3.5" 12TB 7.2K SATA 6Gb Hot Swap 512e HDD | 8 |
| 4XB7A13914 | B7F0 | ThinkSystem 3.5" 16TB 7.2K SATA 6Gb Hot Swap 512e HDD | 8 |
| 4XB7A38130 | BCFH | ThinkSystem 3.5" 18TB 7.2K SATA 6Gb Hot Swap 512e HDD | 8 |

Table 24. 3.5-inch hot-swap 6 Gb SATA SSDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 3.5-inch hot-swap SSDs - 6 Gb SATA - Mixed Use/Mainstream (3-5 DWPD) | | | |
| 4XB7A17137 | BA4W | ThinkSystem 3.5" S4620 480GB Mixed Use SATA 6Gb HS SSD | 8 |
| 4XB7A17138 | BA4X | ThinkSystem 3.5" S4620 960GB Mixed Use SATA 6Gb HS SSD | 8 |
| 4XB7A17096 | B8JL | ThinkSystem 3.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17097 | B8JF | ThinkSystem 3.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17098 | B8J0 | ThinkSystem 3.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17099 | B8HR | ThinkSystem 3.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A13639 | B49R | ThinkSystem 3.5" Intel S4610 240GB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A13640 | B49S | ThinkSystem 3.5" Intel S4610 480GB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A13641 | B49T | ThinkSystem 3.5" Intel S4610 960GB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A10242 | B48D | ThinkSystem 3.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD | 8 |
| 3.5-inch hot-swap SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD) | | | |
| 4XB7A17118 | BA7K | ThinkSystem 3.5" S4520 240GB Read Intensive SATA 6Gb HS SSD | 8 |
| 4XB7A17119 | BA7L | ThinkSystem 3.5" S4520 480GB Read Intensive SATA 6Gb HS SSD | 8 |
| 4XB7A17120 | BA7M | ThinkSystem 3.5" S4520 960GB Read Intensive SATA 6Gb HS SSD | 8 |
| 4XB7A38276 | BCTH | ThinkSystem 3.5" Multi Vendor 240GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A38277 | BCTJ | ThinkSystem 3.5" Multi Vendor 480GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A38278 | BCTK | ThinkSystem 3.5" Multi Vendor 960GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A38279 | BCTL | ThinkSystem 3.5" Multi Vendor 1.92TB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A38281 | BCTM | ThinkSystem 3.5" Multi Vendor 3.84TB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17081 | B8JB | ThinkSystem 3.5" 5300 240GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17082 | B8J9 | ThinkSystem 3.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17083 | B8JC | ThinkSystem 3.5" 5300 960GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17084 | B8HZ | ThinkSystem 3.5" 5300 1.92TB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17085 | B8HQ | ThinkSystem 3.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A13625 | B49D | ThinkSystem 3.5" Intel S4510 240GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A13626 | B49E | ThinkSystem 3.5" Intel S4510 480GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A13627 | B49F | ThinkSystem 3.5" Intel S4510 960GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17176 | B6TM | ThinkSystem 3.5" PM883 240GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17177 | B6TN | ThinkSystem 3.5" PM883 480GB Entry SATA 6Gb Hot Swap SSD | 8 |
| 4XB7A17179 | B6JY | ThinkSystem 3.5" PM883 1.92TB Entry SATA 6Gb Hot Swap SSD | 8 |

Table 25. 3.5-inch simple-swap 6 Gb SATA HDDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 3.5-inch simple-swap HDDs - 6 Gb NL SATA | | | |
| 7XB7A00055 | AUZS | ThinkSystem 1TB 7.2K 6Gbps SATA 3.5" Simple Swap 512n HDD | 8 |
| 7XB7A00056 | AUZT | ThinkSystem 2TB 7.2K 6Gbps SATA 3.5" Simple Swap 512n HDD | 8 |
| 7XB7A00057 | AUZU | ThinkSystem 4TB 7.2K 6Gbps SATA 3.5" Simple Swap 512n HDD | 8 |
| 7XB7A00058 | AXC7 | ThinkSystem 6TB 7.2K 6Gbps SATA 3.5" Simple Swap 512e HDD | 8 |
| 7XB7A00059 | AXC6 | ThinkSystem 8TB 7.2K 6Gbps SATA 3.5" Simple Swap 512e HDD | 8 |

Table 26. 3.5-inch simple-swap 6 Gb SATA SSDs

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| 3.5-inch simple-swap SSDs - 6 Gb SATA - Mixed Use/Mainstream (3-5 DWPD) | | | |
| 4XB7A17134 | BK7M | ThinkSystem 3.5" S4620 480GB Mixed Use SATA 6Gb SS SSD | 8 |
| 4XB7A17135 | BK7N | ThinkSystem 3.5" S4620 960GB Mixed Use SATA 6Gb SS SSD | 8 |
| 3.5-inch simple-swap SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD) | | | |
| 4XB7A17109 | BK7C | ThinkSystem 3.5" S4520 240GB Read Intensive SATA 6Gb SS SSD | 8 |
| 4XB7A17110 | BK7D | ThinkSystem 3.5" S4520 480GB Read Intensive SATA 6Gb SS SSD | 8 |
| 4XB7A17111 | BK7E | ThinkSystem 3.5" S4520 960GB Read Intensive SATA 6Gb SS SSD | 8 |
| 4XB7A13951 | B4KE | ThinkSystem 3.5" Intel S4510 240GB Entry SATA 6Gb Simple Swap SSD | 8 |
| 4XB7A13952 | B4KC | ThinkSystem 3.5" Intel S4510 480GB Entry SATA 6Gb Simple Swap SSD | 8 |
| 4XB7A13953 | B4KD | ThinkSystem 3.5" Intel S4510 960GB Entry SATA 6Gb Simple Swap SSD | 8 |

Table 27. M.2 SATA drives

| Part number | Feature | Description | Maximum supported |
|---|---|---|---|
| M.2 SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD) | | | |
| 7N47A00129 | AUUL | ThinkSystem M.2 32GB SATA 6Gbps Non-Hot Swap SSD | 1 |
| 7N47A00130 | AUUV | ThinkSystem M.2 128GB SATA 6Gbps Non-Hot Swap SSD | 1 |
| 4XB7A17071 | B8HS | ThinkSystem M.2 5300 240GB SATA 6Gbps Non-Hot Swap SSD | 1 |
| 4XB7A17073 | B919 | ThinkSystem M.2 5300 480GB SATA 6Gbps Non-Hot Swap SSD | 1 |

### USB memory key

For general portable storage needs, the server also supports the USB memory key option that is listed in the following table.

Table 28. USB memory key

| Part number | Feature | Description |
|---|---|---|
| 00ML200 | None* | 32GB Enterprise Value USB Memory Key |

* Field upgrade only.

## Internal backup units

The ST250 supports the internal backup unit options that are listed in the following table.

Table 29. Internal backup units

| Part number | Feature code | Description | Maximum supported |
|---|---|---|---|
| Drives | | | |
| 7T27A01503 | AVF5 | ThinkSystem Internal Half High LTO Gen7 SAS Tape Drive | 1 |
| 4T27A10727 | B4BM | ThinkSystem Internal Half High LTO Gen8 SAS Tape Drive | 1 |
| 7T27A01501 | AVF6 | ThinkSystem Internal RDX USB 3.0 Dock | 1 |
| LTO Media | | | |
| 7TP7A01606 | AVF7 | ThinkSystem LTO Gen7 6TB Tape | Not applicable |
| 4TP7A09619 | B4BN | ThinkSystem LTO Gen8 12TB Tape | Not applicable |
| RDX Media | | | |
| 7TP7A01601 | AVF8 | ThinkSystem RDX 500GB Cartridge | Not applicable |
| 7TP7A01602 | AVF1 | ThinkSystem RDX 1TB Cartridge | Not applicable |
| 7TP7A01603 | AVF0 | ThinkSystem RDX 2TB Cartridge | Not applicable |
| 7TP7A04318 | AXD1 | ThinkSystem RDX 4TB Cartridge | Not applicable |

Configuration notes:

- The RDX drive is attached via the internal USB 3.0 port on the system board. The USB cable ships with the drive.
- The use of an LTO tape drive requires a SAS HBA, either the 430-8i or 430-16i SAS/SATA 12Gb HBA. Details about the adapters in the SAS adapters for external storage section. The SAS cable ships with the tape drive.
- Configurations with an M.2 drive + optical drive + backup drive (either RDX or tape) is only supported as a field upgrade. Such configurations are not supported configure-to-order (CTO). For field upgrades, the drives are installed as follows:
  - Optical drive goes in Bay 1 (upper bay) connected to SATA port 6
  - Tape/RDX drive goes in Bay 0 (lower bay) connected to a SAS HBA or internal USB port

For field upgrades to add an internal tape drive, you will need to also order the cable kit listed in the following table. This kit is not needed for factory (CTO) orders.

Table 30. Tape drive cable kit

| Part number | Feature code | Description |
|---|---|---|
| 4Z57A14085 | B47M | ThinkSystem ST250 ODD/Tape Cable Kit<br>• 1x ODD data cable<br>• 1x ODD/tape power cable |

For more information about RDX drive and LTO tape drives, see the Backup Units page on the Lenovo Press site: https://lenovopress.com/servers/options/backup

## Optical drives

The ST250 supports the internal optical drive options listed in the following table. The internal optical are installed in the 5.25-inch media drive bays.

Table 31. Optical drives

| Part number | Feature code | Description | Maximum supported |
|---|---|---|---|
| Internal optical drives | | | |
| 7XA7A01204* | AVEZ | ThinkSystem Half High SATA DVD-ROM Optical Disk Drive | 2 |
| 7XA7A01202 | AVEY | ThinkSystem Half High SATA DVD-RW Optical Disk Drive | 2 |

* Lenovo offers two different versions of the DVD-ROM drive, however the differences are only cosmetic. The functions and performance are identical.

Configuration rules:

- Only one optical drive can be installed if an M.2 drive is used. The use of two optical drives + M.2 is not supported.
- For configurations using the onboard SATA controller, if 1 or 2 optical drives are installed, only 6 HDDs or SSDs can be installed.
- Configurations with an M.2 drive + optical drive + backup drive (either RDX or tape) is only supported as a field upgrade. Such configurations are not supported configure-to-order (CTO). For field upgrades, the drives are installed as follows:
  - Optical drive goes in Bay 1 (upper bay) connected to SATA port 6
  - Tape/RDX drive goes in Bay 0 (lower bay) connected to a SAS HBA or internal USB port

For field upgrades to add one of the internal optical drives, you will need to also order the cable kit listed in the following table. For two internal optical drives, order two cable kits. This kit is not needed for factory (CTO) orders.

Table 32. Optical drive cable kit

| Part number | Feature code | Description |
|---|---|---|
| 4Z57A14085 | B47M | ThinkSystem ST250 ODD/Tape Cable Kit<br>• 1x ODD data cable<br>• 1x ODD/tape power cable |

The Half High SATA DVD-ROM drive supports the following media and speeds for reading:

- CD-ROM 48X
- CD-DA (DAE) 48X
- CD-R 48X
- CD-RW 40X
- DVD-ROM (single layer) 16X
- DVD-ROM (dual layer) 12X
- DVD-R (4.7 GB) 16X
- DVD-R DL 8X
- DVD+R 16X
- DVD+R DL 8X
- DVD-RW (4.7 GB) 8X
- DVD+RW 8X

The Half High SATA DVD-RW drive supports the same media and speeds for reading as HH DVD-ROM. In addition, this drive supports the following media and speeds for writing:

- CD-R 24X
- CD-RW 4X
- High Speed CD-RW 10X
- Ultra Speed CD-RW 16X
- DVD-R 8X
- DVD-R DL 8X
- DVD+R 8X
- DVD+R DL 8X
- DVD-RW 6X

- DVD+RW 8X

The server supports the external USB optical drive listed in the following table.

Table 33. External optical drive

| Part number | Feature code | Description |
|---|---|---|
| 7XA7A05926 | AVV8 | ThinkSystem External USB DVD RW Optical Disk Drive |

The drive is based on the Lenovo Slim DVD Burner DB65 drive and supports the following formats: DVD-RAM, DVD-RW, DVD+RW, DVD+R, DVD-R, DVD-ROM, DVD-R DL, CD-RW, CD-R, CD-ROM.

## I/O expansion options

The ST250 server has four PCIe 3.0 slots, as follows:

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

The following figure shows the locations of the PCIe slots.

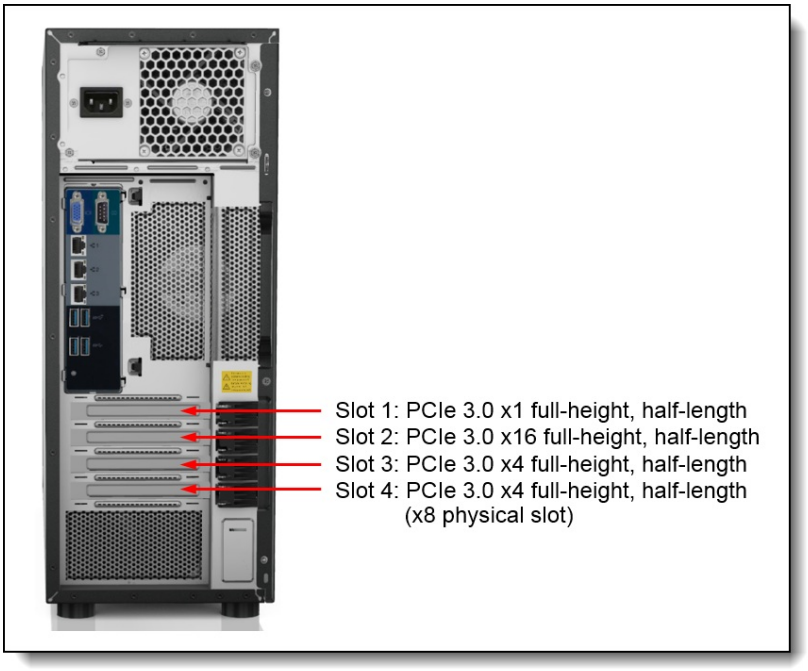



Figure 9. ThinkSystem ST250 PCIe slots

## Network adapters

The ST250 has two onboard Gigabit Ethernet ports, connected to a Broadcom BCM5720 embedded controller.

The following table lists other supported network adapters. The maximum supported column indicates which slots each adapter is supported in. For slot locations see the I/O expansion options section.

Table 34. Network adapters

| Part number | Feature code | Description | Slots supported | Maximum supported |
|---|---|---|---|---|
| Gigabit Ethernet | | | | |
| 7ZT7A00484 | AUZV | ThinkSystem Broadcom 5719 1GbE RJ45 4-Port PCIe Ethernet Adapter | 2,3,4 | 2 |
| 7ZT7A00482 | AUZX | ThinkSystem Broadcom 5720 1GbE RJ45 2-Port PCIe Ethernet Adapter | 1,2,3,4 | 2 |
| 7ZT7A00533 | AUZZ | ThinkSystem I350-F1 PCIe 1Gb 1-Port SFP Ethernet Adapter | 2,3,4 | 2 |
| 7ZT7A00534 | AUZY | ThinkSystem I350-T2 PCIe 1Gb 2-Port RJ45 Ethernet Adapter | 2,3,4 | 2 |
| 7ZT7A00535 | AUZW | ThinkSystem I350-T4 PCIe 1Gb 4-Port RJ45 Ethernet Adapter | 2,3,4 | 2 |
| 10 Gb Ethernet SFP+ | | | | |
| 00AG580 | AT7T | Emulex VFA5.2 2x10 GbE SFP+ Adapter and FCoE/iSCSI SW | 2,3,4 | 2* |
| 00AG570 | AT7S | Emulex VFA5.2 2x10 GbE SFP+ PCIe Adapter | 2,3,4 | 2* |
| 7XC7A05525 | B0YL | Intel X710-DA4 4x10Gb SFP+ Adapter | 2,3,4 | 2* |
| 7ZT7A00537 | AUKX | ThinkSystem Intel X710-DA2 PCIe 10Gb 2-Port SFP+ Ethernet Adapter | 2,3,4 | 2* |
| 10 Gb Ethernet 10GBASE-T | | | | |
| 00MM850 | ATRY | Intel X550-T1 Single Port 10GBase-T Adapter | 2,3,4 | 2 |
| 00MM860 | ATPX | Intel X550-T2 Dual Port 10GBase-T Adapter | 2,3,4 | 2 |
| 7XC7A05927 | B0X1 | Intel X710-T4 4x10Gb Base-T Adapter | 2,3,4 | 2 |
| 25 Gb Ethernet | | | | |
| 7ZT7A00505 | AUKS | ThinkSystem Broadcom 57412 25GbE SFP28 1-Port PCIe Ethernet Adapter | 2,3,4 | 2* |
| 7XC7A05523 | B0WY | ThinkSystem Intel XXV710-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter | 2,3,4 | 2* |

* Requires transceivers or DAC cables that must be ordered separately.

For more information, including the transceivers and cables that each adapter supports, see the list of Lenovo Press Product Guides in the Ethernet adapters category:
https://lenovopress.com/servers/options/ethernet

## SAS adapters for external storage

The following table lists the SAS HBAs and RAID adapters suitable for connectivity to external storage.

Table 35. Supported SAS HBAs and RAID adapters

| Part number | Feature code | Description | Slots supported | Maximum supported |
|---|---|---|---|---|
| 12 Gb SAS HBA | | | | |
| 7Y37A01090 | AUNR | ThinkSystem 430-8e SAS/SATA 12Gb HBA | 2,3,4 | 2 |
| 12 Gb RAID Adapter | | | | |
| 7Y37A01087 | AUNQ | ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter | 2,3,4 | 1* |

* Limited by the number of supercap mounts in the server

The following table summarizes the features of supported adapters.

Table 36. Comparison of features

| Feature | 430-8e | RAID 930-8e |
|---|---|---|
| Adapter type | HBA | External RAID |
| Part number | 7Y37A01090 | 7Y37A01087 |
| Controller chip | LSI SAS3408 | LSI SAS3516 |
| Broadcom equivalent | HBA 9400-8e | MegaRAID 9480-8e |
| Host interface | PCIe 3.0x8 | PCIe 3.0x8 |
| Port interface | 12 Gb SAS | 12 Gb SAS |
| Number of ports | 8 | 8 |
| Port connectors | 2x Mini-SAS HD SFF8644 | 2x Mini-SAS HD SFF8644 |
| Drive interface | SAS/SATA | SAS,SATA |
| Drive type | HDD/SSD/SED* | HDD,SED,SSD |
| Hot-swap drives | Yes | Yes |
| Maximum devices | 512 (planned: 1024) | 64 (planned: 216) |
| RAID levels | None | 0/1/10/5/50/6/60 |
| JBOD mode | Yes | Yes |
| Cache | None | 4GB (Standard) |
| CacheVault cache protection | None | Yes (Flash) |
| Performance Accelerator (FastPath) | No | Yes |
| SSD Caching (CacheCade Pro 2.0) | No | No |
| SED support* | Yes* | Yes |

* SED (self-encrypting drive) support of the SAS HBA is by using software on the server (SED commands are passed through the HBA to the drives).

## Fibre Channel host bus adapters

The following table lists the Fibre Channel HBAs supported by the server.

Table 37. Fibre Channel adapters

| Part number | Feature code | Description | Slots supported | Maximum supported |
|---|---|---|---|---|
| 16 Gb Fibre Channel | | | | |
| 01CV840 | ATZV | Emulex 16Gb Gen6 FC Dual-port HBA | 2,3,4 | 2 |
| 01CV830 | ATZU | Emulex 16Gb Gen6 FC Single-port HBA | 2,3,4 | 2 |

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

## Flash Storage adapters

The server currently does not support Flash Storage adapters.

## GPU adapters

The ST250 server supports the graphics processing units (GPUs) listed in the following table.

Table 38. GPU adapters

| Part number | Feature code | Description | Slots supported | Maximum supported |
|---|---|---|---|---|
| 4X67A14935 | B7JW | ThinkSystem NVIDIA Quadro P2200 5GB PCIe Active GPU | 2 | 1 |
| 4X67A11584 | B31D | ThinkSystem NVIDIA Quadro P620 2GB PCIe Active GPU | 2 | 1 |

The following rule applies:

- The use of a GPU requires 550W hot-swap power supplies

For information about GPUs, see the ThinkSystem GPU Summary:
https://lenovopress.com/lp0768-thinksystem-gpu-summary

## Fans and cooling

The ST250 has the following fans. All fans are fixed (non-hot-swap).

- One or two system fans at the front of the server, mounted on the drive cages. If the server has one drive cage, only one front fan is included
- One system fan at the rear of the server
- Fan mounted on the heatsink of the processor
- One fan in each power supply

See the Inside view in the Components and connectors section for locations.

## Power supplies

The server supports either a single fixed power supply or one or two hot-swap power supplies. When two hot-swap power supplies are installed, they form a redundant pair. The following table lists the supported power supplies.

Table 39. Power supply options

| Part number | Feature code | Description | Maximum supported | 110V AC | 220V AC | 240V DC China only |
|---|---|---|---|---|---|---|
| None* | B41Q | ThinkSystem ST250 250W Fixed PSU | 1 | Yes | Yes | No |
| 7N67A00882 | B41P | 550W (230V/115V) Platinum Hot-Swap Power Supply | 2 | Yes | Yes | Yes |

* Configure-to-order only

The power supplies are auto-sensing and support both 110V AC (100-127V 50/60 Hz) and 220V AC (200-240V 50/60 Hz) power. In China only, the 550W power supply also support 240V DC. Both 250W and 550W power supplies are 80 PLUS Platinum certified. The 550W hot-swap power supply is Energy Star 2.1 compliant.

Power supply options do not include a line cord.

For server configurations, the inclusion of a power supply is model dependent. Configure-to-order models can be configured without a power cord if desired.

The following table lists the maximum configuration for the 250W power supply.

Table 40. Maximum configuration for the 250W power supply

| Subsystem | 250W fixed power supply |
|---|---|
| Processor | Up to 80W TDP |
| Memory | No restriction |
| Drives | Up to 4x 3.5-inch drives or 8x 2.5-inch drives (HDD or SSD) |
| Media bays | 1x optical drive or 1x LTO tape drive or 1x RDX drive |
| M.2 | No restriction |
| Adapters (except GPU) | 1 or 2 adapters up to PCIe x8 |
| GPU | Not supported |

For further power configuration of the server, use the Lenovo Capacity Planner, available at:
https://datacentersupport.lenovo.com/us/en/products/solutions-and-software/software/lenovo-capacity-planner/solutions/ht504651

### Power cords

Line cords can be ordered as listed in the following table.

Table 41. Power cords

| Region | Part number | Feature | Description |
|---|---|---|---|
| Argentina | 39Y7930 | 6222 | 2.8m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord |
| Argentina | 81Y2384 | 6492 | 4.3m, 10A/220V, C13 to IRAM 2073 (Argentina) Line Cord |
| Australia/NZ | 39Y7924 | 6211 | 2.8m, 10A/250V, C13 to AS/NZ 3112 (Australia/NZ) Line Cord |
| Australia/NZ | 81Y2383 | 6574 | 4.3m, 10A/230V, C13 to AS/NZS 3112 (Aus/NZ) Line Cord |
| Brazil | 69Y1988 | 6532 | 2.8m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord |
| Brazil | 81Y2387 | 6404 | 4.3m, 10A/250V, C13 - 2P+Gnd (Brazil) Line Cord |
| China | 39Y7928 | 6210 | 2.8m, 220-240V, C13 to GB 2099.1 (China) Line Cord |
| China | 81Y2378 | 6580 | 4.3m, 10A/220V, C13 to GB 2099.1 (China) Line Cord |
| Denmark | 39Y7918 | 6213 | 2.8m, 10A/250V, C13 to DK2-5a (Denmark) Line Cord |
| Denmark | 81Y2382 | 6575 | 4.3m, 10A/230V, C13 to DK2-5a (Denmark) Line Cord |
| Europe | 39Y7917 | 6212 | 2.8m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord |
| Europe | 81Y2376 | 6572 | 4.3m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord |
| India | 39Y7927 | 6269 | 2.8m, 10A/250V, C13(2P+Gnd) (India) Line Cord |
| India | 81Y2386 | 6567 | 4.3m, 10A/240V, C13 to IS 6538 (India) Line Cord |
| Israel | 39Y7920 | 6218 | 2.8m, 10A/250V, C13 to SI 32 (Israel) Line Cord |
| Israel | 81Y2381 | 6579 | 4.3m, 10A/230V, C13 to SI 32 (Israel) Line Cord |
| Italy/Chile | 39Y7921 | 6217 | 2.8m, 220-240V, C13 to CEI 23-16 (Italy/Chile) Line Cord |
| Italy/Chile | 81Y2380 | 6493 | 4.3m, 10A/230V, C13 to CEI 23-16 (Italy/Chile) Line Cord |
| Japan | 46M2593 | A1RE | 2.8m, 12A/125V, C13 to JIS C-8303 (Japan) Line Cord |
| Japan | 4L67A08357 | 6533 | 2.8m, 200V, C13 to JIS C-8303 (Japan) Line Cord |
| Japan | 39Y7926 | 6335 | 4.3m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord |
| Japan | 4L67A08362 | 6495 | 4.3m, 12A/200V, C13 to JIS C-8303 (Japan) Line Cord |
| South Africa | 39Y7922 | 6214 | 2.8m, 10A/250V, C13 to SABS 164 (S Africa) Line Cord |
| South Africa | 81Y2379 | 6576 | 4.3m, 10A/230V, C13 to SABS 164 (South Africa) Line Cord |
| South Korea | 39Y7925 | 6219 | 2.8m, 220-240V, C13 to KETI (S Korea) Line Cord |
| South Korea | 81Y2385 | 6494 | 4.3m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord |
| Switzerland | 39Y7919 | 6216 | 2.8m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord |
| Switzerland | 81Y2390 | 6578 | 4.3m, 10A/230V, C13 to SEV 1011-S24507 (Sws) Line Cord |
| Taiwan | 23R7158 | 6386 | 2.8m, 10A/125V, C13 to CNS 10917-3 (Taiwan) Line Cord |
| Taiwan | 81Y2375 | 6317 | 2.8m, 10A/240V, C13 to CNS 10917-3 (Taiwan) Line Cord |
| Taiwan | 4L67A08363 | AX8B | 4.3m, 10A/125V, C13 to CNS 10917 (Taiwan) Line Cord |
| Taiwan | 81Y2389 | 6531 | 4.3m, 10A/250V, C13 to 76 CNS 10917-3 (Taiwan) Line Cord |
| UK | 39Y7923 | 6215 | 2.8m, 10A/250V, C13 to BS 1363/A (UK) Line Cord |
| UK | 81Y2377 | 6577 | 4.3m, 10A/230V, C13 to BS 1363/A (UK) Line Cord |
| US/Canada | 90Y3016 | 6313 | 2.8m, 10A/120V, C13 to NEMA 5-15P (US) Line Cord |
| US/Canada | 46M2592 | A1RF | 2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord |
| US/Canada | 4L67A08359 | 6370 | 4.3m, 10A/125V, C13 to NEMA 5-15P (US) Line Cord |
| US/Canada | 4L67A08361 | 6373 | 4.3m, 10A/250V, C13 to NEMA 6-15P (US) Line Cord |

## Integrated virtualization

The server supports booting from an operating system or hypervisor installed on an M.2 solid-state drive. See the M.2 drives section for details and the list of available options.

You can download supported VMware vSphere hypervisor images from the following web page and load it on the M.2 drive using the instructions provided:
https://vmware.lenovo.com/content/custom_iso/

## Systems management

The ST250 contains an integrated service processor, XClarity Controller (XCC), which provides advanced service-processor control, monitoring, and alerting functions. The XCC is based on the Pilot4 XE401 baseboard management controller (BMC) using a dual-core ARM Cortex A9 service processor.

### Local management

The ST250 offers a front operator panel showing key LED status indicators, as shown in the following figure.

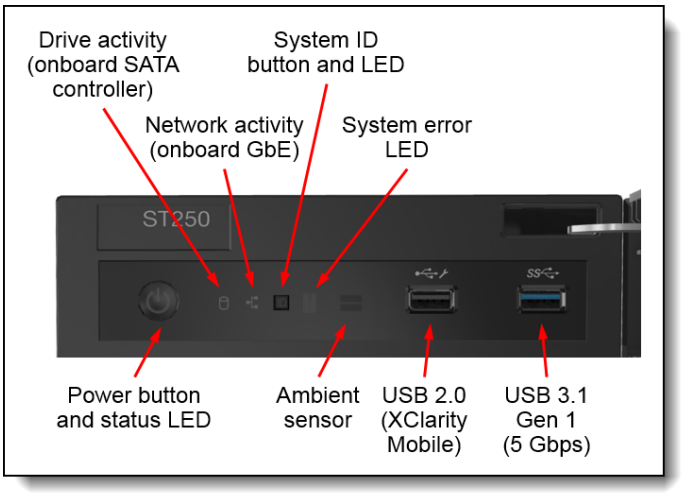



Figure 10. Front operator panel

### System status with XClarity Mobile

The XClarity Mobile app includes a tethering function where you can connect your Android or iOS device to the server via USB to see the status of the server.

The steps to connect the mobile device are as follows:

1. Enable USB Management on the server, by holding down the ID button for 3 seconds (or pressing the dedicated USB management button if one is present)
2. Connect the mobile device via a USB cable to the server's USB port with the management symbol 
3. In iOS or Android settings, enable Personal Hotspot or USB Tethering
4. Launch the Lenovo XClarity Mobile app

Once connected you can see the following information:

- Server status including error logs (read only, no login required)
- Server management functions (XClarity login credentials required)

### Remote management

The server offers a dedicated RJ45 port at the rear of the server for remote management via the XClarity Controller management processor. The port supports 10/100/1000 Mbps speeds.

Remote server management is provided through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3 (no SET commands; no SNMP v1)
- Common Information Model (CIM-XML)
- Representational State Transfer (REST) support
- Redfish support (DMTF compliant)
- Web browser - HTML 5-based browser interface (Java and ActiveX not required) using a responsive design (content optimized for device being used - laptop, tablet, phone) with NLS support

IPMI via the Ethernet port (IPMI over LAN) is supported, however it is disabled by default. For CTO orders you can specify whether you want to the feature enabled or disabled in the factory, using the feature codes listed in the following table.

Table 42. IPMI-over-LAN settings

| Part number | Feature code | Description |
|---|---|---|
| CTO only | B7XZ | Disable IPMI-over-LAN (default) |
| CTO only | B7Y0 | Enable IPMI-over-LAN |

There are two XClarity Controller upgrades available for the server, Advanced and Enterprise.

Lenovo XClarity Controller Advanced adds the following remote control functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- Capturing blue-screen errors
- International keyboard mapping support
- LDAP-based authentication

Lenovo XClarity Controller Enterprise enables the following additional features:

- Boot Capture
- Remote mounting of CD-ROM (ISO) and diskette (IMG) files as virtual drives
- Virtual console collaboration - Ability for up to 6 remote users to be log into the remote session simultaneously
- Power capping
- License for XClarity Energy Manager

Preconfigured models come with either XClarity Controller Standard, Advanced or Enterprise, depending on the model. See the Models section for details. The following table shows the field upgrades available for preconfigured models.

Table 43. XClarity Controller field upgrades

| Part number | Feature code | Description |
|---|---|---|
| 4L47A09132 | AVUT | ThinkSystem XClarity Controller Standard to Advanced Upgrade<br>(for servers that have XCC Standard) |
| 4L47A09133 | AVUU | ThinkSystem XClarity Controller Advanced to Enterprise Upgrade<br>(for servers that have XCC Advanced) |

For configure-to-order (CTO) models, you can elect to have one of the following XCC functionality by selecting the appropriate XCC feature codes as listed in the following table:

- XCC Standard - select neither feature listed in the table
- XCC Advanced - select feature AVUT
- XCC Enterprise - select feature AUPW

Table 44. XClarity Controller Upgrades for configure-to-order

| Feature code | Description |
|---|---|
| AVUT | ThinkSystem XClarity Controller Standard to Advanced Upgrade |
| AUPW | ThinkSystem XClarity Controller Standard to Enterprise Upgrade |

### Lenovo XClarity Provisioning Manager

Lenovo XClarity Provisioning Manager (LXPM) is a UEFI-based application embedded in ThinkSystem servers and accessible via the F1 key during system boot.

LXPM provides the following functions:

- Graphical UEFI Setup
- System inventory information and VPD update
- System firmware updates (UEFI and XCC)
- RAID setup wizard
- OS installation wizard (including unattended OS installation)
- Diagnostics functions

### Lenovo XClarity Administrator

Lenovo XClarity Administrator is a centralized resource management solution designed to reduce complexity, speed response, and enhance the availability of Lenovo systems and solutions.

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

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 provides full management function to ThinkSystem servers, including the following:

- Discovery
- Inventory
- Monitoring and alerting
- Call home
- Centralized user management
- Cryptography modes, server certificates, and encapsulation
- Configuration patterns
- Operating system deployment
- Firmware updates

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

### Lenovo XClarity Integrators

Lenovo also offers software plug-in modules, Lenovo XClarity Integrators, to manage physical infrastructure from leading external virtualization management software tools including those from Microsoft and VMware.

These integrators are offered at no charge, however if software support is required, a Lenovo XClarity Pro software subscription license should be ordered.

Lenovo XClarity Integrators offer the following additional features:

- Ability to discover, manage, and monitor Lenovo server hardware from VMware vCenter or Microsoft System Center
- Deployment of firmware updates and configuration patterns to Lenovo x86 rack servers and Flex System from the virtualization management tool
- Non-disruptive server maintenance in clustered environments that reduces workload downtime by dynamically migrating workloads from affected hosts during rolling server updates or reboots
- Greater service level uptime and assurance in clustered environments during unplanned hardware events by dynamically triggering workload migration from impacted hosts when impending hardware failures are predicted

For more information about all the available Lenovo XClarity Integrators, see the Lenovo XClarity Administrator Product Guide: https://lenovopress.com/tips1200-lenovo-xclarity-administrator

### Lenovo XClarity Essentials

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

- Lenovo Essentials OneCLI

  OneCLI is a collection of server management tools that uses a command line interface program to manage firmware, hardware, and operating systems. It provides functions to collect full system health information (including health status), configure system settings, and update system firmware and drivers.

- Lenovo Essentials UpdateXpress

  The UpdateXpress tool is a standalone GUI application for firmware and device driver updates that enables you to maintain your server firmware and device drivers up-to-date and help you avoid unnecessary server outages. The tool acquires and deploys individual updates and UpdateXpress System Packs (UXSPs) which are integration-tested bundles.

- Lenovo Essentials Bootable Media Creator

  The Bootable Media Creator (BOMC) tool is used to create bootable media for offline firmware update.

For more information and downloads, visit the Lenovo XClarity Essentials web page:
http://support.lenovo.com/us/en/documents/LNVO-center

### Lenovo XClarity Energy Manager

Lenovo XClarity Energy Manager is a power and temperature management solution for data centers. It is an agent-free, web-based console that enables you to monitor and manage power consumption and temperature in your data center through the management console. 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 the XClarity Controller Enterprise (XCC Enterprise) upgrade as described in the Remote Management section. If your server does not have the XCC Enterprise upgrade, Energy Manager licenses can be ordered as shown in the following table.

Table 45. Lenovo XClarity Energy Manager

| Description | Part number |
|---|---|
| 4L40E51621 | Lenovo XClarity Energy Manager Node License (1 license needed per server) |

For more information about XClarity Energy Manager, see the following resources:

- Lenovo Support page:
  https://datacentersupport.lenovo.com/us/en/solutions/lnvo-lxem
- Lenovo Information Center:
  https://sysmgt.lenovofiles.com/help/topic/LXEM/lxem_overview.html?cp=4

## Security

The ST250 offers the following security features:

- Electronic security measures:
  - Administrator and power-on passwords
  - Trusted Platform Module (TPM) supporting both TPM 1.2 and TPM 2.0
  - For China customers, the Nationz TPM plug-in module
  - Self-encrypting drives with support for IBM Security Key Lifecycle Manager
- Mechanical security measures
  - Loop for a padlock to prevent the side panel from being opened
  - Slot at the rear of the server for a Kensington Cable Lock
  - Optional lockable front door
  - Optional chassis intrusion switch

The Nationz TPM module is installed in a dedicated socket on the system board. See the Components and connectors section for locations of physical components.

The following table lists the security options for the server.

Table 46. Security features

| Part number | Feature code | Description |
|---|---|---|
| 4M17A12791 | B41K | ThinkSystem ST250 4U Security Door |
| 4M17A12792 | B4MA | ThinkSystem ST258 4U Security Door (China customers only) |
| 4Z57A14086 | B4LS | ThinkSystem ST250 Intrusion Cable Kit |
| CTO only* | B22N | ThinkSystem Nationz Trusted Platform Module v2.0 (China customers only) |

* Available via configure-to-order or in preconfigured models only

For self-encrypting drives (SEDs) with support for enterprise key managers, see the SED encryption key management section.

### Intel Transparent Supply Chain

Add a layer of protection in your data center and have peace of mind that the server hardware you bring into it is safe authentic and with documented, testable, and provable origin.

Lenovo has one of the world's best supply chains, as ranked by Gartner Group, backed by extensive and mature supply chain security programs that exceed industry norms and US Government standards. Now we are the first Tier 1 manufacturer to offer Intel® Transparent Supply Chain in partnership with Intel, offering you an unprecedented degree of supply chain transparency and assurance.

To enable Intel Transparent Supply Chain for the Intel-based servers in your order, add the following feature code in the DCSC configurator, under the Security tab.

Table 47. Intel Transparent Supply Chain ordering information

| Feature code | Description |
|---|---|
| BB0P | Intel Transparent Supply Chain |

For more information on this offering, see the paper *Introduction to Intel Transparent Supply Chain on Lenovo ThinkSystem Servers*, available from https://lenovopress.com/lp1434-introduction-to-intel-transparent-supply-chain-on-thinksystem-servers.

## Keyboards and Mice

The following table lists the supported full-sized USB keyboards and mice available for Lenovo ThinkSystem servers.

The keyboards have the following features:

- Full-sized 104-key keyboard with 3 special Windows keys
- 3 LEDs for caps lock, scroll lock and num lock
- Wired USB connection with 1.8m cable
- Adjustable feet at the rear of the keyboard

**Tip**: For keyboards that fit in the rack-mounted console kit, see the KVM console options section, or the 1U 18.5-inch Standard Media Console product guide.

Table 48. Lenovo Preferred Pro USB Full-sized keyboards - ThinkSystem

| Part number | Feature code | Description |
|---|---|---|
| Mice | | |
| 7M57A04698 | B0LN | ThinkSystem Optical Wheel Mouse - USB |
| Keyboards | | |
| 7ZB7A05521 | AXTM | ThinkSystem Pref. Pro Keyboard USB - Arabic 253 RoHS v2 |
| 7ZB7A05520 | AXTN | ThinkSystem Pref. Pro Keyboard USB - Arabic French 462 RoHS v2 |
| 7ZB7A05519 | AXTP | ThinkSystem Pref. Pro Keyboard USB - Belgium/French 120 RoHS v2 |
| 7ZB7A05518 | AXTQ | ThinkSystem Pref. Pro Keyboard USB - Belgium/UK 120 RoHS v2 |
| 7ZB7A05517 | AXTR | ThinkSystem Pref. Pro Keyboard USB - Brazil/Portuguese 275 RoHS v2 |
| 7ZB7A05515 | AXTS | ThinkSystem Pref. Pro Keyboard USB - Bulgarian 442 RoHS v2 |
| 7ZB7A05511 | AXTU | ThinkSystem Pref. Pro Keyboard USB - Czech RoHS v2 |
| 7ZB7A05509 | AXTV | ThinkSystem Pref. Pro Keyboard USB - Danish 159 RoHS v2 |
| 7ZB7A05508 | AXTW | ThinkSystem Pref. Pro Keyboard USB - Dutch 143 RoHS v2 |
| 7ZB7A05506 | AXTX | ThinkSystem Pref. Pro Keyboard USB - French 189 roHS v2 |
| 7ZB7A05496 | AXTZ | ThinkSystem Pref. Pro Keyboard USB - French Canadian 058 French RoHS v2 |
| 7ZB7A05504 | AXTY | ThinkSystem Pref. Pro Keyboard USB - French Canadian 445 Multilingual RoHS v2 |
| 7ZB7A05495 | AXU0 | ThinkSystem Pref. Pro Keyboard USB - German 129 RoHS v2 |
| 7ZB7A05494 | AXU1 | ThinkSystem Pref. Pro Keyboard USB - Greek 319 RoHS v2 |
| 7ZB7A05493 | AXU2 | ThinkSystem Pref. Pro Keyboard USB - Hebrew RoHS v2 |
| 7ZB7A05492 | AXU3 | ThinkSystem Pref. Pro Keyboard USB - Hungarian 208 RoHS v2 |
| 7ZB7A05491 | AXU4 | ThinkSystem Pref. Pro Keyboard USB - Iceland 197 RoHS v2 |
| 7ZB7A05490 | AXU5 | ThinkSystem Pref. Pro Keyboard USB - Italy 141 RoHS v2 |
| 7ZB7A05489 | AXU6 | ThinkSystem Pref. Pro Keyboard USB - Japanese 194 RoHS |
| 7ZB7A05488 | AXU7 | ThinkSystem Pref. Pro Keyboard USB - Korean 413 RoHS v2 |
| 7ZB7A05487 | AXU8 | ThinkSystem Pref. Pro Keyboard USB - LA Spanish 171 RoHS v2 |
| 7ZB7A05486 | AXU9 | ThinkSystem Pref. Pro Keyboard USB - Norwegian 155 RoHS v2 |
| 7ZB7A05485 | AXUA | ThinkSystem Pref. Pro Keyboard USB - Polish RoHS v2 |
| 7ZB7A05484 | AXUB | ThinkSystem Pref. Pro Keyboard USB - Portuguese 163 RoHS v2 |
| 7ZB7A05483 | AXUC | ThinkSystem Pref. Pro Keyboard USB - Romanian RoHS v2 |
| 7ZB7A05482 | AXUD | ThinkSystem Pref. Pro Keyboard USB - Russian/Cyrillic 441 RoHS v2 |
| 7ZB7A05481 | AXUE | ThinkSystem Pref. Pro Keyboard USB - Serbian/Cyrillic RoHS v2 |
| 7ZB7A05480 | AXUF | ThinkSystem Pref. Pro Keyboard USB - Slovak 245 RoHS v2 |
| 7ZB7A05471 | AXUQ | ThinkSystem Pref. Pro Keyboard USB - Slovenian 234 RoHS v2 |
| 7ZB7A05479 | AXUG | ThinkSystem Pref. Pro Keyboard USB - Spanish 172 RoHS v2 |
| 7ZB7A05478 | AXUH | ThinkSystem Pref. Pro Keyboard USB - Swedish/Finn 153 RoHS v2 |
| 7ZB7A05477 | AXUJ | ThinkSystem Pref. Pro Keyboard USB - Swiss F/G 150 RoHS v2 |
| 7ZB7A05476 | AXUK | ThinkSystem Pref. Pro Keyboard USB - Thailand 191 RoHS v2 |
| 7ZB7A05513 | AXTT | ThinkSystem Pref. Pro Keyboard USB - Trad Chinese/US 467 RoHS v2 |
| 7ZB7A05474 | AXUM | ThinkSystem Pref. Pro Keyboard USB - Turkish 179 RoHS v2 |
| 7ZB7A05475 | AXUL | ThinkSystem Pref. Pro Keyboard USB - Turkish 440 RoHS v2 |
| 7ZB7A05473 | AXUN | ThinkSystem Pref. Pro Keyboard USB - UK English 166 RoHS v2 |
| 7ZB7A05522 | AXTL | ThinkSystem Pref. Pro Keyboard USB - US English 103P RoHS v2 |
| 7ZB7A05472 | AXUP | ThinkSystem Pref. Pro Keyboard USB - US Euro 103P RoHS v2 |

## Rack installation

The server can be installed in the rack with the Rack Mount Kit, which converts the server to a rack-mountable server.

**Note**: The server is a 4U rack mount server, however the rack mount kit adds 1U to the vertical space occupied by the server. The total rack space occupied is 5U.

Part number information is listed in the following table. The kit can only be ordered as an option part number, not in a CTO order.

Table 49. Rack installation options

| Part number | Description |
|---|---|
| 4M17A12785 | ThinkSystem ST50/ST250 Rack Mount Kit |

The rack mount kit includes the following items:

- 1U tray to hold the server horizontally
- Left and right slide rails
- Cable management arm
- Brackets and other hardware
- Installation instructions

## Operating system support

The server supports the following operating systems:

- Microsoft Windows Server 2016
- Microsoft Windows Server 2019
- Red Hat Enterprise Linux 7.5
- Red Hat Enterprise Linux 7.7
- Red Hat Enterprise Linux 7.8
- Red Hat Enterprise Linux 7.9
- Red Hat Enterprise Linux 8.0
- Red Hat Enterprise Linux 8.1
- Red Hat Enterprise Linux 8.2
- Red Hat Enterprise Linux 8.3
- Red Hat Enterprise Linux 8.4
- SUSE Linux Enterprise Server 12 SP3
- SUSE Linux Enterprise Server 12 SP5
- SUSE Linux Enterprise Server 12 Xen SP3
- SUSE Linux Enterprise Server 12 Xen SP5
- SUSE Linux Enterprise Server 15
- SUSE Linux Enterprise Server 15 SP1
- SUSE Linux Enterprise Server 15 SP2
- SUSE Linux Enterprise Server 15 SP3
- SUSE Linux Enterprise Server 15 Xen
- SUSE Linux Enterprise Server 15 Xen SP1
- SUSE Linux Enterprise Server 15 Xen SP2
- SUSE Linux Enterprise Server 15 Xen SP3
- VMware ESXi 6.5 U2
- VMware ESXi 6.5 U3
- VMware ESXi 6.7
- VMware ESXi 6.7 U2
- VMware ESXi 6.7 U3
- VMware ESXi 7.0
- VMware ESXi 7.0 U1
- VMware ESXi 7.0 U2
- VMware ESXi 7.0 U3

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=st250-7y45-7y46

**Virtualization support**: The onboard SATA ports of the server can be used with virtualization hypervisors, including VMware ESXi, Linux KVM, Xen, and Microsoft Hyper-V, however support is limited to AHCI (non-RAID) mode. RSTe mode is not supported with virtualization hypervisors.

For configure-to-order configurations, the server can be preloaded with VMware ESXi. Ordering information is listed in the following table.

Table 50. VMware ESXi preload

| Part number | Feature code | Description |
|---|---|---|
| CTO only | B3VW | VMware ESXi 6.5 U2 (Factory Installed) |
| CTO only | B6U0 | VMware ESXi 6.5 U3 (factory installed) |
| CTO only | B3VX | VMware ESXi 6.7 (Factory Installed) |
| CTO only | B6U1 | VMware ESXi 6.7 U2 (factory installed) |
| CTO only | B88T | VMware ESXi 6.7 U3 (factory installed) |
| CTO only | BBZG | VMware ESXi 7.0 (Factory Installed) |
| CTO only | BE5E | VMware ESXi 7.0 U1 (Factory Installed) |
| CTO only | BHSR | VMware ESXi 7.0 U2 (Factory Installed) |

## Physical and electrical specifications

The ST250 has the following overall physical dimensions, including tower feet, excluding components that extend outside the standard chassis, such as power supply handles:

- Width: 176 mm (6.9 inches) (4U)
- Height: 444 mm (17.5 inches)
- Depth: 578 mm (22.8 inches)

The following table lists the detailed dimensions. See the figure below for the definition of each dimension.

Table 51. Detailed dimensions

| Dimension | Description |
|---|---|
| 176 mm (4U) | $X_a$ = Width, using widest features (not including feet) |
| 155 mm | $X_b$ = Width, distance to outer edges of chassis feet (feet do not extend beyond the chassis) |
| 444 mm | $Y_a$ = Height, from bottom of feet to top of chassis body |
| 430 mm | $Y_b$ = Height, from bottom of chassis body to top of chassis body |
| 544 mm | $Z_a$ = Depth, from front door to most rearward I/O port surface |
| 578 mm | $Z_b$ = Depth, from front door to deepest feature of the chassis body feature |
| 595 mm | $Z_c$ = Depth, from front door to deepest feature such as power supply handle |
| 23 mm | $Z_e$ = Depth, front door to front plate of chassis body |

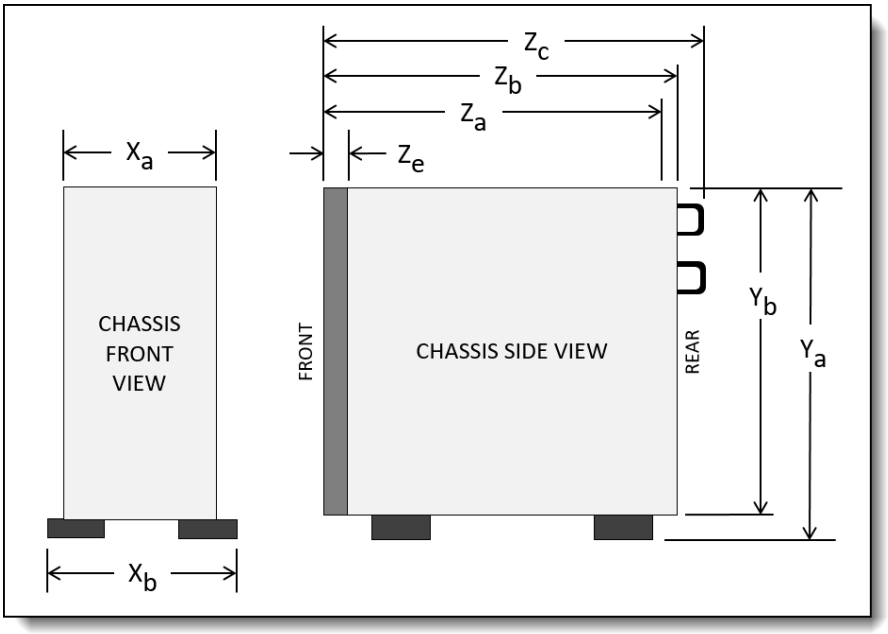



Figure 11. Server dimension

The shipping dimensions (cardboard packaging) of the ST250 are as follows:

- Width: 579 mm (22.8 inches)
- Height: 298 mm (11.7 inches)
- Depth: 763 mm (30.0 inches)

The server has the following weight:

- Weight, fully configured: 23.56 kg (51.94 lb)

Electrical requirements are as follows:

- Models with a 250 W AC fixed power supply:
  - 100-127 (nominal) V ac; 50 Hz or 60 Hz
  - 200 - 240 (nominal) V ac; 50 Hz or 60 Hz
- Models with 550 W AC hot-swap power supplies:
  - 100-127 (nominal) V ac; 50 Hz or 60 Hz; 6.2 A
  - 200 - 240 (nominal) V ac; 50 Hz or 60 Hz; 3.0 A
  - Input kilovolt-amperes (kVA) (approximately):
    - Minimum configuration: 0.16 kVA
    - Maximum configuration: 0.722 kVA
- Models with 550 W 240V DC power supplies (China customers running 240V DC input)
  - 200 - 240 (nominal) V dc; 2.5 A
  - Input kilovolt-amperes (kVA) (approximately):
    - Minimum configuration: 0.16 kVA
    - Maximum configuration: 0.70 kVA

## Operating environment

The server can operate in ASHRAE A2 environments (10-35°C).

The server can be configured to operate in ASHRAE A3 environments (5-40°C), provided the following restrictions are met:

- Processor with a maximum TDP of 80W
- Maximum of 8x 2.5" drives
- PCIe adapters up to 10W power consumption

The server is supported operating in the following environments:

- ASHRAE A2:
  - Temperature: 10°C to 35°C
  - Humidity: 8% to 80%
  - Altitude 0-3000 m (10,000 ft), derated 1°C per 300 m above 950 m
- ASHRAE A3:
  - Temperature: 5°C to 40°C
  - Humidity: 8% to 85%
  - Altitude 0-3000 m (10,000 ft), derated 1°C per 175 m above 950 m

Non-operating environment support:

- Without packaging:
  - Temperature: -10 °C to 60 °C
  - Humidity: 8 to 90%
- Storage with packaging:
  - Temperature: -40 °C to 70 °C
  - Humidity: 8 to 90%

Thermal (heat) output:

- Minimum configuration: 238.6 BTU/hr, 69.8 W
- Maximum configuration: 1010.33 BTU/hr, 296.10 W

Acoustical noise emissions: See the following table.

Table 52. Acoustical noise emissions

| | **Minimum** | **Typical** | **Maximum** |
|---|---|---|---|
| **Sound power level** | | | |
| Idle | 3.7 bels | 3.8 bels | 4.3 bels |
| Operating | 3.7 bels | 4.0 bels | 4.4 bels |
| **Sound pressure level (tabletop)** | | | |
| Idle | 26.5 dBA | 26.8 dBA | 39.4 dBA |
| Operating | 26.7 dBA | 27.0 dBA | 40.1 dBA |
| **Sound pressure level (floor)** | | | |
| Idle | 19.3 dBA | 19.5 dBA | 29.5 dBA |
| Operating | 19.4 dBA | 21.0 dBA | 32.3 dBA |

Notes:

- These sound levels were measured in controlled acoustical environments according to procedures specified by ISO 7779 and are reported in accordance with ISO 9296.
- The declared acoustic noise levels are based on specified configurations, which may change slightly depending on configuration/conditions.

## Warranty and Support

The ST250 has a 1-year or 3-year warranty, based on the machine type of the system:

- 7Y46 - 1 year warranty
- 7Y45 - 3 year warranty

The standard warranty terms are customer-replaceable unit (CRU) and onsite (for field-replaceable units FRUs only) with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered.

Lenovo's additional support services provide a sophisticated, unified support structure for your data center, with an experience consistently ranked number one in customer satisfaction worldwide. Available offerings include:

- **Premier Support**

  Premier Support provides a Lenovo-owned customer experience and delivers direct access to technicians skilled in hardware, software, and advanced troubleshooting, in addition to the following:

  - Direct technician-to-technician access through a dedicated phone line
  - 24x7x365 remote support
  - Single point of contact service
  - End to end case management
  - Third-party collaborative software support
  - Online case tools and live chat support
  - On-demand remote system analysis

- **Warranty Upgrade (Preconfigured Support)**

  Services are available to meet the on-site response time targets that match the criticality of your systems.

  - 3, 4, or 5 years of service coverage
  - 1-year or 2-year post-warranty extensions
  - **Foundation Service**: 9x5 service coverage with next business day onsite response. YourDrive YourData is an optional extra (see below).
  - **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select countries). Bundled with YourDrive YourData.
  - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select countries). Bundled with YourDrive YourData.

- **Managed Services**

  Lenovo Managed Services provides continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of your data center using state-of-the-art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals.

  Quarterly reviews check error logs, verify firmware & OS device driver levels, and software as needed. We'll also maintain records of latest patches, critical updates, and firmware levels, to ensure you systems are providing business value through optimized performance.

- **Technical Account Management (TAM)**

  A Lenovo Technical Account Manager helps you optimize the operation of your data center based on a deep understanding of your business. You gain direct access to your Lenovo TAM, who serves as your single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. In addition, your TAM will help proactively make service recommendations and manage your service relationship with Lenovo to make certain your needs are met.

- **Enterprise Server Software Support**

  Enterprise Software Support is an additional support service providing customers with software support on Microsoft, Red Hat, SUSE, and VMware applications and systems. Around the clock availability for critical problems plus unlimited calls and incidents helps customers address challenges fast, without incremental costs. Support staff can answer troubleshooting and diagnostic questions, address product comparability and interoperability issues, isolate causes of problems, report defects to software vendors, and more.

- **YourDrive YourData**

  Lenovo's YourDrive YourData 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 and is optional with Foundation Service. It is bundled with Essential Service and Advanced Service.

- **Health Check**

  Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that your systems and business are always running at their best. Health Check supports Lenovo-branded server, storage, and networking devices, as well as select Lenovo-supported products from other vendors that are sold by Lenovo or a Lenovo-Authorized Reseller.

Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

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

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

Lenovo Service offerings are region-specific. Not all preconfigured support and upgrade options are available in every region. For information about Lenovo service upgrade offerings that are available in your region, refer to the following resources:

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

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

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

## Services

Lenovo Services is a dedicated partner to your success. Our goal is to reduce your capital outlays, mitigate your IT risks, and accelerate your time to productivity.

**Note**: Some service options may not be available in all countries. For more information, go to https://www.lenovo.com/services. For information about Lenovo service upgrade offerings that are available in your region, contact your local Lenovo sales representative or business partner.

Here's a more in-depth look at what we can do for you:

- **Asset Recovery Services**

  Asset Recovery Services (ARS) helps customers recover the maximum value from their end-of-life equipment in a cost-effective and secure way. On top of simplifying the transition from old to new equipment, ARS mitigates environmental and data security risks associated with data center equipment disposal. Lenovo ARS is a cash-back solution for equipment based on its remaining market value, yielding maximum value from aging assets and lowering total cost of ownership for your customers. For more information, see the ARS page, https://lenovopress.com/lp1266-reduce-e-waste-and-grow-your-bottom-line-with-lenovo-ars.

- **Assessment Services**

  An Assessment helps solve your IT challenges through an onsite, multi-day session with a Lenovo technology expert. We perform a tools-based assessment which provides a comprehensive and thorough review of a company's environment and technology systems. In addition to the technology based functional requirements, the consultant also discusses and records the non-functional business requirements, challenges, and constraints. Assessments help organizations like yours, no matter how large or small, get a better return on your IT investment and overcome challenges in the ever-changing technology landscape.

- **Design Services**

  Professional Services consultants perform infrastructure design and implementation planning to support your strategy. The high-level architectures provided by the assessment service are turned into low level designs and wiring diagrams, which are reviewed and approved prior to implementation. The implementation plan will demonstrate an outcome-based proposal to provide business capabilities through infrastructure with a risk-mitigated project plan.

- **Basic Hardware Installation**

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

- **Deployment Services**

  When investing in new IT infrastructures, you need to ensure your business will see quick time to value with little to no disruption. Lenovo deployments are designed by development and engineering teams who know our Products & Solutions better than anyone else, and our technicians own the process from delivery to completion. Lenovo will conduct remote preparation and planning, configure & integrate systems, validate systems, verify and update appliance firmware, train on administrative tasks, and provide post-deployment documentation. Customer's IT teams leverage our skills to enable IT staff to transform with higher level roles and tasks.

- **Integration, Migration, and Expansion Services**

  Move existing physical & virtual workloads easily, or determine technical requirements to support increased workloads while maximizing performance. Includes tuning, validation, and documenting ongoing run processes. Leverage migration assessment planning documents to perform necessary migrations.

## Regulatory compliance

The ST250 server conforms to the following standards:

- Energy Star 2.1
- USA FCC Title 47 CFR Part 15 Subpart B
- Canada ICES-003, issue 6, Class A
- UL62368-1
- CSA C22.2, No. 62368-1-14
- NOM-019
- Argentina IEC60950-1
- Australia/New Zealand AS/NZS CISPR 32, Class A
- Japan VCCI 32-1
- IEC 60950-1 (CB Certificate and CB Test Report), IEC 62368-1 (CB Certificate and CB Test Report)
- China CCC (GB4943.1), GB9254 Class A, GB17625.1, CECP, CELP
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN32, Class A; KN35
- Russia, Belorussia and Kazakhstan, TR CU 020/2011 and TR CU 004/2011
- CE Mark (EN55032 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3, EN 62368-1)
- CISPR 32, Class A
- TUV-GS ( EN62368-1, EK1-ITB2000)
- India BIS certification

## 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.

**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 53. 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 and ThinkSystem DM Series external storage systems for high-performance storage. See the DE 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

## External backup units

The following table lists the available external SAS tape backup options.

**Tip:** Verify the end-to-end support of an IBM tape backup solution through the IBM System Storage Interoperation Center (SSIC): http://www.ibm.com/systems/support/storage/ssic

Table 54. External SAS backup options

| Part number | Description |
|---|---|
| External SAS tape backup drives | |
| 6160S6E | IBM TS2260 Tape Drive Model H6S |
| 6160S7E | IBM TS2270 Tape Drive Model H7S |
| 6160S8E | IBM TS2280 Tape Drive Model H8S |
| External SAS tape backup autoloaders | |
| 6171S6R | IBM TS2900 Tape Autoloader w/LTO6 HH SAS |
| 6171S7R | IBM TS2900 Tape Autoloader w/LTO7 HH SAS |
| 6171S8R | IBM TS2900 Tape Autoloader w/LTO8 HH SAS |
| External tape backup libraries | |
| 6741A1F | IBM TS4300 3U Tape Library-Base Unit |
| SAS backup drives for TS4300 Tape Library | |
| 01KP934 | LTO 6 HH SAS Drive |
| 01KP937 | LTO 7 HH SAS Drive |
| 01KP953 | LTO 8 HH SAS Drive |

For more information, see the list of Product Guides in the Backup units category: https://lenovopress.com/servers/options/backup

## 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 server supports attachments to the uninterruptible power supply (UPS) units that are listed in the following table.

Table 55. Uninterruptible power supply units

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

† Only available in China and countries in the Asia Pacific region.

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 56. Power distribution units

| Part number | Description |
|---|---|
| 0U Basic PDUs | |
| 00YJ776 | 0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord |
| 00YJ777 | 0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord |
| 00YJ778 | 0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord |
| 00YJ779 | 0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord |
| Switched and Monitored PDUs | |
| 00YJ780 | 0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord |
| 00YJ781 | 0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord |
| 00YJ782 | 0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord |

| Part number | Description |
|---|---|
| 00YJ783 | 0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord |
| 46M4003 | 1U 9 C19/3 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord |
| 46M4004 | 1U 12 C13 Switched and Monitored DPI PDU (without line cord) |
| 46M4005 | 1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord |
| Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets) | |
| 71762NX | Ultra Density Enterprise C19/C13 PDU Module (without line cord) |
| 71763NU | Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord |
| C13 Enterprise PDUs (12x IEC 320 C13 outlets) | |
| 39M2816 | DPI C13 Enterprise PDU+ (without line cord) |
| 39Y8941 | DPI Single Phase C13 Enterprise PDU (without line cord) |
| C19 Enterprise PDUs (6x IEC 320 C19 outlets) | |
| 39Y8948 | DPI Single Phase C19 Enterprise PDU (without line cord) |
| 39Y8923 | DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord |
| Front-end PDUs (3x IEC 320 C19 outlets) | |
| 39Y8938 | DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord |
| 39Y8939 | DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord |
| 39Y8934 | DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord |
| 39Y8940 | DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord |
| 39Y8935 | DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord |
| NEMA PDUs (6x NEMA 5-15R outlets) | |
| 39Y8905 | DPI 100-127V PDU with Fixed NEMA L5-15P line cord |
| Line cords for PDUs that ship without a line cord | |
| 40K9611 | DPI 32a Line Cord (IEC 309 3P+N+G) |
| 40K9612 | DPI 32a Line Cord (IEC 309 P+N+G) |
| 40K9613 | DPI 63a Cord (IEC 309 P+N+G) |
| 40K9614 | DPI 30a Line Cord (NEMA L6-30P) |
| 40K9615 | DPI 60a Cord (IEC 309 2P+G) |
| 40K9617 | DPI Australian/NZ 3112 Line Cord |
| 40K9618 | DPI  Korean 8305 Line Cord |

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

## Rack cabinets

The ST250 server can be installed horizontally in a rack cabinet using the Rack Mount Kit, as described in the Rack installation section.

The following table lists the supported rack cabinets.

Table 57. Rack cabinets

| Part number | Description |
|---|---|
| 7D2B0001WW / 7D2N0001WW | 12U 1200mm Deep Micro Datacenter Rack |
| 7D2C0001WW / 7D2P0001WW | 18U 1200mm Deep Micro Datacenter Rack |
| 93072RX | 25U Standard Rack |
| 93072PX | 25U Static S2 Standard Rack |
| 93634PX | 42U 1100mm Dynamic Rack |
| 93634EX | 42U 1100mm Dynamic Expansion Rack |
| 93604PX | 42U 1200mm Deep Dynamic Rack |
| 93614PX | 42U 1200mm Deep Static Rack |
| 93084EX | 42U Enterprise Expansion Rack |
| 93084PX | 42U Enterprise Rack |
| 93074RX | 42U Standard Rack |

For specifications about these racks, see the Lenovo Rack Cabinet Reference, available from:
https://lenovopress.com/lp1287-lenovo-rack-cabinet-reference

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.

Table 58. KVM console

| Part number | Description |
|---|---|
| 4XF7A73009 | ThinkSystem 18.5" LCD Console (with English keyboard) |

The following table lists the available KVM switches and the options that are supported with them.

Table 60. KVM switches and options

| Part number | Description |
|---|---|
| KVM Console switches | |
| 1754D1T | ThinkSystem Digital 2x1x16 KVM Switch (DVI video output port) |
| 1754A1T | ThinkSystem Analog 1x8 KVM Switch (DVI video output port) |
| 1754D2X | Global 4x2x32 Console Manager (GCM32) |
| 1754D1X | Global 2x2x16 Console Manager (GCM16) |
| 1754A2X | Local 2x16 Console Manager (LCM16) |
| 1754A1X | Local 1x8 Console Manager (LCM8) |
| Cables for ThinkSystem Digital and Analog KVM Console switches | |
| 4X97A11108 | ThinkSystem VGA to DVI Conversion Cable |
| 4X97A11109 | ThinkSystem Single-USB Conversion Cable for Digital KVM |
| 4X97A11107 | ThinkSystem Dual-USB Conversion Cable for Digital KVM |
| 4X97A11106 | ThinkSystem USB Conversion Cable for Analog KVM |
| Cables for GCM and LCM Console switches | |
| 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

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## Related publications and links

For more information, see these resources:

- ThinkSystem ST250 product page
  https://www.lenovo.com/us/en/data-center/servers/towers/ThinkSystem-ST250/p/77XX7TRST25
- ThinkSystem ST250 drivers and support
  http://datacentersupport.lenovo.com/products/servers/thinksystem/st250/7y45/downloads
- Lenovo ThinkSystem ST250 product publications:
  http://thinksystem.lenovofiles.com/help/index.jsp
  - Quick Start
  - Tower-to-Rack Conversion Kit Installation Instructions
  - Setup Guide
  - Maintenance Manual
  - Lenovo XClarity Provisioning Manager User Guide
- ServerProven hardware compatibility:
  http://www.lenovo.com/us/en/serverproven

## Related product families

Product families related to this document are the following:

- 1-Socket Tower Servers
- ThinkSystem ST250 Server

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