

## Lenovo ThinkSystem SR850 Server (Xeon SP Gen 1) Product Guide

The Lenovo ThinkSystem SR850 is a 4-socket server that features a streamlined 2U rack design that is optimized for price and performance, with best-in-class flexibility and expandability. Models of the SR850 are powered by up to four Intel Xeon Processor Scalable Family processors, each with up to 28 cores, for an efficient 4-socket solution. The ThinkSystem SR850's agile design provides rapid upgrades for processors and memory, and its large, flexible storage capacity helps to keep pace with data growth.

*Suggested uses:* General business consolidation, data analytics, virtualization, database, dense computing and scientific applications



Figure 1. Lenovo ThinkSystem SR850

### Did you know?

With a dense 2U design, the Lenovo ThinkSystem SR850 provides advanced features and capabilities. These include support for up to four sockets and 48 DIMMs, mix and match internal storage, and enterprise-grade systems management with the embedded Lenovo XClarity Controller.

The SR850 has space for 16x 2.5-inch drive bays, up to 8 of which can be configured as AnyBay drives - supporting SAS, SATA or NVMe drives. NVMe drives are high-speed, low-latency storage, ideal for storage tiering. The server also offers easy expansion, with up to nine PCIe slots (two of which are x16) and up to 2 (mirrored) M.2 drives for rapid OS boot, faster than either USB keys or SD cards.

## Key features

The flexible ThinkSystem SR850 server can scale from two to four Intel Xeon Gold or Platinum processors, delivering significantly faster performance than the previous generation. Built for standard workloads like general business applications and server consolidation, it can also accommodate high-growth areas such as databases and virtualization. The ThinkSystem SR850's agile design permits rapid upgrades for processors and memory, and its large, flexible storage capacity helps to keep pace with data growth.

With the capability to support up to 48 DIMMs, four sockets, mix-and-match internal storage with up to 16 drives, and a dedicated slot for Gigabit or 10 GbE networking, the SR850 provides unmatched features and capabilities in a dense 2U rack-mount design.

## Scalability and performance

The SR850 offers numerous features to boost performance, improve scalability and reduce costs:

- Supports Gold and Platinum level processors in the Intel Xeon Processor Scalable Family. Processors supported have up to 28 cores, core speeds of up to 3.6GHz, L3 cache sizes up to 38.5 MB, and TDP ratings of up to 205W.
- The SR850's processor mezzanine tray design enables you to start with two processors and 24 DIMM sockets and upgrade to four processors and 48 DIMM sockets when you need it, helping lower initial costs and manage growth.
- Up to four processors, 112 cores, and 226 threads maximize the concurrent execution of multithreaded applications.
- 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 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.
- Support for up to 48 TruDDR4 memory DIMMs operating at 2666 MHz means you have the fastest available memory subsystem and memory capacity of up to 3.0 TB using 48x 64 GB LRDIMMs (all processors) or 6.0 TB using 48x 128 GB 3DS RDIMMs (requires M-suffix processors).
- The use of solid-state drives (SSDs) instead of, or along with, traditional spinning drives (HDDs), can improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.
- Up to 16x 2.5-inch drive bays -- supporting combinations of SAS or SATA HDDs, SAS or SATA SSDs, and NVMe PCIe SSDs -- provide a flexible and scalable all-in-one platform to meet your increasing demands.
- Support for up to 8x NVMe PCIe SSDs in a 2.5-inch form factor maximizes drive I/O performance, in terms of throughput, bandwidth, and latency.
- 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 16 drives on a single controller.
- Supports a new Lenovo patented-design M.2 adapter for convenient operating system boot functions. Available M.2 adapters support either one M.2 drive or two M.2 drives in a RAID 1 configuration for boot drive performance and reliability.
- The server has a dedicated flexible LAN-on-motherboard (LOM) slot, supporting a variety of 10 GbE or Gigabit Ethernet adapters that do not occupy one of the standard PCIe slots.
- A total of up to 9 general-purpose PCIe 3.0 slots plus slots dedicated to the LOM adapter and the M.2 adapter.

- The server offers PCI Express 3.0 I/O expansion capabilities that improve the theoretical maximum bandwidth by almost 100% (8 GTps per link using 128b/130b encoding) compared to the previous generation of PCI Express 2.0 (5 GTps per link using 8b/10b encoding).

### **Availability and serviceability**

The SR850 provides many features to simplify serviceability and increase system uptime:

- The server offers Single Device Data Correction (SDDC, also known as Chipkill), Adaptive Double-Device Data Correction (ADDDC, also known as Redundant Bit Steering or RBS), memory mirroring, and memory rank sparing for redundancy in the event of a non-correctable memory failure.
- The server offers hot-swap drives, supporting RAID redundancy for data protection and greater system uptime.
- The Dual M.2 Boot Adapter supports RAID-1 which enables two installed M.2 drives to be configured as a redundant pair.
- The server has up to two hot-swap redundant power supplies and six hot-swap redundant fans to provide availability for business-critical applications.
- The power-source-independent light path diagnostics uses LEDs to lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- The optional LCD system information display panel provides more detailed diagnostics by displaying all error messages and VPD data needed for a service call, thereby aiding with problem resolution and system uptime.
- Proactive Platform Alerts (including PFA and SMART alerts): Processors, voltage regulators, memory, internal storage (SAS/SATA HDDs and SSDs, NVMe SSDs, M.2 storage, flash storage adapters), fans, power supplies, RAID controllers, server ambient and subcomponent temperatures. Alerts can be surfaced through the XClarity Controller to managers such as Lenovo XClarity Administrator, VMware vCenter, and Microsoft System Center. These proactive alerts let you take appropriate actions in advance of possible failure, thereby increasing server uptime and application availability.
- Solid-state drives (SSDs) offer more reliability than traditional mechanical 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.
- Built-in diagnostics in UEFI, using Lenovo XClarity Provisioning Manager, speed up troubleshooting tasks to reduce service time.
- Lenovo XClarity Provisioning Manager collects and saves service data to USB key drive or remote CIFS share folder, for troubleshooting and to reduce service time.
- Auto restart in the event of a momentary loss of AC power (based on the power policy setting in the XClarity Controller service processor)
- 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.
- Three-year or one-year customer-replaceable unit and onsite limited warranty, 9 x 5 next business day. Optional service upgrades are available.

### **Manageability and security**

Powerful systems management features simplify local and remote management of the SR850:

- Lenovo XClarity Controller (XCC) monitors server availability and performs remote management. XCC Advanced is standard, which enables remote KVM. Optional XCC Enterprise enables 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 methods, such as digital signatures and remote attestation.
- Supports Secure Boot to ensure only a digitally signed operating system can be used. Supported with HDDs and SSDs, as well as M.2 drives in the M.2 Adapter.
- 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.

### **Energy efficiency**

The SR850 offers the following energy-efficiency features to save energy, reduce operational costs, and increase energy availability:

- Energy-efficient planar components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Platinum certifications
- Intel Intelligent Power Capability turns individual processor elements on and off as needed to reduce power draw.
- Low-voltage 1.2 V DDR4 memory offers energy savings compared to 1.35 V and 1.5 V DDR3 DIMMs.
- Solid-state drives (SSDs) consume 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 and thus keeping your system cooler.
- 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.

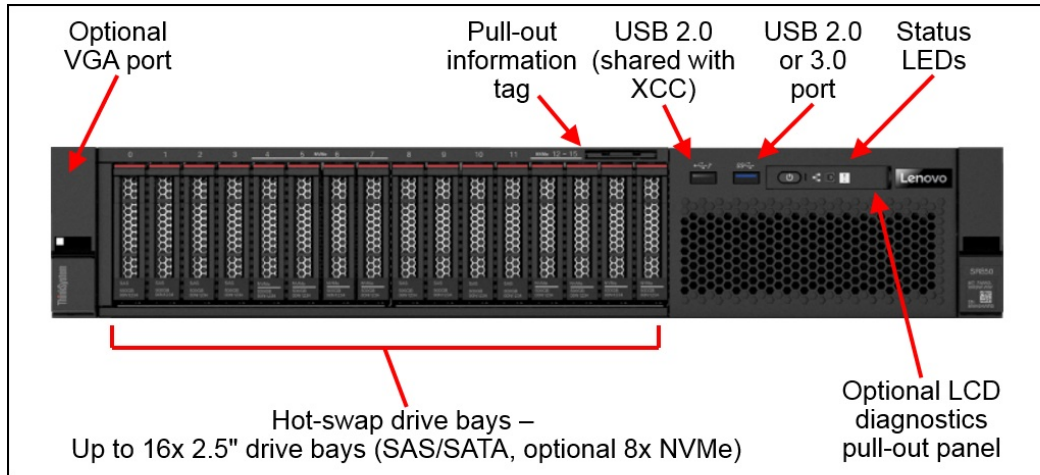


Figure 2. Front view of the Lenovo ThinkSystem SR850

The following figure shows the rear of the server.

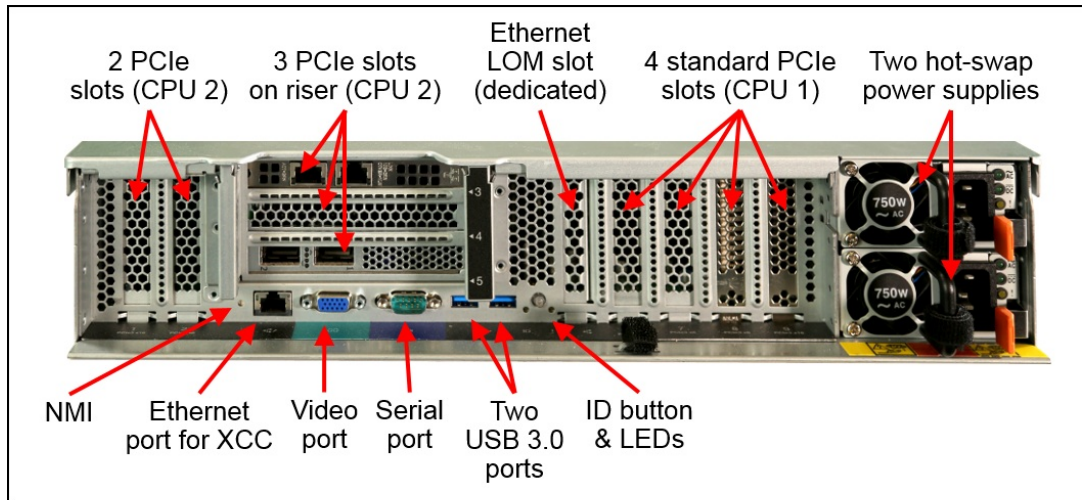


Figure 3. Rear view of the Lenovo ThinkSystem SR850

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

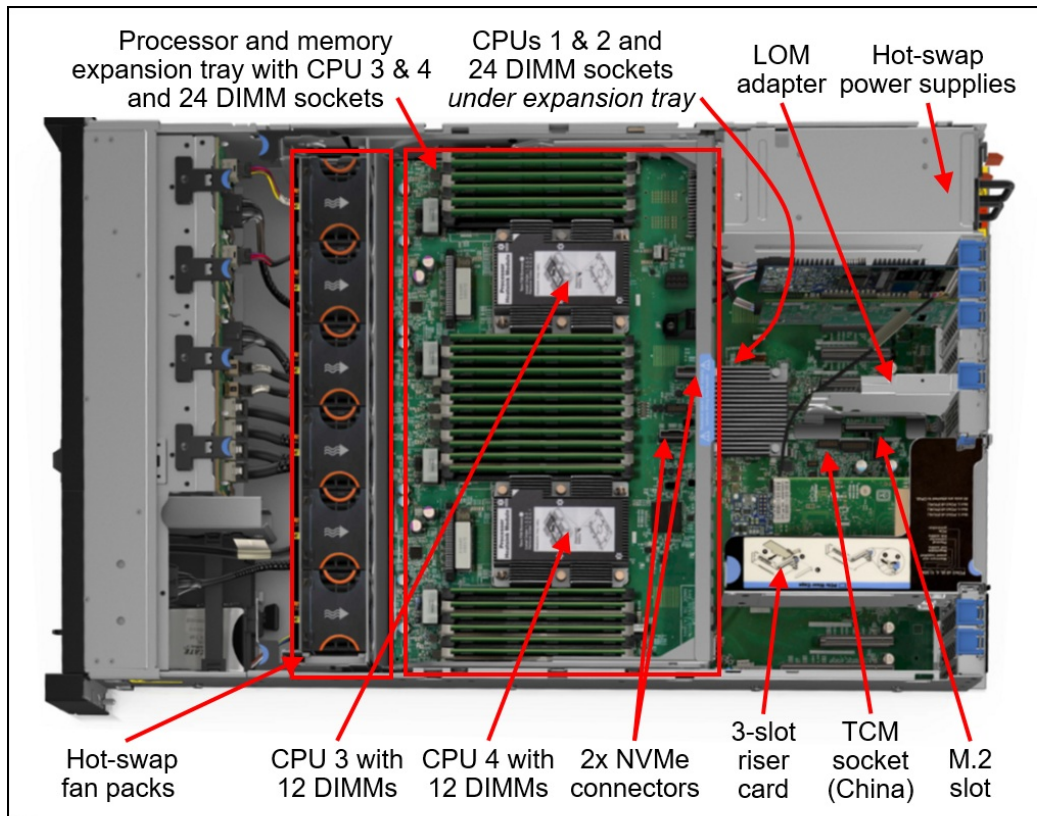


Figure 4. Internal view of the Lenovo ThinkSystem SR850

## System architecture

The following figure shows the architectural block diagram of the SR850, showing the major components and their connections.

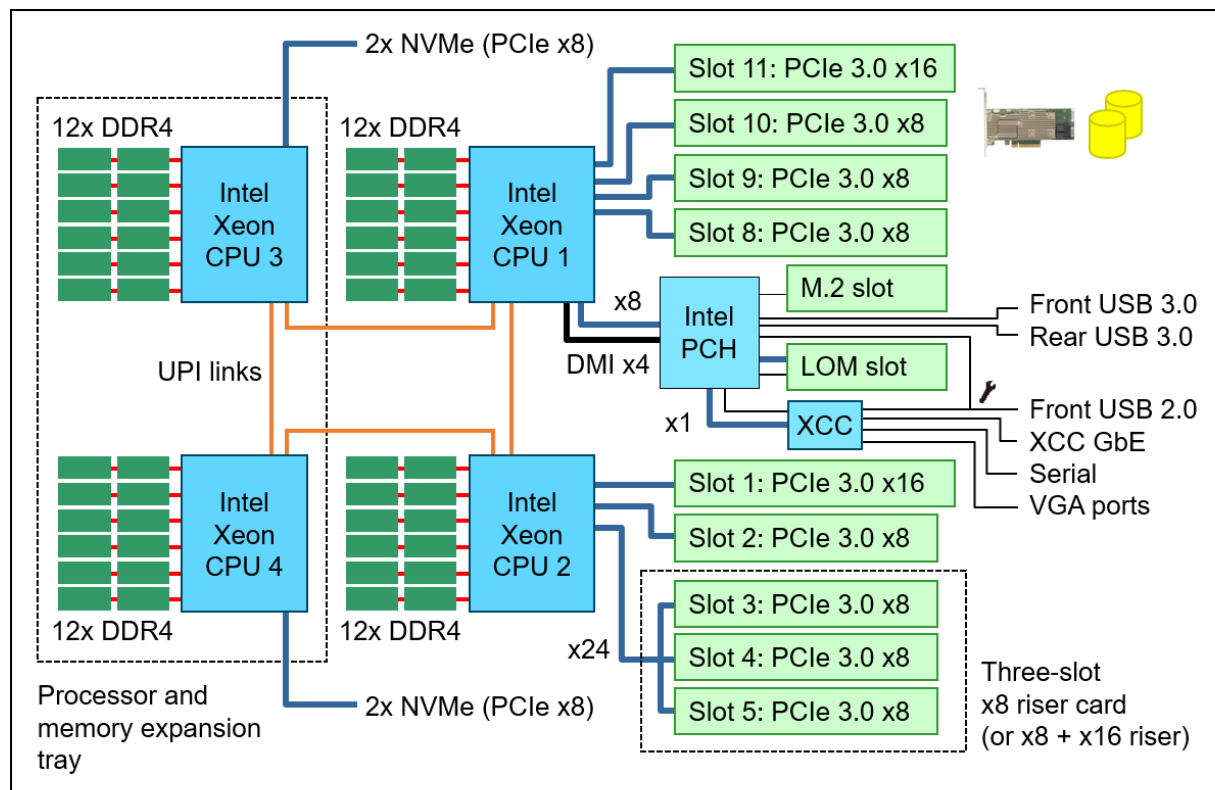


Figure 5. SR850 architectural block diagram

## Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Machine types	7X18 - 1 year warranty 7X19 - 3 year warranty
Form factor	2U rack.
Processor	Up to four Intel Xeon Processor Scalable Family of processors, either Gold or Platinum level processors (formerly codename "Skylake"). Supports processors up to 28 cores, core speeds up to 3.6 GHz, and TDP ratings up to 205W. Two processor sockets on the system board and two processors on the Processor and Memory Expansion Tray (standard on most models). Two Intel Ultra Path Interconnect (UPI) links at 10.4 GT/s each. Four processors are connected in a ring topology.
Chipset	Intel C624 "Lewisburg" chipset
Memory	Up to 48 DIMM sockets (12 DIMMs per processor) supporting Lenovo TruDDR4 DIMMs at up to 2666 MHz. RDIMMs, LRDIMMs and 3DS RDIMMs are supported, but memory types cannot be mixed. There are 24 DIMM sockets on the system board, and an additional 24 DIMM sockets on the processor and memory expansion tray (standard on most models).

Components	Specification
Memory maximums	With RDIMMs: Up to 1.5 TB with 48x 32 GB RDIMMs and four processors. With LRDIMMs: Up to 3.0 TB with 48x 64 GB LRDIMMs and four processors. With 3DS RDIMMs: Up to 6.0 TB with 48x 128 GB 3DS RDIMMs and four processors (requires M-suffix processors that support greater than 786 GB memory per processor)
Memory protection	ECC, SDDC (for x4-based memory DIMMs), ADDDC (for x4-based memory DIMMs), memory mirroring, and memory sparing.
Disk drive bays	Up to 16 2.5-inch hot-swap SAS/SATA bays.
Maximum internal storage	<ul style="list-style-type: none"> <li>● 245.76TB using 16x 15.36TB 2.5-inch SAS SSDs</li> <li>● 61.44TB using 8x 7.68TB 2.5-inch NVMe SSDs</li> <li>● 38.4TB using 16x 2.4TB 2.5-inch HDDs</li> </ul>
Storage controller	<ul style="list-style-type: none"> <li>● No embedded RAID</li> <li>● 12 Gb SAS/SATA RAID adapters: <ul style="list-style-type: none"> <li>○ RAID 530i (cacheless) supports RAID 0, 1, 10, 5, 50</li> <li>○ RAID 730-8i with 1GB cache supports RAID 0, 1, 10, 5, 50</li> <li>○ RAID 730-8i with 2GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60</li> <li>○ RAID 930-8i with 2GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60</li> <li>○ RAID 930-16i and 24i with 4GB or 8GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60</li> </ul> </li> <li>● 12 Gb SAS/SATA non-RAID: 430-8i and 430-16i HBAs</li> </ul>
Optical drive bays	No internal optical drive.
Tape drive bays	No internal backup drive.
Network interfaces	Integrated 10Gb Ethernet controller, based on the Intel Ethernet Connection X722. The server supports 1 of 6 available Phy adapters, providing either 2- or 4-port Gigabit Ethernet, 2- or 4-port 10 GbE with SFP+ connections or 2- or 4-port 10 GbE with RJ45 connections. One port can optionally be shared with the XClarity Controller (XCC) management processor for Wake-on-LAN and NC-SI support.
PCI Expansion slots	Up to 9 PCIe slots plus a slot reserved for a LOM Ethernet adapter, plus a slot for the M.2 adapter. Six slots plus the LOM slot are on the system board and three (slots 3-5) are through a riser card. Three riser cards are available. All slots are available with two processors.  The slots are as follows: <ul style="list-style-type: none"> <li>● Slot 1: PCIe 3.0 x16 (low profile)</li> <li>● Slot 2: PCIe 3.0 x8 (low profile)</li> <li>● Slot 3-5: Riser card slots (choices are x8/x8/x8, x8/x8/x8ML2 and x8/x16ML2)</li> <li>● Slot 6: PCIe 2.0 x2 / 6 Gb SATA slot reserved for M.2 adapter and drives</li> <li>● Slot 7: Reserved for Ethernet LOM phy adapter</li> <li>● Slot 8: PCIe 3.0 x8 (low profile)</li> <li>● Slot 9: PCIe 3.0 x8 (low profile)</li> <li>● Slot 10: PCIe 3.0 x8 (low profile)</li> <li>● Slot 11: PCIe 3.0 x16 (low profile)</li> </ul>



Components	Specification
Ports	<p>Front: Two USB 2.0 ports or one USB 2.0 and one USB 3.0 port, model dependent. The first USB 2.0 port can be configured to support local systems management by using the XClarity Administrator mobile app on a mobile device connected via a USB cable. Optional front VGA video port (CTO or field upgrade).</p> <p>Rear: Two USB 3.0 ports, one VGA video port, one DB-9 serial port, and one RJ-45 XClarity Controller (XCC) systems management port. The serial port can be shared with the XCC for serial redirection functions.</p> <p>Internal: Optional M.2 adapter in dedicated slot supporting one or two M.2 drives (for OS boot support, including hypervisor support).</p>
Cooling	Six N+1 redundant hot swap 60 mm fans (all six standard). One fan integrated in each power supply.
Power supply	Up to two hot-swap redundant AC power supplies (all 80 PLUS Platinum certification): 750 W, 1100 W and 1600 W AC options, supporting 220 V AC. 750 W and 1100 W options also support 110V input supply. In China only, all power supply options support 240 V DC. Second power supply requires either Processor and Memory Expansion Tray or a power interposer card.
Video	G200 graphics with 16 MB memory with 2D hardware accelerator, integrated into the XClarity Controller. Maximum resolution is 1920x1200 32bpp at 60Hz.
Hot-swap parts	Drives, power supplies, and fans.
Systems management	XClarity Controller embedded management, XClarity Administrator centralized infrastructure delivery, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. XClarity Controller Advanced standard with the SR850; XClarity Controller Enterprise optional with software license upgrade. Light path diagnostics for local failure detection and reporting, with optional LCD diagnostics pull-out panel.
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM), supporting TPM 1.2 or TPM 2.0. In China only, optional Trusted Cryptographic Module (TCM). Lockable top cover. Optional lockable front security bezel.
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the <a href="#">Operating system support</a> 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: 445 mm (17.5 in.), height: 87 mm (3.4 in.), depth: 765 mm (30.1 in.). See <a href="#">Physical and electrical specifications</a> for details.
Weight	Minimum configuration: 18 kg (40 lb.), maximum: 27 kg (59.6 lb)

The SR850 servers are shipped with the following items:

- ThinkSystem Toolless Slide Rail
- Documentation flyer
- Power cords (model and region dependent)

## Models

ThinkSystem SR850 models can be configured by using the Lenovo Data Center Solution Configurator (DCSC), <https://dcsc.lenovo.com>.

Server models are region-specific; that is, each region may define their own server models, and not all server models are available in every region. Configure-to-order (CTO) models can also be created for factory-integrated server customization. The following table lists the base CTO models of the ThinkSystem SR850 server.

Table 2. Base CTO models

Description	Machine Type/Model
ThinkSystem SR850 - 3 year Warranty	7X19CTO1WW
ThinkSystem SR850 - 1 year Warranty	7X18CTO1WW

**Withdrawn models:** All SR850 models with Intel Xeon SP Gen 1 processors are now withdrawn from marketing. For models with Gen 2 processors, see <https://lenovopress.com/lp1052>

## Processor options

The SR850 supports Gold and Platinum level processors in the Intel Xeon Processor Scalable Family.

The server supports up to four processors:

- Processors 1 and 2 are installed in sockets on the system board.
- Processors 3 and 4 are installed on the Processor and Memory Expansion Tray.

The SR850 Processor and Memory Expansion Tray has a patent-pending sliding and rolling lift mechanism that requires only a one-handed operation to insert or remove from the server. It has a toolless design for superior usability, serviceability and reliability.

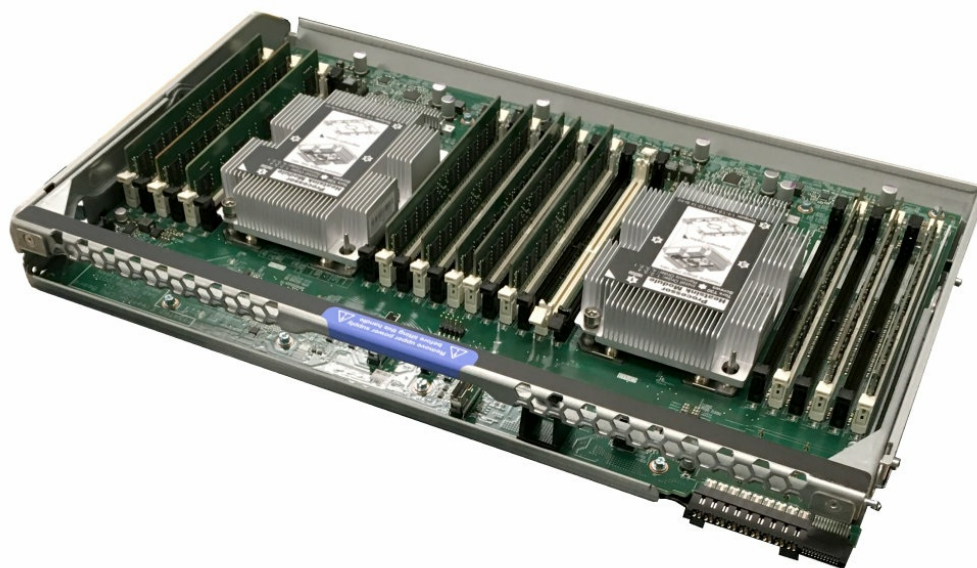


Figure 6. SR850 Processor and Memory Expansion Tray

The ordering information for the Processor and Memory Expansion Tray is shown in the following table.

Table 3. Processor and Memory Expansion Tray

Part number	Feature code	Description
7B27A03953	AUPY	SR850 Processor and Memory Expansion Tray

The following processor quantities are supported:

- Two processors, installed in sockets 1 and 2, without the Processor and Memory Expansion Tray
- Four processors, installed in all four sockets
- Configurations of one processor or three processors are supported via Special Bid

The SR850 supports the Intel Xeon Processor Scalable Family options listed in the following table.

All supported processors have the following characteristics:

- 14 nm process technology
- Six DDR4 memory channels
- 48 PCIe 3.0 I/O lanes
- 1 MB L2 cache
- 1.375 MB L3 cache per core (except where larger, as noted with \*\* in the table below)
- Intel Hyper-Threading Technology
- Intel Turbo Boost Technology 2.0
- Intel Advanced Vector Extensions 512 (AVX-512)
- Intel Ultra Path Interconnect (UPI) links at 10.4 GT/s (replaces QPI)

With two processors installed, the two processors are connected together using one UPI link. With four processors installed, the processors are connected together using a ring topology, using two UPI links, one to each adjacent processor in the ring.

Processors with the T suffix have more robust thermal characteristics (higher T-case). Processors with the M suffix support greater than 768 GB per processor.

Table 4. Processor options

Part number	Feature code	Description	Memory speed	Supports >768 GB per CPU	L3 cache	AVX-512 FMA units
7XG7A04974	AX8M	Intel Xeon Gold 5115 10C 85W 2.4GHz	2400 MHz	No	13.75 MB	1
4XG7A09098	B248	Intel Xeon Gold 5117 14C 105W 2.0GHz	2400 MHz	No	19.25 MB	1
7XG7A04971	AX7D	Intel Xeon Gold 5118 12C 105W 2.3GHz	2400 MHz	No	16.5 MB	1
7XG7A04973	B259	Intel Xeon Gold 5119T 14C 85W 1.9GHz	2400 MHz	No	19.25 MB	1
7XG7A04970	AX7C	Intel Xeon Gold 5120 14C 105W 2.2GHz	2400 MHz	No	19.25 MB	1
7XG7A04972	AX7E	Intel Xeon Gold 5120T 14C 105W 2.2GHz	2400 MHz	No	19.25 MB	1
7XG7A04959	AX70	Intel Xeon Gold 5122 4C 105W 3.6GHz	2666 MHz*	No	16.5 MB**	2*
7XG7A03949	AWEX	Intel Xeon Gold 6126 12C 125W 2.6GHz	2666 MHz	No	19.25 MB**	2
None†	AX73	Intel Xeon Gold 6126T 12C 125W 2.6GHz	2666 MHz	No	19.25 MB**	2
7XG7A04958	B251	Intel Xeon Gold 6128 6C 115W 3.4GHz	2666 MHz	No	19.25 MB**	2
7XG7A03945	AX6D	Intel Xeon Gold 6130 16C 125W 2.1GHz	2666 MHz	No	22 MB	2
7XG7A04961	AX72	Intel Xeon Gold 6130T 16C 125W 2.1GHz	2666 MHz	No	22 MB	2
7XG7A03947	B24N	Intel Xeon Gold 6132 14C 140W 2.6GHz	2666 MHz	No	19.25	2
7XG7A04957	AX6Y	Intel Xeon Gold 6134 8C 130W 3.2GHz	2666 MHz	No	24.75 MB**	2
7XG7A04968	B258	Intel Xeon Gold 6134M 8C 130W 3.2GHz	2666 MHz	Yes	24.75 MB**	2
7XG7A03948	AX6W	Intel Xeon Gold 6136 12C 150W 3.0GHz	2666 MHz	No	24.75 MB**	2
7XG7A03943	AX6Q	Intel Xeon Gold 6138 20C 125W 2.0GHz	2666 MHz	No	27.5 MB	2
7XG7A04960	B252	Intel Xeon Gold 6138T 20C 125W 2.0GHz	2666 MHz	No	27.5 MB	2
7XG7A03944	AX6R	Intel Xeon Gold 6140 18C 140W 2.3GHz	2666 MHz	No	24.75 MB	2
7XG7A04967	B257	Intel Xeon Gold 6140M 18C 140W 2.3GHz	2666 MHz	Yes	24.75 MB	2
7XG7A03946	AX6E	Intel Xeon Gold 6142 16C 150W 2.6GHz	2666 MHz	No	22 MB	2
7XG7A04966	B256	Intel Xeon Gold 6142M 16C 150W 2.6GHz	2666 MHz	Yes	22 MB	2
None†	AX6X	Intel Xeon Gold 6144 8C 150W 3.5GHz	2666 MHz	No	24.75 MB**	2
None†	AX6V	Intel Xeon Gold 6146 12C 165W 3.2GHz	2666 MHz	No	24.75 MB**	2
7XG7A03942	AWEW	Intel Xeon Gold 6148 20C 150W 2.4GHz	2666 MHz	No	27.5 MB	2
7XG7A06760	AX6T	Intel Xeon Gold 6150 18C 165W 2.7GHz	2666 MHz	No	24.75 MB	2
7XG7A03941	AX6P	Intel Xeon Gold 6152 22C 140W 2.1GHz	2666 MHz	No	30.25 MB	2
None†	AX6S	Intel Xeon Gold 6154 18C 200W 3.0GHz	2666 MHz	No	24.75 MB	2
7XG7A03938	AX6L	Intel Xeon Platinum 8153 16C 125W 2.0GHz	2666 MHz	No	22 MB	2
7XG7A03939	AWEV	Intel Xeon Platinum 8156 4C 105W 3.6GHz	2666 MHz	No	16.5 MB**	2
7XG7A04969	AX7B	Intel Xeon Platinum 8158 12C 150W 3.0GHz	2666 MHz	No	24.75 MB**	2
7XG7A03937	AWGJ	Intel Xeon Platinum 8160 24C 150W 2.1GHz	2666 MHz	No	33 MB	2
7XG7A04965	B255	Intel Xeon Platinum 8160M 24C 150W 2.1GHz	2666 MHz	Yes	33 MB	2
None†	AX6N	Intel Xeon Platinum 8160T 24C 150W 2.1GHz	2666 MHz	No	33 MB	2
7XG7A03936	AX6K	Intel Xeon Platinum 8164 26C 150W 2.0GHz	2666 MHz	No	35.75 MB	2
None†	AX6M	Intel Xeon Platinum 8168 24C 205W 2.7GHz	2666 MHz	No	33 MB	2
7XG7A03935	AX6J	Intel Xeon Platinum 8170 26C 165W 2.1GHz	2666 MHz	No	35.75 MB	2
7XG7A04964	B254	Intel Xeon Platinum 8170M 26C 165W 2.1GHz	2666 MHz	Yes	35.75 MB	2
7XG7A03934	AX6H	Intel Xeon Platinum 8176 28C 165W 2.1GHz	2666 MHz	No	38.5 MB	2
7XG7A04963	B253	Intel Xeon Platinum 8176M 28C 165W 2.1GHz	2666 MHz	Yes	38.5 MB	2
None†	AX6G	Intel Xeon Platinum 8180 28C 205W 2.5GHz	2666 MHz	No	38.5 MB	2
None†	AX74	Intel Xeon Platinum 8180M 28C 205W 2.5GHz	2666 MHz	Yes	38.5 MB	2

\* All Gold 5000-level processors, except the 5122, support 2400 MHz memory speeds and have one AVX-512 512-bit FMA units. The 5122 processor supports 2666 MHz and has two FMA units

\*\* L3 cache is 1.375 MB per core except for processor indicated with \*\* where the cache size is larger

† These high-performance processors have high thermal requirements and can only be ordered in a configure-to-order (CTO) configuration. No field upgrade of processors is supported. In addition, if these processors are used, then no backplanes or drives can be installed, and there are cooling restrictions. See the [Internal storage](#) and [Cooling](#) sections for details.

## Memory options

The SR850 server supports TruDDR4 memory. TruDDR4 memory uses the highest-quality components sourced from Tier 1 DRAM suppliers and only memory that meets strict tolerances 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 SR850 supports up to 12 DIMMs per processor, for a total of 48 DIMMs when four processors are installed. Each processor has six memory channels, and supports one or two DIMMs per channel.

All DIMMs can operate at a speed of 2666 MHz, both at 1 DIMM per channel and 2 DIMMs per channel. However, if the processor selected has a lower memory bus speed (eg 2400 MHz), then all DIMMs will operate at that lower speed.

The following table lists the memory options that are available for the SR850 server.

Table 5. Memory options

Part number	Feature code	Description	Maximum supported
<b>RDIMMs</b>			
7X77A01301	AUU1	ThinkSystem 8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM	48 (12 per processor)
7X77A01302	AUNB	ThinkSystem 16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM	48 (12 per processor)
7X77A01303	AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	48 (12 per processor)
7X77A01304	AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	48 (12 per processor)
<b>LRDIMMs</b>			
7X77A01305	AUNE	ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	48 (12 per processor)
<b>3DS RDIMMs</b>			
7X77A01307	AUNF	ThinkSystem 128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM	48 (12 per processor)

The following rules apply when selecting the memory configuration:

- The server supports RDIMMs, LRDIMMs and 3DS RDIMMs. UDIMMs are not supported.
- Mixing RDIMMs and LRDIMMs is not supported.
- Mixing 3DS RDIMMs with either RDIMMs or LRDIMMs is not supported.

- Mixing x4 and x8 DIMMs *is* supported.
- When mixing 16 GB and 32 GB DIMMs in the same configuration, use 16GB 2Rx8 DIMMs instead of 16 GB 1Rx4 DIMMs for better performance
- For best performance, populate memory DIMMs in quantities of 6 or 12 per processor, so that all memory channels are used.

The following memory protection technologies are supported:

- ECC
- SDDC (for x4-based memory DIMMs; look for "x4" in the DIMM description)
- ADDDC (for x4-based memory DIMMs)
- Memory channel mirroring
- Memory rank sparing

If memory channel mirroring is used, then DIMMs must be installed in pairs (minimum of one pair per processor), and both DIMMs in a pair must be identical in type and size. 50% of the installed capacity is available to the operating system.

If memory rank sparing is used, then a minimum of one quad-rank DIMM or two single-rank or dual-rank DIMMs must be installed per populated channel (the DIMMs do not need to be identical). In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The largest rank in the channel will be automatically selected as the spare rank. The amount of memory available to the operating system depends on the number, capacity and rank counts of the DIMMs installed.

## Internal storage

The server can support up to 16x 2.5-inch drives, SAS, SATA or NVMe, depending on the selected backplane configuration. You can mix drives in the same server, but not in the same array. Drives are all installed from the front of the server. The server also supports one or two M.2 drives, installed in an M.2 adapter.

In this section:

- [Backplanes and drive bays](#)
- [Processors with backplane restrictions](#)
- [Adapters and cabling](#)
- [Field upgrades](#)
- [M.2 drives](#)
- [SED encryption key management with ISKLM](#)

### Backplanes and drive bays

The SR850 supports various internal storage configurations based on two different backplanes:

- 8-drive SAS/SATA backplane for 8x 2.5-inch SAS or SATA drives
- 8-drive SAS/SATA+AnyBay backplane for either:
  - 8x 2.5-inch SAS or SATA drives
  - 4x 2.5-inch SAS or SATA drives + 4x 2.5-inch U.2 (NVMe) drives

For configure-to-order (CTO) configurations, ordering information for the backplanes is in the following table.

Table 6. Backplane ordering

Part number	Feature code	Description
None*	AUR5	ThinkSystem 2U 2.5" AnyBay 8-Bay Backplane Kit
None*	AURA	ThinkSystem 2U/Tower 2.5" SATA/SAS 8-Bay Backplane Kit

\* Backplanes are configure-to-order (CTO) only; however, upgrade kits are available that include backplanes, as described in the [Field upgrades](#) section below.

Regular 2.5-inch SAS/SATA drive bays support only SAS or SATA drives, however the Lenovo AnyBay drive bay design allows a choice of SATA, SAS or NVMe drives. This design enables the flexibility to configure some of the bays with high-performance PCIe SSDs and still use the remaining bays for high-capacity HDDs, which is the ideal solution for storage tiering.

Backplane connections are as follows:

- The 8-drive SAS/SATA backplane has two SAS/SATA connectors and connects to a supported RAID controller or SAS HBA.
- The 8-drive SAS/SATA+AnyBay backplane has two SAS/SATA connectors and connects to a supported RAID controller or SAS HBA plus four PCIe connectors to connect to either two PCIe connectors on the Processor and Memory Expansion Tray (see [Figure 4](#)), or four PCIe connectors on a NVMe Switch adapter installed in a PCIe slot.

Five drive configurations are possible with these two backplanes:

1. 8 drive bays, all SAS/SATA
2. 8 drive bays, where 4 are AnyBay
3. 16 drive bays, all SAS/SATA
4. 16 drive bays, where 4 are AnyBay
5. 16 drive bays, where 8 are AnyBay
6. Zero drive bays without any backplanes installed

The first five configurations are shown in the following figure.

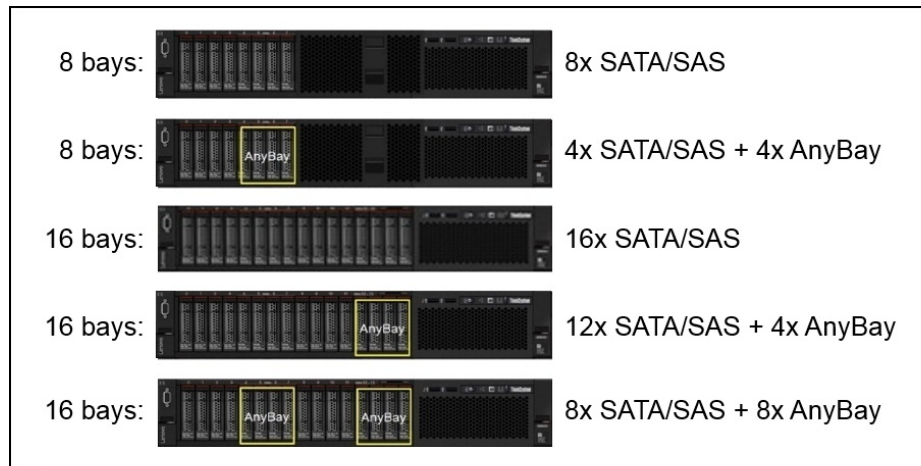


Figure 7. Drive bay configurations

## Processors with backplane restrictions

The following processors have high thermal characteristics. If any one of these processors is selected, then no backplanes and no 2.5-inch drives can be installed in the server:

- Intel Xeon Gold 6126T 12C 125W 2.6GHz Processor
- Intel Xeon Gold 6144 8C 150W 3.5GHz Processor
- Intel Xeon Gold 6146 12C 165W 3.2GHz Processor
- Intel Xeon Gold 6154 18C 200W 3.0GHz Processor
- Intel Xeon Platinum 8160T 24C 150W 2.1GHz Processor
- Intel Xeon Platinum 8168 24C 205W 2.7GHz Processor
- Intel Xeon Platinum 8180 28C 205W 2.5GHz Processor
- Intel Xeon Platinum 8180M 28C 205W 2.5GHz Processor

The use of M.2 drives is still supported with these processors.

Use of these processors does have cooling restrictions. See the [Cooling](#) section for details.

**Special bid configuration with one backplane:** With one of the above processors selected, it is possible to also include one 8-drive backplane, however additional cooling restrictions are in place. See the [Cooling](#) section for details. Such configurations requires a Special Bid request.

## Adapters and cabling

This section describes the adapter and cabling requirements for each of the five configurations. There are two aspects of the server configuration that determine what adapters are needed:

- For configurations with two SAS/SATA backplanes, you can select either one 16-port SAS/SATA adapter or two 8-port SAS/SATA adapters
- For AnyBay drive bays, cabling varies depending on whether the server has four processors and the Processor and Memory Expansion Tray (with its two NVMe connectors) installed. If the server has only two processors configured, then the NVMe ports are provided by an NVMe Switch adapter.

The five drive bay configurations are shown in the subsections below. Where there are different adapter and cabling options, or for 2 or 4 processors, they are shown by the letters A, B, C and D. These configuration numbers are also later references in the [Field upgrades section](#).

1. 8x drive bays, all SAS/SATA
2. 8x drive bays, where 4 are AnyBay
3. 16x drive bays, all SAS/SATA
4. 16x drive bays, where 4 are AnyBay
5. 16x drive bays, where 8 are AnyBay

**Tip:** The adapters are described in detail in the [Controllers for internal storage](#) section.



## 1. 8 drive bays, all SAS/SATA

In this drive bay configuration, all eight drives are connected to one 8-port SAS/SATA RAID adapter or HBA using two backplane cables, as shown in the following figure.

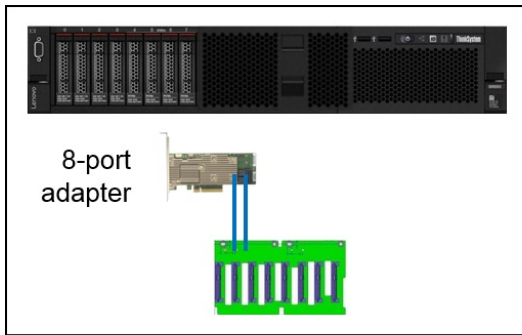


Figure 8. Adapter and cabling for 8x drive bays, all SAS/SATA

## 2. 8 drive bays, where 4 are AnyBay

In 8-drive bay configurations where four of those drive bays are AnyBay drive bays, possible adapter and cabling configurations are shown in the following figure.

When only two processors are selected, an AnyBay drive bays and NVMe Switch Adapter is used to provide the four needed NVMe ports. When four processors are selected, the NVMe ports on the Processor and Memory Expansion Tray are used to connect to the NVMe connectors on the backplane.

In this configuration you can have up to eight SAS or SATA drives, or you can instead put up to four NVMe drives in the AnyBay drive bays, along with up to four SAS/SATA drives in the other drive bays.

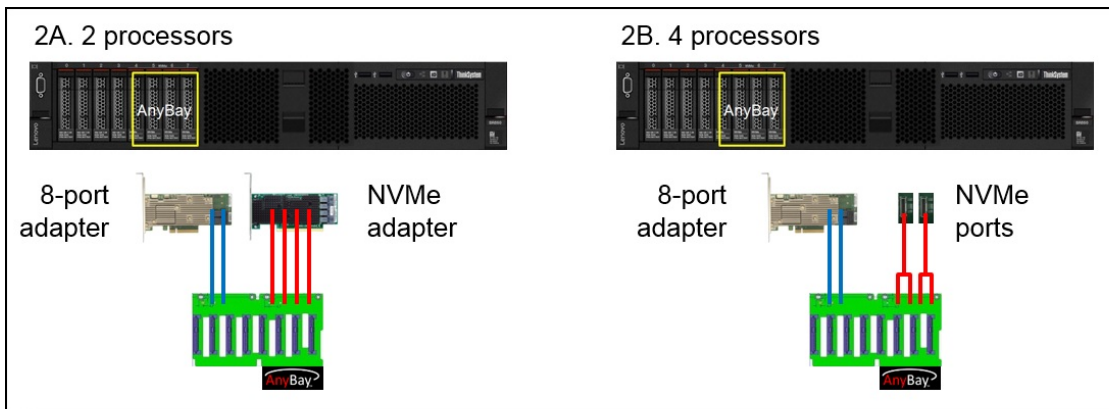


Figure 9. Adapter and cabling for 8 drive bays, where 4 of the bays are AnyBay

### 3. 16 drive bays, all SAS/SATA

In 16-bay configurations where all 16 drive bays are SAS/SATA drives, you can use either two 8-port SAS/SATA RAID adapters or HBAs or one 16-port SAS/SATA RAID adapter or HBA. These choices are shown in the following figure.

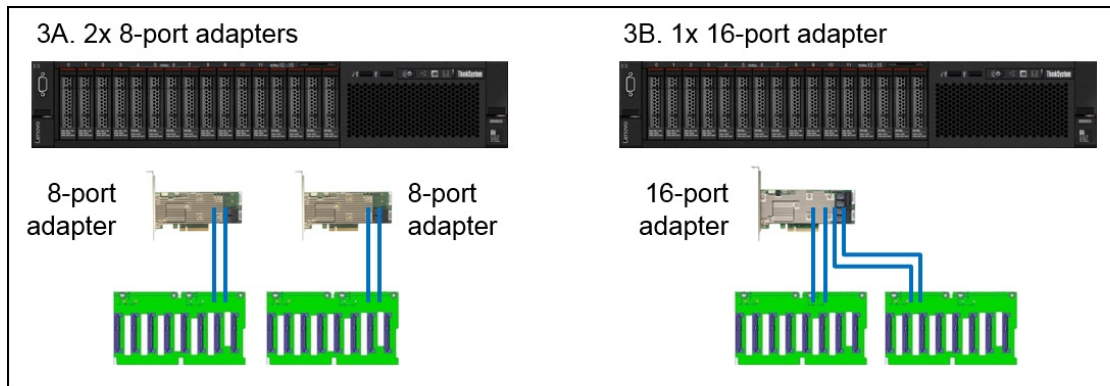


Figure 10. Adapter and cabling for 16 drive bays, all SAS/SATA

### 4. 16 drive bays, where 4 are AnyBay

In 16-drive configurations where four of the bays are AnyBay drive bays, you can elect to have either one 16-port adapter or two 8-port adapters for SAS/SATA connectivity. In addition, the NVMe connectivity depends on whether you have two or four processors installed: for two-processor systems, an NVMe Switch Adapter is required; for four-processor systems, the onboard NVMe ports can be used. The configurations are shown in the following figure.

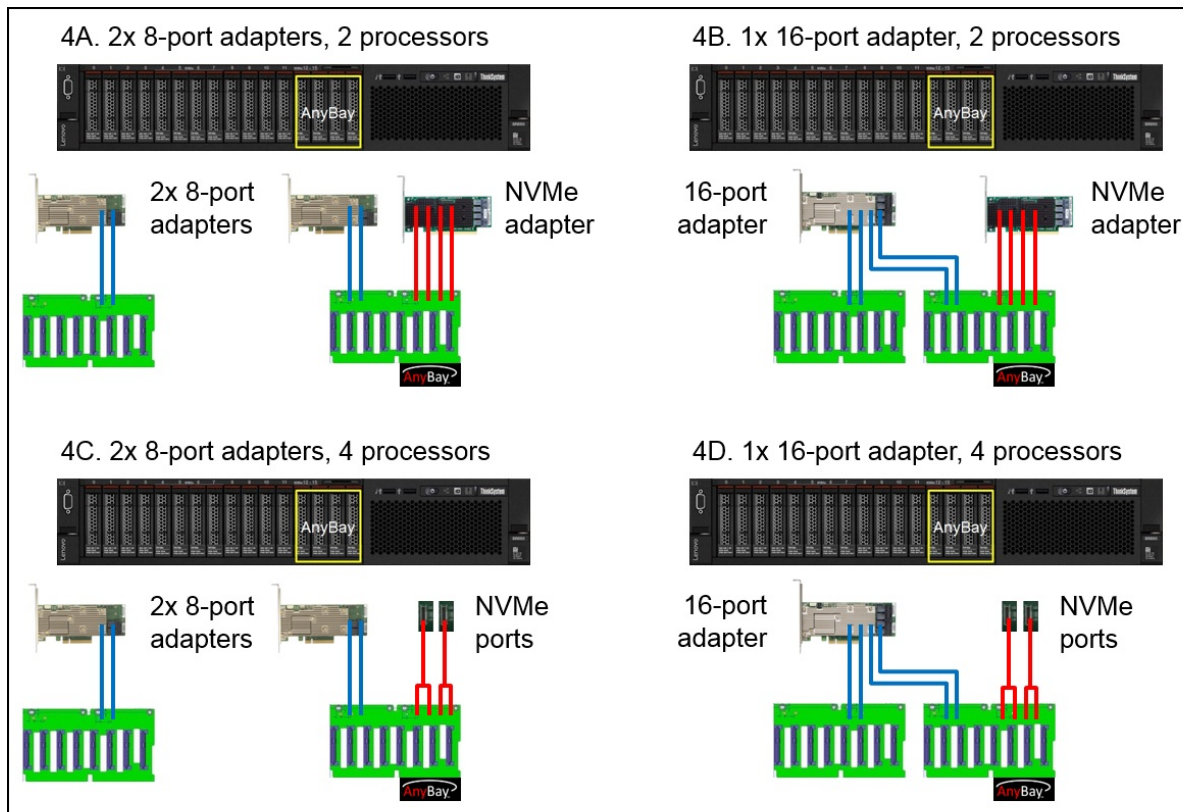


Figure 11. Adapter and cabling for 16 drive bays, where 4 of the bays are AnyBay

## 5. 16 drive bays, where 8 are AnyBay

In 16-drive configurations where eight of the bays are AnyBay drive bays, you can select either one 16-port adapter or two 8-port adapters for SAS/SATA connectivity. In addition, the NVMe connectivity depends on whether you have two or four processors installed:

- For two-processor systems, two NVMe Switch Adapters are required
- For four-processor systems, the onboard NVMe ports is used for four of the AnyBay drive bays and an NVMe Switch Adapter is needed for the other four AnyBay drive bays.

The configurations are shown in the following figure.

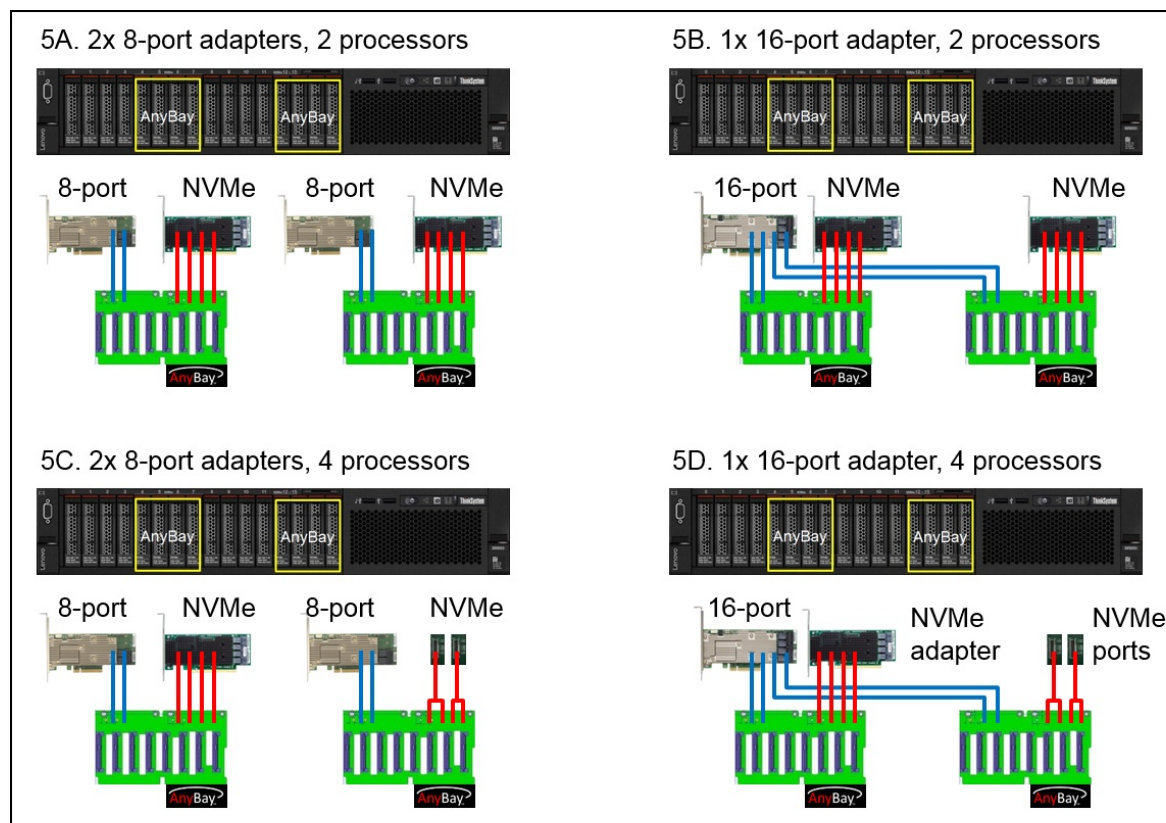


Figure 12. Adapter and cabling for 16 drive bays, where 8 of the bays are AnyBay

## Field upgrades

This section describes how customers can upgrade their 8-bay configurations after the initial purchase of the server. The two backplane upgrade kits are listed in the following table.

Table 7. Drive backplane upgrades

Part number	Feature code	Description
7C57A03998	AXP7	ThinkSystem SR850/SR860 2.5" SATA/SAS 8-Bay BP Kit
7C57A03999	AXP8	ThinkSystem SR850/SR860 2.5" AnyBay 8-Bay BP Kit

The ThinkSystem SR850 2.5" SATA/SAS 8-Bay BP Kit, 7C57A03998, contains the following items:

- 1x 8-bay SAS/SATA backplane
- 1x backplane power cable

- 2x 900mm SAS/SATA cables
- 2x 720mm SAS/SATA cables
- 8x 1-bay fillers

The ThinkSystem SR850 2.5" AnyBay 8-Bay BP Kit, 7C57A03999, contains the following items:

- 1x 8-bay AnyBay backplane (4 SAS/SATA connectors, 4 AnyBay connectors)
- 1x backplane power cable
- 1x 900mm SAS/SATA cable
- 1x 720mm SAS/SATA cable
- 4x 750mm NVMe cables for use with NVMe Switch Adapter
- 2x 900mm NVMe cables for use with onboard NVMe ports

In addition to the backplane kits, you will need a RAID adapter or HBA, and for some upgrades you may also need an NVMe adapter. Upgrades needed are listed in the following two tables. Upgrading from an 8-port SAS/SATA adapter to a 16-port SAS/SATA adapter is supported, however that requires removing the existing 8-port adapter.

**Tip:** The adapters are described in the [Controllers for internal storage](#) section.

The following table lists the available upgrades for SR850 servers with a single SAS/SATA backplane (See [Configuration 1](#) above).

Table 8. Upgrades for servers with one 8-bay SAS/SATA backplane (Config 1)

Target configuration	Remove existing 8-port adapter	Components to add
<b>Servers with two processors</b>		
16x bays (all SAS/SATA) with 2x 8-port adapters (Config 3A)	No	1x SAS/SATA backplane 1x 8-port adapter
16x bays (4x AnyBay) with 2x 8-port adapters, 1x NVMe adapter (Config 4A)	No	1x AnyBay backplane 1x 8-port adapter, 1x NVMe adapter
16x bays (all SAS/SATA) with 1x 16-port adapter (Config 3B)	Yes	1x SAS/SATA backplane 1x 16-port adapter
16x bays (4x AnyBay) with 1x 16-port adapter, 1x NVMe adapter (Config 4B)	Yes	1x AnyBay backplane 1x 16-port adapter, 1x NVMe adapter
<b>Servers with four processors</b>		
16x bays (all SAS/SATA) with 2x 8-port adapters (Config 3A)	No	1x SAS/SATA backplane 1x 8-port adapter
16x bays (4x AnyBay) with 2x 8-port adapters (Config 4C)	No	1x AnyBay backplane 1x 8-port adapter, cables to onboard NVMe ports
16x bays (all SAS/SATA) with 1x 16-port adapter (Config 3B)	Yes	1x SAS/SATA backplane 1x 16-port adapter
16x bays (4x AnyBay) with 1x 16-port adapter (Config 4D)	Yes	1x AnyBay backplane 1x 16-port adapter, cables to onboard NVMe ports

The following table lists the available upgrades for SR850 servers with a single AnyBay backplane (See [Configuration 2](#) above).

Table 9. Upgrades for servers with one 8-bay AnyBay backplane (Config 2)

Target configuration	Remove existing 8-port adapter	Components to add
<b>Servers with two processors</b>		
16x bays (4x AnyBay) with 2x 8-port adapters, 1x NVMe adapter (Config 4A)	No	1x SAS/SATA backplane 1x 8-port adapter
16x bays (8x AnyBay) with 2x 8-port adapters, 2x NVMe adapters (Config 5A)	No	1x AnyBay backplane 1x 8-port adapter, 1x NVMe adapter
16x bays (4x AnyBay) with 1x 16-port adapter, 1x NVMe adapter (Config 4B)	Yes	1x SAS/SATA backplane 1x 16-port adapter
16x bays (8x AnyBay) with 2x 8-port adapters, 2x NVMe adapters (Config 5B)	Yes	1x AnyBay backplane 1x 16-port adapter, 1x NVMe adapter
<b>Servers with four processors</b>		
16x bays (4x AnyBay) with 2x 8-port adapters (Config 4C)	No	1x SAS/SATA backplane 1x 8-port adapter
16x bays (8x AnyBay) with 2x 8-port adapters, 1x NVMe adapter (Config 5C)	No	1x AnyBay backplane 1x 8-port adapter, 1x NVMe adapter
16x bays (4x AnyBay) with 1x 16-port adapter (Config 4D)	Yes	1x SAS/SATA backplane 1x 16-port adapter
16x bays (8x AnyBay) with 2x 8-port adapters, 1x NVMe adapter (Config 5D)	Yes	1x AnyBay backplane 1x 16-port adapter, 1x NVMe adapter

## M.2 drives

The server supports one or two M.2 form-factor SATA drives for use as an operating system boot solution. With two M.2 drives configured, the drives are configured by default as a RAID-1 mirrored pair for redundancy.

The M.2 drives install into an M.2 adapter which in turn is installed in a dedicated slot on the system board. See the internal view of the server in the [Components and connectors](#) section for the location of the M.2 slot.

There are two M.2 adapters supported, as listed in the following table.

Table 10. M.2 components

Part number	Feature code	Description	Maximum supported
7Y37A01092	AUMU	ThinkSystem M.2 Enablement Kit (contains the Single M.2 Boot Adapter; supports 1 drive)	1
7Y37A01093	AUMV	ThinkSystem M.2 with Mirroring Enablement Kit (contains the Dual M.2 Boot Adapter, supports 1 or 2 drives)	1

Supported drives are listed in the [Internal drive options](#) section.

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>



## SED encryption key management with ISKLM

The server supports self-encrypting drives (SEDs) as listed in the [Internal drive options](#) section. To effectively manage a large deployment of these drives in Lenovo servers, IBM Security Key Lifecycle Manager (SKLM) offers a centralized key management solution. A Lenovo Feature on Demand (FoD) upgrade is used to enable this SKLM support in the management processor of the server.

The following table lists the part numbers and feature codes for the upgrades.

Table 11. FoD upgrades for SKLM support

Part number	Feature code	Description
Security Key Lifecycle Manager - FoD (United States, Canada, Asia Pacific, and Japan)		
00D9998	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 1 year S&S
00D9999	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 3 year S&S
Security Key Lifecycle Manager - FoD (Latin America, Europe, Middle East, and Africa)		
00FP648	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 1 year S&S
00FP649	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 3 year S&S

## Controllers for internal storage

The SR850 supports internal SAS and SATA drives with the addition of a RAID adapter or HBA. For NVMe support, the server offers two onboard NVMe ports on the processor and memory expansion tray (with four processors) and two ports with the use of an NVMe Switch Adapter.

The following table lists the adapters used for the internal storage of the SR850 server.

**Tip:** Unlike System x RAID adapters, no upgrades are available for these RAID adapters. All supported functions are included with the base part numbers.

Table 12. Controllers for internal storage

Part number	Feature code	Description	Slots supported	Maximum supported
SAS/SATA HBA				
7Y37A01088	AUNL	ThinkSystem 430-8i SAS/SATA 12Gb HBA	10 , 2	2
7Y37A01089	AUNM	ThinkSystem 430-16i SAS/SATA 12Gb HBA	10 , 2	1
RAID adapters				
7Y37A01082	AUNG	ThinkSystem RAID 530-8i PCIe 12Gb Adapter	10 , 2	2
7Y37A01083*	AUNH*	ThinkSystem RAID 730-8i 1GB Cache PCIe 12Gb Adapter	10 , 2	2
4Y37A09722	B4RQ	ThinkSystem RAID 730-8i 2GB Flash PCIe 12Gb Adapter	10 , 2	2
7Y37A01084	AUNJ	ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter	10 , 2	2
7Y37A01085	AUNK	ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter	10 , 2	1
4Y37A09721	B31E	ThinkSystem RAID 930-16i 8GB Flash PCIe 12Gb Adapter	10 , 2	1
NVMe adapter				
7Y37A01081	AUV2	ThinkSystem 1610-4P NVMe Switch Adapter	1, 11	2

\* \* The RAID 730-8i 1GB Cache adapter is not available in USA and Canada.

The following two tables compare the functions of the storage adapters.

Table 13. Comparison of internal storage controllers - RAID adapters

Feature	RAID 530-8i	RAID 730-8i 1GB**	RAID 730-8i 2GB	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 4Y37A09721
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
Broadcom equivalent	MegaRAID 9440-8i	MegaRAID 9361-8i	MegaRAID 9361-8i	MegaRAID 9460-8i	MegaRAID 9460-16i
Host interface	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8
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

\* SAS HBAs support SEDs (self-encrypting drives) by using software on the server and simply passing SED commands through the HBA to the drives. SED support by RAID controllers is provided using the built-in MegaRAID SafeStore functionality of the adapter.

\*\* The RAID 730-8i 1GB Cache adapter is not available in USA and Canada.

Table 14. Comparison of internal storage controllers - HBAs and NVMe switches

Feature	430-8i	430-16i	1610-4P NVMe
Adapter type	HBA	HBA	NVMe switch
Part number	7Y37A01088	7Y37A01089	7Y37A01081
Form factor	PCIe low profile	PCIe low profile	PCIe HHHL
Controller chip	LSI SAS3408	LSI SAS3416	Broadcom PEX9733
Broadcom equivalent	HBA 9400-8i	HBA 9400-16i	P310W-4P
Host interface	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x16
Port interface	12 Gb SAS	12 Gb SAS	PCIe NVMe
Number of ports	8	16	4
Port connectors	2x Mini-SAS HD x4 (SFF-8643)	4x Mini-SAS HD x4 (SFF-8643)	4x Mini-SAS HD x4 (SFF-8643)
Drive interface	SAS, SATA	SAS, SATA	NVMe
Drive type	HDD, SSD, SED*	HDD, SSD, SED*	SSD
Hot-swap drives	Yes	Yes	Yes
Max devices	8	16	4
RAID levels	No RAID	No RAID	None
JBOD mode	Yes	Yes	Yes
Cache	No	No	None
CacheVault cache protection	No	No	No
Performance Accelerator (FastPath)	No	No	No
SSD Caching (CacheCade Pro 2.0)	No	No	No
SED support*	Yes	Yes	No

\* SAS HBAs support SEDs (self-encrypting drives) by using software on the server and simply passing SED commands through the HBA to the drives. SED support by RAID controllers is provided using the built-in MegaRAID SafeStore functionality of the adapter.

For more information about the adapters see the product guides in the RAID adapters or HBA sections of the Lenovo Press web site:

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

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



## 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:

- Table 23: [2.5-inch hot-swap 12 Gb SAS HDDs](#)
- Table 24: [2.5-inch hot-swap 6 Gb SATA HDDs](#)
- Table 25: [2.5-inch hot-swap 12 Gb SAS SSDs](#)
- Table 26: [2.5-inch hot-swap 6 Gb SATA SSDs](#)
- Table 27: [2.5-inch hot-swap PCIe 4.0 NVMe SSDs](#)
- Table 28: [2.5-inch hot-swap PCIe 3.0 NVMe SSDs](#)

M.2 drives:

- Table 29: [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.

**PCIe 4.0 NVMe drive support:** When installed in this server, PCIe 4.0 NVMe drives will operate at PCIe 3.0 speeds.

Table 15. 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
7XB7A00031	AUM5	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD SED	16
7XB7A00033	B0YX	ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD SED	16

Table 16. 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 17. 2.5-inch hot-swap 12 Gb SAS SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 12 Gb SAS - Performance (10+ DWPD)			
4XB7A10219	B4Y4	ThinkSystem 2.5" SS530 400GB Performance SAS 12Gb Hot Swap SSD	16
4XB7A10230	B4Y5	ThinkSystem 2.5" SS530 800GB Performance SAS 12Gb Hot Swap SSD	16
4XB7A10231	B4Y6	ThinkSystem 2.5" SS530 1.6TB Performance SAS 12Gb Hot Swap SSD	16
4XB7A10232	B4Y7	ThinkSystem 2.5" SS530 3.2TB Performance SAS 12Gb Hot Swap SSD	16
2.5-inch hot-swap SSDs - 12 Gb SAS - Mainstream (3-5 DWPD)			
4XB7A17062	B8HU	ThinkSystem 2.5" PM1645a 800GB Mainstream SAS 12Gb Hot Swap SSD	16
4XB7A17063	B8J4	ThinkSystem 2.5" PM1645a 1.6TB Mainstream SAS 12Gb Hot Swap SSD	16
4XB7A17064	B8JD	ThinkSystem 2.5" PM1645a 3.2TB Mainstream SAS 12Gb Hot Swap SSD	16
4XB7A13654	B4A1	ThinkSystem 2.5" PM1645 1.6TB Mainstream SAS 12Gb Hot Swap SSD	16
4XB7A13655	B4A2	ThinkSystem 2.5" PM1645 3.2TB Mainstream SAS 12Gb Hot Swap SSD	16
2.5-inch hot-swap SSDs - 12 Gb SAS - Entry / Capacity (<3 DWPD)			
4XB7A38175	B91A	ThinkSystem 2.5" PM1643a 960GB Entry SAS 12Gb Hot Swap SSD	16
4XB7A38176	B91B	ThinkSystem 2.5" PM1643a 1.92TB Entry SAS 12Gb Hot Swap SSD	16
4XB7A17054	B91C	ThinkSystem 2.5" PM1643a 3.84TB Entry SAS 12Gb Hot Swap SSD	16
4XB7A17055	B91D	ThinkSystem 2.5" PM1643a 7.68TB Entry SAS 12Gb Hot Swap SSD	16
4XB7A17056	BC4R	ThinkSystem 2.5" PM1643a 15.36TB Entry SAS 12Gb Hot Swap SSD	16
4XB7A13645	B4A7	ThinkSystem 2.5" PM1643 3.84TB Capacity SAS 12Gb Hot Swap SSD	16
2.5-inch hot-swap SED SSDs - 12 Gb SAS - Mainstream (3-5 DWPD)			
4XB7A17069	B6K5	ThinkSystem 2.5" SS530 400GB Mainstream SAS 12Gb Hot Swap SSD SED	16

Table 18. 2.5-inch hot-swap 6 Gb SATA SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 6 Gb SATA - Mainstream (3-5 DWPD)			
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
4XB7A17091	B8J7	ThinkSystem 2.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	16

Part number	Feature	Description	Maximum supported
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
4XB7A13636	B49P	ThinkSystem 2.5" Intel S4610 1.92TB Mainstream SATA 6Gb Hot Swap SSD	16
4XB7A13637	B49Q	ThinkSystem 2.5" Intel S4610 3.84TB Mainstream SATA 6Gb Hot Swap SSD	16
4XB7A10237	B488	ThinkSystem 2.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD	16
4XB7A10238	B489	ThinkSystem 2.5" 5200 480GB Mainstream SATA 6Gb Hot Swap SSD	16
4XB7A10239	B48A	ThinkSystem 2.5" 5200 960GB Mainstream SATA 6Gb Hot Swap SSD	16
4XB7A10240	B48B	ThinkSystem 2.5" 5200 1.92TB Mainstream SATA 6Gb Hot Swap SSD	16
4XB7A10241	B48C	ThinkSystem 2.5" 5200 3.84TB Mainstream SATA 6Gb Hot Swap SSD	16
2.5-inch hot-swap SSDs - 6 Gb SATA - Entry (<3 DWPD)			
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
4XB7A17080	B8J2	ThinkSystem 2.5" 5300 7.68TB Entry SATA 6Gb Hot Swap SSD	16
4XB7A38185	B9AC	ThinkSystem 2.5" 5210 960GB Entry SATA 6Gb Hot Swap QLC SSD	16
4XB7A38144	B7EW	ThinkSystem 2.5" 5210 1.92TB Entry SATA 6Gb Hot Swap QLC SSD	16
4XB7A38145	B7EX	ThinkSystem 2.5" 5210 3.84TB Entry SATA 6Gb Hot Swap QLC SSD	16
4XB7A38146	B7EY	ThinkSystem 2.5" 5210 7.68TB 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
4XB7A13622	B49B	ThinkSystem 2.5" Intel S4510 1.92TB Entry SATA 6Gb Hot Swap SSD	16
4XB7A13623	B49C	ThinkSystem 2.5" Intel S4510 3.84TB 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
4XB7A10198	B34L	ThinkSystem 2.5" PM883 1.92TB Entry SATA 6Gb Hot Swap SSD	16
4XB7A10199	B34M	ThinkSystem 2.5" PM883 3.84TB Entry SATA 6Gb Hot Swap SSD	16
4XB7A10200	B4D2	ThinkSystem 2.5" PM883 7.68TB Entry SATA 6Gb Hot Swap SSD	16

Part number	Feature	Description	Maximum supported
7SD7A05740	B0Z0	ThinkSystem 2.5" Intel S4500 960GB Entry SATA 6Gb Hot Swap SSD	16
4XB7A10154	B2X3	ThinkSystem 2.5" 5200 960GB Entry SATA 6Gb Hot Swap SSD	16
4XB7A10155	B2X4	ThinkSystem 2.5" 5200 1.92TB Entry SATA 6Gb Hot Swap SSD	16
4XB7A10156	B2X5	ThinkSystem 2.5" 5200 3.84TB Entry SATA 6Gb Hot Swap SSD	16
4XB7A10157	B2X6	ThinkSystem 2.5" 5200 7.68TB Entry SATA 6Gb Hot Swap SSD	16

Table 19. 2.5-inch hot-swap PCIe 4.0 NVMe SSDs (operate at PCIe 3.0 speeds in this server)

Part number	Feature	Description	Maximum supported
<b>2.5-inch SSDs - PCIe 4.0 NVMe - Mainstream (3-5 DWPD)</b>			
4XB7A17152	BCFV	ThinkSystem U.2 Intel P5600 1.6TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A17153	BCFR	ThinkSystem U.2 Intel P5600 3.2TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A17154	BCFS	ThinkSystem U.2 Intel P5600 6.4TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A64175	BE03	ThinkSystem U.3 Kioxia CM6-V 800GB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A17112	B96Z	ThinkSystem U.3 Kioxia CM6-V 1.6TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A17113	B96T	ThinkSystem U.3 Kioxia CM6-V 3.2TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A17114	B96P	ThinkSystem U.3 Kioxia CM6-V 6.4TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	8
<b>2.5-inch SSDs - PCIe 4.0 NVMe - Entry (&lt;3 DWPD)</b>			
4XB7A17145	BCFT	ThinkSystem U.2 Intel P5500 1.92TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A17146	BCFW	ThinkSystem U.2 Intel P5500 3.84TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	8
4XB7A17147	BCFU	ThinkSystem U.2 Intel P5500 7.68TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	8

Table 20. 2.5-inch hot-swap PCIe 3.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
2.5-inch SSDs - PCIe 3.0 NVMe - Performance (10+ DWPD)			
7N47A00081	AUMJ	ThinkSystem U.2 Intel Optane P4800X 375GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	8
7N47A00083	B2ZJ	ThinkSystem U.2 Intel Optane P4800X 750GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	8
2.5-inch SSDs - PCIe 3.0 NVMe - Mainstream (3-5 DWPD)			
4XB7A13936	B589	ThinkSystem U.2 Intel P4610 1.6TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A13937	B58A	ThinkSystem U.2 Intel P4610 3.2TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A13938	B58B	ThinkSystem U.2 Intel P4610 6.4TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A08516	B21W	ThinkSystem U.2 Toshiba CM5-V 800GB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A08517	B21X	ThinkSystem U.2 Toshiba CM5-V 1.6TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A08518	B21Y	ThinkSystem U.2 Toshiba CM5-V 3.2TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A08519	B2XJ	ThinkSystem U.2 Toshiba CM5-V 6.4TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	8
2.5-inch SSDs - PCIe 3.0 NVMe - Entry (<3 DWPD)			
4XB7A10202	B58F	ThinkSystem U.2 Intel P4510 1.0TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A10204	B58G	ThinkSystem U.2 Intel P4510 2.0TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A10205	B58H	ThinkSystem U.2 Intel P4510 4.0TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A10175	B34N	ThinkSystem U.2 PM983 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A10176	B34P	ThinkSystem U.2 PM983 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	8
4XB7A10177	B4D3	ThinkSystem U.2 PM983 7.68TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	8
7SD7A05777	B11E	ThinkSystem U.2 Intel P4500 4.0TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	8

**Note:** NVMe PCIe SSDs support surprise hot removal and hot insertion, provided the operating system supports PCIe SSD hot-swap.

Table 21. M.2 SATA drives

Part number	Feature	Description	Maximum supported
M.2 SSDs - 6 Gb SATA - Entry (<3 DWPD)			
7N47A00129	AUUL	ThinkSystem M.2 32GB SATA 6Gbps Non-Hot Swap SSD	2
7N47A00130	AUUV	ThinkSystem M.2 128GB SATA 6Gbps Non-Hot Swap SSD	2
7SD7A05703	B11V	ThinkSystem M.2 5100 480GB SATA 6Gbps Non-Hot Swap SSD	2
4XB7A17071	B8HS	ThinkSystem M.2 5300 240GB SATA 6Gbps Non-Hot Swap SSD	2
4XB7A17073	B919	ThinkSystem M.2 5300 480GB SATA 6Gbps Non-Hot Swap SSD	2

## 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 22. USB memory key

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

\* Field upgrade only.

## Internal backup units

The server does not supports any internal backup units, such as tape drives or RDX drives.

## Optical drives

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

Table 23. 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, CD-RW, CD-R, CD-ROM.

## I/O expansion options

The server supports up to 9 PCIe 3.0 slots, plus a slot for the LOM adapter and a slot for the M.2 adapter.

Six PCIe 3.0 slots (1, 2, 8, 9, 10, 11) are on the system board and three slots (slots 3-5) are through a riser card. A riser card is standard on some models and optional on others. The LOM slot (slot 7) is also vertically mounted on the system board. All slots are available with two processors.

The PCIe slots are as follows:

- Slot 1: PCIe 3.0 x16 (low profile) (CPU 2)
- Slot 2: PCIe 3.0 x8 (low profile, x8 physical slot) (CPU 2)
- Slot 3-5: Riser card slots (see below) (CPU 2)
- Slot 6: PCIe 2.0 x2 dedicated to M.2 adapter and drives
- Slot 7: Dedicated to Ethernet LOM phy adapter (CPU 1)

- Slot 8: PCIe 3.0 x8 (low profile, x8 physical slot) (CPU 1)
- Slot 9: PCIe 3.0 x8 (low profile, x8 physical slot) (CPU 1)
- Slot 10: PCIe 3.0 x8 (low profile, x8 physical slot) (CPU 1)
- Slot 11: PCIe 3.0 x16 (low profile) (CPU 1)

The locations of the slots are shown in the following figure.

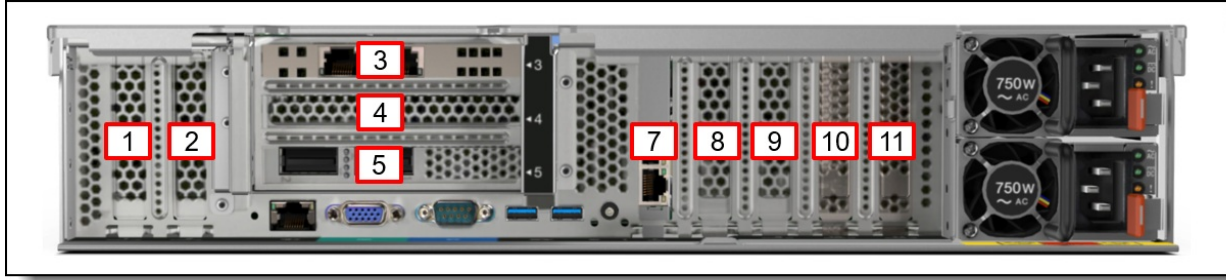


Figure 13. SR850 slots

**Note:** Slot 6 is an internal slot for the M.2 adapter as described in the [M.2 drives section](#).

Slots 3-5 are implemented using a riser card, and the SR850 supports three different riser cards as listed in the following table.

The following table lists the ordering information for the riser cards.

Table 24. PCI riser card options

Part number	Feature code	Description	Maximum supported
7C57A03950	AUR4	ThinkSystem SR850/SR860 x8/x8/x8 PCIe FH Riser 1 Kit	1
7C57A03951	AUR7	ThinkSystem SR850/SR860 x8/x8/x8ML2 PCIe FH Riser 1 Kit	1
7C57A03952	AURB	ThinkSystem SR850/SR860 x8/x16ML2 PCIe FH Riser 1 Kit	1

The riser cards listed in the table have the following slots:

- x8/x8/x8 PCIe FH Riser:
  - Slot 3: PCIe 3.0 x8 FHHL (x16 physical slot)
  - Slot 4: PCIe 3.0 x8 FHHL (x16 physical slot)
  - Slot 5: PCIe 3.0 x8 FHHL (x16 physical slot)
- x8/x8/x8ML2 PCIe FH
  - Slot 3: PCIe 3.0 x8 FHHL (x16 physical slot)
  - Slot 4: PCIe 3.0 x8 FHHL (x16 physical slot)
  - Slot 5: PCIe 3.0 x8 ML2 FHHL (x8 physical slot)
- x8/x16ML2 PCIe FH Riser
  - Slot 3: PCIe 3.0 x8 FHHL (x16 physical slot)
  - Slot 4: None
  - Slot 5: PCIe 3.0 x16 ML2 FHHL (x16 physical slot)

## Network adapters

The SR850 has integrated Intel Ethernet Connection X722 technology which can provide up to four 1/10GbE network ports via an optional LOM card. The X722 has the following features:

- Integrated into the Intel PCH chipset
- Supports 1GbE or 10GbE connections, depending on the selected LOM Phy adapter

- Offers VXLAN/NVGRE hardware offloads
- Supports VMDq and SR-IOV for advanced virtualization
- Supports iWarp RDMA

To provide connectivity to the X722, the SR850 supports six different LOM (LAN on Motherboard) cards which provide the Ethernet PHY function. Only 1 LOM card can be installed. See [Figure 3](#) for the location of the LOM slot.

The LOM card supports NC-SI to allow the network connection to be shared between the operating system and the XClarity Controller (XCC) management module. The LOM also supports Wake-on-LAN (WOL).

For more information about the X722 controller, see the Lenovo Press product guide: <http://lenovopress.com/LP0654-intel-x722-integrated-controller>

The following table lists the supported LOM cards.

**Note:** None of the LOM cards listed in the table support speeds lower than 1 Gbps.

Table 25. Supported LOM adapters

Part number	Feature code	Description	Ports	Slots supported	Maximum supported
Gigabit Ethernet					
7ZT7A00544	AUKG	ThinkSystem 1Gb 2-port RJ45 LOM	2x RJ45	7	1
7ZT7A00545	AUKH	ThinkSystem 1Gb 4-port RJ45 LOM	4x RJ45	7	1
10 Gb Ethernet					
7ZT7A00546	AUKJ	ThinkSystem 10Gb 2-port SFP+ LOM	2x SFP+ bays	7	1
7ZT7A00547	AUKK	ThinkSystem 10Gb 4-port SFP+ LOM	4x SFP+ bays	7	1
7ZT7A00548	AUKL	ThinkSystem 10Gb 2-port Base-T LOM	2x RJ45 (10GBASE-T)	7	1
7ZT7A00549	AUKM	ThinkSystem 10Gb 4-port Base-T LOM	4x RJ45 (10GBASE-T)	7	1

The SR850 also supports an ML2 card provided a suitable ML2 riser card is installed (see the [I/O expansion options section](#) for details). The ML2 card supports NC-SI and WOL. The following table lists the supported ML2 adapters.

**VFA5.2 and FCoE support:** ThinkSystem servers do not support Features on Demand, so the Emulex VFA5.2 ML2 Dual Port 10GbE SFP+ Adapter, 00AG560, cannot be upgraded to FCoE support. If you need FCoE or iSCSI support use 01CV770 instead.



Table 26. Supported ML2 adapters

Part number	Feature code	Description	Bus width	Slots supported	Maximum supported
Gigabit Ethernet					
7ZT7A00536	AUKW	ThinkSystem Intel I350-T4 ML2 1Gb 4-Port RJ45 Ethernet Adapter	PCIe 3.0 x8	5	1
10 Gb Ethernet					
00JY940	ATRH	Intel X710-DA2 ML2 2x10GbE SFP+ Adapter	PCIe 3.0 x8	5	1
7ZT7A00497	AUKQ	ThinkSystem Broadcom 57416 10GBASE-T 2-Port ML2 Ethernet Adapter	PCIe 3.0 x8	5	1
00AG560**	AT7U	Emulex VFA5.2 ML2 Dual Port 10GbE SFP+ Adapter	PCIe 3.0 x8	5	1
01CV770	AU7Z	Emulex VFA5.2 ML2 2x10 GbE SFP+ Adapter and FCoE/iSCSI SW	PCIe 3.0 x8	5	1
25 Gb Ethernet					
7ZT7A00507	AUKU	ThinkSystem Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-Port ML2 Ethernet Adapter	PCIe 3.0 x8	5	1
00MN990	ATZR	Mellanox ConnectX-4 Lx 10/25GbE SFP28 1-port ML2 Adapter	PCIe 3.0 x8	5	1
InfiniBand					
7ZT7A00501	AUKR	ThinkSystem Mellanox ConnectX-3 Pro ML2 FDR 2-Port QSFP VPI Adapter	PCIe 3.0 x8	5	1

\* ThinkSystem servers do not support Features on Demand, so the Emulex VFA5.2 ML2 Dual Port 10GbE SFP+ Adapter, 00AG560, cannot be upgraded to FCoE support. If you need FCoE or iSCSI support use 01CV770 instead.

The following table lists additional supported network adapters that can be installed in the regular PCIe slots.

**VFA5.2 and FCoE support:** ThinkSystem servers do not support Features on Demand, so the Emulex VFA5.2 2x10 GbE SFP+ PCIe Adapter, 00AG570, cannot be upgraded to FCoE support. If you need FCoE or iSCSI support use 00AG580 instead.

Table 27. Supported PCIe Network Adapters

Part number	Feature code	Description	Slots supported	Maximum supported
Gigabit Ethernet				
7ZT7A00533	AUZZ	ThinkSystem I350-F1 PCIe 1Gb 1-Port SFP Ethernet Adapter	1-5, 8, 9, 11	8
7ZT7A00534	AUZY	ThinkSystem I350-T2 PCIe 1Gb 2-Port RJ45 Ethernet Adapter	1-5, 8, 9, 11	8
7ZT7A00535	AUZW	ThinkSystem I350-T4 PCIe 1Gb 4-Port RJ45 Ethernet Adapter	1-5, 8, 9, 11	8
7ZT7A00482	AUZX	ThinkSystem Broadcom 5720 1GbE RJ45 2-Port PCIe Ethernet Adapter	1-5, 8, 9, 11	8
7ZT7A00484	AUZV	ThinkSystem Broadcom 5719 1GbE RJ45 4-Port PCIe Ethernet Adapter	1-5, 8, 9, 11	8

Part number	Feature code	Description	Slots supported	Maximum supported
<b>10 Gb Ethernet - 10GBase-T</b>				
7ZT7A00496	AUKP	ThinkSystem Broadcom 57416 10GBASE-T 2-Port PCIe Ethernet Adapter	1-5, 8, 9, 11	8
00MM860	ATPX	Intel X550-T2 Dual Port 10GBase-T Adapter	1-5, 8, 9, 11	8
4XC7A08225	B31G	ThinkSystem QLogic QL41134 PCIe 10Gb 4-Port Base-T Ethernet Adapter	1-5, 8, 9, 11	8
<b>10 Gb Ethernet - SFP+</b>				
7ZT7A00537	AUKX	ThinkSystem X710-DA2 PCIe 10Gb 2-Port SFP+ Ethernet Adapter	1-5, 8, 9, 11	5†
7ZT7A00493	AUKN	ThinkSystem Emulex OCe14104B-NX PCIe 10Gb 4-Port SFP+ Ethernet Adapter	3, 4, 5	3
00AG570*	AT7S	Emulex VFA5.2 2x10 GbE SFP+ PCIe Adapter	1-5, 8, 9, 11	8
00AG580	AT7T	Emulex VFA5.2 2x10 GbE SFP+ Adapter and FCoE/iSCSI SW	1-5, 8, 9, 11	8
<b>25 Gb Ethernet</b>				
4XC7A08228	B21R	ThinkSystem QLogic QL41262 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	1-5, 8, 9, 11	8
7XC7A05523	B0WY	ThinkSystem Intel XXV710-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	1-5, 8, 9, 11	5†
7ZT7A00505	AUKS	ThinkSystem Broadcom 57412 25GbE SFP28 1-Port PCIe Ethernet Adapter	1-5, 8, 9, 11	8
4XC7A08238	B5T0	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-port PCIe Ethernet Adapter	1-5, 8, 9, 11	8
01GR250	AUAJ	Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-port PCIe Ethernet Adapter	1-5, 8, 9, 11	8
4XC7A08229	B31C	ThinkSystem Mellanox ConnectX-5 Ex 25/40GbE 2-port Low-Latency Adapter	11, 1	2
<b>40 Gb Ethernet</b>				
00MM950	ATRN	Mellanox ConnectX-4 Lx 1x40GbE QSFP+ Adapter	1-5, 8, 9, 11	8
7ZT7A00500	AUVG	ThinkSystem Mellanox ConnectX-4 PCIe FDR 2-Port QSFP VPI Adapter	1-5, 8, 9, 11	8
4XC7A08229	B31C	ThinkSystem Mellanox ConnectX-5 Ex 25/40GbE 2-port Low-Latency Adapter	11, 1	2
<b>100 Gb Ethernet</b>				
00KH924	ASWQ	Mellanox ConnectX-4 1x100GbE/EDR IB QSFP28 VPI Adapter	11, 1	2
00MM960	ATRP	Mellanox ConnectX-4 2x100GbE/EDR IB QSFP28 VPI Adapter	11, 1	2
<b>InfiniBand</b>				
7ZT7A00500	AUVG	ThinkSystem Mellanox ConnectX-4 PCIe FDR 2-Port QSFP VPI Adapter	1-5, 8, 9, 11	8
00KH924	ASWQ	Mellanox ConnectX-4 1x100GbE/EDR IB QSFP28 VPI Adapter	11, 1	2
00MM960	ATRP	Mellanox ConnectX-4 2x100GbE/EDR IB QSFP28 VPI Adapter	11, 1	2

Part number	Feature code	Description	Slots supported	Maximum supported
4C57A14178	B4RA	ThinkSystem Mellanox ConnectX-6 HDR100 QSFP56 2-port PCIe InfiniBand Adapter	1	1
4C57A14177	B4R9	ThinkSystem Mellanox ConnectX-6 HDR100 QSFP56 1-port PCIe InfiniBand Adapter	1	1
Omni-Path Architecture (OPA)				
00WE023	AU0A	Intel OPA 100 Series Single-port PCIe 3.0 x8 HFA	1-5, 8, 9, 11	8
00WE027	AU0B	Intel OPA 100 Series Single-port PCIe 3.0 x16 HFA	11, 1	2

\* ThinkSystem servers do not support Features on Demand, so the Emulex VFA5.2 2x10 GbE SFP+ PCIe Adapter, 00AG570, cannot be upgraded to FCoE support. If you need FCoE or iSCSI support use 00AG580 instead.

† Support for the X710-DA2 and XXV710-DA2 adapters is limited to 5 adapters. See [Support Tip HT508158](#) for details.

For more information, including the transceivers and cables that each adapter supports, see the list of Lenovo Press Product Guides in the Networking adapters category:

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

## Fibre Channel host bus adapters

The following table lists the Fibre Channel HBAs supported by SR850 server.

Table 28. Fibre Channel HBAs

Part number	Feature code	Description	Slots supported	Maximum supported
32 Gb Fibre Channel HBAs				
4XC7A08250	B5SX	ThinkSystem Emulex LPe35000 32Gb 1-port PCIe Fibre Channel Adapter	1-5, 8, 9, 11	8
4XC7A08251	B5SY	ThinkSystem Emulex LPe35002 32Gb 2-port PCIe Fibre Channel Adapter	1-5, 8, 9, 11	8
7ZT7A00516	AUNS	ThinkSystem QLogic QLE2740 PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	1-5, 8, 9, 11	8
7ZT7A00518	AUNU	ThinkSystem QLogic QLE2742 PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	1-5, 8, 9, 11	8
7ZT7A00519	AUNV	ThinkSystem Emulex LPe32002-M2-L PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	1-5, 8, 9, 11	8
7ZT7A00517	AUNT	ThinkSystem Emulex LPe32000-M2-L PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	1-5, 8, 9, 11	8
16 Gb Fibre Channel HBAs				
01CV750	ATZB	QLogic 16Gb Enhanced Gen5 FC Single-port HBA	1-5, 8, 9, 11	8
01CV760	ATZC	QLogic 16Gb Enhanced Gen5 FC Dual-port HBA	1-5, 8, 9, 11	8
01CV830	ATZU	Emulex 16Gb Gen6 FC Single-port HBA	1-5, 8, 9, 11	8
01CV840	ATZV	Emulex 16Gb Gen6 FC Dual-port HBA	1-5, 8, 9, 11	8

For more information, see the list of Lenovo Press Product Guides in the Host bus adapters category:

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

## SAS adapters for external storage

The following table lists SAS HBAs and RAID adapters supported by SR850 server for use with external storage.

Table 29. Adapters for external storage

Part number	Feature code	Description	Slots supported	Maximum supported
<b>SAS HBAs</b>				
7Y37A01090	AUNR	ThinkSystem 430-8e SAS/SATA 12Gb HBA	1-5, 8, 9, 11	8
7Y37A01091	AUNN	ThinkSystem 430-16e SAS/SATA 12Gb HBA	1-5, 8, 9, 11	8
<b>External RAID adapters</b>				
7Y37A01087	AUNQ	ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter	1-5, 8, 9, 11	4

For more information, see the list of Lenovo Press Product Guides in the Host bus adapters and RAID adapters categories:

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

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

The following table compares the specifications of the external SAS HBAs and RAID adapters.

Table 30. Comparison of external storage adapters

Feature	430-8e	430-16e	930-8e
Adapter type	HBA	HBA	External RAID
Part number	7Y37A01090	7Y37A01091	7Y37A01087
Controller chip	LSI SAS3408	LSI SAS3416	LSI SAS3516
Broadcom equivalent	HBA 9400-8e	HBA 9400-16e	MegaRAID 9480-8e
Host interface	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8
Port interface	12 Gb SAS	12 Gb SAS	12 Gb SAS
Number of ports	8	16	8
Port connectors	2x Mini-SAS HD SFF8644	4x Mini-SAS HD SFF8644	2x Mini-SAS HD SFF8644
Drive interface	SAS/SATA	SAS/SATA	SAS,SATA
Drive type	HDD/SSD/SED*	HDD/SSD/SED*	HDD,SED,SSD
Hot-swap drives	Yes	Yes	Yes
Maximum devices	512 (planned: 1024)	512 (planned: 1024)	64 (planned: 216)
RAID levels	None	None	0/1/10/5/50/6/60
JBOD mode	Yes	Yes	Yes
Cache	None	None	4GB (Standard)
CacheVault cache protection	None	None	Yes (Flash)
Performance Accelerator (FastPath)	No	No	Yes
SSD Caching (CacheCade Pro 2.0)	No	No	No
SED support*	Yes	Yes	Yes

\* SAS HBAs support SEDs (self-encrypting drives) by using software on the server and simply passing SED commands through the HBA to the drives. SED support by RAID controllers is provided using the built-in MegaRAID SafeStore functionality of the adapter.

## Flash storage adapters

The server supports the PCIe Flash Storage adapters listed in the following table.

Table 31. Flash Storage Adapters

Part number	Feature code	Description	Slots supported	Maximum supported
Mainstream NVMe PCIe Adapters - Optimized for mixed-intensive application workloads with an endurance of 3-5 DWPD.				
4XB7A38234	BCGJ	ThinkSystem HHHH Kioxia CM5-V 1.6TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-5, 8, 9, 11	8
4XB7A38237	BCGK	ThinkSystem HHHH Kioxia CM5-V 3.2TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-5, 8, 9, 11	8
4XB7A38240	BCGL	ThinkSystem HHHH Kioxia CM5-V 6.4TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-5, 8, 9, 11	8
7SD7A05769	B11X	ThinkSystem HHHH Intel P4600 2.0TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-5, 8, 9, 11	8

For details about these adapters, see the Lenovo Press product guides in the Flash Adapters category: <https://lenovopress.com/servers/options/ssdadapter>

## GPU adapters

The SR850 currently does not support any graphics processing units (GPUs).

## Cooling

The server has six 60 mm hot-swap fans and all six fans are standard in all models. The server offers N+1 redundancy, meaning that one fan can fail and the server still operates normally.

Either 16K RPM fans or 19K RPM fans are used in the server, depending on the components used in the server.

Table 32. Fan selections

Part number	Feature code	Description
CTO only	B81D	SR850/SR860 60x38 16K Fan Unit
4F17A60142	B81C	SR850/SR860 60x38 19K Fan Unit

The 16K fan is the default selection, however the 19K fan is automatically selected when one of the following processors with high thermal characteristics is selected:

- Intel Xeon Gold 6126T 12C 125W 2.6GHz Processor
- Intel Xeon Gold 6144 8C 150W 3.5GHz Processor
- Intel Xeon Gold 6146 12C 165W 3.2GHz Processor
- Intel Xeon Gold 6154 18C 200W 3.0GHz Processor
- Intel Xeon Platinum 8160T 24C 150W 2.1GHz Processor
- Intel Xeon Platinum 8168 24C 205W 2.7GHz Processor
- Intel Xeon Platinum 8180 28C 205W 2.5GHz Processor
- Intel Xeon Platinum 8180M 28C 205W 2.5GHz Processor

For existing customers with the original 16K fans wish to operate the server without restrictions, the 19K RPM fans can be installed as field upgrades using part number 4F17A60142. The part number contains 1 fan. A total of 6 fans will need to be ordered.

## Power supplies

The server supports up to two redundant hot-swap power supplies.

Installing a second power supply requires either the Processor and Memory Expansion Tray (7B27A03953) or the power interposer (feature AUPZ).

The power interposer enables redundant power support when the Processor and Memory Expansion Tray is not installed. If you do not have the Processor and Memory Expansion Tray installed and want to install two power supplies, then the power interposer card must be installed.

**Tip:** Use Lenovo Capacity Planner to determine exactly what power your server needs:

<https://datacentersupport.lenovo.com/us/en/products/solutions-and-software/software/lenovo-capacity-planner/solutions/ht504651>

Table 33. Power supply options

Part number	Feature code	Description	Maximum supported	110V AC	220V AC	240V DC China only†
None*	AUPZ	SR850 2S Power Paddle (power interposer)	1**	Yes	Yes	Yes
7N67A00883	AUPR	750W Platinum (230V/115V) Power Supply	2	Yes	Yes	Yes
7N67A00885	AUPS	1100W Platinum (230V/115V) Power Supply	2	Yes	Yes	Yes
7N67A00886	AUPT	1600W Platinum (230V) Power Supply	2	No	Yes	Yes

\* Configure-to-order only

\*\* Only needed if two power supplies are installed but the Processor and Memory Expansion Tray is not installed

† Support for 240 DC is planned

750W and 1100W power supplies are auto-sensing and support both 110V AC (100-127V 50/60 Hz) and 220V AC (200-240V 50/60 Hz) power. The 1600 W power supply only supports 220V AC power.

For China customers, all three power supplies are 240V DC ready; support is planned for a future date.

**Note:** At 110 V, the 1100W power supply generates 1050W of power.

Power supply options do not include a line cord.

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

## Power cords

Line cords and rack power cables with C13 connectors can be ordered as listed in the following table.

**110V customers:** If you plan to use the ThinkSystem 1100W power supply with a 110V power source, select a power cable that is rated above 10A. Power cables that are rated at 10A or below are not supported with 110V power.

Table 34. Power cords

Part number	Feature code	Description
Rack cables		
00Y3043	A4VP	1.0m, 10A/100-250V, C13 to C14 Jumper Cord
39Y7937	6201	1.5m, 10A/100-250V, C13 to C14 Jumper Cord
4L67A08369	6570	2.0m, 13A/100-250V, C13 to C14 Jumper Cord
4L67A08366	6311	2.8m, 10A/100-250V, C13 to C14 Jumper Cord
4L67A08370	6400	2.8m, 13A/100-250V, C13 to C14 Jumper Cord
39Y7932	6263	4.3m, 10A/100-250V, C13 to C14 Jumper Cord
4L67A08371	6583	4.3m, 13A/100-250V, C13 to C14 Jumper Cord
Line cords		
39Y7930	6222	2.8m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord
81Y2384	6492	4.3m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord
39Y7924	6211	2.8m, 10A/250V, C13 to AS/NZS 3112 (Australia/NZ) Line Cord

Part number	Feature code	Description
81Y2383	6574	4.3m, 10A/250V, C13 to AS/NZS 3112 (Australia/NZ) Line Cord
69Y1988	6532	2.8m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord
81Y2387	6404	4.3m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord
39Y7928	6210	2.8m, 10A/220V, C13 to GB 2099.1 (China) Line Cord
81Y2378	6580	4.3m, 10A/250V, C13 to GB 2099.1 (China) Line Cord
39Y7918	6213	2.8m, 10A/250V, C13 to DK2-5a (Denmark) Line Cord
81Y2382	6575	4.3m, 10A/250V, C13 to DK2-5a (Denmark) Line Cord
39Y7917	6212	2.8m, 10A/250V, C13 to CEE 7/7 (Europe) Line Cord
81Y2376	6572	4.3m, 10A/250V, C13 to CEE 7/7 (Europe) Line Cord
39Y7927	6269	2.8m, 10A/250V, C13 to IS 6538 (India) Line Cord
81Y2386	6567	4.3m, 10A/250V, C13 to IS 6538 (India) Line Cord
39Y7920	6218	2.8m, 10A/250V, C13 to SI 32 (Israel) Line Cord
81Y2381	6579	4.3m, 10A/250V, C13 to SI 32 (Israel) Line Cord
39Y7921	6217	2.8m, 10A/250V, C13 to CEI 23-16 (Italy) Line Cord
81Y2380	6493	4.3m, 10A/250V, C13 to CEI 23-16 (Italy) Line Cord
4L67A08362	6495	4.3m, 12A/200V, C13 to JIS C-8303 (Japan) Line Cord
39Y7922	6214	2.8m, 10A/250V, C13 to SABS 164-1 (South Africa) Line Cord
81Y2379	6576	4.3m, 10A/250V, C13 to SANS 164-1 (South Africa) Line Cord
39Y7926	6335	4.3m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord
39Y7925	6219	2.8m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord
81Y2385	6494	4.3m, 12A/250V, C13 to KSC 8305 (S. Korea) Line Cord
39Y7919	6216	2.8m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord
81Y2390	6578	4.3m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord
23R7158	6386	2.8m, 10A/125V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2375	6317	2.8m, 10A/250V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2374	6402	2.8m, 13A/125V, C13 to CNS 10917 (Taiwan) Line Cord
4L67A08363	AX8B	4.3m, 10A/125V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2389	6531	4.3m, 10A/250V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2388	6530	4.3m, 13A/125V, C13 to CNS 10917 (Taiwan) Line Cord
39Y7923	6215	2.8m, 10A/250V, C13 to BS 1363/A (UK) Line Cord
81Y2377	6577	4.3m, 10A/250V, C13 to BS 1363/A (UK) Line Cord
90Y3016	6313	2.8M, 10A/125V, C13 to NEMA 5-15P (US) Line Cord
46M2592	A1RF	2.8m, 10A/250V, C13 to NEMA 6-15P (US) Line Cord
00WH545	6401	2.8M, 13A/125V, C13 to NEMA 5-15P (US) Line Cord
4L67A08359	6370	4.3m, 10A/125V, C13 to NEMA 5-15P (US) Line Cord
4L67A08361	6373	4.3m, 10A/250V, C13 to NEMA 6-15P (US) Line Cord
4L67A08360	AX8A	4.3m, 13A/125V, C13 to NEMA 5-15P (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/](https://vmware.lenovo.com/content/custom_iso/)

## Systems management

The server contains an integrated service processor, XClarity Controller (XCC), which provides advanced 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 SR850 offers a front operator panel with key LED status indicators, as shown in the following figure.

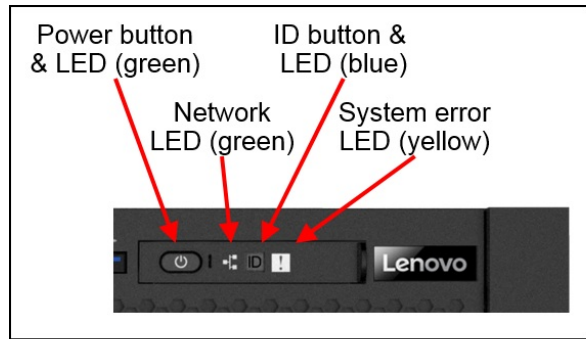


Figure 14. Front operator panel

As an alternative to the front operator panel, (certain models or configure-to-order; not available as a field upgrade), the server supports a pull-out LCD display panel. The LCD display panel allows quick access to system status, firmware, network, and health information. The following figure shows the front operator panel with LCD display.

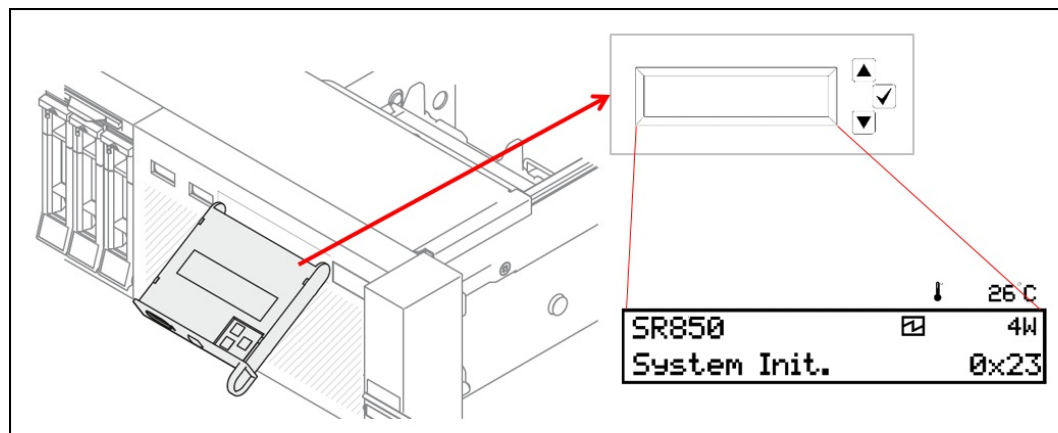


Figure 15. Front operator panel with LCD display

The LCD display and the function buttons give you access to the following information:

- Error messages

- System VPD: machine type & mode, serial number, UUID string
- System firmware levels: UEFI and XCC firmware
- XCC network information: hostname, MAC address, IP address, DNS addresses
- Environmental data: Ambient temperature, CPU temperature, AC input voltage, estimated power consumption
- System reset action

The front operator panel with LCD display can be ordered as listed in the following table.

Table 35. LCD system information display panel

Part number	Feature code	Description
None*	AUMW	Front operator panel with LCD display

\* Only available configure-to-order or with predefined models

The server offers light path diagnostics. If an environmental condition exceeds a threshold or if a system component fails, the XCC lights LEDs inside the server to help you diagnose the problem and find the failing part. The SR850 has fault LEDs next to the following components:


- Each processor
- Each memory DIMM
- Each drive bay
- Each system fan
- Each power supply

The front of the server also houses an information pull-out tab (also known as the network access tag). See [Figure 2](#) for the location. A label on the tab shows the network information (MAC address and other data) to remotely access XClarity Controller.

### 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 SMNP 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 the 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 the feature enabled or disabled in the factory, using the feature codes listed in the following table.

Table 36. IPMI-over-LAN settings

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

A virtual presence (remote control) capability also comes standard in the server for remote server management. Virtual media (remote drive images) support is optional via a software license upgrade.

The remote control functions include the following:

- 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
- With the XCC Enterprise license upgrade, mapping ISO and diskette IMG image files as virtual drives that are available for use by the server

The Enterprise license upgrade, shown in the following table, enables the following features:

- Boot Capture
- Remote mounting of ISO and IMG files
- 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

Table 37. XClarity Controller Enterprise Upgrade

Part number	Feature code	Description
4L47A09133	AVUU	ThinkSystem XClarity Controller Advanced to Enterprise Upgrade

## 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 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 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 38. 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/Invo-lxem>
- Lenovo Information Center:  
[https://sysmgt.lenovofiles.com/help/topic/LXEM/lxem\\_overview.html?cp=4](https://sysmgt.lenovofiles.com/help/topic/LXEM/lxem_overview.html?cp=4)

## Security

The server offers the following security features:

- Administrator and power-on password
- Trusted Platform Module (TPM) supporting both TPM 1.2 and TPM 2.0
- Optional Trusted Cryptographic Module (TCM) or Nationz TPM 2.0, available only in China
- Lockable top cover to help prevent access to internal components
- Optional lockable front security bezel
- Self-encrypting drives with support for IBM Security Key Lifecycle Manager

The TCM and Nationz TPM modules, available only for China customers, are installed in a dedicated socket on the system board, as shown in [Figure 4](#).

The optional lockable front bezel is shown in the following figure and includes a key that enables you to secure the bezel over the drives and system controls thereby reducing the chance of unauthorized or accidental access to the server.

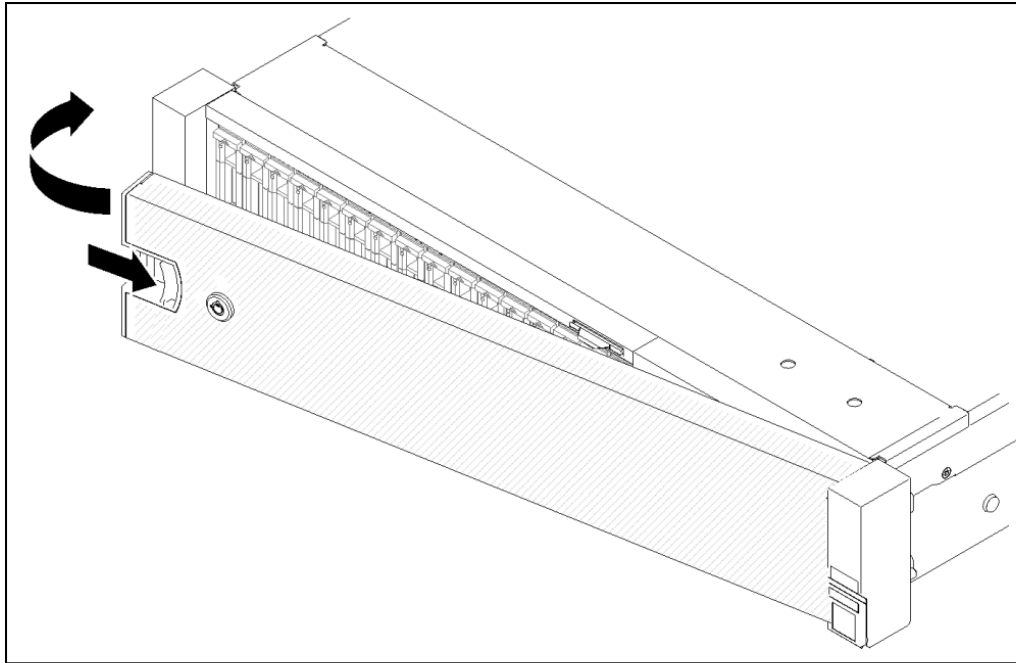


Figure 16. Lockable front security bezel

The dimensions of the security bezel are:

- Width: 437 mm (17.2 in.)
- Height: 87 mm (3.4 in.)
- Width: 23 mm (0.9 in.)

The following table lists the security options for the server.

Table 39. Security features

Part number	Feature code	Description
None*	AVKE	ThinkSystem Trusted Cryptographic Module (China customers only)
None*	B22N	ThinkSystem Nationz Trusted Platform Module v2.0 (China customers only)
7Z17A02580	AURX	ThinkSystem 2U Security Bezel

\* Not available as a field upgrade. The component is CTO on pre-configured models only.

For SED drives and IBM Security Key Lifecycle Manager support see the [SED encryption key management with ISKLM](#) section.

## Rack installation

The following table lists the rack installation options that are available for the server.

The Front VGA Connector Upgrade Kit allows you to upgrade your server by adding a VGA video port to the front of the server (if the server does not already come with a front VGA port). When the front VGA is in use, the rear VGA port is automatically disabled.

Table 40. Rack installation options

Option	Feature Code	Description
Optional front VGA port		
7X97A03954	AUPX	ThinkSystem SR850 Front VGA Connector Upgrade Kit
Rail slides		
7M27A05700	AXCH	ThinkSystem Toolless Slide Rail Kit with 2U CMA
7M27A05702	AXCA	ThinkSystem Toolless Slide Rail
4M17A07274	AXFN	ThinkSystem Tooled Slide Rail
4M17A07273	AXFM	ThinkSystem Toolless Friction Rail
Cable Management Arms		
4M17A07275	AXFU	ThinkSystem 2U CMA Upgrade Kit for Tooled Slide Rail
7M27A05698	None*	ThinkSystem 2U CMA Upgrade Kit for Toolless Slide Rail

\* This kit is for field upgrades only; for CTO use the rail kit with CMA, feature AXCH

The following table summarizes the rail kit features and specifications.

Table 41. Rail kit features and specifications summary

Feature	ThinkSystem Toolless Slide Rail	ThinkSystem Tooled Slide Rail	ThinkSystem Toolless Friction Rail
Part number	7M27A05702 (no CMA) 7M27A05700 (with CMA)	4M17A07274	4M17A07273
Rail type	Full-out slide (ball bearing)	Full-out slide (ball bearing)	Half-out slide (friction)
Toolless installation	Yes	No	Yes
Cable Management Arm (CMA) support	Yes (7M27A05700 only)	Optional (4M17A07275)	No
In-rack server maintenance	Yes	Yes	No
1U PDU support	Yes	Yes	Yes
0U PDU support	Limited*	Limited*	Limited**
Rack type	Lenovo and IBM 4-post, IEC standard-compliant	Lenovo and IBM 4-post, IEC standard-compliant	Lenovo and IBM 4-post, IEC standard-compliant
Mounting holes	Square or round	Square, round, or threaded	Square or round
Mounting flange thickness	2 mm - 3.3 mm (0.08 - 0.13 in.)	2 mm - 3.3 mm (0.08 - 0.13 in.)	2 mm - 3.3 mm (0.08 - 0.13 in.)
Distance between front and rear mounting flanges	610 mm - 864 mm (24 - 34 in.)	610 mm - 864 mm (24 - 34 in.)	610 mm - 864 mm (24 - 34 in.)
Rail length***	730 mm (28.74 in.)	837 mm (32.9 in.)	728 mm (28.7 in.)

\* For 0U PDU support, the rack must be at least 1100 mm (43.31 in.) deep without a CMA, or at least 1200 mm (47.24 in.) deep if a CMA is used.

\*\* For 0U PDU support with the friction rail kit, the rack must be at least 1000 mm (39.37 in.) deep.

\*\*\* Measured when mounted on the rack, from the front surface of the front mounting flange to the rear most point of the rail.

## Operating system support



The server supports the following operating systems:

- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2016
- Microsoft Windows Server 2019
- Microsoft Windows Server, version 1709
- Microsoft Windows Server, version 1803
- Red Hat Enterprise Linux 6.10 x64
- Red Hat Enterprise Linux 6.9 x64
- Red Hat Enterprise Linux 7.3
- Red Hat Enterprise Linux 7.4
- Red Hat Enterprise Linux 7.5
- Red Hat Enterprise Linux 7.6
- Red Hat Enterprise Linux 7.7
- Red Hat Enterprise Linux 7.8
- Red Hat Enterprise Linux 7.9
- Red Hat Enterprise Linux 8.0
- Red Hat Enterprise Linux 8.1
- Red Hat Enterprise Linux 8.2
- SUSE Linux Enterprise Server 11 Xen x64 SP4
- SUSE Linux Enterprise Server 11 x64 SP4
- SUSE Linux Enterprise Server 12 SP2
- SUSE Linux Enterprise Server 12 SP3
- SUSE Linux Enterprise Server 12 SP4
- SUSE Linux Enterprise Server 12 SP5
- SUSE Linux Enterprise Server 12 Xen SP2
- SUSE Linux Enterprise Server 12 Xen SP3
- SUSE Linux Enterprise Server 12 Xen SP4
- 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 Xen
- SUSE Linux Enterprise Server 15 Xen SP1
- SUSE Linux Enterprise Server 15 Xen SP2
- VMware ESXi 6.0 U3
- VMware ESXi 6.5
- VMware ESXi 6.5 U1
- VMware ESXi 6.5 U2
- VMware ESXi 6.5 U3
- VMware ESXi 6.7
- VMware ESXi 6.7 U1
- VMware ESXi 6.7 U2
- VMware ESXi 6.7 U3
- VMware ESXi 7.0
- VMware ESXi 7.0 U1

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=sr850-7x18-7x19>

For configure-to-order configurations, the server can be preloaded with VMware ESXi installed on M.2 cards. Ordering information is listed in the following table.

Table 42. VMware ESXi preload

Part number	Feature code	Description
CTO only	AXFS	VMware ESXi 6.0 U3 (factory installed)
CTO only	AXFT	VMware ESXi 6.5 U1 (factory installed)
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	B4XA	VMware ESXi 6.7 U1 (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)

### Physical and electrical specifications

The SR850 has the following overall physical dimensions, excluding components that extend outside the standard chassis, such as EIA flanges, front security bezel (if any), and power supply handles:

- Width: 445 mm (17.5 inches)
- Height: 87 mm (3.4 inches)
- Depth: 765 mm (30.1 inches)

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

Table 43. Detailed dimensions

Dimension	Description
482 mm	$X_a$ = Width, to the outsides of the front EIA flanges
435 mm	$X_b$ = Width, to the rack rail mating surfaces
445 mm	$X_c$ = Width, to the outer most chassis body feature
87 mm	$Y_a$ = Height, from the bottom of chassis to the top of the chassis
693 mm	$Z_a$ = Depth, from the rack flange mating surface to the rearmost I/O port surface
730 mm	$Z_b$ = Depth, from the rack flange mating surface to the rearmost feature of the chassis body
728 mm	$Z_c$ = Depth, from the rack flange mating surface to the rearmost feature such as power supply handle
35 mm	$Z_d$ = Depth, from the forwardmost feature on front of EIA flange to the rack flange mating surface
47 mm	$Z_e$ = Depth, from the front of security bezel (if applicable) or forwardmost feature to the rack flange mating surface

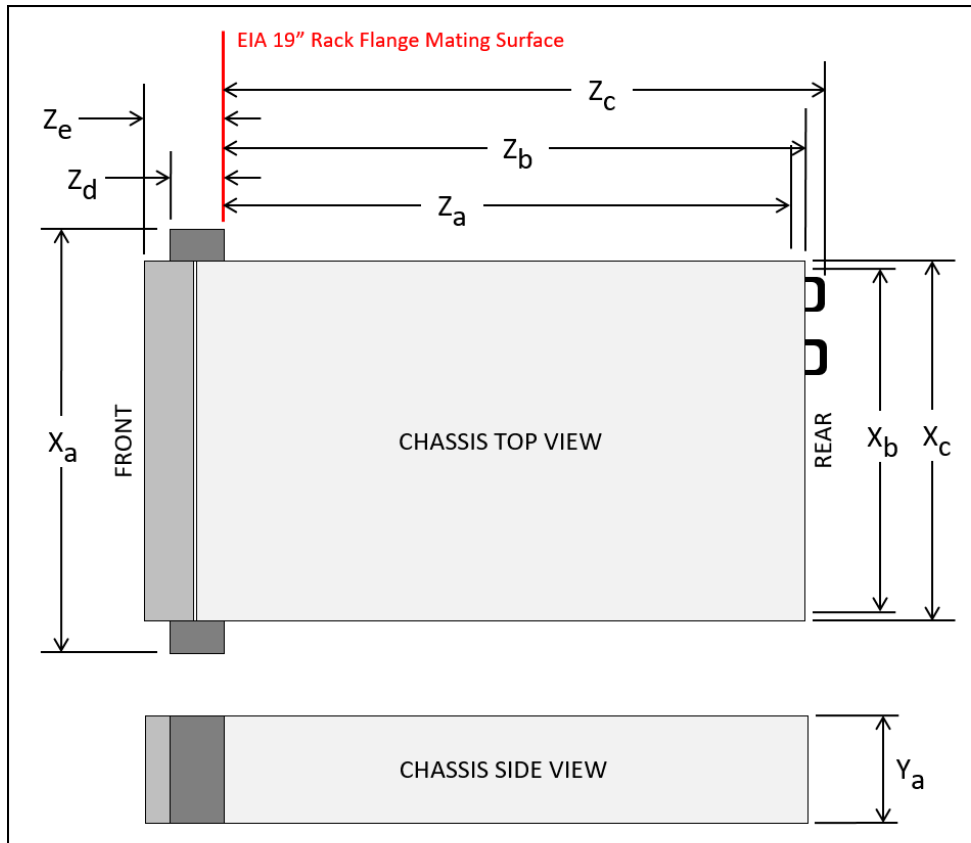


Figure 17. Server dimensions

The shipping dimensions (cardboard packaging) are as follows:

- Width: 592 mm (23.3 inches)
- Height: 282 mm (11.1 inches)
- Depth: 992 mm (39.1 inches)

Weight:

- Minimum 18 kg (40 lb.), fully configured 27 kg (59.6 lb.)

Electrical specifications:

- Electrical - Input voltage
  - 100 - 127 (nominal) V AC, 50 Hz or 60 Hz
  - 200 - 240 (nominal) V AC, 50 Hz or 60 Hz
  - 180 - 300 V DC (support is planned; China only)
- Power consumption:
  - 100-127 V:
    - 750W power supply: 8.4 kVA
    - 1100W power supply: 12 kVA
  - 200-240 V:
    - 750W power supply: 4.1 kVA
    - 1100W power supply: 6 kVA
    - 1600W power supply: 8.7 kVA

## Operating environment

The ThinkSystem SR850 server complies with ASHRAE Class A2 specifications, and depending on the hardware configuration, also complies with ASHRAE Class A3 and Class A4 specifications. System performance may be impacted when operating temperature is outside ASHRAE A2 specification.

To comply with ASHRAE class A3 and class A4 specifications, the server models must meet the following hardware configuration requirements:

- Two power supplies installed
- NVMe drives not installed
- PCIe flash storage adapters not installed

CPU core speed may be reduced depending on the processor selected.

**Cooling restrictions:** Certain high-performance processors have additional cooling restrictions regarding ambient temperature and fan redundancy. See the [Cooling](#) section for details.

The server is supported in the following environment:

- Air temperature:
  - Operating:
    - ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).
    - ASHRAE Class A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft).
    - ASHRAE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipment/storage: -40°C to 60°C (-40°F to 140°F)
- Maximum altitude: 3,050 m (10,000 ft)
- Relative Humidity (non-condensing):
  - Operating
    - ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F)
    - ASHRAE Class A3: 8% to 85%; maximum dew point: 24°C (75°F)
    - ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F)
  - Shipment/storage: 8% to 90%

The server generates the following heat and noise:

- Heat/thermal output:
  - Minimum configuration: 454 BTU/hr, 133 W
  - Maximum configuration: 5118 BTU/hr, 1500 W
- Noise level (LWAm)
  - Sound power, idling: 5.2 bels (minimum), 5.8 bels (typical), 6.4 bels (maximum)
  - Sound power, operating: 5.8 bels (minimum), 6.8 bels (typical), 7.0 bels (maximum)

The server has the following vibration and shock limits:

- Vibration:
  - Operating: 0.21 G rms at 5 Hz to 500 Hz for 15 minutes across 3 axes
  - Non-operating: 1.04 G rms at 2 Hz to 200 Hz for 15 minutes across 6 surfaces
- Shock:
  - Operating: 15 G for 3 milliseconds in each direction (positive and negative X, Y, and Z axes)
  - Non-operating:
    - 12 kg - 22 kg: 50 G for 152 in./sec velocity change across 6 surfaces
    - 23 kg - 31 kg: 35 G for 152 in./sec velocity change across 6 surfaces

## Warranty and Support

The SR850 has a 1-year or 3-year warranty based on the machine type of the system:

- 7X18: 1 year warranty
- 7X19: 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 a 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 spares 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 Data Center Group (DCG) Servers and System Storage  
<http://pcsupport.lenovo.com/us/en/solutions/ht503310>
- Lenovo Data Center Services Agreement  
<http://support.lenovo.com/us/en/solutions/ht116628>

## 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.

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.

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



## Regulatory compliance

The SR850 server conforms to the following standards:

- Energy Star v2.1
- FCC: Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 6, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 32, Class A; AS/NZS 60950.1
- IEC 60950-1 (CB Certificate and CB Test Report)
- China CCC (GB4943.1), GB9254 Class A, GB17625.1
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN32, Class A; KN35
- Russia, Belorussia and Kazakhstan, EAC: TP TC 004/2011(for Safety); TP TC 020/2011(for EMC)
- CE Mark (EN55032 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3)
- CISPR 32, Class A
- TUV-GS (EN60950-1 /IEC60950-1, 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 44. 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 server supports both USB-attached RDX backup units and SAS-attached tape drives.

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 45. 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>

The following table lists the external RDX backup options available.

Table 46. External RDX dock and cartridges

Part number	Feature code	Description
External RDX docks		
4T27A10725	B32R	ThinkSystem RDX External USB 3.0 Dock (No cartridge included with the drive)
Cartridges		
7TP7A01601	AVF8	ThinkSystem RDX 500GB Cartridge
7TP7A01602	AVF1	ThinkSystem RDX 1TB Cartridge
7TP7A01603	AVF0	ThinkSystem RDX 2TB Cartridge
7TP7A04318	AXD1	ThinkSystem RDX 4TB Cartridge

For more information, see the Lenovo RDX USB 3.0 Disk Backup Solution product guide: <https://lenovopress.com/tips0894-rdx-usb-30>

## Fibre Channel SAN switches

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

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

## Uninterruptible power supply units

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

Table 47. Uninterruptible power supply units

Part number	Description
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)
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 48. Power distribution units

Part number	Description
<b>0U Basic PDUs</b>	
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
<b>Switched and Monitored PDUs</b>	
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
00YJ783	0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord
46M4002*	1U 9 C19/3 C13 Switched and Monitored DPI PDU (without 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
<b>Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)</b>	
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
<b>C13 Enterprise PDUs (12x IEC 320 C13 outlets)</b>	
39M2816	DPI C13 Enterprise PDU+ (without line cord)
39Y8941	DPI Single Phase C13 Enterprise PDU (without line cord)
<b>C19 Enterprise PDUs (6x IEC 320 C19 outlets)</b>	
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
<b>Front-end PDUs (3x IEC 320 C19 outlets)</b>	
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
<b>NEMA PDUs (6x NEMA 5-15R outlets)</b>	
39Y8905	DPI 100-127V PDU with Fixed NEMA L5-15P line cord
<b>Line cords for PDUs that ship without a line cord</b>	
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)

Part number	Description
40K9615	DPI 60a Cord (IEC 309 2P+G)
40K9617	DPI Australian/NZ 3112 Line Cord
40K9618	DPI Korean 8305 Line Cord

\* Not available in USA and Canada

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

## Rack cabinets

The following table lists the supported rack cabinets.

Table 49. Rack cabinets

Part number	Description
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, keyboards, and KVM switches.

Table 50. Console keyboards

Part number	Description
Consoles	
17238BX	1U 18.5" Standard Console (without keyboard)
Console keyboards	
7ZB7A05469	ThinkSystem Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2
7ZB7A05468	ThinkSystem Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2
7ZB7A05206	ThinkSystem Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2
7ZB7A05207	ThinkSystem Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2
7ZB7A05208	ThinkSystem Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2
7ZB7A05210	ThinkSystem Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2
7ZB7A05209	ThinkSystem Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2
7ZB7A05211	ThinkSystem Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2
7ZB7A05212	ThinkSystem Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2
7ZB7A05213	ThinkSystem Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2
7ZB7A05214	ThinkSystem Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2
7ZB7A05215	ThinkSystem Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2
7ZB7A05216	ThinkSystem Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2
7ZB7A05217	ThinkSystem Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2
7ZB7A05218	ThinkSystem Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2
7ZB7A05219	ThinkSystem Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2
7ZB7A05220	ThinkSystem Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2
7ZB7A05221	ThinkSystem Keyboard w/ Int. Pointing Device USB - Portuguese 163 RoHS v2
7ZB7A05222	ThinkSystem Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2
7ZB7A05223	ThinkSystem Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2
7ZB7A05231	ThinkSystem Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2
7ZB7A05224	ThinkSystem Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2
7ZB7A05225	ThinkSystem Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2
7ZB7A05226	ThinkSystem Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2
7ZB7A05227	ThinkSystem Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2
7ZB7A05467	ThinkSystem Keyboard w/ Int. Pointing Device USB - Trad Chinese/US 467 RoHS v2
7ZB7A05228	ThinkSystem Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2
7ZB7A05229	ThinkSystem Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2
7ZB7A05470	ThinkSystem Keyboard w/ Int. Pointing Device USB - US Eng 103P RoHS v2
7ZB7A05230	ThinkSystem Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2
ThinkSystem Digital and Analog KVM Console switches and cables	
1754D1T	ThinkSystem Digital 2x1x16 KVM Switch (DVI video output port)
1754A1T	ThinkSystem Analog 1x8 KVM Switch (DVI video output port)
4X97A11108	ThinkSystem VGA to DVI Conversion Cable

Part number	Description
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
GCM and LCM Console switches and cables	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
43V6147	Single Cable USB Conversion Option (UCO)
39M2895	USB Conversion Option (4 Pack UCO)
46M5383	Virtual Media Conversion Option Gen2 (VCO2)
46M5382	Serial Conversion Option (SCO)

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

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## Related publications and links

For more information, see these resources:

- Lenovo ThinkSystem SR850 product page:  
<https://www.lenovo.com/us/en/data-center/servers/mission-critical/Lenovo-ThinkSystem-SR850/p/77XX7HSSR85>
- Interactive 3D Tour of the ThinkSystem SR850:  
<https://lenovopress.com/LP0676>
- Lenovo Press video walk-through of the ThinkSystem SR850:  
<https://lenovopress.com/LP0701>
- ThinkSystem SR850 drivers and support  
<https://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr850/7x18/downloads>
- Lenovo ThinkSystem SR850 product publications:  
<http://thinksystem.lenovofiles.com/help/index.jsp>
  - Quick Start
  - Rack Installation Guide
  - Setup Guide
  - Hardware Maintenance Manual
  - Messages and Codes Reference
  - Memory Population Reference
- ServerProven hardware compatibility:  
<http://www.lenovo.com/us/en/serverproven>

## Related product families

Product families related to this document are the following:

- [4-Socket Rack Servers](#)
- [ThinkSystem SR850 Server](#)

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