System x3650 M4 (E5-2600 v2)
Product Guide (withdrawn product)

The System x3650 M4 server provides outstanding performance for your business-critical applications. Its energy-efficient design supports more cores, memory, and data capacity in a scalable 2U package that is easy to service and manage. With more computing power per watt and the latest Intel Xeon processors, you can reduce costs while maintaining speed and availability.

Suggested use: database, virtualization, enterprise applications, collaboration/email, streaming media, web, HPC, Microsoft RemoteFX, and cloud applications.

Figure 1 shows the System x3650 M4.

Figure 1. The System x3650 M4

Did you know?

The x3650 M4 offers a flexible, scalable design and simple upgrade path to 16 hard-disk drives (HDDs) or solid-state drives (SSDs) plus optical and tape drives at the same time, with up to six PCIe Gen 3 slots and up to 768 GB of memory. This flexible onboard Ethernet solution provides four standard embedded Gigabit Ethernet ports and two optional embedded 10 Gb Ethernet ports without occupying PCIe slots. Comprehensive systems management tools with the next-generation Integrated Management Module II (IMM2) make it easy to deploy, integrate, service, and manage.

Key features

The x3650 M4 is an outstanding 2U two-socket business-critical server, offering improved performance and pay-as-you grow flexibility along with new features that improve server management capability. This powerful system is designed for your most important business applications and cloud deployments.

Combining balanced performance and flexibility, the x3650 M4 is a great choice for small and medium businesses up to the large enterprise. It can provide outstanding uptime to keep business-critical applications and cloud deployments running safely. Ease of use and comprehensive systems management tools make it easy to deploy. Outstanding RAS and high-efficiency design improve your business environment and help save operational costs.

Scalability and performance

The x3650 M4 offers numerous features to boost performance, improve scalability, and reduce costs:

- Intel Xeon processor E5-2600 v2 product family
    - Improves productivity by offering superior system performance with up to 12-core processors, up to 30 MB of L3 cache, and up to two 8 GT/s QPI interconnect links.
    - Supports up to two processors, 24 cores, and 48 threads maximize the concurrent execution of multi-threaded applications.
    - Supports up to 1866 MHz memory speeds.
    - Supports up to 768 GB memory with 32 GB LRDIMMs or HCDIMMs.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows CPU cores to run at maximum speeds during peak workloads by temporarily going beyond processor TDP.
- Intel Hyper-Threading Technology boosts performance for multi-threaded applications by enabling simultaneous multi-threading 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 utilize the hardware for virtualization workloads.
- Intel Advanced Vector Extensions (AVX) significantly improve floating-point performance for compute-intensive technical and scientific applications.
- 12 Gbps SAS internal storage connectivity doubles the data transfer rate compared to 6 Gb SAS solutions to maximize performance of storage I/O-intensive applications.
- The use of solid-state drives (SSDs) instead of, or along with, traditional spinning drives (HDDs) can significantly improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.
- Up to 32 1.8-inch SSD bays, or up to 16 2.5-inch bays, or up to 6 3.5-inch bays, together with internal backup and an optical drive at the same time, provide a flexible and scalable all-in-one platform to meet your increasing demands.
- The server has four integrated Gigabit Ethernet ports and two optional 10 Gb Ethernet ports with mezzanine cards that do not consume PICe slots.
- 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).
- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E5 family. This integration helps to dramatically reduce I/O latency and increase overall system performance.
- Support for NVIDIA Quadro graphics processing units (GPUs) to maximize computing power

Availability and serviceability

The x3650 M4 provides many features to simplify serviceability and increase system uptime:

- The server offers memory mirroring and memory rank sparing for redundancy in the event of a non-correctable memory failure.
- Tool-less cover removal provides easy access to upgrades and serviceable parts, such as CPU, memory, and adapter cards.
- The server offers hot-swap drives, supporting RAID redundancy for data protection and greater system uptime.
- The server has up to two redundant hot-swap power supplies and four hot-swap dual-motor redundant fans (two fan zones with an N+1 fan design) to provide availability for business-critical applications.
- The light path diagnostics panel and individual light path LEDs quickly lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Predictive Failure Analysis (PFA) detects when system components (processors, VRMs, memory, HDDs, fans, and power supplies) operate outside of standard thresholds and generates proactive alerts in advance of a possible failure, therefore increasing uptime.
- Solid-state drives (SSDs) offer significantly better reliability than traditional mechanical HDDs for greater uptime.
- Built-in Integrated Management Module Version II (IMM2) continuously monitors system parameters, triggers alerts, and performs recovering actions in case of failures to minimize downtime.
- Built-in diagnostics, using Dynamic Systems Analysis (DSA) Preboot, speed up troubleshooting tasks to reduce service time.
- Three-year customer-replaceable unit and on-site limited warranty, 9x5 next business day. Optional service upgrades are available.

Manageability and security

Powerful systems management features simplify local and remote management of the x3650 M4:

- The server includes an Integrated Management Module II (IMM2) to monitor server availability and perform remote management.
- Integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Integrated Trusted Platform Module (TPM) 1.2 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- IBM Systems Director offers comprehensive systems management tools that help to increase uptime, reduce costs, and improve productivity through advanced server management capabilities.
- Intel Execute Disable Bit functionality can help 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 x3650 M4 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to the green environment:

- Energy-efficient planar components help lower operational costs.
- The x3650 M4 is Energy Star 2.0 compliant. Energy Star is the trusted, US government-backed symbol for energy efficiency, with the goal of helping customers save money and protect the environment through energy efficient products and practices.
- Highly efficient 550 W, 750 W, and 900 W AC power supplies with 80 PLUS Platinum certification. Available 750W DC power option.
- Intel Xeon processor E5-2600 v2 product family offers better performance over the previous generation while fitting into the same thermal design power (TDP) limits.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.
- Low-voltage Intel Xeon processors draw less energy to satisfy the demands of power and thermally constrained data centers and telecommunication environments.
- Low-voltage 1.35 V DDR3 memory RDIMMs consume up to 19% less energy compared to 1.5 V DDR3 RDIMMs.
- 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 is a part of Calibrated Vectored Cooling technology. Hexagonal holes can be grouped more densely than round holes, providing more efficient airflow through the system.
- IBM Systems Director Active Energy Manager™ provides advanced data center power notification and management to help achieve lower heat output and reduced cooling needs.

Components and connectors

Figure 2 shows the front of the server.

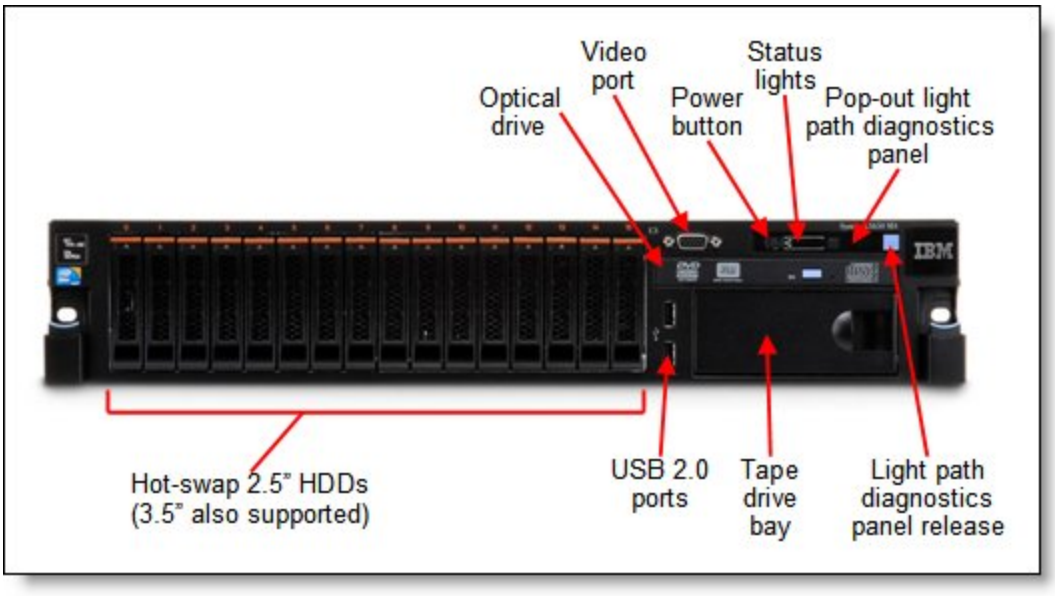

Figure 2. Front view of the System x3650 M4

Figure 3 shows the rear of the server.

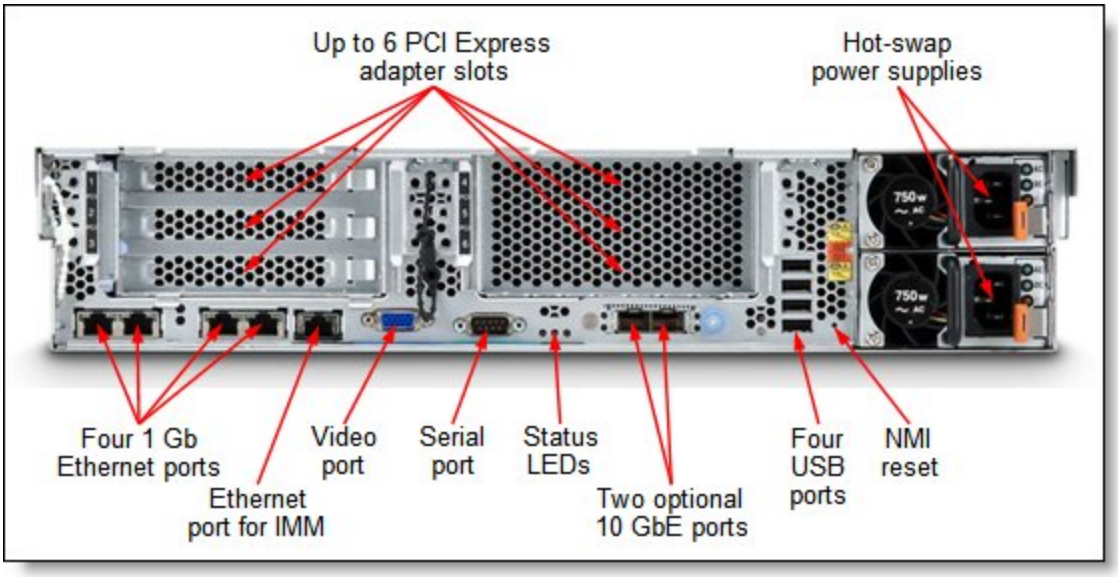

Figure 3.

Rear view of the System x3650 M4

Figure 4 shows the locations of key components inside the server.

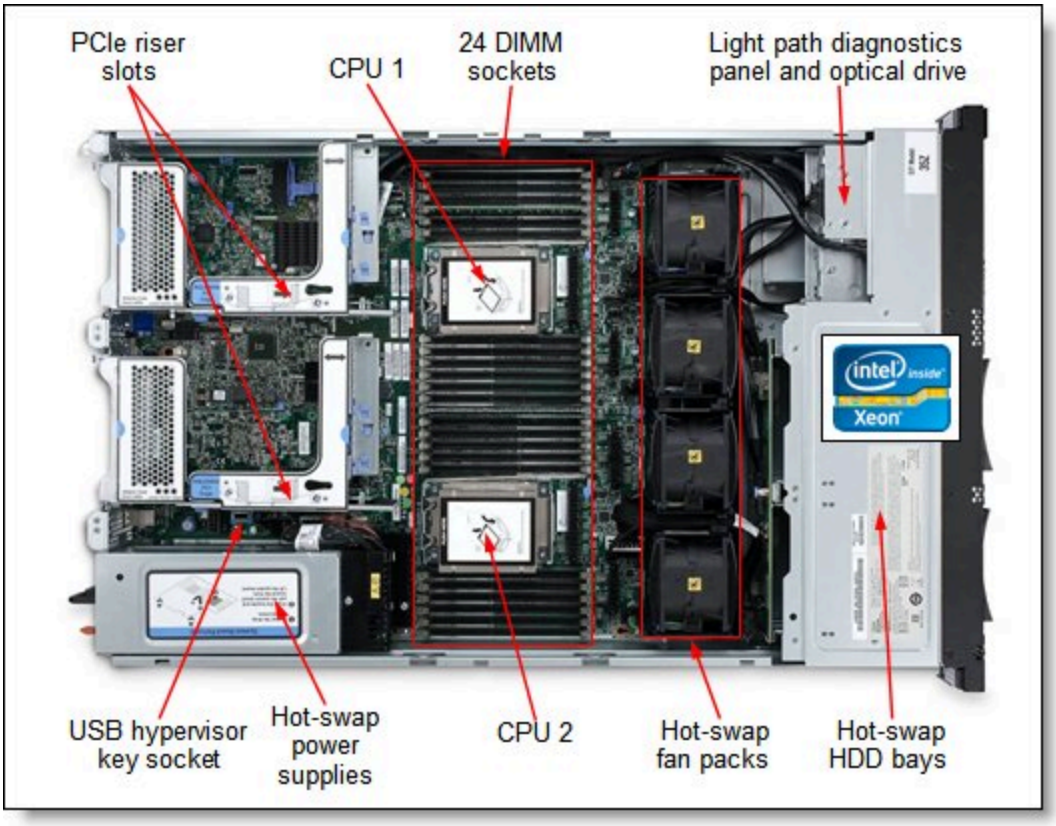

Figure 4. Inside

view of the System x3650 M4

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Form factor	2U Rack.
Processor	Up to two Intel Xeon processor E5-2600 v2 product family CPUs with 12 cores (up to 2.7 GHz) or ten cores (up to 3.0 GHz) or eight cores (up to 3.3 GHz) or six cores (up to 3.5 GHz) or four cores (up to 3.5 GHz). Two QPI links up to 8.0 GT/s each. Up to 1866 MHz memory speed. Up to 30 MB L3 cache.
Chipset	Intel C602J.
Memory	Up to 24 DIMM sockets (12 DIMMs per processor). RDIMMs, UDIMMs, HyperCloud DIMMs, and LRDIMMs (Load Reduced DIMMs) are supported, but memory types cannot be intermixed. Memory speed up to 1866 MHz.
Memory maximums	• With RDIMMs: Up to 384 GB with 24x 16 GB RDIMMs and two processors • With UDIMMs: Up to 128 GB with 16x 8 GB UDIMMs and two processors • With HyperCloud DIMMs: Up to 768 GB with 24x 32 GB DIMMs and two processors • With LRDIMMs: Up to 768 GB with 24x 32 GB LRDIMMs and two processors
Memory protection	ECC, Chipkill, memory mirroring, and memory rank sparing.
Disk drive bays	Up to 32 1.8" SSD bays, or 16 2.5" hot-swap SAS/SATA bays, or up to six 3.5" hot-swap SAS/SATA bays, or up to eight 2.5" Simple Swap SATA bays, or up to six 3.5" Simple Swap SATA bays.
Maximum internal storage	Up to 28.8 TB with 1.8 TB 2.5" SAS HDDs, up to 16 TB with 1 TB 2.5" NL SAS/SATA HDDs, up to 25.6 TB with 800 GB 1.8" SATA SSDs, up to 25.6 TB with 1.6 TB 2.5" SAS/SATA SSDs, or up to 36 TB with 6 TB 3.5" NL SAS/SATA HDDs. Intermix of SAS/SATA is supported.
RAID support	• **6 Gb SAS/SATA:** RAID 0, 1, 10 with integrated M5110e or optional M5110; optional upgrades to RAID 5, 50 are available (zero-cache; 512 MB battery-backed cache; 512 MB or 1 GB flash-backed cache). Optional upgrade to RAID 6, 60 is available for M5110e or M5110 with 512 MB or 1 GB cache upgrades. • **12 Gb SAS/SATA:** RAID 0, 1, 10 with optional M5210; optional upgrades to RAID 5, 50 are available (zero-cache; 1 GB non-backed cache; 1 GB or 2 GB flash-backed cache). Optional upgrade to RAID 6, 60 is available for M5210 with 1 GB or 2 GB cache upgrades.
Optical drive bays	One bay for optional DVD-ROM or Multiburner drive.
Tape drive bays	Optional Tape Enablement Kit is available to support one DDS5, DDS6, or RDX internal USB tape drive.
Network interfaces	Four integrated Gigabit Ethernet 1000BASE-T ports (RJ-45); two embedded 10 Gb Ethernet ports (10GBASE-T RJ-45 or 10GBASE-SR SFP+ based) on optional 10 Gb Ethernet mezzanine card (does not consume PCIe slot).

Components	Specification
PCI Expansion slots	Up to six slots depending on the riser cards installed. The slots are as follows: • Slot 1: PCIe 3.0 x8; full-height, full-length • Slot 2: PCIe 3.0 x8; full-height, half-length • Slot 3: PCIe 3.0 x8; full-height, half-length • Slot 4: Optional, requires second processor and second riser card • Slot 5: Optional, requires second processor and second riser card • Slot 6: Optional, requires second processor and second riser card Optional riser cards available with PCIe x8 or PCIe x16 or PCI-X slots.
Ports	Two USB 2.0 and one DB-15 video on front. Four USB 2.0, one DB-15 video, one DB-9 serial, one RJ-45 systems management, four RJ-45 GbE network ports, two optional RJ-45 or SFP+ 10 GbE network ports on rear. Two internal USB ports (for embedded hypervisor and internal tape drive).
Cooling	Calibrated Vectored Cooling with up to four redundant hot swap fans (three standard, additional fan with second processor or with the x3650 M4 Thermal Solution Kit); two fan zones with N+1 fan design; each fan has two motors.
Power supply	Up to two redundant hot-swap 550 W AC or 750 W AC or 900 W AC power supplies (all 80 PLUS Platinum certification), or -48V 750 W DC power supply options.
Video	Matrox G200eR2 with 16 MB memory integrated into the IMM2. Maximum resolution is 1600x1200 at 75 Hz with 16 M colors.
Hot-swap parts	Hard drives, power supplies, and fans.
Systems management	UEFI, Integrated Management Module II (IMM2), Predictive Failure Analysis, Light Path Diagnostics, Automatic Server Restart, IBM Systems Director and Active Energy Manager, ServerGuide. Optional Integrated Management Module Advanced Upgrade software feature for remote presence.
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM).
Operating systems	Microsoft Windows Server 2012 R2, 2012, 2008 R2 and 2008; Red Hat Enterprise Linux (RHEL) 5, 6, and 7; SUSE Linux Enterprise Server (SLES) 10, 11, and 12; VMware vSphere (ESXi) 5.0, 5.1, 5.5, and 6.0.
Limited warranty	Three-year customer-replaceable unit and on-site limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades are available through Lenovo Services: Four-hour or two-hour response time, eight-hour fix time, one-year or two-year warranty extension, remote technical support for System x hardware and some third-party applications.
Dimensions	Height: 86 mm (3.4 in), width: 445 mm (17.5 in), depth: 746 mm (29.4 in)
Weight	Minimum configuration: 25 kg (55 lb), maximum: 30 kg (65 lb)

The x3650 M4 servers are shipped with the following items:

- Statement of Limited Warranty
- Important Notices
- Rack Installation Instructions
- Documentation CD that contains the *Installation and User's Guide*
- IBM Systems Director Flyer
- System x Gen-III Slides Kit
- System x Gen-III Cable Management Arm (CMA)
- 2.8 m (9.18 in) C13-C14 power cord (one for models with one power supply, and two for models with two power supplies)

Standard models

The following table lists the standard models.

Table 2. Standard models

Model number	Intel Xeon processors† (two maximum)	Memory	RAID	Drive bays (std / max)	Drives	GbE	I/O slots (std / max)	Optical	Power supply (std / max)
Models announced September 2013									
7915A3x	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 4GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915B3x	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 4GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915C3x	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915C5x	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	6x 3.5" HS / 6	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915D3x	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
791523x	1x E5-2637 v2 4C 3.5GHz 15MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915F3x	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e 512MB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
791533x	1x E5-2643 v2 6C 3.5GHz 25MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915G3x	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
791553x	1x E5-2650L v2 10C 1.7GHz 25MB 1600MHz 70W	1x 8GB 1600MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915H3x	1x E5-2660 v2 10C 2.2GHz 25MB 1866MHz 95W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
791543x	1x E5-2667 v2 8C 3.3GHz 25MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915J3x	1x E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
7915L3x	1x E5-2680 v2 10C 2.8GHz 25MB 1866MHz 115W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915M3x	1x E5-2690 v2 10C 3.0GHz 25MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
791573x	1x E5-2695 v2 12C 2.4GHz 30MB 1866MHz 115W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
791583x	1x E5-2697 v2 12C 2.7GHz 30MB 1866MHz 130W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2

* x in the Model number represents a region-specific letter (for example, the EMEA Model number is 7915A3G, and the US Model number is 7915A3U). Ask a Lenovo representative for specifics.
† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, TDP.
§ For models A3x and B3x, the standard DIMM is rated at 1600 MHz, but operates at up to 1333 MHz to match the processor memory speed. Actual memory speed maximums depend on several factors, as described in "Memory options".

Express models

The following table lists the Express models.

Table 3. Express models

Model number	Intel Xeon processors† (two maximum)	Memory	RAID	Drive bays (std / max)	Drives	GbE	I/O slots (std / max)	Optical	Power supply (std / max)
United States, Canada, Latin America									
7915EFU	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915EGU	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915EHU	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915EJU	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 16GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 750W HS / 2
7915EKU	1x E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	1x 16GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	2x 750W HS / 2
Latin America (Brazil only)									
7915EPU	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
7915EQU	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	2x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
Asia Pacific (China only)									
7915ELC	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Optional	1x 550W HS / 2
7915EOC	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 15K	4	3 / 6	Optional	1x 550W HS / 2
7915ERC	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Optional	1x 550W HS / 2
7915ESC	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 15K	4	3 / 6	Optional	1x 550W HS / 2
7915ETC	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Optional	1x 550W HS / 2
7915EUC	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 15K	4	3 / 6	Optional	1x 550W HS / 2
7915EVC	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	2x 750W HS / 2
7915EWC	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 8GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	2x 750W HS / 2
Europe									
7915E6G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
7915E7G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915E8G	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915E9G	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 750W HS / 2

Model number	Intel Xeon processors† (two maximum)	Memory	RAID	Drive bays (std / max)	Drives	GbE	I/O slots (std / max)	Optical	Power supply (std / max)
7915K3G	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1600MHz§	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915K9G	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	2x 8GB 1866MHz	M5110e 1GB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
7915KAG	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 4GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
Central and Eastern Europe (CEE) and Middle East and Africa (MEA)									
7915E6G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
7915E8G	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915E9G	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 750W HS / 2
7915K3G	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1600MHz§	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915K9G	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	2x 8GB 1866MHz	M5110e 1GB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
7915KAG	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 4GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
Russia/Commonwealth of Independent States (CIS)									
7915E7G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915E8G	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915K3G	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1600MHz§	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915K9G	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	2x 8GB 1866MHz	M5110e 1GB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
7915KAG	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 4GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
Australia and New Zealand									
7915DDM	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1600MHz§	M5110e 512MB (f)	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Optional	1x 550W HS / 2
7915FFM*	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	2x 550W HS / 2
7915GGM*	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 16GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	2x 750W HS / 2

† Processor detail: Processor quantity and model, number of cores, core speed, L3 cache, memory speed, TDP.
(f) The ServeRAID M5110e RAID controller in this model includes flash-backed cache.
§ For models EFU, K3G, KAG, and DDM, the standard DIMM is rated at 1600 MHz, but operates at up to 1333 MHz to match the processor memory speed. For models ELC, EOC, ERC, and ESC, the standard DIMM is rated at 1866 MHz, but operates at up to 1333 MHz to match the processor memory speed. For models ETC and EUC, the standard DIMM is rated at 1866 MHz, but operates at up to 1600 MHz to match the processor memory speed. Conversely, for models EWC and GGM, the processor memory speed is rated at 1866 MHz, but operates at up to 1600 MHz to match the rated speed of the installed DIMM. Actual memory speed maximums depend on several factors, as described in "Memory options".
* Includes USB Memory Key for VMWare ESXi 5.5.

Processor options

The x3650 M4 supports the processor options listed in the following table. The server supports up to two processors. This table shows which server models have each processor standard. If there is no corresponding *where-used* model for a particular processor, this processor is only available through CTO. Second processor options include an additional cooling fan.

Table 4. Processor options

Part number	Feature codes*	Description	Standard models where used
46W4360	A3VR / A3V7	Intel Xeon E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	A3x
46W4361	A3VS / A3V8	Intel Xeon E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	B3x
46W4363	A3VU / A3VA	Intel Xeon E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	C3x
00Y7650	A4EQ / A4EN	Intel Xeon E5-2628L v2 8C 1.9GHz 20MB 1600MHz 70W	-
46W4364	A3VV / A3VB	Intel Xeon E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	D3x
46W4376	A3W7 / A3VP	Intel Xeon E5-2630L v2 6C 2.4GHz 15MB 1600MHz 60W	-
46W4362	A3VT / A3V9	Intel Xeon E5-2637 v2 4C 3.5GHz 15MB 1866MHz 130W	23x
46W4367	A3VY / A3VE	Intel Xeon E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	F3x
46W4371	A3W2 / A3VJ	Intel Xeon E5-2643 v2 6C 3.5GHz 25MB 1866MHz 130W	33x
00Y7652	A4ER / A4EP	Intel Xeon E5-2648L v2 10C 1.9GHz 25MB 1866MHz 70W	-
46W4365	A3VW / A3VC	Intel Xeon E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	G3x
46W4375	A3W6 / A3VN	Intel Xeon E5-2650L v2 10C 1.7GHz 25MB 1600MHz 70W	53x
46W4366	A3VX / A3VD	Intel Xeon E5-2660 v2 10C 2.2GHz 25MB 1866MHz 95W	H3x
46W4372	A3W3 / A3VK	Intel Xeon E5-2667 v2 8C 3.3GHz 25MB 1866MHz 130W	43x
46W4369	A3W0 / A3VG	Intel Xeon E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	J3x
46W4370	A3W1 / A3VH	Intel Xeon E5-2680 v2 10C 2.8GHz 25MB 1866MHz 115W	L3x
46W4377	A3W8 / A3VQ	Intel Xeon E5-2690 v2 10C 3.0GHz 25MB 1866MHz 130W	M3x
46W4373	A3W4 / A3VL	Intel Xeon E5-2695 v2 12C 2.4GHz 30MB 1866MHz 115W	73x
46W4374	A3W5 / A3VM	Intel Xeon E5-2697 v2 12C 2.7GHz 30MB 1866MHz 130W	83x

* The first feature code is for the first processor; the second feature code is for the second processor.

Memory options

System x DDR3 memory is compatibility tested and tuned for optimal System x performance and throughput. System x memory specifications are integrated into the light path diagnostics for immediate system performance feedback and optimum system uptime. From a service and support standpoint, System x memory automatically assumes the System x system warranty, and Lenovo provides service and support worldwide.

The System x3650 M4 supports DDR3 memory. The server supports up to 12 DIMMs when one processor is installed and up to 24 DIMMs when two processors are installed. Each processor has four memory channels, and there are three DIMMs per channel.

The following rules apply when selecting the memory configuration:

- Server supports UDIMMs, RDIMMs, HyperCloud DIMMs (also known as HCDIMMs), and LRDIMMs.
- Mixing different types of memory (UDIMMs, RDIMMs, HyperCloud DIMMs, and LRDIMMs) is not supported.
- 16 GB HyperCloud DIMMs and 32 GB HyperCloud DIMMs cannot be mixed.
- Mixing 1.5 V and 1.35 V DIMMs is supported; in such a case, all DIMMs operate at 1.5 V.
- Maximum number of ranks per one channel is eight (with the exception of Load Reduced DIMMs and HyperCloud DIMMs where more than eight ranks are supported, because one quad-rank LRDIMM or HCDIMM provides the reduced electrical load on a memory bus).
- The maximum quantity of DIMMs that can be installed in the server depends on the number of CPUs, DIMM type, rank, and operating voltage, as shown in the "Max. qty supported" row in Table 5.
- All DIMMs in the server operate at the same speed, which is determined as the lowest value of:
    - Memory speed that is supported by the specific CPU.
    - Lowest of maximum operating speeds for selected memory configuration that depends on rated speed, operating voltage, and quantity of DIMMs per channel, as shown under "Maximum operating speed" section in the table.

The following table shows the characteristics of the supported DIMMs. Tables cells highlighted with a gray background indicate when the combination of DIMM voltage and the number of DIMMs per channel still allows the DIMMs to operate at a rated speed.

Table 5. Maximum memory speeds (Part 1: RDIMMs)

DIMM specification	**RDIMM**					
Rank	Single rank			Dual rank		
Part numbers	00D5024 (4 GB) 00D5036 (8 GB)		00D5020 (4 GB) 00D5032 (8 GB)	00D5044 (8 GB) 46W0672 (16 GB)		00D5048 (16 GB)
Rated speed	1600 MHz		1866 MHz	1600 MHz		1866 MHz
Rated voltage	1.35 V		1.5 V	1.35 V		1.5 V
Operating voltage	1.35 V	1.5 V	1.5 V	1.35 V	1.5 V	1.5 V
Max qty supported*	24	24	24	24	24	24
Max DIMM capacity	8 GB	8 GB	8 GB	16 GB	16 GB	16 GB
Max memory capacity	192 GB	192 GB	192 GB	384 GB	384 GB	384 GB
Max. memory at rated speed	None	128 GB	64 GB	None	256 GB	256 GB
Maximum operating speed						
1 DIMM per channel	1333 MHz	1600 MHz	1866 MHz	1333 MHz	1600 MHz	1866 MHz
2 DIMMs per channel	1333 MHz	1600 MHz	1600 MHz	1333 MHz	1600 MHz	1866 MHz
3 DIMMs per channel	800 MHz	1066 MHz	1066 MHz	800 MHz	1066 MHz	1066 MHz

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

Table 5. Maximum memory speeds (Part 2: UDIMMs, LRDIMMs, and HyperCloud DIMMs)

DIMM specification	**UDIMM**		**LRDIMM**	**HyperCloud DIMM**	
Rank	Dual rank		Quad rank	Dual rank	
Part number	00D5016 (8 GB)		46W0761 (32 GB)	46W0767 (32 GB)	
Rated speed	1600 MHz		1866 MHz	1333 MHz	
Rated voltage	1.35 V		1.5 V	1.35 V	
Operating voltage	1.35 V	1.5 V	1.5 V	1.35 V	1.5 V

Max. qty supported*	16	16	24	24	24
Max. DIMM capacity	8 GB	8 GB	32 GB	32 GB	32 GB
Max. memory capacity	128 GB	128 GB	768 GB	768 GB	768 GB
Max. memory at rated speed	None	128 GB	512 GB	512 GB	768 GB
Maximum operating speed					
1 DIMM per channel	1333 MHz	1600 MHz	1866 MHz	1333 MHz	1333 MHz
2 DIMMs per channel	1333 MHz	1600 MHz	1866 MHz	1333 MHz	1333 MHz
3 DIMMs per channel	No support	No support	1066 MHz	1066 MHz	1333 MHz

* Maximum quantity supported is shown for two processors installed.

The following memory protection technologies are supported:

- ECC
- Chipkill (for x4-based memory DIMMs)
- Memory mirroring
- Memory rank sparing

If memory mirroring is used, DIMMs must be installed in pairs (minimum of one pair per each CPU), and both DIMMs in a pair must be identical in type and size.

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 being identical). In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The size of a rank varies depending on the DIMMs installed.

The following table lists the memory options that are available for x3650 M4 server.

Table 6. Memory options

Part number	Feature code	Description	Maximum supported	Standard models where used
UDIMMs				
00D5016	A3QC	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	16 (8 per CPU)	-
RDIMMs - 1600 MHz				
00D5024	A3QE	4GB (1x4GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	A3x, B3x
00D5036	A3QH	8GB (1x8GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	C3x, C5x, D3x, F3x
00D5044	A3QK	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	53x
46W0672	A3QM	16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	-
RDIMMs - 1866 MHz				
00D5020	A3QD	4GB (1x4GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	-
00D5032	A3QG	8GB (1x8GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	23x, 33x, 43x, 73x, 83x, G3x, H3x, J3x, L3x, M3x
00D5048	A3QL	16GB (1x16GB, 2Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	-
LRDIMMs				
46W0761	A47K	32GB (1x32GB, 4Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP LRDIMM	24 (12 per CPU)	-
HyperCloud DIMMs				
46W0767	A4RE	32GB (1x32GB,1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP HyperCloud DIMM	24 (12 per CPU)	-

Internal storage

The System x3650 M4 server supports 1.8-inch solid-state drives (SSDs), 2.5-inch SSDs and HDDs, and 3.5-inch HDDs. The server supports the following configurations:

1. 16x 2.5-inch hot-swap drive bays, either with or without a SAS expander
2. 8x 2.5-inch hot-swap drive bays
3. 6x 3.5-inch hot-swap hard drive bays
4. 8x 2.5-inch hot-swap drive bays + 16x 1.8-inch SSD drive bays
5. 8x 2.5-inch simple swap drive bays (only available in CTO)
6. 32x 1.8-inch SSD drive bays (only available in CTO)
7. 6x 3.5-inch simple-swap SATA hard drive bays (only available in CTO)

The following figure shows the first three of these configurations.

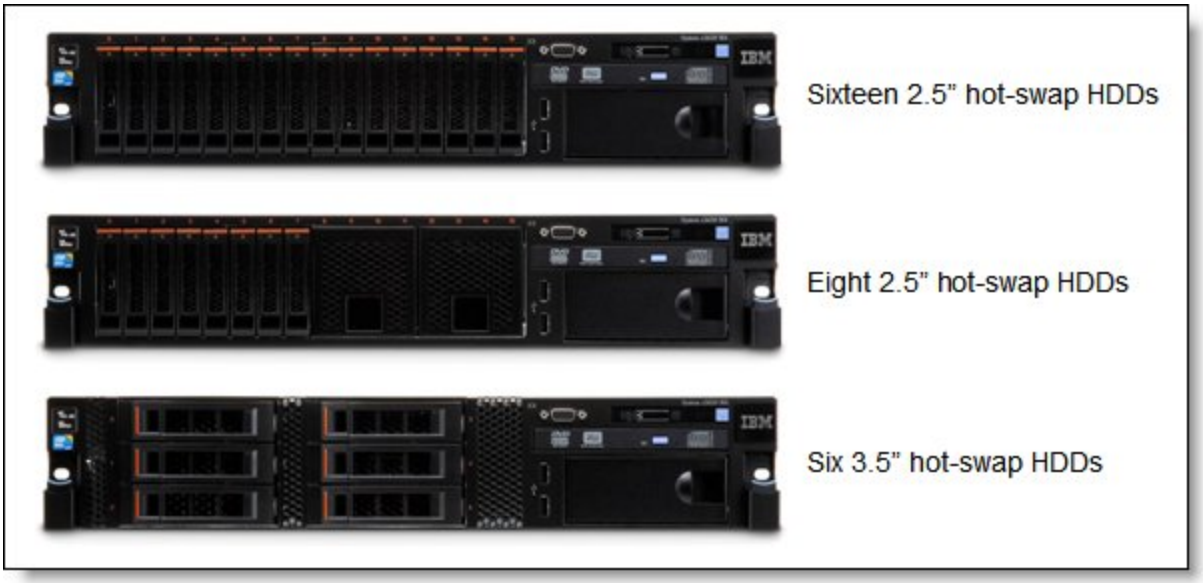

Figure 5. Internal drive configurations (3 of 6 configurations shown)

Backplanes and enablement kits

All standard models, except models C4x and C5x, ship with eight 2.5-inch Slim-SFF SAS/SATA hot-swap hard drive bays. Models C4x and C5x ship with six 3.5-inch SAS/SATA hot-swap hard drive bays.

The following table shows the internal storage expansion options that are available for x3650 M4 server.

Table 7. Internal storage expansion options

Part number	Feature code	Name and description	Maximum supported
6 Gb SAS/SATA			
69Y5319	A1JY	x3650 M4 Plus 8x 2.5" HS HDD Assembly Kit with Expander • For models with eight 2.5-inch hot-swap bays, adds eight more bays for a total of 16 2.5-inch hot-swap HDD bays. • This option includes a SAS expander card that is mounted on an HDD backplane, and it does not consume a PCIe slot. • Includes internal cables.	1
00D9490	A39W	x3650 M4 Plus 8 2.5" HS HDD Assembly Option Kit • For models with eight 2.5-inch hot-swap bays, adds eight more bays for a total of 16 2.5-inch hot-swap HDD bays. • Does not include a SAS expander. • Requires a second RAID adapter for the second set of eight drives. • Includes internal cables.	1
00D9493	A39Z	x3650 M4 8 2.5" Plus 16 1.8" SSD Assembly Option Kit • For models with eight 2.5-inch hot-swap bays, adds 16 1.8-inch SSD bays for a total of 24 bays. • Requires two SSD controllers for the 16 SSDs. • Includes internal cables.	1

Part number	Feature code	Name and description	Maximum supported
None*	A39X	x3650 M4 Hot-Swap 16/32 HDD Assembly Kit • For CTO only. First set of 16 1.8-inch SSD bays.	1
00D9492	A39Y	x3650 M4 16 Plus 16 1.8" SSD Assembly Option Kit • For CTO only. Second set of 16 1.8-inch SSD bays. • Use with feature A39X to configure a total of 32 1.8-inch SSD bays.	1
None*	A3A0	x3650 M4 2.5" Simple Swap Kit • For CTO only • Supports eight simple-swap drives • No support for 16 simple-swap drives	1
69Y5320	A1L6	x3650 M4 Tape Enablement Kit • Adds support for an internal RDX drive • This option includes one USB cable • The RDX drive is ordered separately	1
12 Gb SAS/SATA			
None*	A460	x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID • For CTO only. First set of eight 2.5-inch hot-swap bays for 12 Gb drive connectivity. • Requires either one M5210 or one N2215.	1
00Y7627	A461	x3650M4 16x 2.5" HS HDD Assembly Kit with Expander for 12Gb RAID • For models with 8x 12 Gb 2.5-inch hot-swap bays, adds 8 more 12 Gb bays for a total of 16x 2.5-inch hot-swap drive bays. • For models with 8x or 16x 6 Gb 2.5-inch hot-swap bays, adds 12 Gb support for the existing drive bays (requires one 12 Gb drive controller). • Includes two backplanes (one of these comes with a SAS expander card that is mounted on it). • Includes two SAS HD internal cables. • Includes power and signal internal cables. • Requires either one M5210 or one N2215.	1
00Y7626	A462	x3650M4 16x 2.5" HS HDD Assembly Kit for 12Gb RAID • For models with 8x 6 Gb 2.5-inch hot-swap bays, adds 12 Gb support for the existing drive bays (requires one 12 Gb controller) or adds 8 more 12 Gb bays for a total of 16x 2.5-inch hot-swap drive bays (requires one 12 Gb drive controller; 8x 6 Gb drive bays are connected to the integrated M5110e, and 8x 12 Gb drive bays are connected to the 12 Gb drive controller). • Does not include a SAS expander. (Eight 6 Gb bays are connected to the integrated M5110e.) • Includes SAS, power and signal internal cables. • Requires either one M5210 or one N2215. (Eight 12 Gb bays are connected to the M5210 or N2215.)	1

* These configurations are only available via CTO and special bid.

Use the following table to determine what backplane kits you need.

Table 8. Drive combinations

Drive combination	Configure these kits	Controllers needed
Hot-swap drives - 6 Gb		
6x 3.5-inch hot-swap drives	• x3650 M4 3.5" HS HDD Assembly Kit, feature A1JV (standard in model C4x, or CTO)	Onboard
8x 2.5-inch hot-swap drives	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x)	Onboard
16x 2.5-inch hot-swap drives with a SAS expander	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650 M4 Plus 8x 2.5" HS HDD Assembly Kit with Expander, part 69Y5319, feature A1JY	Onboard
16x 2.5-inch hot-swap drives without a SAS expander	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650 M4 Plus 8 2.5" HS HDD Assembly Option Kit, part 00D9490, feature A39W	Onboard + 1x adapter
8x 2.5-inch drives + 16x 1.8-inch drives	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650 M4 8 2.5" Plus 16 1.8" SSD Assembly Option Kit, part 00D9493, feature A39Z	Onboard + 2x adapters
16x 1.8-inch drives (CTO only)	• x3650 M4 Hot-Swap 16/32 HDD Assembly Kit, feature A39X	2x adapters
32x 1.8-inch drives (CTO only)	• x3650 M4 Hot-Swap 16/32 HDD Assembly Kit, feature A39X • x3650 M4 16 Plus 16 1.8" SSD Assembly Option Kit, part 00D9492, feature A39Y	4x adapters
Hot-swap drives - 12 Gb		
8x 2.5-inch hot-swap drives	• x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID, feature A460 (CTO only)	1x 12 Gb adapter
16x 2.5-inch hot-swap drives with a SAS expander	• x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID, feature A460 (CTO only) • x3650M4 16x 2.5" HS HDD Assembly Kit with Expander for 12Gb RAID, part number 00Y7627	1x 12 Gb adapter
8x 2.5-inch 6 Gb drives + 8x 2.5-inch 12 Gb drives	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650M4 16x 2.5" HS HDD Assembly Kit for 12Gb RAID, part number 00Y7626	Onboard + 1x 12 Gb adapter
Simple-swap drives		
6x 3.5-inch simple-swap drives (CTO only)	• x3650 M4 3.5" SS HDD Assembly Kit, feature A1JW (CTO only)	Onboard
8x 2.5-inch simple-swap drives (CTO only)	• x3650 M4 2.5" Simple Swap Kit, feature A3A0 (CTO only)	Onboard
Tape drive option		

Drive combination	Configure these kits	Controllers needed
Add an internal tape drive to any of the above	• x3650 M4 Tape Enablement Kit, part 69Y5320, feature A1L6	None

Controllers for internal storage

The following table lists the RAID controllers and additional options used for internal disk storage of x3650 M4 server.

Table 9. RAID controllers and HBAs for internal storage (Part 1: 6 Gbps SAS)

Part number	Feature code	Description	Maximum supported	Standard models where used
6 Gb RAID controllers and internal SAS HBAs				
Integrated	None	ServeRAID M5110e SAS/SATA Controller	1	All models
81Y4481	A347	ServeRAID M5110 SAS/SATA Controller	3	-
46M0912	3876	6Gb Performance Optimized HBA	4	-
46C8988	A3MW	N2115 SAS/SATA HBA	4	-
Hardware upgrades for the M5110 and M5110e (per one controller)				
81Y4508	A22E	ServeRAID M5100 Series Battery Kit	1*	-
90Y5046	A2BB	x3650 M4 Remote Supercap and Battery Tray**	1	-
81Y4484	A1J3	ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade	1	-
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade	1	D3x, F3x
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade	1	53x, 73x, 83x, G3x, H3x, J3x, L3x
47C8670	A4G6	ServeRAID M5100 Series 2GB Flash/RAID 5 Upgrade	1	-
Features on Demand (FoD) upgrades for the M5110 and M5110e (per one server)				
81Y4544	A1X2	ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade	1	-
90Y4318	A2MD	ServeRAID M5100 Series SSD Caching Enabler	1†	-
90Y4273	A2MC	ServeRAID M5100 Series SSD Performance Key	1†	-
81Y4546	A1X3	ServeRAID M5100 Series RAID 6 Upgrade	1†	-

* The ServeRAID M5100 Series Battery Kit (81Y4508) is only supported with ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade (81Y4484).
† This FoD upgarde requires one of the cache memory upgrades.
** Cannot be installed if an internal tape drive is installed

Table 9. RAID controllers and HBAs for internal storage (Part 2: 12 Gbps SAS)

Part number	Feature code	Description	Maximum supported	Standard models where used
12 Gb RAID controllers and internal SAS HBAs				
46C9110	A3YZ	ServeRAID M5210 SAS/SATA Controller	1	-
47C8675	A3YY	N2215 SAS/SATA HBA	1	-
Hardware upgrades for the M5210				
47C8656	A3Z0	ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade	1	-
47C8660	A3Z1	ServeRAID M5200 Series 1GB Flash/RAID 5 Upgrade	1	-

47C8664	A3Z2	ServeRAID M5200 Series 2GB Flash/RAID 5 Upgrade	1	-
47C8668	A3Z3	ServeRAID M5200 Series 4GB Flash/RAID 5 Upgrade	1	-
Feature on Demand upgrades for the M5210				
47C8708	A3Z6	ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade	1	-
47C8706	A3Z5	ServeRAID M5200 Series RAID 6 Upgrade	1*	-
47C8710	A3Z7	ServeRAID M5200 Series Performance Accelerator	1*	-
47C8712	A3Z8	ServeRAID M5200 Series SSD Caching Enabler	1*	-

* Requires cache memory upgrade (47C8656, 47C8660, or 47C8664).

The integrated ServeRAID M5110e SAS/SATA Controller has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Supports 512 MB battery-backed cache or 512 MB, 1 GB, or 2 GB flash-backed cache
- Up to 6 Gbps throughput per port
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller

The ServeRAID M5110 SAS/SATA Controller has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports connections to SAS/SATA drives and SAS Expanders
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Supports 512 MB battery-backed cache or 512 MB, 1 GB, or 2 GB flash-backed cache
- Up to 6 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller

The ServeRAID M5210 SAS/SATA Controller has the following specifications:

- Eight internal 12 Gbps SAS/SATA ports
- Two x4 HD mini-SAS internal connectors (SFF-8643)
- Supports connections to SAS/SATA drives and SAS Expanders
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5200 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5200 Series RAID 6 Upgrade
- Supports 1 GB non-backed cache or 1 GB, 2 GB, or 4 GB flash-backed cache
- Up to 12 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS3108 12 Gbps ROC controller

The 6Gb Performance Optimized HBA has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports connections to SAS/SATA HDDs and SATA SSDs
- Optimized for SSD performance
- No RAID support
- Up to 6 Gbps throughput per port
- PCIe 2.0 x8 host interface
- Based on the LSI SAS2008 6 Gbps controller

The N2115 SAS/SATA HBA has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports connections to SAS/SATA HDDs and SATA SSDs
- Optimized for SSD performance
- No RAID support
- Up to 6 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2308 6 Gbps controller

The N2215 SAS/SATA HBA has the following specifications:

- Eight internal 12 Gbps SAS/SATA ports
- Two x4 HD mini-SAS internal connectors (SFF-8643)
- Supports connections to SAS/SATA HDDs and SATA SSDs
- Optimized for SSD performance
- No RAID support
- Up to 12 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS3008 12 Gbps controller

For more information, see the list of Lenovo Press Product Guides in the RAID adapters category:
https://lenovopress.com/servers/options/raid?rt=product-guide

Internal drive options

The following table lists currently available drive options for the internal disk storage of the x3650 M4 server.

Table 10. Disk drive options for internal disk storage

Part number	Feature code	Description	Maximum supported
1.8-inch SSDs - Enterprise			
41Y8366	A4FS	S3700 200GB SATA 1.8" MLC Enterprise SSD	32
41Y8371	A4FT	S3700 400GB SATA 1.8" MLC Enterprise SSD	32
1.8-inch SSDs - Enterprise Value			
00AJ335	A56V	120GB SATA 1.8" MLC Enterprise Value SSD	32
00AJ340	A56W	240GB SATA 1.8" MLC Enterprise Value SSD	32
00AJ345	A56X	480GB SATA 1.8" MLC Enterprise Value SSD	32
00AJ350	A56Y	800GB SATA 1.8" MLC Enterprise Value SSD	32
00AJ040	A4KV	S3500 80GB SATA 1.8" MLC Enterprise Value SSD	32
00AJ050	A4KX	S3500 400GB SATA 1.8" MLC Enterprise Value SSD	32
00AJ455	A58U	S3500 800GB SATA 1.8" MLC Enterprise Value SSD	32
2.5-inch hot-swap HDDs - 6 Gbps SAS			
90Y8926	A2XB	146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	16
90Y8877	A2XC	300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
81Y9670	A283	300GB 15K 6Gbps SAS 2.5" G2HS HDD	16
90Y8872	A2XD	600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
00AJ300	A4VB	600GB 15K 6Gbps SAS 2.5'' G2HS HDD	16
81Y9650	A282	900GB 10K 6Gbps SAS 2.5" SFF HS HDD	16
00AD075	A48S	1.2TB 10K 6Gbps SAS 2.5'' G2HS HDD	16
00NA441	ASCD	1.8TB 10K 6Gbps SAS 2.5" G2HS 512e HDD	16
2.5-inch hot-swap HDDs - 6 Gbps NL SAS			
90Y8953	A2XE	500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	16
81Y9690	A1P3	1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	16
2.5-inch hot-swap HDDs - 6 Gbps NL SATA			
81Y9722	A1NX	250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
81Y9726	A1NZ	500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
81Y9730	A1AV	1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
2.5-inch hot-swap SEDs - 6 Gbps SAS			
90Y8913	A2XF	300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
90Y8908	A3EF	600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
81Y9662	A3EG	900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
00AD085	A48T	1.2TB 10K 6Gbps SAS 2.5'' G2HS SED	16
2.5-inch hot-swap SSDs - Enterprise 6 Gbps SAS			
49Y6129	A3EW	200GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6134	A3EY	400GB SAS 2.5" MLC HS Enterprise SSD	16

Part number	Feature code	Description	Maximum supported
49Y6139	A3F0	800GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6195	A4GH	1.6TB SAS 2.5" MLC HS Enterprise SSD	16
2.5-inch hot-swap SSDs - Enterprise 6 Gbps SATA			
41Y8331	A4FL	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8336	A4FN	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8341	A4FQ	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	16
2.5-inch hot-swap SSDs - Enterprise Entry/Value 6 Gbps SATA			
00YC365	AT8M	120GB Enterprise Entry SATA HS 2.5" SSD	16
00AJ355	A56Z	120GB SATA 2.5" MLC HS Enterprise Value SSD	16
00YC370	AT8N	240GB Enterprise Entry SATA HS 2.5" SSD	16
00AJ360	A570	240GB SATA 2.5" MLC HS Enterprise Value SSD	16
00FN298	AS0D	240GB SATA 2.5" MLC HS Entry SSD	16
00YC375	AT8P	480GB Enterprise Entry SATA HS 2.5" SSD	16
00AJ365	A571	480GB SATA 2.5" MLC HS Enterprise Value SSD	16
00FN327	AS0E	480GB SATA 2.5" MLC HS Entry SSD	16
00AJ370	A572	800GB SATA 2.5" MLC HS Enterprise Value SSD	16
00YC380	AT8Q	960GB Enterprise Entry SATA HS 2.5" SSD	16
00AJ000	A4KM	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ005	A4KN	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ010	A4KP	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ015	A4KQ	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	16
00FN268	A5U4	S3500 1.6TB SATA 2.5" MLC HS Enterprise Value SSD	16
3.5-inch hot-swap HDDs - 6 Gbps SAS			
49Y6092	A3DV	300GB 15K 6Gbps SAS 3.5" G2HS HDD	6
49Y6102	A3DX	600GB 15K 6Gbps SAS 3.5" G2HS HDD	6
3.5-inch hot-swap HDDs - 6 Gbps NL SAS			
90Y8567	A26M	1TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	6
90Y8572	A2U0	2TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	6
90Y8577	A2R2	3TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	6
49Y6210	A4AF	4TB 7.2K 6Gbps NL SAS 3.5'' G2HS HDD	6
00ML213	AS78	6TB 7.2K 6Gbps NL SAS 3.5" G2HS 512e HDD	6
3.5-inch hot-swap HDDs - 6 Gbps NL SATA			
81Y9786	A22Y	500GB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
81Y9790	A22P	1TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
81Y9794	A22T	2TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
00FN113	A5VD	2TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	6
81Y9798	A22S	3TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
49Y6002	A3W9	4TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
00FN143	A5VH	4TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	6
00FN173	A5VM	6TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	6
3.5-inch hot-swap SEDs - 6 Gbps NL SAS			

Part number	Feature code	Description	Maximum supported
00W1543	A4AJ	4TB 7.2K 6Gbps NL SAS 3.5'' G2HS SED	6
3.5-inch hot-swap SSDs - 6 Gbps SATA			
00YC420	AT8Y	960GB Enterprise Entry SATA HS 3.5" SSD	6
3.5-inch simple-swap HDDs - 6 Gbps NL SATA			
81Y9802*	A22U	500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6
81Y9806*	A22X	1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6
81Y9810*	A22W	2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6

* Simple swap drives are for use in configurations that are only available via special bid or Configure To Order (CTO).

Internal backup units

The server supports the internal tape drive options listed in the following table. The x3650 M4 Tape Enablement Kit (69Y5320) is required to support these tapes internally.

Table 11. Internal tape drives

Part number	Feature code	Description	Maximum supported
00D2786	A2VE	RDX Internal USB 3.0 Dock with 320GB Cartridge	1
00D2787	A2VF	RDX Internal USB 3.0 Dock with 500GB Cartridge	1
00D2788	A2VG	RDX Internal USB 3.0 Dock with 1TB Cartridge	1

For more information, see the list of lenovo Press Product Guides in the Backup units category: https://lenovopress.com/storage/tape?rt=product-guide

Optical drives

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

Table 12. Optical drives

Part number	Feature code	Description	Maximum supported	Standard models where used
46M0901	4161	UltraSlim Enhanced SATA DVD-ROM	1	-
46M0902	4163	UltraSlim Enhanced SATA Multi-Burner	1	-

UltraSlim Enhanced SATA DVD-ROM (part number 46M0901) supports the following media and speeds for reading:

- CD-ROM 24X
- CD-DA (DAE) 20X
- CD-R 24X
- CD-RW 24X
- DVD-ROM (single layer) 8X
- DVD-ROM (dual layer) 8X
- DVD-R (4.7 GB) 6X
- DVD-R DL 4X
- DVD+R 6X
- DVD+R DL 4X
- DVD-RW (4.7 GB) 4X
- DVD+RW 4X
- DVD-RAM (4.7/9.4 GB) 4X

UltraSlim Enhanced SATA Multi-Burner (46M0902) supports the same media and speeds for reading as DVD-ROM (46M0901). This drive also supports the following media and speeds for writing:

- CD-R 24X
- CD-RW 4X
- High Speed CD-RW 10X
- Ultra Speed CD-RW 16X
- Ultra Speed Plus CD-RW 16X
- DVD-R 8X
- DVD-R DL 6X
- DVD+R 8X
- DVD+R DL 6X
- DVD-RW 6X
- DVD+RW 8X
- DVD-RAM 5X

I/O expansion options

The server supports up to six PCIe slots with different riser cards installed into two riser sockets on the system planar (one riser socket supports installation of one riser card). Riser 1 supplies slots 1, 2, and 3. Riser 2 supplies slots 4, 5, and 6. Standard models have Riser card 1 installed with three PCIe 3.0 x8 slots. To enable slots 4 - 6, install a second processor and a second riser card.

The following table lists the PCI riser card options available.

Table 13. PCI riser card options

Part number	Feature code	Description	Maximum supported
69Y5321	A1JT / A1JU*	x3650 M4 PCIe Riser Card (3 x8 PCIe slots) (one included in standard models in Riser socket 1)	2
69Y5322	A1JP / A1JQ*	x3650 M4 PCIe Riser Card (1 x16 + 1 x8 PCIe slots)	2
81Y6843	A1JR / A1JS*	x3650 M4 PCIX Riser Card (2 PCIX + 1 x16 PCIe slots)	2
90Y5085	A3L2 / A3A1*	x3650 M4 PCIe Riser Card 2 (1 x16 for GPU + 1 x8 FH/HL Slots)	2

* For CTO orders, the first feature code is for the first riser slot and the second feature code is for the second riser slot.

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

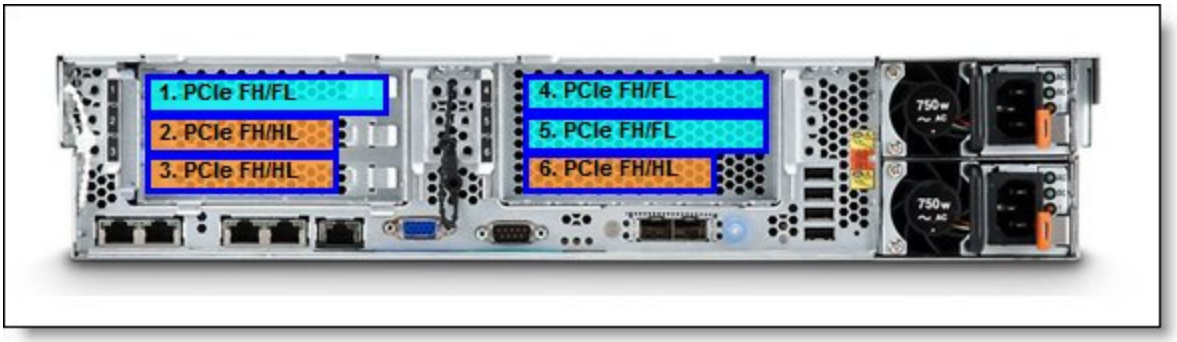

Figure 6. Slot dimensions

The specific slots that are available depend on the riser cards installed in Riser socket 1 and Riser socket 2, as shown in the following table. Standard models have 69Y5321 installed in Riser socket 1.

Tip: All slots support full-height adapters. Slots 1, 4, and 5 support full-length adapters, whereas slots 2, 3, and 6 (when present) support half-length adapters.

Table 14. PCIe slot descriptions (FH=full height, FL=full length, HL=half length, DW=double width)

Slot number	**PCIe 3 x8 riser 69Y5321** (standard)	**PCIe x16 riser 69Y5322**	**PCI-X riser 81Y6843**	**GPU riser 90Y5085**
Riser socket 1 (CPU 1)	1: PCIe 3.0 x8; FH, FL	1: PCIe 3.0 x16 FH, FL	1: PCI-X 64b/133 FH, FL	1: No slot present
	2: PCIe 3.0 x8; FH, HL	2: PCIe 3.0 x8 FH, HL	2: PCI?X 64b/133 FH, HL	2: PCIe 3.0 x16 FH, FL, DW
	3: PCIe 3.0 x8; FH, HL	3: No slot present	3: PCIe 3.0 x16 FH, HL	3: PCIe 3.0 x8 FH, HL
Riser socket 2 (CPU 2 required)	4 :PCIe 3.0 x8 FH, FL	4: PCIe 3.0 x16 FH, FL	4: PCI-X 64b/133 FH, FL	4: No slot present
	5: PCIe 3.0 x8 FH, FL	5: PCIe 3.0 x8 FH, FL	5: PCI-X 64b/133 FH, FL	5: PCIe 3.0 x16 FH, FL, DW
	6: PCIe 3.0 x8 FH, HL	6: No slot present	6: PCIe 3.0 x16 FH, HL	6: PCIe 3.0 x8 FH, HL

Note: Slots 4, 5, and 6 require a second processor to be installed.

The x3650 M4 Thermal Solution Kit, 46W8422 contains an 80 mm fan which provides the fourth system fan needed for the QLogic Dual Port 10GbE SFP+ Embedded VFA for IBM System x when only one processor is installed. The Thermal Solution Kit is not needed if two processors are installed, since the second processor includes this fan.

Table 15. Thermal Solution Kit

Part number	**Feature code**	**Description**	**Maximum supported**
46W8422	A499*	x3650 M4 Thermal Solution Kit	1

* For CTO orders, feature code A3ZE, IBM System x3650 M4 Fan Assembling Kit will be substituted

Network adapters

The x3650 M4 supports four integrated Gigabit Ethernet ports. Optionally, two 10 Gb Ethernet ports can be added by installing one of the dual-port 10 Gb Ethernet mezzanine cards listed in the following table. These cards use a dedicated connector on the motherboard and do not consume a PCI expansion slot.

Integrated NICs have the following features:

- Intel I350AM4 chip
- Four GbE ports
- TCP Offload Engine (TOE) support
- Wake on LAN support
- IPv6 support
- 802.1Q VLAN tagging support
- NIC Teaming (load balancing and failover)

The following table lists additional network adapters that are currently available for the x3650 M4.

Table 16. Network adapters

Part number	Feature code	Description	Maximum supported#
40 Gb Ethernet			
00D9550	A3PN	Mellanox ConnectX-3 40GbE / FDR IB VPI Adapter	6*
10 Gb Ethernet (Mezzanine Card - does not consume a PCI expansion slot)			
44T1360	A4YQ	Broadcom NetXtreme 2x10 GbE SFP+ Mezz Adapter	1*
90Y6454**	A22H	QLogic Dual Port 10GbE SFP+ Embedded VFA	1*
90Y5179	A2TF	QLogic Embedded VFA FCoE/iSCSI License (FoD) (Features on Demand Upgrade for 90Y6454)	1
00Y7730	A4MC	Emulex Dual Port 10GbE SFP+ Embedded VFA IIIr	1*
90Y5178	A2TE	Emulex Embedded VFA III FCoE/iSCSI License (Features on Demand Upgrade for 00Y7730)	1
49Y7980	A3JS	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter	1*
49Y7990	A3JT	Intel X540 Dual Port 10GBase-T Embedded Adapter	1
10 Gb Ethernet			
44T1370	A5GZ	Broadcom NetXtreme 2x10GbE BaseT Adapter	6
00D8540	A4XH	Emulex Dual Port 10GbE SFP+ VFA IIIr	6*
95Y3760	A2U2	Emulex VFA III FCoE/iSCSI License (FoD license for 00D8540 - one for each adapter)	6
00JY820	A5UT	Emulex VFA5 2x10 GbE SFP+ PCIe Adapter	6*
00JY830	A5UU	Emulex VFA5 2x10 GbE SFP+ Adapter and FCoE/iSCSI SW	6*
None	AS3M	Emulex VFA5 2x10 GbE SFP+ Integrated Adapter	1*
00JY824	A5UV	Emulex VFA5 FCoE/iSCSI SW for PCIe Adapter (FoD) (FoD upgrade for 00JY820 or feature code AS3M)	6
00D9501	A3A2	LLM-SM Dual Port 10GbE SFP+ Adapter	6*
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter	6*
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter	6
00D9690	A3PM	Mellanox ConnectX-3 10GbE Adapter	6*
90Y4600	A3MR	QLogic 8200 Dual Port 10GbE SFP+ VFA	6*
00Y5624	A3MT	QLogic 8200 VFA FCoE/iSCSI License (FoD) (FoD license for 90Y4600 -- one for each adapter)	6
47C9952	A47H	Solarflare SFN5162F MR Dual Port 10GbE SFP+ Adapter	6*
47C9977	A522	Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra	6*
Gigabit Ethernet			

90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter	6
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter	6
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2	6
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4	6
00AG500	A56K	Intel I350-F1 1xGbE Fiber Adapter	6
00AG510	A56L	Intel I350-T2 2xGbE BaseT Adapter	6
00AG520	A56M	Intel I350-T4 4xGbE BaseT Adapter	6
42C1780	2995	Broadcom NetXtreme 2xGbE BaseT Adapter	6
InfiniBand (Mezzanine Card - does not consume a PCI expansion slot)			
00D4143	A36R	Dual Port FDR Embedded Adapter	1*
InfiniBand			
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter	6*

* SFP+ and QSFP+ based adapters require supported transceivers or DAC cables that must be purchased separately.
** The QLogic Dual Port 10GbE SFP+ Embedded VFA requires the x3650 M4 Thermal Solution Kit, 46W8422 or the second processor (with additional system fan).
# Maximum quantity is achieved with two processors installed. With one processor, the maximum quantity is half of the listed value (this does not apply to mezzanine cards).

For more information, see the list of Lenovo Press Product Guides in the Networking adapters category: https://lenovopress.com/servers/options/ethernet?rt=product-guide

Storage host bus adapters

The following table lists storage HBAs available for the x3650 M4 server. The maximum quantity listed is for configurations with two processors installed. If one processor is installed, the maximum quantity supported is half of the listed value.

Table 17. Storage adapters

Part number	Feature code	Description	Maximum supported
Fibre Channel - 16 Gb			
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA	6
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA	6
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA	6
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA	6
Fibre Channel - 8 Gb			
42D0485	3580	Emulex 8 Gb FC Single-port HBA	6
42D0494	3581	Emulex 8 Gb FC Dual-port HBA	6
42D0501	3578	QLogic 8 Gb FC Single-port HBA	6
42D0510	3579	QLogic 8 Gb FC Dual-port HBA	6
SAS			
46M0907	5982	6 Gb SAS HBA	6
46C9010	A3MV	N2125 SAS/SATA HBA	6
00AE912	A5M0	N2225 SAS/SATA HBA	3
00AE916	A5M1	N2226 SAS/SATA HBA	3

For more information, see the list of Lenovo PressProduct Guides in the Host bus adapters category: https://lenovopress.com/servers/options/hba?rt=product-guide

PCIe SSD adapters

The server supports the High IOPS SSD adapters listed in the following table.

Table 18. SSD adapters

Part number	Feature code	Description	Maximum supported
Enterprise			
00AE995	ARYP	1000GB Enterprise io3 Flash Adapter	4
00AE998	ARYQ	1300GB Enterprise io3 Flash Adapter	4
00JY001	ARYR	2600GB Enterprise io3 Flash Adapter	4
00JY004	ARYS	5200GB Enterprise io3 Flash Adapter	4*
Enterprise Value			
00AE983	ARYK	1250GB Enterprise Value io3 Flash Adapter	4
00AE986	ARYL	1600GB Enterprise Value io3 Flash Adapter	4
00AE989	ARYM	3200GB Enterprise Value io3 Flash Adapter	4
00AE992	ARYN	6400GB Enterprise Value io3 Flash Adapter	4*

* The 5200GB and 6400GB io3 Flash Adapters cannot be factory installed; they are supported as field-installable options only. The server cannot be shipped with these adapters installed.

For details about these adapters, see the Lenovo Press Product Guides in the PCIe SSD Adapters category, found at the following address:
https://lenovopress.com/servers/options/ssdadapter?rt=product-guide

GPU adapters

The server supports GPUs provided the appropriate riser card is installed (one or two riser cards depending on the number of GPUs). For the NVIDIA Quadro K600, riser card 69Y5322 is used. For all other GPUs, riser card 90Y5085 is used. The server provides up to 225W of external power to each GPU. The following table lists the supported GPUs.

Table 19. GPU adapters

Part number	Feature code	Description	Maximum supported
None*	A3WH	NVIDIA Quadro K600	4
None*	A3WJ	NVIDIA Quadro K2000	2
None*	A3YU	NVIDIA Quadro K4000	2
None*	A3YW	NVIDIA Quadro K5000	2
None*	A3YV	NVIDIA Quadro K6000	2
None*	A5FG	NVIDIA Tesla K40c	1
None*	A470	NVIDIA Grid K2 (Actively Cooled)	2

* Available only via CTO or special bid.

The following configuration rules apply when selecting GPU adapters:

- General requirements for all GPUs
  - Use the configurator tools to ensure the necessary cables, riser cards, air baffles, and other prerequisites are selected
  - When 2 GPUs are selected (2, 3 or 4 GPUs in the case of the Quadro K600), the second processor is required and will require a special heatsink
  - GPUs cannot be mixed
  - Further restrictions apply depending on the power supplies installed as described in the Power supplies section.
- NVIDIA Quadro K600 requirements:
  - Maximum 128 GB system memory
- NVIDIA Quadro K2000 requirements:
  - No additional requirement
- NVIDIA Quadro K4000, K5000, K6000 requirements:
  - Only drive backplanes 8x 2.5" HS HDD Kit (feature A1JX) or Plus 8x 2.5" HS HDD Assembly Kit with Expander (feature A1JY) can be selected
- NVIDIA Tesla K40c requirements:
  - For models with E5-2600 v2 processors. Models with E5-2600 not supported.
  - Second processor required
- NVIDIA Grid K2 requirements:
  - Second processor required
  - When 2 GPUs selected, only drive backplanes 8x 2.5" HS HDD Kit (feature A1JX) or Plus 8x 2.5" HS HDD Assembly Kit with Expander (feature A1JY) can be selected

Power supplies

The server supports up to two redundant power supplies. Standard models come with one or two power supplies (model dependent). The following table lists the power supplies.

Table 20. Power supplies

Part number	Feature code	Description	Maximum supported	Standard models where used
94Y6668	A1H6	System x 550W High Efficiency Platinum AC Power Supply	2	53x, A3x, B3x, C3x, C5x, D3x, F3x
94Y6669	A1H5	System x 750W High Efficiency Platinum AC Power Supply	2	G3x, H3x, J3x
94Y7631	A39N	System x 750W High Efficiency -48 V DC Power Supply	2	-
94Y6667	A2EB	System x 900W High Efficiency Platinum AC Power Supply	2	23x, 33x, 43x, 73x, 83x, L3x, M3x

An AC power supply ships standard with one 2.8 m C13 - C14 power cord.

General power supply rules are as follows:

- Minimum of 1 and maximum of 2 power supplies per system
- If 2 installed, power supplies must be identical

550W power supply restrictions

- GPUs not supported
- 135W processors not supported; 130W processors supported with restrictions as listed below.
- With 1 power supply installed and 2 processors 115W or lower:
  - Maximum 8 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 3 PCIe adapters (including mezzanine cards)
  - Maximum 16 drives
- With 1 power supply installed and 1 processors 130W or lower:
  - Maximum 12 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 3 PCIe adapters (including mezzanine cards)
  - Maximum 16 drives
- With 2 power supplies installed and 2 processors 115W or lower:
  - Maximum 16 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 3 PCIe adapters (including mezzanine cards)
  - Maximum 16 drives
- With 2 power supplies installed and 1 processor 130W or lower:
  - Maximum 12 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 4 PCIe adapters (including mezzanine cards) (if 4 adapters to be installed, one must be a mezzanine card)
  - Maximum 16 drives

750W power supply restrictions

- With 1 power supply installed and no GPU adapter is selected:
  - Maximum 24 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 4 PCIe adapters (including mezzanine cards) (if 4 adapters to be installed, one must be a mezzanine card)
- With 1 power supply installed and GPU adapters are selected:
  - Maximum 1 Quadro K5000 or any supported quantity of Quadro K2000, K600
  - All other GPUs not supported
  - Processors up to 115W supported
  - Maximum 16 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 2 PCIe adapters (including mezzanine cards, excluding GPUs)
  - Maximum 8 drives

900W power supply restrictions:

- With 1 power supply installed and no GPU adapter is selected, there is no restriction on drives, memory, processors or adapters
- With 1 power supply installed and certain GPU adapters are selected:
  - Maximum 1 Quadro K5000; or any supported quantity of Quadro K2000, K600
  - Maximum 24 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 2 PCIe adapters (including mezzanine cards, excluding GPUs)
- With 1 power supply installed and certain GPU adapters are selected:
  - Maximum 1 Quadro K6000, Grid K2
  - Maximum 16 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 12 drives
  - Maximum 2 PCIe adapters (including mezzanine cards, excluding GPUs)
- With 1 power supply installed and Tesla K40c is selected:
  - Maximum 16 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 10 drives
  - Maximum 2 PCIe adapters (including mezzanine cards, excluding GPUs)
- With 2 power supplies installed and Tesla K40c is selected:
  - Maximum 10 drives
  - No restriction on memory and PCIe adapters
- With 2 power supplies installed and 2 Grid K2 or 2 K6000 are selected:
  - Maximum 12 DIMMs
  - No Quad rank RDIMMs, LRDIMM or HCDIMM
  - Maximum 12 drives
  - Maximum 1 PCIe adapter (including mezzanine cards, excluding GPUs)
- 2 Quadro K5000 adapters supported with 2 power supply installed

Integrated virtualization

The server supports VMware ESXi installed on a USB memory key. The key is installed in a USB socket inside the server. The following table lists the virtualization options.

Table 21. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	Blank USB Memory Key for VMware ESXi Downloads	1
41Y8382	A4WZ	USB Memory Key for VMware ESXi 5.1 Update 1	1

Systems management

The server contains Integrated Management Module II (IMM2), which provides advanced service-processor control, monitoring, and an alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM2 lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. Optionally, the IMM2 also provides a virtual presence capability for remote server management capabilities.

The IMM provides remote server management through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Common Information Model (CIM)
- Web browser

The optional Integrated Management Module Advanced Upgrade is required to enable the remote presence and blue-screen capture features. The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel colors, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

The blue-screen capture feature captures the video display contents before the IMM restarts the server when the IMM detects an operating-system hang condition. A system administrator can use the blue-screen capture to assist in determining the cause of the hang condition. The following table lists the remote management option.

Table 22. Remote management option

Part number	Feature code	Description	Maximum supported	Models where used
90Y3901	A1ML	Integrated Management Module Advanced Upgrade	1	-

All standard models ship with a pop-out light path diagnostics panel on the front of the server (See Figure 2). Configure-to-order (CTO) customers may elect to deselect this feature and instead have a basic light path diagnostics panel on the front of the server. The following table shows the two light path diagnostics features

Table 23. Light path diagnostics options

Part number	Feature code	Description	Maximum supported	Models where used
None*	A1LF	System x Lightpath Kit	1	-
00Y7676	A2U6	System x Advanced Lightpath Kit	1	All models

* CTO only

Operating systems

The server supports the following operating systems:

- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Datacenter x86 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Enterprise x86 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Standard x86 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2008, Web x86 Edition
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- Red Hat Enterprise Linux 7
- SUSE Linux Enterprise Server 10 for AMD64/EM64T
- SUSE Linux Enterprise Server 11 for AMD64/EM64T
- SUSE Linux Enterprise Server 11 for x86
- SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T
- SUSE Linux Enterprise Server 12
- SUSE Linux Enterprise Server 12 with Xen
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)
- VMware vSphere 6.0 (ESXi)

See the ServerProven® website for the latest information about the specific versions and service levels supported and any other prerequisites: www.lenovo.com/us/en/serverproven/

Physical and electrical specifications

Dimensions and weight:

- Height: 86.5 mm (3.4 in)
- Width: 445 mm (17.5 in)
- Depth: 746 mm (29.4 in)
- Weight:
  - Minimum configuration: 25 kg (55 lb)
  - Maximum configuration: 30 kg (65 lb)

Supported environment:

- Air temperature:
  - Server on: 5 °C to 40 °C (41 °F to 104 °F); altitude: 0 to 950 m (3,117 ft); decrease the maximum system temperature by 1 °C for every 175-m increase in altitude.
  - Server off: 5 °C to 45 °C (41 °F to 113 °F)
  - Maximum altitude: 3,050 m (10,000 ft), 5 °C to 28 °C (41 °F to 82 °F)
  - Shipment: -40 °C to +60 °C (-40 °F to 140 °F)
- Humidity:
  - Server on: 8% to 85%, maximum dew point 24 °C, maximum rate of change 5 °C/hr

- Server off: 8% to 85%, maximum dew point 27 °C

- Design to ASHRAE Class A3, ambient of 36 °C to 40 °C (96.8 °F to 104 °F), with relaxed support:
  - Supports cloud like workload with no performance degradation acceptable (Turbo-Off).
  - Under no circumstance can any combination of worst case workload and configuration result in system shutdown or design exposure at 40 °C.
  - The worst-case workload (like Linpack, Turbo-On) might have performance degradation.
- Electrical:
  - Models with 900 W power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 10 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 5 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.15 kVA
      - Maximum configuration: 1.02 kVA
  - Models with 750 W ac power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 8.9 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 4.5 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.15 kVA
      - Maximum configuration: 0.9 kVA
  - Models with 550 W power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 6.5 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 3.3 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.16 kVA
      - Maximum configuration: 0.66 kVA
- BTU output:
  - Minimum configuration: 525 Btu/hr (123 watts)
  - Maximum configuration: 3480 Btu/hr (1020 watts)
- Noise level:
  - 6.6 bels (operating)
  - 6.4 bels (idle)

Warranty options

The System x3650 M4 has a three-year warranty with 24x7 standard call center support and 9x5 Next Business Day onsite coverage. Also available are Lenovo Services warranty maintenance upgrades and post-warranty maintenance agreements, with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

Lenovo warranty service upgrade offerings are country-specific. Not all warranty service upgrades are available in every country. For more information about Lenovo warranty service upgrade offerings that are available in your country, visit the Lenovo Services website:
https://www-304.ibm.com/sales/gss/download/spst/servicepac

The following table explains warranty service definitions in more detail.

Table 24. Warranty service definitions

Term	Description
On-site service	A service technician will arrive at the client's location for equipment service.
24x7x2 hour	A service technician is scheduled to arrive at the client's location within two hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
24x7x4 hour	A service technician is scheduled to arrive at the client's location within four hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
9x5x4 hour	A service technician is scheduled to arrive at the client's location within four business hours after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday-Friday, excluding Lenovo holidays. For example, if a customer reports an incident at 3:00 pm on Friday, the technician will arrive by 10:00 am the following Monday.
9x5 next business day	A service technician is scheduled to arrive at the client's location on the business day after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday - Friday, excluding Lenovo holidays. Calls received after 4:00 pm local time require an extra business day for service dispatch. Next business day service is not guaranteed.
Committed Repair	Problems receive priority handling so that repairs are completed within the committed time of 6, 8, or 24 hours. Lenovo provides service 24 hours/day, every day, including Lenovo holidays.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
  - Three, four, or five years of 9x5 or 24x7 service coverage
  - Onsite response from next business day to 2 or 4 hours
  - Committed repair service
  - Warranty extension of up to 5 years
  - Post warranty extensions
- Committed Repair Service
  Committed Repair Services enhances the level of Warranty Service Upgrade or Post Warranty/Maintenance Service offering associated with the selected systems. Offerings vary and are available in select countries.
  - Priority handling to meet defined time frames to restore the failing machine to good working condition
  - Committed repair service levels are measured within the following coverage hours:
    - 24x7x6: Service performed 24 hours per day, 7 days per week, within 6 hours
    - 24x7x8: Service performed 24 hours per day, 7 days per week, within 8 hours
    - 24x7x24: Service performed 24 hours per day, 7 days per week, within 24 hours
- Hard Drive Retention
  Lenovo's Hard Drive Retention service is a multi-drive hard drive retention offering that ensures your data is always under your control, regardless of the number of hard drives that are installed in your Lenovo server. In the unlikely event of a hard drive failure, you retain possession of your hard drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The Hard Drive Retention service can be purchased in convenient bundles with our warranty upgrades and extensions.

- Microcode Support
  Keeping microcode current helps prevent hardware failures and security exposure. There are two levels of service: analysis of the installed base and analysis and update where required. Offerings vary by country and can be bundled with other warranty upgrades and extensions.
- Remote Technical Support Services (RTS)
  RTS provides comprehensive technical call center support for covered servers, storage, operating systems, and applications. Providing a single source for support of hardware and software issues, RTS can reduce problem resolution time, decreasing the cost to address technical problems and increasing uptime. Offerings are available for Windows, Linux, IBM Systems Director, VMware, Microsoft business applications, and Lenovo System x storage devices, and IBM OEM storage devices.

Regulatory compliance

The server conforms to the following regulations:

- Energy Star 2.0
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, 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 22, Class A
- IEC 60950-1(CB Certificate and CB Test Report)
- China CCC (GB4943), GB9254 Class A, GB17625.1
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22, GOST R 51318.24, GOST R 51317.3.2, GOST R 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1,EK1-ITB2000)
- RoHS compliance (Directive 2002/95/EC)

External disk storage expansion

The x3650 M4 supports attachment to external storage expansion enclosures, such as the EXP2500 series, by using the ServeRAID M5120 SAS/SATA Controller. The x3650 M4 can also be attached to supported external storage systems, such as the Lenovo Storage S3200 (see the External disk storage systems section).

Table 25. RAID controllers and options for external disk storage expansion

Part number	Feature code	Description	Maximum supported	Standard models where used
00AE938	A5ND	ServeRAID M5225-2GB SAS/SATA Controller	4	-
81Y4478	A1WX	ServeRAID M5120 SAS/SATA Controller	4	-
Features on Demand upgrades for the M5225 (per server)				
47C8706	A3Z5	ServeRAID M5200 Series RAID 6 Upgrade-FoD	1	
47C8710	A3Z7	ServeRAID M5200 Series Performance Accelerator-FoD	1	
47C8712	A3Z8	ServeRAID M5200 Series SSD Caching Enabler -FoD	1	
Hardware upgrades for the M5120 (per RAID controller)				
81Y4508	A22E	ServeRAID M5100 Series Battery Kit	1*	-
90Y5046	A2BB	x3650 M4 Remote Supercap and Battery Tray**	1	-
81Y4484	A1J3	ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade	1	-
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade	1	-
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade	1	-
47C8670	A4G6	ServeRAID M5100 Series 2GB Flash/RAID 5 Upgrade	1	-
Feature on Demand upgrades for the M5120 (per server)				
81Y4544	A1X2	ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade	1	-
90Y4318	A2MD	ServeRAID M5100 Series SSD Caching Enabler	1	-
90Y4273	A2MC	ServeRAID M5100 Series SSD Performance Key	1	-
81Y4546	A1X3	ServeRAID M5100 Series RAID 6 Upgrade	1†	-

* The ServeRAID M5100 Series Battery Kit (81Y4508) is only supported with ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade (81Y4484).
† The ServeRAID M5100 Series RAID 6 Upgrade (81Y4546) requires 512 MB or 1 GB cache upgrades.
** Cannot be installed if an internal tape drive is installed.

The ServeRAID M5225 SAS/SATA Controller has the following specifications:

- Eight external 12 Gbps SAS/SATA ports
- Supports 12, 6, and 3 Gbps SAS and 6 and 3 Gbps SATA data transfer rates
- Two external x4 mini-SAS HD connectors (SFF-8644)
- Supports 2 GB flash-backed cache (standard)
- Supports RAID levels 0, 1, 5, 10, and 50 (standard)
- Supports RAID 6 and 60 with the optional M5200 Series RAID 6 Upgrade
- Supports optional M5200 Series Performance Accelerator and SSD Caching upgrades
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS3108 12 Gbps ROC controller
- Supports connectivity to the EXP2512 and EXP2524 storage expansion enclosures

The ServeRAID M5120 SAS/SATA Controller has the following specifications:

- Eight external 6 Gbps SAS/SATA ports
- Two external x4 mini-SAS connectors (SFF-8088)
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Supports 512 MB battery-backed cache or 512 MB, 1 GB, or 2 GB flash-backed cache
- 6 Gbps throughput per port
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller
- Supports connectivity to the EXP2512 and EXP2524 storage expansion enclosures

For more information, see the following Lenovo Press Product Guides:

- ServeRAID M5120 SAS/SATA Controller
  http://lenovopress.com/tips0858
- ServeRAID M5225-2GB SAS/SATA Controller
  http://lenovopress.com/tips1258

The controllers support connectivity to the external expansion enclosures listed in the following table. Up to nine expansion enclosures can be daisy-chained per one controller external port. For better performance, distribute expansion enclosures evenly across both controller ports.

Table 26. External expansion enclosures

Part number	Description	Maximum quantity supported per one RAID controller
610012X	EXP2512 Storage Enclosure	17
610024X	EXP2524 Storage Enclosure	9

The external SAS cables listed in Table 27 support connectivity between external expansion enclosures and an external RAID controller (M5120 or M5225-2GB).

Table 27. External SAS cables for external storage expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
M5120: Server to Expansion enclosure connectivity (Mini-SAS x4 to Mini-SAS x4)		
00WC017	1 m SAS Cable	1
00WC018	3 m SAS Cable	1
M5225-2GB: Server to Expansion enclosure connectivity (Mini-SAS HD x4 to Mini-SAS x4)		
00MJ162	0.6m SAS Cable (mSAS HD to mSAS)	1
00MJ163	1.5m SAS Cable (mSAS HD to mSAS)	1
00MJ166	3m SAS Cable (mSAS HD to mSAS)	1
Expansion enclosure to Expansion enclosure connectivity (Mini-SAS x4 to Mini-SAS x4)		
00WC017	1 m SAS Cable	1
00WC018	3 m SAS Cable	1

Table 28 lists drives that are supported by EXP2512 external expansion enclosures.

Table 28. Drive options for EXP2512 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
3.5" NL SAS HS HDDs		
00NC555	2TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
00NC557	3TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
00NC559	4TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12

Table 29 lists hard disk drives that are supported by EXP2524 external expansion enclosures.

Table 29. Drive options for EXP2524 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
2.5" NL SAS HS HDDs		
00NC571	1TB 7,200 rpm 6Gb SAS NL 2.5" HDD	24
2.5" SAS HS HDDs		
00NC561	146GB 15,000 rpm 6Gb SAS 2.5" HDD	24
00NC563	300GB 15,000 rpm 6Gb SAS 2.5" HDD	24
00NC565	600GB 10,000 rpm 6Gb SAS 2.5" HDD	24
00NC567	900GB 10,000 rpm 6Gb SAS 2.5" HDD	24
00NC569	1.2TB 10,000 rpm 6Gb SAS 2.5" HDD	24
2.5" SAS HS SSDs		
00NC573	200GB 6Gb SAS 2.5" SSD	24
00NC575	400GB 6Gb SAS 2.5" SSD	24

External disk storage systems

The following table lists the external storage systems that are offered by Lenovo that can be used in x3650 M4 solutions.

Table 30. External disk storage systems

Part number	Description
Lenovo Storage S2200	
64112B1	Lenovo Storage S2200 LFF Chassis SAS Single Controller, Rack Kit, 9x5NBD
64112B2	Lenovo Storage S2200 LFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64114B1	Lenovo Storage S2200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64114B2	Lenovo Storage S2200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
64112B3	Lenovo Storage S2200 SFF Chassis SAS Single Controller, Rack Kit, 9x5NBD
64112B4	Lenovo Storage S2200 SFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64114B3	Lenovo Storage S2200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64114B4	Lenovo Storage S2200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
Lenovo Storage S3200	
64113B1	Lenovo Storage S3200 LFF Chassis SAS Single Controller, Rack Kit, 9x5NBD
64113B2	Lenovo Storage S3200 LFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64116B1	Lenovo Storage S3200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64116B2	Lenovo Storage S3200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
64113B3	Lenovo Storage S3200 SFF Chassis SAS Single Controller, Rack Kit, 9x5NBD
64113B4	Lenovo Storage S3200 SFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD
64116B3	Lenovo Storage S3200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64116B4	Lenovo Storage S3200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
IBM Storwize	
6096CU2	IBM Storwize V3500 3.5-inch Dual Control Storage Controller Unit
6096CU3	IBM Storwize V3500 2.5-inch Dual Control Storage Controller Unit
6099L2C	IBM Storwize V3700 3.5-inch Storage Controller Unit
6099S2C	IBM Storwize V3700 2.5-inch Storage Controller Unit
6099T2C	IBM Storwize V3700 2.5-inch DC Storage Controller Unit
6194L2C	IBM Storwize V5000 LFF Control Enclosure
6194S2C	IBM Storwize V5000 SFF Control Enclosure
6195SC5	IBM Storwize V7000 2.5-inch Storage Controller Unit

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

- IBM Storage
  https://lenovopress.com/storage/san/ibm
- Lenovo Storage
  https://lenovopress.com/storage/san/lenovo

External backup units

The following table lists the external backup options that are offered by Lenovo that can be used in x3650 M4 solutions.

Table 31. External backup options

Part number	Description
External tape enclosures	
61901UX	IBM Multimedia Backup Enclosure
Backup drives for IBM Multimedia Backup Enclosure	
00NV402	6190 HH LTO5 SAS Tape Drive
00NV404	6190 HH LTO6 SAS Tape Drive
00NV406	6190 RDX 3.0 Dock/320GB Cartridge Bundle
00NV407	6190 RDX 3.0 Dock/500GB Cartridge Bundle
00NV408	6190 RDX 3.0 Dock/1.0TB Cartridge Bundle
00NV455	6190 RDX 3.0 Dock/2.0TB Cartridge Bundle
External backup units	
362532Y	RDX External USB 3.0 Dock with 320GB Cartridge
362550Y	RDX External USB 3.0 Dock with 500GB Cartridge
36251TY	RDX External USB 3.0 Dock with 1TB Cartridge
6160S6X	IBM TS2360 Tape Drive Model S63
6160S6E	IBM TS2260 Tape Drive Model H6S
6160S5E	IBM TS2250 Tape Drive Model H5S
6171S4R	IBM TS2900 Tape Autoloader w/LTO4 HH SAS
6171S5R	IBM TS2900 Tape Autoloader w/LTO5 HH SAS
6171S6R	IBM TS2900 Tape Autoloader w/LTO6 HH SAS
61732UL	IBM TS3100 Tape Library Model L2U
61734UL	IBM TS3200 Tape Library Model L4U
Fibre Channel backup drives for TS3100 and TS3200 Tape Libraries	
00NA101	6173 LTO Ultrium 4 Fibre Channel Drive Sled
00NA103	6173 LTO Ultrium 4 Half High Fibre Drive Sled
00NA107	6173 LTO Ultrium 5 Fibre Channel Drive
00NA113	6173 LTO Ultrium 5 Half High Fibre Drive Sled
00NA115	6173 LTO Ultrium 6 Fibre Channel Drive
00NA119	6173 LTO Ultrium 6 Half High Fibre Drive Sled
SAS backup drives for TS3100 and TS3200 Tape Libraries	
00NA121	6173 LTO Ultrium 4 SAS Drive Sled
00NA105	6173 LTO Ultrium 4 Half High SAS DriveV2 Sled
00NA109	6173 LTO Ultrium 5 SAS Drive Sled
00NA111	6173 LTO Ultrium 5 Half High SAS Drive Sled
00NA117	6173 LTO Ultrium 6 Half High SAS Drive Sled

For more information, see the list of Product Guides in the Backup units category:
http://lenovopress.com/systemx/tape

Top-of-rack Ethernet switches

The following table lists the top-of-rack Ethernet switches that are offered by Lenovo that can be used in x3650 M4 solutions.

Table 32. Top-of-rack switches

Part number	Description
1 Gb Ethernet top-of-rack switches	
7159BAX	Lenovo RackSwitch G7028 (Rear to Front)
7159CAX	Lenovo RackSwitch G7052 (Rear to Front)
7159G52	Lenovo RackSwitch G8052 (Rear to Front)
10 Gb Ethernet top-of-rack switches	
7159BR6	Lenovo RackSwitch G8124E (Rear to Front)
7159G64	Lenovo RackSwitch G8264 (Rear to Front)
7159DRX	Lenovo RackSwitch G8264CS (Rear to Front)
7159CRW	Lenovo RackSwitch G8272 (Rear to Front)
7159GR6	Lenovo RackSwitch G8296 (Rear to Front)
40 Gb Ethernet top-of-rack switches	
7159BRX	Lenovo RackSwitch G8332 (Rear to Front)

For more information, see the list of Product Guides in the Top-of-rack switches category: http://lenovopress.com/systemx/tor

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used in x3650 M4 solutions.

Table 33. 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)

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

http://lenovopress.com/systemx/power

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used in x3650 M4 solutions.

Table 34. Power distribution units

Part number	Description
0U Basic PDUs	
46M4122	0U 24 C13 16A 3 Phase PDU with IEC 309 P+N+Gnd line cord
46M4125	0U 24 C13 30A 3 Phase PDU with NEMA L21-30P line cord
46M4128	0U 24 C13 30A PDU with NEMA L6-30P line cord
46M4131	0U 24 C13 32A PDU with IEC 309 P+N+Gnd line cord
46M4143	0U 12 C19/12 C13 32A 3 Phase PDU with IEC 309 3P+N+Gnd line cord
46M4140	0U 12 C19/12 C13 60A 3 Phase PDU with CS8365L 3P+Gnd line cord
Switched and Monitored PDUs	
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
46M4167	1U 9 C19/3 C13 Switched and Monitored 30A 3 Phase PDU with NEMA L21-30P line cord
46M4116	0U 24 C13 Switched and Monitored 30A PDU with NEMA L6-30P line cord
46M4119	0U 24 C13 Switched and Monitored 32A PDU with IEC 309 P+N+Gnd line cord
46M4137	0U 12 C19/12 C13 Switched and Monitored 32A 3 Phase PDU with IEC 309 3P+N+Gnd cord
46M4134	0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU with CS8365L 3P+Gnd cord
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
71762NX	Ultra Density Enterprise C19/C13 PDU Module (without line cord)
71762MX	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
71763MU	Ultra Density Enterprise C19/C13 PDU+ 60A/208V/3ph with IEC 309 3P+Gnd line cord
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
39M2816	DPI C13 Enterprise PDU+ (without line cord)
39Y8941	DPI Single Phase C13 Enterprise PDU (without line cord)
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
39Y8948	DPI Single Phase C19 Enterprise PDU (without line cord)
39Y8923	DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord
Front-end PDUs (3x IEC 320 C19 outlets)	
39Y8938	DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord
39Y8939	DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord
39Y8934	DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8940	DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8935	DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
Universal PDUs (7x IEC 320 C13 outlets)	
39Y8951	DPI Universal Rack PDU with US LV and HV line cords

Part number	Description
39Y8952	DPI Universal Rack PDU with CEE7-VII Europe line cord
39Y8953	DPI Universal Rack PDU with Denmark line cord
39Y8954	DPI Universal Rack PDU with Israel line cord
39Y8955	DPI Universal Rack PDU with Italy line cord
39Y8956	DPI Universal Rack PDU with South Africa line cord
39Y8957	DPI Universal Rack PDU with UK line cord
39Y8958	DPI Universal Rack PDU with AS/NZ line cord
39Y8959	DPI Universal Rack PDU with China line cord
39Y8962	DPI Universal Rack PDU (Argentina)
39Y8960	DPI Universal Rack PDU (Brazil)
39Y8961	DPI Universal Rack PDU (India)
NEMA PDUs (6x NEMA 5-15R outlets)	
39Y8905	DPI 100-127V PDU with Fixed NEMA L5-15P line cord
Line cords for PDUs that ship without a line cord	
40K9611	DPI 32a Line Cord (IEC 309 3P+N+G)
40K9612	DPI 32a Line Cord (IEC 309 P+N+G)
40K9613	DPI 63a Cord (IEC 309 P+N+G)
40K9614	DPI 30a Line Cord (NEMA L6-30P)
40K9615	DPI 60a Cord (IEC 309 2P+G)
40K9617	DPI Australian/NZ 3112 Line Cord
40K9618	DPI Korean 8305 Line Cord

For more information, see the list of Product Guides in the Power infrastructure category:
http://lenovopress.com/systemx/power

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used in x3650 M4 solutions.

Table 35. Rack cabinets

Part number	Description
201886X	11U Rack Office Enablement Kit
93072RX	25U S2 Standard Rack
93072PX	25U Static S2 Standard Rack
93074RX	42U S2 Standard Rack
93634PX	42U 1100mm Enterprise V2 Dynamic Rack
93634EX	42U 1100mm Enterprise V2 Dynamic Expansion Rack
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93084PX	42U Enterprise Rack
93084EX	42U Enterprise Expansion Rack

For more information, see the list of Product Guides in the Rack cabinets and options category:
http://lenovopress.com/systemx/rack

Rack console options

The server supports the rack console switches and monitor kits listed in the following table.

Table 36. Rack options

Part number	Feature code	Description
Monitor kits and keyboard trays		
17238BX	1723HC1 fc A3EK	1U 18.5" Standard Console
17238EX	1723HC1 fc A3EL	1U 18.5" Enhanced Media Console
172317X	1723HC1 fc 0051	1U 17in Flat Panel Console Kit
172319X	1723HC1 fc 0052	1U 19in Flat Panel Console Kit
Console switches		
3858D3X	3858HC1 fc A4X1	Avocent Universal Management Gateway 6000
1754D2X	1754HC2 fc 6695	Global 4x2x32 Console Manager (GCM32)
1754D1X	1754HC1 fc 6694	Global 2x2x16 Console Manager (GCM16)
1754A2X	1754HC4 fc 0726	Local 2x16 Console Manager (LCM16)
1754A1X	1754HC3 fc 0725	Local 1x8 Console Manager (LCM8)
Console cables		
00AK142	A4X4	UM KVM Module VGA+SD Dual RJ45
43V6147	3757	Single Cable USB Conversion Option (UCO)
39M2895	3756	USB Conversion Option (4 Pack UCO)
39M2897	3754	Long KVM Conversion Option (4 Pack Long KCO)
46M5383	5341	Virtual Media Conversion Option Gen2 (VCO2)
46M5382	5340	Serial Conversion Option (SCO)

For more information, see the list of Product Guides in the Rack cabinets and options category: http://lenovopress.com/systemx/rack

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Related publications and links

For more information, see these resources:

- Lenovo Servers product page
  http://www.lenovo.com/systems/servers
- System x3650 M4 documentation
  http://publib.boulder.ibm.com/infocenter/systemx/documentation/topic/com.lenovo.sysx.7915.doc/c_product_page.html
- ServerProven hardware compatibility page for the x3650 M4 (E5-2600 v2)
  http://www.lenovo.com/us/en/serverproven/xseries/7915CE5CxxxxV2.shtml
- Lenovo Press Product Guides for servers and options
  http://lenovopress.com
- *Configuration and Option Guide*
  http://www.ibm.com/systems/xbc/cog/
- xREF - System x Reference Sheets
  http://lenovopress.com/xref
- Support Portal - System x3650 M4
  http://www.ibm.com/support/entry/portal/product/lenovo_x86_servers/lenovo_system_x3650_m4
- System Storage Interoperation Center
  http://www.ibm.com/systems/support/storage/ssic

Related product families

Product families related to this document are the following:

- 2-Socket Rack Servers

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This document, TIPS0850, was created or updated on April 15, 2016.

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