



IBM System x3300 M4

IBM Redbooks Product Guide

The IBM® System x3300 M4 is a high-throughput network server with excellent performance scalability when you add memory and a second processor. They incorporate the powerful Intel Xeon processor E5-2400 product family with up to 15 MB cache. The energy-efficient design of the server supports two processors and 12 memory modules. It also supports either eight 3.5-inch HDDs or sixteen 2.5-inch HDDs or solid-state drives in a scalable tower or 4U rack package that is easy to service and manage. With more computing power per watt and the latest Intel Xeon processors, you can reduce costs and maintain speed and availability.

Suggested use for the IBM System x3300 M4 is for general business applications, collaboration/email, web, and virtualized desktops in a workgroup or distributed environments.

The following figure shows the IBM System x3300 M4 server.



Figure 1. The IBM System x3300 M4

Did you know?

The x3300 M4 server offers a flexible design with a choice of 3.5-inch or 2.5-inch drives, with up to six PCIe slots (four of which are PCIe 3.0) and up to 192 GB of memory. The Onboard Ethernet solution provides up to four integrated Gigabit Ethernet ports without occupying PCIe slots. Comprehensive systems management tools with the next-generation IBM Integrated Management Module II (IMM2) make it easy to deploy, integrate, service, and manage.

Key features

A high-performance dual-socket tower server, the IBM System x3300 M4 server, can deliver the scalability, reliable performance, and optimized efficiency for your general business applications. You start with the basics and then upgrade as your business changes, without jeopardizing existing investments. Virtualizing the PC infrastructure into one server can provide access to a powerful server with abundant storage space and significantly reduce IT costs.

Scalability and performance

The x3300 M4 offers numerous features to boost performance, improve scalability, and reduce costs:

- The Intel Xeon processor E5-2400 product family improves productivity by offering affordable dual-socket system performance. It has eight-core processors with up to 2.3 GHz core speeds, up to 20 MB of L3 cache, and one Intel QuickPath Interconnect (QPI) link of up to 8 GTps.
- Up to 2 processors, 16 cores, and 32 threads maximize the concurrent execution of multithreaded applications.
- With intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0, processor cores can run at maximum speeds during peak workloads by temporarily going beyond processor thermal design power (TDP).
- Intel Hyper-Threading Technology boosts performance for multithreaded applications by enabling simultaneous multithreading within each processor core, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks so that operating system vendors can better use the hardware for virtualization workloads.
- Intel Advanced Vector Extensions (AVX) can improve floating point performance for compute-intensive technical and scientific applications.
- The 12 registered DIMMs (RDIMMs) of 1600 MHz DDR3 ECC memory provide speed, high availability, and a memory capacity of up to 192 GB.
- The theoretical maximum memory bandwidth of the Intel Xeon processor E5-2400 product family is 38.4 GBps at 1600 MHz, which is 20% more than the previous generation of Intel Xeon 5600 processors.
- The server offers up to four integrated Gigabit Ethernet ports with a convenient Feature on Demand (FoD) upgrade process that does not require the purchase of additional hardware. Two ports are enabled as standard, and two ports can be enabled with an optional license.
- The server offers PCIe 3.0 I/O expansion capabilities. These capabilities improve the theoretical maximum bandwidth by almost 100% (8 GTps per link by using 128b/130b encoding) compared to the previous generation of PCIe 2.0 (5 GTps per link by using 8b/10b encoding).
- With Intel Integrated I/O Technology, the PCIe 3.0 controller is integrated into the Intel Xeon processor E5 family. This controller reduces I/O latency and increases overall system performance.
- Up to sixteen 2.5-inch hot-swap drive bays or eight 3.5-inch hot-swap or simple-swap drive bays provide significant internal storage capacity.

Availability and serviceability

The x3300 M4 provides many features to simplify serviceability and increase system uptime:

- Memory mirroring and memory rank sparing for redundancy if a noncorrectable memory failure occurs.
- Tool-less cover removal, which provides easy access to upgrades and serviceable parts, such as CPU, memory, and expansion cards.
- Hot-swap drives that support RAID redundancy for data protection and greater system uptime.
- Up to two redundant hot-swap power supplies (model dependent) for business-critical applications.
- Optional N+1 redundant fan solution to maximum uptime if a fan failure occurs.
- Individual light path LEDs that quickly lead the technician to failed (or failing) components. This feature simplifies servicing, speeds up problem resolution, and helps to improve system availability.
- Predictive Failure Analysis (PFA), which detects when system components (for example, processors, memory, and hard disk drives) operate outside of standard thresholds. It also generates proactive alerts in advance of possible failure, therefore, increasing uptime.
- A built-in IMM2 that continuously monitors system parameters, triggers alerts, and performs recovering actions if a failure to minimize downtime occurs.
- Built-in diagnostics by using Dynamic Systems Analysis (DSA) Preboot, which speeds 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 x3300 M4 server:

- An IMM2 to monitor server availability and perform remote management.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) that enables improved setup, configuration, and updates, and simplifies error handling.
- Integrated Trusted Platform Module (TPM) 1.2 support that enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Industry-standard support of Advanced Encryption Standard-New Instructions (AES-NI) for faster, stronger encryption.
- IBM Systems Director for proactive systems management. IBM Systems Director offers comprehensive systems management tools that help to increase up-time, reduce costs, and improve productivity through advanced server management capabilities.
- Intel Execute Disable Bit functionality that helps to prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.
- Intel Trusted Execution Technology, which provides enhanced security through hardware-based resistance to malicious software attacks. With this technology, an application can run in its own isolated space protected from all other software that runs on a system.

Energy efficiency

The x3300 M4 server offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to the green environment:

- Energy-efficient system board components to help lower operational costs.
- High-efficient 550 W and 750 W redundant power supplies, with 80 PLUS Platinum certification, and an efficient 460 W fixed power supply with 80 PLUS Bronze certification.
- The Intel Xeon processor E5-2400 product family, which offers better performance over the previous generation and fits into the same TDP limits.
- Intel Intelligent Power Capability, which powers individual processor elements on and off, as needed, to reduce power draw.
- Low-voltage Intel Xeon processors that draw less energy to satisfy demands of power and thermally constrained data centers and telecommunication environments.
- Low-voltage 1.35 V DDR3 memory RDIMMs that use 15% less energy than 1.5 V DDR3 RDIMMs.
- Use of hexagonal ventilation holes, which are part of the IBM Calibrated Vectors Cooling™ technology. Hexagonal holes can be grouped more densely than round holes and provide more efficient airflow through the system.
- IBM Systems Director Active Energy Manager™, which provides advanced data center power notification and management to help achieve lower heat output and reduced cooling needs.

Locations of key components and connectors

The following figure shows the front of the server, which includes the 3.5-inch drive configuration and the 2.5-inch drive configuration.

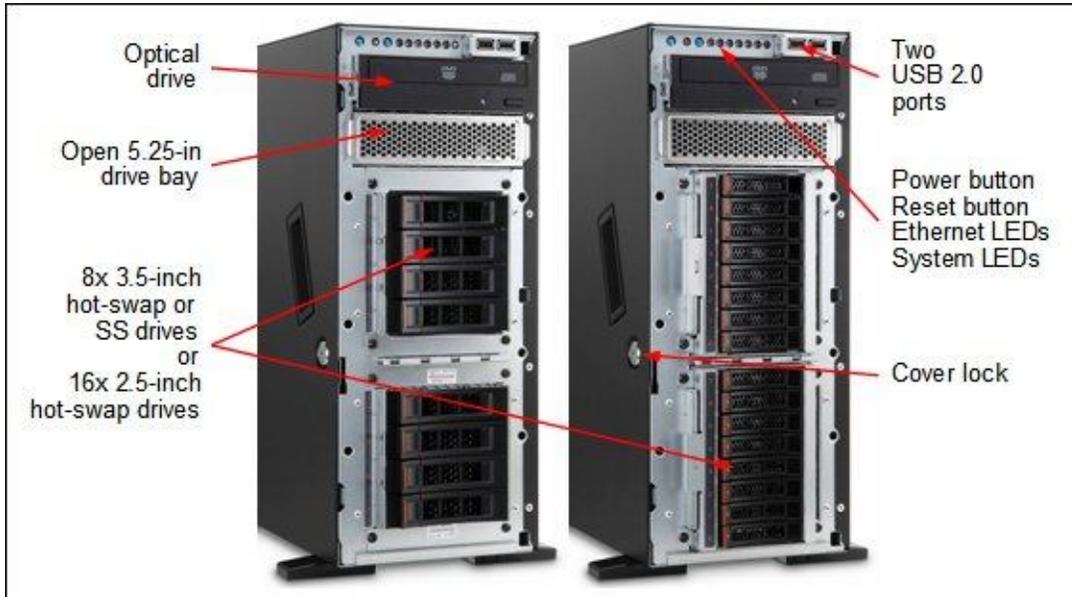


Figure 2. Front view of the IBM System x3300 M4 server

The following figure shows the rear of the server.

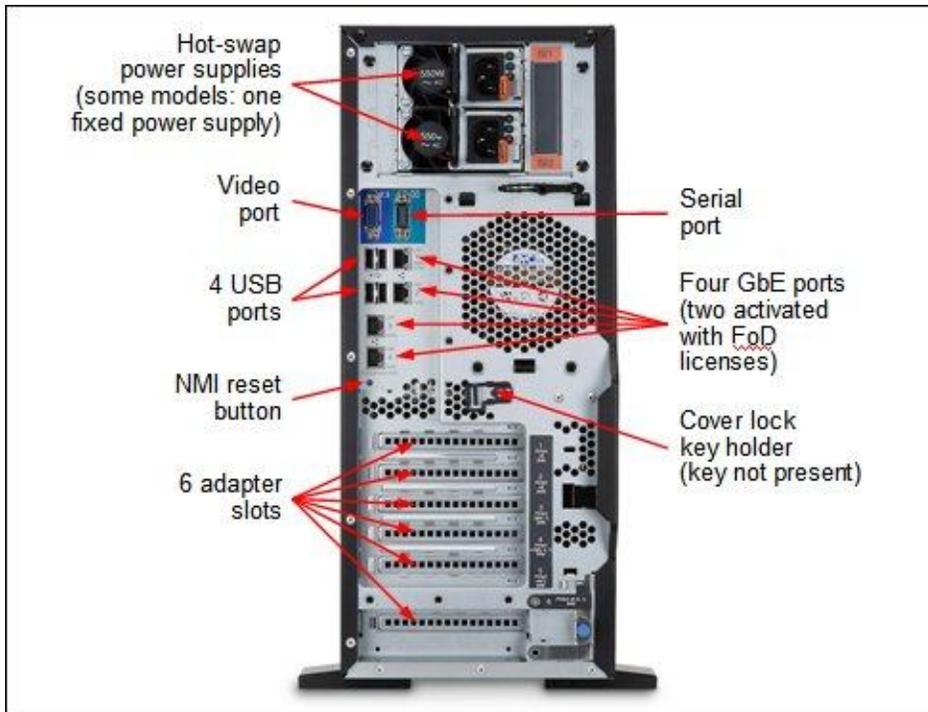


Figure 3. Rear view of the IBM System x3300 M4 server

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

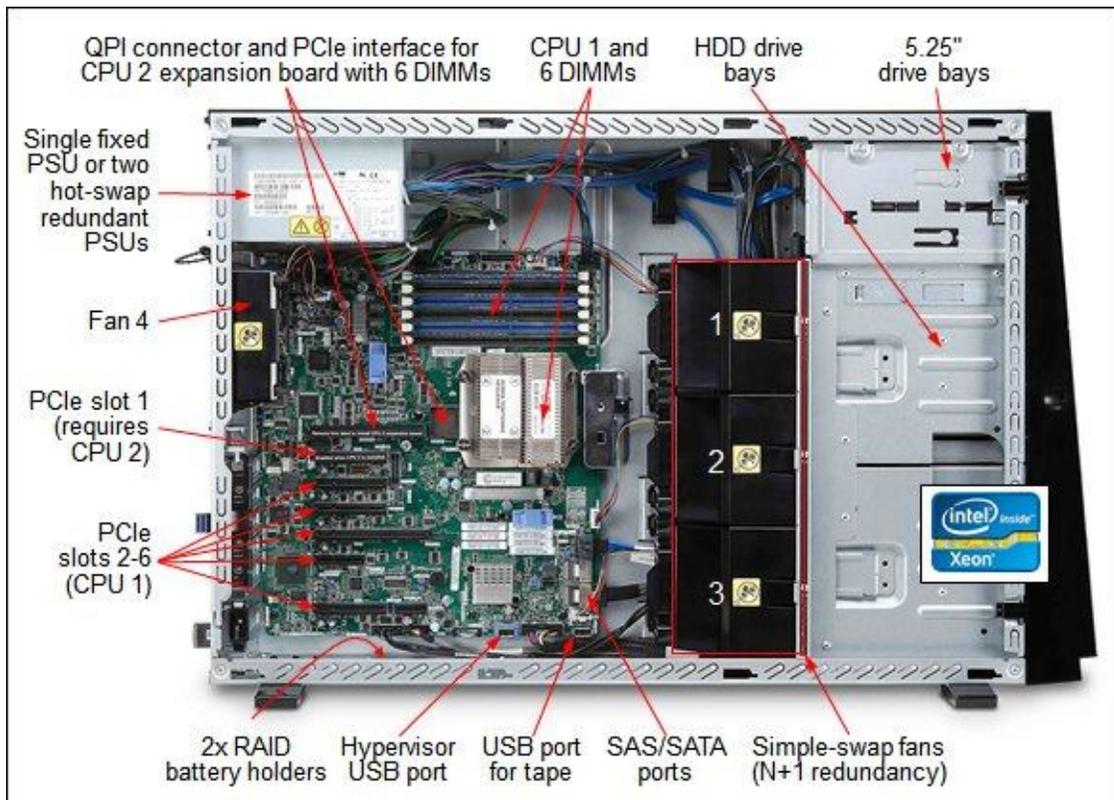


Figure 4. Inside view of the IBM System x3300 M4 server

Processor 1 is installed on the system board. Processor 2 is installed in on an expansion board.

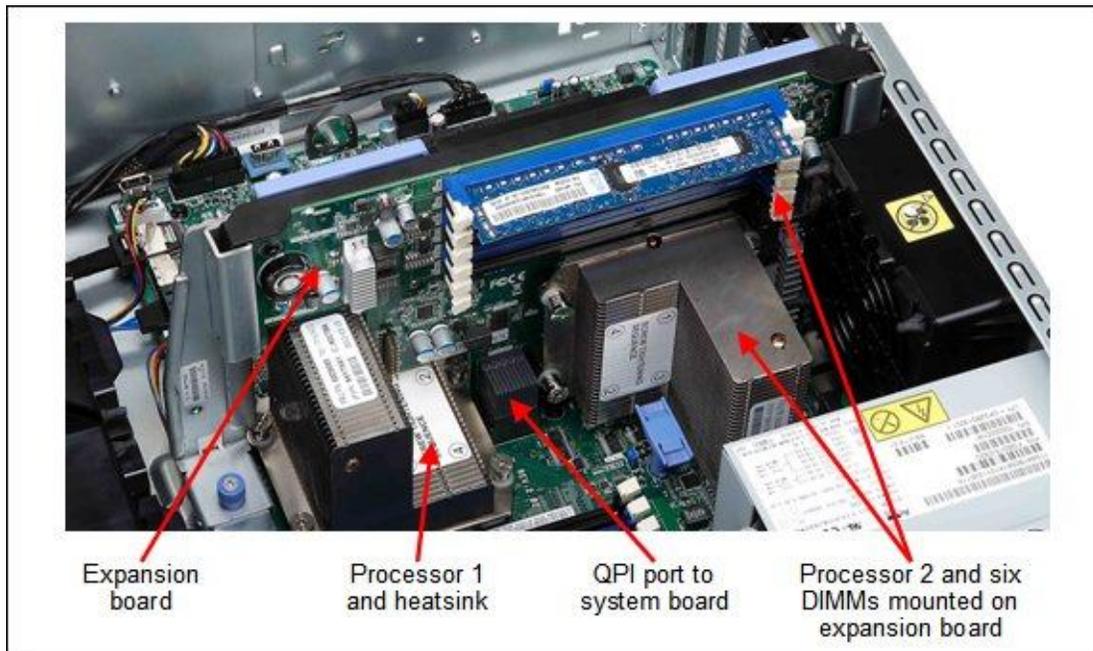


Figure 5. Processor 2 installed on the expansion board

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications (part 1)

Components	Specification
Form factor	Tower or 4U Rack.
Processor	Up to two Intel Xeon processor E5-2400 product family processors with eight cores (up to 2.3 GHz), six cores (up to 2.4 GHz), or four cores (up to 2.2 GHz), one QPI link up to 8.0 GTps, up to 1600 MHz memory speed, up to 20 MB L3 cache; or one Intel Xeon processor E5-1400 product family processor with four cores up to 2.8 GHz, 10 MB L3 cache, and 1333 MHz memory speed (CTO only); or one Intel Pentium processor 1400 product family processor with two cores up to 2.8 GHz, 5 MB L3 cache, and 1066 MHz memory speed (CTO only).
Chipset	Intel C600
Memory	Up to 12 DDR3 DIMM sockets (6 DIMMs per processor). RDIMMs and UDIMMs are supported, but memory types cannot be intermixed.
Memory maximums	With RDIMMs: Up to 192 GB with 12x 16 GB RDIMMs and two processors. With UDIMMs: Up to 48 GB with 12x 4 GB UDIMMs and two processors.
Memory protection	ECC, Chipkill (for x4-based memory DIMMs), memory mirroring, and memory rank sparing.
Disk drive bays	Up to 16x 2.5-inch hot-swap SAS/SATA HDDs or SSDs, or up to 8x 3.5-inch hot-swap SAS/SATA HDDs, or up to 8x 3.5-inch simple-swap SATA HDDs.
Maximum internal storage	32 TB with 4 TB 3.5" SATA HDDs, or 19.2 TB with 1.2 TB 2.5" SAS HDDs, or 16 TB with 1 TB 2.5" SATA or NL SAS HDDs or 25.6 TB with 1.6 TB 2.5" SSDs. Intermix of SAS/SATA is supported but not in the same volume.
RAID support	RAID 0, 1, 10 standard with the ServeRAID C105 software RAID solution. Optional hardware-based RAID with RAID 0, 1, and 10 support with the ServeRAID H1110, M1115, or M5110. Upgrades to RAID 5 and 50 are available for the M1115. Upgrades to RAID 5 and 50 are available for the M5110 (zero-cache; 512 MB battery-backed cache; 512 MB or 1 GB flash-backed cache). Optional upgrades to RAID 6 and 60 are available for the M5110 with caches.
Optical drive bays	One half-height 5.25" bays for optical drives. DVD-ROM or Multiburner standard (model dependent)
Tape drive bays	One half-height bay for optional USB tape drive.
Network interfaces	Up to four integrated Gigabit Ethernet 1000BASE-T RJ-45 ports with the onboard Intel I350-CM2 controller (two ports are enabled, and an additional two ports require the optional software FoD upgrade to enable them). One port is configured for remote access to the Integrated Management Module, either dedicated (default) or shared.
PCI Expansion slots	Up to six slots but the slots usable depend on the number of processors installed and the power supply used. See "I/O expansion options" for specifics. <ul style="list-style-type: none"> ● Slot 1: PCIe 3.0 x8; full-height, half-length ● Slot 2: PCIe 3.0 x8; full-height, full-length ● Slot 3: PCIe 3.0 x8 (x4 wired); full-height, half-length ● Slot 4: PCIe 3.0 x16 (x8 wired); full-height, full-length ● Slot 5: PCIe 2.0 x4 (x1 wired); full-height, half-length ● Slot 6: PCIe 2.0 x8 (x4 wired); full-height, half-length (supports optional PCI-X 64 bit/133 MHz interposer card)

Table 1. Standard specifications (part 2)

Components	Specification
Ports	Front: Two USB 2.0 port Rear: Four USB 2.0, one DB-15 video, one DB-9 serial, four RJ-45 GbE network ports Internal: Two internal USB ports (for embedded hypervisor and internal tape drive).
Cooling	IBM Calibrated Vecteded Cooling with up to four simple swap fans. Two fans shipped standard on single processor models (fan locations 2 and 4 as shown in Figure 4) and three fans shipped on dual processor models (fan locations 2, 3 and 4). Optional fan in location 1 provides N+1 redundancy.
Power supply	Up to two redundant hot-swap 550 W ac or 750 W ac power supplies (80 PLUS Platinum certified), or one 460 W fixed power supply (80 PLUS Bronze certified)
Hot-swap parts	Hard drives, power supplies (model dependent)
Systems management	UEFI, IBM IMM2, Predictive Failure Analysis, Light Path Diagnostics, Automatic Server Restart, IBM Systems Director and IBM Systems Director Active Energy Manager, IBM ServerGuide. Optional IMM Advanced Upgrade by using FoD for remote presence (graphics, keyboard and mouse, virtual media).
Security	Power-on password, administrator's password, Trusted Platform Module (TPM).
Video	Matrox G200eR2 with 16 MB memory integrated into the IMM2. Maximum resolution is 1600x1200 at 75 Hz with 16 M colors.
Operating systems supported	Microsoft Windows Server 2008 R2 and 2008, Red Hat Enterprise Linux 5 and 6, SUSE Linux Enterprise Server 10 and 11, VMware vSphere 5.
Warranty	3-year customer-replaceable unit and on-site limited warranty with 9x5/NBD.
Service and support	Optional service upgrades are available through the IBM ServicePac® offering: 4-hour or 2-hour response time, 8-hour fix time, 1-year or 2-year warranty extension, remote technical support for IBM hardware and selected IBM and third-party (Microsoft, Linux, VMware) software.
Dimensions	In tower configuration: <ul style="list-style-type: none"> • Width: 235 mm (9.25 in), 176 mm (6.9 in) without stabilizer feet • Depth: 678 mm (26.7 in), 605 mm (23.8 in) without front bezel • Height: 438 mm (17.1 in). 425 mm (16.7 in) without stabilizer feet In rack configuration (with rack conversion kit): <ul style="list-style-type: none"> • Width: 481 mm (18.9 in) • Height: 176 mm (6.9 in) (4U) • Depth: 625 mm (24.6 in) excluding bezel (bezel and HDD handles adds 24 mm)
Weight	In tower configuration: <ul style="list-style-type: none"> • Minimum: 22.0 kg (48.5 lb) • Maximum: 29.7 kg (65.4 lb) In rack configuration (with rack conversion kit): <ul style="list-style-type: none"> • Minimum: 20.5 kg (45.2 lb) • Maximum: 28.2 kg (62.1 lb)

The x3300 M4 servers are shipped with the following items:

- Statement of Limited Warranty
- Important Notices
- Registration flyer
- Documentation CD that contains the *Installation and Service Guide*
- IBM Systems Director 6.3 Base for x86 DVD-ROM
- One 2.8 m C13 country-specific line cord (EMEA models do not contain line cord, it must be purchased separately)

Standard models

The following table lists the standard models.

Table 2. Standard models

Model	Intel Xeon CPUs (2 maximum)†	Memory	RAID	Disk bays (std/max)	Disks	Onboard Ethernet (std/max)	I/O slots (1 CPU / 2 CPUs)	DVD	Power
Models announced July 2012									
7382-A2x	1x E5-2403 4C 1.8GHz 10MB 1066MHz 80W	1x 2 GB	C105	4x 3.5" SS / 8*	Open	2x GbE / 4	5 / 3*	DVD- ROM	1x 460 W fixed / 1
7382-B2x	1x E5-2407 4C 2.2GHz 10MB 1066MHz 80W	1x 4 GB	C105	4x 3.5" HS / 8*	Open	2x GbE / 4	5 / 3*	DVD- ROM	1x 460 W fixed / 1
7382-C2x	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 4 GB	H1110	4x 3.5" HS / 8*	Open	2x GbE / 4	5 / 3*	DVD- ROM	1x 460 W fixed / 1
7382-D2x	1x E5-2430 6C 2.2GHz 15MB 1333MHz 95W	1x 4 GB	H1110	4x 3.5" HS / 8	Open	2x GbE / 4	5 / 3**	DVD- ROM	1x 550 W HS / 2
7382-D4x	1x E5-2430 6C 2.2GHz 15MB 1333MHz 95W	1x 4 GB	M1115	8x 2.5" HS / 16	Open	2x GbE / 4	5 / 3**	DVD- ROM	1x 550 W HS / 2
7382-F2x	1x E5-2440 6C 2.4GHz 15MB 1333MHz 95W	1x 4 GB	M1115	8x 2.5" HS / 16	Open	2x GbE / 4	5 / 3**	DVD- ROM	1x 550 W HS / 2

† Processor detail: Processor quantity and model, number of cores, core speed, L3 cache, memory speed, and power consumption.

‡ The first number is the number of I/O slots available with one processor; the second number is for two processors.

* In configurations with a 460 W power supply: With 1 CPU, up to 5 PCIe slots are usable, and up to eight 3.5-inch drive bays are usable; with 2 CPUs, up to 3 slots and four 3.5-inch drive bays are usable.

** In configurations with 550 W power supplies: With 1 CPU, up to 5 PCIe slots are usable; with 2 CPUs, up to 3 slots are usable. Drive configurations are not affected.

For information about standard features of the server, see the "Specifications" section.

Express models

The following table lists the express models.

Table 3. Express models

Model	Intel Xeon processor† (2 maximum)	RAM	RAID	Disk bays	Disks	Network	Optical	Power
North America (NA)								
7382-EAU	1x E5-2407 4C 2.2GHz 10MB 1066MHz 80W	1x 8GB	M1115	4x 3.5" HS / 8	Open	2x GbE / 4	DVD-ROM	1x 460W fixed / 1
7382-EBU	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 8GB	M1115	4x 3.5" HS / 8	Open	2x GbE / 4	DVD-ROM	1x 550W HS / 2
7382-ECU	1x E5-2440 6C 2.4GHz 15MB 1333MHz 95W	1x 8GB	M1115	8x 2.5" HS / 16	Open	2x GbE / 4	DVD-ROM	1x 550W HS / 2
Europe Integrated Operating Team (IOT), Central and Eastern Europe (CEE) and Middle East & Africa (MEA)								
7382-E1G	1x E5-2403 4C 1.8GHz 10MB 1066MHz 80W	1x 4GB	C105	4x 3.5" SS / 8	Open	2x GbE / 4	Multiburner	1x 460W fixed / 1
7382-E2G	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 8GB	H1110	4x 3.5" HS / 8	Open	2x GbE / 4	Multiburner	1x 460W fixed / 1
7382-E3G	1x E5-2407 4C 2.2GHz 10MB 1066MHz 80W	1x 4GB	M1115	8x 2.5" HS / 16	Open	2x GbE / 4	Multiburner	1x 550W HS / 2
7382-E4G	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 8GB	M5110	8x 2.5" HS / 16	Open	2x GbE / 4	Multiburner	1x 550W HS / 2
7382-E5G	1x E5-2403 4C 1.8GHz 10MB 1066MHz 80W	1x 4GB	C105	4x 3.5" SS / 8	1x 1TB 3.5" SATA SS	2x GbE / 4	Multiburner	1x 460W fixed / 1
7382-K5G	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 8GB	M5110	8x 3.5" HS / 8	Open	2x GbE / 4	Multiburner	1x 550W HS / 2
Russia/Commonwealth of Independent States (CIS)								
7382-E2G	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 8GB	H1110	4x 3.5" HS / 4	Optional	2x GbE / 4	Multiburner	1x 460W fixed / 1
7382-E4G	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 8GB	M5110	8x 2.5" HS / 16	Optional	2x GbE / 4	Multiburner	1x 550W HS / 2
7382-E6G	1x E5-2407 4C 2.2GHz 10MB 1066MHz 80W	1x 4GB	M5110	8x 2.5" HS / 16	Optional	2x GbE / 4	Multiburner	1x 550W HS / 2
7382-K5G	1x E5-2420 6C 1.9GHz 15MB 1333MHz 95W	1x 8GB	M5110	8x 3.5" HS / 8	Open	2x GbE / 4	Multiburner	1x 550W HS / 2

† Processor detail: Processor quantity and model, number of cores, core speed, L3 cache, memory speed, and power consumption.

Processor options

The x3300 M4 server supports the processor options that are 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, then this processor is only available through CTO.

The option also includes the expansion board that Processor 2 is mounted on. Installing the second processor requires installation of Fan 3. The part numbers listed in the following table include this fan.

Table 4. Processor options

Part number	Feature code*	Description	Standard models where used
None*	A2R9 / None†	Intel Pentium Processor 1403 2C 2.6GHz 5MB 1066MHz 80W	-
None*	A2RA / None†	Intel Pentium Processor 1407 2C 2.8GHz 5MB 1066MHz 80W	-
None*	A3AJ / None†	Intel Xeon Processor E5-1410 4C 2.8GHz 10MB 1333MHz 80W	-
00D2581	A2R4 / A2RF	Intel Xeon Processor E5-2403 4C 1.8GHz 10MB 1066MHz 80W	A2x
00D2582	A2R5 / A2RG	Intel Xeon Processor E5-2407 4C 2.2GHz 10MB 1066MHz 80W	B2x
00D2583	A2R6 / A2RH	Intel Xeon Processor E5-2420 6C 1.9GHz 15MB 1333MHz 95W	C2x
00D2584	A2R7 / A2RJ	Intel Xeon Processor E5-2430 6C 2.2GHz 15MB 1333MHz 95W	D2x, D4x
00D2586	A2RB / A2RL	Intel Xeon Processor E5-2430L 6C 2.0GHz 15MB 1333MHz 60W	-
00D2585	A2R8 / A2RK	Intel Xeon Processor E5-2440 6C 2.4GHz 15MB 1333MHz 95W	F2x
00D2588	A2RD / A2RN	Intel Xeon Processor E5-2450 8C 2.1GHz 20MB 1600MHz 95W	-
00D2587	A2RC / A2RM	Intel Xeon Processor E5-2450L 8C 1.8GHz 20MB 1600MHz 70W	-
00D2589	A2RE / A2RP	Intel Xeon Processor E5-2470 8C 2.3GHz 20MB 1600MHz 95W	-

* The first feature code is for the first processor; the second feature code is for the second processor
 † Only one of these processors is supported in the server, and they can be ordered only via CTO.

Memory options

The IBM System x3300 server supports DDR3 memory. The server supports up to six DIMMs when one processor is installed and up to 12 DIMMs when two processors are installed. Each processor has three memory channels and two DIMMs per channel. The following rules apply when selecting the memory configuration:

- The server supports unregistered DIMMs (UDIMMs) and RDIMMs. LRDIMMs are not supported.
- Mixing different types of memory (UDIMMs and RDIMMs) is not supported.
- Mixing 1.5 V and 1.35 V DIMMs in the same server is supported. In this case, all DIMMs operate at 1.5 V.
- The maximum number of ranks per channel is eight.
- The maximum quantity of DIMMs that can be installed in a server depends on the number of CPUs, DIMM type, rank, and operating voltage, as shown in the "Maximum quantity" row in the following table.
- All DIMMs in the server operate at the same speed, which is determined as the lowest value of the following speeds:
 - Memory speed supported by a specific CPU
 - Lowest maximum operating speed for the selected memory configuration, which depends on the rated speed, operating voltage, and quantity of DIMMs per channel, as shown in the "Maximum operating speed" section in the following table

Table highlighting: 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: UDIMMs)

Specification	DIMM type	UDIMMs			
		Single rank		Dual rank	
Rank		Single rank		Dual rank	
Part numbers		49Y1403 (2 GB)		49Y1404 (4 GB)	
Rated speed		1333 MHz		1333 MHz	
Rated voltage		1.35 V		1.35 V	
Operating voltage		1.35 V	1.5 V	1.35 V	1.5 V
Maximum quantity*		12	12	12	12
Largest DIMM		2 GB	2 GB	4 GB	4 GB
Maximum memory capacity		24 GB	24 GB	48 GB	48 GB
Maximum memory at rated speed		12 GB	12 GB	24 GB	24 GB
Maximum operating speed (MHz)					
1 DIMM per channel		1333 MHz	1333 MHz	1333 MHz	1333 MHz
2 DIMMs per channel		1066 MHz	1066 MHz	1066 MHz	1066 MHz

* Maximum quantity supported is shown for two processors installed. When one processor is installed, the maximum quantity supported is a half of what is shown.

Table 5. Maximum memory speeds (Part 2: RDIMMs)

Specification	RDIMM								
	Single rank			Dual rank			Quad rank		
Part number	49Y1405 (2GB) 49Y1406 (4GB)		49Y1559 (4GB)	49Y1407 (4GB) 49Y1397 (8GB) 49Y1563 (16GB)		90Y3178 (4GB) 90Y3109 (8GB) 00D4968 (16GB)		49Y1400 (16GB)	
Rated speed	1333 MHz		1600 MHz	1333 MHz		1600 MHz		1066 MHz	
Rated voltage	1.35 V		1.5 V	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	1.5 V	1.35 V	1.5 V	
Maximum quantity*	12	12	12	12	12	12	12	12	
Largest DIMM	4 GB	4 GB	4 GB	16 GB	16 GB	16 GB	16 GB	16 GB	
Maximum memory capacity	48 GB	48 GB	48 GB	192GB	192GB	192GB	192 GB	192 GB	
Maximum memory at rated speed†	48 GB	48 GB	48 GB	192GB	192GB	192GB	No support	No support	
Maximum operating speed (MHz)									
1 DIMM per channel	1333 MHz	1333 MHz	1600 MHz	1333 MHz	1333 MHz	1600 MHz	800 MHz	800 MHz	
2 DIMMs per channel	1333 MHz	1333 MHz	1600 MHz	1333 MHz	1333 MHz	1600 MHz	800 MHz	800 MHz	

* Maximum quantity supported is shown for two processors installed. When one processor is installed, the maximum quantity supported is a half of what is shown.

† The number here is the most memory that you can have installed that will operate at the rated speed of the DIMMs. "No support" means that the DIMM cannot operate at its rated speed in this server and operates at a lower speed even at 1 DPC.

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 (a minimum of one pair per CPU), and both DIMMs in a pair must be identical in type and size.

If memory rank sparing is used, a minimum of one quad-rank DIMM or two single-rank or dual-rank DIMMs must be installed per populated channel. (The DIMMs do not need to be identical.) In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The size of a rank varies depending on the DIMMs that are installed.

The following table lists the memory options that are available for the x3300 M4 server.

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

Table 6. Memory options

Part number	Feature code	Description	Maximum supported	Standard models where used
UDIMMs				
49Y1403	A0QS	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 ECC DDR3 1333MHz LP UDIMM	12	-
49Y1404	8648	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP UDIMM	12	-
RDIMMs - 1333 MHz and 1066 MHz				
49Y1405	8940	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	12	A2x
49Y1406	8941	4GB (1x4GB, 1Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	12	B2x, C2x, D2x, D4x, F2x
49Y1407	8942	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	12	-
49Y1397	8923	8GB (1x8GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	12	-
49Y1400	8939	16GB (1x16GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	12	-
49Y1563	A1QT	16GB (1x16GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	12	-
RDIMMs - 1600 MHz				
49Y1559	A28Z	4GB (1x4GB, 1Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	12	-
90Y3178	A24L	4GB (1x4GB, 2Rx8, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	12	-
90Y3109	A292	8GB (1x8GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	12	-
00D4968	A2U5	16GB (1x16GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	12	-

Internal storage

The IBM System x3300 M4 server supports the internal storage configurations that are listed in the following table. Details about the supported RAID controllers is listed in Table 9.

Support for SATA drives: The ServeRAID C105 supports only SATA drives.

Table 7. Supported drive combinations

Config (see Figure 6)	Supported drive size and type	Max drives supported	Supported RAID controller	Components required
1	3.5" LFF simple-swap SATA	4	C105, H1110, M1115, M5110	<ul style="list-style-type: none"> 1x IBM System x3300 Simple-Swap SATA Kit 4x3.5", 00D2590
2		8*	C105+8-pack enabler, M1115, M5110	<ul style="list-style-type: none"> 2x IBM System x3300 Simple-Swap SATA Kit 4x3.5", 00D2590 1x 8-Pack ServeRAID C105 Controller Enabler, 90Y4349
3	3.5" LFF hot-swap SAS/SATA	4	C105, H1110, M1115, M5110	<ul style="list-style-type: none"> 1x IBM System x3300 3.5" HS Kit for HW/SW RAID, 00D2591
4		8*	C105+8-pack enabler, M1115, M5110	<ul style="list-style-type: none"> 2x IBM System x3300 3.5" HS Kit for HW/SW RAID, 00D2591
5	2.5" SFF hot-swap SAS/SATA	8*	M1115, M5110	<ul style="list-style-type: none"> 1x IBM System x3300 1st 2.5" HS Kit, feature A2SE
6		16*	M1115, M5110	<ul style="list-style-type: none"> 1x IBM System x3300 1st 2.5" HS Kit, feature A2SE 1x IBM System x3300 2nd 2.5" HS Upgrade Kit, 00D2592

* If the server has a 460 W fixed power supply and two processors installed, no 2.5" drive configurations are supported, and the maximum supported 3.5-inch drives is four drives. See the "Power supplies" section.

The following figure shows these configurations.

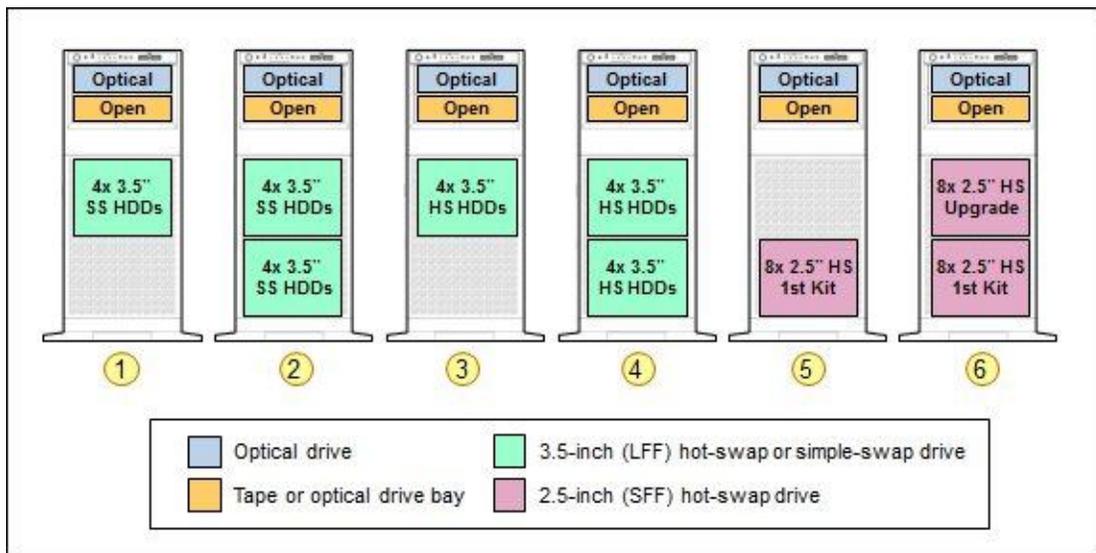


Figure 6. Internal drive configurations

Standard models of the x3300 M4 server ship with one drive bay kit as listed in Table 2. The following table shows the internal storage expansion options that are available for the x3300 M4 server.

Table 8. Internal storage expansion options

Part number	Feature code	Name	Maximum supported	Standard models where used (All Quantity=1)
00D2590	A2SB	IBM System x3300 Simple-Swap SATA Kit 4x3.5" (Used in configurations 1 and 2 in Figure 6)	2*	A2x
00D2591	A2SC	IBM System x3300 3.5" HS Kit for HW/SW RAID (Used in configurations 3 and 4)	2*	B2x, C2x, D2x
None	A2SE	IBM System x3300 1st 2.5" HS Kit (Used in configurations 5 and 6)	1	D4x, F2x
00D2592	A2SF	IBM System x3300 2nd 2.5" HS Upgrade Kit Includes a SAS expander mounted on the back of the backplane (Used in configuration 6)	1	-

* For models with a 460 W fixed power supply and two processors, only one 3.5-inch kit is supported.

Controllers for internal storage

The x3300 M4 includes the ServeRAID C105 onboard SATA controller with software RAID capabilities. The C105 functionality is embedded on the Intel C600 chipset. On some models, this disk controller is used to connect to the disk drives. On other models, a hardware RAID controller, such as the ServeRAID H1110 or M1115, is installed, which deactivates the onboard C105 controller.

The following table lists the RAID controllers and controller upgrades that are used for internal disk storage of the x3300 M4 server.

Table 9. RAID controllers for internal storage

Part number	Feature code	Description	Maximum supported	Standard models where used
RAID controllers				
Integrated	A2VA	ServeRAID C105 for IBM System x®	Integrated	A2x, B2x
81Y4492	A1XL	ServeRAID H1110 SAS/SATA Controller	1	C2x, D2x
81Y4448	A1MZ	ServeRAID M1115 SAS/SATA Controller	1	D4x, F2x
81Y4481	A347	ServeRAID M5110 SAS/SATA Controller	1	-
RAID controller upgrades				
81Y4542	A1X1	ServeRAID M1100 Series Zero Cache/RAID 5 Upgrade (FoD activation)	1	-
81Y4544	A1X2	ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade (FoD activation)	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	-
81Y4508	A22E	ServeRAID M5100 Series Battery Kit	1*	-
81Y4546	A1X3	ServeRAID M5100 Series RAID 6 Upgrade (FoD activation)	1†	-
90Y4349	A2V7	8-Pack ServeRAID C105 Controller Enabler (An FoD upgrade for onboard ServeRAID C105 that enables support for up to eight SATA HDDs)	1	-

* The ServeRAID M5100 Series Battery Kit (81Y4508) is supported only with ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade (81Y4484).

† The ServeRAID M5100 Series RAID 6 Upgrade (81Y4546) requires a RAID 5 Upgrade.

ServeRAID C105 has the following features:

- Support for 4 drives or 8 drives with the addition of the 8-Pack ServeRAID C105 Controller Enabler feature, 90Y4349
- Support for simple-swap and hot-swap SATA hard drives (SSDs and SAS HDDs are not supported.)
- Support for RAID 0, 1, and 10 (Non-RAID is not supported.)
- 3 Gbps throughput per port
- Support for up to eight volumes
- Support for virtual drive sizes greater than 2 TB
- Fixed stripe unit size of 64 KB
- Support for MegaRAID Storage Manager management software

Driver availability: No native (in-box) driver exists for Windows and Linux. You must download the drivers separately. No support is available for VMware, Hyper-V, Xen, KVM.

The ServeRAID H1110 adapter has the following specifications:

- Four internal 6 Gbps SAS/SATA ports
- Connects to up to four SAS or SATA drives (8 or more drives are not supported.)
- One x4 mini-SAS internal connector (SFF-8087)
- 6 Gbps throughput per port
- Based on the LSI SAS2004 6 Gbps RAID on Chip (ROC) controller
- PCIe 2.0 x4 host interface
- Support for RAID 0, 1, 1E, and 10

The ServeRAID M1115 SAS/SATA Controller has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M1100 Series RAID 5 upgrades
- 6 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2008 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)
- Support for RAID levels 0, 1, and 10
- Support for RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Support for RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Support for 512 MB battery-backed cache or 512 MB or 1 GB flash-backed cache
- 6 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller

If ServeRAID M5110 is selected with a battery kit or flash upgrade, the battery or flash power module is installed remotely from the adapter in a battery holder that is mounted inside the server case as shown in the following figure.

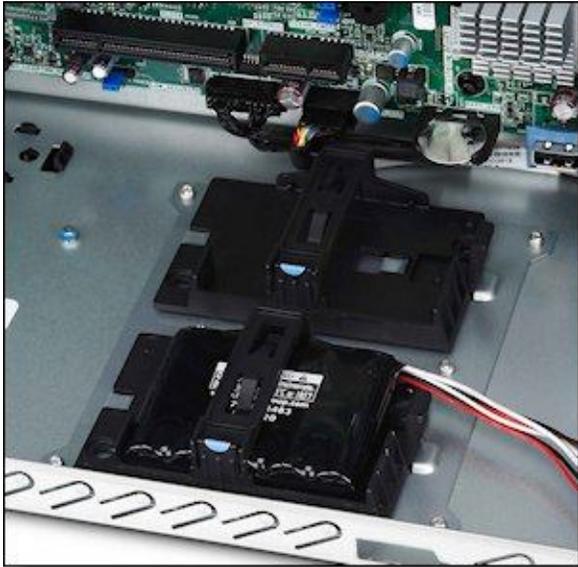


Figure 7. ServeRAID battery or flash power module installed in the battery holder

For more information, see the list of IBM Redbooks® Product Guides in the RAID adapters category:
<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=raid>

Internal drive options

The following table lists the hard drive options for the internal disk storage of the x3300 M4 server.

Drive support: If the server has a 460 W fixed power supply and two processors installed, no 2.5-inch drive configurations are supported, and the maximum number of supported 3.5-inch drives is four drives. See the "Power supplies" section.

Table 10. Disk drive options for internal disk storage (Part 1)

Part number	Feature code	Description	Maximum supported*
2.5" 15K SAS Hot-Swap HDDs			
49Y6102	A3DX	IBM 600GB 15K 6Gbps SAS 3.5" G2HS HDD	16
49Y6097	A3DW	IBM 450GB 15K 6Gbps SAS 3.5" G2HS HDD	16
81Y9670	A283	IBM 300GB 15K 6Gbps SAS 2.5" SFF HS HDD	16
49Y6092	A3DV	IBM 300GB 15K 6Gbps SAS 3.5" G2HS HDD	16
90Y8926	A2XB	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	16
2.5" 10K SAS Hot-Swap HDDs			
00AD075	A48S	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	16
81Y9650	A282	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	16
90Y8872	A2XD	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
90Y8877	A2XC	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
2.5" 10K & 15K SAS Hot-Swap Self Encrypting Drives (SEDs)			
00AD085	A48T	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS SED	16
90Y8913	A2XF	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
90Y8944	A2ZK	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	16
2.5" NL SAS Hot-Swap HDDs			
81Y9690	A1P3	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	16
90Y8953	A2XE	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	16
2.5" NL SATA Hot-Swap HDDs			
81Y9730	A1AV	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
81Y9726	A1NZ	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
81Y9722	A1NX	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
2.5" SAS-SSD Hybrid drives			
00AD102	A4G7	IBM 600GB 10K 6Gbps SAS 2.5" G2HS Hybrid	16

* If the server has a 460 W fixed power supply and two processors installed, no 2.5-inch drive configurations are supported and the maximum supported 3.5-inch drives is 4 drives. See the "Power supplies" section.

Table 10. Disk drive options for internal disk storage (Part 2)

Part number	Feature code	Description	Maximum supported*
2.5" Enterprise SSDs			
41Y8341	A4FQ	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8336	A4FN	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8331	A4FL	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	16
49Y6195	A4GH	IBM 1.6TB SAS 2.5" MLC HS Enterprise SSD	16
49Y6139	A3F0	IBM 800GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6134	A3EY	IBM 400GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6129	A3EW	IBM 200GB SAS 2.5" MLC HS Enterprise SSD	16
00W1125	A3HR	IBM 100GB SATA 2.5" MLC HS Enterprise SSD	16
2.5" Enterprise Value SSDs			
00AJ015	A4KQ	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ010	A4KP	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ005	A4KN	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ000	A4KM	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	16
90Y8643	A2U3	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	16
90Y8648	A2U4	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	16
49Y5839	A3AS	IBM 64GB SATA 2.5" MLC HS Enterprise Value SSD	16
49Y5844	A3AU	IBM 512GB SATA 2.5" MLC HS Enterprise Value SSD	16
3.5" NL SAS Hot-swap HDDs			
49Y6210	A4AF	IBM 4TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	8
90Y8577	A2R2	IBM 3TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	8
90Y8572	A2U0	IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	8
90Y8567	A26M	IBM 1TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	8
3.5" NL SAS Hot-swap SEDs			
00W1543	A4AJ	IBM 4TB 7.2K 6Gbps NL SAS 3.5" G2HS SED	8
00W1533	A4AH	IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS SED	8

* If the server has a 460 W fixed power supply and two processors installed, no 2.5-inch drive configurations are supported and the maximum supported 3.5-inch drives is 4 drives. See the "Power supplies" section.

Table 10. Disk drive options for internal disk storage (Part 3)

Part number	Feature code	Description	Maximum supported*
3.5" NL SATA Hot-swap HDDs			
49Y6002	A3W9	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	8
81Y9798	A22S	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	8
81Y9794	A22T	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	8
81Y9790	A22P	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	8
81Y9786	A22Y	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	8
3.5" NL SATA Simple-swap HDDs			
49Y6012	A3WA	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	8
81Y9814	A22V	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	8
81Y9810	A22W	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	8
81Y9806	A22X	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	8
81Y9802	A22U	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	8

* If the server has a 460 W fixed power supply and two processors installed, no 2.5-inch drive configurations are supported and the maximum supported 3.5-inch drives is 4 drives. See the "Power supplies" section.

Internal backup units

The server supports the internal tape drive options that are listed in the following table.

Table 11. Internal tape drives

Part number	Feature code	Description	Maximum supported
None	A2U7	IBM RDX 3 Internal USB Drive	1
00D2786	A2VE	IBM RDX Internal USB 3.0 Dock with 320GB Cartridge	1
00D2787	A2VF	IBM RDX Internal USB 3.0 Dock with 500GB Cartridge	1
00D2788	A2VG	IBM RDX Internal USB 3.0 Dock with 1TB Cartridge	1
46C5399	5711	IBM DDS Generation 5 USB Tape Drive	1
39M5636	5395	IBM DDS Generation 6 USB Tape Drive	1
43W8478	5393	IBM Half High LTO Gen 3 SAS Tape Drive	2*
44E8895	5397	IBM Half High LTO Gen 4 SAS Tape Drive	2*
49Y9898	5345	IBM Half High LTO Gen 5 Internal SAS Tape Drive	2*
00D8924	A3S3	IBM Half High LTO Ultrium Gen 6 Internal SAS Tape Drive	2*

* With standard models, installation of a second tape drive requires removal of the optical drive.

USB tape drives are attached to the internal USB connector. SAS tape drives require SAS host bus adapters (HBA). See the "Storage host bus adapters" section for list of available SAS HBAs.

For more information, see the list of IBM Redbooks Product Guides in the Backup units category:
<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tape>

Optical drives

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

Table 12. Optical drives

Part number	Feature code	Description	Maximum supported	Standard models where used
None*	4154	Half-High SATA DVD-ROM	2	A2x, B2x, C2x, D2x, D4x, F2x
81Y6404	4155	Half-High SATA Multiburner	2	-

* This option is available only by using CTO or is already installed in standard models.

The two half-high drives in the table can be installed in any open 5.25-inch drive bay (Figure 5).

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

- CD-ROM 48X
- CD-DA (DAE) 40X
- CD-R 48X
- CD-RW 40X
- DVD-ROM (single layer) 16X
- DVD-ROM (dual layer) 12X
- DVD-R (4.7 GB) 16X
- DVD-R DL 12X
- DVD+R 16X
- DVD+R DL 12X
- DVD-RW (4.7 GB) 12X
- DVD+RW 12X
- DVD-RAM (4.7/9.4 GB) 6X

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

- CD-R 24X
- CD-RW 4X
- High Speed CD-RW 10X
- Ultra Speed CD-RW 16X
- DVD-R 8X
- DVD-R DL 8X
- DVD+R 8X
- DVD+R DL 8X
- DVD-RW 6X
- DVD+RW 8X
- DVD-RAM 3X

I/O expansion options

The server supports up to six PCIe slots. Slots 1 - 4 are PCIe 3.0 slots. The slots have the following slot form factors:

- Slot 1: PCIe 3.0 x8; full-height, half-length (requires second processor)
- Slot 2: PCIe 3.0 x8; full-height, full-length
- Slot 3: PCIe 3.0 x8 (x4 wired); full-height, half-length
- Slot 4: PCIe 3.0 x16 (x8 wired); full-height, full-length
- Slot 5: PCIe 2.0 x4 (x1 wired); full-height, half-length
- Slot 6: PCIe 2.0 x8 (x4 wired); full-height, half-length (supports optional PCI-X 64 bit/133 MHz interposer card)

Depending on the number of processors installed and the type of power supply used, only a subset of the slots is available for use as listed in the following table.

Table 13. Slot availability based on the number of processors installed and the type of power supply used

	460 W fixed power supply	550 W hot-swap power supply (1 or 2)	750 W hot-swap power supply (1 or 2)
One processor installed	Slots 2 - 6	Slots 2 - 6	Slots 2 - 6
Two processors installed	Any three slots	Any three slots	All six slots

Slots 1 - 4 are PCI Express 3.0 slots. Slots 5 and 6 are PCI Express 2.0 slots. Slot 4 accepts a graphics processing unit (GPU) at a maximum of 75W power consumption. Slot 6 can be converted to a PCI-X slot (64 bit, 133 MHz) by using the kit that is listed in the following table.

Table 14. PCI riser card options

Part number	Feature code	Description	Maximum supported
00D4346	A2SH	PCI-X Riser Kit (for slots 6 only)	1 (slot 6 only)

Network adapters

The x3300 M4 server supports four integrated Gigabit Ethernet 1000BASE-T RJ-45 ports. Two ports are enabled standard, and two enabled optionally with the FoD upgrade that is listed in the following table. The controller is based on the Intel I350-CM2.

Table 15. Upgrade to enable Ethernet ports 3 and 4

Part number	Feature code	Description	Maximum supported
90Y9314	A2GT	Intel I-350 Embedded Dual Port GbE Activation for IBM System x® (FoD)	1

The integrated Ethernet controller has the following Ethernet features:

- NIC teaming (load balancing and failover)
- 1 Gb Ethernet IEEE 802.3, 802.3u, and 802.3ab PHY specifications compliant
- Integrated PHY for 10/100/1000 Mbps for multispeed, full, and half-duplex auto-negotiation
- IEEE 802.3x and 802.3z compliant flow control support with software-controllable Rx thresholds and Tx pause frames
- Automatic cross-over detection function (MDI/MDI-X)
- IEEE 1588 protocol and 802.1AS implementation
- IEEE802.3az - Energy Efficient Ethernet (EEE)
- Full wake-up support
- Advanced Power Management (APM) support
- Advanced Configuration and Power Interface (ACPI) specification v2.0c
- Magic packet wake-up enable

The integrated Ethernet controller has the following I/O virtualization features:

- Eight transmit (Tx) and receive (Rx) queue pairs per port
- Flexible port partitioning: 32 virtual functions (VF) with four ports or 16 VFs with two ports
- Support for PCI-SIG SR-IOV specification
- Rx/Tx round-robin scheduling
- Traffic isolation and traffic steering
- Virtual machine (VM) to VM packet forwarding (packet loopback)
- MAC and VLAN anti-spoofing
- Malicious driver detection
- Storm control
- Per-pool statistics, off loads, and jumbo support
- Independent Function Level Reset (FLR) for physical and virtual functions
- IEEE 802.1q virtual local area network (VLAN) support with VLAN tag insertion, stripping, and packet filtering for up to 4096 VLAN tags
- IEEE 802.1q advanced packet filtering
- Mirroring rules
- Support for simple VEPA
- VF promiscuous modes

The integrated Ethernet controller has the following Stateless offload and performance features:

- TCP/UDP, IPv4 checksum offloads (Rx/ Tx/Large-send); extended Tx descriptors
- IPv6 support for IP/TCP and IP/UDP receive checksum offload
- Tx TCP segmentation offload (IPv4, IPv6)
- Transmit Segmentation Offloading (TSO)
- Interrupt throttling control
- Legacy and Message Signal Interrupt (MSI)
- Message Signal Interrupt Extension (MSI-X)
- Receive Side Scaling (RSS) for Windows
- Scalable I/O for Linux environments (IPv4, IPv6, TCP/UDP)
- Support for packets up to 9.5 KB (jumbo frames)

The following table lists the supported network adapters.

Table 16. Network adapters

Part number	Feature code	Description	Maximum supported†
Integrated controller			
90Y9314	A2GT	Intel I-350 Embedded Dual Port GbE Activation for IBM System x (FoD)	1 / 1
40 Gb Ethernet			
00D9550	A3PN	Mellanox ConnectX-3 40GbE / FDR IB VPI Adapter for IBM System x	4 / 5
10 Gb Ethernet			
94Y5180	A4Z6	Broadcom NetXtreme Dual Port 10GbE SFP+ Adapter for IBM System x	4 / 5
42C1820*	1637	Brocade 10Gb CNA for IBM System x	4 / 5
None#	A2UN	Emulex Dual Port 10GbE SFP+ Integrated VFA III for IBM System x	1 / 1
95Y3762	A2U1	Emulex Dual Port 10GbE SFP+ VFA III for IBM System x	4 / 5
95Y3760	A2U2	Emulex VFA III FCoE/iSCSI License for IBM System x (FoD) for A2UN or A2U1	4 / 5**
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x	4 / 5
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x	4 / 5
81Y9990	A1M4	Mellanox ConnectX-2 Dual Port 10GbE Adapter for IBM System x	4 / 5
00D9690	A3PM	Mellanox ConnectX-3 10 GbE Adapter for IBM System x	4 / 5
42C1800	5751	QLogic 10Gb CNA for IBM System x	4 / 5
90Y4600	A3MR	QLogic 8200 Dual Port 10GbE SFP+ VFA for IBM System x	4 / 5
Gigabit Ethernet			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x	4 / 5
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x	4 / 5
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x	4 / 5
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x	4 / 5
42C1780	2995	NetXtreme II 1000 Express Dual Port Ethernet Adapter	4 / 5
42C1750	2975	PRO/1000 PF Server Adapter	4 / 5
InfiniBand			
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x	4 / 5

* Withdrawn from marketing

† In the Maximum supported column, the first number is with one processors installed, and the second number is with two processors installed.

Emulex Dual Port 10GbE SFP+ Integrated VFA III is only available through CTO or Special Bid (SBB 95Y3768)

** One license per one Emulex Dual Port 10GbE VFA III (95Y3762) or Emulex Dual Port 10GbE Integrated VFA III (SBB 95Y3768).

For more information, see the list of IBM Redbooks Product Guides in the Networking adapters category:

<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=networkadapters>

Storage host bus adapters

The following table lists the storage HBAs that are supported by the x3300 M4 server.

Table 17. Storage adapters

Part number	Feature code	Description	Maximum supported†
Fibre Channel - 16 Gb			
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x	4 / 5
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x	4 / 5
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x	4 / 5
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x	4 / 5
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x	4 / 5
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x	4 / 5
Fibre Channel - 8 Gb			
42D0485	3580	Emulex 8 Gb FC Single-port HBA for IBM System x	4 / 5
42D0494	3581	Emulex 8 Gb FC Dual-port HBA for IBM System x	4 / 5
42D0501	3578	QLogic 8 Gb FC Single-port HBA for IBM System x	4 / 5
42D0510	3579	QLogic 8 Gb FC Dual-port HBA for IBM System x	4 / 5
46M6049	3589	Brocade 8 Gb FC Single-port HBA for IBM System x	4 / 5
46M6050	3591	Brocade 8 Gb FC Dual-port HBA for IBM System x	4 / 5
Fibre Channel - 4 Gb			
39R6525	3567	QLogic 4 Gb FC Single-Port PCIe HBA for IBM System x	4 / 5
39R6527	3568	QLogic 4 Gb FC Dual-Port PCIe HBA for IBM System x	4 / 5
59Y1987	3885	Brocade 4 Gb FC Single-port HBA for IBM System x	4 / 5
59Y1993	3886	Brocade 4 Gb FC Dual-port HBA for IBM System x	4 / 5
SAS			
46M0907	5982	IBM 6 Gb SAS HBA Controller	4 / 5
46M0912	3876	IBM 6Gb Performance Optimized HBA	1 / 1

† In the Maximum supported column, the first number is with one processors installed, and the second number is with two processors installed.

For more information, see the list of IBM Redbooks Product Guides in the Host bus adapters category:
<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=hba>

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†
90Y4377	A3DY	IBM 1.2TB High IOPS MLC Mono Adapter	3 / 4
46C9078	A3J3	IBM 365GB High IOPS MLC Mono Adapter	3 / 4
46C9081	A3J4	IBM 785GB High IOPS MLC Mono Adapter	3 / 4

† In the Maximum supported column, the first number is with one processors installed, and the second number is with two processors installed.

GPU adapters

The x3300 M4 server supports graphics processing units (GPUs) in slot 4. The slot supports adapters up to 75 W power consumption. The following table lists the supported GPUs.

Table 19. GPU adapters

Part number	Feature code	Description	Maximum supported
90Y2380#	A3WJ	NVIDIA Quadro K2000	1
90Y2384#	A3WH	NVIDIA Quadro K600	1

SBB part numbers, not available as options. Order via CTO or Special Bid only

The use of a GPU adapter requires installation of one or two 750 W power supplies. 550 W or 460 W power supplies are not supported.

Power supplies

The server supports one of the following power supply configurations:

- One 460 W fixed power supply, non-redundant (80 PLUS Bronze certified)
- Up to two redundant hot-swap 550 W ac power supplies (80 PLUS Platinum certified)
- Up to two redundant hot-swap 750 W ac power supplies (80 PLUS Platinum certified)

Table 2 lists the power supplies included in standard models. For servers with one redundant hot-swap power supply, the following table lists the upgrades to add the second redundant power supply. Models with a fixed power supply cannot be upgraded to hot-swap redundant power supplies.

Table 20. Optional redundant power supply upgrades

Part number	Feature code	Description	Maximum supported	Standard models where used
00J6844*	A3DQ	IBM 550W Redundant PSU	2	D2x, D4x, F2x
94Y6669	A3DR	IBM 750W Redundant PSU	2	-

* Replaces 94Y6668

The use of the 460 W fixed power supply or 550 W power supply imposes the configuration limitations that are listed in the following table.

Table 21. Configuration limitations based on power supply used (PSU = power supply unit)

Power supply	Number of CPUs	Redundancy	2.5" drive support	3.5" drive support	GPU support	PCIe adapter support*
460 W fixed	1	No	No support	Full support (8)	No support	Full support (5)
	2	No	No support	Up to 4 drives	No support	Maximum 3 adapters
550 W hot-swap	1	Yes with second PSU	Full support	Full support (8)	No support	Full support (5)
	2	Yes with second PSU	Full support	Full support (8)	No support	Maximum 3 adapters
750 W hot-swap	1	Yes with second PSU	Full support	Full support (8)	Full support	Full support (5)
	2	Yes with second PSU	Full support	Full support (8)	Full support	Full support (6)

* Full support: With one processor installed, full support is five slots (slots 2 - 5); with two processors installed, full support is six slots (slots 1 - 6).

An ac power supply ships standard without a line cord, which must be purchased separately.

Cooling fans

Standard models of the server come standard with two simple swap cooling fans, one rear fan and one system fan. The server supports up to four fans, including one that provides N+1 cooling redundancy. The following table lists the power supplies and redundant cooling upgrade option.

Table 22. Fan upgrades

Part number	Feature code	Description	Standard / Maximum*
00D2593	A2SJ	Redundant System Fan	1 / 3

* Not including the rear fan (4) as shown in the following figure.

The following figure shows the location of the four fans.



Figure 8. Location of the cooling fans

Standard fans are fan 2 and fan 4. The following table shows the configuration requirements for fans 1 and 3.

Table 23. Fan upgrades

Configuration	Fan requirement
Either of: <ul style="list-style-type: none"> • Two CPUs installed • Three or more PCIe adapters installed 	Install fan 3 only
Both: <ul style="list-style-type: none"> • Fan 3 installed • Any quantity of 16GB 1600 MHz RDIMM (00D4968) installed 	Install both fan 1 and fan 3
<ul style="list-style-type: none"> • N+1 Fan redundancy desired* 	Install fan 1

* Redundancy is not available if any quantity of 16GB 1600 MHz RDIMM (00D4968) is installed.

Integrated virtualization

The x3300 M4 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 24. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1
41Y8300	A2VC	IBM USB Memory Key for VMware vSphere 5.0	1
41Y8307	A383	IBM USB Memory Key for VMware ESXi 5.0 Update 1	1
41Y8311	A2R3	IBM USB Memory Key for VMWare ESXi 5.1	1
41Y8382	A4WZ	IBM USB Memory Key for VMware ESXi 5.1 Update 1	1
41Y8385	A584	IBM USB Memory Key for VMware ESXi 5.5	1

Not supported: VMware ESXi and vSphere do not support the ServeRAID C105 integrated RAID controller.

Remote management

The x3300 M4 server contains IBM 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 IMM2 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 IMM Advanced Upgrade (software feature) 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 color depths, regardless of the system state
- Remotely accessing the server by using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the 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 25. Remote management option

Part number	Feature code	Description	Maximum supported
90Y3901	A1ML	IBM Integrated Management Module Advanced Upgrade	1

In the default UEFI configuration, Ethernet port 2 is configured to be dedicated to remote access to the IMM2. If preferred, you can change the UEFI setting so that remote access to the IMM2 is via Port 1 and also accessible to the operating system. This setting is also useful if you do not have a dedicated management network. The following table shows this setting and its effect on the Ethernet ports.

Note: The IMM2 network must operate 100 Mbps full duplex. The IMM2 network connection does not support Gigabit Ethernet. In shared mode, the production Ethernet network on that port still operates at Gigabit speeds.

Table 26. UEFI settings for remote access to the IMM

UEFI mode	Ethernet Port 1	Ethernet Port 2	Ethernet Port 3 (optional)	Ethernet Port 4 (optional)
IMM network interface port dedicated (default)	Production Ethernet	IMM2 dedicated*	Production Ethernet	Production Ethernet
IMM network interface port shared	Shared - Production Gb Ethernet and IMM2*	Production Ethernet	Production Ethernet	Production Ethernet

* The IMM network is limited to 100 Mbps full duplex

Supported operating systems

The x3300 M4 server supports the following operating systems:

- IBM 4690 Operating System V6
- 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 Small Business Server 2008 Premium Edition
- Microsoft Windows Small Business Server 2008 Standard Edition
- Red Hat Enterprise Linux 5 Server Edition
- 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
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for x86
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- VMware ESX 4.1

- VMware ESXi 4.1
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)

For the latest information about the specific versions and service levels supported and any other prerequisites, see the IBM ServerProven® website:

<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml>

Physical and electrical specifications

The x3300 M4 server has the following dimensions and weight (approximate):

- In tower configuration:
 - Width: 235 mm (9.25 in), 176 mm (6.9 in) without stabilizer feet
 - Depth: 678 mm (26.7 in), 605 mm (23.8 in) without front bezel
 - Height: 438 mm (17.1 in), 425 mm (16.7 in) without stabilizer feet
 - Weight minimum: 22.0 kg (48.5 lb)
 - Weight maximum: 29.7 kg (65.4 lb)
- In rack configuration (with rack conversion kit):
 - Width: 481 mm (18.9 in)
 - Height: 176 mm (6.9 in) (4U)
 - Depth: 625 mm (24.6 in) excluding bezel (bezel and HDD handles adds 24 mm)
 - Minimum: 20.5 kg (45.2 lb)
 - Maximum: 28.2 kg (62.1 lb)

The x3300 M4 server has the following supported environment:

- Server on:
 - Temperature: 5°C - 40°C (41°F - 104°F) up to 950mm (3,117ft)
 - Above 950m, de-rated maximum air temperature 1°C / 175m.
 - Humidity, non-condensing: -12°C dew point (10.4°F) and 8% - 85% relative humidity
 - Maximum dew point: 24°C (75°F)
 - Maximum altitude: 3050 m (10,000 ft) & 5°C - 28°C (41°F - 82°F)
 - Maximum rate of temperature change: 5°C/hr (41°F/hr) for tape drive, 20°C/hr (68°F/hr) for HDDs
- Server off:
 - Temperature: 5°C to 45°C (41°F - 113°F)
 - Relative humidity: 8% - 85%
 - Maximum dew point: 27°C (80.6°F)
- Storage:
 - Temperature: 1°C to 60°C (33.8°F - 140°F)
 - Altitude: 3050 m (10,000 ft)
 - Relative humidity: 5% - 80%
 - Maximum dew point: 29°C (84.2°F)
- Shipping:
 - Temperature: -40°C to 60°C (-40°F - 140°F)

- Altitude: 10,700 m (35,105 ft)
- Relative humidity: 5% - 100%
- Maximum dew point: 29°C (84.2°F)

The x3300 M4 server has the following electrical specifications:

- Models with 460 W power supplies:
 - 100 to 127 nominal V ac; 50-60 Hz; 11-6.4 A
 - 200 to 240 nominal V ac; 50-60 Hz; 11-3.2 A
 - Input kilovolt-amperes (kVA) (approximately): Minimum configuration: 0.12 kVA, Maximum: 0.64 kVA
- Models with 550 W power supplies:
 - 100 to 127 nominal V ac; 50-60 Hz; 11-6.5 A
 - 200 to 240 nominal V ac; 50-60 Hz; 11-3.3 A
 - Input kilovolt-amperes (kVA) (approximately): Minimum configuration: 0.12 kVA, Maximum: 0.66 kVA
- Models with 750 W power supplies:
 - 100 to 127 nominal V ac; 50-60 Hz; 11-8.9 A
 - 200 to 240 nominal V ac; 50-60 Hz; 11-4.5 A
 - Input kilovolt-amperes (kVA) (approximately): Minimum configuration: 0.14 kVA, Maximum: 0.90 kVA

The x3300 M4 server has the following heat and noise output:

- BTU output: ship configuration - 406.03 Btu/hr (119 watts)
- BTU output: full configuration - 2900.2 Btu/hr (850 watts)
- Acoustical noise emission levels: 5.5 bels (idling), 6.0 bels (operating)

Warranty options

The IBM System x3300 M4 has a 3-year on-site warranty with 9x5 next-business-day terms. IBM offers the warranty service upgrades through the IBM ServicePac offerings that are highlighted in this section. IBM ServicePac offerings are a series of prepackaged 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.

IBM ServicePac offerings are country-specific. That is, each country might have its own service types, service levels, response times, and terms and conditions. Not all covered types of ServicePac offerings might be available in a particular country. For more information about IBM ServicePac offerings that are available in your country, see the IBM ServicePac Product Selector at: <https://www-304.ibm.com/sales/gss/download/spst/servicepac>

The following table explains the warranty service definitions in more detail.

Table 27. Warranty service definitions

Term	Description
IBM on-site repair (IOR)	A service technician will come to the server's location for equipment repair.
24x7x2 hour	A service technician is scheduled to arrive at the customer's location within two hours after remote problem determination is completed. IBM provides service around the clock, every day, including IBM holidays.
24x7x4 hour	A service technician is scheduled to arrive at the customer's location within four hours after remote problem determination is completed. IBM provides service around the clock, every day, including IBM holidays.
9x5x4 hour	A service technician is scheduled to arrive at the customer's location within four business hours after remote problem determination is completed. IBM provides service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays. After 1:00 p.m., if it is determined that on-site service is required, the customer can expect the service technician to arrive the morning of the following business day. For noncritical service requests, a service technician will arrive by the end of the following business day.
9x5 next business day	A service technician is scheduled to arrive at the customer's location on the business day after IBM receives the call, following remote problem determination. IBM provides service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

In general, the following types of IBM ServicePac offerings are available:

- Warranty and maintenance service upgrades
 - Service coverage for 1, 2, 3, 4, or 5 years, 9x5 or 24x7
 - On-site repair from next business day to 2 or 4 hours
 - Warranty extension of 1 or 2 years
- Remote technical support services
 - One or three years with 24x7 coverage (severity 1) or 9x5 next business day for all severities
 - Installation and startup support for System x servers
 - Remote technical support for System x servers
 - Software support - Support Line
 - Microsoft or Linux software
 - VMware
 - IBM Systems Director

Regulatory compliance

The server conforms to the following standards:

- 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. 60950-1-07
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- IEC-60950-1 (CB Certificate and CB Test Report)
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- China CCC (GB4943.1), GB9254-2008 class A, GB17625.1-2003
- Korea KN22, Class A; KN24
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3)
- CISPR 22, Class A
- TUV-GS EN60950-1 /IEC60950-1,EK1-ITB2000)
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-99, GOST R 51317.3.3-99

External disk storage expansion

The server supports attachment to external storage expansion enclosures, such as the EXP2500 series, by using the ServeRAID M5120 SAS/SATA Controller.

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)
- Support for RAID 0, 1, and 10
- Support for RAID 5 and 50 with optional M5100 Series RAID 5 upgrades
- Support for RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Support for a 512 MB battery-backed cache or 512 MB or 1 GB flash-backed cache (cache)
- 6 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller
- Support for connectivity to the EXP2512 and EXP2524 storage expansion enclosures

For more information, see the IBM Redbooks Product Guide *ServeRAID M5120 SAS/SATA Controller for IBM System x*:

<http://www.redbooks.ibm.com/abstracts/tips0858.html?Open>

The ServeRAID M5120 SAS/SATA Controller supports connectivity to the IBM System Storage® external expansion enclosures that are listed in the following table. Up to nine expansion enclosures can be daisy-chained per one M5120 external port. For better performance, distribute expansion enclosures evenly across both M5120 ports.

Table 28. IBM System Storage external expansion enclosures

Part number	Description	Maximum quantity supported per one M5120
172701X*	IBM System Storage EXP3000	18
174712X	IBM System Storage EXP2512 Express	18
174724X	IBM System Storage EXP2524 Express	9

* Withdrawn from marketing

The external SAS cables that are listed in the following table support connectivity between external expansion enclosures and the ServeRAID M5120 SAS/SATA Controller.

Table 29. External SAS cables for external storage expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
39R6531	IBM 3 m SAS Cable	1
39R6529	IBM 1 m SAS Cable	1

The following table lists the drives that are supported by the EXP2512 external expansion enclosures.

Table 30. Drive options for EXP2512 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
3.5-inch NL SAS HS HDDs		
49Y1903	1TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
49Y1902	2TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
90Y8720	3TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
3.5-inch SAS HS HDDs		
49Y1899	300GB 15,000 rpm 6Gb SAS 3.5" HDD	12
49Y1900	450GB 15,000 rpm 6Gb SAS 3.5" HDD	12
49Y1901	600GB 15,000 rpm 6Gb SAS 3.5" HDD	12

The following table lists the hard disk drives that are supported by the EXP2524 external expansion enclosures.

Table 31. Drive options for EXP2524 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
2.5-inch NL SAS HS HDDs		
49Y1898	500GB 7,200 rpm 6Gb SAS NL 2.5" HDD	24
81Y9952	1TB 7,200 rpm 6Gb SAS NL 2.5" HDD	24
2.5-inch SAS HS HDDs		
49Y1896	146GB 15,000 rpm 6Gb SAS 2.5" HDD	24
49Y1895	300GB 10,000 rpm 6Gb SAS 2.5" HDD	24
81Y9944	300GB 15,000 rpm 6Gb SAS 2.5" HDD	24
81Y9596	600GB 10,000 rpm 6Gb SAS 2.5" HDD	24
81Y9948	900GB 10,000 rpm 6Gb SAS 2.5" HDD	24
2.5-inch SAS HS SSDs		
81Y9956	200GB 2.5" SAS SSD	24
81Y9960	400GB 2.5" SAS SSD	24

External disk storage systems

The following table lists the external storage systems that are supported by the server and can be ordered through the System x sales channel. The server might support other IBM disk systems that are not listed in this table. For more information, see IBM System Storage Interoperability Center at:

<http://www.ibm.com/systems/support/storage/ssic>

Table 32. External disk storage systems

Part number	Description
1746A2D	IBM System Storage DS3512 Express Dual Controller Storage System
1746A2S	IBM System Storage DS3512 Express Single Controller Storage System
1746A4D	IBM System Storage DS3524 Express Dual Controller Storage System
1746A4S	IBM System Storage DS3524 Express Single Controller Storage System
181494H	IBM System Storage DS3950 Model 94
181498H	IBM System Storage DS3950 Model 98
181492H	IBM System Storage EXP395 Expansion Unit
1746A2E	IBM System Storage EXP3512 Express Storage™ Expansion Unit
1746A4E	IBM System Storage EXP3524 Express Storage Expansion Unit

For more information, see the list of IBM Redbooks Product Guides in the System Storage category:

<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=externalstorage>

External backup units

The server supports the external backup attachment options that are listed in the following table.

Table 33. External backup options (part 1)

Part number	Description
External tape expansion enclosures for internal tape drives	
87651UX	1U Tape Drive Enclosure
8767HHX	Half High Tape Drive Enclosure
87651NX	1U Tape Drive Enclosure (with Nema 5-15P LineCord)
8767HNX	Half High Tape Drive Enclosure (with Nema 5-15P LineCord)
Tape enclosure adapters (with cables)	
44E8869	USB Enclosure Adapter Kit
40K2599	SAS Enclosure Adapter Kit
Internal backup drives supported by external tape enclosures	
00D2786	IBM RDX Internal USB 3.0 Dock with 320GB Cartridge
00D2787	IBM RDX Internal USB 3.0 Dock with 500GB Cartridge
00D2788	IBM RDX Internal USB 3.0 Dock with 1TB Cartridge
46C5399	IBM DDS Generation 5 USB Tape Drive
39M5636	IBM DDS Generation 6 USB Tape Drive
43W8478	IBM Half High LTO Gen 3 SAS Tape Drive
44E8895	IBM Half High LTO Gen 4 SAS Tape Drive
49Y9898	IBM Half High LTO Gen 5 Internal SAS Tape Drive
External backup units*	
36251TY	IBM RDX USB 3.0 Dock with 1TB Cartridge
362532Y	IBM RDX USB 3.0 Dock with 320GB Cartridge
362550Y	IBM RDX USB 3.0 Dock with 500GB Cartridge

Table 33. External backup options (part 2)

Part number	Description
3628L3X	IBM Half High LTO Gen 3 External SAS Tape Drive (with US line cord)
3628L4X	IBM Half High LTO Gen 4 External SAS Tape Drive (with US line cord)
3628L5X	IBM Half High LTO Gen 5 External SAS Tape Drive (with US line cord)
3628N3X	IBM Half High LTO Gen 3 External SAS Tape Drive (without line cord)
3628N4X	IBM Half High LTO Gen 4 External SAS Tape Drive (without line cord)
3628N5X	IBM Half High LTO Gen 5 External SAS Tape Drive (without line cord)
3580S3V	System Storage TS2230 Tape Drive Express Model H3V
3580S4V	System Storage TS2240 Tape Drive Express Model H4V
3580S5E	System Storage TS2250 Tape Drive Express Model H5S
3580S5X	System Storage TS2350 Tape Drive Express Model S53
3572S4R	TS2900 Tape Library with LTO4 HH SAS drive & rack mount kit
3572S5R	TS2900 Tape Library with LTO5 HH SAS drive & rack mount kit
35732UL	TS3100 Tape Library Model L2U Driveless
35734UL	TS3200 Tape Library Model L4U Driveless
46X2682†	LTO Ultrium 5 Fibre Channel Drive
46X2683†	LTO Ultrium 5 SAS Drive Sled
46X2684†	LTO Ultrium 5 Half High Fibre Drive Sled
46X2685†	LTO Ultrium 5 Half High SAS Drive Sled
46X6912†	LTO Ultrium 4 Half High Fibre Channel Drive Sled
46X7117†	LTO Ultrium 4 Half High SAS DriveV2 Sled
46X7122†	LTO Ultrium 3 Half High SAS DriveV2 Sled

* The external tape drives that are listed can be ordered through the System x sales channel. The server might support other IBM tape drives that are not listed in this table. For more information, see the IBM System Storage Interoperability Center: <http://www.ibm.com/systems/support/storage/ssic>

† These part numbers are the tape drive options for 35732UL and 35734UL.

External USB tape drives are connected to the external USB ports on the server. External SAS or Fibre Channel tape drives require the corresponding HBA (sold separately, see the "Storage host bus adapter" section).

For the latest information about the specific versions and service levels supported and any other prerequisites, see the IBM ServerProven website:

<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml>

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

<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tape>

Top-of-rack Ethernet switches

The server supports the top-of-rack Ethernet switches from IBM System Networking that are listed in the following table.

Table 34. IBM System Networking: Top-of-rack switches

Part number	Description
IBM System Networking - 1 Gb top-of-rack switches	
0446013	IBM System Networking RackSwitch G8000R
7309CFC	IBM System Networking RackSwitch G8000F
7309CD8	IBM System Networking RackSwitch G8000DC
7309G52	IBM System Networking RackSwitch G8052R
730952F	IBM System Networking RackSwitch G8052F
427348E	IBM Ethernet Switch J48E
6630010	Juniper Networks EX2200 24 Port
6630011	Juniper Networks EX2200 24 Port with PoE
6630012	Juniper Networks EX2200 48 Port
6630013	Juniper Networks EX2200 48 Port with PoE
IBM System Networking - 10 Gb top-of-rack switches	
7309DRX	IBM System Networking RackSwitch G8264CS (Rear to Front)
7309DFX	IBM System Networking RackSwitch G8264CS (Front to Rear)
7309BD5	IBM System Networking RackSwitch G8124DC
7309BR6	IBM System Networking RackSwitch G8124ER
7309BF7	IBM System Networking RackSwitch G8124EF
7309G64	IBM System Networking RackSwitch G8264R
730964F	IBM System Networking RackSwitch G8264F
7309-CR9	IBM System Networking RackSwitch G8264TR
7309-CF9	IBM System Networking RackSwitch G8264TF
0719-410	Juniper Networks EX4500 - Front to Back Airflow
0719-420	Juniper Networks EX4500 - Back to Front Airflow
IBM System Networking - 40 Gb top-of-rack switches	
8036BRX	IBM System Networking RackSwitch G8332 (Rear to Front)
8036BFX	IBM System Networking RackSwitch G8332 (Front to Rear)
8036ARX	IBM System Networking RackSwitch G8316R
8036AFX	IBM System Networking RackSwitch G8316F

For more information, see the list of IBM Redbooks Product Guides in the Top-of-rack switches category: <http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tor>

Uninterruptible power supply units

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

Table 35. Uninterruptible power supply units

Part number	Description
Tower UPS	
53961AX	IBM 1000VA LCD Tower UPS (120V)
53961JX	IBM 1000VA LCD Tower UPS (100V)
53961KX	IBM 1000VA LCD Tower UPS (230V)
53962AX	IBM 1500VA LCD Tower UPS (120V)
53962JX	IBM 1500VA LCD Tower UPS (100V)
53962KX	IBM 1500VA LCD Tower UPS (230V)
Rack-mounted UPS	
21304RX	IBM UPS 10000XHV
53951AX	IBM 1500VA LCD 2U Rack UPS (100V/120V)
53951KX	IBM 1500VA LCD 2U Rack UPS (230V)
53952AX	IBM 2200VA LCD 2U Rack UPS (100V/120V)
53952KX	IBM 2200VA LCD 2U Rack UPS (230V)
53953AX	IBM 3000VA LCD 3U Rack UPS (100V/120V)
53953JX	IBM 3000VA LCD 3U Rack UPS (200V/208V)
53956AX	IBM 6000VA LCD 4U Rack UPS (200V/208V)
53956KX	IBM 6000VA LCD 4U Rack UPS (230V)
53959KX	IBM 11000VA LCD 5U Rack UPS (200V/208V/230V)

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category: <http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power>

Power distribution units

The server supports attachments to the power distribution units (PDUs) that are listed in the following table.

Table 36. Power distribution units (part 1)

Part number	Description
Switched and Monitored PDUs	
46M4002	IBM 1U 9 C19/3 C13 Active Energy Manager DPI PDU
46M4003	IBM 1U 9 C19/3 C13 Active Energy Manager 60A 3 Phase PDU
46M4004	IBM 1U 12 C13 Active Energy Manager DPI PDU
46M4005	IBM 1U 12 C13 Active Energy Manager 60A 3 Phase PDU
46M4167	IBM 1U 9 C19/3 C13 Switched and Monitored 30A 3 Phase PDU
46M4116	IBM 0U 24 C13 Switched and Monitored 30A PDU
46M4119	IBM 0U 24 C13 Switched and Monitored 32A PDU
46M4134	IBM 0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU
46M4137	IBM 0U 12 C19/12 C13 Switched and Monitored 32A 3 Phase PDU
Enterprise PDUs	
71762MX	IBM Ultra Density Enterprise PDU C19 PDU+ (WW)
71762NX	IBM Ultra Density Enterprise PDU C19 PDU (WW)
71763MU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU+ (NA)
71763NU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU (NA)
39M2816	IBM DPI C13 Enterprise PDU without linecord
39Y8923	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208 V) fixed line cord
39Y8941	DPI Single Phase C13 Enterprise PDU without line cord
39Y8948	DPI Single Phase C19 Enterprise PDU without line cord
Front-end PDUs	
39Y8934	DPI 32 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8935	DPI 63amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8938	30 amp/125 V Front-end PDU with NEMA L5-30P connector
39Y8939	30 amp/250 V Front-end PDU with NEMA L6-30P connector
39Y8940	60 amp/250 V Front-end PDU with IEC 309 60A 2P+N+Gnd connector

Table 36. Power distribution units (part 2)

Part number	Description
Universal PDUs	
39Y8951	DPI Universal Rack PDU with US LV and HV line cords
39Y8952	DPI Universal Rack PDU with CEE7-VII Europe LC
39Y8953	DPI Universal Rack PDU with Denmark LC
39Y8954	DPI Universal Rack PDU with Israel LC
39Y8955	DPI Universal Rack PDU with Italy LC
39Y8956	DPI Universal Rack PDU with South Africa LC
39Y8957	DPI Universal Rack PDU with UK LC
39Y8958	DPI Universal Rack PDU with AS/NZ LC
39Y8959	DPI Universal Rack PDU with China LC
39Y8962	DPI Universal Rack PDU (Argentina)
39Y8960	DPI Universal Rack PDU (Brazil)
39Y8961	DPI Universal Rack PDU (India)
0U Basic PDUs	
46M4122	IBM 0U 24 C13 16A 3 Phase PDU
46M4125	IBM 0U 24 C13 30A 3 Phase PDU
46M4128	IBM 0U 24 C13 30A PDU
46M4131	IBM 0U 24 C13 32A PDU
46M4140	IBM 0U 12 C19/12 C13 60A 3 Phase PDU
46M4143	IBM 0U 12 C19/12 C13 32A 3 Phase PDU

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category:
<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power>

Rack cabinets

The server can be installed in a rack with the Tower to Rack Conversion Kit (00D2594). The server supports the rack cabinets that are listed in the following table.

Table 37. Rack cabinets and Tower to Rack Conversion Kit

Part number	Description
Tower to rack conversion kits	
00D2594	Tower to Rack Conversion Kit
Rack cabinets	
201886X	IBM 11U Office Enablement Kit
93072PX	IBM 25U Static S2 Standard Rack
93072RX	IBM 25U Standard Rack
93074RX	IBM 42U Standard Rack
93074XX	IBM 42U Standard Rack Extension
93084EX	IBM 42U Enterprise Expansion Rack
93084PX	IBM 42U Enterprise Rack
93604EX	IBM 42U 1200 mm Deep Dynamic Expansion Rack
93604PX	IBM 42U 1200 mm Deep Dynamic Rack
93614EX	IBM 42U 1200 mm Deep Static Expansion Rack
93614PX	IBM 42U 1200 mm Deep Static Rack
93624EX	IBM 47U 1200 mm Deep Static Expansion Rack
93624PX	IBM 47U 1200 mm Deep Static Rack
99564RX	IBM S2 42U Dynamic Standard Rack
99564XX	IBM S2 42U Dynamic Standard Expansion Rack

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category:

<http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=rack>

The following figure shows the System x3300 M4 server installed in the Tower to Rack Conversion Kit.



Figure 9. The IBM System x3300 M4 server with the Tower to Rack Conversion Kit

Rack options

The System x3300 M4 server supports the rack console switches and monitor kits listed in the following table.

Table 38. Rack options

Part number	Feature code	Description
Monitor kits and keyboard trays		
17238BX	1723HC1 fc A3EK	IBM 1U 18.5" Standard Console
17238EX	1723HC1 fc A3EL	IBM 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 for IBM
1754D2X	1754HC2 fc 6695	IBM Global 4x2x32 Console Manager (GCM32)
1754D1X	1754HC1 fc 6694	IBM Global 2x2x16 Console Manager (GCM16)
1754A2X	1754HC4 fc 0726	IBM Local 2x16 Console Manager (LCM16)
1754A1X	1754HC3 fc 0725	IBM Local 1x8 Console Manager (LCM8)
Console cables		
00AK142	A4X4	UM KVM Module VGA+SD Dual RJ45
43V6147	3757	IBM Single Cable USB Conversion Option (UCO)
39M2895	3756	IBM USB Conversion Option (4 Pack UCO)
39M2897	3754	IBM Long KVM Conversion Option (4 Pack Long KCO)
46M5383	5341	IBM Virtual Media Conversion Option Gen2 (VCO2)
46M5382	5340	IBM Serial Conversion Option (SCO)



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- IBM US Announcement Letter
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- IBM System x3300 M4 product page
<http://www.ibm.com/systems/x/hardware/tower/x3300m4>
- IBM System x3300 M4 Installation and Service Guide
<http://ibm.com/support/entry/portal/docdisplay?Indocid=MIGR-5091193>
- ServerProven hardware compatibility page for the x3300 M4
<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/xseries/7382.html>
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