IBM System x3100 M5 Product Guide

IBM Redbooks Product Guide

The IBM® System x3100 M5 single-socket tower server is designed for small businesses and first-time server buyers looking for a solution to improve business efficiency. It delivers several innovative features with a competitive price, either in a compact mini-tower form factor, or standard tower form factor with hot-swap power supplies and disk drives. The IBM System x3100 M5 provides next-generation performance in an innovative and compact design with flexible configuration options, built-in security, and systems management capabilities. It leverages the next-generation dual-core and quad-core Intel Xeon processor technology.

Suggested uses: Retail/kiosks, and SMBs, looking for file and printer servers, web serving, small business infrastructure, and virtual desktops for small workgroups.

Figure 1. The IBM System x3100 M5 (compact mini-tower shown)

Did you know?

The System x3100 M5 server is a compact, cost-effective, single-processor tower or rack-mountable server that has been optimized to provide outstanding availability, manageability, and performance features to small-to-medium-sized businesses, retail stores, or distributed enterprises. It supports the latest Intel Xeon E3-1200 v3 “Haswell” family of processors for applications that require performance and stability, and Core i3, Pentium, and Celeron processors for applications that require lower cost.

The system includes features that are not typically seen in this class of system, such as standard, embedded RAID 0 and RAID 1, remote control capabilities even when the machine is powered off, and Predictive Failure Analysis (PFA) on processor and memory. Some models also support hot-swap redundant power supplies and hot-swap disk drives.

Key features

Often, small-to-medium sized businesses (SMBs) have limited IT budget and resources, and rely on partners or multitalented employees to help manage the company's network. Business needs for efficiency improvement and retention of critical data require the usage of a server that is easy to get up and running quickly and is dependable. You need to squeeze as much as possible out of your IT dollars while saving costs on features that are not needed in an SMB environment. The IBM System x3100 M5 is an ideal first server to meet those business needs. It was built for speed, yet eliminates costly design features that are found in general-purpose servers that are unnecessary for smaller businesses.

Scalability and performance

The x3100 M5 offers numerous features to boost performance, improve scalability, and reduce costs:

- The single-socket x3100 M5 supports the new quad-core Intel Xeon Processor E3-1200 v3 ("Haswell") family of processors, which offer impressive computing power in a space-saving mini-tower design.
- Choice of processors with up to four cores to enable the effective usage of multi-threaded applications.
- Intel Xeon Processor E3-1200 v3 family supports Intel Hyper-Threading Technology and Intel Turbo Boost Technology 2.0 to maximize performance.
- Up to 32 GB of high-speed DDR3 system memory with four DIMM sockets.
- Memory speeds up to 1600 MHz.
- Four available high-performance PCI Express 3.0 or 2.0 slots.
- Up to four internal 3.5-inch simple-swap or hot-swap SATA II HDDs on some models offer low-cost/high-capacity storage.
- Up to eight internal 2.5-inch hot-swap SAS/SATA HDDs on some models offers maximum scalability and performance.
- Integrated ServeRAID-C100 software RAID controller supports RAID 0, 1, and 10. Hardware RAID options are available.
- Integrated dual-port Gigabit Ethernet provides increased network throughput and redundancy with efficient slot-saving integration.
- An available 5.25-inch drive bay supports either a half-high tape drive or an RDX Removable Disk Cartridge drive, for cost-effective data backup. A DVD-ROM drive is standard in a dedicated bay.
- Seven USB ports, two USB 3.0 on the front and four USB 2.0 on the back. In addition, there is one internal port for use with a tape drive or RDX Removable Disk Cartridge drive.

Availability and serviceability

The x3100 M5 provides many features to simplify serviceability and increase system uptime:

- ECC memory provides error correction that is not available in PC-class "servers" that use parity memory. Avoiding system crashes (and data loss) because of soft memory errors can mean greater system uptime.
- Tool-less cover removal provides easy access to upgrades and serviceable parts, such as CPU, memory, and adapters.
- Hot-swap drive bays that are available on some models combined with RAID capabilities offer the potential of no downtime in the event of a drive failure.

- The Predictive Failure Analysis (PFA) detects when system components (for example, processors, memory, and hard disk drives) operate outside of standard thresholds and generates pro-active alerts in advance of possible failure, therefore increasing uptime.
- Built-in Integrated Management Module Version II (IMM2) continuously monitors system health, triggers alerts, and performs recovering actions in case of failures to minimize downtime.
- Built-in diagnostic tests using Dynamic Systems Analysis (DSA) Preboot speeds up troubleshooting tasks to reduce service time.
- A DVD-ROM drive is standard in a dedicated bay for easy software installation.
- Redundant hot-swap power supports on some models helps keep the server always running
- One-year customer replaceable unit and onsite limited warranty, next business day 9x5. Optional service upgrades are available.

Manageability and security

Powerful systems management features simplify local and remote management of the x3100 M5:

- The server includes an Integrated Management Module II (IMM2) to monitor server availability and perform remote management (some features require optional license upgrades).
- 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 functions, such as digital signatures and remote attestation.
- Intel Xeon Processor E3-1200 v3 family supports Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- IBM Systems Director is included for proactive systems management. It offers comprehensive systems management tools that help to increase up-time, reduce costs, and improve productivity through advanced server management capabilities.
- The Intel Execute Disable Bit function can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.

Energy efficiency

The x3100 M5 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to a green environment:

- Energy-efficient planar components help lower operational costs.
- Available 350 W power supply, 300 W 80 PLUS Bronze certified power supply, or 430 W hot-swap 80 PLUS Silver certified power supply.
- With the addition of the Operating Temperature Enhancement Kit, the server supports the ASHRAE A3 standard, which means the server can operate in temperatures as high as 40°C. This means potential savings in environmental cooling costs.
- The Intel Xeon processor E3-1200 v3 product family offers significantly better performance over the previous generation while fitting into the same thermal design power (TDP) limits.
- Low-voltage Intel Xeon processors draw less energy to satisfy demands of power and thermally constrained data centers and telecommunication environments.
- The server uses hexagonal ventilation holes, a part of IBM Calibrated Vectored Cooling™ technology. Hexagonal holes can be grouped more densely than round holes, providing more efficient airflow through the system.

Locations of key components

The x3100 M5 is available in two different tower designs: a compact tower with a fixed power supply and simple-swap drive bays, or a standard tower with hot-swap power supplies and hot-swap drive bays. Figures 2 and 3 show the front and rear of the x3100 M5.

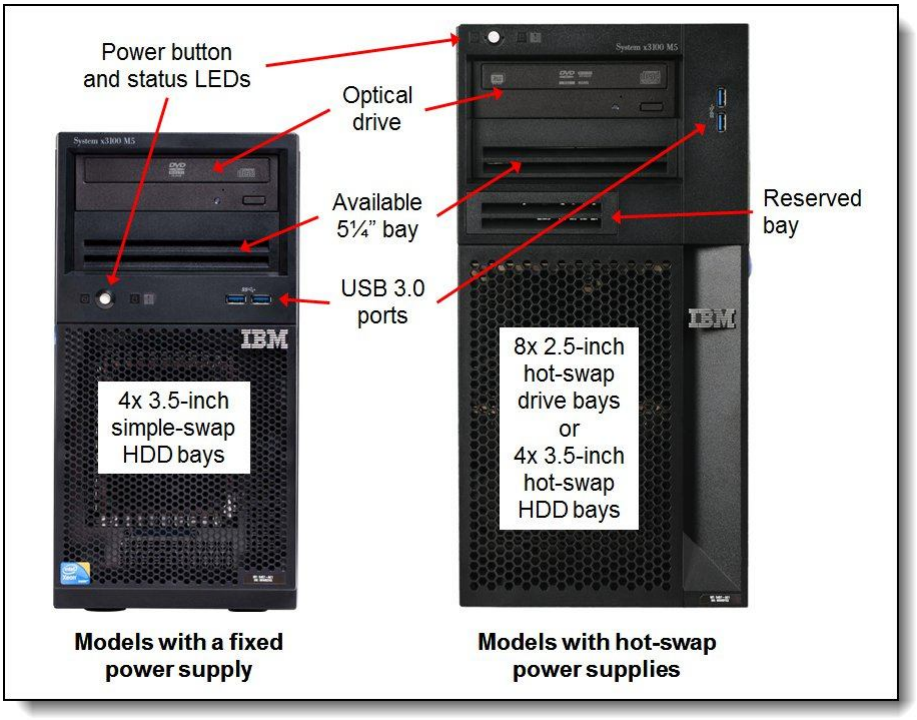

Figure 2. Front view of the System x3100 M5 - compact tower and standard tower

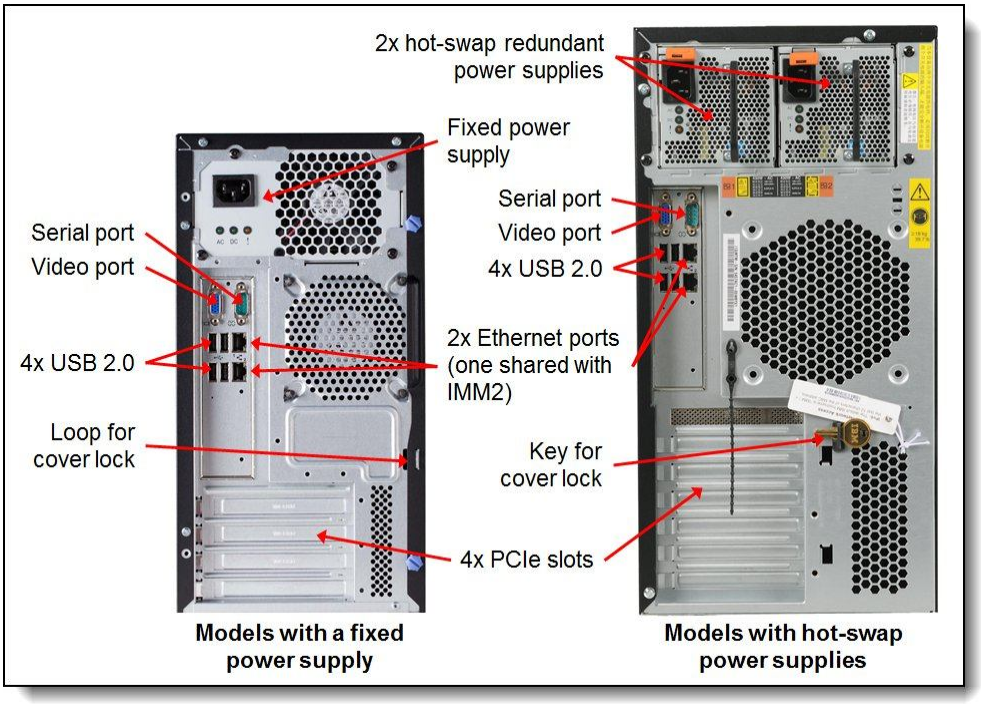

Figure 3. Rear view of the System x3100 M5 - compact tower and standard tower

Figures 4 and 5 show the locations of key components inside the server.

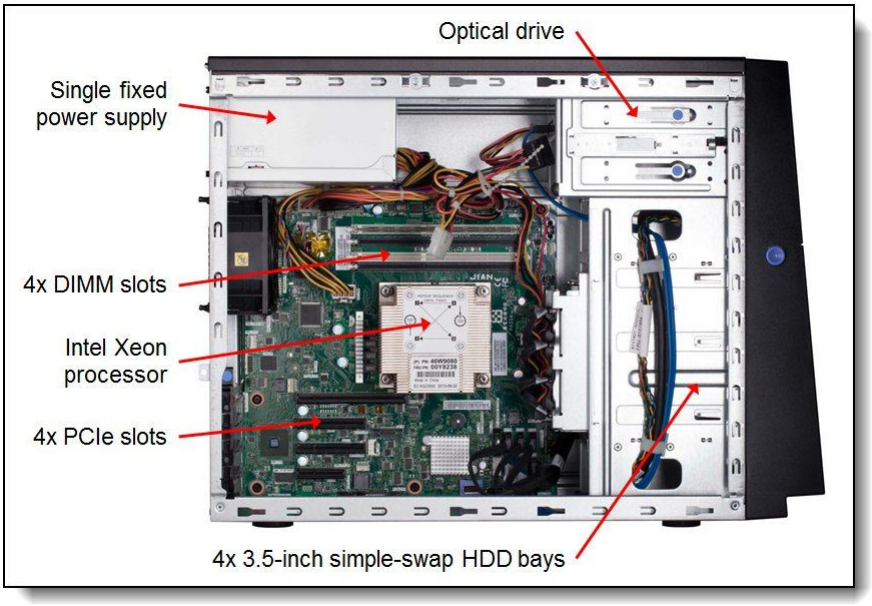

Figure 4. Inside view of System x3100 M5 - compact tower configuration

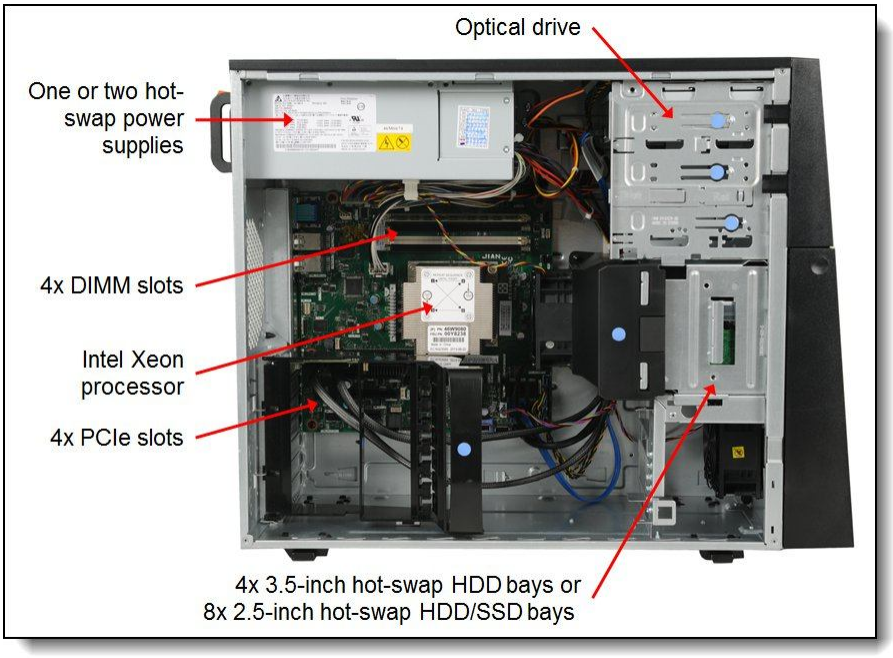

Figure 5. Inside view of System x3100 M5 - standard tower configuration

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications (part 1 of 2)

Components	Specification
Form factor	Two designs: ● Compact tower (can be a 4U rack form factor using the optional Tower-to-Rack Conversion Kit, 69Y5182). ● Standard Tower (can be a 5U rack form factor using the optional Tower-to-Rack Conversion Kit, 00J6353).
Processor	One Intel “Haswell” processor as listed in model table or available CTO: ● One 2-core Intel Celeron Processor 2.8 GHz and 1333 MHz memory. ● One 2-core Intel Pentium Processor up to 3.4 GHz and 1600 MHz memory. ● One 2-core Intel Core i3 Processor up to 3.7 GHz and 1600 MHz memory. ● One 2 or 4-core Intel Xeon E3-1200 v3 up to 3.7 GHz & 1600 MHz memory. Supports EM64T for 32-bit and 64-bit operating systems and applications.
L3 cache	Integrated in the processor: ● Up to 2 MB for Intel Celeron processors. ● Up to 3 MB L3 for Intel Pentium processors. ● Up to 4 MB L3 for Intel Core i3 processors. ● Up to 8 MB L3 for Intel Xeon E3-1200 v3 processors.
Chip set	Intel C222, formerly known as Intel Lynx Point PCH and Intel Denlow platform.
Memory DIMM slots	Four DDR3 DIMM slots supporting UDIMMs. RDIMMs are not supported.
Memory capacity	Up to 32 GB with 8 GB DDR3 UDIMMs and four populated DIMM slots.
Memory protection	ECC.
Disk drive bays	Compact tower: Up to four 3.5" simple-swap bays Standard tower: Up to four 3.5" hot-swap bays (HDDs) or eight 2.5" hot-swap bays (HDDs or SSDs)
Maximum internal storage	Compact tower: Up to 24 TB with 6 TB 3.5" simple-swap NL SATA HDDs. Standard tower: Up to 24 TB with 6 TB 3.5" hot-swap NL SATA HDDs or up to 8 TB with 1 TB 2.5" hot-swap NL SAS HDDs
RAID support	Software RAID 0, 1, or 10 with ServeRAID C100 controller, upgradeable to RAID 5. Optional hardware RAID with ServeRAID H1110 (RAID 0, 1, 1E, or 10) or M1115 (RAID 0, 1, 10, optional RAID 5, or 50) or M5110 (RAID 0, 1, 10, optional 5, 50, 6, or 60, and optional cache with flash backup). Additional upgrades for M5110. *For compact tower*: using the hardware RAID adapter also requires a RAID upgrade kit (00J6352).
Optical drive bays	One 5.25" HH bay, support for DVD-ROM or multiburner. Half-High SATA DVD-ROM or multiburner included in standard models (model specific).
Tape drive bays	One 5.25" HH bay, support for DDS, RDX, or LTO drive.
Network interfaces	Integrated two-port Gigabit Ethernet (Broadcom BCM5717). One port is shared with the IBM Integrated Management Module (IMM).
PCI expansion slots	Four PCI Express slots: ● Slot 1, PCIe 3.0 x16 (x8 wired), full-height, half-length. ● Slot 2, PCIe 3.0 x8 (x8 wired), full-height, half-length. ● Slot 2, PCIe 2.0 x8 (x4 wired), full-height, half-length. ● Slot 4, PCIe 2.0 x4 (x1 wired), full-height, half-length.

Table 1. Standard specifications (part 2 of 2)

Components	Specification
Ports	*Front*: Two USB 3.0 ports. *Rear*: Four USB 2.0, one DB-15 video, one DB-9 serial, two RJ-45 Gigabit Ethernet network ports (one dedicated and one shared with the IMM2 management processor). *Internal*: One USB 2.0 port for internal USB tape drive.
Cooling	*Compact tower*: Up to two speed-controlled non-redundant fans. A second fan is required if two or more adapters are installed (Thermal Solution Fan kit, 46W9177, optional). Optional Operating Temperature Enhancement Kit, 00Y8197, to enable the server to operate in a 40°C environment. *Standard tower*: Up to two speed-controlled non-redundant fans. A second fan is required if two or more adapters are installed (Thermal Solution Fan kit, 00Y8200, included in standard models). Optional Operating Temperature Enhancement Kit, 00FK940, to enable the server to operate in a 40°C environment.
Power supply	*Compact tower*: One fixed (non-hot-swap) power supply, model dependent: Either 300 W ac 80 PLUS Bronze power supply or 350 W ac power supply. *Standard tower*: Up to two 430 W hot-swap 80 PLUS Silver redundant power supplies.
Hot-swap parts	*Compact tower*: None. *Standard tower*: Disk drive bays and power supplies.
Systems management	UEFI, IBM Integrated Management Module II (IMM2), basic light path diagnostic tests, Automatic Server Restart, IBM Systems Director, and IBM ServerGuide. Optional IMM Advanced FoD Upgrade for remote presence (graphics, keyboard and mouse, and virtual media).
Video	Matrox G200eR2 with 16 MB memory that is integrated into the IMM2. Maximum resolution is 1600x1200 at 75 Hz with 16 M colors.
Security features	Power-on password, administrator password, and Trusted Platform Module.
Operating systems supported	Microsoft Windows Server 2008 R2, 2012, 2012 R2; Red Hat Enterprise Linux 5; SUSE Linux Enterprise Server 11; VMware ESX 5.1, 5.5; (no USB 3.0 support for RHEL 5.1 or VMware ESX 5.1, 5.5).
Limited warranty	One-year customer replaceable unit and onsite limited warranty with 9x5/ next-business-day (NBD) response time.
Service and support	Optional service upgrades available through IBM ServicePac® offerings: 24x7/NBD or four hours onsite repair, 1-year or 2-year warranty extension, remote technical support for IBM hardware and selected IBM and third-party (Microsoft, Linux, VMware) software.
Dimensions	Compact tower: Height: 360 mm (14.2"), width: 180 mm (7.1"), depth: 480 mm (18.9") Standard tower: Height: 439 mm (17.3"), width: 217 mm (8.6"), depth: 569 mm (22.4")
Weight	Compact tower: Minimum configuration: 10 kg (22.0 lb), maximum: 13 kg (28.7 lb) Standard tower: Minimum configuration: 19.6 kg (43 lb), maximum: 22 kg (48.5 lb)

The x3100 M5 servers are shipped with the following items:

- Statement of Limited Warranty.
- Important Notices.
- Documentation CD that contains the *Installation and Service Guide.*
- Country-specific models might have one or two country-specific power cord.

Standard models

The following table lists the standard models.

Table 2. Standard models

Model	Intel Processor* (one maximum)	Memory	RAID controller	Disk bays	Disks	Network	Optical	Power supply	Fans
Compact tower form factor - simple-swap drives and fixed power supply									
5457-A3x	Pentium G3440 3.3GHz 3MB 1600MHz 2C (54W)	1x 4 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	Open	2x GbE	DVD	1x 350W fixed	1 / 2
5457-B3x	Xeon E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	1x 4 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	Open	2x GbE	DVD	1x 350W fixed	1 / 2
5457-C3x	Xeon E3-1231 v3 3.4GHz 8MB 1600MHz 4C (80W)	1x 4 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	Open	2x GbE	DVD	1x 300W fixed	1 / 2
Standard tower form factor - hot-swap drives and power supplies									
5457-C5x	Xeon E3-1231 v3 3.4GHz 8MB 1600MHz 4C (80W)	1x 4 GB 1600 MHz	ServeRAID H1110	4x 3.5" HS	Open	2x GbE	Multi-burner	1x 430W hot-swap	2 / 2
5457-F3x	Xeon E3-1271 v3 3.6GHz 8MB 1600MHz 4C (80W)	1x 4 GB 1600 MHz	ServeRAID M1115	8x 2.5” HS	Open	2x GbE	Multi-burner	1x 430W hot-swap	2 / 2

* Processor detail: Processor quantity, processor model, core speed, number of cores, L3 cache, memory speed, and thermal design power (TDP) rating

Express models

Express models are preconfigured with additional components, such as processors, memory, and disks with the purpose of making the ordering and installation process simpler. The following table lists the Express models that are available in certain regions.

Table 3. Express models

Model	Intel Processor* (one maximum)	Memory	RAID controller	Disk bays	Disks	Network	Optical	Power supply	Fans
Compact tower form factor - simple-swap drives and fixed power supply									
5457-EAx	Core i3 4150 3.5GHz 3MB 1600MHz 2C (54W)	1x 4 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	1x 1TB NL SATA	2x GbE	DVD	1x 350W fixed	1 / 2
5457-EBx	Xeon E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	2x 8 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	Open	2x GbE	Multi-burner	1x 350W fixed	1 / 2
5457-ECx	Xeon E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	1x 8 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	1x 1TB NL SATA	2x GbE	Multi-burner	1x 350W fixed	1 / 2
5457-EDx	Xeon E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	1x 8 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	2x 1TB NL SATA	2x GbE	Multi-burner	1x 350W fixed	1 / 2
5457-EFx	Xeon E3-1231 v3 3.4GHz 8MB 1600MHz 4C (80W)	1x 8 GB 1600 MHz	ServeRAID C100	4x 3.5" SS	Open	2x GbE	Multi-burner	1x 350W fixed	1 / 2
Standard tower form factor - hot-swap drives and power supplies									
5457-EEx	Xeon E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	1x 8 GB 1600 MHz	ServeRAID H1110	8x 2.5” HS	Open	2x GbE	Multi-burner	1x 430W hot-swap	2 / 2
5457-EGx	Xeon E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	1x 8 GB 1600 MHz	ServeRAID M1115	8x 2.5” HS	1x 300GB 10K SAS	2x GbE	Multi-burner	1x 430W hot-swap	2 / 2
5457-EHx	Xeon E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	1x 8 GB 1600 MHz	ServeRAID M1115	8x 2.5” HS	Open	2x GbE	Multi-burner	2x 430W hot-swap	2 / 2
5457-EJx	Xeon E3-1271 v3 3.6GHz 8MB 1600MHz 4C (80W)	1x 8 GB 1600 MHz	ServeRAID M1115	8x 2.5” HS	Open	2x GbE	Multi-burner	1x 430W hot-swap	2 / 2
5457-EKx	Xeon E3-1271 v3 3.6GHz 8MB 1600MHz 4C (80W)	2x 8 GB 1600 MHz	ServeRAID M5110†	8x 2.5” HS	Open	2x GbE	Multi-burner	2x 430W hot-swap	2 / 2

* Processor detail: Processor quantity, processor model, core speed, number of cores, L3 cache, memory speed, and thermal design power (TDP) rating

† Model EKx includes ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade for IBM System x® (81Y4487) and System x3100 Hardware RAID Remote Battery/Cap Mechanical kit (00J6455)

Processor options

The server supports only one processor, which is already installed in all standard and Express models. No additional processor options are available. The following table lists all processors that are available in standard models of x3100 M5 or through configure-to-order (CTO). If there is no corresponding *where-used* model for a particular processor, then that processor is only available through the CTO process or special bid.

Table 4. Processor options

Feature code*	Description**	Standard models where used
A58S	Intel Celeron Processor G1840 2.8GHz 2MB 1333MHz 2C (53W)	-
A58D	Intel Core i3 Processor 4150 3.5GHz 3MB 1600MHz 2C (54W)	EAx
A58E	Intel Core i3 Processor 4150T 3.0GHz 3MB 1600MHz 2C (35W)	-
A58C	Intel Core i3 Processor 4350 3.6GHz 4MB 1600MHz 2C (54W)	-
A58B	Intel Core i3 Processor 4360 3.7GHz 4MB 1600MHz 2C (54W)	-
A58R	Intel Pentium Processor G3220 3.0GHz 3MB 1333MHz 2C (53W)	-
A58G	Intel Pentium Processor G3240 3.1GHz 3MB 1333MHz 2C (53W)	-
A58H	Intel Pentium Processor G3240T 2.7GHz 3MB 1333MHz 2C (35W)	-
A58J	Intel Pentium Processor G3440 3.3GHz 3MB 1600MHz 2C (53W)	A3x
A58F	Intel Pentium Processor G3450 3.4GHz 3MB 1600MHz 2C (53W)	-
A3QT	Intel Xeon Processor E3-1220 v3 3.1GHz 8MB 1600MHz 4C (80W)	B3x, EBx, ECx, EDx, EEx, EGx, EHx
A4VZ	Intel Xeon Processor E3-1220L v3 1.1GHz 4MB 1600MHz 2C (13W)	-
A58K	Intel Xeon Processor E3-1231 v3 3.4GHz 8MB 1600MHz 4C (80W)	C3x, C5x, EFx
A58Q	Intel Xeon Processor E3-1240L v3 2.0GHz 8MB 1600MHz 4C (25W)	-
A58L	Intel Xeon Processor E3-1241 v3 3.5GHz 8MB 1600MHz 4C (80W)	-
A58M	Intel Xeon Processor E3-1271 v3 3.6GHz 8MB 1600MHz 4C (80W)	EJx, EKx, F3x
A58P	Intel Xeon Processor E3-1275L v3 2.7GHz 8MB 1600MHz 4C (45W)	-
A58N	Intel Xeon Processor E3-1281 v3 3.7GHz 8MB 1600MHz 4C (82W)	-

* No additional processor options are available. The server supports only one processor, which is already included in a standard or custom configuration.
** Processor detail: Processor model, core speed, L3 cache, memory speed, number of cores, and thermal design power (TDP) rating

Memory options

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.

The x3100 M5 has four DIMM slots, and only DDR3 ECC UDIMMs are supported. The CPU has two memory channels, and there are two DIMMs per channel.

Configuration rules: If you plan to install more than one DIMM, then the DIMMs must be installed in a pair, and both DIMMs in a pair must be identical in type and size.

The following table lists the memory options that are supported by the server.

Table 5. Memory options

Part number	Feature code	Description	Maximum supported	Standard models where used
00D5012	A3QB	4GB (1x4GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	4	A3x, B3x, C3x, C5x, EAx, F3x
00D5016	A3QC	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	4	All other models

Internal drives

Models of the x3100 M5 with the compact tower form factor (and either a 300 W or a 350 W fixed power supply) support up to four 3.5-inch simple-swap SATA hard disk drives, as shown in the following figure.

Figure 6. Simple-swap drive bays of the compact tower models (accessible with the front bezel removed)

The following table lists the supported 3.5-inch hard disk drive options.

For information about 512e Advanced Format drives, see the IBM Redpaper, *Advanced Format HDD Technology Overview*, available from:
http://www.redbooks.ibm.com/abstracts/redp5119.html?Open

Table 6. Simple-swap 3.5-inch SATA disk drive options

Part number	Feature code	Description	Maximum supported
512e Advanced Format drives			
00FN118	A5VE	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS 512e HDD	4
00FN133	A5VG	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS 512e HDD	4
00FN148	A5VJ	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2SS 512e HDD	4
00FN163	A5VL	IBM 5TB 7.2K 6Gbps NL SATA 3.5" G2SS 512e HDD	4
00FN178	A5VN	IBM 6TB 7.2K 6Gbps NL SATA 3.5" G2SS 512e HDD	4
512-byte sector drives			
81Y9802	A22U	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	4
81Y9806	A22X	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	4
81Y9810	A22W	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	4
81Y9814	A22V	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	4

Models of the x3100 M5 using the standard tower chassis (and with hot-swap 430 W power supplies) support either up to eight 2.5-inch hot-swap drives or four 3.5-inch hot-swap drives, as shown in the following figure.

Figure 7. Hot-swap drives that are supported in standard tower models with hot-swap power supplies (front bezel removed) - 4x 3.5-inch (left) or 8x 2.5-inch (right)

The following table lists the supported 2.5-inch drive options. Hot-swap SATA HDDs and hot-swap SAS HDDs can be intermixed, but not in the same array. Hot-swap HDDs cannot be intermixed with simple-swap HDDs.

Table 7. 2.5-inch hot-swap disk drive options

Part number	Feature code	Description	Maximum supported
2.5-inch 10K SAS HDDs			
90Y8877	A2XC	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	8
90Y8872	A2XD	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	8
81Y9650	A282	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	8
2.5-inch 15K SAS HDDs			
90Y8926	A2XB	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	8
81Y9670	A283	IBM 300GB 15K 6Gbps SAS 2.5" G2HS HDD	8
2.5-inch SAS self-encrypting drives (SEDs)			
90Y8908	A3EF	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	8
81Y9662	A3EG	IBM 900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	8
2.5-inch NL SAS HDDs			
90Y8953	A2XE	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	8
81Y9690	A1P3	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	8
2.5-inch NL SATA HDDs			
81Y9722	A1NX	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	8
81Y9726	A1NZ	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	8
81Y9730	A1AV	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	8
2.5-inch Enterprise Value SSDs			
00FN298	AS0D	IBM 240GB SATA 2.5" MLC HS Entry SSD	8
00FN327	AS0E	IBM 480GB SATA 2.5" MLC HS Entry SSD	8
00FN332	AS0F	IBM 960GB SATA 2.5" MLC HS Entry SSD	8
90Y8643	A2U3	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	8
90Y8648	A2U4	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	8

The following table lists the supported 3.5-inch hot-swap drives.

Table 8. 3.5-inch hot-swap disk drive options

Part number	Feature code	Description	Maximum supported
3.5-inch 15K SAS HDDs - 512-byte sector drives			
49Y6092	A3DV	IBM 300GB 15K 6Gbps SAS 3.5" G2HS HDD	4
49Y6097	A3DW	IBM 450GB 15K 6Gbps SAS 3.5" G2HS HDD	4
49Y6102	A3DX	IBM 600GB 15K 6Gbps SAS 3.5" G2HS HDD	4
3.5-inch NL SATA HDDs - 512-byte sector drives			
81Y9786	A22Y	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	4
81Y9790	A22P	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	4
81Y9794	A22T	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	4
81Y9798	A22S	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	4
49Y6002	A3W9	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	4
3.5-inch NL SATA HDDs - 512e Advanced Format drives			
00FN113	A5VD	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	4
00FN128	A5VF	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	4
00FN143	A5VH	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	4
00FN158	A5VK	IBM 5TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	4
00FN173	A5VM	IBM 6TB 7.2K 6Gbps NL SATA 3.5" G2HS 512e HDD	4

Controllers for internal storage

The Integrated ServeRAID C100 disk controller offers RAID 0, 1, and 10 standard. The ServeRAID C100 is an integrated SATA controller with software RAID capabilities. It is a cost-effective way to provide reliability, performance, and fault-tolerant disk subsystem management to help safeguard your valuable data and enhance availability. The ServeRAID C100 has the following specifications:

- Supports RAID levels 0, 1, and 10
- Onboard SATA controller with software RAID capabilities
- Supports 3 Gbps SATA ports
- Support for up to two virtual drives
- Support for virtual drive sizes greater than 2 TB
- Fixed stripe unit size of 64 KB
- Support for MegaRAID Storage Manager management software

The following table lists the RAID controller and internal HBAs that are supported by the server.

Table 9. RAID controllers and HBAs for internal storage

Part number	Feature code	Description	Maximum supported	Standard models where used
Integrated	None	ServeRAID C100 for System x	1	All other models
81Y4492	A1XL	ServeRAID H1110 SAS/SATA Controller	1	C5x, EEx
81Y4448	A1MZ	ServeRAID M1115 SAS/SATA Controller	1	F3x, EGx, EHx, EJx
81Y4481	A347	ServeRAID M5110 SAS/SATA Controller	1	EKx
46C8988	A3MW	N2115 SAS/SATA HBA for IBM System x	1	-
46M0907	5982	IBM 6Gb SAS HBA	1	-

The following table lists the supported upgrades to the internal RAID controllers and HBAs.

Table 10. Upgrades for internal storage controllers

Part number	Feature code	Description	Maximum supported	Standard models where used
Upgrades for the ServeRAID C100				
81Y4406	A17U	ServeRAID C100 Series RAID 5 Upgrade for IBM System x-FoD	1	-
Upgrades for the ServeRAID M1115 SAS/SATA Controller				
81Y4542	A1X1	ServeRAID M1100 Series Zero Cache/RAID 5 Upgrade for IBM System x	1	-
Upgrades for the ServeRAID M5110 SAS/SATA Controller				
81Y4508	A22E	ServeRAID M5100 Series Battery Kit** (Supported only with 512MB cache option, 81Y4484)	1	-
81Y4544	A1X2	ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade for IBM System x	1	-
81Y4484	A1J3	ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade for IBM System x	1	-
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade for IBM System x**	1	EKx
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade for IBM System x**	1	-
81Y4546	A1X3	ServeRAID M5100 Series RAID 6 Upgrade for IBM System x	1*	-
90Y4273	A2MC	ServeRAID M5100 Series SSD Performance Key for IBM System x	1*	-
90Y4318	A2MD	ServeRAID M5100 Series SSD Caching Enabler for IBM System x	1*	-

* A cache option (81Y4484, 81Y4487, or 81Y4559) must be selected.
** For the standard tower chassis only (hot-swap power supplies). Not supported in the compact tower chassis.

The following table lists chassis upgrades for RAID controllers.

Table 11. Chassis upgrades

Part number	Feature code	Description	Maximum supported	Standard models where used
00J6352	A49A	System x3100 3.5" Simple Swap HDD Hardware RAID upgrade kit For the compact tower chassis only (fixed power supply) to enable support of RAID controllers; if selected then one of the following controllers is required: ServeRAID M1115, ServeRAID H1110, or N2115 HBA. Not supported the standard tower chassis.	1	-
00J6455	A3SE	System x3100 Hardware RAID Remote Battery/Cap Mechanical kit For the standard tower chassis only (hot-swap power supplies) to provide a housing for a battery or flash backup unit; required if the battery upgrade (81Y4508) or a flash upgrade is selected. Not supported in the compact tower chassis.	1	EKx

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 backup units

The server supports the internal tape drive options that are listed in the following table. Internal tape drives are installed in a 5.25-inch HH bay. A maximum of one tape drive is supported. SAS tape drives require an internal SAS HBA to be installed in server. USB tape drives are connected to the dedicated USB tape drive connector on the system board.

Table 12. Internal tape drives

Part number	Feature code	Description	Maximum supported
44E8895	5397	IBM Half High LTO Gen 4 SAS Tape Drive*	1
49Y9898	5345	IBM Half High LTO Gen 5 SAS Tape 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

* Requires N2115 SAS/SATA HBA for IBM System x (46C8988) or IBM 6Gb SAS HBA (46M0907)

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 13. Optical drives

Part number	Feature code	Description	Maximum supported	Standard models where used
None*	4154	Half-High SATA DVD-ROM	1	A3x, B3x, C3x, EAx
81Y6404	4155	Half-High SATA Multi-Burner	1	All other models

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

The 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

The Half-High SATA Multi-Burner 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 offers four PCI Express expansion slots. The form-factors of available slots are as follows. This applies to both the compact tower chassis and the standard tower chassis.

- Slot 1, PCIe 3.0 x16 (x8 wired), full-height, half-length
- Slot 2, PCIe 3.0 x8 (x8 wired), full-height, half-length
- Slot 3, PCIe 2.0 x8 (x4 wired), full-height, half-length
- Slot 4, PCIe 2.0 x4 (x1 wired), full-height, half-length

Network adapters

The x3100 M5 offers two integrated Gigabit Ethernet ports. One port is shared with Integrated Management Module II (IMM2), implementing Network Controller-Sideband Interface (NC-SI).

The integrated NICs have the following features:

- Broadcom BCM5717 chip
- TCP/IP Offload Engine (TOE) support
- Wake on LAN support
- Receive side Scaling (RSS) and Transmit side Scaling (TSS) support
- MSI and MSI-X capability- up to five MSI-X vectors
- VLAN tag support (IEEE 802.1Q)
- Layer 2 priority encoding (IEEE 802.1p)
- Link aggregation (IEEE 802.3ad) and Full-duplex flow control (IEEE 802.3x)
- IP, TCP, and UDP checksum offload (hardware based) on Tx/Rx over IPv4/IPv6
- Hardware TCP segmentation offload over IPv4/IPv6
- Jumbo frame support
- NIC Teaming (Load Balancing and Failover)

The following table lists additional supported network adapters.

Table 14. Network adapters

Part number	Feature code	Description	Maximum supported
Gigabit Ethernet			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x	2
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x	3
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x	3
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x	3
00AG500	A56K	Intel I350-F1 1xGbE Fiber Adapter for IBM System x	4
00AG510	A56L	Intel I350-T2 2xGbE BaseT Adapter for IBM System x	4
00AG520	A56M	Intel I350-T4 4xGbE BaseT Adapter for IBM System x	4
42C1750	2975	PRO/1000 PF Server Adapter	3
10 Gigabit Ethernet			
49Y7910	A18Y	Broadcom NetXtreme II Dual Port 10GBaseT Adapter for IBM System x	3
00D8540	A4XH	Emulex Dual Port 10GbE SFP+ VFA IIIr for IBM System x*	3
95Y3760	A2U2	Emulex VFA III/IIIr FCoE/iSCSI License for IBM System x (FoD) (FCoE upgrade license for 00D8540)	License
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x*	3
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x	3
00D9690	A3PM	Mellanox ConnectX-3 10 GbE Adapter for IBM System x*	3
90Y4600	A3MR	QLogic 8200 Dual Port 10GbE SFP+ VFA for IBM System x*	3
00Y5624	A3MT	QLogic 8200 VFA FCoE/iSCSI License for IBM System x (FoD) (FCoE upgrade license for 90Y4600)	License

* Require SFP+ optical transceivers or DAC cables that must be purchased separately.

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 host bus adapters (HBAs) supported by x3100 M5 server.

Table 15. Storage adapters

Part number	Feature code	Description	Maximum supported
Fibre Channel - 16 Gb			
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x	3
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x	3
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x	3
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x	3
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x	3
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x	3
Fibre Channel - 8 Gb			
42D0485	3580	Emulex 8 Gb FC Single-port HBA for IBM System x	3
42D0494	3581	Emulex 8 Gb FC Dual-port HBA for IBM System x	3
42D0501	3578	QLogic 8 Gb FC Single-port HBA for IBM System x	3
42D0510	3579	QLogic 8 Gb FC Dual-port HBA for IBM System x	3
46M6049	3589	Brocade 8 Gb FC Single-port HBA for IBM System x	3
46M6050	3591	Brocade 8 Gb FC Dual-port HBA for IBM System x	3
SAS			
46C9010	A3MV	N2125 SAS/SATA HBA for IBM System x	3
46M0907	5982	IBM 6 Gb SAS HBA Controller	3

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 does not support High IOPS SSD adapters.

Power supplies

Compact tower models either come with a single fixed 350 W ac power supply or a single fixed 80 PLUS Bronze 300 W ac power supply. There are no additional power supply options.

Standard tower models offer one or two hot-swap 430 W ac power supplies, which are 80 PLUS Silver certified. For models with only one power supply, the part number to order a second power supply is listed in the following table. Two power supplies that are installed form a redundant pair.

Table 16. Hot-swap power supply option

Part number	Feature code	Description	Maximum supported
00D3821	A2Z0	430W Redundant Power Supply	1

Fans and cooling

Both the compact tower design (with a single fixed power supply) and the standard tower design (with hot-swap power supplies) come with one or two speed-controlled non-redundant fans, model dependent (see Table 2). The second fan is required if two or more adapters are installed, and the fan is configured by selecting the appropriate Thermal Solution Fan Kit, as listed in the following table.

If you want to operate the server in an environment up to 40°C (104°F), use the optional Operating Temperature Enhancement Kit that is listed in the table. This kit contains an additional thermal sensor.

Table 17. Cooling options

Part number	Feature code	Description	Maximum supported
For compact tower systems (with a fixed power supply)			
46W9177	A3SF	System x3100 Thermal Solution Fan kit for 4U Tower	1
00Y8197	A49B	System x3100 Operating Temperature Enhancement Kit for 4U Tower	1
For standard tower systems (with hot-swap power supplies)			
00Y8200	A49D	System x3100 Thermal Solution Fan kit for 5U Tower	1
00FK940	A49C	System x3100 Operating Temperature Enhancement Kit for 5U Tower	1

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 18. Hot-swap power supply option

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1
41Y8385	A584	IBM USB Memory Key for VMware ESXi 5.5	1

Remote management

The server contains IBM 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 IBM 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 19. Remote management option

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

Supported operating systems

The server supports the following operating systems:

- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)

For the latest information about the specific versions and service levels that are 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

Dimensions and weight - compact tower systems with a fixed power supply:

- Height: 360 mm (14.2 in.)
- Width: 180 mm (7.1 in.)
- Depth: 480 mm (18.9 in.)
- Weight:
  - Minimum ship configuration: 10 kg (22.0 lb)
  - Maximum ship configuration: 13 kg (28.7 lb)

Dimensions and weight - standard tower systems with redundant hot-swap power supplies:

- Height: 439 mm (17.3 in.)
- Width: 217 mm (8.6 in.)
- Depth: 569 mm (22.4 in.)
- Weight
  - Minimum ship configuration: 19.6 kg (43 lb)
  - Maximum ship configuration: 22.0 kg (48.5 lb)

Supported environment:

- Temperature
  - Server on
    - 10.0° to 35.0° C (50° to 95° F); altitude: 0 to 914.4 m (3,000 ft)
    - 10.0° to 32.0° C (50° to 89.6° F); altitude: 914.4 m (3,000 ft) to 2,133.6 m (7,000 ft)
    - Supports up to 40° C (104° F) when the Operating Temperature Enhancement Kit is installed
  - Server off
    - 10.0° to 43.0° C (50° to 109.4° F); maximum altitude: 2,133.6 m (7,000 ft)
  - Shipping
    - -40° to 60° C (-40° to 140° F)
- Relative humidity: 8 to 80%
- Maximum altitude: 2,133.6 m (7,000 ft)

Electrical:

430 watt power supply:

- 100 - 127 (nominal) V ac; 50 - 60 Hz; 6.0 A (maximum)
- 200 - 240 (nominal) V ac; 50 - 60 Hz; 3.0 A (maximum)
- Input kilovolt-amperes (kVA) (approximately)
  - Minimum configuration: 0.100 kVA
  - Maximum configuration: 0.506 kVA

350 watt power supply:

- 100 - 127 (nominal) V ac; 50 - 60 Hz; 7.0 A (maximum)
- 200 - 240 (nominal) V ac; 50 - 60 Hz; 3.5 A (maximum)
- Input kilovolt-amperes:
  - Minimum configuration: 0.035 kVA
  - Maximum configuration: 0.350 kVA

300 watt power supply:

- 100 - 127 (nominal) V ac; 50 - 60 Hz; 7.0 A (maximum)
- 200 - 240 (nominal) V ac; 50 - 60 Hz; 3.5 A (maximum)
- Input kilovolt-amperes:
  - Minimum configuration: 0.035 kVA
  - Maximum configuration: 0.350 kVA

Environmental data:

- BTU output
  - Ship configuration: 341 Btu/hr (100 watts)
  - Full configuration: 1726 Btu/hr (506 watts)
- Noise level
  - Model with fixed power supply: 5.0 bels (idle), 5.0 bels (operating)
  - Model with hot-swap power supply: 5.0 bels (idle), 5.0 bels (operating)

Warranty options

The x3100 M5 has a 1-year onsite warranty with 9x5/NBD terms. IBM offers warranty service upgrades through IBM ServicePac offerings. The IBM ServicePac is 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. 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

In general, the types of IBM ServicePac offerings are:

- Warranty and maintenance service upgrades
  - One, 2, 3, 4, or 5 years of 9x5 or 24x7 service coverage
  - Onsite repair from next business day to 4 or 2 hours (selected areas)
  - One or two years of warranty extension
- Remote technical support services
  - One or three years with 24x7 coverage (severity 1) or 9x5/NBD 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

The following table explains warranty service definitions in more detail.

Table 20. Warranty service definitions

Term	Description
IBM onsite repair (IOR)	A service technician comes to the server's location for equipment repair.
24x7x2 hour	A service technician is scheduled to arrive at your customer's location within two hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
24x7x4 hour	A service technician is scheduled to arrive at your customer's location within four hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
9x5x4 hour	A service technician is scheduled to arrive at your customer's location within four business hours after remote problem determination is completed. We provide service from 8:00 a.m. - 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays. If after 1:00 p.m. it is determined that onsite 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 arrives by the end of the following business day.
9x5 next business day	A service technician is scheduled to arrive at your customer's location on the business day after we receive your call, following remote problem determination. We provide service from 8:00 a.m. - 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

Regulatory compliance

The server conforms to the following international standards:

- ASHRAE A3
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES003, issue 5, 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; AS/NZS 60950.1
- IEC-60950-1 (CB Certificate and CB Test Report)
- China CCC GB4943.1, GB9254 Class A, and GB17625.1
- Taiwan BSMI CNS13438, Class A); CNS14336-1
- Korea KN22, Class A; KN24
- Russia, Belorussia and Kazakhstan, TR CU 020/2011 (for EMC) and TR CU004/2011 (for safety)
- IEC 60950-1 (CB Certificate and CB Test Report)
- 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)

External disk storage expansion

The x3100 M5 supports attachment to external storage expansion enclosures, such as the EXP2500 series, by using either the ServeRAID M5225 or ServeRAID M5120 RAID controllers. The server can also be attached to supported external storage systems, such as the IBM System Storage® DS3500 series, by using a supported HBA.

Table 21. RAID controllers and options for external disk storage expansion

Part number	Feature code	Description	Maximum supported
00AE938	A5ND	ServeRAID M5225-2GB SAS/SATA Controller for IBM System x	1
81Y4478	A1WX	ServeRAID M5120 SAS/SATA Controller	3
Hardware upgrades for the M5120			
81Y4508	A22E	ServeRAID M5100 Series Battery Kit** (Supported only with 512MB cache option, 81Y4484)	1*
00J6455	A3SE	System x3100 Hardware RAID Remote Battery/Cap Mechanical kit**	1
81Y4484	A1J3	ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade	3
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade**	1
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade**	1
Feature on Demand upgrades for the M5120			
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†
Feature on Demand upgrades for the M5225			
47C8706	A3Z5	ServeRAID M5200 Series RAID 6 Upgrade for IBM Systems-FoD	1
47C8710	A3Z7	ServeRAID M5200 Series Performance Accelerator for IBM Systems-FoD	1
47C8712	A3Z8	ServeRAID M5200 Series SSD Caching Enabler for IBM Systems-FoD	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 cache upgrade (either 81Y4484, 81Y4487, or 81Y4559).
** For the standard tower chassis only (hot-swap power supplies). Not supported in the compact tower chassis.

The ServeRAID M5225-2GB SAS/SATA Controller has the following specifications:

- Eight external 12 Gbps SAS/SATA ports
- Two external x4 mini-SAS HD connectors (SFF-8643)
- Supports RAID levels 0, 1, 10, 5, 50 standard
- Optional support for RAID 6 and 60 with the M5200 Series RAID 6 Upgrade
- 2 GB flash-backed cache standard
- PCIe x8 3.0 host interface
- Based on the LSI SAS3108 12 Gbps ROC 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)
- 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 or 1 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 IBM Redbooks Product Guide *ServeRAID M5120 SAS/SATA Controller for IBM System x* at:
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 22. IBM System Storage external expansion enclosures

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

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 23. External SAS cables for external storage expansion enclosures

Part number	Feature code	Description	Quantity supported per one enclosure
Cables for use with M5120 controller			
39R6531	3707	IBM 3 m SAS Cable	1
39R6529	3708	IBM 1 m SAS Cable	1
Cables for use with M5225 controller			
00Y2459		0.6m SAS Cable (mSAS HD to mSAS)	1
00Y2461		1.5m SAS Cable (mSAS HD to mSAS)	1
00Y2463		3m SAS Cable (mSAS HD to mSAS)	1
90Y7682		6m SAS Cable (mSAS HD to mSAS)	1

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

Table 24. Drive options for EXP2512 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
3.5" 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
46W0975	4TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
3.5" 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 EXP2524 external expansion enclosures.

Table 25. Drive options for EXP2524 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
2.5" 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" SAS HS HDDs		
49Y1896	146GB 15,000 rpm 6Gb SAS 2.5" HDD	24
81Y9944	300GB 15,000 rpm 6Gb SAS 2.5" HDD	24
00W1595	600GB 10,000 rpm 6Gb SAS 2.5" HDD	24
46W0970	900GB 10,000 rpm 6Gb SAS 2.5" HDD	24
46W0980	1.2TB 10,000 rpm 6Gb SAS 2.5" HDD	24
2.5" SAS HS SSDs		
49Y6072	200GB 6Gb SAS 2.5" SSD	24
49Y6077	400GB 6Gb SAS 2.5" 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 System x sales channel. The server may support other IBM disk systems that are not listed in this table.

For more information, see the IBM System Storage Interoperability Center at http://www.ibm.com/systems/support/storage/ssic.

Table 26. 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 27. External backup options

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 that are supported by external tape enclosures	
46C5364	IBM RDX Removable Hard Disk Storage System - Internal USB 160 GB Bundle
46C5387	IBM RDX Removable Hard Disk Storage System - Internal USB 320 GB Bundle
46C5388	IBM RDX Removable Hard Disk Storage System - Internal USB 500 GB Bundle
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
00D8924	IBM Half High LTO Ultrium Gen 6 Internal SAS Tape Drive
External backup units*	
362516X	IBM RDX Removable Hard Disk Storage System - External USB 160 GB Bundle
362532X	IBM RDX Removable Hard Disk Storage System - External USB 320 GB Bundle
362550X	IBM RDX Removable Hard Disk Storage System - External USB 500 GB Bundle

* Note: The external tape drives that are listed can be ordered through System x sales channel. The server may support other IBM tape drives that are not listed in this table. For more information, see the IBM System Storage Interoperability Center.

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 28. IBM System Networking - Top-of-rack switches

Part number	Description
IBM System Networking - 1 Gb top-of-rack switches	
7309BAX	IBM System Networking RackSwitch G7028
0446013	IBM System Networking RackSwitch G8000R
7309CFC	IBM System Networking RackSwitch G8000F
7309G52	IBM System Networking RackSwitch G8052R
730952F	IBM System Networking RackSwitch G8052F
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)
7309BR6	IBM System Networking RackSwitch G8124ER
7309BF7	IBM System Networking RackSwitch G8124EF
7309G64	IBM System Networking RackSwitch G8264R
730964F	IBM System Networking RackSwitch G8264F
7309CR9	IBM System Networking RackSwitch G8264TR
7309CF9	IBM System Networking RackSwitch G8264TF
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 29. 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 (100 V/120 V)
53953JX	IBM 3000VA LCD 3U Rack UPS (200 V/208 V)
53956AX	IBM 6000VA LCD 4U Rack UPS (200 V/208 V)
53956KX	IBM 6000VA LCD 4U Rack UPS (230 V)

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 30. Power distribution units (part 1 of 2)

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 power cord
39Y8941	DPI Single Phase C13 Enterprise PDU without power cord
39Y8948	DPI Single Phase C19 Enterprise PDU without power cord
Front-End PDUs	
39Y8934	DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd connector
39Y8935	DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd connector
39Y8938	30amp/125V Front-end PDU with NEMA L5-30P connector
39Y8939	30amp/250V Front-end PDU with NEMA L6-30P connector
39Y8940	60amp/250V Front-end PDU with IEC 309 60A 2P+N+Gnd connector

Table 30. Power distribution units (part 2 of 2)

Part number	Description
Universal PDUs	
39Y8951	DPI Universal Rack PDU w/ US LV and HV power cords
39Y8952	DPI Universal Rack PDU w/ CEE7-VII Europe LC
39Y8953	DPI Universal Rack PDU w/ Denmark LC
39Y8954	DPI Universal Rack PDU w/ Israel LC
39Y8955	DPI Universal Rack PDU w/Italy LC
39Y8956	DPI Universal Rack PDU w/South Africa LC
39Y8957	DPI Universal Rack PDU w/UK LC
39Y8958	DPI Universal Rack PDU with AS/NZ LC
39Y8959	DPI Universal Rack PDU w/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

Racks cabinets

The server supports the rack cabinets that are listed in the following table. One of the tower-to-rack conversion kits is required for the server to be installed in the rack.

Table 31. Rack cabinets

Part number	Description
00J6353	Tower to 5U Rack Conversion Kit for IBM System x3100 M5 (for systems with hot-swap power supplies)
69Y5182	Tower to 4U Rack Conversion Kit for IBM System x3100 M5 (for systems with fixed power supplies)
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

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

Rack options

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

Table 32. 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)

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

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- IBM System x3100 M5 product page
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