IBM System x3650 M3
Product Guide (withdrawn product)

The IBM® System x3650 M3 provides outstanding performance for your mission-critical applications. Its energy-efficient design supports more cores, memory, and data capacity in a scalable 2U package that is easy to service and manage. With more computing power per watt and the latest Intel Xeon processors, you can reduce costs while maintaining speed and availability.

Suggested uses: customers requiring a highly available, energy-efficient, rack-optimized solution for physical and virtual intensive commercial environments like eBusiness/eCommerce, collaboration, virtualization, database, and enterprise resource planning applications.

Figure 1 shows the IBM System x3650 M3.

Figure 1. The IBM System x3650 M3

Did you know?

The x3650 M3 offers a flexible, scalable design and simple upgrade path to 16 HDDs or SSDs plus an optical drive, and up to 288 GB of memory. In addition, a built-in altimeter provides more efficient power utilization and lower noise levels. Comprehensive systems management tools such as advanced diagnostics, a cable management arm, and the ability to control resources from a single point make it easy to deploy, integrate, service, and manage.

Key features

The challenge of a high-performance business is to do more with less—serve more Web pages, handle more secure connections, support more email users. You need to reduce the costs of doing business and improve the service you deliver to your customers while lowering your overall risk. The dual-socket IBM System x3650 M3 can reduce your costs with its new energy-smart design. It can improve service with reduced operational complexity and increased management functionality. It will lower your IT risk with the resiliency that comes from having no single point of failure. And like all IBM servers, the x3650 M3 offers you the trust that comes from IBM global reach, service, and support.

The x3650 M3 is a high-performance rack server that uses significantly less power than previous generations, with unified systems management tools, leading reliability, availability, and serviceability features, and broad system flexibility, housed in a compact 2U mechanical package.

Performance

The x3650 M3 offers numerous features to boost performance and reduce costs:

- Up to two 6-core Xeon 5600 series processors offering superior performance. Xeon 5600 series processors offer up to 54% better performance than the previous generation 5500 series processors (workload dependent).
- Eighteen DIMMs of registered 1333 MHz DDR3 ECC memory provide speed, high availability, and a memory capacity of up to 288 GB.
- High-performance 6 Gbps SAS RAID controllers and 15K RPM 6 Gbps SAS disk drives in a variety of capacities to suit your local storage requirements.
- The use of solid-state drives (SSDs) instead of or along with traditional spinning drives (HDDs) can significantly improve I/O performance. An SSD can support 20,000 I/O operations per second (IOPS) whereas a typical HDD handles fewer than 500 IOPS.

Flexibility and scalability

The x3650 M3 has the ability to grow with your application requirements with these features:

- A choice of 4-core or 6-core processors with clock rates from 1.6 GHz to 3.6 GHz.
- 18 DIMM sockets allowing memory expansion of up to 288 GB.
- A choice of power supplies including 460 W, 675 W AC or DC, or energy-efficient 675 W.
- Five or six USB 2.0 ports available - two front, two rear, one internal for an embedded hypervisor, plus one additional internal port when the optional Tape Enablement Kit is installed.
- Storage bay flexibility: Up to 16 hot-swap 2.5" drive bays for SAS or SATA HDDs, or solid-state drives (intermixing supported); or eight 2.5" bays plus an internal tape drive bay.
- Direct-attach SAS storage with the EXP2512, EXP2524, and EXP3000 storage enclosures is supported. IBM System Storage servers, including network-attached storage (NAS), and iSCSI or Fibre Channel-attached storage, can also be attached.
- The x3650 M3 provides four PCI Express (PCIe) 2.0 x8 I/O slots for increased network or storage connectivity.

Manageability and security

Powerful systems management features simplify local and remote management of the x3650 M3:

- The x3650 M3 includes an Integrated Management Module (IMM) to monitor server availability, perform Predictive Failure Analysis, and trigger IBM Systems Director alerts.
- An optional Virtual Media Key enables additional systems management capabilities, including web-based out-of-band remote control (keyboard video and mouse), remote optical drive support, Windows “blue screen” error capture, and support for LDAP and SSL protocols.

- Text Console Redirection support allows the administrator to remotely view x3650 M3 text messages over Serial or LAN connections.
- Integrated industry-standard Unified Extensible Firmware Interface (UEFI) next-generation BIOS. New capabilities include:
    - Human readable event logs — no more beep codes
    - Complete out-of-band coverage by the Advance Settings Utility to simplify remote setup
    - A complete setup solution, allowing adapter configuration functions to be moved into UEFI
    - Consistent firmware management across an entire product line
- Integrated Trusted Platform Module (TPM) 1.2 support.
- Industry-standard AES NI support for faster, stronger encryption.
- Integrated IPMI 2.0 support alerts IBM Systems Director to anomalous environmental factors, such as voltage and thermal conditions. It also supports highly secure remote power control using data encryption.
- IBM Systems Director is included for proactive systems management. IBM Systems Director comes with a portfolio of tools, including IBM Systems Director Active Energy Manager, IBM Service and Support Manager, and others. IBM Systems Director also offers extended systems management tools for additional server management and increased availability. When a problem is encountered, IBM Systems Director can issue administrator alerts via email, pager, and other methods.
- IBM Systems Director Active Energy Manager provides advanced power management features with actual real-time energy monitoring, reporting, and capping features.

Availability and serviceability

The System x3650 M3 provides many features to simplify serviceability and increase system uptime:

- The x3650 M3 servers offer Chipkill ECC memory protection (when using x4 DIMMs). Chipkill memory is up to 16 times better than standard ECC memory at correcting memory errors. This can help reduce downtime caused by memory errors.
- The x3650 M3 offers memory mirroring for redundancy in the event of a non-correctable memory failure.
- Toolless cover removal provides easy access to upgrades and serviceable parts, such as HDDs and memory. Similarly, the Virtual Media Key and the ServeRAID controller can be installed and replaced without tools. This means less time (and therefore less money) spent servicing the x3650 M3.
- The server offers hot-swap and redundant fan modules and power supplies and hot-swap disk drives (redundant when implemented in conjunction with a RAID controller). These features mean greater system uptime.
- Toolless slides ship with the server, together with a cable management arm (CMA), that allow the rack server to easily slide into place.
- The drop-down light path diagnostics panel and individual light path LEDs quickly lead the technician to failed (or failing) components. This simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Solid-state drives (SSDs) offer 2.5 times the MTBF rate (2,500,000 hrs) of HDDs, for greater uptime.
- The three-year (parts and labor) limited onsite warranty provides peace of mind and greater investment protection than a one-year warranty does.

Energy efficiency

The System x3650 M3 has an energy-efficient design with features including the following:

- Low-voltage processors draw less energy and produce less waste heat than high-voltage processors, thus helping to reduce data center energy costs. Available 4-core Xeon 5600 series processors use only 40 W and 6-core processors consume as little as 60 W.

- Optional solid-state drives (SSDs) use only 2 W of power per drive, compared to 9 - 10 W for 2.5-inch HDDs. This is as much as 80% less power than a 2.5-inch HDD would use, with a corresponding reduction in heat output that further improves the overall bottom line.
- Support for 1.35 V low-voltage DDR3 memory DIMMs that consume 20% less energy.
- Energy-efficient components, including low-voltage transistors and voltage regulator modules, and power supplies that are up to 90% efficient.
- The x3650 M3 uses hexagonal ventilation holes in the chassis. Hexagonal holes can be grouped more densely than round holes, providing more efficient airflow through the system chassis. This ultimately results in reduced operational costs.
- An altimeter works in conjunction with the IMM to govern fan rotation based on the readings that it delivers. This saves money under normal conditions because the fans do not have to spin at high speed.

Locations of key components and connectors

Figure 2 shows the front of the server.

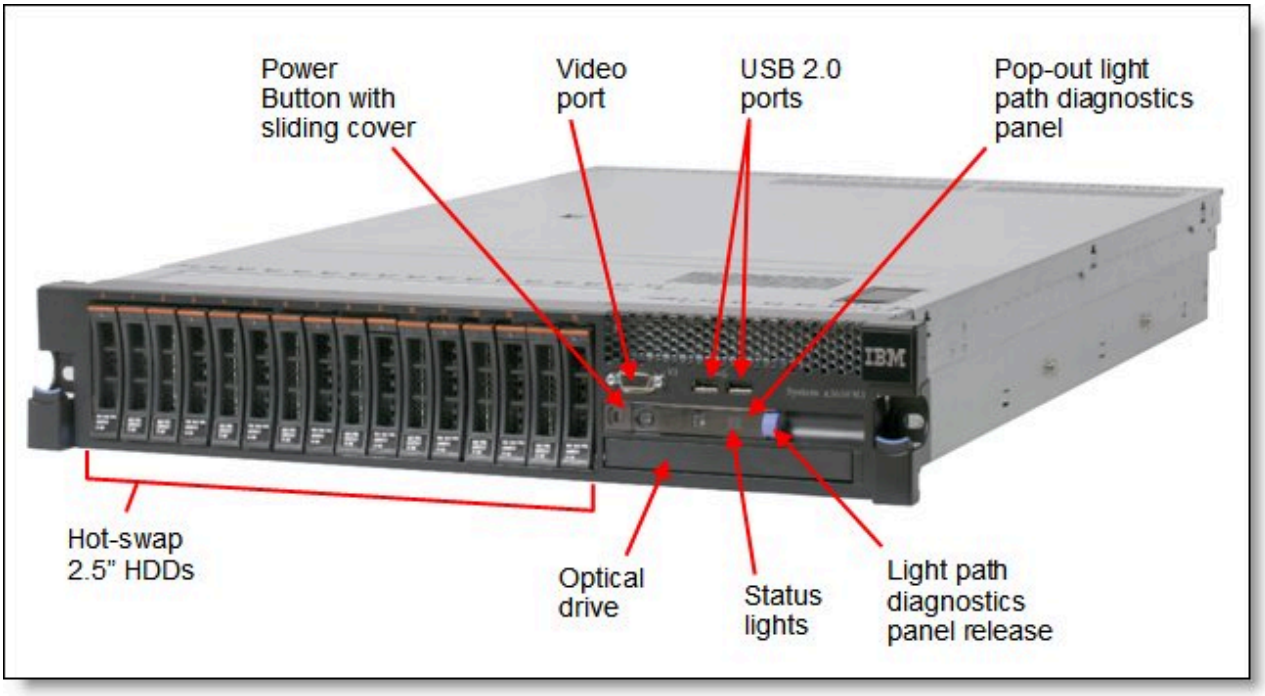
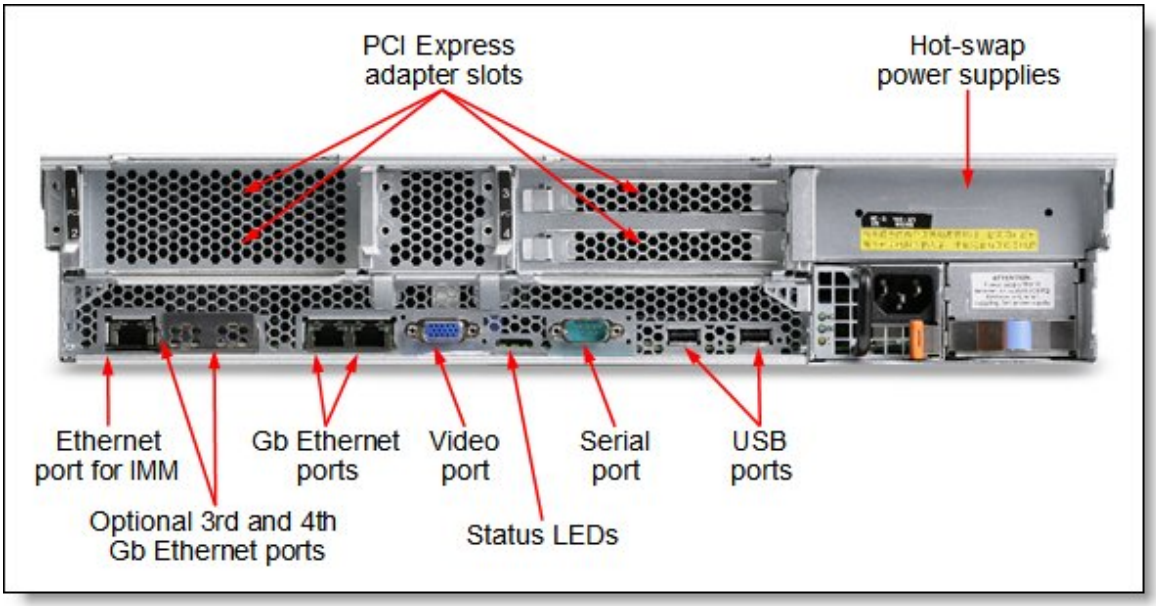


Figure 2. Front view of the IBM System x3650 M3

Figure 3 shows the rear of the server.



Figure

3. Rear view of the IBM System x3650 M3

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

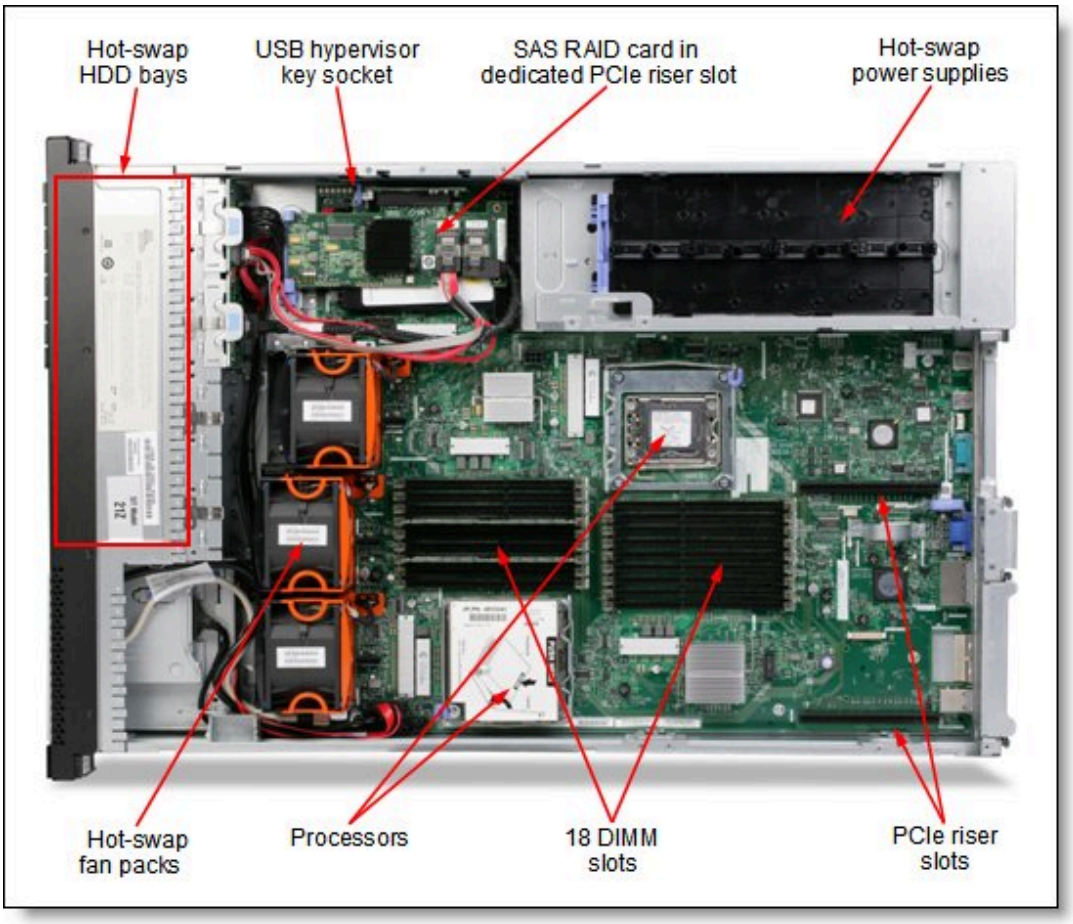


Figure 4. Inside view of the IBM System x3650 M3

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Form factor	2U Rack.
Processor	Up to two six-core (up to 3.46 GHz) or quad-core (up to 3.6 GHz) Intel Xeon 5600 series processors with QuickPath Interconnect technology up to 6.4 GT/s, and up to 1333 MHz memory speed. Also supports the Intel Xeon X5698 4.4 GHz dual-core processor. Supports specific Quad-core and Dual-core Intel Xeon 5500 series processors via Configure-To-Order (CTO).
Memory cache	Up to 12 MB L3 for Xeon 5600 processors. Up to 8 MB L3 for Xeon 5500 processors.
Chipset	Intel 5520.
Memory	Up to 18 DIMM sockets (9 DIMMs per processor). Up to 288 GB with 16 GB DDR3 RDIMMs and 18 populated DIMM slots (up to 144 GB with 9 DIMMs per processor), or up to 48 GB with 4 GB DDR3 UDIMMs and 12 populated DIMM slots (up to 24 GB with 6 DIMMs per processor).
Memory protection	ECC, ChipKill (for x4-based memory DIMMs), memory mirroring, and memory sparing.
Disk drive bays	Up to 16 2.5" hot-swap SAS/SATA HDDs or solid-state drives.
Maximum internal storage	Up to 25.6 TB with 1.6 TB SSDs, or Up to 19.2 TB with 1.2 TB SAS HDDs, or Up to 16.0 TB with 1 TB SATA HDDs Intermix of SAS/SATA/SSD is supported.
RAID support	RAID 0, 1, 1E with ServeRAID-BR10il v2 or M1015; RAID 0, 1, 5, 10, 50 with M5014 or M5015. Optional upgrade to RAID 5 is available for M1015. Optional upgrade to RAID 6, 60 is available for M5014/M5015.
Optical drive bays	One, support for DVD-ROM or Multiburner. Separate bay.
Tape drive bays	Optional Tape Enablement Kit is available to support one DDS5, DDS6, or RDX internal tape drive. If used, the maximum number of HDD bays is limited to 8.
Network interfaces	Integrated 2 ports, plus 2 ports on optional Gigabit Ethernet with Ethernet Daughter Card (does not consume PCIe slot).
PCI Expansion slots	Up to 5 (up to 4 available, one slot is dedicated to RAID controller), dependant on the riser cards used (three different riser cards are available: 2x PCI-E x8 Gen 2, 1x PCI-E x16 Gen 2, and 2x PCI-X 64 bit/133 MHz). Up to two riser cards are supported.
External ports	Two USB 2.0 and one DB-15 video on front. Two USB 2.0, one DB-15 video, one DB-9 serial, one RJ-45 systems management, up to 4 RJ-45 network ports (2 standard, 2 optional) on rear. One internal USB port for embedded hypervisor.
Cooling	IBM Calibrated Vectored Cooling™ with 3 counter-rotating hot swap fans with N+1 redundancy. Altimeter is to control fan speed based on atmospheric pressure.
Power supply	Up to 2 redundant hot-swap 460 W AC or 675 W AC or 675 W high-efficiency (HE) AC power supplies with 90%+ efficiency. 675 W -48 V DC models are available via CTO.
Hot-swap components	Hard drives, power supplies, fans.
Systems management	UEFI, IBM Integrated Management Module (IMM), Predictive Failure Analysis, Light Path Diagnostics, Automatic Server Restart, IBM Systems Director* and IBM Systems Director Active Energy Manager™, IBM ServerGuide. Optional Virtual Media Key for remote presence (graphics, keyboard and mouse, virtual media).
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM)

Video	Matrox G200eV with 16 MB memory integrated into the IMM. Maximum resolution is 1280x1024 at 75 Hz with 16M 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 ESX 4.1 and VMware ESXi 4.1 embedded hypervisor, Sun Solaris 10.
Limited warranty	3-year customer-replaceable unit and onsite limited warranty with 9x5/next business day response time.
Service and support	Optional service upgrades are available through IBM ServicePacs®: 4-hour or 2-hour response time, 8 hours 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.

* Effective October 12, 2012, or until supply is depleted, IBM will discontinue the shipment of IBM Systems Director DVDs with IBM System x servers and IBM BladeCenter chassis. IBM Systems Director Express Edition and IBM Systems Director Standard Edition, which include software subscription and support, continue to be available for IBM System x servers and IBM Blade Centers.

The x3650 M3 servers are shipped with the following items:

- Statement of Limited Warranty
- Important Notices
- Rack Installation Instructions
- Documentation CD that contains the *Installation and User's Guide*
- IBM Gen 2 Slides Kit
- IBM Gen 2 Cable Management Arm (CMA)
- 2.8 m C13-C14 power cord (one for models with one power supply and two for models with two power supplies)

Standard models

The following table lists the standard models.

Table 2. Standard models

Model	Processor* (2 maximum)	Memory	RAID controller	Disk bays (std / max)	Disks	Network	Optical	Power supply
Models announced February 2011								
7945-12x	1x Xeon E5603 1.60 GHz 4C, 4 MB, 1066 MHz	1x 4 GB	BR10il v2	4 / 16	Open	2x GbE	Optional	1x 460 W
7945-22x	1x Xeon E5606 2.13 GHz 4C, 8 MB, 1066 MHz	1x 4 GB	M1015	8 / 16	Open	2x GbE	Optional	1x 460 W
7945-32x	1x Xeon E5607 2.26 GHz 4C, 8 MB, 1066 MHz	1x 4 GB	M1015	8 / 16	Open	2x GbE	Optional	1x 460 W
7945-D2Y	1x Xeon E5620 2.40GHz 4C, 12MB, 1066MHz	1x 4 GB		16 / 16	Open	2x GbE	Optional	1x 80 W
7945-D4x	1x Xeon E5620 2.40 GHz 4C, 12 MB, 1066 MHz	1x 4 GB	M1015	8 / 16	Open	2x GbE	Optional	1x 460 W
7945-H4x	1x Xeon L5640 2.26 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5015 + Battery	8 / 16	Open	2x GbE	Optional	1x 460 W
7945-52x	1x Xeon E5645 2.40 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5014	8 / 16	Open	2x GbE	Optional	1x 460 W
7945-54x	2x Xeon E5645 2.40 GHz 6C, 12 MB, 1333 MHz	2x 4 GB	M5014	8 / 16	Open	2x GbE	Optional	2x 675 W HE
7945-62x	1x Xeon E5649 2.53 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5014	8 / 16	Open	2x GbE	Optional	1x 460 W
7945-J4x	1x Xeon X5650 2.66 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5015 + Battery	8 / 16	Open	2x GbE	Optional	1x 675 W
7945-L4x	1x Xeon X5660 2.80 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5015 + Battery	8 / 16	Open	2x GbE	Optional	1x 675 W
7945-72x	1x Xeon X5675 3.06 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5015 + Battery	8 / 16	Open	2x GbE	Optional	1x 675 W HE
7945-82x	1x Xeon X5690 3.46 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5015 + Battery	8 / 16	Open	2x GbE	Optional	1x 675 W HE

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

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

Standard models with SAP Preloaded

The following table lists the models that include SAP Discovery System v4 preloaded with SUSE Linux ES SAP Business All-in-one.

Table 3. Standard preload models

Model	Processor* (2 maximum)	Memory	RAID adapter	Disk bays (std / max)	Disks	Network	Optical	Power supply
7945-JSx†	2x Xeon X5650	6x 4 GB	M5015 + Battery	8 / 16	7x 300 GB SAS + 1x 500 GB SATA	2x GbE	Multiburner	2x 675 W
7945-J6x†	2x Xeon X5650	6x 4 GB	M5015 + Battery	8 / 16	7x 300 GB SAS + 1x 500 GB SATA	2x GbE	Multiburner	2x 675 W HE
7945-JCx†	2x Xeon X5650	6x 4 GB	M5015 + Battery	8 / 16	7x 300 GB SAS + 1x 500 GB SATA	2x GbE	Multiburner	2x 675 W HE

* Processor detail: Processor quantity and model, core speed, number of cores, L3 cache, memory speed.
† Models include SAP Discovery System v4 preloaded with SUSE Linux ES SAP Business All-in-one.

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

Express Models

Table 4. Express models

Region / model	Processor* (2 maximum)	Memory	RAID controller	Disk bays (std / max)	Disks	Network	Optical	Power supply
NA								
7945-E7U	2x Xeon X5675 3.06 GHz 6C 12 MB 1333 MHz	6x 4 GB	M5015 + Battery	8 / 16	Optional	2x GbE	Multi-burner	2x 675 W
7945-E8U	1x Xeon E5649 2.53GHz 6C 12MB 1333MHz	3x 4 GB	M5015 + Battery	8 / 16	Optional	2x GbE	Multi-burner	2x 460 W
LA								
7945-E7Ux	2x Xeon X5675 3.06 GHz 6C 12 MB 1333 MHz	6x 4 GB	M5015 + Battery	8 / 16	Optional	2x GbE	Multi-burner	2x 675 W
7945-E8U	1x Xeon E5649 2.53 GHz 6C 12 MB 1333 MHz	3x 4 GB	M5015	16 / 16	Optional	2x GbE	Multi-burner	1x 460 W
7945-EAU	1x Xeon E5645 2.40 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M1015	8 / 16	1x 146 GB	2x GbE	Multi-burner	1x 460 W
7945-EBU	1x Xeon E5649 2.53 GHz 6C 12 MB 1333 MHz	2x 8 GB	M5014	16 / 16	1x 300 GB	2x GbE	Multi-burner	2x 460 W
7945-D4U	1x Xeon E5620 2.40 GHz 4C 12 MB 1066 MHz	1x 4 GB	M1015	8 / 16	Optional	2x GbE	Multi-burner	1x 460 W
7945-J4U	1x Xeon X5650 2.66 GHz 6C 12 MB 1333 MHz	1x 4 GB	M5015	8 / 16	Optional	2x GbE	Multi-burner	1x 675 W
7945-54U	2x Xeon E5645 2.40 GHz 6C, 12 MB, 1333 MHz	2x 4 GB	M5014	8 / 16	Optional	2x GbE	Multi-burner	2x 675 W
7945-52U	1x Xeon E5645 2.40 GHz 6C, 12 MB, 1333 MHz	1x 4 GB	M5014	8 / 16	Optional	2x GbE	Multi-burner	1x 675 W
7945-82U	1x Xeon X5690 3.46 GHz 6C 12 MB 1333 MHz	1x 4 GB	M5015	8 / 16	Optional	2x GbE	Multi-burner	1x 675 W

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

Processor options

Features of the Intel Xeon 5600 processors used in the x3650 M3 include:

- Intel QuickPath Technology (QPI), a platform architecture that provides high-speed (up to 25.6 GBps), and point-to-point connections both between processors and between processors and the I/O hub. Each processor has its own dedicated memory that it accesses directly through an Integrated Memory Controller. In cases where a processor needs to access the dedicated memory of another processor, it can do so through the high-speed QPI that links all the processors.
- Turbo Boost Technology dynamically turns off unused processor cores and increases the clock speed of the cores in use. It will increase the frequency in steps of 133 MHz (to a maximum of three steps or 400 MHz) as long as the processors' predetermined thermal and electrical requirements are still met. For example, with three cores active, a 2.26 GHz processor can run the cores at 2.4 GHz. With only one or two cores active, the same processor can run those cores at 2.53 GHz. All Xeon 5600 processors support Turbo Boost with the exception of L5609, E5607, E5606, and E5603.
- Intel Hyper-Threading Technology, which boosts performance for multi-threaded applications by enabling simultaneous multi-threading within each processor core, up to two threads per core. Hyper-Threading reduces computational latency, thereby making optimal use of every clock cycle. All Xeon 5600 processors support Hyper-Threading Technology with the exception of L5609, E5607, E5606, and E5603.
- Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.
- Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better utilize the hardware for virtualization workloads.

The x3650 M3 supports the processor options listed in the following table. The server supports up to two processors. This table shows which server models have each processor standard. If there is no corresponding *where-used* model for a particular processor then this processor is only available through CTO.

In the x3650 M3, two processors are standard and the server supports two maximum.

Table 5. Processor options

Part number	Feature code	Intel Xeon Processor	Models where used
Intel Xeon 5600 series processors			
81Y6538	A0YX	Intel Xeon E5603 4C 1.60GHz 4MB 1066MHz 80w	12x
59Y4022	7708	Intel Xeon E5640 4C 2.66GHz 12MB 1066MHz 80w	G2x
81Y6542	A0Z1	Intel Xeon E5649 6C 2.53GHz 12MB 1333MHz 80w	62x
59Y4017	7703	Intel Xeon L5609 4C 1.86GHz 12MB 1066MHz 40w	-
59Y4018	7704	Intel Xeon L5630 4C 2.13GHz 12MB 1066MHz 40w	C2x
59Y4019	7705	Intel Xeon L5640 6C 2.26GHz 12MB 1333MHz 60w	H2x, H4x
81Y6541	A0Z0	Intel Xeon X5647 4C 2.93GHz 12MB 1066MHz 130w	-
59Y4024	7710	Intel Xeon X5660 6C 2.80GHz 12MB 1333MHz 95w	L2x, L4x
59Y4026	7712	Intel Xeon X5667 4C 3.06GHz 12MB 1333MHz 95w	-
59Y4025	7711	Intel Xeon X5670 6C 2.93GHz 12MB 1333MHz 95w	M2x
81Y6543	A0Z2	Intel Xeon X5672 4C 3.20GHz 12MB 1333MHz 95w	-
81Y6544	A0Z3	Intel Xeon X5675 6C 3.06GHz 12MB 1333MHz 95w	72x

59Y4028	7714	Intel Xeon X5680 6C 3.33GHz 12MB 1333MHz 130w	N2x
81Y6545	A0Z4	Intel Xeon X5687 4C 3.60GHz 12MB 1333MHz 130w	-
81Y6546	A0Z5	Intel Xeon X5690 6C 3.46GHz 12MB 1333MHz 130w	82x

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 IBM System x3650 M3 supports up to nine DDR3 DIMMs when one processor is installed and up to 18 DIMMs when two processors are installed. However, the maximum number of DIMMs is limited by the number of ranks in the DIMMs:

- RDIMMs
  - Up to 18 single-rank RDIMMs (nine per processor) for a maximum of 72 GB (18x 4 GB)
  - Up to 18 dual-rank RDIMMs for a maximum of 288 GB (18x 16 GB)
  - Up to 12 quad-rank RDIMMs for a maximum of 192 GB (12x 16 GB)
- UDIMMs
  - Up to 12 dual-rank UDIMMs for a maximum of 48 GB (12x 4 GB)

Each processor has three memory channels, and there are three DIMMs per channel. RDIMMs can be populated three per channel. However, UDIMMs can only be populated two DIMMs per channel. That is, you can have up to 18 RDIMMs installed in the server, but only up to 12 UDIMMs. Mixing UDIMMs and RDIMMs is not supported.

Maximum memory speed is limited by memory speed supported by the specific processor and by the number and type of DIMMs installed (whichever has a lower memory speed rating), as follows:

- Intel Xeon 5600 series processors:
  - 1333 MHz when one or two single-rank or dual-rank RDIMMs per channel are installed or one UDIMM per channel is installed
  - 1066 MHz when one quad-rank RDIMM per channel is installed or two UDIMMs per channel are installed
  - 800 MHz when three single-rank or dual-rank RDIMMs or two quad-rank RDIMMs per channel are installed

The server supports both 1.5 V and 1.35 V DIMMs. Mixing 1.5 V and 1.35 V DIMMs in the same server is supported for Intel Xeon 5600 series processor-based systems, in such a case all DIMMs operate at 1.5 V. Intel Xeon 5500 series processor-based systems do not support 1.35 V DIMMs.

The following memory protection technologies are supported:

- ECC
- ChipKill (for x4-based RDIMMs)
- Memory mirroring
- Memory sparing

If memory mirroring is used then DIMMs must be installed in pairs (minimum of one pair per each CPU), and both DIMMs in a pair must be identical in type and size. If Memory Sparing is used then DIMMs must be installed in sets of three, and all DIMMs in the same set must be identical in type and size. Memory sparing is only supported for Intel Xeon 5600 series processor-based systems.

The following table lists memory options available for x3650 M3 server.

Table 6. Memory options

Part number	Feature code	Description	Maximum quantity	Models where used
UDIMM				

44T1569	1914	2GB (1x2GB, Dual Rankx8) PC3-10600 CL9 ECC DDR3-1333MHz LP UDIMM	12	
49Y1403	A0QS	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP UDIMM	12	
49Y1404	8648	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP UDIMM	12	
1.35V RDIMM				
49Y1405	8940	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1392	3893	2GB (1x2GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1394	3894	4GB (1x4GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	C2x, H2x
49Y1406	8941	4GB (1x4GB, 1Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	Other models
49Y1407	8942	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1397	8923	8GB (1x8GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1398	8921	8GB (1x8GB, 2Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	18	
49Y1563	A1QT	16GB (1x16GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1400	8939	16GB (1x16GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	12	
1.5V RDIMM				
44T1592	1712	2GB (1x2GB, 1Rx8, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1433	8934	2GB (1x2GB, 2Rx8, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1434	8935	2GB (1x2GB, 1Rx4, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
44T1599	1713	4GB (1x4GB, Dual Rankx8) PC3-10600 CL9 ECC DDR3-1333MHz LP RDIMM	18	
49Y1435	8936	4GB (1x4GB, 2Rx4, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
49Y1436	8937	8GB (1x8GB, 2Rx4, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	18	
46C7483	1707	16GB (1x16GB, Quad Rankx4) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM	12	

Internal storage

IBM System x3650 M3 server supports the following internal storage configurations:

- Four SATA 2.5" SFF Simple-Swap drive bays (only available in CTO)
- Four SAS/SATA 2.5" SFF hot-swap drive bays
- Eight SAS/SATA 2.5" SFF hot-swap drive bays
- Sixteen SAS/SATA 2.5" SFF hot-swap drive bays
- Eight SAS/SATA 2.5" SFF hot-swap drive bays and internal tape drive

Figure 5 shows these configurations.

Figure 5.

Internal drive configurations

Standard models of x3650 M3 ship with four (model A2x) or eight (all models except A2x) SAS/SATA 2.5" SFF hot-swap hard drive bays. The following table shows internal storage expansion options available for x3650 M3 server.

Table 7. Internal storage expansion options

Part number	Feature code	Name	Maximum supported
69Y4236	4174	IBM System x3650 M3 Hot-Swap SAS/SATA 4 Pac HDD Upgrade Option	1
59Y3825	1747	Hot-swap SAS SATA 8 Pack HDD Enablement Option (with 6 Gb/sec expander)	1
69Y5034	5720	Hot-swap SAS SATA 8 Pack HDD Enablement Kit (with two ServeRAID M5015 adapters)	1
59Y3806	4181	IBM System x3650 M3 Tape Enablement Kit	1

These options have the following descriptions:

- 69Y4236 upgrades models with four hot-swap HDD bays to eight hot-swap HDD bays. This option requires a ServeRAID M1015, M5014, or M5015.
- 59Y3825 upgrades models with eight hot-swap HDD bays to 16 hot-swap HDD bays. This option includes a SAS expander card that fits into a dedicated RAID slot, and RAID controller occupies one of the four PCIe slots, limiting the number of available slots to three.
- 69Y5034 upgrades models with eight hot-swap HDD bays to 16 hot-swap HDD bays. This option includes two ServeRAID M5015 RAID controllers (without batteries). The number of available PCIe slots is three.
- 59Y3806 upgrades models with eight hot-swap HDD bays to eight hot-swap HDD bays plus an internal tape drive (DDS5, DDS6, or RDX). This includes the riser card with USB and SAS tape connectors, replacing the standard SAS RAID riser card.

Controllers for internal storage

The following table lists the RAID controllers and additional options used for internal disk storage of x3650 M3 server.

Table 8. RAID controllers for internal storage

Part number	Feature code	Description	Maximum supported	Standard models where used
46M0969*	3889	ServeRAID B5015 SSD Controller	1	-
49Y4731	9742	ServeRAID BR10il SAS/SATA Controller v2	1	A2x, 12x
81Y4492	A1XL	ServeRAID H1110 SAS/SATA Controller for IBM System x	1	-
46M0831	0095	ServeRAID M1015 SAS/SATA Controller	1	B2x, C2x, D2x, H2x, N2x, 22x, 32x, D4x
46M0916	3877	ServeRAID M5014 SAS/SATA Controller	1	F2x, G2x, 52x, 54x, 62x
46M0829	0093	ServeRAID M5015 SAS/SATA Controller	1 or 2**	J2x, L2x, M2x, JSx, H4x, J4x, J6x, JCx, L4x, 72x, 82x
90Y4304	A2NF	ServeRAID M5016 SAS/SATA Controller for IBM System x	1	-
46M0830	0094	ServeRAID M5025 SAS/SATA Controller	1	-
43W4296*	3571	ServeRAID MR10i SAS/SATA Controller	1	-
46M0832	9749	ServeRAID M1000 Series Advance Feature Key	1	-
46M0930	5106	ServeRAID M5000 Series Advance Feature Key	1†	-
46M0917	5744	ServeRAID M5000 Series Battery Kit	1	J2x, L2x, M2x, JSx, H4x, J4x, J6x, JCx, L4x, 72x, 82x
68Y7396	5862	ServeRAID M5000 Series Battery Remote Mount Cable	1	-
81Y4426	A10C	ServeRAID M5000 Series Performance Accelerator Key	1†	-

* Withdrawn from marketing
** When this RAID controller is ordered separately, then the maximum quantity supported is one. When this RAID controller is ordered as a part of the 69Y5034 upgrade (see Table 6), then the maximum quantity supported is two.
† Only one key is supported in each controller, either the Advance Feature Key or the Performance Accelerator Key.

When the maximum number of HDD bays is eight, the RAID controller occupies a dedicated PCIe slot on x3650 M3 and does not consume the regular PCIe slot. When 16 HDD bay configurations are used, the number of available regular PCIe slots is three.

The ServeRAID BR10il v2 SAS/SATA Controller has the following specifications:

- One Mini-SAS internal connector
- Supports RAID levels 0, 1, and 1E
- 3 Gbps throughput per port
- Based on the LSI 1064E controller
- PCI Express 2.0 x4 host interface

- Stripe size: 64 KB (fixed)

The ServeRAID M1015 SAS/SATA Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional ServeRAID M1000 Series Advanced Feature Key
- 6 Gbps throughput per port
- Based on the LSI SAS2008 6 Gbps RAID on Chip (ROC) controller
- PCI Express 2.0 x8 host interface
- Configurable stripe size up to 64 KB

The ServeRAID M5014 SAS/SATA Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 0, 1, 5, 10, and 50
- Supports RAID 6 and 60 with the optional M5000 Advanced Feature Key
- Performance optimization for SSD drives with optional M5000 Series Performance Accelerator Key
- 6 Gbps throughput per port
- PCI Express 2.0 x8 host interface
- Based on the LSI SAS2108 6 Gbps ROC controller
- 256 MB of onboard cache
- Optional Intelligent Li-Ion-based battery backup unit with the ServeRAID M5000 Series Battery Kit

The ServeRAID M5015 SAS/SATA Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 0, 1, 5, 10, and 50
- Supports RAID 6 and 60 with the optional M5000 Advanced Feature Key
- Performance optimization for SSD drives with optional M5000 Series Performance Accelerator Key
- 6 Gbps throughput per port
- PCI Express 2.0 x8 host interface
- Based on the LSI SAS2108 6 Gbps ROC controller
- 512 MB of onboard cache
- Standard Intelligent Li-Ion-based battery backup unit with up to 48 hours of data retention

The ServeRAID B5015 SSD Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 1 and 5
- 6 Gbps throughput per SAS port
- PCI Express 2.0 x8 host interface
- Based on PMC-Sierra PM8013 maxSAS 6 Gb/s SAS RoC controller
- Performance optimized for SSDs
- Stripe size of up to 1 MB

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 hard drive options for internal disk storage of x3650 M3 server.

Table 9. Disk drive options for internal disk storage

Part number	Feature code	Description	Maximum supported
2.5-inch 15K SAS HDDs			
81Y9670	A283	IBM 300GB 15K 6Gbps SAS 2.5" G2HS HDD	
42D0677	5536	IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	
90Y8926	A2XB	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	
2.5-inch 10K SAS HDDs			
00AD075	A48S	IBM 1.2TB 10K 6Gbps SAS 2.5'' G2HS HDD	
81Y9650	A282	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	
49Y2003	5433	IBM 600GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	
90Y8872	A2XD	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	
42D0637	5599	IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	
90Y8877	A2XC	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	
2.5-inch self-encrypting drives (SEDs)			
00AD085	A48T	IBM 1.2TB 10K 6Gbps SAS 2.5'' G2HS SED	
81Y9662	A3EG	IBM 900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	
90Y8908	A3EF	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	
90Y8913	A2XF	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	
44W2264	5413	IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS SED	
44W2294	5412	IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS SED	
90Y8944	A2ZK	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	
2.5-inch SAS-SSD Hybrid drive			
00AD102	A4G7	IBM 600GB 10K 6Gbps SAS 2.5'' G2HS Hybrid	
2.5-inch NL SAS HDDs			
81Y9690	A1P3	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	
42D0707	5409	IBM 500GB 7200 6Gbps NL SAS 2.5" SFF Slim-HS HDD	
90Y8953	A2XE	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	
2.5-inch NL SATA HDDs			
81Y9730	A1AV	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	
42D0752	5407	IBM 500GB 7200 NL SATA 2.5" SFF Slim-HS HDD	
81Y9726	A1NZ	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	
81Y9722	A1NX	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	
2.5-inch Enterprise Value SSDs			
49Y5839	A3AS	IBM 64GB SATA 2.5" MLC HS Enterprise Value SSD	
49Y5844	A3AU	IBM 512GB SATA 2.5" MLC HS Enterprise Value SSD	
2.5-inch Enterprise SSDs			
49Y6195	A4GH	IBM 1.6TB SAS 2.5" MLC HS Enterprise SSD	
00W1125	A3HR	IBM 100GB SATA 2.5" MLC HS Enterprise SSD	
90Y8643	A2U3	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	

90Y8648	A2U4	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	

For information about solid state drives, see the IBM Redbooks Product Guide *Solid State Drives for IBM BladeCenter and System x servers*, available from:
http://www.redbooks.ibm.com/abstracts/tips0792.html?Open

For information about self-encrypting drives (SEDs), see the IBM Redbooks Product Guide *Self-Encrypting Drives for IBM System x*, available from:
http://www.redbooks.ibm.com/abstracts/tips0761.html?Open

For a discussion about drive interface technology include SAS and SATA, see the IBM Redpaper, *IBM System x Server Disk Drive Interface Technology*, available from
http://www.redbooks.ibm.com/abstracts/redp4791.html?Open

Internal backup units

The server supports the internal tape drive options listed in the following table. The x3650 M3 Tape Enablement Kit, 59Y3806, is required to support these tapes internally. 59Y3806 upgrades models with eight hot-swap HDD bays to support an internal tape drive (DDS5, DDS6, or RDX). This option includes the riser card with USB and SAS tape connectors, replacing the standard SAS RAID riser card.

Table 10. Internal tape drives

Part number	Feature code	Description	Maximum supported
59Y3806	4181	x3650 M3 Tape Enablement Kit	1
46C5399	5711	IBM DDS Generation 5 USB Tape Drive	1
39M5636	5395	IBM DDS Gen 6 USB Tape Drive	1
46C5367	5708	IBM RDX 320GB Cartridge	1
46C5368	5709	IBM RDX 500GB Cartridge	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

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 listed in the following table.

Table 11. Optical drives

Part number	Feature code	Description	Maximum supported	Standard models where used
46M0901	4161	IBM UltraSlim Enhanced SATA DVD-ROM	1	-
46M0902	4163	UltraSlim Enhanced SATA Multi-Burner	1	JSx, J6x, JCx

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

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

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

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

I/O expansion options

The server supports up to four PCI Express slots with different riser cards installed into two riser sockets on the system planar (one riser socket supports installation of one riser card). The slot form factors are as follows:

- Slot 1: Full height, full length
- Slot 2: Low profile with standard bracket
- Slot 3: Full height, full length
- Slot 4: Full height, half length

Riser 1 supplies slots 1 and 2. Riser 2 supplies slots 3 and 4. Standard models have two riser cards installed that provide a total of four PCI Express 2.0 x8 slots (two PCI Express x8 Gen 2 slots per riser card).

You can replace each standard riser with one of the following risers (or configure one of these riser cards instead of the standard 2 x8 riser using special bid or CTO) :

- Riser with one PCI Express x16 Gen 2 slot
- Riser with two PCI-X 64 bit/133 MHz slots

The following table lists the PCI riser card options.

Table 12. PCI riser card options

Part number	Feature code	Description	Maximum supported
46M1072	5086	PCI Express (2x8) Riser Card (included in standard models)	2
46M1073	5088	PCI Express (1x16) Riser Card	2
46M1074	5087	PCI-X Riser Card (two PCI-X 1.0a 64-bit 133 MHz slots)	2
None*	3734	PCI-Express (2 x8 slots; 1 FH/FL, 1 FH/HL) Riser Card 2	-
None*	4276	PCI-X (2 slots; 1 FH/FL, 1 FH/HL) Riser Card 2	-
None*	4303	PCI-Express (1 x16 slot; FH/FL) Riser Card 2	-

* These options are CTO only

The server has an additional PCI Express slot dedicated to the RAID controller.

Network adapters

x3650 M3 supports up to four integrated Gigabit Ethernet ports. Two ports are standard, and two ports can be added by installing the optional Dual-port Gigabit Ethernet Daughter card, 46M1076. This card uses a dedicated connector on the motherboard and does not consume a PCI expansion slot. Integrated NICs have the following features:

- Broadcom BCM5709 chip
- TCP Offload Engine (TOE) support
- Wake on LAN support
- 802.1Q VLAN tagging support
- NIC Teaming (load balancing and failover)

Table 13. Network adapters

Part number	Feature code	Description	Maximum supported
40 Gb Ethernet			
00D9550	A3PN	Mellanox ConnectX-3 40GbE / FDR IB VPI Adapter for IBM System x	4
10 Gb Ethernet			
42C1820*	1637	Brocade 10 Gb Dual-port CNA for IBM System x	4
49Y4250	5749	Emulex 10GbE Virtual Fabric Adapter for IBM System x	3
49Y7950	A18Z	Emulex 10GbE Virtual Fabric Adapter II for IBM System x	4
95Y3751	A348	Emulex Dual Port VFAII Adapter & FCoE/iSCSI License	3
49Y4274	5715	Emulex VFA II FCoE/iSCSI License for IBM System x (FoD)	4
81Y9990	A1M4	Mellanox ConnectX-2 Dual Port 10GbE Adapter for IBM System x	4
00D9690	A3PM	Mellanox ConnectX-3 10 GbE Adapter for IBM System x	4
42C1800	5751	QLogic 10 Gb Dual Port CNA for IBM System x	4
1 Gb Ethernet			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x	4
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x	4
49Y7910	A18Y	Broadcom NetXtreme II Dual Port 10GBaseT Adapter for IBM System x	3
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x	4
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x	4
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x	4
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x	4
42C1750	2975	PRO/1000 PF Server Adapter by Intel	4
InfiniBand			
95Y3750	A2MY	Mellanox ConnectX-2 Dual-port QSFP QDR IB Adapter	1
00D9550	A3PN	Mellanox ConnectX-3 40GbE / FDR IB VPI Adapter for IBM System x	4

* Withdrawn from marketing

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 storage HBAs supported by x3650 M3 server.

Table 14. Storage adapters

Part number	Feature code	Description	Maximum supported
16 Gb Fibre Channel			
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x	4
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x	4
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x	4
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x	4
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x	4
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x	4
8 Gb Fibre Channel			
46M6050	3591	Brocade 8Gb FC Dual-port HBA for IBM System x	4
46M6049	3589	Brocade 8Gb FC Single-port HBA for IBM System x	4
42D0494	3581	Emulex 8Gb FC Dual-port HBA for IBM System x	4
42D0485	3580	Emulex 8Gb FC Single-port HBA for IBM System x	4
42D0510	3579	QLogic 8Gb FC Dual-port HBA for IBM System x	4
42D0501	3578	QLogic 8Gb FC Single-port HBA for IBM System x	4
4 Gb Fibre Channel			
59Y1993	3886	Brocade 4Gb FC Dual-port HBA for IBM System x	4
59Y1987	3885	Brocade 4Gb FC Single-port HBA for IBM System x	4
42C2071*	1699	Emulex 4Gb FC Dual-Port PCI-E HBA for IBM System x	4
42C2069*	1698	Emulex 4Gb FC Single-Port PCI-E HBA for IBM System x	4
39R6525*	3567	QLogic 4Gb FC Single-Port PCIe HBA for IBM System x	4
39R6527	3568	QLogic 4Gb FC Dual-Port PCIe HBA for IBM System x	4
iSCSI			
39Y6146*	2976	QLogic iSCSI Single-Port PCIe HBA for IBM System x	4
42C1770	2977	QLogic iSCSI Dual-Port PCIe HBA for IBM System x	4
SAS			
46M0912	3876	IBM 6Gb Performance Optimized HBA	4
46M0907	5982	IBM 6Gb SAS HBA	4

* Withdrawn from marketing

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 15. SSD adapters

Part number	Feature code	Description	Maximum supported
46M0877*	0096	IBM 160GB High IOPS SS Class SSD PCIe Adapter	4
46M0898*	1649	IBM 320GB High IOPS MS Class SSD PCIe Adapter	4
46M0878*	0097	IBM 320GB High IOPS SD Class SSD PCIe Adapter	3
81Y4535*	A1NE	320 GB High IOPS SLC Adapter for IBM System x	-
81Y4519*	5985	640 GB High IOPS MLC Duo Adapter for IBM System x	2
81Y4539*	A1ND	640 GB High IOPS SLC Duo Adapter for IBM System x	-

* Withdrawn from marketing

Power supplies

The server supports up to two redundant power supplies, providing N+N redundancy. Standard models come with one or two power supplies (model dependent). -48V DC models are only available through CTO. The following table lists the power supplies.

Table 16. Power supplies

Part number	Feature code	Description	Maximum supported	Standard models where used
46M1075	2100	IBM 675 W Redundant Power Supply	2*	All other models
69Y1510	4780	IBM -48V DC Input 675 W Redundant Power Supply	2	-
81Y6557	A0ZG	IBM 675W High Efficiency Redundant AC Power Supply	2*	54x, 72x, 82x, J6x, JCx
81Y6558	A0ZH	IBM 460W Redundant AC Power Supply	2*	12x, 22x, 32x, D4x, H4x, 52x, 62x

* At least 1 power supply comes standard with every model

An AC power supply ships standard with one 2.8 m C13 - C14 power cord. A DC power supply ships without power cords.

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 17. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1
41Y8278	1776	IBM USB Memory Key for VMware ESXi 4	
41Y8287	3033	IBM USB Memory Key for VMware ESXi 4.1	
41Y8296	A1NP	IBM USB Memory Key for VMware ESXi 4.1 Update 1	
41Y8300	A2VC	IBM USB Memory Key for VMware ESXi 5.0	
41Y8307	A383	IBM USB Memory Key for VMware ESXi 5.0 Update1	
41Y8311	A2R3	IBM USB Memory Key for VMware ESXi 5.1	
41Y8382	A4WZ	IBM USB Memory Key for VMware ESXi 5.1 Update 1	
41Y8385	A584	IBM USB Memory Key for VMware ESXi 5.5	

Remote management

The server contains IBM Integrated Management Module (IMM), 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 IMM lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. Optionally, the IMM 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 virtual media key 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 1280x1024 at 75 Hz, 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 18. Remote management option

Part number	Feature code	Description	Maximum supported
46C7526	5080	IBM Virtual Media Key	1

Supported operating systems

The server supports the following operating systems:

- Microsoft Windows HPC Server 2008
- Microsoft Windows Server 2003 R2 x64 Datacenter Edition Unlimited Virtualization
- Microsoft Windows Server 2003, Web Edition
- Microsoft Windows Server 2003/2003 R2, Datacenter x64 Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise x64 Edition
- Microsoft Windows Server 2003/2003 R2, Standard Edition
- Microsoft Windows Server 2003/2003 R2, Standard x64 Edition
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Datacenter x86 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Enterprise x86 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Standard x86 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2008, Web x86 Edition
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Microsoft Windows Small Business Server 2003/2003 R2 Premium Edition
- Microsoft Windows Small Business Server 2003/2003 R2 Standard Edition
- Microsoft Windows Small Business Server 2008 Premium Edition
- Microsoft Windows Small Business Server 2008 Standard Edition
- Red Hat Enterprise Linux 4 AS for AMD64/EM64T
- Red Hat Enterprise Linux 4 AS for x86
- Red Hat Enterprise Linux 4 ES for AMD64/EM64T
- Red Hat Enterprise Linux 4 ES for x86
- Red Hat Enterprise Linux 4 WS/HPC for AMD64/EM64T
- Red Hat Enterprise Linux 4 WS/HPC for x86
- 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
- Red Hat Enterprise MRG 1.0 Realtime (x64)
- Red Hat Enterprise MRG 2.0 Realtime (x64)
- Solaris 10 Operating System

- SUSE LINUX Enterprise Real Time 11 AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for x86
- SUSE LINUX Enterprise Server 10 with Xen for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.0
- VMware ESX 4.1
- VMware ESXi 4.0
- VMware ESXi 4.1
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)

See the IBM ServerProven® website for the latest information about the specific versions and service levels supported and any other prerequisites:
http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml

Physical and electrical specifications

Dimensions and weight:

- Height: 85 mm (3.36 in)
- Width: 443 mm (17.5 in)
- Depth: 698 mm (27.5 in)
- Weight:
  - Minimum configuration: 21.1 kg (46.5 lb)
  - Maximum configuration: 29.6 kg (65 lb)

Supported environment:

- Air temperature
  - Server on: 10 to 35° C (50 to 95° F); altitude: 0 to 914 m (3,000 ft). Decrease system temperature by 0.75° C for every 1,000-foot increase in altitude.
  - Server off: 5 to 45° C (41 to 113° F)
  - Shipment: -40 to +60° C (-40 to 140° F)
- Humidity
  - Server on: 20 to 80%; maximum dew point 21° C; maximum rate of change 5° C/hr
  - Server off: 8 to 80%; maximum dew point 27° C
- Electrical
  - Models with 675 W power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 7.8 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 3.8 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.12 kVA
      - Maximum configuration: 0.78 kVA
  - Models with 460 W power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 5.3 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 2.6 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.12 kVA
      - Maximum configuration: 0.53 kVA
- BTU output
  - Minimum configuration: 307 Btu/hr (90 watts)
  - Maximum configuration: 2260 Btu/hr (780 watts)
- Noise level
  - 6.5 bels (operating)
  - 6.3 bels (idle)

Warranty options

The IBM System x3650 M3 has a 3-year onsite warranty with 9x5/next business day terms. IBM offers the warranty service upgrades through IBM ServicePacs, discussed in this section. 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, that is, each country might have its own service types, service levels, response times, and terms and conditions. Not all covered types of ServicePacs might be available in a particular country. For more information about IBM ServicePac offerings available in your country visit the IBM ServicePac Product Selector at:

https://www-304.ibm.com/sales/gss/download/spst/servicepac

The following table explains warranty service definitions in more detail.

Table 19. Warranty service definitions

Term	Description
IBM onsite 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 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. to 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 will arrive 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. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

In general, the types of IBM ServicePacs are as follows:

- 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
  - One or 2 years of warranty extension
- 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 international 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. 69950-1-03
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- IEC-60950-1:2001 (CB Certificate and CB Test Report)
- Taiwan BSMI CNS 13438, Class A; CNS 14336
- China CCC (4943-2001), GB 9254-2008 Class A, GB 17625.1:2003
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, GOST R 51317.3.3-99
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1,EK1-ITB2000)

External disk storage expansion

The external disk storage expansion enclosures listed in the following table are available.

Table 20. External storage expansion enclosures

Part number	Description	Maximum quantity supported per one M5025
172701X	IBM System Storage® EXP3000	18 (9 per port)
174712X	IBM System Storage EXP2512 Express	18 (9 per port)
174724X	IBM System Storage EXP2524 Express	9 (9 per port)

The hard disk drives listed in the following table are supported with external expansion enclosures.

Table 21. Hard drive options for external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
EXP3000 Hot-Swap SATA 3.5" Hard Drives		
43W7630	1000 GB Dual Port Hot Swap SATA	12
49Y1940	IBM 2 TB 7200 Dual Port SATA 3.5'' HS HDD	12
EXP3000 Hot-Swap SAS 3.5" Hard Drives		
44W2234	IBM 300 GB 15K 6 Gbps SAS 3.5" Hot-Swap HDD	12
44W2239	IBM 450 GB 15K 6 Gbps SAS 3.5" Hot-Swap HDD	12
44W2244	IBM 600 GB 15K 6 Gbps SAS 3.5" Hot-Swap HDD	12
EXP2512 Hot-Swap SAS 3.5" Hard Drives		
49Y1899	300 GB 15K 6 Gb SAS 3.5" HDD	12
49Y1900	450 GB 15K 6 Gb SAS 3.5" HDD	12
49Y1901	600 GB 15K 6 Gb SAS 3.5" HDD	12
49Y1903	1 TB 7,200 RPM 6 Gb SAS NL 3.5" HDD	12
43W7630	1000 GB Dual Port Hot Swap SATA	12
49Y1902	2 TB 7,200 RPM 6 Gb SAS NL 3.5" HDD	12
90Y8720	3 TB 7,200 RPM 6 Gb SAS NL 3.5" HDD	12
EXP2524 Hot-Swap SAS 2.5" Hard Drives		
49Y1896	146 GB 15K 6 Gb SAS 2.5” HDD	24
49Y1895	300 GB 10K 6 Gb SAS 2.5” HDD	24
81Y9596	600 GB 10K 6 Gb SAS 2.5” HDD	24
49Y1898	500 GB 7,200 RPM 6 Gb SAS NL 2.5” HDD	24
EXP2524 Hot-Swap SAS 2.5" Solid State Drives		
81Y9956	200GB 2.5" SAS SSD	24
81Y9960	400GB 2.5" SAS SSD	24

The RAID controllers listed in the following table are supported with external expansion enclosures.

Table 22. RAID controllers for external storage expansion enclosures

Part number	Description	Maximum quantity supported

46M0830	ServeRAID M5025 SAS/SATA Controller	4
46M0930	ServeRAID M5000 Series Advance Feature Key†	1 per one M5025
81Y4426	ServeRAID M5000 Series Performance Accelerator Key†	1 per one M5025

† Only one key is supported in each controller, either the Advance Feature Key or the Performance Accelerator Key.

The ServeRAID M5025 SAS/SATA Controller has the following specifications:

- Two Mini-SAS external connectors
- Supports RAID levels 0, 1, 5, 10, and 50
- Supports RAID 6 and 60 with the optional M5000 Advanced Feature Key
- Performance optimization for SSD drives with optional M5000 Series Performance Accelerator Key
- 6 Gbps throughput per port
- PCI Express 2.0 x8 host interface
- Based on the LSI SAS2108 6 Gbps ROC controller
- 512 MB of onboard cache
- Intelligent Li-Ion-based battery backup unit with up to 48 hours of data retention
- Supports connectivity to the EXP3000, EXP2512, and EXP2524 storage expansion enclosures

For more information, see the IBM Redbooks Product Guide *ServeRAID M5025 SAS/SATA Controller for IBM System x*: http://www.redbooks.ibm.com/abstracts/tips0739.html?Open

The external SAS cables listed in the following table are supported with external expansion enclosures and M5025 RAID controllers.

Table 23. External SAS cables for external storage expansion enclosures

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

* Note: The EXP3000 and EX2500 series can be chained with each other. In such a case, one cable is used to connect first EXP25xx or EXP3000 to the RAID controller, and every consecutive EXP unit is connected to previous one by one cable.

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. Refer to IBM System Storage Interoperability Center for further information, http://www.ibm.com/systems/support/storage/ssic.

Table 24. 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 Storage Systems category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=externalstorage

External backup units

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

Table 25. 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 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

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
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
00D8924	IBM Half High LTO Ultrium Gen 6 Internal SAS Tape Drive
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

* Note: The external tape drives listed can be ordered through System x sales channel. Server may support other IBM tape drives that are not listed in this table. Refer to IBM System Storage Interoperability Center for further information.
† Note: These part numbers are the tape drives options for 35732UL and 35734UL.

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 listed in the following table.

Table 26. 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
7309CR9	IBM System Networking RackSwitch G8264TR
7309CF9	IBM System Networking RackSwitch G8264TF
0719410	Juniper Networks EX4500 - Front to Back Airflow
0719420	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 listed in the following table.

Table 27. Uninterruptible power supply units

Part number	Description
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) listed in the following table.

Table 28. Power distribution units

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
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 supports the rack cabinets listed in the following table.

Table 29. Rack cabinets

Part number	Description
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

Rack options

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

Table 34. 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 Global Financing can help you obtain the IT solution you need while preserving funding for other strategic investments and optimizing cash flow. Our Fair Market Value (FMV) lease helps ensure that you have the latest IBM technology and with our mid-lease upgrade capability, you can increase the capacity of the system with little to no change in monthly payments. At the end of the lease, take advantage of our flexible end-of-lease options to fit your changing business needs. IBM Global Financing has the breadth and depth of offerings, longevity, proven success and global reach to help you develop a robust financing and asset management strategy that provides you the opportunity to leverage new technologies and turn your ambitious vision into a tangible solution.

Here are some other reasons why working with us makes solid financial sense:

- Expand your purchasing power—Affordable monthly payments allow you to change the technology acquisition discussion from “what can I afford right now” to “what solution is really right for my business.” IBM Global Financing allows you to expand your purchase power to get you the right solution.
- Accelerate your project’s cash flow break-even point—Acquire your IBM technology today and begin to realize its benefits now. An FMV lease can help you get the solution you need now, with low monthly payments that better align upfront costs with the anticipated return on investment from the technology.
- Easy to acquire with affordable rates—We offer one-stop shopping for a total IT solution, so you can acquire IBM hardware, software, services and the financing you need—from one IT provider.

Plus, we provide simple, easy-to-understand contracts and quick approvals. As the world’s largest IT financing provider, with an asset base of US$35.8 billion and over 125,000 customers, IBM Global Financing offers highly competitive rates that promote low total cost of ownership and low monthly payments.

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Related publications and links

For more information see these resources:

- *Installation and User's Guide - IBM System x3650 M3 (4255, 7376, 7945) and IBM Smart Analytics System 5600 (7949)*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5083595
- *Problem Determination and Service Guide - IBM System x3650 M3 (4255, 7376, 7945) and IBM Smart Analytics System 5600 (7949)*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5083596
- IBM System x Support Portal
  http://ibm.com/support/entry/portal/
  http://ibm.com/support/entry/portal/Downloads/Hardware/Systems/System_x/System_x3650_M3

Related product families

Product families related to this document are the following:

- 2-Socket Rack Servers

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