

An affordable single-socket, dual-core server with high performance and data protection for small and medium businesses



Product Guide

February 2008

IBM System x3200 M2

Product Overview

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Value-priced performance, capacity and availability

Suggested uses: Small/medium/large enterprises and distributed/remote offices seeking scalability, top performance, and enterprise-class availability features at an entry-level price.

The **single-socket IBM® System x3200 M2**, incorporating **IBM X-Architecture™** features, is an affordable, single-socket tower server that offers more performance, configuration flexibility and availability features than many other servers in its class. From network infrastructure to distributed applications to front-end workloads, the x3200 M2 is designed to meet a wide range of business needs and help you adapt to changing business requirements.

The x3200 M2 supports the latest **quad-core Intel® Xeon™**, **dual-core Xeon™**, and **dual-core Core 2 Duo®** processors, designed with either a **1333MHz** (Xeon) or an **800MHz** (Core 2 Duo) front-side bus (FSB), **64-bit extensions (EM64T)**, and up to **12MB** of L2 cache (model-specific), to provide the computing power you need to match your business needs and growth. In addition, the x3200 M2 uses industry-standard **667MHz PC2-5300 ECC** (Error Checking and Correcting) memory—for high performance and reliability.

All models offer impressive scalability, including up to **8GB** of memory and up to **four 3.5-inch simple-swap** or **hot-swap enterprise-class Serial ATA (SATA)** hard disk drives with a total capacity of up to **3TB**¹, or up to **four high-performance 3.5-inch hot-swap Serial-Attach SCSI (SAS)** drives with an internal storage capacity of **1.17TB**. For additional performance and high availability, the x3200 M2 offers *integrated* hardware **RAID-0/1/1E** support standard in the *hot-swap* SAS/SATA models (optional for *simple-swap* SATA models), and optional **RAID-10/5/6**. To meet your backup requirements, the x3200 M2 supports a choice of **half-high tape drives**, a **DVD-RAM** optical drive, or a **GoVault EZ** removable disk drive. The server ships as a tower unit; an optional **rack conversion kit** turns the x3200 M2 into a **5U** rack-mounted server to save precious data center floor space.

Standard in the x3200 M2 is a **mini Baseboard Management Controller (mBMC2)** that enables users to manage and control the server easily—both locally and remotely. This high level of manageability is designed to keep costs down and the system up—even when network usage increases. Other advanced features that help maximize network availability by increasing uptime, include **simple-swap** or **hot-swap/redundant HDDs**, **hot-swap/redundant power and fans**; **temperature-controlled fans** with **Calibrated Vectored Cooling™**; and industry-standard **IPMI 2.0** support, including **highly secure remote power control**.

With the inclusion of unique IBM service and support features such as **IBM Director**, **IBM ServerGuide™** and support for the optional **IBM Remote Supervisor Adapter II SlimLine**, the x3200 M2 is equally well designed for a locally managed data center environment as for a remotely managed or stand-alone environment, while offering maximum availability.

For a balance of high-performance dual-core processing, high availability and vast internal SAS storage at a budget price, the x3200 M2 is the ideal system.

Selling Features

Price/Performance

The x3200 M2 offers numerous features to boost performance and reduce product and operating costs:

- Models containing the **quad-core Xeon** processor, with high-end **1333MHz** front side bus and **12MB** of L2 cache, offer peak performance, capable of tackling the toughest jobs.
- Models containing the **dual-core Xeon** processor, with high-end **1333MHz** front side bus and **6MB** of L2 cache, offer superior performance and durability.
- Models containing the **dual-core Core 2 Duo** processor, with fast **800MHz** front side bus and **2MB** of L2 cache, offer high performance at an entry price.
- **Low-voltage processors** draw less power and produce less waste heat than high-voltage processors, thus helping to reduce data center energy costs. The **quad-core** Xeon processors, especially, are highly power-efficient, consuming only **23.75W per processor core**.

¹ GB equals 1,000,000,000 bytes and TB equals 1,000,000,000,000 bytes when referring to hard disk drive capacity. Accessible capacity may be less.

- Ultra-fast **667MHz PC2-5300 DDR II ECC** memory offers high speed and high availability.
 - One **x8 high-speed PCI-E** adapter slot offers investment protection by supporting high-performance adapters, such as Ethernet, Fibre Channel and InfiniBand cards, none of which will run in older conventional PCI slots.
 - Integrated **hardware RAID-0/1/1E** support at no extra charge and without consuming a valuable adapter slot. RAID-0 offers improved disk performance via data striping; RAID-1 offers disk mirroring for high availability, and RAID-1E provides mirroring functionality with an odd number of drives.
 - Support for up to **four hot-swap 3.5-inch SAS** or **SATA** hard disk drives, or up to **eight hot-swap 2.5-inch SAS** HDDs, offers high-performance with high availability. The SAS/SATA controller provides full-duplex (**2 x 300MBps**) data transfers for SAS drives. For lower cost with high capacity, other models support up to **four simple-swap Serial ATA** drives. The SATA drives offer performance approximately equal to that of Ultra320 SCSI.
 - The integrated **Gigabit Ethernet** controller with **IPMI 2.0** support provides high-speed network communications.
 - A **high degree of device integration**, including SAS/SATA, RAID-0/1, Gigabit Ethernet, systems management and video controllers, lowers costs and frees up valuable adapter slots.
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Flexibility

The x3200 M2 has the ability to grow with your application requirements, thanks to:

- A choice of one **quad-core Xeon** processor with **2.5 to 2.83GHz** clock rate, and **1333MHz** FSB, a **dual-core Xeon** processor with **3.0GHz** clock rate, and **1333MHz** FSB, or a **dual-core Core 2 Duo** processor with **2.4GHz** clock rate, and **800MHz** FSB.
 - A choice of **65W** or **95W** processors.
 - Up to **8GB** of high-speed DDR2 system memory.
 - **Four** or **five available** adapter slots: **two low-latency PCI-E (x8, x1)**, and **two legacy PCI** (32-bit, 33MHz) slots in all models. (An optional **PCI-X/66** slot is available as an add-on.)
 - **Seven USB 2.0** ports (six external, one *internal*), which are up to **40X** faster² than older **USB 1.1** ports. This provides speedy access to external HDDs (non-arrayed), optical drives, internal and external tape drives, and other USB devices. Two ports are on the front of the unit and four are on the back, for easy access. The internal port is reserved for a half-high tape drive.
 - **Up to four internal 3.5-inch simple-swap SATA** or **hot-swap SAS or SATA HDDs** or **eight 2.5-inch hot-swap SAS HDDs**, and a **half-high tape** drive, **DVD-RAM** drive, or **GoVault** drive. This provides tremendous internal storage capability, along with full data backup.
 - Alternatively, iSCSI or Fibre Channel-attached storage can be attached using **IBM System Storage™** or **TotalStorage™** servers.
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Manageability

Powerful systems management features simplify local and remote management of the x3200 M2:

- The x3200 M2 includes a **mini Baseboard Management Controller 2 (mBMC2)** to monitor server availability, perform Predictive Failure Analysis, etc., and trigger IBM Director alerts.
 - Integrated **IPMI 2.0** support alerts IBM Director to anomalous environmental factors, such as voltage and thermal conditions. It also supports **highly secure remote power control** using data encryption.
 - **IBM Director** is provided for proactive systems management. It comes with a portfolio of tools, including *Management Processor Assistant*, *RAID Manager*, *Update Assistant*, *Software Distribution* and a *Real Time Diagnostics* tool. In addition, IBM Director offers extended systems management tools for additional server management and increased availability.
 - An optional **Remote Supervisor Adapter II SlimLine** provides additional systems management capabilities, including *Web-based out-of-band control*; *virtual floppy and optical drive support*; *Windows "blue screen" error capture*; *LDAP and SSL support*; and *remote redirection of PCI video, text, keyboard and mouse*. And it does all this without consuming a valuable adapter slot.
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Availability and Serviceability

The x3200 M2 provides many features to simplify serviceability and increase system uptime:

- x3200 M2 servers use standard **ECC memory**, which can correct certain types of memory errors. This can help reduce downtime caused by memory failure.
 - **Toolless cover removal** provides easy access to upgrades and serviceable parts. Similarly, the **Remote Supervisor Adapter II SlimLine, simple-swap** or **hot-swap/redundant HDDs**, as well as **hot-swap/redundant fans** and **power supplies** (model-specific) can be installed and replaced without tools, meaning greater system uptime while these components are being serviced.
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² Data transfer rates may be less than the maximum possible.

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- Integrated **RAID-1/1E arrays** allow the server to keep operating in the event of a drive failure
- **IPMI 2.0** supports highly secure remote system power control using data encryption. This allows an administrator to restart a server without having to visit it in person, saving travel time and getting the server back up and running quickly and securely.
- **Temperature-controlled fans** adjust to compensate for changing thermal characteristics. At the lower speeds they draw less power and suffer less wear. Equally important in a crowded data center, temperature-controlled fans produce less ambient noise in the data center than if they were constantly running at full speed.
- The **three-year (parts and labor) limited onsite warranty³** offered on selected models (Machine Type **4368**) helps give you peace of mind and greater investment protection than a one-year warranty does.

Key Features



High-Performance Processors

The x3200 M2 supports either an Intel Xeon processor or an Intel Core 2 Duo processor, allowing you to choose the most appropriate processor for your business needs. The x3200 M2 offers a choice of processor clock rates, FSB speeds and power draws:

- **95W quad-core Xeon** processor model **X3350** or **X3360** running at **2.66** or **2.83GHz** (respectively), with 64-bit extensions, (**23.75W** per core), a **1333MHz** FSB, and **12MB** of L2 processor cache (2 x 4MB)—*when the processors are available from Intel*
- **95W quad-core Xeon** processor model **X3320** running at **2.5GHz**, with 64-bit extensions, (**23.75W** per core), a **1333MHz** FSB, and **6MB** of L2 processor cache (2 x 4MB —*when the processors are available from Intel*)
- **65W dual-core Xeon** processor model **E3110** running at **3.0GHz**, with 64-bit extensions, *low power draw* (**32.5W** per core), a **1333MHz** FSB, and **6MB** of L2 processor cache
- **65W dual-core Core 2 Duo** processor model **E4600** (operating at **2.4GHz**) with 64-bit extensions, *low power draw* (**32.5W** per core), an **800MHz** FSB, and **2MB** of L2 processor cache (1 x 2MB)

The **dual-core** processors contain **two complete processor cores**; **quad-core** processors, similarly, contain **four** cores. Dual-core processors contain one **unified cache shared** by both cores, while quad-core processors have **independent** caches (one per pair of cores). The shared cache is dynamically allocated between the two cores as needed. The two cores appear to software as two physical processors. The dual-core processors offer considerably higher performance than a same-speed Xeon processor with a single core. Likewise, quad-core processors offer considerably higher performance than a same-speed Xeon processor with dual cores.

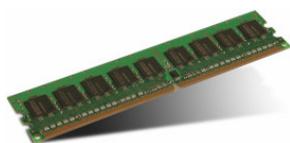
Intel **Extended Memory 64 Technology (EM64T)** 64-bit extensions allow the Xeon processor to use large memory addressing when running with a 64-bit operating system. This in turn lets individual software processes directly access more than 4GB of RAM, which was the limit of 32-bit addressing. This can result in much higher performance for certain kinds of programs, such as database management and CAD. Additional registers and instructions (SSE3) can further boost performance for applications written to use them. Contact your software providers to determine their software support for EM64T.

The **1333MHz** FSB (which connects memory to the processor) offers a peak rate of **10.67GBps**, or up to **two-thirds** higher throughput at the same processor clock speed than an **800MHz** FSB. This may result in much higher data transfer rates.

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.

High-Speed DDR II ECC Memory



The x3200 M2 ships with either one or two DIMMs installed and supports up to **8GB** of memory in **4** DIMM sockets. It uses **PC2-5300** double data rate II (DDR II) memory (operating at **667MHz**) for faster access, and provides ECC memory protection.

The x3200 M2 supports either **1**, **2**, or **4** DIMMs. When 2 or 4 DIMMs are installed, memory operates in **two-way interleaved** mode for increased performance.

Memory is available in kits consisting of *one* **512MB** or *two* **1GB** or **2GB** DIMMs.

³ For terms and conditions or copies of the IBM Statement of Limited Warranty, call 800-772-2227 in the U.S. In Canada call 800-426-2255. Telephone support may be subject to additional charges. For warranties including onsite labor, a technician is sent after IBM attempts to resolve the problem remotely. International warranty service is available in any country in which this product is sold.

Hot-Swap/Redundant Components

System availability is maximized through the use of hot-swap and redundant components, including:

- **Hot-swap/redundant** or **simple-swap hard disk drives** (with **RAID-1/1E** protection standard)
- **Hot-swap, redundant power supplies** (optional, model-specific)

Disk/Tape Controllers

Some x3200 M2 models include an integrated **four-port LSI 1064e SAS/SATA** controller. Other x3200 M2 models include a **SATA** controller only, integrated into the Intel chipset. (All models provide a dedicated internal SATA port for a GoVault removable disk backup device.)

The integrated controller in all **hot-swap** models supports up to **four 3.5-inch** or **eight 2.5-inch** internal **SAS LVD** (low-voltage differential) **hot-swap** drives standard, and provides data transfer speeds of up to **300MB** per second⁴ in *each* direction (**full-duplex**) for **SAS** drives, for an aggregate speed of **600MBps**, nearly double that of Ultra320 SCSI's **320MBps** (half-duplex) bandwidth. The serial design of the SAS bus allows maximum performance to be maintained as additional drives are added. This controller also supports up to **four** Serial ATA (**SATA**) drives at **300MBps (half-duplex)**.

The integrated controller in the *hot-swap* models offers *hardware RAID-0/1/1E* support for SAS or SATA drives. An optional **ServeRAID-MR10i** controller can be added for **RAID-10/5/6** support, as well as optional battery backup with 256MB of cache memory.

The *simple-swap* SATA models offer an integrated **SATA** controller, which supports up to **four** internal **simple-swap LVD SATA** drives at the same **300MBps (half-duplex)** throughput.

Large HDD Storage Capacity

The x3200 M2 offers a choice of disk storage, supporting up to **four 3.5-inch simple-swap** Serial ATA (**SATA**) drives or **four 3.5-inch hot-swap** high-performance Serial-Attach SCSI (**SAS**) or SATA drives, or up to **eight 2.5-inch hot-swap SAS** drives.



SAS 3.5-inch Hot-Swap

- **10,000 RPMs** — 73.4, 146.8 or **300GB (1.2TB maximum)**
- **15,000 RPMs** — 73.4 or **146.8GB (587.6TB)**

SATA 3.5-inch Simple-Swap or Hot-Swap

- **7,200 RPMs** — 160, 250, 500 or **750GB (3.0TB)**

SAS 2.5-inch Hot-Swap

- **10,000 RPMs** — 73.4, or **146.8GB (1.174TB maximum)**

Notes: Enterprise-class 500GB or higher SATA drives offer increased reliability compared to lower-capacity SATA drives. Hot-swap SAS drives use the Converged Tray for interchangeability with other IBM System x™ and IBM eServer™ xSeries® systems.

If you need more storage space, terabyte capacities are possible with external direct-attach, NAS and SAN solutions.

Drive Bays

Some x3200 M2 models contain **7** drive bays standard (**3.5-inch HDD** models), while others provide **11** drive bays (**2.5-inch** models). All models offer **two 5.25-inch** bays, **one 3.5-inch** floppy drive bay, and either **four 3.5-inch** HDD bays or **eight 2.5-inch** HDD bays. Some models support up to **four hot-swap SAS** or **SATA** drives; other models support up to **four simple-swap SATA** drives.

An optical drive (**48X/32X/48X/16X** CD-RW/DVD-ROM Combo drive) with a SATA interface ships standard in one 5.25-inch bay. The other 5.25-inch bay supports one of several backup options: a **half-high tape** drive, a **DVD-RAM** drive, or a **GoVault** removable disk drive. The tape drive must have a **SCSI** or **USB 2.0** interface. (A SCSI tape drive would require an optional SCSI controller; an internal USB port is provided standard.) The GoVault drive has a **SATA** interface. No diskette drive is supplied with any model; an *external* USB floppy drive may be used, if needed.

Hot-swap and simple-swap drives may be inserted or removed through the front of the server. **Hot-swap** drives *do not* require powering off the system. **Simple-swap** SATA drives *do* require powering off the system first; however, no tools or jumpers are required for installation and removal, allowing for faster, simpler servicing than fixed drives.

For still more storage, a direct-attach, iSCSI, or SAN external expansion option can be added, using an optional controller.

⁴ Data transfer rates depend on many factors and are often less than the maximum possible.

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High-Performance Adapter Slots

The x3200 M2 offers **four** adapter slots **standard**, plus **one optional** one. **Two PCI-E (PCI Express) full-length/full-height** adapter slots **are provided**. One (Slot 2) is a **x8** ("by 8") **4GBps** slot, capable of supporting **x1/x4/x8** adapters at full speed. The other (Slot 1) is a **x1** (500MBps) slot, capable of accepting x1 or x4 adapters⁵. **Slots 3 and 4** are **full-length/full-height** legacy **33MHz PCI** slots.

In addition, an optional **PCI-X/66** adapter slot is available, using an add-in daughtercard.

PCI-Express is a high-performance, low-latency, next-generation serial I/O bus that is rapidly replacing the older parallel PCI and PCI-X buses. A **x8** PCI-E adapter offers approximately *four times* the maximum throughput of a 133MHz PCI-X adapter⁶. (A **x1** adapter offers throughput similar to a 64-bit **66MHz** PCI-X slot.)

The RAID daughtercard and Remote Supervisor Adapter II SlimLine card plug into dedicated slots on the planar. This, coupled with the fact that the **SAS/SATA**, **Gigabit Ethernet**, **systems management** and **video** controllers are integrated onto the system board, means that all PCI/PCI-E adapter slots are all *available*, which provides a wide degree of latitude in expansion options.

Internal Backup

The x3200 M2 supports several internal **half-high backup** options. Supported technologies include:

- DDS-5 (SCSI, SATA)
- DDS-6 (USB)
- DLTV4 (SATA)
- DVD-RAM (SATA)
- GoVault EZ (SATA)
- LTO-2 (SCSI)
- LTO-3 Ultrium (SCSI, SAS)
- VXA-3 (SCSI)



Gigabit Ethernet Controller

The x3200 M2 includes **one** integrated **Broadcom 5722** Gigabit Ethernet controller for up to 10X higher maximum throughput than a 10/100 Ethernet controller. In addition, the 5722 supports **IPMI-over-LAN**.

It also supports highly secure remote power management using **IPMI 2.0**, plus **Wake on LAN**[®] and **PXE** (Preboot Execution Environment) flash interface. Optional PCI adapters offering failover and load balancing between adapters are available for added throughput and increased system availability.

Ultra-Efficient Cooling

Strategically located fans, combined with efficient airflow paths, provide highly effective system cooling for the x3200 M2, known as **Calibrated Vektored Cooling**. The server includes **three hot-swap** fans. In addition, each power supply contains a fan.

The fans automatically adjust speeds in response to changing thermal requirements, from minimum RPMs to maximum, depending on the zone, redundancy, and internal temperatures. When the temperature inside the server increases, the fans speed up to maintain the proper ambient temperature. When the temperature returns to a normal operating level, the fans return to their default speed. Why not simply run the fans at 100% capacity all the time? For several good reasons: to reduce the ambient noise, reduce the wear-and-tear on the fans and reduce the server power draw. The reduction in ambient noise and power draw may be relatively minor for a single server, but put dozens or hundreds in a data center and it can make a big difference!

In addition, the server uses **hexagonal ventilation holes** in the chassis. Hexagonal holes can be grouped more densely than round holes, providing greater airflow through the system cover.

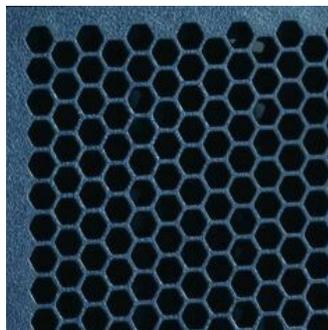
This cooling scheme is important because newer, more powerful, processors generate a significant amount of heat, and heat must be controlled for the system to function properly.

Other Features

- **Seven USB 2.0 ports** — Provides flexibility to add high-speed external devices. The USB 2.0 specification supports up to 480Mbps transfer rates. (Note: Not all USB 2.0 devices are capable of achieving this rate.) Two ports are provided on the front of the server, four are on the back, and one is internal to support a USB-interface tape drive.
- **Remote Supervisor Adapter II SlimLine support** — This optional full-function systems

⁵ The slot accepts x1 or x4 adapters; however the slot provides x1 throughput only.

⁶ Actual throughput will depend on the adapter vendor's implementation.



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management adapter adds local and remote management functions without consuming an adapter slot.

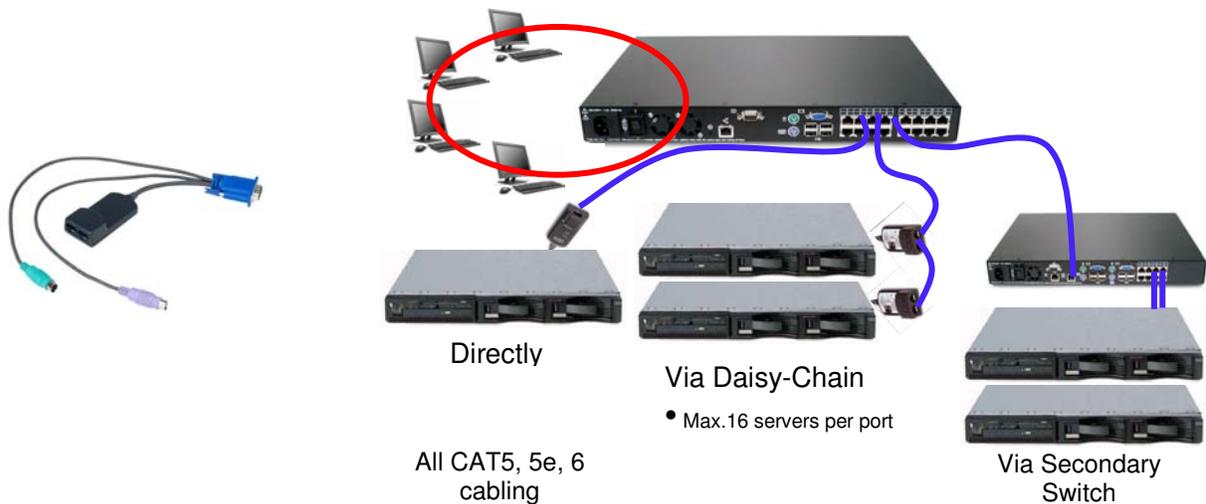
- **Toolless chassis** — The cover can be opened without tools, and many components can be installed or removed and replaced without tools, including the optical drive, hot-swap HDDs, PCI and PCI-E adapters, as well as the integrated RAID controller and optional Remote Supervisor Adapter II SlimLine. This can save a servicer significant time.

Rack Cable Management and KVM Console Switching

IBM Advanced Cabling Technology (**ACT**) is an optional feature that offers many advantages over standard KVM cabling across the entire System x and xSeries product line. So now you can interconnect all of your servers with one smart cabling architecture. ACT cabling eliminates the need for one-to-one direct connections between each server and a KVM switch by using a daisy-chain approach.

The snarl of cabling behind most racks is at best inconvenient to work around and at worst an expensive logistical nightmare, requiring the rewiring of servers, PDUs, KVM switches, and other equipment whenever a rack server is added or removed. Even worse, the veil of cables blocks rack airflow and can actually contribute to equipment failure due to overheating. ACT cabling is the solution for reducing behind-the-rack cabling by as much as **87%**.

The illustration below shows a sample ACT configuration:



Conventional cabling has bulky KVM cables exiting each server, which then connect to a KVM switch. The cables exiting a series of KVM switches must then be aggregated via additional KVM switches and PDUs, which only increases the number—and cost—of cables, KVM switches and PDUs. Instead, the daisy-chain approach of ACT cabling uses readily available, inexpensive CAT5 and 6 cabling to considerably *reduce* the number of cables, KVM switches, and PDUs needed, rather than increasing them. If a server is removed or added, no complicated rewiring is needed. One cable connects the first server in the rack to the next, and so on. Up to **16** servers form a chain; up to **8** chains can connect to one Local Console Manager (LCM); **16** LCMs can connect to one Global Console Manager (GCM). In this manner, up to **2,048 servers** can be centrally managed. Equally importantly, with ACT—unlike some other offerings—everything is done externally via cabling; *no* special adapters are required.

Extensive System Support Features

The IBM services and technical support portfolio provides world-class, consistent, high-quality service and support. The x3200 M2 server offers a number of tools and services designed to make ownership a positive experience. From the start, IBM programs make it easier for customers to plan for, configure and purchase System x or xSeries servers, get them running and keep them running long-term. These features include IBM ServerProven[®], the IBM Standalone Solutions Configuration Tool, IBM System x and BladeCenter Power Configurator, IBM ServerGuide, IBM Electronic Service Agent[™], Product Customization Services and extensive technical support offerings.



The IBM **ServerProven** program provides the confidence that specific options and operating systems have been tested on the server and are officially supported to work together. It is updated frequently to ensure that the latest compatibility information is always at your customers' fingertips.

The IBM **Standalone Solutions Configuration Tool** (SSCT) is a downloadable tool that simplifies the often complex chore of configuring a full rack of servers (including blade servers) and confirming that you have all the cables, power distribution units, KVM (keyboard, video and mouse) switch boxes and other components you need, as well as the proper airflow clearances, electrical circuits and other

environmental conditions.

IBM System x and BladeCenter Power Configurator helps IT managers plan for data center power needs, by providing the following information for specific configurations of System x and BladeCenter systems: *power input* (watts), *PDU sizing* (amps), *heat output* (BTUs), *airflow requirements through chassis* (CFM), *VA rating*, *leakage current* (mA), and *peak inrush current* (amps).

IBM ServerGuide (installed from CD) simplifies the process of installing and configuring System x and xSeries servers. ServerGuide goes beyond mere hardware configuration by assisting with the automated installation of the Microsoft® Windows® Server 2000 and 2003 operating systems, device drivers and other system components, with minimal user intervention. (Drivers are also included for support of Novell NetWare, Red Hat Linux and SUSE LINUX.) This focus on deployment helps customers reduce both their total cost of ownership and the complexity that administrators and technical personnel face.

IBM Electronic Service Agent™ is an innovative “call home” feature that allows System x and BladeCenter servers to automatically report hardware problems to IBM support, which can even dispatch onsite service⁷ if necessary to those customers entitled to onsite support under the terms of their warranty or an IBM Maintenance Agreement. Electronic Service Agent resides on a server and provides electronic support and problem management capabilities through a highly secure electronic dialogue between your systems and IBM. It monitors networked servers for hardware errors and it can perform hardware and software inventories and report inventory changes to IBM. All information sent to IBM is stored in a highly secure database and used for improved problem determination.

Additional services include hardware warranty upgrades and factory-installed **Product Customization Services** (PCS), such as asset tagging, hardware integration, software imaging and operating systems personalization.

IBM offers extensive **technical support** by phone and via the Web. Support options include links to forums/newsgroups, problem submission, online shopping support, service offerings, device drivers for all IBM product lines, software downloads and even upcoming technical seminar worldwide schedules and registration. Also available are remote installation, configuration and usage support for System x and xSeries hardware and software, as well as onsite custom services to give customers the level of expertise they require.

Advanced Systems Management Capabilities

The x3200 M2 has a high level of systems management capabilities that are well-suited to remote locations as well as to stand-alone environments. Features include the mini Baseboard Management Controller 2 (mBMC2), Automatic Server Restart, Wake on LAN® support, PXE support, Predictive Failure Analysis, Text Console Redirection over LAN, IBM Director and support for an optional Remote Supervisor Adapter II SlimLine.

The mBMC2 provides industry-standard **Intelligent Platform Management Interface (IPMI) 2.0**-compliant systems management. It provides a number of important system functions, including:

- Monitoring of system and battery voltage, system temperature, fans, power supplies, processor and DIMM status
- Fan speed control
- Product ID and Family ID detection
- Highly secure remote power on/off
- System reset control
- NMI/SMI detection and generation
- System diagnostic LED control (power, HDD, activity, alerts, heartbeat)
- IPMI over LAN
- Serial Over LAN
- Proxy server support
- LAN messaging and alerting
- VLAN support
- Enhanced authentication and encryption algorithms (RMCP+, SHA-1, AES)
- Local update of BMC firmware
- Firmware firewall
- Support for IPMI v2.0 compliant management software (e.g., xCAT)
- Other mandatory and optional IPMI BMC functions

The mBMC2 alerts IBM Director to anomalous environmental factors, such as voltage and thermal conditions—even if the server has failed.

⁷ For onsite labor, IBM will attempt to diagnose and resolve the problem remotely before sending a technician.

The x3200 M2 also supports an optional IBM **Remote Supervisor Adapter II SlimLine** for additional systems management capabilities, including:

- Graphical console redirection over LAN
- Web-based out-of-band control
- Windows “blue screen” capture
- Remote virtual floppy and CD-ROM
- High-speed remote redirection of PCI video, keyboard and mouse
- SSL (Secure Socket Layer) and LDAP (Lightweight Directory Access Protocol) support

Automatic Server Restart (ASR) helps reduce downtime by restarting the server automatically in the event of a system lockup. ASR technology is a combination of hardware circuitry tied into the server’s system reset function and a device driver. As long as the server continues running, the ASR watchdog timer will keep being reset, but if the operating system crashes or the hardware freezes somehow the ASR software will be unable to reset the hardware timer. If the timer is not reset within five minutes, it automatically triggers the ASR hardware, which immediately restarts the server (and logs an ASR event with IBM Director). These features are designed so that *no more than five minutes can pass before the server is restarted*.

Wake on LAN permits the server to be remotely powered on if it has been shut off. Once powered up, the server can be controlled across the network, using the **Preboot Execution Environment (PXE)**.

Like Wake on LAN, PXE is system firmware. It allows software such as the optional **IBM Remote Deployment Manager** to take control of a system before the BIOS, operating system or applications are loaded (using Wake on LAN/PXE) and lets an administrator perform many low-level tasks remotely that would otherwise require a visit to each system. These tasks may include such things as formatting a hard disk drive, updating system firmware, or deploying a Windows or Linux operating system.

Predictive Failure Analysis (PFA) is designed to allow the x3200 M2 to detect impending failure of supported components (processors, memory, voltage regulator modules, fans, and hard disk drives) *before* actual failure, and alert the administrator through IBM Director. This gives you the ability to replace the failing component *before* it fails, resulting in increased uptime.

Text Console Redirection support allows the administrator to remotely view text messages via LAN.

IBM Director software for advanced workgroup management is included with the x3200 M2. IBM Director comes with a portfolio of tools, including *Management Processor Assistant, Rack Manager, RAID Manager, Update Assistant and Software Distribution. System Availability* (a no-charge download) and *Capacity Manager* (sold separately) are available as add-ons for additional server management and increased availability. IBM Director provides a single uniform graphical interface for all of these systems management functions.

IBM Director enables you to customize thresholds and monitor system components (for things like temperature, voltage regulation, etc.) to help maximize uptime.

IBM developed **IBM Systems Director Active Energy Manager for x86** to put control of system power-saving features at the fingertips of administrators. Active Energy Manager is a combination of hardware and software designed to take advantage of new features, such as monitoring power usage and balancing the performance of the system according to available power input. It provides the ability to plan and predict power consumption based on your hardware configuration. It also helps enable you to reduce the infrastructure required for redundancy, by using fewer servers on smaller power feeds and potentially lowering your overall data center support costs. It does this by inventorying all components, then adding up the total power draw and tracking the usage.

Key Options

IBM options for System x servers let you take your servers to a higher level

You can rely on System x options to supply a complete solution for your business needs. Options help you create an optimized server system to meet your data protection, storage and availability needs. Every IBM option is designed and tested for peak performance and flexibility, helping to maximize your return on investment. The combination of System x servers and options lets you keep your fingers on the pulse of your e-business.

Memory — Memory is a significant factor in systems application performance. Adding more memory to a System x server is one of the most effective ways to increase application performance. For best performance in a server with a dual-core processor, there should be twice as much memory available as for a single-core processor. When memory is installed in pairs, the x3200 M2 provides two-way interleaving for added performance.

Hard Disk Drives — IBM hard disk drives help customers improve the transaction and cost performance of their System x servers. The choice of hard disk drives can be a critical aspect of maximizing the I/O throughput of the system. **SAS** hard disk drives (3.5-inch) are available for the x3200 M2 with capacities up to **300GB** at **10,000** RPMs and up to **146.8GB** at **15,000** RPMs. Enterprise-class **SATA** hard disk drives are available with capacities up to **750GB** (3.5-inch) at **7,200** RPMs. In addition,

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2.5-inch hot-swap SAS drives with capacities of up to **146.8GB** at **10,000 RPMs** are supported in some models.

Power Supply — The optional second power supply for the x3200 M2 enables redundancy for hot-swap power in selected models.

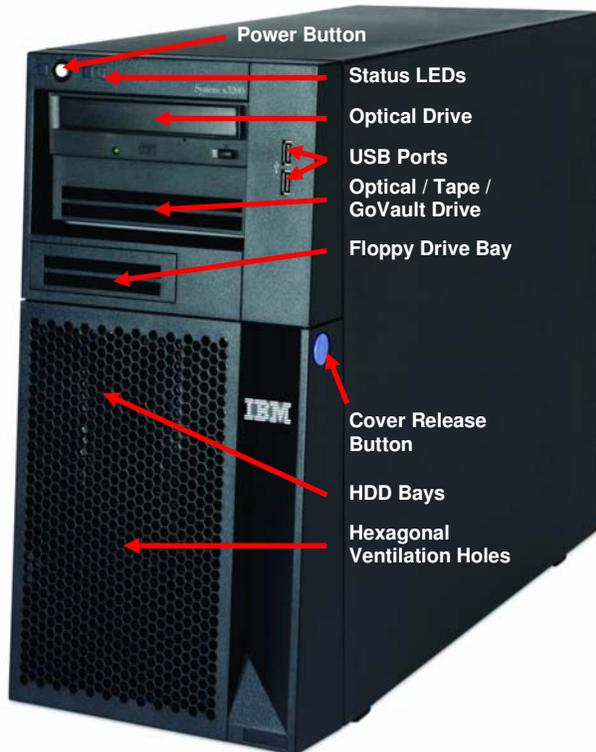
Remote Supervisor Adapter II SlimLine — The x3200 M2 includes a plethora of systems management features built-in; however, sometimes additional management capability is needed. In those situations, the Remote Supervisor Adapter II SlimLine not only offers powerful new features, it does so without taking up a valuable PCI-E adapter slot, using a dedicated slot on the motherboard instead.

External Storage — The IBM **TotalStorage DS3000, DS4000, DS6000, and DS8000** series, as well as the **System Storage DS4000, N3000, N5000, and N7000** series, comprise a powerful and broad shared storage family with integrated management software designed to meet midrange and enterprise needs. For lower-end needs, IBM offers the TotalStorage **DS400** storage enclosure.

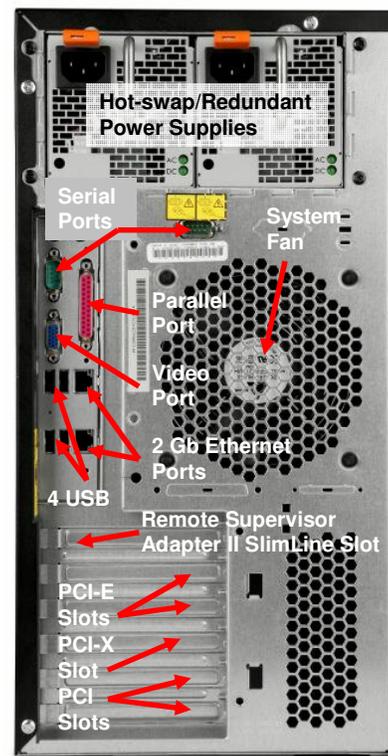
External SAN, iSCSI, and direct-attach storage is available using one of several IBM System Storage and TotalStorage host bus adapters. Additionally, external LAN-attached tape storage is available.

x3200 M2 Images

Front View

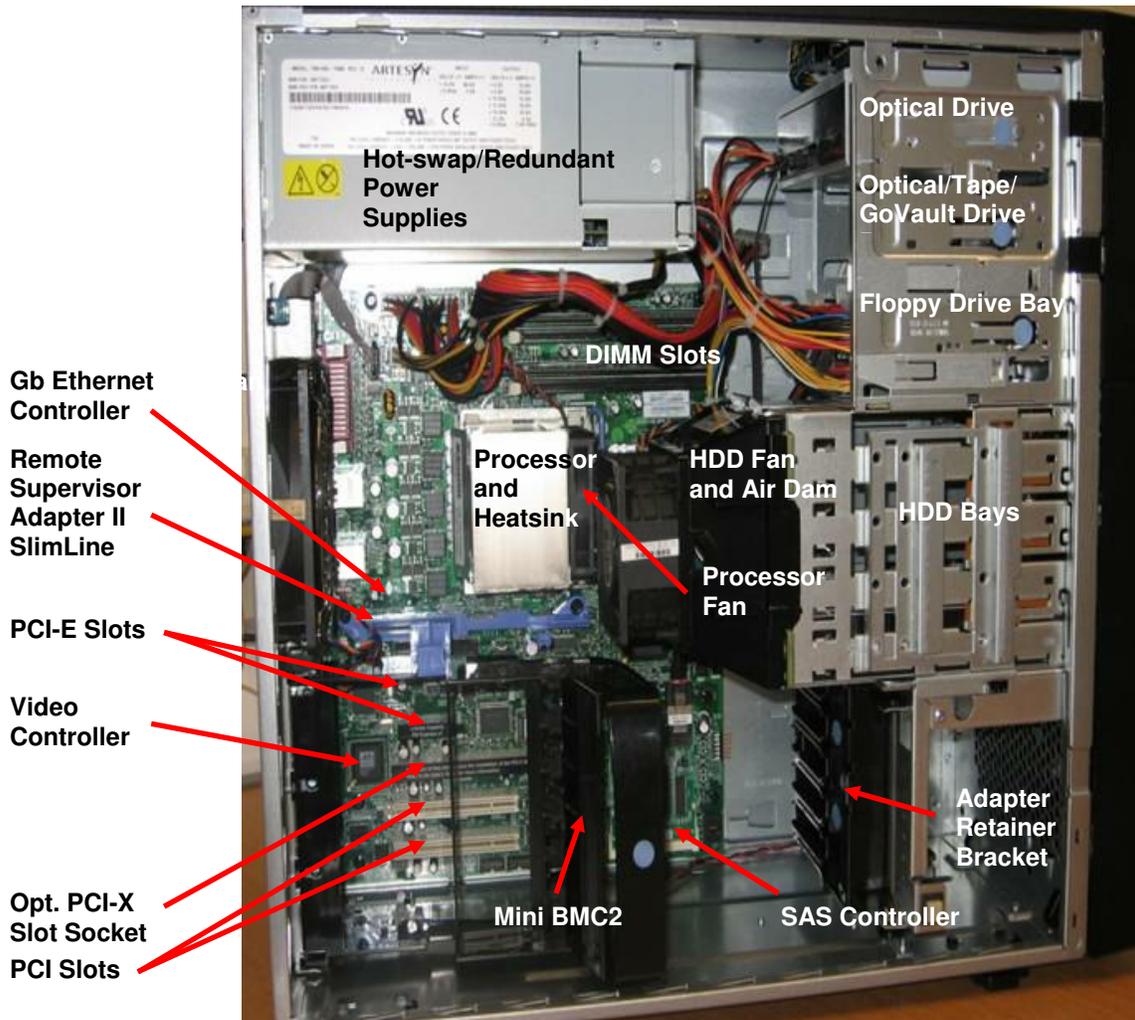


Rear View



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Interior View



| x3200 M2 Specifications | | | |
|---|--|---|---|
| Machine type | 4367-2xX/2xY, 3xX/3xY, 4xX/4xY, 5xX/5xY, 7xX/7xY (1 yr. war.) 4368-2xX/2xY, 3xX/3xY, 4xX/4xY, 5xX/5xY, 7xX/7xY (3 yr. war.) | | |
| Form factor | Tower (convertible to 5U rack) | | |
| Processor type | Quad-core Xeon (E33xx) 2.5GHz E3320 (4xX/4xY), 2.66GHz E3350 (5xX/5xY), 2.83GHz E3360 (7xX/7xY) | Dual-core Xeon (E31xx) 3.0GHz E3110 (3xX/3xY) | Dual-core Core 2 Duo (E46xx) 2.4GHz E4600 (2xX/2xY) |
| Maximum processor power draw | 95W (4xX/4xY, 5xX/5xY, 7xX/7xY) | | 65W (2xX/2xY, 3xX/3xY) |
| Front-side bus (FSB) speed | 800MHz (2xX/2xY) | | 1333MHz (3xX/3xY, 4xX/4xY, 5xX/5xY, 7xX/7xY) |
| # of processors standard / maximum | 1 / 1 | | |

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| x3200 M2 Specifications | | | | |
|--|---|---|---|--|
| Internal L2 cache | 12MB (independent 6MB cache per pair of cores)—4xX/4xY, 5xX/5xY, 7xX/7xY | 6MB (shared 6MB cache)—3xX/3xY | 2MB (shared 2MB cache)—2xX/2xY | |
| Chipset | Intel 3210 | | | |
| Standard / maximum memory⁸ | 2GB (2 x 1GB) / 8GB (7xX/7xY) | 1GB (2 x 512MB) / 8GB (3xX/3xY, 4xX/4xY, 5xX/5xY) | 512MB (1 x 512MB) / 8GB (2xX/2xY) | |
| Standard memory type | Unbuffered PC2-5300 (667MHz) DDR II ECC (non-Chipkill) | | | |
| Memory interleaving | Yes (two-way with pairs of DIMMs) | | | |
| DIMM capacities supported | 512MB, 1GB, 2GB | | | |
| # of DIMM sockets total / available | 4 / 3 (2xX/2xY) | | 4 / 2 (3xX/3xY, 4xX/4xY, 5xX/5xY, 7xX/7xY) | |
| # of DIMMs supported | 1, 2, or 4 | | | |
| Online spare memory supported | No | | | |
| Memory mirroring supported | No | | | |
| # of drive bays total / available | 11 / 10 | | 7 / 6 | |
| # of HDD drive bays total / available | 8 / 8 2.5-inch (52X/52Y, 74X/74Y) | | 4 / 4 3.5-inch (2xX/2xY, 3xX/3xY, 4xX/4xY, 54X/54Y, 72X/72Y) | |
| # of 5.25" bays total / available | 2 / 1 (optical drive installed) | | | |
| Maximum HDD capacity standard | 3TB (4 x 750GB) 3.5-inch hot-swap SATA | 3TB (4 x 750GB) 3.5-inch simple-swap SATA | 1.2TB (4 x 300GB) 3.5-inch hot-swap SAS | 1.17GB (8 x 146.8GB) 2.5-inch hot-swap SAS |
| HDD capacities supported | 3.5-inch SAS 73.4, 146.8, 300GB—10K RPMs; 73.4, 146.8GB—15K RPMs | 3.5-inch SATA 160, 250, 500, 750GB—7.2K RPMs | 2.5-inch SAS 73.4, 146.8GB—10K RPMs | |
| # of HDDs standard | None | | | |
| Disk drive technology | 3.5-inch hot-swap SAS/SATA (34X/34Y, 42X/42Y, 54X/54Y, 72X/72Y) | 3.5-inch simple-swap SATA (2xX/2xY, 32X/32Y) | 2.5-inch hot-swap SAS (52X/52Y, 74X/74Y) | |
| Integrated disk controller | Four-port LSI 1064e SAS/SATA—hot-swap models | | Four-port SATA (via chipset)—simple-swap models | |
| # of disk drives supported per port | 1 | | | |
| Integrated RAID controller | LSI 1064e (hot-swap models only) for RAID 0/1/1E | | | |
| Optional RAID controllers supported | LSI 1064e (simple-swap models only) for RAID 0/1/1E; ServeRAID-MR10i for RAID-0/1/1E/10/5/6 | | | |
| Internal backup drives supported | 1 half-high 5.25-inch tape drive (SCSI, SAS or USB); or 1 GoVault (SATA); or 1 DVD-RAM (SATA) | | | |
| # of optical drives standard | 1 SATA CD-RW/DVD-ROM (48X, in dedicated 5.25" bay) | | | |
| # of diskette drives standard | None (USB-attach) | | | |

⁸ Maximum memory and disk capacity may require the replacement of standard components with the largest supported component available.

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| x3200 M2 Specifications | | |
|---|--|--|
| # of adapter slots total / available | 4 / 4 (standard) or 5 / 5 (optional) | |
| # of PCI-E x8 slots (4GBps) | 1 full-height/full-length | |
| # of PCI-E x1 slots (500MBps) | 1 full-height/full-length ⁹ | |
| # of PCI-X/66 slots (500MBps) | 1 full-height/full-length (optional via daughtercard) | |
| # of legacy 33MHz legacy PCI slots | 2 | |
| # of video ports | 1 | |
| Video controller | ATI Radeon ES1000 | |
| Video memory | 32MB SDRAM | |
| Maximum video resolution at 32-bit color | 1024 x 768 x 32-bit color at 85Hz | |
| Gigabit Ethernet controller | Broadcom BCM5722 | |
| # of Gigabit Ethernet ports | 1 (rear) | |
| # of RS485 ports | None | |
| # of serial ports | 2 ¹⁰ (rear) | |
| # of parallel ports | 1 (rear) | |
| # of PS/2 mouse ports | None (USB-attach) | |
| # of PS/2 keyboard ports | None (USB-attach) | |
| # of USB 2.0 ports | 6 external ports (2 front, 4 rear), plus 1 internal connector for tape drive | |
| Integrated systems management controller | Yes (mBMC2) | |
| Optional systems management adapter | Remote Supervisor Adapter II SlimLine | |
| Light path diagnostics support | None | |
| Predictive Failure Analysis support | Processors, memory, voltage regulator modules (VRDs), HDDs, PCI-E slots, and fans | |
| Hot-swap/redundant power supported | Yes / Yes (54X/54Y, 74X/74Y) | No / No (all other models) |
| # of power supplies standard / maximum | 1 / 2 (54X/54Y, 74X/74Y) | 1 / 1 (all other models) |
| Power supply size | 430W universal, autoswitching (54X/54Y, 74X/74Y) | 400W universal, autoswitching (all other models) |
| # of fans/blowers standard / maximum | 3 / 3 (plus one fan per power supply) | |
| Hot-swap/redundant fans supported | No | |
| Heat emitted: minimum / maximum BTUs per hour | 630 / 1784 (model-specific) | |
| Maximum altitude | 7,000 ft; 2,133 m | |
| Operating temperature range | 50 – 95° F; 10 – 35° C (up to 3,000 ft / 914.4 m); 50 – 90° F; 10 – 32° C (3,000 ft / 914.4m to 2,133m) | |
| Operating humidity range | 8-80% | |
| Dimensions (HWD) / weight | 17.25" (438mm) H 8.5" (216mm) W 21.25" (540mm) D 30.4" (772mm) D (with redundant power) | 36 (minimum) – 56 lb (maximum) 16.3 – 25.2 kg |

⁹ The slot accepts x1 or x4 adapters, however the slot provides x1 throughput only.

¹⁰ If the Remote Supervisor Adapter II SlimLine is installed, COM2 is disabled.

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| x3200 M2 Specifications | | |
|------------------------------------|---|---|
| Operating systems supported | Microsoft Windows Server 2003 & R2 (Standard/Web/Enterprise Editions) 32/64-bit, Windows Small Business Server 2003 & R2 (SE/PE), RHEL 4/5 32/64-bit, SLES 9/10 32/64-bit, SLES 9 Open Enterprise Server, NetWare 6.5/NetWare 6.5 Open Enterprise Server, SCO UnixWare 7.1.4, IBM OS4690 V4 | |
| Length of limited warranty | 3 years (parts and labor) ¹¹ — Machine Type 4368 | 1 year (parts and labor) — Machine Types 4367 |

The Bottom Line

The x3200 M2 is an extremely powerful entry system, incorporating leading-edge industry-standard features and adding IBM-unique innovations:

Price/Performance

- **High-throughput processors** — A choice of **2.5GHz to 2.83GHz quad-core** or **3.0GHz dual-core Xeon** processors
- **Low-cost dual-core Core 2 Duo** processors
- **Low-energy-draw Core 2 Duo** and **Xeon** processors, to help save you money on energy usage
- **Large cache** — **2MB, 6MB, or 12MB** of L2 processor cache (processor-dependent)
- **64-bit extensions** (EM64T)
- **High-performance front-side bus** — **800MHz** or **1333MHz** FSB (model-specific)
- **High-performance memory** — **667MHz PC2-5300 DDR II** ECC memory standard with **two-way interleaving**
- **High-performance disk technology** — Integrated **SAS/SATA** controller and slotless *hardware*-based **RAID** controller (standard in hot-swap models; optional in simple-swap models)
- **High-performance external expansion** — **Seven** 480Mbps **USB 2.0** ports (two front, four rear, one internal)
- **High-performance communications** — Integrated **Gigabit Ethernet** controller
- **Fast I/O** — **PCI-E x8** adapter slot

Flexibility

- **Large memory capacity** — Up to **8GB** of **ECC memory**, using **4 DIMMs**
- **High-capacity disk storage** — Up to **1.2TB** of internal **3.5-inch hot-swap SAS** storage or **3TB** of **hot-swap** or **simple-swap** SATA storage, or up to **1.17TB** of **2.5-inch hot-swap SAS** storage
- Support for an **optional half-high tape, DVD-RAM, or GoVault EZ** drive (in *addition* to the HDDs)
- *Hardware*-based **RAID-0/1/1E** support *standard* in **hot-swap** models, *optional* in **simple-swap** models
- **Six available** adapter slots:
 - One x8¹² PCI-E** slot (4GBps)
 - One x1¹³ PCI-E** slots (500MBps)
 - Two 33MHz** legacy **PCI** slots
 - One optional PCI-X/66** slot (500MBps)
- Integrated **CD-ROM** drive

Manageability, Serviceability and Availability

- IBM **Director** systems management software, including:
 - IBM Management Processor Assistant
 - IBM Rack Manager
 - IBM RAID Manager
 - IBM Update Assistant

¹¹ For terms and conditions or copies of the IBM Statement of Limited Warranty, call 800-772-2227 in the U.S. In Canada call 800-426-2255. IBM makes no representation or warranty regarding third-party products or services including those designated as ServerProven or ClusterProven. Telephone support may be subject to additional charges. For warranties including onsite labor, a technician is sent after IBM attempts to resolve the problem remotely. International warranty service is available in any country in which this product is sold.

¹² The x8 slots can accept x1, x4 or x8 adapters running at x1, x4 or x8 throughput, respectively.

¹³ The x4 slot can accept x1, x4 or x8 adapters; however x8 adapters will be limited to x4 throughput.

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- IBM Software Distribution
 - IBM System Availability
 - **Integrated mini Baseboard Management Controller 2** (mBMC2), with **IPMI 2.0** compliance, including highly secure remote power control
 - **ECC memory protection**
 - Support for **highly available** *hardware*-based **RAID-1/1E** arrays standard, without consuming an adapter slot
 - **Hot-swap SAS, hot-swap SATA, or simple-swap SATA** hard disk drives, for quick and simple installation and replacement of drives
 - **Ultra-efficient cooling**
 - Optional **hot-swap/redundant power supplies**
 - **PFA support** for processors, memory, voltage regulator modules, HDDs, and fans
 - Optional **Remote Supervisor Adapter II SlimLine** daughter card (no slot required)
 - Supports the **LDAP** and **SSL** industry standards
 - Optional **tower-to-rack conversion kit**
-



For More Information

IBM System x Servers
Electronic Service Agent
IBM System x and BladeCenter Power Configurator
Standalone Solutions Configuration Tool
ServerProven Program
Technical Support
Other Technical Support Resources
Configuration and Options Guide

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MB, GB and TB = 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, when referring to storage capacity. Accessible capacity is less; up to 3GB is used in service partition. Actual storage capacity will vary based upon many factors and may be less than stated.

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will depend on considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

Maximum internal hard disk and memory capacities may require the replacement of any standard hard drives and/or memory and the population of all hard disk bays and memory slots with the largest currently supported drives available. When referring to variable speed CD-ROMs, CD-Rs, CD-RWs and DVDs, actual playback speed will vary and is often less than the maximum possible.

XSO03038-USEN-00