A rack-dense, 2U dual-socket entry server, for growing businesses

General purpose, enterprise-class entry 2U server for growing businesses

[Suggested uses: File/print, email/collaboration, and small business applications.]

Small-to-medium sized businesses looking for servers need systems with powerful features at an affordable price, simple installation and quick and easy servicing to improve overall business efficiency. Previously, that often led to the purchase of an “all in one” tower solution. However, businesses that are growing or expect to grow rapidly may outgrow a tower’s capacity quickly. The IBM® System x3610 provides a new balance of cost-to-own, features, and support, which makes it ideal for growing businesses. The dual-socket x3610 supports high-performance quad- and dual-core Intel® Xeon® processors, designed with up to a leading-edge 1333MHz front-side bus (FSB), 64-bit extensions (EM64T), and either 6MB or 4MB (dual-core) or 12MB (quad-core) of L2 cache, to provide you with plenty of computing power to meet your business needs. In addition, the x3610 uses industry-standard PC2-5300 667MHz DDR2 ECC (Error Checking and Correcting) memory—for high performance and reliability. Dual integrated high-speed Gigabit Ethernet controllers are standard, as are high-performance PCI Express adapter slots and legacy PCI slots. The x3610 helps to keeps your costs low by omitting high-end features that are inappropriate for its target market.

All models offer impressive scalability, including dual-processor support, up to 24GB of memory and a variety of high-performance internal hard disk and backup drive configurations: up to six 3.5-inch Serial-Attach SCSI (SAS) hot-swap drives with an internal storage capacity of 1.8TB1, or up to six 3.5-inch Serial ATA (SATA II) hot-swap drives (4.5TB). Hardware-based RAID-0/1/1E support is standard. Optional IBM RAID controllers provide additional RAID levels and external drive support. The slim 2U size of the x3610 helps you maximize your rack investments. Up to 21 of these servers can be installed in a single 42U rack, for a total of up to 42 processors, offering the ideal balance of performance, storage and I/O slots per rack.

Optional Advanced Connectivity Technology (ACT) interconnect cabling helps reduce cable clutter and cost and minimizes installation time when interconnecting many rack-mounted servers.

Standard in the x3610 is a Baseboard Management Controller (BMC) that enables the user to manage and control the server easily—both locally and remotely. This high level of manageability is designed to help keep management costs down and the system up. These advanced features help maximize network availability by increasing uptime, as do hot-swap/redundant HDDs, redundant power, temperature-controlled fans, IPMI 2.0 support, including highly secure remote power control and Serial-over-LAN, as well as text-console redirect via Serial-over-LAN. With the addition of unique IBM features, such as IBM ServerGuide™, the x3610 is designed to get up and running quickly, and stay that way, all with the backing of IBM service and support.

If you need a balance of high-performance dual-socket processing, large internal storage in a rack-dense environment, and no unnecessary features, the x3610 is the ideal system.

Price/Performance

The x3610 offers numerous features to boost performance and reduce product and operating costs:

- Up to two quad- or dual-core Xeon processors with high-end 1333MHz or 1066MHz front side bus and 4MB to 12MB (processor-specific) of integrated Level 2 cache per processor offer superior performance capable of tackling the toughest jobs. 64-bit extensions provide the flexibility to run 32-bit and 64-bit applications concurrently.

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1 TB equals 1,000,000,000,000 bytes when referring to hard disk drive capacity. Accessible capacity may be less.
• **Low-voltage processors** draw less power and produce less waste heat than high-voltage processors, thus helping to reduce data center energy costs. The **dual-core** Xeon processors use only **65W**. This is half the wattage consumed by older **130W** processors. The **80W quad-core** processors are even more economical, consuming only **20W** per core, vs. **32.5W** per core for the 65W dual-core processors.

• Ultra-fast **667MHz PC2-5300 DDR2 ECC memory** provides speed and high availability. Equally importantly, DDR II memory consumes up to **37% less energy** than fully buffered memory, used by some competitive systems.

• Two **high-speed PCI-E x8 adapter slots** offer potential investment protection by supporting high-performance adapters, such as Fibre Channel cards, which won’t run in older 33MHz and 66MHz conventional PCI slots.

• The integrated **LSI 1068E SAS/SATA controller** provides **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 offers mirroring with an odd number of drives (3 or 5).

• Up to **six 3.5-inch hot-swap SAS** or **six 3.5-inch hot-swap SATA II** hard disk drives offer high-performance with high availability. The SAS controller provides full-duplex (2 x 300MBps) SAS data transfers, nearly double that of half-duplex Ultra320 SCSI (1 x 320MBps). The half-duplex SATA drives offer throughput (300MBps, with low latency) approximately equal to Ultra320 SCSI.

• The integrated **dual Gigabit Ethernet** controllers with **IPMI 2.0** support provide high-speed network communications without consuming valuable adapter slots.

• **A high degree of device integration**, including SAS, RAID, dual Gigabit Ethernet, systems management and video controllers, helps to lowers costs and frees up valuable adapter slots.

**Flexibility**

The x3610 has the ability to grow with your application requirements, thanks to:

• A choice of **quad-core** or **dual-core** processors with **1.6 to 2.0GHz** clock rates, **1333MHz** or **1066MHz** FSB, and **65W** to **80W** maximum power draw.

• Up to **24GB** of high-speed DDR2 system memory in **six** sockets. This many sockets permits up to **12GB** of memory using low-cost 2GB DIMMs.

• Two **available high-performance PCI-E** adapter slots in all models. In addition, **two PCI** slots are provided for legacy adapters.

• Installing the optional **ServeRAID-MR10il** or **ServeRAID-MR10M** cards upgrade the built-in RAID support with additional RAID levels and **128MB** or **256MB** of cache (respectively), to enable even higher-performance hardware RAID support.

• The **six USB 2.0** ports are up to **40X** faster than older **USB 1.1** ports. This provides speedy access to external HDDs (non-arrayed), optical drives, tape drives, and other USB devices. Two ports are on the front of the unit and four are on the back.

• A choice of up to **six 3.5-inch HDDs** offers a variety of storage options: a maximum of **1.8TB** of internal **hot-swap SAS** storage or **6TB** of internal **hot-swap SATA** storage.

• Alternatively, iSCSI or Fibre Channel-attached storage can be attached using **IBM System Storage** or **TotalStorage** servers.

**Manageability**

Powerful systems management features simplify local and remote management of the x3610:

• The x3610 includes a **Baseboard Management Controller (BMC)** to monitor server availability, perform Predictive Failure Analysis, etc. The BMC enables service personnel to use diagnostic tools to resolve problems quickly.

• Integrated **IPMI 2.0** monitors anomalous environmental factors, such as voltage and thermal conditions. It also supports **highly secure remote power control** using data encryption.

• **Text Console Redirection** support allows the administrator to remotely view x3610 text messages over Serial or LAN.

**Availability and Serviceability**

The x3610 provides many features to simplify serviceability and increase system uptime:

• x3610 servers use **DDR2 ECC memory DIMMs**, which provide soft error correction. **DDR2 DIMMs** consume less energy than fully buffered DIMMs.

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2 Data transfer rates may be less than the maximum possible.
Key Features

High-Performance Xeon Processors

The x3610 supports up to two high-performance Intel Xeon processors, allowing you to upgrade to a second processor as business needs require. The x3610 offers a choice of processor clock rates, FSB speeds and power draw:

- **80W quad-core** Xeon processor models E5405 at 2.0GHz, **only 20W per core of power draw** with 64-bit extensions, a 1333MHz FSB, and 12MB of L2 processor cache (2 x 6MB)
- **65W dual-core** Xeon processor model E5205 at 1.86GHz, with 64-bit extensions, **only 32.5W per core of power draw**, a 1066MHz FSB, and 6MB of **shared** L2 processor cache
- **65W dual-core** Xeon processor model E5110 at 1.6GHz, with 64-bit extensions, **only 32.5W per core of power draw**, a 1066MHz FSB, and 4MB of L2 processor cache (2 x 2MB)

Dual-core Xeon 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 dual independent caches (one pair of cores). The shared cache is dynamically allocated between the cores as needed. The multiple cores appear to software as multiple 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 1066MHz FSB (which connects memory to the processor) boasts a peak rate of 8.53GBps, or up to one-third higher throughput at the same processor clock speed than an 800MHz FSB (6.4GBps) used in older systems. The 1333MHz FSB 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.

**DDR II ECC Memory**

The x3610 supports up to 24GB of memory in 6 DIMM sockets. Some models include two 1GB DIMMs standard, while others ship with one 1GB DIMM. The x3610 uses registered PC2-5300 double data rate II (DDR2) memory (operating at 667MHz) for fast access, and ECC protection.

The DDR II memory consumes as much as 37% less power than fully buffered memory does, which contributes to an energy-efficient system.
The system supports either one, two or four DIMMs installed. With two or four DIMMs installed, the x3610 operates in two-way interleaved mode, for higher performance. When only one DIMM is used, the system defaults to noninterleaved mode. Memory is available in kits consisting of one 512MB or two 1GB, 2GB or 4GB DIMMs.

High-Performance Adapter Slots
The x3610 provides two physical x8 (“by 8”) PCI-E (PCI Express) adapter slots standard. Each is capable of supporting x1/x4/x8 adapters. Slots 3 and 4 are low-profile/half-length. Electrically they are x8 slots as well (meaning that they operate at full x8 4GBps speeds). Slots 1 and 2 are also low-profile/half-length standard 32-bit/33MHz PCI slots. They can be used for legacy PCI cards that won’t fit in the newer PCI-E slots.

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 adapter4. (A x1 adapter offers throughput similar to a 66MHz PCI-X slot.) Because the LSI 1068E SAS/SATA, dual Gigabit Ethernet, systems management and video controllers are integrated onto the system board, the four adapter slots are all available, which offers you a wide degree of latitude in expansion options.

Hot-Swap/Redundant Components
System availability is maximized through the extensive use of hot-swap and redundant components, including:

- Hot-swap, redundant hard disk drives (with RAID-0/1/1E protection standard and RAID-10/5/50/6/60 optional; RAID-60 requires external storage)
- Fixed redundant power supplies (optional)

Large HDD Storage Capacity
The x3610 offers a choice of disk storage, supporting up to six (3.5-inch) hot-swap high-performance Serial-Attach SCSI (SAS) drives, or up to six (3.5-inch) hot-swap Serial-ATA II (SATA II) drives:

3.5-inch SAS
- 15,000 RPMs — 73.4, 146.8 or 300GB (1.8TB maximum)

3.5-inch SATA
- 7,200 RPMs — 160, 250, 500, or 750GB (4.5TB)

The hot-swap SAS drives use the Converged Tray for interchangeability with other IBM System x systems. If you need more storage space, terabyte capacities are possible with external direct-attach, NAS and SAN solutions.

Disk/Tape Controllers
The integrated LSI 1068E controller offers hardware RAID-0/1/1E support for the SAS or SATA drives.

The SAS controller provides data transfer speeds of up to 300MB per second5 in each direction (full-duplex) across the SAS bus, 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.

The optional ServeRAID-MR10il SAS/SATA PCI-E controller adds four additional RAID levels: RAID-10, 5, 50, and 6, along with 128MB of cache memory for higher performance on internal drives. Alternatively, the ServeRAID-MR10M SAS/SATA PCI-E controller supports RAID-0/1/10/5/50/6/60 with 256MB of battery-backed cache. It supports the attachment of external storage devices.

Likewise, the half-length PCI-E SAS HBA Controller provides RAID-0/1/1E support for internal and external SAS or SATA hard disk and tape drives.

Backup Devices
The x3610 supports several external backup options. Supported drives include:

- DDS-5 Tape Drive (SAS)
- GoVault EZ Drive (SAS)

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4 Actual throughput will depend on the adapter vendor’s implementation.
5 Data transfer rates depend on many factors and are often less than the maximum possible.
A rack-dense, 2U dual-socket entry server, for growing businesses

- LTO-3 Half High Tape Drive (SAS)

Drive Bays
The x3610 contains seven drive bays in all. Six 3.5-inch bays support hot-swap SAS or SATA drives. This enables up to six slimline (1.0”) drives totaling up to 1.8TB (SAS) or 4.5TB (SATA) to be installed.

A 24X/10X/24X/8X6 speed (ultraslim, 0.5”) DVD-ROM/CD-ROM combo drive with a SATA interface ships standard in all x3610 servers. No floppy drive is supplied with any model; an external USB floppy drive may be used, if needed.

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

Dual Gigabit Ethernet Controllers
The x3610 includes two integrated Broadcom BCM5722 Gigabit Ethernet controllers with load-balancing capabilities, and up to 10X higher maximum throughput than a 10/100 Ethernet controller.

The controllers also support highly secure remote power management using IPMI 2.0, plus Wake on LAN® and PXE (Preboot Execution Environment) flash interface.

Efficient Cooling
Strategically located fans, combined with efficient airflow paths, provide highly effective system cooling for the x3610. The base server includes three fans. In addition, each power supply also contains a fan.

The fans automatically adjust speeds in response to changing thermal requirements, depending on the temperature inside the server. When the temperature 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
- Six 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 and four are on the back. The x3610 supports boot from USB devices.

- Video port — The Aspeed AST1100 BMC controller provides up to 1600x1200 graphics resolution, with a color depth of 16 bits at 60Hz refresh rate, and a 64-bit 2D graphics accelerator.

- Toolless cover removal — Allows quick installation, upgrade and servicing of the server.

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%.

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

6 Variable read rate. Actual playback speed varies and is often less than the maximum possible.
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.

The illustration below shows a sample ACT configuration:

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**Advanced Systems Management Capabilities**

The x3610 has a systems management capabilities that are well-suited to entry-level systems. Features include the Baseboard Management Controller (BMC), Wake on LAN® support, PXE support, and text console redirect via SOL.

The BMC 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)
- IPMI over LAN
- Serial Over LAN
- Enhanced authentication and encryption algorithms (RMCP+, AES)
- Local update of BMC firmware
- Support for IPMI v2.0 compliant management software (e.g., xCAT)
- Other mandatory and optional IPMI BMC functions

**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).

**Text Console Redirection** support allows the administrator to remotely view x3610 text messages via serial-over-LAN.

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**Extensive System Support Features**

The IBM services and technical support portfolio provides world-class, consistent, high-quality service and support. The x3610 server offers a number of tools and services designed to make ownership a positive experience. From the start, IBM programs make it easier for you to plan...
IBM options for System x servers help 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.

**Processors** — The Intel Xeon processor provides high clock rates, dual- or quad-cores, 64-bit extensions, a large cache and advanced features for availability and manageability. Large cache size, combined with a fast 1066MHz or 1333MHz front-side bus, reduces memory latency and facilitates the movement of data through the processor and I/O devices. *(Note: System performance depends not only on the number of processors in the server but also on the power and functionality of each processor.)* Adding a second processor may be a cost-effective way to achieve significant performance improvements.

**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. The x3610 takes memory upgrades in pairs and provides **two-way interleaving** when more than one DIMM is installed.

**Hard Disk Drives** — IBM hard disk drives help you improve the transaction and cost performance of your 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 are available for the x3610 with capacities up to 300GB (3.5-inch) aipece at 15,000 RPMs. 3.5-inch Serial ATA II hard disk drives are available with capacities up to 750GB aipece at 7,200 RPMs.

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7 For onsite labor, IBM will attempt to diagnose and resolve the problem remotely before sending a technician.
Power Supply — The optional second power supply for the x3610 enables system power redundancy.

ServeRAID Controllers — System x servers using ServeRAID technology allow companies to build a reliable foundation for business-critical computing. IBM ServeRAID technology allows an array consisting of multiple physical hard disk drives to be treated as one logical drive. ServeRAID technology also allows data to be stored redundantly, across multiple hard disk drives—enhancing both the integrity and the availability of the data. SAS and SATA ServeRAID controllers offer enhanced performance due to onboard processors and cache. Because IBM ServeRAID controllers can help significantly improve data transfer rates, this technology is extremely effective when implementing demanding, transaction-oriented applications. By employing the advanced fault tolerance of IBM ServeRAID technology, companies can effectively implement networked business systems that require large amounts of storage space for data and applications that must be available for their businesses to continue operating.

The optional ServeRAID-MR10iIl is a low-profile/half-length PCI-E x4 card that offers high performance and 128MB of DDR2 cache memory for internal SAS/SATA storage. The adapter supports six RAID levels on the x3610: 0 (striping), 1 (mirroring), 10 (mirroring and striping), 5 (striping with parity), 50 (RAID-5 across multiple arrays), and 6 (striping with dual parity). (Although the controller also supports RAID-60, there are insufficient drive bays in the x3610 to utilize that RAID level.)

The optional ServeRAID-MR10M PCI-E x8 controller offers high performance and 256MB of cache memory with battery backup for external SAS JBODs, such as the IBM TotalStorage EXP3000. The adapter supports seven RAID levels: 0, 1, 10, 5, 50 (RAID-5 across multiple arrays), 6 (double parity) and 60 (RAID-6 across multiple arrays).

The optional half-length PCI-E IBM SAS HBA Controller offers RAID-0/1 support as well as RAID-1E (mirroring with an odd number of drives) for internal and external SAS/SATA HDDs and control of internal/external tape drives.

x3610 Images

Front View
A rack-dense, 2U dual-socket entry server, for growing businesses

**Rear View**

**Interior View**

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### x3610 Specifications

<table>
<thead>
<tr>
<th>Machine type</th>
<th>7942-2xX/2xY, 4xX/4xY, 6xX/6xY</th>
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<tbody>
<tr>
<td>Form factor</td>
<td>2U</td>
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<tr>
<td>Processor type</td>
<td>Quad-core Xeon (E54xx) 2.0GHz E5405 (42X/42Y, 62X/62Y)</td>
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<thead>
<tr>
<th>Specification</th>
<th>x3610 Specifications</th>
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<tbody>
<tr>
<td><strong>Maximum processor power draw</strong></td>
<td>65W (22X/22Y, 24X/24Y)</td>
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<td><strong>Front-side bus (FSB) speed</strong></td>
<td>1333MHz (42X/42Y, 62X/62Y)</td>
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<td><strong># of processors standard / maximum</strong></td>
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<td><strong>Internal L2 cache</strong></td>
<td>12MB (2 x 6MB shared cache)—42X/42Y, 62X/62Y</td>
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<td><strong>Chipset</strong></td>
<td>Intel 5100</td>
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<tr>
<td><strong>Standard / maximum memory</strong></td>
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<td><strong>Standard memory type</strong></td>
<td>Registered PC2-5300 (667MHz) DDR II ECC</td>
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<td><strong>Memory interleaving</strong></td>
<td>Yes (two-way using 2 or 4 DIMMs; noninterleaved with 1 DIMM)</td>
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<td>512MB, 1GB, 2GB, 4GB</td>
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<td><strong># of 5.25&quot; bays total / available</strong></td>
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<td><strong>Maximum HDD capacity</strong></td>
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<td><strong># of diskette drives standard</strong></td>
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<td><strong>Integrated RAID controller / cache</strong></td>
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<td><strong># of adapter slots total / available</strong></td>
<td>ServeRAID-MR10M (256MB cache standard)—external SAS/SATA</td>
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<td><strong>SAS HBA (256MB)—internal/external SAS/SATA</strong></td>
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<td><strong># of PCI-E physical x8/electrical x4 slots (2GBps)</strong></td>
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<td><strong># of PCI-E x1 slots (500MBps)</strong></td>
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<td><strong># of PCI-X/133 slots (1GBps)</strong></td>
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<td><strong># of 33MHz legacy PCI slots</strong></td>
<td>Two low-profile/half-length (slots 1 and 2)</td>
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<tr>
<td><strong># of video ports</strong></td>
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</tr>
</tbody>
</table>

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

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<table>
<thead>
<tr>
<th>Feature</th>
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<tr>
<td>Video controller</td>
<td>Aspeed AST1100</td>
</tr>
<tr>
<td>Video memory</td>
<td>64MB DDR</td>
</tr>
<tr>
<td>Maximum video resolution at 32-bit color</td>
<td>1600 x 1200 x 16-bit color at 60Hz</td>
</tr>
<tr>
<td>Gigabit Ethernet controller</td>
<td>2 x Broadcom BCM5722</td>
</tr>
<tr>
<td><strong>TOE / failover / load-balancing-capable</strong></td>
<td>No / No / Yes</td>
</tr>
<tr>
<td># of Gigabit Ethernet ports</td>
<td>2 (rear)</td>
</tr>
<tr>
<td># of RS485 ports</td>
<td>None</td>
</tr>
<tr>
<td># of serial ports</td>
<td>1 (rear)</td>
</tr>
<tr>
<td># of parallel ports</td>
<td>None (USB-attached)</td>
</tr>
<tr>
<td># of mouse ports</td>
<td>1 (rear)</td>
</tr>
<tr>
<td># of keyboard ports</td>
<td>1 (rear)</td>
</tr>
<tr>
<td># of USB 2.0 ports</td>
<td>6 (2 front, 4 rear) ports</td>
</tr>
<tr>
<td>Integrated systems management controller</td>
<td>Yes (BMC)</td>
</tr>
<tr>
<td>Optional systems management adapter</td>
<td>None</td>
</tr>
<tr>
<td>Light path diagnostics support</td>
<td>None</td>
</tr>
<tr>
<td>Predictive Failure Analysis support</td>
<td>None</td>
</tr>
<tr>
<td>Power supply size</td>
<td>600W universal, autoswitching</td>
</tr>
<tr>
<td># of power supplies standard / maximum</td>
<td>1 / 2</td>
</tr>
<tr>
<td>Hot-swap/redundant power supported</td>
<td>Redundant only (with two power supplies installed)</td>
</tr>
<tr>
<td># of fans/blowers standard / maximum</td>
<td>3 / 3</td>
</tr>
<tr>
<td>Hot-swap/redundant fans supported</td>
<td>No</td>
</tr>
<tr>
<td>Heat emitted: minimum / maximum</td>
<td>1,230 - 3,312 BTUs / 360 – 970 Watts</td>
</tr>
<tr>
<td>Rack mount method</td>
<td>Slide rails</td>
</tr>
<tr>
<td>Maximum altitude</td>
<td>7,000 ft / 2,133 m</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>50 – 95°F; 10 – 35°C (up to 3,000 ft / 914.4 m); Decrease system temperature by 0.75°C for every 1,000-foot increase in altitude.</td>
</tr>
<tr>
<td>Dimensions (HWD) / weight</td>
<td>3.36” (85.4mm) H 17.5” (444mm) W 27.8” (705mm) D 46.5 (minimum) - 65 lb (maximum) 21.1 - 29.0 kg</td>
</tr>
<tr>
<td>Operating systems supported</td>
<td>Microsoft Windows Server 2003 and R2 (Standard/Web/Enterprise Editions) 32/64-bit, 32/64-bit, Windows Small Business Server 2003 and R2, RHEL 4/5 32/64-bit, SLES 9/10 32/64-bit, VMware ESX Server 3.5</td>
</tr>
<tr>
<td>Length of limited warranty</td>
<td>3 years (parts and labor)⁹</td>
</tr>
</tbody>
</table>

⁹ 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.

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A rack-dense, 2U dual-socket entry server, for growing businesses

The Bottom Line

The x3610 is an extremely powerful entry-level system, incorporating leading-edge industry-standard features and adding IBM-unique innovations:

**Price/Performance**
- High-throughput processors — 2.0GHz quad-core or 1.6 to 1.86GHz dual-core Xeon processors; up to 8 (quad-core) or 4 (dual-core) processor cores per server
- Energy-efficient processors — 80W quad-core and 65W dual-core Xeon processors
- Energy-efficient DDR2 memory
- Large cache — 12MB, 6MB or 4MB of L2 processor cache
- 64-bit extensions (EM64T)
- Leading-edge front-side bus — 1333MHz or 1066MHz FSB (model-specific)
- Fast memory — Registered 667MHz PC2-5300 DDR II ECC memory standard with two-way interleaving
- Fast disk technology — Integrated Serial-Attach SCSI (SAS) controller and hardware-based RAID-0 data striping standard
- Fast communications — Integrated dual Gigabit Ethernet controllers, supporting load-balancing
- Fast I/O — PCI-E x8 adapter slots

**Flexibility**
- Large memory capacity — 24GB of DDR II ECC memory, using 6 DIMMs
- A choice of six 3.5-inch SAS or SATA drives
- High-capacity disk storage — Up to 1.8TB of internal hot-swap SAS or 4.5TB of hot-swap SATA storage
- Support for external storage and tape/disk cartridge (GoVault EZ) backup
- High-performance external expansion — Six 480Mbps USB 2.0 ports (two front, four rear)
- Hardware-based RAID-0/1/1E support standard; optional RAID RAID-10/5/50/6/60
- Four available adapter slots —
  - Two x8 PCI-E slots (4Gbps)
  - Two 32-bit legacy PCI slots
- Integrated DVD-ROM/CD-ROM combo drive

**Manageability, Serviceability and Availability**
- Integrated Baseboard Management Controller (BMC):
  - IPMI 2.0 compliance, including highly secure remote power control
  - Text console redirection systems management standard
- Hardware-based RAID-1/1E disk mirroring standard; optional RAID-10/5/50/6/60 highly available arrays
- Efficient cooling
- Hot-swap hard disk drives
- Optional redundant power supplies
- Slide rail design

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For More Information

IBM System x and xSeries Servers  
ibm.com/systems/x

Electronic Service Agent  
ibm.com/support/electronic

IBM System x and BladeCenter Power Configurator  
ibm.com/systems/bladecenter/powerconfig

Standalone Solutions Configuration Tool  
ibm.com/servers/eserver/xseries/library/configtools.html

Configuration and Options Guide  
ibm.com/servers/eserver/xseries/cog

ServerProven Program  
ibm.com/servers/eserver/serverproven/compat/us

Technical Support  
ibm.com/server/support

Other Technical Support Resources  
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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.

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