Hardware Announcement
October 5, 2004

IBM @server xSeries 236 Express Tower Server — Fast 2.8 GHz/800 MHz/1MB L2, Intel Xeon processor for high performance and scalability

Overview

Express Portfolio

Select configurations of xSeries® systems are part of the IBM Express Portfolio program — designed, developed, and priced to meet the specific needs of mid-sized businesses. These systems are easy to acquire, install, and manage. They leverage IBM technology to provide tangible solutions to help you solve business problems in an on demand world.

Features of the Express program:

- Everyday low price
- Additional supply planned to help establish business continuity and enable on demand for small and medium business environments
- Offerings configured to match the business needs of small and medium business customers
- Hot-swap power supplies
- 800 MHz front-side bus (FSB) support
- Dual front hot-swap fans and dual rear hot-swap fans
- Integrated Gigabit Ethernet and Integrated RAID support
- DDR2 ECC DIMMs, combined with an integrated ECC memory controller, corrects many soft and hard single bit memory errors[5] and minimizes disruption of service to LAN clients
- Integrated Systems Management with optional upgrade to Remote Supervisor Adapter (RSA) II SlimLine (RSA II SlimLine does not require PCI slot)
- Light Path Diagnostics with a side cover visible Light Path panel
- Automatic server restart (ASR) on OS hang condition

Powered and scaled for on demand growth

- Powerful 2.8 GHz Intel™ Xeon processors with 1 MB L2 cache
- 200 MHz FSB yielding 800 MHz functional speed processor operations to memory and PCI bus
- 1 GB (2x 512 MB) of high-speed, two-way interleaved, 800 MHz ECC memory
- High-speed, wide-bandwidth, one full-length PCI-X bus slot at 133 MHz (Hot-swap)
- High-speed, wide-bandwidth, two full-length PCI-X bus slots at 100 MHz
- High-speed, wide-bandwidth, two full length PCI-E bus slots at 2 GB transfer rate or 512 MHz
- Dual Broadcom 5721 Gigabit Ethernet ports and dual-channel Adaptec 7902 UltraSCSI up to 320 MB/s
- Six hot-swap drive bays; three 73.4 GB 10K-rpm SCSI HS HDDs standard
- ServeRAID™ 7K SCSI adapter standard

High availability for around-the-clock e-business

- Integrated systems management processor and support for the RSA II SlimLine option
- Wake on LAN®
- ECC memory to detect many double bit errors and correct many single bit errors
- Integrated memory mirroring and online spare options

Service and support perfected for e-business

- ServerGuide™ and IBM Director
- IBM Server support and Web support[6]
- Three-year, on-site[7], parts and labor, limited warranty[8]

Key prerequisites

- Monitor
- Keyboard/mouse

At a glance

The xSeries 236 Express Tower Server features:

- Powerful 2.8 GHz[1] Intel Xeon processor
- 1 GB (2x 512 MB) of 800 MHz DDR2 ECC system memory, 16 GB maximum[2]
- Dual-channel Ultra320 controller
- Three 73.4 GB 10K-rpm SCSI hot-swap HDDs
- One or two 670-Watt power supply; hot-swap option redundant cooling with hot-swap power upgrade option
- ServeRAID 7K SCSI adapter
- Integrated systems management processor
- Five full-length PCI slots: One 64-bit/133 MHz PCI-X, hot-plug, two 64-bit/100 MHz PCI-X and two x4 PCI_E slots 2 GB
- One half-length PCI slot: 32-bit/33 MHz
- Eight drive bays: Standard diskette drive and 48x-20x[3] CD-ROM, six hot-swap HDD bays
- Up to 1.3 TB[4] hot-swap disk storage using nine 146.8 GB HDDs
- Dual integrated Gigabit Ethernet controllers
- SVGA video with 16 MB memory
- Support for Integrated xSeries Adapter for IBM @server iSeries™
- 5U tower industry-standard models, rack mount optional
- Three USB, two integrated system management, two serial, one parallel, mouse, and keyboard ports

Planned availability date

November 5, 2004

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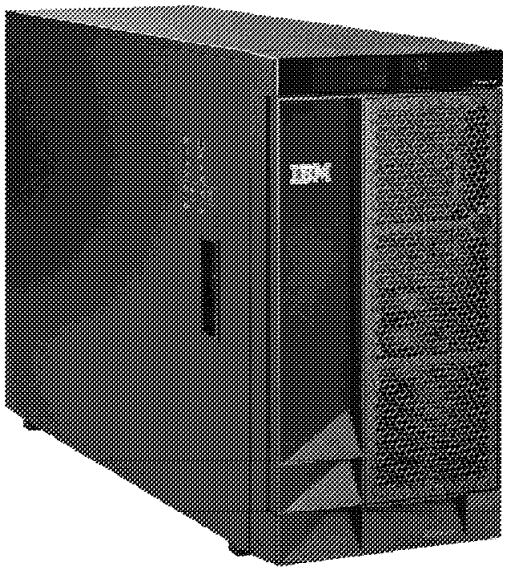
Description



Related options

Intel Xeon Processor options

- IBM xSeries 2.8 GHz/800 MHz — 1 MB L2 Cache Xeon Processor (13N0681)

This processor is ideal for data-intensive applications that range from data mining to evolving Web services. Innovative technologies deliver processing speeds of 2.8 GHz with performance headroom for unpredictable server workloads and escalating computing needs.

Intel Xeon processors with 1 MB L2 cache feature Intel NetBurst microarchitecture, with EM64T, and increase overall throughput via a faster 800 MHz system bus and enhanced level 2 cache. They also incorporate Hyperthreading technology, allowing the processors to execute more than one thread per processor. These enhancements result in faster response times, support for more simultaneous users, and increased transaction workloads.

This processor option supports SMP applications when installed in the second processor slot of all x236 models with similar processors.

IBM PC2-3200-333 DDR2 Chipkill Memory Option Kit

The IBM 1 GB (2x512MBx4 MB) Chipkill™ RDIMM Kit (73P2865) consists of two 512 x 4 MB PC2-3200-333 DDR2 ECC DDR ChipKill SDRAM DIMMs.

Note: DDR2 ECC DIMMs, combined with an integrated ECC memory controller, corrects many soft and hard single bit memory errors, and minimizes disruption of service to LAN clients

Chipkill distributes information covered by Error Correction Coding across separate memory chips so if any of the chips fail, the data can still be reconstructed from the remaining chips and the system can continue running

The increased processor performance coupled with DDR memory enables you to retrieve and process information faster and more efficiently. DDR memory executes twice the number of operations per cycle than traditional SDRAM memory, effectively doubling the data exchange rate between memory and processors.

IBM xSeries 670W Hot Swap Power Supply

- xSeries 670W Hot Swap Power Supply (North America) (25K9560)
- xSeries 670W Hot Swap Power Supply (worldwide) (24R9258)

The 670-watt redundant power supply is designed to supply power for all systems. This option contains two rear hot-swap fans for redundant cooling

Optional SCSI RAID Card, ServeRAID 7k (71K8642), will enable the additional RAID option (such as RAID levels 0, 00, 1, 10, 5, 50, and IBM exclusive 1E and 1E0) when it is installed on a reserved connector.

Optional RSA2 Daughter Card, RSA II SlimLine (73P9341), full function remote system management.

Tower To Rack Conversion Kit (13N0956) Provides hardware needed to convert this unit to a 5U-high, rack-mounted server. Includes covers, slides, cable management arm, and miscellaneous mounting hardware.

High-performance server subsystems

x236 servers are high-throughput, two-way, SMP-capable network servers with excellent performance scalability when you add memory and a second processor. They incorporate powerful Intel Xeon(tm) processors with 1 MB L2 cache. These flip-chip, pin grid array 2 (FC-PGA2) processors feature advanced transfer L2 caches integrated onto the processor core and run at the same clock speed as the processor core.

The advanced transfer caches are a result of a ″backside bus″ 256 bits wide. They feature a quad-wide cache line that can transfer four 64-bit cache line segments at one time to deliver full-speed capability. Both caches feature eight-way set associative cache.

Two processor connectors are standard on the system board to support installation of a second processor. High-speed, 200/800 MHz (bus speed runs at 200 MHz but data is clocked on four edges yielding a transfer rate of 800 MHz).SDRAM is optimized for 800 MHz processor-to-memory subsystem performance. The x236 server uses the Intel Lindenhurst chipset to maximize throughput from processor to memory, and system I/O buses

Standard x236 configuration

Model	Processor	Cache	Memory	SCSI Interface	Mechanical
8841–0EU	2.8 GHz	1 MB	1 GB ECC	Dual Ultra320	Tower

Additional features:

- Ability to upgrade to two-way SMP processing by adding a second processor of the same speed and processor type.
- System board contains eight DIMM connectors supporting 512 MB, 1 GB, and 2 GB DDR II-400 ECC RDIMMs:
  - Two-way interleaved memory for improved performance (memory must be installed in matched pairs)
  - Up to 16 GB of system memory (with 2 GB memory DIMMs installed)

- High-speed, wide-bandwidth, full-length PCI bus slots:
  - One 64-bit; 133 MHz PCI-X 2.0, hot-plug
  - Two 64-bit; 100 MHz PCI-X
  - Two PCI_E; 2 GB
  - One 32-bit; 33 MHz(half length)
- Dual-channel, 64-bit Ultra320 (LVD) SCSI PCI controller supports high-speed up to 320 MB/s internal storage solutions.
- Dual full-duplex, Gigabit Ethernet controllers speeds network communications to LAN clients.

The x236 subsystems are tuned to provide solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features, combined with SMP capability, make the xSeries 236 server an excellent choice for stand-alone or clustered general-business application, file, and print server.

High-availability and serviceability features

- Redundant cooling includes:
  - Six hot-swap fans (single replaceable unit), model dependent, or with power option
  - Passive processor heatsinks
  - Processor cooling air duct
- One 670-watt power supply, or two hot-swap redundant power supplies, depending on model, to support robust high-availability applications
- Hot-swap HDD bays with SCA-2 connectors to support SAF-TE functions
- Adaptec 7902 dual-channel, Ultra320 SCSI controller to support internal Ultra320 through SCSI-2 devices
- DDR2 ECC DIMMs, combined with an integrated ECC memory controller, corrects many soft and hard single-bit memory errors,(when memory mirroring used) while minimizing disruption of service to LAN clients
- Memory hardware scrubbing to correct many soft memory errors automatically without software intervention
- Chipkill distributes information covered by error correction coding across separate memory chips so if any of the chips fail, the data can still be reconstructed from the remaining chips and the system can continue running
- ECC L2 cache processor to improve data integrity and help reduce downtime
- PFA on processors and memory to help alert the system administrator of an imminent component failure
- Support for optional Remote Supervisor Adapter for remote systems management through a Web-based browser
- Six hot-swap redundant system cooling fans to cool system and enable replacement without powering down the server
- Integrated systems management processor supports:
  - Automatic server restart (ASR)
  - Fan monitoring and control
  - Power supply monitoring
  - Temperature monitoring
  - Voltage monitoring
  - Power on/off, reset sequencing
  - LED controls (Light Path Diagnostics support)
  - IPMI capability which allows you to accept commands and send status
  - Full interconnect and alerting via the integrated systems-management RS-485 ports (up to 24 ISMP Servers) with use of optional RSA II SlimLine adapter
  - Remote firmware update
  - Numeric error logging
- Information LED panel to give visual indications of system health
- Light Path Diagnostics and on-board diagnostics for an LED map which provide error codes which are explained in the HMM.
- Easy access to system board, adapter cards, processor, and memory
- CPU failure recovery in SMP configurations:
  - Forces failed processor offline
  - Automatically reboots server
  - Generates alerts

Expandability and growth

The xSeries 236 server is a 5 U tower configuration engineered to meet the compactness of a 5 U rack drawer. SVGA video, dual-channel Ultra320 SCSI, and full-duplex Gigabit Ethernet are integrated on the system board.

Features include:

- System memory expansion to 16 GB (with 2 GB memory DIMMs installed)
- Five full-length adapter card slots, two 64-bit/100 MHz PCI-X, one 64-bit/133 MHz PCI-X hot-plug, two PCI_E 2 GB, and one 32-bit/33 MHz non hot-plug card slot
- Ten drive bays:
  - Six 3.5-inch, slim-high HDDs, hot-swap drive bays; three 5.25 inch, half-high device bays; and one 3.5-inch, slim-high drive bay
  - Three 73.4 GB 10K-rpm SCSI HS HDDs standard
  - Internal support for high-performance (up to 15,000 rpm) for Ultra160 and Ultra320 SCSI HDDs and a high-capacity tape backup device
  - Up to 1.3 TB of internal data storage, using nine 146 GB Ultra160 or Ultra320 SCSI Hot-Swap SL HDDs.

These servers can handle applications for today and expand for future growth.

Systems management: Integrated BMC:

The xSeries 236 includes an integrated baseboard management controller, that provides industry standard Intelligent Platform Management Interface (IPMI) 1.5 compliant systems management. The BMC comes standard, and shares one of the two onboard Ethernet ports for access. The BMC can be accessed via software that is compatible with IPMI 1.5 (xCAT, etc). The BMC is implemented using industry leading OSA firmware/applications in conjunction with the integrated baseboard management controller.

- Features and benefits
  - Monitoring of system voltages
  - Monitor battery voltage
  - Monitor system temperatures
  - Fan speed control
  - Fan tachometer monitor
  - Good Power signal monitor
  - System ID and planar version detection
  - System power control
  - System reset control
  - NMI detection (System Interrupts)
  - SMI detection and generation (System Interrupts)
  - Serial port text console redirection
  - System LED control (power, HDD, activity, alerts, heartbeat)
  - Supports IPMI v1.5 compliant management software (ie: xCAT)

In addition the customer can purchase an optional Remote Supervisor Adapter II SlimLine to provide additional systems management function.

Optional Remote Supervisor Adapter II SlimLine: The optional RSA II SlimLine adds accelerated graphics and delivers advanced control and monitoring features to manage your xSeries server (select models) at virtually any time, from virtually any place. This daughter card can be added to the server through a connector that connects to the planar, for select models. This adapter enables easy console redirection with text and graphics, keyboard and mouse (Operating system must support USB) support over the system management LAN connections.

Note: The RSA II SlimLine option for x236 includes a riser card.

With video compression now built into the adapter hardware, it allows the greater screen sizes and refresh rates that are standard in the marketplace. This feature allows the user to display server activities from power-on to full operation, remotely with remote user interaction at virtually any time.

The embedded Web server provides remote control from any standard Web browser. No additional software is required on the remote administrator′s workstation. For users accustomed to a command line interface, the administrator can also use the provided CLI from a Telnet session to perform some of the functions that they can perform from the Web server. The Remote Supervisor Adapter II SlimLine provides remote management and control of the system independent of the server status, in many cases even if the server is powered off or otherwise disabled.

- Features and benefits
  - Continuously monitors system environmentals (temperatures and voltages), operating system status, critical system components such as processors, VRMs, memory, fans, power supplies, and power backplanes (where supported by the system)
  - Video compression hardware is built in, eliminating drivers
  - Faster graphics support makes monitoring and control more efficient
  - Virtual CD and floppy designed to provide the user with the ability to configure and diagnose a server remotely without a visit from your IT staff
  - RSA II SlimLine supports SSL (Secure Socket Layer) and LDAP (Lightweight Directory Access Protocol)
  - Integrated with IBM Director and Director Agent.
  - Built in LAN and serial connectivity supports virtually any network infrastructure.
  - Multiple alerting functions warn systems administrators of potential problems, over e-mail, pager support, LAN, and/or SNMP.
  - Installs on the system planar using a dedicated connector, and eliminates the need to take a PCI-X slot.

The RSA II SlimLine features are similar to the RSA II except for the following features:

- Reset button not accessible from back of system.
- Mini USB cable no longer required, uses internal USB bus. The system has a designated systems management Ethernet port, activated only when RSA II SlimLine is installed.
- External AC adapter not required, uses standby power from system power supplies.
- Status LEDs not external viewable.
- The RSA II SlimLine no longer supports the prior RSA II interconnect function.
- The RSA II is required for use with the Integrated xSeries Adapter for iSeries

IBM Director: xSeries 236 servers feature IBM Director, a powerful, highly integrated systems management software solution built on industry standards and designed for ease of use. Exploit your existing enterprise or workgroup management environments and use rich security features to access and manage physically dispersed IT assets more efficiently over the Internet.

Potentially reduces cost through:

- Reduced downtime
- Increased productivity of IT personnel and end users
- Reduced service and support costs

IBM Director provides integration into leading workgroup and enterprise systems management environments, via upward integration modules. The advanced management capabilities built into xSeries servers can be accessed from:

- Tivoli® Enterprise and Tivoli NetView®
- Computer Associates CA Unicenter TNG Framework
- NetIQ BMC Patrol
- Microsoft™ SMS
- Intel LANDesk™ Management Suite
- HP OpenView Network Node Manager

IT administrators can view the hardware configuration of remote systems in detail and monitor the usage and performance of critical components such as processors, HDDs, and memory.

IBM Director includes IBM Director Extensions, a portfolio of server tools that integrate into the Director framework and work with the integrated systems management processor to access environmental system information.

The processor supervises the operating system status and the following system components and alerts the IT administrator to critical errors:

- Automatic Server Restart (ASR) monitors the operating system status and automatically restarts the server if the operating system(9) stops working. An alert is generated if the system is restarted via ASR.
- Fan monitoring and control; fan status and fan presence is monitored. Fan speed is controlled and automatically increased to maintain system cooling if temperature thresholds are exceeded. An alert is generated for:
  - Failure or if failure is predicted
  - Installation or removal occurs
  - Power supply condition changes for the power supply
  - Temperature changes: CPU and HDD backplane temperatures are monitored. An alert is generated if (preset) temperature warning thresholds are exceeded or restored and if critical temperature thresholds are exceeded. Soft and hard system shutdowns are automatically initiated if critical temperature thresholds are exceeded.
  - Voltage conditions change: CPU and power subsystem voltage thresholds are monitored. An alert is generated if over or under voltages occur.
  - Power on/off and reset sequencing; Power on/off and power reset are supported through the ASF interface.
  - LED controls (Light Path support): Light Path Diagnostics LEDs are illuminated in case of key

component errors or failures to enable quick local diagnostics and servicing.
  - Flash update enables updates to the integrated systems management processor firmware.

The integrated systems management processor supports upgrading to the optionally available Remote Supervisor Adapter for full out-of-band remote management capabilities.

Installation of an optional Remote Supervisor Adapter provides the following systems management capabilities:

- PFA-enabled critical hardware components
- Temperature
- Voltage
- Fan speed
- Light Path Diagnostics
- Power supply

The IT administrator has comprehensive, virtual on-site control of xSeries servers and can remotely:

- Access the server regardless of the status
- Inventory and often display detailed system and component information
- View server bootup during POST
- Browse and delete logs of events and errors
- Reset or power cycle the server
- Run diagnostics, SCSI, and RAID setup during POST
- Monitor thresholds on server health including:
  - Operating system load
  - POST time-out
  - Voltage
  - Temperature
- Proactive alerts for critical server events including PFA on:
  - Processors
  - Memory
- Define automated actions such as:
  - Send e-mail or a page to an administrator
  - Execute a command or program
  - Pop up an error message to the Director console
- Monitor Flash BIOS
- Monitor and graph the utilization of server resources such as:
  - Memory
  - Processor
  - HDDs
  - Identify potential performance bottlenecks and react to prevent down time
  - Monitor, manage, and configure RAID subsystems without taking them offline

Integrated xSeries Adapter for iSeries

The x236 is the newest xSeries server to be attached to IBM eServer® i5 or iSeries servers. A new Integrated xSeries Adapter (1519-200) attaches an x346 to connect to an IBM eServer i5 or iSeries server and enables customers to coverage the iSeries family of servers to provide virtual storage, virtual ethernet and tape sharing to an attached xSeries easily integrate security, backup and operations of a Windows™ and OS/400® environment.

Advanced Configuration and Power Interface (ACPI)

Advanced Configuration and Power Interface (ACPI) is an open industry specification that defines a flexible and extensible hardware interface for the system board. Software designers use this specification to integrate power management features throughout a computer system, including hardware, the operating system, and application software. This integration enables Windows to determine which applications are active and handle all of the power management resources for computer subsystems and peripherals.

World-class support tools and programs

The x236 server includes tools and programs designed to make ownership a positive experience. From the start, IBM programs help you purchase servers, get them running, and keep them running over the long haul. IBM can help your company maintain ownership of technology leadership network servers.

- IBM Server support is available by calling 800-IBM SERV (426-7378) in the U.S. and Canada for problem determination or placement of service calls for warranty[7].
- IBM on-site[7], three-year limited warranty[8] with next-business-day service (same-business-day service optionally available) helps protect your investment if a problem occurs. This service also includes replacement of parts identified through PFA.
- The ServerProven[10] program enables you to configure your server confidently with various devices and operating systems. This Web-based program provides compatibility information from actual testing of the xSeries 236 server with various adapters and devices.
- The ServerGuide CD includes utilities and drivers for assisted installation of popular network operating systems. Also included is a Broadcom Ethernet CD.
- Electronic support on the Web provides additional support in an easy-to-use format

Product positioning

The xSeries 236 is positioned above the entry, 2-way, xSeries 226 and below the 4-way departmental tower xSeries 255. This xSeries 236 server contains additional fault tolerance through hot-swap redundant cooling, redundant power, hot-plug PCI-X, and support for PCI-Express. It also features enhanced systems-management control. As xSeries universal servers, they are offered in flexible tower models and can be rack mounted using a tower-to-rack conversion kit.

With the xSeries 236, two segments will be combined into one departmental and mission-critical space. The xSeries 236 is a compact 5 U, two way, SMP-capable Xeon processor-based platform designed with integrated high availability features for mainstream network server applications.

These xSeries 236 servers are ideal for customers who require up to two-way 2.80 GHz processing power, significant memory, high-availability, and large data storage scalability. High-speed memory, 64-bit and 32-bit PCI buses, six Ultra320, hot-swap drive bays, and device bay for high-capacity tape drives make these servers ideal for mainstream network computing.

The xSeries 236 is an excellent choice for use with the Integrated xSeries Adapter for iSeries

Reference information

[1] GHz and MHz denote the internal and/or external clock speed of the microprocessor only, not application performance. Many factors affect application performance.

[2] PC2-3200-333 DDR SDRAM is an extension of the PC133 and PC100 memory. PC2-3200-333 double data rate (DDR)

means you get 4x data in the same clock cycle. Our actual data transfer is at 800 MHz.

3 Actual playback speed will vary and is often less than maximum.

4 When referring to HDD or tape backup capacity, GB stands for 1,000,000,000 bytes and TB stands for 1,000,000,000,000 bytes. User capacity may vary depending on operating environments.

5 Chipkill distributes information covered by Error Correcting Code across separate memory chips so if any of the chip fails, the data can still be reconstructed from the remaining chips and the system can continue running.

6 Some Web programs may not be available in all countries.

7 With respect to on-site service, the customer may be asked certain diagnostic questions before a technician is sent.

8 For information on the IBM Statement of Limited Warranty, visit

http://www.ibm.com/servers/support/machine_warranties/

This information is also available by calling 800-426-7378 or contacting your IBM representative or reseller. Copies are available upon request.

9 The ASR function is currently supported on Microsoft Windows 2000 and Windows 2003.

10 IBM makes no warranties, expressed or implied, regarding non-IBM products and services that are ServerProven®, including but not limited to implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

11 System will support 16 GB of memory with the 2 GB memory DIMMs installed (when available).

12 Capacities are based on installation of nine 146 GB Ultra320 SCSI Hot-Swap SL HDDs. For the latest information on supported HDD options, visit

http://www.ibm.com/pc/us/compat

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IBM US Announcement Supplemental Information

October 5, 2004

Publications

The following publications and CD-ROMs are shipped with the xSeries® 236 servers

- The *x236 Installation Guide* contains an introduction to the computer, installation and setup, installing options, reference information, and problem determination. The installation guide has easy-to-use text and pictorials to enable you to quickly set up the xSeries 236.
- ServerGuide™ CD contains drivers to support the xSeries 236 servers. In addition, it includes a set of easy-to-use utilities for assisted installation via CD of several popular network operating systems.
- Publications CD and a new Broadcom Ethernet Driver CD.
- IBM ServeRAID 7k CD.
- IBM Director systems management software is included.

Note: Software versions, features, and functions shipped with these systems may change as new releases become available or may be discontinued at any time.

The *x236 Installation Guide* and *Hardware Maintenance Manual,* in U.S. English versions, are available from

http://www.ibm.com/pc/support

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Integrated Technology Services

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Technical information

Physical specifications

	8841-0EU
Processor	Xeon
Internal speed	2.8 GHz
External speed	800 MHz
Number standard	1
Maximum	2
L2 cache (full-speed)	1 MB
Memory (133 MHz SDRAM)	1 GB ECC
RDIMMs	2 x 512 MB Non-Chipkill™
DIMM sockets	8
Capacity	16 GB[11]
Video	SVGA
memory	16 MB
SCSI controller	Ultra320
Channels	2
Connector internal	6
Connector external	1
RAID controller	2
Channels	2
Connector internal	2
Connector external	1
HDD	3-73.4 GB 10K
Total bays	10
5.25/3.5-in HH	3
3.5-in slim	1
Hot-swap	6
Internal capacity	1.3 TB[12]
Bays available	5
5.25/3.5-in HH	2
3.5-in slim	0
Hot-swap	3
Total PCI slots	6
64-bit/133 MHz	1
64-bit/100 MHz	2
PCI_E 2 GHz	2
32-bit/33 MHz	1
Slots available	6
System management	Standard[13]
Ethernet controllers	10/100/1000 Mb
CD-ROM (IDE)	48x-24x
Diskette drive	1.44 MB
Power supply	670 W[14]
Number standard	1
Hot-swap	Yes
Redundant power	Yes
Auto restart	Yes

[11] System will support 16 GB of memory with the 2 GB memory DIMMs installed (when available).

[12] Capacities are based on installation of nine 146 GB Ultra320 SCSI Hot-Swap SL HDDs. For the latest information on supported HDD options, visit **http://www.ibm.com/pc/us/compat**

[13] These systems contain an integrated system management processor that provides a set of monitoring and alert features. Refer to the **Description** section for details. For higher levels of system management support the Remote Supervisor Adapter is optionally available.

[14] The 670 watt redundant power supply is designed to support system fully configured.

48x-24x CD-ROM drive characteristics[15]

- Formatted capacity: 650 MB
- Average access time including latency: Less than 85 ms
- Sustained data transfer rate: 3,000 to 7,200 KB/s
- Burst data transfer rate
  - ATA PIO mode 4: 16.6 MB/sec
  - ATA Multiword DMA Mode 2: 16.6 MB/sec
- Technology: Full constant angular velocity (CAV)

[15] Actual playback speed will vary and is often less than maximum.

73.4 GB, 10,000 rpm HDD

- Formatted capacity: 73,400 MB
- Rotational speed: 10,000 rpm
- Typical average read seek time: < 4.7 ms
- Data transfer rate (maximum bursting): 320 MB/s
- Average latency: 3.00 ms
- Sustained data transfer rate : 33 to 67 MB/s
- PFA/S.M.A.R.T. enabled: Yes
- Interface: Ultra320 SCSI

Video subsystem

- ATI Radeon 7000M Graphics Accelerator
- Integrated on planar and connected to the PCI bus
- 16 MB of embedded DDR1 video memory
- 128-bit graphics engine with 8, 16, and 32 bpp mode acceleration
- 32 bpp (4G colors/True Color) support
- Integrated 300 MHz RAMDAC
- DDC2B monitor communications support

Supported video mode capabilities for the SVGA PCI controller:

Microsoft™ Windows NT™ V4.0 and Windows™ 2000

Resolution	Colors	Refresh Rate (Hz)
640 x 480 x 8	256	60, 72, 75, 85
640 x 480 x 16	64K	60, 72, 75, 85
640 x 480 x 32	16 million	60, 72, 75, 85
800 x 600 x 8	256	60, 72, 75, 85
800 x 600 x 16	64K	60, 72, 75, 85
800 x 600 x 32	16 million	60, 72, 75, 85
1024 x 768 x 8	256	60, 70, 75, 85
1024 x 768 x 16	64K	60, 70, 75, 85
1024 x 768 x 32	16 million	60, 70, 75, 85
1152 x 864 x 8	256	60, 70, 75
1152 x 864 x 16	64K	60, 70, 75
1152 x 864 x 32	16 million	60
1280 x 1024 x 8	256	60, 75, 85
1280 x 1024 x 16	64K	60, 75, 85
1280 x 1024 x 32	16 million	60, 75, 85
1600 x 1200 x 8	256	60, 75, 85
1600 x 1200 x 16	64K	60, 75, 85
1600 x 1200 x 32	16 million	60, 75

Note: NetWare and SCO drivers are contained in the respective operating system packages or bulletin boards.

Dimensions

Tower

- Width: 216.0 mm (8.5 in)
- Depth: 700.0 mm (27.6 in)
- Height: 440.0 mm (17.31 in)

Tower

- Weight: 33.63 kg (74 lb) (minimum configuration)
- Weight: 45.90 kg (101 lb) (maximum configuration)

Electrical

- 100 to 240 V ac; 50 Hz —60 Hz; 9.3 —4.7 A
- Input kilovolt-amperes (kVA) (approximately):
- Minimum configuration: 0.360 kVA
- Maximum configuration: 0.930 kVA
- Btu output: ship configuration — 1230 Btu/hr. (360 watts)

- Btu output: full configuration — 3710 Btu/hr. (930 watts)
- Acoustical Noise Emission levels: 5.9 bels (idling and operating)

Note: The noise emission level stated is the declared (upper limit) sound power level, in bels, for a random sample of machines. All measurements made in accordance with ISO 7779 and reported in conformance with ISO 9296.

x236 servers are intended for use as floor-standing servers and are tested and designed to operate in a horizontal position. The x236 can also be used as a rack model with the optional rack install kit.

Standards: These systems support or comply with the following standards:

- Multiprocessor Specification (MPS) 1.4
- Peripheral Component Interconnect (PCI) specification 2.2
- Peripheral Component Interconnect (PCI-X) specification v1.0
- PCI-Express specification 1.0a
- SCSI- Ultra 160 and SCSI- Ultra320
- Hardware-enabled to meet the International Organization for Standardization (ISO) 9241, Part 3

Equipment approvals and safety

- FCC — Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 3, Class A
- UL-1950[11]
- CSA C22.2 No. 950
- NOM-018[16]

[16] This server model is certified by the respective UL and NOM agencies.

Operating environment

- Temperature
  - 10.0° to 35.0°C (50° to 95°F) at 0 to 914 m (0 to 3,000 ft)
  - 10.0° to 32.0°C (50° to 90°F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,134 m (7,000 ft)

Systems

2.8 GHz

- Product Category (2005 law): G
- Product Category (2007 law): D

Hardware requirements: For attended installation of an operating system, this server requires a compatible:

- Keyboard
- Mouse
- HDD
- Display (E51, E54, P74, G78, LCD, or equivalent)

Unattended or remote installation may be performed without requiring some or all of these components. Review your unattended software installation program information for specific hardware configuration requirements.

For service, the server requires a compatible:

- Keyboard
- Mouse
- HDD
- Display (E51, E54, E74, G78, LCD, or equivalent)

When having the unit serviced, plan to have these components attached to your server either directly or indirectly via a console switch.

Software requirements

Programming requirements: The following network operating systems are supported in the x236 server:

- Microsoft
  - Windows 2000 Server
  - Windows 2000 Advanced Server
  - Windows Server 2003, Standard Edition
  - Windows Server 2003, Enterprise Edition
  - Windows Server 2003
- Novell
  - NetWare 6.5
  - NetWare 5.1
- Santa Cruz
  - Operation, Inc. —SCO UnixWare 7.1.4
- Linux™
  - Red Hat Enterprise Linux 3 AS X-86
  - Red Hat Enterprise Linux 3 WS X-86
  - Red Hat Enterprise Linux 3 for AMD64 and Intel™ EM64T
  - SUSE LINUX Enterprise Server 8
  - SUSE Standard Server 8
  - VMWare ESX 2.1

Note: Certification is planned for these operating systems.

For additional support, certification, and version information on network operating systems, visit

http://www.ibm.com/pc/us/compat

Preload option

The following network operating systems are supported as preloads in the xSeries 236:

- Microsoft
  - Windows 2000 Server
  - Windows 2000 Advanced Server
  - Windows Small Business Server 2000
  - Windows Server 2003, Standard Edition
  - Windows Server 2003, Enterprise Edition
  - Windows Server 2003

Compatibility: The x236 systems contain licensed system programs that include set configuration, set features, and test programs. System BIOS is loaded from a ″flash″ EEPROM into system memory. This BIOS provides instructions and interfaces designed to support the standard features of the x236 server and to maintain compatibility with many current software programs.

To view detailed information on the Internet about IBM and non-IBM devices, adapters, software, and network operating systems supported with xSeries servers, visit

http://www.ibm.com/pc/us/compat

Contact your IBM representative, IBM Business Partner, or refer to the IBM Sales Manual for information on the compatibility of hardware and software for xSeries servers. The Sales Manual is updated periodically as new features and options are announced that support these servers.

Limitations

- The x236 server support a maximum of 16 GB of system memory when you add a IBM 2 GB PC3200 ECC DDR2 SDRAM DIMM in each of the eight DIMM slots, when available. All supported system memory is addressable through direct memory access (DMA). The x236 server supports 512 MB, 1 GB and 2 GB, 800 MHz (Bus speed runs at 200 MHz, but data is clocked on four edges yielding a transfer rate of 800 MHz) DDR2 800 ECC SDRAM DIMMs.[8] DIMMs must be installed in matched pairs. Refer to the **Planning information** section for supported memory options.
- Mixing microprocessors of different speeds or cache size is not supported.
- Use the version of ServerGuide shipped with the system, or a later version, to load software and drivers. Earlier versions of ServerGuide may not be compatible with the server.

Refer to the **Software requirements** section for operating system limitations.

User group requirements: This announcement satisfies or partially satisfies requirements from one or more of the worldwide user group communities.

Planning information

Customer setup: The x236 servers are designated as customer setup. Customer setup instructions are shipped with systems and options.

Configuration information:

Integrated RAID One configuration: Two manufacturing instructions (MI) enable you to setup a RAID one[1] configuration. These instructions enable configuration via Odyssey (IBM.com).

Bay configuration: The x236 server contains 10 drive bays. The six 3.5-inch hot-swap bays are located on the lower half of x236 tower models and three bays are populated with 73.4 GB 10K SCSI HDDs The four bays on the top portion of tower model is designed primarily for removable media devices. One bay contains the standard 3.5-inch, slim-high diskette drive, another bay contains the standard CD-ROM drive, while the remaining two 5.25-inch half-high bays can support tape backup or other devices. These two drive bays can support three 3.5-inch slim-high, hot-swap HDDs through installation of an optional 3-Pack Ultra320 Hot-Swap Expansion Kit.

SCSI cabling considerations

The x236 server contains a backplane that supports six hot-swap drive bays. The backplane is connected to the integrated dual-channel, Ultra320 SCSI controller connector through a one-drop 16-bit LVD SCSI cable. If internal RAID support is required, other than the SCSI RAID card 7k option, this cable cannot be used. You must purchase the SCSI Option One-Drop Cable, (02R2068).

The 48x-24x IDE CD-ROM is cabled directly to the IDE port.

External SCSI attachment

To attach external SCSI devices, a supported SCSI adapter is required or use of the external option cable (24P7973)

In the configurations where an external SCSI device attachment is required, an external SCSI connector knockout is available at rear of system for mounting the optional cable.

External Serial attachment

To attach an external serial cable RS232, use the serial connector at the rear of the system.

Processor upgrades

The following processor upgrades are supported:

- IBM xSeries 2.8 GHZ/800 MHZ — 1 MB L2 Cache Xeon Processor -13N0681

Supported memory options

The following memory options are supported:

- IBM 1 GB PC3200 ECC DDR2 SDRAM DIMM — (73P3522) (2x 512 MB) non-Chipkill
- IBM 1 GB PC3200 ECC DDR2 SDRAM DIMM — (73P2865) (2x 512 MB) Chipkill
- IBM 2 GB PC3200 ECC DDR2 SDRAM DIMM — (73P2866) (2x 1 GB) Chipkill

Power supply requirements: These models contain one 670-watt power supply, which is a hot-swap power supply. One hot swap supply has enough power to supply a fully loaded box. If redundancy is required, the user should install additional power supplies to insure sufficient power will be available. A fault light illuminates when a power supplies fails.

Optional rack installations feature: The x236 models are optionally installable as rack units and are designed so they can be installed in an industry-standard 19-inch rack cabinet such as the NetBAY42 or NetBAY25. The x236 system requires a rack mount kit for rack installation. In addition, it can also be installed in the deeper NetBAY42 ER.

If you choose not to use an IBM rack, the cabinet must meet EIA™-310-D standards for mounting flanges and hole clearances with front to rear mounting of 27.5-28.5 inches. The rack must provide sufficient room in front of the forward EIA flange to allow for bezel attachment-the standard for 310-D suggests 49mm clearance. It must also provide adequate room at the rear of the rack, behind the rear flange for cable management; the x236 requires approximately 6.5 inches in this space.

The rack should include perforated front and rear doors and must not prevent the flow of cool air into or out of the rack. The weight handling capacity of the rack is 50 pounds. Finally the rack must provide proper stabilization so that the rack does not become unstable when servers are pulled out of service.

Cable orders: Dual Broadcom 5721 10/100/1000 Mbps, full-duplex Ethernet PCI controllers, standard with the x236 server, are connected directly to an independent RJ-45 connector. The RJ-45 connectors provide a 10BaseT, 100Base-TX, or 1000Base-TX interface for connecting twisted-pair cable to the Ethernet network. Cabling is not included with the server. To connect the Ethernet controller to a repeater or switch, use a UTP cable with RJ-45 connectors at both ends. For 100/1000

Mbps operation, Category 5 cabling must be used. For 10 Mbps operation, Category 3, or better, cabling must be used.

There are no additional cabling requirements, other than for system power, keyboard, mouse, and monitor connections.

Installability: The x236 server requires about 20 minutes for installation. Installation includes unpacking, setting up, and powering on the system. Additional time is required to install an operating system, additional adapters, or features.

Packaging: **x236**

- System Unit Carton: 1 box
- Country Kit Carton:
  - Keyboard with attached cable
  - Mouse with attached cable
  - System unit power cord
  - xSeries 236 Installation Guide
  - ServerGuide and IBM Director
  - CD-ROM Packages
  - Publications CD
  - New Broadcom Ethernet Driver CD
  - IBM ServeRAID 7k CD

The x236 system is shipped as a single package. The country kit carton is contained inside the top portion of the system unit carton.

Supplies: **For end users:** IBM xSeries 236 express server can be purchased through the dealers.

Security, auditability, and control

Security and auditability features include:

- Power-on and remote-control password functions provide controls of who has access to the data and server setup program on the server.
- Set unattended boot mode allows the system keyboard to be locked to all entries except the password and at the same time allows other computers on the network to access the system disk drive.
- Mechanical lock allows the user to lock the system cover to prevent unauthorized personnel access to diskette drives or removable media (tower models only, security of rack drawer models is provided by the rack enclosure).
- Selectable boot sequence prevents unauthorized installation of software or removal of data from the diskette drive.

It is a customer's responsibility to ensure that the server is secure to prevent sensitive data from being removed.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

IBM Electronic Services

IBM Global Services has transformed its delivery of hardware and software support services to put you on the road to higher systems availability. IBM Electronic Services is a Web-enabled solution that provides you with an exclusive, no-additional-charge enhancement to the service and support on the IBM eServer®. You should benefit from greater system availability due to faster problem resolution and preemptive monitoring. IBM Electronic Services is comprised of two separate but complementary elements: IBM Electronic Services news page and IBM Electronic Service Agent™.

IBM Electronic Services news page provides you with a single Internet entry point that replaces the multiple entry points traditionally used by customers to access IBM Internet services and support. By using the news page, it enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The IBM Electronic Service Agent is no-additional-charge software that resides on your IBM eServer system that is designed to proactively monitor events and transmit system inventory information to IBM on a periodic customer-defined timetable. The IBM Electronic Service Agent tracks system inventory, hardware error logs, and performance information. If the server is under a current IBM maintenance service agreement or within the IBM warranty period, the Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to provide proactive service that maintains higher system availability and performance. In addition, information collected through the Service Agent will be made available to IBM service support representatives when they are helping answer your questions or diagnosing problems.

To learn how IBM Electronic Services can work for you, visit

http://www.ibm.com/support/electronic

Terms and conditions

This product is available for purchase under the terms of the IBM Customer Agreement.

Each IBM machine is manufactured from parts that may be new or used. In some cases, a machine may not be new and may have been previously installed.

Regardless, IBM's appropriate warranty terms apply.

IBM Global Financing: Yes

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

In the United States, call 800-IBM-SERV (426-7378), or write to:

Warranty Information
P.O. Box 12195
Research Triangle Park, NC 27709
Attn: Dept JDJA/B203

Warranty period

- System hardware — Three years
- Optional features — One year

Optional IBM features initially installed in an IBM system carry the same warranty period as the system. If installed after the initial system installation, they carry the balance of the system warranty or the optional feature warranty, whichever is greater.

Warranty service: If required, IBM provides repair or exchange service depending on the type of warranty service specified below for the machine. An IBM technician will attempt to resolve your problem over the telephone, you must follow IBM's problem determination

and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations, additional charges may apply outside IBM's normal service area, contact your local IBM representative or your reseller for country- and location-specific information.

Customer Replaceable Unit (CRU) (keyboard, mouse, speaker, memory, HDD, and other easily replaceable parts) service and on-site for other selected parts.

CRU service: IBM will ship CRU parts to you for your replacement. If IBM instructs you to return the replaced CRU, you are responsible for returning it to IBM in accordance with IBM's instructions. If you do not return the defective CRU, if IBM so instructs, within 30 days of your receipt of the replacement CRU, IBM may charge you for the replacement.

On-site service: IBM on-site repair (IOR), 9 hours per day, Monday through Friday excluding holidays, next business day (NBD) response. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit and suitable for the purpose. On-site service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM service center. In those locations where on-site service is not available, the normal in-county service delivery is used.

Call IBM at 800-IBM-SERV (426-7378), to assist with problem isolation for hardware to determine if warranty service is required. Telephone support may be subject to additional charges, even during the limited warranty period.

International Warranty Service (IWS): International Warranty Service (IWS) is available during the warranty period to customers who travel or relocate to countries where their computer is sold and serviced by IBM or IBM resellers authorized to perform warranty service. Eligible IBM computers are identified by their four-digit machine type.

You can obtain IWS through the method of service, such as CRU, depot, carry-in, or on-site, provided in the servicing country. Service methods and procedures vary by country, and some service or parts may not be available in all countries. Service centers in certain countries may not be able to service all models of a particular machine type. In addition, some countries may have fees and restrictions that apply at the time of service.

To determine the eligibility of your computer and to view a list of countries where service is available, visit

http://www-3.ibm.com/pc/support/site.wss/warranty/warranty.vm

For more information on IWS, refer to Services Announcement 601-034, dated September 25, 2001.

Agreement: Programs included with this product are licensed under the terms and conditions of the License Agreements shipped with the system.

Maintenance services — ServiceElect and ServiceSuite™

ServiceElect and ServiceSuite provide hardware warranty service upgrades, maintenance, and selected annuity support services in one agreement.

Warranty service upgrade: During the warranty period, warranty service upgrade provides an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response time objectives and are not guaranteed.

An IBM technician will attempt to resolve your problem over the telephone, you must follow IBM's problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable, parts that are considered CRUs will be provided as part of the machine's standard warranty CRU service.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

The following warranty service upgrade options are available:

- On-site service — IOR, 9 hours per day, Monday through Friday excluding holidays, 4-hour average response
- On-site service — IOR, 24 hours per day, 7 days a week, 4-hour average response
- On-site service — IOR, 24 hours per day, 7 days a week, 2-hour average response

Maintenance service: If required, IBM provides repair or exchange service depending on the type of maintenance service specified below for the machine. An IBM technician will attempt to resolve your problem over the telephone, you must follow IBM's problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed.

CRU service: If your problem can be resolved with a CRU (keyboard, mouse, speaker, memory, HDD, and other easily replaceable parts), IBM will ship these parts to you for replacement by you. If IBM instructs you to return the replaced CRU, you are responsible for returning it to IBM in accordance with IBM's instructions. If you do not return the defective CRU, if IBM so instructs, within 30 days of your receipt of the replacement CRU, IBM may charge you for the replacement.

On-site service: IOR, IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

The following on-site service options are available:

- IOR, 9 hours per day, Monday through Friday excluding holidays, next business day response

- IOR, 9 hours per day, Monday through Friday excluding holidays, 4 hour average response
- IOR, 24 hours per day, 7 days a week, 4 hour average response
- IOR, 24 hours per day, 7 days a week, 2 hour average response

Maintenance service (ICA)

Maintenance services are available for ICA legacy contracts. The preferred go-to-market offerings are ServiceElect. However, ICA legacy contracts will still be available for current customers until they are withdrawn.

Alternative service (warranty service upgrades): During the warranty period, warranty service upgrade provides an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response time objectives and are not guaranteed.

An IBM technician will attempt to resolve your problem over the telephone, you must follow IBM′s problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable, parts that are considered CRUs will be provided as part of the machine′s standard warranty CRU service.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

The following warranty service upgrade option is available:

- On-site service — IOR, 24 hours per day, 7 days a week, 4-hour average response

Maintenance service: If required, IBM provides repair or exchange service depending on the type of maintenance service specified below for the machine. An IBM technician will attempt to resolve your problem over the telephone, you must follow IBM′s problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed.

CRU service: If your problem can be resolved with a CRU (keyboard, mouse, speaker, memory, HDD, and other easily replaceable parts), IBM will ship these parts to you for replacement by you. If IBM instructs you to return the replaced CRU, you are responsible for returning it to IBM in accordance with IBM′s instructions. If you do not return the defective CRU, if IBM so instructs, within 30 days of your receipt of the replacement CRU, IBM may charge you for the replacement.

On-site service: IOR, IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

The following on-site service options are available:

- IOR, 9 hours per day, Monday through Friday excluding holidays, NBD response
- IOR, 24 hours per day, 7 days a week, 4-hour average response

Non-IBM parts support

Warranty service

IBM is now shipping machines with selected non-IBM parts that contain an IBM FRU part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

Warranty service upgrades and maintenance services: Under certain conditions, IBM Integrated Technology Services repairs selected non-IBM parts at no additional charge for machines that are covered under a warranty service upgrade or maintenance services.

IBM Service provides hardware problem determination on non-IBM parts (adapter cards, PCMCIA cards, disk drives, memory, and so forth) installed within IBM systems covered under warranty service upgrade or maintenance services and provides the labor to replace the failing parts at no additional charge. If IBM has Technical Service Agreements with the manufacturers of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing parts at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or maintenance services.

IBM hourly service rate classification: One

ServicePac® offerings

Warranty and maintenance options: The announced products may be eligible for ServicePacs for Warranty and Maintenance Options, convenient prepackaged offerings for warranty service upgrades and maintenance services.

Installation services: The announced products may be eligible for ServicePacs for Installation Services, convenient prepackaged offerings for installation services. Refer to the **Prices** section for information on the availability of ServicePac offerings.

For additional ServicePac information, visit

http://www-1.ibm.com/services/its/us/servicepac.html

Field-installable features: Yes

Model conversions: No

Machine installation: Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

Graduated charges: No. This product does not contain licensed internal code or licensed machine code.

Prices

Description	Machine type/ model	Part number	IBM list price[17]
xSeries 236 — Tower 2.8 GHz/800 MHz/1 MB L2, 1 GB, 3-73.4 GB HDDs, ServeRAID™ 7K	8841-0EU	88410EU	$3,879

[17] IBM list price; does not include tax or shipping and is subject to change without notice. Reseller prices may vary.

For of the name of the nearest IBM representative or Business Partner, call 800-IBM-4YOU (426-4968).

ServicePac for warranty and maintenance

Description	Part number
Electronic — 1 year IOR 9 x 5 + NBD response	69P9406
Electronic — 1 year IOR 9 x 5 + 4-hour average response	69P9407
Electronic — 1 year IOR 7 x 24 + 4-hour average response	69P9408
Electronic — 1 year IOR 7 x 24 + 2-hour average response	69P9409
Electronic — 2 year 9 x 5 NBD IOR + NBD response	96P2125
Electronic — 2 year 9 x 5 x 4 IOR + 4-hour average response	96P2126
Electronic — 2 year 24 x 7 x 4 IOR + 4-hour average response	96P2127
Electronic — 2 year 24 x 7 x 2 IOR + 2-hour average response	96P2128
Electronic — 3 year IOR 9 x 5 + 4-hour average response	21P2083
Electronic — 3 year IOR 7 x 24 + 4-hour average response	21P2084
Electronic — 3 year IOR 7 x 24 + 2-hour average response	21P2085
Electronic — 4 year IOR 9 x 5 + NBD response	69P9266
Electronic — 4 year IOR 9 x 5 + 4-hour average response	69P9267
Electronic — 4 year IOR 7 x 24 + 4-hour average response	69P9268
Electronic — 4 year IOR 7 x 24 + 2-hour average response	69P9269
Electronic — 5 year IOR 9 x 5 + NBD response	69P9270
Electronic — 5 year IOR 9 x 5 + 4-hour average response	69P9271
Electronic — 5 year IOR 7 x 24 + 4-hour average response	69P9272
Electronic — 5 year IOR 7 x 24 + 2-hour average response	69P9273

Maintenance service charges (ICA)

Alternative service (warranty service upgrades)

IOR 24 x 7
$689

Annual maintenance service

IOR 9 x 5	IOR 24 x 7
$1,300	$1,950

For ServiceElect (ESA) Maintenance Service Charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

IBM Global Financing

IBM Global Financing offers competitive financing to credit-qualified customers and Business Partners to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, both from IBM and other manufacturers or vendors, as well as commercial financing (revolving lines of credit, terms loans, acquisition facilities, and inventory financing credit lines) for Business Partners. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization, or visit

http://www.ibm.com/financing

IBM Global Financing offerings are provided through IBM Credit LLC in the United States and other IBM subsidiaries and divisions worldwide to qualified commercial and government customers. Rates are based on a customer's credit rating, financing terms, offering type, equipment type, and options, and may vary by country. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice. Financing solutions from IBM Global Financing can help you stretch your budget and affordably acquire the new product. But beyond the initial acquisition, our end-to-end approach to IT management can also help keep your technologies current, reduce costs, minimize risk, and preserve your ability to make flexible equipment decisions throughout the entire technology life cycle.

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