



IBM @server® BladeCenter HS20 blade servers – Fast 3.6 GHz/800 MHz-1 MB L2, Xeon processors with EM64T capability, 2.8 GHz/800 MHz BladeCenter LV models with EM64T, and new low profile handle

Overview

Extend the capabilities of your high-density BladeCenter™ with BladeCenter HS20 blade servers that include Intel™ Xeon processors with EM64T.

These new blade servers have processor speeds of 2.8 (LV) and 3.6 GHz. Intel Extended Memory Technology allows servers to access larger amounts of memory. Processors with EM64T support 64-bit extended memory operating systems from Microsoft™, Red Hat, and SUSE, when available.

These processors can also run in legacy mode (where a 32-bit application is running under a 32-bit operating system) and remain fully compatible with 32-bit applications and operating systems.

BladeCenter HS20 blade servers can be installed in a new BladeCenter chassis (8677-3XX) or they can be installed in your existing BladeCenter chassis (8677-1XX or 8677-2XX) after it is upgraded with the new 2000-watt power supply option (26K4816)². In addition, these new HS20 blades servers can be installed in the BladeCenter T chassis (8720-1RX and 8730-1RX).

Eight 2.8 GHz LV processor model blades are supported in the BladeCenter T chassis (8720, 8730). For all other 8843 HS20 models, up to seven blades are supported in the BladeCenter T chassis (8720 or 8730).

The BladeCenter HS20 blade servers, coupled with the BladeCenter and BladeCenter T chassis, advance application serving

with performance, density, and scalability.

At your command are:

- Powerful, two-way SMP-capable Xeon processors
- High-speed memory
- Dual Gigabit Ethernet connections
- SCSI RAID-1 and 1E (mirroring) supported in 32-bit legacy mode only
- Advanced high-availability and systems management features

Powerful blade-thin computing: The BladeCenter T chassis and BladeCenter HS20 blade servers with low-profile handles are the key components to building your blade server configuration for telecommunications.

Service and support perfected for e-business

- IBM Director and Remote Deployment Manager (RDM)
- ServerProven® compatibility testing and Web support
- Three-year, on-site³, limited warranty⁴

Key prerequisites

- BladeCenter or BladeCenter T chassis
- Monitor, keyboard, and mouse for setup
- Network switch module
- Boot device such as on-board HDDs, BladeCenter Storage Expansion Unit HDDs, or network storage device
- Management module with latest level firmware
- Rack with appropriate PDUs and main power distribution

At a glance

BladeCenter HS20 blade servers include:

- 3.6 GHz/800 MHz¹ and 2.8 GHz/800 MHz Low Voltage (LV) models, with 1 MB L2 cache Intel Xeon processors with Extended Memory 64 Technology (EM64T)
- Two-way SMP processing with 800 MHz front-side bus (FSB)
- High-speed 1 GB (2 x 512 MB DIMMs) DDR2 ECC SDRAM memory or 512 MB (2 x 256 MB DIMMs) DDR2 memory in LV models
- Dual Broadcom 5704S Gigabit Ethernet connections with failover support
- Support for Fibre Channel (FC)
- Support for HS20 Ethernet or FC expansion card
- Integrated systems-management processor
- Integrated SCSI controller and connectors for two 2.5-inch small form factor (SFF) SCSI HDDs
- Connector for adding optional BladeCenter Storage Expansion Unit supporting up to two hot-swap 3.5 inch U320 HDDs and two additional HS20 Ethernet or Fibre Channel expansion cards
- Lower power usage on LV models, embedded roadmap Intel processor, and NEBS support in BladeCenter T with full blade configurations

Planned availability date

February 25, 2005

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: <http://www.ibm.com>.

Description

Related options

IBM processor upgrade with:

- xSeries® Xeon 3.6 GHz/800 MHz — 1 MB L2 Cache (13N0659) Upgrade Processor Option with Intel EM64T
- xSeries Xeon 2.8 GHz/800 MHz — 1 MB L2 Cache (13N0699) Low Voltage Upgrade Processor Option with Intel EM64T

These next-generation Xeon processors use a 800 MHz common clock speed for external operations.

BladeCenter HS20 Low Profile Handle (25K8360) for 800 MHz Blade Server

BladeCenter 2,000-watt Power Supply (26K4816)

The 2,000-watt power supply supports the increased demands of the BladeCenter HS20 blades. It comes standard in the new 8677-3XU BladeCenter.

Notes

- For 8677 BladeCenter Chassis with 1200-watt power supplies do not provide enough power to maintain redundancy at full density. Customers with the 1XX chassis that want full density must upgrade to the 2000-watt power supplies (26K4816).
- For 8677 BladeCenter Chassis with 1800-watt power supplies, 2.8 GHz LV processor model blades are supported. When installing other 8843 HS20 models, customers with the 2XX chassis must upgrade to the 2000-watt power supplies (26K4816) to maintain redundancy at full density

BladeCenter HS20

High-performance blade-server subsystems: BladeCenter HS20 blades servers are high-throughput, two-way, SMP-capable Xeon-based blade servers, highly scalable when you add memory. These flip-chip, pin grid array 2 (FC-PGA2) processors feature advanced transfer L2 caches integrated onto the processor core that runs at the same clock speed. The advanced transfer cache is a result of a “backside bus” 256 bits wide. It features a quad-wide cache line that can transfer four 64-bit cache line segments at one time to deliver full-speed capability. The cache is eight-way set associative.

One Intel Xeon processor with EM64T is standard on the blade server. High-speed, PC2-3200 DDR2 SDRAM is synchronized for up to 400 MHz processor-to-memory subsystem performance with current processors.

The BladeCenter HS20 uses the Intel Lindenhurst (E7520) system chipset that includes:

- Memory and I/O Controller (MCH)
- Intel PXH-D
- ICH-S

The MCH includes:

- Integrated high-performance main memory subsystem
- Integrated PCI Express Interface
- Maximizes throughput between processors and main memory

The PXH includes:

- Bridges PCI Express bus to a PCI-X bus. The PXH connects to the MCH via a PCI express (x4) bus.
- Serves as a bridge and converts transactions on the PCI express bus to transactions on the PCI-X bus.

The ICH-S includes:

- USB interface
- Local On-Blade Service Processor interface
- PCI-X bus interface to the LSI 1020 SCSI controller and PCI bus interface to the ATI mobility Radeon video controller
- PCI-X bus interface for video controller
- Systems management bus, supporting PHILLIPS I2C two-wire protocol interface
- Low power controller interface for POST/BIOS EEPROM
- Dual Gigabit Ethernet connections
- One external PCI-X bus segment for daughter card connector

Standard BladeCenter HS20 configuration

Models	Processor	L2 cache	Memory	Ethernet	HDD
8843-LTx	2.8 GHz Xeon	1 MB	512 MB ECC	Dual Gb	Open
8843-L1x	2.8 GHz Xeon	1 MB	512 MB ECC	Dual Gb	Open
8843-4Tx	3.6 GHz Xeon	1 MB	1 GB ECC	Dual Gb	Open

Additional features

- BladeCenter HS20 system board containing four DIMM connectors, supporting 256 MB, 512 MB, 1 GB, or 2 GB DIMM options
 - Up to 8 GB of system memory is supported with 2 GB DIMMs.
 - Memory is two-way interleaved (must be installed in matched pairs).
 - Memory sizes can be mixed.
 - Chipkill™ function is supported.
- Support for optional SCSI Storage Expansion Unit, supporting high-speed (320 MB/s), Low-Voltage Differential SCSI (LVDS) RAID 1 and 1E internal storage solutions
- SCSI controller, supporting SCSI data storage up to 293 GB⁵ (two 146 GB HDDs) and RAID-1 and -1E
- Two full-duplex, dual Gigabit Ethernet PCI connections, high-speed network communications to LAN clients

BladeCenter HS20 blade servers are designed for high throughput from processor, to memory, and to bus I/O.

These features, combined with SMP capability and blade-thin density, make it an excellent choice for space constrained environments used for:

- Web caching
- Collaboration
- Terminal serving
- Dynamic Web serving
- Firewall
- Telecommunications
- Active directory services
- Scientific and technical computing
- Linux™ clustering

High-availability and serviceability features

- Hot-swap blades enable easy access to each blade server
- Management module interfaces with each blade server for single systems management control

The BladeCenter HS20 blade servers deliver on reliability and serviceability.

Features include:

- Intel EM64T ECC DIMMs, combined with an integrated ECC memory controller, correct soft and hard single-bit memory errors, while minimizing disruption of service to LAN clients
- Chipkill memory — correction for up to four bits per DIMM to help keep your blade server up and running
- Memory hardware scrubbing, designed to correct soft memory errors automatically without software intervention
- ECC L2 cache processors to help improve data reliability and reduce downtime
- CPU failure recovery in SMP configurations:
 - Forces failed processor offline
 - Automatically reboots server
 - Generates alerts
 - Continues operations with the working processor
- PFA on SCSI HDD options, memory, and processors to alert the system administrator of an imminent component failure
- Dual Gigabit Ethernet connections support:
 - Failover, adapter fault tolerance
 - PXE 2.0 Boot Agent
 - Wake on LAN®
 - Load balancing or teaming
- An integrated management processor that supports diagnostic, reset, POST, and auto recovery functions and monitors temperature and voltage; alerts generated when thresholds are exceeded (refer to the **Limitations** section for restrictions)

Systems management

IBM Director

BladeCenter HS20 blade servers include IBM Director. This powerful, highly integrated systems management software solution is 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.

It can help reduce costs through:

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

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 can be extended with optional add-ons for advanced server management, deployment, and software distribution. All of these tools smoothly integrate into IBM Director for consistent look-and-feel and single point of management while taking advantage of the IBM Director monitoring, scheduling, alerting, event management, and group management capabilities.

Optional add-ons

- The IBM Director Server Plus Pack is a collection of five tools with predictive and autonomic capabilities that help deliver optimal server performance and high availability. The five tools include Capacity Manager, Software Rejuvenation, Active PCI Manager, System Availability, and Rack Manager.
- Application Workload Manager extends IBM Director to enable the control of how multiple applications use server resources and protects against unexpected resource contention.
- RDM is an effective tool for the initial deployment phase of a system's life cycle with its ability to remotely send out complete software images for installation in a preboot environment.
- Software Distribution Premium Edition enables you to create and distribute software packages to systems on your network, saving travel and labor costs.

IBM Director also enables integration into leading workgroup and enterprise systems management environments via its Upward Integration Modules. This enables the advanced management capabilities built into xSeries servers to be accessed from:

- Tivoli® Enterprise and Tivoli NetView®
- Computer Associates CA Unicenter TNG
- HP OpenView
- Microsoft SMS
- BMC Patrol
- NetIQ

For more information about IBM Director, refer to Software Announcement 202-246, dated September 24, 2002.

RDM for BladeCenter

BladeCenter can use RDM, which enables the configuration and deployment of BladeCenter HS20 blade servers within a single BladeCenter. This highly flexible and powerful tool enables you to deploy system images that include the operating system and configuration detail to one or more blade servers at one time from an IBM Director console on the network.

With RDM you can:

- Add instructions for loading firmware or specific operating systems
- Deploy multiple blade servers in a BladeCenter at one time
- Store various images on the RDM server for target server installations
- Restore initial or incremental disk image locally with a keystroke
- Drop and drag capability to deploy images

BladeCenter management module

Use the management module in the BladeCenter to manage the BladeCenter and obtain vital system information about your installed BladeCenter HS20 servers. The management module communicates with the blade servers within the BladeCenter via an RS-485 intermanagement network. This network relays vital information about individual blade servers such as:

- Temperature
- Voltages
- Power supply status
- Memory status
- Fan status
- HDD status
- Error and status log

You receive status and control all blade servers within the BladeCenter. You can shut down and restart any blade server from anywhere on the network to help save time and costs associated with travel to the actual installation.

These manageability functions are provided through a self-contained Web page, creating an easy and familiar way for administrators to monitor, control, and maintain high availability.

Product positioning

The BladeCenter HS20 offerings are positioned as the highest density servers of the eServer® line. They represent a new approach to the deployment of application servers where two-way, SMP-capable Xeon processing, high-availability design, systems management, and easy setup features are combined in an extremely dense package.

The BladeCenter and BladeCenter HS20 blades can require less space and power resources because of their high-density design, reduced power requirements, and single environment systems management. This is an extremely important consideration for:

- Large enterprises
- Application service providers
- Scientific and technical computing businesses

They are an excellent fit for applications such as:

- Lotus Notes®
- Microsoft Exchange
- Linux clusters

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 For 8677 BladeCenter Chassis with 1200-watt power supplies do not provide enough power to maintain redundancy at full density. Customers with the 1XX chassis that want full density must upgrade to the 2000-watt power supplies (26K4816).

For 8677 BladeCenter Chassis with 1800-watt power supplies, 2.8 GHz LV processor model blades are supported. When installing other 8843 HS20 models, customers with the 2XX chassis must upgrade to the 2000-watt power supplies (26K4816) to maintain redundancy at full density.

³ IBM sends a technician after attempting to diagnose and resolve the problem remotely.

⁴ For information on the IBM Statement of Limited Warranty, visit

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

Alternatively, this information is also available by contacting your IBM representative or reseller. Copies are available upon request.

⁵ When referring to HDD or tape backup capacity, GB stands for one billion bytes. Total user capacity may vary depending on operating environments.

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld ID and password are required (use IBM ID).

BP Attachment for Announcement Letter 105-019

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=105-019>

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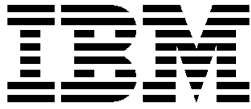
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January 18, 2005

Publications

An installation and user's guide, safety, and warranty publications are shipped with each BladeCenter™ HS20 blade.

The following publications are available immediately.

Title	Order number
BladeCenter Solutions	GM13-0173
xSeries® Family Brochure	GM13-0128

The *BladeCenter HS20 Installation and User's Guide* and *Hardware Maintenance Manual*, in U.S. English versions, are available from

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

Services

Integrated Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure for e-business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

<http://www.ibm.com/services/>

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Technical information

Physical specifications

BladeCenter HS20

	8843-LTx	8843-L1x	8843-4Tx
Processor	Xeon	Xeon	Xeon
Internal speed	2.8 GHz	2.8 GHz	3.6 GHz
External speed	800 MHz (QP)	800 MHz (QP)	800 MHz (QP)
Number standard	1	1	1
Maximum	2	2	2
L2 cache (full-speed)	1 MB	1 MB	1 MB
L3 cache	0	0	0
Memory (PC2-3200 DDR2)	512 MB ECC	512 MB ECC	1 GB ECC
DIMMs	2 x 256 MB	2 x 256 MB	2 x 512 MB
DIMM sockets	4	4	4
Capacity	8 GB ⁶	8 GB ⁶	8 GB ⁶
Video	SVGA	SVGA	SVGA
Memory	16 MB	16 MB	16 MB
SCSI controller	Ultra320	Ultra320	Ultra320
Channels	1	1	1
Connector internal	2	2	2
Connector external	0	0	0
RAID 1/1E	Yes	Yes	Yes
HDD	0	0	0
Connectors	1	1	1
Internal capacity	0	0	0
Total HDD bays	0	0	0
PCI slots	0	0	0
Management processor	Standard	Standard	Standard
Ethernet controller	Dual Gb	Dual Gb	Dual Gb
FC card	Optional	Optional	Optional
Storage expansion	Optional	Optional	Optional
SCSI interface	Ultra320	Ultra320	Ultra320
HDD support	2	2	2
Internal capacity	293.6 GB ⁷	293.6 GB ⁷	293.6 GB ⁷
DVD-ROM (IDE)	0	0	0
Diskette drive	0	0	0
Power supply	0	0	0

⁶ Total system memory capacity is based on using 2 GB memory DIMMs

⁷ Capacities are based on installation of two 146.8 GB SCSI HDDs. For latest information on supported HDD options, visit

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

Video subsystem

- ATI Mobility Radeon Video controller
- Integrated on the blade
- 16 MB embedded video memory

Supported BladeCenter HS20 video resolutions

Resolution	Maximum refresh rate supported	CRT support	CRT ISO 9241.3 compliance	Flat panel support
640 x 480	85 Hz	Yes	Yes	Yes
800 x 600	85 Hz	Yes	Yes	Yes
1024 x 768	75 Hz	Yes	Yes	Yes
1280 x 1024	40 Hz	No	No	Yes
1600 x 1200	28 Hz	No	No	Yes

Note: For resolutions supported by different operating systems, refer to the operating system documentation.

Electrical — BladeCenter HS20: 12.2 (nominal) V dc

Standards: This system supports or complies with the following standards:

- Multiprocessor Specification (MPS) 1.4.
- 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 60950 Safety of Information Technology Equipment
- CSA C22.2 No.60950 Safety of Information Technology Equipment 60950
- NOM-019 Seguridad de Equipo de Procesamiento de Datos

Operating environment

- Temperature:
 - 10° to 35°C (50° to 95°F) at 0 to 914 m (0 to 3,000 ft)
 - 10° to 32°C (50° to 90°F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)

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

- Keyboard
- Mouse
- Display

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
- Display

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

Software requirements: The following network operating systems have been tested for compatibility with the BladeCenter HS20:

- Microsoft™:
 - Windows™ 2000 Advanced Server (requires SP 3)
 - Windows 2000 Server (requires SP 3)
 - Windows Server 2003, Standard Edition
 - Windows Server 2003, Enterprise Edition
 - Windows Server 2003, Web Edition
- Linux™:
 - Red Hat Enterprise Linux AS (V.3 for AMD64/EM64T)
 - Red Hat Enterprise Linux AS (V.3 for x86)
 - Red Hat Enterprise Linux ES (V.3 for x86)
 - Red Hat Enterprise Linux WS (V.3 for x86)
 - SUSE LINUX Enterprise Server 9 (32- and 64-bit)
 - SUSE LINUX Enterprise Server 9 for x86

For additional information support, certification, and versions of network operating systems, visit

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

Compatibility: The BladeCenter HS20 contains licensed system programs that include set configuration, set features, and test programs. IBM 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 BladeCenter HS20 and to maintain compatibility with many current software programs.

For detailed information about IBM and non-IBM devices, adapters, software, and network operating systems supported with xSeries servers, visit

<http://www.ibm.com/us/pc/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 BladeCenter HS20 blades contain four DIMM sockets. A maximum of 8 GB of system memory is supported by using 2 GB DIMMs of PC2-3200 CL2.5 ECC DDR2 memory in each of the 4 DIMM sockets. All supported system memory is addressable through direct memory access. The BladeCenter HS20 supports currently available 256 MB, 512 MB, 1 GB, or 2 GB DIMM options. Supported DIMMs can coexist in the same server; however, memory DIMMs of the same capacity must be installed in matched pairs. Refer to the **Planning information** section or the xSeries server Web page memory options.
- Microprocessors must be of the same type and clock speed on each BladeCenter HS20. Mixing microprocessors of different speeds or cache size or upgrading the base processors is not supported.

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

User group requirements

Limitations

- IBM Director is supported in 32-bit legacy mode only.
- ASR is supported in 32-bit legacy mode only.
- RDM:
 - Supports 32-bit legacy Windows native and clone install
 - Supports Red Hat EL (Advanced Server) 3.0 32- and 64-bit installs via a white paper
 - Updates BIOS, perform CMOS updates, and configure RAID controller
 - Does not support IA 64e-bit Windows native install
 - Supports Windows clone install
 - Does not support SLES 9
- ServerGuide™ and Scripting Toolkit
 - Supports unattended installation of the legacy 32-bit Windows network operating systems only (Windows 2000 and Windows 2003) but not for the installation of 64-bit operating systems
- Update Express: Supports 32-bit legacy mode only
- Systems may require 2000-watt power supply as determined by the BladeCenter power module upgrade guideline (document part number 25K8424 shipped with HS20 blades).

Planning information

Customer responsibilities

BladeCenter HS20 blade, and related options: This product is designated as customer setup. Customer setup instructions are shipped with the product.

Integrated RAID-1 and 1E configuration

Manufacturing instructions (MI) enable you to set up a RAID-1 integrated mirroring configuration. This instruction enables configuration via Odyssey (ibm.com). The manufacturing instruction is Integrated Mirroring SCSI HDD (59P5805).

Configuration information: BladeCenter HS20 blades must be installed in a BladeCenter.

BladeCenter 8677-3XU configuration

The BladeCenter contains 14 blade server bays supporting up to 14 hot-swap BladeCenter HS20 blades. A control panel is located on the top left of the unit contain the following LEDs:

- Power good
- Blade location
- Over temperature
- Information
- General fault

Two bays at the top to the right of the control panel contain the standard DVD-ROM and 1.44 MB diskette drives.

The rear housing contains:

- Two hot-swap, redundant blower assemblies in the center, mounted one on top of the other
- Two standard 2000-watt power supply modules and module bays for two optional power supplies modules on each side of the blower assemblies
- One standard management module for KVM/Management
- Four hot-swap module bays on the left rear chassis, stacked in pairs, support one or two BladeCenter four-port Gigabit Ethernet Modules and one or two BladeCenter two-port Fibre Channel Switch Modules.

BladeCenter T 8720-1RX, 8730-1RX Configuration

The BladeCenter T contains eight blade server bays supporting up to eight hot-swap BladeCenter HS20 blades, depending on HS20 models selected. Eight 2.8 GHz LV processor model blades are supported in the BladeCenter T chassis (8720, 8730). Up to seven of all other 8843 HS20 models are supported in the BladeCenter T chassis (8720 or 8730).

Processor upgrades

The system comes standard with one Intel™ Xeon processor. An additional processor may be added by purchasing a supported processor option.

The following processor options are supported with BladeCenter HS20:

- 2.8 GHz/800 MHz-1 MB L2 Cache Xeon Processor with EM64T (13N0699) (1) LV Models
- 3.6 GHz/800 MHz-1 MB L2 Cache Xeon Processor with EM64T (13N0659) (1)

Memory support

The following memory options are supported with BladeCenter HS20:

- 512 MB PC2-3200 DDR 2 Memory (2 x 256 MB) x8 (73P3523)
- 1 GB PC2-3200 DDR 2 Memory (2 x 512 MB) x8 (73P3522)
- 1 GB PC2-3200 DDR 2 Memory (2 x 512 MB) (73P2865)
- 2 GB PC2-3200 DDR 2 Memory (2 x 1 GB) (73P2866)

Power considerations — 8677

The BladeCenter enclosure contains two 2000-watt 220 V ac power modules. These modules must be attached to a supported high-voltage PDU. These standard power modules support blade bays 1 through 6 with power redundancy. When adding additional blade servers in

bays 7 through 14, a BladeCenter 2000-watt power supply module option must be installed. This option provides both power and redundancy to these blade bays.

Power considerations — 8720, 8730

The BladeCenter T enclosure contains two 1300-watt 220 V ac power modules (8730) or two 1300-watt -48V dc power modules (8720). These standard power modules support blade bays 1 through 4 with power redundancy. When adding additional blade servers in bays 5 through 8, a BladeCenter T power supply module option must be installed. This option provides both power and redundancy to these blade bays. If three 8843 blade models other than L1X or LTX are installed in bays 1 through 4, only a Storage Expansion Unit option may be added. A fourth blade of any type is not supported

Notes

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- For 8677 BladeCenter Chassis with 1800-watt power supplies, 2.8 GHz LV processor model blades are supported. When installing other 8843 HS20 models, customers with the 2XX chassis must upgrade to the 2000-watt power supplies (26K4816) to maintain redundancy at full density.

Cable orders: Each BladeCenter HS20 blade contains two Gigabit Ethernet connections. An optional BladeCenter four-port Gigabit Ethernet Switch Module must be installed in the BladeCenter to support additional Ethernet connections. This Ethernet switch contains four ports with RJ-45 connectors. The RJ-45 connectors provides a 10/100/1000 Base-T interface (either at half or full duplex) 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 Mbps, or higher operation, Category 5 cabling must be used. For 10 Mbps operation, Category 3, or better, cabling must be used.

Installations using the BladeCenter 2-port Fibre Channel Switch Module require short- or long-wave small form factor pluggable (SFP) options and appropriate FC cabling.

Installability: Each BladeCenter HS20 requires approximately 10 minutes for installation. Installation includes unpacking, setting up, and powering on the system. Additional time is required to install an operating system, additional options, or features.

Packaging: BladeCenter HS20 Carton:

- BladeCenter HS20
- Publications/CD Package:
 - Installation and User's Guide
 - Documentation CD-ROM (softcopy of publications)
 - Broadcom CD-ROM
 - Safety flyer
 - Blade ID labels
 - Standard Form Factor Daughter Card tray kit

The BladeCenter HS20 blades are shipped in a single package.

Related options

Processor upgrades

- Xeon processor
- Heat sink
- Installation publications/warranty

Security, auditability, and control

Security and auditability features:

- A power-on password function provides control of who has access to the data and server setup program on the server.
- A 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.
- A selectable boot sequence can be used to prevent unauthorized installation of software or removal of data from the diskette drive.

The BladeCenter HS20 blades have no security intrusion detection; therefore, they should be installed in a rack environment that provides security through lockable doors or other security measures. It is a customer's responsibility to ensure that the server is secure to protect sensitive data.

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. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The IBM Electronic Service Agent is a no-additional-charge software that resides on your IBM eServer system. It 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

IBM Global Financing: Yes

more 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: 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): 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.

Licensing: Programs included with this product are licensed under the terms and conditions of the License Agreements that are 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:

- 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: 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, 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.

- 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 field replaceable unit (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 program license charges apply: No. This product does not contain licensed internal code or licensed machine code.

Prices

Description	Machine type/ model	Part number	IBM list price ⁸
BladeCenter 2.8 GHz HS20 800 MHz/1 MB L2, 512 MB LV Server with Low Profile Handle	8843-LTU	8843LTU	\$2,189
BladeCenter 2.8 GHz HS20 800 MHz/1 MB L2, 512 MB LV Server	8843-L1U	8843L1U	2,189
BladeCenter 3.6 GHz HS20 800 MHz/1 MB L2, 1 GB Server with Low Profile Handle	8843-4TU	88434TU	3,229

Description	Part number	IBM list price
BladeCenter HS20 Low Profile Handle (for 800 MHz Blade Server)	25K8360	\$ 45
2.8 GHz/800 MHz-1 MB Low Voltage Processor Option	13N0699	699

⁸ IBM price; does not include tax or shipping and is subject to change without notice. Reseller prices may vary.

Order Now

To order direct, call IBM at 877-999-7115 and select option 4.

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

ServicePac for warranty service upgrade

Description	Part number
3-year WSU, IOR 24 x 7 2-hour average response	69P9519
3-year WSU, IOR 24 x 7 4-hour average response	69P9518
3-year WSU, IOR 9 x 5 4-hour average response	69P9517
1-year IOR 24 x 7 2-hour average response	69P9516
2-year IOR 24 x 7 2-hour average response	96P2132
4-year IOR 24 x 7 2-hour average response	69P9523
5-year IOR 24 x 7 2-hour average response	69P9527
1-year IOR 24 x 7 4-hour average response	69P9515
2-year IOR 24 x 7 4-hour average response	96P2131
4-year IOR 24 x 7 4-hour average response	69P9522
5-year IOR 24 x 7 4-hour average response	69P9526
1-year IOR 9 x 5 4-hour average response	69P9514
2-year IOR 9 x 5 4-hour average response	96P2130
4-year IOR 9 x 5 4-hour average response	69P9521
5-year IOR 9 x 5 4-hour average response	69P9525
1-year IOR 9 x 5 NBD response	69P9513
2-year IOR 9 x 5 NBD response	96P2129
4-year IOR 9 x 5 NBD response	69P9520
5-year IOR 9 x 5 NBD response	69P9524

For ServicePac prices, visit

<http://www-1.ibm.com/services/its/us/spwarmain.html>

Maintenance service (Legacy) (IOR) charges**Alternative service (Warranty service upgrades)**

**IOR
24 x 7**

\$400

Maintenance service

**IOR
9 x 5** **IOR
24 x 7**

\$400 **\$600**

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 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. 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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