IBM BladeCenter HS22 is a versatile, easy-to-use blade server optimized for performance, power, and cooling

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At a glance

BladeCenter® HS22 blade servers revolutionize the economics of application server deployment with versatility, ease of use, performance, and energy efficiency.

These new server models include:

- Single-wide (30 mm), high-performance blade servers
- Up to two Intel® Xeon® 5500 series processors with Intel Turbo Boost Technology and Intel HT Technology
- Up to 12 DDR-3 very low-profile memory DIMM slots
- Standard models with high-speed PC3-10600 1333 MHz high-performance double data rate (DDR3) ECC memory; maximum system memory 96 GB
- Broadcom 5709S dual Gigabit Ethernet connections with failover support
- Models with integrated dual 10 Gigabit Ethernet connections also available
- Support for additional Ethernet, SAS, Fibre Channel, and Infiniband expansion cards and a total of eight I/O ports per blade
- Support for up to two hot-swap SFF SAS, SATA or solid state drives with RAID 0 and 1 standard
- Support for optional RAID 5 controller with battery-backed write-back cache
- Internal standard USB 2.0 port for future optional embedded hypervisor
• Integrated Management Module for remote supervision with concurrent keyboard, video, and mouse (cKVM) standard
• Next-generation BIOS, Unified Extensible Firmware Interface (UEFI)
• Added security with a Trusted Platform Module chip standard

1 Using 8 GB DIMMs.

Overview

The IBM® BladeCenter HS22 offers great performance balanced with flexible configuration options and simple management in an efficient server designed to run a broad range of workloads exceptionally well.

Versatile:
• Feature-rich design enables HS22 to run to a broad range of workloads including infrastructure, virtualization, and enterprise applications
• Extensive choice of processors, memory, internal storage and I/O options allows flexible configurations
• Supported across all BladeCenter enterprise and office chassis

Easy to use:
• Two hot-swap storage bays support SAS, SATA, and solid state drives, enabling drives to be removed easily for quick replacement
• Future optional embedded hypervisor enables "instant virtualization"
• Integrated Management Module provides remote supervision and cKVM functions as standard
• Light Path Diagnostic and Predictive Failure Analysis® enables quick serviceability and maintenance

Performance optimized:
• Up to two next-generation Intel Xeon 5500 series processors
• High memory capacity with 12 DDR-3 VLP memory DIMM slots capable of running fast memory up to 1333 MHz
• High speed I/O on the blade supports up to 40 GbE to each blade and up to a total of eight ports of I/O per blade

Power and cooling optimized:
• Optional low-power processor, solid-state drives, and low power memory DIMMs
• Support for the energy-efficient BladeCenter E chassis
• Support for IBM System Director Active Energy Manager to monitor and cap power consumption
• Innovative component layout and blade design helps keep the blade up and running even under demanding conditions

Key prerequisites

• BladeCenter chassis
• Monitor, keyboard, and mouse for setup
• Network switch module
• Boot device, such as on-board HDD or network storage device
• Advance Management Module with latest-level firmware
• Rack and appropriate PDUs and main power distribution
Planned availability dates

March 31, 2009: HS22 BladeCenter models and options

IBM BladeCenter HS22 7870D2x
IBM BladeCenter HS22 7870A2x
IBM BladeCenter HS22 7870CCx
IBM BladeCenter HS22 7870B3x
IBM BladeCenter HS22 787084x
IBM BladeCenter HS22 7870C3x
IBM BladeCenter HS22 7870C4x
IBM BladeCenter HS22 7870L2x

Intel Xeon Processor E5502 2c 43W5986
Intel Xeon Processor E5504 4c 44T1712
Intel Xeon Processor E5506 4c 43W5987
Intel Xeon Processor E5520 4c 44T1736
Intel Xeon Processor E5530 4c 44T1883
Intel Xeon Processor E5540 4c 44T1884
Intel Xeon Processor X5550 4c 44T1885
Intel Xeon Processor X5560 4c 44T1886
Intel Xeon Processor X5570 4c 44T1887
Intel Xeon Processor L5520 4c 46M0697
1 GB (1x1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 44T1485
VLP Low Power RDIMM
2 GB (1x2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 44T1487
VLP RDIMM
4 GB (1x4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 44T1488
VLP RDIMM
SAS Connectivity Card (CIOv) for IBM BladeCenter 43W4068
Ethernet Expansion Card (CIOv) for IBM BladeCenter 44W4475
QLogic 4Gb Fibre Channel Expansion Card (CIOv) for IBM BladeCenter 46M6065

June 30, 2009: HS22 BladeCenter option

8 GB (1x8GB) Dual Rank PC3-8500 CL7 ECC DDR3-1066 44T1579
VLP RDIMM

Description

Related options

IBM processor upgrades

Addl Intel Xeon Processor E5502 43W5986
2c 1.86 GHz 4 MB Cache 800 MHz
Addl Intel Xeon Processor E5504 44T1712
4c 2.00 GHz 4 MB Cache 800 MHz
Addl Intel Xeon Processor E5506 43W5987
4c 2.13 GHz 4 MB Cache 800 MHz
Addl Intel Xeon Processor E5520 44T1736
4c 2.26 GHz 8 MB Cache 1066 MHz
Addl Intel Xeon Processor E5530 44T1883
4c 2.40 GHz 8 MB Cache 1066 MHz
Addl Intel Xeon Processor E5540 44T1884
4c 2.53 GHz 8 MB Cache 1066 MHz
Addl Intel Xeon Processor X5550 44T1885
4c 2.66 GHz 8 MB Cache 1333 MHz
Addl Intel Xeon Processor X5560 44T1886
4c 2.66 GHz 8 MB Cache 1333 MHz
Addl Intel Xeon Processor X5570 44T1887
4c 2.93 GHz 8 MB Cache 1333 MHz
Addl Intel Xeon Processor L5520 46M0697
4c 2.26 GHz 8 MB Cache 1066 MHz

IBM memory upgrades
Other upgrades

SAS Connectivity Card (CIOv) for IBM BladeCenter (43W4068)

This adapter offers the ideal way to connect the HS22 server to a wide variety of SAS storage devices. Built on up to 3 gigabit per second, full-duplex, SAS technology, the adapter can connect to the IBM System Storage DS3200 from the BladeCenter E or H chassis, and to multiple Disk Storage Module in the BladeCenter S. The adapter's innovative Combination Form Factor design allows usage of other IO technologies simultaneously from the same blade server, such as additional Ethernet or Fibre Channel adapters.

2-port Ethernet Expansion Card (CIOv) for IBM BladeCenter (44W4475)

This is a 2-port 1 Gb Ethernet adapter with PCI-e interface designed specifically for HS22 and follow on blades. It is based off up to Broadcom 5709S ASIC and offers value-added features like TCP Offload (TOE) and SW iSCSI support for high performance. The adapter's innovative Combination Form Factor design allows usage of other IO technologies (in CFFh form factor) simultaneously from the same blade server, such as additional Ethernet or Fibre Channel adapters.

QLogic 4 Gb Fibre Channel Expansion Card (CIOv) for IBM BladeCenter (46M6065)

This adapter enables you to quickly and simply connect the HS22 server to a Fibre Channel SAN. Simply pick any Fibre Channel storage solution from IBM System Storage DS3000, DS4000, DS5000, or DS8000 series, and begin accessing data over a high-speed interconnect. The adapter's innovative Combination Form Factor design allows usage of other IO technologies (in CFFh form factor) simultaneously from the same blade server, such as additional Ethernet or Fibre Channel adapters.

BladeCenter HS22

*High-performance, blade server subsystems*

The BladeCenter HS22 low-voltage blade servers are high-throughput, two-way, SMP-capable blade servers, and are highly scalable when you add memory.

The BladeCenter HS22 server supports up to two Intel Xeon 5500 Series processors. The processor board has the following major components:

- Two Socket B (LGA 1366) sockets for up to two Intel Xeon 5500 Series processors (a single processor is shipped standard)
- Two Enterprise Voltage Regulator-Down (EVRD) regulators. The EVRD supplies both the processor core voltage and L2 cache voltage and must adhere to Intel Voltage Regulator Module (VRM) and Enterprise Voltage Regulator-Down (EVRD) 11.0 Specification
- One Intel IO Hub (IOH): Host Bridge controller with PCI Express interface
- Twelve DDR3 VLP DIMM memory sockets
- One Intel South Bridge (ICH10)
- One Broadcom BCM5709S Gigabit Ethernet Controller
- One LSI 1064E SAS Controller
- Two SAS connectors for two 2.5-inch SAS Hard Drives
- 16 MB system uEFI BIOS ROM
- One Maxim VSC452 Super baseboard Management Controller with Integrated VGA Controller
- Two HDM Midplane connectors
• One Blade Expansion connector
• One CIOv Daughter Card connector
• One TPM 1.2 chip
• One internal USB connector for bootable Flash key

The Intel IOH provides the interface between the processors, and PCI Express buses that interface to the ICH10, the high speed daughter card connector, and the blade expansion connector. The HS22 server uses the following features provided by the IOH:

• Dual independent processor Intel QuickPath Interconnect (Intel QPI) links (one processor per link)
• One x4 ESI bus to interface to the ICH10
• One x4 PCI Express bus to connect to the Broadcom Ethernet 5709S Controller
• Eight x4 PCI Express buses: One to the LSI 1064E SAS Controller, four to the Blade Expansion connector, and two to the CIOv daughter card connector.

The Intel I/O Controller Hub 10 (ICH10) contains the following features:

• Interface to the IOH via the x4 ESI bus
• PCI-Express 1.0 Compliant
• USB host interface with support for USB 2.0
• Low Pin Count (LPC) interface

On the HS22, the ICH10 uses the x4 PCI Express bus and the LPC bus to interface with the Maxim VSC452 IMM. The USB buses are used to interface with the USB key, the MM for keyboard and mouse, and a Cypress USB hub that provides KVM USB and media tray support.

The HS22 server memory is contiguous and is shared by both processors when both processors are installed. It is Error Correction Code (ECC) protected and supports up to 96 GB using 1 GB, 2 GB, 4 GB, or 8 GB VLP DDR3 DIMMs on twelve DIMM connectors. The processors have integrated DDR3 memory controllers and interface directly to it's six associated DDR3 DIMMs. For each CPU, a minimum of two DIMMs must be installed. Additional DIMMs may be installed one at a time as needed.

The HS22 server supports DDR3 speeds up to 1333 MHz, with the actual operating speed dictated by the CPU and DIMM combination which is installed. For the CPU, memory speed support is as follows:

• When 1333 MHz RDIMMs are installed and a 1333 MHz Intel Xeon 5500 Series processor is installed:
  – If there is one RDIMM installed per memory channel, DDR3 speed is up to 1333 MHz.
  – If there are two RDIMMs installed per channel, DDR3 speed is up to 1066 MHz.
  – If any memory channel on the board has two RDIMMs installed, DDR3 speed is up to 1066 MHz for all memory channels.
• When 1066 MHz RDIMMs are installed or a 1066 MHz Intel Xeon 5500 Series processor is installed.
  – DDR3 speed is always up to 1066 MHz.
• When 800 MHz RDIMMs are installed or an 800 MHz Intel Xeon 5500 Series processor is installed.
  – DDR3 speed is always up to 800 MHz.

The HS22 supports memory mirroring. Chipkill™ is supported in Independent mode when x4-based DIMMs are installed.

**Standard BladeCenter HS22 configuration**

**Information by model**

<table>
<thead>
<tr>
<th>Intel Model</th>
<th>Xeon CPU</th>
<th>CPU FSB</th>
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IBM Europe, Middle East, and Africa Hardware Announcement ZG09-0134
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Model configurations Intel

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<td>7870L2x</td>
<td>L5520</td>
<td>1x 2 GB</td>
<td>12</td>
<td>Open 30 mm</td>
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</tr>
</tbody>
</table>

All models support the following chassis:
BCE, BCH, BCS

EMEA x = G

Additional features

- The BladeCenter HS22 system board contains 12 DIMM connectors (30 mm blade)
- Each DIMM connector supports 1 GB, 2 GB, 4 GB, or 8 GB DIMM options:
  - Chipkill is supported in Independent mode when x4-based DIMMs are installed.
- One or two hot-swap SATA, SAS or solid-state HDDs (up to 300 GB each) are supported in the base blade
- Dual Gigabit Ethernet PCI connections

BladeCenter HS22 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- and power-constrained environments used for:

- Infrastructure applications
- Virtualization
- General enterprise applications
High-availability and serviceability features

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

The BladeCenter HS22 blade servers deliver reliability and serviceability.

Features include:

- High-performance ECC memory, combined with an integrated ECC memory controller, to help correct soft and hard single-bit memory errors, while reducing 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 many soft memory errors automatically without software intervention.
- ECC L2 cache processors to help improve data reliability and reduce downtime.
- CPU failure recovery in Symmetric Multi-Processing (SMP) configurations:
  - Forces failed processor offline
  - Automatically reboots server
  - Generates alerts
  - Continues operations with the working processor
- PFA on SAS HDD options, memory, and processors to help alert the system administrator of an imminent component failure.
- Support for dual Gigabit Ethernet connections:
  - Failover, adapter fault tolerance
  - PXE 2.0 Boot Agent
  - Wake on LAN®
  - Load balancing or teaming
- Integrated management processor that supports diagnostic, reset, POST, and auto-recovery functions, and monitors temperature and voltage. Alerts are generated when certain thresholds are exceeded (refer to the Limitations section for restrictions).

IBM Systems Director

BladeCenter HS22 blade servers include IBM Director. IBM Systems Director is an easy to use, point-and-click, platform management solution that streamlines the way physical and virtual systems are managed across a multisystem environment. Leveraging industry standards, IBM Systems Director supports multiple operating systems and virtualization technologies across IBM and non-IBM x86 platforms. Through a single user interface, IBM Systems Director provides consistent views for visualizing managed systems, determining how these systems relate to one another while identifying their individual status, thus helping to correlate technical resources with business needs.

IBM Systems Director utilizes a modular and extensible platform services foundation, providing a way to easily add advanced platform management capabilities to the base offering. The IBM Systems Director offering provides the base function needed for platform management. Advanced platform management functions can be seamlessly added as they are required. Systems Director is based on industry standards and can report results to other tools. IBM Systems Director is a strategic platform management tool that grows with the needs of a business.

Optional add-ons (available for an additional charge)

- Active Energy Manager (AEM) is positioned as a key component of IBM's energy-efficient technologies and services, which are part of IBM's Project Green that began May 2007. AEM will measure, monitor, and manage the energy management components built into IBM servers and provides a cross-platform management solution. AEM also retrieves temperature
and power information via wireless sensors (SynapSense) and collects alerts, events, and
data from facility providers related to power and cooling equipment.

- BladeCenter Open Fabric Manager is designed to help you manage growth and complexity
  by making it easy to manage I/O and network interconnects for up to 100 BladeCenter
  chassis - up to 1,400 blade servers. BladeCenter Open Fabric Manager helps make blade
deployment EASY: once installed, the utility is resident in the Advanced Management Module
(AMM) so you can pre-configure LAN and SAN connections. Thus, I/O connections are made
automatically when you plug in a blade. And no special tools or training is required; just
manage with the easy-to-use GUI.

**IBM ToolsCenter**

The IBM System x® ToolsCenter is collection system management tools to help manage your
HS22 blade server and BladeServer environment. ToolsCenter makes managing your server
environment less complicated, more productive, and cost-effective.

These tools include:

- **Deployment**

  IBM ServerGuide™ is a tool that simplifies the process of installing and configuring
  IBM System x and BladeCenter servers. ServerGuide automates installation of Windows®
  server operating systems, device drivers, and other system components, with minimal user
  intervention.

  The ServerGuide Scripting Toolkit enables you to tailor and build custom hardware
deployment solutions. It provides hardware configuration utilities and operating system
(OS) installation examples for IBM System x and BladeCenter x86-based hardware. The
ServerGuide Scripting Toolkit, Windows Edition enables you to create a bootable Windows
Preinstallation Environment (Windows PE) 2.1 CD or DVD.

  BladeCenter Start Now Advisor is a configuration tool that can help you quickly configure
components of the BladeCenter S chassis. Automatically updates the firmware for selected
chassis components, and provides you with the option of saving your configuration. Start
Now Advisor guides you through the process of connecting your computer to the chassis,
either over a network or through a direct attachment to the Ethernet port on the advanced
management module.

- **Configuration**

  Advanced Settings Utility (ASU) systems configuration utility that provides command line
interface, unattended scripting capability, and is supported in multiple operating-system
platforms like DOS, Linux®, Solaris, Windows, and WinPE.

  Storage Configuration Manager (SCM) is a scalable and integrated storage management tool
for both internal and external storage subsystem for IBM System x and BladeCenter. Storage
Configuration Manager is an Open standards-based management tool that provides a uniform
and rich user interface that is easy to use.

- **Updates**

  The UpdateXpress System Packs (UXSPs) contain an integration-tested bundle of online
firmware and device driver updates for your server. UXSPs facilitate the download and install
of all drivers and firmware for a given system and verify that you are working with a complete
set of updates which have been tested together.

  Bootable Media Creator pulls current updates for firmware and drivers from IBM Web site and
creates custom bootable media to CD, DVD, or USB key.

- **Diagnostics**

  Dynamic System Analysis (DSA) collects and analyzes system information to aid in
diagnosing system problems. DSA creates a merged log that allows for easy identification of
cause-and-effect relationships from different log sources in the system.

**BladeCenter advanced management module**

BladeCenter HS22 is supported on the Advanced Management Module.
Use the Advanced Management Module in the BladeCenter to manage the BladeCenter and obtain vital system information about your installed BladeCenter HS22 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:

- 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.

### Standard BladeCenter HS22 configurations

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>L2 Cache</th>
<th>Memory</th>
<th>HDD</th>
<th>HDD Iface</th>
<th>Power Supply</th>
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<td>7870-D2G</td>
<td>1 x 1.86 GHz Intel Xeon E5502 2c</td>
<td>4 MB total</td>
<td>2x1 GB SAS Open bay</td>
<td>RAID **</td>
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<tr>
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<td>1 x 2.00 GHz Intel Xeon E5504 4c</td>
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** Power supplied through BladeCenter chassis

### Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www-03.ibm.com/able/product_accessibility/index.html

### Product positioning

The BladeCenter HS22 offerings are positioned as high-density, compute-oriented blade servers offering lower power usage Intel Xeon processors.

The BladeCenter and BladeCenter HS22 blades can require less space and power resources than traditional rack offerings 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

**Product number**

<table>
<thead>
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<th>BladeCenter HS22</th>
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**Description**

- Intel Xeon Processor E5502
  - 2c 1.86 GHz 4 MB Cache 800 MHz
- Intel Xeon Processor E5504
  - 4c 2.00 GHz 4 MB Cache 800 MHz
- Intel Xeon Processor E5506
  - 4c 2.13 GHz 4 MB Cache 800 MHz
- Intel Xeon Processor E5520
  - 4c 2.26 GHz 8 MB Cache 1066 MHz
- Intel Xeon Processor E5530
  - 4c 2.40 GHz 8 MB Cache 1066 MHz
- Intel Xeon Processor E5540
  - 4c 2.53 GHz 8 MB Cache 1066 MHz
- Intel Xeon Processor X5550
  - 4c 2.66 GHz 8 MB Cache 1333 MHz
- Intel Xeon Processor X5560
  - 4c 2.66 GHz 8 MB Cache 1333 MHz
- Intel Xeon Processor X5570
  - 4c 2.93 GHz 8 MB Cache 1333 MHz
- Intel Xeon Processor L5520
  - 4c 2.26 GHz 8 MB Cache 1066 MHz

**Part Number**

- Intel Xeon Processor E5502: 43W5986
- Intel Xeon Processor E5504: 44T1712
- Intel Xeon Processor E5506: 43W5987
- Intel Xeon Processor E5520: 44T1736
- Intel Xeon Processor E5530: 44T1883
- Intel Xeon Processor E5540: 44T1884
- Intel Xeon Processor X5550: 44T1885
- Intel Xeon Processor X5560: 44T1886
- Intel Xeon Processor X5570: 44T1887
- Intel Xeon Processor L5520: 46M0697

**Publications**

An installation and user's guide, and safety and warranty publications are shipped with each BladeCenter HS22 blade. The following publications are available immediately:

<table>
<thead>
<tr>
<th>Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 GB (1X1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP Low Power RDIMM</td>
<td>44T1485</td>
</tr>
<tr>
<td>2 GB (1X2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM</td>
<td>44T1487</td>
</tr>
<tr>
<td>4 GB (1X4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM</td>
<td>44T1488</td>
</tr>
<tr>
<td>8 GB (1X8GB) Dual Rank PC3-8500 CL7 ECC DDR3-1066 VLP RDIMM</td>
<td>44T1579</td>
</tr>
<tr>
<td>SAS Connectivity Card (CIOV) for IBM BladeCenter</td>
<td>43W4068</td>
</tr>
<tr>
<td>Ethernet Expansion Card (CIOV) for IBM BladeCenter</td>
<td>44W4475</td>
</tr>
<tr>
<td>QLogic 4Gb Fibre Channel Expansion Card (CIOV) for IBM BladeCenter</td>
<td>46M6065</td>
</tr>
</tbody>
</table>
The publication BladeCenter HS22 Installation and User's Guide and Hardware Maintenance Manual, in U.S. English, are available from

http://www-304.ibm.com/jct01004c/systems/support/

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

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

http://www.ibm.com/services/continuity

For details on education offerings related to specific products, visit


Select your country, and then select the product as the category.

Technical information

Specified operating environment

Physical specifications

BladeCenter HS22

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>Cores</th>
<th>E5502</th>
<th>E5504</th>
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</thead>
<tbody>
<tr>
<td>7870-D2G</td>
<td>Intel Xeon E5502</td>
<td>2 core</td>
<td></td>
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<td>7870-A2G</td>
<td>Intel Xeon E5504</td>
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<td>Feature</td>
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<td>7870-B3G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------</td>
<td>---------</td>
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<td></td>
</tr>
<tr>
<td>Processor</td>
<td>Intel Xeon E5504</td>
<td>Intel Xeon E5530</td>
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<td></td>
</tr>
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<td>4 core</td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td>Max. mem. speed</td>
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<tr>
<td>Number standard</td>
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<td></td>
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<tr>
<td>Maximum</td>
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<td></td>
<td></td>
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<tr>
<td>L2 cache (full speed)</td>
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<td>8 MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory (VLP ECC DDR3)</td>
<td>2 GB</td>
<td>4 GB</td>
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<td></td>
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<tr>
<td>DIMMS (Standard)</td>
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<td>2x 2 GB</td>
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<tr>
<td>DIMM sockets</td>
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<td>12</td>
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</tr>
<tr>
<td>Capacity</td>
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<td>96 GB²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td>SVGA</td>
<td>SVGA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>16 MB</td>
<td>16 MB</td>
<td></td>
<td></td>
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<tr>
<td>Disk controller</td>
<td>SAS</td>
<td>SAS</td>
<td></td>
<td></td>
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<tr>
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<td>0</td>
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<td>Internal capacity</td>
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<td></td>
</tr>
<tr>
<td>Total HDD bays</td>
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<td>2</td>
<td></td>
<td></td>
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<tr>
<td>PCI Slots</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>Management proc.</td>
<td>Standard</td>
<td>Standard</td>
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<td></td>
</tr>
<tr>
<td>Ethernet controller</td>
<td>Dual GB</td>
<td>Dual GB</td>
<td></td>
<td></td>
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<tr>
<td>FC card</td>
<td>Optional</td>
<td>Optional</td>
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<td></td>
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<tr>
<td>DVD-ROM (IDE)</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>Diskette drive</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**7870-B4G 7870-C3G**

<p>| Processor                | Intel Xeon E5540 | Intel Xeon X5560 |
|--------------------------| 4 core  | 4 core  |
| Int. speed               | 2.53 GHz | 2.80 GHz |
| Max. mem. speed          | 1066 MHz | 1333 MHz |
| Interconnect speed       | 5.86 GT/s | 6.4 GT/s |
| Number standard          | 1       | 1       |
| Maximum                  | 2       | 2       |</p>
<table>
<thead>
<tr>
<th>Feature</th>
<th>Model 7870-C4G</th>
<th>Model 7870-L2G</th>
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</thead>
<tbody>
<tr>
<td>L2 cache (full speed)</td>
<td>8 MB</td>
<td>8 MB</td>
</tr>
<tr>
<td>Memory (VLP ECC DDR3)</td>
<td>4 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>DIMMs (Standard)</td>
<td>2x 2 GB</td>
<td>2x 2 GB</td>
</tr>
<tr>
<td>DIMM sockets</td>
<td>12</td>
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<tr>
<td>Capacity</td>
<td>96 GB²</td>
<td>96 GB²</td>
</tr>
<tr>
<td>Video</td>
<td>SVGA</td>
<td>SVGA</td>
</tr>
<tr>
<td>Memory</td>
<td>16 MB</td>
<td>16 MB</td>
</tr>
<tr>
<td>Disk controller</td>
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<td>SAS</td>
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<td>Channels</td>
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</tr>
<tr>
<td>Connector int.</td>
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<td>2</td>
</tr>
<tr>
<td>Connector ext.</td>
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<td>0</td>
</tr>
<tr>
<td>RAID</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HDD</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Connectors</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Internal capacity</td>
<td>600 GB³</td>
<td>600 GB³</td>
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<tr>
<td>Total HDD bays</td>
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<tr>
<td>PCI Slots</td>
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<tr>
<td>Management proc.</td>
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<td>Ethernet controller</td>
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<td>Dual GB</td>
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<tr>
<td>FC card</td>
<td>Optional</td>
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<tr>
<td>DVD-ROM (IDE)</td>
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<td>0</td>
</tr>
<tr>
<td>Diskette drive</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Power supply</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Note:** Model CCx includes a Broadcom 10 Gb 2-port Ethernet Expansion Card standard installed.

* 7870-2MU; 7870-3MU QLogic 4GB Fibre Channel Expansion Card (CIOv) standard installed.

**Video subsystem**
- Matrox video core
- Integrated on the blade

**Supported BladeCenter HS22 video resolutions**

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Maximum Refresh Rate Supported</th>
<th>CRT Support</th>
<th>CRT ISO 9241.3 Compliance</th>
<th>Flat Panel Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>640 x 480</td>
<td>85 Hz</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>800 x 600</td>
<td>85 Hz</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>1024 x 768</td>
<td>75 Hz</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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

**Dimensions - BladeCenter HS22**
- Height: 24.5 cm (9.7 in)
- Depth: 44.6 cm (17.6 in)
- Width: 2.9 cm (1.14 in)
- Maximum weight: 5.4 kg (12 lb) (depending on the configuration when options are added)
BladeCenter HS22

Approximate Shipping dimensions and weight:

Single Pack Dimensions - L 60.32 cm x W 33.4 cm x H 15.57 cm (L 23.75 in x W 13.13 in x H 6.13 in)
Single Pack Weight - 4.2 kg (9.2 lbs)
Quantity per Pallet - 42
Pallet Load Dimensions - 121.9 cm x 101.6 cm x 122.9 cm (48.0 in x 40.0 in x 48.4 in)
Pallet Load Weight - 197.9 kg (436.4 lbs)
Estimated Safe Stacking - 4 high

Electrical

BladeCenter chassis: 200 to 240 (nominal) V ac; 50 Hz or 60 Hz
BladeCenter HS22: 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

• CE Mark (EN55022:1998 Class A, EN60950, EN55024:1998, EN61000-3-2 and EN61000-3-3)
• CISPR 22, Class A
• TUV-GS (EN60950/ISO 9241-3/ISO 9241-8)
• FCC - Verified to comply with Part 15 of the FCC Rules (Class A) prior to product delivery
• IEC 60950 CB Certificate and CB Test Report indicating compliance to Group Differences

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: 2,133 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**

**Programming requirements**
The following network operating systems have been tested for compatibility with the BladeCenter HS22:

- **Microsoft:**
  - Windows Server 2008 Datacenter (32-bit)
  - Windows Server 2008 Datacenter (64-bit)
  - Windows Server 2008 Enterprise (32-bit)
  - Windows Server 2008 Enterprise (64-bit)
  - Windows Server 2008 Standard (32-bit)
  - Windows Server 2008 Standard (64-bit)
  - Windows Server 2008 Web (32-bit)
  - Windows Server 2008 Web (64-bit)
  - Windows Small Business Server 2008 Premium (64-bit)
  - Windows Small Business Server 2008 Standard (64-bit)
  - Windows Essential Business Server 2008 Premium (64-bit)
  - Windows Essential Business Server 2008 Standard (64-bit)
  - Windows Server 2008 HPC Edition (64-bit)
  - Windows HPC Server 2008 (64-bit)
  - Windows Datacenter 2003 R2 UV (32-bit)
  - Windows Datacenter 2003 R2 UV (64-bit)
  - Windows Server 2003 R2 Enterprise (32-bit)
  - Windows Server 2003 R2 Enterprise (64-bit)
  - Windows Server 2003 R2 Standard (32-bit)
  - Windows Server 2003 R2 Standard (64-bit)
  - Windows Server 2003 R2 Web (32-bit)
  - Windows Compute Cluster Server (64-bit)
  - Windows Compute Cluster Edition (64-bit)
  - Windows Small Business Server 2003 R2 Premium
  - Windows Small Business Server 2003 R2 Standard
- **Linux:**
  - Red Hat EL 5 (Server) 32-bit
  - Red Hat EL 5 (Server) 64-bit
  - Red Hat EL 5 (Server) 64-bit w/ Xen
  - SUSE Linux ES 10 32-bit
  - SUSE Linux ES 10 32-bit w/ Xen
  - SUSE Linux ES 10 64-bit
  - SUSE Linux ES 10 64-bit w/ Xen

Support for VMware ESX 3.5 update 4 is expected June 30, 2009.

**Note:** Preview announcements provide insight into IBM plans and directions. General availability, prices, ordering information, and terms and conditions will be provided when the support is announced.
For additional information, support, certification, and versions of network operating systems, access


Compatibility

The BladeCenter HS22 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 HS22 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 System x servers, visit


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

Limitations

• The BladeCenter HS22 blades contain 12 DIMM sockets. A maximum of 96 GB of system memory is supported by using an 8 GB DIMM of ECC DDR memory in each of the DIMM sockets. A minimum of two DIMMs per CPU must be installed; DIMMs may be added singly after that. DIMMs must be installed in matched pairs for Mirror Mode.

Refer to the Planning information section or the System x server Web page for memory options.

• Microprocessors must be of the same type, power level, and clock speed on each BladeCenter HS22. Mixing microprocessors of different speeds, power levels, or cache sizes or upgrading the base processors is not supported. The latest BladeCenter hardware and software compatibility is available via the Web


• The BladeCenter HS22 is supported in the BladeCenter H chassis (8852), the BladeCenter S chassis (8886), and the BladeCenter E chassis (8677). For supported configurations, refer to the latest BladeCenter hardware configuration tools via the Web

http://www-03.ibm.com/systems/x/hardware/configtools.html

Refer to the Software requirements section for operating system limitations.

Planning information

Customer responsibilities

This product is designated as customer setup. Customer setup instructions are shipped with the product.

Configuration information

BladeCenter HS22 blades must be installed in a BladeCenter chassis.

BladeCenter configuration

The BladeCenter contains 14 blade server bays supporting up to 14 hot-swap BladeCenter HS22 blades. A control panel, located at the top left of the unit, contains the following LEDs:

• Power good
• Blade location
• Over temperature
Processor upgrades

The system comes standard with one Intel Xeon processor.

** An additional processor may be added by purchasing a supported processor option. The optional processor must match the initial processor in each system.

Memory support

The following memory options are supported with BladeCenter HS22:

<table>
<thead>
<tr>
<th>Option Description</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 GB (1x1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP Low Power RDIMM</td>
<td>44T1485</td>
</tr>
<tr>
<td>2 GB (1x2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM</td>
<td>44T1487</td>
</tr>
<tr>
<td>4 GB (1x4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM</td>
<td>44T1488</td>
</tr>
<tr>
<td>8 GB (1x8GB) Dual Rank PC3-8500 CL7 ECC DDR3-1066 VLP RDIMM</td>
<td>44T1579</td>
</tr>
</tbody>
</table>

Power considerations

BladeCenter HS22 is supported in the BladeCenter chassis.

Note: Consult specific chassis announcements for more information on setup and redundancy.

Cable orders

Each BladeCenter HS22 blade contains two Gigabit Ethernet connections. An optional BladeCenter Gigabit Ethernet Switch Module must be installed in the BladeCenter to support external Ethernet connections.

Cabling is not included with the server. Consult the Ethernet Switch module documentation for external cabling requirements.

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

Installability

Each BladeCenter HS22 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 HS22

<table>
<thead>
<tr>
<th>Product</th>
<th>Package Description</th>
<th>Boxes</th>
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<tbody>
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<td>BladeCenter HS22 Carton</td>
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<td></td>
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<td>Publications Package</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Contents:</td>
<td></td>
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</tbody>
</table>
The BladeCenter HS22 blades are shipped in a single package. The approximate shipping dimensions and weight are:

- Single pack dimensions: 60.32 x 33.4 x 15.57 cm (23.75 x 13.13 x 6.13 in)
- Single pack weight: 4.2 kg (9.2 lb)

**Related options**

**Processor upgrade**

<table>
<thead>
<tr>
<th>Processor Model</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel Xeon Processor E5502</td>
<td>43w5986</td>
</tr>
<tr>
<td>2c 1.86 GHZ 4 MB Cache 800 MHZ</td>
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<tr>
<td>Intel Xeon Processor E5504</td>
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<td>4c 2.00 GHZ 4 MB Cache 800 MHZ</td>
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<tr>
<td>Intel Xeon Processor E5506</td>
<td>43w5987</td>
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<tr>
<td>4c 2.13 GHZ 4 MB Cache 800 MHZ</td>
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</tr>
<tr>
<td>Intel Xeon Processor E5520</td>
<td>44T1736</td>
</tr>
<tr>
<td>4c 2.26 GHZ 8 MB Cache 1066 MHZ</td>
<td></td>
</tr>
<tr>
<td>Intel Xeon Processor E5530</td>
<td>44T1883</td>
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<td>4c 2.40 GHZ 8 MB Cache 1066 MHZ</td>
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<tr>
<td>Intel Xeon Processor E5540</td>
<td>44T1884</td>
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<td>4c 2.53 GHZ 8 MB Cache 1066 MHZ</td>
<td></td>
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<tr>
<td>Intel Xeon Processor X5550</td>
<td>44T1885</td>
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<td>Intel Xeon Processor X5570</td>
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<tr>
<td>4c 2.93 GHZ 8 MB Cache 1333 MHZ</td>
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<tr>
<td>Intel Xeon Processor L5520</td>
<td>46M0697</td>
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<tr>
<td>4c 2.26 GHZ 8 MB Cache 1066 MHZ</td>
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</table>

- Intel Xeon processor
- Heat sink
- Installation publications and warranty

**Security, auditability, and control**

Security and auditability features include:

- A power-on password function helps provide 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 help prevent unauthorized installation of software or removal of data from the diskette drive.

The BladeCenter HS22 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 the client'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.

**Global Technology Services**

Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.
General product/system description

BladeCenter HS22

The BladeCenter HS22 low-voltage blade servers are high-throughput, two-way, SMP-capable blade servers, and are highly scalable when you add memory.

One processor is standard on the blade server. High-speed VLP PC3-10600 1333 MHz high-performance double data rate (DDR3) ECC memory is synchronized to the processor-to-memory subsystem performance with current processors.

The BladeCenter HS22 uses the 2S Intel 5520 chipset that includes:

- IOH (North Bridge)
- ICH 10 (South Bridge)

The IOH includes:

- Integrated PCI Express interface

The ICH 10 includes:

- USB interface
- Systems-management bus, supporting Philips I2C two-wire protocol interface
- Low-power controller (LPC BUS) interface

BladeCenter HS22 Model Configurations

Information by model

<table>
<thead>
<tr>
<th>Intel Model Configurations</th>
<th>Intel</th>
<th>Xeon name</th>
<th>CPU speed</th>
<th>CPU power</th>
<th>FSB speed</th>
<th>CPU cache</th>
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<tr>
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Model configurations | Intel | Xeon name | Standard memory | DIMM slots | HDDs | Blade width | Chassis |
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<td>Open</td>
<td>30 mm</td>
<td></td>
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</table>

All Models support the following chassis:
- BCE, BCH, BCT, BCS

The processor GHz speed is the internal processor speed. External processor operations to system memory at up to 1333 MHz.

Europe considerations

IBM Europe, Middle East, and Africa Hardware Announcement ZG09-0134

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NLS support is not provided for any of the BladeCenter HS22 components.

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The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used 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.

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To learn how Electronic Services can work for you, visit [http://www.ibm.com/support/electronic](http://www.ibm.com/support/electronic)

**Terms and conditions**

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

**Warranty period**

- Three years
- Optional features - One year

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

The following have been designated as consumables or supply items and are, therefore, not covered by this warranty:

- Battery

**Warranty service**

If required, IBM provides repair or exchange service, depending on the type of warranty service specified below for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. 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.
The type of service is Customer Replaceable Unit (for example, keyboard, mouse, speaker, memory, or hard disk drive) Service and On-site Service.

**Customer Replaceable Unit (CRU) Service**

IBM provides a replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request. A CRU is designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU. Installation of Tier 1 CRUs, as specified in this announcement, is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service specified below, On-site Service.

Based upon availability, a CRU will be shipped for next business day (NBD) delivery. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- Blank filler
- Cable-management arm
- Hard disk drive
- Hot-swap fan
- Hot-swap power supply
- Lift handle kit
- Memory DIMM
- Memory expansion card
- Optical drive
- PCI adapter
- PCI divider
- Power cord
- Service label
- Service processor
- System label
- Top cover
- Voltage regulator module

**On-site Service**

This provides On-site Repair, 9 hours per day, Monday through Friday excluding holidays, NBD response. IBM or your reseller 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-country service delivery is used.

**International Warranty Service**

International Warranty Service (IWS) is available in selected countries or regions.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased.

Under IWS, warranty service will be provided with the prevailing warranty service type and service level available for the IWS-eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.
To determine the eligibility of your machine and to view a list of countries where service is available, visit


For more information on IWS, refer to Services Announcement ZS01-0168, 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.

**IBM hourly service rate classification**

Two

**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.

**Licensed machine code**

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting


IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System x technical support Web site

http://www-304.ibm.com/systems/support/

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

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The announced products are also eligible for ServicePac® warranty upgrades. ServicePacs provide a higher level of service than that provided under the base IBM Machine Warranty.
ServicePacs can be purchased from your IBM Business Partner and are specific to the machines/products listed.

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<th>ServicePac Offering</th>
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**Announcement countries for ServicePacs**

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**e-ServicePac**

Austria Belgium Bulgaria Croatia Czech Rep Denmark Egypt Finland France (1) Germany Greece Hungary Ireland Israel Italy Luxembourg Netherlands Norway Pakistan Poland Portugal Romania Russia (2) S. Africa Serbia Slovakia Slovenia Spain Sweden Switzerland Turkey UK (3) Ukraine

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(2) Except Russia

(3) UK mainland Only

(4) Austria and Germany Only

(5) Czech Republic, Hungary, Poland, Solovkia, Slovenia, Switzerland and Romania Only

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