



IBM BladeCenter QS22 delivers five times the double-precision floating-point processing power

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At a glance

The BladeCenter QS22 features:

- Two 3.2 GHz IBM PowerXCell 8i processors
- Up to 32GB PC2-6400 800MHz DDR2 memory
- 460 single-precision (SP) GFLOPS per blade (peak)
- 217 double-precision (DP) GFLOPS per blade (peak)
- Integrated dual 1Gb Ethernet
- IBM Enhanced I/O Bridge Chip
- Optional pair 1GB DDR2 VLP DIMMs as I/O buffer (2GB total; 46C0501)
- Optional 4x SDR InfiniBand adapter (32R1760)
- Optional SAS expansion card (39Y9190)
- Serial over LAN
- Single-wide blade for BladeCenter H chassis
- Support by IBM SDK for Multicore Acceleration V3.0

For ordering, contact:

Your IBM representative, an IBM Business Partner, or the Americas Call Centers at

800-IBM-CALL Reference: YE001

Overview

The BladeCenter® QS22 is based on the innovative multi-core IBM PowerXCell 8i processor. This is the second-generation processor based on the Cell Broadband Engine™ Architecture. The QS22 provides five times the double-precision floating-point processing power compared to previous generation IBM QS20 and QS21 blades. It can therefore yield application results faster and with more fidelity. This can enable organizations to get information faster to facilitate important business decisions.

Part of the BladeCenter family of products, the new QS22 is a high-performance blade that extends and deepens the IBM high-performance computing (HPC) solution portfolio by providing a new level of parallelism and performance to targeted workloads. The PowerXCell 8i multi-core processor architecture helps the QS22 accelerate key algorithms such as 3D rendering, compression, and encryption. It enables companies to create and run highly visual, immersive, real-time applications. This performance offers significant potential benefit to companies in aerospace and defense, health care,

life sciences, petroleum exploration, financial markets, digital media, electronics, government, education, and other industries.

The QS22 relies on two 3.2 GHz PowerXCell 8i processors. The PowerXCell 8i processor's breakthrough heterogeneous multi-core architecture and high-speed communications capabilities deliver real-time response. By incorporating advanced multiprocessing technologies, the PowerXCell 8i processor is especially suitable for high-performance workloads.

The PowerXCell 8i processor is an asymmetric multi-core processor that is optimized for parallel processing and streaming applications. Unlike symmetric multi-core, cache-based architectures which may not be able to efficiently handle streaming applications, the PowerXCell 8i processor is designed to offer very high performance and fast response. The PowerXCell 8i processor includes a Power Processor Element (PPE) and eight highly optimized enhanced double-precision (eDP) SIMD engines called Synergistic Processor Elements (SPE).

The PPE is intended to run the operating system and coordinate computation. A key performance advantage comes from its eight decoupled eDP SPE SIMD engines with dedicated resources including large register files and DMA channels.

The QS22 provides very high performance in a small physical space:

- 460 single-precision (SP) GFLOPS or 217 double-precision (DP) GFLOPS per blade
- 6.4/3.0 TFLOPS (SP/DP peak) in a single BladeCenter chassis
- 25.8/12.18 TFLOPS (SP/DP peak) in a standard 42U rack with 56 blades installed

The QS22 offers a great deal of flexibility. Coupled with the robust BladeCenter H chassis, which offers advanced high-speed communication fabric, the processing power of the QS22 can be fully leveraged by compute-intensive applications. Equipped with dual Gigabit Ethernet and optional dual-port 4x InfiniBand adapters connected through PCI-Express, the QS22 can connect to a substantial number of host systems with extraordinary throughput. An optional I/O buffer is designed to further accelerate applications that can leverage it.

The BladeCenter QS22, unlike specialized add-in floating-point accelerators, can also boost performance on fixed-point arithmetic through the use of the eight powerful SPEs and their SIMD execution units. The capabilities of the QS22 complement blade servers based on Intel® Xeon, AMD Opteron and POWER™ processors. Blades can be inter-mixed in the BladeCenter H chassis so you can build an efficient infrastructure for your multi-platform environment.

The BladeCenter QS22 can offer a peak single-precision floating-point performance of up to 1.84 GFLOPS per Watt of energy consumed and up to 0.87 GFLOPS per watt of double-precision peak performance. In addition, the BladeCenter infrastructure uses energy-efficient components and shared infrastructure architecture for power optimization.

BladeCenter QS22 joins the BladeCenter QS21, enhancing the portfolio of IBM blades based on the Cell Broadband Engines Architecture. The QS22 and QS21 blades are designed to coexist in the BladeCenter H chassis with other IBM HS, JS, and LS blades. QS22 is recommended for applications and workloads that require more processor memory and the enhanced double-precision performance.

The QS22 is supported by the Red Hat Enterprise Linux™ 5.2 (RHEL) operating system upon its availability. You can leverage a broad ecosystem of hardware and software vendors committed to RHEL along with the extraordinary performance of PowerXCell 8i. RHEL also offers industry leading security, auditing, file system and virtualization capabilities to support your applications.

The IBM Software Development Kit for Multicore Acceleration V3.0 (SDK V3.0) includes an Eclipse-based Integrated Development environment, libraries, frameworks, performance tools and example code. IBM XL C/C++ v9.0 and XL Fortran v11.1 compilers are also optimized for PowerXCell 8i (QS22) code development. Together with the Red Hat Enterprise Linux operating system and the IBM compilers, SDK V3.0 was closely integrated to make it easier to leverage the power of the PowerXCell 8i processor (QS22) for your applications.

IBM SDK for Multicore Acceleration V3.0.0.3 (SDK V3.0.0.3) is a fixpack to SDK V3.0, which, in addition to providing maintenance and fixes to SDK V3.0, includes three additional libraries:

- Basic Linear Algebra Subprograms (BLAS) Library
- LAPACK — Linear Algebra PACKage Library
- Monte Carlo Random Number Generator Library

These libraries were created to further leverage the power of the PowerXCell 8i processor

(QS22). To obtain these enhancements, clients may choose to update their SDK V3.0 to the SDK V3.0.0.3 level.

Key prerequisites

The BladeCenter QS22 requires:

- BladeCenter H chassis (8852)
- Operating system: Red Hat Enterprise Linux 5.2 (RHEL), or later is recommended. Fedora 7 includes the code required to run on QS22. For supported operating systems, refer to the ServerProven® Plan.
- IBM Software Developer Kit (SDK) for Multicore Acceleration V3.0 is recommended for application development. Customers may choose to upgrade to the latest fixpack for SDK V3.0 (SDK V3.0.0.3) to obtain the latest fixes and enhancements that leverage the new features and capabilities of QS22.

Planned availability date

June 6, 2008

Description

The BladeCenter QS22 is a single-wide dual-processor (two-way) blade server. The QS22 Blade Server is based on the high-density, high performance IBM PowerXCell 8i processor. A functioning system provides leading-edge performance density optimized for operation with the high-speed interconnect in the BladeCenter H chassis.

The BladeCenter QS22 has the following major components:

- Two 3.2 GHz IBM PowerXCell 8i processors
- Up to 32GB PC2-6400 800MHz DDR2 memory
- 460 single-precision (SP) GFLOPS per blade (peak)
- 217 double-precision (DP) GFLOPS per blade (peak)
- Integrated dual 1Gb Ethernet
- IBM Enhanced I/O Bridge Chip
- Optional pair 1GB DDR2 VLP DIMMs as I/O buffer (2GB total)
- Optional 4x SDR InfiniBand adapter (32R1760)
- Optional SAS expansion card (39Y9190)
- Serial over LAN
- Single-wide blade for BladeCenter H chassis
- Support by IBM SDK for Multicore Acceleration V3.0
- Advanced power management including over subscription and thermal

The BladeCenter QS22 is based on the 64-bit IBM PowerXCell 8i processor operating at 3.2 GHz. Two processors per blade are directly mounted to the blade planar board to provide multiprocessing capability. Each processor includes 32/32 KB L1 (data/instruction) and 512 KB L2 cache.

The memory subsystem consists of 8 DIMM slots, enabling configurations from 4GB (if 4 slots populated with 1GB DIMMs) to 32 GB (if all 8 slots populated with 4GB DIMMs) of ECC memory. The QS22 is available in two base model configurations:

- QS22 with 8GB Memory (8x1GB DIMMs) MTM 0793-38y
- QS22 with 16GB Memory (4x4GB DIMMs) MTM 0793-40y

With four additionally available DIMM slots, if desired, optional memory can be added to the 40y model to build a configurations of 32GB. Highest memory bandwidth and therefore optimal

performance can be achieved when all DIMM sockets are populated.

Options for the BladeCenter QS22 include:

- Cisco Systems 4X InfiniBand Expansion Card for BladeCenter (32R1760)
- SAS Expansion Card (CFFv) for BladeCenter (39Y9190)
- 2GB (2x1GB) VLP PC2-6400 DDR2 Memory (46C0501)
- 8GB (2x4GB) VLP PC2-6400 DDR2 Memory (46C0510)

As a part of the ServerProven® program, compatibility listings are updated on the Web. Detailed information relative to IBM and non-IBM vendor devices, adapters, software, and network operating systems supported with BladeCenter QS22 (0793) can be accessed via the Web

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

The System Storage™ Interoperation Center can be accessed via the Web

http://www-03.ibm.com/systems/support/storage/config/ssic/displayesssearchwithoutjs.wss?start_over=yes

Standard QS22 blade configuration:

System number	Processor	Memory	Ethernet
0793	Two 3.2 GHz PowerXCell 8i	4 to 32 GB DDR2 2 to 16 GB/processor	Two 1 Gb controllers

System SE0 number	Processor	Memory
079338U	Two 3.2 GHz PowerXCell 8i	8 GB DDR2 4 GB/processor
079340U	Two 3.2 GHz PowerXCell 8i	16 GB DDR2 8 GB/processor

Product preview

The BladeCenter QS22 is available in memory configurations starting at 4GB and up to 32GB using 1GB and/or 4GB memory DIMMs. Support for 2GB DIMMs is targeted for second half 2008, further enhancing memory configuration flexibility. Support for additional chassis including BladeCenter HT and BladeCenter S, as well as options such as the PCIe expansion blade (BPE3) are also targeted for second half 2008.

A 8GB USB Flash Drive (43W3934) will be available before June 30, 2008.

Preview announcements provide insight into IBM's plans and directions. General availability, prices, ordering information, and terms and conditions will be provided when the product is announced.

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 108-277

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=108-277>

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Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Other company, product, and service names may be trademarks or service marks of others.

Education support

IBM PowerXCell 8i processor collateral and other resources

A substantial library of information and tools related to the Cell Broadband Engine™ Architecture is available online and can be accessed via

<http://www.ibm.com/developerworks/power/cell/>

Related course offerings

IBM offers an number of training vehicles for clients interested in learning about the Cell Broadband Engine Architecture. Online, Web-based training is available at the IBM Educational Assistant

<http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>

Publications

A CD that contains product documentation is shipped with each BladeCenter® QS22 system. In addition, this package includes safety and warranty publications.

The IBM Systems Information Center provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The IBM Systems Information Center is at

<http://publib.boulder.ibm.com/infocenter/systems>

The following publications are shipped on a Documentation CD with the product.

Title

Accessing the IBM Systems Information Center
IBM License Agreement for Machine Code
IBM Safety Information Book
Installation and User's Guide
Problem Determination and Service Guide
Statement of Limited Warranty and Support

Services

Global 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 to be an On Demand 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/>

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

<http://www.ibm.com/services/learning/index.html>

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

Technical information

Specified operating environment

Physical specifications

	0793
Processor	
Speed	3.2 GHz
Number (soldered)	2
L2 cache	512 KB per processor
Memory DIMMs	1GB VLP PC2-6400 DDR2, 4GB VLP PC2-6400 DDR2, 4-32GB per QS22
HDD controller	None
IDE controller	None
Total slots	
PCI-X	CFFv socket for Optional SAS adapter
PCIe	HSEC socket for Optional high-speed network adapters
Memory Expansion	One Optional pair of 1GB DDR2 VLP DIMMs I/O buffer memory

Physical characteristics

- Width: 245 mm (9.7 in)
- Depth: 446 mm (17.6 in)
- Height: 29 mm (1.14 in)
- Weight: 5.44 kg (12 lbs) maximum

To assure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

Operating environment

- Temperature
 - 10° to 35°C (50° to 95°F) at an altitude of 0 to 914 Meters (0 to 2,999 feet)
 - 10° to 32°C (50° to 90°F) at an altitude between 915 and 2,133 Meters (3,002 to 6,998 feet)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)
- Wet bulb (caloric value): 25 kCal/hour or Btu
- Operating Voltage
- Power Consumption

- 230 watts for 079338U
- 264 watts for 079340U
- plus 46 watts for 4 additional 4GB DIMMs
- plus 8 watts for optional pair 1GB I/O buffer DIMMs (2 GB total)
- plus 9 watts for optional SAS expansion card
- plus 9 watts for optional IB adapter

Hardware requirements: The BladeCenter QS22 requires a BladeCenter chassis and appropriate network switches.

The BladeCenter QS22 does not have any internal disk storage so an external boot solution must be implemented.

One solution is to implement a boot server. This option involves installing the RHEL5.2 operating system to the local disk of JS21, JS22, or other POWER™ compatible system. Once the install is complete, the image of install is copied over to remote boot server which is then used to boot the QS22 blades over the network.

An alternative boot solution for QS22 is the BladeCenter Boot Disk System, a 2U, 12-drive enclosure that supports hot-swap SAS drives. This storage product can be used to consolidate the boot functionality for up to 28 QS22 blades to a single, highly available enclosure. The part number for the boot disk system is 172622B. To use the boot disk system an optional SAS expansion adapter card (39Y9190) is required for each QS22 blade. The QS22 blades with optional SAS adapters connect to the boot disk system through the SAS Connectivity Module for BladeCenter (39Y9195). SAS adapters and SAS connectivity modules are purchased separately in addition to the BladeCenter Boot Disk System.

A third solution is to use the optional IBM 8GB uFDM Flash Drive (43W3934). The flash drive option plugs into a socket on the QS22 blade. When using this option the Linux™ operating system can be installed and QS22 can boot directly from the flash drive.

QS22	Processor	L2 Cache	Memory	Ethernet
0793xxx	Two 3.2 GHz PowerXCell 8i processors	512 KB/ processor	4 to 32 GB DDR2	Two 1 Gb controllers

Software requirements: An operating system must be acquired separately. Red Hat Enterprise Linux 5.2 (RHEL) planned to be available second quarter 2008, is recommended.

Limitations: The BladeCenter QS22 is supported in the BladeCenter H (BC-H) chassis only. The QS22 may be intermixed with all other blade servers supported in the BC-H: HS, JS, LS, and QS21 blades.

Planning information

Cable orders: No cables required

Packaging

Product	Shipment group	Number of boxes
BladeCenter QS22	BladeCenter QS22 Carton	1

Security, auditability, and control

The BladeCenter and QS22 blade 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 has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

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.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

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

Terms and conditions

Volume orders: Contact your IBM representative.

IBM credit corporation financing: Yes

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

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

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

Warranty period

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

Optional IBM features initially installed in an IBM system carry the same warranty period as the machine. If installed after the initial machine installation, they carry the balance of the machine 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 for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. 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.

The type of service is customer replaceable unit (CRU) (for example, keyboard, mouse, speaker, memory, or HDD) service and on-site service.

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 or a Tier 2 CRU. Installation of a Tier 1 CRU 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.

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 have been designated as a Tier 1 CRU:

- 3V Lithium Battery
- Air Baffle for I/O buffer DIMM Connector
- Blade Cover and Warning Label
- Front Bezel Assembly
- FRU List Label
- High-speed InfiniBand Expansion Card
- I/O Buffer Memory DIMM
- SAS Expansion Card
- System Service Label

On-site service: This provides on-site repair (IOR), 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-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.

Calls must be received by 5:00 p.m. local time in order to qualify for NBD service.

International Warranty service (IWS): 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

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/warrantyform?brandind=5000008>

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

ServicePac®, ServiceSuite™, ServiceElect, and ServiceElite: ServicePac, ServiceSuite, ServiceElect, and ServiceElite provide hardware warranty service upgrades, maintenance, and

selected support services in one agreement.

Warranty service upgrade: During the warranty period, a 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.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

CRUs will be provided as part of the machine's standard warranty CRU service except that you may install a Tier 1 CRU yourself or request IBM installation, at no additional charge, under one of the On-site service levels specified below.

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.

Hardware models announcing with this release will utilize existing U.S. ServicePacs. Refer to the following IBM Web site for applicable U.S. ServicePac information

http://www-935.ibm.com/services/us/its/html/servicepac_americas.html

To determine the applicable U,S, ServicePacs for a specific product (including the most recent product announcements), refer to the ServicePac Product Selector Tool accessible via the above Web site.

Maintenance service: If required, IBM provides repair or exchange service depending on the type of maintenance 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. You must follow the problem determination and resolution procedures that IBM specifies. 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 (for example, keyboard, mouse, speaker, memory, or HDD), IBM will ship the 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.

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.

On-site 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.

Maintenance service (ICA)

Maintenance services are available for ICA legacy contracts.

Alternative service (warranty service upgrades): During the warranty period, a 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.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

A CRU will be provided as part of the machine's standard warranty CRU service except that you may install a Tier 1 CRU yourself or request IBM to install it, at no additional charge, under the

type of warranty service specified.

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.

Maintenance service: If required, IBM provides repair or exchange service depending on the type of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. 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 (for example, keyboard, mouse, speaker, memory, or HDD), IBM will ship the 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.

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.

On-site 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.

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 warranty service upgrades or maintenance services.

IBM service provides hardware problem determination on non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, or memory) installed within IBM machines covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical service Agreement with the manufacturer 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 part 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 a maintenance service.

IBM hourly service rate classification: (One, Two, Three)

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

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 or by contacting your IBM representative or visiting

<http://www-1.ibm.com/servers/support>

/machine_warranties/machine_code.html

Machine using LMC Type Model: 0793 ALL

IBM may release changes to the machine code. IBM plans to make the machine code changes available for download from the BladeCenter technical support Web site

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/brandmain?brandind=5000020>

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.

Educational allowance: None

Prices

The following Single Entity Offering (SEO) option is newly announced for the BladeCenter QS22 (MT 0793):

Description	Model number	SEO number	Initial / MES / Both / Support
BladeCenter QS22	HC1	079338U	Initial
BladeCenter QS22	HC1	079340U	Initial

Option SEOs

2GB (2x1GB) VLP PC2-6400 DDR2 Memory		46C0501	Both
8GB (2x4GB) VLP PC2-6400 DDR2 Memory		46C0510	Both

The following are newly announced features on the specified models of the BladeCenter QS22 0793 machine type:

Description	Model number	Feature number	Initial / MES / Both / Support
BladeCenter QS22	HC1		
Blade Cover	HC1	0905	Initial
Cisco Systems 4X InfiniBand expansion card for IBM BladeCenter	HC1	1466	Initial
EMEA Long Leadtime Configurations	HC1	1763	Initial
Hungary CHW plant 9SH	HC1	1764	Initial
Guad CHW plant 9KQ	HC1	1765	Initial
ISTC CHW 9K2	HC1	1766	Initial
RTP CHW 9NR	HC1	1767	Initial
Offload Manufacturing to Guadalajara HVEC	HC1	1768	Initial
to RTP HVEC	HC1	1769	Initial
to ISTC	HC1	1770	Initial
Capacity Scheduling service	HC1	1772	Initial
Custom SLA Scheduling	HC1	1796	Initial

service

Custom Asset Tagging -- Standard	HC1	2200	Initial
Enhanced	HC1	2201	Initial
Custom Media Shippinggroup	HC1	2206	Initial
Request for Global Trade Number (UPC or EAN)	HC1	2207	Initial
Custom Labeling	HC1	2220	Initial
Custom Palletization	HC1	2221	Initial
Request for a new Vendor Logo Hardware	HC1	2247	Initial
Request for an existing IBM Feature	HC1	2248	Initial
Request for an existing Public RPQ	HC1	2249	Initial
Department of Defense UID Label	HC1	2320	Initial
Packaging -- 1U Blade WW	HC1	2562	Initial
Blade Base and Planar	HC1	2641	Initial
Filler, Baffle DDR2 VLP Thermal Mech DIMM	HC1	2772	Initial
SAS Expansion Card (CFFv) for BladeCenter	HC1	2979	Initial
Install in Rack 01	HC1	3101	Initial
Install in Rack 02	HC1	3102	Initial
Install in Rack 03	HC1	3103	Initial
Install in Rack 04	HC1	3104	Initial
Install in Rack 05	HC1	3105	Initial
Install in Rack 06	HC1	3106	Initial
Install in Rack 07	HC1	3107	Initial
Install in Rack 08	HC1	3108	Initial
Install in Rack 09	HC1	3109	Initial
Install in Rack 10	HC1	3110	Initial
Install in Rack 11	HC1	3111	Initial
Install in Rack 12	HC1	3112	Initial
Install in Rack 13	HC1	3113	Initial
Install in Rack 14	HC1	3114	Initial
Install in Rack 15	HC1	3115	Initial
Install in Rack 16	HC1	3116	Initial
Install in Rack 17	HC1	3117	Initial
Install in Rack 18	HC1	3118	Initial
Install in Rack 19	HC1	3119	Initial
Install in Rack 20	HC1	3120	Initial
Install in Rack 21	HC1	3121	Initial
Install in Rack 22	HC1	3122	Initial
Install in Rack 23	HC1	3123	Initial
Install in Rack 24	HC1	3124	Initial
Install in Rack 25	HC1	3125	Initial
Install in Rack 26	HC1	3126	Initial
Install in Rack 27	HC1	3127	Initial
Install in Rack 28	HC1	3128	Initial
Install in Rack 29	HC1	3129	Initial
Install in Rack 30	HC1	3130	Initial
Install in Rack 31	HC1	3131	Initial
Install in Rack 32	HC1	3132	Initial
Install in Rack 33	HC1	3133	Initial
Install in Rack 34	HC1	3134	Initial
Install in Rack 35	HC1	3135	Initial
Install in Rack 36	HC1	3136	Initial
Install in Rack 37	HC1	3137	Initial

Install in Rack 38	HC1	3138	Initial
Install in Rack 39	HC1	3139	Initial
Install in Rack 40	HC1	3140	Initial
Install in Rack 41	HC1	3141	Initial
Install in Rack 42	HC1	3142	Initial
Install in Rack 43	HC1	3143	Initial
Install in Rack 44	HC1	3144	Initial
Install in Rack 45	HC1	3145	Initial
Install in Rack 46	HC1	3146	Initial
Install in Rack 47	HC1	3147	Initial
Install in Rack 48	HC1	3148	Initial
Install in Rack 49	HC1	3149	Initial
Install in Rack 50	HC1	3150	Initial
Install in Rack 51	HC1	3151	Initial
Install in Rack 52	HC1	3152	Initial
Install in Rack 53	HC1	3153	Initial
Install in Rack 54	HC1	3154	Initial
Install in Rack 55	HC1	3155	Initial
Install in Rack 56	HC1	3156	Initial
Install in Rack 57	HC1	3157	Initial
Install in Rack 58	HC1	3158	Initial
Install in Rack 59	HC1	3159	Initial
Install in Rack 60	HC1	3160	Initial
Install in Rack 61	HC1	3161	Initial
Install in Rack 62	HC1	3162	Initial
Install in Rack 63	HC1	3163	Initial
Install in Rack 64	HC1	3164	Initial
BladeCenter 01	HC1	3301	Initial
BladeCenter 02	HC1	3302	Initial
BladeCenter 03	HC1	3303	Initial
BladeCenter 04	HC1	3304	Initial
BladeCenter 05	HC1	3305	Initial
BladeCenter 06	HC1	3306	Initial
BladeCenter 07	HC1	3307	Initial
BladeCenter 08	HC1	3308	Initial
BladeCenter 09	HC1	3309	Initial
BladeCenter 10	HC1	3310	Initial
BladeCenter 11	HC1	3311	Initial
BladeCenter 12	HC1	3312	Initial
BladeCenter 13	HC1	3313	Initial
BladeCenter 14	HC1	3314	Initial
BladeCenter 15	HC1	3315	Initial
BladeCenter 16	HC1	3316	Initial
BladeCenter 17	HC1	3317	Initial
BladeCenter 18	HC1	3318	Initial
BladeCenter 19	HC1	3319	Initial
BladeCenter 20	HC1	3320	Initial
BladeCenter 21	HC1	3321	Initial
BladeCenter 22	HC1	3322	Initial
BladeCenter 23	HC1	3323	Initial
BladeCenter 24	HC1	3324	Initial
BladeCenter 25	HC1	3325	Initial
BladeCenter 26	HC1	3326	Initial
BladeCenter 27	HC1	3327	Initial
BladeCenter 28	HC1	3328	Initial
BladeCenter 29	HC1	3329	Initial
BladeCenter 30	HC1	3330	Initial
BladeCenter 31	HC1	3331	Initial
BladeCenter 32	HC1	3332	Initial
BladeCenter 33	HC1	3333	Initial
BladeCenter 34	HC1	3334	Initial
BladeCenter 35	HC1	3335	Initial
BladeCenter 36	HC1	3336	Initial
BladeCenter 37	HC1	3337	Initial
BladeCenter 38	HC1	3338	Initial
BladeCenter 39	HC1	3339	Initial
BladeCenter 40	HC1	3340	Initial
BladeCenter location 01	HC1	3401	Initial
BladeCenter location 02	HC1	3402	Initial
BladeCenter location 03	HC1	3403	Initial
BladeCenter location 04	HC1	3404	Initial
BladeCenter location 05	HC1	3405	Initial

BladeCenter location 06	HC1	3406	Initial
BladeCenter location 07	HC1	3407	Initial
BladeCenter location 08	HC1	3408	Initial
BladeCenter location 09	HC1	3409	Initial
BladeCenter location 10	HC1	3410	Initial
BladeCenter location 11	HC1	3411	Initial
BladeCenter location 12	HC1	3412	Initial
BladeCenter location 13	HC1	3413	Initial
BladeCenter location 14	HC1	3414	Initial
1GB VLP PC2-6400 DDR2 x8 DIMM	HC1	3952	Initial
4GB VLP PC2-6400 DDR2 x4 DIMM	HC1	3954	Initial
Labels for QS22	HC1	4016	Initial
Blade Bezel for QS22	HC1	4031	Initial
System Documentation and Software-US English	HC1	7326	Initial
Customer Solution Center services	HC1	7831	Initial
Consolidate Shipment	HC1	8031	Initial
e1350 Solution Component	HC1	8034	Initial
TAA Compliant Order	HC1	8067	Initial
General Racking Solution	HC1	8072	Initial
Integrate BladeCenter in Manufacturing	HC1	8077	Initial
No Publications Selected	HC1	8086	Initial
No Preload Specify	HC1	9206	Initial

The following 3331 machine type feature numbers are being announced to support memory MES:

Description	Model number	Feature number	Initial / MES/ Both/ Support
3331-HC1	HC1		
2GB (2x1GB) PC2-6400 CL6 ECC DDR2 800MHz VLP RDIMM	HC1	3955	MES
8GB (2x4GB) PC2-6400 CL6 ECC DDR2 800MHz VLP RDIMM	HC1	3957	MES

Machine
type/ Supp.
model Cat. Description

0793-HC1 IOR BladeCenter QS22

Supp.
Feature Cat. Description

Machine type/model: 0793-HC1

Package quantity: One

0905	CCE/CCR	Blade Cover
1466	CCE/CCR	Cisco Systems 4X InfiniBand expansion card for BladeCenter
1763	CCE/CCR	EMEA Long Leadtime Configurations
1764	CCE/CCR	Hungary CHW plant 9SH

1765	CCE/CCR	Guad CHW plant 9KQ
1766	CCE/CCR	ISTC CHW 9K2
1767	CCE/CCR	RTP CHW 9NR
1768	CCE/CCR	Offload Manufacturing to Guadalajara HVEC
1769	CCE/CCR	Offload Manufacturing to RTP HVEC
1770	CCE/CCR	Offload Manufacturing to ISTC
1772	CCE/CCR	Capacity Scheduling service
1796	CCE/CCR	Custom SLA Scheduling service
2200	CCE/CCR	Custom Asset Tagging -- Standard
2201	CCE/CCR	Custom Asset Tagging -- Enhanced
2206	CCE/CCR	Custom Media Shippgroup
2207	CCE/CCR	Request for Global Trade Number (UPC or EAN)
2220	CCE/CCR	Custom Labeling
2221	CCE/CCR	Custom Palletization
2247	CCE/CCR	Request for a new Vendor Logo Hardware
2248	CCE/CCR	Request for an existing IBM Feature
2249	CCE/CCR	Request for an existing Public RPQ
2320	CCE/CCR	Department of Defense UID Label
2562	CCE/CCR	Packaging -- 1U Blade WW
2641	CCE/CCR	Blade Base and Planar
2772	CCE/CCR	Filler, Baffle DDR2 VLP Thermal Mech DIMM
2979	CCE/CCR	SAS Expansion Card (CFFv) for BladeCenter
3101	CCE/CCR	Install in Rack 01
3102	CCE/CCR	Install in Rack 02
3103	CCE/CCR	Install in Rack 03
3104	CCE/CCR	Install in Rack 04
3105	CCE/CCR	Install in Rack 05
3106	CCE/CCR	Install in Rack 06
3107	CCE/CCR	Install in Rack 07
3108	CCE/CCR	Install in Rack 08
3109	CCE/CCR	Install in Rack 09
3110	CCE/CCR	Install in Rack 10
3111	CCE/CCR	Install in Rack 11
3112	CCE/CCR	Install in Rack 12
3113	CCE/CCR	Install in Rack 13
3114	CCE/CCR	Install in Rack 14
3115	CCE/CCR	Install in Rack 15
3116	CCE/CCR	Install in Rack 16
3117	CCE/CCR	Install in Rack 17
3118	CCE/CCR	Install in Rack 18
3119	CCE/CCR	Install in Rack 19
3120	CCE/CCR	Install in Rack 20
3121	CCE/CCR	Install in Rack 21
3122	CCE/CCR	Install in Rack 22
3123	CCE/CCR	Install in Rack 23
3124	CCE/CCR	Install in Rack 24
3125	CCE/CCR	Install in Rack 25
3126	CCE/CCR	Install in Rack 26
3127	CCE/CCR	Install in Rack 27
3128	CCE/CCR	Install in Rack 28
3129	CCE/CCR	Install in Rack 29
3130	CCE/CCR	Install in Rack 30
3131	CCE/CCR	Install in Rack 31
3132	CCE/CCR	Install in Rack 32
3133	CCE/CCR	Install in Rack 33
3134	CCE/CCR	Install in Rack 34
3135	CCE/CCR	Install in Rack 35
3136	CCE/CCR	Install in Rack 36
3137	CCE/CCR	Install in Rack 37
3138	CCE/CCR	Install in Rack 38
3139	CCE/CCR	Install in Rack 39
3140	CCE/CCR	Install in Rack 40
3141	CCE/CCR	Install in Rack 41
3142	CCE/CCR	Install in Rack 42
3143	CCE/CCR	Install in Rack 43
3144	CCE/CCR	Install in Rack 44
3145	CCE/CCR	Install in Rack 45
3146	CCE/CCR	Install in Rack 46
3147	CCE/CCR	Install in Rack 47
3148	CCE/CCR	Install in Rack 48
3149	CCE/CCR	Install in Rack 49
3150	CCE/CCR	Install in Rack 50

3151	CCE/CCR	Install in Rack 51
3152	CCE/CCR	Install in Rack 52
3153	CCE/CCR	Install in Rack 53
3154	CCE/CCR	Install in Rack 54
3155	CCE/CCR	Install in Rack 55
3156	CCE/CCR	Install in Rack 56
3157	CCE/CCR	Install in Rack 57
3158	CCE/CCR	Install in Rack 58
3159	CCE/CCR	Install in Rack 59
3160	CCE/CCR	Install in Rack 60
3161	CCE/CCR	Install in Rack 61
3162	CCE/CCR	Install in Rack 62
3163	CCE/CCR	Install in Rack 63
3164	CCE/CCR	Install in Rack 64
3301	CCE/CCR	BladeCenter 01
3302	CCE/CCR	BladeCenter 02
3303	CCE/CCR	BladeCenter 03
3304	CCE/CCR	BladeCenter 04
3305	CCE/CCR	BladeCenter 05
3306	CCE/CCR	BladeCenter 06
3307	CCE/CCR	BladeCenter 07
3308	CCE/CCR	BladeCenter 08
3309	CCE/CCR	BladeCenter 09
3310	CCE/CCR	BladeCenter 10
3311	CCE/CCR	BladeCenter 11
3312	CCE/CCR	BladeCenter 12
3313	CCE/CCR	BladeCenter 13
3314	CCE/CCR	BladeCenter 14
3315	CCE/CCR	BladeCenter 15
3316	CCE/CCR	BladeCenter 16
3317	CCE/CCR	BladeCenter 17
3318	CCE/CCR	BladeCenter 18
3319	CCE/CCR	BladeCenter 19
3320	CCE/CCR	BladeCenter 20
3321	CCE/CCR	BladeCenter 21
3322	CCE/CCR	BladeCenter 22
3323	CCE/CCR	BladeCenter 23
3324	CCE/CCR	BladeCenter 24
3325	CCE/CCR	BladeCenter 25
3326	CCE/CCR	BladeCenter 26
3327	CCE/CCR	BladeCenter 27
3328	CCE/CCR	BladeCenter 28
3329	CCE/CCR	BladeCenter 29
3330	CCE/CCR	BladeCenter 30
3331	CCE/CCR	BladeCenter 31
3332	CCE/CCR	BladeCenter 32
3333	CCE/CCR	BladeCenter 33
3334	CCE/CCR	BladeCenter 34
3335	CCE/CCR	BladeCenter 35
3336	CCE/CCR	BladeCenter 36
3337	CCE/CCR	BladeCenter 37
3338	CCE/CCR	BladeCenter 38
3339	CCE/CCR	BladeCenter 39
3340	CCE/CCR	BladeCenter 40
3401	CCE/CCR	BladeCenter location 01
3402	CCE/CCR	BladeCenter location 02
3403	CCE/CCR	BladeCenter location 03
3404	CCE/CCR	BladeCenter location 04
3405	CCE/CCR	BladeCenter location 05
3406	CCE/CCR	BladeCenter location 06
3407	CCE/CCR	BladeCenter location 07
3408	CCE/CCR	BladeCenter location 08
3409	CCE/CCR	BladeCenter location 09
3410	CCE/CCR	BladeCenter location 10
3411	CCE/CCR	BladeCenter location 11
3412	CCE/CCR	BladeCenter location 12
3413	CCE/CCR	BladeCenter location 13
3414	CCE/CCR	BladeCenter location 14
3952	CCE/CCR	1GB VLP PC2-6400 DDR2 x8 DIMM
3954	CCE/CCR	4GB VLP PC2-6400 DDR2 x4 DIMM
4016	CCE/CCR	Labels for QS22
4031	CCE/CCR	Blade Bezel for QS22
7326	CCE/CCR	System Documentation and Software- US English

7831	CCE/CCR	Customer Solution Center services
8031	CCE/CCR	Consolidate Shipment
8034	CCE/CCR	e1350 Solution Component
8067	CCE/CCR	TAA Compliant Order
8072	CCE/CCR	General Racking Solution
8077	CCE/CCR	Integrate BladeCenter in Manufacturing
8086	CCE/CCR	No Publications Selected
9206	CCE/CCR	No Preload Specify

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