

BladeCenter QS21 Type 0792



Problem Determination and Service Guide

BladeCenter QS21 Type 0792



Problem Determination and Service Guide

Note

Before using this information and the product it supports, read the general information in Appendix C, "Notices," on page 113 and the *Warranty and Support Information* on the *Documentation CD*.

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Contents

Safety	vii
Chapter 1. Introduction	1
Related documentation	1
Notices and statements used in this document.	2
Features and specifications.	2
Support for local storage.	3
Turning on the blade server.	3
Turning off the blade server.	4
Blade server controls and LEDs	6
System board LEDs	7
System board internal and expansion card connectors.	8
Chapter 2. Configuring the blade server	9
Communicating with the blade server	9
Using the Advanced Management Module	9
Using the Web interface	10
Using the command-line interface	10
Using Serial over LAN	10
Using the serial interface	10
Using the SMS utility program	11
Starting SMS	11
Viewing FRU information	12
Adding FRU information	13
Updating the system and BMC firmware	15
Updating steps	16
Determining current blade server firmware levels	17
Updating the BMC firmware	18
Using the BMC update package	18
Using the Advanced Management Module	18
Installing the system firmware	20
The firmware update package	21
Using the package	21
Updating the system firmware automatically	22
Installing the firmware manually.	22
Updating the system firmware images	23
Updating the optional expansion card firmware	23
Integrating the Gigabit Ethernet controller into the BladeCenter	23
Updating the Ethernet controller firmware	24
Using the update package.	24
Firmware update steps	25
Blade server Ethernet controller enumeration.	26
Chapter 3. Parts listing	27
Replaceable components	27
Chapter 4. Installing and removing replaceable units	29
Installation guidelines	29
System reliability guidelines	30
Handling static-sensitive devices	30
Removing the blade server from the BladeCenter unit	31
Removing the blade server	31
Opening and removing the blade server cover	32

Removing the BladeCenter PCI Express I/O Expansion Unit	32
Installing the optional InfiniBand card	33
Adding I/O DDR2 memory modules	36
Replacing DIMM fillers	37
Installing the SAS expansion card	38
Installing the BladeCenter PCI Express I/O Expansion Unit	40
Removing the blade-server front bezel assembly	41
Replacing the system board base and planar.	41
Replacing the battery	42
Using the miscellaneous parts kit	45
Replacing the ball studs	45
Finishing the installation	47
Installing the front bezel assembly.	47
Closing the blade server cover	49
Input/output connectors and devices	49
Chapter 5. Diagnostics and troubleshooting	51
Prerequisites.	51
Basic checks	51
Finding troubleshooting information	52
Troubleshooting charts	52
Problems indicated by the front panel LEDs	52
Problems indicated by the system board LEDs	54
Power problems	57
Power throttling.	57
Network connection problems	57
Service processor problems	58
Software problems	58
Recovering the system firmware code	59
Checking the boot image	59
Booting from the TEMP image	59
Recovering the TEMP image from the PERM image	59
Supported boot media	59
Booting the system	60
Diagnostic programs and messages	62
Running diagnostics and preboot DSA	62
Diagnostic text messages	63
Viewing the test log	63
DSA error messages.	63
CPU test results	64
BMC test results	64
Memory tests	70
System firmware startup messages	71
Boot errors and handling	72
Boot list	72
System firmware update errors	74
Memory initialization errors	75
USB errors	75
Network boot errors	77
SAS boot errors	79
I/O DIMM boot-time errors.	86
Other error messages	88
BMC firmware messages	89
NMI error messages	92
Problem reporting	94
Problem description	94

Solving undetermined problems	95
Calling IBM for service	96
Appendix A. Using the SMS utility	97
Starting the SMS utility	97
The SMS utility menu	97
Select Language	98
Setup Remote IPL (Initial Program Load)	98
IP Parameters	99
Adapter Configuration	100
Ping Test	101
Advanced Setup: DHCP	101
Change SCSI Settings	101
Select Console	101
Select Boot Options	102
Firmware Boot Side Options	104
Progress Indicator History	104
FRU information	105
Adding FRU information	106
SAS Settings	108
Appendix B. Getting help and technical assistance	111
Before you call	111
Using the documentation	111
Getting help and information from the World Wide Web	111
Software service and support	112
Hardware service and support	112
Appendix C. Notices	113
Trademarks.	114
Important notes	114
Product recycling and disposal.	115
Battery return program.	116
Electronic emission notices	117
Federal Communications Commission (FCC) statement	117
Industry Canada Class A emission compliance statement	118
Avis de conformité à la réglementation d'Industrie Canada	118
Australia and New Zealand Class A statement	118
United Kingdom telecommunications safety requirement	118
Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A	
EU-Richtlinie zur Elektromagnetischen Verträglichkeit	118
Deutschland: Einhaltung des Gesetzes über die elektromagnetische	
Verträglichkeit von Geräten	118
Zulassungsbescheinigung laut dem Deutschen Gesetz über die	
elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC	
EG Richtlinie 2004/108/EG) für Geräte der Klasse A	118
European Union EMC Directive conformance statement	119
Taiwanese Class A warning statement	119
Japanese Voluntary Control Council for Interference (VCCI) statement	120
Korean Class A warning statement	120
Index	121

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφαλείας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians:

This section contains information for trained service technicians.

Inspecting for unsafe conditions:

Use the information in this section to help you identify potential unsafe conditions in an IBM product that you are working on. Each IBM product, as it was designed and manufactured, has required safety items to protect users and service technicians from injury. The information in this section addresses only those items. Use good judgment to identify potential unsafe conditions that might be caused by non-IBM alterations or attachment of non-IBM features or options that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

- Electrical hazards, especially primary power.
- Primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, such as a damaged CRT face or a bulging capacitor.
- Mechanical hazards, such as loose or missing hardware.

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
 - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
 - Make sure that the power cord is the correct type, as specified in the documentation for your BladeCenter unit type.
 - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the blade server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment:

Observe the following guidelines when servicing electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, and missing safety grounds.

- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical current.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.
- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
 - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
 - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
 - When using a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when measuring high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Important:

All caution and danger statements in this documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in the *IBM Safety Information* book.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *IBM Safety Information* book under statement 1.

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with the blade server or optional device before you install the device.

Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Statement 2:



CAUTION:

When replacing the lithium battery, use only IBM Part Number 43W9859 or 03N2449 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Statement 3:



CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



DANGER

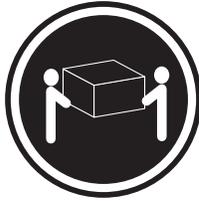
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

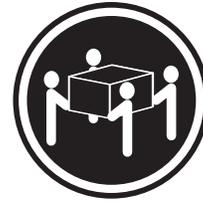
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 5:



CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 8:



CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Statement 13:



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 21:



CAUTION:

Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

ADVERTENCIA: El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur when installing and using your IBM® BladeCenter®. It describes the diagnostic tools that come with the BladeCenter QS21, error codes and suggested actions. It also describes how to replace failing components.

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 CRU:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see *Warranty and Support Information*.

Note: The illustrations in this document might differ slightly from the hardware.

Related documentation

In addition to this document, the following documentation also comes with the server:

- *Installation and User's Guide*

This printed document contains general information about the blade server, including how to install supported options and how to configure the blade server.

- *Safety Information*

This document is in Portable Document Format (PDF) on the *Documentation CD*. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.

- *Warranty and Support Information*

This document is in PDF on the *Documentation CD*. It contains information about the terms of the warranty and about service and assistance.

- *IBM Software Development Kit for Multicore Acceleration Version 3.0.0 Installation Guide*

This document is in PDF and can be downloaded from <http://www.ibm.com/support/us/en/>. It contains information about how to install the operating system and how to program applications for the blade server.

Depending on the server model, additional documentation might be included on the *Documentation CD*.

The blade server might have features that are not described in the documentation that comes with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to

provide additional information that is not included in the blade server documentation. The most recent versions of all BladeCenter documentation are at <http://www.ibm.com/support/us/en/>.

In addition to the documentation in this library, be sure to review the planning and installation documents for your BladeCenter hardware available at <http://www.ibm.com/support/us/en/>.

Updates might be available for this document. You can check for the most recent version at <http://www.ibm.com/support/us/en/>.

Notices and statements used in this document

The caution and danger statements that appear in this document are also in the multilingual *Safety Information* document, which is on the *Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features and specifications

The following table provides a summary of the features and specifications of the BladeCenter QS21.

Through the BladeCenter Advanced Management Module, you can view the blade server firmware code and other hardware configuration information.

The BladeCenter QS21 is an accessory for the BladeCenter H Type 8852 unit and the BladeCenter HT Type 8740 and 8750 (enterprise environment only).

Providing it is supported by the BladeCenter unit, you can install and operate any other model of blade server in the same BladeCenter unit as a BladeCenter QS21.

Note: Power, cooling, removable-media drives, external ports, and advanced system management are provided by the IBM BladeCenter H and HT units. For more information, see the documentation that comes with your BladeCenter unit.

Table 1. Blade server features and specifications

<p>Microprocessor:</p> <p>Two IBM Cell/B.E. PowerPC 64-bit architecture processors w/VMX with 8 Synergistic Processor Units (SPU), 512 KB L2 cache, 256 KB on each Synergistic Processing Engine (SPE)</p> <p>Memory: Fixed system memory configuration of 2 GB XDR memory, 1 GB per Cell Broadband Engine™ (Cell/B.E.) processor. Extra memory cannot be added</p>	<p>Integrated functions:</p> <ul style="list-style-type: none"> • Two 1 Gigabit Ethernet controllers • Local service processor • 2 Cell/B.E. companion chips each providing a PCIe and a single PCI-X interface • RS-485 interface for communication with BladeCenter Management Module • USB Controller <p>Supported Options:</p> <ul style="list-style-type: none"> • Serial attached SCSI (SAS) expansion card • High-Speed InfiniBand Card, IB-4x • I/O Buffer DIMM VLP DDR2 512 MB, total 1 GB per channel 	<p>Environment:</p> <ul style="list-style-type: none"> • Ambient temperature: <ul style="list-style-type: none"> – Operating temperature: 25°C to 35°C (77°F to 95°F). Altitude: 0 to 2133 m (0 to 7000 ft) • Humidity: <ul style="list-style-type: none"> – Operating temperature: 8% to 80% <p>Size:</p> <ul style="list-style-type: none"> • Height: 24.5 cm (9.7 inches) • Depth: 44.6 cm (17.6 inches) • Width: 2.9 cm (1.14 inches) • Maximum weight: 5 kg (13.2 lb) <p>Electrical input:</p> <ul style="list-style-type: none"> • Power supply: 12 V dc
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Support for local storage

The BladeCenter provides a SAS solution for local storage. This comprises a SAS expansion card attached to the blade server, a SAS switch in the rear of the chassis, and various options to attach storage to that integrated SAS switch. An optional SAS expansion card is available for the BladeCenter QS21.

Storage can be attached via the external SAS host controller. The BladeCenter QS21 supports the SAS drives of the IBM System Storage™ DS3200 and the IBM System Storage EXP3000 expansion unit. Check the IBM BladeCenter support Web site for details of supported SAS drives at <http://www.ibm.com/support/us/en/>.

Turning on the blade server

The BladeCenter QS21 is hot-swappable and can be inserted into the BladeCenter unit when the unit is already powered up. However, it can only be powered on by one of the methods described in this section. While the blade server is powering up, the power-on LED on the front of the server is lit. See “Blade server controls and LEDs” on page 6 for the power-on LED states.

After you have installed the BladeCenter QS21 into a powered up BladeCenter unit, wait until the power on LED on the blade server flashes slowly before turning on the blade server.

You can turn on the blade server in any of the following ways:

Using the power control button

You can press the power-control button Figure 1 on page 4 which is behind the control-panel door on the front of the blade server if local power control is enabled for the blade server. Local power control is enabled and disabled through the BladeCenter Management Module Web interface.

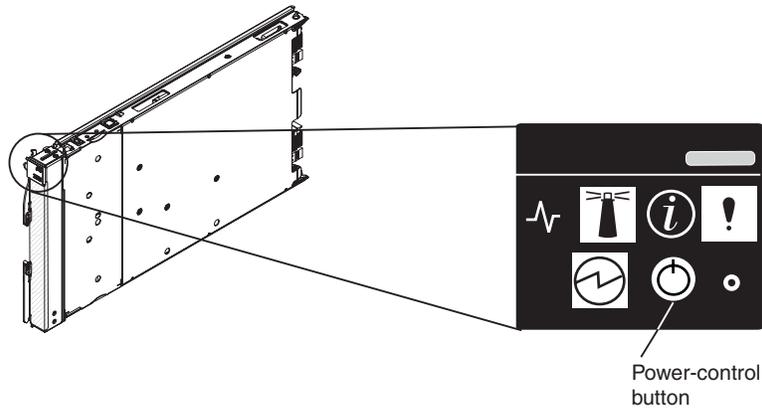


Figure 1. Blade server power button

Using the BladeCenter Advanced Management Module

You can use the BladeCenter Management Module Web interface to turn on the blade server remotely.

Using the Wake on LAN® feature:

If you want to use the Wake on LAN feature, the feature must be enabled in the installed operating system and it must not have been disabled through the Advanced Management Module.

In the event of a power failure the BladeCenter unit and then the blade server can start automatically when power is restored. You must configure this through the BladeCenter Advanced Management Module. See the *BladeCenter Management Module User's Guide* for further information about this feature.

Turning off the blade server

When you turn off the blade server, it is still connected to power through the BladeCenter unit and can continue to respond to requests from the service processor, including remote requests to turn the blade server on. To remove all power from the blade server, you must physically remove it from the BladeCenter unit or power off the BladeCenter unit.

To avoid loss of data, shut down the Linux® operating system before you turn off the blade server. Shut down the operating system by entering the `shutdown -h now` command at the command prompt or by choosing **shutdown** if you are using a graphical user interface (GUI). See your operating system documentation for additional information about shutting down the operating system.

If the BladeCenter unit has not been turned off, the blade server can be turned off in any of the following ways:

Using the power control button

You can press the power control button behind the control-panel door on the front panel of the blade server. This starts an orderly shutdown of the operating system, providing your operating system supports this feature, before turning off the BladeCenter QS21. If the operating system stops functioning, pressing and holding the power control button for more than 4 seconds turns off the blade server.

Using the BladeCenter Advanced Management Module

You can use the Advanced Management Module Web interface to turn off

the blade server remotely. You can also configure the Advanced Management Module to turn off the blade server automatically if the system is not operating correctly.

Note: After turning off the blade server, wait at least 5 seconds before turning it on again.

Blade server controls and LEDs

This section describes the controls and LEDs on the front panel of the blade server. For further information about the LEDs and how they can be used to assist in troubleshooting, see “Problems indicated by the front panel LEDs” on page 52.

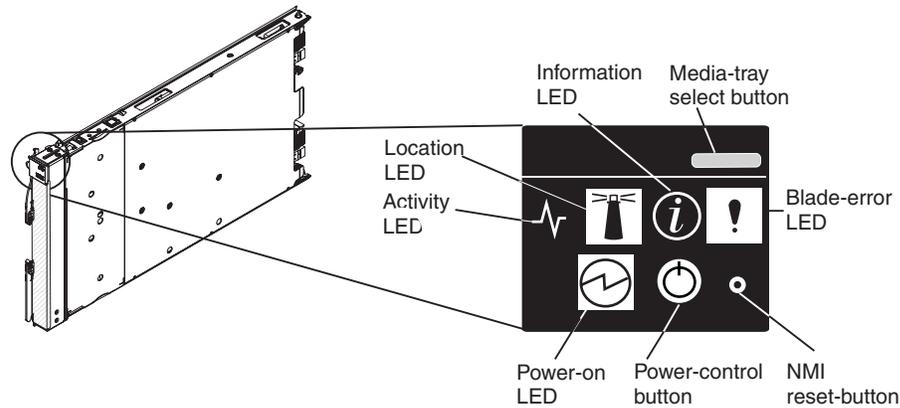


Figure 2. Power-control button and LEDs

Note: The control panel door which normally covers the LEDs and power-control button is omitted for reasons of clarity.

Activity LED:

This green LED lights when there is network activity.

Location LED:

This blue LED is turned on remotely by the system administrator to assist in locating the blade server. The location LED on the BladeCenter unit lights at the same time.

Information LED:

This amber LED lights to indicate that information about a system error has been placed in the Advanced Management Module Event Log. The information LED remains on until turned off by Advanced Management Module or through IBM Director Console.

Blade error LED:

This amber LED lights when a system error has occurred in the blade server.

Power control button:

Press this button to turn the blade server on or off. The power control button only has effect if local power control is enabled for the blade server. Local power control is enabled and disabled through the BladeCenter Advanced Management Module Web interface.

Media tray select button:

This button associates the shared BladeCenter unit media tray (DVD/CD drive and USB ports) with the blade server. The LED on the button flashes while the request is being processed, then lights when the ownership of the media tray has been transferred to the blade server.

It can take approximately 20 seconds for the operating system on the blade server to recognize the media tray.

Power on LED:

This green LED indicates the power status of the blade server as follows:

- Flashing rapidly - The service processor on the blade server is communicating with the BladeCenter Advanced Management Module.
- Flashing slowly - The blade server has power but is not turned on.
- Lit continuously (steady) - The blade server has power and is turned on.
- Not lit. Either the BladeCenter unit is powered off, or a power failure has occurred on the blade server or the BladeCenter unit.

NMI reset button

If the operating system has been installed, pressing this with a paper clip or pin causes the operating system to call the system debugger.

Note: The blade error LED, information LED, and location LED can be turned off through the BladeCenter Management Module Web interface.

System board LEDs

The BladeCenter QS21 has status LEDs on the system board to indicate the health of various components. Some are within the light box while others are in different location. A lit LEDs indicates an error condition. Complete information about the LEDs can be found in “Troubleshooting charts” on page 52.

To find out what if any errors have occurred on the system board, you must:

1. Remove the blade server from the BladeCenter unit
2. Open the cover
3. Press the light path diagnostics switch

This lights any error LEDs that were turned on during processing. It also lights a green LED to indicate the capacitor is charged and the light path diagnostics system is operating.

Figure 3 on page 8 shows the location of the light path LEDs and the diagnostics switch.

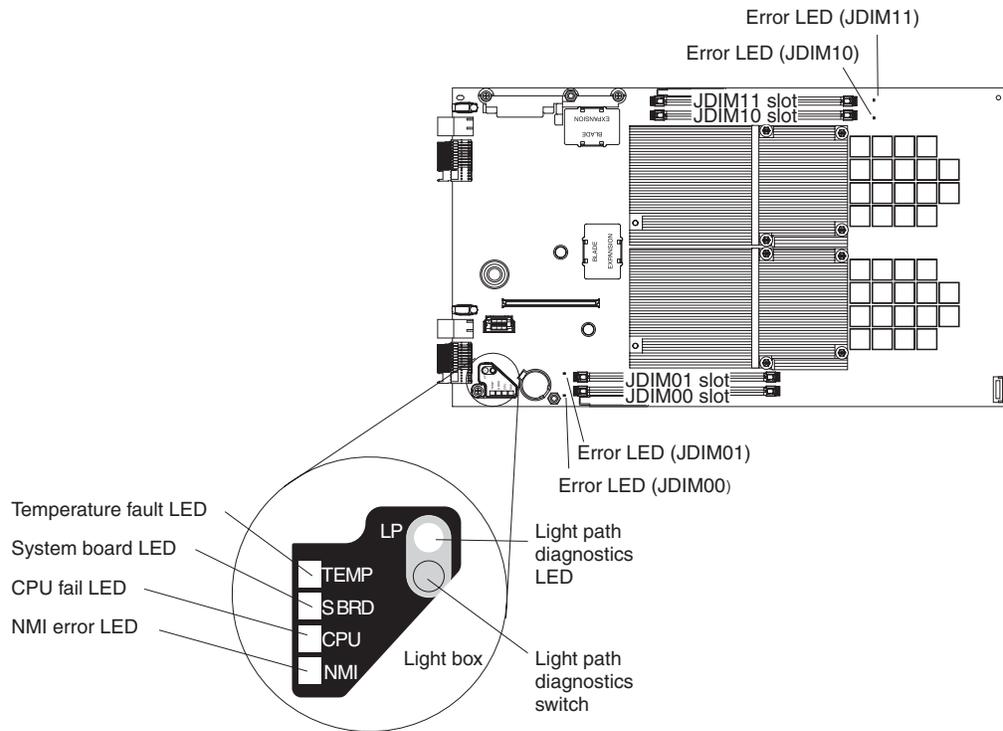


Figure 3. System-board LEDs

Pressing the light path diagnostics switch lights the LED(s) to indicate where an error has occurred.

System board internal and expansion card connectors

The following illustration shows the location of the connectors for user-installable options.

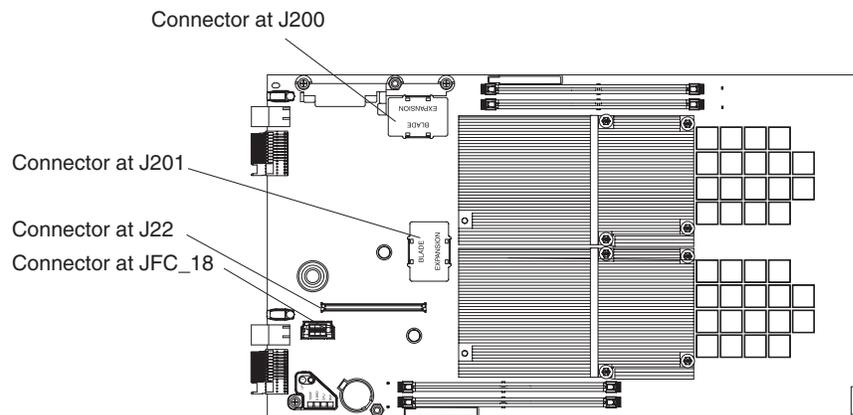


Figure 4. Locations of the expansion option connectors on the system board

Chapter 2. Configuring the blade server

This chapter describes how to:

- Communicate with a blade server.
- Use System Management Services (SMS) to view and update the system firmware revision number. This does not require the operating system to be installed.
- Update the baseboard management controller (BMC) firmware using the Advanced Management Module.
- Update the system firmware using the command-line utility.
- Configure the Ethernet gigabit controllers and in preparation for a network installation of the operating system.

Note: You can update the BMC firmware through the Advanced Management Module Web interface without booting the operating system. However, to update the system firmware you must boot the operating system first.

Communicating with the blade server

The operating system does not have to be booted before you can communicate with the BladeCenter QS21. You can access it through:

Advanced Management Module

The Web-based management and configuration program. This is your main access method to the blade server.

The command-line interface

See “Using the command-line interface” on page 10 for further information.

Serial over LAN (SOL)

This is similar to the serial interface, but allows you to connect to the blade server over the network. See “Using Serial over LAN” on page 10 for further information.

The serial interface

You can connect a PC or compatible terminal directly to the BladeCenter H or HT unit using a special cable. See “Using the serial interface” on page 10 for further information.

Note: The BladeCenter H and HT Serial Breakout cables are not supplied with the unit and must be ordered separately

System Management Services (SMS)

The SMS utility allows you to view and update the VPD, change the boot device and set network parameters. See “Using the SMS utility program” on page 11 for further information.

Using the Advanced Management Module

The Advanced Management Module is the main means of administering the BladeCenter system. Use the Advanced Management Module Web-based management and configuration program to:

- Configure the BladeCenter unit
- Update and configure BladeCenter components including the BladeCenter QS21
- Monitor the current system status

- Check the event log for system and other errors

Using the Web interface

Complete the following steps to start the Web-based management and configuration program:

1. Open a Web browser. In the address or URL field, type the Internet protocol (IP) address or host name that is assigned for the Management Module remote connection. The default IP address is:

192.168.70.125

The Enter Network Password window opens.

2. Type your user name and password. Before you log in to the Advanced Management Module for the first time, contact your system administrator regarding whether your organization has assigned a user name and password to you. Use the initial (default) user name and password the first time that you log in to the Advanced Management Module. If you have an assigned user name and password, use them for all subsequent logins. All login attempts are documented in the event log.

The initial user ID and password for the Advanced Management Module are:

User ID

USERID (all capital letters)

Password

PASSWORD (note the number zero, not the letter O, in PASSWORD)

3. Follow the instructions that appear on the screen. Be sure to set the timeout value that you want for your Web session.

The BladeCenter management and configuration window opens.

For additional information, see the *IBM BladeCenter Advanced Management Module User's Guide*.

Using the command-line interface

The IBM BladeCenter Advanced Management Module also provides a command-line interface to provide direct access to BladeCenter management functions. You can use this as an alternative to using the BladeCenter Management Module Web interface.

Through the command-line interface, you can issue commands to control the power and configuration of the blade server and other components in the BladeCenter unit. For information and instructions, see the *IBM BladeCenter Management Module Command-Line Interface Reference Guide*.

Using Serial over LAN

To establish a Serial over LAN (SOL) connection to the blade server, you must configure the SOL feature for the blade server and start an SOL session as described in the *IBM BladeCenter Serial over LAN Setup Guide*. In addition, the Advanced Management Module must be configured as described in the *IBM BladeCenter Management Module User's Guide*, and the BladeCenter unit must be configured as described in the *IBM BladeCenter Serial over LAN Setup Guide*.

Using the serial interface

Use the serial interface to:

- Observe firmware progress.

- Access the Linux terminal in order to configure Linux.

You can connect a PC serially through the BladeCenter unit using a specific UART cable. To connect to the serial console, plug the serial cable into the BladeCenter unit and connect the other end to a serial device or computer with a serial port. For more information, see the documentation that comes with your BladeCenter unit.

Set the following parameters for the serial connection on the terminal client:

- 115200 baud
- 8 data bits
- No parity
- One stop bit
- No flow control

By default, the blade server sends output over SOL and to the serial port on the BladeCenter unit. However, the default for input is to use SOL. If you wish to use a device connected to the serial port for input you must press any key on that device while the blade server boots.

Using the SMS utility program

The Advanced Management Module is the main means of administering the BladeCenter unit and the BladeCenter servers. However, another utility is provided which in some cases can give more information than that displayed in the Advanced Management Module. This is the System Management Services (SMS) utility program.

The SMS utility program allows you to view and update the VPD, change the boot list and set network parameters.

Starting SMS

Complete the following steps to start SMS:

1. Using a Telnet or SSH client, connect to the Advanced Management Module external Ethernet interface IP address.
2. When prompted, enter a valid user ID and password. The default management module user ID is USERID, and the default password is PASSWORD, where the 0 is a zero.

Note: The user ID and password may have been changed. If so, check with the system administrator for a valid id and password.

3. Power cycle the blade server and start an SOL console session by using the `power -cycle -c` command.

For example, to power cycle and start an SOL remote text console with a blade server that is in the first bay of the BladeCenter unit, issue the command:

```
power -cycle -c -T system:blade[1]
```

To open a console session with a blade server that is already powered on, use the command:

```
console -T system:blade[1]
```

4. After approximately 30 seconds, you see a sequence of checkpoint codes displayed on the console. These codes are generated by the Power On Self Test (POST).
5. When the POST menu and indicators displays a screen similar to:

```

QS21 Firmware Starting
Check ROM = OK
Build Date = Apr 24 2007 09:32:34
FW Version = "QB-1.6.0-0"

Press "F1" to enter Boot Configuration (SMS)

Initializing memory configuration...
MEMORY
Modules = Elpida 512MB, 3200 MHz
XDRlibrary = v0.32, Bin A/C, RevB, DualDD
Calibrate = Done
Test = Done

SYSTEM INFORMATION
Processor = Cell/B.E.(TM) DD3.2 @ 3200 MHz
I/O Bridge = Cell BE companion chip DD2.x
Timebase = 26666 kHz (internal)
SMP Size = 2 (4 threads)
Boot-Date = 2007-06-08 11:20
Memory = 2048MB (CPU0: 1024MB, CPU1: 1024MB)

```

Press **F1** to display the SMS menu.

Viewing FRU information

The VPD on each blade server contains details about the machine type or model, serial number and the universal unique ID.

Complete the following steps to see this information:

1. Start SMS by completing the above steps. The SMS menu appears:

```

PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Main Menu
1. Select Language
2. Setup Remote IPL (Initial Program Load)
3. Change SCSI Settings
4. Select Console
5. Select Boot Options
6. Firmware Boot Side Options
7. Progress Indicator History
8. FRU Information
9. Change SAS Boot Device

-----
Navigation Keys:

                                X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key:
-----

```

2. Type **8** to select FRU Information. A screen similar to the following appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

FRU Information

Machine Type and Model: 079232x

Machine Serial Number: ABCDEFG

Universal Unique ID: 12345678-1234-1234-1234-123456789ABC

Navigation Keys:

M = return to Main Menu

ESC key = return to previous screen

X = eXit System Management Services

Select Navigation key :

Note: You cannot change the FRU information from this screen, only view it.

Adding FRU information: When you replace a FRU details are not recorded in the VPD. You must enter them manually through SMS.

When the system firmware detects an FRU replacement part during boot the process stops to allow you to enter the machine type or model and serial number. Boot does not continue until the information is provided.

To enter new FRU information, complete the following steps:

1. Using a Telnet or SSH client, connect to the Advanced Management Module external Ethernet interface IP address.
2. When prompted, enter a valid user ID and password. The default management module user ID is USERID, and the default password is PASSWORD, where the 0 is a zero.

Note: The userid and password may have been changed. If so, check with the system administrator for a valid user id and password.

3. Power cycle the blade server and start an SOL console by using the power -cycle -c command. See "Using the SMS utility program" on page 11 for further information.
4. The following screen appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
```

```
Enter Type Model Number
(Must be 7 characters, only A-Z, a-z, 0-9 allowed. Press Esc to skip)
```

```
Enter Type Model Number :
```

Type the model number according to the instructions on the screen and press **Enter** to continue.

5. You must confirm the model number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
```

```
Number entered is: 1234567
Accept number?
(Enter 'y' or 'Y' to accept or 'n' or 'N' to decline)
```

```
Select Navigation key :
```

Type **y** or **Y** and press **Enter** to confirm the number.

6. At the following screen, type the serial number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----

Enter Serial Number
(Must be 7 characters, only A-Z, a-z, 0-9 allowed)

Enter Serial Number :
-----
```

Press **Enter** to continue.

7. You must now confirm the serial number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----

Number entered is: ABCDEFG
Accept number?
(Enter 'y' or 'Y' to accept or 'n' or 'N' to decline)

Select Navigation key :
-----
```

Type **y** or **Y** and press **Enter** to confirm the number.

This completes the process and the blade server continues to boot as normal.

Updating the system and BMC firmware

The firmware consists of two distinct packages:

- A firmware package for the baseboard management controller (BMC). This is referred to as the BMC firmware.
- A firmware package for the basic input/output system (BIOS) which runs on the Cell/B.E. processor. This is referred to as system firmware.

Note: The user and operating system interfaces of the system firmware are based on the Open Firmware standard. Detailed system information is provided through the Open Firmware device tree. You can use the client interface and Run-Time Abstraction Services (RTAS) to run management functions.

BMC firmware

- Communicates with advanced management module
- Controls power on
- Initializes the board, including the Cell/B.E. processors and clock chips
- Monitors the physical board environment

System firmware

- Takes over when the BMC has successfully initialized the board
- Acts as the basic input/output system (BIOS)
- Includes boot-time diagnostics and power-on self test
- Prepares the system for the operating system boot

The packages are delivered separately and do not follow the same versioning scheme.

IBM provides two basic update options for updating or "flashing" the firmware: online and offline. The offline method requires you to use an alternate bootable media to restart the server and perform the firmware update. For greater convenience and flexibility, IBM now also provides online updates that you can install while the operating system is running. The online method allows you to run the update at any time, with the flexibility to restart the server at a time when it is most convenient to do so. As a best practice, use the online update packages to perform all of your basic update functions

IBM periodically makes updates to both BMC and system firmware. These may be downloaded from <http://www.ibm.com/support/us/en/>.

Note: To avoid problems and to maintain proper system performance, always make sure that both the BMC firmware and the system firmware are at the same level for all BladeCenter QS21 servers within the BladeCenter unit.

Updating steps

Complete the following steps to update the BMC and system firmware images:

1. Check the revision level of the firmware on the blade server and the level of the updates on <http://www.ibm.com/support/us/en/>. If the level on the Web site is higher than the version currently installed, continue with the updating steps.
2. Download the firmware updates.
3. Boot the operating system if it is not running already.
4. Update the BMC firmware using the update package or the Management Module. See "Updating the BMC firmware" on page 18 for further information.
5. Restart the blade server. This boots the blade server with the new BMC firmware.
6. Update the system firmware image. See "Installing the system firmware" on page 20 for further information.
7. The system reboots. This boots the blade server with the new system firmware.
8. Shut down the blade server.

Note: There may be instances where you must update the BMC firmware before updating the system firmware. Check the *readme* file that comes with each firmware package for more information.

Determining current blade server firmware levels

Complete the following steps to view the current firmware code levels for both the BMC and the system firmware:

1. Access and log on to the Advanced Management Module Web interface as described in the *Management Module User's Guide*.
2. From the **Monitors** menu section, select **Firmware VPD**:

The screenshot shows the BladeCenter H Advanced Management Module web interface. The left sidebar contains a navigation menu with 'Monitors' expanded to 'Firmware VPD'. The main content area is titled 'BladeCenter Firmware Vital Product Data' and contains three tables:

Blade Firmware Vital Product Data

Bay(s)	Name	Firmware Type	Build ID	Released	Revision
1	SN#Y1S0MA731223	BIOS	QB0102000	03-02-2007	1
		Blade sys. mgmt. proc.	BNBT06b	n/a	1.05

I/O Module Firmware Vital Product Data

Bay	Type	Firmware Type	Build ID	Released	Revision
1	Ethernet SM	Boot ROM	WMZ03011	05/01/2006	0102
		Main Application 1	WMZ03011	05/01/2006	0102
		Main Application 2	WMZ03011	05/01/2006	0102

Management Module Firmware Vital Product Data

Bay	Name	Firmware Type	Build ID	File Name	Released	Revision
1	mm06	AMM firmware	BPET25T	CNETCMUS.PKT	02-27-07	37
2		Management Module 2 is not installed.				

Fan-pack Firmware Vital Product Data

Bay	Firmware Type	Revision

The **Blade Server Firmware Vital Product Data (VPD)** window shows the build identifier, release, and revision level of both the system firmware/BIOS and the BMC firmware. In the example above, the system firmware or BIOS version is QB0102000 and the BMC firmware is BNBT06b.

Compare this information to the firmware information provided at <http://www.ibm.com/support/us/en/>. If the two match, then the blade server has the latest firmware. If not, download the firmware package from the IBM Support Web site. See "Updating the BMC firmware" on page 18 or the IBM Support Web site for installation instructions.

You can also view the firmware level from within the operating system by using the following command:

```
xxd /proc/device-tree/openprom/ibm, fw-vernum_encoded
```

Output is similar to:

```
0000000: 5142 3031 3031 3030 3000 00          QB0101000..
```

where QB0101000 is the system firmware version.

Note: The system firmware version displayed by the BladeCenter Advanced Management Module might be different from the version displayed by your operating system. Cross-reference information is given in the firmware information at <http://www.ibm.com/support/us/en/>, and in the *readme* file which comes with the firmware image.

Updating the BMC firmware

You can update the BMC firmware from the Linux prompt using the update package, if you have installed RHEL 5.2, or from Advanced Management Module.

The Linux executable package allows you to run the firmware update without exiting the Linux environment. In addition, when you run it with the `-x` (extract) option, the package allows you to extract the Linux update files to a specified location.

Using the BMC update package

If you have not done so already you must install RHEL 5.2 or later before you can update the BMC firmware from the Linux command prompt.

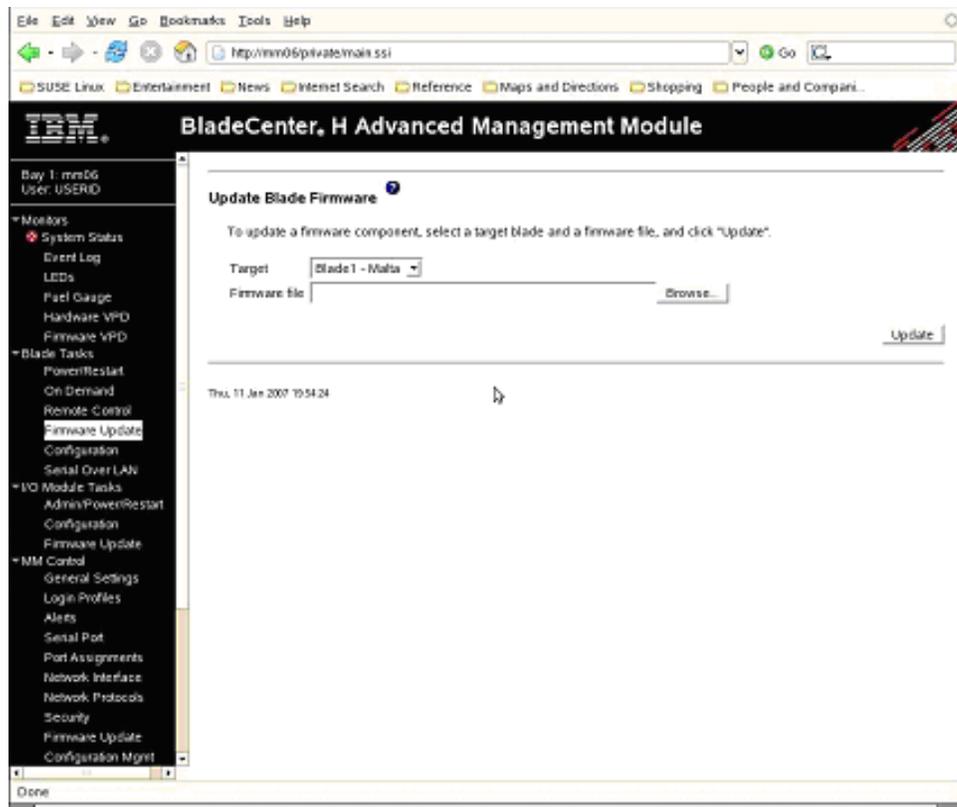
Complete the following steps to update the BMC firmware from the Linux command prompt:

1. Check the README that comes with the BMC firmware as it contains specific information about that particular firmware release.
2. Boot the blade server and the operating system.
3. Download the package from the IBM support site at <http://www.ibm.com/support/us/en/>. The update package has a `.sh` extension.
4. Change to the directory where you have downloaded the package.
5. Run the package using the `-s` option.
6. Reboot the blade server.

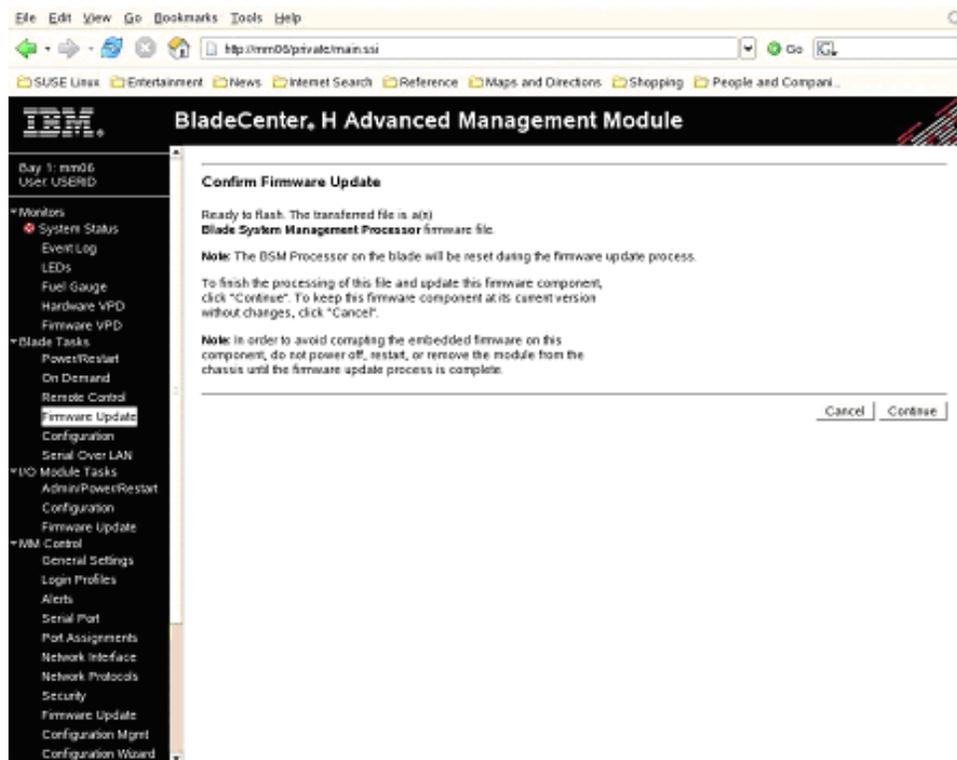
Using the Advanced Management Module

Complete the following steps to update the BMC firmware:

1. Download the BMC firmware image file from <http://www.ibm.com/support/us/en/> to a suitable location on a server that is accessible on the network. The BMC firmware image file name has the format `BNBT<version number>.pkt`.
2. Power off the blade server you want to update.
3. Log in to the Advanced Management Module Web interface.
4. Click **Firmware Update** from the Blade Tasks submenu at the left of your screen. The following screen appears:

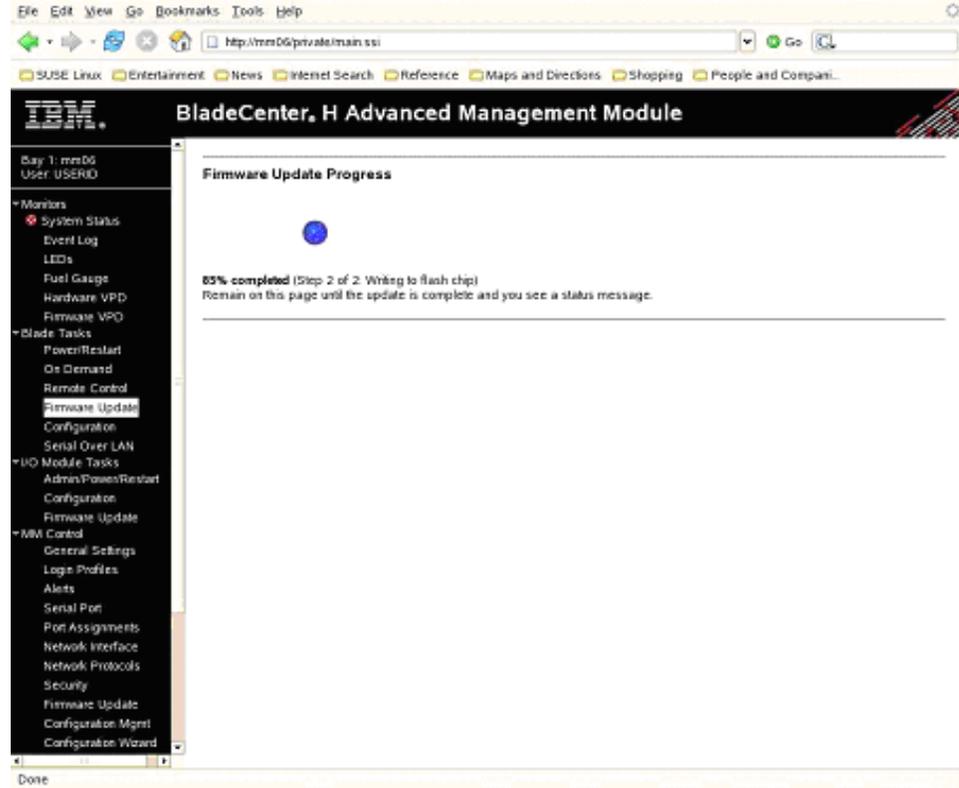


5. Choose the blade server you want to update (target) and browse to the firmware image file.
6. Click on **Update**.
7. The validity of the image is checked, then the following screen appears:



Click **Continue**.

8. The next screen shows the firmware update progress:



When the update is finished, a confirmation message appears and an entry is placed in the Advanced Management Module log.

9. Power up and boot the blade server.

Note: BladeCenter QS21 firmware contains a proprietary implementation of Cell/B.E. hardware initialization code.

Installing the system firmware

System firmware can only be installed after the operating system has booted. If the operating system is not installed or cannot boot, then no upgrade or recovery is possible. See the other sections of the manual Chapter 5, “Diagnostics and troubleshooting,” on page 51 for further information about troubleshooting the BladeCenter QS21 blade server.

You can update the system firmware:

- Through IBM Director. See the IBM Director documentation on the *IBM Director* CD for further information.
- Using the update package available from <http://www.ibm.com/support/us/en/>. See “Updating the system firmware automatically” on page 22 for further information on how to perform an update.
- Using the update_flash script available on supported Linux operating systems. This requires the system firmware image file. See “The firmware update package” on page 21 for information about how to extract the file.
- Updating the firmware manually. See “Installing the firmware manually” on page 22 for further information.

For all the above options Linux needs to have a current version of `rtas_flash` device driver installed. This is normally installed with the operating system. If it is not, see the installation guide for the *Software Development Kit for Multicore Acceleration* for instructions about how to get this device driver and install it.

Note: You may have to update the BMC before updating the system firmware. See the *README* file that comes with the package.

The firmware update package

You can update firmware using the update packages available from <http://www.ibm.com/support/us/en/>. These can be installed either through IBM Director or by executing the `.sh` file contained in the package. This section describes how to use the update package to install the firmware update or extract the firmware image for manual installation.

To install the firmware package using IBM Director, see the documentation on the *IBM Director CD*.

Note: The blade server must be configured and have a running Linux operating system before the package can be extracted or installed.

The update package consists of 4 files:

- A file containing the change history for the BladeCenter QS21 system firmware. This has a `.chg` extension.
- A file containing the update package. This has an `.sh` extension.
- A readme file for the update package. This contains specific installation and configuration information.
- An XML file. This file is for use by IBM Systems Management tools, including IBM Director Update Manager, UpdateXpress CD, and UpdateXpress System Pack Installer.

Using the package

The package consists of a file with a `.sh` extension that runs from the Linux prompt. It has a number of options. To see what options are available, run the package without any options or with the `-h` switch:

```
# ./ibm_fw_bios_qb-1.9.1-2_linux_cell.sh
```

In this example, `ibm_fw_bios_qb-1.9.1-3_linux_cell.sh` is the name of the firmware update package. The file name changes according to the version of the firmware.

A screen similar to the following appears:

Usage:

```
-x /someDirectory - Extract the payload to <some directory>
-xr /someDirectory - Extract the payload plus PkgSdk files to <some directory>
-xd /dev/fd0 - Create a DOS bootable diskette - Internal floppy drive
-xd /dev/sda - Create a DOS bootable diskette - External USB floppy drive
-u - Perform update unattended
-h - Display this help screen
++debug - Display helpful debug information
```

Note:

All other command line arguments are passed to the payload executable

The `-xd` options are not supported on the BladeCenter QS21 blade server.

The -x option

This enables to extract another executable file, in this example `ibm_fw_bios_qb-1.9.1-2.sh` which in turn may be run to create the `.bin` file required if you wish to update the firmware manually. See “Installing the firmware manually” for further information.

The -u option

This performs an unattended and automatic update of the system firmware. The blade server reboots automatically as part of the update process.

Updating the system firmware automatically

Complete the following steps to update the firmware automatically using the update package:

1. Check the README before attempting to update the system firmware as it contains specific information about the particular firmware release.
2. Download the update package from <http://www.ibm.com/support/us/en/>. The update package has a `.sh` extension.
3. Change to the directory where you have downloaded the package.
4. Run the package with the `-u` option. Using the example from above, at the command prompt enter:

```
./ibm_fw_bios_qb-1.9.1-2_linux_cell.sh -u
```
5. Check the system firmware images to confirm the update has succeeded. See “Determining current blade server firmware levels” on page 17 for instructions.

Installing the firmware manually

If you cannot update the firmware using the `update_flash` script, it is possible to update the firmware manually. You can use `rtas_flash` over `/proc`.

Complete the following steps to install the firmware manually:

1. Download the update package from <http://www.ibm.com/support/us/en/>.
2. Extract the system firmware image package. At the command prompt enter:

```
./<update package> -x <target directory>
```

For example, to extract the image package `ibm_fw_bios_qb-1.9.1-2.sh` from `ibm_fw_bios_qb-1.9.1-2_linux_cell.sh` in the directory `/temp/fwimage` enter:

```
./ibm_fw_bios_qb-1.9.1-2_linux_cell.sh -x /temp/fwimage
```

If the directory does not exist the firmware package creates it.

3. Change to the directory containing the firmware image package.
4. Extract the firmware image. At the command prompt enter:

```
./<image package> -x
```

For example, to extract the image file `QB-1.9.1-2-boot_rom.bin` from `ibm_fw_bios_qb-1.9.1-2.sh` enter:

```
./ibm_fw_bios_qb-1.9.1-2.sh -x
```

5. Ensure the `rtas_flash` driver is loaded. To do this, run `lsmod`.
6. If the module is not yet in the kernel, invoke the following to load it:

```
modprobe rtas_flash
```
7. To update your current firmware, copy the image file to `/proc/ppc64/rtas/firmware_update` and reboot manually:

```
cp <image-file> /proc/ppc64/rtas/firmware_update  
shutdown -r now
```

For example, to copy the image file `cp QB-1.9.1-2-boot_rom.bin` to `/proc/ppc64/rtas/firmware_update` enter:

```
cp QB-1.9.1-2-boot_rom.bin /proc/ppc64/rtas/firmware_update
shutdown -r now
```

8. Once the system reboots, update the system firmware images. See “Updating the system firmware images” for instructions.

Updating the system firmware images

Once the system firmware is updated, the BladeCenter QS21 boots from the new firmware. However, there are always two copies of the system firmware image on the blade server:

TEMP This is the firmware image normally used in the boot process. When the firmware is updated, it is the TEMP image that is replaced.

PERM This is a backup copy of the system firmware boot image. The blade server only boots from this image if the TEMP image is corrupt. See “Recovering the system firmware code” on page 59 for further information about how to recover from a corrupt TEMP image.

Once you have updated the system firmware and booted the blade server, you should copy the TEMP image to the PERM image. This ensures that the PERM and TEMP images are at the same revision level. The TEMP and PERM images should always be at the same revision level.

There are two commands you can use to update an old image on PERM.

- From the Linux prompt issue the following command:

```
update_flash -c
```

Note: The script checks whether the board has booted from the TEMP image. If not, the script does not complete.

- From the Linux prompt issue the following command:

```
echo 0 > /proc/rtas/manage_flash
```

For more information on booting from the TEMP or PERM images, see “Recovering the system firmware code” on page 59.

Updating the optional expansion card firmware

If you have installed the SAS optional expansion card or the high-speed InfiniBand expansion card you may have to update the firmware. See the documentation that comes with the components for instructions about how to update the firmware.

IBM periodically makes updates available for both SAS and InfiniBand expansion cards. These may be downloaded from <http://www.ibm.com/support/us/en/>.

Integrating the Gigabit Ethernet controller into the BladeCenter

One dual-port Gigabit Ethernet controller is integrated on the blade server system board. Each controller port provides a 1000-Mbps full-duplex interface connecting to one of the Ethernet Switch Modules in BladeCenter unit I/O bays 1 and 2 of the BladeCenter H unit or the BladeCenter HT unit. These enable simultaneous transmission and reception of data on the Ethernet local area network (LAN).

Each Ethernet-controller port on the system board is routed to a different switch module in I/O bay 1 or bay 2. The routing from the Ethernet-controller port to the I/O bay varies according to whether an Ethernet adapter is enabled and the operating system that is installed. See “Blade server Ethernet controller enumeration” on page 26 for information about how to determine the routing from the Ethernet-controller ports to I/O bays for your blade server.

You do not have to set any jumpers or configure the controller for the blade server operating system. However, you must install a device driver to enable the blade server operating system to address the Ethernet-controller ports. For device drivers and information about configuring your Ethernet controller ports, see the Ethernet software documentation that comes with your blade server, or contact your IBM marketing representative or authorized reseller. For updated information about configuring the controllers, go to the Barcelona Computing Centre Web site at <http://www.bsc.es/projects/deepcomputing/linuxoncell/>.

Note: If your blade server contains a different type of optional Ethernet-compatible switch module in I/O bay 1 than the switch modules that are mentioned in this section, see the documentation that comes with the Ethernet switch module that you are using.

Updating the Ethernet controller firmware

To update the Ethernet controller firmware, you must download an update package from <http://www.ibm.com/support/us/en/>. This section describes how to use the update package to install the firmware update.

The update package consists of four files:

- A file containing the change history for the QS22 Ethernet Controller firmware. This has a .chg extension.
- A file containing the update package. This has an .sh extension.
- A readme file for the update package. This contains specific installation and configuration information.
- An XML file. This file is for use by IBM Systems Management tools, including IBM Director Update Manager, UpdateXpress CD, and UpdateXpress System Pack Installer.

Using the update package

The package consists of an file with a .sh extension that runs from the Linux prompt. It has a number of options. To see what options are available, run the package without any options or with the -h switch:

```
# ./brcm_fw_nic_2.0.3-e-1_rhe15_cell.sh
```

In the example shown above, `brcm_fw_nic_2.0.3-e-1_rhe15_cell.sh` is the name of the firmware update package. The file name changes according to the version of the firmware.

A screen similar to the following appears:

```

Usage:
-x /someDirectory - Extract the payload to <some directory>
-xr /someDirectory - Extract the payload plus PkgSdk files to <some directory>
-xd /dev/fd0 - Create a DOS bootable diskette - Internal floppy drive
-xd /dev/sda - Create a DOS bootable diskette - External USB floppy drive
-u - Perform update unattended
-h - Display this help screen
++debug - Display helpful debug information

```

The -xd and -x options are not supported on BladeCenter QS21.

The -u option performs an unattended and automatic update of the firmware. The blade server reboots automatically as part of the update process.

Firmware update steps

Complete the following steps to update the firmware automatically:

1. Check the README before attempting to update the system firmware as it contains specific information about the particular firmware release.
2. Download the update package from <http://www.ibm.com/support/us/en/>. The update package has a .sh extension.
3. Change to the directory where you have downloaded the package.
4. Run the package with the -u option. Using the example from above, at the command prompt enter:

```
./ brcm_fw_nic_2.0.3-e-1_rhel5_cell.sh -u
```

During the update process, messages similar to the following appear on the console:

```

[root@c4b14 brcm-2.0.3-ppc]# ./ brcm_fw_nic_2.0.3-e-1_rhel5_cell.sh -u
IBM Ethernet Firmware Update Tool, Version 1.0.2

Warning. No Broadcom NetXtreme II adapters found.

      ADAPTER MAC          BOOT    IPMI    ASF    PXE    UMP
-----
001A640E030C (5704s)    3.21    2.20    NA     NA     NA
001A640E030D (5704s)    NA      NA      NA     NA     NA

Updating Broadcom NetXtreme adapters.
Updating 001A640E030C using file 16A8bc.bin ---> Update successful
Updating 001A640E030C using file 16A8ipmi.bin ---> Update successful
Error! Firmware not detected on device 001A640E030D.

Warning. No Broadcom NetXtreme II adapters found.

      ADAPTER MAC          BOOT    IPMI    ASF    PXE    UMP
-----
001A640E030C (5704s)    3.38    2.47    NA     NA     NA
001A640E030D (5704s)    NA      NA      NA     NA     NA

One or more errors occurred during the firmware update process. See /var

```

Note: The error message shown above is correct as it refers to an adapter not available on BladeCenter QS21.

Blade server Ethernet controller enumeration

The enumeration of the Ethernet controller or controller ports in a blade server is operating system dependent. You can verify the Ethernet controller or controller port designations that a blade server uses through your operating system settings.

The routing of an Ethernet controller or controller port to a particular BladeCenter unit I/O bay depends on the type of Ethernet expansion card that is installed. You can verify which Ethernet-controller port in this blade server is routed to which I/O bay by using the following test:

1. Install only one Ethernet switch module or pass-thru module, in I/O bay 1.
2. Make sure that the ports on the switch module or pass-thru module are enabled (**Switch Tasks** → **Management** → **Advanced Switch Management** in the BladeCenter Management Module Web interface).
3. Enable only one of the Ethernet-controller ports on the blade server. Note the designation that the blade server operating system has for the controller port.
4. Ping an external computer on the network connected to the Ethernet switch module. If you can ping the external computer, the Ethernet-controller port that you enabled is associated with the switch module in I/O bay 1. The other Ethernet-controller port in the blade server is associated with the switch module in I/O bay 2.

Communications from optional I/O expansion cards are routed to I/O bays 3 and 4. If you have installed an I/O expansion card on the blade server you can verify which controller port on an expansion card is routed to which I/O bay by performing the same test, using a controller on the expansion card and a compatible switch module or pass-thru module in I/O bay 3 or 4.

Chapter 3. Parts listing

This parts listing supports BladeCenter QS21 replaceable components. To check for an updated parts list on the Web, do the following:

1. Go to <http://www.ibm.com/support/>.
2. Under **Find resources**, select **Upgrades, accessories and parts**.

Replaceable components

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 CRU:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see *Warranty and Support Information*.

The following table lists which replaceable components are available for the BladeCenter QS21.

Description	FRU No.	Tier 1 CRU No.	Tier 2 CRU No.
DIMM , VLP 512 MB DDR2 I/O Buffer		39M5860	
Cisco 4X Infiniband Expansion Card for IBM BladeCenter			32R1763
InfiniBand 4X DDR Expansion Card (CFFh)			43W4425
Front bezel		60H2963	
BladeCenter QS21 blade assembly, base and planar			60H2960
3V lithium battery		43W9859	
SAS expansion card			39Y9188
BladeCenter PCI Express I/O Expansion Unit		43W4390	
DIMM filler		60H2962	
Miscellaneous Parts Kit			60H3251
Blade Cover and Warning Label		46C7201	
System Service Label		60H2965	
FRU List Label		60H2966	

Part numbers can change and other options can become available. For the latest information, check the IBM Web site at <http://www.ibm.com/support/us/en/>.

Chapter 4. Installing and removing replaceable units

This chapter provides instructions for replacing units on the blade server. Replaceable units are components, such as memory modules, and I/O expansion cards. Some removal instructions are provided in case you need to replace one replaceable with another.

You can replace the following items:

- Battery
- Front bezel assembly (control panel)
- Blade server cover
- Impedance air baffles
- DIMM fillers
- System board

You can add or remove the following optional items:

- Cisco 4X Infiniband Expansion Card for IBM BladeCenter
- InfiniBand 4X DDR Expansion Card (CFFh)
- I/O buffer DDR2 memory modules
- SAS expansion card
- BladeCenter Expansion unit

Note: If you wish to install the InfiniBand 4X DDR Expansion Card (CFFh) you must install Red Hat Enterprise Linux 5.2 or higher.

Installation guidelines

Before you begin, read the following:

- Read the safety information beginning on page vii and the guidelines in “Handling static-sensitive devices” on page 30. This information will help you work safely with the blade server and components.
- You do not have to turn off the blade server or disconnect the BladeCenter unit from power to install or replace any of the hot-swappable modules on the rear of the BladeCenter unit.
- Before you remove a hot-swappable blade server from the BladeCenter unit, you must shut down the operating system on it by typing the `shutdown -h now` command or choosing the shut down option from your GUI. See “Turning off the blade server” on page 4 for details. You do not have to shut down the BladeCenter unit itself.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the blade server or BladeCenter unit, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped. You can remove or install the component while the blade server or BladeCenter unit is running providing the blade server or BladeCenter unit and operating system support the hot-swappable capability. Orange can also indicate touch points on hot-swappable components. See the instructions for removing or installing a specific hot-swappable component for any additional procedures that you might have to perform before you remove or install the component.

System reliability guidelines

To help ensure proper cooling and system reliability, make sure that:

- The ventilation holes on the blade server are not blocked.
- Each of the blade bays on the front of the BladeCenter unit has a blade server or filler blade installed. Do not operate the BladeCenter unit for more than 1 minute without a blade server or filler blade installed in each blade bay.
- You have followed the reliability guidelines in the documentation that comes with the BladeCenter unit.

Handling static-sensitive devices

Attention: Static electricity can damage electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an *unpainted* metal part of the BladeCenter chassis for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the blade server or BladeCenter unit without setting the device down. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the blade server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.
- Wear an electrostatic-discharge wrist strap, if one is available.

Removing the blade server from the BladeCenter unit

Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit for more than 1 minute without a blade server or filler blades installed in each blade bay.
- Note the number of the bay that contains the blade server before you remove it. You must reinstall the blade server in the same bay from which it was removed. Reinstalling a blade server into a different bay than the one from which it was removed could have unexpected consequences, such as incorrect reconfiguration of the blade server. Some blade server configuration information and update options are established according to bay number.

If you reinstall the blade server into a different bay, you might have to reconfigure the blade server.

Removing the blade server

The blade server is a hot-swappable device, and the blade bays in the BladeCenter unit are hot-swappable bays. Therefore, you can install or remove the blade server without removing power from the BladeCenter unit. However, you must turn off the blade server before removing it from the BladeCenter unit.

Complete the following steps to remove the blade server:

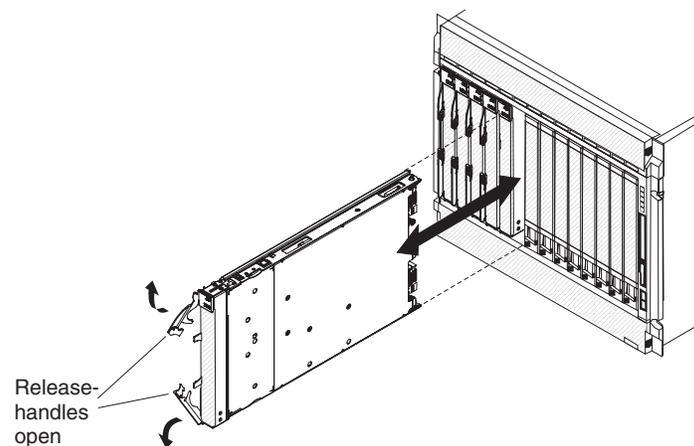


Figure 5. Removing the blade server

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. If the blade server is operating, the power on LED is lit continuously (steady). Before you remove a blade server from the BladeCenter unit, you must shut down the operating system on it by typing the shutdown -h now command or choosing the shut down option from your GUI. See “Turning off the blade server” on page 4 for details. You do not have to shut down the BladeCenter unit itself.
3. Open the two release levers as shown in the illustration. The blade server moves out of the bay approximately 0.6 cm (0.25 inch).
4. Pull the blade server out of the bay.
5. Place either a filler blade or a new blade server in the bay within 1 minute.

Opening and removing the blade server cover

You must open the blade server cover to access, install or remove any of the replaceable items except the front bezel assembly.

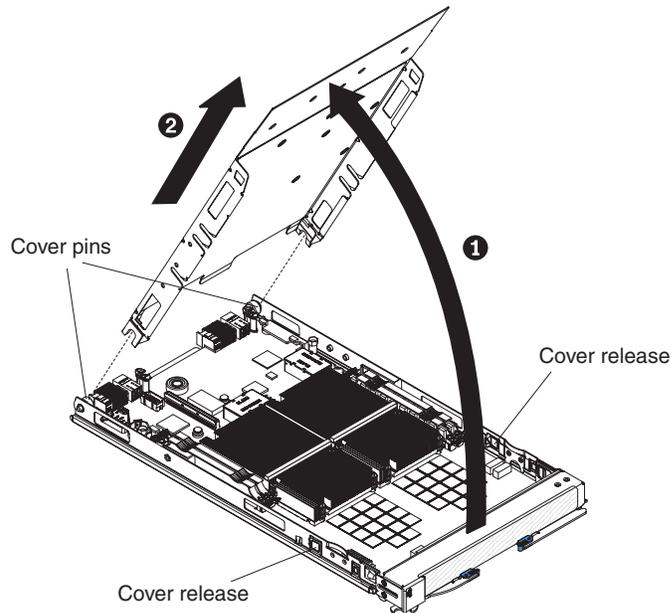


Figure 6. Opening the blade server cover

Complete the following steps to open the blade server cover:

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. Carefully place the blade server on a flat, static-protective surface, with the cover side up.
3. Press the blue blade cover release on each side of the blade server and lift the outer cover open (see Figure 6).
4. If you want to remove the cover, carefully lift it from the cover pins and set it aside (see Figure 6).

Statement 21:



CAUTION:

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

Removing the BladeCenter PCI Express I/O Expansion Unit

You must remove BladeCenter PCI Express I/O Expansion Unit, if installed, to access, install or remove any of the replaceable items except the front bezel assembly.

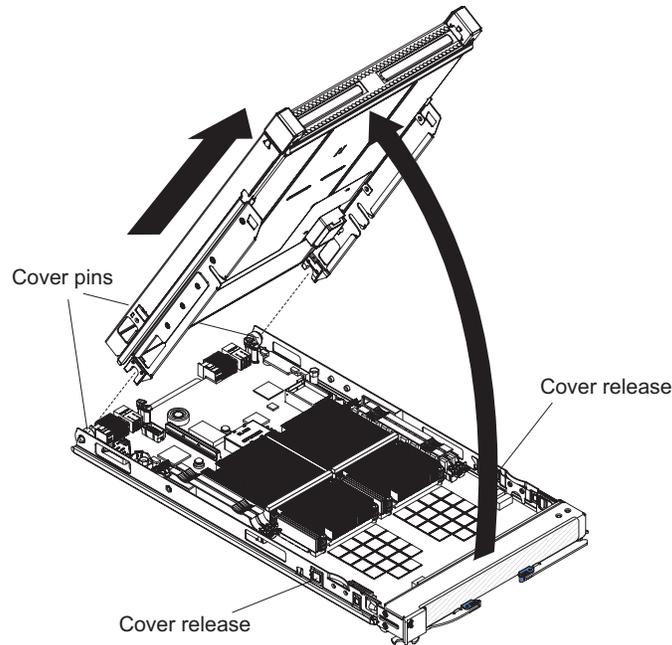


Figure 7. Removing the expansion unit

Complete the following steps to remove BladeCenter PCI Express I/O Expansion Unit:

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. Carefully place the blade server on a flat, static-protective surface, with the expansion unit side facing up.
3. Press the blue blade cover release on each side of the blade server and lift the expansion unit (see Figure 7).
4. To remove the expansion unit, carefully lift it from the cover pins and set it aside.

Statement 21:



CAUTION:

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

Installing the optional InfiniBand card

The InfiniBand card connects to the high-speed connector on the system board using the two expansion card locator pins to assist with fitting and locking in place. Use the blue handling areas to handle the card, and, when it has been placed in position, to lock it into place.

Note: If you wish to install the InfiniBand 4X DDR Expansion Card (CFFh) you must install Red Hat Enterprise Linux 5.2 or higher.

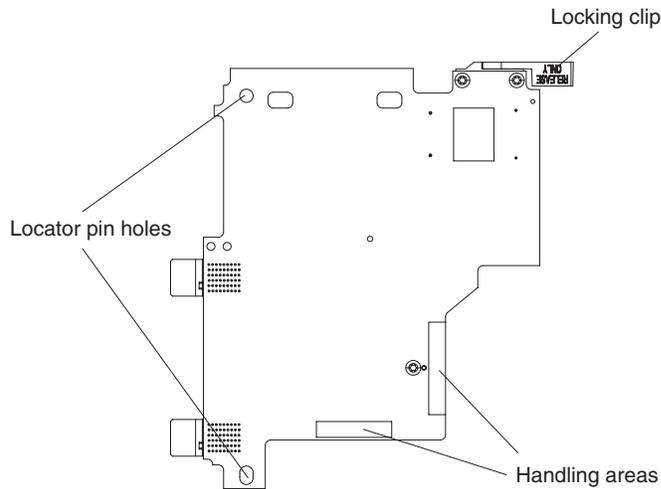


Figure 8. InfiniBand card handling areas

Complete the following steps to install the InfiniBand card:

1. Shut down the BladeCenter QS21.
2. Remove the BladeCenter QS21 from BladeCenter unit.
3. Remove the top cover.
4. Locate the high-speed connector at location J200 on the system board.

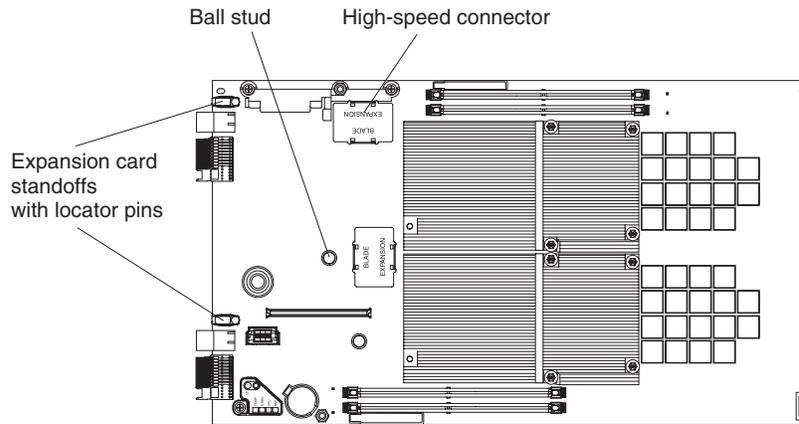


Figure 9. Expansion card connector, locator pins, and ball stud

5. Remove the connector cover.
6. Locate the expansion card locator pins at the back of the system board.
7. Locate the connector and ball socket on the InfiniBand card.

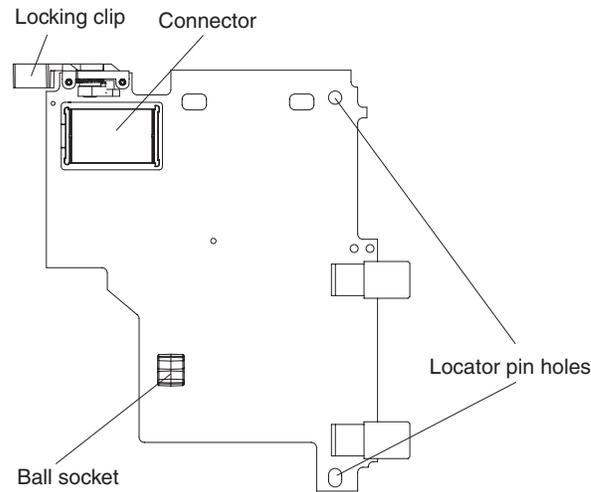


Figure 10. InfiniBand card reverse view

8. Slide the InfiniBand card locator pin holes over the expansion card locator pins. The card rests on the locator pins.

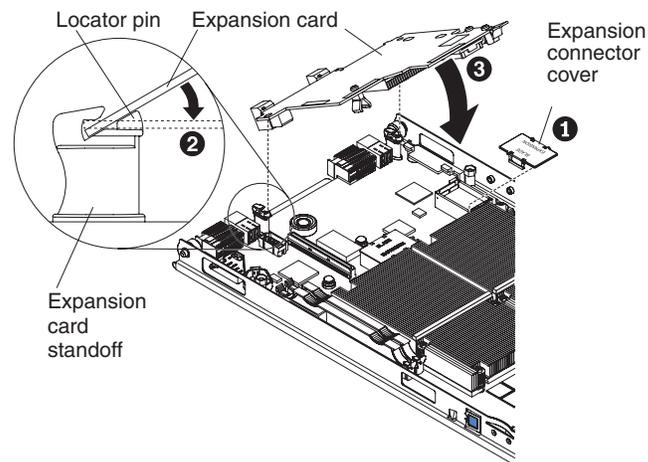


Figure 11. Positioning the InfiniBand card

9. Check that the ball socket on the card is over the corresponding ball stud on the main board then carefully press the InfiniBand card into position. Use the blue areas only to avoid damage to the card.
10. Check that the blue locking clip has locked into position.
11. If you do not want to install any other options, replace the cover and insert the BladeCenter QS21 into the BladeCenter unit.

Attention: The connectors on the system board and the InfiniBand card are not designed for repeated removal or replacement of components. Avoid removing the InfiniBand card once it is in position,

Adding I/O DDR2 memory modules

This section describes how to add extra I/O DDR2 memory. There are two slots per Cell/B.E. companion chip allowing up to 1 GB of memory for each Cell/B.E. companion chip for I/O buffering.

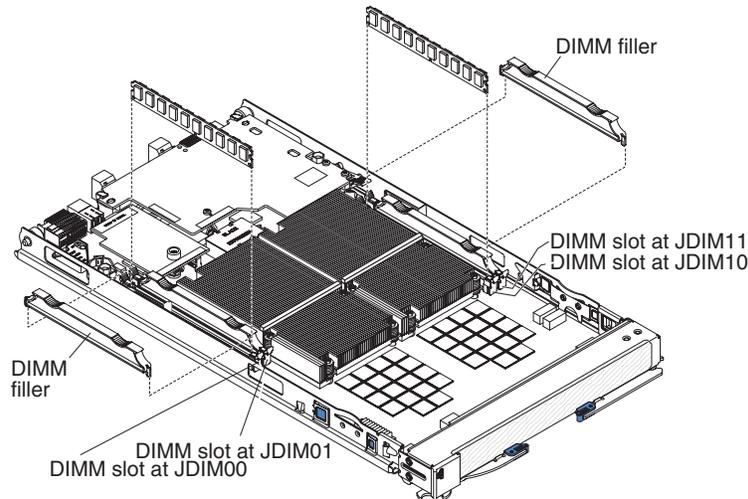


Figure 12. DIMM slot location

You must add memory as pairs of dual inline memory modules (DIMMs). You may fit one or more memory modules for each buffer, but each I/O buffer must use the same type of memory module and have the same amount of memory. The minimum amount of memory you can add is 512 MB per buffer, or one module per buffer. If you fit a single pair of DIMMs you must use slots JDIM00 and JDIM11.

The BladeCenter QS21 supports VLP DDR2 512 MB DIMMs only.

Note: The DIMMs are used as memory for the I/O buffers only. You cannot increase the size of system memory which is fixed at 1GB for each Cell/B.E. processor.

To install extra I/O buffer memory, complete the following steps:

1. Shut down the BladeCenter QS21.
2. Remove the BladeCenter QS21 from the BladeCenter unit.
3. Open the top cover.
4. Locate the DIMM slots in which you want to insert the I/O DDR2 memory modules.

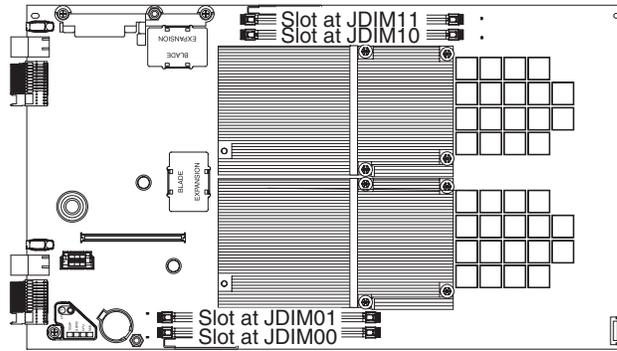


Figure 13. DIMM slot location

There are four DIMM slots, two for each Cell/B.E. companion chip. If this is the first pair of DIMMs you are installing, use slots 00 and 11. Slots 00 and 11 are the two outer slots as shown in Figure 13. For a second pair of DIMMs, use the remaining slots 01 and 10.

5. Remove the DIMM fillers from the slots where you want to insert the DIMMs. Retain the DIMM fillers. You need them if you remove any DIMMs from the blade server as they are an important part of the blade server cooling system.
6. Place the DIMM in the slot, contact side down. Check the orientation of the module. The central locating pin in the slot should match the corresponding cut-out on the module.
7. Carefully press the module into place until the retaining clips snap into position. Make sure that the clips are locked properly.

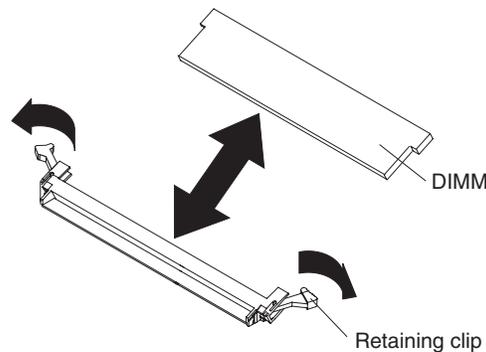


Figure 14. DIMM retaining clips

8. Repeat steps 6 and 7 until you have installed all the optional DIMMs.
9. Ensure that all unused DIMM slots are fitted with DIMM fillers.
10. If you do not want to install any other options, replace the cover and insert the BladeCenter QS21 into the BladeCenter unit.

Replacing DIMM fillers

For the BladeCenter QS21 cooling system to work properly there must be no empty DIMM slots. Unused slots must be fitted with DIMM fillers. Replace faulty DIMM fillers and, if you remove memory modules, fit empty slots with DIMM fillers.

To install or replace DIMM fillers, complete the following steps:

1. Shut down the BladeCenter QS21.

2. Remove the BladeCenter QS21 from BladeCenter.
3. Open the top cover.
4. Remove any faulty DIMM fillers.
 - a. Open the retaining clips on either end of the DIMM slot.
 - b. Pull the filler out of the slot.
5. If you remove memory modules be sure to remove them in pairs. If you keep a single pair of memory modules they must be in the outermost slots, JDIM00 and JDIM11. See Figure 13 on page 37 for further information.
 - a. Open the retaining clips on either end of the DIMM slot.
 - b. Pull the module out of the slot.
6. Carefully press the DIMM filler into the empty DIMM slot until the retaining clips snap into position.
7. Repeat step 6 until all unused slots are fitted with DIMM fillers.
8. Replace the cover and insert the BladeCenter QS21 into the BladeCenter unit.

Installing the SAS expansion card

The BladeCenter QS21 does not have any built-in disk storage. The SAS expansion card allows you to connect storage to the BladeCenter QS21. Use the blue handling areas to handle the card.

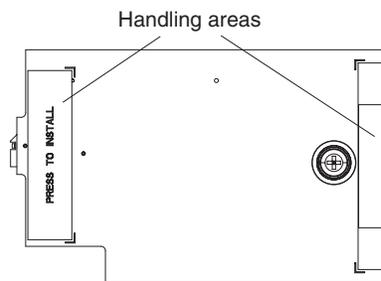


Figure 15. SAS expansion card handling areas

Complete the following steps to install the SAS expansion card:

1. Shut down the BladeCenter QS21.
2. Remove the BladeCenter QS21 from the BladeCenter unit.
3. Open the top cover.
4. Locate the two SAS expansion card connectors at locations J22 and JFC_18 and the ball stud on the system board.

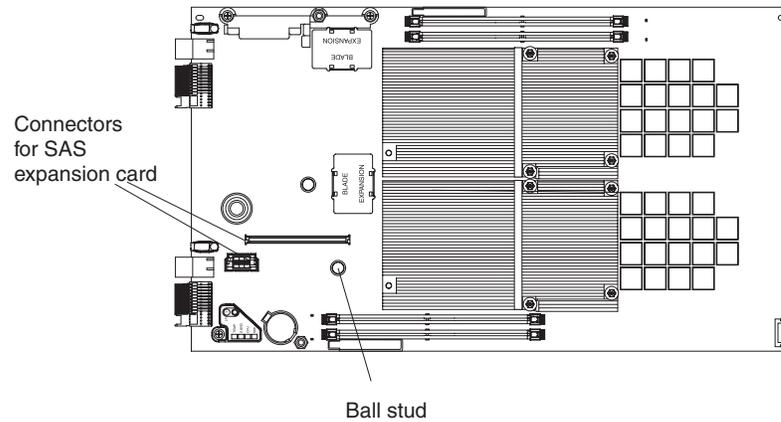


Figure 16. SAS expansion card connector and ball stud location

5. Locate the connectors and the ball socket on the SAS card.

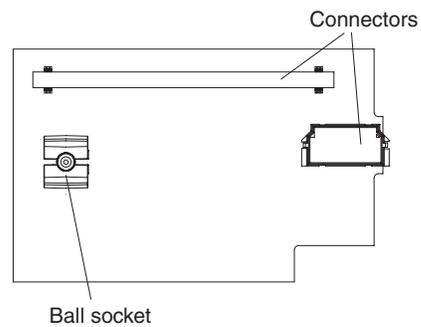


Figure 17. SAS expansion card reverse side

6. Align the connectors on the system board with the connector on the SAS card.

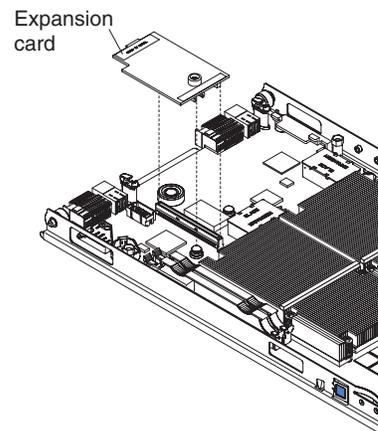


Figure 18. SAS expansion card location

7. Using the blue handling areas, carefully push the card down to insert it into the connectors. Ensure that the ball stud on the system board engages with the ball socket on the SAS expansion card.
8. If you do not want to install any other options, replace the cover and insert the BladeCenter QS21 into the BladeCenter unit.

Installing the BladeCenter PCI Express I/O Expansion Unit

Important:

- A BladeCenter QS21 with the BladeCenter PCI Express I/O Expansion Unit installed takes up two contiguous slots in the BladeCenter chassis
- You must remove any expansion card using the high-speed connector before installing the expansion unit.

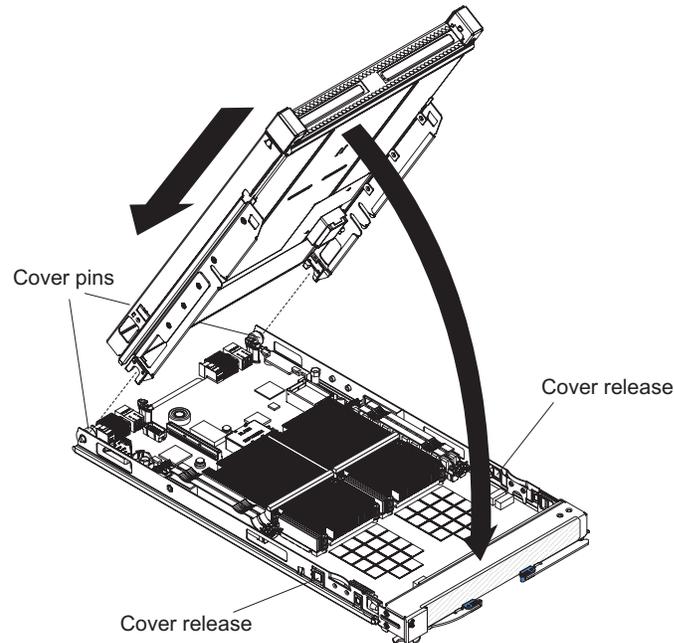


Figure 19. Installing the expansion unit

Complete the following steps to install the BladeCenter PCI Express I/O Expansion Unit:

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. Remove the blade server cover and set it aside. See “Opening and removing the blade server cover” on page 32 for further information.
3. Remove the connector cover or any optional card from the high-speed connector. Figure 9 on page 34 shows the location of the high-speed connector.
4. Lower the expansion unit so that the slots at the rear slide down onto the cover pins at the rear of the blade server, as shown in Figure 19.
5. Carefully close the expansion unit as shown in Figure 19 until it clicks into place.

Removing the blade-server front bezel assembly

Before you can replace a defective system board assembly or blade server front bezel assembly, you must first remove the blade server front bezel assembly. Figure 20 shows how to remove the front bezel assembly from a blade server.

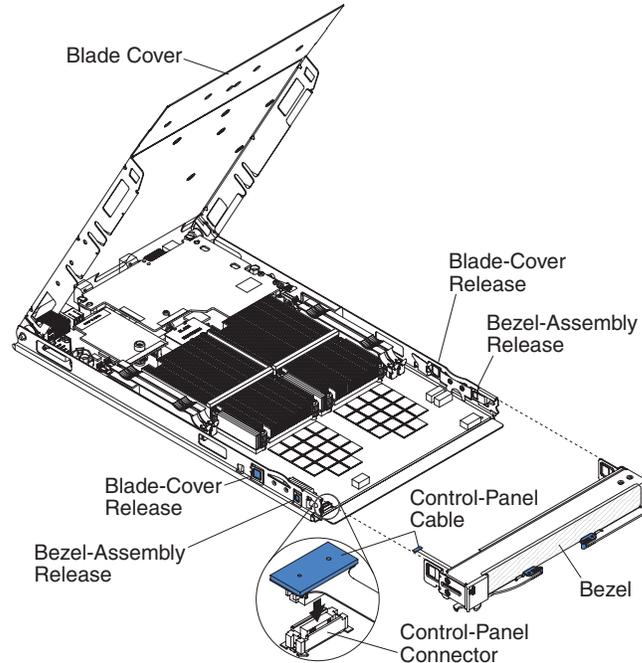


Figure 20. Removing the front bezel assembly

Complete the following steps to remove the front bezel assembly:

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. Open the blade server cover.
3. Carefully disconnect the control panel cable from the control panel connector.
4. Press the front bezel release on both sides of the system board and pull the front bezel assembly away from the blade server.
5. Store the front bezel assembly in a safe place.

Replacing the system board base and planar

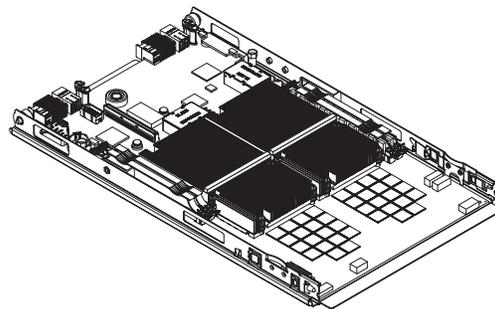


Figure 21. System board assembly

Complete the following steps to replace the system board base and planar:

1. Shut down the BladeCenter QS21.
2. Remove the BladeCenter QS21 from the BladeCenter unit.
3. Open and remove the top cover, and set it aside. See “Opening and removing the blade server cover” on page 32 for detailed instructions.
4. Remove the front bezel from the defective system board and set it aside. See “Removing the blade-server front bezel assembly” on page 41 for detailed instructions.
5. Remove any optional components from the defective system board and set them aside.
6. Note down the serial number of the defective system board. You need this later to update the VPD information.
7. On the replacement system board, install the front bezel assembly. See “Installing the front bezel assembly” on page 47 for detailed instructions.
8. On the replacement system board, reinstall any options you removed from the defective system board. See “Installing the optional InfiniBand card” on page 33, “Installing the SAS expansion card” on page 38 and “Adding I/O DDR2 memory modules” on page 36 for detailed instructions.
9. Replace the cover and close. See “Closing the blade server cover” on page 49 for details.
10. Reinstall the blade server in the BladeCenter unit.
11. Update the BMC, system and optional expansion card firmware as described in Chapter 2, “Configuring the blade server,” on page 9.
12. Using SMS, update the VPD information by entering the serial number of the defective system board. See “Adding FRU information” on page 13 for details.
13. Configure the replacement blade server to boot from the same device as the original defective unit. See the *QS21 Installation and User's Guide* for details.

Note: Providing the options on the new blade server are the same as on the old you do not have to reinstall or reconfigure the operating system but simply configure the boot options to boot from the boot device.

Replacing the battery

IBM has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.

Note: In the U. S., call 1-800-IBM-4333 for information about battery disposal.

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

To order replacement batteries, call 1-800-IBM-SERV within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM authorized reseller or IBM marketing representative.

Note: After you replace the battery, the blade server is automatically reconfigured. However, you must reset the system date and time through the operating system that you installed.

Statement 2:



CAUTION:

When replacing the lithium battery, use only IBM Part Number 43W9859 or 03N2449 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Note: See “Battery return program” on page 116 for more information about battery disposal.

Complete the following steps to replace the battery:

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. Follow any special handling and installation instructions that come with the battery.
3. If the blade server is operating, shut down the operating system by typing the `shutdown -h now` command or by choosing shut down from the GUI. If the blade server was not powered off, press the power control button (behind the blade server control panel door) to turn off the blade server. See “Blade server controls and LEDs” on page 6 for more information about the location of the power control button.
4. Remove the blade server from the BladeCenter unit (see “Removing the blade server from the BladeCenter unit” on page 31 for information).
5. Carefully place the blade server on a flat, static-protective surface.
6. Open the blade server cover (see “Opening and removing the blade server cover” on page 32 for instructions).
7. Locate the battery (connector BH1) on the system board.

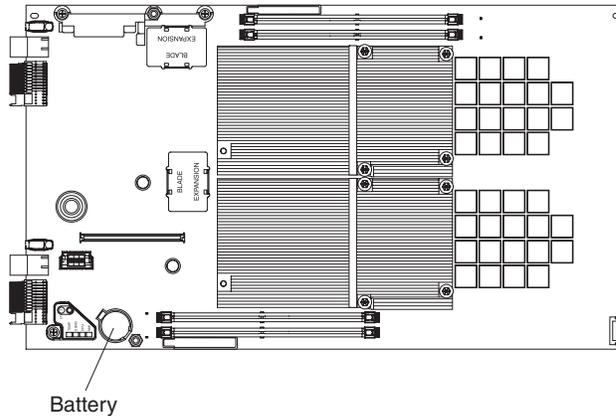
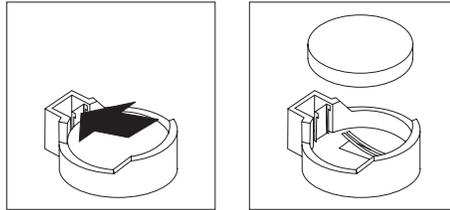


Figure 22. Battery location

8. Remove the battery:
 - a. Use one finger to press the top of the battery clip away from the battery. The battery pops up when released.



- b. Use your thumb and index finger to lift the battery from the socket.
 - c. Dispose of the battery as required by local ordinances or regulations.
9. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket, under the battery clip.
 - b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.
10. Close the blade server cover (see “Closing the blade server cover” on page 49).

Statement 21:



CAUTION:

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

11. Reinstall the blade server into the BladeCenter unit.
12. Turn on the blade server (see “Turning on the blade server” on page 3).
13. Reset the system date and time through the operating system that you installed. For additional information, see your operating-system documentation.

Using the miscellaneous parts kit

The miscellaneous parts kit contains replacement parts and screws to be used if the original item is damaged. It contains the following items:

Kit, Miscellaneous Parts	Quantity
Socket, alignment	4
Cover Connector Plug, 200 position	4
Pin, InfiniBand expansion card support, pivot point blocks	4
Ball stud, InfiniBand expansion card support	4
Tray, InfiniBand expansion card support end bracket	2
Pin, alignment	2
Screw, Plastite 4-20x6.35	8
Screw, 3.5 x 6 Pan Head, Philips, Planar	6
QS21 Planar Light box with transparency assembly	1
Impedance Air Baffle Top, Foam	4
Impedance Air Baffle DIMM Sides	4

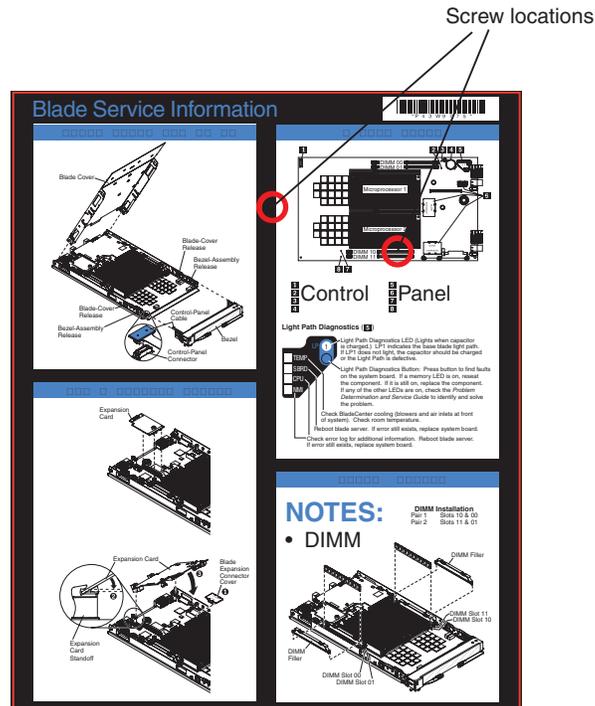
To replace a support or bracket you need a Philips head screwdriver.

Replacing the ball studs

The ball studs help support the optional expansion cards and should be replaced if damaged.

To remove and replace a ball stud, complete the following steps:

- Using a Philips head screwdriver pierce the label at the red circle corresponding with the ball stud you wish to replace.



- Carefully unscrew the ball stud and remove.

3. Position the replacement ball stud over the hole and screw into position, taking care not to over-tighten as this might damage the system board.

Finishing the installation

To complete the installation you must:

1. Reinstall the front bezel assembly on the blade server if removed. See “Installing the front bezel assembly” for further information.
2. Ensure there is a DIMM filler or a DIMM in each of the I/O buffer DIMM slots.
3. Replace and close the blade server cover. See “Closing the blade server cover” on page 49 for further information.

Statement 21:



CAUTION:

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

4. Reinstall the blade server into the BladeCenter unit.
5. Turn on the blade server. See “Turning on the blade server” on page 3 for further information.
6. If you have replaced the battery or the system board assembly, reset the system date and time through the operating system that you installed. For additional information, see your operating system documentation.

Note: If you have just powered on the BladeCenter unit, wait until the power on LED on the blade server flashes slowly before powering on the blade server.

Installing the front bezel assembly

The following illustration shows how to reinstall the front bezel assembly on the blade server.

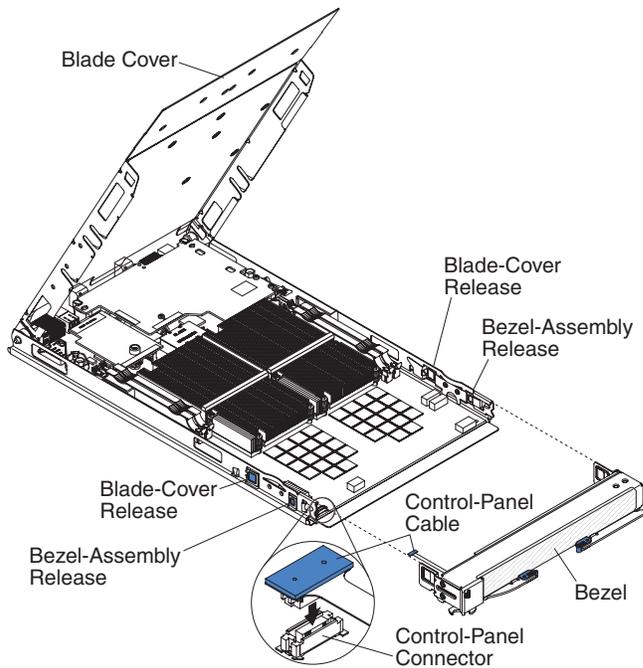


Figure 23. Reinstalling the front bezel assembly

Complete the following steps to install the blade server front bezel assembly:

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. Connect the control panel cable to the control panel connector on the system board assembly.
3. Carefully slide the front bezel assembly onto the blade server, as shown in Figure 23, until it clicks into place.

Note: Make sure that you do not pinch any cables when you reinstall the front bezel assembly.

Closing the blade server cover

Important: The blade server cannot be inserted into the BladeCenter unit until the cover is installed and closed. Do not attempt to override this protection.

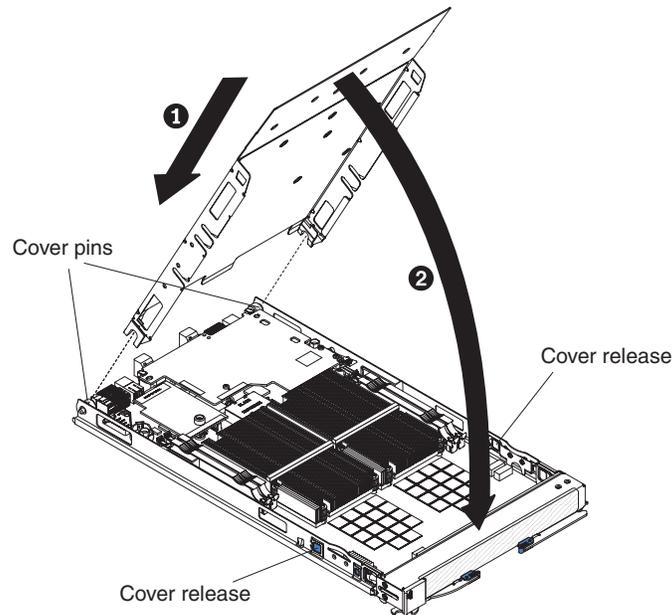


Figure 24. Closing the blade server cover

Complete the following steps to close the blade server cover:

1. Read the safety information beginning on page vii and “Installation guidelines” on page 29.
2. If you removed the front bezel assembly, replace it now. See “Installing the front bezel assembly” on page 47 for instructions, and Figure 24.
3. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade server, as shown Figure 24. Before closing the cover, make sure that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade server.
4. Carefully close the cover as shown in Figure 24 until it clicks into place.

Input/output connectors and devices

The BladeCenter unit contains the input/output connectors that are available to the blade server. See the documentation that comes with the BladeCenter unit for information about the input/output connectors.

Chapter 5. Diagnostics and troubleshooting

This chapter provides basic troubleshooting information to help you solve some common problems that might occur while setting up your blade server.

A problem with the BladeCenter QS21 can relate either to the BladeCenter QS21 or the BladeCenter unit.

A problem with the blade server exists if the BladeCenter unit contains more than one blade server and only one of the blade servers has the symptom. If all of the blade servers have the same symptom, then the problem relates to the BladeCenter unit. For more information, see the documentation that comes with your BladeCenter unit.

Note: The BladeCenter QS21 is supported in the BladeCenter H Type 8852 unit and the BladeCenter HT Type 8740 and 8750 (enterprise environment only) unit. However you can put other blade servers compatible with the BladeCenter units in the same unit as a BladeCenter QS21.

Prerequisites

Before you start problem determination or servicing, check that:

- The BladeCenter QS21 is inserted correctly into the BladeCenter unit
- All components are connected correctly
- The BladeCenter QS21 has the latest firmware updates. These include:
 - BMC
 - System
 - Gigabit Ethernet controller
 - SAS expansion card (if installed)
 - InfiniBand high-speed expansion card (if installed)

Basic checks

If you install the blade server in the BladeCenter unit and the blade server does not start, always perform the following basic checks before continuing with more advanced troubleshooting:

- Make sure that the BladeCenter unit is correctly connected to a power source.
- Reseat the blade server in the BladeCenter unit.
- If the power on LED is flashing slowly, the blade server may be turned off. To turn on the blade server, see “Turning on the blade server” on page 3 for further information.
- If you have just added a new optional device or component, make sure that it is correctly installed and compatible with the blade server and its components. If the device or component is not compatible, remove it from the blade server, reinstall the blade server in the BladeCenter unit, and then restart the blade server.
- Use Advanced Management Module to check that the blade server appears in the list of blade servers available.

Finding troubleshooting information

Table 2 describes where to find troubleshooting information in this section.

Note: Many components, including the CPU, RAM and power supplies cannot be exchanged in the field. The only replaceable parts are the optional SAS daughter card, battery, front bezel assembly, I/O buffer DIMM memory, and the optional InfiniBand card.

Table 2. Where to find troubleshooting information

Component	Where to find information
SAS expansion card Front bezel High-speed InfiniBand expansion card	"Solving undetermined problems" on page 95
Memory	"Boot errors and handling" on page 72
LEDs Power Network connections Service processor Software problems	"Troubleshooting charts" on page 52

For troubleshooting information about other BladeCenter components, see the appropriate *Problem Determination and Service Guide*, and other product-specific documentation. See "Related documentation" on page 1 for additional information. For the latest editions of the IBM BladeCenter documentation, go to <http://www.ibm.com/support/us/en/> on the World Wide Web.

Troubleshooting charts

The following tables list problem symptoms and suggested solutions. If you cannot find the problem in the troubleshooting charts, or if carrying out the suggested steps do not solve the problem, have the blade server serviced.

If you have problems with an adapter, monitor, keyboard, mouse, or power module, see the *Problem Determination and Service Guide* that comes with your BladeCenter unit for more information.

If you have problems with an Ethernet switch module, I/O adapter, or other optional device that can be installed in the BladeCenter unit, see the *Problem Determination and Service Guide* or other documentation that comes with the device for more information.

Problems indicated by the front panel LEDs

The state of the LEDs on the front of the blade can help in isolating problems.

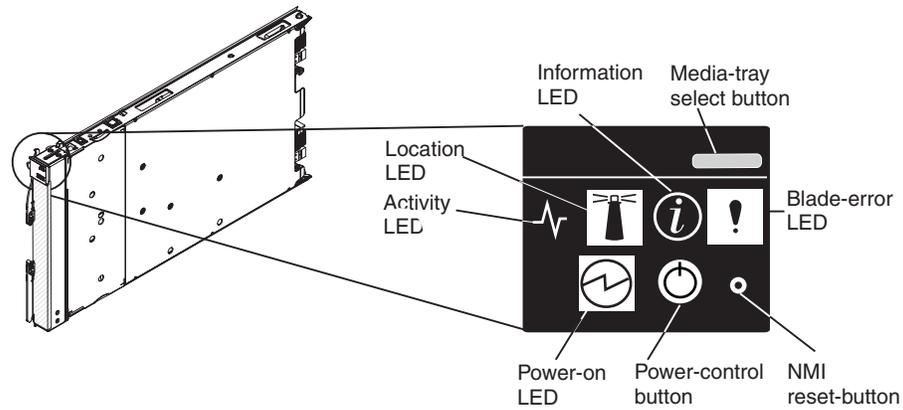


Figure 25. Power-control button and LEDs

The table below gives an explanation and a suggested action, if required, for each LED.

Table 3. Explanation of LEDs and their states

LED	State	Explanation	Suggested action
Blade error LED	Amber	A system error has occurred on the blade server.	Check the BladeCenter error log, see "Problem reporting" on page 94.
Information LED	Amber	Information about a system error has been placed in the Advanced Management Module Event Log. The information LED remains on until turned off by Advanced Management Module or through IBM Director Console.	Check Advanced Management Module to see what the problem is. See the <i>BladeCenter Management Module User's Guide</i> for further information about the error.
Activity LED	Green	There is network activity.	No action required. For further information about troubleshooting networks, see "Network connection problems" on page 57.

Table 3. Explanation of LEDs and their states (continued)

LED	State	Explanation	Suggested action
Power-on LED	Flashing rapidly	The service processor on the blade server is communicating with the BladeCenter Management Module.	No action required
	Flashing slowly	The blade server has power but is not turned on.	Turn on if required
	Lit continuously (steady)	The blade server has power and is turned on.	No action required
	Not lit.	Blade server not powered.	<ol style="list-style-type: none"> 1. Reseat blade server. 2. Check if BladeCenter power supplies numbers 3 and 4 are installed and powered. If they are not, install and power them or use slots 1-5. 3. Go to "Power problems" on page 57

Problems indicated by the system board LEDs

The blade server must be removed from the BladeCenter unit and the cover removed before you can use the light path LEDs for diagnostics. To activate the light box and the other light path LEDs, press the light path diagnostics switch. The location of each LED on the system board is shown in the table below.

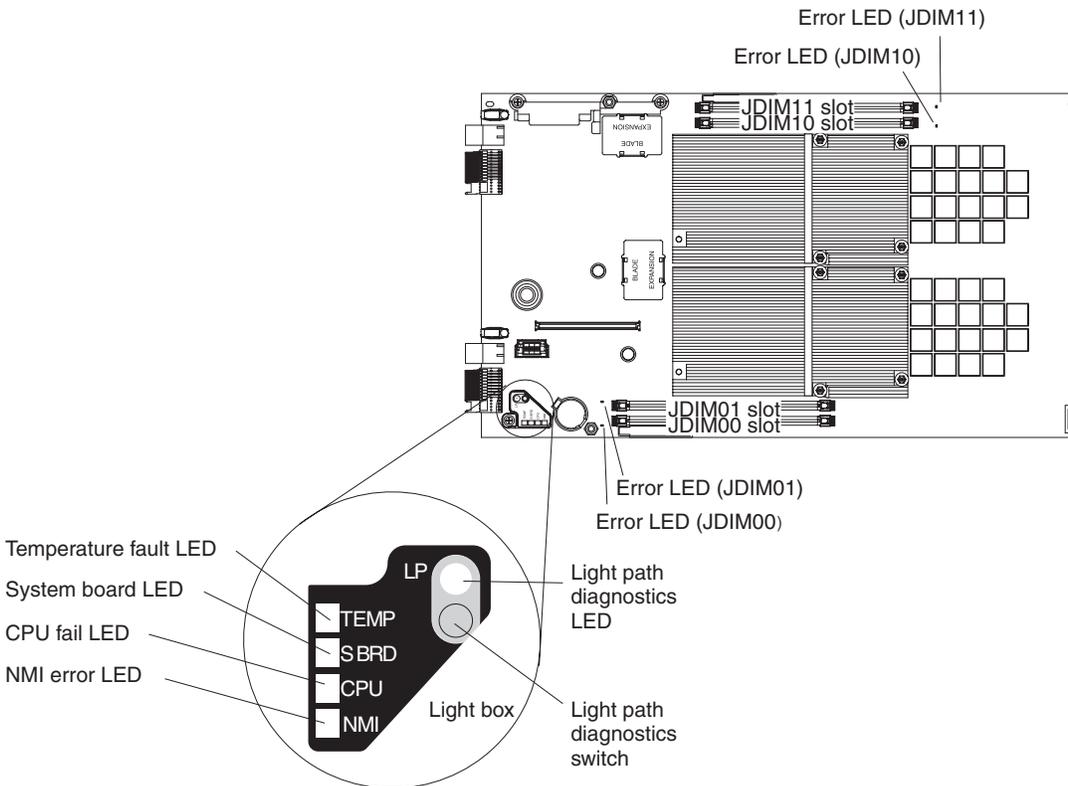


Figure 26. Light box and system board LEDs

Table 4. System board LEDs

LED	Color	Board location	Explanation	Comments
Status LEDs				The status LEDs are listed for reasons of completeness since they are for use by IBM service only and are not normally visible. They are not activated by the light path diagnostics switch.
Heartbeat	Green	D16	Indicates the BMC is functional.	
Alert	Yellow	D15	Indicates an error condition has occurred on the system board.	
Ethernet 1 activity	Green	D12	Indicates Ethernet 1 is active and sending or receiving packets.	
Ethernet 0 activity	Green	D11	Indicates Ethernet 0 is active and sending or receiving packets.	
BE0_PLL_LOCK	Green	D8	Indicates the phased lock loop of Cell/B.E.-0 is working.	
BE1_PLL_LOCK	Green	D13	Indicates the phased lock loop of Cell/B.E.-1 is working.	
MM_SELECT_A	Green	D19	Indicates Advanced Management Module A is active.	
MM_SELECT_B	Green	D18	Indicates Advanced Management Module B is active.	
Light path LEDs				Either remove or replace the DIMM and reboot.
DIMM at JDIM11 error	Yellow	D21	There has been a failure in the I/O DIMM module.	
DIMM at JDIM10 error	Yellow	D20	See Figure 26 on page 54 for the location of each DIMM and its associated LED.	
DIMM at JDIM01 error	Yellow	D10		
DIMM at JDIM00 error	Yellow	D7		
Light box LEDs				

Table 4. System board LEDs (continued)

LED	Color	Board location	Explanation	Comments
Temperature fault	Yellow	Light box	The blade server has exceeded the operational temperature range.	<ul style="list-style-type: none"> Using the Advanced Management Module, check that the BladeCenter unit cooling system is operating correctly. Replace any missing filler blades in the BladeCenter unit. Replace any missing filler blades in the BladeCenter QS21 DIMM sockets. Check that other blade servers are operating within the recommended temperature range. Replace the blade server, power on and boot. Check Advanced Management Module for errors. <p>If the problem persists, contact your IBM service representative as the system board may need servicing.</p>
NMI error	Yellow		The NMI pinhole reset on the front panel has been pressed.	Pressing the reset causes the operating system to call the system debugger.
CPU fail	Yellow		One of the Cell BE processors has failed.	Contact your IBM service representative as the system board needs replacement.
System board	Yellow		A critical error has occurred in a component on the system board.	Contact your IBM service representative as the system board may need replacing.
Light path diagnostics	Green		Lights when the light path diagnostics switch is pressed. Indicates that the capacitor is charged and the light path LEDs can light to show any errors.	<p>If this LED does not light then the light path LEDs cannot function.</p> <p>Reinstall the blade server in the BladeCenter unit and power on to recharge.</p> <p>If this fails to resolve the problem, there is a problem with the system board and it may need replacement.</p>

Power problems

Power symptom	Suggested action
The blade server does not turn on.	<ol style="list-style-type: none"> 1. Make sure that: <ol style="list-style-type: none"> a. The power-on LED on the front of the BladeCenter unit is lit. b. The LEDs on all the BladeCenter power modules are lit. c. The power-on LED on the blade-server control panel is flashing slowly. <ul style="list-style-type: none"> • The power-on LED flashes rapidly for a short period to indicate it is communicating with Advanced Management Module. If the power-on LED to flash rapidly and continues to do so, the blade server is not communicating with the management module; reseal the blade server and reboot. • If the power LED is off, either the blade bay is not receiving power, the blade server is defective, the Advanced Management Module firmware is an earlier version and does not support this function, or the LED information panel is loose or defective. d. Local power control for the blade server is enabled. Check using the Advanced Management Module Web interface. The blade server might have been instructed through the Advanced Management Module to turn on. 2. If you have just installed a new option in the blade server, remove it, and restart the blade server. If the blade server now powers on, troubleshoot the option. See the documentation that comes with the option for further information. 3. Try another blade server in the blade bay. If it works, you may need to have a trained service technician replace the system blade assembly.

Power throttling

Be aware that the BladeCenter unit automatically reduces the BladeCenter QS21 processor speed if certain conditions are met. One such condition is temperature thresholds being exceeded, for example, when the blade server is running in acoustic mode. This throttling occurs independent of your power configuration. Full processor speed is restored automatically when the conditions that have caused the throttling have been resolved.

Network connection problems

Network connection symptom	Suggested action
One or more blade servers are unable to communicate with the network.	<p>Make sure that:</p> <ul style="list-style-type: none"> • The switch modules for the network interface being used are installed in the correct BladeCenter bays and are configured and operating correctly. • The settings in the switch module are correct for the blade server (settings in the switch module are blade server specific). <p>For additional information, see:</p> <ul style="list-style-type: none"> • Chapter 2, “Configuring the blade server,” on page 9 • The <i>Problem Determination and Service Guide</i> that comes with your BladeCenter unit • Other product-specific documentation that comes with the switch module <p>Note: For the latest editions of the IBM BladeCenter documentation, go to http://www.ibm.com/support/us/en/.</p> <p>If the problem remains, see “Solving undetermined problems” on page 95.</p> <p>If all the blades cannot communicate with the network, check the network itself for problems.</p>

Service processor problems

Service processor symptom	Suggested action
Service processor reports a general monitor failure.	<ol style="list-style-type: none">1. If the blade server is operating, shut down the operating system.2. If the blade server was not turned off, press the power-control button (behind the blade server control-panel door) to turn off the server.3. Remove the blade server from the BladeCenter unit.4. Wait 30 seconds and reinstall the blade server into the BladeCenter unit.5. Restart the blade server. <p>If the problem remains, see "Solving undetermined problems" on page 95</p>

Software problems

Symptom	Suggested action
You suspect a software problem.	<ol style="list-style-type: none">1. To determine whether the problem is caused by the software, make sure that:<ul style="list-style-type: none">• The blade server has the minimum memory that is needed to use the software. For memory requirements, see the software documentation.• The software is designed to operate on the blade server.• Other software works on the blade server.• The software works on another server.2. If you received any error messages when using the software, see the software documentation for a description of the messages and suggested solutions to the problem.3. Contact the software vendor.

Recovering the system firmware code

The system firmware is contained in two separate images in the flash memory of the blade server: temporary and permanent. These images are referred to as TEMP and PERM, respectively. The system normally starts from the TEMP image, and the PERM image serves as a backup. If the TEMP image becomes damaged, such as from a power failure during a firmware update, the system automatically starts from the PERM image.

If the TEMP image is damaged, you can recover the TEMP image from the PERM image. See “Recovering the TEMP image from the PERM image” for further information.

Checking the boot image

To check whether the system has started from the PERM image, enter:

```
cat /proc/device-tree/openprom/ibm,fw-bank
```

A P is returned if the system has started from the PERM image.

Booting from the TEMP image

To initiate a boot from the TEMP image after the system has booted from the PERM side, complete the following steps:

1. Turn off the blade server.
2. Restart the blade system management processor from the Advanced Management Module.
3. Turn on the blade server.

Note: If the temp side is corrupted the boot times out, and an automatic reboot occurs after switching to the PERM side.

If the blade server does not restart, you must replace the system board assembly. Contact a service support representative for assistance.

Recovering the TEMP image from the PERM image

To recover the TEMP image from the PERM image, you must copy the PERM image into the TEMP image. To perform the copy, complete the following steps:

1. Copy the perm image to the temp image. Using the Linux operating system, type the following command:

```
update_flash -r
```
2. Shut down the blade server using the operating system.
3. Restart the blade system management processor from the management module.
4. Turn on the blade server.

You might need to update the firmware code to the latest version. See “Updating the system and BMC firmware” on page 15 for more information on updating the firmware code.

Supported boot media

The BladeCenter QS21 can boot from the operating system installation CDs or DVDs to allow the operating system to be installed.

Once the operating system is installed, the BladeCenter QS21 can also boot either from attached SAS storage if you have the installed the optional SAS Expansion Card or from the network.

If you wish to perform a standard Bootp/TFTP network boot, please note the following restrictions:

- Only the built-in Gigabit Ethernet Controller or I/O Bridge is supported
- Only boot through the Ethernet switch on the top side of BladeCenter
- No fall back or configurable change to the bottom switch is possible
- In the Advanced Management Module you need to set boot list to **Network**
- There is no support for a router between the blade and TFTP server. Only local TFTP is supported.

Use Advanced Management Module to configure the required boot mode. See *IBM BladeCenter Management Module Installation Guide* for more information.

Booting the system

This section provides an overview on how to interpret the console output of the host firmware. The output is grouped into several parts, which are detailed below.

1. The first part of the boot process shows the system name and build date. You see an error at this point if the firmware image is corrupted.

```
*****
QS21 Firmware Starting
Check ROM = OK
Build Date = Apr 24 2007 13:43:46
FW Version = QB-1.6.0-0
Press "F1" to enter Boot Configuration (SMS)
```

2. Memory initialization follows next.

Note: It can take several seconds to initialize the RAMBUS memory.

3. The memory is initialized. The screen displays details of the vendor and the speed of memory modules.

```
Initializing memory configuration...
MEMORY
Modules = Elpida 512MB, 3200 Mhz
XDRlibrary = v0.32, Bin A/C, RevB, DualDD
Calibrate = Done
Test      = Done
```

The next screens show the open firmware section of the boot process and provide checkpoints and an overview which adapters are available in the system. The details in the adapter list are not meaningful.

Note: The warning(!) Permanent Boot ROM is displayed if there is a problem with the TEMP image and system firmware is running on from the PERM image. You should correct this problem as soon as possible. See “Recovering the TEMP image from the PERM image” on page 59 for further information.

```
OPEN FIRMWARE Adapters on 000001460ec0000000
    00 0800 (D) : 14e4 16a8   network [ ethernet ]
    00 0900 (D) : 14e4 16a8   network [ ethernet ]
Adapters on 000003460ec0000000
    00 0800 (D) : 1033 0035   usb-ohci ( NEC uPD720101 )
    00 0900 (D) : 1033 0035   usb-ohci ( NEC uPD720101 )
    00 0a00 (D) : 1033 00e0   usb-ehci*
```

Welcome to Open Firmware

Licensed Internal Code - Property of IBM
(c) Copyright IBM Corp. 2005, 2007 All Rights Reserved.
Cell BE is a trademark of SONY Computer Entertainment Inc.

Type 'boot' and press return to continue booting the system.
Type 'reset-all' and press enter to reboot the system.

disable nvram logging .. done

4. The next screen displays system information. It shows revision information about the chip set, SMP size, boot date/time, and the available memory.

```
SYSTEM INFORMATION
Processor = Cell/B.E.(TM) DD3.2 @ 3200 MHz
I/O Bridge = Cell BE companion chip DD2.x
Timebase = 26666 kHz (internal)
SMP Size = 2 (4 threads)
Boot-Date = 2007-06-08 11:20
Memory = 2048MB (CPU0: 1024MB, CPU1: 1024MB)
```

The Operating System now boots unless you press **F1** in which case the SMS menu starts. See “Using the SMS utility program” on page 11 for further information.

Diagnostic programs and messages

The Dynamic System Analysis (DSA) Preboot diagnostic programs are the primary method of testing the major components of the server. DSA is a system information collection and analysis tool that you can use to provide information IBM service and support to aid in the diagnosis of the system problems. The DSA diagnostic programs come on the IBM Dynamic System Analysis Preboot Diagnostic CD. You can download the CD from <http://www.ibm.com/support/us/en> if one did not come with your server. As you run the diagnostic programs, text messages are displayed on the screen and are saved in the test log. A diagnostic text message indicates that a problem has been detected and indicates the action you should take as a result of the text message.

The DSA diagnostic programs collect the following information about the following aspects of the system:

- System configuration
- Network interfaces and settings
- Hardware inventory USB information
- IBM LightPath diagnostics status
- Service processor status and configuration
- Vital product data and system firmware information
- Drive Health Information
- LSI RAID & Controller configuration

The DSA diagnostic programs can also provide diagnostics for the following system components:

- Baseboard Management Controller
- Memory stress
- CPU stress

Additionally, DSA creates a merged log that includes events from all collected logs.

All collected information can be output as a compressed XML file that can be sent to IBM Service. Additionally, you can view the information locally through a generated text report file. Optionally, the generated HTML pages may be copied to removable media and viewed from a web browser.

Running diagnostics and preboot DSA

To run the diagnostic programs, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices then turn on the server.
3. Ensure that external DSA bootable media is available as a boot device. For boot device selection, system firmware will work through the boot path as specified in the onboard planar VPD and try to establish communication with the specified interfaces in sequential order. These boot devices include the USB attached DVD (BladeCenter, media tray), the SAS storage if attached, as well as Network attached storage.

Note: To ensure the blade server boots from the correct device, use the Advanced Management Module to change the boot order so the blade server boots first from the preboot DSA device.

4. If required, :

5. When the boot prompt appears, press enter, type **dsa** and press enter again. Alternatively you can wait for the timeout to expire.
6. The command line interface prompt will then appear on the SOL connection. The BladeCenter QS21 does not support the graphical user interface.
7. Follow the on screen directions to run preboot DSA. Diagnostics are run from within preboot DSA.

When you are using the CPU or Memory stress tests, call your IBM service representative if you experience any system instability.

To determine what action you should take as a result of a diagnostic text message, see “DSA error messages.”

Open firmware memory diagnostic results are output to the SOL connection. They are also logged in NVRAM. All NVRAM logs (more than just OF diags) are collected as part of the DSA merged log.

If the diagnostic programs do not detect any hardware errors but the problem remains during normal server operations, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

A single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

If there are multiple error codes or light path diagnostics LEDs that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See Table 20 on page 90 for further information about diagnosing microprocessor problems.

If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again.

Diagnostic text messages

Diagnostic text messages are displayed while the tests are running. A diagnostic text message contains one of the following results:

- **Passed:** The test was completed without any errors
- **Failed:** The test detected an error
- **Aborted:** The test could not proceed because of the server configuration

Additional information concerning test failures is available in the extended diagnostic results for each test.

Viewing the test log

To view the test log when the tests are completed, issue the `view` command from the DSA command line interface. DSA collections may also be transferred to an external USB device using the `copy` command from the DSA command line interface.

DSA error messages

The tables below describe the messages that the diagnostic programs might generate and suggested actions to correct the detected problems. Follow the suggested actions in the order given.

CPU test results

Table 5. CPU test results

Test	Number	Status	Extended results	Actions
CPU stress test	089-901-xxx	Fail	Test failure	<ol style="list-style-type: none"> 1. If the system has stopped responding, turn off and restart the system and then run the test again. 2. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 3. Run the test again. 4. Check system firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 5. Run the test again. 6. If the system has stopped responding, turn off and restart the system and then run the test again. 7. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action.
	089-802-xxx	Abort	System resource availability error	
	089-801-xxx	Abort	Internal program error	

BMC test results

Table 6. BMC test results

Test	Number	Status	Extended results	Actions
I2C test	166-901-xxx	Fail	The BMC indicates a failure in the IPMB bus.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from power. The system must be removed from AC power in order to reset the BMC. 2. After 45 seconds, reconnect the system to power and turn on the system. 3. Run the test again. 4. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 5. Check BMC firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 6. Run the test again. 7. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action.

Table 6. BMC test results (continued)

Test	Number	Status	Extended results	Actions
	166-902-xxx	Fail	The BMC indicates a failure in the memory card bus.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from power. The system must be removed from AC power in order to reset the BMC. 2. After 45 seconds, reconnect the system to power and turn on the system. 3. Run the test again. 4. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 5. Check BMC firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 6. Run the test again. 7. If the reported memory size is the same as the installed memory size, complete the following steps. Otherwise, go to step 8. <ol style="list-style-type: none"> a. Turn off the system and disconnect it from power. b. Reseat all the system DIMMs within the system. c. Reconnect the system to power and turn on the system. d. Run the test again. 8. Turn off the system and disconnect it from power. 9. Remove all the system memory. 10. Install the minimum memory configuration for the system. See the <i>QS21 Installation and User's Guide</i> for supported memory configurations. 11. Reconnect the system to power and turn on the system. 12. Make sure that the reported memory size is the same as the installed memory size. 13. Run the test again. If the memory passes the test, one of the uninstalled memory cards or DIMMs is the failing component. 14. Repeat steps 8 through to 13 as necessary, using different memory cards and DIMMs, to isolate the failing component. It is important to change only one element each time in order to identify the specific cause of the error. 15. Replace the failing memory card or DIMM.

Table 6. BMC test results (continued)

Test	Number	Status	Extended results	Actions
	166-903-xxx	Fail	The BMC indicates a failure in the Ethernet sideband bus.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from power. The system must be removed from AC power in order to reset the BMC. 2. After 45 seconds, reconnect the system to power and turn on the system. 3. Run the test again. 4. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 5. Check BMC firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 6. Check Ethernet device firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 7. Run the test again. 8. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action.

Table 6. BMC test results (continued)

Test	Number	Status	Extended results	Actions
	166-904-xxx	Fail	The BMC indicates a failure in the main bus.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from power. The system must be removed from AC power in order to reset the BMC. 2. After 45 seconds, reconnect the system to power and turn on the system. 3. Run the test again. 4. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 5. Check BMC firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 6. Run the test again. 7. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action.
	166-905-xxx	Fail	The BMC indicates a failure in the pecos bus.	
	166-906-xxx	Fail	The BMC indicates a failure in the BMC private bus.	
	166-907-xxx	Fail	The BMC indicates a failure in the power backplane bus.	
	166-908-xxx	Fail	The BMC indicates a failure in the microprocessor bus.	
	166-910-xxx	Fail	The BMC indicates a failure in the PCIe and Light path diagnostics bus.	

Table 7. BMC test results

Test	Number	Status	Extended results	Actions
	166-801-xxx BMC	Abort	BMC I2C test canceled: the BMC returned an incorrect response length.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from power. The system must be removed from AC power in order to reset the BMC. 2. After 45 seconds, reconnect the system to power and turn on the system. 3. Run the test again. 4. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 5. Check BMC firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 6. Run the test again. 7. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action.
	166-802-xxx BMC	Abort	BMC I2C test canceled: the test cannot be completed for an unknown reason.	
	166-803-xxx BMC	Abort	BMC I2C test canceled: the node is busy; try later.	
	166-804-xxx BMC	Abort	BMC I2C test canceled: invalid command.	
	166-805-xxx BMC	Abort	BMC I2C test canceled: invalid command for the given LUN.	
	166-806-xxx BMC	Abort	BMC I2C test canceled: timeout while processing the command.	
	166-807-xxx BMC	Abort	BMC I2C test canceled: out of space	
	166-808-xxx BMC	Abort	BMC I2C test canceled: reservation canceled or invalid reservation ID	
	166-809-xxx BMC	Abort	BMC I2C test canceled: request data was truncated.	
	166-810-xxx BMC	Abort	BMC I2C test canceled: request data length is invalid.	
	166-811-xxx BMC	Abort	BMC I2C test canceled: request data field length limit is exceeded.	
	166-812-xxx BMC	Abort	BMC I2C test canceled: a parameter is out of range.	

Table 7. BMC test results (continued)

Test	Number	Status	Extended results	Actions
	166-813-xxx BMC	Abort	BMC I2C test canceled: cannot return the number of requested data bytes.	
	166-814-xxx BMC	Abort	BMC I2C test canceled: requested sensor, data, or record is not present.	
	166-814-xxx BMC	Abort	BMC I2C test canceled: invalid data field in the request.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from power. The system must be removed from AC power in order to reset the BMC. 2. After 45 seconds, reconnect the system to power and turn on the system. 3. Run the test again. 4. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 5. Check BMC firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Diagnostic Event Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM Support Web site at http://www.ibm.com/support/us/en/. 6. Run the test again. 7. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action.
	166-816-xxx BMC	Abort	BMC I2C test canceled: the command is illegal for the specified sensor or record type	
	166-817-xxx BMC	Abort	BMC I2C test canceled: a command response could not be provided	
	166-818-xxx BMC	Abort	BMC I2C test canceled: cannot execute a duplicated request.	

Table 7. BMC test results (continued)

Test	Number	Status	Extended results	Actions
	166-819-xxx BMC	Abort	BMC I2C test canceled: a command response could not be provided; the SDR repository is in update mode.	
	166-820-xxx BMC	Abort	BMC I2C test canceled: a command response could not be provided; the device is in firmware update mode.	
	166-821-xxx BMC	Abort	BMC I2C test canceled: a command response could not be provided; BMC initialization is in progress	
	166-822-xxx BMC	Abort	BMC I2C test canceled: the destination is unavailable.	
	166-823-xxx BMC	Abort	BMC I2C test canceled: cannot execute the command; insufficient privilege level.	
	166-824-xxx BMC	Abort	BMC I2C test canceled: cannot execute the command.	
	166-000-xxx	Pass		

Memory tests

Table 8. Memory test results

Test	Number	Status	Extended results	Actions
Memory stress test	201-000-xxx	Pass		

Table 8. Memory test results (continued)

Test	Number	Status	Extended results	Actions
	202-802-xx	Fail	General error: memory size is insufficient to run the test.	<ol style="list-style-type: none"> 1. Ensure all memory is enabled by checking Available System Memory in the Resource Utilization section of the DSA Diagnostic Event Log. 2. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 3. Run the test again. 4. Execute the standard DSA memory diagnostic to validate all memory. 5. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action.
	202-901-xxx	Fail	Test failure.	<ol style="list-style-type: none"> 1. Execute the standard DSA memory diagnostic to validate all memory. 2. Make sure that the DSA Diagnostic code is at the latest level. The latest level DSA Diagnostic code can be found on the IBM Support Web site at http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA/. 3. Turn off the system and disconnect it from power. 4. Reseat the DIMMs. 5. Reconnect the system to power and turn on the system. 6. Run the test again. 7. Execute the standard DSA memory diagnostic to validate all memory. 8. If you cannot reproduce the problem, contact your IBM technical-support representative.
	202-801-xxx	Abort	Internal program error.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the system firmware code and DSA code are at the latest level. 3. Run the test again. 4. Turn off and restart the system if necessary to recover from a hung state. 5. Run the memory diagnostic to identify the specific failing DIMM. 6. If the test continues to fail, refer to the other sections of this chapter for diagnosis and corrective action
	202-000-xxx	Pass		

System firmware startup messages

The system firmware displays the progress of the startup process on the serial console from the time that ac power is connected to the system until the operating system login prompt is displayed following a successful operating system startup.

If a serial console is not connected, you can use the Advanced Management Module to monitor the logs and display informational and error messages.

If the firmware encounters an error during the startup process, a message describing the error together with an error code is displayed on the serial console.

There are two types of error, where xxx represents the number of the error code:

Cxxx This is an internal checkpoint. If the system stops during the startup process a checkpoint may be displayed.

Exxx This type of error means that there is a failure that does not allow the firmware to continue the startup process. Check the error codes in the section “Boot errors and handling” on page 72. If these do not help resolve the problem, contact a service support representative.

There are cases where a message that is informational only is displayed on the serial console.

Wxxx This is a warning message. The firmware allows the startup process to continue, but indicates there maybe a problem. A warning message can be combined with an error message to give more complete information about an error.

A complete list of possible messages is given in the section “Boot errors and handling” on page 72.

Boot errors and handling

The following sections describe boot errors and actions you can take to resolve these errors.

Boot list

The following table describes boot list errors.

Table 9. System firmware boot list errors

Code	Message	Description	Action
E3400	It was not possible to boot from any device specified in the VPD	The firmware found a valid VPD but was not able to find bootable code on any of the devices listed in it.	Use Advanced Management Module Web browser to specify at least one device that contains bootable code. From the Advanced Management Module Web interface, choose BladeTasks>Configuration>Boot Sequence .
E3401	Aborting boot, <details>	Boot aborted due to error detected by the low level code. The <details> string provides the error description.	Based on the <details> string you may have to take an action on faulty hardware or use the Advanced Management Module to correct the system configuration. If the problem persists, contact your IBM service representative.
E3402	Aborting boot, internal error.	Boot aborted due to error detected by the low level code.	The exact reason is unknown but could be a firmware problem. If the problem persists, contact your IBM service representative.

Table 9. System firmware boot list errors (continued)

Code	Message	Description	Action
E3403	Bad executable: <details>	The file loaded from the boot device is not a valid PPC executable ELF file. The <details> string provides more details about the file type.	Using the Advanced Management Module correct the boot device configuration. Select a valid boot device and executable path
E3404	Not a bootable device!	The system cannot load an executable file from this device.	Using the Advanced Management Module correct the boot device configuration. Select a valid boot device and executable path.
E3405	No such device	The specified boot device is currently not present or not ready for access.	Check the hardware device or use the Advanced Management Module to correct the system configuration. If the problem persists, contact your IBM service representative.
E3406	Client application returned an error: <details>	The OS or a standalone application returned an error code to the system firmware. The <details> string provides the error description	Based on the <details> string you may have to take an action on faulty hardware or use the Advanced Management Module to correct the system configuration. It may be needed to perform the firmware or OS upgrade to resolve compatibility issues. If the problem persists, contact your IBM service representative.
E3407	Load failed	Load or boot failed to load requested file from the device. This is informational message and may be preceded by one or more other error messages.	Based on the preceding error messages you may have to take an action on faulty hardware or use the Advanced Management Module to correct the system configuration
E3408	Failed to claim memory for the executable	An attempt to load executable file from the boot device failed due to insufficient memory or firmware problem.	Verify that loaded file was indeed the right executable intended to boot this system. If not, using the Advanced Management Module correct the system configuration. Otherwise, contact your IBM service representative. You may need to add more memory to the system or to perform the firmware upgrade.
E3409	Unknown FORTH Word	Internal code error, or compatibility issue.	Contact your IBM service representative. You may need to perform the firmware upgrade.
E3410	Boot list successfully read from VPD but no useful information received.	The firmware found a valid VPD but was not able to find bootable code on any of the devices listed in it.	Use Advanced Management Module Web browser to specify at least one device that contains bootable code. From the Advanced Management Module Web interface, choose BladeTasks>Configuration>Boot Sequence .

Table 9. System firmware boot list errors (continued)

Code	Message	Description	Action
W3411	Client application returned.	Loaded OS or standalone application returned to firmware. This may be a normal condition or firmware could not detect any error issued by the client application. Booting from the boot-device list will be interrupted at this stage and no further attempts to boot from devices in the list will be made.	None needed. If boot (e.g. yaboot) exited because of need to boot from different device in the list, either boot manually from the firmware (ok) prompt or, using the Advanced Management Module, change the boot device order in the system configuration.
E3420	Boot list could not be read from VPD.	The firmware found an invalid VPD. Possibly it has been corrupted by the system software.	The VPD must be rewritten. Use the Advanced Management Module Web browser to specify at least one device that contains bootable code. From the Advanced Management Module Web interface, choose BladeTasks>Configuration>Boot Sequence . If the problem persists, contact your IBM service representative.

System firmware update errors

The following table describes system firmware errors that can occur if there have been problems after an update.

Table 10. System firmware boot errors

Code	Message	Description	Action
E4000	(RTAS Flash) unknown flash chip version	The flash update code does not support the onboard boot ROM flash chip.	Contact your IBM service representative as the system board may need replacing.
E4010	Platform check failed for image	The firmware image does not match the hardware platform.	Check the firmware image and ensure you have the right image for the BladeCenter QS21. See "Using the SMS utility program" on page 11. If the image is incorrect, download and install the correct image from http://www.ibm.com/support/us/en/ . See "Updating the system and BMC firmware" on page 15 for further information.
E4020	(RTAS flash) image corrupted (CRC)	The image for a system firmware update is corrupted.	Download the image again and reapply the update. If this does not resolve the problem, apply an image from a different source.

Memory initialization errors

The following table describes the memory initialization errors that can occur during boot.

Table 11. Memory initialization errors

Code	Message	Description	Action
E1006	Memory Incomplete.	Not all the XDR system memory could be initialized.	The blade server can still boot but with reduced system memory. Power down then reboot the blade. If this does not resolve the problem, contact your IBM service representative as the system board may need replacing.
E1100	System memory init failure. Boot abort.	The system XDR memory could not be initialized. The boot process has aborted.	Power down then reboot the blade. If this does not resolve the problem, contact your IBM service representative as the system board may need replacing.
E1110	System memory test failure. Boot abort.	An error has occurred while testing the XDR memory.	Power down then reboot the blade. If this does not resolve the problem, contact your IBM service representative as the system board may need replacing.
E1200	System memory init failure during second-pass calibration. CPU halted.	Since the first-pass calibration succeeded, either the CPU or the system XDR memory could have a defective contact.	Power down then reboot the blade. If this does not resolve the problem, contact your IBM service representative as the system board may need replacing.
E1210	Memory controller failed. CPU halted.	The built-in memory controller of the CPU encountered an unexpected error.	Power down then reboot the blade. If this does not resolve the problem, contact your IBM service representative as the system board may need replacing.
W1250	Timing Calibration failed: BE... YRAC... DQ... pin... Note: <xx...> indicates the number of the pin where the error has occurred.	This warning message accompanies a later memory initialization error message and lists the pin number for help in locating the cause of the error.	See the accompanying memory initialization error message for further information.

USB errors

The following table describes boot list errors. These may occur when booting from a bootable CD or DVD.

Table 12. System firmware boot errors

Code	Message	Description	Action
E5000	(USB) Media or drive not ready for this blade.	The media tray is not accessible for boot.	<p>Verify that the media tray is assigned to the blade and that the media is configured correctly.</p> <p>If this does not resolve the problem, check the other blade servers. If they cannot access the media, there may be a problem with the BladeCenter unit. See the documentation that comes with the BladeCenter unit for further information.</p>
E5010	(USB) No Media Found! Please check for the drawer/inserted media.	Media is not inserted or the drawer of the media tray is open.	Ensure that there is a bootable CD or DVD in the tray and that the drawer is closed.
E5020	(USB) Unknown media format.	The media is not recognized by the firmware.	Insert a suitable bootable CD.
E5030	(USB) Device communication error	Firmware cannot communicate with the BladeCenter USB devices.	<p>This could be a firmware or physical hardware problem. Check:</p> <ul style="list-style-type: none"> • The Advanced Management Module for messages • The system firmware image is not corrupt. See “System firmware update errors” on page 74 for more information about possible errors and their solution. • Other blade servers within the BladeCenter unit to see if they have the problem. If they do, the BladeCenter unit itself may be the cause of the problem. See the <i>Problem Determination and Service Guide</i> for your BladeCenter unit for more information. <p>Finally, power down then reboot the blade. If this does not help resolve the problem, contact your IBM service representative.</p>

Table 12. System firmware boot errors (continued)

Code	Message	Description	Action
E5040	(USB) Device transaction error. <command> Note: <command> indicates the command in progress when the transaction error occurred. This information may not always be available.	The drive showed an error during data transfer.	<ol style="list-style-type: none"> 1. Verify that the media tray is assigned to the blade server. Note: A reboot of the blade server the to which the media tray was previously assigned is required. 2. Check that the correct media is inserted and that the drawer is closed. 3. Inspect the media to see if there is visible damage. 4. Use another CD or DVD drive to check that the media is readable. 5. Check with other blade servers within the BladeCenter unit to see if they have the problem. If they do, the BladeCenter unit itself may be the cause of the problem. See the <i>Problem Determination and Service Guide</i> for your BladeCenter unit for more information.

Network boot errors

The following table describes the network boot errors.

Table 13. Network boot errors

Code	Message	Description	Action
E3000	(net) Could not read MAC address.	The firmware could not establish a communication socket for booting over the network due to an error while retrieving the MAC address of the network device.	<p>Power down then reboot the blade server.</p> <p>If this does not resolve the problem, contact your IBM service representative.</p>
E3001	(net) Could not get IP address.	The DHCP server is not responding, or there could be a MAC address conflict in your network.	<ul style="list-style-type: none"> • Check that your DHCP server is available • Check that an IP addresses has been correctly assigned • check that your MAC address is valid and is unique across your network
E3002	(net) ARP request to TFTP server (x.x.x.x) failed. Note: (x.x.x.x) represents the address of the TFTP server.	The MAC address resolution failed for the TFTP server with IP address (x.x.x.x).	<ol style="list-style-type: none"> 1. Check that the TFTP server is available and can be reached over the network. 2. Check that the DHCP server is correctly assigning IP addresses.

Table 13. Network boot errors (continued)

Code	Message	Description	Action
E3003	(net) unknown TFTP error.	The TFTP server encountered an error but is not able to determine its cause.	Power down then reboot the blade server. If this does not help resolve the problem, contact your IBM service representative.
E3004	(net) TFTP buffer too small for <filename> Note: <filename> is the name of the file TFTP has attempted to buffer.	The requested file is too big.	Try to load a smaller file. If this succeeds, check your DHCP server configuration.
E3005	(net) ICMP ERROR: <error message>	The TFTP server cannot be reached.	Check that the TFTP server is available and correctly configured.
E3006	(net) Could not initialize network device	The network device could not be activated.	Check that you have connected all network cables and that you have enabled the BladeCenter I/O module.
E3008	(net) Can't obtain TFTP server IP address	The DHCP server has not delivered the IP address of the TFTP server.	Check your DHCP server configuration.
E3009	(net) file not found: <filename>	The requested file was not found on the TFTP server.	Check your DHCP server configuration and make sure that you are using the proper TFTP server and the right file name.
E3010	(net) TFTP access violation	The TFTP server reported a file access violation.	Check the file name and the permissions of the file that should be downloaded.
E3011	(net) illegal TFTP operation	The TFTP server is not able to handle the request.	There may be too many UDP ports open on the TFTP server. Reboot the TFTP server and retry the transfer.
E3012	(net) unknown TFTP transfer ID	The TFTP server could not assign the data to a UDP packet based on its transfer ID. The transfer ID for this connection may be in use by another client.	Reboot and retry the transfer. If the problem persists check the configuration of the UDP ports on your TFTP server.
E3013	(net) no such TFTP user	The TFTP server reported an unknown user.	Change the TFTP server configuration to grant anonymous user access.
E3014	(net) TFTP error occurred after <No> bad packets received	The TFTP client received too many bad packets.	Reboot and retry the transfer. If the error persists, this could indicate problems with the network. Check all network connections and cables.
E3015	(net) TFTP error occurred after missing <No> responses	The TFTP client has missed too many packets.	Reboot and retry the transfer. If the error persists, this could indicate problems with the network. Check all network connections and cables.
E3016	(net) TFTP error missing block <No>, expected block was <No>	The TFTP client received a packet that is out of order.	Reboot and retry the transfer.

Table 13. Network boot errors (continued)

Code	Message	Description	Action
E3017	(net) TFTP block size negotiation failed	TFTP server has sent an acknowledgement to the client without block size information for subsequent TFTP network traffic.	The TFTP server may not be working properly. Change the TFTP server configuration to allow block size negotiation. Reboot the blade and/or the TFTP server and try again.
E3018	(net) file exceeds maximum TFTP transfer size	The requested file is too big to transfer via TFTP.	Change the TFTP server configuration to increase the block size to a maximum value of 1432 bytes.

Note: Be aware that your BladeCenter QS21 has two Ethernet controllers and can be connected to two Ethernet switches. As the blade center performs a network boot from the controller that acquires the IP address first make sure that your Linux configuration supports this. If your Linux environment requires a static IP address for a particular Ethernet port, you must set up your DHCP environment accordingly.

SAS boot errors

These error messages only appear if you have installed the optional SAS daughter card.

Table 14. SAS boot errors

Code	Message	Description	Action
E4303	LSISAS1064 controller initialization failed.	The blade server firmware was not able to initialize the controller. This could indicate a hardware, blade server firmware, or SAS expansion card firmware problem.	Try following steps in order to fix the problem: <ol style="list-style-type: none"> 1. Reboot the blade. 2. Power down then remove and reinstall the blade server in the BladeCenter unit. 3. Remove and reinstall the SAS Expansion Card. 4. Ensure the SAS Expansion Card firmware and blade firmware version are at the correct level. 5. If the error started after a SAS Expansion Card firmware upgrade or a blade server firmware upgrade, consider a rollback to the previous firmware versions. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible. 6. Plug the SAS expansion card into another blade server. If the problem persists, the SAS Expansion Card may need replacement. 7. Plug a different SAS expansion card into the blade server. If the problem persists, the blade server may need replacement.

Table 14. SAS boot errors (continued)

Code	Message	Description	Action
E4304	LSISAS1064 controller operation failed.	The blade firmware was not able to bring the controller to an operational state. This could indicate a hardware, blade server firmware, or SAS expansion card firmware problem.	<p>Try following steps in order to fix the problem:</p> <ol style="list-style-type: none"> 1. Reboot the blade. 2. Power down then remove and reinstall the blade server in the BladeCenter unit. 3. Remove and reinstall the SAS Expansion Card. 4. Ensure the SAS Expansion Card firmware and blade firmware version are at the correct level. 5. If the error started after a SAS Expansion Card firmware upgrade or a blade server firmware upgrade, consider a rollback to the previous firmware versions. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible. 6. Plug the SAS expansion card into another blade server. If the problem persists, the SAS Expansion Card may need replacement. 7. Plug a different SAS expansion card into the blade server. If the problem persists, the blade server may need replacement.

Table 14. SAS boot errors (continued)

Code	Message	Description	Action
E4305	LSISAS1064 port failed.	The blade firmware could not enable the SAS port. This could indicate a hardware, blade server firmware, or SAS expansion card firmware problem.	<p>Try following steps in order to fix the problem:</p> <ol style="list-style-type: none"> 1. Reboot the blade. 2. Power down then remove and reinstall the blade server in the BladeCenter unit. 3. Remove and reinstall the SAS Expansion Card. 4. Ensure the SAS Expansion Card firmware and blade firmware version are at the correct level. 5. If the error started after a SAS Expansion Card firmware upgrade or a blade server firmware upgrade, consider a rollback to the previous firmware versions. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible. 6. Plug the SAS expansion card into another blade server. If the problem persists, the SAS Expansion Card may need replacement. 7. Plug a different SAS expansion card into the blade server. If the problem persists, the blade server may need replacement.

Table 14. SAS boot errors (continued)

Code	Message	Description	Action
E4307	LSISAS1064 network topology read failed.	The blade server firmware was not able to discover the SAS topology. This could indicate a hardware, blade server firmware, or SAS expansion card firmware problem.	<p>Try following steps in order to fix the problem:</p> <ol style="list-style-type: none"> 1. Reboot the blade. 2. Power down then remove and reinstall the blade server in the BladeCenter unit. 3. Remove and reinstall the SAS Expansion Card. 4. Ensure the SAS Expansion Card firmware and blade firmware version are at the correct level. 5. If the error started after a SAS Expansion Card firmware upgrade or a blade server firmware upgrade, consider a rollback to the previous firmware versions. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible. 6. Plug the SAS expansion card into another blade server. If the problem persists, the SAS Expansion Card may need replacement. 7. Plug a different SAS expansion card into the blade server. If the problem persists, the blade server may need replacement.

Table 14. SAS boot errors (continued)

Code	Message	Description	Action
E4308	SAS disk device node not found!	The Open Firmware Device Tree (see IEEE 1275) become corrupted. It might indicate a blade firmware problem.	<p>Try following steps in order to fix the problem:</p> <ol style="list-style-type: none"> 1. Reboot the blade. 2. Power down then remove and reinstall the blade server in the BladeCenter unit. 3. If the error started after a SAS Expansion Card firmware upgrade or a blade server firmware upgrade, consider a rollback to the previous firmware versions. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible. 4. If the error has started reporting after an Open Firmware script change, for example in a custom startup script, verify the script. 5. If the error started after activating an Open Firmware script, for example by setting the <code>use-nvramrc?</code> configuration variable, verify the script. 6. Reproduce the blade server Open Firmware environment (firmware version, scripts, configuration variables, hardware configuration etc.) with another blade server(s). 7. If the error started after a hardware component was added or removed, consider a rollback to the original hardware configuration.

Table 14. SAS boot errors (continued)

Code	Message	Description	Action
E4309	SAS disk (@<Bus>,<ID>,<LUN>): SAS address not found!	<p>The Open Firmware Device Tree (see IEEE 1275) is corrupted. This might indicate a blade server firmware problem. Note that it is likely that blade firmware was not able to read a remote disk as well (see error #E430B).</p> <p>The <Bus>, <ID>, and <LUN> values determine the disk's Open Firmware Device Tree unit address (see IEEE 1275). Sample error message:</p> <p>E4309 SAS disk (@0,3,0): SAS address not found! The Open Firmware Device Tree node name is /axon@10000000000/plb5/plb4/pcix@4000004600000000/scsi@2/disk@0,3,0. The disk is located at Bus#0, ID#3, and LUN#0.</p>	<p>Try following steps in order to fix the problem:</p> <ol style="list-style-type: none"> 1. Reboot the blade. 2. Power down then remove and reinstall the blade server in the BladeCenter unit. 3. If the error started after a blade server firmware update, consider a rolling back to the previous firmware version. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible. 4. Update the blade firmware. 5. If the error started after an Open Firmware script change (for example, a custom startup script), verify the script. 6. If the error started after activating an Open Firmware script, (for example by setting use-nvramrc?configuration variable), verify the script. 7. Reproduce the blade Open Firmware environment (firmware version, scripts, configuration variables, hardware configuration etc.) with another blade server. 8. If the error started after a hardware was added or removed, consider rolling back to the original hardware configuration.

Table 14. SAS boot errors (continued)

Code	Message	Description	Action
E430A	SAS disk block size not found!	The Open Firmware Device Tree (see IEEE 1275) has become corrupted. This might indicate a blade server firmware problem.	<p>Try following steps in order to fix the problem:</p> <ol style="list-style-type: none"> 1. Reboot the blade. 2. Power down then remove and reinstall the blade server in the BladeCenter unit. 3. If the error started after a blade server firmware update, consider a rolling back to the previous firmware version. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible. 4. Update the blade firmware. 5. If the error started after an Open Firmware script change (for example, a custom startup script), verify the script. 6. If the error started after activating an Open Firmware script, (for example by setting <code>use-nvramrc?configuration</code> variable), verify the script. 7. Reproduce the blade Open Firmware environment (firmware version, scripts, configuration variables, hardware configuration etc.) with another blade server. 8. If the error started after a hardware was added or removed, consider rolling back to the original hardware configuration.

Table 14. SAS boot errors (continued)

Code	Message	Description	Action
E430B	SAS disk (@<Bus>,<ID>,<LUN>): SAS Address xx:xx:xx:xx:xx:xx:xx:xx, LUN#<LUN>	<p>The blade firmware was not able to read a remote disk. The error might be due to connectivity, SAS switch(es), remote disk, remote storage, hardware, blade firmware, or SAS Expansion Card firmware problem(s).</p> <p>Output: The <Bus>, <ID>, and <LUN> values are determine the disk's Open Firmware Device Tree unit address (see IEEE 1275). The xx:xx:xx:xx:xx:xx:xx:xx value determines the SAS address of device containing the disk.</p> <p>If a disk is a physical device then the SAS address is the identifier of disk itself. If a disk is a volume within a RAID controller then the SAS address is identifier of the RAID controller. The <LUN> is disk logical unit number. Note: though the logical unit number is printed explicitly and within the unit address, it is always the same value.</p> <p>Sample error message:</p> <p>E430B SAS disk (@0,3,0): SAS Address 50:01:0b:90:00:42:8a:ee, LUN#0</p> <p>The Open Firmware Device Tree node name is /axon@1000000000/plb5/plb4/pcix@4000004600000000/scsi@2/disk@0,3,0.</p> <p>The disk is located at Bus#0, ID#3, and LUN#0. The SAS address of device containing disk is 50:01:0b:90:00:42:8a:ee. The logical unit number is zero.</p>	<p>Try following steps in order to fix the problem:</p> <ol style="list-style-type: none"> 1. Ensure the remote disk is operating correctly. Try to read the disk from another blade server in the same BladeCenter unit. This verifies SAS topology and remote storage operation as well. Note: Concurrent access to a disk from a different blade server might corrupt the disk's file system. Check with a system administrator before attempting this step. 2. Ensure the remote storage is configured correctly. If configured as a RAID array, check the RAID configuration. See the documentation that comes with the storage for further information. 3. Ensure the operation of the entire SAS topology. This includes checking any SAS switches, SAS cables, connectors, etc. See the documentation that comes with each component of the SAS topology. 4. Reboot the blade. 5. Power down then remove and reinstall the blade server in the BladeCenter unit. 6. Remove and reinstall the SAS Expansion Card. 7. Ensure the SAS Expansion Card firmware and blade firmware version are at the correct level. 8. If the error started after a SAS Expansion Card firmware upgrade or a blade server firmware upgrade, consider a rollback to the previous firmware versions. Check with the documentation at http://www.ibm.com/systems/bladecenter/support/ to verify whether rollback is possible.

I/O DIMM boot-time errors

These error messages only appear if you have installed optional I/O DIMM.

Table 15. I/O DIMM boot errors

Code	Message	Description	Action
E2001	Incompatible DIMM type (not DDR2).	The DIMM is not a DDR2 DIMM.	Replace the DIMM with a DIMM of type DDR2.

Table 15. I/O DIMM boot errors (continued)

E2002	Incompatible DIMM type (not registered type).	The DIMM is not a registered DIMM.	Replace the DIMM with a DIMM of type "registered".
E2011	Incompatible DIMM type (maximum DIMM frequency too slow).	The maximum I/O-frequency of the DIMM is slower than memory controller's frequency.	Replace the DIMM with a DIMM allowing an I/O-frequency of at least 333MHz.
E2012	Incompatible DIMM type (CAS Latency).	The DIMM does not provide a CAS Latency setting for an I/O-frequency of 333 MHz or the configuration data is inconsistent.	Replace the DIMM with a DIMM with correct configuration data.
E2013	Incompatible DIMM type (Burst Length).	The DIMM does not support a Burst Length of 4.	Replace the DIMM with a DIMM supporting a Burst Length of 4.
E2014	Incompatible DIMM type (wrong bank count).	The DIMM has a bank count different from 4 and 8.	Replace the DIMM with a DIMM with a bank count of 4 or 8.
E2021	Incompatible DIMM type (DIMM data width).	The DIMM's the data width is different from 36 and 72.	Replace the DIMM with a DIMM with a data width of 36 or 72.
E2022	Incompatible DIMM type (SDRAM data width).	The DIMM's data-lanes are organized other than "by 8".	Replace the DIMM with a DIMM with an SDRAM data width of 8 lanes.
E2031	Data error.	The DIMM is defective.	Replace the DIMM with a new one.
E2032	Address line error.	The DIMM is defective.	Replace the DIMM with a new one.

The following table shows the warning messages that may appear:

Table 16. I/O DIMM warning messages

Code	Message	Description	Action
W2081	Unsupported DIMM type (not 512 MB).	The DIMM has a size different from 512MB.	Replace the DIMM with a DIMM of size 512 MB to avoid compatibility problems.
W2082	Unsupported DIMM type (CAS Latency z instead of 5).	The DIMM is operated with CAS Latency z, but only a CAS Latency of 5 is supported.	Replace the DIMM with a DIMM with a CAS Latency of 5 for an I/O frequency of 333 MHz to avoid compatibility problems.
W2083	Unsupported DIMM type (contains more data than program buffer).	The SPD of the DIMM contains more data elements than needed.	Replace the DIMM with an SPD of 128 bytes to avoid compatibility problems.

The following table shows informational messages.

Table 17. I/O DIMM informational messages

Code	Message	Description	Action
	No DIMM.	The socket is not populated.	Insert a DIMM into the empty socket to make full use of the I/O-buffer capability.

In addition to appearing on the console, messages are also written to the Advanced Management Module log. The table below lists the messages.

Table 18. I/O DIMM Advanced Management Module messages

Message	Severity	Description	Action
Blade memory fault: <i>Exxxx</i> on <i>JDIMMyy</i> . Where <i>Exxxx</i> is the error number shown in the table Table 15 on page 86 and <i>JDIMMyy</i> is the slot number of the affected I/O buffer DIMM	Error	An error occurred while initializing one I/O-buffer memory module.	See the console output for more details and for the affected DIMM.
Unsupported I/O Buffer DIMM type: <i>Wxxxx</i> on <i>JDIMMyy</i> . Where <i>Wxxxx</i> is the warning number shown in table Table 16 on page 87and <i>JDIMMyy</i> is the slot number of the affected I/O buffer DIMM	Warning	An I/O-buffer memory module with correct but unsupported properties was found.	See the console output for more details and for the affected DIMM.

Other error messages

The following table describes other error messages that can be displayed.

Table 19. Other error messages

Code	Message	Description	Action
E1001	Boot ROM CRC failure	The firmware image was found to be inconsistent during bootup. The inconsistency might be due to image corruption during flash update or might indicate a hardware problem.	The boot watchdog triggers. Reject the malfunctioning flash image as described in “Recovering the TEMP image from the PERM image” on page 59. Power down then reboot the blade. If the problem persists, contact your IBM service representative as the system board assembly may need replacement.
E1002	System memory could not be initialized	The firmware encountered an error during the memory initialization.	The boot watchdog automatically boots the system from the permanent flash side. The malfunctioning firmware image should be rejected as described in “Recovering the TEMP image from the PERM image” on page 59. Power down then reboot the blade. If the problem persists, contact your IBM service representative as the system board assembly may need replacement.

Table 19. Other error messages (continued)

Code	Message	Description	Action
E1003	Firmware image incomplete	The firmware detected missing components and cannot continue execution.	The boot watchdog automatically boots the system from the permanent flash side. The malfunctioning firmware image should be rejected as described in “Recovering the TEMP image from the PERM image” on page 59. Power down then reboot the blade. If the problem persists, contact your IBM service representative as the system board assembly may need replacement.
E1004	Unspecified Internal Firmware Error	The firmware encountered an unexpected error condition.	The boot watchdog automatically boots the system from the permanent flash side. The malfunctioning firmware image should be rejected as described in “Recovering the TEMP image from the PERM image” on page 59. Power down then reboot the blade. If the problem persists, contact your IBM service representative as the system board assembly may need replacement.

BMC firmware messages

The following is a description of the BMC firmware messages that are sent to the Advanced Management Module. Use the Advanced Management Module Web interface to view them.

No codes are associated with these messages. However, the status column indicates their severity.

There are three levels of severity:

Information

Informational messages only. No action need be taken, but you should continue to monitor the item concerned.

Warning

A potentially serious error has occurred. The BMC has taken the action described in the **Automatic action** column on the Advanced Management Module but you may be required to take further action. See the appropriate sections of this chapter indicated in Table 20 on page 90 for further information

Error A serious error has occurred. The blade server may have been powered off or rebooted. See the specific error for what action is required.

Table 20. BMC firmware messages

Event	Severity	Message	Automatic Action by BMC	Action required by user
Temperature Events				
<p>Acoustic mode</p> <p>Cell/B.E. processor 0 Temp above Warning Temperature (>73 °C)</p> <p>Standard mode</p> <p>Cell/B.E. processor 0 Temp above Warning Temperature (>82 °C)</p>	Information	Blade throttled.	<p>Throttle (Reduce Frequency).</p> <p>This is a BladeCenter unit operation which reduces processor speed on the blade server concerned until the temperature has dropped to normal levels.</p>	No action required.
<p>Acoustic mode</p> <p>Cell/B.E. processor 1 Temp above Warning Temperature (>73 °C)</p> <p>Standard mode</p> <p>Cell/B.E. processor 1 Temp above Warning Temperature (>82 °C)</p>	Information	Blade throttled.	<p>Throttle (Reduce Frequency).</p> <p>This is a BladeCenter unit operation which reduces processor speed on the blade server concerned until the temperature has dropped to normal levels.</p>	
<p>Performance modeCell/B.E. processor 0 Temp above Warning Temperature (>80 °C)</p>	Warning	Processor 1 (BE0 Temp) over recommended temperature.	Advanced Management Module increases blower speed.	
<p>Performance modeCell/B.E. processor 1 Temp above Warning Temperature (>80 °C)</p>	Warning	Processor 2 (BE1 Temp) over recommended temperature.	Advanced Management Module increases blower speed.	

Table 20. BMC firmware messages (continued)

Event	Severity	Message	Automatic Action by BMC	Action required by user
Cell/B.E. processor 0 Temp above Shut-Off Temperature (95°C)	Error	Processor 1 (BE0 Temp) critical fault.	Power Off The temperature of the processor has reached a critical level.	<ul style="list-style-type: none"> • Check that the BladeCenter unit cooling system is operating correctly. • Replace any missing filler blades in the BladeCenter unit. • Replace any missing filler blades in the BladeCenter QS21 DIMM module sockets. • Check that other blade servers are operating within the recommended temperature range. • Remove and replace the blade server, power on and boot. If problem persists, please contact IBM service.
Cell/B.E. processor 1 Temp above Shut-Off Temperature (95°C)	Error	Processor 2 (BE1 Temp) critical fault.	Power Off The temperature of the processor has reached a critical level.	
Temp above Shut-Off Temperature (100°C)	Error	Processor 3 (SB1 Temp) critical fault.	Power Off The temperature of the system board has reached a critical level.	
Cell/B.E. companion chip 2 Temp above Shut-Off Temperature (100°C)	Error	Processor 4 (SB2 Temp) critical fault.	Power Off The temperature of the system board has reached a critical level.	
Cell/B.E. Events				
Processor Failure Cell/B.E. processor 0 (Checkstop)	Error	CPU 1 internal fault	Reboot	There may be a problem with the system board. If problem persists, please contact IBM service.
Processor Failure Cell/B.E. processor 1 (Checkstop)	Error	CPU 2 internal fault	Reboot	There may be a problem with the system board. If problem persists, please contact IBM service.
Failure Initializing Cell/B.E. processor 0 or Cell/B.E. companion chip 0	Error	CPU 1 Fault + "Init Failed #x", where x is a number representing the error condition	Power Off	Reboot. If the problem persists, the blade needs to be replaced.
Failure Initializing Cell/B.E. processor 1 or Cell/B.E. companion chip 1	Error	CPU 2 Fault	Power Off	

Table 20. BMC firmware messages (continued)

Event	Severity	Message	Automatic Action by BMC	Action required by user
Cell BE processor 0 over recommended Voltage (1,25V)	Warning	Processor 1 (CPU 1/2 VCORE) over recommended voltage	None	No action required.
Cell BE processor 0 under recommended Voltage (0,92V)	Warning	Processor 1 (CPU 1/2 VCORE) under recommended voltage	None	
Cell BE processor 1 over recommended Voltage (1,25V)	Warning	Processor 2 (CPU 1/2 VCORE) over recommended voltage	None	
Cell BE processor 1 under recommended Voltage (0,92V)	Warning	Processor 2 (CPU 1/2 VCORE) under recommended voltage	None	
Planar Events				
Voltage fault	Error	Planar voltage fault + "Voltage Fault #x", where x is a bit field showing the state of all the voltage signals	Power Off	Reboot. If the error condition continues, report the exact error message to IBM service.
Voltage+-10% (not BE voltage)	Error	Blade voltage fault	None	-
Other Events				
NMI reset button on Front panel pressed	Error	Front panel critical Interrupt	Soft-Reset	None. This is a user-initiated action.
Boot WDT Timeout (Firmware Corrupted)	Warning	Firmware BIOS ROM Corruption detected	Reboot & Switch to the permanent flash side	Reinstall TEMP image. See "Recovering the system firmware code" on page 59 for further information.
DIAGS: Invalid PCI-X Card	Error	PCI-X card not supported	None	No power on, PCI-X expansion card needs to be replaced

NMI error messages

The following messages are placed in the Advanced Management Module error log.

Note:

The system halts if any of the errors listed below occur.

Table 21. NMI messages

Message	Severity	Event	Lightpath LED	Action
DIAGS: SB0 NMI: PCI-X	Error	Cell/B.E. companion chip 1 indicates an error on its PCI-X bus	NMI Error	Reboot. If the system does not reboot or the problem persists, contact IBM service with details of the problem and the error code.
DIAGS: SB1 NMI: PCI-X	Error	Cell/B.E. companion chip 2 indicates an error on its PCI-X bus	NMI Error	
DIAGS: SB0 NMI: PCI-E P00	Error	Cell/B.E. companion chip 1 indicates an error on PCIe Channel 0	NMI Error	
DIAGS: SB1 NMI: PCI-E P00	Error	Cell/B.E. companion chip 2 indicates an error on PCIe Channel 0	NMI Error	
DIAGS: SB0 NMI: PCI-E P01	Error	Cell/B.E. companion chip 1 indicates an error on PCIe Channel 1	NMI Error	
DIAGS: SB1 NMI: PCI-E P01	Error	Cell/B.E. companion chip 2 indicates an error on PCIe Channel 1	NMI Error	
DIAGS: SB0 NMI: DIMM 00	Error	Cell/B.E. companion chip 1 indicates an error on JDIMM 00	NMI Error	
DIAGS: SB0 NMI: DIMM 01	Error	Cell/B.E. companion chip 1 indicates an error on JDIMM 01	NMI Error	
DIAGS: SB1 NMI: DIMM 10	Error	Cell/B.E. companion chip 2 indicates an error on JDIMM 10	NMI Error	

Table 21. NMI messages (continued)

Message	Severity	Event	Lightpath LED	Action
DIAGS: SB1 NMI: DIMM 11	Error	Cell/B.E. companion chip 2 indicates an error on JDIMM 11	NMI Error	

Problem reporting

Firmware logs and Firmware settings are located in the system's Non-Volatile Random Access Memory (NVRAM). In the case of an error where IBM support is needed, complete the following steps to provide the firmware log information:

1. Boot Linux.
2. Log in as root.
3. Extract the log with this command:

```
cat /dev/nvram > /tmp/QS21-fw-nvram.img
```

4. Create a problem description in the /tmp/PROBLEM.txt file. See "Problem description" for further information.
5. Go to the Advanced Management Module Web interface for the blade and save the event log as a text file with the name QS21-event-log.txt.
6. Create a .tgz file using the following commands:

```
tar cvfz QS21-error-log-<customer>-<date>.tgz \
/tmp/PROBLEM.txt /tmp/QS21-fw-nvram.img
```

where:

<customer>

Contains a short name of the customer.

<date>

Contains the creation date.

7. Provide IBM support with the tgz file.

Problem description

The problem description must added to /tmp/PROBLEM.txt together with the following information:

- Customer name and address.
- Name of the person who created the log, including their contact information.
- Date and time.
- Blade server slot position in BladeCenter unit. You can obtain this from the Advanced Management Module.
- Blade server serial number. You can obtain this from the Advanced Management Module.
- BMC firmware version number. You can obtain this from the Advanced Management Module
- Linux Kernel version number. You must indicate if this is a private build.

Solving undetermined problems

Note: When you are diagnosing a problem in the blade server, you must determine whether the problem is in the blade server or in the BladeCenter unit.

- If all of the blade servers have the same symptom, the problem is probably elsewhere in the infrastructure. For more information, see the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* for your BladeCenter unit.
- If the BladeCenter unit contains more than one blade server and only one of the blade servers has the problem, troubleshoot the blade server that has the problem.

If the blade server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 58.

Check the LEDs on all the power supplies of the BladeCenter unit in which the blade server is installed. If the LEDs indicate that the power supplies are working correctly and reseating the blade server does not correct the problem, complete the following steps:

1. Turn off the blade server.
2. Remove the blade server from the BladeCenter unit and remove the cover.
3. Make sure that the control panel connector is correctly seated on the system board (see “Removing the blade-server front bezel assembly” on page 41 for the location of the connector).
4. If no LEDs on the control panel are working of the blade server, replace the bezel assembly. Try to turn on the blade server from the Advanced Management Module (see the documentation for the BladeCenter unit and Advanced Management Module for more information).
5. Reinstall the blade server and check. If the blade server remains inactive, continue with step 6.
6. Turn off the blade server.
7. Remove the blade server from the BladeCenter unit and remove the cover.
8. Remove or disconnect the following devices one at a time, if installed, until you find the failure:
 - High Speed InfiniBand expansion card
 - SAS expansion card
 - I/O buffer DIMMx

Reinstall, turn on, and reconfigure the blade server each time.

If the problem is solved when you remove the device from the blade server but the problem recurs when you reinstall the same device, suspect the device; if the problem recurs when you replace the device with a different one, suspect the system board. Have a trained service technician replace the system board assembly.

If you suspect a networking problem and the blade server passes all the system tests, suspect the network switch. However, the problem may concern the network itself and be external to the system.

Calling IBM for service

See Appendix B, "Getting help and technical assistance," on page 111 for information about calling IBM for service.

When you call for service, have as much of the following information available as possible:

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
 - Does the blade server fail the diagnostic programs? If so, what are the error codes?
 - What occurs? When? Where?
 - Is the failure repeatable?
 - Has the current server configuration ever worked?
 - What changes, if any, were made before it failed?
 - Is this the original reported failure, or has this failure been reported before?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- BIOS code level
- Operating-system type and version level

You can solve some problems by comparing the configuration and software setups between working and nonworking servers. When you compare servers to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the blade servers:

- Machine type and model
- All relevant firmware levels
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Configuration option settings
- Operating system control file setup

Appendix A. Using the SMS utility

Use the System Management Services (SMS) utility to perform a variety of configuration tasks on the BladeCenter QS21 blade server.

Starting the SMS utility

Start the SMS utility to configure the blade server.

1. Establish an SOL session with the blade server. See the *BladeCenter Management Module Command-Line Interface Reference Guide* or the *BladeCenter Serial-Over-LAN Setup Guide* for more information.
2. Turn on or restart the blade server.
3. When the boot process starts, you see a screen similar to the following:

```
QS21 Firmware Starting
Check ROM = OK
Build Date = Apr 24 2007 09:32:34
FW Version = "QB-1.6.0-0"

Press "F1" to enter Boot Configuration (SMS)

Initializing memory configuration...
MEMORY
Modules = Elpida 512MB, 3200 MHz
XDRLibrary = v0.32, Bin A/C, RevB, DualDD
Calibrate = Done
Test = Done

SYSTEM INFORMATION
Processor = Cell/B.E.(TM) DD3.2 @ 3200 MHz
I/O Bridge = Cell BE companion chip DD2.x
Timebase = 26666 kHz (internal)
SMP Size = 2 (4 threads)
Boot-Date = 2007-06-08 11:20
Memory = 2048MB (CPU0: 1024MB, CPU1: 1024MB)
```

Press **F1** to enter the SMS menu.

The SMS utility menu

Select SMS tasks from the SMS utility main menu. Choices on the SMS utility main menu depend on the version of the firmware in the blade server. Some menu choices might differ slightly from these descriptions.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Main Menu
1. Select Language
2. Setup Remote IPL (Initial Program Load)
3. Change SCSI Settings
4. Select Console
5. Select Boot Options
6. Firmware Boot Side Options
7. Progress Indicator History
8. FRU Information
9. Change SAS Boot Device
```

Change SCSI Settings

Select this choice to view and change the addresses of the SCSI controllers that are attached to the blade server.

Select Console

Select this choice to select the console on which the SMS menus are displayed.

Select Boot Options

Select this choice to view and set various options regarding the installation devices and boot devices.

If a device that you are trying to select (such as a USB CD drive in the BladeCenter media tray) is not displayed in the Select Device Type menu, select List all Devices and select the device from that menu.

Select Language

Select this choice to change the language that is used to display the SMS menus. A screen similar to the following appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Select Language
  1. IS08859-1 English (United States) *

-----

Navigation Keys:
M = return to Main Menu          N = Next page of list
ESC key = return to previous screen  X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key :
```

At present, English (United States) is the only available language.

Setup Remote IPL (Initial Program Load)

Select this to configure a network adapter for networks that use static IP addresses or TFTP only. By default the BladeCenter QS21 uses DHCP, in which case no changes should be made.

The screen is a similar to:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
NIC Adapters (NET)
1. /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
2. /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1,1
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

To view the Network Parameters screen type the number of the adapter you wish to configure and press **Enter**. A screen similar to the following appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
Network Parameters
NET /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
1. IP Parameters
2. Adapter Configuration
3. Ping Test
4. Advanced Setup: DHCP
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

Type the number of the menu item and press **Enter**.

IP Parameters

This allows you to configure IP for the network adapter to use static IP addresses or TFTP. You should not change these setting if you use DHCP, which is the default.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
IP Parameters
NET /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
1. Client IP Address          [000.000.000.000]
2. Server IP Address         [000.000.000.000]
3. Gateway IP Address        [000.000.000.000]
4. Subnet Mask                [255.255.255.000]
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen    X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

Select an item from the list and enter the appropriate address and subnet mask. Press **Enter** when you have finished each item. To save the information and return to the Main Menu, press **M**. If you wish to cancel and return to the main menu, press **Esc**.

Adapter Configuration

This allows you to set network parameters for the adapter.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
Adapter Configuration
NET /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
1. Speed, Duplex
2. Spanning Tree Enabled
3. Protocol
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen    X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

Do not change these settings unless required by your network. The defaults are:

- Speed: detected automatically
- Spanning Tree Enabled: disabled
Only change this if your network uses the Spanning-Tree Protocol link management protocol.
- Protocol: standard.
IEE 802.3 is the only other option.

Ping Test

This enables you to verify the static IP addresses you have set.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Ping Test
NET /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
Speed, Duplex: auto, auto
Client IP Address          [000.000.000.000]
Server IP Address         [000.000.000.000]
Gateway IP Address        [000.000.000.000]
Subnet Mask                [255.255.255.000]
Protocol: Standard
Spanning Tree Enabled: No
Connector Type:

1. Execute Ping Test
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen    X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key :
```

Type **1** to ping each IP address in turn.

Advanced Setup: DHCP

You do not need to use this option unless your network requires a specific block size or filename.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Advanced Setup: DHCP
NET /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
1. DHCP Retries: 255
2. TFTP Blocksize: 512
3. TFTP Retries: 5
4. TFTP Filename:

-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen    X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key :
```

Change SCSI Settings

At present the BladeCenter QS21 does not support SCSI so this option is not available.

Select Console

You do not have to use this option as, by default, the current session is the active session, and BladeCenter QS21 does not support more than one session.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
Select Console
To select this console as the active console press 0
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

Select Boot Options

Use this screen to select the device from which to install the operating system, the boot device and the boot device order. If you wish to install or boot from the BladeCenter unit media tray, you must first allocate it to the blade server using the Advanced Management Module.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
Multiboot
1. Select Install/Boot Device
2. Configure Boot Device Order
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

Select Install/Boot Device

To select the installation or boot device, type **1** and press **Enter**. The screen that appears is similar to the following:

```

PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Select Device
Number      Device Name
.           NET /axon@10000000000/p1b5/p1b4/pcix@4000004600000000/ethernet@1
.           CDR0M .../p1b5/p1b4/pcix@4000004600000000/usb@1/hub@1/hub@2/cdrom@3
-----

Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key :

```

Only available boot devices are displayed. If you wish to boot from the CD/DVD drive in the media tray, first allocated it to the blade server using the Advanced Management Module, as otherwise, it is not shown as an available option.

Configure Boot Device Order

When booting the operating system, the blade server cycles through the boot devices in list order until it finds a boot device. If it does not, an error is generated and placed in the Advanced Management Module. You may only list boot devices if they are allocated or available to the blade server. For example, to include the CD/DVD drive in the BladeCenter media tray in the list, first been allocate it to the blade server using Advanced Management Module. To select boot device order, type **2** and press **Enter**. A screen similar to the following appears:

```

PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Configure Boot Device Order
1. Select 1st Boot Device
2. Select 2nd Boot Device
3. Select 3rd Boot Device
4. Select 4th Boot Device
5. Display Current Setting
6. Restore Default Setting
-----

Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key :

```

To set the boot device order, type the menu number according to the order you want for a particular device. For example, to choose the first boot device, type **1** and press **Enter**. A screen showing all the available boot devices appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Select Device
Number      Position      Device Name
1.          1             Not Specified
2.          1             NET /axon@10000000000/p1b5/p1b4/pcix@4000004600000000/ethernet1
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key :
```

The screen shows the current position in the list for the displayed boot devices. To alter the position, choose a device, type the number and press **Enter**. To save your selection, press **M** to return to the menu.

Firmware Boot Side Options

Normally the BladeCenter QS21 boots from the Temporary side and you should not change this. However, there may be occasions, for example boot failure, where you must change the setting.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----
Firmware Boot Side Options Menu

Firmware Boot Side for next boot: Temporary

1. Permanent
2. Temporary
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
-----
Type menu item number and press Enter or select Navigation key :
```

Progress Indicator History

This shows the messages from the present and previous attempts to boot the blade. It also shows messages from the last occasion the blade could not boot from the Temporary side, if any.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
View Progress Indicator History
1. Current Boot Progress Indicator
2. Previous Boot Progress Indicator
3. Previous Failover Permanent Side Boot
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

The screen below shows an example of a successful previous boot:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
Progress Indicator History
```

```
Creating common NVRAM partition
                                C0880
Could not find SAS partition in NVRAM - created.
Adapters on 000001460ec00000
                00 0800 (D) : 14e4 16a8   network [ ethernet ]
                00 0900 (D) : 14e4 16a8   network [ ethernet ]
Adapters on 000001a040000000
                00 0000 (B) : 1014 032c   pci
Adapters on 000001a240000000
                00 0000 (B) : 1014 032c   pci
```

```
-----
Navigation Keys:
M = return to Main Menu                N = Next page of list
ESC key = return to previous screen    X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

Press **N** to scroll through the boot history. When you have finished, press **Esc** to return to the menu.

FRU information

The VPD on each blade server contains details about the machine type or model, serial number and the universal unique ID.

The screen is similar to the following:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

FRU Information

Machine Type and Model: 079338x

Machine Serial Number: ABCDEFG

Universal Unique ID: 12345678-1234-1234-1234-123456789ABC

Navigation Keys:

M = return to Main Menu

ESC key = return to previous screen X = eXit System Management Services

Select Navigation key :

Adding FRU information

When you replace a FRU details are not recorded in the VPD. You must enter them manually through SMS.

When the system firmware detects an FRU replacement part during boot the process stops to allow you to enter the machine type or model and serial number. Boot does not continue until the information is provided.

To enter new FRU information, complete the following steps:

1. Using a Telnet or SSH client, connect to the Advanced Management Module external Ethernet interface IP address.
2. When prompted, enter a valid user ID and password. The default management module user ID is USERID, and the default password is PASSWORD, where the 0 is a zero.

Note: The userid and password may have been changed. If so, check with the system administrator for a valid user id and password.

3. Power cycle the blade and start an SOL console by using the power -cycle -c command. See “Using the SMS utility program” on page 11 for further information.
4. The following screen appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----

Enter Type Model Number
(Must be 7 characters, only A-Z, a-z, 0-9 allowed. Press Esc to skip)

Enter Type Model Number :
```

Type the model number according to the instructions on the screen and press **Enter** to continue.

5. You must confirm the model number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----

Number entered is: 1234567
Accept number?
(Enter 'y' or 'Y' to accept or 'n' or 'N' to decline)

Select Navigation key :
```

Type **y** or **Y** and press **Enter** to confirm the number.

6. At the following screen, type the serial number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----

Enter Serial Number
(Must be 7 characters, only A-Z, a-z, 0-9 allowed)

Enter Serial Number :
-----
```

Press **Enter** to continue.

7. You must now confirm the serial number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
-----

Number entered is: ABCDEFG
Accept number?
(Enter 'y' or 'Y' to accept or 'n' or 'N' to decline)

Select Navigation key :
-----
```

Type **y** or **Y** and press **Enter** to confirm the number.

SAS Settings

Use this option to configure or change the SAS settings if you have installed the IBM BladeCenter Boot Disk System.

Note: You must use this option when configuring an IBM BladeCenter Boot Disk System for the first time.

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
SAS Settings
1. Change SAS Boot Device Address
2. Change SAS Boot Device LUN Id
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
```

```
-----
Type menu item number and press Enter or select Navigation key :
```

Choose **1** to set or change the SAS Boot Device Address. A screen similar to the following appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
```

```
-----
Change SAS Boot Device Address

Current SAS Disk Address (Default = 0) : 0
```

```
-----
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen      X = eXit System Management Services
```

```
-----
Type SAS Address in hexadecimal and press Enter or select navigation key:
```

The SAS address can be obtained from the Storage System Profile utility. See the documentation that comes with your IBM BladeCenter Boot Disk System for more information about the Storage System Profile utility.

Once you have typed the address, press **Enter** to add the address, then **M** to return to the SAS Settings menu.

Choose **2** to set or change the SAS Boot Device LUN ID. A screen similar to the following appears:

PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.

Change SAS Boot Device LUN Id

Current SAS LUN Id (Default = 0) : 0

Navigation Keys:

M = return to Main Menu

ESC key = return to previous screen X = eXit System Management Services

Type new LUN Id in hexadecimal and press Enter or select navigation key:

The LUN Id can be obtained from the Storage System Profile utility. See the documentation that comes with your IBM BladeCenter Boot Disk System for more information about the Storage System Profile utility.

Appendix B. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your BladeCenter product or optional device, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.
- Go to <http://www.ibm.com/systems/bladecenter/support/> to check for information to help you solve the problem.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with BladeCenter systems also describes the diagnostic tests that you can perform. Most BladeCenter systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the software.

Using the documentation

Information about your IBM BladeCenter system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/systems/bladecenter/support/> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM BladeCenter information is <http://www.ibm.com/systems/bladecenter/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/systems/support/>.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with BladeCenter products. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/us/>, or see <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See <http://www.ibm.com/planetwide/> for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

Appendix C. Notices

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

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Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Product recycling and disposal

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Battery return program

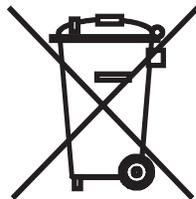
This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to <http://www.ibm.com/ibm/environment/products/index.shtml> or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

For Taiwan: Please recycle batteries.



For the European Union:



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For California:

Perchlorate material – special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

"Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Community contact:
IBM Technical Regulations
Pascalstr. 100, Stuttgart, Germany 70569
Telephone: 0049 (0)711 785 1176
Fax: 0049 (0)711 785 1283
E-mail: tjahn@de.ibm.com

Taiwanese Class A warning statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Korean Class A warning statement

이 기기는 업무용으로 전자파 적합등록을 받은 기기 이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

Index

A

- Advanced Management Module 9
 - command-line interface 10
 - logging onto the Management Module 10
 - updating BMC firmware 18
 - web interface 10
- air baffle
 - DIMM side 45
 - top 45
- attention notices 2

B

- battery
 - connector 8
 - replacing 42
- battery return program 116
- bezel assembly
 - installing 48
 - removing 41
- blade server
 - closing cover 40, 49
 - opening cover 32
 - removing cover 32
 - removing from BladeCenter unit 31
- blade server communication 9
- BMC firmware 15
 - messages 89
 - updating 18
 - viewing level 17
- booting the system 60

C

- caution statements 2
- Class A electronic emission notice 117
- command-line interface 9
 - configuration 10
- components
 - system board 8
- configuration
 - Advanced Management Module 10
 - command-line interface 10
 - Ethernet controller 23, 26
 - Serial over LAN 10
- connectors
 - battery 8
 - I/O expansion card 8
 - input/output 49
 - memory 8
 - microprocessor 8
 - system board 8
- controller
 - enumeration 26
 - Ethernet 23
- cover
 - closing 40, 49

- cover (*continued*)
 - opening 32
 - removing 32

D

- danger statements 2
- device driver
 - Ethernet controller 24
- DIMM
 - See I/O DDR2 memory modules
- DIMM fillers
 - installing 37
- drive
 - connectors 8
 - specifications 2

E

- electrical input 3
- electronic emission Class A notice 117
- environment 3
- error messages
 - BMC firmware 89
 - boot errors 72
 - boot list 72
 - I/O DIMM boot errors 86
 - network boot 77
 - other error messages 88
 - SAS error messages 79
 - system firmware 74, 75
 - USB 75
- errors
 - firmware startup process 71
- Ethernet controller
 - configuring 23
 - controller 3
 - device driver 24
 - enumeration 26
 - updating firmware 24
- expansion cards
 - updating firmware 23

F

- FCC Class A notice 117
- filler blade 31
- firmware
 - BMC 15
 - system 15
 - updating steps 16
 - updating, BMC firmware 18
 - updating, Ethernet controller 24
 - updating, expansion cards 23
 - updating, system firmware 20
 - updating, system firmware image 23
 - viewing level, BMC firmware 17

- firmware code
 - recovering 59
- frequency throttling 57
- front bezel assembly
 - See bezel assembly
- FRU
 - adding information 13, 106
 - viewing information 12, 105

I

- I/O DDR2 memory modules
 - adding 36
 - error messages 86
- identifying problems
 - front panel LEDs 52
 - network connection 57
 - power 57
 - service processor 58
 - software 58
 - system board LEDs 54
- image
 - PERM 59
 - TEMP 59
- important notices 2
- InfiniBand expansion card
 - ball stud 45
 - replacing 45
 - installing 33
 - support end bracket 45
 - support pin 45
- installation
 - completing 47
- installing
 - battery 43
 - bezel assembly 48
 - InfiniBand expansion card 33
 - options 29
 - SAS expansion card 38
- integrated functions 3

L

- LEDs
 - activity 6
 - blade error 6
 - control panel 6
 - identifying problems 52
 - information 6
 - light box 54
 - location 6
 - power on 6
 - system board 7
 - identifying problems 54
- light box
 - LEDs 54
- Linux operating system 59

M

- media tray
 - select button 6
- memory
 - specifications 2, 3
- memory module
 - specifications 3
- microprocessor
 - specifications 3
- miscellaneous parts kit 45

N

- network boot
 - error messages 77
- network connection
 - identifying problems 57
- NMI reset button 7
- notes 2
- notes, important 114
- notices 113
 - electronic emission 117
 - FCC, Class A 117
- notices and statements 2

O

- option
 - installing 29
- Options 3

P

- part numbers 27
- PERM image
 - updating 23
 - using, to recover TEMP image 59
- ports, input/output 49
- power
 - identifying problems 57
 - problem 57
 - throttling 57
- power control button 6
- problem
 - how to report a 94
- problem determination
 - basic checks 51
 - prerequisites 51
 - troubleshooting charts 52
 - troubleshooting information 52
- problem reporting 94
- problems
 - power 57
 - service processor 58
 - solving 51
 - undetermined 95
- product recycling and disposal 115
- publications 1

R

- recovering
 - system firmware code 59
 - TEMP image from PERM image 59
- recycling and disposal, product 115
- reject function, TEMP image 59
- removing
 - battery 44
 - blade server 31
- replacing
 - battery 42

S

- SAS
 - error messages 79
 - supported System Storage 3
- SAS expansion card
 - connectors 38
 - installing 38
- serial interface 9
 - configuring 10
- Serial over LAN 9
 - configuration 10
- service processor
 - identifying problems 58
- service, calling for 96
- SMS 9, 97
 - adding FRU information 13, 106
 - starting 11
 - viewing FRU information 12, 105
- software
 - identifying problems 58
- specifications 2
- starting
 - blade server 3
 - TEMP image 59
- statements and notices 2
- static electricity 30
- static-sensitive devices, handling 30
- stopping the blade server 4
- storage
 - support for local 3
- supported boot media 59
- system board
 - connectors 8
 - LEDs 7
 - replacing 41
- system boot 60
 - boot error list 72
 - boot errors 72
 - I/O DIMM boot errors 86
 - network boot error messages 77
 - other error messages 88
 - SAS error messages 79
 - supported boot media 59
- system firmware 15
 - PERM image 23
 - recovering 59
 - startup process errors 71

- system firmware (*continued*)
 - system firmware boot error list 74, 75
 - TEMP image 23
 - updating 20
 - updating image 23
 - updating image manually 22
- System Management Services 97
 - See SMS
- system reliability 30

T

- TEMP image
 - recovering 59
 - reject function 59
 - starting 59
 - updating 23
- trademarks 114
- troubleshooting
 - overview 51
- turning off the blade server 4
- turning on the blade server 3

U

- undetermined problems 95
- United States electronic emission Class A notice 117
- United States FCC Class A notice 117
- update_flash 20
 - c option 23
- USB errors 75

W

- Wake on LAN 4



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