



BladeCenter QS20 Type 0200

Installation and User's Guide

Welcome.

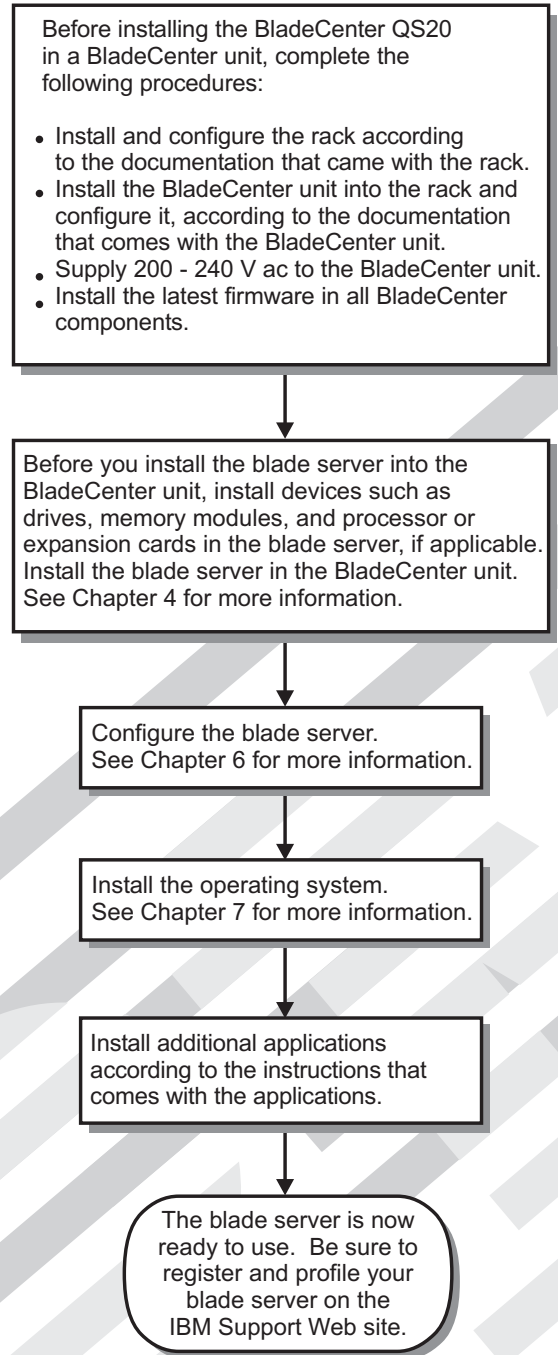
Thank you for buying an IBM blade server. Your blade server features superior performance, availability, and scalability.

This Installation and User's Guide contains information for setting up, configuring, and using your blade server.

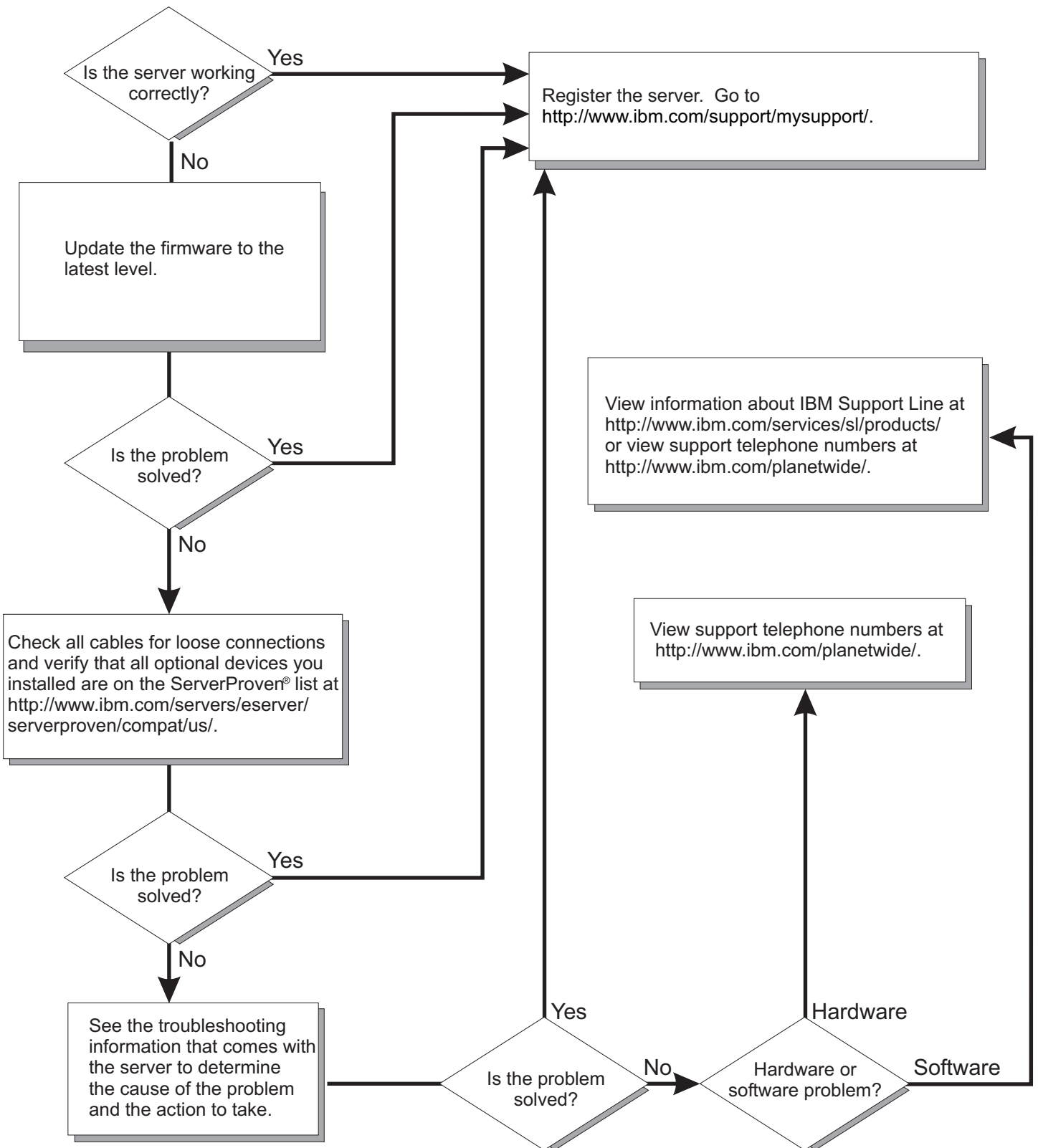
Additionally, a service information label is attached to each BladeCenter unit and blade server. This label provides a graphical summary of many of the installation and service activities that are associated with each device.

For more information about your BladeCenter components and features, you can view the publications on the Documentation CD or download them from the IBM Support Web site.

Go to <http://www.ibm.com/support/>



Server Support



BladeCenter QS20 Type 0200



Installation and User's Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 61.

Third Edition (September 2006)

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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 ασφάλειας (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.

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 33F8354 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

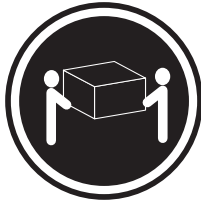
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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

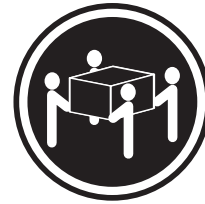
Statement 4:



≥ 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 chapter gives an overview of the processor and the BladeCenter QS20.

The BladeCenter QS20

The high performance BladeCenter QS20 is based on the 64 bit Cell Broadband Engine™ processor (Cell BE) with a frequency of 3.2 GHz. Two processors are supported per blade and are directly mounted on the blade planar board to provide multiprocessing capability. Each processor includes 32/32 KB L1 (data/instruction) and 512 KB L2 cache.

The Cell BE implementation of the broadband processor architecture (CBEA) includes one PowerPC® Processor Element (PPE) core and eight synergistic processing cores (SPE). Each SPE core includes one synergistic processing unit (SPU) with its own local storage (LS) area, and one dedicated memory flow controller (MFC), which has an associated memory management unit (MMU) to hold and process memory protection and access permission information. To facilitate data flow on-chip and externally, the Cell BE also implements the broadband engine bus and other I/O structures.

There is a highspeed RAMBUS interface to the processor, a 4x PCI-Express channel, a 32bit/33MHZ PCI bus interface, which is specified to attach the PATA controller to the board, 1 Gigabit Ethernet MAC, a UART and an external bus controller. Attached to the external bus are a Flash EPROM device (8 Mbyte), 1 MB of battery-backed NVRAM and battery-backed RTC.

The local service processor supports Light Path LEDs, environmental monitoring, front panel, chip initialization and the Management Module interface.

To ensure compatibility with existing blades, the BladeCenter QS20 provides two midplane connectors. These connectors contain Gigabit Ethernet links, power and a chassis management bus. On-card VRMs generate all required voltages from the 12V bulk supply from the Blade midplane connection. The blade includes an IDE hard disk (that can provide a boot mechanism for an operating system), and optional InfiniBand daughter card support. The BladeCenter QS20 operates in a BladeCenter® (8677) chassis.

For more information about the processor, see

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

Figure 1 on page 2 shows a BladeCenter QS20.

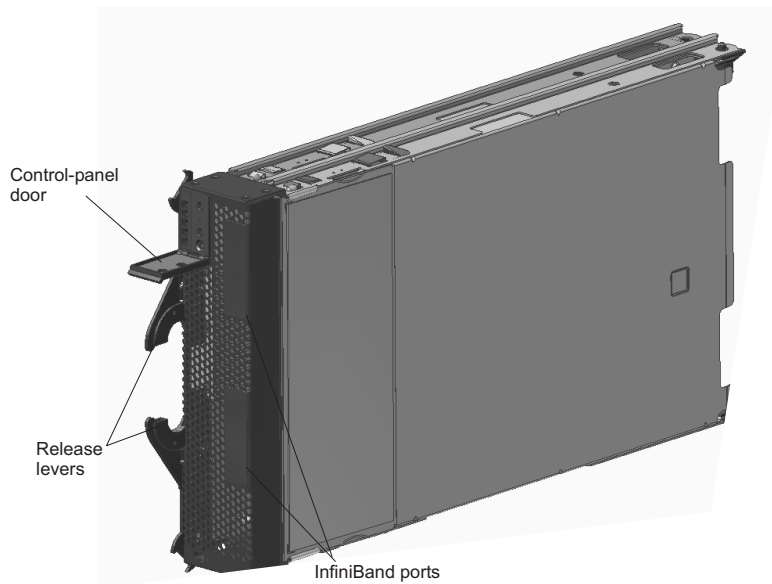


Figure 1. BladeCenter QS20

The BladeCenter QS20 is an accessory for the 8677 BladeCenter Enterprise chassis only.

For more information about the BladeCenter QS20, see “Features and specifications” on page 7.

The BladeCenter

The BladeCenter unit has Management Module firmware. The BladeCenter unit also provides power, and Sense Logic Control firmware to connect processor and support logic to the service processor.

Configuring the BladeCenter is straightforward. The basic building blocks consist of double-width blades. You insert these blades into the IBM BladeCenter unit. You can install up to seven hot-swap BladeCenter QS20 blades in each BladeCenter unit. Because a BladeCenter chassis is seven U high, six BladeCenter unit completely fill a standard 42 U rack. Communication between blades within a unit and between blades in different unit is by Ethernet. Communications with the outside world is the same.

Power modules and power module bays

This section briefly describes power modules and power module bays.

Figure 2 on page 3 shows the location of the power module bays in the BladeCenter Type 8677.

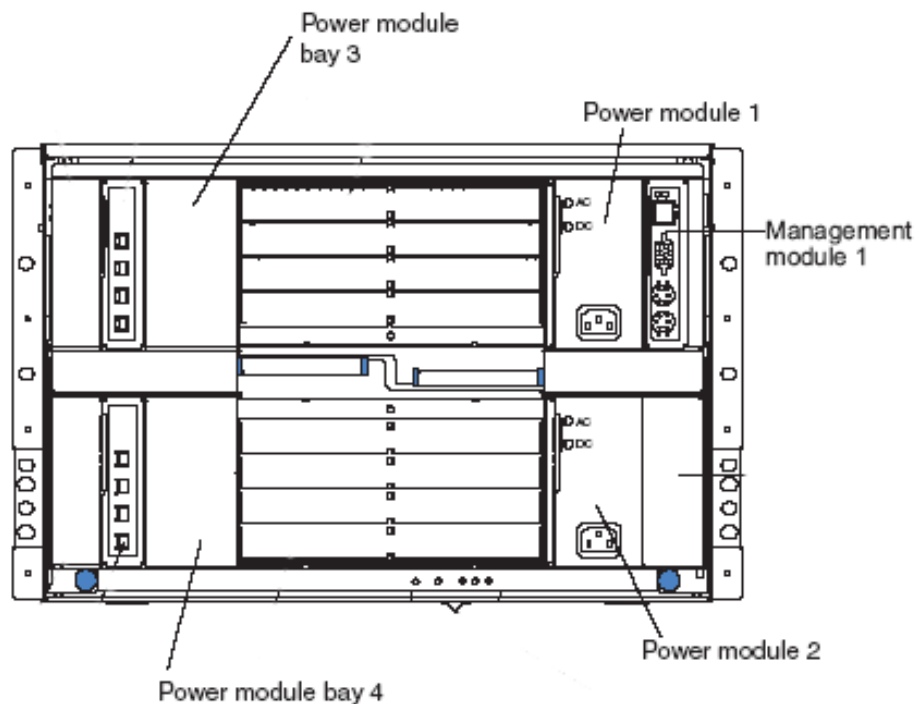


Figure 2. BladeCenter Type 8677 rear view showing the power module bays

Note: Make sure that you review and understand the design of the BladeCenter unit. Refer to the following documents if you need help to determine your system configuration requirements and the bays and connectors where you install or remove components:

- The *IBM @server BladeCenter (Type 8677) Planning and Installation Guide* on the IBM BladeCenter Documentation CD.
- <http://www.ibm.com/pc/support/> on the World Wide Web.

Table 1. Power module and power module bay allocation

Blade server installed in:	Minimum number of power modules required	Install power module in the following power module bays:
Blade bays 1-6	One	1 (for redundancy you can install a second power module in power module bay 2)
Blade bays 7-14	One	3 (for redundancy you can install a second power module in power module bay 4)

Note: Do not insert a blade server in blade bays 6/7. This is because the blade server would be split between the two sets of power modules.

Using this book

This *Installation and User's Guide* provides information to help you:

- Set up the BladeCenter QS20
- Start and configure the BladeCenter QS20
- Install options

- Install the operating system
- Perform basic troubleshooting of the BladeCenter QS20

Record information about the blade server in the following table.

Product name	BladeCenter QS20
Machine type	0200
Model number	_____
Serial number	_____

The machine type, model number, and serial number are on the identification label that is behind the control-panel door on the front of the blade server, and on a label on the side of the blade server that is visible when the blade server is not in the BladeCenter unit. You need these numbers when you register the blade server with IBM.

Related documentation

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

- *Problem Determination and Service Guide*
This document is in Portable Document Format (PDF) on the IBM *Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.
- *Safety Information*
This document is in Portable Document Format (PDF) on the IBM *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 IBM *Documentation* CD. It contains information about the terms of the warranty and about service and assistance.
- *BladeCenter QS20 SDK Toolkit Installation and User's Guide*
This document is in PDF and can be downloaded from <http://www.ibm.com/pc/support/>. 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 IBM *Documentation* CD.

The blade server can 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/bladecenter/>. In addition to the documentation in this library, be sure to review the *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit type for information to help you prepare for system installation and configuration. This document is available at <http://www.ibm.com/bladecenter/>.

The Documentation CD

The *Documentation* CD contains documentation for the blade server in PDF and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

The IBM *BladeCenter Documentation* CD requires the following minimum hardware and software:

- Microsoft® Windows NT® 4.0 (with Service Pack 3 or later), Windows 98, Windows 2000, Windows XP, AIX®, UNIX®, SUSE LINUX, or Red Hat Linux®
- 100 MHz microprocessor
- 32 MB of RAM
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems

Note: Acrobat Reader software is included on the CD, and you can install it when you run the Documentation Browser.

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the books, and view books using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in use in your system and displays the books in the language for that region (if available). If a book is not available in the language for that region, the English version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into your CD-ROM drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users:
 - If you are using a Windows operating system, insert the CD into your CD-ROM drive and click **Start ► Run**. In the **Open** field, type:
`x:\win32.bat`

where *x* is the drive letter of your CD-ROM drive, then click **OK**.

- If you are using a Linux operating system, insert the CD into your CD-ROM drive; then, run the following command from the `/mnt/cdrom` directory:
`sh runlinux.sh`

The **Available Topics** list displays all the books for the blade server. Some books might be in folders. A plus sign (+) indicates each folder or book that has additional books under it. Click the plus sign to display the additional books.

When you select a book, a description of the book appears under **Topic Description**. To select more than one book, press and hold the Ctrl key while you select the books. Click **View Book** to view the selected book or books in Acrobat Reader or xpdf. If you selected more than one book, all the selected books are opened in Acrobat Reader or xpdf.

To search all the books, type a word or word string in the **Search** field and click **Search**. The books in which the word or word string appears are listed in order of the most occurrences. Click a book to view it, and press Ctrl+F to use the Acrobat search function or Alt+F to use the xpdf search function within the book.

Click **Help** for detailed information about using the Documentation Browser.

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 IBM *BladeCenter 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 QS20.

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

The BladeCenter QS20 does not support the function of any USB ports, optical drives, or floppy drives native to the BladeCenter.

The BladeCenter QS20 is an accessory for the 8677 BladeCenter Enterprise chassis only.

Note: Power, cooling, removable-media drives, external ports, and advanced system management are provided by the IBM BladeCenter Type 8677. For more information, see the *IBM BladeCenter (Type 8677) Planning and Installation Guide*.

Table 2. Blade server features and specifications

<p>Microprocessor: Two IBM Cell Broadband Engines PowerPC 64-bit architecture w/VMX with 8 SPUs, 512 KB L2 cache, 256 KB on each SPE.</p> <p>Memory: 2 x 256 MB or 2 x 512 MB XDR DRAM with ECC. (Only configuration supported.)</p> <p>IDE device: Support for one internal integrated drive electronics (IDE) 2.5-inch hard disk drive.</p>	<p>Size:</p> <ul style="list-style-type: none"> • Height: 24.5 cm (9.7 inches) • Depth: 44.6 cm (17.6 inches) • Width: 5.8 cm (2.28 inches) • Maximum weight: 6 kg (13.2 lb) <p>Integrated functions:</p> <ul style="list-style-type: none"> • Two 1 Gigabit Ethernet controllers • Local service processor • One IDE hard disk drive controller with one channel • RS-485 interface for communication with BladeCenter Management Module 	<p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Operating temperature: maximum 25°C (77°F). Altitude: 0 to 914 m (0 to 3000 ft) – Operating temperature: maximum 25°C (77°F). Altitude: 914 m to 2133 m (3000 ft to 7000 ft) – Storage temperature: -40° to 60°C (-40° to 140° F) • Humidity: <ul style="list-style-type: none"> – Operating temperature: 8% to 80% – Storage temperature: 5% to 80% <p>Electrical input:</p> <ul style="list-style-type: none"> • Power supply: 12 V DC
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Reliability, availability, and serviceability features

Three important features in server design are reliability, availability, and serviceability (RAS). These RAS features are designed to help you protect the integrity of the data stored on your blade server; help ensure that your blade server is available when you want to use it; and, in the event of a failure, help you easily diagnose and repair the failure with minimal inconvenience.

The following is a list of some of the RAS features that your blade server supports:

- Automatic error retry or recovery
- Automatic server restart
- Built-in monitoring for temperature, voltage, and hard disk drives
- Customer-upgradeable system firmware code
- Diagnostic support of Ethernet controller ports
- Error codes and messages
- Error correcting code (ECC) protection on the Level 2 (L2) cache
- ECC memory
- Service processor that communicates with the BladeCenter Management Module to enable remote blade server management
- SDRAM with serial presence detect (SPD) and vital product data (VPD)
- System error logging
- VPD (includes information stored in nonvolatile memory for easier remote viewing)

Chapter 2. Blade server power, controls, and indicators

This chapter describes the power features, how to turn on and turn off the blade server, and what the controls and indicators mean.

Turning on the blade server

Notes:

- After you connect the power cords of the BladeCenter unit to the electrical outlets, wait until the power-on LED on the blade server flashes slowly before pressing the blade server power-control button. Before the LED flashes, the service processor in the BladeCenter Management Module is initializing, and the power-control button on the blade server will not respond.
- 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 11 for the power-on LED states.
- Throughout this document, the Management Module Web-based user interface is also known as the BladeCenter Management Module Web interface.

After you connect the BladeCenter unit to power, the blade server can start in any of the following ways:

- You can press the power-control button on the front of the blade server (behind the control-panel door) to start the server.
- If a power failure occurs, the BladeCenter unit and then the blade server can start automatically when power is restored (if the blade server is configured through the BladeCenter Management Module to do so).
- You can use the BladeCenter Management Module Web interface to turn on the blade server remotely.

Turning off the blade server

When you turn off the blade server, it is still connected to power through the BladeCenter unit. The blade server can respond to requests from the service processor, such as a remote request to turn on the blade server.

To avoid loss of data, shut down the Linux operating system before you turn off the blade server. Shut down the operating system by typing the `shutdown -h now` command. See your operating-system documentation for additional information about shutting down the operating system.

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

- You can press the power-control button on the blade server (behind the control-panel door). This starts an orderly shutdown of the operating system, if this feature is supported by your operating system.

Note: After turning off the blade server, wait at least 5 seconds before you press the power-control button to turn on the blade server again.

- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the blade server.
- You can use the BladeCenter Management Module Web interface to turn on the blade server remotely.

Note: After you have turned off the blade server, wait at least 30 seconds for the hard disk drives to stop spinning before you remove the blade server from the BladeCenter unit.

Blade server controls and LEDs

This section describes the controls and LEDs on the blade server.

Power-control button: This button is behind the control-panel door. Press this button to manually turn the blade server on or off.

Note: The power-control button has effect only if local power control is enabled for the blade server. Local power control is enabled and disabled through the BladeCenter Management Module Web interface.

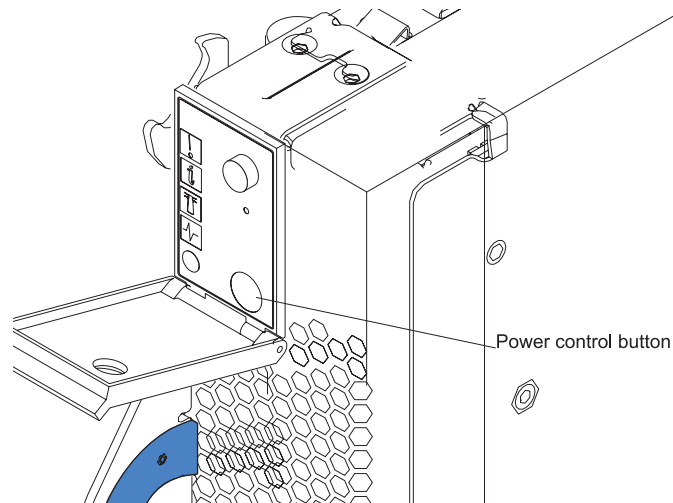


Figure 3. Power-control button

Notes:

- The control-panel door is shown in the closed (normal) position in this illustration.
- The blade-error LED, information LED, and location LED can be turned off through the BladeCenter Management Module Web interface.
- For additional information about errors, see “Problems indicated by LEDs” on page 54.
- This blade server does not have a keyboard/mouse/video select button.

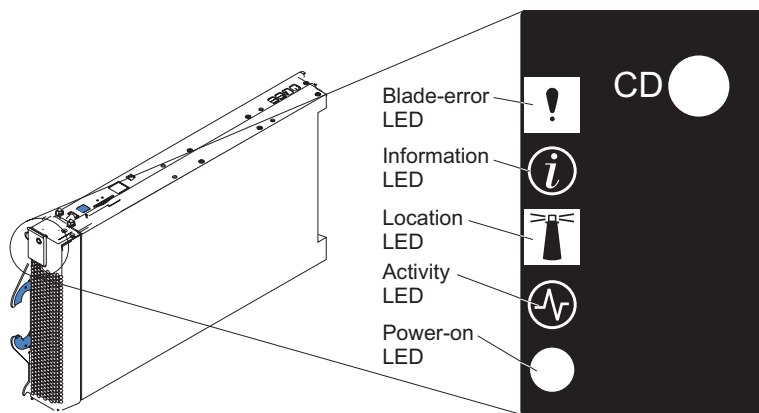


Figure 4. Controls and LEDs

Blade-error LED: When this amber LED is lit, it indicates that a system error has occurred in the blade server.

Information LED: Not supported.

Location LED: When this blue LED is lit, it has been turned on remotely by the system administrator to aid in visually locating the blade server. The location LED on the BladeCenter unit will be lit also.

Activity LED: When this green LED is lit, it indicates that there is network activity.

Power-on LED: This green LED indicates the power status of the blade server in the following manner:

- Flashing rapidly - The service processor on the blade server is communicating with the BladeCenter Management Module.
- Flashing slowly - The blade server has ac power but is not turned on.
- Lit continuously (steady) - The blade server has ac power and is turned on.
- Not lit. Power failure occurred on the blade server

System-board internal and option connectors

The following illustration shows the location of the system-board components, including connectors for user-installable options.

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

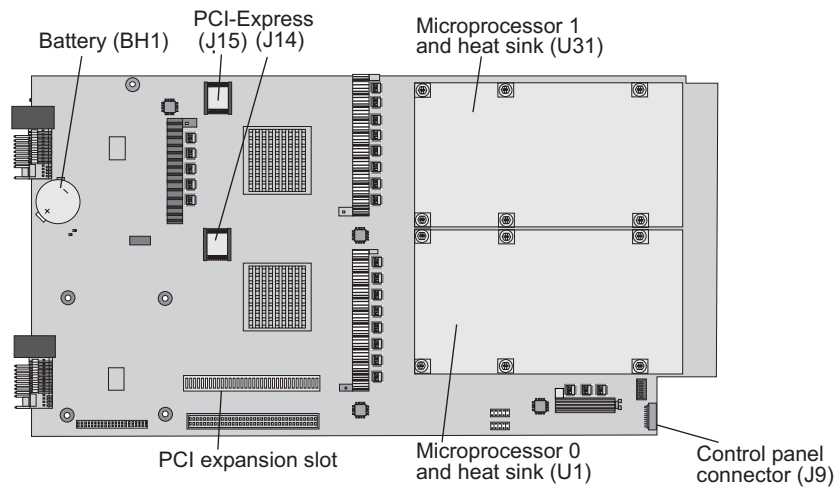


Figure 5. System board components

Chapter 3. Preparing the BladeCenter unit

This chapter describes the tasks that you must perform before you can use the BladeCenter unit with the blade server.

Preinstallation checklist

Before you can use the BladeCenter unit with the blade server, you must correctly set up and configure the BladeCenter unit, and install and configure the required components in the BladeCenter unit. If you have not already done so, perform the activities on the following checklist:

- ___ 1. Set up the rack in which you will install the BladeCenter unit.
- ___ 2. Install the BladeCenter unit in a rack.
- ___ 3. Install and configure the required BladeCenter unit components:
 - ___ a. Make sure that the BladeCenter unit has adequate power to support all the installed devices. The BladeCenter unit must contain either two or four power modules. If necessary, upgrade the power modules in the BladeCenter unit. For additional information, see the *IBM BladeCenter Power Module Upgrade Guidelines*.
 - ___ b. Install and configure one or two Management Modules in the BladeCenter unit. For the BladeCenter QS20, BladeCenter 8677 with Management Module 1 is the only supported chassis.
 - ___ c. Install and configure one or two Gigabit Ethernet modules in the BladeCenter unit. For the BladeCenter QS20 only the following BladeCenter Ethernet switch-modules are supported:
 - Nortel Networks Layer 2/3 Copper Gigabit Ethernet Switch Module (P/N: 26K6530)
 - Cisco Systems Intelligent Gigabit Ethernet Switch Module (P/N: 13N2281 / 32R1892 / FRU 13N2285)
- ___ 4. If the BladeCenter unit was shipped to you before June 2003, make sure that:
 - ___ a. The hardware and firmware in the BladeCenter unit are at the supported levels for the blade server. Go to the IBM Support Web site, <http://www.ibm.com/pc/support/>, for additional information.
 - ___ b. The BladeCenter unit has the correct customer interface card (CIC).

Note: Cisco Ethernet switch-modules need a special configuration to work properly with a BladeCenter QS20.

For illustrations and additional information, see the following related documentation on the World Wide Web at <http://www.ibm.com/pc/support/>:

- *IBM BladeCenter (Type 8677) Planning and Installation Guide*
- *IBM BladeCenter Power Module Upgrade Guidelines*
- *IBM BladeCenter Management Module Installation Guide*
- *IBM BladeCenter Management Module Command-Line Interface Reference Guide*
- The documentation that comes with the Ethernet switch module that you are using; for example:
 - *IBM BladeCenter Cisco Systems Intelligent Gigabit Ethernet Switch Module Installation Guide*

- *IBM BladeCenter Nortel Networks Layer 2/3 GbE Switch Module Installation Guide*

Note: For more information, see “Related documentation” on page 4.

Chapter 4. Installing the blade server in the BladeCenter unit

If you have options to install in the blade server, refer to the *BladeCenter QS20 Problem Determination and Service Guide* for instructions; then, return here. Otherwise, continue with the instructions in this chapter.

Installing the blade server

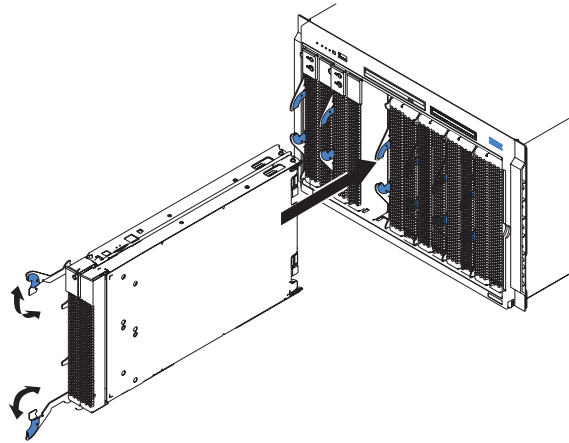


Figure 6. Inserting the blade server into the BladeCenter

Notes:

- For information about the design of the BladeCenter unit, including the hot-swap blade bays, see the *IBM BladeCenter (Type 8677) Planning and Installation Guide*.
- The blade server is a hot-swap device. 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.
- The maximum number of blade servers that the BladeCenter unit supports varies by the wattage of the power supplies that are installed in the BladeCenter unit. For more information about determining the power requirements for the blade server, see the *IBM BladeCenter Power Module Upgrade Guidelines*.
- Do not install a blade server in blade bays 6/7. For more information and explanation, see Table 1 on page 3.
- To help ensure proper cooling, performance, and system reliability, do not operate the BladeCenter unit for more than 1 minute without a blade server or filler blades installed in each blade bay.

When you remove filler blades from a blade bay in the BladeCenter unit so that you can install a blade server, *do not* discard the filler blades. You need the filler blades if you ever remove the blade server. For future use, store the filler blades in a static-protective environment, such as the static-protective package that comes with the blade server.

Attention: If you plan to remove a blade server and reinstall it, be sure to note the number of the bay that contains the blade server before you remove it. Then, 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 unintended consequences, such as incorrectly reconfiguring 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.

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.

Complete the following steps to install a blade server into the BladeCenter unit:

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
2. If you have not done so already, install any options needed, such as disk drives or memory, in the blade server.
3. Select the bay for the blade server.
4. If the bay that you selected contains filler blades, remove the filler blades. For future use, store the filler blades in a static-protective environment.
5. Make sure that the release levers on the blade server are in the open position (perpendicular to the blade server).
6. Slide the blade server into the bay until it stops. The spring-loaded doors further back in the bay that cover the bay opening move out of the way as you insert the blade server.
7. Push the release levers on the front of the blade server to the closed position.
8. (Optional) A set of user labels comes with the blade server. Write identifying information on one of the user labels for the blade server; then, place the label on the BladeCenter unit bezel just below the blade server, as shown in Figure 7 on page 19.

If you install a blade server in bay 13-14, place the label next to the product name. Do not cover the label that contains the system information.

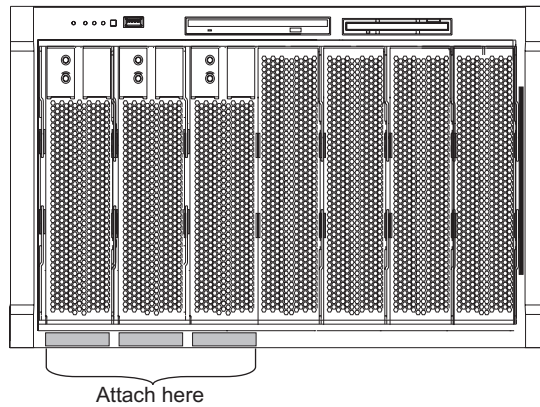


Figure 7. Where to attach user labels

Important: Do not place the label on the blade server or in any way block the ventilation holes on the blade server.

9. If this is not the initial installation of this blade server in the BladeCenter unit, continue with the next step.

If this is the initial installation of this blade server in the BladeCenter unit, you must perform the following additional tasks:

- a. Turn on the blade server by pressing the power-control button on the blade server control panel. The power-on LED on the blade server changes from the slowly-flashing state to a continuously lit (steady) state.
 - b. Install the operating system. Use the installation instructions that come with the operating system. For more information, see Chapter 7, "Installing the operating system," on page 51.
10. If you have already installed the operating system on the blade server, the blade server is ready to use.

If you have not already done so, turn on the blade server by pressing the power-control button on the blade server control panel. The power-on LED on the blade server changes from the slowly-flashing state to a continuously lit (steady) state.
 11. If you have other blade servers to install, you can do so now.

Chapter 5. Installing and removing replaceable units

This chapter provides instructions for replacing units on the blade server. Replaceable units are components, such as memory modules, the hard disk drive, and I/O expansion cards. (Some removal instructions are provided in case you need to remove one replaceable unit to install another.)

The following replaceable units are supported:

- Battery
- IDE hard disk (one only)
- The bezel assembly (control panel)
- InfiniBand cards (optional)

Installation guidelines

Before you begin, read the following information:

- Read the safety information beginning on page v and the guidelines in “Handling static-sensitive devices” on page 22. This information will help you work safely with the blade server and options.
- Read the information in .
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver and a Phillips screwdriver available.
- 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-swap modules on the rear of the BladeCenter unit.
- Before you remove a hot-swap blade server from the BladeCenter unit, you must shut down the operating system by typing the `shutdown -h now` command. If the blade server was not turned off, press the power-control button (behind the blade-server control-panel door) to turn off the blade server. 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, which means that if the blade server or BladeCenter unit and operating system support hot-swap capability, you can remove or install the component while the blade server or BladeCenter unit is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap 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.

- You have not installed any small computer system interface (SCSI) devices. The blade server does not support SCSI devices. If you attach SCSI devices to the blade server, these devices will not be recognized or configured, and they will not operate.

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

The following illustration shows how to remove the blade server from the BladeCenter unit.

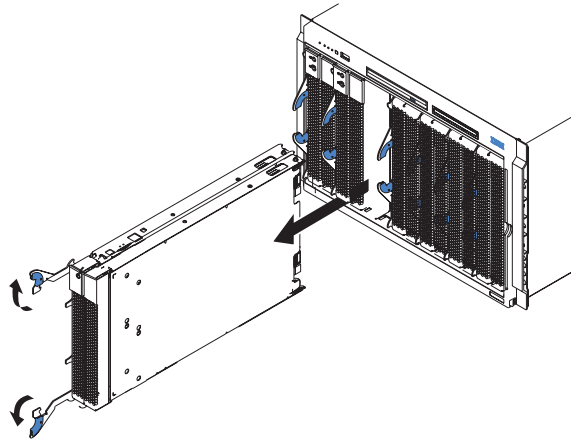


Figure 8. Removing the blade server

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 that you remove. You need this information if you decide to reinstall the blade server in the BladeCenter unit. If you reinstall the blade server, be sure to reinstall it 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 unintended consequences, such as incorrectly reconfiguring 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.

Note: The blade server is a hot-swap device, and the blade bays in the BladeCenter unit are hot-swap 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:

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
2. If the blade server is operating, the power-on LED is lit continuously (steady). Shut down the operating system by typing the `shutdown -h now` command. If the blade server was not turned 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 11 for more information about the location of the power-control button.

Attention: Wait at least 30 seconds for the hard disk drives to stop spinning, before proceeding to the next step.

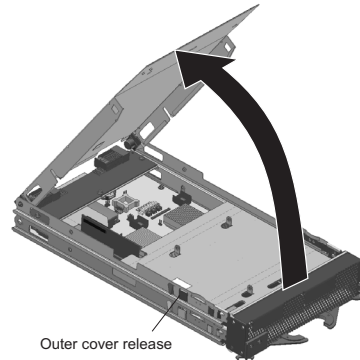
3. Open the two release levers as shown in the illustration. The blade server moves out of the bay approximately 0.6 cm (0.25 inch).

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 the blade server cover

The following illustration shows how to open the cover on the blade server. The BladeCenter QS20 has an inner cover as well as an outer cover.

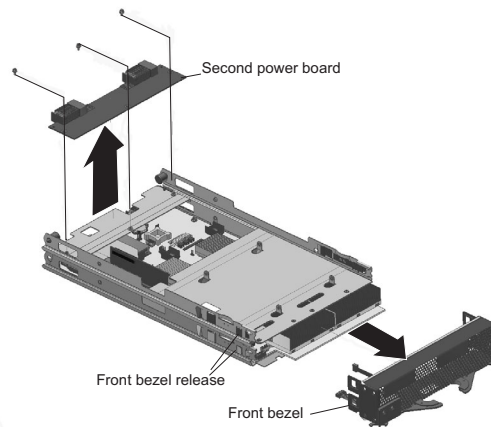
1. Open outer cover



2. Remove outer cover from blade server



3. Remove second power board and front bezel



4. Open inner cover

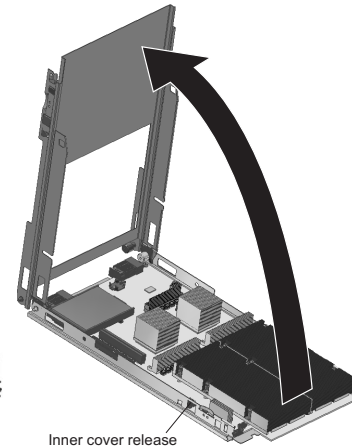


Figure 9. Opening the blade server cover

Complete the following steps to open the blade server cover:

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
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 9, step 1).
4. Lift the cover from the blade server and set it aside (see Figure 9, step 2).
5. Remove the second power board (see Figure 9, step 3).
6. Disconnect any (optionally) installed PCI-Express cables.
7. Press the two front bezel release buttons on each side of the server and remove the front bezel assembly (see Figure 10 on page 27 and Figure 9, step 3).
8. Press the blue blade-cover release on each side of the blade server and lift the inner cover open (see Figure 9, step 4).

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 blade-server bezel assembly

Before you can replace a defective system-board assembly or blade-server bezel assembly, you must first remove the blade-server bezel assembly. The following illustration shows how to remove the bezel assembly from a blade server.

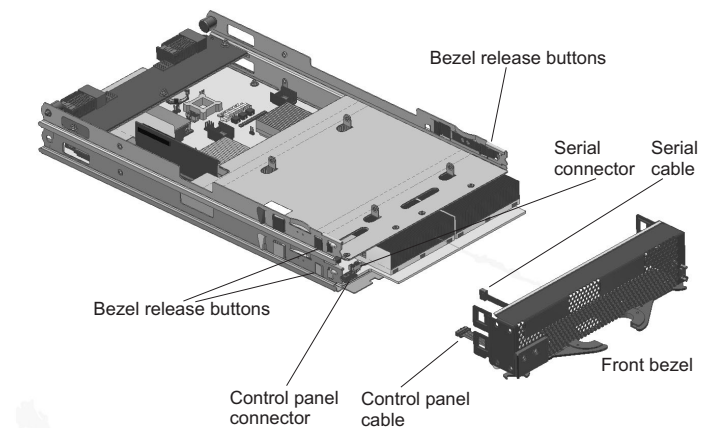


Figure 10. Removing the bezel assembly

Complete the following steps to remove the blade-server bezel assembly:

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
2. Open the blade server cover.
3. Press the bezel-assembly release and pull the bezel assembly away from the blade server approximately 1.2 cm (0.5 inch).
4. Disconnect the control panel cable from the control panel connector.
5. Disconnect the serial cable from the serial connector.
6. Pull the bezel assembly away from the blade server.
7. Store the bezel assembly in a safe place.

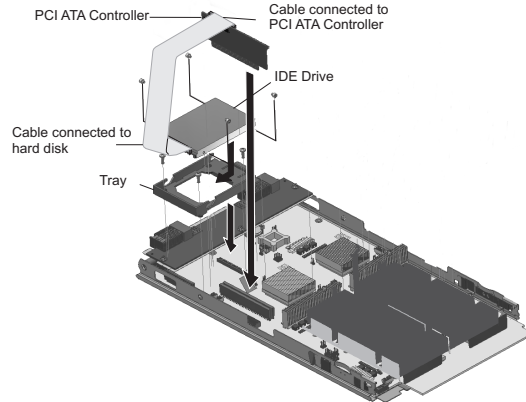
Installing the IDE hard disk drive

The blade server has a connector on the system board for installing a 2.5-inch integrated drive electronics (IDE) hard disk drive. The BladeCenter QS20 model comes with the IDE hard disk drive already installed.

Note: Some hard disk drives have Phillips screws; therefore, make sure that a Phillips screwdriver is available.

Attention: To maintain proper system cooling, do not operate the BladeCenter unit for more than 1 minute without a blade server or filler blade installed in each blade bay.

1. Install the hard disk into the blade server



2. Hard disk and PCI ATA controller installed on the blade server system board

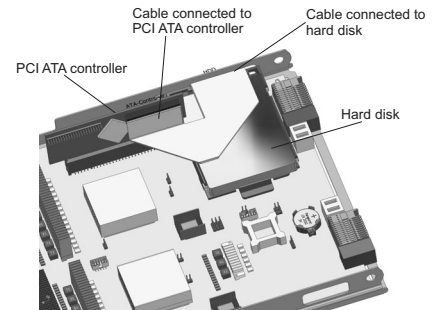


Figure 11. Installing the hard disk

Attention:

- Do not press on the top of the hard disk drive when installing it. Pressing the top could damage the hard disk drive.
- IDE hard disk drives must be set to master.

Complete the following steps to install a 2.5-inch IDE hard disk drive:

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
2. If the blade server is operating, shut down the Linux operating system by typing the `shutdown -h now` command. If the blade server was not turned 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 11 for more information about the location of the power-control button.
3. Remove the blade server from the BladeCenter unit. (See “Removing the blade server from the BladeCenter unit” on page 23 for instructions.) Carefully place the blade server on a flat, static-protective surface.
4. Open the blade server cover. See “Opening the blade server cover” on page 25 for instructions.
5. Place the tray from the option kit on the system board, aligning the tray with the screws on the system board. Note the four screws that are under the four screw holes in the tray. Set the tray aside and remove the four screws.
6. Replace the tray and secure the tray to the system board with screws from the hardware kit.
7. Connect the cable to the PCI ATA controller at one end and the hard disk drive at the other end.
8. Insert the PCI ATA controller card into the slot on the system board
9. Place the hard disk drive into the tray and, from the rear edge of the hard disk drive, push it into the tray. The hard disk drive clicks into place.
10. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 40.

Installing InfiniBand

This section describes how to install the InfiniBand option.






CAUTION:

Be careful when you fit or remove InfiniBand cables. Make sure you do not pinch the serial connection cable inside the blade.

InfiniBand package content

Each InfiniBand™ option package consists of:

Table 3. InfiniBand package contents

Description	What the item looks like
1 x Mellanox InfiniBand card	
1 x adapter card	
1 x PCI-Express cable	
2 x key headers	
4 x screws	
1 x installation instructions	This document

What you need to install InfiniBand

Make sure you have a small flat screwdriver before you install your InfiniBand card.

Installing InfiniBand

To install an InfiniBand option, do the following:

1. Shut down the BladeCenter QS20.
2. Remove the BladeCenter QS20 from BladeCenter.
3. Open the top cover.
4. Remove the small plastic cover on the front bezel from the slot where the InfiniBand option is to be installed.



Figure 12. Removing the InfiniBand slot cover

Note: If only one InfiniBand option is to be installed, it is recommended that you install it in the upper slot.

5. Unlatch, but do not disconnect the front bezel. Be careful with the cables.
6. Place the first key header on the respective BladeCenter QS20's PCI Express connector so that it covers the two contacts closest to the hard disk drive, see Figure 13 on page 31.

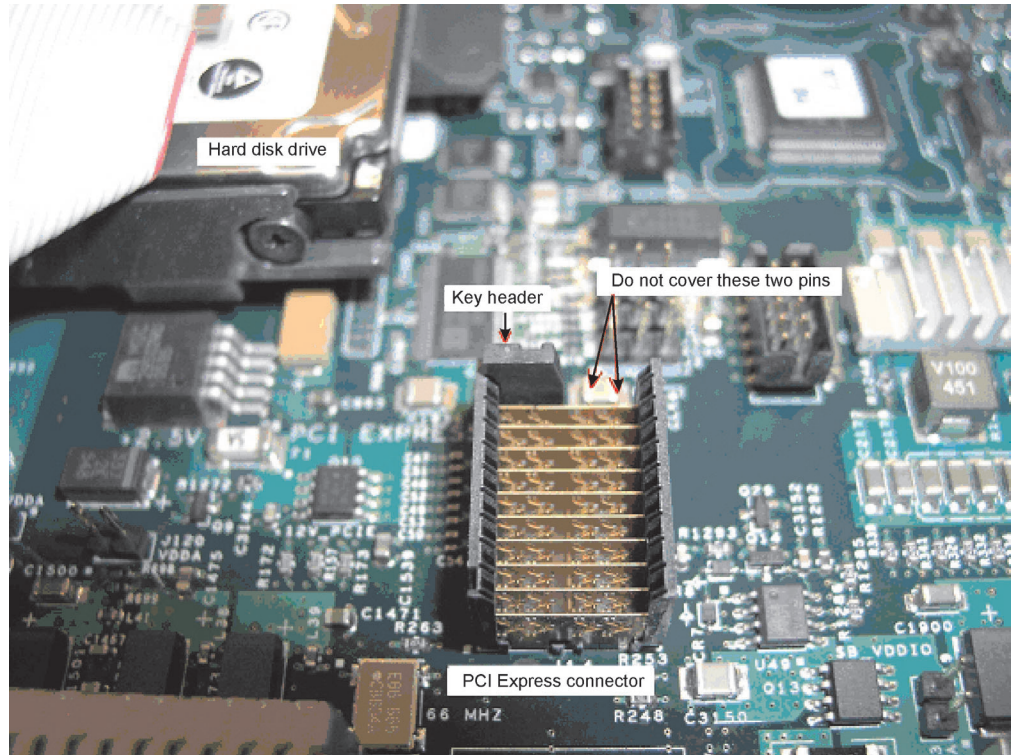


Figure 13. Where to place the key header on the BladeCenter QS20 board

7. Hold the PCI Express adapter card so that you look top down onto the PCI-Express connector J1. Place the second key header so that it covers the two upper rightmost contacts, see Figure 14.

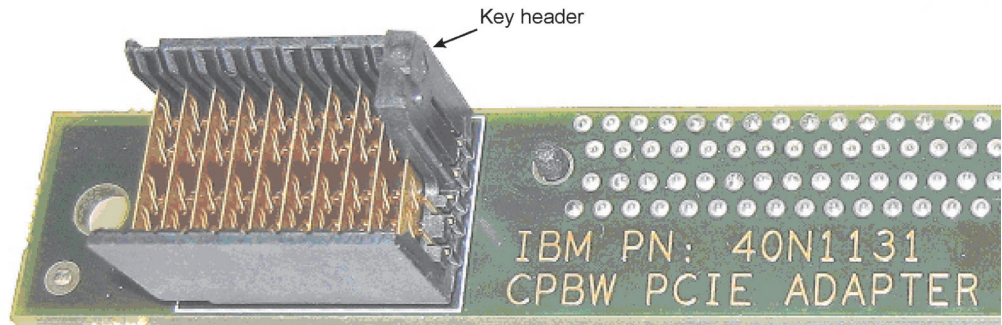


Figure 14. PCI Express adapter card with installed key header

8. Plug the InfiniBand card into the adapter. Make sure the index hole of the InfiniBand card matches the index mark of the adapter, see Figure 15 on page 32.

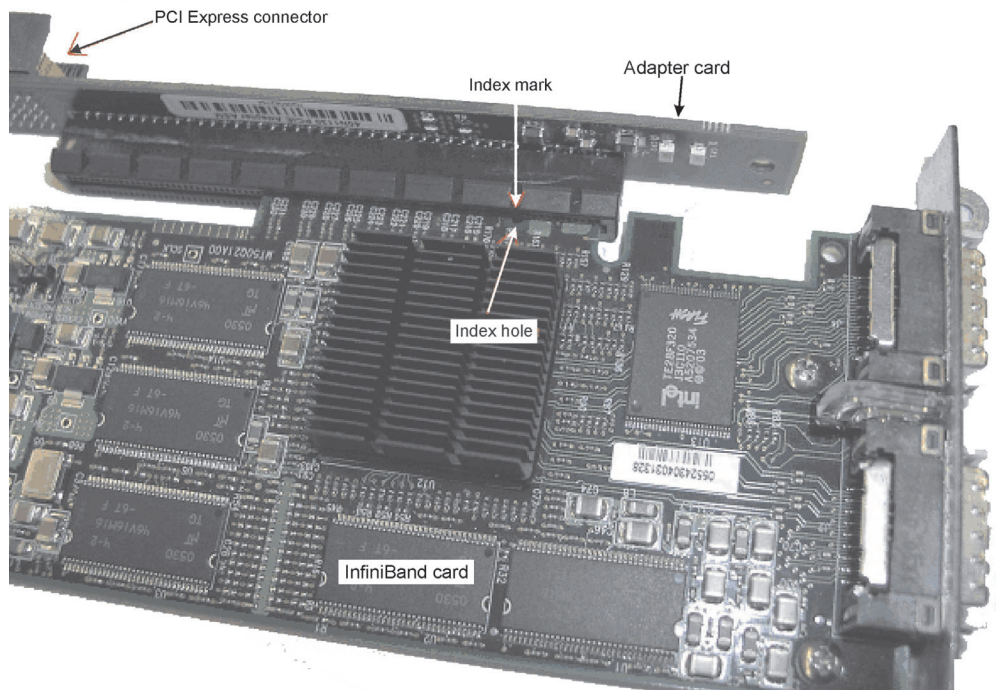


Figure 15. InfiniBand card connected to PCI Express adapter card

9. Mount this assembly into the BladeCenter QS20 so that the InfiniBand ports of the InfiniBand card point to the front bezel and match the respective ports of the front bezel.
10. Secure the assembly with the four screws that were delivered with your InfiniBand card, see Figure 16 on page 33.

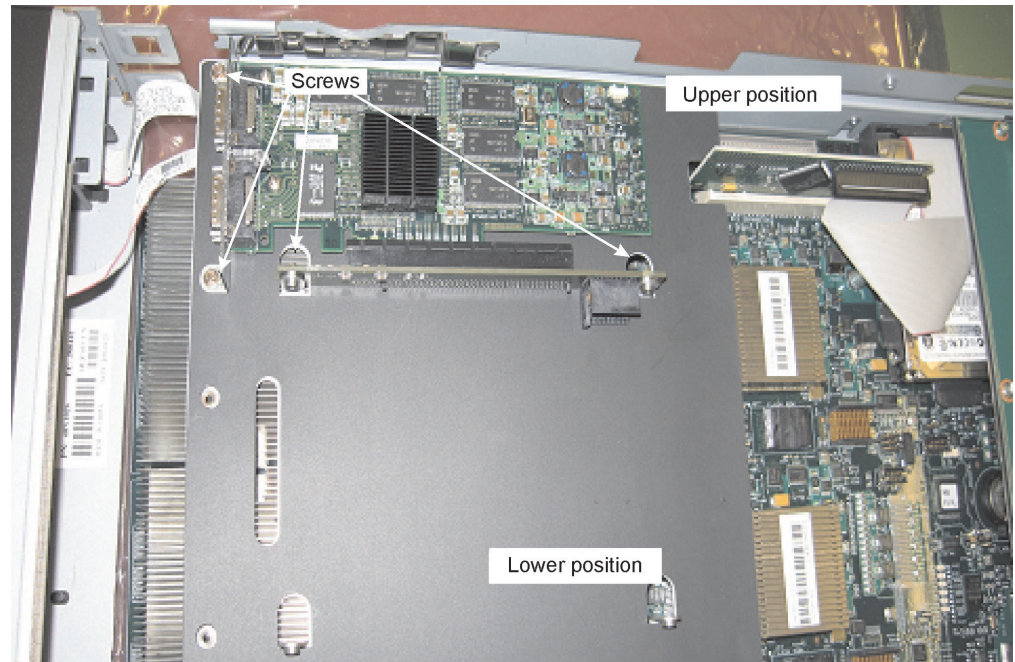


Figure 16. Mounting point and position description

11. Optional: repeat the above steps for the second InfiniBand option.
12. Refit the front bezel.

Note: Make sure that you do not pinch the control-panel or the serial cables when you install the front bezel assembly. Make sure the serial cable is not blocking the upper two InfiniBand ports. Route the cable so that it cannot be damaged when you plug and unplug the InfiniBand connectors, see Figure 17 on page 34 and Figure 18 on page 34.

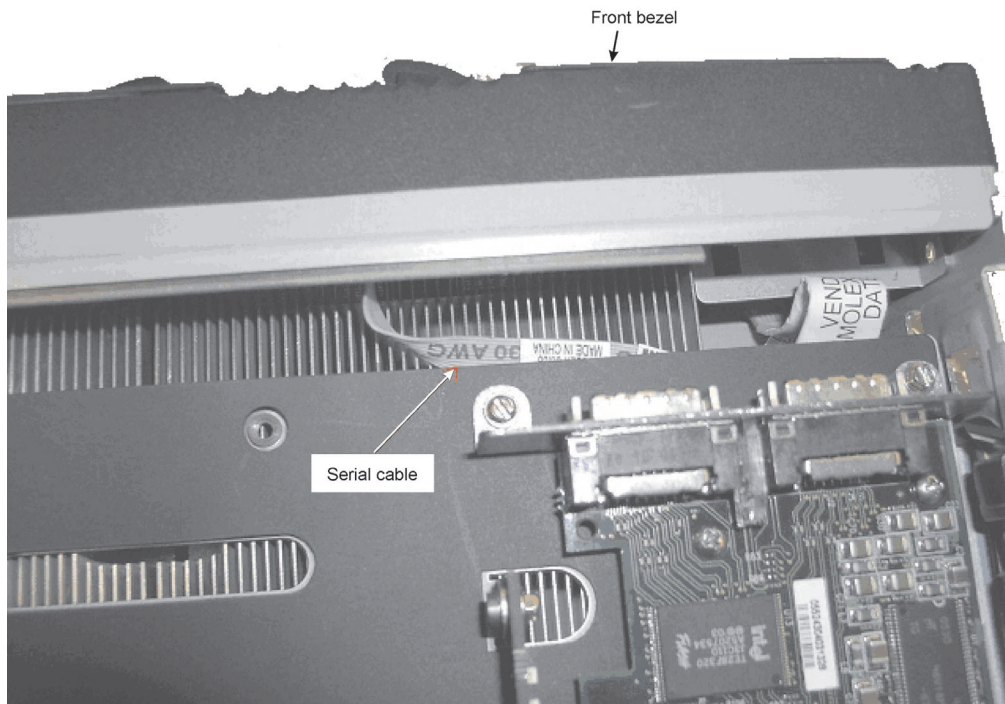


Figure 17. Serial cable position (1)

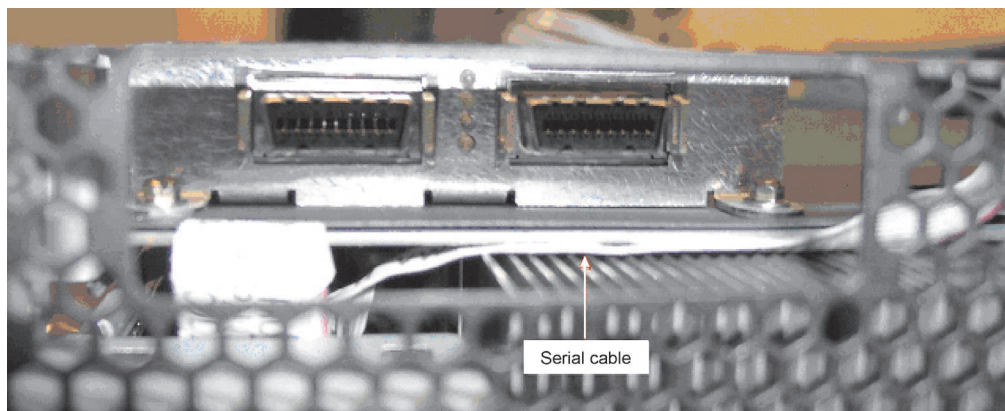


Figure 18. Serial cable position (2)

13. Plug the PCI-Express cable into the BladeCenter QS20's PCI-Express connector closest to the InfiniBand card. Leave the other end unconnected.

Note: The cable is assymetric! You must plug the connector with two clamps into the BladeCenter QS20 and the connector with only one clamp into the adaptor card (with the clamp facing you), see Figure 19 on page 35 and Figure 20 on page 36.

14. Fan out the cables and carefully bend them sideways.
15. Connect the second connector of the PCI-Express cable to the InfiniBand card adaptor. If you have installed the lower (second) InfiniBand option, be careful

not to damage the second card when you install the connector to the upper card.



Figure 19. PCI Express connector installation (if you have installed the second InfiniBand option)

16. Optional: repeat the above steps for the second InfiniBand option.

Note: When you install the lower (second) InfiniBand option, make sure that the PCI-Express cable is not blocking the top cover.

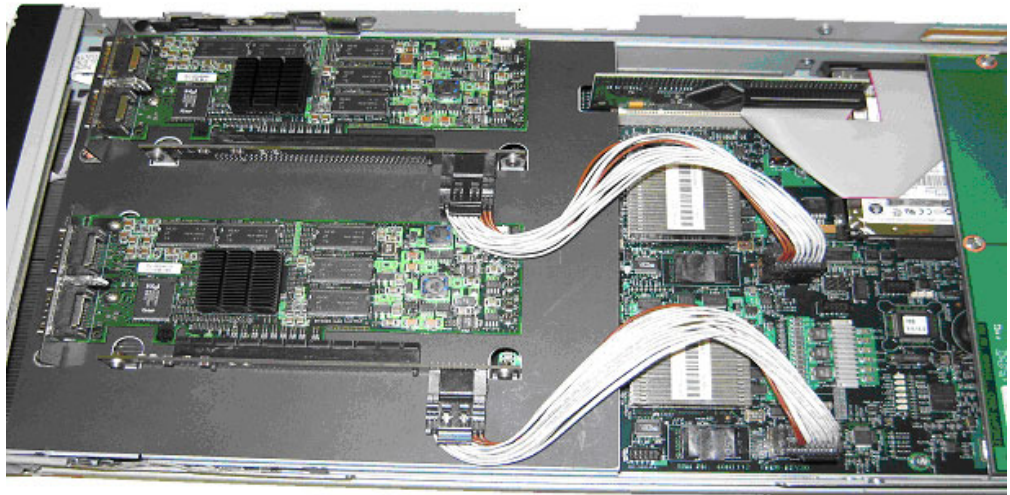


Figure 20. Overview with two InfiniBand options installed

17. Carefully close the cover.

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 33F8354 or 15F8409 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 66 for more information about battery disposal.

Complete the following steps to replace the battery:

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
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. If the blade server was not turned 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 11 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 23 for information).
5. Carefully place the blade server on a flat, static-protective surface.
6. Open the blade server cover (see “Opening the blade server cover” on page 25 for instructions).
7. Locate the battery (connector BH1) on the system board.

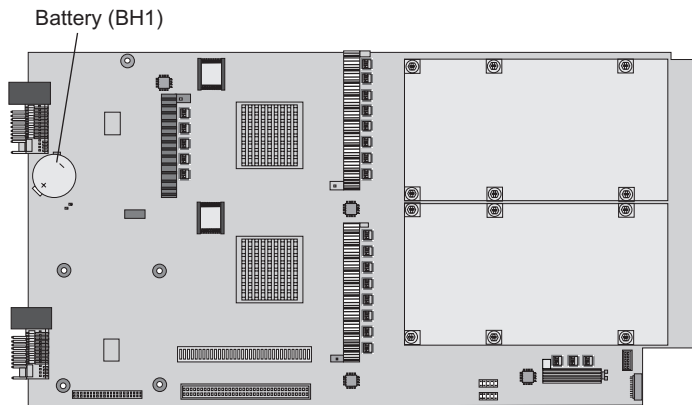


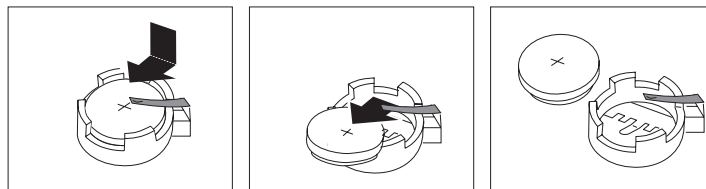
Figure 21. Battery location

8. Remove the battery:
 - a. Use your finger to press down on one side of the battery; then, slide the battery out from its socket. The spring mechanism will push the battery out toward you as you slide it from the socket.

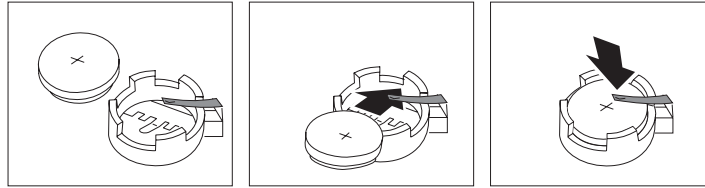
Note: You might need to lift the battery clip slightly with your fingernail to make it easier to slide the battery.

- b. Use your thumb and index finger to pull the battery from under the battery clip.

Note: After you remove the battery, press gently on the clip to make sure that the battery clip is touching the base of the battery socket.



9. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket, under the battery clip. Make sure that the side with the positive (+) symbol is facing up.
 - b. As you slide it under the battery clip, press the battery down into the socket.



10. Close the blade server cover (see “Closing the blade server cover” on page 42).

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 9).
13. Reset the system date and time through the operating system that you installed. For additional information, see your operating-system documentation.

Completing the installation

To complete the installation, perform the following tasks, if you have not already done so.

1. Install the blade-server bezel assembly on the blade server (see “Installing the blade server bezel assembly”).
2. Close the blade server cover (see “Closing the blade server cover” on page 42).

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.

3. Reinstall the blade server into the BladeCenter unit .
4. Turn on the blade server (see “Turning on the blade server” on page 9).
5. After you replace 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 connected the power cords of the BladeCenter unit to electrical outlets, you will have to wait until the power-on LED on the blade server flashes slowly before pressing the power-control button on a blade server.

Installing the blade server bezel assembly

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

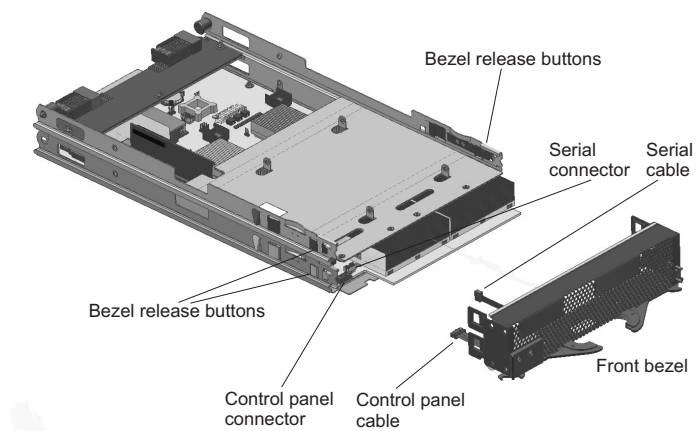


Figure 22. Installing the bezel assembly

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

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
2. Connect the control-panel cable to the control-panel connector on the system-board assembly.
3. Connect the serial cable from the serial connector to the serial connector on the system-board assembly.
4. Carefully slide the bezel assembly onto the blade server as shown in the illustration, until it clicks into place.

Note:

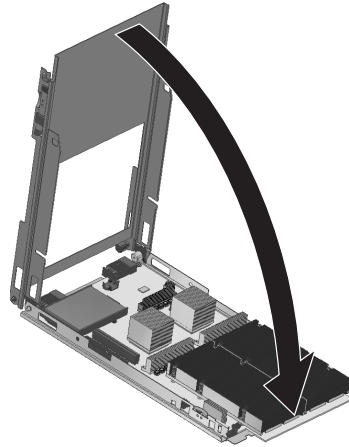
- Make sure that you do not to pinch the control-panel or the serial cables when you install the bezel assembly.
- If you have an InfiniBand option installed make sure the serial cable is not blocking any InfiniBand port.

Closing the blade server cover

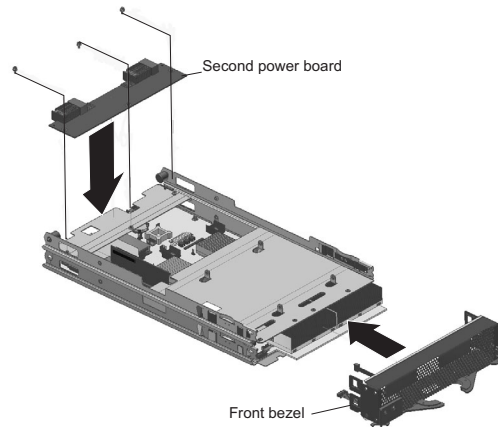
Important: The blade server cannot be inserted into the BladeCenter unit until the cover is installed and closed. Do not attempt to override this protection.

The following illustration shows how to close the blade server cover.

1. Close inner cover



2. Replace second power board and front bezel



3. Close outer cover

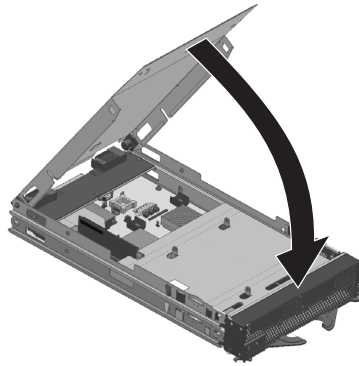


Figure 23. Closing the blade server cover

Complete the following steps to close the blade server cover:

1. Read the safety information beginning on page v and “Installation guidelines” on page 21.
2. Close the inner cover. It clicks into place when it is closed, see Figure 23, step 1.
3. If you removed the blade bezel assembly, replace it now. See “Installing the blade server bezel assembly” on page 40 for instructions, and Figure 23, step 2.
4. If you removed the second power board, replace it now, see Figure 23, step 2.
5. If you disconnected any PCI-Express cables reconnect them now. See the documentation that comes with the InfiniBand option for detailed installation instructions.
6. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade server, as shown in the illustration. 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.

7. Pivot the cover to the closed position as shown in the illustration, until it clicks into place, see Figure 23 on page 42, step 3.

Note: If you have an InfiniBand option installed, make sure that you do not pinch or bend any PCI-Express cable. Do not use excessive force to close the cover. If it does not close remove the cover and carefully bend the PCI-Express cables so that they no longer block the cover. Take care not to exceed the cable's minimum bending radius.

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.

The BladeCenter QS20 supports an external UART connection at the front panel. A special cable (part number 83421-9208) is required to connect this UART connection to a standard 9-pin UART connection. .

Chapter 6. Configuring the blade server

This chapter contains the configuration tasks that you must perform so that you can use the IBM BladeCenter Management Module command-line interface. This chapter also describes other configuration requirements for the blade server.

After you install the blade server in the BladeCenter unit, the blade server is automatically configured. The blade server is automatically reconfigured after you install software or hardware. IBM periodically make firmware updates available for the blade server. Before you continue, make sure that the blade server has the latest version of firmware code. For additional information, see “Upgrading the system firmware” on page 48.

Because the firmware code in the blade server uses auto-configuration, additional blade-server configuration programs are not required for the blade server. However, if you have attached other devices to the blade server or the BladeCenter unit, you must configure those devices as described in the applicable documentation that comes with those devices or the BladeCenter unit.

You do not have to set any passwords to use the blade server. If you change the battery or replace the system-board assembly, you must reset the date and time through your operating system.

For information about setting up your network configuration for remote management, see the *IBM BladeCenter Planning and Installation Guide* or the *IBM BladeCenter T Installation and User's Guide* located at <http://www.ibm.com/pc/support/> on the World Wide Web.

Notes:

- The BladeCenter unit needs to be configured only once.
- 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 chapter, see the documentation that comes with the Ethernet switch module that you are using.
- Before you can run programs on the blade server, you must install an operating system on the blade server. For information about installing the operating system, see Chapter 7, “Installing the operating system,” on page 51.
- Throughout this document, the Management Module Web-based user interface is also known as the BladeCenter Management Module Web interface.
- Throughout this document, the user name is also known as the user identifier or user ID for logging on to the management module.

Communicating with the blade server

You can access the blade server through:

- The management module, either through
 - The Web-based management and configuration program. This is your main access method to the blade server.or
- The command-line interface. See “Using the command-line interface” on page 46.
- The serial interface. See “Using the serial interface” on page 46.

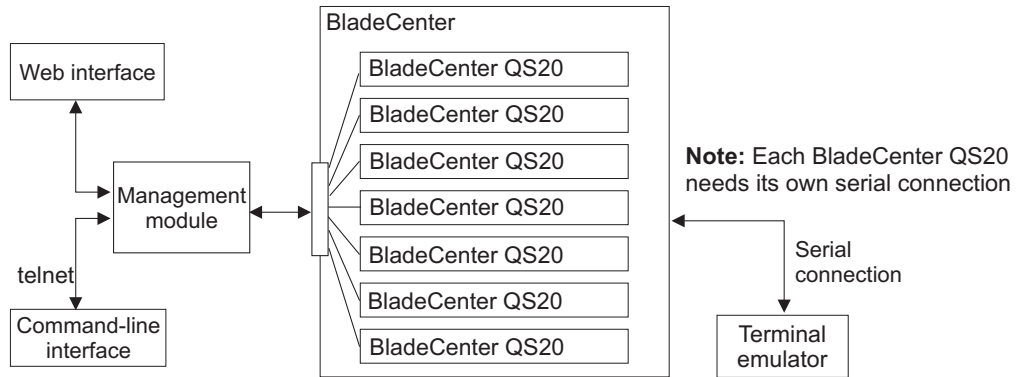


Figure 24. Communication with the blade servers

The next sections describe the management and configuration program in the Management Module in more detail.

Using the command-line interface

The IBM @server BladeCenter Management Module command-line interface provides direct access to BladeCenter management functions 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*.

Note: Serial-over-LAN (SOL) is not implemented on BladeCenter QS20s, therefore you cannot use the command-line interface to access the BladeCenter QS20's text console command prompts. You must use the serial interface instead.

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 front panel using a specific UART cable. To connect to the serial console, plug the serial cable into the front panel and connect the other end to a serial device or computer with a serial port.

Set the following parameters for the serial connection on the Hyperterminal:

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

Starting the management and configuration program in the Management Module

Use the Management Module Web-based management and configuration program to:

- Configure the BladeCenter unit.
- Update and configure BladeCenter components.
- Monitor the current system status.
- Check the event log for system and other errors.

Complete the following steps to start the Web-based management and configuration program. (For additional information, see the *IBM BladeCenter (Type 8677) Planning and Installation Guide*.)

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 onto the 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 onto the 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 Management Module are:

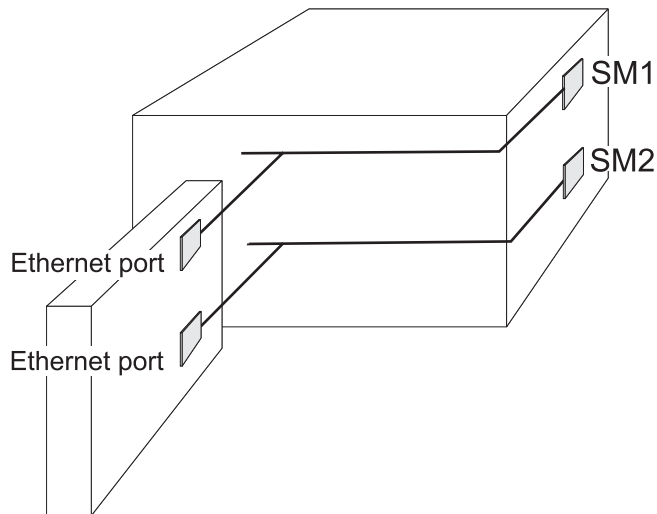
- User ID: USERID (all capital letters)
 - Password: PASSWORD (note the number zero, not the letter O, in PASSWORD)
3. Follow the instructions that appear on the screen. Be sure to set the timeout value that you want for your Web session.

The BladeCenter management and configuration window opens.

Integrating the Gigabit Ethernet controllers into the BladeCenter

Two dual-port Gigabit Ethernet controllers are integrated on the blade server system board. Each controller port provides a 1000-Mbps full-duplex interface for connecting to one of the Ethernet-compatible switch modules in I/O bays 1 and 2, which enables 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 48 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 controllers 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 IBM Support Web site at <http://www.bsc.es/projects/deepcomputing/linuxoncell/>.

Blade server Ethernet controller enumeration

The enumeration of the Ethernet controllers 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.

Upgrading the system firmware

The following section describes how to update the firmware.

BladeCenter QS20 firmware contains a proprietary implementation of Cell BE hardware initialization code. The user and operating system interfaces 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.

Firmware package and contents

The firmware consists of :

- A firmware package, which runs on the Cell BE (Host FW)
- A firmware package for the on-board service processor (SP™ FW)

Both packages follow the same versioning scheme. You must ensure that both versions are the same when you perform an upgrade. Table 4 describes the firmware files.

Table 4. Firmware files

Filename	Description
CB1-FW-<version>-boot_rom.bin	Image for flashing through Linux
CBlade-<version>.pkt	Firmware image to flash the service processor using the BladeCenter Management Module.

Determining current blade server firmware code levels

Complete the following steps to view the current firmware code levels for the blade server and the service processor:

1. Access and log onto the BladeCenter Management Module Web interface as described in the *IBM BladeCenter (Type 8677) Planning and Installation Guide*.
2. From the **Blade Tasks** section, select **Firmware VPD**.

The **Blade Server Firmware VPD** window contains the build identifier, release, and revision. Compare this information to the firmware information on the IBM Support Web site at <http://www.ibm.com/pc/support/>. If these two types of information match, then the blade server has the latest firmware code. If these two types of information differ, download the latest firmware code from the IBM Support Web site. Follow the update instructions on the IBM Support Web site.

Note: The firmware version displayed by the BladeCenter Management Module might be different from the version displayed by your operating system. Cross-referenced information is given in the firmware information on the IBM Support Web site at <http://www.ibm.com/pc/support/>, and in the readme file for the firmware image.

Installing the firmware

You only need to install the BladeCenter QS20 firmware if you need to do either of the following:

- Upgrade to a newer version
- Downgrade to an older version if there are problems with the current version

The firmware for the on-board service processor can only be installed using the standard firmware update feature of the BladeCenter Management Module. For more information, see the Management Module documentation or ask your IBM support representative.

Host FW can only be installed using the Linux operating system. If Linux is not installed or cannot be started, then no upgrade or recovery is possible. Call your IBM support representative. Linux needs to have a current version of `rtas_flash` device driver installed. For instructions about how to get this driver and how to install it, read the *BladeCenter QS20 SDK Toolkit Installation and Users Guide*.

This device driver offers a number of different methods for installing and managing a system flash using the `/proc` interface. The script, `update_flash`, simplifies the procedure, and your Linux distributor should provide you with this script. For more information, see the *BladeCenter QS20 SDK Toolkit Installation and Users Guide*.

Installing the firmware manually

Where older versions of the `update_flash` script exist on your system or where it is not installed you can use `rtas_flash` over `/proc`. To install the firmware, do the following:

1. Ensure the `rtas-flash` driver is loaded. To do this, run `lsmod`.
2. If the module is not yet in the kernel, invoke the following to load it:

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

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

Updating the host and service processor images

To update the host and service processor images, do the following:

1. Boot the operating system if it is not running already.
2. Update the host firmware image as described in the section above.
3. Restart the blade.
4. Shut down the blade.
5. Update the service processor firmware using the Management Module.

Updating the host firmware on PERM

To update an old image on PERM you must copy the TEMP image to PERM side. The command is:

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

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

For more information, see “Recovering the system firmware code” on page 58.

Chapter 7. Installing the operating system

Before you install the operating system on the blade server, make sure that you provide a connection to the blade server.

Important:

- If you plan to install the operating system through the Ethernet network, see:
 - Chapter 3, “Preparing the BladeCenter unit,” on page 15
 - “Integrating the Gigabit Ethernet controllers into the BladeCenter” on page 47
 - “Blade server Ethernet controller enumeration” on page 48
 - The documentation that comes with the Ethernet switch module that you are using
- After you install the operating system on the blade server, you must install any service packs or update packages that come with the operating system. For additional information, see the instructions that come with your operating-system documentation and the service packs or update packages.

To install the operating system on a blade server, follow the installation instructions that come with the operating system. You can download the latest operating-system installation instructions from *BladeCenter QS20 SDK Toolkit Installation and Users Guide* and install the operating system at the BladeCenter unit (local deployment).

Note: Some options have device drivers that you must install. See the documentation that comes with the options for information about installing any required device drivers.

If your operating system does not have the required device drivers, contact your IBM marketing representative or authorized reseller, or see your operating-system documentation for additional information.

Chapter 8. Solving problems

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 BladeCenter QS20 can relate to either the BladeCenter BladeCenter QS20 or the BladeCenter unit.

- A blade-server problem 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 *IBM BladeCenter (Type 8677) Hardware Maintenance Manual and Troubleshooting Guide*.

If you install the blade server in the BladeCenter unit and the blade server does not start, perform the following actions:

- Make sure that the BladeCenter unit is correctly connected to a power source.
- Reseat the blade server in the BladeCenter unit (see Chapter 4, “Installing the blade server in the BladeCenter unit,” on page 17).
- If the power-on LED is flashing slowly, turn on the blade server (see “Turning on the blade server” on page 9).
- 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.

If the blade server does not start after you have performed the preceding actions, see the *Problem Determination and Service Guide* for your blade server on the Documentation CD.

Firmware startup process

The 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 after a successful operating-system startup.

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 xxxx represents the number of the error code:

- | | |
|--------------|--|
| Cxxxx | This is an internal checkpoint. If the system hangs during the startup process and displays this type of error, contact a service support representative. |
| Exxxx | This type of error means that there is a failure that does not allow the firmware to continue the startup process. Contact a service support representative. |

Descriptions of each of the error codes for Cxxxx, and Exxxx are not included in this document, see the *Problem Determination and Service Guide* for your blade server.

Troubleshooting charts

The following tables list problem symptoms and suggested solutions.

Notes:

- Blade Center 8677 with Management Module 1 is the only supported chassis for the BladeCenter QS20.
- If you have problems with an adapter, monitor, keyboard, mouse, or power module, see the *BladeCenter Type (8677) Hardware Maintenance Manual and Troubleshooting Guide* for more information.
- If you have problems with an Ethernet or Fibre Channel switch module, IBM BladeCenter Optical Pass-Thru Module, I/O adapter, or other optional device that can be installed in the BladeCenter unit, see the applicable *Hardware Maintenance Manual and Troubleshooting Guide* or other documentation that comes with the device for more information.

Problems indicated by LEDs

Table 5. Explanation of LEDs and their states

LED	State	Explanation	Suggested action
Blade-error LED	Amber	system error has occurred in the blade server. Information about a system error for this blade server has been placed in the BladeCenter system error log.	Check the BladeCenter error log, see the <i>Problem Determination and Service Guide</i>
Information LED	Amber	Not used / supported	not applicable
Activity LED	Green	There is network activity.	No action required

Table 5. 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 56

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. If the blade server is in blade bays 7 through 14, power modules are in power-module bays 1, 2, 3, and 4. d. The power-on LED on the blade-server control panel is flashing slowly. <ul style="list-style-type: none"> • If the power-on LED is flashing rapidly and continues to do so, the blade server is not communicating with the Management Module; reseal the blade server and go to step 3. • If the power LED is off, either the blade bay is not receiving power, the blade server is defective, or the LED information panel is loose or defective. e. Local power control for the blade server is enabled (use the BladeCenter Management Module Web interface to make sure), or the blade server was instructed through the Management Module (Web interface) to turn on. f. The blade server is not installed in blade bay 6/7, because if a blade server is installed in either of these bays, it can cause damage to the power supply. A blade server can be installed in blade bays 5/6 or 7/8, but not in 6/7. 2. If you just installed an option in the blade server, remove it, and restart the blade server. If the blade server now turns on, troubleshoot the option (see the documentation that comes with the option for information). 3. Try another blade server in the blade bay; if it works, replace the faulty blade server. 4. If the problem remains, <i>BladeCenter QS20 Problem Determination and Service Guide</i>.

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 6, "Configuring the blade server," on page 45 • The following documentation: <ul style="list-style-type: none"> – <i>IBM BladeCenter (Type 8677) Hardware Maintenance Manual and Troubleshooting Guide</i> <p>Note: For the latest editions of the IBM BladeCenter documentation, go to http://www.ibm.com/pc/support/ on the World Wide Web.</p> <ul style="list-style-type: none"> • Other product-specific documentation that comes with the switch module <p>If the problem remains, see the <i>BladeCenter QS20 Problem Determination and Service Guide</i>.</p>

Service processor problems

Service processor symptom	Suggested action
Service processor reports a general monitor failure.	<ol style="list-style-type: none"><li data-bbox="540 289 1450 321">1. If the blade server is operating, shut down the operating system.<li data-bbox="540 331 1450 384">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.<li data-bbox="540 394 1450 426">3. Remove the blade server from the BladeCenter unit.<li data-bbox="540 436 1450 468">4. Wait 30 seconds and reinstall the blade server into the BladeCenter unit.<li data-bbox="540 478 1450 510">5. Restart the blade server. <p data-bbox="540 520 1450 567">If the problem remains, <i>BladeCenter QS20 Problem Determination and Service Guide</i>.</p>

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 flash update, you can recover the TEMP image from the PERM image.

If the TEMP image becomes damaged, you can see one of two symptoms:

- The system automatically starts from the PERM 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.

- The system hangs or is non-responsive after the system is started with no checkpoints.

Starting the TEMP image

To force the system to start the TEMP image, complete the following steps:

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

Note: 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 perform the reject function. The reject function copies the PERM image into the TEMP image. To perform the reject function, complete the following steps:

1. Reject 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 <http://www.ibm.com/pc/support> for more information about how to update the firmware code.

Appendix A. 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/bladecenter/> and click **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/bladecenter/>, click **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 BladeCenter systems, optional devices, services, and support at <http://www.ibm.com/bladecenter/>. For service information, click **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/>, 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).

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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.

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

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 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 may 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 available from IBM.

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

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Product recycling and disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. Information on product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of programs and services to assist equipment owners in recycling their IT products. Information on product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

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/batteryrecycle.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.

In California, the following applies:

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 includes a lithium manganese dioxide battery which contains a perchlorate substance.

In the Netherlands, the following applies.



For Taiwan: Please recycle batteries.



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 89/336/EWG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

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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 89/336/EWG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 18. September 1998 (bzw. der EMC EG Richtlinie 89/336) 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 nach Paragraf 5 des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

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 89/336/EEC 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.

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。

Chinese Class A warning statement

聲 明
此為 A 級產品。在生活環境中，該產品可能會造成無線電干擾。在這種情況下，可能需要用戶對其干擾採取切实可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

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Korean Class A warning statement

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Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda

IBM power cord part number	Used in these countries and regions
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

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