

AMD Opteron LS20 Type 8850 for IBM BladeCenter

Installation and User's Guide

Welcome.

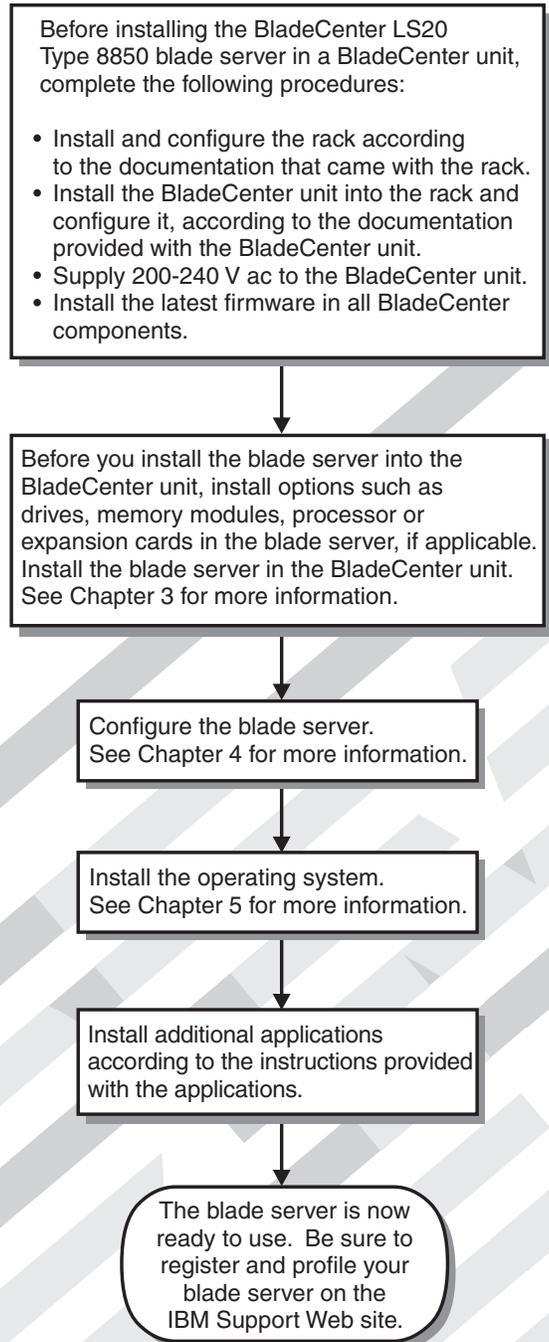
Thank you for buying an IBM blade server. Your blade server features superior performance, availability, and scalability.

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

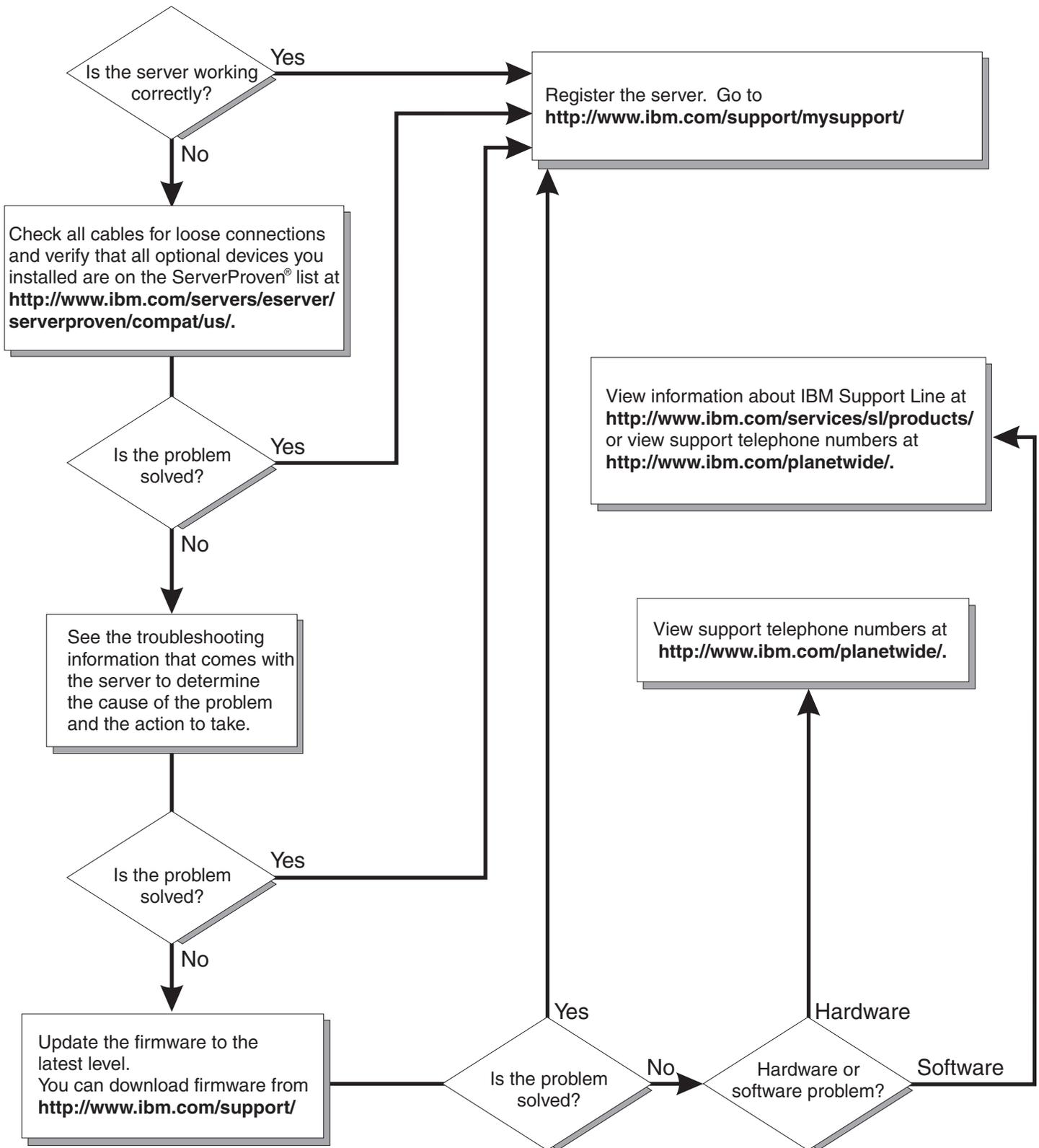
Additionally, a service information label is attached to each BladeCenter unit and blade server. This label provides a graphical summary of many of the installation and service activities that are associated with each device.

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

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



Server Support



AMD Opteron LS20 Type 8850
for IBM BladeCenter



Installation and User's Guide

Note: Before using this information and the product it supports, read the general information in “Notices” on page 45 and the *Warranty and Support Information* document for your blade server type on the *Documentation CD*.

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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.

在安裝本產品之前，請仔細閱讀 **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 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.

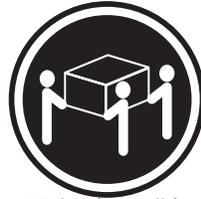
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

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)



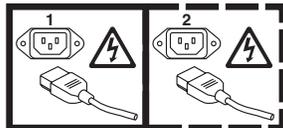
≥ 55 kg (121.2 lb)

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.

Chapter 1. Introduction

The AMD Opteron LS20 Type 8850 for IBM® BladeCenter® systems are designed for high-performance computing (HPC) applications. These high-density, high-performance blade servers are ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and reliable data storage.

Note: Unless otherwise stated, references to the BladeCenter unit apply to all BladeCenter and BladeCenter T units.

This *Installation and User's Guide* provides information about:

- Setting up the blade server
- Starting and configuring the blade server
- Installing hardware options
- Installing the operating system
- Performing basic troubleshooting of the blade server

Packaged with this document are software CDs that help you to configure hardware, install device drivers, and install the operating system. To download the latest device drivers, go to <http://www.ibm.com/support/>.

The blade server comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document for your blade server on the *Documentation* CD. You can obtain up-to-date information about the blade server at <http://www.ibm.com/support/>.

If firmware and documentation updates are available, you can download them from <http://www.ibm.com/support/>. The blade server might have features that are not described in the documentation that comes with the blade server, and 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. To check for updates, go to <http://www.ibm.com/support/>. For firmware updates, click **Downloads and drivers**. For documentation updates, under **Search technical support**, type 8850 and click **Search**.

Note: Changes are made periodically to the IBM Web site. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

Record information about the blade server in the following table. You will need this information when you register the blade server with IBM. You can register the blade server at <http://www.ibm.com/support/mysupport/>.

Product name	AMD Opteron LS20 for IBM BladeCenter
Machine type	8850
Model number	_____
Serial number	_____

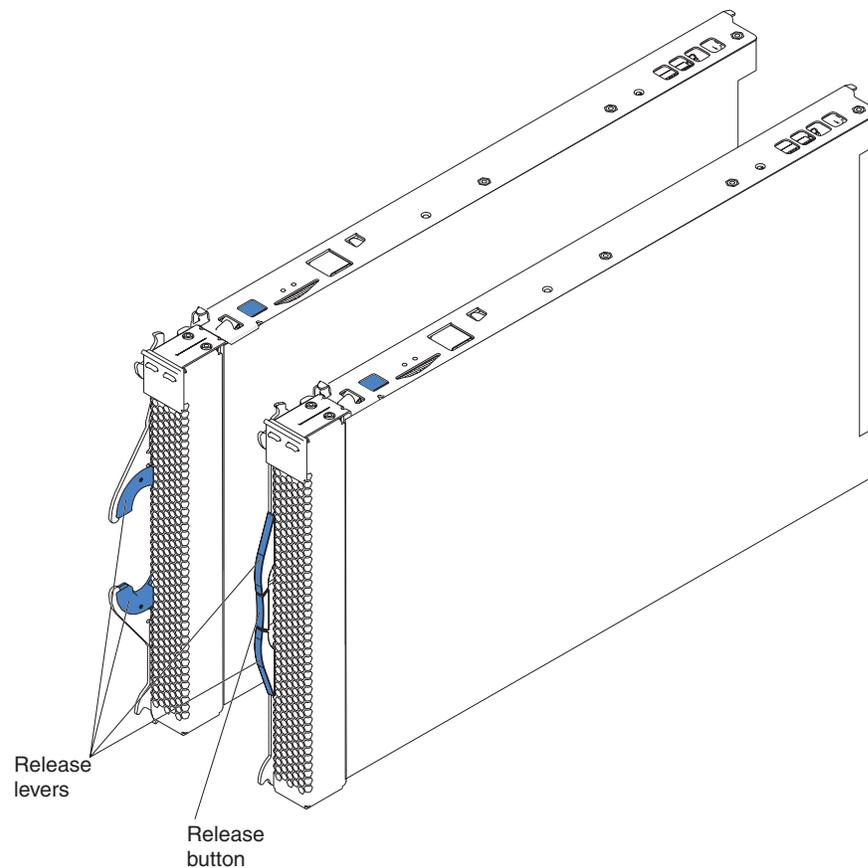
The model number and serial number are on the ID label that is behind the control panel door on the front of the blade server, and on a label on the side of the blade server that is visible when the blade server is not in the BladeCenter unit.

A set of blank labels comes with the blade server. When you install the blade server in the BladeCenter unit, write identifying information on a label and place the label on the BladeCenter unit bezel. See the documentation for your BladeCenter unit for recommended label placement.

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

The LS20 Type 8850 blade server has one of the bezels shown in the following illustration.

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



Related documentation

This *Installation and User's Guide* contains general information about the server, including how to install supported options and how to configure the server. The following documentation also comes with the server:

- *Warranty and Support Information*

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

- *Safety Information*

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

- *Problem Determination and Service Guide*

This document is in PDF on the *Documentation CD*. It contains information to help you solve problems yourself, and it contains information for service technicians.

Depending on your BladeCenter product, additional documentation might be included on the *Documentation CD*. In addition to the documentation in this library, be sure to review the *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit for information to help you prepare for system installation and configuration.

To check for updated documentation and technical updates, complete the following steps.

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 8850, and click **Search**.

The IBM Documentation CD

The IBM Documentation CD contains documentation for your server in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

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

- Microsoft® Windows® NT 4.0 (with Service Pack 3 or later), or Windows 2000, 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. 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 documents, and view documents, using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in use in your system and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

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

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

where *e* is the drive letter of the CD-ROM drive, and click **OK**.
 - If you are using Red Hat Linux, insert the CD into the CD-ROM drive; then, run the following command from the `/mnt/cdrom` directory:
`sh runlinux.sh`

Select your blade server from the **Product** menu. The **Available Topics** list displays all the documents for your blade server. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

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

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

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 *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:

- **Note:** 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 possible 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 blade server operating in a non-NEBS/ETSI environment.

Note: Power, cooling, removable-media drives, external ports, and advanced system management are provided by the BladeCenter unit.

<p>Microprocessor:</p> <p>Supports up to two microprocessors</p> <ul style="list-style-type: none"> • AMD Opteron processor • AMD chipset <p>Note: Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors in your blade server.</p> <p>Memory:</p> <ul style="list-style-type: none"> • Dual channel (DDR1) with 4 DIMM slots (two for each microprocessor) • Type: 2-way interleaved, DDR1, PC3200, VLP, ECC SDRAM registered x4 (Chipkill™) DIMMs only (Chipkill is not supported for 512 MB DIMMs) • Supports 512 MB, 1 GB, and 2 GB DIMMs (as of the date of this publication) <p>Drives: Support for two internal small-form-factor SCSI drives</p>	<p>Integrated functions:</p> <ul style="list-style-type: none"> • Dual-channel Gigabit Ethernet controller • Expansion card interface • Intelligent Platform Management Interface (IPMI) • Baseboard management controller (BMC) with IPMI firmware • ATI Radeon 7000M video controller • LSI 1020 SCSI controller • Light path diagnostics • Local service processor (BMC) • RS-485 interface for communication with the management module • Automatic server restart (ASR) • Serial over LAN (SOL) • 4 USB buses for communication with keyboard, mouse, diskette drive, and CD-ROM drive <p>Predictive Failure Analysis® (PFA) alerts:</p> <ul style="list-style-type: none"> • Microprocessor • Memory 	<p>Electrical Input: 12 V dc</p> <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Blade server on: 10° to 35°C (50° to 95°F). Altitude: 0 to 914 m (2998.69 ft) – Blade server on: 10° to 32°C (50° to 95°F). Altitude: 914 m to 2134 m (2998.69 ft to 7000 ft) – Blade server off: -40° to 60°C (-40° to 140°F) • Humidity: <ul style="list-style-type: none"> – Blade server on: 8% to 80% – Blade server off: 5% to 80% <p>Size:</p> <ul style="list-style-type: none"> • Height: 24.5 cm (9.7 inches) • Depth: 44.6 cm (17.6 inches) • Width: 2.9 cm (1.14 inches) • Maximum weight: 5.0 kg (11 lb)
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Note: The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard, mouse, CD drive, and diskette drive. The BladeCenter unit uses USB for internal communications with these devices.

What your LS20 Type 8850 blade server offers

The design of the blade server takes advantage of advancements in memory management and data storage. The blade server uses the following features and technologies:

- **Disk drive support**

The blade server supports up to two 2.5 inch SCSI disk drives. For the BladeCenter T unit, the SCSI controller is able to interface to the solid-state flash hard disk drives.

- **IBM Director**

IBM Director is a workgroup-hardware-management tool that you can use to centrally manage servers. For more information, see the IBM Director documentation on the *IBM Director CD*.

- **Impressive performance using the latest microprocessor technology**

The blade server supports up to two AMD Opteron microprocessors. Depending on the model, the blade server comes with either one or two microprocessors installed. For models equipped with one factory-installed microprocessor, an optional microprocessor can be added.

- **Integrated network support**

The blade server comes with two integrated dual Gigabit Ethernet controllers. Each Ethernet controller has an interface for connecting to 10/100/1000-Mbps networks through an Ethernet-compatible switch module on the BladeCenter unit. The blade server automatically selects between 10BASE-T and 100/1000BASE-TX environments. Each controller provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN). The controllers support Wake on LAN[®] technology.

- **I/O expansion**

The blade server comes with connectors on the system board for an optional expansion card, such as the Fibre Channel expansion card, for adding more network communication capabilities to the blade server.

- **Large system memory**

As of the date of this publication, the memory bus in the blade server supports up to 8 GB of system memory, typically 4 GB per microprocessor. The memory controller provides support for up to four industry-standard 2.6 V, 184-pin, double-data-rate (DDR1), PC3200, very low profile (VLP), registered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. For the most current list of supported DIMMs, see the ServerProven[®] list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

- **Light path diagnostics**

The light path diagnostics feature provides light-emitting diodes (LEDs) to assist in isolating problems with the blade server. An LED on the blade server control panel is lit if an unusual condition or a problem occurs. If this happens, you can look at the LEDs on the system board to locate the source of the problem.

- **Power throttling**

Each blade server is powered by two BladeCenter redundant power-supply modules. By enforcing a power policy known as power domain oversubscription, the BladeCenter unit can share the power load between two power modules to ensure efficient power for each device in the BladeCenter unit. This policy is enforced when the initial power is applied to the BladeCenter unit or when a blade server is inserted into the BladeCenter unit.

The possible settings for this policy are:

- Redundant without performance impact
- Redundant with performance impact
- Non-redundant

You can configure and monitor the power environment by using the management module. For more information about configuring and using power throttling, see the management-module documentation or <http://www.ibm.com/support/>.

Reliability, availability, and serviceability features

Three of the most important features in server design are reliability, availability, and serviceability (RAS). These RAS features help to ensure the integrity of the data that is stored in the blade server, the availability of the blade server when you need it, and the ease with which you can diagnose and correct problems.

The blade server has the following RAS features:

- Advanced Configuration and Power Interface (ACPI)
- Automatic error retry or recovery
- Automatic server restart
- Built-in monitoring for temperature, voltage, hard disk drives, and flash drives
- Chipkill memory for dual inline memory modules (DIMMs) with a capacity of 1 GB or greater
- Customer-upgradeable basic input/output system (BIOS) code
- Customer support center 24 hours per day, 7 days a week¹
- Diagnostic support of Ethernet controllers
- Error codes and messages
- ECC protection on the L2 cache
- ECC memory
- Failover Ethernet support
- Light path diagnostics feature
- Power-on self-test (POST)
- Predictive Failure Analysis (PFA) alerts
- Service processor that communicates with the 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)
- Wake on LAN capability

IBM Director

With IBM Director, a network administrator can perform the following tasks:

- View the hardware configuration of remote systems, in detail
- Monitor the usage and performance of critical components, such as microprocessors, disks, and memory
- Centrally manage individual or large groups of IBM and non-IBM Intel®-processor-based servers, desktop computers, workstations, and mobile computers on a variety of platforms

1. Service availability will vary by country. Response time will vary depending on the number and nature of incoming calls.

IBM Director provides a comprehensive entry-level workgroup hardware manager. It includes the following key features:

- Advanced self-management capabilities for maximum system availability.
- Multiple operating-system platform support, including Microsoft Windows 2000 Server, Windows Server 2003, Windows XP Professional, AIX, i5/OS, Red Hat Linux, SUSE Linux, VMware, and Novell NetWare. For a complete list of operating systems that support IBM Director, see the IBM Director Compatibility Document. This document is in Portable Document Format (PDF) at <http://www.ibm.com/pc/support/site.wss/document.do?Indocid=MIGR-61788>. It is updated every 6 to 8 weeks.
- Support for IBM and non-IBM servers, desktop computers, workstations, and mobile computers.
- Support for systems-management industry standards.
- Integration into leading workgroup and enterprise systems-management environments.
- Ease of use, training, and setup.

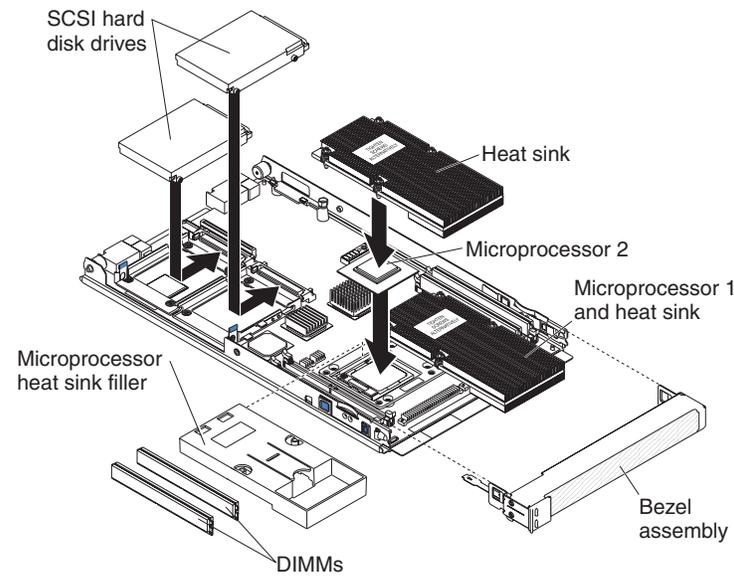
IBM Director also provides an extensible platform that supports advanced server tools that are designed to reduce the total cost of managing and supporting networked systems. By deploying IBM Director, you can achieve reductions in ownership costs through the following benefits:

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

For more information about IBM Director, see the documentation on the *IBM Director* CD that comes with the server, the IBM Director Information Center at http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/dirinfo/fqm0_main.html , and the IBM xSeries Systems Management Web page at http://www.ibm.com/servers/eserver/xseries/systems_management/, which presents an overview of IBM Systems Management and IBM Director.

Major components of the blade server

You must remove the blade server from the BladeCenter unit and remove the cover to see the components. The following illustration shows the major components of the LS20 Type 8850 blade server.



Chapter 2. Power, controls, jumpers, switches, and indicators

This chapter describes the power features, how to turn on and turn off the blade server, what the controls and indicators mean, and where the system board jumpers and switches are located and how to use them.

Turning on the blade server

After you connect the blade server to power through the BladeCenter unit, 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, see “The control panel buttons and LEDs” on page 12) to start the blade server.

Notes:

1. Wait until the power-on LED on the blade server flashes slowly before pressing the blade server power-control button. During this time, the service processor in the management module is initializing; therefore, the power-control button on the blade server does not respond.
 2. While the blade server is powering-up, the power-on LED on the front of the server is lit. See “The control panel buttons and LEDs” on page 12 for the power-on LED states.
- 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 management module to do so).
 - You can turn on the blade server remotely by means of the service processor in the management module.
 - If the operating system supports the Wake on LAN feature and the blade server power-on LED is flashing slowly, the Wake on LAN feature can turn on the blade server, if the Wake on LAN feature has not been disabled through the management-module.

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 remove all power from the blade server, you must remove it from the BladeCenter unit.

Shut down the operating system before you turn off the blade server. See the operating-system documentation for information about shutting down the operating system.

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, see “The control panel buttons and LEDs” on page 12). This also starts an orderly shutdown of the operating system, if this feature is supported by the operating system.

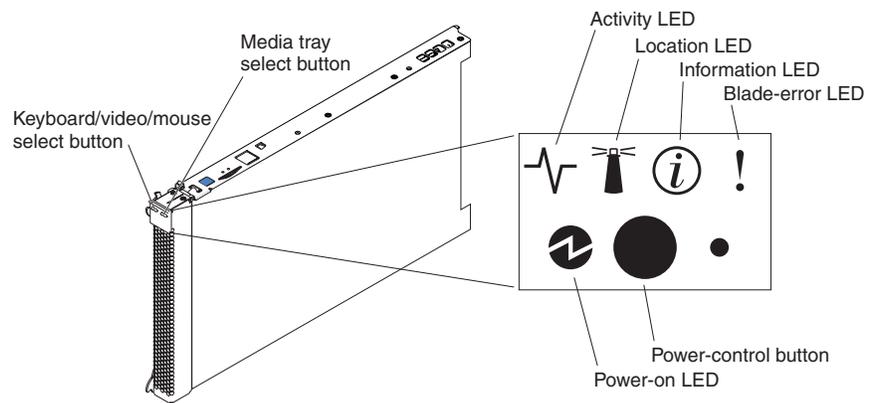
Note: After turning off the blade server, wait at least 5 seconds before you press the power-control button to turn on the blade server again.

- 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.
- The management module can turn off the blade server.

The control panel buttons and LEDs

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

Note: The control panel door is shown in the closed (normal) position in the following illustration. To access the power-control button, you must open the control panel door.



Keyboard/video/mouse (KVM) select button: Press this button to associate the shared BladeCenter unit keyboard port, video port, and mouse port with the blade server. The LED on this button flashes while the request is being processed and then is lit when the ownership of the keyboard, video, and mouse has been transferred to the blade server. It can take approximately 20 seconds to switch the keyboard, video, and mouse control from one blade server to another.

You can also press keyboard keys in the following sequence to switch keyboard, video, and mouse control between blade servers:

NumLock NumLock *bay_number* Enter

(*bay_number* is the two-digit number of the blade bay in which the blade server is installed.)

Although the keyboard that is attached to the BladeCenter unit is a PS/2®-style keyboard, internal communication with it is through the USB. The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard and mouse. When you are not running an operating system that has USB device drivers, such as in the following situations, the keyboard responds very slowly:

- Running the blade server integrated diagnostics
- Running a BIOS update diskette on a blade server
- Updating the diagnostics on a blade server
- Running the Broadcom firmware CD for a blade server

If there is no response when you press the keyboard/video/mouse select button, you can use the management-module Web interface to determine whether local control has been disabled on the blade server.

If you install a supported Microsoft Windows operating system on the blade server while it is not the current owner of the keyboard, mouse, and video, a delay of up to 1 minute occurs the first time you switch the keyboard, video, and mouse to the blade server. During this one-time-only delay, the blade server device manager enumerates the keyboard, video, and mouse and loads the device drivers. All subsequent switching takes place in the normal keyboard/video/mouse switching time frame (up to 20 seconds).

CD/diskette/USB select button: Press this button to associate the shared BladeCenter unit removable-media drives and USB ports with the blade server. The LED on the button flashes while the request is being processed then is lit when the ownership of the removable-media drives and USB ports has been transferred to the blade server. It can take approximately 20 seconds for the operating system in the blade server to recognize the removable-media drives and USB ports.

The operating system in the blade server must provide USB support for the blade server to recognize and use the removable-media drives and USB ports. The BladeCenter unit uses USB for internal communication with these devices. If there is no response when you press the CD/diskette/USB select button, you can use the management-module Web interface to determine whether local control has been disabled on the blade server.

Activity LED: When this green LED is lit, it indicates that there is activity on the hard disk drive or network.

Location LED: When this blue LED is lit, it has been turned on by the system administrator to aid in visually locating the blade server. The location LED on the BladeCenter unit will be lit also. The location LED can be turned off through the management-module Web interface or through IBM Director Console.

Information LED: When this amber LED is lit, it indicates that information about a system error for the blade server has been placed in the management module event log. The information LED can be turned off through the management-module Web interface or through IBM Director Console.

Blade-error LED: When this amber LED is lit, it indicates that a system error has occurred in the blade server. The blade-error LED will turn off only after the error is corrected.

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

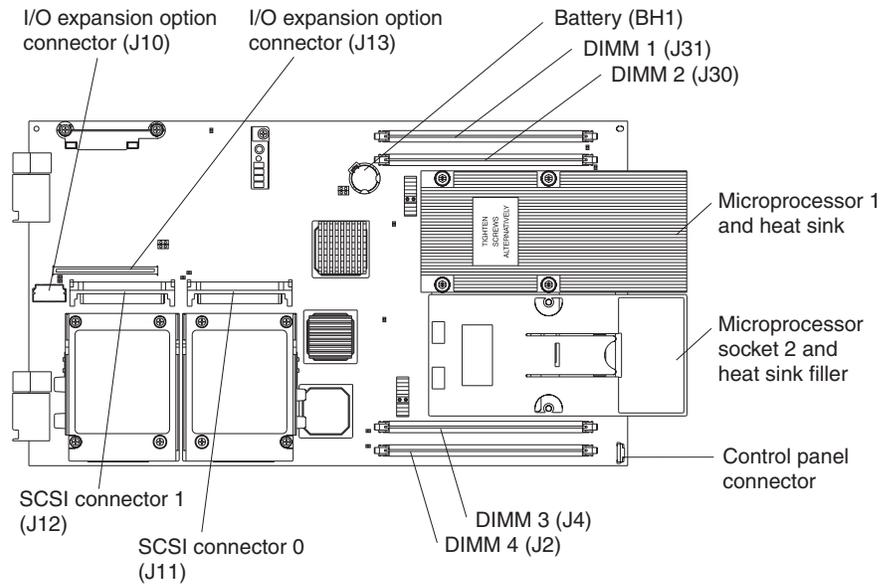
Note: The power-control button has effect only if local power control is enabled for the blade server. Local power control is enabled and disabled through the management-module Web interface.

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

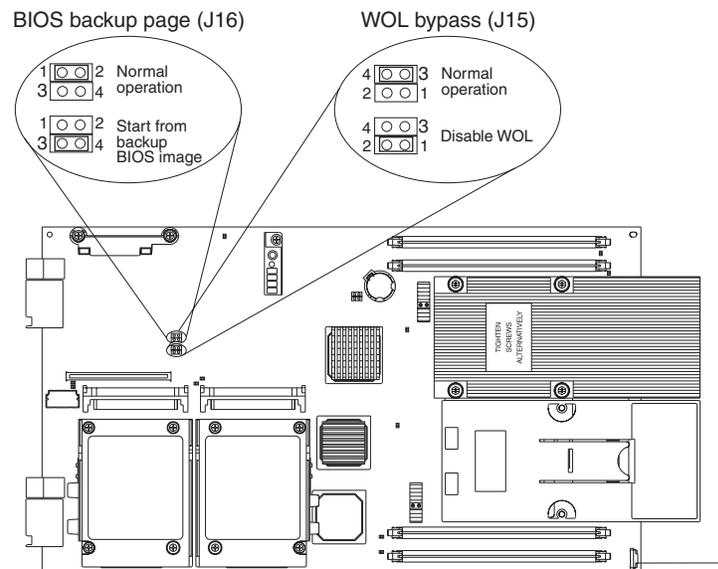
- Flashing rapidly: The service processor (BMC) on the blade server is handshaking with the management module.
- Flashing slowly: The blade server has power but is not turned on.
- Lit continuously: The blade server has power and is turned on.

System board components and jumpers

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



The following illustration shows the jumpers on the system board.



Chapter 3. Installing options

This chapter provides instructions for installing hardware options in the blade server. Some option-removal instructions are provided in case you need to remove one option to install another.

Installation guidelines

Before you install options, read the following information:

- Read the safety information that begins on page v and the guidelines in “Handling static-sensitive devices.” This information will help you work safely.
- When you install your new blade server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your blade server is ready to function at maximum levels of performance. To download firmware updates for your blade server, go to <http://www.ibm.com/support/> and click **Downloads and drivers**.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Back up all important data before you make changes to disk drives.
- Before you remove a blade server from the BladeCenter unit, you must shut down the operating system and 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 open or close a latch.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that you can remove or install the component while the 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.
- When you are finished working on the blade server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported options for the blade server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

System reliability guidelines

To help ensure proper cooling and system reliability, make sure that the following requirements are met:

- Microprocessor socket 2 always contains either a microprocessor heat sink filler or a microprocessor and heat sink. If the blade server has only one microprocessor, it must be installed in microprocessor socket 1.
- You do not operate the BladeCenter unit without a blade server, expansion unit, or filler blade installed in each blade bay to ensure proper cooling. See the documentation for your BladeCenter unit type for additional information.

Handling static-sensitive devices

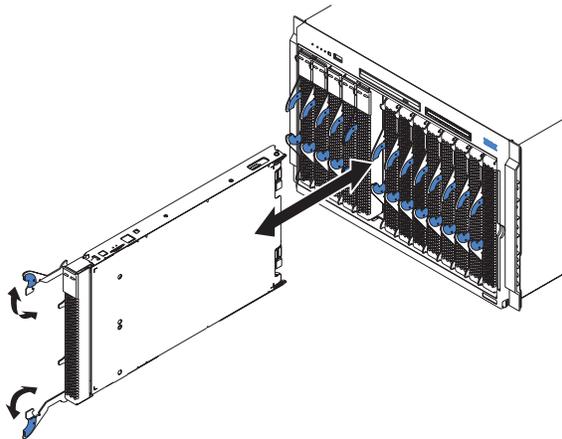
Attention: Static electricity can damage the blade server and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

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

- When you work on a BladeCenter T unit, use an electrostatic discharge (ESD) wrist strap, especially when you handle modules, optional devices, or blade servers. To work correctly, the wrist strap must have a good contact at both ends (touching your skin at one end and firmly connected to the ESD connector on the front or back of the BladeCenter T unit).
- 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 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 unit or any *unpainted* metal surface on any other grounded rack component in the rack you are installing the device in 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 without setting it 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.

Removing the blade server from the BladeCenter unit

The following illustration shows how to remove the blade server from BladeCenter type 8677. The appearance of your BladeCenter unit might be different, see the documentation for your BladeCenter unit.



Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit without a blade server, expansion unit, or filler blade installed in each blade bay.
- When you remove the blade server, note the bay number. Reinstalling a blade server into a different bay from the one it was removed from could have unintended consequences. Some 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.

To remove the blade server, complete the following steps:

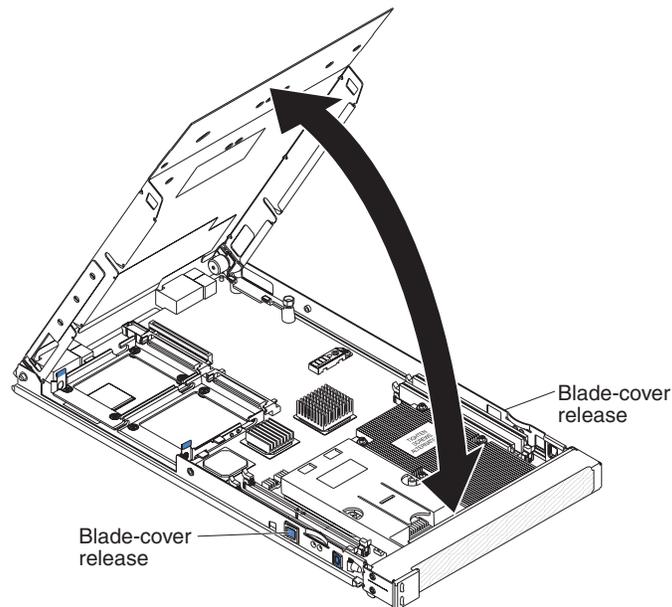
1. If the blade server is operating, shut down the operating system; then, press the power-control button (behind the blade server control panel door) to turn off the blade server (see “Turning off the blade server” on page 11 for more information).

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

2. 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).
3. Pull the blade server out of the bay. Spring-loaded doors further back in the bay move into place to cover the bay temporarily.
4. Place either a filler blade or another device in the bay within 1 minute. The recessed spring-loaded doors will move out of the way as you insert the blade or filler blade.

Opening the blade server cover

The following illustration shows how to open the cover on a blade server.



To open the blade server cover, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from the BladeCenter unit” on page 16 for instructions).
3. Carefully lay the blade server down on a flat, non-conductive surface, with the cover side up.
4. Press the blade-cover release on each side of the blade server and lift the cover open, as shown in the illustration.
5. Lay the cover flat, or lift it from the blade server and store for future use.

Statement 21:

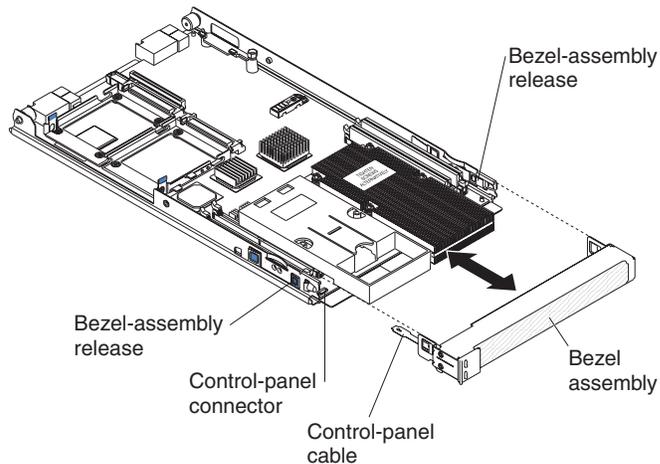


CAUTION:

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

To install certain options, you must first remove the blade server bezel assembly. The following illustration shows how to remove the bezel assembly.



To remove the blade server bezel assembly, complete the following steps:

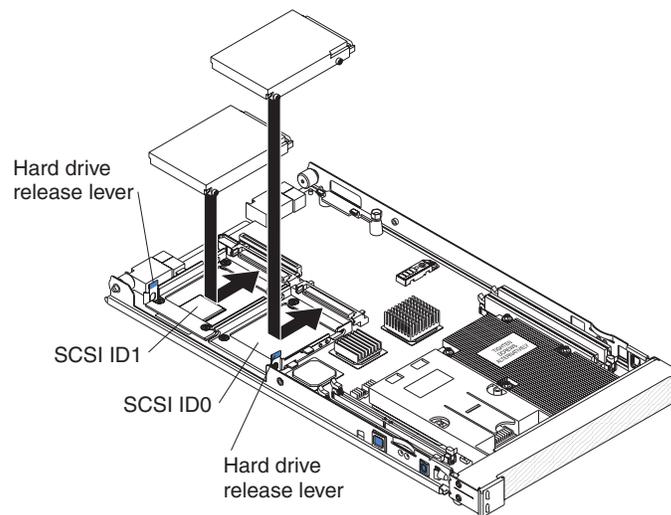
1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Open the blade server cover (see “Opening the blade server cover” on page 17 for instructions).
3. Press the bezel-assembly release on each side of the blade server and pull the bezel assembly away from the blade server approximately 1.2 cm (0.5 inch).
4. Disconnect the control-panel cable from the control-panel connector.
5. Pull the bezel assembly away from the blade server.
6. Store the bezel assembly in a safe place.

Installing a SCSI hard disk drive

The blade server has two connectors on the system board for installing optional Ultra320 SCSI hard disk drives.

All Ultra320 SCSI connectors are on the same bus. Depending on the blade server model, at least one SCSI hard disk drive might already be installed. If the blade server is equipped with one SCSI hard disk drive, you can install an additional SCSI hard disk drive. These two SCSI hard disk drives can be used to implement and manage a redundant array of independent disks (RAID) level-1 array. See “Configuring a SCSI RAID array” on page 39 for information about SCSI RAID configuration.

The following illustration shows how to install a SCSI hard disk drive.



Note: Do not install a SCSI hard disk drive in SCSI connector 1 (SCSI ID 1) if you intend to also install an optional standard-form-factor expansion card. The standard-form-factor expansion card occupies the same area as the second hard disk drive.

To install a SCSI hard disk drive, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Shut down the operating system, turn off the blade server, and remove the blade server from the BladeCenter unit. See “Removing the blade server from the BladeCenter unit” on page 16 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. Open the blade server cover (see “Opening the blade server cover” on page 17 for instructions).
5. Locate SCSI connector 0 (J11) or SCSI connector 1 (J12).
Attention: Do not press on the top of the drive. Pressing the top could damage the drive.
6. Put the drive into the tray and push it into the connector until the drive moves past the lever at the front of the tray.
7. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 29.

Removing a SCSI hard disk drive

To remove a SCSI hard disk drive, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Shut down the operating system, turn off the blade server, and remove the blade server from the BladeCenter unit. See “Removing the blade server from the BladeCenter unit” on page 16 for instructions.
3. Carefully lay the blade server on a flat, non-conductive surface.
4. Open the blade server cover (see “Opening the blade server cover” on page 17 for instructions).
5. Locate SCSI connector 0 (J11) or SCSI connector 1 (J12).
6. While pulling the blue lever at the front of the hard disk drive tray, slide the drive out of the SCSI connector and disengage it from the drive tray.

Installing memory modules

The following notes describe the types of dual inline memory modules (DIMMs) that the blade server supports and other information that you must consider when installing DIMMs:

- The system board contains four DIMM connectors and supports two-way memory interleaving.
- As of the date of this publication, the DIMM options that are available for the blade server are 512 MB, 1 GB, and 2 GB. Depending on the memory configuration set in blade server BIOS, as of the date of this publication, the blade server can support a minimum of 1 GB and a maximum of 8 GB of system memory.
- For optimum performance, one pair of DIMMs is associated with each microprocessor. The blade server comes with two DIMMs installed for each microprocessor.

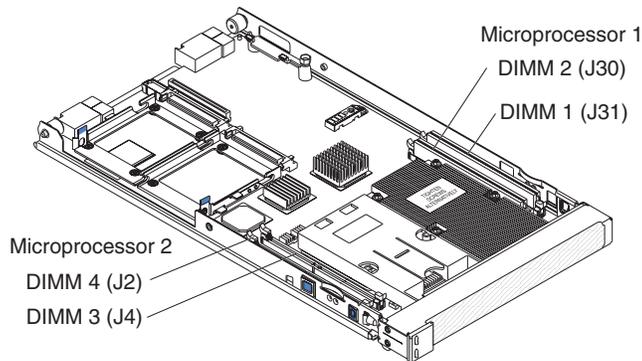
Pair	DIMM connectors
Microprocessor 1	1 (J31) and 2 (J30)
Microprocessor 2	3 (J4) and 4 (J2)

- One pair of DIMMs can be used when two microprocessors are installed, but the blade server will operate at a lower level of efficiency. When one microprocessor is installed, you can only install DIMMs in the DIMM connectors that are associated with the microprocessor.
- When you install memory, you must install a pair of matched DIMMs.
- Both DIMMs in a pair must be the same size, speed, type, technology, and physical design. You can mix compatible DIMMs from different manufacturers.
- The second pair does not have to be DIMMs of the same size, speed, type, technology, and physical design as the first pair.
- Install only 2.6 V, 184-pin, DDR1, PC3200, VLP, registered SDRAM with ECC DIMMs. For a current list of supported DIMMs for the blade server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

- Installing or removing DIMMs changes the configuration of the blade server. When you restart the blade server, a message indicates that the memory configuration has changed. Start the Configuration/Setup Utility program and select **Save Settings**. See “Configuration/Setup Utility menu choices” on page 34 for more information.

To install a DIMM, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Read the documentation that comes with the DIMMs.
3. Shut down the operating system, turn off the blade server, and remove the blade server from the BladeCenter unit. See “Removing the blade server from the BladeCenter unit” on page 16 for instructions.
4. Carefully lay the blade server on a flat, non-conductive surface.
5. Open the blade server cover (see “Opening the blade server cover” on page 17 for instructions).



6. Locate the DIMM connectors on the system board (see the above illustration). Determine the connectors into which you will install the DIMMs.
7. Touch the static-protective package that contains the DIMM option to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack you are installing the DIMM option in for at least 2 seconds; then, remove the DIMM from its package.
8. Complete the following steps for each DIMM that you install:
 - a. Turn the DIMM so that the DIMM keys align correctly with the connector on the system board.

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
 - b. Insert the DIMM by pressing the DIMM along the guides into the connector. Make sure that the retaining clips snap into the closed positions.

Important: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
9. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 29.

Installing an additional microprocessor

The blade server comes with one or two microprocessors installed on the system board. The blade server supports two microprocessors. With two microprocessors, the blade server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load between the microprocessors. If the blade server comes with one microprocessor, you can install a second microprocessor.

Notes:

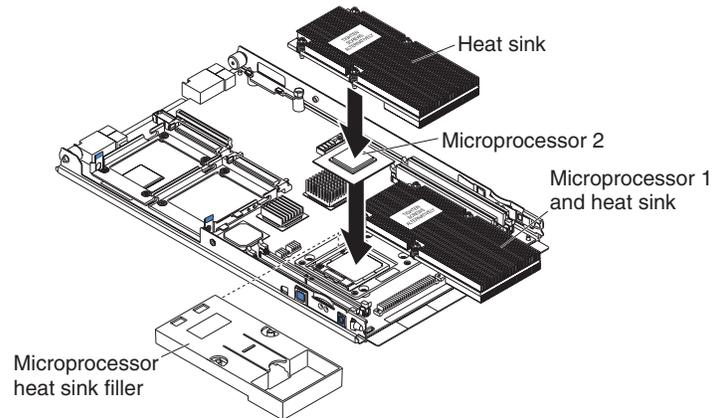
1. You can not remove the single microprocessor and replace it with a different type of microprocessor of greater or lesser speed.
2. If you install a second microprocessor, you must install the same microprocessor type and speed as the first microprocessor.

To use SMP, obtain an SMP-capable operating system. For a list of supported operating systems and other options, go to <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

The following notes describe the type of microprocessor that the server supports and other information that you must consider when installing a microprocessor:

- If the blade server has two microprocessors, they must have the same cache size and type, the same clock speed, same number of cores, and identical internal and external clock frequencies (including system bus speed).
- If only one microprocessor is installed, it must be installed in the microprocessor 1 socket.
- For a list of microprocessors that the blade server supports, go to the ServerProven list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
- Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you have to update the blade server BIOS code. To download the most current level of BIOS code, go to <http://www.ibm.com/support/>.
- The microprocessors do not require terminators. If microprocessor 2 is not installed, the microprocessor 2 socket must contain a microprocessor heat-sink filler (which is sometimes called a microprocessor baffle).
- The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.

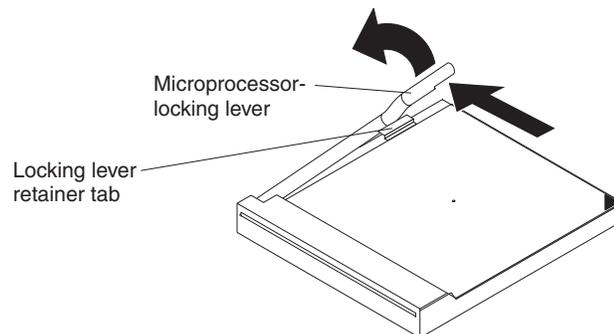
The following illustration shows how to install the second microprocessor on the system board for the blade server.



To install an additional microprocessor, complete the following steps:

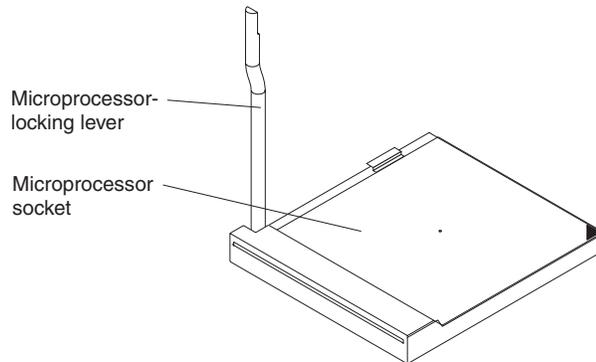
1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Shut down the operating system, turn off the blade server, and remove the blade server from the BladeCenter unit. See “Removing the blade server from the BladeCenter unit” on page 16 for instructions.
3. Carefully lay the blade server on a flat, non-conductive surface.
4. Open the blade server cover (see “Opening the blade server cover” on page 17 for instructions).
5. Remove the bezel assembly (see “Removing the blade server bezel assembly” on page 18 for instructions).
6. Locate the microprocessor socket on the system board.
7. Unlatch and remove the heat-sink filler.
8. Install the microprocessor:
 - a. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if one is present.

Attention: Do not use any tools or sharp objects to lift the locking lever on the microprocessor socket. Doing so might result in permanent damage to the system board.
 - b. Release the microprocessor locking lever by moving it away from the microprocessor socket and around the locking lever retainer tab; then, rotate it upward to the fully open position.



Attention:

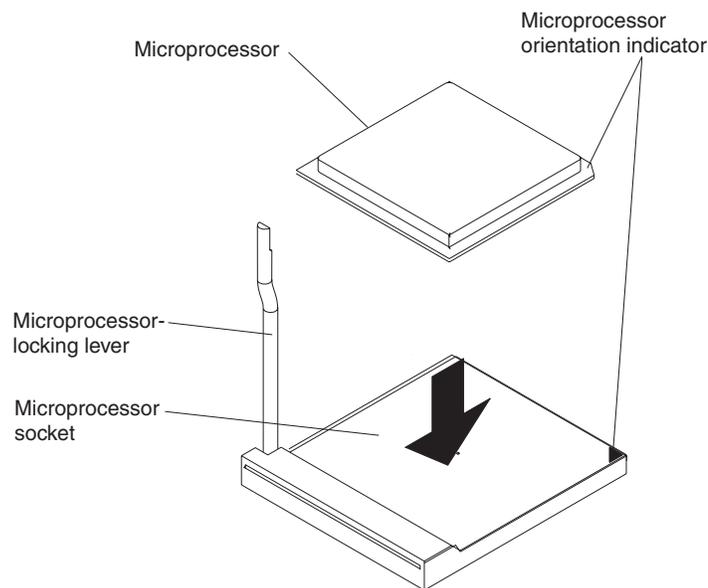
- Make sure that the locking lever on the microprocessor socket is in the fully open position before you insert the microprocessor in the socket. Failure to do so might cause permanent damage to the microprocessor, microprocessor socket, or system board.



- Avoid touching the components and gold pins on the microprocessor. Make sure that the microprocessor is completely and correctly seated in the socket. Incomplete insertion might cause damage to the system board or to the microprocessor.
- c. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the blade server or any *unpainted* metal surface on any other grounded rack component in the rack you are installing the microprocessor in for at least 2 seconds; then, remove the microprocessor from the package.

Attention: Do not use excessive force when pressing the microprocessor into the socket.

- d. Center the microprocessor over the microprocessor socket. Align the triangle on the corner of the microprocessor with the triangle on the corner of the socket and make sure that the pin patterns of the microprocessor and microprocessor socket match; then, carefully press the microprocessor into the socket.



Attention: Make sure that the microprocessor is oriented and aligned correctly in the socket before you try to close the lever.

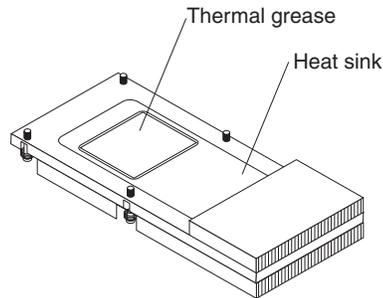
- e. Carefully close the lever to secure the microprocessor in the socket.

Note: A new microprocessor comes in a kit with a heat sink.

9. Install a heat sink on the microprocessor.

Attention:

- Do not set down the heat sink after you remove the plastic cover.
- Do not touch the thermal grease on the bottom of the heat sink. Touching the thermal grease will contaminate it. If the thermal grease on the microprocessor or heat sink becomes contaminated, contact your service technician.



- a. Remove the plastic protective cover from the thermal material on the bottom of the heat sink.
- b. Make sure that the thermal material is still on the bottom of the heat sink; then, align and place the heat sink on top of the microprocessor in the retention bracket, grease side down. Press firmly on the heat sink.
- c. Align the four captive screws on the heat sink with the holes on the heat-sink retention module.
- d. Press firmly on the captive screws and tighten them, alternating between screws until they are tight. Do not overtighten the screws by using excessive force. If you are using a torque wrench, tighten the screws to 1.00 to 1.26 Newton-meters (Nm) (0.74 to 0.93 foot-pounds).

Attention: If you need to remove the heat sink after installing it, note that the thermal material might have formed a strong bond between the heat sink and the microprocessor. Do not force the heat sink and microprocessor apart; doing so can damage the microprocessor pins. Loosening the captive screws on one side of the heat sink fully before loosening the captive screws on the other side helps break the bond between the components without damaging them.

10. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 29.

Installing an I/O expansion card

If the BladeCenter unit supports I/O expansion, you can add an I/O expansion card to the blade server. An I/O expansion card provides additional connections for communicating on a network.

Your blade server supports installation of one I/O expansion card of either the small-form-factor or standard-form-factor design. Some expansion cards are available as both small-form-factor cards and standard-form-factor cards. Other expansion cards are available only as standard-form-factor cards. See the ServerProven list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of available I/O-expansion cards and their form-factor types.

You cannot install both sizes of I/O-expansion card in a blade server at the same time. You can install a small-form-factor expansion card in addition to two SCSI hard disk drives. You cannot install a standard-form-factor expansion card into a blade server with two SCSI hard disk drives. When you add an I/O-expansion card, you must make sure that the I/O modules it is mapped to both support the expansion card network-interface type.

The blade server supports a number of I/O expansion cards types, such as:

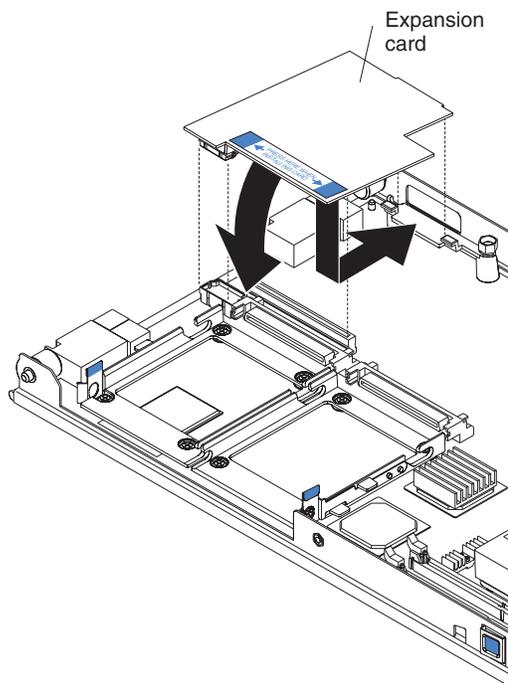
- Gigabit Ethernet expansion card
- Fibre Channel expansion card
- Myrinet expansion card

The following sections describe how to install an I/O expansion card in the blade server.

Installing a small-form-factor expansion card

Install a small-form-factor expansion card near SCSI connector 1 (J12). To install a small-form-factor expansion card, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Shut down the operating system, turn off the blade server, and remove the blade server from the BladeCenter unit. See “Removing the blade server from the BladeCenter unit” on page 16 for instructions.
3. Carefully lay the blade server on a flat, non-conductive surface.
4. Open the cover (see “Opening the blade server cover” on page 17 for instructions).
5. Install the small-form-factor expansion card, as shown in the following illustration.



- a. Orient the expansion card.
- b. Slide the notch in the narrow end of the card into the raised hook on the tray; then, gently pivot the card into the expansion card connectors.

For device-driver and configuration information needed to complete the installation of the expansion card, see the documentation that comes with the expansion card.

6. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 29.

Installing a standard-form-factor expansion card

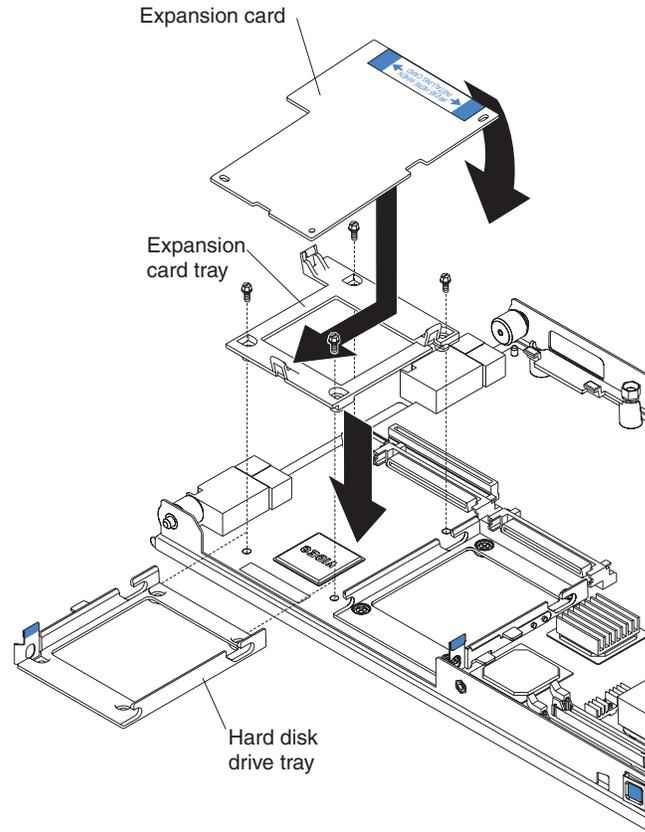
If a SCSI drive is connected to SCSI connector 1 (J12), you must remove it before you can install a standard-form-factor expansion card (see “Removing a SCSI hard disk drive” on page 20). You cannot have both a drive that is connected to SCSI connector 1 and a standard-form-factor expansion card installed in the blade server. If you are removing the SCSI disk drive, backup any information on it that you want to keep to another storage device.

If the SCSI hard disk drive that is installed in SCSI connector 1 is part of a RAID array, delete the SCSI RAID array before removing the drive. When you delete the RAID array, the array configuration information is removed and no data is deleted (see “Configuring a SCSI RAID array” on page 39 for more information).

To install a standard-form-factor expansion card, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Shut down the operating system, turn off the blade server, and remove the blade server from the BladeCenter unit. See “Removing the blade server from the BladeCenter unit” on page 16 for instructions.
3. Carefully lay the blade server on a flat, non-conductive surface.
4. Open the cover (see “Opening the blade server cover” on page 17 for instructions).

5. If a drive is connected to SCSI connector 1, remove the drive and tray (see “Removing a SCSI hard disk drive” on page 20 for instructions), and save the screws that secure the tray to the system board. Store the screws in a safe place.
6. Install the expansion card. The following illustration shows how to install the expansion card.



- a. Install the expansion card tray. Secure the tray to the system board with the screws from the option kit or from the removed drive tray.
- b. Orient the expansion card and slide the notch in the narrow end of the card into the raised hook on the tray; then, gently pivot the wide end of the card into the expansion card connectors.

For device-driver and configuration information to complete the installation of the expansion card, see the documentation that comes with the expansion card.

If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 29.

Completing the installation

To complete the installation, complete the following tasks. Instructions for each task are in the following sections.

1. Reinstall the blade server bezel assembly, if you removed it (see “Installing the blade server bezel assembly” for information on installing the bezel assembly).
2. Close the blade server cover (see “Closing the blade server cover”).

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 (see “Installing the blade server in a BladeCenter unit” on page 30).
4. Turn on the blade server (see “Turning on the blade server” on page 11).
5. For certain options, run the blade server Configuration/Setup Utility program (see “Updating the blade server configuration” on page 32).

Note: If you have just connected the power cords of the BladeCenter unit to electrical outlets, you must wait until the power-on LED on the blade server flashes slowly before pressing the power-control button.

Installing the blade server bezel assembly

See the illustration in “Removing the blade server bezel assembly” on page 18 for information about installing the bezel assembly.

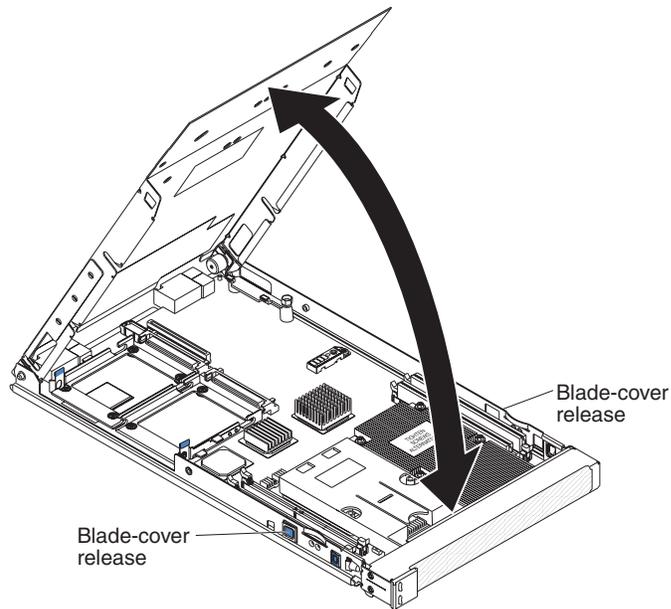
To install the blade server bezel assembly, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. Connect the control-panel cable to the control-panel connector on the system board.
3. Carefully slide the bezel assembly onto the blade server until it clicks into place.

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.

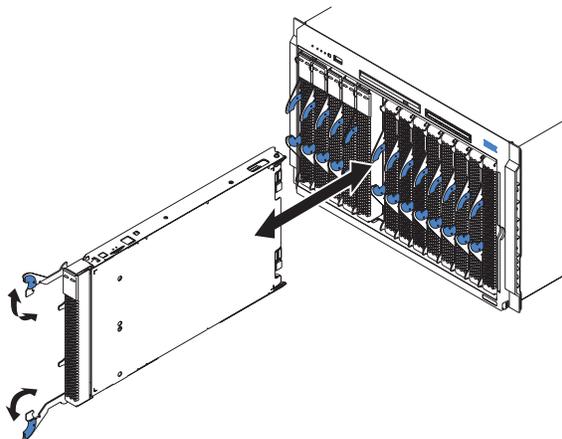


To close the blade server cover, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 15.
2. If you removed the blade bezel assembly, replace it now (see “Installing the blade server bezel assembly” on page 29 for instructions).
3. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade server, as shown in the illustration. Before closing the cover, check that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade server.
4. Pivot the cover to the closed position, as shown in the illustration, until it clicks into place.

Installing the blade server in a BladeCenter unit

The following illustration shows how to install the blade server into BladeCenter type 8677. The appearance of your BladeCenter unit might be different, see the documentation for your BladeCenter unit.



To install a blade server in a BladeCenter unit, complete the following steps.

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.

1. Read the safety information beginning on page v and “Installation guidelines” on page 15 through “Handling static-sensitive devices” on page 15.
2. If you have not done so already, install any options that you want, such as SCSI drives or memory, in the blade server.
3. Select the bay for the blade server.

Notes:

- a. When any blade server or option is in blade bay 7 through 14 (in a BladeCenter unit) or in blade bays 5 through 8 (in a BladeCenter T unit), power modules must be present in all four power-module bays.
 - b. To help ensure proper cooling, performance, and system reliability, make sure that each of the blade bays on the front of the BladeCenter unit has a either blade server, expansion unit, or filler blade installed. Do not operate the system unit without either a blade server, expansion unit, or filler blade installed in each blade bay for more than 1 minute for a BladeCenter unit or 20 minutes for a BladeCenter T unit.
 - c. If you reinstall a blade server that you removed, you must install it in the same blade bay from which you removed it. Some blade server configuration information and update options are established according to bay number. Reinstalling a blade server into a different blade bay from the one from which it was removed could have unintended consequences, and you might have to reconfigure the blade server.
4. Make sure that the release levers on the blade server are in the open position (perpendicular to the blade server).
 5. Slide the blade server into the blade bay until it stops. The spring-loaded doors farther back in the bay that cover the bay opening move out of the way as you insert the blade server.
 6. Push the release levers on the front of the blade server closed.
 7. Turn on the blade server (see “Turning on the blade server” on page 11 for instructions).
 8. Make sure that the power-on LED on the blade control panel is lit continuously, indicating that the blade server is receiving power and is turned on.
 9. (Optional) Write identifying information on one of the user labels that come with the blade servers and place the label on a BladeCenter unit bezel.
For information about the label placement, see the illustrations in Chapter 1, “Introduction,” on page 1.

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

10. If you have other blade servers to install, do so now.

Note: Reinstall the bezel assembly on the BladeCenter T unit after you have finished installing the blade servers (see the *BladeCenter T Types 8720 and 8730 Installation and User's Guide* for detailed instructions for reinstalling the bezel assembly).

If this is the initial installation for the blade server in the BladeCenter unit, you must configure the blade server through the Configuration/Setup Utility program and install the blade server operating system. See “Updating the blade server configuration” and Chapter 5, “Installing the operating system,” on page 41 for details.

Updating the blade server configuration

When the blade server starts for the first time after you add or remove an internal option or an external SCSI device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program automatically starts so that you can save the new configuration settings. See “Using the Configuration/Setup Utility program” on page 33 for more information about the Configuration/Setup Utility program.

Some options have device drivers that you must install. See the documentation that comes with each option for information about installing device drivers.

The blade server comes with at least one microprocessor. If more than one microprocessor is installed, the blade server can now operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. See Chapter 5, “Installing the operating system,” on page 41 and your operating-system documentation for additional information.

Input/output connectors and devices

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

The blade server has two selection buttons on the control panel: the CD/diskette/USB select button and the keyboard/video/mouse select button. See “The control panel buttons and LEDs” on page 12 for information about these buttons and their functions.

The Ethernet controllers on the blade server communicate with the network through the Ethernet-compatible I/O modules on the BladeCenter unit. Network signals to and from the blade server or any expansion cards are automatically routed to a same-network-interface I/O module through circuitry in the BladeCenter unit.

Chapter 4. Configuring the blade

The following configuration programs come with the blade server:

- **Configuration/Setup Utility program**

The Configuration/Setup Utility program is part of the basic input/output system (BIOS) code in the blade server. Use it to change system settings, such as interrupt requests (IRQ), date and time, and passwords. See “Using the Configuration/Setup Utility program” for more information.

- **LSI Logic Configuration Utility program**

The LSI Logic Configuration Utility program is part of the BIOS code in the blade server. Use it to set the device scan order and to set the SCSI controller IDs. See “Using the LSI Logic Configuration Utility program” on page 39 for more information.

The IBM Remote Deployment Manager (RDM) Version 4.20 program is available for purchase. You can use IBM RDM Version 4.20 (or later) to install a BIOS code update onto a blade server by following the instructions in the documentation that comes with the RDM program. To determine if an operating system supports the RDM program or for updated information about RDM and information about purchasing the software, go to http://www.ibm.com/servers/eserver/xseries/systems_management/.

For information about setting up the network configuration for remote management, such as with the IBM Director products, see the *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit type. You can obtain the planning guides from <http://www.ibm.com/support/>.

Using the Configuration/Setup Utility program

To start the Configuration/Setup Utility program, complete the following steps:

1. Turn on the blade server (see “Turning on the blade server” on page 11).
2. Immediately give the blade server control of the BladeCenter unit shared keyboard, mouse, and video ports.
 - If you are managing the blade server using the BladeCenter system console, press the KVM select button on the blade server (see “The control panel buttons and LEDs” on page 12 for information).
 - If you are managing the blade server from a remote location, see the *IBM BladeCenter Management Module User’s Guide*, *IBM BladeCenter Management Module Command-Line Interface Reference Guide*, or *IBM BladeCenter Serial over LAN Setup Guide* for information and instructions.
3. When the Configuration/Setup utility message opens, press **F1**.
4. Follow the instructions on the screen.

Configuration/Setup Utility menu choices

The following choices are on the Configuration/Setup Utility main menu. Depending on the version of the BIOS code in the blade server, some menu choices might differ slightly from these descriptions.

- **System Summary**

Select this choice to display configuration information, including the type, speed, and cache sizes of the microprocessors and the amount of installed memory. When you make configuration changes through other options in the Configuration/Setup Utility program, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

- **Processor Summary**

Select this choice to view information about the microprocessors installed in the blade server.

- **USB Device Summary**

Select this choice to view information about the USB devices installed in the blade server.

- **System Information**

Select this choice to display information about the blade server. When you make configuration changes through other options in the Configuration/Setup Utility program, some of those changes are reflected in the system information; you cannot change settings directly in the system information.

- **Product Data**

Select this choice to view the machine type and model of the blade server, the serial number, and the revision level or issue date of the BIOS, diagnostics, and BMC code stored in electrically erasable programmable ROM (EEPROM).

- **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports.

You can also enable or disable the integrated SCSI and Ethernet controllers, and all standard ports (such as serial). **Enable** is the default setting for all controllers. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the Ethernet controller, the blade server will have no Ethernet capability.

- **Remote Console Redirection**

Select this choice to enable serial over LAN (SOL) and to set remote console communication parameters.

- **Video**

Select this choice to view information about the integrated video controller.

- **System MAC Addresses**

Select this choice to set and view the MAC addresses for the Ethernet controllers on the blade server.

- **Date and Time**

Select this choice to set the system date and time, in 24-hour format (*hour:minute:second*).

- **System Security**

Select this choice to set a power-on password. See “Using passwords” on page 36 for more information about passwords.

- **Start Options**

Select this choice to view or change the start options. Changes in the start options take effect when you start the blade server.

- **Startup Sequence Options**

Select this choice to view the startup device sequence that is set for the blade server.

Note: To set the startup sequence, which is the order in which the blade server checks devices to find a boot record, you must use the management-module Web interface.

You can set keyboard operating characteristics, such as whether the blade server starts with the keyboard number lock on or off. You can enable the blade server to run without a diskette drive or keyboard.

You can enable or disable the PXE option for either of the integrated Gigabit Ethernet controllers. The default setting is **Planar Ethernet 1**, which enables the PXE option for the first Ethernet controller on the system board.

If you enable the boot fail count, the BIOS default settings will be restored after three consecutive failures to find a boot record.

You can enable a virus-detection test that checks for changes in the boot record when the blade server starts.

This choice is on the full Configuration/Setup menu only.

- **Advanced Setup**

Select this choice to change settings for advanced hardware features.

Important: The blade server might malfunction if these options are incorrectly configured. Follow the instructions on the screen carefully.

- **Memory Settings**

Select this choice to manually enable a pair of memory connectors, memory node interleave, and memory chipkill (if supported).

If a memory error is detected during POST or memory configuration, the blade server automatically disables the failing memory pair of memory connectors and continues operating with reduced memory. After the problem is corrected, you must enable the memory connectors. Use the arrow keys to highlight the pair of memory connectors that you want to enable, and use the arrow keys to select **Enable**.

- **CPU Options**

Select this choice to disable the microprocessor cache or to set the microprocessor cache to use the write-back or the write-through method. Write-back caching generally provides better system performance.

- **PCI Bus Control**

Select this choice to view and set interrupts for PCI devices and to configure the master-latency-timer (MLT) value for the blade server.

– **Baseboard Management Controller (BMC) Settings**

Select this choice to enable or disable the **Reboot on System NMI** option on the menu. If you enable this option, the blade server will automatically restart 60 seconds after the service processor issues a nonmaskable interrupt (NMI) to the blade server. You can also select this choice to enable or disable and set the time-outs for the loader watchdog timers and view BMC version information.

- **BMC Network Configuration**

Select this choice to set the network addresses of the BMC.

- **BMC System Event Log**

Select this choice to view and clear BMC event log entries.

• **Save Settings**

Select this choice to save the changes you have made in the settings.

• **Restore Settings**

Select this choice to cancel the changes you have made in the settings and restore the previous settings.

• **Load Default Settings**

Select this choice to cancel the changes you have made in the settings and restore the factory settings.

• **Exit Setup**

Select this choice to exit from the Configuration/Setup Utility program. If you have not saved the changes you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Using passwords

From the **System Security** choice, you can set, change, and delete a power-on password.

If you set a power-on password, you must type the power-on password to complete the system startup and to have access to the full Configuration/Setup Utility menu.

You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password. Keep a record of your password in a secure place.

If you forget the power-on password, you can regain access to the blade server by removing the blade server battery and then reinstalling it. (See the *Problem Determination and Service Guide* for your blade server for more information about replacing the battery.)

Firmware updates

IBM will periodically make firmware updates available for the blade server. Use the following table to determine the methods that you can use to install these firmware updates.

Important: To avoid problems and to maintain proper system performance, always make sure that the BIOS, service processor (BMC), and diagnostic firmware levels are consistent for all blade servers within the BladeCenter unit.

Firmware	Update diskette	RDM	Update Xpress	Management-module Web interface	Switch-module Web interface	Switch-module Telnet interface
BIOS code	Yes	Yes	Yes	No	No	No
Diagnostic code	Yes	Yes ¹	Yes	No	No	No
Service processor code (BMC code)	Yes	Yes	Yes	Yes	No	No

¹ You must set up a custom RDM task.

The service processor (BMC) in the blade server provides the following features:

- Continuous health monitoring and control
- Configurable notification and alerts
- Event logs that are timestamped and saved in nonvolatile memory and can be attached to e-mail alerts
- Remote graphics console redirection
- Point-to-point protocol (PPP) support
- Remote power control
- Remote firmware update and access to critical server settings
- Around-the-clock access to the blade server, even if the server is turned off

At some time, you might have to update the service processor (BMC) to apply the latest firmware. Download the latest firmware for the service processor from the IBM Support Web site at <http://www.ibm.com/support/>. Use the management-module Web interface to update the service processor (BMC) firmware. The Web interface is described in the *IBM BladeCenter Management Module User's Guide*.

Before installing the blade server in a BladeCenter unit, go to <http://www.ibm.com/support/> to download the latest firmware for the blade server type.

To update the management-module firmware using the management-module Web-based user interface, complete the following steps:

1. Start the management-module management and configuration program. For more information, see the *IBM BladeCenter Management Module User's Guide*.
2. In the "BladeCenter Management Module" configuration window, under the **MM Control** section, click **Firmware Update**.
3. In the **Update MM Firmware** section, click **Browse** to locate the firmware files that you downloaded. Follow the instructions in the readme file to update the firmware.
4. Click **Update**.

Configuring the Gigabit Ethernet controllers

Two Ethernet controllers are integrated on the blade server system board. Each controller provides a 1000-Mbps full-duplex interface for connecting to one of the Ethernet-compatible I/O modules in I/O-module bays 1 and 2, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN). Each Ethernet controller on the system board is routed to a different I/O module in I/O-module bay 1 or bay 2. The routing from an Ethernet controller to I/O-module bay will vary based on blade server type and the operating system that is installed. See "Blade server Ethernet controller enumeration" for information about how to determine the routing from an Ethernet controller to an I/O-module bay for the blade server.

Note: Other types of blade servers, such as the BladeCenter HS20 Type 8678 blade server, that are installed in the same BladeCenter unit as the LS20 Type 8850 blade server might have different Ethernet controller routing. See the documentation that comes with the other blade servers for information.

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 controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the blade server. For updated information about configuring the controllers, see <http://www.ibm.com/support/>.

The Ethernet controllers in your blade server support failover, which provides automatic redundancy for the Ethernet controllers. Without failover, you can have only one Ethernet controller from each server attached to each virtual LAN or subnet. With failover, you can configure more than one Ethernet controller from each server to attach to the same virtual LAN or subnet. Either one of the integrated Ethernet controllers can be configured as the primary Ethernet controller. If you have configured the controllers for failover and the primary link fails, the secondary controller takes over. When the primary link is restored, the Ethernet traffic switches back to the primary Ethernet controller. (See the operating-system device-driver documentation for information about configuring for failover.)

Important: To support failover on the blade server Ethernet controllers, the Ethernet switch modules in the BladeCenter unit must have identical configurations.

Blade server Ethernet controller enumeration

The enumeration of the Ethernet controllers in a blade server is operating-system dependent. You can verify the Ethernet controller designations that a blade server uses through the operating-system settings.

The routing of an Ethernet controller to a particular I/O-module bay depends on the type of blade server. You can verify which Ethernet controller is routed to which I/O-module bay by using the following test:

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

If you have installed an I/O expansion card in the blade server, communications from the expansion card are routed to I/O-module bays 3 and 4, if these bays are supported by your BladeCenter unit type. You can verify which controller on the card is routed to which I/O-module bay by performing the same test and using a controller on the expansion card and a compatible switch module or pass-thru module in I/O-module bay 3 or 4.

Configuring a SCSI RAID array

Configuring a SCSI RAID array applies to a blade server in which two SCSI hard disk drives are installed.

Two SCSI hard disk drives in the blade server can be used to implement and manage RAID level-1 (mirror) arrays in operating systems that are listed on the ServerProven list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>. For the blade server, you must configure the SCSI RAID using the following programs:

- LSI Configuration Utility program
- ServeRAID Manager program

Using the LSI Logic Configuration Utility program

You can use the LSI Logic Configuration Utility program to:

- Set the SCSI device scan order
- Set the SCSI ID for the controller

Note: You can use the ServeRAID™ configuration programs to configure the SCSI hard disk drives. See “Using the ServeRAID configuration programs” on page 40 for information on configuring for RAID operation.

Important: Depending on your RAID configuration, you must create the array *before* you install the operating system in the blade server. See the IBM *ServeRAID Support* CD for more information.

To start the LSI configuration utility program, complete the following steps:

1. Turn on the blade server (make sure that the blade server is the owner of the keyboard, mouse, and video) and watch the monitor screen.

2. When the <<<Press Ctrl-C to start LSI Configuration Logic Utility>>> prompt appears, press Ctrl-C.
3. Use the arrow keys to select the controller (channel) from the list of adapters; then, press Enter.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter. If you select **Device Properties** and **Mirroring Properties**, additional screens are displayed.

Using the ServeRAID configuration programs

The IBM *ServeRAID Support* CD contains the ServeRAID Manager program, which you can use to configure the hard disk drives for use with the LSI SCSI controller. For details about using these programs, see the documentation that comes on the IBM *ServeRAID Support* CD.

Chapter 5. Installing the operating system

The LS20 Type 8850 blade server supports the following operating systems:

- Red Hat Enterprise Linux 3 AS, ES, WS (32 bit and 64 bit)
- Red Hat Enterprise Linux 4 AS, ES, WS (32 bit and 64 bit)
- SUSE LINUX Enterprise Server 9 (32 bit and 64 bit)
- VMware 2.5
- Microsoft Windows 2003 Standard Edition, Enterprise Edition, Web Edition (32 bit)
- Microsoft Windows 2000 Server and Advanced Server
- Microsoft Windows 2003 Standard Edition, Enterprise Edition, Web Edition (64 bit, where available)
- Microsoft Windows XP Professional (32 bit)
- Red Hat Enterprise Linux 2.1 AS, ES, WS
- Novell Open Enterprise Server NetWare 6.5

To install the operating system on a blade server, you can use any of the following methods:

- Use Remote Deployment Manager (RDM) Version 4.20 (or later) to install a supported Microsoft Windows or Red Hat Advanced Server operating system. To determine whether the operating system you plan to install supports RDM, see http://www.ibm.com/servers/eserver/xseries/systems_management/.
- Download the latest operating-system installation instructions at <http://www.ibm.com/support> and install the operating system. Local deployment for supported Microsoft Windows operating systems, such as Windows 2000, might require an integrated CD that contains the Windows operating system with service packs applied. Instructions for creating a Windows Integrated CD are contained in the latest operating-system installation instructions on the IBM Support Web page.

Important:

1. The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard, mouse, CD-ROM drive, and diskette drive (or external diskette drive on a BladeCenter T unit). The BladeCenter unit uses USB for internal communication with these devices.
2. Some operating systems, such as Red Hat Enterprise Linux 2.1, enable you to select the type of mouse that is being used. If you are offered this choice, select USB instead of PS/2. Although the mouse is a PS/2-style device, communication with the mouse is through an internal USB bus in the BladeCenter unit; therefore, the operating system in the blade server must recognize the mouse as a USB device.

Using RDM Version 4.20 or later to install the operating system

You can use RDM version 4.20 (or later) to install a supported Microsoft Windows or Red Hat Advanced Server operating system on a blade server. Follow the instructions in the documentation that comes with RDM to install a supported operating system.

Note: To determine whether the operating system you plan to install supports RDM, see http://www.ibm.com/servers/eserver/xseries/systems_management/.

Downloading operating-system installation instructions

After you configure the blade server hardware, complete the following steps to download the latest operating-system installation instructions from the IBM Support Web page:

1. Go to the IBM Support Web page at <http://www.ibm.com/support>.
2. From the **Support by product** list, select **Servers**.
3. Under **Select your product**, from the **Family** list, select your server model; then, select **Go**.
4. The available installation instructions are displayed on the “Operating System Installation” page.

Chapter 6. Solving problems

This section provides basic information about the diagnostic tools available to help you solve some common problems that might occur while setting up the blade server.

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

- Make sure that the BladeCenter unit is properly connected to a power source.
- Reseat the blade server in the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 30).
- Status of the power-on LED:
 - If the LED is flashing slowly, turn on the blade server (see “Turning on the blade server” on page 11).
 - If the LED is lit continuously, make sure that the KVM select button is lit. If the KVM button is not lit, see “The control panel buttons and LEDs” on page 12 for more information.
- If you have just added a new option or component, make sure that it is properly installed and compatible with the blade server and its components. If the option 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.

Note: Microprocessors can only be removed by a trained service technician.

If the blade server does not start up after verifying the above actions, see the *Problem Determination and Service Guide* on the *Documentation CD*.

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes and error messages**

The power-on self-test beep codes indicate the detection of a problem.

- One beep indicates successful completion of POST.
- Repeating long beeps indicate a memory error has occurred. Make sure that all DIMMs are correctly installed.
- Any other combination of beeps indicates that POST detected a problem.

Error messages also appear during startup if POST detects a hardware-configuration problem. Make sure any devices you might have installed are correctly installed.

See the *Problem Determination and Service Guide* for your blade server for more information about POST beep codes and error messages.

- **Problem isolation tables**

Use the problem isolation tables to find solutions to problems with definite symptoms. These tables are in the *Problem Determination and Service Guide* for your blade server.

- **Diagnostic programs**

Real Time Diagnostics tests the major components of the BladeCenter unit, including the management modules, I/O modules, removable media drives, and the blade servers, while the operating system is running. Real Time Diagnostics can be plugged into an existing IBM Director environment or installed without IBM Director present. For documentation and download information for Real Time Diagnostics, see http://www.ibm.com/servers/eserver/xseries/systems_management/. Instructions for using the diagnostic programs are in the *Problem Determination and Service Guide* for your blade server.

- **Light path diagnostics**

Use light path diagnostics LEDs on the system board to identify system errors. If the system-error LED on the system LED panel on the front or rear of the BladeCenter unit is lit, one or more error LEDs on the BladeCenter unit components also might be lit. These LEDs help identify the cause of the problem. Blade server error LEDs are described in the *Problem Determination and Service Guide* for your blade server.

Notices

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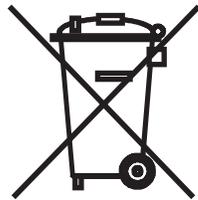
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Avis de conformité à la réglementation d'Industrie Canada

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Notice to Customers

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