



BladeCenter HS20
Type 8832

Hardware Maintenance Manual and Troubleshooting Guide





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Guide

Notes

- Before using this information and the product it supports, read the general information in Appendix B, "Safety information," on page 97, and Appendix C, "Notices," on page 137.
- **The most recent version of this document is available at <http://www.ibm.com/pc/support/>.**

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About this manual

This manual contains configuration information, diagnostic information, error codes, error messages, service information, and a symptom-to-FRU index for the IBM® BladeCenter® HS20 Type 8832 blade server.

Important: The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM BladeCenter products. See the parts listing in "System" on page 94 to determine if the component being replaced is a customer replaceable unit (CRU) or a FRU.

Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions. See Appendix B, "Safety information," on page 97.

Leia todas as instruções de cuidado e perigo antes de executar qualquer operação.

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

安裝本產品之前，請先閱讀「安全資訊」。

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Accertarsi di leggere tutti gli avvisi di attenzione e di pericolo prima di effettuare qualsiasi operazione.

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.

Lea atentamente todas las declaraciones de precaución y peligro ante de llevar a cabo cualquier operación.

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

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

Online support

You can download the most current diagnostic, BIOS flash, and device driver files from <http://www.ibm.com/pc/support/> on the World Wide Web.

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Chapter 1. Introduction

The IBM *@server* BladeCenter HS20 Type 8832 blade server is based on the IBM X-Architecture[®] technologies¹.

The HS20 server can be installed in the IBM *@server* BladeCenter Type 8677 unit or IBM *@server* BladeCenter T Types 8720 and 8730 units.

Note: Unless otherwise stated, references to the BladeCenter unit also apply to the BladeCenter T unit

These high-performance blade servers are ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and reliable data storage.

This *Hardware Maintenance Manual and Troubleshooting Guide* and other publications that provide detailed information about the blade server are provided in Portable Document Format (PDF) on the IBM *BladeCenter Documentation* CD.

1. Enterprise X-Architecture technology takes full advantage of existing IBM technologies to build powerful, scalable, and reliable Intel processor-based servers. For more information about IBM Enterprise X-Architecture, go to <http://www.ibm.com/pc/us/eserver/xseries/xarchitecture/enterprise/index.html>.

The BladeCenter HS20 blade server will have one of the bezels shown in Figure 1.

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

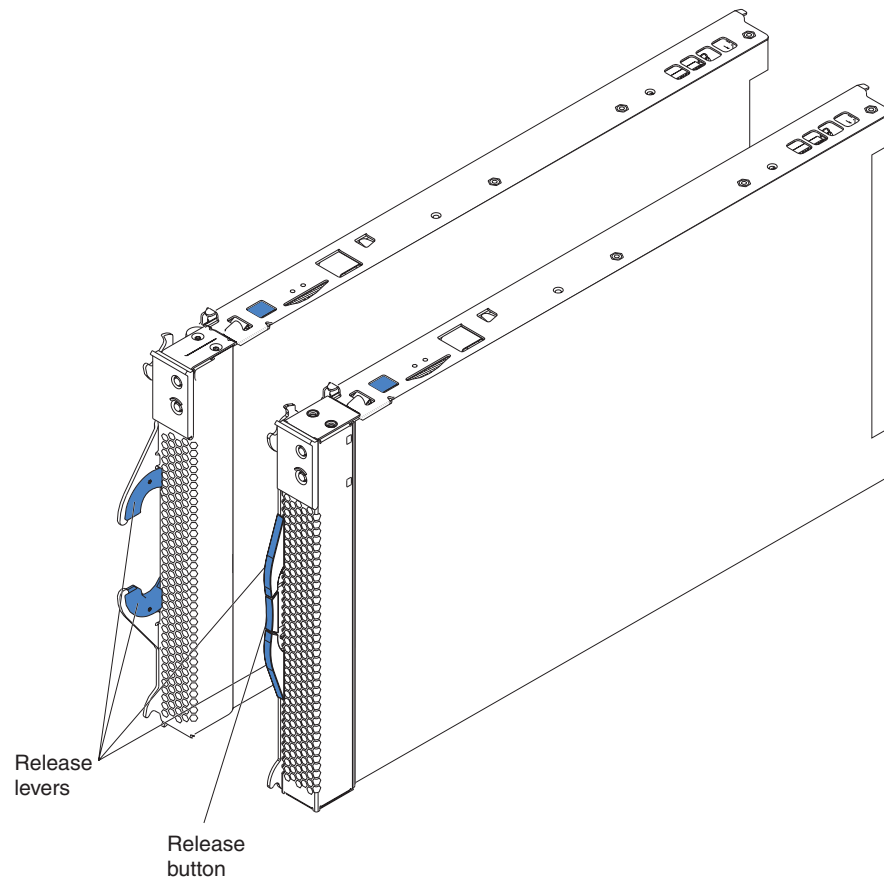


Figure 1. HS20 blade server bezels

A set of user labels comes with the blade server. When you install the blade server in the BladeCenter unit, write identifying information on a label and place it on the BladeCenter unit bezel, just below the blade server, as shown in Figure 2 on page 3.

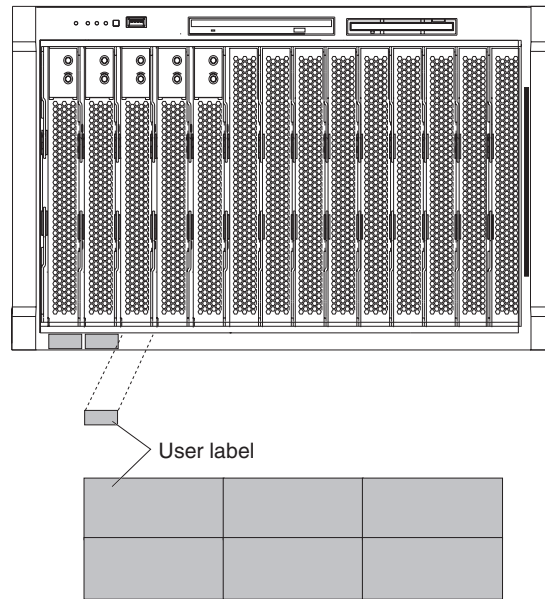


Figure 2. Label placement, Blade Center unit

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

Figure 3 shows the placement of the label, just to the side of the blade server, on the BladeCenter T unit.

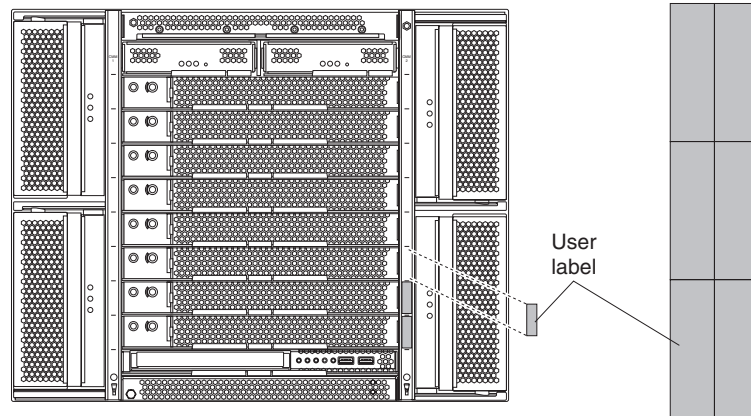


Figure 3. Label placement, Blade Center T unit

Related documentation

In addition to this *Hardware Maintenance Manual and Troubleshooting Guide*, the following documentation is provided in PDF on the IBM *BladeCenter Documentation* CD or the IBM *BladeCenter T Documentation* CD that comes with the IBM BladeCenter unit:

- *Safety Information*: This document 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* book.
- *BladeCenter HS20 Type 8832 Installation and User's Guide*: This document provides general information about the blade server, including information about features, how to configure the server, and how to get help.
- *BladeCenter Type 8677 Installation and User's Guide*: This document contains instructions for setting up and configuring the BladeCenter unit and basic instructions for installing some options. It also contains general information about the BladeCenter unit.
- *BladeCenter T Types 8720 and 8730 Installation and User's Guide*
This document contains instructions for setting up and configuring the BladeCenter T unit and basic instructions for installing some options. It also contains general information about the BladeCenter T unit.
- *BladeCenter Type 8677 Hardware Maintenance Manual and Troubleshooting Guide*: This document contains the information to help you solve BladeCenter problems yourself, and information for service technicians.
- *BladeCenter T Types 8720 and 8730 Hardware Maintenance Manual and Troubleshooting Guide*
This document contains information to help you solve BladeCenter T problems yourself, and information for service technicians.
- *BladeCenter Type 8677 Rack Installation Instructions*: This document contains instructions for installing the BladeCenter unit in a rack.
- *BladeCenter T Rack Installation Instructions*
These documents contain instructions for installing the BladeCenter T unit in a 4-post, Universal Telco Frame (UTF), and 2-post rack.
- *IBM eServer BladeCenter Serial over LAN Setup Guide*
This document explains how to update and configure BladeCenter components for Serial over LAN (SOL) operation. The SOL connection provides access to the text-console command prompt on each blade server, enabling the blade servers to be managed from a remote location.
- *IBM 4-Port Gb Ethernet Switch Module for BladeCenter Installation and User's Guide*: This document contains instructions for setting up and configuring the IBM 4-Port Gb Ethernet Switch Module for BladeCenter and a description of the switch module features.

Additional documents might be included on the IBM *BladeCenter Documentation* CD or the IBM *BladeCenter T Documentation* CD.

The blade server might have features that are not described in the documentation that you received with the blade server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM Web site at <http://www.ibm.com/pc/support/>.

Features and specifications

This section provides a summary of the features and specifications of the blade server. Use the Configuration/Setup Utility program in the server to determine the specific type of microprocessor that is in the blade server.

BladeCenter HS20 specifications for non-NEBS/ETSI environments

The following table provides a summary of the features and specifications of the BladeCenter HS20 Type 8832 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 IBM @server BladeCenter Type 8677 unit and BladeCenter T Types 8720 and 8730 units.

Table 1. Specifications for non-NEBS/ETSI environments

Microprocessor: Supports up to two microprocessors • Intel Xeon microprocessor • 512 KB ECC L2 cache • 533 MHz front-side bus (FSB) Memory: • Four double data rate (DDR) PC1600 sockets • Minimum: 512 MB • Maximum: 8 GB (4 GB depending on operating system) • Type: 2-way interleaved, DDR, PC2100, ECC SDRAM registered x4 (Chipkill) dual inline memory modules (DIMMs) only Notes: 1. PC2100 DIMMs are backward-compatible and can function in the PC1600 sockets. 2. Chipkill is available for DIMMs with 512 MB or greater. • Supports 256 MB, 512 MB, 1 GB, and 2 GB (depending on operating system) DIMMs	Drives: • Support for up to two internal IDE 2.5-inch hard disk drives • Support for up to two Ultra320 SCSI hot-swap hard disk drives available in an optional SCSI storage expansion unit Integrated functions: • Two Gigabit Ethernet controllers • ATI Rage XL video controller • Light path diagnostics • Local service processor • IDE hard disk drive controller • RS-485 interface for communication with BladeCenter management module • USB buses for communication with keyboard, mouse, diskette drive, and CD-ROM drive Predictive Failure Analysis (PFA) alerts: • Microprocessor • Memory • Hard disk drives	Size: • Height: 24.5 cm (9.7 inches) • Depth: 44.6 cm (17.6 inches) • Width: 2.9 cm (1.14 inches) • Maximum weight: 5.4 kg (12 lb) Electrical input: • Input voltage: 12 V dc Environment: • Air temperature: – 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: – Blade server on: 8% to 80% – Blade server off: 5% to 80%
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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-ROM drive, and diskette drive. The BladeCenter unit uses USB for internal communications with these devices.

BladeCenter HS20 specifications for NEBS/ETSI environments

The following table provides a summary of the features and specifications of the BladeCenter HS20 Type 8832 blade server operating in a NEBS/ETSI environment.

Note: Power, cooling, removable-media drives, external ports, and advanced system management are provided by the IBM @server BladeCenter T Type 8720 unit.

Table 2. Specifications for NEBS/ETSI environments

Microprocessor: Supports up to two microprocessors • Intel Xeon DP Processor • 512 KB ECC L2 cache • 533 MHz front-side bus (FSB) Memory: • Four double data rate (DDR) PC1600 sockets • Minimum: 1 GB • Maximum: 8 GB • Type: 2-way interleaved, DDR, PC2100, ECC SDRAM registered x4 (Chipkill) dual inline memory modules (DIMMs) only Notes: 1. PC2100 DIMMs are backward-compatible and can function in the PC1600 sockets. 2. Chipkill is available for DIMMs with 512 MB or greater. • Supports 512 MB, 1 GB, and 2 GB DIMMs Drives: • Support for up to two internal 2.5-inch flash drives (NEBS application requires flash-based IDE drives) • Support for up to two Ultra320 SCSI hot-swap hard disk drives available in an optional SCSI storage expansion unit	Integrated functions: • Two Gigabit Ethernet controllers • ATI Rage XL video controller • Light path diagnostics • Local service processor • IDE drive controller • RS-485 interface for communication with the management module • USB buses for communication with keyboard, mouse, external diskette drive, and CD-ROM drive Predictive Failure Analysis (PFA) alerts: • Microprocessor • Memory Size: • Height: 24.5 cm (9.7 inches) • Depth: 44.6 cm (17.6 inches) • Width: 2.9 cm (1.14 inches) • Maximum weight: 5.4 kg (12 lb)	Electrical input: • Input voltage: 12 V dc Environment (NEBS): • Air temperature: – Blade server on: 5° to 40°C (41° to 104°F). Altitude: -60 to 1800 m (-197 to 6000 ft) – Blade server on (short term): -5° to 55°C (23° to 131°F) Altitude: -60 to 1800 m (-197 to 6000 ft) – Blade server on: 5° to 30°C (41° to 86°F). Altitude: 1800 to 4000 m (6000 to 13 000 ft) – Blade server on (short term): -5° to 45°C (23° to 113°F). Altitude: 1800 to 4000 m (6000 to 13 000 ft) – Blade server off: -40° to 70°C (-40° to 158°F) • Humidity: – Blade server on: 5% to 80% – Blade server on (short term): 5% to 90% but not to exceed 0.024 kg water/kg of dry air – Blade server off: uncontrolled Note: "Short term" refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)
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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-ROM drive, and diskette drive. The BladeCenter T unit uses USB for internal communications with these devices.

Notices and statements used in this book

The caution and danger statements used in this book also appear in the multilingual Safety Information book provided on the IBM *BladeCenter Documentation* CD. Each caution and danger statement is numbered for reference to the corresponding statement in the safety book.

The following notices and statements are used in the documentation:

- **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.

Chapter 2. Blade server power, controls, and indicators

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

Turning on the blade server

After you connect the BladeCenter unit 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) to start the 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 BladeCenter 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 “Blade server controls and LEDs” on page 10 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 BladeCenter 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 Web interface.

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). This 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.

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

Blade server controls and LEDs

This section describes the controls and light-emitting diodes (LEDs) on the blade server.

Notes:

1. The control panel door is shown in the closed (normal) position in this illustration. To access the power-control button, you must open the control panel door.
2. The illustrations in this document might differ slightly from your hardware.

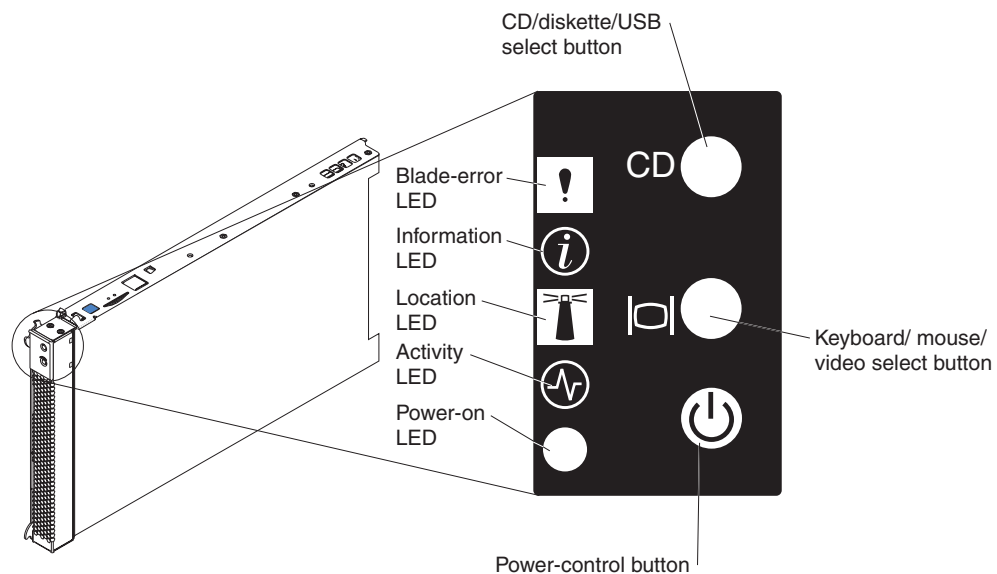


Figure 4. Controls and LEDs

CD/diskette/USB select button: Press this button to associate the CD-ROM drive, diskette drive, and USB port with this blade server. The LED on this button flashes while the request is being processed, then is steady when the ownership of the CD-ROM drive, diskette drive, and USB port has been transferred to this blade server. It can take up to 20 seconds for the operating system in this blade server to recognize the CD-ROM drive, diskette drive, and USB port.

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.

Keyboard/mouse/video select button: Press this button to associate the keyboard port, mouse port, and video port with this blade server. The LED on this button flashes while the request is being processed, then is steady when the ownership of the keyboard, mouse, and video has been transferred to this blade server. It can take up to 20 seconds to switch the keyboard, video, and mouse control to the blade server.

Notes:

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. The BladeCenter unit uses USB for internal communication with these devices.
2. Although the keyboard attached to the BladeCenter unit is a PS/2-style keyboard, communication with it is through a USB bus. When you are running an operating system that does not have USB drivers, such as in the following instances, 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
3. If you install Microsoft Windows 2000 on the blade server while it is not the current owner of the keyboard, video, and mouse, a delay of up to one 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).
4. The blade-error LED, information LED, and location LED can be turned off through the BladeCenter management-module Web interface or the IBM Director console. The IBM Director program is a system-management product that comes with the BladeCenter unit.

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

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

NumLock NumLock *blade_server_number* Enter

where *blade_server_number* is the two-digit number for the blade bay in which the blade server is installed.

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

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

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

- Flashing rapidly – The service processor on the blade server is handshaking with the BladeCenter 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.

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

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

on the BladeCenter unit will be lit also. The location LED can be turned off through the management-module Web interface or the IBM Director console.

Information LED: When this amber LED is lit, it indicates that information about a system error for this blade server has been placed in the system-error log.

The information LED can be turned off through the management-module Web interface or the 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.

Chapter 3. Configuration

Note: Detailed information about the configuration programs provided with the blade server is available in the HS20 Type 8832 Installation and User's Guide on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

The following configuration programs are provided with the blade server:

- **Configuration/Setup Utility program**

This is part of the basic input/output system (BIOS) code in the blade server. Use it to change interrupt request (IRQ) settings, set the date and time, and set passwords (see "Using the Configuration/Setup Utility program" on page 14).

- **IBM ServerGuide Setup and Installation CD**

The ServerGuide program provides software-setup tools and installation tools that are designed for the blade server. Use this CD during the installation of the blade server to configure basic hardware features, such as a SCSI controller with RAID capabilities, and to simplify the installation of the operating system. For information about using this CD, see HS20 Type 8832 Installation and User's Guide on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

Note: The ServerGuide program works only with 32-bit Windows operating systems.

- **Preboot Execution Environment (PXE) boot agent utility program**

The PXE boot agent utility program is part of the BIOS code in the blade server. Use it to select the boot protocol and other boot options and to select a power management option. For information about using this utility, see the HS20 Type 8832 Installation and User's Guide on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

The following product is available for purchase:

- **IBM Remote Deployment Manager (RDM) Version 4.11 Update 3 or later**

You can use the IBM Remote Deployment Manager (RDM) Version 4.11 Update 3 (or later) product to install a BIOS update onto the blade server. Follow the instructions in the documentation that comes with the RDM program to install a BIOS update.

To determine if the operating system supports the RDM program or for updated information about RDM and information about purchasing the software, go to http://www.ibm.com/pc/ww/eserver/xseries/systems_management/index.html.

For information about setting up a network configuration for remote management, such as with the IBM Director products, see, depending on the blade server, either the *IBM @server BladeCenter Planning and Installation Guide* or the *IBM @server BladeCenter T Planning and Installation Guide*. You can obtain the planning guides from http://www-1.ibm.com/servers/eserver/bladecenter/literature/solutions_lit.html.

Using the Configuration/Setup Utility program

This section provides the instructions to start the Configuration/Setup Utility program and descriptions of the menu choices.

Starting the Configuration/Setup Utility program

Complete the following steps to start the Configuration/Setup Utility program:

1. Turn on the blade server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.
3. Select the settings to view or change.

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
- System Information
 - Product Data
- Devices and I/O Ports
- Date and Time
- System Security
- Start Options
- Advanced Setup
 - System Partition Visibility
 - Memory Settings
 - CPU Options
 - PCI Bus Control
 - Integrated System Management Processor Settings
- Error Logs
 - Select **POST Error Log** to view the three most recent error codes and messages that the system generated during POST.
- Save Settings
- Restore Settings
- Load Default Settings
- Exit Setup

ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD includes an easy-to-use setup and installation program that is designed for the IBM blade server. The ServerGuide program detects the blade server model and hardware options that are installed and uses that information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically.

Note: The ServerGuide program works only with 32-bit Windows operating systems.

If a later version of the ServerGuide program is available, you can download a free image of the *ServerGuide Setup and Installation* CD from the IBM ServerGuide Web page at <http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html>.

Detailed information about the *ServerGuide Setup and Installation* CD is available from the HS20 Type 8832 Installation and User's Guide on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

Installing the operating system without ServerGuide

If you have already configured the blade server hardware and you decide not to use the ServerGuide program to install the operating system, you can download the latest operating-system installation instructions from the IBM Support Web page at <http://www.ibm.com/pc/support/>.

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 the password in a secure place.

If you forget the power-on password, you can regain access to the blade server through one of the following methods:

- Remove the blade server battery and then reinstall it (see “Replacing the battery” on page 50).
- Change the position of the power-on password override switch (switch 8 on switch block 2 on the system board) to bypass the power-on password check the next time the blade server is turned on. You can then start the Configuration/Setup Utility program and change the power-on password. You do not need to move the switch back to the previous position after the password is overridden. See Figure 30 on page 61 for the location of switch block 2.

Note: Shut down the operating system, turn off the blade server, and remove the blade server from the BladeCenter unit to access the switches.

Starting the PXE boot agent utility program

Complete the following steps to start the PXE boot agent utility program:

1. Turn on the server.
2. When the Broadcom NetXtreme Boot Agent vX.X.X prompt appears, press Ctrl+S.

Notes:

- a. If the PXE setup prompt is not displayed, use the Configuration/Setup Utility program to set the enable Ethernet PXE/DHCP option.
 - b. By default, you have 2 seconds after the prompt appears on the screen to press Ctrl+S.
3. Use the arrow keys or press Enter to select a choice from the menu.
 - Press Esc to return to the previous menu.
 - Press the F4 key to exit.
 4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

Firmware updates

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

Note: The current version of UpdateXpress does not provide support for the BladeCenter and blade server environment. UpdateXpress packages that provide support for the BladeCenter product, when they become available, can be downloaded from <http://www.ibm.com/pc/support/>.

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

Firmware	Update diskette	RDM	Management-module Web interface	Switch-module Web interface	Switch-module Telnet interface
Blade server BIOS code	Yes	Yes	No	No	No
Blade server diagnostic code	Yes	Yes ¹	No	No	No
Blade server service processor code	Yes	Yes	Yes	No	No
¹ User must set up a custom task.					

At some time, you might have to flash the service processor to apply the latest firmware. Download the latest firmware for the blade server service processor from the IBM Support Web site at <http://www.ibm.com/pc/support/>. Use the management-module Web interface to flash the service processor. The Web interface is described in the IBM *@server BladeCenter Type 8677 Installation and User's Guide* on the IBM *BladeCenter Documentation* CD and IBM *@server BladeCenter T Types 8720 and 8730 Installation and User's Guide* on the IBM *BladeCenter T Documentation* CD.

More information about updating the service processor is available in the HS20 Type 8832 *Installation and User's Guide* on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

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 switch modules in switch-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 switch module in switch-module bay 1 or bay 2. The routing from Ethernet controller to switch-module bay will vary based on blade server type and the operating system that is installed. See “Blade server Ethernet controller enumeration” on page 18 for information about how to determine the routing from Ethernet controller to switch-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 this BladeCenter HS20 Type 8832 blade server might have different Ethernet controller routing. See the documentation that comes with the other blade servers for detailed information.

You do not need 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, go to the IBM Support Web site at <http://www.ibm.com/pc/support/>.

The Ethernet controllers support failover, which provides automatic redundancy for the Ethernet controllers. You can configure either one of the integrated Ethernet controllers 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 to each other.

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 a blade server uses through the operating system settings.

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

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

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

Configuring an IDE RAID

Note: Configuring an IDE RAID only applies to a blade server that has two IDE hard disk drives installed.

You can configure an IDE redundant array of independent disks (RAID) array for the blade server. Two IDE hard disk drives in the blade server can be used to implement and manage RAID level-0 (stripe) and RAID level-1 (mirror) arrays under operating systems that are listed on the ServerProven® list at <http://www.ibm.com/pc/compat/>. For information about this function, see the HS20 Type 8832 Installation and User's Guide on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

Important: You must create the RAID array *before* you install the operating system on the blade server.

Chapter 4. Diagnostics

This section provides basic troubleshooting information to help you solve some common problems that might occur with the blade server.

If you cannot locate and correct the problem using the information in this section, see Appendix A, “Getting help and technical assistance,” on page 95 for more information.

General checkout

The server diagnostic programs are stored in the upgradeable read-only memory (ROM). These programs test the major components of the blade server. The diagnostics can be downloaded from <http://www.ibm.com/pc/support/>.

If you cannot determine whether a problem is caused by the hardware or by the software, you can run the diagnostic programs to confirm that the hardware is working properly.

When you run the diagnostic programs, a single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages might not occur the next time you run the test.

Notes:

1. If multiple error codes are displayed, diagnose the first error code that is displayed.
2. If the server stops with a POST error, go to “POST error codes” on page 71.
3. If the blade server stops and no error is displayed, go to “Undetermined problems” on page 90.
4. For safety information, see Appendix B, “Safety information,” on page 97.
5. For intermittent problems, check the error log.
6. If blade front panel shows no LEDs, verify blade status and errors in BladeCenter web interface; also see “Undetermined problems” on page 90.
7. If device errors occur, see “Error symptoms” on page 77.

001 USE THE FOLLOWING PROCEDURE TO CHECKOUT THE SERVER.

1. Turn off the server and all external devices, if attached.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Turn on all external devices.
5. Turn on the server.
6. Record any POST error messages that are displayed on the screen. If an error is displayed, look up the first error in the "POST error codes" on page 71.
7. Check the information LED panel Blade-error LED; if it is on, see "Light path diagnostics" on page 24.
8. Check the system-error log. If an error was recorded by the system, see Chapter 8, "Symptom-to-FRU index," on page 65.
9. Start the diagnostic programs.
10. Check for the following responses:
 - One beep.
 - Readable instructions or the main menu.

002 DID YOU RECEIVE BOTH OF THE CORRECT RESPONSES?

NO. Find the failure symptom in Chapter 8, "Symptom-to-FRU index," on page 65.

YES. Run the diagnostic programs. If necessary, see "Diagnostic programs and error messages" on page 21.

If you receive an error, see Chapter 8, "Symptom-to-FRU index," on page 65.

If the diagnostic programs were completed successfully and you still suspect a problem, see "Undetermined problems" on page 90.

Diagnostic tools overview

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

- **POST beep codes**

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

- One beep indicates successful completion of POST.
- More than one beep indicates that POST detected a problem. Error messages also appear during startup if POST detects a hardware-configuration problem.

See "Beep symptoms" on page 65 for more information.

- **Error symptom charts**

These charts list problem symptoms and steps to correct the problems. See "Error symptoms" on page 77 for more information.

- **Diagnostic programs and error messages**

The system diagnostic programs are provided in ROM. These programs (see "Diagnostic programs and error messages" on page 21) test the major components of the blade server.

- **Light path diagnostics feature**

Use the light path diagnostics feature to identify system errors quickly. See the "Light path diagnostics" on page 24 for more information.

POST

When you turn on the server, it performs a series of tests to check the operation of server components and some of the options that are installed in the blade server. This series of tests is called the power-on self-test, or POST.

If POST finishes without detecting any problems, a single beep sounds, and the first screen of the operating system or application program appears.

POST error logs

If POST detects a problem, more than one beep sounds, and an error message appears on the screen. See “Beep symptoms” on page 65 and “POST error codes” on page 71 for more information.

Notes:

1. If you have a power-on password set, you must type the password and press Enter, when prompted, before POST will continue.
2. A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will not occur the next time you run the test.

The POST error log contains the three most recent error codes and messages that the system generated during POST. The system-error log refers you to the management module log, which can be accessed through the BladeCenter unit.

Viewing error logs from the Configuration/Setup Utility program

Start the Configuration/Setup Utility program; then, select **Error Logs** from the main menu. See “Using the Configuration/Setup Utility program” on page 14 for more information.

Diagnostic programs and error messages

The server diagnostic programs are stored in ROM on the system board. These programs are the primary method of testing the major components of the server.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing of complex problems that are indicated by error messages should be performed by trained service personnel.

Sometimes the first error to occur causes additional errors. In this case, the blade server displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

Error codes that might be displayed are listed at “Diagnostic error codes” on page 68.

The diagnostic text message format is as follows:

result test_specific_string

where:

result	is one of the following results:
Passed	This test was completed without any errors.
Failed	This test discovered an error.
User Aborted	You stopped the test before it was completed.
Not Applicable	You attempted to test a device that is not present in the computer.
Aborted	The test could not proceed because of the computer configuration.
Warning	A possible problem was reported during the test (for example, a device that was to be tested is not installed).
test_specific_string	is an error code or other information about the error.

Starting the diagnostic programs

You can press F1 while running the diagnostic programs to obtain help information. You also can press F1 from within a help screen to obtain online documentation from which you can select different categories. To exit from the help information and return to where you left off, press Esc.

Complete the following steps to start the diagnostic programs:

1. Turn on the blade server and watch the screen.

Note: When running the diagnostic programs, make sure that the blade server controls the needed components for the tests, including the CD-ROM drive, diskette drive, and USB port. You can use the selection buttons on the blade server to make necessary adjustments.

2. When the message F2 for Diagnostics appears, press F2.
3. Type the appropriate password; then, press Enter.
4. After the diagnostic programs start, select either **Extended** or **Basic** from the top of the screen.
5. When the Diagnostic Programs screen appears, select the test you want to run from the list that appears; then, follow the instructions on the screen.

Notes:

- a. If the blade server stops during testing and you cannot continue, restart the blade server and try running the diagnostic programs again. If the problem remains, replace the component that was being tested when the blade server stopped.
- b. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the BladeCenter and that the blade server controls them.

- c. If you run the diagnostic programs with either no mouse or a mouse attached to the BladeCenter unit that is not controlled by the blade server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat** buttons. All other functions provided by mouse-selectable buttons are also available using the function keys.
- d. You can view server configuration information (such as system configuration, memory contents, and device drivers) by selecting **Hardware Info** from the top of the screen.

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

Viewing the test log

When the tests are completed, you can view the test log by selecting **Utility** from the top of the screen and then selecting **View Test Log**.

Notes:

1. You can view the test log only while you are in the diagnostic programs. When you exit the diagnostic programs, the test log is cleared (saved test logs are not affected). To save the test log so that you can view it later, click **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.
2. To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette may contain other data.

Diagnostic error message tables

For descriptions of the error messages that might appear when you run the diagnostic programs, see “Diagnostic error codes” on page 68.

Notes:

1. Depending on the server configuration, some of these error messages might not appear when you run the diagnostic programs.
2. If diagnostic error messages appear that are not listed in the error message tables, make sure that the server has the latest levels of BIOS, service processor, and diagnostics microcode installed.

Error symptoms

This section describes methods for troubleshooting other error symptoms.

Error symptom charts

You can use the error symptom charts to find solutions to problems that have definite symptoms (see “Error symptoms” on page 77).

If you cannot find the problem in the error symptom charts, go to “Starting the diagnostic programs” on page 22 to test the blade server.

Small computer system interface messages

This information only applies if a storage expansion unit is available. If you receive a SCSI error message when running the SCSI Select Utility program, see “SCSI error codes” on page 87.

Note: If the server does not have a hard disk drive, ignore any message that indicates that the BIOS is not installed.

Light path diagnostics

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 on. These LEDs help identify the cause of the problem.

This section provides the information to identify, using the light path diagnostics, problems that might arise. To locate the actual component that caused the error, you must locate the lit error LED on that component.

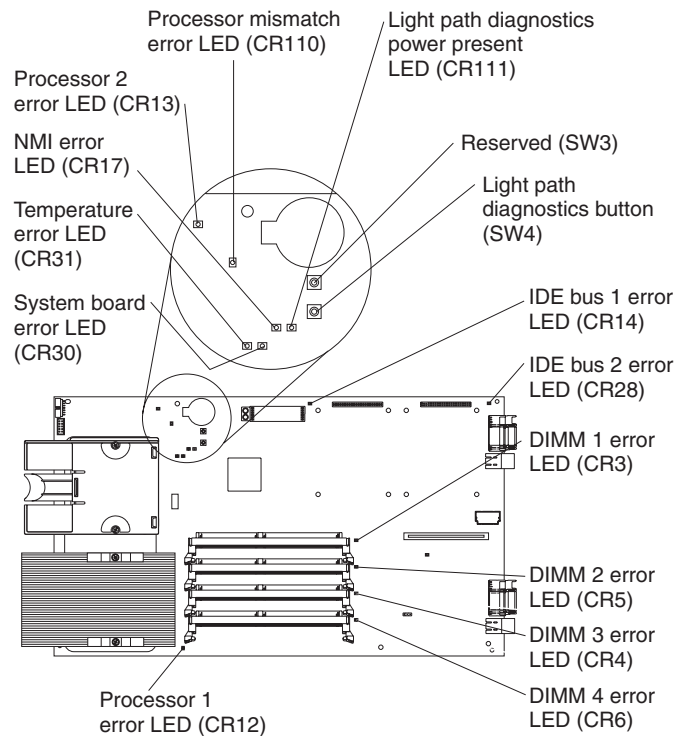


Figure 5. System board: light path diagnostics

For example:

A blade server error has occurred and you have noted that the blade server blade-error LED is lit on the blade server control panel. You then:

1. Remove the blade server from the BladeCenter unit.
2. Place the blade server on a flat, static-protective surface.
3. Remove the cover from the blade server.
4. Press and hold the light path diagnostics button to relight the LEDs that were lit before you removed the blade server from the BladeCenter unit. The LEDs will remain lit for as long as you press the button, to a maximum of 25 seconds.

Note: Power is available to relight the light path diagnostics LEDs for a short period of time after the blade server is removed from the BladeCenter unit. During that period of time, you can relight the light path diagnostics LEDs for a maximum of 25 seconds (or less, depending on the number of LEDs that are lit and the length of time the blade server is removed from the BladeCenter unit) by pressing the light path diagnostics button. The light path diagnostics power present LED (CR111) lights when the light path diagnostics button is pressed if power is available to relight the blade-error LEDs. If the light path diagnostics power present LED does not light when the light path diagnostics button is pressed, no power is available to light the blade-error LEDs and they will be unable to provide any diagnostic information.

Use the table at “Light path diagnostics” on page 75 to help determine the cause of the error and the action you should take.

Memory errors

If a memory problem occurs, take the following actions before replacing a DIMM:

1. Reseat both DIMMs in the bank.
2. Check for a memory type mismatch in the bank.
3. Run the diagnostic programs.

For more information about memory, see “Installing memory modules” on page 40.

Recovering the BIOS code

If the BIOS code has become damaged, such as from a power failure during a flash update, the blade server may appear to be nonfunctional (no video, no beeps). You can recover the BIOS code using the BIOS code page jumper (J12) and a BIOS flash diskette.

Note: To obtain a BIOS flash diskette, download a BIOS flash diskette from the World Wide Web. Go to <http://www.ibm.com/pc/support/> and make the selections for your server.

The flash memory of the server consists of a primary page and a backup page. The J12 jumper controls which page is used to start the blade server. If the BIOS code in the primary page is damaged, you can use the backup page to start the blade server; then, start the BIOS flash diskette to restore the BIOS code to the primary page.

To recover the BIOS code, complete the following steps:

1. Turn off the blade server.
2. Remove the blade server from the BladeCenter unit (see “Removing the blade server from the BladeCenter unit” on page 29).
3. Remove the cover (see “Opening the blade server cover” on page 34).
4. Locate jumper J12 (BIOS code page jumper) on the system board.

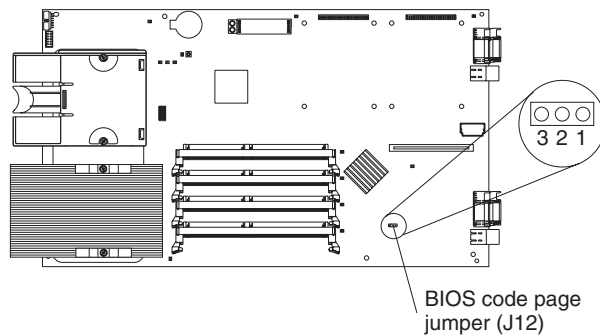


Figure 6. System board: BIOS code page jumper

5. Move J12 to pins 2 and 3 to enable BIOS recovery mode.
6. Replace the cover and reinstall the blade server in the BladeCenter unit, making sure the media tray is selected by the relevant blade server.
7. Insert the BIOS flash diskette into the diskette drive.
8. Restart the blade server. The system begins the power-on self-test (POST).
9. Select **1 - Update POST/BIOS** from the menu that contains various flash (update) options.
10. When you are prompted whether you want to move the current POST/BIOS image to the backup ROM location, press N.
Attention: If you press Y, the damaged BIOS will be copied into the secondary page.
11. When you are prompted whether you want to save the current code to a diskette, press N.
12. Select your language (0 through 5) and press Enter to accept your choice.
13. **Attention:** Do *not* restart the blade server at this time. Remove the flash diskette from the diskette drive.
14. Turn off the blade server, remove it from the BladeCenter, and remove the cover of the blade server.
15. Move J12 to pins 1 and 2 to return to normal startup mode.
16. Replace the cover and reinstall the blade server in the BladeCenter unit; then restart the blade server. The system starts up.

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.

Chapter 5. Customer replacement units

This chapter provides instructions for adding certain components to the blade server. Some removal instructions are provided in case you need to remove one option to install another.

Installation guidelines

Before you begin to install options in the blade server, read the following information:

- Read Appendix B, “Safety information,” on page 97 and the guidelines in “Handling static-sensitive devices.” This information will help you work safely with the blade server and options.
- Back up all important data before you make changes to disk drives.
- For a list of supported options for the blade server, go to <http://www.ibm.com/pc/us/compat/>.
- Before you remove a hot-swap 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, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the blade server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

System reliability considerations

To help ensure proper cooling and system reliability, make sure that microprocessor socket 2 always contains either the microprocessor heat sink filler or a microprocessor and heat sink.

Handling static-sensitive devices

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

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

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- 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 in which you are installing the device 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 the device down, place it in its static-protective package. Do not place the device on the blade server cover or on a metal table.
- Take additional care when handling devices during cold weather because heating reduces indoor humidity and increases static electricity.
- When working on the BladeCenter T unit, use an electrostatic discharge (ESD) wrist strap, especially when you will be handling modules, options, and blade servers. To work properly, 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).

Major components of the blade server

Figure 7 shows the locations of major components in the blade server. You need to remove the blade server from the BladeCenter unit and remove the blade server cover to see the components.

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

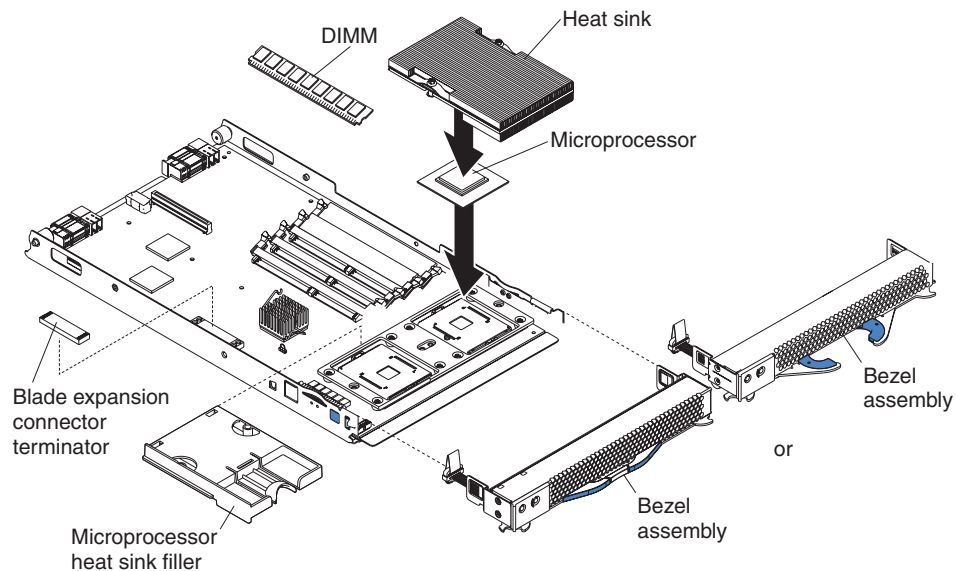


Figure 7. Major components of the blade server

Replacing the blade server in the BladeCenter unit

This section contains information on how to remove the blade server from the BladeCenter unit, and how to reinstall it.

Removing the blade server from the BladeCenter unit

This section describes how to remove a blade server from the BladeCenter unit.

Notes:

1. The illustrations in this document might differ slightly from your hardware.
2. Unless otherwise stated, references to the BladeCenter unit also apply to the BladeCenter T unit.

Figure 8 shows how to remove the blade server from the BladeCenter unit.

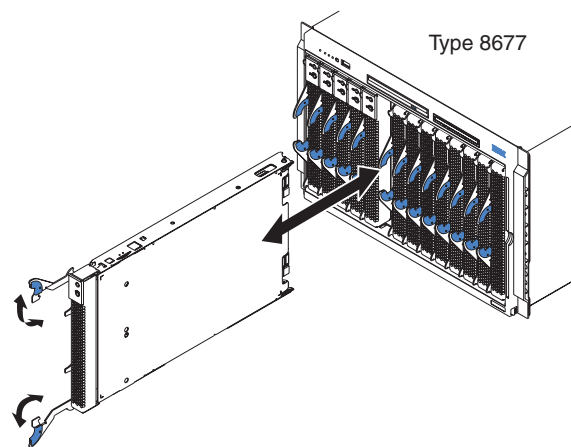


Figure 8. Blade server replacement in the BladeCenter unit Type 8677

Figure 9 shows how to remove the blade server from the BladeCenter T unit.

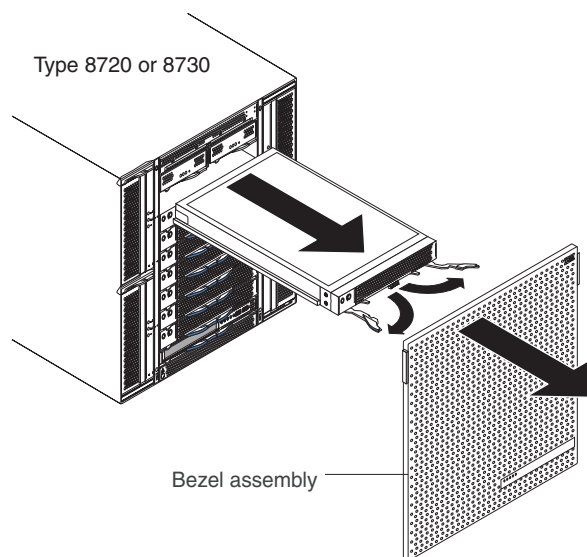


Figure 9. Blade server removal in the BladeCenter unit Type 8720 or 8730

Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit for more than one minute for the BladeCenter unit and 20 minutes for the BladeCenter T unit without either a blade server, expansion unit, or filler blade installed in each blade bay.
- Note the bay number. Reinstalling a blade server into a different bay than the one from which it was removed 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 need to reconfigure the blade server.

Complete the following steps to remove the blade server:

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 “Blade server controls and LEDs” on page 10).

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

2. Open the two release levers (see Figure 8 on page 29 and Figure 9 on page 29). The blade server moves out of the bay approximately 0.6 cm (0.25 inch).

Note: You must remove the bezel assembly from the BladeCenter T unit before you can access the blade server. Firmly grip the blue touch points (at the top-left and top-right sides of the bezel) and forcefully pull forward, lifting the bezel up and away from the BladeCenter T unit. Carefully set the bezel assembly aside in a safe place (see the BladeCenter T Types 8720 and 8730 *Installation and User's Guide* for detailed information about reinstalling the bezel assembly).

3. Pull the blade server out of the bay. Spring-loaded doors farther back in the bay move into place to cover the bay temporarily.
4. Place either a filler blade or another blade server in the bay within one minute for the BladeCenter unit and 20 minutes for the BladeCenter T unit. The recessed spring-loaded doors will move out of the way as you insert the blade server.

Installing the blade server in the BladeCenter unit

This section describes the installation of a blade server in the BladeCenter unit.

Figure 10 shows how to install the blade server into the BladeCenter unit.

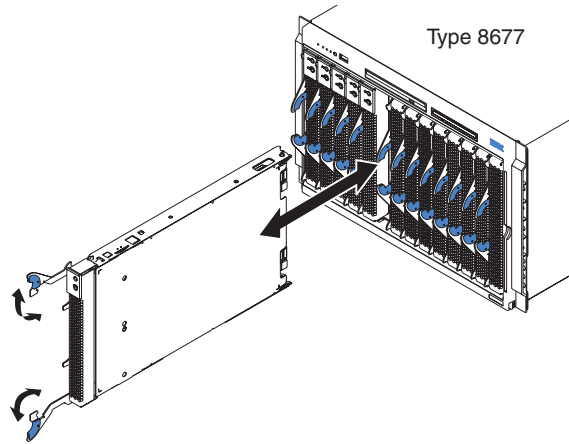


Figure 10. Blade server replacement in the BladeCenter unit Type 8677

Figure 11 shows how to install the blade server into the BladeCenter T unit.

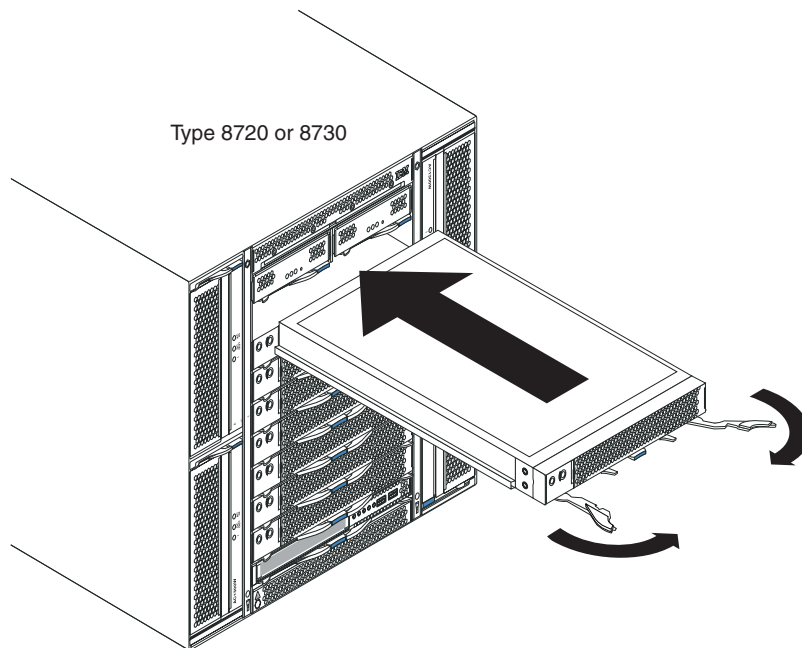


Figure 11. Blade server installation in the BladeCenter unit Type 8720 or 8730

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

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 at Appendix B, “Safety information,” on page 97, “Installation guidelines” on page 27, and “Handling static-sensitive devices” on page 27.
2. If you have not done so already, install any options that you want, such as IDE drives or memory, in the blade server.
3. Select the bay for the blade server.

Notes:

- a. If the blade server has an expansion unit installed on it, the blade server and expansion option require two adjacent bays.
 - b. When any blade server or option is in either blade bay 7 through 14 (in the BladeCenter unit) or blade bay 5 through 8 (in the BladeCenter T unit), power modules must be present in all four power bays.
 - c. 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 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 one minute for the BladeCenter unit and 20 minutes for the BladeCenter T unit.
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 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 9).
 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. If necessary, write identifying information on one of the user labels that come with the blade server and place the label on the BladeCenter unit bezel.

Figure 12 on page 33 shows the placement of the label, just below the blade server, on the BladeCenter unit.

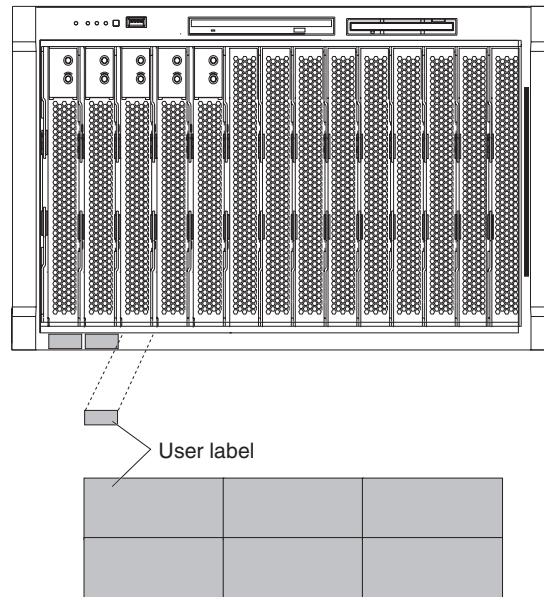


Figure 12. Applying a label to the BladeCenter Type 8677

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

Figure 13 shows the placement of the label, just to the side of the blade server, on the BladeCenter T unit.

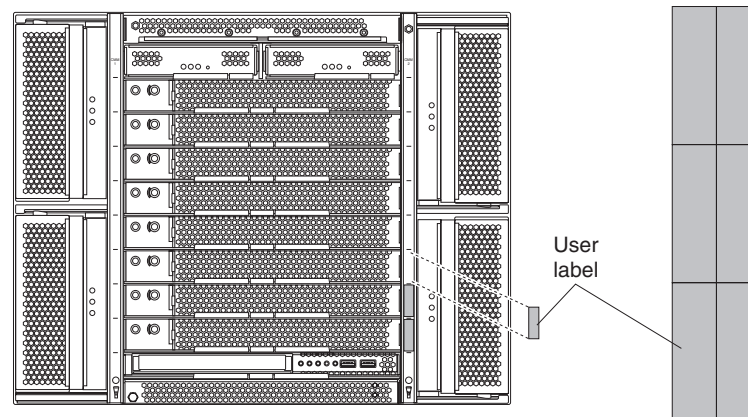


Figure 13. Applying a label to the BladeCenter Type 8720 or 8730

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

Note: Reinstall the bezel assembly on the BladeCenter T unit after you have finished installing the blades (see the BladeCenter T Types 8720 and 8730 *Installation and User's Guide* for detailed information about reinstalling the bezel assembly). However, if you installed an option such as a PCI I/O Expansion Unit with PCI adapters that requires cables, you will not be able to install the bezel assembly, which contains an air filter for the BladeCenter T unit. If you cannot install the bezel assembly, a filter must be provided on the rack. See the IBM *@server* BladeCenter T Planning and Installation Guide for information about

installing an air filter on the rack (you can obtain the planning guide from http://www-1.ibm.com/servers/eserver/bladecenter/literature/solutions_lit.html).

Attention: If you reinstall a blade server that you removed, you must install it in the same bay from which it was removed. Some blade server configuration information and update options are established according to bay number. Reinstalling a blade server into a different bay from the one from which it was removed could have unintended consequences, and you might have to reconfigure the blade server.

If this is the initial installation for a blade server in the BladeCenter unit, you must configure the blade server with the Configuration/Setup Utility and install the blade server operating system. Detailed information about these tasks is available in the HS20 Type 8832 Installation and User's Guide on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

Operating the blade server cover

This section contains information opening and closing the blade server cover.

Opening the blade server cover

This section describes how to open the blade server cover, illustrated in Figure 14.

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

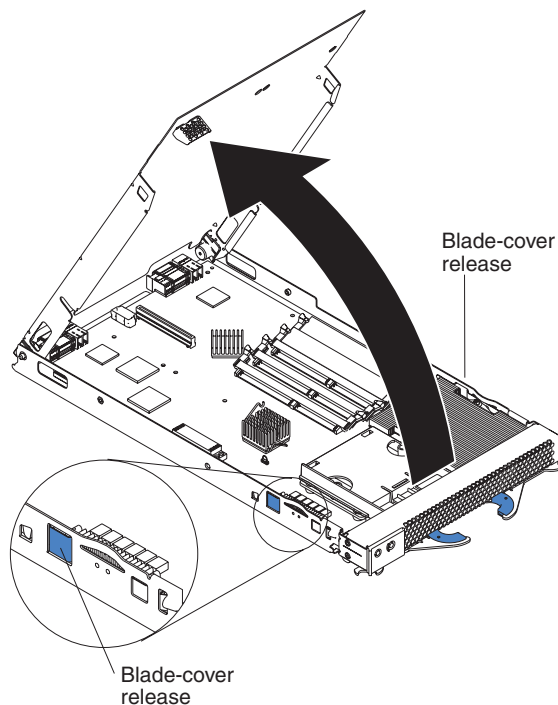


Figure 14. Opening the blade server cover

Complete the following steps to open the blade server cover:

1. Read the safety information beginning at Appendix B, "Safety information," on page 97 and "Installation guidelines" on page 27.

2. Carefully lay the blade server down on a flat, non-conductive surface, with the cover side up.
3. Press the blade-cover release on each side of the blade server and lift the cover open, as shown in the illustration.
4. Lay the cover flat, or lift it from the blade server.

Statement 21



CAUTION:

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

Closing the blade server cover

This section describes how to close the blade server cover, as illustrated in Figure 15.

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

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

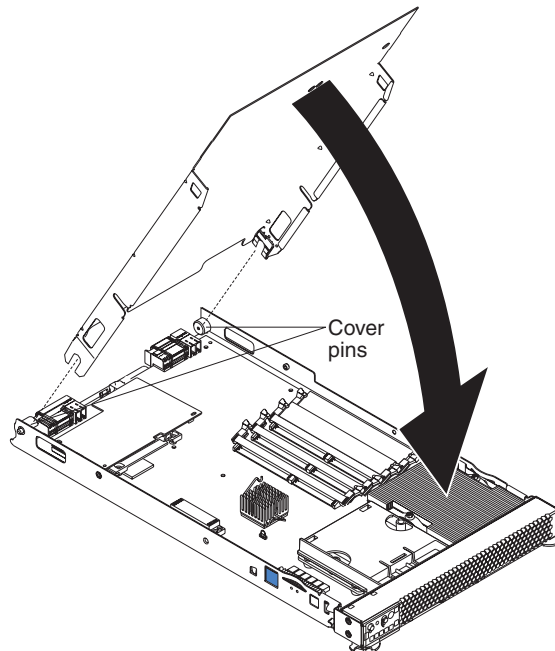


Figure 15. Closing the blade server cover

Complete the following steps to close the blade server cover:

1. Read the safety information beginning at Appendix B, “Safety information,” on page 97 and “Installation guidelines” on page 27.
2. If you removed the blade bezel assembly, replace it now (see “Installing the blade server bezel assembly” on page 37).

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 Figure 15 on page 35. Before closing the cover, make sure that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade server.
4. Pivot the cover to the closed position as shown in Figure 15 on page 35, until it clicks into place.

Replacing the blade server bezel assembly

This section contains information on how to remove and install the blade server bezel assembly.

Removing the blade server bezel assembly

To install certain options you must first remove the blade server bezel assembly. Figure 16 shows how to remove the bezel assembly from a blade server.

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

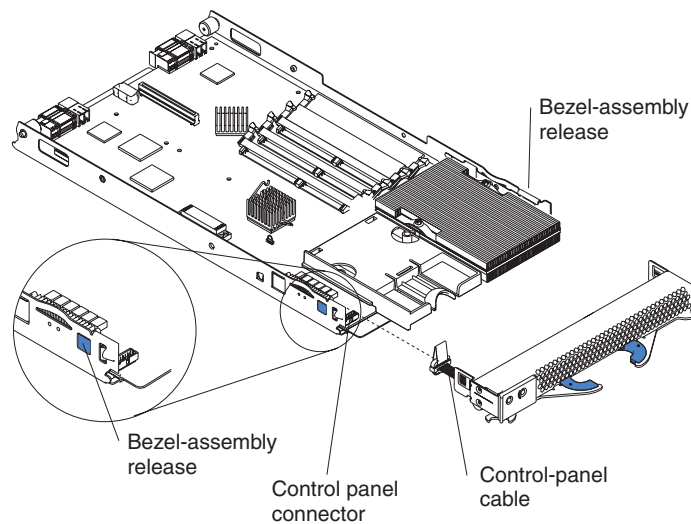


Figure 16. Blade server bezel placement

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

1. Review Appendix B, “Safety information,” on page 97 and “Installation guidelines” on page 27.
2. Open the blade server cover.
3. Press the bezel-assembly release and pull the bezel assembly away from the blade server approximately 1.2 cm (0.5 inch).
4. Disconnect the control-panel cable from the control-panel connector.
5. Pull the bezel assembly away from the blade server.
6. Store the bezel assembly in a safe place.

Installing the blade server bezel assembly

Figure 17 shows how to install the bezel assembly on the blade server.

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

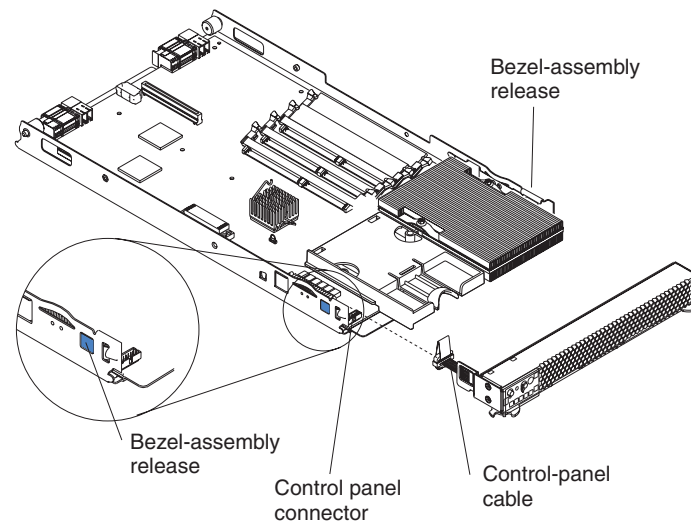


Figure 17. Blade server bezel placement

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

1. Read the safety information beginning at Appendix B, “Safety information,” on page 97 and “Installation guidelines” on page 27.
2. Connect the control-panel cable to the control-panel connector on the system board (see Figure 29 on page 60).
3. Carefully slide the bezel assembly onto the blade server as shown in Figure 17, until it clicks into place.

Installing IDE disk drives

The blade server has two connectors on the system board for installing an optional 2.5-inch HS20 IDE hard disk drive or BladeCenter flash disk drive.

Note: In this document, both types of drives are referred to as IDE drives.

Each IDE connector is on a separate bus. Some models come with at least one IDE hard disk drive already installed. By installing a second IDE hard disk drive, you can implement and manage RAID level-1 under both the Linux and Microsoft Windows 2000 operating systems.

Attention: To maintain proper system cooling, do not operate the BladeCenter unit without either a blade server, expansion unit, or filler blade installed in each blade bay for more than one minute for the BladeCenter unit and 20 minutes for the BladeCenter T unit.

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

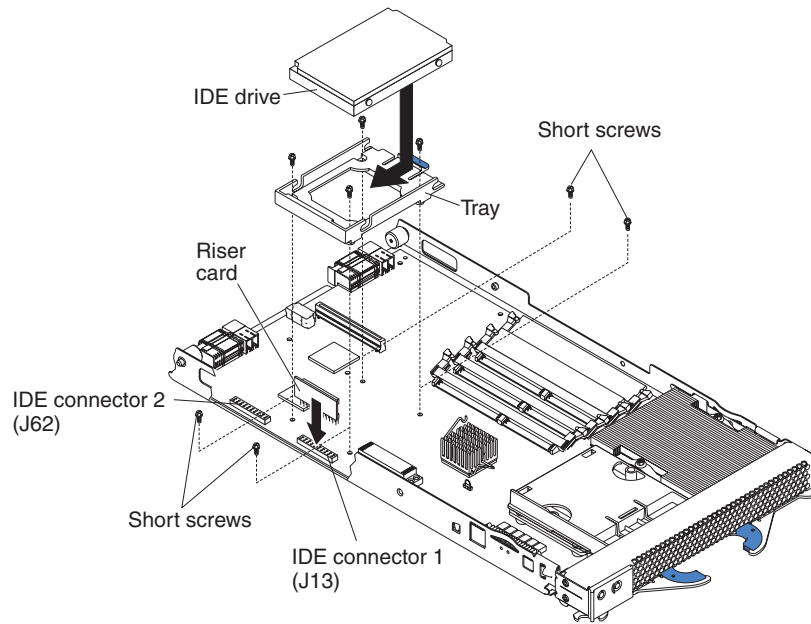


Figure 18. Installing an IDE drive

Notes:

1. If you are upgrading the IDE drive and a drive tray is currently installed, complete steps 1 through 4 of this procedure, and then go to step 9 on page 39.
2. Do not install an IDE drive in IDE connector 2 if you intend to also install an optional I/O expansion card. The I/O expansion card occupies the same area as the second IDE drive.

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

1. Review Appendix B, “Safety information,” on page 97 and “Installation guidelines” on page 27.
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 29).
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 34).
5. Insert the riser card from the option kit into an IDE connector on the blade server system board.

Important: Drives must be installed in the following order: IDE connector 1 (J13) first, then IDE connector 2 (J62).

6. Place the IDE drive tray from the option kit over the riser card as shown in Figure 18, aligning the tray with the four screw holes on the system board.

Note: Some models will contain screws in all four holes, and some will contain only two.

7. Remove the tray temporarily; then, remove the screws from the screw holes on the system board and replace the tray. Secure the tray to the system board with the screws from the kit.
8. Set any jumpers or switches on the IDE drive.

Important: Both IDE drives must be set to Master.

Attention: Do not press on the top of the IDE drive. Pressing the top could damage the drive.

9. Place the IDE drive into the tray and push it, from the rear edge of the drive, into the connector on the riser card until the hard disk drive moves past the lever at the back of the tray. The drive clicks into place.
10. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 52.

Memory modules

This section provides information about the types of memory the blade server supports, and describes how to install memory modules.

Memory technology and Chipkill

Some models of the BladeCenter HS20 Type 8832 contain dual inline memory modules (DIMMs) with 256 MB capacity and 128 MB technology, which support the Chipkill feature. Other models, however, contain DIMMs with 256 MB capacity and 256 MB technology, which does not support Chipkill. If you require DIMMs that support the Chipkill feature, a limited supply of the 256 MB, 128 Mb technology DIMMs will be available for order.

Note: IBM will continue to offer the Chipkill feature with DIMMs that have a capacity of 512 MB or greater.

Memory considerations

The following notes describe the types of DIMMs that the blade server supports and other information that you must consider when installing DIMMs:

Notes:

1. The system board contains four DIMM connectors and supports two-way memory interleaving.
2. The DIMM options available for the blade server are 256 MB, 512 MB, 1 GB, and 2 GB. The blade server supports a minimum of 512 MB and a maximum of 8 GB (4 GB depending on operating system) of system memory.
3. The blade server comes with two DIMMs installed in the DIMM 3 (J2) and DIMM 4 (J6) memory connectors. When you install additional DIMMs, be sure to install them as a pair, in DIMM connectors 1 (J1) and 2 (J5). Table 3 describes the order in which DIMMs must be installed.

Table 3. DIMM installation order

Pair	DIMM connectors
First	3 (J2) and 4 (J6)
Second	1 (J1) and 2 (J5)

4. When you install memory, you must install a pair of matched DIMMs.
5. Both DIMMs in a pair must be the same size, speed, type, and technology. You can mix compatible DIMMs from various manufacturers.
6. The second pair does not have to be DIMMs of the same size, speed, type, and technology as the first pair.
7. Install only 2.5 V, 184-pin, double-data-rate (DDR), PC2100, registered synchronous dynamic random-access memory (SDRAM) with error correcting

code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2100 SDRAM Registered DIMM specification, which is available from <http://www.jedec.org/>. For a current list of supported options for the blade server, see the ServerProven list at <http://www.ibm.com/pc/us/compat/>.

8. PC2100 DIMMs are backward-compatible and work in the PC1600 sockets.
9. Installing or removing DIMMs changes the configuration information for the blade server. Therefore, after installing or removing a DIMM, you must change and save the new configuration information by using the Configuration/Setup Utility program. When you restart the blade server, the system displays a message indicating that the memory configuration has changed. Start the Configuration/Setup Utility program and select **Save Settings** (see "Configuration/Setup Utility menu choices" on page 14).

Installing memory modules

Figure 19 shows the location of the DIMM sockets on the system board.

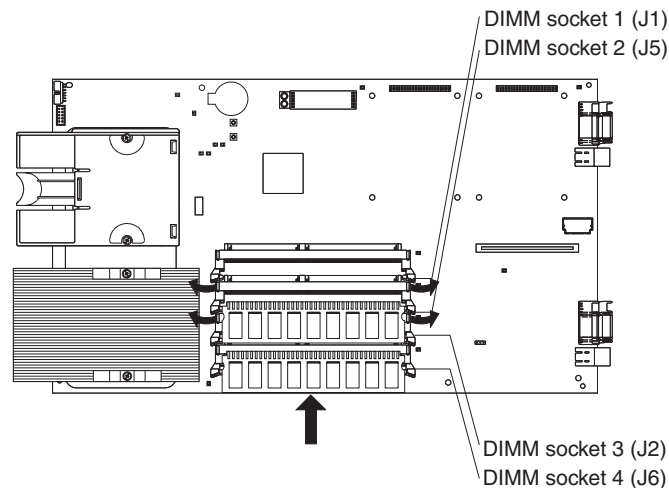


Figure 19. DIMM socket locations

Before you begin, read the documentation that comes with the option.

Complete the following steps to install a DIMM:

1. Review Appendix B, "Safety information," on page 97 and "Installation guidelines" on page 27.
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 29).
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 34).
5. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs (see note 3 on page 39.).
6. Touch the static-protective package that contains the DIMM option to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* surface on any other grounded rack component for at least two seconds. Then, remove the DIMM from the package.
7. To install the DIMMs, repeat 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 properly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
8. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 52.

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. 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/pc/us/compat/>.

Attention: To ensure proper blade server operation when you install a second microprocessor, observe the following precautions:

- Always install microprocessors that have the same cache size and type, the same clock speed, and identical internal and external clock frequencies (including system bus speed).
- Make sure that the microprocessor with the lowest feature set is the startup (bootstrap) microprocessor installed in the microprocessor 1 socket (location U66).

Notes:

1. For a list of microprocessors supported by the HS20 blade server, go to the ServerProven list at <http://www.ibm.com/pc/us/compat/>.
2. Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you need to update the blade server BIOS code. The latest level of BIOS code for the blade server is available from <http://www.ibm.com/pc/support/> on the World Wide Web.
3. The microprocessor sockets in this server contain built-in termination for the microprocessor bus; therefore, no terminator card is required if a second microprocessor is not installed in microprocessor socket 2. However, for proper airflow, this socket must contain a microprocessor heat-sink filler, sometimes called a microprocessor baffle.
4. The microprocessor speeds are automatically set for this server; therefore, you do not need to set any microprocessor frequency-selection jumpers or switches.

Figure 20 on page 42 depicts the installation of a second microprocessor on the system board.

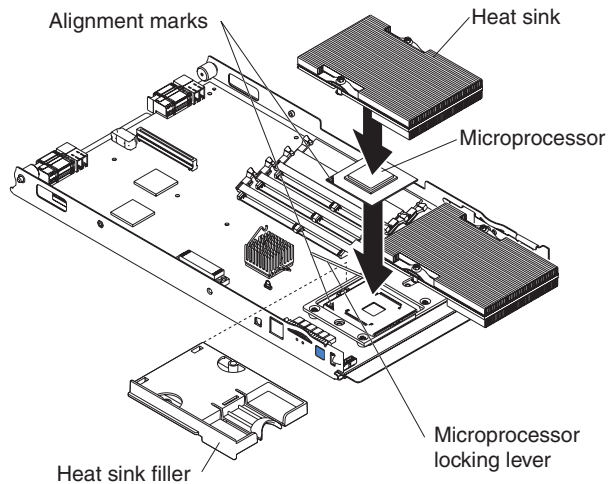


Figure 20. Installing a second microprocessor

Complete the following steps to install an additional microprocessor:

1. Review Appendix B, “Safety information,” on page 97 and “Installation guidelines” on page 27.
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 29).
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 34).
5. Remove the bezel assembly (see “Removing the blade server bezel assembly” on page 36).
6. Locate microprocessor socket 2 on the system board (see Figure 29 on page 60).
7. 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.
 - b. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the BladeCenter chassis or any *unpainted* surface on any other grounded rack component for at least two seconds; then, remove the microprocessor from the package.

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.
 - c. Rotate the locking lever on the microprocessor socket from its closed and locked position (Figure 21 on page 43) until it stops or clicks in the fully open position (approximately a 135° angle), as shown in Figure 22 on page 43.

Attention: You must ensure 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 result in permanent damage to the microprocessor, microprocessor socket, and system board.

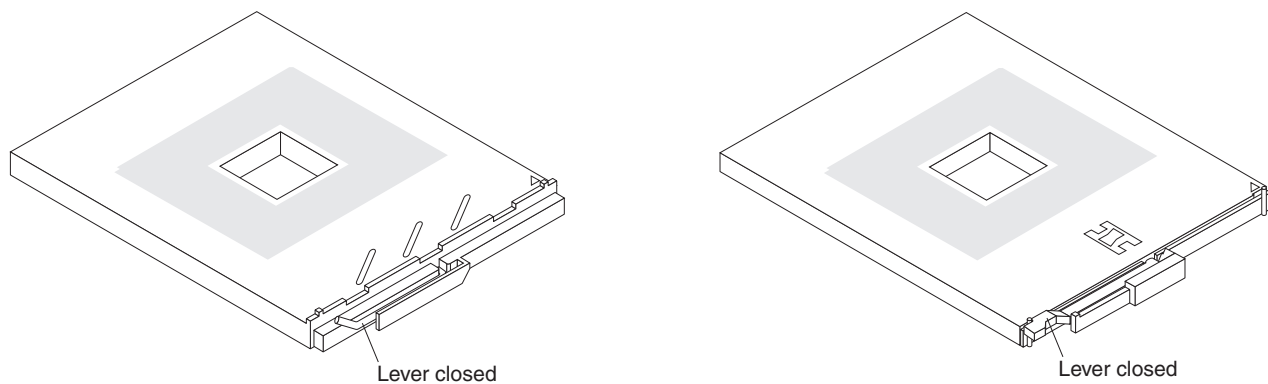


Figure 21. Microprocessor locking lever in the closed position

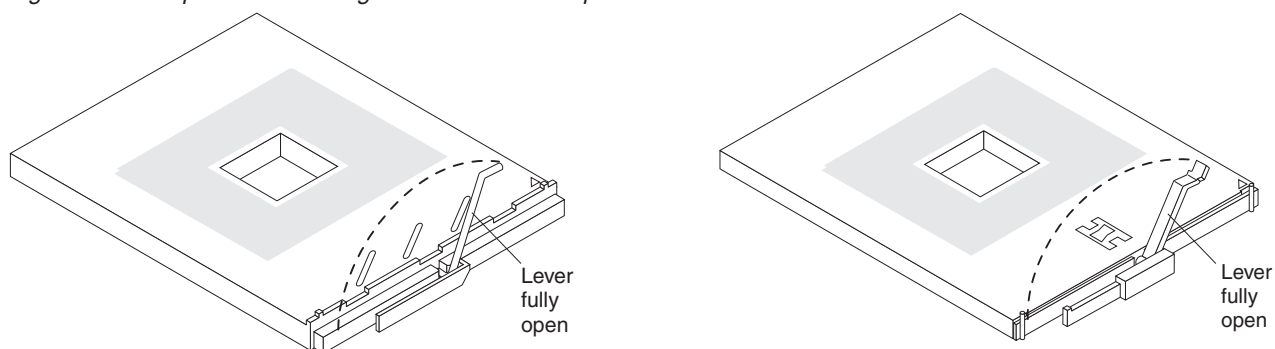


Figure 22. Microprocessor locking lever in the fully open position

- 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 carefully press the microprocessor into the socket.

Attention:

 - Do not use excessive force when pressing the microprocessor into the socket.
 - 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.
9. Install a heat sink on the microprocessor:
 - a. Remove the plastic protective cover from the bottom of the heat sink.

Attention:

- Do not set down the heat sink after you remove the plastic cover.

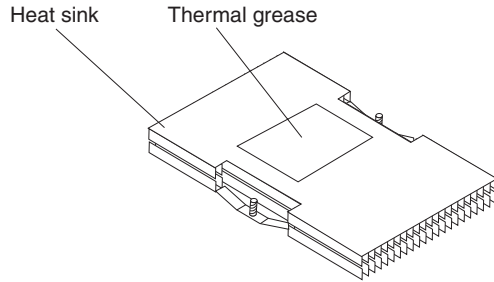


Figure 23. Location of thermal grease on heat sink

- 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, it can be corrected by a service technician.
 - b. 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. Using a screwdriver, secure the heat sink to the retention bracket on the system board using the two captive mounting screws. Press firmly on the screws and tighten them, alternating between them. Do not overtighten the screws. If you are using a torque wrench, tighten the screws to 1.13 newton-meters +/- 0.13 newton-meters (10 inch-pounds +/- 1.15 inch-pounds).
10. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 52.

Installing an I/O expansion card

You can add an optional I/O expansion card to the blade server to give the blade server additional network connections for communicating on a network.

Attention: When you add an I/O expansion card, you must make sure that the switch modules (also known as I/O modules)² in switch-module bays 3 and 4 on the BladeCenter unit both support the I/O expansion card network-interface type. For example, if you add an Ethernet expansion card to the blade server, the modules in switch-module bays 3 and 4 on the BladeCenter unit must both be compatible with the Ethernet expansion card. All other I/O expansion cards installed on other blade servers in the BladeCenter unit must also be compatible with these switch modules. In this example, you could then install two Ethernet Switch Modules, two pass-thru modules, or one Ethernet Switch Module and one pass-thru module. Because pass-thru modules are compatible with a variety of I/O expansion cards, installing two pass-thru modules would allow use of several different types of compatible I/O expansion cards within the same BladeCenter unit.

"If the IDE hard disk drive that is installed in IDE connector 2 is part of a RAID array, delete this IDE RAID array configuration before removing the hard disk drive.

2. In the BladeCenter unit Type 8677, these modules are referred to as "switch modules"; in the BladeCenter T unit Types 8720 and 8730, these modules are referred to as "I/O modules." In this document, these modules will be known as *switch modules*.

When you delete the RAID array, the array configuration information is removed; no data is deleted. See "Deleting an IDE RAID array configuration" on page 53 for instructions.

Important: Installation of an I/O expansion card requires removal of the IDE drive installed in IDE connector 2. The I/O expansion card occupies the same space as this IDE drive and replaces it. You cannot install an IDE drive in IDE connector 2 while an I/O expansion card is installed in the blade server.

- If the IDE drive installed in IDE connector 2 contains any information that you want to keep, back it up to another storage device.
- If the IDE hard disk drive that is installed in IDE connector 2 is part of a RAID array, delete this IDE RAID array configuration before removing the hard disk drive. When you delete the RAID array, the array configuration information is removed; no data is deleted. For information about creating and deleting an IDE RAID array configuration, see the HS20 Type 8832 Installation and User's Guide on the *BladeCenter Documentation* CD or the *BladeCenter T Documentation* CD.

Figure 24 shows how to install an I/O expansion card on the blade server. The card is installed near IDE connector 2.

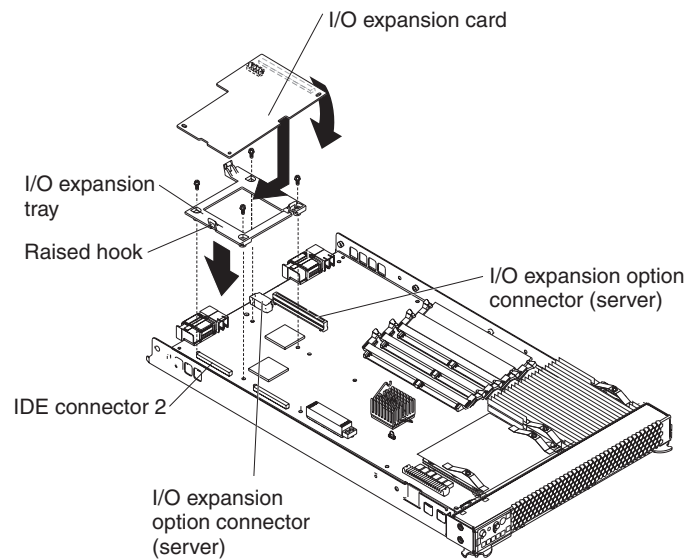


Figure 24. Installing an I/O expansion card

Complete the following steps to install an I/O expansion card:

1. Review Appendix B, "Safety information," on page 97 and "Installation guidelines" on page 27.
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 29).
3. Carefully lay the blade server on a flat, static-protective surface.
4. Open the cover (see "Opening the blade server cover" on page 34 for instructions).

5. If an IDE hard disk drive is in IDE connector 2, remove the drive and tray (save the screws that secured the tray to the system board); otherwise, remove the two existing screws near IDE connector 2 that secure the system board to the chassis, as shown in Figure 24 on page 45.
 6. Install the I/O expansion card:
 - a. Install the I/O expansion card tray. Secure the tray to the system board with the screws from the option kit, as shown in Figure 24 on page 45.
 - b. Orient the I/O expansion card as shown in Figure 24 on page 45.
 - c. 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 I/O expansion card connectors, as shown in the illustration.
- Note:** For device driver and configuration information to complete the installation of the I/O expansion card, see the documentation that comes with the option. Some documentation might also be on the IBM *BladeCenter Documentation* CD or the IBM *BladeCenter T Documentation* CD that comes with the BladeCenter unit.
7. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 52.

Installing an expansion unit

You can install an optional BladeCenter SCSI Storage Expansion Unit or Peripheral Card Interface (PCI) I/O Expansion Unit on the blade server.

Important: To avoid potential performance and reliability problems when configuring or replacing drives in a mirrored configuration, ensure that the storage capacities and speeds of the drives are identical.

Notes:

1. After you install the SCSI storage expansion unit on the blade server, the blade server and expansion unit become a single unit that occupies two blade bays in the BladeCenter unit.
2. To ensure proper cooling and system reliability, make sure that each of the SCSI hard disk drive bays on the SCSI storage expansion unit contains either a hot-swap SCSI hard disk drive or a filler panel.

For a list of SCSI hard disk drives supported by the blade server, go to the ServerProven list at <http://www.ibm.com/pc/us/compat/>.

Figure 25 on page 47 shows how to install the SCSI storage expansion unit on the blade server.

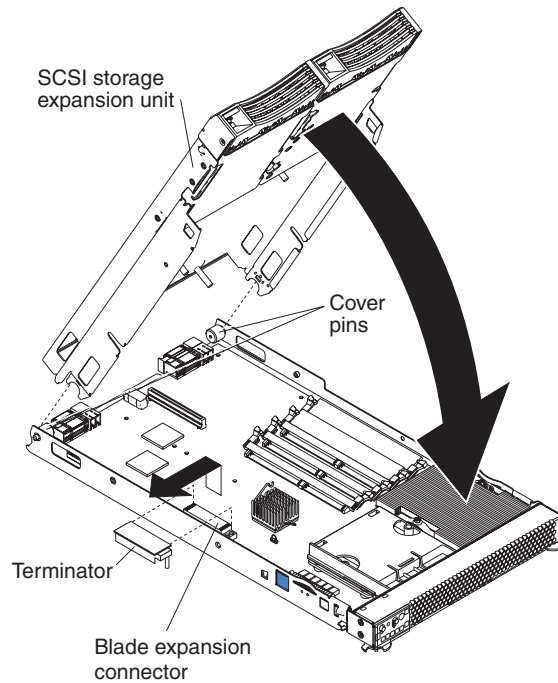


Figure 25. SCSI storage expansion unit installation

Figure 26 shows how to install a PCI I/O Expansion Unit on a blade server.

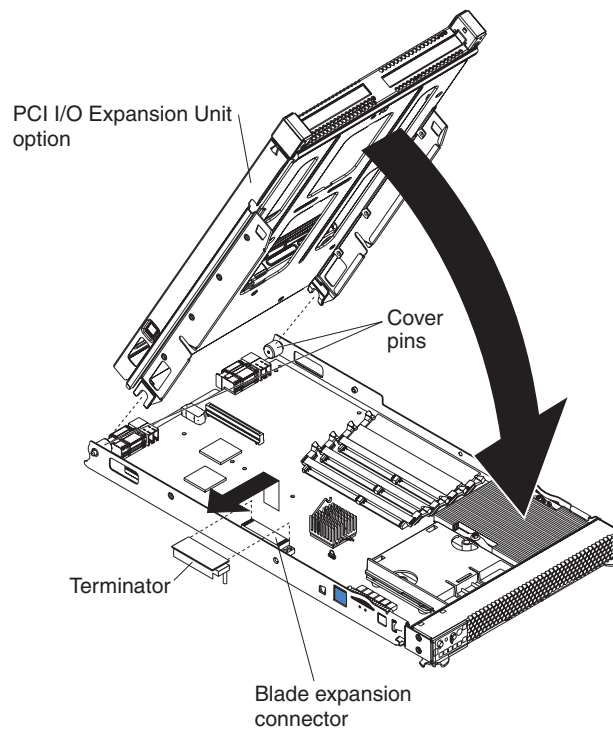


Figure 26. PCI I/O expansion unit installation

With the SCSI storage expansion unit installed on the blade server, you can install up to two hot-swap SCSI hard disk drives in the option and configure them for embedded mirroring (RAID level1). Each SCSI device must have a unique SCSI ID. This ID enables the SCSI controller in the I/O expansion card to identify the device

and ensure that different devices on the same SCSI channel do not attempt to transfer data simultaneously. The SCSI IDs for the hard disk drives in the expansion unit are permanent (not configurable). Table 4 lists the SCSI IDs for the hard disk drives that are installed in the expansion unit. See "Installing a SCSI hot-swap hard disk drive" for instructions for installing hard disk drives.

Table 4. SCSI IDs for hot-swap hard disk drives in the expansion unit

Device	SCSI ID
Drive bay 1	0
Drive bay 2	1

Note: SCSI ID 7 is usually reserved for the SCSI controller; however, this SCSI ID is changeable through the ServeRAID configuration program or the LSI configuration program utility.

Use the Configuration/Setup Utility program in the blade server to enable or disable the SCSI controller in the storage expansion unit. See the documentation that comes with the storage expansion unit for information about configuring the storage expansion unit and SCSI hard disk drives.

Installing a SCSI hot-swap hard disk drive

If you have installed a SCSI storage expansion unit on the blade server, you can install up to two SCSI hot-swap hard disk drives in the bays in the expansion unit.

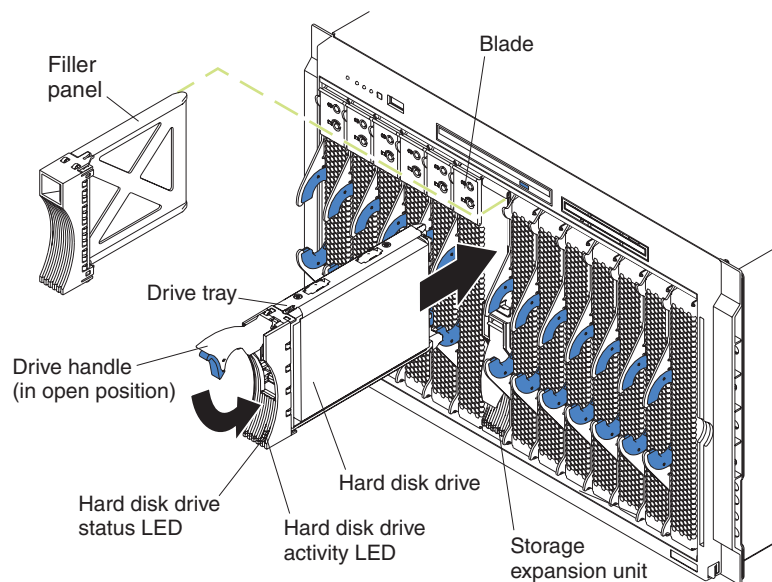
If a hot-swap hard disk drive in the expansion unit fails, you can replace it without turning off the blade server. Therefore, you have the advantage of continuing to operate the blade server while a hard disk drive in this unit is removed or installed.

Each hot-swap hard disk drive has two indicator LEDs. If the amber hard disk drive status LED for a hard disk drive is lit continuously, that hard disk drive is faulty and must be replaced.

Each hot-swap hard disk drive that you plan to install must be mounted in a hot-swap-drive tray. The hard disk drive must have a Single Connector Attachment (SCA) connector. Hot-swap-drive trays come with the hot-swap hard disk drives.

For a list of SCSI hard disk drives supported by the blade server, go to the ServerProven list at <http://www.ibm.com/pc/us/compat/>.

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



Complete the following steps to install a SCSI hot-swap hard disk drive in a storage expansion unit.

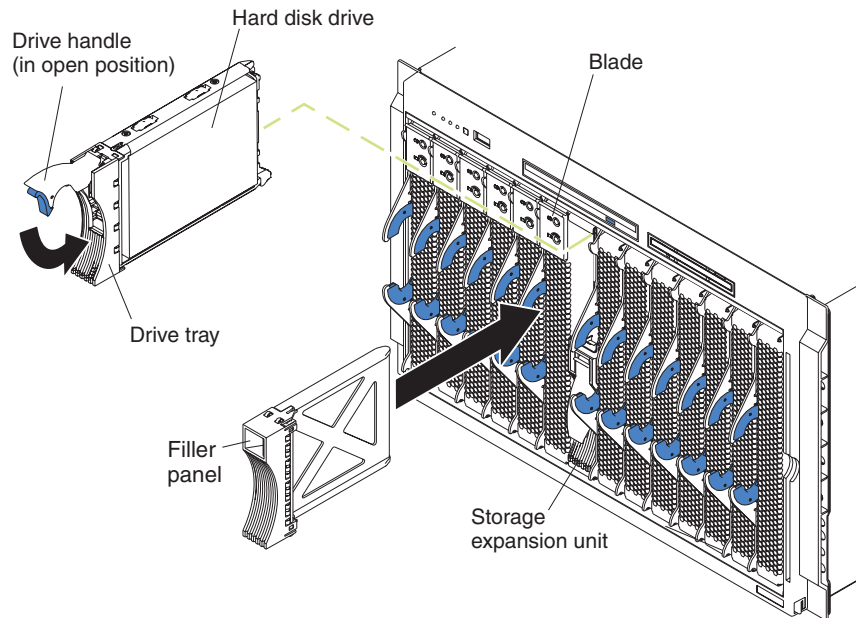
Attention: To maintain proper system cooling, do not operate the BladeCenter unit for more than one minute without either a hot-swap hard disk drive or a filler panel installed in each storage expansion unit bay.

1. Review Appendix B, “Safety information,” on page 97 and “Installation guidelines” on page 27.
2. Remove the filler panel from one of the empty hot-swap bays by inserting your finger into the depression at the top of the filler panel and pulling it away from the expansion unit.
3. Install the SCSI hot-swap hard disk drive:
 - a. Ensure that the tray handle is open (that is, perpendicular to the hard disk drive).
 - b. Align the hard disk drive assembly with the guide rails in the bay.
 - c. Gently push the hard disk drive assembly into the bay until it stops.
 - d. Push the tray handle to the closed (locked) position.
 - e. Check the hard disk drive LEDs to verify that the hard disk drive is operating properly.
 - If the amber hard disk drive status LED for a hard disk drive is lit continuously, that hard disk drive is faulty and needs to be replaced.
 - If the green hard disk drive activity LED is flashing, the hard disk drive is being accessed.

See the documentation that comes with the expansion unit for information about configuring the expansion unit and SCSI hard disk drives.

Replacing a SCSI hot-swap hard disk drive

If a hard disk drive in the storage expansion unit fails, you can replace it without turning off the blade server.



Complete the following steps to replace a SCSI hot-swap hard disk drive in a storage expansion unit hot-swap bay.

Attention: To maintain proper system cooling, do not operate the BladeCenter unit for more than one minute without either a hot-swap hard disk drive or a filler panel installed in each storage expansion unit bay.

1. Read Appendix B, "Safety information," on page 97 and "Installation guidelines" on page 27.
2. Locate the defective hard disk drive (look for an amber status LED that is lit on the front of the hard disk drive).
3. Make sure the hard disk drive has stopped spinning.
4. Move the handle on the hard disk drive to the open position (perpendicular to the hard disk drive), and pull the hot-swap hard disk drive assembly from the bay.
5. Within one minute, install the replacement hard disk drive in the hot-swap bay (see "Installing a SCSI hot-swap hard disk drive" on page 48 for instructions).

Replacing the battery

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

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

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with

normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

Note: After you replace the battery, you must reconfigure the blade server and reset the system date and time.

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.

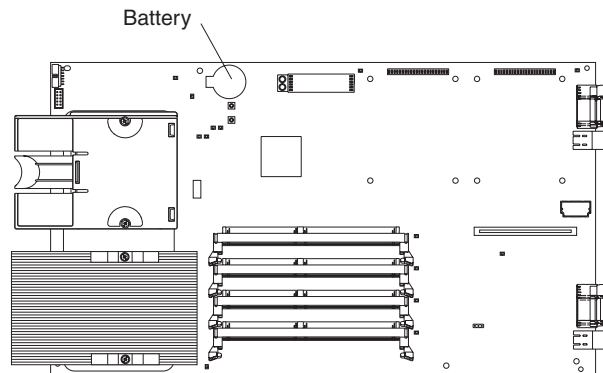
Do not:

- 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.

Complete the following steps to replace the battery:

1. Review Appendix B, "Safety information," on page 97 and "Installation guidelines" on page 27.
2. Follow any special handling and installation instructions supplied with the battery.
3. Turn off the blade server and remove the blade from the BladeCenter unit (see "Removing the blade server from the BladeCenter unit" on page 29 for instructions).
4. Open the blade server cover (see "Opening the blade server cover" on page 34 for instructions).
5. Locate the battery on the system board.



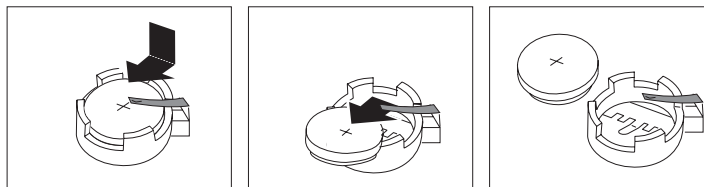
6. Remove the battery:

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

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

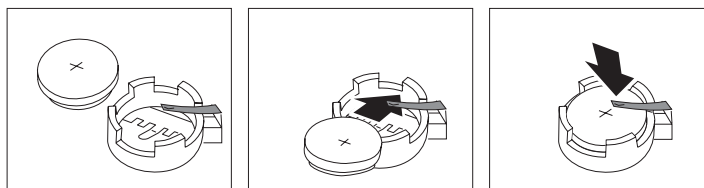
- b. Use your thumb and index finger to pull the battery from under the battery clip.

Note: After you remove the battery, ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.



7. Insert the new battery:

- a. Tilt the battery so that you can insert it into the socket, under the battery clip.
- b. As you slide it under the battery clip, press the battery down into the socket.



8. Close the blade server cover (see “Closing the blade server cover” on page 35).

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.

9. Reinsert the blade server into the bay in the BladeCenter unit.
10. Turn on the blade server.
11. Start the blade server Configuration/Setup Utility program and set configuration parameters as needed (see “Using the Configuration/Setup Utility program” on page 14).

Completing the installation

To complete the installation, perform the following tasks.

1. Reinstall the blade server bezel assembly, if you removed it (see “Installing the blade server bezel assembly” on page 37).
2. Close the blade server cover, unless you installed the expansion unit option (see “Closing the blade server cover” on page 35).

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 “Replacing the blade server in the BladeCenter unit” on page 29).
4. Turn on the blade server (see “Turning on the blade server” on page 9).
5. For certain options, run the blade server Configuration/Setup Utility program (see “Updating the blade server configuration”).

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 a blade server flashes slowly before pressing the power-control button on that blade server.

Updating the blade server configuration

When you start the blade server for the first time after you add or remove an internal option or an external SCSI device (if the storage expansion unit has been installed), you might see a message telling you that the configuration has changed. The blade server Configuration/Setup Utility program automatically starts so that you can save the new configuration information (see “Using the Configuration/Setup Utility program” on page 14).

Some options have device drivers that you need to install. See the documentation that comes with the option for information about installing any required device drivers.

The blade server comes with one or two microprocessors installed on the system board. If the blade server comes with two microprocessors, or the blade server comes with one microprocessor and you have installed an additional microprocessor, the blade server can now operate as an SMP server. Therefore, you might want to upgrade the operating system to support SMP (see Chapter 6, “Installing the operating system,” on page 55 and the operating-system documentation).

Input/output connectors and devices

The input/output connectors 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/mouse/video select button (see “Blade server controls and LEDs” on page 10).

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

Chapter 6. Installing the operating system

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

- Use the *ServerGuide Setup and Installation* CD to install a supported Microsoft Windows operating system.
- Use the Remote Deployment Manager (RDM) Version 4.11 Update 3 (or later) program to install a supported Microsoft Windows operating system or Red Hat Advanced Server 2.1.

Note: To determine if the operating system you plan to install supports RDM, go to http://www.ibm.com/pc/ww/eserver/xseries/systems_management/index.html.

- Download the latest operating system installation instructions from the IBM Support Web page at <http://www.ibm.com/pc/support/> and install the operating system at the BladeCenter unit (local deployment).

Note: Local deployment for Microsoft Windows 2000 requires an integrated CD that contains Windows 2000 with Service Pack 3 applied. Instructions for creating a Windows 2000 Integrated CD are contained in the latest operating system installation instructions for Windows 2000 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. The BladeCenter unit uses USB for internal communication with these devices.
2. Some operating systems, such as Red Hat Linux 7.3, permit you to select the type of mouse being used. If 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 chassis; therefore, the operating system in the blade server must recognize the mouse as a USB device.

Using RDM Version 4.11 Update 3 or later

You can use the RDM version 4.11 Update 3 (or later) program to install a supported Microsoft Windows operating system or Red Hat Advanced Server 2.1 on a blade server. Follow the instructions in the documentation that comes with the RDM program to install a supported Microsoft Windows operating system.

Note: To determine if the operating system you plan to install supports RDM, go to http://www.ibm.com/pc/ww/eserver/xseries/systems_management/index.html.

Downloading installation instructions

The installation instructions can be downloaded from the IBM Support Web page at <http://www.ibm.com/pc/support/>.

Chapter 7. Field replaceable units

This chapter describes the removal of field-replaceable server components.

Important: The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM products. See the parts listing in “System” on page 94 to determine if the component being replaced is a customer replaceable unit (CRU) or a FRU.

Microprocessor removal

Note:

- Read “Installation guidelines” on page 27.
- Read the safety notices at Appendix B, “Safety information,” on page 97.
- Read “Handling static-sensitive devices” on page 27.

Complete the following steps to remove a microprocessor:

1. 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 29).
2. Carefully lay the blade server on a flat, non-conductive surface.
3. Open the blade server cover (see “Opening the blade server cover” on page 34 for instructions).
4. Remove the bezel assembly (see “Removing the blade server bezel assembly” on page 36 for instructions).
5. Identify the microprocessor to be removed.

Note: If you are replacing a failed microprocessor, verify that you have selected the correct microprocessor for replacement (see “Light path diagnostics” on page 75).

6. Remove the heat sink:
 - a. Loosen one captive screw fully; then, loosen the other captive screw.

Attention: Loosening one screw fully before loosening the other screw will help to break the thermal bond that adheres the heat sink to the microprocessor.
 - b. Gently pull the heat sink off of the microprocessor.
7. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position (approximately 135° angle), as shown in Figure 28 on page 58.

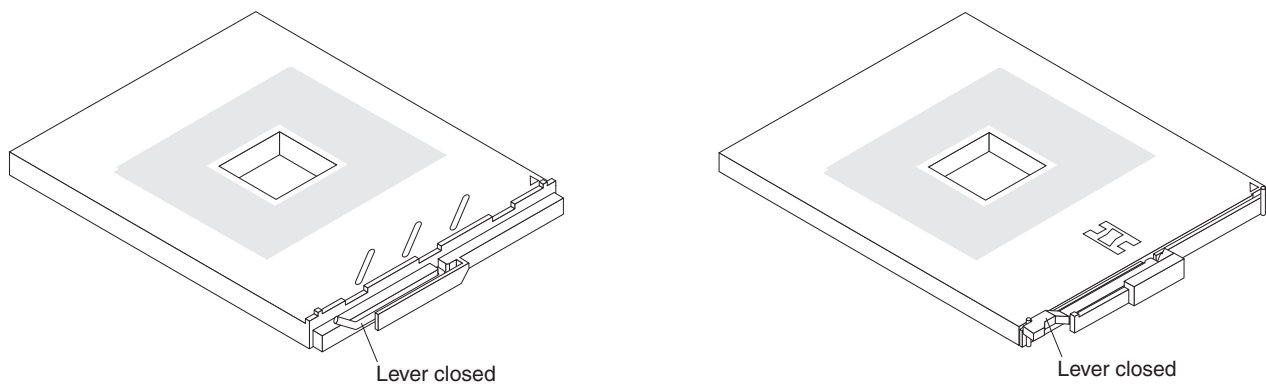


Figure 27. Microprocessor locking lever in the closed position

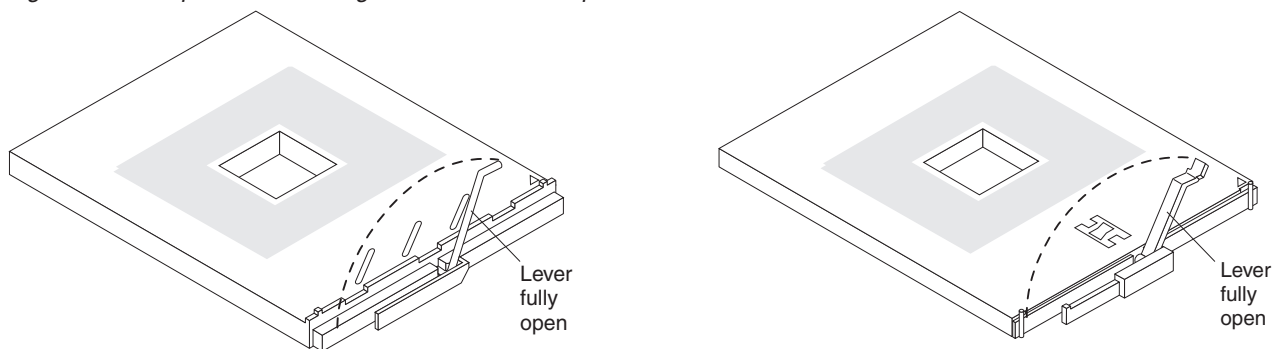
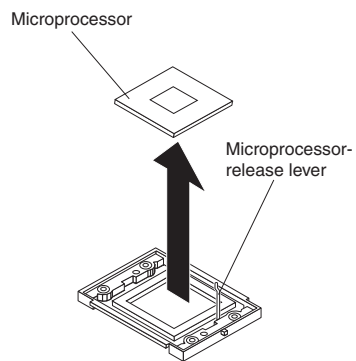


Figure 28. Microprocessor locking lever in the fully open position

Attention: You must ensure that the locking lever on the microprocessor socket is in the fully open position before you remove the microprocessor from or insert the microprocessor into the socket. Failure to do so might result in permanent damage to the microprocessor, microprocessor socket, and system board.

8. Pull the microprocessor out of the socket.



To install a microprocessor, see “Installing an additional microprocessor” on page 41 and the documentation provided with the microprocessor option for complete installation instructions.

Attention: If you are not installing a replacement microprocessor in socket 2, you must reinstall the microprocessor baffle in that socket.

Thermal grease

This section contains information about removing and replacing the thermal grease between the heat sink and the microprocessor. The thermal grease must be replaced whenever the heat sink has been removed from the top of the microprocessor and is going to be reused, or when debris is found in the grease.

Note:

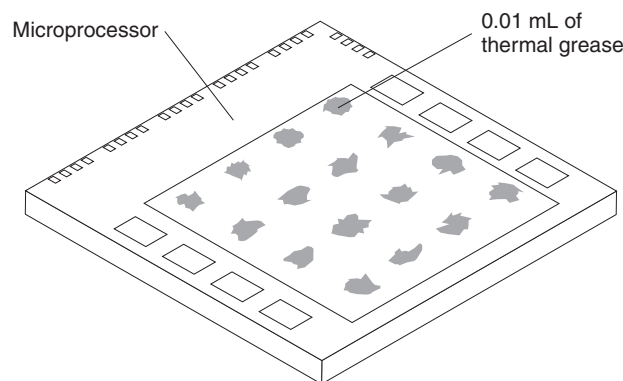
- Read “Installation guidelines” on page 27.
- Read the safety notices at Appendix B, “Safety information,” on page 97.
- Read “Handling static-sensitive devices” on page 27.

Complete the following steps to replace damaged or contaminated thermal grease on the microprocessor and heat sink:

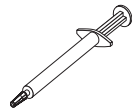
1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

Note: Be sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



5. Use the thermal grease syringe to place 16 uniformly spaced dots of 0.01mL each on the top of the microprocessor.



Note: 0.01mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22mL) of the grease will remain in the syringe.

6. Install the heat sink onto the microprocessor as described in “Installing an additional microprocessor” on page 41.

System board

This section shows the locations of items on the system board and describes how to remove the system board.

System board component locations

Figure 29 shows the location of the battery and of system board connectors.

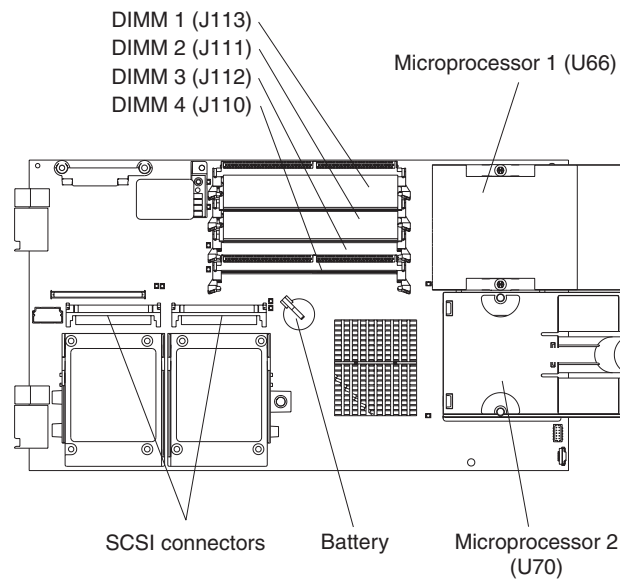


Figure 29. System board component locations

Note: The blade expansion connector (J8) requires a terminator unless an expansion option is connected to it.

Switches and jumpers

Figure 30 shows the location of the switches and jumpers on the system board.

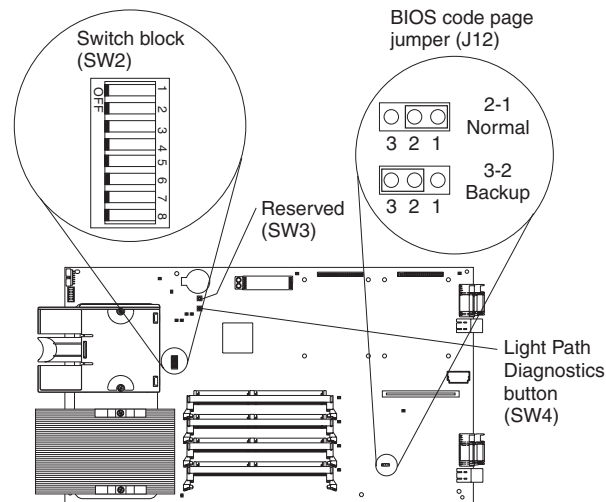


Figure 30. System board switches and jumpers

Switches

Table 5 describes the function of each switch on switch block (SW2).

Table 5. Switch block (SW2)

Switch number	Default value	Switch description
1 through 4	Off	Reserved.
5	Off	Power-on override. When toggled to On, this switch forces the blade server to turn on, overriding the power-on button. The power-on override switch should be used for debug purposes only and should not be used to override management module control of the server.
6 through 7	Off	Reserved
8	Off	Power-on password override. Changing the position of this switch bypasses the power-on password check the next time the blade server is turned on and starts the Configuration/Setup Utility program so that you can change or delete the power-on password. You do not need to move the switch back to the default position after the password is overridden. See “Using passwords” on page 15 for additional information about the power-on password.

Jumpers

When the BIOS code page jumper (J12) is moved from pins 1 and 2 to pins 2 and 3, you can start the blade server from a backup BIOS page (see “Recovering the BIOS code” on page 25). The default position is pins 1 and 2.

Note: If you start the blade server from the backup page because the primary BIOS page has become damaged, you must flash the primary BIOS code.

System board LED locations

Figure 31 shows the location of the LEDs on the system board. You might need to refer to this illustration when solving problems with the blade server. You need to remove the blade server from the BladeCenter unit, open the cover, and press the light path diagnostics button to light any error LEDs that were turned on during processing.

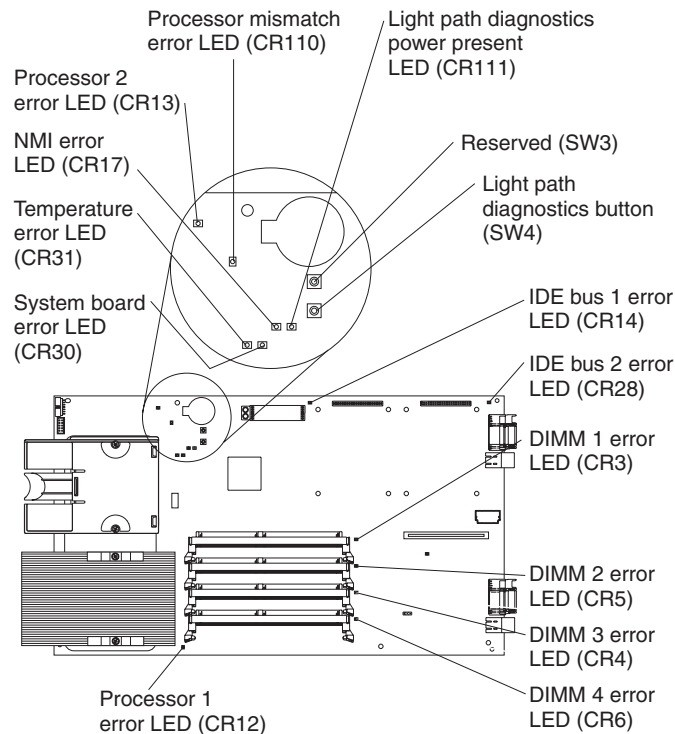


Figure 31. System board LED locations

Note: Power is available to relight the light path diagnostics LEDs for a short period of time after the blade server is removed from the BladeCenter unit. During that period of time, you can relight the light path diagnostics LEDs for a maximum of 25 seconds (or less, depending on the number of LEDs that are lit and the length of time the blade server is removed from the BladeCenter unit) by pressing the light path diagnostics button. The light path diagnostics power present LED (CR111) lights when the light path diagnostics button is pressed if power is available to relight the blade-error LEDs. If the light path diagnostics power present LED does not light when the light path diagnostics button is pressed, no power is available to light the blade-error LEDs and they will be unable to provide any diagnostic information.

System board removal

When replacing the system board, you must either update the system with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

Note:

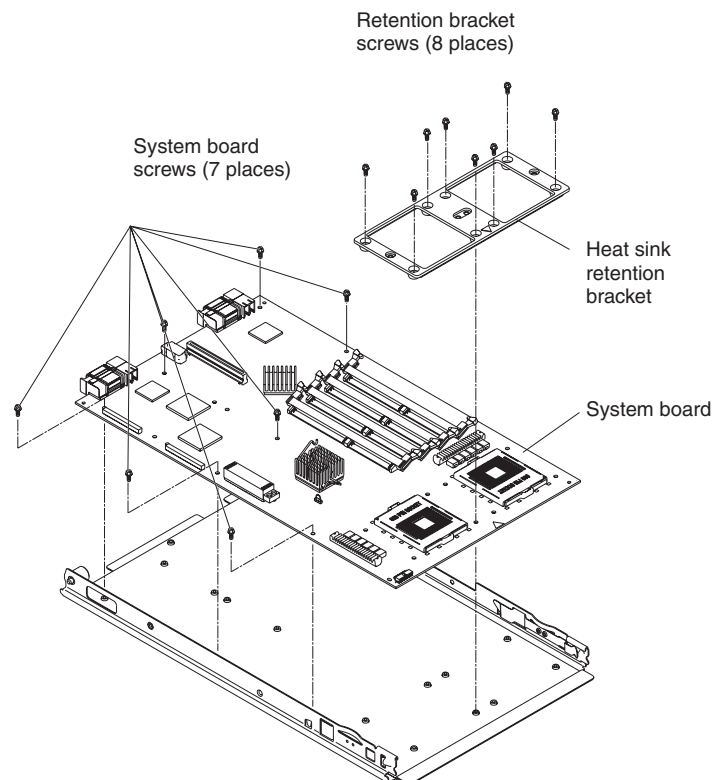
- Read “Installation guidelines” on page 27.
- Read the safety notices at Appendix B, “Safety information,” on page 97.
- Read “Handling static-sensitive devices” on page 27.

Complete the following steps to remove the system board:

1. Shut down the operating system and turn off the blade server (see “Turning off the blade server” on page 9).
2. Remove the blade server from the BladeCenter (see “Removing the blade server from the BladeCenter unit” on page 29).
3. Remove the blade server cover (see “Opening the blade server cover” on page 34) or expansion unit (see “Installing an expansion unit” on page 46).
4. Remove the blade server bezel assembly (see “Removing the blade server bezel assembly” on page 36).
5. Remove all components (see the appropriate installation instructions and reverse the steps) and place them on a static-protective surface for reinstallation.

Notes:

- a. A microprocessor assembly ships with a new heat sink.
- b. A system board does not ship with a heat sink. When replacing the system board and re-installing an existing microprocessor, be sure to also re-install the heat sink (see “Thermal grease” on page 59).



6. Remove the eight screws that secure the heat sink retention bracket to the system board, and put the screws and the module in a safe place.

Notes:

- a. Note the alignment of the heat sink retention bracket (the arrow on the bracket aligns with the arrow on the system board). You will need to align the bracket the same way when reinstalling it.
 - b. One of the screws also helps secure the system board to the blade chassis.
7. Remove the other seven screws that secure the system board to the blade chassis, and put the screws in a safe place.
 8. Pull the system board carefully out of the blade chassis.

Reverse these steps to install the replacement system board.

Note: Two self-adhesive labels ship with the system board. Apply one on top of the existing ethernet MAC address label located on the bottom of the blade chassis. The other label remains with the owner.

Chapter 8. Symptom-to-FRU index

This index supports the HS20 blade servers.

Notes:

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by this index, refer to the manual for that device.
3. Always start with “General checkout” on page 19.

The symptom-to-FRU index lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this symptom-to-FRU index to help you decide which FRUs to have available when servicing the server.

The left column of the tables in this index lists error codes or messages, and the right column lists one or more suggested actions or FRUs to replace.

Note: In tables with more than two columns, multiple columns are required to describe the error symptoms.
Take the action (or replace the FRU) suggested first in the list of the right-hand column, then try the server again to see if the problem has been corrected before taking further action.

Note: Reseat a suspected component or reconnect a cable before replacing the component.

The POST BIOS code displays POST error codes and messages on the screen.

Beep symptoms

Beep symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the examples in the following table.

Beeps	Description
1-2-3	• One beep • A pause (or break) • Two beeps • A pause (or break) • Three beeps
4	Four continuous beeps

One beep after successfully completing POST indicates the system is functioning properly.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Beep/symptom	FRU/action
1-1-2 (Microprocessor register test failed)	1. Optional microprocessor (if installed) 2. Microprocessor 3. System board

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Beep/symptom	FRU/action
1-1-3 (CMOS write/read test failed)	1. Battery 2. System board
1-1-4 (BIOS ROM checksum failed)	1. Flash BIOS. 2. DIMM. 3. System board.
1-2-1 (Programmable Interval Timer failed)	• System board
1-2-2 (DMA initialization failed)	• System board
1-2-3 (DMA page register write/read failed)	• System board
1-2-4 (RAM refresh verification failed)	1. DIMM 2. System board
1-3-1 (first 64K RAM test failed)	1. DIMM 2. System board
1-3-2 (first 64K RAM parity test failed)	1. DIMM 2. System board
2-1-1 (Secondary DMA register failed)	• System board
2-1-2 (Primary DMA register failed)	• System board
2-1-3 (Primary interrupt mask register failed)	• System board
2-1-4 (Secondary interrupt mask register failed)	• System board
2-2-1 (Interrupt vector loading failed)	• System board
2-2-2 (Keyboard controller failed)	1. Keyboard 2. System board 3. Management module
2-2-3 (CMOS power failure and checksum checks failed)	1. Battery 2. System board
2-2-4 (CMOS configuration information validation failed)	1. Battery 2. System board
2-3-1 (Screen initialization failed)	• System board
2-3-2 (Screen memory failed)	• System board
2-3-3 (Screen retrace failed)	• System board

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Beep/symptom	FRU/action
2-3-4 (Search for video ROM failed)	• System board
2-4-1 (Video failed; screen believed operable)	• System board
3-1-1 (Timer tick interrupt failed)	• System board
3-1-2 (Interval timer channel 2 failed)	• System board
3-1-3 (RAM test failed above address OFFFFH))	1. DIMM 2. System board
3-1-4 (Time-Of-Day clock failed)	1. Battery 2. System board
3-2-1 (Serial port failed)	• System board
3-2-2 (Parallel port failed)	• System board
3-2-3 (Math coprocessor test failed)	1. Microprocessor 2. System board
3-2-4 (Failure comparing CMOS memory size against actual)	1. DIMM 2. System board 3. Battery
3-3-1 (Memory size mismatch occurred.)	1. Verify that both DIMMs in bank are of the same size, speed, type and technology. 2. DIMM 3. System board 4. Battery
3-3-2 (Critical SMBUS error occurred)	1. Power down blade server and reseal it in chassis. 2. DIMMs. 3. System board.
3-3-3 (No operational memory in system) Note: In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility is set to Enabled (its default setting), you must restart the server three times to force the system BIOS code to reset the memory connector or bank of connectors from Disabled to Enabled .	1. Install or reseal the memory modules, and then do a 3 boot reset. (For more information on a 3 boot reset, see “Using the Configuration/Setup Utility program” on page 14.) 2. DIMMs. 3. System board.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Beep/symptom	FRU/action
Two short beeps (Information only, the configuration has changed)	1. Run Diagnostics. 2. Run the Configuration/Setup Utility program.
Three short beeps	1. DIMM 2. System board
One continuous beep	1. Microprocessor 2. Optional microprocessor (if installed) 3. System board
Repeating short beeps	1. Keyboard 2. System board

No-beep symptoms

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
No-beep symptom	FRU/action
No beep and the system operates correctly.	• System board
No beep and no video (System error LED is OFF)	• See “Undetermined problems” on page 90.
No beep and no video (System Attention LED is ON)	• See “Light path diagnostics” on page 24.

Diagnostic error codes

Note: In the following error codes, if *XXX* is *000*, *195*, or *197*, *do not* replace a FRU. The description for these error codes are:

- 000** The test passed.
- 195** The Esc key was pressed to stop the test.
- 197** Warning; a hardware failure might not have occurred.

For all error codes, replace the FRU or take the action indicated.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Error code/symptom	FRU/action
001-250-000 (Failed system board ECC)	• System board
001-250-001 (Failed processor board ECC)	• System board
001-292-000 (Core system: failed/CMOS checksum failed)	• Load BIOS defaults and rerun test.
001-XXX-000 (Failed core tests)	• System board
001-XXX-001 (Failed core tests)	• System board

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Error code/symptom	FRU/action
005-XXX-000 (Failed video test)	• System board
030-XXX-000 (Failed internal SCSI interface test)	1. SCSI storage expansion unit 2. System board
035-XXX-099	1. No adapters were found. 2. If adapter is installed re-check connection.
075-XXX-000 (Failed power supply test)	• Power supply
089-XXX-001 (Failed microprocessor test)	1. Microprocessor 1 2. System board
089-XXX-002 (Failed optional microprocessor test)	1. Optional microprocessor 2 2. System board
165-060-000 (Service Processor: ASM may be busy)	1. Rerun the diagnostic test. 2. Fix other error conditions that may be keeping ASM busy. Refer to the error log and diagnostic panel. 3. Power down blade server and reseal it in chassis. 4. System board.
165-198-000 (Service Processor: Aborted)	1. Rerun the diagnostic test 2. Fix other error conditions that may be keeping ASM busy. Refer to the error log and diagnostic panel. 3. Power down blade server and reseal it in chassis. 4. System board.
165-201-000 (Service Processor: Failed)	1. Power down blade server and reseal it in chassis. 2. System board.
165-330-000 (Service Processor: Failed)	• Update to the latest ROM diagnostic level and retry.
165-342-000 (Service Processor: Failed)	1. Ensure latest firmware levels for ASM and BIOS are installed. 2. Power down blade server and reseal it in chassis. 3. System board.
166-198-000 System Management: Aborted (Unable to communicate with ASM. It may be busy. Run the test again.)	1. Run the diagnostic test again. 2. Correct other error conditions and retry. These include other failed system management tests and items logged in the System Error Log of the management module. 3. Power down blade server and reseal it in chassis. 4. System board.
166-201-001 System Management: Failed (I2C bus error(s) See SERVPROC and DIAGS entries in event log.)	1. DIMMs 2. System board
166-201-002 System Management: Failed (I2C bus error(s) See SERVPROC and DIAGS entries in event log.)	1. Reseat I2C cable between the operator information card and the system board. 2. Operator information card. 3. System board.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
166-201-003 System Management: Failed (I2C bus error(s) See SERVPROC and DIAGS entries in event log.)	1. I/O adapter 2. System board
166-201-004 System Management: Failed (I2C bus error(s) See SERVPROC and DIAGS entries in event log.)	1. SCSI storage expansion unit 2. System board
166-201-005 System Management: Failed (I2C bus error(s) See SERVPROC and DIAGS entries in event log.)	1. DIMMs 2. Microprocessors 3. System board
166-342-000 System Management: Failed (ASM adapter BIST indicate failed tests.)	1. Ensure the latest firmware levels for Remote Supervisor Adapter and BIOS are installed. 2. Power down blade server and reseal it in chassis. 3. Remote Supervisor Adapter.
166-400-000 System Management: Failed (ISMP self test result failed tests: x where x = Flash, RAM, or ROM.)	1. Reflash or update firmware for ISMP. 2. System board.
180-XXX-000 (Diagnostics LED failure)	• Run diagnostics panel LED test for the failing LED.
180-XXX-001 (Failed front LED panel test)	1. Front bezel with customer interface card 2. System board
180-XXX-002 (Failed diagnostics LED panel test)	• System board
180-XXX-003 (Failed system board LED test)	• System board
180-XXX-005 (Failed SCSI backplane LED test)	1. SCSI storage expansion unit 2. System board
201-XXX-0nn (Failed memory test.)	1. DIMM Location slots 1-4 where <i>nn</i> = DIMM location. Note: <i>nn</i> 1=DIMM 1; 2=DIMM 2; 3=DIMM 3; 4=DIMM 4. 2. System board.
202-XXX-001 (Failed system cache test)	1. Microprocessor 1 2. System board
202-XXX-002 (Failed system cache test)	1. Microprocessor 2 2. System board
217-198-XXX (Could not establish drive parameters)	• SCSI storage expansion unit
217-XXX-000 (Failed hard disk drive test) Note: If RAID is configured, the hard disk drive number refers to the RAID logical array.	• Hard disk drive 1
217-XXX-001 (Failed hard disk test) Note: If RAID is configured, the hard disk number refers to the RAID logical array.	• Hard disk drive 2

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Error code/symptom	FRU/action
405-XXX-000 (Failed Ethernet test on controller on the system board)	1. Verify that Ethernet is not disabled in BIOS. 2. System board.

POST error codes

In the following error codes, *X* can be any number or letter.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Error code/symptom	FRU/action
062 (Three consecutive startup failures using the default configuration.)	1. Run the Configuration/Setup Utility program. 2. Battery. 3. System board. 4. Microprocessor.
101, 102 (System and processor error)	• System board
106 (System and processor error)	• System board
111 (Channel check error)	1. Failing adapter 2. DIMM 3. System board
114 (Adapter read-only memory error)	1. Failing adapter. 2. Run diagnostics.
151 (Real time clock error)	1. Run diagnostics. 2. Battery. 3. System board.
161 (Real time clock battery error)	1. Run the Configuration/Setup Utility program. 2. Battery. 3. System board.
162 (Device configuration error) Note: Be sure to load the default settings and any additional desired settings; then, <i>save the configuration</i> .	1. Run the Configuration/Setup Utility program. Note: If unable to enter Configuration/Setup Utility program, view system event log in BladeCenter management module. 2. Battery. 3. Failing device. 4. System board.
163 (Real-time clock error)	1. Run the Configuration/Setup Utility program. 2. Battery. 3. System board.
164 (Memory configuration changed.)	1. Run the Configuration/Setup Utility program. 2. DIMM. 3. System board.
165 (Service Processor failure)	• System board

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
184 (Power-on password damaged)	1. Run the Configuration/Setup Utility program. 2. System board.
185 (Drive startup sequence information corrupted)	1. Run the Configuration/Setup Utility program. 2. System board.
189 (An attempt was made to access the server with invalid passwords)	• Run the Configuration/Setup Utility program, and enter the administrator password.
201 (Memory test error.) If the server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again.	1. DIMM 2. System board
229 (Cache error)	1. Microprocessor 2. Optional microprocessor (if installed)
262 (DRAM parity configuration error)	1. Run the Configuration/Setup Utility program. 2. Battery. 3. System board.
289 (DIMM disabled by POST or user)	1. Run the Configuration/Setup Utility program, if the DIMM was disabled by the user. 2. Disabled DIMM, if not disabled by user. 3. System board
301 (Keyboard or keyboard controller error)	1. Keyboard 2. System board
303 (Keyboard controller error)	• System board
602 (Invalid diskette boot record)	1. Diskette 2. Diskette drive 3. Cable 4. System board
604 (Diskette drive error)	1. Run the Configuration/Setup Utility program and diagnostics. 2. Diskette drive. 3. Drive cable. 4. System board.
605 (Unlock failure)	1. Diskette drive 2. Drive cable 3. System board
662 (Diskette drive configuration error)	1. Run the Configuration/Setup Utility program and diagnostics. 2. Diskette drive. 3. Drive cable. 4. System board.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
762 (Coprocessor configuration error)	1. Run the Configuration/Setup Utility program. 2. Battery. 3. Microprocessor.
962 (Parallel port configuration error)	1. Run the Configuration/Setup Utility program and verify that the parallel-port setting is correct. 2. System board.
11XX (System board serial port 1 or 2 error)	1. Disconnect the external cable on the serial port. 2. Run the Configuration/Setup Utility program. 3. System board.
1162 (Serial port configuration conflicts)	1. Run the Configuration/Setup Utility program and ensure that the IRQ and I/O port assignments needed by the serial port are available. 2. If all interrupts are being used by adapters, remove an adapter or force other adapters to share an interrupt.
1301 (I2C cable to operator information panel not found)	1. Cable 2. Operator information card 3. Power switch assembly 4. System board
1302 (I2C cable from system board to power-on and reset switches not found)	1. Cable 2. Power switch assembly 3. System board
1303 (I2C cable from system board to power backplane not found)	1. Cable 2. Power supply 3. System board
1304 (I2C cable to diagnostic LED board not found)	1. Power switch assembly 2. System board
1762 (Hard disk configuration error)	1. Hard disk drive. 2. Hard disk drive cables. 3. Run the Configuration/Setup Utility program. 4. SCSI storage expansion unit. 5. System board.
178X (Fixed disk error)	1. Hard disk drive cables. 2. Run diagnostics. 3. Hard disk drive. 4. System board.
1800 (No more hardware interrupt available for PCI adapter)	1. Run Configuration/Setup to verify that the interrupt resource settings are correct. 2. Failing adapter (if installed). 3. System board.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
1962 (Drive does not contain a valid boot sector)	1. Verify that a startable operating system is installed. 2. Run diagnostics. 3. Hard disk drive. 4. SCSI storage expansion unit. 5. System board.
2400 (Video controller test failure)	1. Verify that the keyboard/mouse/video select button LED on the front of the blade server is on, indicating that the blade server is connected to the shared BladeCenter monitor. 2. Verify that the monitor is connected correctly to the BladeCenter unit. 3. Video adapter (if installed). 4. System board.
2462 (Video memory configuration error)	1. Verify that the keyboard/mouse/video select button LED on the front of the blade server is on, indicating that the blade server is connected to the shared BladeCenter monitor. 2. Verify that the monitor is connected correctly to the BladeCenter unit. 3. Video adapter (if installed). 4. System board.
5962 (IDE CD-ROM drive configuration error)	1. Run the Configuration/Setup Utility program. 2. CD-ROM drive. 3. CD-ROM power cable. 4. IDE cable. 5. System board. 6. Battery.
8603 (Pointing-device error)	1. Pointing device 2. System board
0001200 (Machine check architecture error)	1. Microprocessor 1 2. Optional microprocessor 2 3. System board
00012000 (Microprocessor machine check)	1. Microprocessor 2. System board
00019501 (Microprocessor 1 is not functioning - check VRM and microprocessor LEDs)	1. Microprocessor 1 2. System board
00019502 (Microprocessor 2 is not functioning – check VRM and microprocessor LEDs)	1. Microprocessor 2 2. System board
00019701 (Microprocessor 1 failed)	1. Microprocessor 1 2. System board
00019702 (Microprocessor 2 failed)	1. Microprocessor 2 2. System board
00151200 (microprocessor machine check)	1. Run the Configuration/Setup Utility program. 2. Microprocessor (check error LED for failing microprocessor). 3. System board.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Error code/symptom	FRU/action
00180200 (No more I/O space available for adapter)	1. Run the Configuration/Setup Utility program. 2. Failing adapter. 3. System board.
01295085 (ECC checking hardware test error)	1. System board 2. Microprocessor
01298001 (System BIOS installed on this server does not support level of processor)	1. Ensure all microprocessors have the same cache size. 2. Microprocessor 1.
01298002 (System BIOS installed on this server does not support level of processor)	1. Ensure all microprocessors have the same cache size. 2. Microprocessor 2.
01298101 (System BIOS installed on this server does not support level of processor)	1. Ensure all microprocessors have the same cache size. 2. Microprocessor 1.
01298102 (System BIOS installed on this server does not support level of processor)	1. Ensure all microprocessors have the same cache size. 2. Microprocessor 2.
01298200 (Microprocessor speed mismatch)	1. Ensure all microprocessors are the same speed. 2. Microprocessor.
I9990301 (Hard disk sector error)	1. Hard disk drive 2. SCSI backplane 3. Cable 4. System board
I9990305 (Hard disk sector error, no operating system installed)	• Install operating system to hard disk.
I9990650 (AC power has been restored)	1. Check cable. 2. Check for interruption of power. 3. Power cable.

Light path diagnostics

Lit blade-error LED	Cause	Action
None	An error has occurred and cannot be isolated, or the service processor has failed.	• An error has occurred that is not represented by a Light Path Diagnostics LED. Check the system error log for more information about the error.

Lit blade-error LED	Cause	Action
DIMM x error	A memory error occurred.	1. Reseat the DIMM indicated by the lit DIMM failure LED. 2. Replace the DIMM. Note: Multiple DIMM LEDs do not necessarily indicate multiple DIMM failures. If more than one DIMM LED is on, reseat/replace one DIMM at a time until error goes away. Refer to the BladeCenter management module system error log for further isolation.
Processor x error	The microprocessor has failed.	1. Verify that the microprocessor indicated by the lit LED is installed correctly. (See "Installing an additional microprocessor" on page 41 for installation instructions). 2. Replace the microprocessor.
Temperature error	The system temperature has exceeded a threshold level.	1. Check to see if a blower on the BladeCenter unit has failed. If it has, replace the fan. 2. Make sure the room temperature is not too high. (See "Features and specifications" on page 5 for temperature information.)
System board error	The system board has failed	1. Replace the blade server cover, reinsert the blade server in the BladeCenter unit, and then restart the server. 2. Replace the system board.
IDE bus x error	The IDE bus indicated by the error LED has failed.	1. Reseat/replace the hard disk drive on IDE bus x. 2. Replace the system board.
NMI error	The system board has failed.	1. Replace the blade server cover, reinsert the blade server in the BladeCenter unit, and then restart the blade server. 2. Check the system error log for information about the error. If the problem remains, replace the system board.
Processor mismatch	The processors do not match.	• Verify that microprocessors 1 and 2 have the same cache size and type and the same clock speed. Internal and external clock frequencies must be identical; also see "Error symptoms" on page 77.

IDE RAID

Note: See "System" on page 94 to determine which components should be replaced by a field service technician.	
Error symptom	FRU/action
Drives are not detected	1. Verify that drives are installed correctly: a. Cables should be of type Ultra ATA-100 or ATA-133 and should be installed correctly. b. Power cables to drives should be connected properly. 2. Cables. 3. Drive.
System hangs when MegaRAID IDEal Software CSB6 RAID adapter ROM scans the IDE channels	1. Verify that drives are installed correctly: a. Cables should be of type Ultra ATA-100 or ATA-133 and should be installed correctly. b. Power cables to drives should be connected properly. 2. Cables. 3. Drive.
BIOS reports that a mirrored array is in degraded mode	1. Verify that all physical drives are: a. Installed correctly b. Powered on 2. Reconnect, replace, or rebuild any failed drive.
One of the hard disk drives in a mirrored array has failed	1. Verify that drives are installed correctly. 2. Replace drive with another drive of the same capacity.
"NO ROM BASIC SYSTEM HALTED" message displays during startup (There are no active partitions)	1. Verify that drives are installed correctly. 2. Run FDISK to set active partition.
Operating system does not boot	1. Check system BIOS configuration for PCI interrupt assignments and verify that some interrupts are assigned for PCI. 2. Verify that the boot device in system BIOS setup (CMOS setup) is selected correctly.

Error symptoms

You can use the error symptom table to find solutions to problems that have definite symptoms.

If you cannot find the problem in the error symptom charts, go to "Starting the diagnostic programs" on page 22 to test the server.

If you have just added new software or a new option and the server is not working, do the following before using the error symptom charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine if the server is running correctly.
- Reinstall the new software or new device.

In the following table, if the entry in the FRU/action column is a suggested action, perform that action; if it is the name of a component, reseal the component and replace it if necessary. The most likely cause of the symptom is listed first.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

CD-ROM drive problems

Symptom	FRU/action
CD-ROM drive is not recognized.	Verify that: - All cables and jumpers are installed correctly. - The correct device driver is installed for the CD-ROM drive. - Run CD-ROM drive diagnostics. - CD-ROM drive.
CD is not working properly.	Clean the CD. - Run CD-ROM drive diagnostics. - CD-ROM drive.
CD-ROM drive tray is not working. (The computer must be turned on.)	Insert the end of a straightened paper clip into the manual tray-release opening. - Run CD-ROM drive diagnostics. - CD-ROM drive.
CD-ROM drive is seen as /dev/sr0 by SuSE. (If the SuSE Linux operating system is installed remotely onto a blade server that is not the current owner of the media tray (CD-ROM drive, diskette drive, and USB port), SuSE sees the CD-ROM drive as /dev/sr0 instead of /dev/cdrom.)	- Establish a link between /dev/sr0 and /dev/cdrom as follows: - Enter the following command: <pre>rm /dev/cdrom; ln -s /dev/sr0 /dev/cdrom</pre> - Insert the following line in the /etc/fstab file: <pre>/dev/cdrom /media/cdrom auto ro,noauto,user,exec 0 0</pre>
CD-ROM drive is not recognized after being switched back to blade server running Windows 2000 Advanced Server with SP3 applied. (When the CD-ROM drive is owned by blade server x, is switched to another blade server, then is switched back to blade server x, the operating system in blade server x no longer recognizes the CD-ROM drive. This happens when you have not safely stopped the drives before switching ownership of the CD-ROM drive, diskette drive, and USB port (media tray).)	Note: Because the BladeCenter unit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device. - Before switching ownership of the CD-ROM drive (media tray) to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, as follows: - Double-click the Unplug or Eject Hardware icon in the Windows taskbar at the bottom right of the screen. - Select USB Floppy and click Stop. - Select USB Mass Storage Device and click Stop. - Click Close. You can now safely switch ownership of the media tray to another blade server.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Diskette drive problems	
Symptom	FRU/action
Diskette drive activity LED stays on, or the system bypasses the diskette drive.	If there is a diskette in the drive, verify that: - The diskette is inserted correctly in the drive. - The diskette is good and not damaged. (Try another diskette if you have one.) - The drive light comes on (one-second flash) when the diskette is inserted. - The diskette contains the necessary files to start the computer. - The diskette drive is enabled in the Configuration/Setup utility program. - The software program is working properly. - The cable is installed correctly (in the proper orientation). - To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). - Cable. - Run diskette drive diagnostics. - Diskette drive. - Media tray card.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Expansion enclosure problems	
Symptom	FRU/action
The SCSI storage expansion unit used to work but does not work now.	Verify that the enclosure is installed correctly. - For more information, see the SCSI storage expansion unit documentation.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Hard disk drive problems	
Symptom	FRU/action
Not all drives are recognized by the hard disk drive diagnostic test (Fixed Disk test).	Remove the first drive not recognized and try the hard disk drive diagnostic test again. - If the remaining drives are recognized, replace the drive you removed with a new one.
System stops responding during hard disk drive diagnostic test.	Remove the hard disk drive being tested when the computer stopped responding and try the diagnostic test again. - If the hard disk drive diagnostic test runs successfully, replace the drive you removed with a new one.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
General problems	
Symptom	FRU/action
Problems such as broken cover locks or indicator LEDs not working	Broken CRU/FRU

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Intermittent problems	
Symptom	FRU/action
A problem occurs only occasionally and is difficult to detect.	• Verify that: – When the computer is turned on, air is flowing from the rear of the computer at the blower grill. If there is no airflow, the blower is not working. This causes the computer to overheat and shut down. – Ensure that the SCSI bus and devices are configured correctly.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Keyboard, mouse, or pointing-device problems	
Symptom	FRU/action
All or some keys on the keyboard do not work.	1. Verify that: • The keyboard cable is securely connected to the BladeCenter management module, and the keyboard and mouse cables are not reversed. • Both the computer and the monitor are turned on. 2. Keyboard. 3. Management module on the BladeCenter unit; see the IBM <i>BladeCenter Type 8677 Hardware Maintenance Manual and Troubleshooting Guide</i> on the IBM <i>BladeCenter Documentation CD</i>.
The mouse or pointing device does not work.	1. Verify that: • The keyboard/mouse/video select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared BladeCenter monitor. • The mouse or pointing-device cable is securely connected to the BladeCenter management module, and that the keyboard and mouse cables are not reversed. • The mouse works correctly with other blade servers. • The mouse device drivers are installed correctly. • Both the computer and the monitor are turned on. • The mouse is recognized as a USB device, not PS2, by the blade server. Although the mouse is a PS2-style device, communication with the mouse is through an internal USB bus in the BladeCenter chassis. Some operating systems permit you to select the type of mouse during installation of the operating system. Select USB. 2. Mouse or pointing device. 3. Management module on the BladeCenter unit; see the IBM <i>BladeCenter Type 8677 Hardware Maintenance Manual and Troubleshooting Guide</i> on the IBM <i>BladeCenter Documentation CD</i>.
Mouse function lost during Red Hat installation.	• If, while installing Red Hat Linux 7.3 to a blade server, you or someone else selects a different blade server as owner of the keyboard, video, and monitor (KVM), you might lose mouse function for the installation process. Do not switch KVM owners until the installation process begins to install the packages (after the 'About to Install' window).

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Memory problems	
Symptom	FRU/action
The amount of system memory displayed is less than the amount of physical memory installed.	Verify that: - The memory modules are seated properly. - You have installed the correct type of memory. - If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. - All banks of memory on the DIMMs are enabled. The computer might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. - Check POST error log for error message 289: - If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. - If the DIMM was disabled by the user or by POST: - Start the Configuration/Setup Utility program. - Enable the DIMM. - Save the configuration and restart the computer. - DIMM. - System board.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Microprocessor problems	
Symptom	FRU/action
The blade server emits a continuous tone during POST. (The startup (boot) microprocessor is not working properly.)	Verify that the startup microprocessor is seated properly. - Startup microprocessor.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Monitor problems	
Symptom	FRU/action
Testing the monitor.	See the information that comes with the monitor for adjusting and testing instructions. (Some IBM monitors have their own self-tests.)

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Monitor problems

Symptom	FRU/action
The screen is blank.	Verify that: - The keyboard/mouse/video select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared BladeCenter monitor. - The system power cord is plugged into the BladeCenter power module and a working electrical outlet. - The monitor cables are connected properly. - The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. - If the computers are C2T chained together, verify that: - The C2T chain cables are securely connected to the computers. - The C2T breakout cable is connected properly. - A computer that is turned on is selected. Important: In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility program is set to Enabled (its default setting), you must restart the computer three times to force the system BIOS to reset the CMOS values to the default configuration (memory connector or bank of connectors enabled). - Make sure that damaged BIOS code is not affecting the video; see “Recovering the BIOS code” on page 25. - If you have verified these items and the screen remains blank, replace: - Monitor - Management module on the BladeCenter (see the <i>IBM BladeCenter Type 8677 Hardware Maintenance Manual and Troubleshooting Guide</i>).
Only the cursor appears.	Verify that the keyboard, video and mouse on the BladeCenter have not been switched to another blade server. If the problem remains, see “Undetermined problems” on page 90.
The monitor goes blank when you direct it to a working blade server, or goes blank when you start some application programs in the blade servers.	Verify that the monitor cable is connected to the video port on the BladeCenter management module. Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, see the information that comes with the monitor for adjusting and testing instructions. If you still cannot find the problem, try using the monitor with another blade server. If the problem persists, see the <i>IBM BladeCenter Type 8677 Hardware Maintenance Manual and Troubleshooting Guide</i> on the IBM BladeCenter Documentation CD.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Monitor problems	
Symptom	FRU/action
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	1. If the monitor self-tests show the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. Notes: a. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. c. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. 2. Monitor. 3. System board.
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the firmware or operating system with the correct language in the blade server that has ownership of the monitor. 2. Monitor. 3. System board.
No video.	1. Make sure the correct machine is selected, if applicable. 2. Make sure all cables are locked down.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Option problems	
Symptom	FRU/action
An IBM option that was just installed does not work.	1. Verify that: • The option is designed for the computer (see the ServerProven list on the World Wide Web at http://www.ibm.com/pc/us/compat/). • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables and that all option hardware and cable connections are secure. • If the failing option is a SCSI storage expansion unit: – The cables for the SCSI expansion unit are connected correctly. – If the SCSI storage expansion unit has been removed, verify that the socket is terminated correctly. – The external SCSI expansion unit is turned on. You must turn on the external SCSI expansion unit before turning on the computer. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. 2. If the option comes with its own test instructions, use those instructions to test the option. 3. Replace the option you just installed.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Power problems

Symptom	FRU/action
Power switch does not work and reset button, if supported, does work.	1. Reseat connector. 2. Front bezel with customer card. 3. System board.
The blade server does not turn on.	1. Verify that: a. The power LED on the front of the BladeCenter unit is on. b. The LEDs on all the BladeCenter power modules are on. c. If the blade server or attached storage expansion unit is in blade bay 7-14, power modules are in power bays 1, 2, 3 and 4. d. The power-on LED on the blade server control panel is blinking slowly. • If the power LED is blinking rapidly and continues to do so, the blade server is not communicating with the management module; reseat the blade server, then go to step 3 • If the power LED is off, the blade bay is not receiving power, the blade server is defective, or the LED information panel is loose or defective. e. Local power control for the blade server is enabled (use the BladeCenter management module Web interface to verify), or the blade server was instructed through the management module (Web interface or IBM Director) to turn on. 2. If you just installed an option in the blade server, remove it, and restart the blade server. If the blade server now turns on, you might have installed more options than the power to that blade bay supports. 3. Try another blade server in the blade bay; if it works, replace the faulty blade server. 4. See “Undetermined problems” on page 90.
The blade server does not turn on and the following conditions are present: 1. The amber system error LED on the Blade Center unit's system LED panel is lit; 2. The amber blade error LED on the blade server's LED panel is lit; and 3. The system error log contains the message "CPUs mismatched".	• The microprocessor with the lowest feature set must be used as the Bootstrap Processor (microprocessor 1 in location U66; see “System board component locations” on page 60). Move the microprocessor in location U66 to location U70, and move the microprocessor in location U70 to location U66.
The blade server turns off for no apparent reason	1. Verify that all blade bays have a blade server, expansion unit, or filler blade properly installed. If these components are missing or improperly installed, an over-temperature condition may result in shutdown. 2. If microprocessor LED is illuminated, replace the microprocessor.
The computer does not turn off.	1. Verify whether you are using an ACPI or non-ACPI operating system. If you are using a non-ACPI operating system: a. Press Ctrl+Alt+Delete. b. Turn off the system by holding the power-control button for 4 seconds. c. If computer fails during BIOS POST and power-control button does not work, remove the blade server from the bay and reseat it. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
ServerGuide problems	
Symptom	FRU/action
The <i>ServerGuide Setup and Installation</i> CD will not start.	- Make sure that the CD-ROM drive is associated with the blade server that you are configuring. - Make sure that the blade server supports the ServerGuide program and has a startable (bootable) CD-ROM (or DVD-ROM) drive. - If the startup (boot) sequence settings have been altered, make sure that the CD-ROM drive is first in the startup sequence.
The SCSI RAID program cannot view all installed drives, or the operating system cannot be installed.	- Make sure that there are no duplicate SCSI IDs or IRQ assignments. - Make sure that the hard disk drive is connected correctly.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. See the <i>ServerGuide Setup and Installation</i> CD label for a list of operating-system versions that support the ServerGuide program.
The operating system cannot be installed; the option is not available.	Make sure that the operating system is supported on the server. If the operating system is supported, either there is no logical drive defined (SCSI RAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Software problem	
Symptom	FRU/action
Suspected software problem.	To determine if problems are caused by the software, verify that: - The computer has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software. Note: If you have just installed an adapter or memory, you might have a memory address conflict. - The software is designed to operate on the computer. - Other software works on the computer. - The software that you are using works on another system. If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and suggested solutions to the problem. - If you have verified these items and the problem remains, contact your place of purchase.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Universal Serial Bus (USB) port problems	
Symptom	FRU/action
A USB device does not work.	Verify that: - The correct USB device driver is installed. - The operating system supports USB devices.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Network connection problems	
Symptom	FRU/action
One or more blade servers are unable to communicate with the network.	Verify that: • The switch modules for the network interface being used are installed in the correct BladeCenter bays and are configured and operating correctly. See the <i>IBM BladeCenter Type 8677 Hardware Maintenance Manual and Troubleshooting Guide</i> on the <i>IBM BladeCenter Documentation CD</i> for details. • The settings in the switch module are appropriate for the blade server (settings in the switch module are blade-specific). If you installed an I/O expansion option, verify that: • The option is designed for the blade server. • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. If the problem remains, see “Undetermined problems” on page 90.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Service processor problems	
Symptom	FRU/action
Service processor in the management module reports a general monitor failure.	• Disconnect the BladeCenter unit from all electrical sources, wait for 30 seconds, reconnect the BladeCenter unit to the electrical sources, and restart the server. If the problem remains, see “Undetermined problems” on page 90 and the <i>IBM BladeCenter Type 8677 Hardware Maintenance Manual and Troubleshooting Guide</i> on the <i>IBM BladeCenter Documentation CD</i>

Service processor error codes

Note: These codes are viewed in the BladeCenter management module log.

When viewed from POST, service processor error codes will appear in hexadecimal form (generally beginning with A2, A3, A4, A5, A6, A7, AD, AE, or E1). However, when viewed from the System Error Log, the messages will appear as text. To determine a possible error condition for the service processor, the System Error Log (see “Viewing error logs from the Configuration/Setup Utility program” on page 21) will refer you to the management module log in the BladeCenter unit.

SCSI error codes

Error code	FRU/action
All SCSI Errors One or more of the following might be causing the problem: • A failing SCSI device (adapter, drive) • An improper SCSI configuration • Duplicate SCSI IDs in the same SCSI chain	• Verify that the SCSI devices are configured correctly.

Temperature error messages

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Message	Action
System over temperature for CPU x.	1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 27. 2. Replace microprocessor x.
Blade Storage Expansion option over recommended temperature.	1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 27. 2. Replace the SCSI hard disk drives. 3. Replace the Blade Storage Expansion option.
CPU x over temperature.	1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 27. 2. Replace microprocessor x.

Power error messages

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.

Message	Action
BSE +12V over recommended voltage	1. Check BladeCenter power (see <i>BladeCenter Hardware Maintenance Manual</i>). 2. Reseat blade storage expansion option. 3. Replace blade storage expansion option.
BSE +12V under recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +5V over recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +5V under recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +18V over recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +18V under recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Message	Action
BSE +3.3V over recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +3.3V under recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +2.5V over recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +2.5V under recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +1.8V over recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
BSE +1.8V under recommended voltage	1. Reseat blade storage expansion option. 2. Replace blade storage expansion option.
System Power Good fault	1. Check BladeCenter power (see <i>BladeCenter Hardware Maintenance Manual</i>). 2. Reseat blade server. 3. Replace blade server.
VRM Power Good fault	1. Check BladeCenter power (see <i>BladeCenter Hardware Maintenance Manual</i>). 2. Reseat blade server. 3. Replace blade server.
System over recommended voltage for +12v.	1. Check BladeCenter power (see <i>BladeCenter Hardware Maintenance Manual</i>). 2. Reseat blade server. 3. Replace blade server.
System over recommended voltage for +1.25v.	1. Reseat blade server. 2. Replace blade server.
System over recommended voltage for +1.5v.	1. Reseat blade server. 2. Replace blade server.
System over recommended voltage for +2.5v.	1. Reseat blade server. 2. Replace blade server.
System over recommended voltage for +3.3v.	1. Reseat blade server. 2. Replace blade server.
System over recommended 5V fault.	1. Reseat blade server. 2. Replace blade server.
VRM voltage over recommended tolerance.	1. Reseat blade server. 2. Replace blade server.
System under recommended voltage for +12v.	1. Check BladeCenter power (see <i>BladeCenter Hardware Maintenance Manual</i>). 2. Reseat blade server. 3. Replace blade server.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Message	Action
System under recommended voltage for +1.25v.	1. Reseat blade server. 2. Replace blade server.
System under recommended voltage for +1.5v.	1. Reseat blade server. 2. Replace blade server.
System under recommended voltage for +2.5v.	1. Reseat blade server. 2. Replace blade server.
System under recommended voltage for +3.3v.	1. Reseat blade server. 2. Replace blade server.
System under recommended 5V fault.	1. Reseat blade server. 2. Replace blade server.

System shutdown

Refer to the following tables when experiencing system shutdown related to voltage or temperature problems.

System errors

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Message	Action
Internal Error CPU x fault	1. Reseat: a. I/O Expansion Option b. Blade Storage Expansion option. c. IDE hard drive. 2. Replace: a. Failing PCI adapter b. Microprocessor x. c. I/O Expansion Option. d. Blade Storage Expansion option. e. IDE hard drive. f. System board.

Temperature-related system shutdown

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Message	Action
System shutoff due to CPU x over temperature	1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 27. 2. Replace microprocessor x.
System shutoff due to Blade Storage Expansion option temperature	1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 27. 2. Replace Blade Storage Expansion option.

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Message	Action
CPU x shut off due to over temperature	1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 27. 2. Replace microprocessor x.
Critical Blower Failure, blade server powering down	• See BladeCenter Hardware Maintenance Manual.
Power Modules are over temperature, blade server powering down	• See BladeCenter Hardware Maintenance Manual.

DASD checkout

Note: See “System” on page 94 to determine which components should be replaced by a field service technician.	
Message	Action
Hard drive x removal detected (level-critical; hard drive x has been removed)	• Information only, take action as appropriate.

Undetermined problems

Note: When troubleshooting a problem with the HS20 Type 8832, it must be determined whether the problem is a blade server problem or a problem with the BladeCenter unit.

- If the BladeCenter unit contains more than one blade server and only one of the blade servers exhibits the problem, it is likely that it is a blade server problem.
- If all of the blade servers exhibit the same symptom, it is probably a BladeCenter unit problem; for more information, see the *IBM BladeCenter Hardware Maintenance Manual*.

Use the information in this section if the diagnostic tests did not identify the failure, the devices list is incorrect, or the system is inoperative.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, remove the battery for 15 minutes, and then reinstall the battery. If you suspect that the BIOS code is damaged, see “Recovering the BIOS code” on page 25.

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

1. Check that the front panel is connected to the system board.
2. If no LEDs on the front panel are working, replace the front panel; then, try to power up the blade server from the BladeCenter web interface (see the BladeCenter documentation for more information).
3. Turn off the blade server.
4. Remove the blade server and remove the cover.

5. Remove or disconnect the following devices (one at a time) until you find the failure (reinstall, turn on and reconfigure the blade server each time):
 - I/O adapter
 - Drives
 - Memory modules (minimum requirement = two 256 MB DIMMs)

Note: Minimum operating requirements are:

- a. System board
 - b. One microprocessor
 - c. Memory (with a minimum of two 256 MB DIMMs)
 - d. A functioning BladeCenter
6. Install and turn on the blade server. If the problem remains, suspect the following FRUs in the order listed:
 - DIMM
 - System board
 - Microprocessor

Notes:

1. If the problem goes away when you remove an I/O adapter from the system and replacing that I/O adapter does not correct the problem, suspect the system board.
2. If you suspect a networking problem and all the system tests pass, suspect a network cabling problem external to the system.

Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Microprocessor or hard disk upgrades
- Failure symptom
 - Do diagnostics fail?
 - What, when, where, single, or multiple systems?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - If it has been working, what changes were made prior to it failing?
 - Is this the original reported failure?
- Diagnostics version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

Note: To eliminate confusion, identical systems are considered identical only if they:

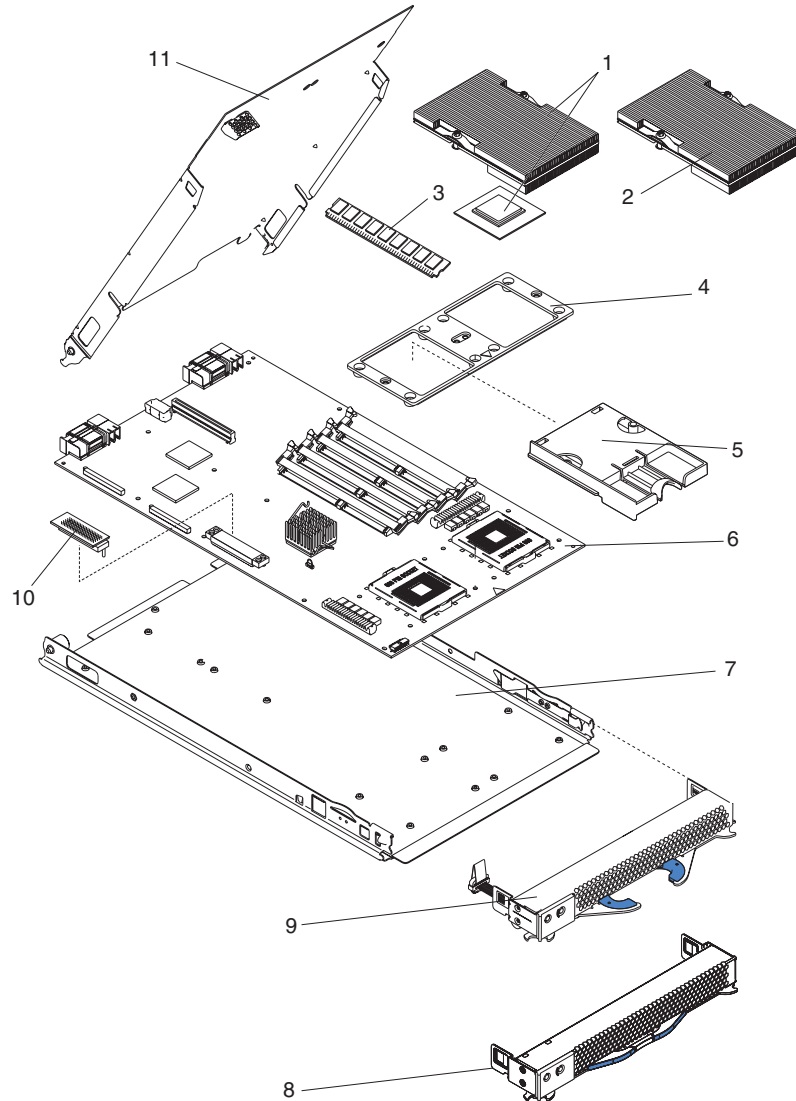
1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same diagnostics code (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between "working" and "non-working" systems will often lead to problem resolution.

Chapter 9. Parts listing, Type 8832

This parts listing supports the HS20 Type 8832 blade server.

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



System

Note: Field replaceable units (FRUs) should be serviced only by qualified field service technicians. Customer replaceable units can be replaced by the customer.

System, Type 8832 (models 11X, 21X, 31X, 9TX, C1X, C2X, G1X, GTX, J1X, L1X, LEX, LTX, M1X, N1X)			
Index		FRU No.	CRU/FRU
1	Microprocessor 533/2.4-512 with heat sink (model 9Tx)	90P3843	FRU
1	Microprocessor 533/2.67-512 with heat sink (model 11x)	73P9066	FRU
1	Microprocessor 533/2.80-512 with heat sink (model 21x, C1x, C2x, L1x, LEX, LTX)	73P9067	FRU
1	Microprocessor 533/3.06-512 with heat sink (model 31x)	73P9068	FRU
1	Microprocessor 533/3.2-1 MB with heat sink (model G1x, GTX)	25K9520	FRU
1	Microprocessor 533/3.2-2 MB with heat sink (model J1x)	25K9583	FRU
1	Microprocessor 533/3.06-1 MB with heat sink (model N1x)	26K9370	FRU
2	Heat sink assembly (models 21x, 31x, 9Tx, C1x, C2x, G1x, GTX, J1x, L1x, LEX)	49P2513	FRU
3	Memory module, 256 MB PC2100 ECC (models 21x, 31x, LTx)	09N4306	CRU
3	Memory module, 512 MB PC2100 ECC (models 9Tx, G1x, GTX, J1x)	09N4307	CRU
/3	Memory module, 512 MB PC2100 ECC (option)	09N4307	CRU
3	Memory module, 1 GB PC2100 ECC (models C1x, C2x, LEX, N1x)	09N4308	CRU
/3	Memory module, 1 GB PC2100 ECC (option)	09N4308	CRU
3	Memory module, 256 MB, non-Chipkill (models L1x, LTX, M1x)	73P2872	CRU
3	Memory module, 2 GB PC2100 ECC (option)	09N4309	CRU
4	Retention module (all models)	49P2633	FRU
5	Microprocessor heat sink filler (models 21x, 9Tx, GTX, L1x, LEX, LTX)	49P2609	CRU
6	System board (all models)	90P0114	FRU
7	Blade base (all models)	90P4713	FRU
8	Front bezel with customer card (models 9Tx, GTX, LTX)	25K9829	CRU
9	Front bezel with customer card (all models except 9Tx, GTX, LTX)	90P4766	CRU
10	Terminator card (all models)	59P6614	CRU
11	Cover and label (all models)	90P4796	CRU
	System service label (all models)	25K8253	CRU
	Warning label (all models)	90P4799	CRU
	Hard disk drive, 40 GB 5400 RPM (models C1x, C2x)	33P3419	CRU
	Hard disk drive, 40 GB 5400 RPM (model LEX) (primary)	71P7506	CRU
	Hard disk drive, 40 GB 5400 RPM (model LEX) (alternative)	71P7502	CRU
	IDE tray/interposer card (models C1x, C2x, LEX)	59P6630	CRU
	Filler, hard disk drive (option)	19K1291	CRU
	Blade expansion (option)	59P6632	CRU
	Battery, 3.0 volt (all models)	33F8354	CRU
	Fibre channel adapter tray (models C1x, C2x)	49P2514	CRU
	Fibre channel adapter tray (option)	49P2514	CRU
	Fibre channel expansion card (models C1x, C2x)	59P6624	CRU
	Fibre channel expansion card (option)	59P6624	CRU
	Miscellaneous parts kit (all models)	02R9003	CRU
	• Screw, M3.5x10 Phillips pan head, hard disk drive and adapter card tray (4)		
	• Screw, M3.5 x 5 hex flange, system board (6)		
	• Light pipe, hard disk drive LEDs (2)		
	• Screw, mobile hard disk drive tray, M3 x # slot cap (4)		
	• Screw, 440, D connector (2)		
	• Screw, M3.5 x 7 slotted Phillips hex flange head (8)		
	• Label, customer write-on (1)		

Appendix A. Getting help and technical assistance

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

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/support/> to check for technical information, hints, tips, and new device drivers.
- Use an IBM discussion forum on the IBM Web site to ask questions.

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

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support/> and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.link.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/pc/support/>.

Software service and support

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

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

Hardware service and support

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

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

Appendix B. Safety information

Note: The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that you are familiar with the computers, functions, terminology, and service information provided in this manual.

The following section contains the safety information that you need to be familiar with before servicing an IBM computer.

General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
 1. Ensure you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety



CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.
Remember: Another person must be there to switch off the power, if necessary.
 - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
 - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators
 and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.
 - Send another person to get medical aid.

Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

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

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Turn off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.

- b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety notices (multi-lingual translations)

The caution and danger safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Japanese
- Korean
- Spanish

Important: All caution and danger statements in this IBM 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 this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

Be sure to read all caution and danger statements before performing any of the instructions.

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	To Disconnect
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.	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-ROM 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.

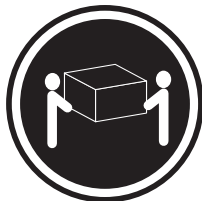


DANGER

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.

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 10

CAUTION:

Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.



Statement 20



CAUTION:

To avoid personal injury, before lifting the unit, remove all the blades to reduce the weight.

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.

Importante:

Todas as instruções de cuidado e perigo da IBM documentation começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

Instrução 1



PERIGO

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:

- Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
- Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.
- Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.
- Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.
- Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.
- Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.
- Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.

Para Conectar:	Para Desconectar:
1. DESLIGUE Tudo. 2. Primeiramente, conecte todos os cabos aos dispositivos. 3. Conecte os cabos de sinal aos conectores. 4. Conecte os cabos de alimentação às tomadas. 5. LIGUE os dispositivos.	1. DESLIGUE Tudo. 2. Primeiramente, remova os cabos de alimentação das tomadas. 3. Remova os cabos de sinal dos conectores. 4. Remova todos os cabos dos dispositivos.

Instrução 2



CUIDADO:

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um módulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de módulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100°C (212°F)
- Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

Instrução 3



PRECAUCIÓN:

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ótica, transmissores, etc.) estiverem instalados, observe o seguinte:

- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

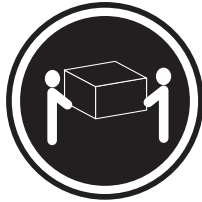


PERIGO

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos óticos, e evite exposição direta ao raio.

Instrução 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5



CUIDADO:

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia elétrica.



Instrução 10

CUIDADO:

Não coloque nenhum objeto com peso superior a 82 kg (180 lbs.) sobre dispositivos montados em rack.



Instrução 20



CUIDADO:

Para prevenir acidentes, antes de erguer a unidade, remova todas as lâminas para reduzir o peso.

Instrução 21



CUIDADO:

A energia é uma ameaça quando a lâmina estiver conectada à fonte de alimentação.
Sempre substitua a cobertura da lâmina antes de efetuar a instalação.

重要:

Server Library 中的所有提醒和危险条款前都有一个数字标识。该数字是用来交叉引用一个英文的提醒和危险条款及本部分中的与之对应的已翻译成其它文字的提醒和危险条款。

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 1



危险

电源、电话和通信电缆中带有危险电流。

为避免电击:

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将应与本产品连接的所有设备连接至正确布线的插座上。

尽量只使用单手拆接信号电缆。

有水、火及结构损坏迹象时，请勿打开任何设备。

除非在安装配置过程中有明确指示，否则，打开设备机盖前应先断开与电源线、远程通信系统、网络和调制解调器的所有连接。

安装、移动或打开本产品及其附带设备的机盖时，应按下表所述连接和断开电缆。

连接时:	断开连接时:
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆连接至设备。	2. 首先从插座中拔出电源线。
3. 将信号电缆连接至接口。	3. 从接口上拔下信号电缆。
4. 将电源线连接至插座。	

声明 2



警告:

更换锂电池时，只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同类型的电池。

如果系统模块中含有锂电池，则只能使用同一厂商制造的同一类型的模块进行更换。电池中含有锂，如果使用、拿放或处理不当，可能会发生爆炸。

请勿对电池进行下列操作：
扔入或浸入水中。
加热超过 100 °C (212 °F)
进行修理或分解
请按本地法规要求处理电池。

声明 3



警告:

安装激光产品（如 CD-ROM、DVD 驱动器、光纤设备或送话器）时，应注意以下事项：

不要拆除外盖。拆除激光产品的外盖可能会导致激光辐射的危险，本设备中没有用户可维修的部件。

非此处指定的其它控制、调整或与性能有关的操作都有可能致激光辐射的危险。



危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，避免直接暴露于光束之下。

声明 4



≥18 kg (37 磅)



≥32 kg (70.5 磅)



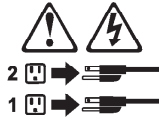
≥55 kg (121.2 磅)

警告：
抬起时请采用安全操作方法。

声明 5



警告：
使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。
另外，本设备可能带有多条电源线。若要断开设备上的所有电流，请确
保所有电源线均已与电源断开连接。



声明 6



警告：
如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至
使用方便的电源。

声明 7



警告:

如果设备带有外门，则在移动或抬起设备前应将其拆除或固定以避免造成人员伤亡。外门支撑不了设备的重量。

声明 8



警告:

不要拆除电源外盖或贴有下列标签的任何部件。



贴有此标签的组件内部存在高电压、高电流的危险。这些组件中没有用户可维修的部件。如果怀疑其中的部件存在问题，应与服务技术人员联系。

声明 9



警告:

为避免人员伤亡，拆除设备上的风扇前应拨下热插拔风扇电缆。

声明 10



警告:

机柜安装的设备上面不能放置重于 82kg (180 磅) 的物品。



> 82 kg (180 磅)

声明 11



警告：

下面的标签表明附近有锋利的边、角或接头。



声明 12



警告：

下面的标签表明附近有高热表面。



• 声明 20



警告：

为避免人身伤害，请在抬起设备之前卸下所有刀片服务器以减轻重量。

• 声明 21



警告：

当刀片服务器连接到电源时会有危险的能量，请始终在安装刀片服务器之前重新装上刀片服务器机盖。

重要資訊：

Server Library 中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在本節的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1



危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

- 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
- 請將電源線接至接線及接地正確的電源插座。
- 請將本產品隨附的設備連接至接線正確的插座。
- 儘可能使用單手來連接或切斷信號電纜線。
- 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開停該設備的電源。
- 在安裝及架構之時，若非非常熟悉，在開停裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
- 在安裝、移動本產品或附加裝置，或開停其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：	切斷：
1. 關閉所有開關。	1. 關閉所有開關。
2. 先將所有電纜線接上裝置。	2. 先自電源插座拔掉電源線。
3. 將信號電纜接上接頭。	3. 拔掉接頭上的所有信號電纜。
4. 再將電源線接上電源插座。	4. 再拔掉裝置上的所有電纜線。
5. 開停裝置的電源。	

聲明 2



注意：

更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會引發爆炸。

請勿將電池：

- 丟入或浸入水中
- 加熱超過 100 °C (212 °F)
- 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3



注意：

安裝雷射產品 (如 CD-ROM、DVD 光碟機、光纖裝置或發射器) 時，請注意下列事項：

- 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。裝置中沒有需要維修的組件。
- 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。



危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意下列事項：

開停時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露於光束下。

聲明 4



≥ 18 公斤 (37 磅) ≥ 32 公斤 (70.5 磅) ≥ 55 公斤 (121.2 磅)

注意：

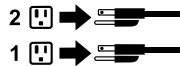
抬起裝置時，請注意安全措施。

聲明 5



注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。
本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所有電源線已與電源分離。



聲明 10



注意：

請勿將任何重量超過 82 公斤 (180 磅) 的物品置於已安裝機架的裝置上方。



> 82 公斤 (180 磅)

聲明 20



警告：

為了避免人身傷害，抬起裝置之前，請先卸下所有的螺旋槳，以便減輕重量。

聲明 21



警告：

當螺旋槳連到電源時可能有危險之虞。安裝螺旋槳之前，請先更換螺旋槳外蓋。

Important:

Toutes les consignes Attention et Danger indiquées dans la bibliothèque IBM documentation sont précédées d'un numéro. Ce dernier permet de mettre en correspondance la consigne en anglais avec ses versions traduites dans la présente section.

Par exemple, si une consigne de type Attention est précédée du chiffre 1, ses traductions sont également précédées du chiffre 1 dans la présente section.

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Notice n° 1



DANGER

Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux.

Pour éviter tout risque de choc électrique:

- Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.
- Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.
- Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.
- Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.
- Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.
- Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relient aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).
- Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
1. Mettez les unités hors tension. 2. Commencez par brancher tous les cordons sur les unités. 3. Branchez les câbles d'interface sur des connecteurs. 4. Branchez les cordons d'alimentation sur des prises. 5. Mettez les unités sous tension.	1. Mettez les unités hors tension. 2. Débranchez les cordons d'alimentation des prises. 3. Débranchez les câbles d'interface des connecteurs. 4. Débranchez tous les câbles des unités.

Notice n° 2



ATTENTION:

Remplacez la pile au lithium usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- Ne la jetez pas à l'eau.
- Ne l'exposez pas à une température supérieure à 100 °C.
- Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.

Notice n° 3



ATTENTION:

Si des produits laser sont installés (tels que des unités de CD-ROM ou de DVD, des périphériques contenant des fibres optiques ou des émetteurs-récepteurs), prenez connaissance des informations suivantes:

- N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.
- Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.

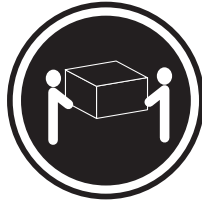


DANGER

Certains produits laser contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.

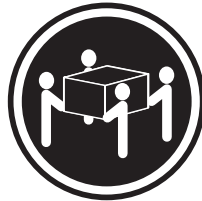
Notice n° 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5



ATTENTION:

Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre unité dispose de plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.



Notice n° 10

ATTENTION:

Ne posez pas d'objet dont le poids dépasse 82 kg sur les unités montées en armoire.



Notice n° 20



ATTENTION:

Pour éviter tout risque de blessure, retirez tous les Serveurs lame de l'unité avant de la soulever.

Notice n° 21



ATTENTION:

Un courant électrique dangereux est présent lorsque le Serveur lame est connecté à une source d'alimentation. Remettez toujours en place le carter du Serveur lame avant d'installer le Serveur lame.

Wichtig:

Alle Sicherheitshinweise in dieser IBM documentation beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die Übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1



VORSICHT

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:

- Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.
- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Signalkabel möglichst einhändig anschließen oder lösen.
- Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.
- Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem Öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.
- Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder Öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.

Kabel anschließen:	Kabel lösen:
1. Alle Geräte ausschalten und Netzstecker ziehen. 2. Zuerst alle Kabel an Einheiten anschließen. 3. Signalkabel an Anschlußbuchsen anschließen. 4. Netzstecker an Steckdose anschließen. 5. Gerät einschalten.	1. Alle Geräte ausschalten. 2. Zuerst Netzstecker von Steckdose lösen. 3. Signalkabel von Anschlußbuchsen lösen. 4. Alle Kabel von Einheiten lösen.

Hinweis 2



ACHTUNG:

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:

- mit Wasser in Berührung bringen.
- über 100 °C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3



ACHTUNG:

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.

- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

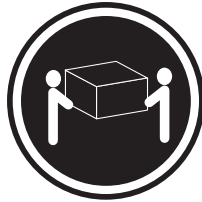


VORSICHT

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

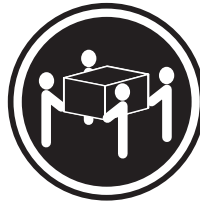
Hinweis 4



≥18 kg



≥32 kg



≥55 kg

ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5



ACHTUNG:

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.



Hinweis 10

ACHTUNG:

Keine Gegenstände, die mehr als 82 kg wiegen, auf Rack-Einheiten ablegen.



Hinweis 20



ACHTUNG:

Um Verletzungen zu vermeiden, entfernen Sie vor dem Anheben der Einheit zur Verringerung des Gewichts alle Blades.

Hinweis 21



ACHTUNG:

Wenn das Blade an eine Stromquelle angeschlossen ist, besteht die Gefahr eines Stromschlags. Bringen Sie die Abdeckung der Blades immer an, bevor Sie sie installieren.

Importante:

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione IBM documentation iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

Avviso 1



PERICOLO

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:

- Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.
- Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.
- Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.
- Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.
- Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o delle unità collegate.

Per collegare:	Per scollegare:
1. SPEGNERE tutti i dispositivi. 2. Collegare prima tutti i cavi alle unità. 3. Collegare i cavi di segnale ai connettori. 4. Collegare i cavi di alimentazione alle prese elettriche. 5. ACCENDERE le unità.	1. SPEGNERE tutti i dispositivi. 2. Rimuovere prima i cavi di alimentazione dalle prese elettriche. 3. Rimuovere i cavi di segnale dai connettori. 4. Rimuovere tutti i cavi dalle unità.

Avviso 2



ATTENZIONE:

Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100°C
- Cercare di ripararla o smontarla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

Avviso 3



ATTENZIONE:

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:

- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.



PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aperto l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

Avviso 5**ATTENZIONE:**

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.

**Avviso 10****ATTENZIONE:**

Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.

**Avviso 20****ATTENZIONE:**

Per evitare incidenti, prima di sollevare l'unità, rimuovere tutte le lame in modo da ridurre il peso.

Avviso 21**ATTENZIONE:**

Quando la lama è collegata alla sorgente elettrica è presente una tensione pericolosa. Sostituire sempre il coperchio della lama prima di installarla.

重要：

Netfinity Server ライブラリーにあるすべての注意および危険の記述は数字で始まります。この数字は、英語版の注意および危険の記述と翻訳された注意および危険の記述を相互参照するために使用します。

例えば、もし注意の記述が数字の 1 で始まっている場合は、その注意の翻訳は、記述 1 の下にあります。

手順を実施する前に、すべての注意：

・ 記述 1

⚠ 危険

感電を防止するため、雷の発生時には、いかなるケーブルの取り付けまたは取り外しも行わないでください。また導入、保守、再構成などの作業も行わないでください。

感電を防止するため：

- － 電源コードは正しく接地および配線が行われている電源に接続してください。
- － 本製品が接続されるすべての装置もまた正しく配線された電源に接続されている必要があります。

できれば、信号ケーブルに取り付けまたは取り外しときは片方の手のみで行うようにしてください。これにより、電位差がある二つの表面に触ることによる感電を防ぐことができます。

電源コード、電話ケーブル、通信ケーブルからの電流は身体に危険を及ぼします。設置、移動、または製品のカバーを開けたり装置を接続したりするときには、以下のようにケーブルの接続、取り外しを行ってください。

接続するには

1. すべての電源を切る
2. まず、装置にすべてのケーブルを接続する。
3. 次に、通信ケーブルをコネクタに接続する
4. その後、電源コンセントに電源コードを接続する
5. 装置の電源を入れる。

取り外すには

1. すべての電源を切る
2. まず、電源コンセントから電源コードを取り外す
3. 次に、通信ケーブルをコネクタから取り外す。
4. その後、装置からすべてのケーブルを取り外す

⚠ 注意

本製品には、システム・ボード上にリチウム電池が使用されています。電池の交換方法や取り扱いを誤ると、発熱、発火、破裂のおそれがあります。

電池の交換には、IBM部品番号33F8354の電池またはメーカー推奨の同等の電池を使用してください。

交換用電池の購入については、お買い求めの販売店または弊社の営業担当までお問い合わせください。

電池は幼児の手の届かない所に置いてください。

万一、幼児が電池を飲み込んだときは、直ちに医師に相談してください。

以下の行為は絶対にしないでください。

- 水にぬらすこと
- 100度C 以上の過熱や焼却
- 分解や充電
- ショート

電池を廃棄する場合、および保存する場合にはテープなどで絶縁してください。他の金属や電池と混ざると発火、破裂の原因となります。電池は地方自治体の条例、または規則に従って廃棄してください。ごみ廃棄場で処分されるごみの中に捨てないでください。

⚠ 注意

レーザー製品 (CD-ROM、DVD、または光ファイバー装置または送信器など) が組み込まれている場合は、下記に御注意ください。

- ここに記載されている制御方法、調整方法、または性能を超えて使用すると、危険な放射線を浴びる可能性があります。
- ドライブのカバーを開けると、危険な放射線を浴びる可能性があります。ドライブの内部に修理のために交換可能な部品はありません。カバーを開けないでください。

⚠ 危険

一部 CD-ROM ドライブは、Class 3A または Class 3B レーザー・ダイオードを使用しています。次の点に注意してください。

CD-ROMドライブのカバーを開けるとレーザーが放射されます。光線をみつめたり、光学器械を使って直接見たりしないでください。また直接光線を浴びないようにしてください。

⚠ 注意



18Kg 以上



32Kg 以上



55Kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

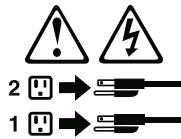
・ 記述 5

注意

サーバーの前面にある電源制御ボタンは、サーバーに供給された電流を遮断しません。

サーバーには、複数の電源コードが接続されているかもしれません。

サーバーから電流を完全に遮断するために、すべての電源コードが電源から取り外されていることを確認してください。



・ 記述 10

注意

ラック・モデルのサーバーの上に 82 Kg 以上の物を置かないでください。



▪ 記述 20



危険：

怪我を避けるため、ユニットを持ち上げる場合は、その前にすべてのブレード・サーバーを取り外して重量を軽くしてください。

▪ 記述 21



危険：

ブレード・サーバーを差し込んだ状態では感電する危険性があります。ブレードを差し込む前に、ブレードのカバーは必ず取り付けておいてください。

중요:

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로 시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는 번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의 경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을 읽으십시오.

경고문 1



위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의 설치, 유지보수 또는 재구성을 하지 마십시오.
- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에 연결하십시오.
- 가능한 한 신호 케이블을 한 손으로 연결하거나 끊으십시오.
- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 꺼지 마십시오.
- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를 열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크 및 모뎀을 끊어 주십시오.
- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:

1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.
3. 신호 케이블을 커넥터에 연결합니다.
4. 콘센트에 전원 코드를 연결합니다.
5. 장치 스위치를 켭니다.

연결을 끊으려면:

1. 모든 스위치를 끕니다.
2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에서 제거합니다.
4. 장치에서 모든 케이블을 제거합니다.

경고문 2



주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음은 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100°C(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:
레이저 제품(CD-ROMs, DVD 드라이브, 광 장치 또는 트랜스미터 등과 같은)이 설치되어 있을 경우 다음을 주의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우 위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를 받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한 레이저 광선에 노출될 수 있습니다.



위험

일부 레이저 제품에는 클래스 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4



≥18 kg (37 lbs)



≥ 32 kg (70.5 lbs)



≥ 55 kg (121.2 lbs)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 5



주의:
장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는 지 확인하십시오.



경고문 10



주의:
서랍형 모델의 장치 상단에 82 kg(180 lbs.)이 넘는 물체를 올려
놓지 마십시오.



> 82 kg (180 lbs)

경고문 20



주의:
부품을 들어올리기 전에 모든 블레이드를 제거하여 무게를 줄여야 위험하지
않습니다.

경고문 21



주의:
블레이드를 전원에 연결할 때 감전 등의 위험이 있을 수 있습니다.
블레이드를 설치하기 전에 항상 블레이드 덮개를 교체하십시오.

Importante:

Todas las declaraciones de precaución de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaración de precaución o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta sección.

Por ejemplo, si una declaración de peligro empieza con el número 1, las traducciones de esta declaración de precaución aparecen en esta sección bajo Declaración 1.

Lea atentamente todas las declaraciones de precaución y peligro antes de llevar a cabo cualquier operación.

Declaración 1



PELIGRO

La corriente eléctrica de los cables telefónicos, de alimentación y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalación, mantenimiento o reconfiguración de este producto durante una tormenta.
- Conecte cada cable de alimentación a una toma de alimentación eléctrica con conexión a tierra y cableado correctos.
- Conecte a tomas de alimentación con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de sent.al.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundación o de daños estructurales.
- Desconecte los cables de alimentación, sistemas de telecomunicaciones, redes y módems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalación y configuración.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operación de instalación, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexión	Para la desconexión
1. APÁGUELO todo. 2. En primer lugar, conecte los cables a los dispositivos. 3. Conecte los cables de señal a los conectores. 4. Conecte cada cable de alimentación a la toma de alimentación. 5. ENCIENDA el dispositivo.	1. APÁGUELO todo. 2. En primer lugar, retire cada cable de alimentación de la toma de alimentación. 3. Retire los cables de señal de los conectores. 4. Retire los cables de los dispositivos.

Declaración 2



PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislación local.

Declaración 3



PRECAUCIÓN:

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra óptica o transmisores), tenga en cuenta las advertencias siguientes:

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiación láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realización de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposición perjudicial a las radiaciones.

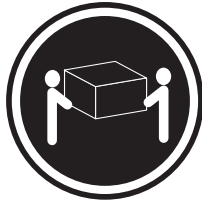


PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiación láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ópticos; evite la exposición directa al rayo.

Declaración 4



≥18 kg



≥32 kg



≥55 kg

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5



PRECAUCIÓN:

El botón de control de alimentación del dispositivo y el interruptor de alimentación de la fuente de alimentación no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentación. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentación de la fuente de alimentación.



Declaración 10

PRECAUCIÓN:

No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.



Declaración 20



PRECAUCIÓN:

Para prevenir ferimentos pessoais, antes de levantar a unidade retire todas as lâminas para diminuir o peso.

Declaración 21



PRECAUCIÓN:

Existe energia perigosa quando a lâmina está ligada à fonte de alimentação. Substitua sempre a cobertura da lâmina antes de instalar a mesma.

Appendix C. Notices

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Important notes

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

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

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

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

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

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

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

Product recycling and disposal

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

Battery return program

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

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

In the Netherlands, the following applies.



Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

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

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

Taiwanese Class A warning statement

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

Chinese Class A warning statement

中华人民共和国“A类”警告声明

声 明

此为A类产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

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