

BladeCenter LS21 Type 7971 and LS41 Type 7972



Problem Determination and Service Guide

BladeCenter LS21 Type 7971 and LS41 Type 7972



Problem Determination and Service Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 107, and the *Warranty and Support Information* document on the *IBM BladeCenter Documentation* CD.

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Contents

Safety	vii
Guidelines for trained service technicians	viii
Inspecting for unsafe conditions	viii
Guidelines for servicing electrical equipment	viii
Safety statements	ix
Chapter 1. Introduction	1
Related documentation	1
Notices and statements in this document	2
Features and specifications	3
Blade server controls and LEDs	4
Turning on the blade server	6
Turning off the blade server	6
System board layouts	7
System board connectors	7
System board switches	8
System board LEDs	9
Chapter 2. Diagnostics	11
Diagnostic tools	11
POST	11
POST beep codes	12
POST error codes	15
Error logs	22
Checkout procedure	24
About the checkout procedure	24
Performing the checkout procedure	24
Troubleshooting tables	25
General problems	25
Hard disk drive problems	26
Intermittent problems	26
Keyboard or mouse problems	27
Memory problems	28
Microprocessor problems	28
Monitor or video problems	29
Network connection problems	30
Optional-device problems	30
Power error messages	31
Power problems	33
Removable-media drive problems	35
ServerGuide problems	36
Service processor problems	36
Software problems	37
Universal Serial Bus (USB) port problems	37
Light path diagnostics	38
Viewing the light path diagnostics LEDs	38
Light path diagnostics LEDs	41
Diagnostic programs, messages, and error codes	42
Running the diagnostic programs	43
Diagnostic text messages	43
Viewing the test log	44
Diagnostic error codes	44
Recovering from a BIOS update failure	50

Service processor (BMC) error codes	51
Solving SAS hard disk drive problems	52
Solving shared BladeCenter resource problems	52
Keyboard or mouse problems	52
Media tray problems	53
Network connection problems	54
Power problems	55
Video problems.	55
Solving undetermined problems.	56
Calling IBM for service	58
Chapter 3. Parts listing, Types 7971 and 7972	59
Chapter 4. Product recovery CDs	63
Chapter 5. Removing and replacing blade server components	67
Installation guidelines	67
System reliability guidelines	68
Handling static-sensitive devices	68
Returning a device or component	68
Removing the blade server from a BladeCenter unit	69
Installing the blade server in a BladeCenter unit.	70
Removing and replacing Tier 1 CRUs	72
Removing the blade server cover	72
Installing the blade server cover	73
Removing an expansion unit	74
Installing an expansion unit	75
Removing the bezel assembly	76
Installing the bezel assembly.	77
Removing a SAS hard disk drive	78
Installing a SAS hard disk drive.	79
Removing a memory module.	80
Installing a memory module	80
Removing and installing an I/O expansion card	82
Removing the battery	88
Installing the battery	88
Removing and replacing Tier 2 CRUs	90
Removing a Concurrent KVM Feature Card	90
Installing a Concurrent KVM Feature Card.	91
Removing the hard disk drive tray	92
Installing the hard disk drive tray	93
Removing and replacing FRUs	94
Removing a microprocessor and heat sink.	94
Installing a microprocessor and heat sink	97
Removing the system board assembly	99
Installing the system board assembly	100
Chapter 6. Configuration information and instructions	101
Firmware updates	101
Using the Configuration/Setup Utility program	101
Configuring the Gigabit Ethernet controllers	101
Blade server Ethernet controller enumeration	102
Configuring a SAS RAID array.	103
Appendix A. Getting help and technical assistance	105
Before you call	105

Using the documentation	105
Getting help and information from the World Wide Web	105
Software service and support	106
Hardware service and support	106
Appendix B. Notices	107
Trademarks.	108
Important notes	108
Product recycling and disposal	109
Battery return program.	110
Electronic emission notices	111
Federal Communications Commission (FCC) statement	111
Industry Canada Class A emission compliance statement	112
Australia and New Zealand Class A statement	112
United Kingdom telecommunications safety requirement	112
European Union EMC Directive conformance statement	113
Taiwanese Class A warning statement	113
Chinese Class A warning statement	113
Japanese Voluntary Control Council for Interference (VCCI) statement	113
Index	115

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

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

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

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

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

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

Guidelines for servicing electrical equipment

Observe the following guidelines when servicing electrical equipment:

- Check the area for electrical hazards such as moist floors, non-grounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical current.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.

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

Safety statements

Important:

Each caution and danger statement in this documentation begins with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

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

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

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 2:



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

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

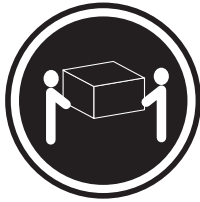


DANGER

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

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

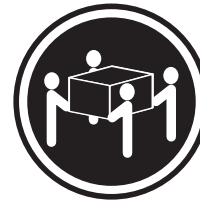
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

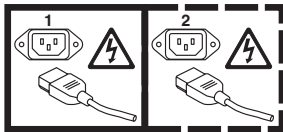
Use safe practices when lifting.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

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



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

Statement 10:



CAUTION:

Do not place any object on top of rack-mounted devices.



Statement 21:



CAUTION:

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

Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® BladeCenter® LS21 Type 7971 and LS41 Type 7972 blade server. It describes the diagnostic tools that come with the blade server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of three types:

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

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

Related documentation

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

- *Installation and User's Guide*

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

- *Safety Information*

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

- *Warranty and Support Information*

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

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

The blade server might have features that are not described in the documentation that comes with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the blade server documentation. The most recent versions of all BladeCenter documentation are at <http://www.ibm.com/bladecenter/>. In addition to the documentation in this library, be sure to review the *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit type for information to help you prepare for system installation and configuration. This document is available at <http://www.ibm.com/bladecenter/>.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

The following table provides a summary of the features and specifications of the blade server.

Notes:

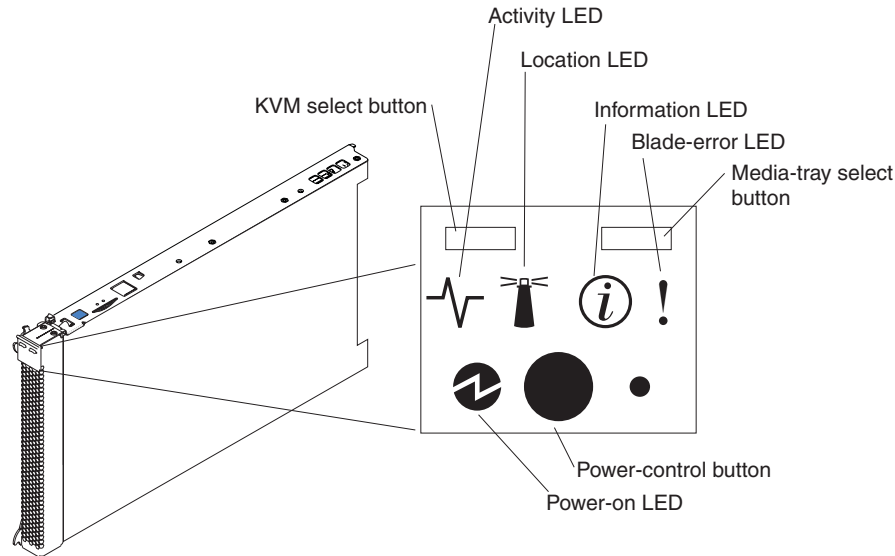
- Power, cooling, removable-media drives, external ports, and advanced system management are provided by the BladeCenter unit.
- The operating system in the blade server must provide USB support for the blade server to recognize and use the removable-media drives and front-panel USB ports. The BladeCenter unit uses USB for internal communications with these devices.

<p>Microprocessor: Supports dual-core AMD Intel microprocessors: Up to two in single-width models or four in double-width models</p> <p>Note: Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors in your blade server.</p> <p>Memory:</p> <ul style="list-style-type: none"> • Dual-channel DIMMs: 8 DIMM slots in single-width models or 16 DIMM slots in double-width models • Type: Very-low profile (VLP), double-data rate 2 (DDR2), ECC SDRAM registered x4 (Chipkill) or x8 (non-Chipkill) DIMMs • Supports 512 MB, 1 GB, and 2 GB (as of the date of this publication): Total memory of up to 16 GB in single-width models or 32 GB in double-width models <p>Drives: Supports small-form-factor, Serial Attached SCSI (SAS) drives: One in single-width models or two in double-width models</p>	<p>Integrated functions:</p> <ul style="list-style-type: none"> • Dual Gigabit Ethernet controllers • Expansion card interface • Local service processor: Baseboard management controller (BMC) with Intelligent Platform Management Interface (IPMI) firmware • ATI RN-50 ES1000 video controller • LSI 1064 Serial Attached SCSI (SAS) controller • Light path diagnostics • RS-485 interface for communication with the management module • Automatic server restart (ASR) • Serial over LAN (SOL) • Four USB buses for communication with keyboard, mouse, and removable media drives <p>Predictive Failure Analysis (PFA) alerts:</p> <ul style="list-style-type: none"> • Microprocessor • Memory • Hard disk drives <p>Electrical Input: 12 V dc</p>	<p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Blade server on: 10° to 35° C (50° to 95° F). Altitude: 0 to 914 m (0 to 3000 ft) – Blade server on: 10° to 32° C (50° to 90° F). Altitude: 914 to 2134 m (3000 to 7000 ft) – Blade server off: -40° to 60° C (-40° to 140° F) • Humidity: <ul style="list-style-type: none"> – Blade server on: 8% to 80% – Blade server off: 5% to 80% <p>Size:</p> <ul style="list-style-type: none"> • Height: 24.5 cm (9.7 inches) • Depth: 44.6 cm (17.6 inches) • Width: <ul style="list-style-type: none"> – Single-width models: 2.9 cm (1.14 inches) – Double-width models: 5.8 cm (2.28 inches) • Maximum weight: <ul style="list-style-type: none"> – Single-width models: 4.9 kg (10.8 lb) – Double-width models: 11.2 kg (24.7 lb)
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Blade server controls and LEDs

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

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



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

Using a keyboard that is directly attached to the management-module, you can press keyboard keys in the following sequence to switch KVM 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. A blade server that occupies more than one blade bay is identified by the lowest bay number that it occupies.

If there is no response when you press the KVM select button, you can use the management-module Web interface to determine whether local control has been disabled on 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 and mouse, even if the keyboard and mouse have PS/2-style connectors.
2. If you install a supported Microsoft Windows operating system on the blade server while it is not the current owner of the KVM, a delay of up to 1 minute occurs the first time that you switch the KVM to the blade server. All subsequent switching takes place in the normal KVM switching time frame (up to 20 seconds).

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

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

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

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

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

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

Note: The operating system in the blade server must provide USB support for the blade server to recognize and use the removable-media drives and front-panel USB ports.

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

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

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

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

Turning on the blade server

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

- You can press the power-control button on the front of the blade server (behind the control panel door, see “Blade server controls and LEDs” on page 4) to start the blade server.

Notes:

1. Wait until the power-on LED on the blade server flashes slowly before pressing the power-control button. While the service processor in the management module is initializing, the power-on LED does not flash, and the power-control button on the blade server does not respond.
 2. While the blade server is starting, the power-on LED on the front of the blade server is lit. See “Blade server controls and LEDs” on page 4 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 using the management module.
 - If the blade server is connected to power (the power-on LED is flashing slowly), the operating system supports the Wake on LAN feature, and the Wake on LAN feature has not been disabled through the management module, the Wake on LAN feature can turn on the blade server.

Turning off the blade server

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

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

The blade server can be turned off in any of the following ways:

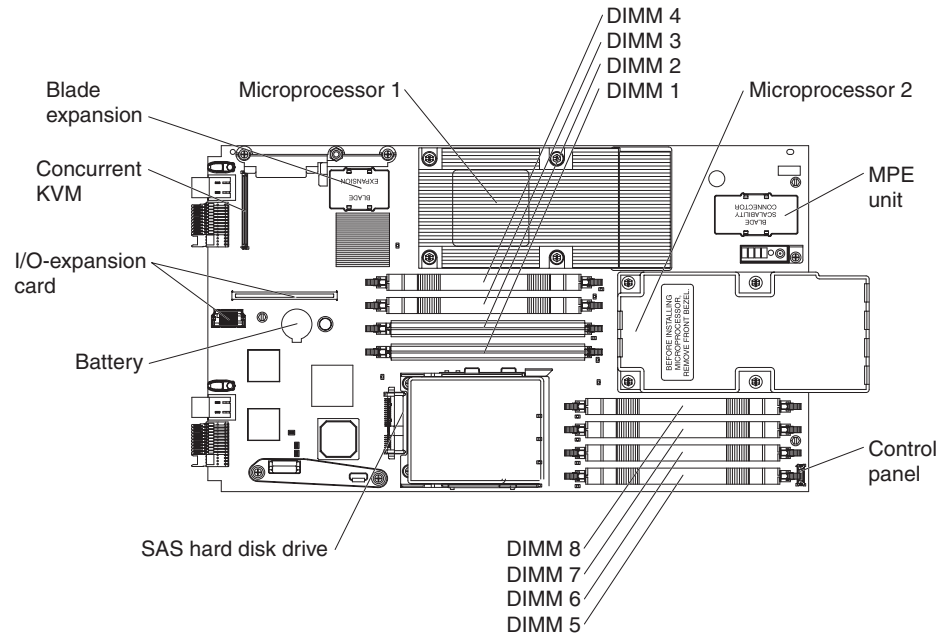
- You can press the power-control button on the blade server (behind the control panel door, see “Blade server controls and LEDs” on page 4). This starts an orderly shutdown of the operating system, if this feature is supported by the operating system.
- If the operating system stops functioning, you 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.
 - If the system is not operating correctly, the management module will automatically turn off the blade server.
 - Through the management-module Web interface, you can also configure the management module to turn off the blade server. For additional information, see the *IBM BladeCenter Management Module User's Guide*.

System board layouts

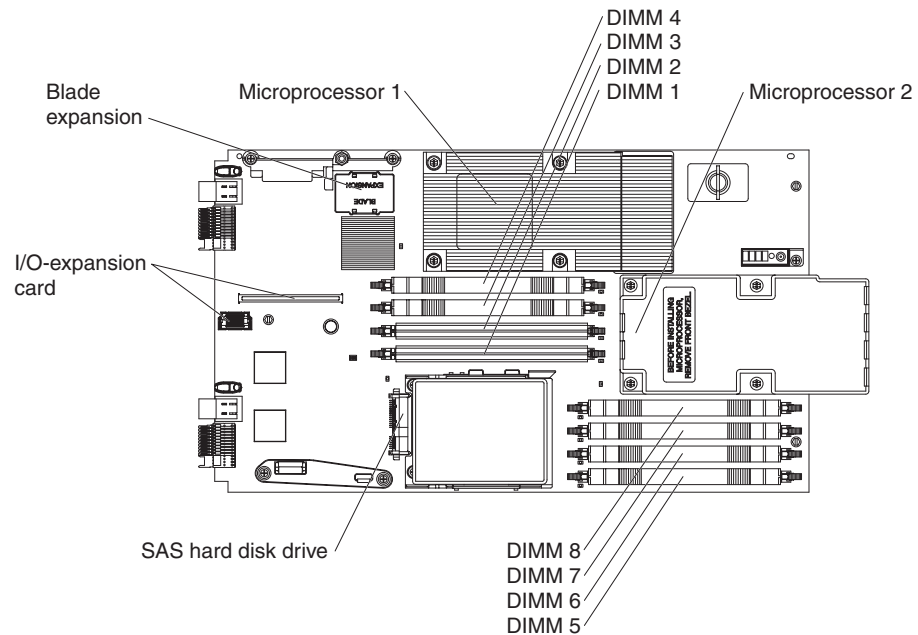
The following illustrations show the connectors, LEDs, and switches on the blade server system board and the Multiprocessor Expansion (MPE) unit. The illustrations in this document might differ slightly from your hardware.

System board connectors

The following illustration shows the connectors on the blade server system board.

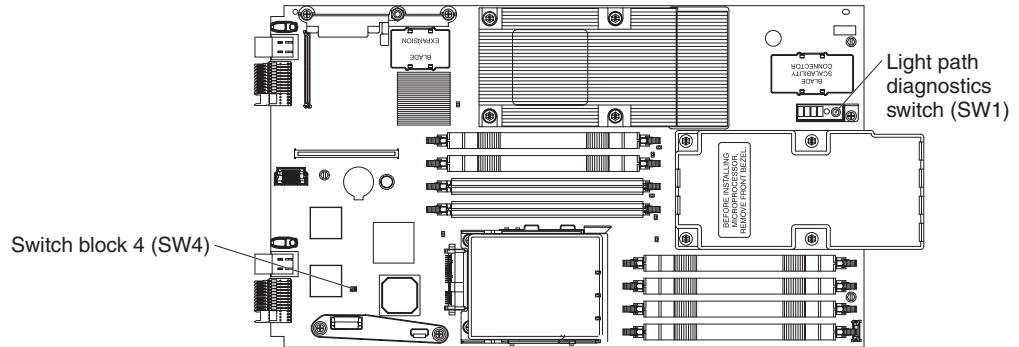


The following illustration shows the connectors on the MPE unit.



System board switches

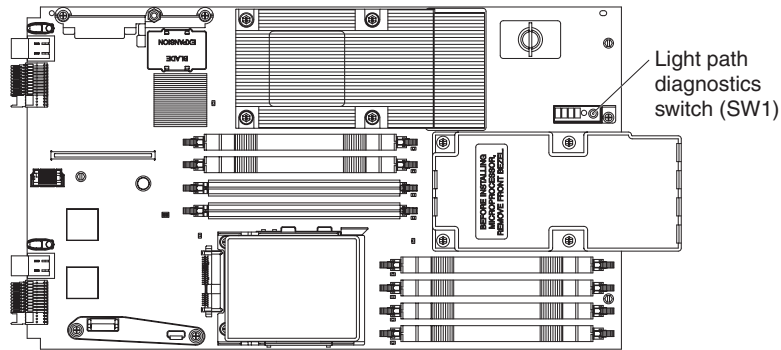
The following illustration shows the location of the switches on the blade server system board.



The following table defines the function of each switch on the blade server system board.

Switch number	Description
SW1	Light path diagnostics switch – Press and hold to relight the system-board LEDs that were lit before you removed the blade server from the BladeCenter unit.
SW4	Switch block 4 has four switches. <ul style="list-style-type: none"> • 1 – Reserved • 2 – BIOS backup page <ul style="list-style-type: none"> – Open: BIOS starts from the primary BIOS page (default) – Closed: BIOS starts from the backup BIOS page • 3 – Password override enable <ul style="list-style-type: none"> – Open: Disabled (default) – Closed: Enabled – Bypass password during next server start • 4 – Wake On LAN enable <ul style="list-style-type: none"> – Open: Disabled – Closed: Enabled (default)

The following illustration shows the location of the light path diagnostics switch on the MPE unit.

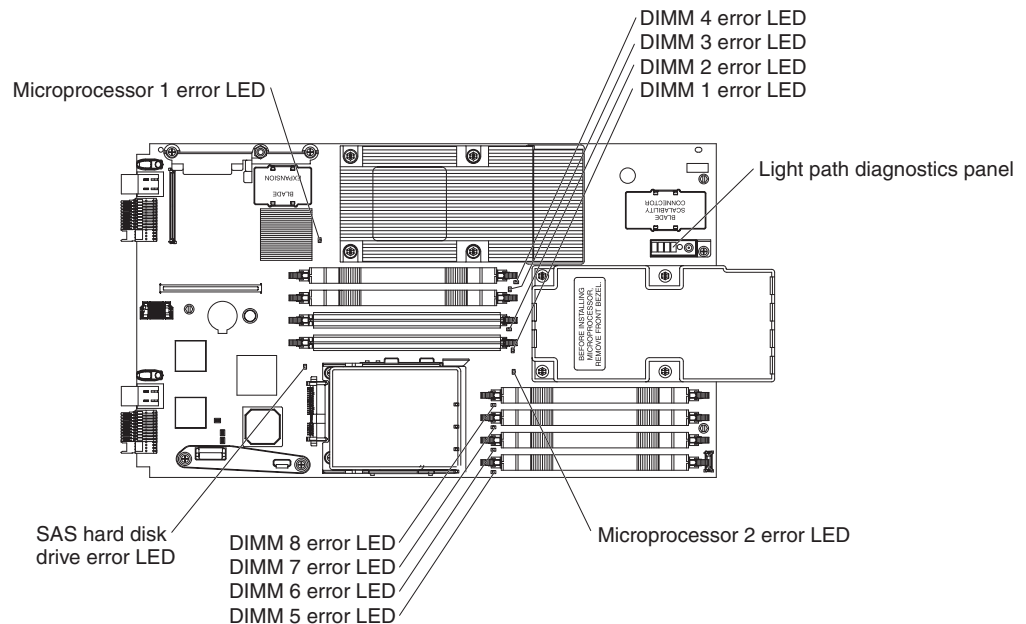


The following table defines the function of the light path diagnostics switch on the MPE unit.

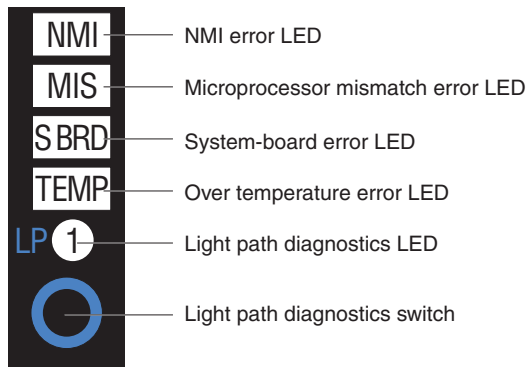
Switch number	Description
SW1	Light path diagnostics switch – Press and hold to relight the MPE-unit LEDs that were lit before you removed the blade server from the BladeCenter unit.

System board LEDs

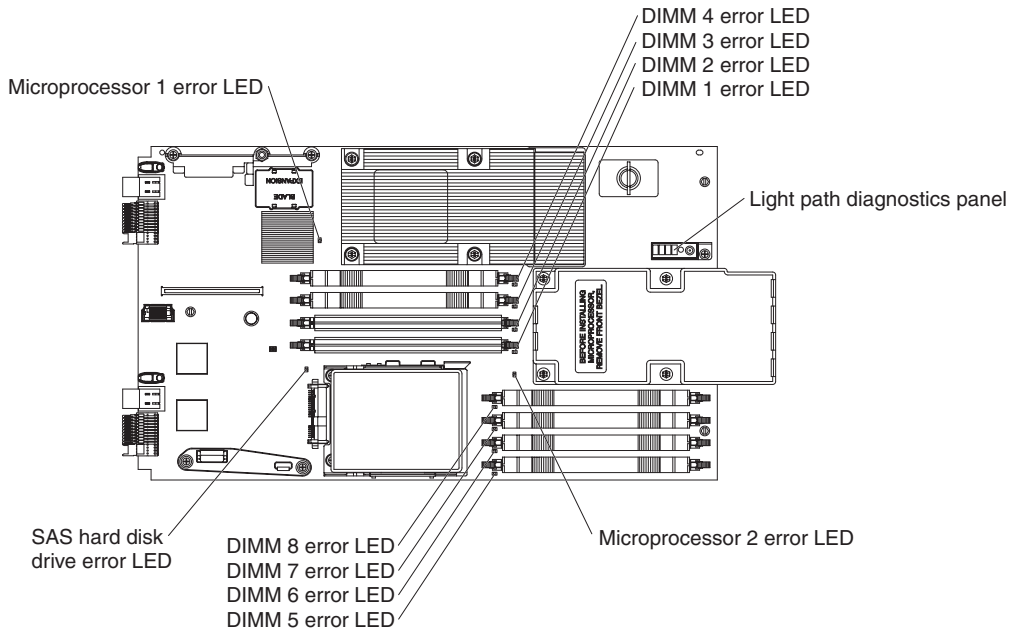
The following illustration shows the LEDs on the blade server system board. You must remove the blade server from the BladeCenter unit, open the cover or remove any optional expansion units, and press the light path diagnostics switch to light any error LEDs that were turned on during processing.



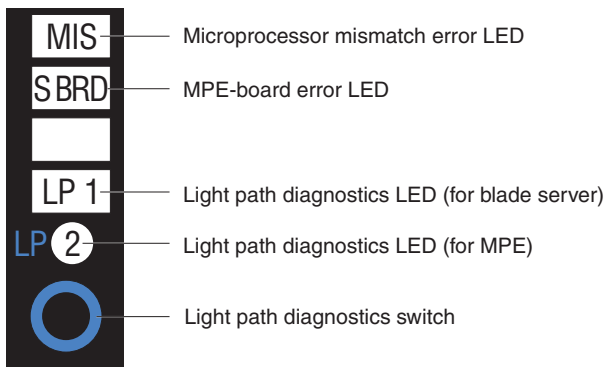
The following illustration shows the light path diagnostics panel on the blade server system board.



The following illustration shows the LEDs on the MPE unit. You must remove the blade server from the BladeCenter unit, open the cover, and press the light path diagnostics switch to light any error LEDs that were turned on during processing.



The following illustration shows the light path diagnostics panel on the MPE unit.



Chapter 2. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the blade server.

Note: The blade server uses shared resources that are installed in the BladeCenter unit. Problems with these shared resources might appear to be in the blade server (see “Solving shared BladeCenter resource problems” on page 52 for information about isolating problems with these resources). See the *Problem Determination and Service Guide* or the *Hardware Maintenance Manual and Troubleshooting Guide* for your BladeCenter unit and other BladeCenter component documentation for diagnostic procedures for shared BladeCenter components.

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 105 for more information.

Diagnostic tools

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

- **POST beep codes, error messages, and error logs**

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” for more information.

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 25 for more information.

- **Light path diagnostics**

Use the light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 38 for more information.

- **Diagnostic programs, messages, and error codes**

The diagnostic programs are the primary method of testing the major components of the blade server. These programs are stored in read-only memory (ROM) on the blade server. See “Diagnostic programs, messages, and error codes” on page 42 for more information.

POST

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

If a power-on password is set, you must type the password and press Enter, when prompted, for POST to run.

If POST is completed without detecting any problems, a single beep sounds, and the blade server startup is completed.

If POST detects a problem, more than one beep might sound, or an error message is displayed. See “Beep code descriptions” on page 12 and “POST error codes” on page 15 for more information.

POST beep codes

A beep code is a combination of short or long beeps or a series of short beeps that are separated by pauses. For example, a “1-2-3” beep code is one short beep, a pause, two short beeps, a pause, and three short beeps. A beep code other than one beep indicates that POST has detected a problem. To determine the meaning of a beep code, see “Beep code descriptions.” If no beep code sounds, see “No-beep symptoms” on page 15.

Beep code descriptions

The following table describes the beep codes and suggested actions to correct the detected problems.

A single problem might cause more than one error message. When this occurs, correct the cause of the first error message. The other error messages usually will not occur the next time POST runs.

Exception: If there are multiple error codes or light path diagnostics LEDs that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 28 for information about diagnosing microprocessor problems.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Beep code	Description	Action
1-1-3	CMOS write/read test failed.	<ol style="list-style-type: none"> 1. Reseat the battery 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board assembly
1-1-4	BIOS ROM checksum failed.	<ol style="list-style-type: none"> 1. Update the BIOS code. 2. Reseat the DIMMs. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board assembly
1-2-1	Programmable interval timer failed.	(Trained service technician only) Replace the system board assembly.
1-2-2	DMA initialization failed.	(Trained service technician only) Replace the system board assembly.
1-2-3	DMA page register write/read failed.	(Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Beep code	Description	Action
1-2-4	RAM refresh verification failed.	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> DIMMs MPE unit (if one is installed) Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> DIMMs (Trained service technician only) System board assembly (Trained service technician only) MPE board assembly (if one is installed)
1-3-1	First 64K RAM test failed.	<ol style="list-style-type: none"> Reseat the DIMMs. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> DIMMs (Trained service technician only) System board assembly
2-1-1	Secondary DMA register test failed.	(Trained service technician only) Replace the system board assembly.
2-1-2	Primary DMA register test failed.	(Trained service technician only) Replace the system board assembly.
2-1-3	Primary interrupt mask register test failed.	(Trained service technician only) Replace the system board assembly.
2-1-4	Secondary interrupt mask register test failed.	(Trained service technician only) Replace the system board assembly.
2-2-2	Keyboard controller test failed.	<ol style="list-style-type: none"> Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). (Trained service technician only) Replace the system board assembly.
2-3-1	Screen initialization failed.	(Trained service technician only) Replace the system board assembly.
3-1-1	Timer tick interrupt failed.	(Trained service technician only) Replace the system board assembly.
3-1-2	Interval timer channel 2 failed.	(Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Beep code	Description	Action
3-1-4	Time-of-day clock failed.	<ol style="list-style-type: none"> 1. Reseat the battery. 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board assembly
3-3-2	I2C error occurred.	<ol style="list-style-type: none"> 1. Power down the blade server and reseat it in the BladeCenter unit. 2. Reseat the following components: <ol style="list-style-type: none"> a. DIMMs b. MPE unit (if one is installed) 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board assembly
3-3-3	No operational memory in system.	<p>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 blade server three times to force the system BIOS to reset the memory connector or bank of connectors from Disabled to Enabled.</p> <ol style="list-style-type: none"> 1. Install or reseat DIMMs and restart the blade server <i>three times</i>. 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board assembly

No-beep symptoms

The following table describes situations in which no beep code sounds when POST is completed.

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
No-beep symptom	Action
No beep and the blade server operates correctly	(Trained service technician only) Replace the system board assembly.
No beep and no video (system-error LED is off)	See “Solving undetermined problems” on page 56.
No beep and no video (system attention LED is lit)	See “Light path diagnostics” on page 38.

POST error codes

The following table describes the POST error codes and suggested actions to correct the detected problems.

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Error code	Description	Action
062	Three consecutive startup failures	<ol style="list-style-type: none"> Run the Configuration/Setup Utility program, select Load Default Settings, make sure that the date and time are correct, and save the settings. Reseat the following components: <ol style="list-style-type: none"> Battery MPE unit (if one is installed) DIMMs (Trained service technician only) Microprocessor 1 (Trained service technician only) Microprocessor 2 Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> Battery DIMMs (Trained service technician only) Microprocessor 1 (Trained service technician only) Microprocessor 2 (Trained service technician only) System board assembly

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
101	Timer tick interrupt failure	(Trained service technician only) Replace the system board assembly.
102	Timer 2 test failure	(Trained service technician only) Replace the system board assembly.
106	Diskette controller failure	(Trained service technician only) Replace the system board assembly.
129	Internal cache (L1) error	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 c. (Trained service technician only) System board assembly
151	Real-time clock failure	<ol style="list-style-type: none"> 1. Reseat the battery. 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board assembly
161	Real-time clock battery failure	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board assembly

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
162	Invalid configuration information or CMOS RAM checksum failure.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board assembly
163	Time of day not set.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, make sure that the date and time are correct, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board assembly
164	Memory size does not match CMOS.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, make sure that the memory configuration is correct, and save the settings. 2. Reseat the DIMMs. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board assembly
175	Bad EEPROM CRC #1	(Trained service technician only) Replace the system board assembly.
177	Bad checksum	(Trained service technician only) Replace the system board assembly.
178	EEPROM not functional	(Trained service technician only) Replace the system board assembly.
184	Bad power-on password.	(Trained service technician only) Replace the system board assembly.
185	Corrupted boot sequence	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board assembly.
186	Security hardware control logic error	(Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
187	VPD Serial Number not set	(Trained service technician only) Replace the system board assembly.
188	Bad EEPROM CRC #2	(Trained service technician only) Replace the system board assembly.
189	Three attempts to enter the incorrect password.	<ol style="list-style-type: none"> 1. Set the Password override enable switch on the system board to Enable; then, restart the blade server, run the Configuration/Setup Utility program, and change the power-on password. 2. (Trained service technician only) Replace the system board assembly.
201	Base memory error or extended memory error.	<ol style="list-style-type: none"> 1. Update the BIOS code and restart the blade server. 2. Reseat the DIMMs. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board assembly
229	Internal cache (L2) error.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 c. (Trained service technician only) System board assembly
289	DIMM disabled by user or system.	<ol style="list-style-type: none"> 1. If the DIMM was disabled by the user, run the Configuration/Setup Utility program and enable the DIMM. 2. Reseat the disabled DIMM. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Disabled DIMM b. (Trained service technician only) System board assembly

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
301	Keyboard failure.	<ol style="list-style-type: none"> 1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.
303	Keyboard controller error.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. (Trained service technician only) Replace the system board assembly.
602	Invalid diskette boot record.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. (Trained service technician only) Replace the system board assembly
604	Diskette drive failure.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. (Trained service technician only) Replace the system board assembly
662	Diskette drive configuration error.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. (Trained service technician only) Replace the system board assembly
1200	Processor machine check.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 c. (Trained service technician only) System board assembly

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1801	No more room for option ROM.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and make sure that the PXE settings are correct. Disabling PXE can allow more options to be managed. 2. Use the Configuration/Setup Utility program (Advanced Setup → PCI Bus Control → PCI ROM Control) to disable each option one at a time, restarting the blade server each time, until the 1801 error code clears. Options that cause the 1801 error code are the I/O-expansion cards and expansion units. Disable these options in the order of least-to-most important. 3. Remove each option one at a time, restarting the blade server each time, until the 1801 error code clears. Options that cause the 1801 error code are the I/O-expansion cards and expansion units. Remove these options in the order of least-to-most important. 4. (Trained service technician only) If the problem remains after all options have been removed, replace the system board assembly.
18xx	PCI error	(Trained service technician only) Replace the system board assembly.
1962	Boot sector error, no operating system installed.	<ol style="list-style-type: none"> 1. Make sure that a bootable operating system is installed. 2. Run the SAS Attached Disk diagnostic test. 3. Reseat the hard disk drive. 4. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Hard disk drive b. (Trained service technician only) System board assembly
2462	Video configuration error	(Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
5962	CD or DVD drive configuration error.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. Reseat the battery. 4. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board assembly
8603	Pointing device error	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. (Trained service technician only) Replace the system board assembly.
I999301	Fixed disk boot sector error.	<ol style="list-style-type: none"> 1. Reseat the hard disk drive. 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Hard disk drive b. (Trained service technician only) System board assembly

Error logs

The BMC log contains all system status messages from the blade server service processor. The management-module event log in your BladeCenter unit contains messages that were generated on each blade server during POST and status messages from the BladeCenter service processor. (See the *Management Module User's Guide* for more information.)

The following illustration shows an example of a BMC log entry.

```
BMC System Event Log
-----
Get Next Entry
Get Previous Entry
Clear BMC SEL

Entry Number=    00005 / 00011
Record ID=       0005
Record Type=     02
Timestamp=       2005/01/25 16:15:17
Entry Details:   Generator ID= 0020
                  Sensor Type= 04
                  Assertion Event
                  Fan
                  Threshold
                  Lower Non-critical - going high

                  Sensor Number= 40
                  Event Direction/Type= 01

                  Event Data= 52 00 1A
```

Important:

- 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 management-module event log in your BladeCenter unit lists messages according to the position of the blade server in the blade bays. If a blade server is moved from one bay to another, the management-module event log will report messages for that blade server using the new bay number; messages for that blade server that were generated before the move will still be listed using the previous bay number.

The BMC log is limited in size. When the log is full, new entries will not overwrite existing entries; therefore, you must periodically clear the BMC log through the Configuration/Setup Utility program (the menu choices are described in the *Installation and User's Guide*). When you are troubleshooting an error, be sure to clear the BMC log so that you can find current errors more easily.

Entries that are written to the BMC log during the early phase of POST show an incorrect date and time as the default time stamp; however, the date and time are corrected as POST continues.

Each BMC log entry appears on its own page. To display all the data for an entry, use the Up Arrow (↑) and Down Arrow (↓) keys or the Page Up and Page Down keys. To move from one entry to the next, select **Get Next Entry** or **Get Previous Entry**.

The BMC log indicates an assertion event when an event has occurred. It indicates a deassertion event when the event is no longer occurring.

Some of the error codes and messages in the BMC log are abbreviated.

You can view the contents of the BMC log from the Configuration/Setup Utility program and from the diagnostic programs.

When you are troubleshooting PCI-X slots, note that the error logs report the PCI-X buses numerically. The numerical assignments vary depending on the configuration. You can check the assignments by running the Configuration/Setup Utility program (see the *Installation and User's Guide* for more information).

Viewing the BMC log from the Configuration/Setup Utility program

For complete information about using the Configuration/Setup Utility program, see the *Installation and User's Guide*.

To view the BMC log, complete the following steps:

1. Turn on the blade server.
2. When the prompt Press F1 for Configuration/Setup appears, press F1. If you have set a power-on password, you must type the password and press Enter to start the Configuration/Setup Utility program.
3. Select **Advanced Settings**, select **Baseboard Management Controller (BMC) settings**, and then select **BMC System Event Log**.

Viewing the BMC log from the diagnostic programs

The BMC log contains the same information, whether it is viewed from the Configuration/Setup Utility program or from the diagnostic programs.

For information about using the diagnostic programs, see “Running the diagnostic programs” on page 43.

To view the BMC log, complete the following steps:

1. If the blade server is running, turn off the blade server.
2. Turn on the blade server.
3. When the prompt F2 for Diagnostics appears, press F2.
4. From the top of the screen, select **Hardware Info**.
5. From the list, select **BMC Log**.

Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the blade server.

About the checkout procedure

Before performing the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page vii.
- The diagnostic programs provide the primary methods of testing the major components of the blade server. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

Exception: If there are multiple error codes or light path diagnostics LEDs that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 28 for information about diagnosing microprocessor problems.

- If the blade server is halted and a POST error code is displayed, see “POST error codes” on page 15. If the blade server is halted and no error message is displayed, see “Troubleshooting tables” on page 25 and “Solving undetermined problems” on page 56.
- For intermittent problems, check the error log; see “Error logs” on page 22 and “Diagnostic programs, messages, and error codes” on page 42.
- If no LEDs are lit on the blade server front panel, verify the blade server status and errors in the management-module Web interface; also see “Solving undetermined problems” on page 56.
- If device errors occur, see “Troubleshooting tables” on page 25.

Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. If the blade server is running, turn off the blade server.
2. Turn on the blade server. Make sure that the blade server has control of the video (the keyboard/video/mouse button is lit). If the blade server does not start, see “Troubleshooting tables” on page 25.
3. Record any POST beep codes that sound or POST error messages that are displayed on the monitor. If an error is displayed, look up the first error in the “POST error codes” on page 15.
4. Check the control panel blade-error LED; if it is lit, check the light path diagnostics LEDs (see “Light path diagnostics” on page 38).
5. Check for the following results:
 - Successful completion of POST, indicated by a single beep
 - Successful completion of startup, indicated by a readable display of the operating-system desktop

6. Did a single beep sound and are there readable instructions on the main menu?
 - **No:** Find the failure symptom in “Troubleshooting tables”; if necessary, see “Solving undetermined problems” on page 56.
 - **Yes:** Run the diagnostic programs (see “Running the diagnostic programs” on page 43).
 - If you receive an error, see “Diagnostic error codes” on page 44.
 - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 56.

Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms. If these symptoms relate to shared BladeCenter unit resources, see “Solving shared BladeCenter resource problems” on page 52.

If you cannot find the problem in these tables, see “Running the diagnostic programs” on page 43 for information about testing the blade server.

If you have just added new software or a new optional device, and the blade server is not working, complete the following steps before using the troubleshooting tables:

1. Remove the software or device that you just added.
2. Run the diagnostic tests to determine whether the blade server is running correctly.
3. Reinstall the new software or new device.

General problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
Not all drives are recognized by the Fixed Disk or SAS Attached Disk diagnostic test.	Remove the drive that is indicated by the diagnostic tests; then, run the Fixed Disk or SAS Attached Disk diagnostic test again. If the remaining drives are recognized, replace the drive that you removed with a new one.
The blade server stops responding during the Fixed Disk or SAS Attached Disk diagnostic test.	Remove the hard disk drive that was being tested when the blade server stopped responding, and run the diagnostic test again. If the Fixed Disk or SAS Attached Disk diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive passes the Fixed Disk or SAS Attached Disk diagnostics test, but the problem remains.	Run the SAS Fixed Disk or SAS Attached Disk diagnostic test again. If the diagnostics continue to pass but the drive continues to have a problem, replace the drive with a new one.

Intermittent problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • When the blade server is turned on, air is flowing from the rear of the BladeCenter unit at the blower grille. If there is no airflow, the blower is not working. This causes the blade server to overheat and shut down. • The SAS hard disk drives are configured correctly. 2. Check the BMC log (see “Error logs” on page 22).

Keyboard or mouse problems

The keyboard and mouse are shared BladeCenter unit resources. First, make sure that the keyboard and mouse are assigned to the blade server; then, see the following table and “Solving shared BladeCenter resource problems” on page 52.

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.	
Symptom	Action
All keyboard and mouse problems.	<ol style="list-style-type: none">1. Make sure that the keyboard/video/mouse select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared keyboard and mouse.2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52).3. Make sure that:<ul style="list-style-type: none">• The device drivers are installed correctly.• The keyboard and mouse are recognized as USB, not PS/2, devices by the blade server. Although the keyboard and mouse might be a PS/2-style devices, communication with them is through USB in the BladeCenter unit. Some operating systems allow you to select the type of keyboard and mouse during installation of the operating system. If this is the case, select USB.4. (Trained service technician only) Replace the system board assembly.

Memory problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program. • All banks of memory are enabled. The blade server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check BMC log for error message 289: <ul style="list-style-type: none"> • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM. 3. Reseat the following components: <ol style="list-style-type: none"> a. DIMMs b. MPE unit (if one is installed) 4. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) MPE board assembly (if one is installed) c. (Trained service technician only) System board assembly

Microprocessor problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The blade server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat microprocessor 1. 2. (Trained service technician only) Replace microprocessor 1.

Monitor or video problems

The video monitor is a shared BladeCenter unit resource. First, make sure that the video monitor is assigned to the blade server; then, see the following table and “Solving shared BladeCenter resource problems” on page 52.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The screen is blank.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. Make sure that: <ul style="list-style-type: none"> • Damaged BIOS code is not affecting the video; see “Recovering from a BIOS update failure” on page 50. • The device drivers are installed correctly. 3. (Trained service technician only) Replace the system board assembly.
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. (Trained service technician only) Replace the system board assembly.
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 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. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.

Network connection problems

The blade server connects to the network using shared BladeCenter unit resources. See the following table and “Solving shared BladeCenter resource problems” on page 52.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
One or more blade servers are unable to communicate with the network.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. Make sure that: <ul style="list-style-type: none"> • The correct device drivers are installed. • The Ethernet controllers correctly configured. • Optional I/O-expansion cards are correctly installed and configured. 3. (Trained service technician only) Replace the system board assembly.

Optional-device problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
An IBM optional device that was just installed does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The device is designed for the blade server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration. 2. If the device comes with its own test instructions, use those instructions to test the device. 3. Reseat the device that you just installed. 4. Replace the device that you just installed.

Power error messages

Power to the blade server is provided by shared BladeCenter unit resources. See the following table and “Solving shared BladeCenter resource problems” on page 52.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Message	Action
System Power Good fault	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. Reseat the MPE unit (if one is installed). 4. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. (Trained service technician only) MPE board assembly (if one is installed)\n b. (Trained service technician only) System board assembly
VRM Power Good fault	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.
System over recommended voltage for +12v.	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.
System over recommended voltage for +3.3v.	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.
System over recommended 5V fault.	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.
VRM voltage over recommended tolerance.	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Message	Action
System under recommended voltage for +12v.	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.
System under recommended voltage for +3.3v.	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.
System under recommended 5V fault.	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. (Trained service technician only) Replace the system board assembly.

Power problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
Power switch does not work, and the reset button does work.	<ol style="list-style-type: none"> 1. Reseat the control-panel connector. 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Bezel assembly b. (Trained service technician only) System board assembly
The blade server does not turn on.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. Make sure that the power-on LED on the blade server control panel is flashing slowly. <ul style="list-style-type: none"> • If the power LED is flashing rapidly and continues to do so, the blade server is not communicating with the management-module; reseat the blade server and go to step 6 • If the power LED is off, the blade bay is not receiving power, the blade server is defective, or the control panel is loose or defective. 3. Check the power-management policies in the operating system for the blade server. 4. Reseat the blade server. 5. If you just installed a device in the blade server, remove it and restart the blade server. If the blade server now starts, you might have installed more devices than the power to that blade bay supports. 6. If you tried another blade server in the blade bay when checking the function of the shared BladeCenter unit resources and the other blade server worked, complete the following tasks on the blade server that was removed: <ol style="list-style-type: none"> a. Reseat the following components: <ol style="list-style-type: none"> 1) MPE unit (if one is installed) 2) Control panel cable b. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> 1) Blade server bezel assembly 2) (Trained service technician only) MPE board assembly (if one is installed) 3) (Trained service technician only) System board assembly 7. See “Solving undetermined problems” on page 56.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
<p>The blade server does not start and the following conditions are present:</p> <ul style="list-style-type: none"> • The amber system-error LED on the BladeCenter unit system LED panel is lit. • The amber blade error LED on the blade server control panel is lit. • The management-module event log contains the message Processor speed mismatch. 	<p>Make sure that microprocessors 1 and 2 are identical (number of cores, cache size and type, clock speed, internal and external clock frequencies).</p> <p>(Trained service technician only) If microprocessors are not identical, remove the microprocessor with the incorrect specifications and replace with a microprocessor that has the correct specifications.</p>
<p>The blade server turns off for no apparent reason.</p>	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. (Trained service technician only) If the microprocessor error LED is lit, replace the microprocessor. 3. (Trained service technician only) Replace the system board assembly.
<p>The blade server does not turn off.</p>	<ol style="list-style-type: none"> 1. Verify whether you are using an Advanced Configuration and Power Interface (ACPI) or non-ACPI operating system. 2. If you are using a non-ACPI operating system, complete the following steps: <ol style="list-style-type: none"> a. Turn off the blade server by pressing the power-control button for 4 seconds. b. If the blade server fails during POST and the power-control button does not work, remove the blade server from the bay and reseal it. 3. If the problem remains or if you are using an ACPI-aware operating system, complete the following steps: <ol style="list-style-type: none"> a. Check the power-management policies in the operating system for the blade server. b. (Trained service technician only) Replace the system board assembly.

Removable-media drive problems

The removable-media (CD, DVD, or diskette) drives are shared BladeCenter unit resources. First, make sure that the drives are assigned to the blade server; then, see the following table and “Solving shared BladeCenter resource problems” on page 52.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
All removable-media drive problems.	<ol style="list-style-type: none"> 1. Make sure that the media-tray select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared removable-media drives. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 3. Run the Configuration/Setup Utility program and make sure that the drive is enabled. 4. For CD or DVD problems, make sure that the correct device driver is installed. 5. Reseat the battery. 6. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Battery. b. (Trained service technician only) System board assembly
The CD or DVD drive is detected as /dev/sr0 by SUSE Linux. (If the SUSE Linux operating system is installed remotely onto a blade server that is not the current owner of the media tray [CD or DVD drive, diskette drive, and USB port], SUSE Linux detects the CD or DVD drive as /dev/sr0 instead of /dev/cdrom.)	<p>Establish a link between /dev/sr0 and /dev/cdrom as follows:</p> <ol style="list-style-type: none"> 1. Enter the following command: <pre>rm /dev/cdrom; ln -s /dev/sr0 /dev/cdrom</pre> 2. Insert the following line in the /etc/fstab file: <pre>/dev/cdrom /media/cdrom auto ro,noauto,user,exec 0 0</pre>
The CD or DVD drive is not recognized after being switched back to the blade server running Windows 2000 Advanced Server with SP3 applied. (When the CD or DVD drive 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 or DVD drive. This happens when you have not safely stopped the drives before switching ownership of the media tray [CD or DVD drive, diskette drive, and USB port].)	<p>Note: Because the BladeCenter unit uses USB to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as disconnecting a USB device. Before you switch ownership of the CD or DVD 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:</p> <ol style="list-style-type: none"> 1. Double-click the Unplug/Eject Hardware icon in the Windows taskbar at the bottom right of the desktop. 2. Select USB Floppy and click Stop. 3. Select USB Mass Storage Device and click Stop. 4. Click Close. <p>You can now safely switch ownership of the media tray to another blade server.</p>

ServerGuide problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The <i>ServerGuide Setup and Installation</i> CD will not start.	<ol style="list-style-type: none"> 1. Make sure that the CD or DVD drive is associated with the blade server that you are configuring. 2. Make sure that the blade server supports the ServerGuide program. 3. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence.
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 supported operating-system versions.
The operating system cannot be installed; the option is not available.	Make sure that the blade server supports the operating system. If it does, either no logical drive is defined (SAS RAID servers), or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Service processor problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
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 blade server. If the problem remains, see “Solving undetermined problems” on page 56, and the <i>Hardware Maintenance Manual and Troubleshooting Guide</i> or <i>Problem Determination and Service Guide</i> for your BladeCenter unit.

Software problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
You suspect a software problem.	<ol style="list-style-type: none"> 1. To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> • The blade server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. Note: If you have just installed an adapter or memory, the blade server might have a memory-address conflict. • The software is designed to operate on the blade server. • Other software works on the blade server. • The software works on another server. 2. If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact your place of purchase of the software.

Universal Serial Bus (USB) port problems

The USB ports are shared BladeCenter unit resources. First, make sure that the USB ports are assigned to the blade server; then, see the following table and “Solving shared BladeCenter resource problems” on page 52.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A USB device does not work.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. Make sure that: <ul style="list-style-type: none"> • The operating system supports USB devices. • The correct USB device driver is installed. 3. (Trained service technician only) Replace the system board assembly.

Light path diagnostics

Light path diagnostics is a system of LEDs on the control panel and on various internal components of the blade server. When an error occurs, LEDs can be lit throughout the blade server to help identify the source of the error.

After you remove the blade server, you can press and hold the light path diagnostics switch for a maximum of 25 seconds to light the LEDs and locate the failing component. The following components have this feature:

- Hard disk drives
- Light path diagnostics panel
- Microprocessors
- Memory modules (DIMMs)

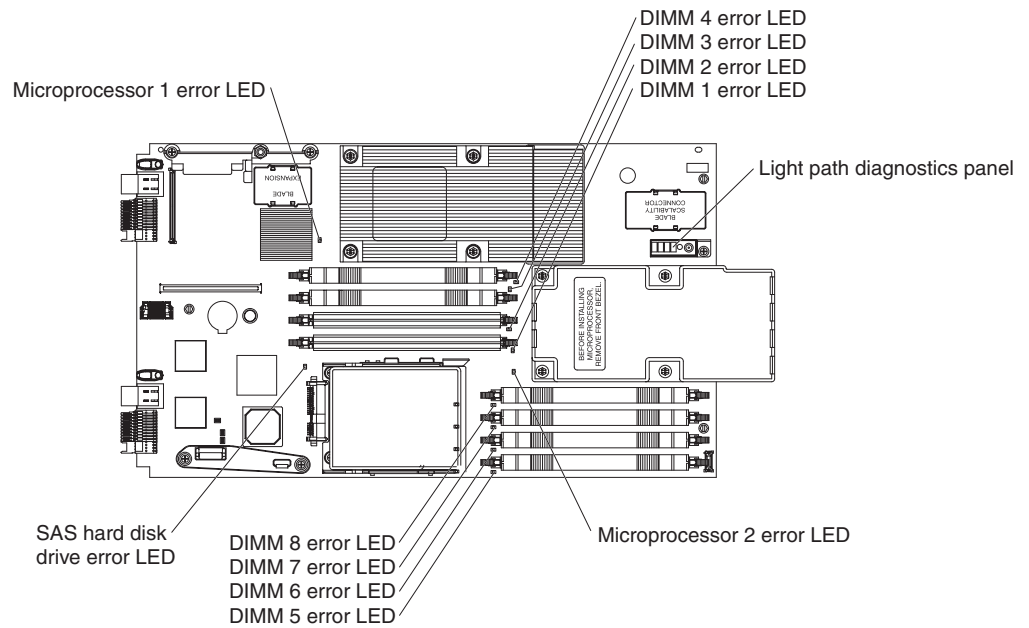
Viewing the light path diagnostics LEDs

Before working inside the blade server to view light path diagnostics LEDs, read the safety information that begins on page vii and “Handling static-sensitive devices” on page 68.

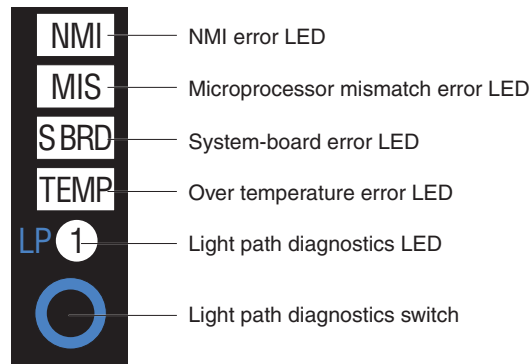
If an error occurs, view the light path diagnostics LEDs in the following order:

1. Look at the control panel on the front of the blade server (see “Blade server controls and LEDs” on page 4).
 - If the information LED is lit, it indicates that information about a suboptimal condition in the blade server is available in the BMC log or in the management-module event log.
 - If the blade-error LED is lit, it indicates that an error has occurred; go to step 2.
2. To view the light path diagnostics panel and LEDs, complete the following steps:
 - a. Remove the blade server from the BladeCenter unit.
 - b. Place the blade server on a flat, static-protective surface.
 - c. Remove the cover from the blade server.
 - d. Press and hold the light path diagnostics switch to light the LEDs of the failing components in the blade server. The LEDs will remain lit for as long as you press the switch, to a maximum of 25 seconds.

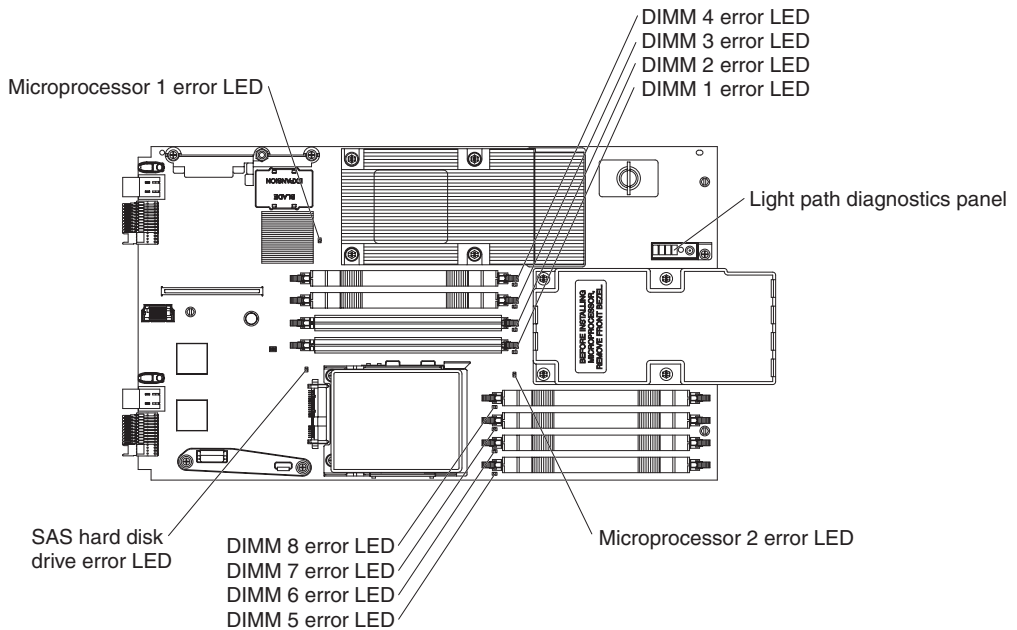
The following illustration shows the locations of the blade server system-board error LEDs and light path diagnostics panel.



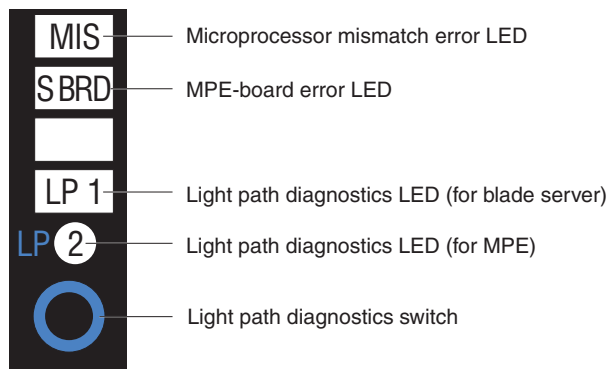
The following illustration shows the LEDs on the blade server system-board light path diagnostics panel.



The following illustration shows the locations of the MPE-unit error LEDs and light path diagnostics panel.



The following illustration shows the LEDs on the MPE unit light path diagnostics panel.



When you press the light path diagnostics switch, note which LEDs are lit on the blade server system board, MPE unit, and light path diagnostics panels. Using this information and the information in “Light path diagnostics LEDs” on page 41 can often provide enough information to diagnose the error.

Light path diagnostics LEDs

The following table describes the LEDs on the light path diagnostics panels, on the blade server system board, and on the MPE unit. It also lists suggested actions to correct the detected problems.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Lit light path diagnostics LED	Description	Action
None	An error has occurred and cannot be isolated, or the service processor has failed.	<ol style="list-style-type: none"> 1. Make sure that the light path diagnostics LED is lit to ensure that there is enough power in the blade server to light the rest of the LEDs. 2. Check the BMC log for information about an error that is not represented by a light path diagnostics LED.
DIMM x error	<ul style="list-style-type: none"> • On the blade server system board: A blade-server DIMM error has occurred. • On the MPE unit: An MPE unit DIMM error has occurred. 	<ol style="list-style-type: none"> 1. Make sure that DIMM x is supported. 2. Reseat DIMM x. 3. Replace DIMM x. <p>Note: Multiple DIMM LEDs do not necessarily indicate multiple DIMM failures. If more than one DIMM LED is lit, reseat or replace one DIMM at a time until the error is corrected.</p>
LP1	<ul style="list-style-type: none"> • On the blade server light path diagnostics panel: The light path LEDs on the blade server system board have power. • On the MPE unit light path diagnostics panel: An error occurred on the blade server system board. 	Remove the MPE unit (if one is installed) and check for lit error LEDs on the blade server system board.
LP2 (on MPE unit only)	Light path LEDs on the MPE unit have power.	Check for lit error LEDs on the MPE unit.
Microprocessor x error	<ul style="list-style-type: none"> • On the blade server system board: Blade-server microprocessor x has failed. • On the MPE unit: MPE unit microprocessor x has failed. 	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat microprocessor x. 2. (Trained service technician only) Replace microprocessor x.
MIS (Microprocessor mismatch)	<ul style="list-style-type: none"> • On the blade server light path diagnostics panel: The blade-server microprocessors do not match. • On the MPE unit light path diagnostics panel: The MPE unit microprocessors do not match. 	Make sure that microprocessors 1 and 2 are identical (number of cores, cache size and type, clock speed, internal and external clock frequencies, and wattage); also, see “Troubleshooting tables” on page 25.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Lit light path diagnostics LED	Description	Action
NMI (NMI error)	The system board has failed.	<ol style="list-style-type: none"> 1. Replace the blade server cover and reinsert the blade server in the BladeCenter unit; then, restart the blade server. Check the BMC log for information about the error. 2. (Trained service technician only) Replace the system board assembly.
S BRD (System board or MPE board error)	The system board or MPE board has failed.	<ul style="list-style-type: none"> • (Trained service technician only) If lit LED is on the blade server light path diagnostics panel, replace the system board assembly. • (Trained service technician only) If lit LED is on the MPE unit light path diagnostics panel, replace the MPE board assembly.
TEMP (Over temperature error)	The system temperature has exceeded a threshold level.	<ol style="list-style-type: none"> 1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 52). 2. Make sure that the room temperature is not too high. See “Features and specifications” on page 3 for temperature information.
SAS hard disk drive error	<ul style="list-style-type: none"> • On the blade server system board: A blade-server hard disk drive has failed. • On the MPE unit: An MPE unit hard disk drive has failed. 	Run the SAS Fixed Disk or SAS Attached Disk diagnostic test. If the diagnostics pass but the drive continues to have a problem, replace the hard disk drive with a new one.

Diagnostic programs, messages, and error codes

The diagnostic programs are the primary method of testing the major components of the blade server. As you run the diagnostic programs, text messages and error codes are displayed on the screen and are saved in the test log. A diagnostic text message or error code indicates that a problem has been detected; to determine what action you should take as a result of a message or error code, see the table in “Diagnostic error codes” on page 44.

If you cannot find the problem using the diagnostic programs, see “Solving undetermined problems” on page 56 for information about testing the blade server.

Running the diagnostic programs

To run the diagnostic programs, complete the following steps:

1. If the blade server is running, turn off the blade server.
2. Turn on the blade server.
3. When the prompt F2 for *Diagnostics* appears, press F2.
4. From the top of the screen, select either **Extended** or **Basic**.
5. From the menu, select the test that you want to run, and follow the instructions on the screen.

For help with the diagnostic programs, press F1. 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, press Esc.

To determine what action you should take as a result of a diagnostic text message or error code, see the table in “Diagnostic error codes” on page 44.

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

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

Exception: If there are multiple error codes or light path diagnostics LEDs that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 28 for information about diagnosing microprocessor problems.

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.

The diagnostic programs assume that a keyboard and mouse are attached to the BladeCenter unit and that the blade server controls them. 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 cannot use the **Next Cat** and **Prev Cat** buttons to select categories. All other mouse-selectable functions are available through function keys.

To view server configuration information such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, or device drivers, select **Hardware Info** from the top of the screen.

Diagnostic text messages

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

Passed: The test was completed without any errors.

Failed: The test detected an error.

User Aborted: You stopped the test before it was completed.

Not Applicable: You attempted to test a device that is not present in the blade server.

Aborted: The test could not proceed because of the blade server configuration.

Warning: The test could not be run. There was no failure of the hardware that was being tested, but there might be a hardware failure elsewhere, or another problem prevented the test from running; for example, there might be a configuration problem, or the hardware might be missing or is not being recognized.

The result is followed by an error code or other additional information about the error.

Viewing the test log

To view the test log when the tests are completed, select **Utility** from the top of the screen and then select **View Test Log**. The test-log data is maintained only while you are running the diagnostic programs. When you exit from the diagnostic programs, the test log is cleared.

To save the test log to a file on a diskette or to the hard disk, select **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.

Note: 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 can contain other data.

Diagnostic error codes

The following table describes the error codes that the diagnostic programs might generate and suggested actions to correct the detected problems.

If the diagnostic programs generate error codes that are not listed in the table, make sure that the latest level of the BIOS code is installed.

In the error codes, *x* can be any numeral or letter. However, if the three-digit number in the central position of the code is 000, 195, or 197, *do not* replace a CRU or FRU. These numbers appearing in the central position of the code have the following meanings:

- 000** The blade server passed the test. Do not replace a CRU or FRU.
- 195** The Esc key was pressed to end the test. Do not replace a CRU or FRU.
- 197** This is a warning error, but it does not indicate a hardware failure; do not replace a CRU or FRU. Take the action that is indicated in the Action column, but *do not replace a CRU or a FRU*. See the description for **Warning** in the section “Diagnostic text messages” on page 43 for more information.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
001-197-000 001-198-000	Test aborted.	<ol style="list-style-type: none"> 1. Check the test log for messages indicating the cause of the error, and take the indicated action. 2. Restart the server. 3. Run the diagnostic test again. 4. Run the Quick Memory Test All Banks diagnostic; then, if an error is detected, take the indicated action 5. Reinstall the blade server in the BladeCenter unit and, if necessary, update the BIOS code on the server; then, rerun the test (see “Firmware updates” on page 101).
001-250-00n	ECC Test logic Failed. See PC Doctor logs. Note: n = Failing CPU. (1 – 4)	<ol style="list-style-type: none"> 1. Restart the server. 2. Run the diagnostic test again. 3. (Trained service technician only) Replace the failing microprocessor.
001-250-000	Failed processor board ECC.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) Microprocessor 1 c. (Trained service technician only) Microprocessor 2 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) Microprocessor 1 c. (Trained service technician only) Microprocessor 2 d. (Trained service technician only) System board assembly
001-292-000	Core system: failed/CMOS checksum failed.	Load the BIOS default settings by using the Configuration/Setup Utility program and run the test again (see the <i>Installation and User's Guide</i> for your blade server).
001-xxx-000	Failed core tests.	(Trained service technician only) Replace the system board assembly.
001-xxx-001	Failed core tests.	(Trained service technician only) Replace the system board assembly.
005-xxx-000	Failed video test.	(Trained service technician only) Replace the system board assembly.
030-xxx-000	Failed internal SAS interface test.	(Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
035-xxx-099	No adapters were found.	Reseat the adapter (if installed).
075-xxx-000	Failed power supply test.	Replace the power supply (see the <i>Hardware Maintenance Manual and Troubleshooting Guide</i> or <i>Problem Determination and Service Guide</i> for your BladeCenter unit).
089-xxx-00n	Failed microprocessor test.	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) Blade server microprocessor 1 if $n = 0$ or 1 (Trained service technician only) Blade server microprocessor 2 if $n = 2$ or 3 (Trained service technician only) MPE unit microprocessor 1 if $n = 4$ or 5 (Trained service technician only) MPE unit microprocessor 2 if $n = 6$ or 7 Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> (Trained service technician only) Blade server microprocessor 1 if $n = 0$ or 1 (Trained service technician only) Blade server microprocessor 2 if $n = 2$ or 3 (Trained service technician only) MPE unit microprocessor 1 if $n = 4$ or 5 (Trained service technician only) MPE unit microprocessor 2 if $n = 6$ or 7
165-060-000	Service Processor: ASM may be busy	<ol style="list-style-type: none"> Rerun the diagnostics test. Correct other error conditions that might be keeping the Advanced System Management (ASM) network or components busy. See the error log and diagnostic panel. Turn off the blade server and reseat it in the BladeCenter unit. (Trained service technician only) Replace the system board assembly.
165-198-000	Service Processor: Aborted	<ol style="list-style-type: none"> Rerun the diagnostic test. Correct other error conditions that might be keeping the Advanced System Management (ASM) network or components busy. See the error log and diagnostic panel. Turn off the blade server and reseat it in the BladeCenter unit. (Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
165-201-000	Service Processor: Failed	<ol style="list-style-type: none"> 1. Power down blade server and reseal it in the chassis. 2. (Trained service technician only) Replace the system board assembly.
165-330-000	Service Processor: Failed	Update the ROM diagnostic to the latest level and run the diagnostics again.
165-342-000	Service Processor: Failed	<ol style="list-style-type: none"> 1. Make sure that the latest firmware levels for Advanced System Management (ASM) and BIOS are installed. 2. Turn off the blade server and reseal it in the BladeCenter unit. 3. (Trained service technician only) Replace the system board assembly.
166-198-00x	System Management: Aborted.	<ol style="list-style-type: none"> 1. Remove the blade server from the BladeCenter unit, wait 30 seconds, and reseal it in the BladeCenter unit; then, run the test again. 2. Update the BMC firmware and run the test again. 3. (Trained service technician only) Replace the system board assembly.
166-403-001	System Management: Failed. (BMC indicates failure in I2C bus test.)	<ol style="list-style-type: none"> 1. Remove the blade server from the BladeCenter unit, wait 30 seconds, and reseal it in the BladeCenter unit; then, run the test again. 2. Update the BMC firmware and run the test again. 3. Update the Ethernet firmware and run the test again. 4. (Trained service technician only) Replace the system board assembly.
166-419-001	System Management: Failed. (BMC indicates failure in I2C bus test.)	<ol style="list-style-type: none"> 1. Remove the blade server from the BladeCenter unit, wait 30 seconds, and reseal it in the BladeCenter unit; then, run the test again. 2. Update the BMC firmware and run the test again. 3. Remove the MPE unit and run the test again. (Trained service technician only) If the error does not repeat, replace the MPE board assembly. 4. (Trained service technician only) Replace the system board assembly.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
166-420-001	System Management: Failed. (BMC indicates failure in I2C bus test.)	<ol style="list-style-type: none"> 1. Remove the blade server from the BladeCenter unit, wait 30 seconds, and reseal it in the BladeCenter unit; then, run the test again. 2. Update the BMC firmware and run the test again. 3. Remove the BladeCenter Storage Expansion Unit 3 and run the test again. If the error does not repeat, replace the BladeCenter Storage Expansion Unit 3. 4. (Trained service technician only) Replace the system board assembly.
166-421-001	System Management: Failed. (BMC indicates failure in I2C bus test.)	<ol style="list-style-type: none"> 1. Remove the blade server from the BladeCenter unit, wait 30 seconds, and reseal it in the BladeCenter unit; then, run the test again. 2. Update the BMC firmware and run the test again. 3. Remove the high-speed expansion card (if one is installed) and run the test again. If the error does not repeat, replace the high-speed expansion card. 4. (Trained service technician only) Replace the system board assembly.
166-422-001	System Management: Failed. (BMC indicates failure in I2C bus test.)	<ol style="list-style-type: none"> 1. Remove the blade server from the BladeCenter unit, wait 30 seconds, and reseal it in the BladeCenter unit; then, run the test again. 2. Update the BMC firmware and run the test again. 3. Remove the I/O-expansion card and run the test again. If the error does not repeat, replace the I/O-expansion card. 4. (Trained service technician only) Replace the system board assembly.
166- <i>nnn</i> -001	System Management: Failed. BMC indicates failure in self test. Note: <ul style="list-style-type: none"> • <i>nnn</i> = 300 to 320 • <i>nnn</i> = 400 to 424 (excluding 403 and 419 to 422) 	<ol style="list-style-type: none"> 1. Remove the blade server from the BladeCenter unit, wait 30 seconds, and reseal it in the BladeCenter unit; then, run the test again. 2. Update the BMC firmware and run the test again. 3. (Trained service technician only) Replace the system board assembly.
180- <i>xxx</i> -000	Diagnostics LED failure.	Run the LED test in the diagnostics program.
180- <i>xxx</i> -001	Failed front LED panel test.	<ol style="list-style-type: none"> 1. Reseat the control-panel connector. 2. Replace the bezel assembly. 3. (Trained service technician only) Replace the system board assembly.
180- <i>xxx</i> -002	Failed diagnostics LED panel test.	(Trained service technician only) Replace the system board assembly.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Error code	Description	Action
180-xxx-003	Failed system board LED test.	(Trained service technician only) Replace the system board assembly.
201-198-xxx	Memory test aborted. See PC Doctor logs.	<ol style="list-style-type: none"> 1. Restart the server. 2. Run the diagnostic test again. 3. Reinstall the diagnostic program. 4. Refer to the error log for additional information.
201-199-xxx	Unexpected error. Test aborted. See PC Doctor logs.	<ol style="list-style-type: none"> 1. Restart the server. 2. Run the diagnostic test again. 3. Reinstall the diagnostic program. 4. Refer to the error log for additional information.
201-xxx-PBD	Test failed. <ul style="list-style-type: none"> • P = CPU Number (1 – 4) • B = Failing Bank/Pair number. • D = Failing DIMM number within Failing CPU # P. • D = 9 = Both DIMMs in the failing bank/pair of DIMMs. 	<ol style="list-style-type: none"> 1. Reseat the failing DIMM(s); then; run the memory diagnostic test again. 2. Replace the failing DIMM(s); then; run the memory diagnostic test again. 3. (Trained service technician only) Replace the system board assembly.
202-xxx-00n	Failed system cache test.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat microprocessor <i>n</i>. 2. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor <i>n</i> b. (Trained service technician only) MPE board assembly (if microprocessor <i>n</i> is on the MPE unit) c. (Trained service technician only) System board assembly (if microprocessor <i>n</i> is on the blade server)
217-198-xxx	Could not establish drive parameters.	<ol style="list-style-type: none"> 1. Reseat hard disk drive <i>x</i>. 2. Update the BIOS code. 3. Replace the following components one at a time, in the order shown, restarting the blade server each time: <ol style="list-style-type: none"> a. Hard disk drive <i>x</i> b. (Trained service technician only) System board assembly
217-xxx-000	Failed hard disk drive test. Note: If RAID is configured, the SAS Attached Disk number refers to the RAID logical drive.	<ol style="list-style-type: none"> 1. Reseat hard disk drive 1. 2. Replace hard disk drive 1.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
217-xxx-001	Failed hard disk drive test. Note: If RAID is configured, the SAS Attached Disk number refers to the RAID logical drive.	<ol style="list-style-type: none"> 1. Reseat hard disk drive 2. 2. Replace hard disk drive 2.
405-xxx-000	Failed Ethernet test on controller on the system board.	<ol style="list-style-type: none"> 1. Make sure that Ethernet is not disabled in the Configuration/Setup Utility program. 2. (Trained service technician only) Replace the system board assembly.

Recovering from a BIOS update failure

The blade server has an advanced recovery feature that will automatically switch to a backup BIOS page if the BIOS code in the blade server has become damaged, such as from a power failure during an update.

The flash memory of the blade server consists of a primary page and a backup page. If the BIOS code in the primary page is damaged, the baseboard management controller will detect the error and automatically switch to the backup page to start the blade server. If this happens, a POST message Booted from backup POST/BIOS image is displayed. The backup page version may not be the same version as the primary image.

You can then recover or restore the original primary page BIOS by using a BIOS flash diskette.

To recover the BIOS code and restore the blade server operation to the primary page, complete the following steps:

1. Download the latest version of the BIOS code from <http://www.ibm.com/bladecenter/>.
2. Update the BIOS code, following the instructions that come with the update file that you downloaded. This will automatically restore and update the primary page.
3. Restart the blade server.

If that procedure fails, the blade server might not restart correctly or might not display video. To manually restore the BIOS code, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 68.
2. Turn off the blade server.
3. Remove the blade server from the BladeCenter unit (see “Removing the blade server from a BladeCenter unit” on page 69).
4. Remove the cover (see “Removing the blade server cover” on page 72).
5. If an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).

6. Locate switch block SW4 on the system board (see “System board switches” on page 8).
7. Move the BIOS backup page switch (SW4-2) to the Closed position to enable the backup page.
8. Install the MPE unit, if one was removed to access SW4 (see “Installing an expansion unit” on page 75).
9. Install the cover and reinstall the blade server in the BladeCenter unit, making sure that the blade server is connected to the media tray.
10. Insert the BIOS flash diskette into the diskette drive.
11. Turn on the blade server. The system begins the power-on self-test (POST).
12. Select **1 - Update POST/BIOS** from the menu that contains various flash (update) options.

Attention: Do *not* type Y when you are prompted to back up the ROM location; doing so causes the damaged BIOS to be copied into the backup page.
13. When you are prompted whether you want to move the current POST/BIOS image to the backup ROM location, type N.
14. When you are prompted whether you want to save the current code to a diskette, type N.
15. Select **Update the BIOS**.

Attention: Do *not* restart the blade server at this time.
16. When the update is complete, remove the flash diskette from the diskette drive.
17. Turn off the blade server and remove it from the BladeCenter unit (see “Removing the blade server from a BladeCenter unit” on page 69).
18. Remove the cover of the blade server (see “Removing the blade server cover” on page 72).
19. If an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
20. Move switch SW4-2 to the Open position to return to the normal startup mode.
21. Install the MPE unit, if one was removed to access SW4 (see “Installing an expansion unit” on page 75).
22. Install the cover and reinstall the blade server in the BladeCenter unit.
23. Turn on the blade server.

Service processor (BMC) error codes

The baseboard management controller (BMC) log contains up to 512 of the most recent service processor errors in IPMI format. These messages are a combination of plain text and error code numbers. You can view the BMC log from the Configuration/Setup Utility menu by selecting **Advanced Setup** → **Baseboard Management Controller (BMC) Settings** → **BMC System Event Log**.

You can view additional information and error codes in plain text by viewing the management-module event log in your BladeCenter unit.

Solving SAS hard disk drive problems

For any SAS error message, one or more of the following devices might be causing the problem:

- A failing SAS device (adapter, drive, or controller)
- An improper SAS configuration

For any SAS error message, make sure that the SAS devices are configured correctly.

Solving shared BladeCenter resource problems

Problems with BladeCenter shared resources might appear to be in the blade server. The following sections provide procedures to help you isolate blade server problems from shared BladeCenter resource problems. If the problem is thought to be with a shared resource, see the *Problem Determination and Service Guide* or the *Hardware Maintenance Manual and Troubleshooting Guide* for your BladeCenter unit and other BladeCenter component documentation for additional information. If the problem cannot be solved, see “Solving undetermined problems” on page 56.

To check the general function of shared BladeCenter resources, complete the following operations:

- Make sure that:
 - The BladeCenter unit has the required power modules installed and is connected to a working power source.
 - Power management has been correctly set for your BladeCenter unit configuration.
- Check if the problem is being experienced with more than one blade server. Perform a test of the function on a known-good blade server.
- Try the blade server in a different blade bay.
- Try a known-good blade server in the blade bay.

Keyboard or mouse problems

To check for keyboard or mouse problems, complete the following steps until the problem is solved:

1. Make sure that:
 - Both the blade server and the monitor are turned on.
 - The keyboard/video/mouse select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared keyboard and mouse.
 - The keyboard or mouse cable is securely connected to the active BladeCenter management-module.
 - The keyboard or mouse works with another blade server.
2. Check for correct management-module operation (see the documentation for your BladeCenter unit).

Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).

3. Replace the keyboard or mouse.
4. Replace the management module (see the documentation for your BladeCenter unit).

If these steps do not resolve the problem, it is likely a problem with the blade server. See “Keyboard or mouse problems” on page 27.

Media tray problems

To check for problems with the media tray (removable media drives and USB ports), complete the following steps until the problem is solved:

1. Make sure that:
 - The media-tray select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared media tray.
 - The media tray devices work with another blade server.
2. Check if the problem affects more than one media tray component:
 - USB ports
 - Diskette drive
 - CD or DVD drive
3. For problems affecting only a USB port:
 - a. Make sure that the USB device is operational. If using a USB hub, make sure that the hub is operating correctly and that any software that the hub requires is installed. Plug the USB device directly into the USB port, bypassing the hub, to check its operation.
 - b. Reseat the following components:
 - 1) USB device cable
 - 2) Media tray cable (if applicable)
 - 3) Media tray
 - c. Replace the following components one at a time, in the order shown, restarting the blade server each time:
 - 1) USB cable (if applicable)
 - 2) Media tray cable (if applicable)
 - 3) Media tray
 - d. Continue with step 7.
4. For problems affecting only the diskette drive:
 - a. If there is a diskette in the drive, make sure that:
 - The diskette is inserted correctly in the drive.
 - The diskette is good and not damaged; the drive LED light flashes once per second when the diskette is inserted. (Try another diskette if you have one.)
 - The diskette contains the necessary files to start the blade server.
 - The software program is working properly.
 - The distance between monitors and diskette drives is at least 76 mm (3 in.).
 - b. Continue with step 6.

5. For problems affecting only the CD or DVD drive:
 - a. Make sure that:
 - The CD or DVD is inserted correctly in the drive. If necessary, insert the end of a straightened paper clip into the manual tray-release opening to eject the CD or DVD. The drive LED light flashes once per second when the CD or DVD is inserted.
 - The CD or DVD is clean and not damaged. (Try another CD or DVD if you have one.)
 - The software program is working properly.
 - b. Continue with step 6.
6. For problems affecting one or more of the removable media drives:
 - a. Reseat the following components:
 - 1) Removable-media drive cable (if applicable)
 - 2) Removable-media drive
 - 3) Media tray cable (if applicable)
 - 4) Media tray
 - b. Replace the following components one at a time, in the order shown, restarting the blade server each time:
 - 1) Removable-media drive cable (if applicable)
 - 2) Media tray cable (if applicable)
 - 3) Removable-media drive
 - 4) Media tray
 - c. Continue with step 7.
7. Check for correct management-module operation (see the documentation for your BladeCenter unit).

Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).

8. Replace the management module (see the documentation for your BladeCenter unit).

If these steps do not resolve the problem, it is likely a problem with the blade server. See “Removable-media drive problems” on page 35 or “Universal Serial Bus (USB) port problems” on page 37.

Network connection problems

To check for network connection problems, complete the following steps until the problem is solved:

1. Make sure that:
 - The network cables are securely connected to the I/O module.
 - Power configuration of the BladeCenter unit supports the I/O module configuration.
 - Installation of the I/O-module type is supported by the BladeCenter unit and blade server hardware.
 - The I/O modules for the network interface that is being used are installed in the correct BladeCenter bays, and are configured and operating correctly.
 - The settings in the I/O module are correct for the blade server (settings in the I/O module are specific to each blade server).
2. Check for correct I/O-module operation; troubleshoot and replace the I/O module as indicated in the documentation for the I/O module.

3. Check for correct management-module operation (see the documentation for your BladeCenter unit).

Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).

4. Replace the management module (see the documentation for your BladeCenter unit).

If these steps do not resolve the problem, it is likely a problem with the blade server. See “Network connection problems” on page 30.

Power problems

To check for power problems, make sure that:

- The LEDs on all the BladeCenter power modules are lit.
- Power is being supplied to the BladeCenter unit.
- Installation of the blade server type is supported by the BladeCenter unit.
- The BladeCenter unit has the correct power configuration to operate the blade bay where your blade server is installed (see the documentation for your BladeCenter unit).
- The BladeCenter unit power management configuration and status support blade server operation (see the *Management Module User's Guide* or the *Management Module Command-Line Interface Reference Guide* for information).
- Local power control for the blade server is correctly set (see the *Management Module User's Guide* or the *Management Module Command-Line Interface Reference Guide* for information).
- The BladeCenter unit blowers are correctly installed and operational.

If these operations do not solve the problem, it is likely a problem with the blade server. See “Power error messages” on page 31 and “Power problems” on page 33.

Video problems

To check for video problems, complete the following steps until the problem is solved:

1. Make sure that:
 - Both the blade server and the monitor are turned on, and that the monitor brightness and contrast controls are correctly adjusted.
 - The keyboard/video/mouse 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 video cable is securely connected to the BladeCenter management-module. Non-IBM monitor cables might cause unpredictable problems.
 - The monitor works with another blade server.

- 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 instructions for adjusting and testing the monitor. If the monitor self-tests show that the monitor is working correctly, 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.

Attention: Moving a color monitor while it is turned on might cause screen discoloration.

Move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any diskette drive is at least 76 mm (3 in.).

2. Check for correct management-module operation (see the documentation for your BladeCenter unit).

Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).

3. Replace the monitor cable, if applicable.
4. Replace the monitor.
5. Replace the management module (see the documentation for your BladeCenter unit).

If these steps do not resolve the problem, it is likely a problem with the blade server. See “Monitor or video problems” on page 29.

Solving undetermined problems

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

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

If the diagnostic tests did not diagnose the failure or if the blade server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 37.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, remove and replace the battery to override the power-on password and clear the CMOS memory; see “Removing the battery” on page 88. If you suspect that the BIOS code is damaged, see “Recovering from a BIOS update failure” on page 50.

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

1. Make sure that the control panel connector is correctly seated on the system board (see “System board connectors” on page 7 for the location of the connector).
2. If no LEDs on the control panel are working, replace the bezel assembly; then, try to turn on the blade server from the management module (see the documentation for the BladeCenter unit and management module for more information).
3. Turn off the blade server.
4. Remove the blade server from the BladeCenter unit 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.
 - MPE unit (if one is installed)
 - I/O-expansion cards
 - Hard disk drive
 - Memory modules. The minimum configuration requirement is 1 GB (two 512 MB DIMMs on the system board).

The following minimum configuration is required for the blade server to start:

- System board assembly
 - One microprocessor
 - Two 512 MB DIMMs
 - A functioning BladeCenter unit
6. Install and turn on the blade server. If the problem remains, suspect the following components in the following order:
 - a. DIMM
 - b. System board assembly
 - c. Microprocessor

If the problem is solved when you remove an I/O-expansion card from the blade server but the problem recurs when you reinstall the same card, suspect the I/O-expansion card; if the problem recurs when you replace the card with a different one, suspect the system board.

If you suspect a networking problem and the blade server passes all the system tests, suspect a network cabling problem that is external to the system.

Calling IBM for service

See Appendix A, "Getting help and technical assistance," on page 105 for information about calling IBM for service.

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

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

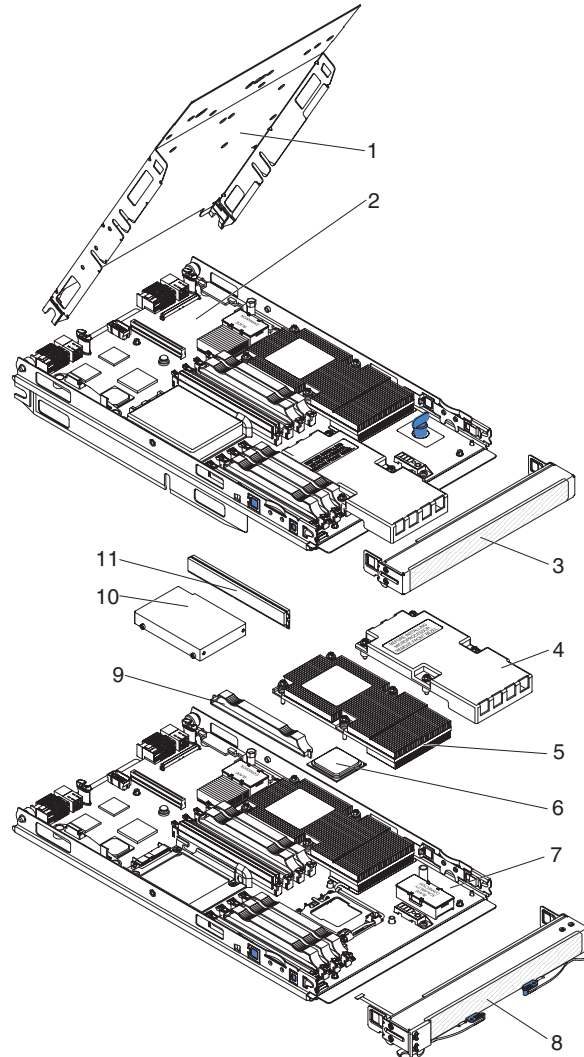
You can solve some problems by comparing the configuration and software setups between working and nonworking servers. When you compare servers to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the blade servers:

- Machine type and model
- BIOS level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

Chapter 3. Parts listing, Types 7971 and 7972

The following replaceable components are available for the LS21 Type 7971 and LS41 Type 7972 blade servers.

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



Replaceable components are of three types:

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

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

Index	Description	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
1	Cover (all models)	46C7201		
2	MPE board assembly (type 7972, models 32x, 3Bx, 3Rx, 4Tx, 52x, 5Bx, 62x, 6Bx, 7Bx, 8Bx, CRx, E2y, ERy)			46C7556
3	Bezel, MPE unit (type 7972, models 32x, 3Bx, 3Rx, 4Tx, 52x, 5Bx, 6Bx, 7Bx, 7My, 8Bx, CRx, E2y, ERy)	40K5904		
4	Filler, microprocessor heat sink (all models)	40K5929		
5	Heat sink, microprocessor (type 7971, models 21x, 2Tx, 31x, 3Ax, 51x, 5Ax, 61x, 6Ax, 7Ax, 8Ax, 3Qx, CQx, E1y, EQy, 6My) (type 7972, models 31x, 3Ax, 51x, 5Ax, 61x, 6Ax, 7Ax, 32x, 3Bx, 3Rx, 4Tx, 52x, 5Bx, 62x, 6Bx, 7Bx, 8Bx, CRx, 7My, E2y, ERy)			40K5895
6	Microprocessor, Opteron 2210, 1.8 GHz, 45W (type 7971, model 2Tx)			43X0910
6	Microprocessor, Opteron 2210, 1.8 GHz, 68W (type 7971, model 21x)			43X0911
6	Microprocessor, Opteron 2212, 2.0 GHz, 68W (type 7971, model 31x)			39R9237
6	Microprocessor, Opteron 2212, 2.0 GHz, 95W (type 7971, model 3Ax)			39R9238
6	Microprocessor, Opteron 2216, 2.4 GHz, 68W (type 7971, models 51x, E1y)			39R9239
6	Microprocessor, Opteron 2216, 2.4 GHz, 95W (type 7971, model 5Ax)			40K8422
6	Microprocessor, Opteron 2218, 2.6 GHz, 95W (type 7971, models 6Ax, 6Mx)			39R9240
6	Microprocessor, Opteron 2218 2.6 68W (7971, model 61x)			44E5217
6	Microprocessor, Opteron 2200, 2.8 GHz, 95W (type 7971, model 7Ax)			43X0912
6	Microprocessor, Opteron 2222 3.0 GHz, 95W (type 7971, mode; 8Ax)			44R4944
6	Microprocessor, Opteron 8212, 2.0 GHz, 68W (type 7972, models 31x, 32x)			39R9241
6	Microprocessor, Opteron 8212, 2.0 GHz, 95W (type 7972, models 3Ax, 3Bx)			39R9242
6	Microprocessor, Opteron 8214, 2.2 GHz, 68W (type 7972, model 4Tx)			43X0913
6	Microprocessor, Opteron 8216, 2.4 GHz, 68W (type 7972, models 51x, 52x)			39R9243
6	Microprocessor, Opteron 8216, 2.4 GHz, 95W (type 7972, models 5Ax, 5Bx)			40K8423
6	Microprocessor, Opteron 8218, 2.6 GHz, 68W (type 7972, models 61x, 62x)			44E5218
6	Microprocessor, Opteron 8218, 2.6 GHz, 95W (type 7972, models 6Ax, 6Bx)			39R9244
6	Microprocessor, Opteron 8220, 2.8 GHz, 95W (types 7972, models 7Ax, 7Bx, 7My)			43X0914
6	Microprocessor, Opteron 8222, 3.0 GHz, 95W (model 8Bx)			44R4949

Index	Description	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
6	Microprocessor, Opteron 2000 1.8G Hz 68W dual core (type 7971, models 3Qx, EQx)			44E5266
6	Microprocessor, Opteron 2347 1.9 GHz 95W quad core (type 7971, model CQx)			44E5271
6	Microprocessor, Opteron 8346 1.8 GHz 68W quad core (type 7971, model 3Rx)			44E5276
6	Microprocessor, Opteron 8347 1.9 GHz 95W quad core (type 7971, model CRx, ERy)			44E5281
7	System board assembly (all models)			46C7545
8	Bezel assembly, blade server (type 7871, all models)	40K5905		
8	Bezel assembly, blade server (type 7872, all models)	40K5896		
9	Filler, DIMM (all models)	40K5989		
10	Hard disk drive, 36.4 GB SAS (option)	26K5778		
10	Hard disk drive, 73.4 GB SAS (type 7971, model 6Mx) (7972 option)	26K5779		
11	Memory, 512 MB PC2-5300, VLP (type 7971, models 31x, 3Ax, 21x, 2Tx) (type 7972, models 31x, 3Ax, 32x, 3Bx, 4Tx)	39M5860		
11	Memory, 1 GB PC2-5300, VLP (type 7971, 3Qx, 51x, 5Ax, 61x, 6Ax, 7Ax, 8Ax, CQx, 6My) (type 7972, 51x, 5Ax, 61x, 6Ax, 7Ax, 3Rx, 52x, 5Bx, 62x, 6Bx, 7Bx, 8Bx, CRx, 7My)	39M5863		
11	Memory, 2 GB PC2-5300, VLP (type 7971, models E1y, EQy) (type 7972, model ERy)	39M5866		
11	Memory, 2 GB PC2-5300, VLP (option)	46C0518		
11	Memory, 4 GB PC2-4200 (option)	39M5869		
11	Memory, 4 GB PC2-5300 (option)	46C0519		
	10 GB high speed daughter card (type 7971 option)	43W4454		
	Alcohol wipe	59P4739		
	Battery, 3.0 volt (all models)	43W9859		
	BladeCenter Storage Expansion Unit 3 (option)	40K1739		
	Cover, socket (all models)	40K5936		
	DC adapter (option)	32R1899		
	Expansion card, Concurrent KVM (option)		13N0842	
	Expansion card, 1 GB Ethernet (option)	44W4488		
	Expansion card, 8 GB Combo FC STDF (type 7971 option)	46C7007		
	Expansion card, IBM Gigabit Ethernet (option)	49Y4236		
	Expansion card, Infiniband 4x high-speed (option)	32R1763		
	Expansion card, Myrinet (option)	32R1845		
	Expansion card, Myrinet 4 MB (option)	40K8871		
	Expansion card, PCI 3e (option)	43W4390		
	Fibre channel expansion card (option)	26R0889		
	Filler, hard disk drive (all models)	40K5928		
	Gummo RoHS Ethernet adapter (type 7972 option)	46M5963		
	iSCSI card (option)	42C7179		

Index	Description	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
	Jumper cable 12 volt (option)	46M6763		
	Kit, miscellaneous parts (all models)	32R2451		
	Label, FRU list (model all)	40K5933		
	Label, system service (all models)	40K5927		
	PCI I/O Expansion Unit 2 (option)	44W4403		
	PCI I/O Expansion Unit 3e (option)	43W4390		
	Tray, SAS hard disk drive (all models)		31R2239	
	SAS daughter card (type 7971 option)	39Y9188		
	ServeRAID 8 k-l card (option)	25R8079		
	ServeRAID 8 k adapter, without battery (option)	44E8732		
	ServeRAID 8 k battery (option)	25R8088		
	Slim CFFE Fibre Channel/Ethernet card (type 7971 option)	39Y9304		
	Slim CFFX Ethernet adapter (type 7971 option)	46M6189		
	Slim CFFX 4GB Fiber Channel daughter card (type 7971 option)	41Y8525		
	QLogic 2-port 10 Gb CFFh CNA for IBM BladeCenter (option)	42C1832		
	QLogic CFFH 8 GB Combo Fiber Channel Blade Expansion card (type 7971 option)	44X1943		

Chapter 4. Product recovery CDs

Table 1 describes the product recovery CD CRUs.

Table 1. Product recovery CDs

Description	CRU part number
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, U.S. English (MT 7141, 7144)	44W4046
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, French (MT 7141, 7144)	44W4047
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, Italian (MT 7141, 7144)	44W4048
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, German (MT 7141, 7144)	44W4049
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, Spanish (MT 7141, 7144)	44W4050
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, Traditional Chinese (MT 7141, 7144)	44W4051
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, Japanese (MT 7141, 7144)	44W4052
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, Simplified Chinese (MT 7141, 7144)	44W4053
Microsoft Windows Server 2003 R2 Standard Edition 32-bit w/SP2 1-4 microprocessors, Korean (MT 7141, 7144)	44W4054
Microsoft Windows Server 2003 R2 Standard Edition 64-bit w/SP2 1-4 microprocessors, U.S. English (MT 7141, 7144)	44W4055
Microsoft Windows Server 2003 R2 Standard Edition 64-bit w/SP2 1-4 microprocessors, Japanese (MT 7141, 7144)	44W4056
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, U.S. English (MT 7141, 7144)	44W4057
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, French (MT 7141, 7144)	44W4058
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, German (MT 7141, 7144)	44W4059
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, Spanish (MT 7141, 7144)	44W4060
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, Simplified Chinese (MT 7141, 7144)	44W4061
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, Traditional Chinese (MT 7141, 7144)	44W4062
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, Japanese (MT 7141, 7144)	44W4063
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-2 microprocessors, Korean (MT 7141, 7144)	44W4064
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, U.S. English (MT 7141, 7144)	44W4065

Table 1. Product recovery CDs (continued)

Description	CRU part number
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, French (MT 7141, 7144)	44W4066
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, Italian (MT 7141, 7144)	44W4067
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, German (MT 7141, 7144)	44W4068
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, Spanish (MT 7141, 7144)	44W4069
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, Simplified Chinese (MT 7141, 7144)	44W4070
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, Traditional Chinese (MT 7141, 7144)	44W4071
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, Japanese (MT 7141, 7144)	44W4072
Microsoft Windows Server 2003 R2 Enterprise Edition 32-bit w/SP2 1-8 microprocessors, Korean (MT 7141, 7144)	44W4073
Microsoft Windows Server 2003 R2 Enterprise Edition 64-bit w/SP2 1-2 microprocessors, U.S. English (MT 7141, 7144)	44W4074
Microsoft Windows Server 2003 R2 Enterprise Edition 64-bit w/SP2 1-2 microprocessors, Japanese (MT 7141, 7144)	44W4075
Microsoft Windows Server 2003 R2 Enterprise Edition 64-bit w/SP2 1-2 microprocessors, Italian (MT 7141, 7144)	44W4078
Microsoft Windows Server 2003 R2 Enterprise Edition 64-bit w/SP2 1-8 microprocessors, U.S.English (MT 7141, 7144)	44W4076
Microsoft Windows Server 2003 R2 Enterprise Edition 64-bit w/SP2 1-8 microprocessors, Japanese (MT 7141, 7144)	44W4077
Microsoft Windows Server 2008 Datacenter 64/64 Bit, Multilingual	49Y0222
Microsoft Windows Server 2008 Datacenter 64/64 Bit, Simplified Chinese	49Y0223
Microsoft Windows Server 2008 Datacenter 64/64 Bit, Traditional Chinese	49Y0224
Microsoft Windows Server 2008 SP Datacenter 32/64 Bit, Multilingual (type 7971)	60Y1760
Microsoft Windows Server 2008 Datacenter R2, Multilingual (type 7971)	59Y7332
Microsoft Windows Server 2008 Datacenter R2, Simplified Chinese (type 7971)	59Y7333
Microsoft Windows Server 2008 Datacenter R2, Traditional Chinese (type 7971)	59Y7334
Microsoft Windows Server 2008 Standard Edition 32/64 Bit 1-4 microprocessors, Multilingual	49Y0892
Microsoft Windows Server 2008 Standard Edition 32/64 Bit 1-4 microprocessors, Simplified Chinese	49Y0893
Microsoft Windows Server 2008 Standard Edition 32/64 Bit 1-4 microprocessors, Traditional Chinese	49Y0894

Table 1. Product recovery CDs (continued)

Description	CRU part number
Microsoft Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 microprocessors, Multilingual	49Y0895
Microsoft Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 microprocessors SP2, Simplified Chinese	49Y0896
Microsoft Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 microprocessors, Traditional Chinese	49Y0897
Microsoft Windows Server 2008 HPS 1-8 microprocessors, English	68Y9455
Microsoft Windows Server 2008 HPS 1-8 microprocessors, Japanese	68Y9456
Microsoft Windows Server 2008 HPS 1-8 microprocessors, Simplified Chinese	68Y9457
Microsoft Windows Server 2008 R2 Foundation, English (type 7971)	81Y2001
Microsoft Windows Server 2008 R2 Foundation, French (type 7971)	81Y2002
Microsoft Windows Server 2008 R2 Foundation, German (type 7971)	81Y2003
Microsoft Windows Server 2008 R2 Foundation, Spanish (type 7971)	81Y2004
Microsoft Windows Server 2008 R2 Foundation, Italian (type 7971)	81Y2005
Microsoft Windows Server 2008 R2 Foundation, Brazilian (type 7971)	81Y2006
Microsoft Windows Server 2008 R2 Foundation, Polish (type 7971)	81Y2007
Microsoft Windows Server 2008 R2 Foundation, Russian (type 7971)	81Y2008
Microsoft Windows Server 2008 R2 Foundation, Turkish (type 7971)	81Y2009
Microsoft Windows Server 2008 R2 Foundation, Japanese (type 7971)	81Y2010
Microsoft Windows Server 2008 R2 Foundation, Simplified Chinese (type 7971)	81Y2011
Microsoft Windows Server 2008 R2 Foundation, Traditional Chinese (type 7971)	81Y2012
Microsoft Windows Server 2008 R2 Foundation, Korean (type 7971)	81Y2013
Microsoft Windows Server 2008 R2 Foundation, Czech (type 7971)	81Y2014
Microsoft Windows Server 2008 R2 Standard Edition 1-4 microprocessors, Multilingual (type 7971)	81Y2015
Microsoft Windows Server 2008 R2 Standard Edition 1-4 microprocessors, Simplified Chinese (type 7971)	81Y2016
Microsoft Windows Server 2008 R2 Standard Edition 1-4 microprocessors, Traditional Chinese (type 7971)	81Y2017

Table 1. Product recovery CDs (continued)

Description	CRU part number
Microsoft Windows Server 2008 Enterprise Edition R2 1-8 microprocessors 10 users, Multilingual (type 7971)	81Y2018
Microsoft Windows Server 2008 Enterprise Edition R2 1-8 microprocessors 10 users, Simplified Chinese (type 7971)	81Y2019
Microsoft Windows Server 2008 Enterprise Edition R2 1-8 microprocessors 10 users, Traditional Chinese (type 7971)	81Y2020
Microsoft Windows Server 2008 Enterprise Edition R2 1-8 microprocessors 25 users, Multilingual (type 7971)	81Y2021
Microsoft Windows Server 2008 Enterprise Edition R2 1-8 microprocessors 25 users, Simplified Chinese (type 7971)	81Y2022
Microsoft Windows Server 2008 Enterprise Edition R2 1-8 microprocessors 25 users, Traditional Chinese (type 7971)	81Y2023
Microsoft Windows Server 2003 Enterprise 32 Embedded Software Package	68Y9467

Chapter 5. Removing and replacing blade server components

Replaceable components are of three types:

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

See Chapter 3, “Parts listing, Types 7971 and 7972,” on page 59 to determine whether a component is a Consumable, Tier 1 CRU, Tier 2 CRU, or FRU.

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

Installation guidelines

Before you install options, read the following information:

- Read the safety information that begins on page vii and the guidelines in “Handling static-sensitive devices” on page 68. This information will help you work safely.
- When you install your new blade server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your blade server is ready to function at maximum levels of performance. To download firmware updates for your blade server, go to <http://www.ibm.com/bladecenter/>, click **Support**, select **BladeCenter LS21** or **BladeCenter LS41** from the **Hardware** list, and click **Go**; then, click the **Download** tab.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Back up all important data before you make changes to disk drives.
- Before you remove a blade server from the BladeCenter unit, you must shut down the operating system and turn off the blade server. You do not have to shut down the BladeCenter unit itself.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the blade server, 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 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.
- For a list of supported options for the blade server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

System reliability guidelines

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

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

Handling static-sensitive devices

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

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

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

Returning a device or component

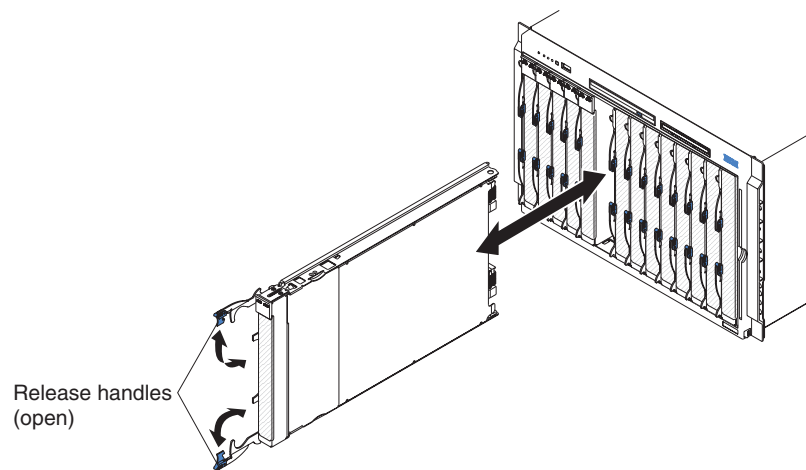
If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing the blade server from a BladeCenter unit

Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit without a blade server, expansion unit, or blade filler 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 have to reconfigure the blade server.

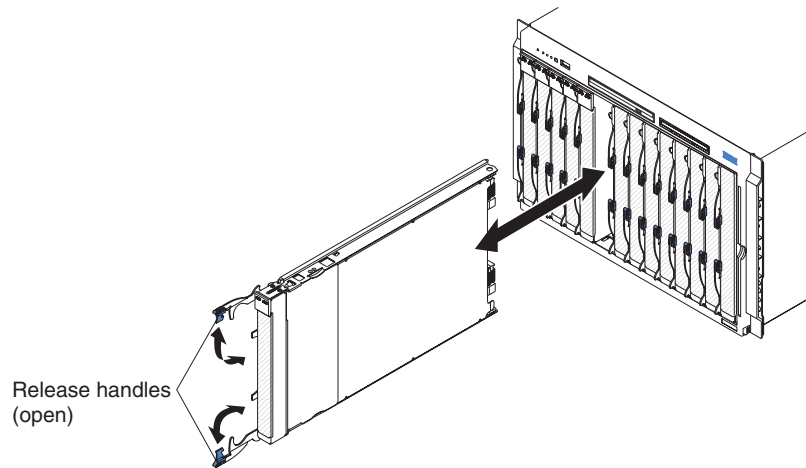
To remove the blade server from a BladeCenter unit, complete the following steps. The appearance of your BladeCenter unit might be different, see the documentation for your BladeCenter unit for additional information.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is operating, shut down the operating system; then, press the power-control button (behind the blade server control panel door) to turn off the blade server (see “Turning off the blade server” on page 6 for more information).
Attention: Wait at least 30 seconds, until the hard disk drives stop spinning, before proceeding to the next step.
3. Pull the two release handles to the open position. The blade server moves out of the bay approximately 0.6 cm (0.25 inch).
4. Pull the blade server out of the bay.
5. Place either a blade filler or another blade server in the bay within 1 minute.

Installing the blade server in a BladeCenter unit

To install a blade server in a BladeCenter unit, complete the following steps. The appearance of your BladeCenter unit might be different, see the documentation for your BladeCenter unit for additional information.



Statement 21:



CAUTION:

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

1. Make sure that the release handles on the blade server are in the open position (perpendicular to the blade server).
2. If you installed a blade filler or another blade server in the bay from which you removed the blade server, remove it from the bay.

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

3. Slide the blade server into the blade bay from which you removed it until it stops.
4. Push the release handles on the front of the blade server to the closed position.
5. Turn on the blade server (see “Turning on the blade server” on page 6).
6. Make sure that the power-on LED on the blade server control panel is lit continuously, indicating that the blade server is receiving power and is turned on.

7. (Optional) Write identifying information on one of the labels that come with the blade servers and place the label on the BladeCenter unit bezel. See the documentation for your BladeCenter unit for information about the label placement.

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

If you have changed the configuration of the blade server or if you are installing a different blade server from the one that you removed, you must configure the blade server through the Configuration/Setup Utility, and you might have to install the blade server operating system. Detailed information about these tasks is available in the *Installation and User's Guide*.

Removing and replacing Tier 1 CRUs

Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

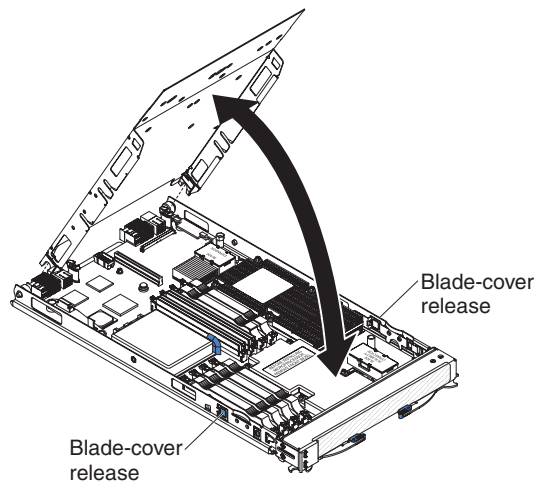
The illustrations in this document might differ slightly from your hardware.

Removing the blade server cover

Note: If the blade server has an expansion unit that does not have a removable cover, remove the expansion unit (see “Removing an expansion unit” on page 74).

To remove the blade server cover, complete the following steps.

Note: The following illustration shows how to remove the cover from a single-width model blade server; removing the cover from a double-width model blade server is similar.

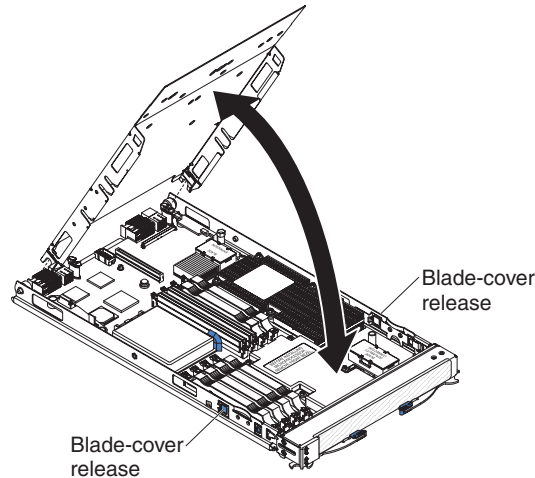


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Carefully lay the blade server down on a flat, static-protective surface, with the cover side up.
4. Press the blade-cover release on each side of the blade server or expansion unit and lift the cover open.
5. Lift the cover from the blade server and store it for future use.

Installing the blade server cover

To install the blade server cover, complete the following steps.

Note: The following illustration shows how to install the cover on a single-width model blade server; installing the cover on a double-width model blade server is similar.



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.

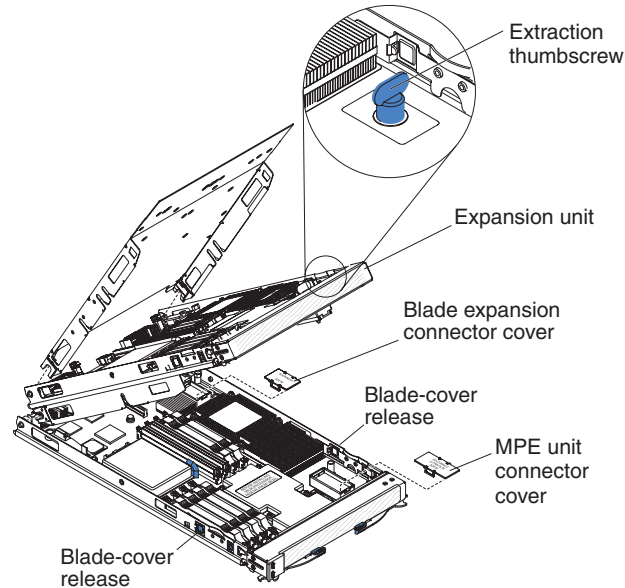
Attention: You cannot insert the blade server into the BladeCenter unit until the cover is installed and closed. Do not attempt to override this protection.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade server. Before closing the cover, check that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade server.
3. Pivot the cover to the closed position until it clicks into place.
4. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing an expansion unit

To remove an expansion unit, complete the following steps.

Note: The following illustration shows how to remove an MPE unit from the blade server; removing another type of expansion unit from a blade server is similar.



1. Read the safety information beginning on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Carefully lay the blade server down on a flat, static-protective surface, with the cover side up.
4. Remove the blade server cover, if one is installed (see “Removing the blade server cover” on page 72).
5. If the expansion unit has an extraction device (such as a thumbscrew or a lever), use it to disengage the expansion unit from the blade server; otherwise, press the blade-cover release on each side of the blade server to disengage the expansion unit from the blade server.

Attention: Do not rotate the expansion unit open further than 90° to avoid damage to the connectors at the rear of the blade server.

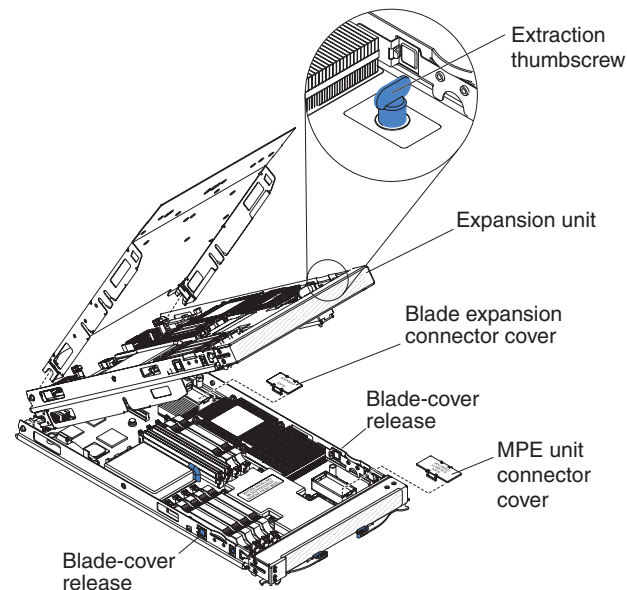
6. Rotate the expansion unit open; then, lift the expansion unit from the blade server.
7. If you are not installing an expansion unit immediately, make sure that the protective covers are installed on the blade expansion connector and the MPE unit connector.
8. If you are instructed to return the expansion unit, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an expansion unit

Attention: If a high-speed expansion card is installed in the blade server system board, you cannot install an expansion unit.

To install an expansion unit, complete the following steps.

Note: The following illustration shows how to install an MPE unit on the blade server; installing another type of expansion unit on a blade server is similar.

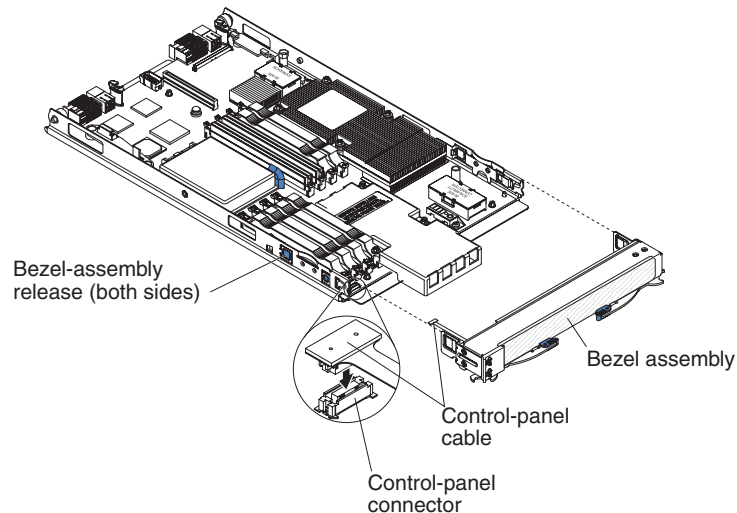


1. Remove the cover from the blade expansion connector, if one is installed.
2. If you are installing an MPE unit, remove the cover from the MPE unit connector, if one is installed.
3. Touch the static-protective package that contains the expansion unit to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the expansion unit from the package.
4. Orient the expansion unit above the blade server.
5. Lower the expansion unit so that the slots at the rear slide down onto the cover pins at the rear of the blade server; then, pivot the expansion unit down onto the blade server.
6. If the expansion unit has an extraction device (such as a thumbscrew or a lever), use it to fully engage the expansion unit on the blade server; otherwise, press the expansion unit firmly into the closed position until it clicks into place.
7. Install the blade-server cover, if required (see “Installing the blade server cover” on page 73).
8. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing the bezel assembly

To remove the bezel assembly, complete the following steps.

Note: The following illustration shows how to remove the bezel assembly from the blade server; removing the bezel assembly from the MPE unit is similar.

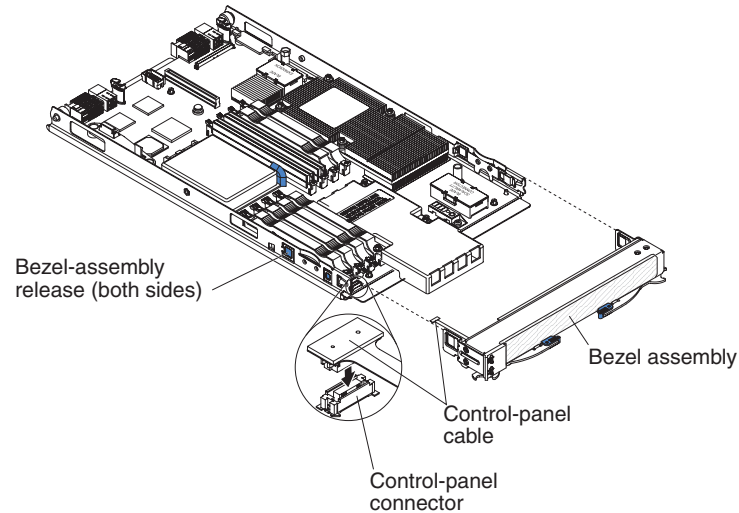


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. Open the blade server cover (see “Removing the blade server cover” on page 72).
3. If you are removing the bezel assembly from the blade server and an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
4. Press the bezel-assembly release on each side of the blade server and pull the bezel assembly away from the blade server approximately 1.2 cm (0.5 inch).
5. If you are removing the blade-server bezel assembly, disconnect the control-panel cable from the control-panel connector.
6. Pull the bezel assembly away from the blade server.
7. If you are instructed to return the bezel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you; otherwise, store the bezel assembly in a safe place.

Installing the bezel assembly

To install the bezel assembly, complete the following steps.

Note: The following illustration shows how to install the bezel assembly on the blade server; installing the bezel assembly on the MPE unit is similar.

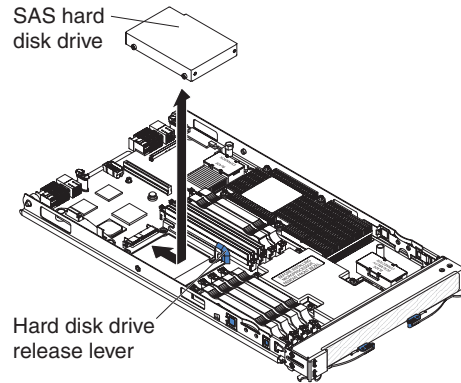


1. If you are installing the blade-server bezel assembly, connect the control-panel cable to the control-panel connector.
2. Carefully slide the bezel assembly onto the blade server until it clicks into place.
3. Install the MPE unit, if one was removed while removing the bezel assembly (see “Installing an expansion unit” on page 75).
4. Install the cover onto the blade server (see “Installing the blade server cover” on page 73).
5. Install the blade server into the BladeCenter (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing a SAS hard disk drive

To remove a SAS hard disk drive, complete the following steps.

Note: The following illustration shows how to remove the SAS hard disk drive from the blade server; removing the SAS hard disk drive from the MPE unit is similar.

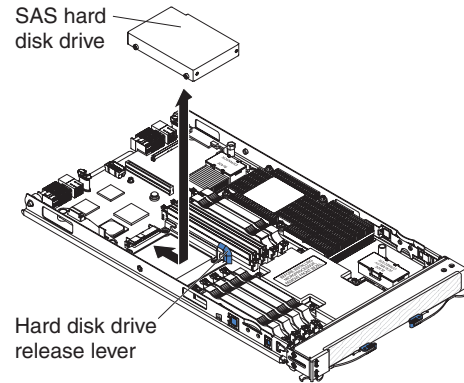


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If you are removing a hard disk drive from the blade server and an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Locate the blue release lever on the hard disk drive tray.
6. While pushing the release lever away from the drive, slide the drive forward to disengage it from the connector at the rear of the drive tray: then, lift the drive out of the drive tray.
7. If you are instructed to return the hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a SAS hard disk drive

To install a SAS hard disk drive, complete the following steps.

Note: The following illustration shows how to install the SAS hard disk drive in the blade server; installing the SAS hard disk drive in the MPE unit is similar.

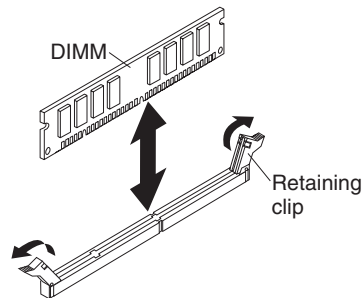


1. Touch the static-protective package that contains the hard disk drive to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the hard disk drive from the package.
Attention: Do not press on the top of the drive. Pressing the top might damage the drive.
2. Place the hard disk drive into the drive tray and push it into the connector at the rear of the drive tray, until the drive moves past the lever at the front of the tray.
3. Install the MPE unit, if one was removed while removing the hard disk drive (see “Installing an expansion unit” on page 75).
4. Install the blade server cover (see “Installing the blade server cover” on page 73).
5. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing a memory module

To remove a DIMM, complete the following steps.

Note: The following illustration shows how to remove a DIMM from the blade server or the MPE unit.



1. Read the safety information that begins vii and “Installation guidelines” on page 67
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If you are removing a DIMM from the blade server and an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Locate the DIMM connectors (see “System board connectors” on page 7). Determine which DIMM you want to remove from the blade server.

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
6. Move the DIMM retaining clips on the side of the DIMM socket to the open position by pressing the retaining clips away from the center of the DIMM socket.
7. Using your fingers, pull the DIMM out of the DIMM socket.
8. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

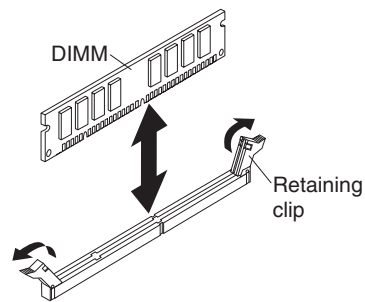
Installing a memory module

Note: If you are replacing a faulty DIMM, make sure that the replacement DIMM is the correct type of memory. For each installed microprocessor, a set of 4 DIMM sockets is enabled (see the following table for more information). If you are adding DIMMs, install the DIMMs in pairs into the DIMM sockets that are enabled. See the *Installation and User’s Guide* for additional information about the type of memory that is compatible with the server.

Installed microprocessors	Enabled DIMM sockets
1 (in blade server)	1, 2, 3, 4 (in blade server)
1 and 2 (in blade server)	1, 2, 3, 4, 5, 6, 7, 8 (in blade server)
1 and 2 (in blade server) 1 (in MPE unit)	1, 2, 3, 4, 5, 6, 7, 8 (in blade server) 1, 2, 3, 4 (in MPE unit)
1 and 2 (in blade server) 1 and 2 (in MPE unit)	1, 2, 3, 4, 5, 6, 7, 8 (in blade server) 1, 2, 3, 4, 5, 6, 7, 8 (in MPE unit)

To install a DIMM, complete the following steps.

Note: The following illustration shows how to install a DIMM in the blade server or the MPE unit.



1. Read the documentation that comes with the DIMM.
2. Locate the DIMM connectors (see “System board connectors” on page 7). Determine the connectors into which you will install the DIMMs.
3. Touch the static-protective package that contains the DIMM to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the DIMM from the package.
Attention: To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.
4. Make sure that both of the connector retaining clips are in the fully open position.
5. Turn the DIMM so that the DIMM keys align correctly with the connector on the system board.
6. Insert the DIMM by pressing the DIMM along the guides into the connector. Make sure that the retaining clips snap into the closed positions.
Attention: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
7. Install the MPE unit, if one was removed while removing the DIMMs (see “Installing an expansion unit” on page 75).
8. Install the blade server cover (see “Installing the blade server cover” on page 73).
9. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

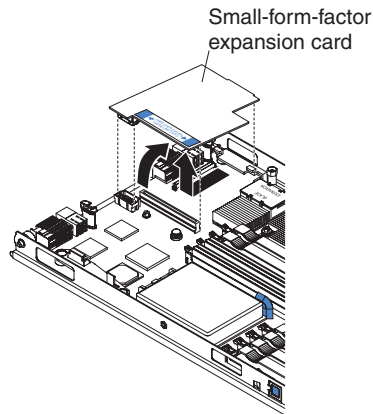
Removing and installing an I/O expansion card

The following sections describe how to remove and replace small-form-factor, standard-form-factor, and high-speed I/O-expansion cards.

Removing a small-form-factor expansion card

To remove a small-form-factor expansion card, complete the following steps.

Note: The following illustration shows how to remove a small-form-factor expansion card from the blade server; removing a small-form-factor expansion card from the MPE unit is similar.

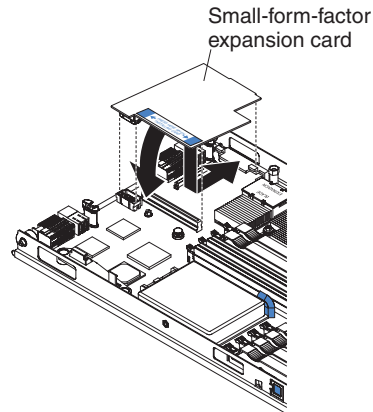


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If you are removing the expansion card from the blade server and an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Gently pivot the wide end of the card out of the expansion card connectors; then, slide the notched end of the card out of the raised hook on the expansion card bracket and lift the card out of the blade server.
6. If you are instructed to return the expansion card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a small-form-factor expansion card

To install a small-form-factor expansion card, complete the following steps.

Note: The following illustration shows how to install a small-form-factor expansion card in the blade server; installing a small-form-factor expansion card in the MPE unit is similar.



1. Touch the static-protective package that contains the expansion card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the expansion card from the package.
2. Orient the expansion card over the expansion card connectors.
3. Slide the notch in the narrow end of the card into the raised hook on the expansion card bracket; then, gently pivot the card into the expansion card connectors.

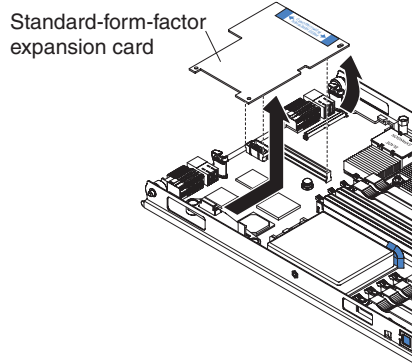
Note: For device-driver and configuration information to complete the installation of the expansion card, see the documentation that comes with the expansion card.

4. Install the MPE unit, if one was removed while removing the expansion card (see “Installing an expansion unit” on page 75).
5. Install the blade server cover (see “Installing the blade server cover” on page 73).
6. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing a standard-form-factor expansion card

To remove a standard-form-factor expansion card, complete the following steps.

Note: The following illustration shows how to remove a standard-form-factor expansion card from the blade server; removing a standard-form-factor expansion card from the MPE unit is similar.

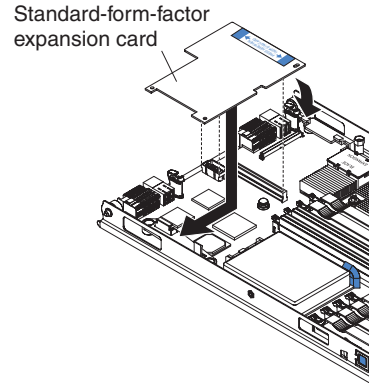


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If you are removing the expansion card from the blade server and an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Gently pivot the wide end of the card out of the expansion card connectors; then, slide the notched end of the card out of the raised hook on the expansion card bracket and lift the card out of the blade server.
6. If you are instructed to return the expansion card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a standard-form-factor expansion card

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

Note: The following illustration shows how to install a standard-form-factor expansion card in the blade server; installing a standard-form-factor expansion card in the MPE unit is similar.



1. Touch the static-protective package that contains the expansion card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the expansion card from the package.
2. Orient the expansion card over the expansion card connectors.
3. Slide the narrow end of the card into the raised hook on the expansion card bracket; then, gently pivot the wide end of the card into the expansion card connectors.

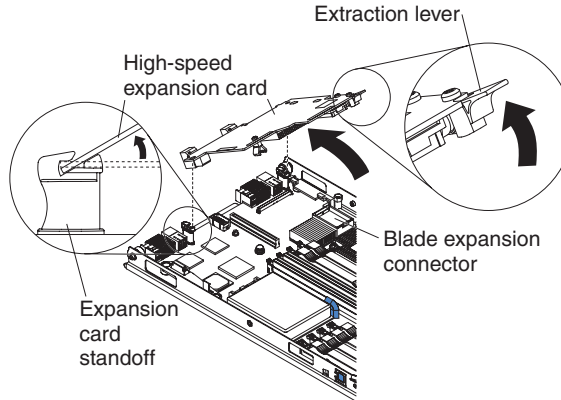
Note: For device-driver and configuration information to complete the installation of the expansion card, see the documentation that comes with the expansion card.

4. Install the MPE unit, if one was removed while removing the expansion card (see “Installing an expansion unit” on page 75).
5. Install the blade server cover (see “Installing the blade server cover” on page 73).
6. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing a high-speed expansion card

To remove a high-speed expansion card, complete the following steps.

Note: The following illustration shows how to remove a high-speed expansion card from the blade server; removing a high-speed expansion card from the MPE unit is similar.

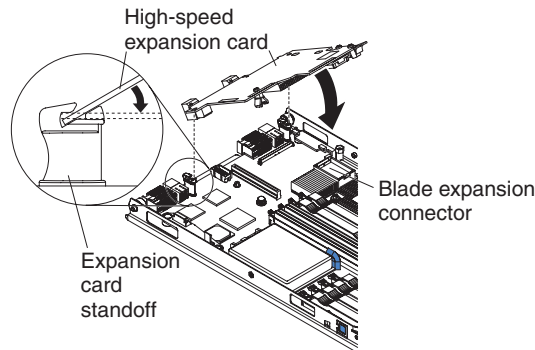


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. Rotate the expansion-card extraction lever upward to disengage the blade-expansion connector.
5. Pivot the narrow end of the card away from the blade expansion connector; then, slide the slots at the back end of the card out of the expansion-card standoffs and lift the card out of the blade server.
6. If you are instructed to return the expansion card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a high-speed expansion card

To install a high-speed expansion card, complete the following steps.

Note: The following illustration shows how to install a high-speed expansion card in the blade server; installing a high-speed expansion card in the MPE unit is similar.



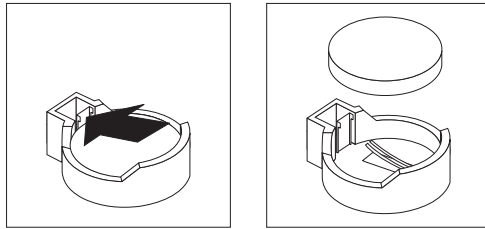
1. Touch the static-protective package that contains the expansion card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the expansion card from the package.
2. Locate the blade-expansion connector and orient the expansion card over it.
3. Slide the slots at the back end of the card onto the pins on the expansion card standoff; then, gently pivot the card into the blade expansion connector.
4. Firmly press on the indicated locations to seat the expansion card.

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

5. Install the blade server cover (see “Installing the blade server cover” on page 73).
6. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing the battery

To remove the battery, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Locate the battery on the system board (see “System board connectors” on page 7).
6. Use one finger to press the top of the battery clip away from the battery. The battery pops up when released.
7. Use your thumb and index finger to lift the battery from the socket.
8. Dispose of the battery as required by local ordinances or regulations.

Installing the battery

The following notes describe information that you must consider when you are replacing the battery in the blade server.

- When you are replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer.
- 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 marketing representative or authorized reseller.
- After you replace the battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

Statement 2:



CAUTION:

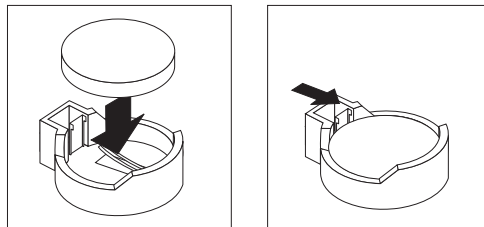
When replacing the lithium battery, use only IBM Part Number 43W9859 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode 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.

To install the battery, complete the following steps.



1. Follow any special handling and installation instructions that come with the battery.
2. Insert the battery:
 - a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
 - b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.
3. Install the MPE unit, if one was removed while removing the battery (see “Installing an expansion unit” on page 75).
4. Install the blade server cover (see “Installing the blade server cover” on page 73).
5. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).
6. Turn on the blade server and run the Configuration/Setup Utility program. Set configuration parameters as needed (see “Using the Configuration/Setup Utility program” on page 101 for information).

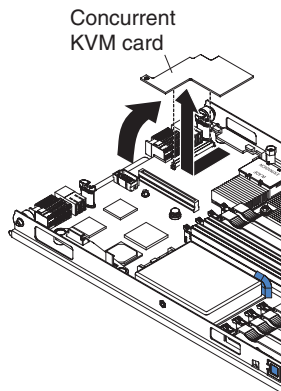
Removing and replacing Tier 2 CRUs

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for the server.

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

Removing a Concurrent KVM Feature Card

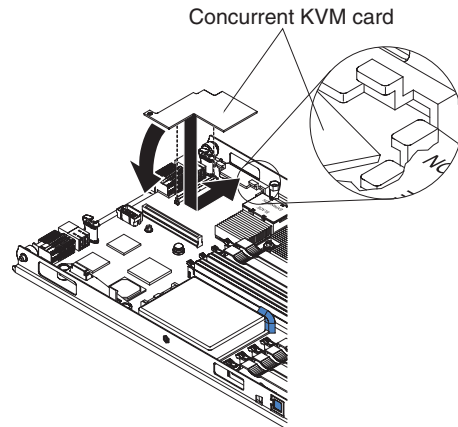
To remove a Concurrent KVM Feature Card, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. If a small-form-factor expansion card or a high-speed expansion card is installed, remove it (see “Removing a small-form-factor expansion card” on page 82 or “Removing a high-speed expansion card” on page 86).
6. Gently pivot the narrow end of the card out of the concurrent-KVM connector; then, slide the notched end of the card out of the tabs on the expansion card bracket and lift the card out of the blade server.
7. If you are instructed to return the Concurrent KVM Feature Card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a Concurrent KVM Feature Card

To install a Concurrent KVM Feature Card, complete the following steps.



1. Touch the static-protective package that contains the expansion card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the Concurrent KVM Feature Card from the package.
2. Locate the concurrent-KVM connector and orient the Concurrent KVM Feature Card over it.
3. Slide the right side of the card (the side of the card that is away from the concurrent-KVM connector) between the two tabs at the right side of the expansion card bracket; then, gently pivot the card into the connector.

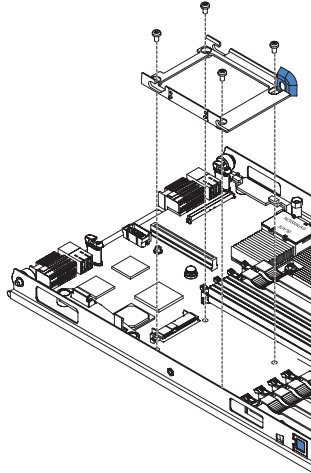
Note: For device-driver and configuration information to complete the installation of the Concurrent KVM Feature Card, see the documentation that comes with the card.

4. If you removed an expansion card while removing the concurrent KVM card, reinstall it (see “Installing a small-form-factor expansion card” on page 83 or “Installing a high-speed expansion card” on page 87).
5. Install the MPE unit, if one was removed while removing the concurrent KVM card (see “Installing an expansion unit” on page 75).
6. Install the blade server cover (see “Installing the blade server cover” on page 73).
7. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing the hard disk drive tray

To remove the hard disk drive tray, complete the following steps.

Note: The following illustration shows how to remove the hard disk drive tray from the blade server; removing the hard disk drive tray from the MPE unit is similar.

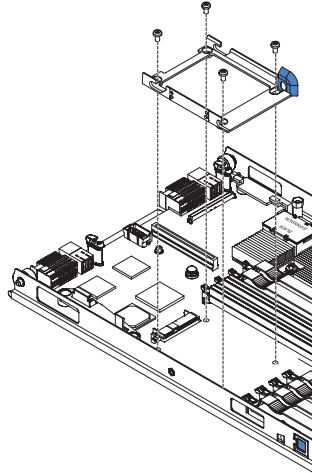


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If you are removing the drive tray from the blade server and an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Remove the hard disk drive from the drive tray, if one is installed (see “Removing a SAS hard disk drive” on page 78).
6. Remove the four screws that secure the drive tray to the system board; then, lift the drive tray out of the blade server.
7. If you are instructed to return the drive tray, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the hard disk drive tray

To install the hard disk drive tray, complete the following steps.

Note: The following illustration shows how to install the hard disk drive tray in the blade server; installing the hard disk drive tray in the MPE unit is similar.



1. Touch the static-protective package that contains the drive tray to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the drive tray from the package.
2. Orient the drive tray over the four mounting holes in the system board and place the drive tray into position.
3. Install the four screws that secure the drive tray to the system board.
4. If you removed the hard disk drive while removing the drive tray, reinstall it (see “Installing a SAS hard disk drive” on page 79).
5. Install the MPE unit, if one was removed while removing the the drive tray (see “Installing an expansion unit” on page 75).
6. Install the blade server cover (see “Installing the blade server cover” on page 73).
7. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

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

Removing a microprocessor and heat sink

Read the following important guidelines before removing a microprocessor that is not faulty (for example, when you are replacing the system board assembly).

Attention: Do *not* use an alcohol wipe with the microprocessor.

If you are not replacing a defective heat sink or microprocessor, the thermal material on the heat sink and microprocessor will remain effective if you complete the following steps:

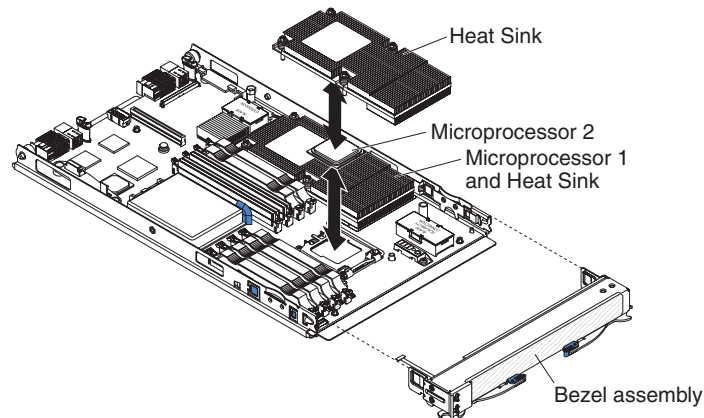
1. Carefully handle the heat sink and microprocessor when removing or installing these components. Do not touch the thermal material or otherwise allow it to become contaminated.
2. In a dual-microprocessor blade server or MPE unit, the microprocessor and the heat sink are a matched set. First transfer the heat sink and microprocessor from one socket to the new system board; then, transfer the other heat sink and microprocessor. (This will make sure that the thermal material remains evenly distributed between each heat sink and microprocessor.)

Notes:

- The heat-sink FRU is packaged with the thermal material applied to the underside. This thermal material is not available as a separate FRU. The heat sink must be replaced when new thermal material is required, such as when a defective microprocessor is replaced or if the thermal material is contaminated or has come in contact with another object other than its paired microprocessor.
- The microprocessor FRU for this blade server and MPE unit includes a heat sink.
- A heat-sink FRU can be ordered separately if the thermal material becomes contaminated.

To remove a microprocessor and heat sink, complete the following steps.

Note: The following illustration shows how to remove a microprocessor and heat sink from the blade server; removing a microprocessor and heat sink from the MPE unit is similar.



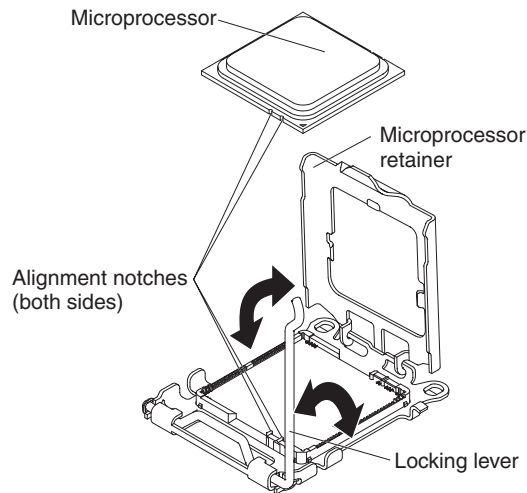
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If you are removing a microprocessor from the blade server and an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Identify the microprocessor that is to be removed.

Note: If you are replacing a failed microprocessor, make sure that you have selected the correct microprocessor for replacement (see “Light path diagnostics” on page 38).

6. If you are removing microprocessor 2 (the microprocessor that is closest to the front of the blade server or MPE unit), remove the bezel assembly (see “Removing the bezel assembly” on page 76).
7. Remove the heat sink.

Attention: Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, you must replace the heat sink.

- a. Loosen the captive screws on one side of the heat sink to break the seal with the microprocessor.
- b. Press firmly on all of the captive screws and loosen them with a screwdriver.
- c. Use your fingers to gently pull the heat sink from the processor.



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.

8. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops in the fully open position (approximately a 135° angle). Lift the microprocessor retainer upward.

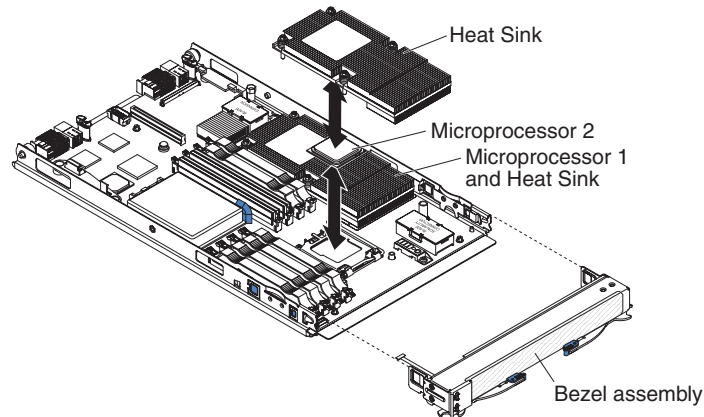
Attention: Only handle the microprocessor by its edges. Do not touch the contacts on the bottom of the microprocessor or in the microprocessor socket. Touching these contacts might result in permanent damage to the system board.

9. Use your fingers to pull the microprocessor out of the socket.
10. If you are instructed to return the microprocessor and heat sink, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor and heat sink

To install a microprocessor and heat sink, complete the following steps.

Note: The following illustration shows how to install a microprocessor and heat sink in the blade server; installing a microprocessor and heat sink in the MPE unit is similar.

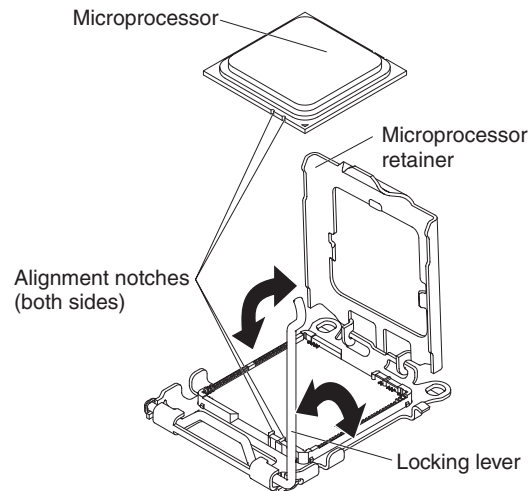


Attention: Do not use any tools or sharp objects to lift the locking lever on the microprocessor socket. Doing so might result in permanent damage to the system board.

1. Make sure that the locking lever and the microprocessor retainer on the microprocessor socket are in the fully open position (each at approximately a 135° angle).

Attention: Only handle the microprocessor by its edges. Do not touch the contacts on the bottom of the microprocessor or in the microprocessor socket. Touching these contacts might result in permanent damage to the system board.

2. Touch the static-protective package that contains the microprocessor to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the microprocessor from the package.
3. Remove the cover from the bottom of the microprocessor.

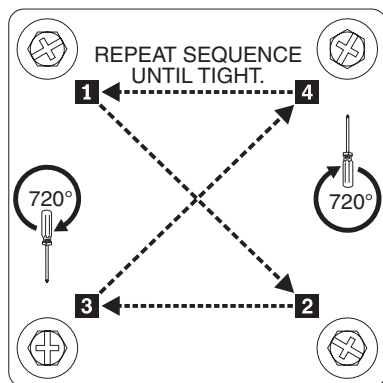


Attention:

- Do not press the microprocessor into the socket.
 - Make sure that the microprocessor is oriented and aligned correctly in the socket before you try to close the microprocessor retainer.
4. Center the microprocessor over the microprocessor socket. Align the notches on both sides of the microprocessor with the notches in the socket and carefully place the microprocessor into the socket.
 5. Carefully close the microprocessor retainer.
 6. Rotate the locking lever on the microprocessor socket to the closed and locked position. Make sure that the lever is secured in the locked position by the tab on the microprocessor socket.
 7. Install the microprocessor.
 8. Install a heat sink on the microprocessor.

Attention:

- Do not set down the heat sink after you remove the plastic cover.
 - Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, contact your service technician.
- a. Remove the plastic protective cover from the bottom of the heat sink.
 - b. Make sure that the thermal material is still on the bottom of the heat sink; then, align and place the heat sink on top of the microprocessor, thermal material side down. Press firmly on the heat sink.
 - c. Press firmly on the captive screws and tighten them with a screwdriver. Follow the pattern that is shown on the following label. Rotate each screw two full rotations each time. Repeat the sequence until the screws are tight. Do not overtighten the screws by using excessive force.



9. Install the bezel assembly (see “Installing the bezel assembly” on page 77).
10. Install the MPE unit, if one was removed while removing the microprocessor and heat sink (see “Installing an expansion unit” on page 75).
11. Install the blade server cover (see “Installing the blade server cover” on page 73).
12. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Removing the system board assembly

Note: This section describes how to remove components from the blade server when the system board assembly is being replaced; removing components from the MPE unit when MPE board assembly is being replaced is similar.

When replacing the system board, you will replace the system board and blade base as one assembly. After replacement, you must either update the blade server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

Note: See “System board layouts” on page 7 for information on the locations of the connectors on the system board.

To remove the system board assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the blade server is installed in a BladeCenter unit, remove it (see “Removing the blade server from a BladeCenter unit” on page 69).
3. Remove the blade server cover (see “Removing the blade server cover” on page 72).
4. If an MPE unit is installed, remove the MPE unit (see “Removing an expansion unit” on page 74).
5. Remove the blade server bezel assembly (see “Removing the bezel assembly” on page 76).
6. Remove all of the installed components in the following list from the system board assembly; then, place them on a non-conductive surface or install them on the new system board assembly.
 - I/O-expansion cards. See “Removing and installing an I/O expansion card” on page 82.
 - Concurrent KVM card. See “Removing a Concurrent KVM Feature Card” on page 90.
 - Hard disk drive. See “Removing a SAS hard disk drive” on page 78.
 - Microprocessors and heat sinks. See “Removing a microprocessor and heat sink” on page 94.
 - DIMMs. See “Removing a memory module” on page 80.
7. If you are instructed to return the system board assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the system board assembly

Note: This section describes how to install components in the blade server when the system board assembly is being replaced; installing components in the MPE unit when MPE board assembly is being replaced is similar.

To install the system board assembly, complete the following steps:

1. Install all of the components in the following list that were removed from the old system board assembly onto the new system board assembly.

Note: Component fillers or covers may have to be removed before some components can be installed (see the *Installation and User's Guide* for more information).

- Concurrent KVM card. See “Installing a Concurrent KVM Feature Card” on page 91.
 - I/O-expansion cards. See “Removing and installing an I/O expansion card” on page 82.
 - Hard disk drive. See “Installing a SAS hard disk drive” on page 79.
 - Microprocessors and heat sinks. See “Installing a microprocessor and heat sink” on page 97.
 - DIMMs. See “Installing a memory module” on page 80.
2. Install the bezel assembly (see “Installing the bezel assembly” on page 77).
 3. Install the MPE unit, if one was removed while removing the system board (see “Installing an expansion unit” on page 75).
 4. Install the blade server cover (see “Installing the blade server cover” on page 73).
 5. Install the blade server into the BladeCenter unit (see “Installing the blade server in a BladeCenter unit” on page 70).

Chapter 6. Configuration information and instructions

This chapter provides information about updating the firmware and using the configuration utilities.

Firmware updates

IBM periodically makes BIOS, service processor (BMC), and diagnostic firmware updates available for the blade server. Go to <http://www.ibm.com/bladeCenter/> to download the latest firmware for the blade server; then, install any updates using the instructions that are included with the downloaded file.

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

Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is part of the BIOS. You can use it to:

- Change interrupt request (IRQ) settings
- Change the startup drive sequence
- Configure serial-port assignments
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords and security settings

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

1. Turn on the server.
2. When the Configuration/Setup utility message appears, press **F1**. If a power-on password has been set, you must type the password to access the Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

Note: See the *Installation and User's Guide* for information and instructions about using the Configuration/Setup Utility program.

Configuring the Gigabit Ethernet controllers

Two Ethernet controllers are integrated on the blade server system board and on the MPE unit. Each controller provides a 1000-Mbps full-duplex interface for connecting to one of the Ethernet-compatible I/O-modules in I/O-module bays 1 and 2, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

Note: When the MPE unit is installed, only the Ethernet controllers on the blade server will be detected by POST and might show an 1801 error code. To enable the Ethernet controllers on the MPE unit, enable **Run PXE on Non-Planar Ethernet** in the Configuration/Setup Utility program (see "Using the Configuration/Setup Utility program").

Each Ethernet controller on the system board is routed to a different I/O-module in I/O-module bay 1 or bay 2. The routing from an Ethernet controller to I/O-module bay will vary based on blade server type and the operating system that is installed. See “Blade server Ethernet controller enumeration” for information about how to determine the routing from an Ethernet controller to an I/O-module bay for the blade server.

Note: Other types of blade servers, such as the BladeCenter HS20 Type 8678 blade server, that are installed in the same BladeCenter unit as the BladeCenter LS21 Type 7971 or LS41 Type 7972 blade server might have different Ethernet controller routing. See the documentation that comes with the other blade servers for information.

You do not have to set any jumpers or configure the controllers for the blade server operating system. However, you must install a device driver to enable the blade server operating system to address the Ethernet controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the blade server. For updated information about configuring the controllers, see <http://www.ibm.com/bladecenter/>.

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

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

Blade server Ethernet controller enumeration

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

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

1. Install only one Ethernet switch module or pass-thru module in I/O-module bay 1.
2. Make sure that the ports on the switch module or pass-thru module are enabled (click **I/O-module Tasks** → **Management** → **Advanced Management** in the management module Web-based user interface).
3. Enable only one of the Ethernet controllers on the blade server. Note the designation that the blade server operating system has for the controller.

4. Ping an external computer on the network connected to the switch module or pass-thru module. If you can ping the external computer, the Ethernet controller that you enabled is associated with the switch module or pass-thru module in I/O-module bay 1. The other Ethernet controller in the blade server is associated with the switch module or pass-thru module in I/O-module bay 2.

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

Configuring a SAS RAID array

Note: Configuring a SAS RAID array applies to a blade server and MPE unit where a SAS hard disk drive is installed in both the blade server and the MPE unit.

You can configure a SAS RAID array for your blade server. You can use two SAS hard disk drives in the blade server to implement and manage a RAID level-0 (striping) or RAID level-1 (mirroring) array under an operating system that is listed at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>. For more information, see the *Installation and User's Guide*.

If an optional BladeCenter Storage Expansion Unit 3 is installed, you can use it to control all of the SAS hard disk drives installed in the blade server. You enable this feature using the Configuration/Setup Utility program (see the *Installation and User's Guide* for information and instructions).

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

You can use the LSI Logic Configuration Utility program to configure the SAS hard disk drives and SAS controller. To start the LSI Logic Configuration Utility, complete the following steps:

1. Turn on the blade server (make sure that the blade server is the owner of the keyboard, video, and mouse) and watch the monitor screen.
2. When the LSI Logic Configuration Utility message appears, press **Ctrl+C**.
3. Follow the instructions on the screen to modify the SAS hard disk drive and SAS controller settings.

Appendix A. Getting help and technical assistance

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

Before you call

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

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

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

Using the documentation

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

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM BladeCenter systems, optional devices, services, and support at <http://www.ibm.com/bladecenter/>. For service information, click **Support**.

Software service and support

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

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

Hardware service and support

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

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

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

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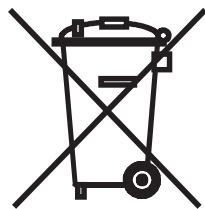
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Battery return program

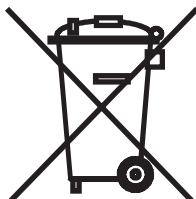
This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area.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

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

For Taiwan: Please recycle batteries.



For the European Union:



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For California:

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

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

Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio

communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

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.

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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级产品，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

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

Index

A

assertion event, BMC log 23
attention notices 2

B

battery
 replacing 88
battery return program 110
battery, installing 88
battery, removing 88
beep code errors 12
bezel assembly
 installing 76
 removing 77
blade server
 installing 70
 removing 69
blade server cover
 installing 73
 removing 72
BladeCenter LS21 and LS41 specifications 3
BMC error codes 51
BMC error log
 viewing from Configuration/Setup Utility 23
 viewing from diagnostic programs 23
BMC event log 23
BMC log
 assertion event, deassertion event 23
 default timestamp 22
 navigating 22
 size limitations 22
buttons
 CD/diskette/USB 5
 keyboard/video/mouse 4
 media-tray select 5
 power-control 5

C

caution statements 2
checkout procedure
 about 24
 performing 24
cKVM card
 installing 91
 removing 90
Class A electronic emission notice 111
components
 MPE unit 7
 system board 7
concurrent-KVM card
 installing 91
 removing 90
configuration
 Configuration/Setup Utility 101
 minimum 57

Configuration/Setup Utility program 101
configuring your blade server 101
connectors
 I/O-expansion card 7
 memory 7
 microprocessor 7
 MPE unit 7
 SAS hard disk drives 7
 system board 7
controller
 Ethernet 101
controller enumeration 102

D

danger statements 2
deassertion event, BMC log 23
description
 switches, MPE unit 9
 switches, system board 8
diagnostic
 error codes 44
 programs, overview 42
 programs, starting 43
 test log, viewing 44
 text message format 43
 tools, overview 11
display problems 29
drive
 connectors 7

E

electronic emission Class A notice 111
error codes and messages
 beep 12
 diagnostic 44
 POST/BIOS 15
 SAS 52
error LEDs 38
error logs 22
 BMC event 23
 BMC system event log 22
 Management-module event log 22
 viewing 23
error symptoms
 general 25
 hard disk drive 26
 intermittent 26
 microprocessor 28
 monitor 29
 optional devices 30
 ServerGuide 36
 software 37
 USB port 37
 video 29

- errors
 - BMC 51
 - format, diagnostic code 43
 - light path LEDs 41
 - messages, diagnostic 42
 - service processor 51
- Ethernet
 - controller enumeration 102
- Ethernet controller
 - configuring 101
 - failover 102
 - redundant network connection 102
- expansion unit
 - installing 75
 - removing 74

F

- FCC Class A notice 111
- filler
 - microprocessor heat sink 68
- firmware updates 101

H

- hard disk drive
 - connectors 7
 - problems 26
 - specifications 3
- hard disk drive tray
 - installing 93
 - removing 92
- high-speed expansion card
 - installing 87
 - removing 86

I

- I/O-expansion card
 - connectors 7
- I/O-expansion cards
 - installing 82
 - removing 82
- important notices 2
- installing
 - bezel assembly 76
 - blade server 70
 - blade server cover 73
 - cKVM card 91
 - concurrent-KVM card 91
 - hard disk drive tray 93
 - high-speed expansion card 87
 - I/O-expansion cards 82
 - memory module 80
 - microprocessor 97
 - MPE board assembly 100
 - SAS hard disk drive 79
 - small-form-factor expansion card 83
 - standard-form-factor expansion card 85
 - system board assembly 100
- integrated functions 3

- intermittent problems 26

L

- LEDs
 - activity 5
 - blade error 5
 - error, locations 38
 - information 5
 - light path diagnostics, viewing without power 38
 - light path, locations 38
 - location 5
 - MPE unit 10
 - power-on 5
 - system board, blade server 9
- light path diagnostics 38
- light path diagnostics LEDs 41
- light path diagnostics panel
 - blade server 9
 - MPE unit 10
- light path LED locations 38
- logs
 - BMC system event 22
 - Management module event 22

M

- media-tray select button 5
- memory
 - specifications 3
- memory module
 - installing 80
 - removing 80
 - specifications 3
 - supported 3
- memory problems 28
- messages
 - diagnostic 42
- microprocessor
 - heat sink 98
 - installing 97
 - problems 28
 - removing 94
 - specifications 3
- minimum configuration 57
- monitor problems 29
- MPE board assembly
 - installing 100
 - replacing 99
- MPE unit
 - LEDs 10
- MPE unit connectors 7
- MPE unit switches
 - description 9

N

- network connection problems 30
- no beep symptoms 15
- notes 2
- notes, important 108

notices
 electronic emission 111
 FCC, Class A 111
notices and statements 2

O

optional device problems 30

P

parts listing 59
POST
 about 11
 error log 23
POST/BIOS error codes 15
power problems 33
problems
 general 25
 hard disk drive 26
 intermittent 26
 memory 28
 microprocessor 28
 monitor 29
 network connection 30
 optional devices 30
 POST/BIOS 15
 power 33
 ServerGuide 36
 service processor 36
 software 37
 undetermined 56
 USB port 37
 video 29
publications 1

R

recovery CDs 63
removing
 bezel assembly 77
 blade server 69
 blade server cover 72
 cKVM card 90
 concurrent-KVM card 90
 hard disk drive tray 92
 high-speed expansion card 86
 I/O-expansion cards 82
 memory module 80
 microprocessor 94
 SAS hard disk drive 78
 small-form-factor expansion card 82
 standard-form-factor expansion card 84
replacing
 battery 88
 MPE board assembly 99
 system board assembly 99

S

SAS error messages 52
SAS hard disk drive
 installing 79
 removing 78
SAS RAID
 configure an array 103
ServerGuide
 problems 36
service processor error codes 51
service processor problems 36
service, calling for 58
small-form-factor expansion card
 installing 83
 removing 82
software problems 37
specifications
 BladeCenter LS21 and LS41 3
standard-form-factor expansion card
 removing 84, 85
starting the blade server 6
statements and notices 2
stopping the blade server 6
switches, system board 8
system board
 switches 8
system board assembly
 installing 100
 replacing 99
system board layouts 7
system board switches
 description 8
system board, blade server
 LEDs 9
system reliability 68
system-board connectors 7

T

test log, viewing 44
tools, diagnostic 11
trademarks 108
troubleshooting tables 25
turning off the blade server 6
turning on the blade server 6

U

undetermined problems 56
United States electronic emission Class A notice 111
United States FCC Class A notice 111
Universal Serial Bus (USB) problems 37
updating firmware 101

V

video problems 29
 See monitor problems



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