BladeCenter H Type 8852, 7989, and 1886

IBM

Problem Determination and Service Guide

BladeCenter H Type 8852, 7989, and 1886

IBM

Problem Determination and Service Guide

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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 pečítaje 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.

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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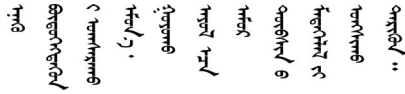
ཐོན་ཟོས་འདི་བདེ་སྐྱོད་མ་བྱས་གོང་། སྐོར་གྱི་ཡིད་གཟབ་
བྱ་འདུ་མིན་ཡོད་པའི་ཟོད་སྐྱེར་བལྟ་དགོས།

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

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

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

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

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

1. Make sure that the power is off and the power cords are disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cords:
    - 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 cords are the correct 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 computer for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.

7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when servicing electrical equipment:

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

Safety statements

Important:

Each caution and danger statement in this document is labeled 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 is labeled "Statement 1", translations for that caution are in the *Safety Information* document under "Statement 1".

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

Statement 1:

DANGER

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

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

To Connect:	To Disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 2:

CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

Statement 3:

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

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

DANGER

> **Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.**
>
> **Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.**

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

Statement 4:

≥ 18 kg (39.7 lb)   ≥ 32 kg (70.5 lb)   ≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
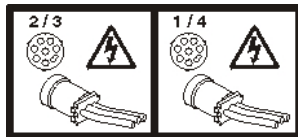
Statement 8:

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

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

Statement 12:

CAUTION:
The following label indicates a hot surface nearby.

Statement 13:

DANGER

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

Statement 20:

CAUTION:
To avoid personal injury, before lifting the unit, remove all the blades to reduce the weight.
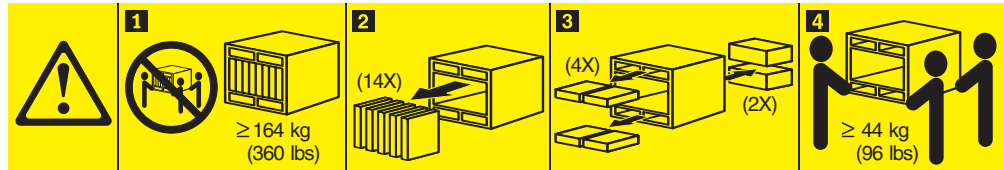
≥ 164 kg
(360 lbs)

(14X)

(4X)

(2X)

≥ 44 kg
(96 lbs)

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.

United Kingdom - 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.

Statement 26:

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

Attention: This server is suitable for use on an IT power distribution system whose maximum phase-to-phase voltage is 240 V under any distribution fault condition.

Important: This product is not suitable for use with visual display workplace devices according to Clause 2 of the German Ordinance for Work with Visual Display Units.

Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® BladeCenter® Type 8852, 7989, and 1886 unit. It describes the diagnostic tools that come with the BladeCenter unit, 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 can 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 computer.
- **Field replacement 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 on the IBM Documentation CD.

Related documentation

In addition to this document, the following related documentation is provided in Portable Document Format (PDF) on the *BladeCenter Documentation* CD that comes with your BladeCenter unit:

- *BladeCenter H Installation and User's Guide*

  This printed document contains instructions for setting up the BladeCenter unit and general information about the BladeCenter unit, including information about features, and how to configure the BladeCenter unit. It also contains detailed instructions for installing, removing, and connecting optional devices that the BladeCenter unit supports.

- *BladeCenter H Rack Installation Instructions*

  This printed document contains instructions for installing the BladeCenter unit in a rack.

- *BladeCenter Advanced Management Module Installation Guide*

  This document contains instructions for installing the management module in the BladeCenter unit and creating the initial configuration.

- *BladeCenter Advanced Management Module User's Guide*

  This document provides general information about the management module for your BladeCenter unit type, including information about features, how to configure the management module, and how to get help.

- *BladeCenter Advanced Management Module Command-Line Interface Reference Guide*

  This document explains how to use the management-module command-line interface to directly access BladeCenter management functions as an alternative to using the Web-based user interface. The command-line interface also provides access to the text-console command prompt on each blade server through a Serial over LAN (SOL) connection.

- *BladeCenter Advanced Management Module Messages Guide*

This document contains a complete list of all non-device specific events and recommended actions, sorted by event ID. Device specific event information is in the documentation for the device.

- *Safety Information*

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

- *Safety Information Labels*

  This document provides the Simplified Chinese, Mongolian, Tibetan, Uygur, and Zhuang translated versions of the product safety labels.

- *Warranty*

  This document contains information about the terms of the warranty.

- *Serial over LAN Setup Guide*

  This document explains how to update and configure BladeCenter components for Serial over LAN (SOL) operation. The SOL connection provides access to the text-console command prompt on each blade server and enables the blade servers to be managed from a remote location.

Additional documentation might be included on the IBM *BladeCenter Documentation* CD.

The BladeCenter unit might have features that are not described in the documentation that comes with the BladeCenter unit. 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 BladeCenter unit documentation. These updates are available from the IBM Web site. To check for updated documentation and technical updates, go to http://www.ibm.com/support/.

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 BladeCenter unit. Depending on the model, some features might not be available, or some specifications might not apply.

Media tray (on front):	Upgradeable microcode:	Environment:

• Optical drive (optional)
• Two USB v2.0 ports
• Front system LED panel
 	
Blade bays (on front): 14 hot-swap blade-server bays
 	
Module bays (on front): Four hot-swap power-module bays
 	
Module bays (on rear):
• Two hot-swap management-module bays
• Ten hot-swap I/O-module bays
• Two hot-swap blower bays
 	
Power modules:
• Minimum: Two hot-swap power modules that are configured for redundant operation
• Maximum: Four hot-swap power modules that provide redundancy to all BladeCenter components
 	
Redundant cooling: Two variable-speed hot-swap blowers
 	
Management module:
• Minimum: One hot-swap advanced management module.
• Maximum: Two hot-swap advanced management modules: one active, one hot stand-by.
	• Management-module firmware
	• I/O-module firmware (not all I/O module types)
	• Blade-server firmware
	
	Security features:
	• Login password for remote connection
	• Secure Sockets Layer (SSL) security for remote management access
	
	Predictive Failure Analysis (PFA) alerts:
	• Blowers
	• Blade-dependent features
	
	Size (9 U):
	• Height: 400.1 mm (15.75 in. or 9 U)
	• Depth: 711.2 mm (28 in.)
	• Width: 482.6 mm (19 in.)
	• Weight:
	  – Full configured weight with blade servers: Approximately 158.8 kg (350 lbs)
	  – Empty chassis without modules or blade servers: Approximately 40.82 kg (90 lbs)
		• Air temperature:
		  – BladeCenter unit on:
		    - Altitude: 0 to 914 m (3000 ft) 10° to 35°C (50° to 95°F)
		    - Altitude: 914 m to 2134 m (3000 ft to 7000 ft) 10° to 32°C (50° to 90°F)
		  – BladeCenter unit off: -40° to 60°C (-40° to 140°F).
		• Humidity: 8% to 80%
		• Acoustics: declared sound power level: 7.5 bels[1]
		
		Electrical input:
		• Sine-wave input (50-60 Hz single-phase) required
		• Input voltage:
		  – Minimum: 200 V ac
		  – Maximum: 240 V ac
		
		Heat output: Approximate heat output in British thermal units (Btu) per hour:
		• Minimum configuration: 1024 Btu/hour (300 watts)
		• Maximum configuration: 32757 Btu/hour (9600 watts)
		
		Airflow: Approximate airflow in cubic feet per minute (cfm):
		• Minimum airflow: 450 cfm
		• Maximum airflow: 975 cfm

Notes:

1. Government regulations (such as those prescribed by Occupational Safety and Health Administration or European Community Directives) might govern noise level exposure in the workplace and might apply to you and your server installation. The actual sound pressure levels in your installation depend on a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room where you designate the racks to be installed; the noise levels from other equipment; the room ambient temperature; and employees' location in relation to the equipment. Compliance with such government regulations also depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. It is recommended that you consult qualified experts in this field to determine whether you are in compliance with the applicable regulations.

Controls, LEDs, and connectors

This section identifies the components, controls, and LEDs on the front and rear of the BladeCenter unit.

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

Front view

This section identifies the components, controls, and LEDs on the front of the BladeCenter unit.
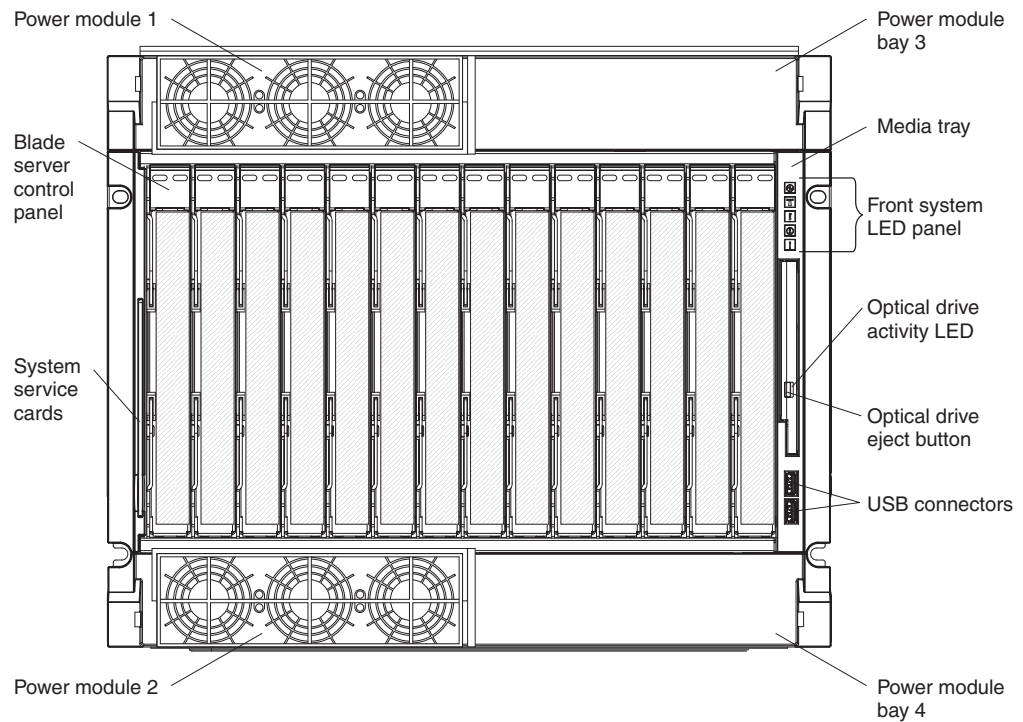
Power modules
The following illustration shows the LEDs on each power module.
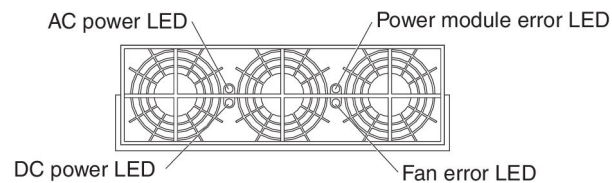
The LEDs on each power module indicate the condition of the power module and fan pack. For additional information, see "Light path diagnostic LEDs" on page 17.

Note: The orientation of the power module shown in the illustration is for a module that is installed in one of the top power-module bays. The orientation for a module that is installed in one of the bottom power-module bays is rotated 180°.

• **DC power LED:** When this green LED is lit, the dc output from the power module to the other components and blade servers is present and within specifications. During typical operation, both the ac power and dc power LEDs are lit.

- **AC power LED:** When this green LED is lit, ac input to the power module is present and within specifications. During typical operation, both the ac power and dc power LEDs are lit.
- **Power module error LED:** When this amber LED is lit, a power module has failed and is not operating within specifications.
- **Fan error LED:** When this amber LED is lit, a fan pack has failed and is not operating within specifications.

Media tray

The media tray contains the following:

- **Front system LED panel**

  The LEDs on this panel provide status information for your BladeCenter unit.

  Power-on

  Location

  Over-temperature

  Information

  System error
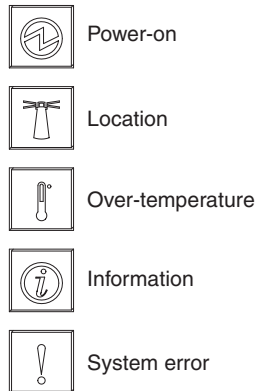
  Note: You can turn off the location LED and the information LED through the Web interface.

  – **Power-on:** When this green LED is lit, power is present in the BladeCenter unit. When this LED is off, the power subsystem, the ac power, or the LED has failed, or the management module is not present or not functioning.

    Attention: If the power-on LED is off, it does not mean there is no electrical current present in the BladeCenter unit. The LED might be burned out. To remove all electrical current from the BladeCenter unit, you must disconnect all power cords from all power modules.

  – **Location:** When this blue LED is lit or flashing, it has been turned on by the system administrator, to aid in visually locating the BladeCenter unit. If a blade server requires attention, the location LED on the blade server usually will also be lit. After the BladeCenter unit has been located, you can have the system administrator turn off the location LED.

  – **Over-temperature:** When this amber LED is lit, the temperature in the BladeCenter unit exceeds the temperature limits, or a blade server reports an over-temperature condition. The BladeCenter unit might have already taken corrective action, such as increasing the blower speed. This LED turns off automatically when there is no longer an over-temperature condition.

  – **Information:** When this amber LED is lit, a noncritical event has occurred that requires attention, such as the wrong I/O module inserted in a bay or power demands that exceed the capacity of power modules that are currently installed. The event is recorded in the event log. Check the LEDs on the BladeCenter unit and the blade servers to isolate the component (see Chapter 2, "Diagnostics," on page 11 for more information about event log messages and checking the LEDs). After the situation is corrected, have the system administrator turn off the information LED.

– **System-error:** When this amber LED is lit, it indicates that a system error has occurred, such as a failed module or a system error in a blade server. An LED on one of the components or on a blade server is also lit to further isolate the error. (See Chapter 2, "Diagnostics," on page 11 for more information.)

- **Optical-drive activity LED:** When this LED is lit, it indicates that the optical drive is in use.
- **Optical-drive eject button:** Press this button to release a disc from the optical drive.
- **USB connectors:** Use these connectors to attach external USB devices.

System service cards

These cards contain system service instructions and a writable area. They slide in and out of the storage location on the left side of the BladeCenter unit.

Blade server control panel

This panel contains indicators and controls for the blade server. See the documentation that comes with your blade server for information about the blade server control panel.

Rear view

This section identifies the components, connectors, and indicators on the rear of the BladeCenter unit.
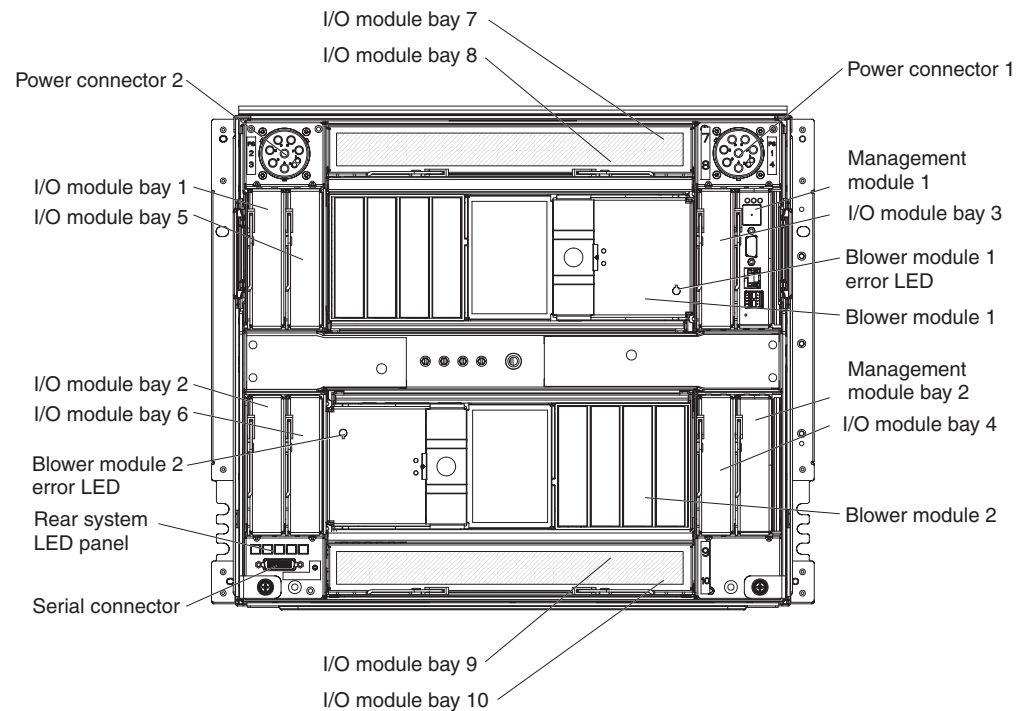
Power connectors

Connect a power cord from each power connector to a 220-volt power distribution unit (PDU) or an appropriate electrical outlet.

I/O modules

See the documentation that comes with each I/O module for a description of the LEDs and connectors on the I/O module.

Management modules
See the documentation that comes with each management module for a description of the LEDs and connectors on the module.

Blower modules
When the amber LED on a blower module is lit, an error has been detected in the blower or ac power to the blower is not present. The system-error LEDs on the BladeCenter system LED panels are also lit.

Serial connector
This connector provides direct access to the serial ports on each of the 14 blade server bays. Use this connector to attach the optional serial port breakout cable and connect up to 14 local consoles. See the documentation that comes with your blade server to see if it supports this cable.

Rear system LED panel
The LEDs on this panel provide status information. These LEDs duplicate the LEDs in the front system LED panel (see "Front system LED panel" on page 6 for more information).

Supplying power to the BladeCenter unit

To supply power to the BladeCenter unit, connect one end of each power cord to a power connector on the rear of the BladeCenter unit and the other end of each power cord to a 220-volt PDU that is connected to an appropriate electrical outlet. The BladeCenter unit does not have a power switch.

After the BladeCenter unit has power, the blade servers in the BladeCenter unit are connected to power but are not turned on. Depending on the configuration settings, the blade servers might have to be individually turned on.

Disconnecting power from the BladeCenter unit

You can shut down the BladeCenter unit by turning off the blade servers and disconnecting the BladeCenter unit from the power source.

To disconnect power from the BladeCenter unit, complete the following steps:

1. Shut down the operating systems and turn off any blade servers. See the documentation that comes with the blade server for detailed instructions.

   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.
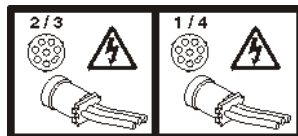
2. Disconnect both power cords from the BladeCenter unit.

   Attention: The power cords on the rear of the BladeCenter chassis are not approved to be connected or disconnected under power. You must first disconnect the power cords from the ac power source; then, you can remove the power cords from the chassis connectors.

   Note: After you disconnect the BladeCenter unit from power, wait at least 5 seconds before you connect the BladeCenter unit to power again.

Chapter 2. Diagnostics

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

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, "Getting help and technical assistance," on page 61 for more information.

Diagnostic tools

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

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See "Troubleshooting tables" on page 12 for more information.

- **Light path diagnostic LEDs**

  Use the light path diagnostic LEDs on the BladeCenter unit and the BladeCenter components to identify system errors quickly. See "Light path diagnostic LEDs" on page 17 for more information.

- **Diagnostic program and error messages**

  The management module built-in self-test (BIST) program checks the BladeCenter unit during startup; then while the BladeCenter unit is running, the management module constantly monitors the status of all of the installed components. If problems or changes in status are found, the management module generates messages and displays them in the event log (see "Event log messages" on page 19).

Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms. If one or more LEDs on the BladeCenter unit or the components is lit, see "Light path diagnostic LEDs" on page 17.

If you cannot find the problem in these tables, see "Solving undetermined problems" on page 20.

If you have just added a new optional device and the BladeCenter unit is not working, complete the following steps before using the troubleshooting tables:

1. Remove the device that you just added.
2. Restart the BladeCenter unit to determine whether the BladeCenter unit is working correctly.
3. Reinstall the new device.

Blade server 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," on page 23 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 blade server power-on LED flashes rapidly for an extended amount of time.	• Make sure that at least one management module is installed, and it is active and working. • Reseat the blade server. • Replace the blade server. • Update the service processor firmware (either IMM1 or IMM2) to the latest level.

Blower module 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," on page 23 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 blower module is running at full speed.	1. Make sure that:
	   • The other blower is installed and working.
	   • At least one management module is installed, and it is active and working.
	2. Reseat the following components:
	   a. Media tray
	   b. Blower module
	3. Replace the blower module.

• **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," on page 23 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 blower module is not working.	1. Make sure all power cords are plugged into 220-Volt power sources and that the power sources are working. 2. Reseat the blower module. 3. Replace the blower module.

Fan pack 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," on page 23 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 fan pack is running at full speed.	1. Make sure that at least one management module is installed, and it is active and working.
	2. Reseat the following components:
	  a. Power module.
	  b. Fan pack [1]
	3. Replace the fan pack [1]

[1] 2900W power modules with removable fan pack only. If the unit is equipped with 2980W power modules, reseat or replace the power module.

I/O module 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," on page 23 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 I/O module will not turn on.	1. Make sure that at least one management module is installed, and it is active and working. 2. Reseat the I/O module. 3. Replace the I/O module.
Cannot communicate with the external ports on an I/O module.	1. Make sure that external ports option is enabled in the management module Web interface. 2. Reseat the I/O module. 3. Replace the I/O module.

Keyboard, mouse, or pointing-device problems

Note: These symptoms apply only to the devices that are connected to the management module; they do not apply to the remote console.

- **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," on page 23 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 keyboard, mouse, or pointing device is not working.	1. Make sure that: • The device is connected to the active management module. • The KVM is owned by a blade server that supports KVM. • The blade server that owns the KVM is turned on. 2. Reseat the device cable. 3. Replace the device.
The keyboard, mouse or pointing device does not work after switching ownership of the KVM to a different blade server.	Make sure that: • The device cables are connected to the active management module, not the USB ports on the media tray. • The KVM is owned by a blade server that supports KVM.

Management module 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," on page 23 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
Cannot connect to the BladeCenter unit using the Web interface or telnet.	1. Make sure that: • The network cable is connected to the Ethernet port on the active management module. • The network cable is not connected to the serial port on the management module. • The IP address or host name is correct. 2. Reseat the management module. 3. Reset and reconfigure the management module (see the *BladeCenter Advanced Management Module Installation Guide* for more information). 4. Replace the management module.

• 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," on page 23 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

Cannot connect to the BladeCenter unit after a switchover to the redundant management module	1. Make sure that:
	
	  • The redundant management module has been installed for at least 45 minutes to receive the transfer of data from the primary management module.
	
	  • The network cable is connected to the Ethernet port on the active (redundant) management module.
	
	  • The network cable is not connected to the serial port on the active (redundant) management module.
	
	  • The IP address or host name is correct.
	
	2. Reseat the management module.
	
	3. Reset and reconfigure the management module (see the *BladeCenter Advanced Management Module Installation Guide* for more information).
	
	4. Replace the management module.

Media tray 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," on page 23 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 optical drive is not recognized by any blade server.	1. Reseat the following components:
	  a. Media tray
	  b. Optical drive
	
	2. Replace the optical drive.

The eject button of the optical drive is not working.	1. Unmount or uninstall the optical drive from OS. 2. Reseat the media tray.

Monitor or video problems

Note: These symptoms apply only to the monitor that is connected to the management module; they do not apply to the remote console.

Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor.

- **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," on page 23 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 monitor is not working	1. Make sure that:
	  • The monitor is turned on and the brightness and contrast controls are adjusted correctly.
	  • The monitor is connected to the active management module.
	  • The blade server that owns the KVM is turned on.
	  • The KVM is owned by a blade server that supports KVM.
	2. Reseat the monitor cable.
	3. Replace the monitor.

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," on page 23 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 BladeCenter unit does not power on.	1. Make sure that:
	  a. All power cords are plugged into 220-Volt power sources and that the power sources are working.
	  b. The ac power and dc power LEDs on the power modules are lit.
	2. If you just installed an option, remove it, and restart the BladeCenter unit. If the BladeCenter unit now powers on, you might have installed more options than the power modules support. You might have to install power modules in power-module bays 3 and 4.
	3. If the problem remains, go to "Solving undetermined problems" on page 20.

Light path diagnostic LEDs

Light path diagnostic LEDs are a system of LEDs on the BladeCenter unit and the BladeCenter components that can be used to identify system errors. If the front or rear system-error LED of the BladeCenter unit is lit, one or more error LEDs on the BladeCenter components also might be lit. These LEDs help identify the cause of the problem.

BladeCenter system LED panel

Use the following table to find solutions to problems that are identified by LEDs on the front and rear BladeCenter system LED panels.

- 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," on page 23 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 LED	Description	Action
Location	A condition has occurred in the BladeCenter unit that has caused the remote system management to identify the BladeCenter unit as needing attention.	Look for any information or error LEDs on the system-LED panels, the modules, and the blade servers in the BladeCenter unit, and follow the instructions for those LEDs in this section.
Over-temperature	The system temperature has exceeded a threshold level.	1. Determine whether a blower module has failed. If it has, replace the blower module as soon as possible, to regain redundancy. 2. Make sure that the room temperature is not too high. (See "Features and specifications" on page 4 for temperature information.) 3. Determine whether a blade server has a lit error LED. If it does, see the documentation that comes with the blade server. 4. Make sure that there is a blade server, module, or filler installed in each bay
Information	A noncritical event has occurred that should be looked at, such as the wrong I/O module inserted in a bay, or power requirements that exceed the capacity of the power modules currently installed.	1. Check the management module event log for messages. 2. Check the LEDs on the BladeCenter unit and the blade servers to isolate the component.
System error	A critical system error has occurred, such as nonredundancy on the power modules or a system error in a blade server.	1. Check the management module event log for messages. 2. Check the LEDs on the BladeCenter unit and the blade servers to isolate the component. • If the error LED is on a module, follow the instructions for that LED in "Module LEDs" on page 18. • If the error LED is on a blade server, see the documentation that comes with the blade server.

Module LEDs

Use the following table to find solutions to problems that are identified by LEDs on the modules installed in BladeCenter unit.

Note: To find descriptions and actions for LEDs on I/O modules or blade servers, see the documentation that comes with the device.

- **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," on page 23 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.**

LED status	Description	Action
Management module: Error LED lit	A critical error has occurred in the management module.	1. Reseat the management module. 2. Reset and reconfigure the management module (see the *BladeCenter Advanced Management Module Installation Guide* for more information). 3. Replace the management module.

Power module: AC power LED is lit, DC power LED not lit	A system fault has shut down the power module or the power module has failed.	1. Determine whether a failed component caused the shut down. If a component failed:
		  a. Replace the failed component.
		  b. Pull the power module out of the BladeCenter unit approximately two inches; then reinstall it.
		2. Replace the power module.

Power module: AC power LED not lit, DC power LED not lit	There is no ac power being supplied to the power module or the power module has failed.	1. Make sure that all power cords are plugged into 220-Volt power sources and that the power sources are working. 2. Replace the power module.
Power module: Fan error LED lit	The fan pack has failed.	Replace the fan pack
Power module: Error LED lit	The power module has failed.	Replace the power module.
Blower module: Error LED lit	The blower module has failed.	Replace the blower module.

Event log messages

Messages that are generated while the management module is monitoring the BladeCenter unit or by the BIST program during startup are displayed in the management module event log. Each message includes a severity level (error [E], warning [W], or information [I]), a source (such as, management module [SERVPROC] or blade server number [BLADE_xx]), a timestamp, and a text description.

When you are viewing the event log, consider the following information:

- If the source of a message is a blade server, see the documentation that comes with the blade server for more information.
- If the source of a message is not a blade server or the management module, see the documentation that comes with the device for more information.
- By default, the entries are sorted by timestamp, with the most recent entry first. You can sort the entries by severity, source, or timestamp by clicking on the appropriate column heading.
- You can filter the entries to show only the entries that match the severity, source, or date you select.
- When a message identifies a specific component, use the following general procedure to resolve the problem:
  1. Check for lit LEDs on the component (see "Light path diagnostic LEDs" on page 17 for more information).
  2. Reseat the component.
  3. Replace the component.
- Review messages with earlier timestamps before taking action on a more recent message. For example, an error message about a failing component with a recent timestamp may be related to an error message about the prior failure of another component.
- For some messages, when an problem has been resolved, the log will display a message beginning with the word "Recovery" and followed by the same text as the original message.

Solving undetermined problems

If the diagnostic aids did not diagnose the failure or if the BladeCenter unit is inoperative, use the information in this section.

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

- 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 all of the blade servers have the same symptom, it is probably a BladeCenter unit or module problem.

Check the LEDs on all the power modules. If the LEDs indicate that the power modules are working correctly, and reseating the BladeCenter components does not correct the problem, complete the following steps to remove or disconnect the BladeCenter components one at a time until you reach a minimal configuration or you locate the problem.

Note: You do not have to remove power from the BladeCenter unit.
1. Shut down the operating system on all blade servers.
2. Make sure that each blade server is turned off; then, pull the release handles to the open position and slide it out of the bay approximately 1 inch.
3. Disengage power modules 2, 3, and 4, one at a time. To do this, pull the release handle to the open position and slide the power module out of its bay approximately 1 inch.
4. Disengage the I/O modules, one at a time. To do this, pull the release handle to the open position and slide the I/O module out of the bay approximately 1 inch.

Note: The following minimum configuration is required for troubleshooting the BladeCenter unit. See "Features and specifications" on page 4 for the minimum operational configuration.

- BladeCenter unit (media tray may be connected)
- One power module in any power module bay
- One management module in either management module bay
- One blower module in either blower module bay

The BladeCenter unit can be checked with the management module Web interface at each stage as components are removed, and will work in the minimal configuration. If the minimal configuration does not work, do the following.
1. Recheck the management-module network settings.
2. Disengage the media tray, and slide it out of the bay approximately 1 inch.

   Note: The front and rear panel LEDs will not function with the media tray removed.
3. Move the power module to power module bay 2.
4. Remove the power cords from the power connectors and reconnect them.
5. Replace the management module.
6. Replace the power module.
7. Replace the midplane.

Calling IBM for service

See Appendix A, "Getting help and technical assistance," on page 61 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 or hard disk upgrades
- Failure symptoms
  - Does the system fail the diagnostic programs? If so, what are the error codes?
  - What occurred? When? Where? Did it occur on a single or multiple systems?
  - Is the failure repeatable?
  - Has the current system 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 the screen with the system summary information)
- 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 systems. When you compare systems to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the systems:
- Machine type and model
- BIOS code level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and release levels
- Diagnostic programs type and version level
- Configuration option settings
- Operating-system control-file setup

Chapter 3. Parts listing

The illustrations and tables in this section identify the replaceable components that are available for the BladeCenter H Type 8852, 7989, and 1886 unit.

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.

Front view
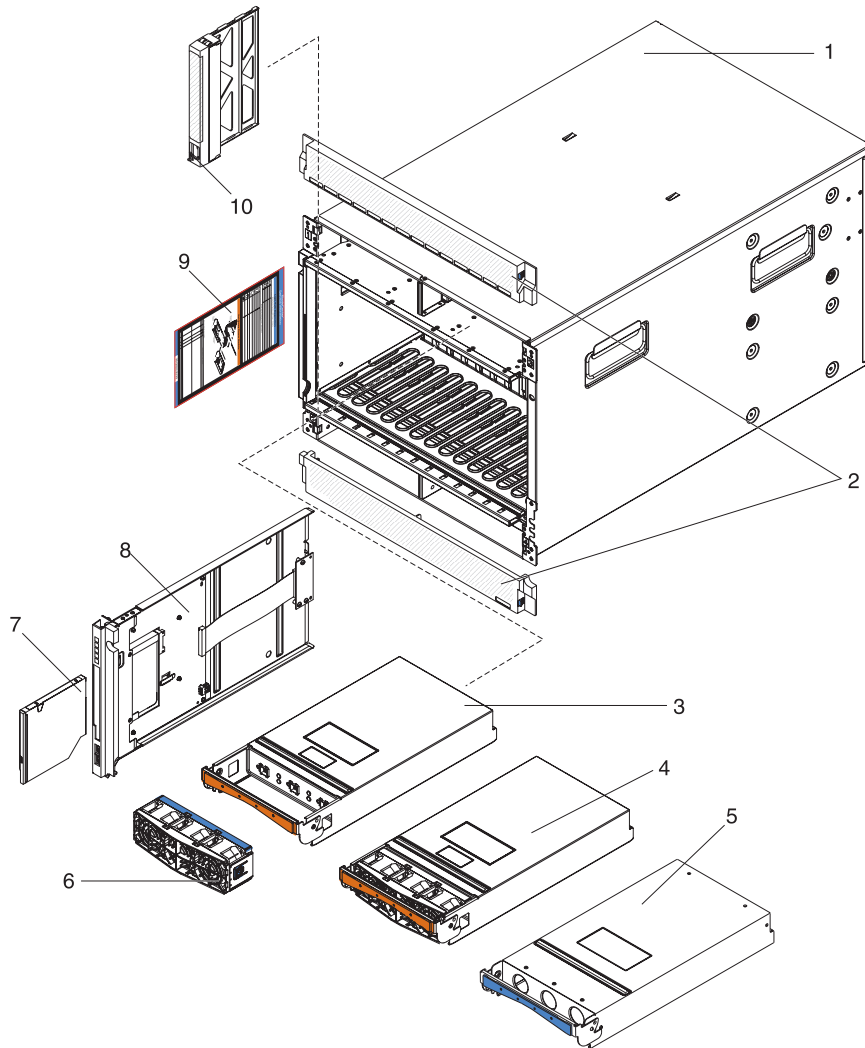
Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Chassis shell, without shuttle (all models)			31R3308
2	Bezels, top and bottom (all models)	31R3300		
3	Power Module, 2900W, without fan pack		39Y7364	
4	Power Module, 2980W high efficiency, with fan pack		39Y7415	
5	Filler, power module (all models)	31R3304		
6	Fan pack (models equipped with 2900W power module only)	43V7099		
7	CD-RW drive, primary (model 4Xx)	39M3545		
7	CD-RW drive, alternate (model 4Xx)	39M3501		
7	DVD-ROM drive	43W4619		
7	DVD drive, multi-burner, primary (model 4Yx)	43W4607		
7	DVD drive, multi-burner, alternate (model 4Yx)	43W4609		
7	Ultrabay Slim CD-RW/DVD-ROM combo drive	42C0967		

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
7	Ultrabay Slim CD-RW/DVD-ROM combo drive	42C0969		
7	DVD drive, SATA, multi-burner (model 4Sx) (option)	44W3254		
7	UltraSlim enhanced SATA multi-burner	44W3256		
8	Media tray (supports 9.5 mm optical drives, use with midplane FRU 25R5780) [1]	31R3305		
8	Media tray (supports 12.7 mm optical drives, use with midplane FRU 25R5780) [1]	43X0299		
8	Media tray (use with midplane FRUs 44X2302, 68Y6734, and 46C9700) [1]	44X2290		
9	System service cards (model 4Sx)	44X2267		
9	System service cards (model 4Yx)	43X0457		
9	System service cards (model 4Xx)	25R5676		
10	Filler, blade server (all models except 4Sx)	39M3317		
	Filler, optical drive	49Y4868		
	Filler, optical drive (model 4Sx)	46C5496		

[1] Your BladeCenter is equipped with one of two different midplane FRUs, depending on the media tray connector design. The media tray you install must match the connector on the midplane. Before you replace a media tray, identify the part number of the midplane FRU by logging on to the Advanced Management Module and checking the chassis hardware data. See the *Advanced Management Module User's Guide* or the *Advanced Management Module Command-Line Interface Reference Guide* for more information about viewing BladeCenter hardware data.

Rear view
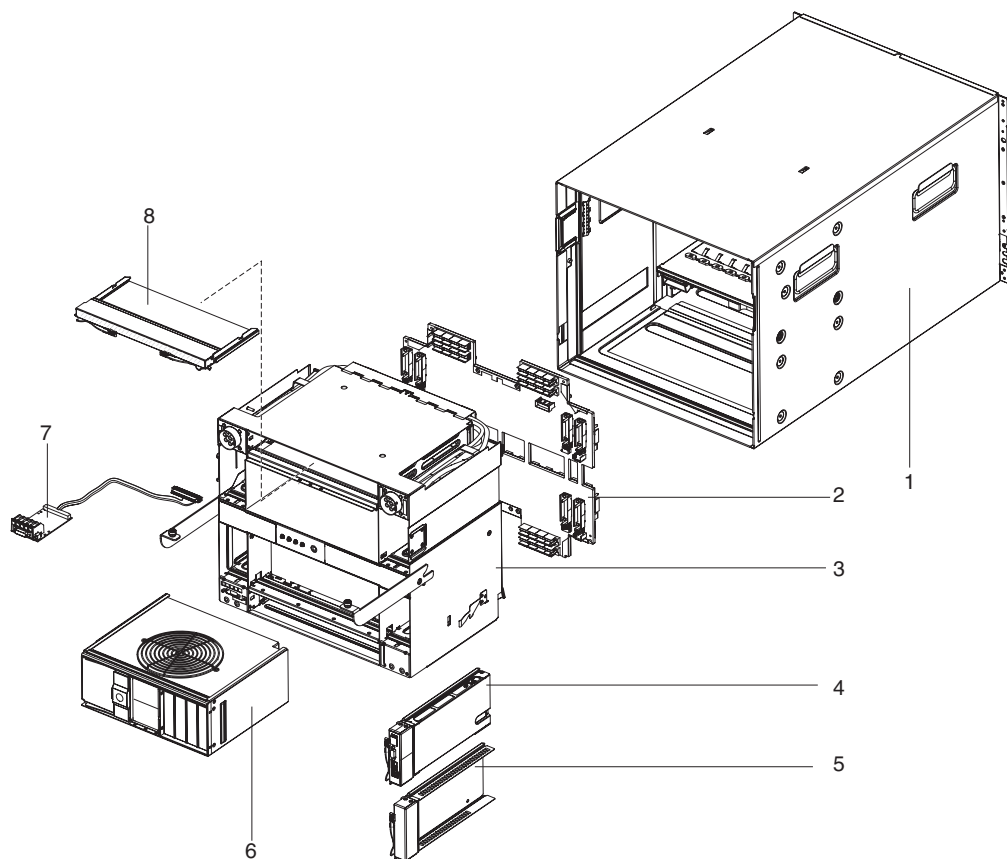
Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Chassis shell (without shuttle)			31R3308
2	Midplane (older models, chassis hardware version v6 or earlier) [1]			25R5780
2	Midplane (chassis hardware version v8) [1]			68Y6734
2	Midplane (chassis hardware version v11 only) [1]			46C9700
3	Shuttle, with card and cable assembly (all models)			31R3331
4	Management module (all models)	60Y0621		
5	Filler, I/O module bays 1-6 and management module (all models)	25R9934		
6	Blower module (older models, chassis hardware version v6 or earlier) [2]	44E5083		
6	Enhanced blower module (newer models, chassis hardware version v8 or later) [2]	68Y8205		
7	Card and cable assembly, rear LED/serial connector (all models)	31R3307		
8	Filler, I/O module bays 7-10, double high (all models)	31R3311		
	Cable, serial port breakout	40K9608		
	Cable, serial USB (option)		43X0510	
	Cable, switch stack, 1 meter (option)		44R8302	
	Card, 4x Expansion		49Y9976	

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Cisco Nexus 4001i switch module		46M6072	
	Filler, I/O module bays 7-10, single high (option)	31R3303		
	Filler, optical drive (option)			
	Kit, miscellaneous (all models)	31R3306		
	Kit, rack (all models)	39M3256		
	Label, system service	44X2289		
	Module, Infiniband pass-thru (option)		43W4424	
	Module, 10 GB high speed switch (option)		39Y9265	
	Module, slim high speed switch (option)		39Y9312	
	Module, catalyst switch 3110X (option)		41Y8518	
	Module, catalyst switch 3110G (option)		41Y8519	
	Module, Inferion 1GB with out stacking (option)		43W4404	
	Module, Intelligent Copper pass-thru (option)		44W4486	
	Module, Nortel 1/10 Gb uplink Ethernet switch (option)		44W4407	
	Module, Nortel 1/10 Gb uplink Ethernet switch (option)		44W4411	
	Module, Qlogic 4 GB fibre channel 10 port full fabric switch (option)		46C7009	
	Module, Qlogic 4 GB fibre channel 20 port full fabric switch (option)		46C7010	
	Module, Qlogic 4 GB 850 nm fibre channel 20 port pass-thru switch (option)		46C7011	
	Voltaire 40 GB Infiniband switch module		46M6006	

Attention:

[1] Before you replace a midplane FRU, identify the part number of the midplane you are replacing either by reading the FRU label on the midplane or by logging on to the Advanced Management Module and checking the chassis hardware data. See the *Advanced Management Module User's Guide* or the *Advanced Management Module Command-Line Interface Reference Guide* for more information about viewing BladeCenter hardware data.

[2] For a list of supported options for the BladeCenter, see the ServerProven® list at http://www.ibm.com/servers/eserver/serverproven/compat/us/.

Power cords

FRU part number	Description	Used in these countries
26R0001	Cable, IEC 320 C20	Worldwide
26R0003	Cable, NEMA L6-30P	Canada, Japan, Mexico, United States of America
26R0009	Cable, 30A 1-phase	Korea
39M5436	Cable, IEC 309 32A/IEC 320 C20	Worldwide except: Australia, Canada, Japan, Korea, Mexico, New Zealand, United States of America
39M5438	Cable, 30A/IEC 250 C20	Australia, New Zealand

Chapter 4. Removing and replacing BladeCenter 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 can install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designed for your computer.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

See Chapter 3, "Parts listing," on page 23 to determine whether a component is a 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 remove or replace a component, read the following information:

- Read the safety information that begins on page v and "Handling static-sensitive devices" on page 30. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- You do not have to disconnect the BladeCenter unit from power to install or replace any of the hot-swap modules in the BladeCenter unit. You must to shut down the operating system and turn off a hot-swap blade server before you remove the blade server, but you do not have to remove power from the BladeCenter unit itself.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the BladeCenter unit.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that you can remove or install the component while the BladeCenter unit is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the BladeCenter unit, open or close a latch, and so on.
- For a list of supported options for the BladeCenter unit, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

System reliability guidelines

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

- Each of the module bays on the front and rear of the BladeCenter unit has either a module or a module filler installed.
- Each of the blade bays on the front of the BladeCenter unit has either a blade server or a blade filler installed.
- Each of the drive bays in a blade server storage expansion option has either a hot-swap drive or a filler panel installed.
- You have followed the cabling instructions that come with optional adapters.
- A removed hot-swap module, blade server, or drive is replaced within 1 minute of removal.
- Cables for the optional modules are routed according to the illustrations and instructions in this document.
- A failed blower is replaced as soon as possible, to restore cooling redundancy.

Handling static-sensitive devices

Attention: Static electricity can damage the BladeCenter unit 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 electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the BladeCenter unit or rack for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it immediately without setting down the device. If it is necessary to set down the device, put it back into its static-protective package.
- 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 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 from your hardware.

Removing a bezel

When working with some devices, such as the media tray and power modules, you must first remove the top or bottom bezels to access the devices.
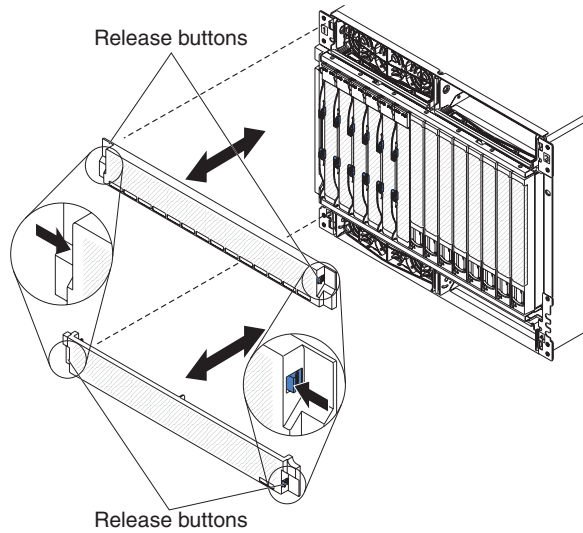
To remove either bezel, complete the following steps.
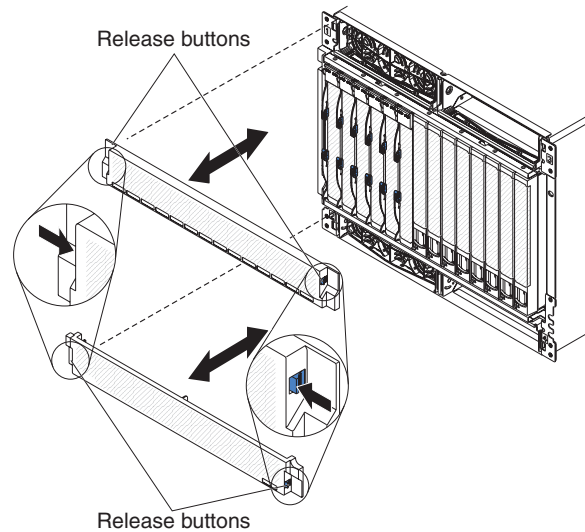
1. Press the blue release button on each end of the bezel.
2. Pull the bezel away from the BladeCenter unit.

Installing a bezel

To install either the top or bottom bezel, complete the following steps.

Release buttons

Release buttons

1. Align the blue tabs on the ends of the bezel with the corresponding holes in the front of the BladeCenter unit.

2. Firmly press the bezel into the BladeCenter unit until the tabs lock it into place.

Removing and replacing the media tray and optical drive or optical drive filler

Your BladeCenter is equipped with one of two different media tray FRUs, depending on the midplane connector design. Before you replace a media tray FRU, identify the part number of the media tray you are replacing either by reading the FRU label on the media tray or by logging on to the Advanced Management Module and checking Hardware VPD information for the Media Module. See the *Advanced Management Module User's Guide* or the *Advanced Management Module Command-Line Interface Reference Guide* for more information about viewing BladeCenter hardware data.

Notes:

1. The following Media Module FRU is compatible only with chassis hardware version v8 midplane (FRU part number 44X2302 or 68Y6734) and v11 midplane (FRU part number 46C9700):
   - Media module FRU part number 44X2290

2. The following Media Module FRU are compatible only with chassis hardware version v6 midplane (FRU part number 25R5780) or earlier:
   - Media module FRU part number 31R3305
   - Media module FRU part number 43X0299
   - Media module FRU part number 44X2268

Removing the media tray and optical drive or optical drive filler

To remove the media tray and optical drive or optical drive filler, complete the following steps.
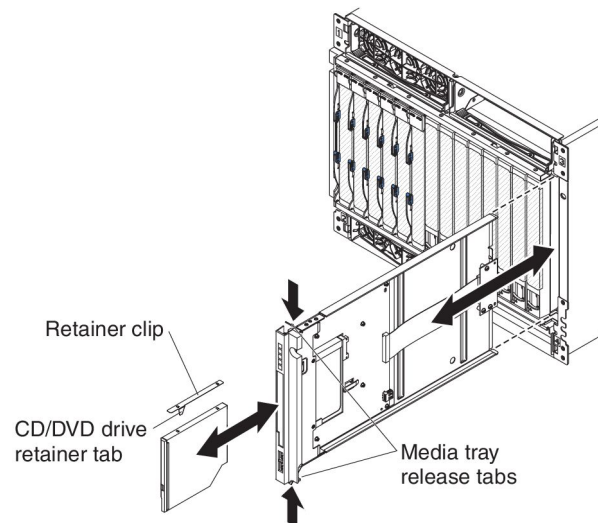
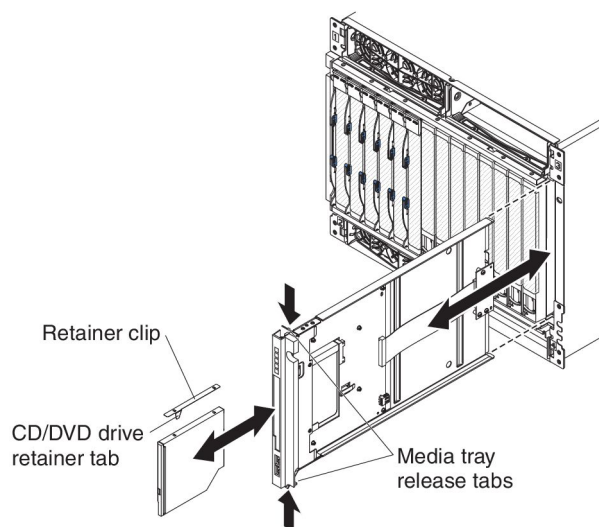**Note:** These instructions assume that the BladeCenter unit is connected to power.

1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Remove the top and bottom bezels (see "Removing a bezel" on page 31).
3. Press the release tabs on the top and bottom of the media tray; then, pull the tray out of the BladeCenter unit.
4. Place the media tray on a clean, static-free surface with the circuit board and optical drive facing up.

Attention: To prevent damage to the circuit board, do not touch or apply pressure to the circuit board or any of its components.

5. Press the optical drive retainer tab and slide the optical drive or optical drive filler out of the media tray.

6. Remove the retainer clip from the side of the optical drive or optical drive filler.

7. If you are instructed to return the media tray, optical drive, or optical drive filler, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the media tray and optical drive or optical drive filler

To install the media tray and optical drive or optical drive filler, complete the following steps.

Note: These instructions assume that the BladeCenter unit is connected to power.

1. Make sure that the media tray is on a clean, static-free surface with the circuit board facing up.

   Attention: To prevent damage to the circuit board, do not touch or apply pressure to the circuit board or any of its components.

2. Install the retainer clip on the side of the optical drive or optical drive filler.

3. Carefully slide the optical drive or optical drive filler into the bay on the media tray until it fully engages the connector and the retainer tab locks into place.

4. Carefully slide the media tray into the BladeCenter unit until the release tabs lock it into place.

5. Install the top and bottom bezels (see "Installing a bezel" on page 32).

Removing and replacing a power module

Your BladeCenter might be equipped with 2900W power modules that have a removable fan pack (part number 39Y7408), or it might be equipped with 2980W high-efficiency power modules with integrated fan pack (part number 39Y7415). The 2900W and 2980W high-efficiency power modules are not interchangeable within the same power domain of the chassis. A power module configuration is supported only if the two power modules are matched within the same power domain:

- Power modules 1 and 2 provide power for domain A (blade slots 1 to 7)
- Power modules 3 and 4 provide power for domain B (blade slots 8 to 14)

The following is an example of a supported configuration:

- Domain A: Power Module 1; 2900W, Power Module 2; 2900W
- Domain B: Power Module 3; 2980W, Power Module 4; 2980W

This is an example of a non-supported configuration:

- Domain A: Power Module 1; 2900W, Power Module 2; 2980W
- Domain B: Power Module 3; 2900W, Power Module 4; 2980W

Attention: Failed power modules should only be replaced with the same type of power module.

Note: The 2980W high-efficiency power modules are identified by a label on the power module handle. Remove the top or bottom bezel as needed to access the power module handle. 2900W power modules do not have this label.

2980 W label

2980 W High
Efficiency label
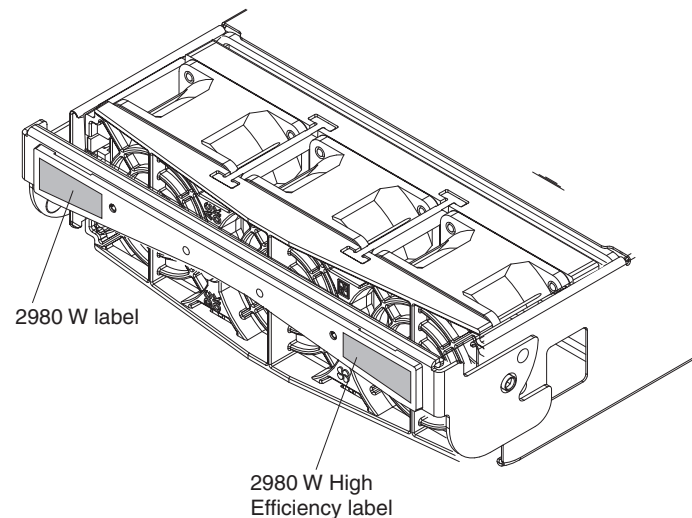
Removing a power module

Attention:

- To help ensure proper cooling and system reliability, make sure that you replace a removed power module or filler with a power module or filler within 1 minute.
- If you are removing a functioning power module, make sure that power LEDs on the remaining power modules are lit; otherwise, shut down the operating systems and turn off all of the blade servers, before you proceed. (See the documentation that comes with the blade server for instructions for shutting down the blade-server operating system and turning off the blade server.)

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.

To remove a power module or power-module filler, complete the following steps.
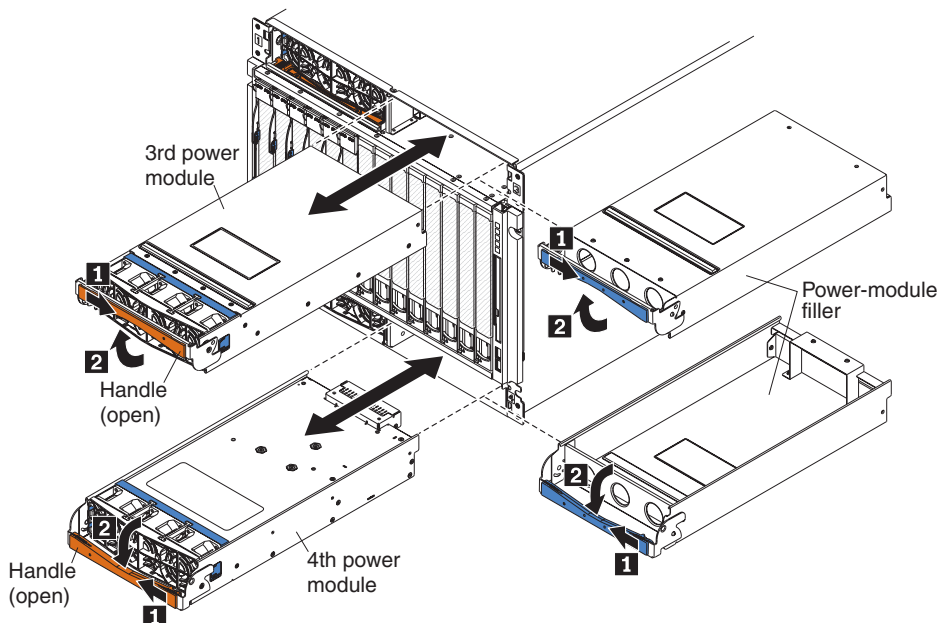
Note: These instructions assume that the BladeCenter unit is connected to power.

1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Remove the top or bottom bezel as needed to access the power module to be removed (see "Removing a bezel" on page 31).
3. Open the power-module handle using one of the following procedures:
   - For a power module in one of the upper power-module bays, push the inner handle release to the right; then, pull the handle up to the open position.
   - For a power module in one of the lower power-module bays, push the inner handle release to the left; then, pull the handle down to the open position.

   The power module moves out of the bay approximately 0.6 cm (0.25 inch).
4. Use the handle to pull the module out of the bay. Within 1 minute, install either another identical power module or a filler into the module bay.
5. If you are replacing a 2900W power module with a new one, remove the fan pack for installation on the new 2900W power module (see "Removing and replacing a fan pack" on page 39).

   Note: Do not attempt to remove the fan pack from a 2980W high-efficiency power module. The fan pack on a 2980W high-efficiency power module is not a replaceable component.
6. If you are instructed to return the power module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a power module

To install a power module or power-module filler, complete the following steps.
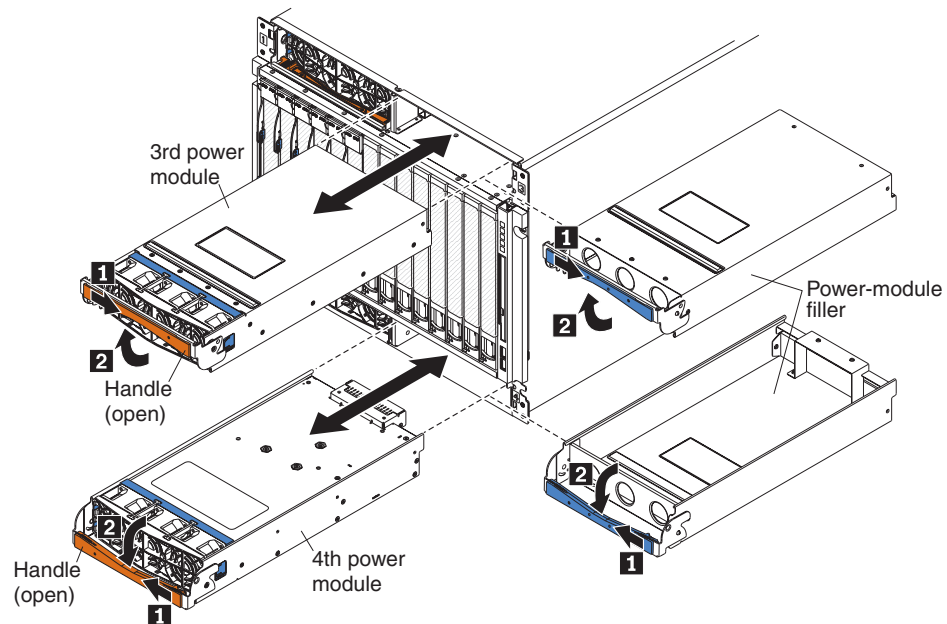
Attention: Failed power modules should only be replaced with the same type of power module.

Note: These instructions assume that the BladeCenter unit is connected to power.

1. If you are replacing a 2900W power module, install a fan pack on the power module if one is not already installed (see "Removing and replacing a fan pack" on page 39).

Note: The 2980W high-efficiency power module comes with an integrated fan pack.

2. Make sure that the handle on the power module is in the open position.
3. Orient the new power module to the selected power-module bay:
   - For the upper power-module bays, the rear connector on the power module must be facing down.
   - For the lower power-module bays, the rear connector on the power module must be facing up.
4. Slide the module into the bay until it stops; then, push the handle to the closed position.
5. Install the bezel that was removed during the removal procedure (see "Installing a bezel" on page 32).

Removing and replacing a fan pack

The procedures in this section apply only to BladeCenter units equipped with 2900W power modules that have a removable fan pack (part number 39Y7408). If your BladeCenter is equipped with 2980W high-efficiency power modules with integrated fan pack (part number 39Y7415), you must replace the entire power module if the fan pack fails. See "Removing and replacing a power module" on page 35 for information and procedures.

Removing a fan pack

To remove a fan pack from a 2900W power module, complete the following steps.

Handle
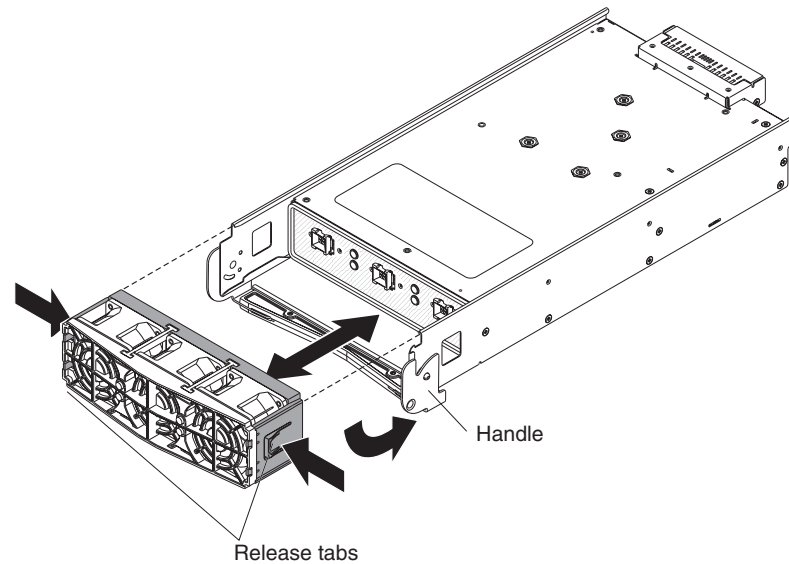
Release tabs

1. Remove the selected power module (see "Removing a power module" on page 36).
2. With the power module rear connector facing up, rotate the handle down so that it is parallel with the bottom of the module.
3. Press the blue release tabs on each side of the fan pack.
4. Pull the fan pack away from the power module.
5. If you are instructed to return the fan pack, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a fan pack

To install a fan pack on a 2900W power module, complete the following steps.


Handle

Release tabs
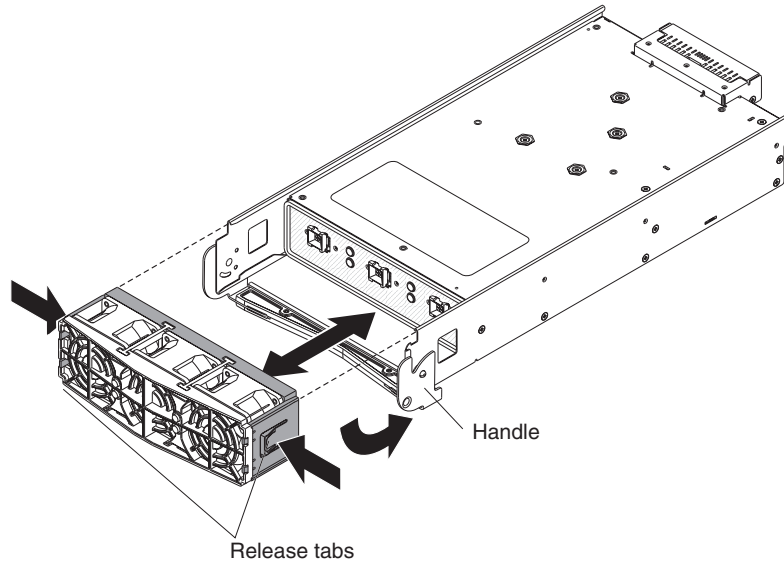
1. Make sure that the handle is rotated down so that it is parallel with the bottom of the module, with the power module rear connector facing up.
2. Slide the fan pack into position on the power module until it stops and locks into place.
3. Rotate the power module handle to the open position.
4. Install the power module (see "Installing a power module" on page 37).

Removing a blade server

Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit without a blade server, expansion unit, or blade server filler installed in each blade bay.
- Note the bay number. Reinstalling a blade server into a different bay from the one from which it was removed could have unintended consequences. Some configuration information and update options are established according to bay number.

To remove a blade server, complete the following steps.
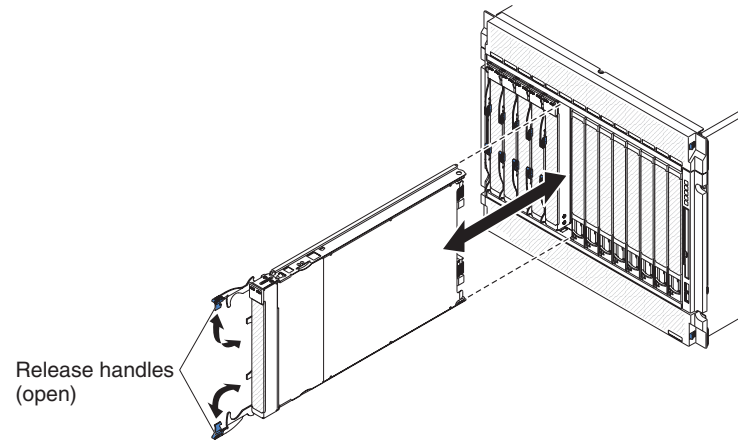
Release handles
(open)

Note: These instructions assume that the BladeCenter unit is connected to power.

1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Shut down the blade-server operating system; then, shut down the blade server. See the documentation that comes with your blade servers for the procedure to shut down the operating system. Wait at least 30 seconds until the drives stop spinning, before you proceed 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. Within 1 minute, install either another blade server or a filler into the module bay.
5. If you are instructed to return the blade server, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
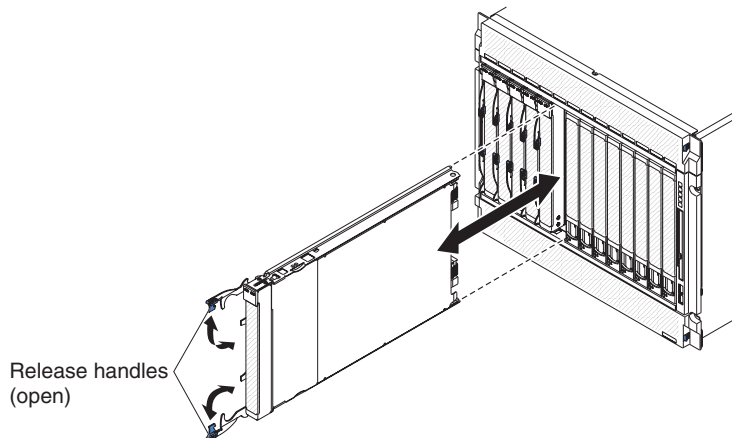
Installing a blade server

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.

Attention:
- Reinstalling a blade server into a different bay from the one from which it was removed could have unintended consequences. Some configuration information and update options are established according to bay number. You might have to reconfigure the blade server.
- If this is the initial installation of a blade server in the BladeCenter unit, you must configure the blade server with the blade-server Configuration/Setup Utility program and install the blade-server operating system. See the documentation that comes with the blade server for instructions.

To install a blade server, complete the following steps.

Release handles
(open)

Note: These instructions assume that the BladeCenter unit is connected to power.

1. Select the bay for the blade server.

   Notes:
   a. Depending on the blade-server type and the optional devices that are installed in it, two or more adjacent bays might be required.
   b. When any blade server or device is in blade bays 8 through 14, power modules must be present in all four power bays.

2. Remove the filler from the bay, if one is installed.

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

3. Make sure that the two release handles are in the open position.
4. Slide the blade server into the bay until it stops.
5. Push the two release handles to the closed position.

6. Make sure that the blade server is receiving power. See the documentation that comes with the blade server for more instructions.
7. (Optional) Write identifying information on one of the labels that come with the blade server; then, place the label on the BladeCenter unit top bezel, just above the blade server.

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

Removing an I/O module

To remove an I/O module or module filler, complete the following steps.
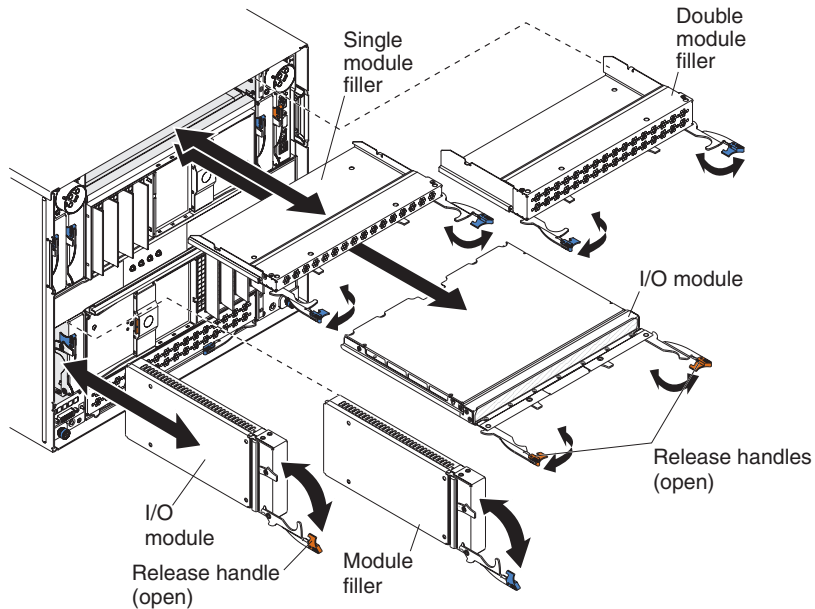
Note: These instructions assume that the BladeCenter unit is connected to power.

1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Disconnect all cables from the module.
3. Pull the release handle or handles to the open position. The module moves out of the bay approximately 0.6 cm (0.25 inch).

   Note: The modules and fillers in I/O bays 1 through 6 each have one release handle; the modules and fillers in I/O bays 7 through 10 each have two release handles.

4. Slide the module out of the bay. Within 1 minute, install either another module or a filler into the module bay.
5. If you are instructed to return the I/O module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an I/O module

The BladeCenter unit has 10 hot-swap I/O module bays that are compatible with three types of I/O modules (see "Rear view" on page 7 for the location of the I/O module bays). See the *Installation and User's Guide* for a description of the types of modules that can be used in each bay.

Note: Before you install a new I/O module, read the documentation that comes with the module for detailed instructions.

To install an I/O module or filler, complete the following steps.
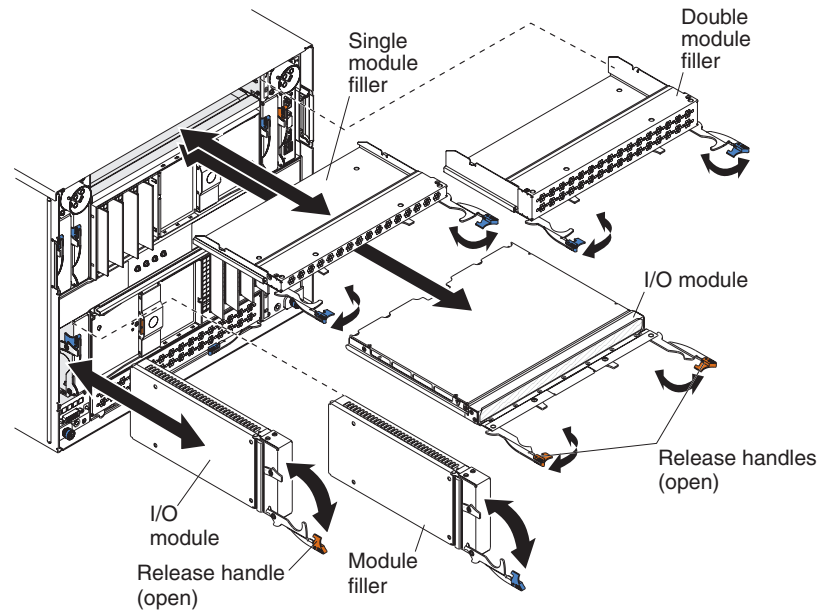
Note: These instructions assume that the BladeCenter unit is connected to power.

1. Make sure that the release handle or handles are in the open position.

   Note: The modules and fillers in I/O bays 1 through 6 each have one release handle; the modules and fillers in I/O bays 7 through 10 each have two release handles.

2. Slide the module into the module bay until it stops.
3. Push the release handle or handles to the closed position.
4. Reconnect all cables to the module.

Removing a management module

To remove a management module or filler, complete the following steps.

Notes:

1. These instructions assume that the BladeCenter unit is connected to power.
2. If you are replacing the only management module in the BladeCenter unit and the management module is functioning, save the configuration file before you proceed. See the *BladeCenter Management Module User's Guide* and the *BladeCenter Management Module Command-Line Interface Reference Guide* for instructions for saving and restoring a configuration file.
3. If you have just installed a second management module in the BladeCenter unit, do not remove the first (primary) management module for up to 45 minutes; the second (redundant) management module needs the time to receive initial status information and firmware levels from the primary management module.
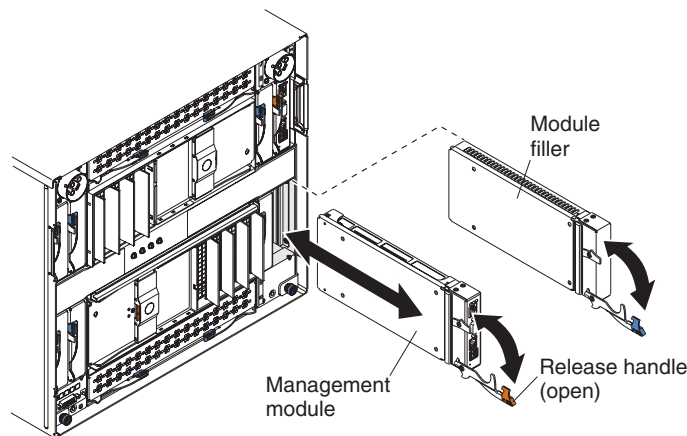

1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Disconnect all cables from the module.
3. Pull the release handle to the open position. The module moves out of the bay approximately 0.6 cm (0.25 inch).
4. Slide the module out of the bay. Within 1 minute, install either another management module or a filler into the bay.
5. If you are instructed to return the management module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a management module

To install a management module, complete the following steps.
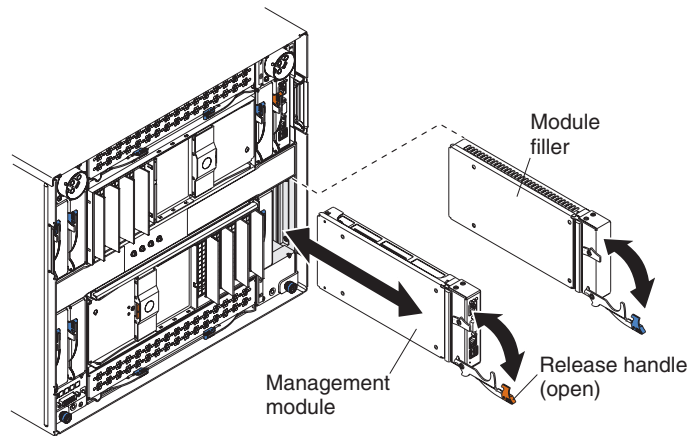
Note: These instructions assume that the BladeCenter unit is connected to power.

1. Make sure that the release handle on the module is in the open position.
2. Slide the module into the module bay until it stops.
3. Push the release handle to the closed position.
4. Reconnect all cables to the module.
5. If this is the only management module in the BladeCenter unit, restore the configuration from the configuration file that you saved when you removed the old management module. See the *BladeCenter Management Module User's Guide* and the *BladeCenter Management Module Command-Line Interface Reference Guide* for detailed information about restoring a saved configuration file.
6. Make sure that the OK LED on the module is lit.

Removing and replacing a blower module

Your BladeCenter might be equipped with standard blower modules (part number 44E5083), or it might be equipped with high-efficiency blower modules (part number 68Y8205). The standard and high-efficiency blower modules are not interchangeable and should not be mixed in the same BladeCenter unit.

Attention: Failed blower modules should only be replaced with the same type of blower module.

Note: Government regulations (such as those prescribed by Occupational Safety and Health Administration or European Community Directives) might govern noise level exposure in the workplace and might apply to you and your server installation. The actual sound pressure levels in your installation depend on a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room where you designate the racks to be installed; the noise levels from other equipment; the room ambient temperature; and employees' location in relation to the equipment. Compliance with such government regulations also depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. It is recommended that you consult qualified experts in this field to determine whether you are in compliance with the applicable regulations.

Removing a blower module

To remove a blower module, complete the following steps.
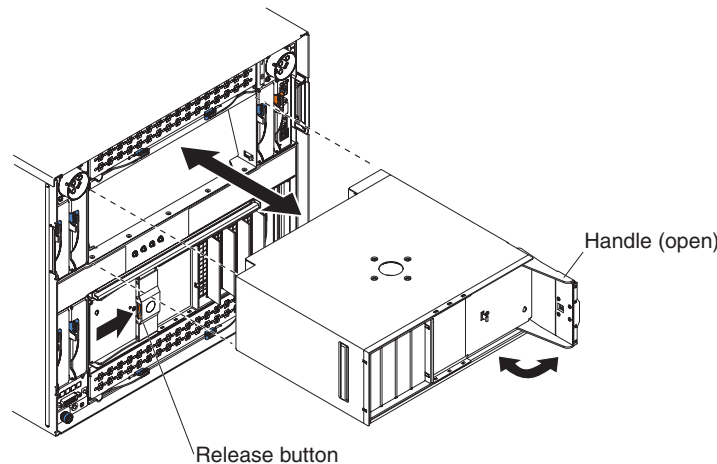
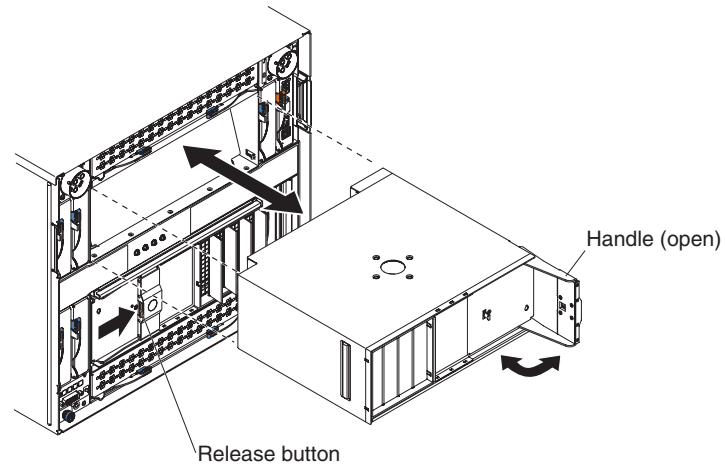Handle (open)

Release button

Note: These instructions assume that the BladeCenter unit is connected to power.

1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Press the release button on the blower handle and rotate the handle to the open position (rotate it to the right for the upper blower module or to the left for the lower blower module).
3. Using the handle, pull the blower module out of the bay. Within 1 minute, install another blower module into the bay.
4. If you are instructed to return the blower module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a blower module

To install a blower module, complete the following steps.

Handle (open)

Release button

Note: These instructions assume that the BladeCenter unit is connected to power.

1. Make sure that the handle on the blower module is in the open position.
2. Orient the blower module to the selected blower-module bay:
   - For the upper bay, the handle must be on the right.
   - For the lower bay, the handle must be on the left.
3. Slide the module into the bay until it stops; then, push the handle to the closed position.

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

The illustrations in this document might differ from your hardware.

Removing the shuttle

To remove the shuttle, complete the following steps.

Shuttle

Shipping screws

Captive thumb
screws

Release latch

Release handle
(open)
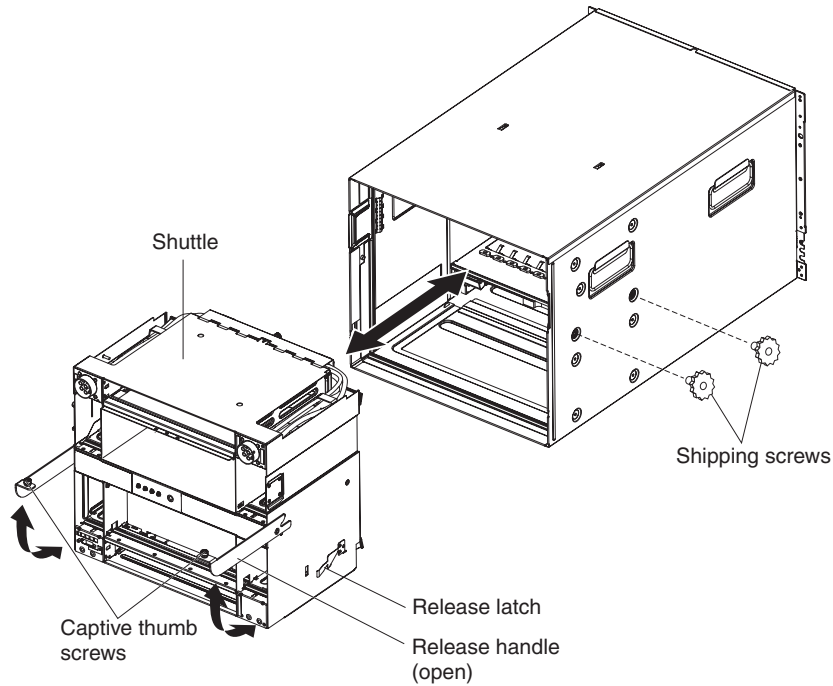
Attention: The BladeCenter unit comes with two shipping screws in each side of
the chassis that help prevent damage to the shuttle during shipment. Make sure
that these screws have been removed before attempting to remove the shuttle.

1. Read the safety information that begins on page v and "Installation
   guidelines" on page 29.
2. Shut down the operating systems and turn off any blade servers in the
   BladeCenter unit. See the documentation that comes with the blade server for
   detailed instructions.
3. Disconnect the power from the BladeCenter unit (see "Disconnecting power
   from the BladeCenter unit" on page 9).
4. Disconnect the cables from the modules in the rear of the BladeCenter unit.
5. Remove any of the following modules that are installed in the rear of the
   BladeCenter unit:
   - I/O modules (see "Removing an I/O module" on page 44).
   - Management modules (see "Removing a management module" on page 46).
   - Blower modules (see "Removing a blower module" on page 48).
6. Remove the two shipping screws from each side of the chassis, if they are
   installed.

7. Remove the upper and lower shipping brackets from the rear of the BladeCenter unit and the rack, if they are installed (see the *Rack Installation Instructions* for more information).

8. Remove the top and bottom bezels (see "Removing a bezel" on page 31).

9. Disengage the following components from the BladeCenter midplane using the procedure indicated:

   • Blade servers: Pull the two release handles on each blade server to the open position (see "Removing a blade server" on page 41).

   • Power modules: Pull the handle on each power module to the open position (see "Removing a power module" on page 36).

   • Media tray: Press the release tabs on the top and bottom of the media tray; then, pull the tray out of the BladeCenter unit (see "Removing the media tray and optical drive or optical drive filler" on page 33).

   Make sure each component is pulled out of the BladeCenter unit about 2.54 cm (1 inch).

   Note: You do not have to remove any of these components completely from the BladeCenter unit.

10. Loosen the captive thumbscrews on the release handles, and pull the handles to the open position. The shuttle moves out of the BladeCenter chassis about 1.27 cm (0.5 inches).

11. Using the handles, pull the shuttle out until it stops (about half-way out).

12. While supporting the shuttle with your hands, press the release latches on each side, and pull the shuttle out of the BladeCenter chassis.

13. If you are replacing the shuttle with a new shuttle, remove the midplane (see "Removing the midplane" on page 56) and any remaining module fillers for installation on the replacement part.

14. If you are instructed to return the shuttle, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the shuttle

To install the shuttle, complete the following steps.

Shuttle

Shipping screws

Captive thumb
screws

Release latch

Release handle
(open)
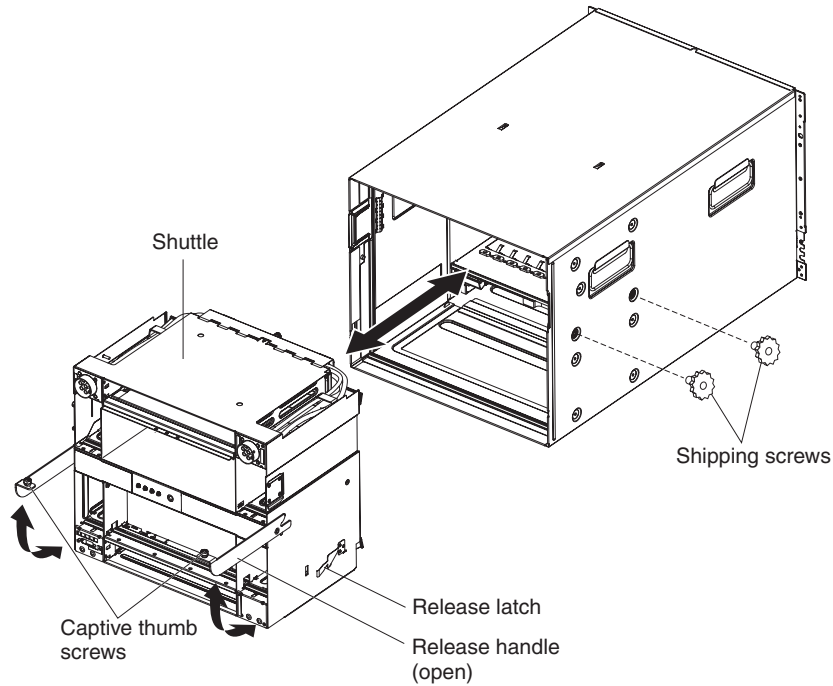
1. If you are installing a new shuttle, install the midplane from the removed shuttle (see "Installing the midplane" on page 57).

2. Make sure that the release handles on the shuttle are in the open position.

3. Align the shuttle with the BladeCenter chassis and push the shuttle into the chassis until it stops.

4. Push the release handles to the closed position. The shuttle will move back fully into the BladeCenter chassis.

5. Tighten the captive thumbscrews on the release handles.

6. Install the upper and lower shipping brackets on the rear of the BladeCenter unit and the rack, if they were removed (see the *Rack Installation Instructions* for more information).

7. Install the two shipping screws in each side of the chassis, if they were removed.

8. Install any of the following modules that were removed from the rear of the BladeCenter unit:

   - I/O modules (see "Removing an I/O module" on page 44).
   - Management modules (see "Installing a management module" on page 47).
   - Blower modules (see "Installing a blower module" on page 49).

9. Push the following components fully into the front of the BladeCenter unit to re-engage the midplane using the procedure indicated:
   - Blade servers: Push each blade server into the bay; then, push the two release handles to the closed position (see "Installing a blade server" on page 42).
   - Power modules: Push each power module into the bay; then, push the handle to the closed position (see "Installing a power module" on page 37).
   - Media tray: Push the media tray into the BladeCenter unit until the release tabs lock it into place (see "Installing the media tray and optical drive or optical drive filler" on page 34).
10. Install the top and bottom bezels (see "Installing a bezel" on page 32).
11. Install any module or blade fillers that were removed.
12. Reconnect any cables that were disconnected from the modules in the rear of the BladeCenter unit.
13. Reconnect the power to the BladeCenter unit (see "Supplying power to the BladeCenter unit" on page 9).
14. Restart any blade servers that were shut down in the BladeCenter unit. See the documentation that comes with each blade server for detailed instructions.

Removing the rear LED/serial connector assembly

To remove the rear LED/serial connector assembly, complete the following steps.
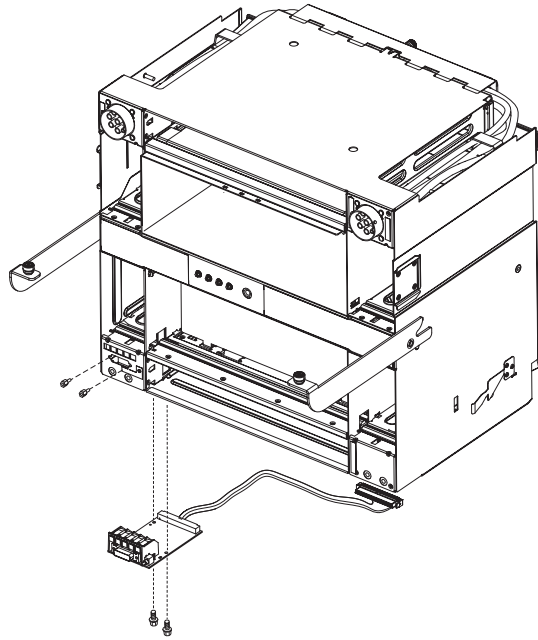
1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Shut down the operating systems and turn off any blade servers in the BladeCenter unit. See the documentation that comes with the blade server for detailed instructions.
3. Disconnect the power from the BladeCenter unit (see "Disconnecting power from the BladeCenter unit" on page 9).
4. Remove the shuttle from the BladeCenter unit (see "Removing the shuttle" on page 50). Place the shuttle on its top on a sturdy surface.
5. Disconnect the assembly cable from the midplane connector. Note the routing of the cable for use during reinstallation.
6. Remove the two studs that attach the serial connector to the rear panel of the shuttle.
7. Remove the two screws that connect the circuit board of the assembly to the bottom of the shuttle.
8. Carefully grasp the circuit board and pull it away from the rear panel of the shuttle until it stops.
9. Tilt the edge of the circuit board out of the opening in the shuttle bottom and slide the assembly out of the shuttle.
10. If you are instructed to return the assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the rear LED/serial connector assembly

To install the rear LED/serial connector assembly, complete the following steps.
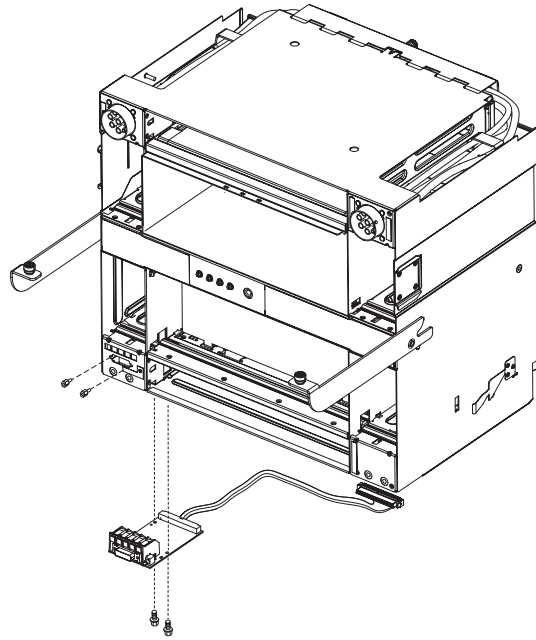
1. Insert the assembly into the opening in the shuttle bottom; then, carefully slide it forward until the serial port is seated firmly in the opening on the back panel of the shuttle.
2. Install the two studs that attach the serial connector to the rear panel of the shuttle.
3. Install the two screws that connect the circuit board of the assembly to the bottom of the shuttle.
4. Route the assembly cable and reconnect it to the midplane connector.

   Attention: Make sure that the cable is properly routed within the structure of the shuttle. An incorrectly routed cable can be pinched and damaged when the shuttle is installed in the BladeCenter unit.
5. Install the shuttle into the BladeCenter unit (see "Installing the shuttle" on page 52).
6. Reconnect the power to the BladeCenter unit (see "Supplying power to the BladeCenter unit" on page 9).
7. Restart any blade servers that were shut down in the BladeCenter unit. See the documentation that comes with the blade server for detailed instructions.

Removing and replacing the midplane

Your BladeCenter is equipped with one of two different midplane FRUs, depending on the media tray connector design. Before you replace a midplane FRU, identify the part number of the midplane you are replacing either by reading the FRU label on the midplane or by logging on to the Advanced Management Module and checking the chassis hardware data. See the *Advanced Management Module User's Guide* or the *Advanced Management Module Command-Line Interface Reference Guide* for more information about viewing BladeCenter hardware data.

Notes:

1. If your BladeCenter H chassis hardware is version v6 or earlier, install midplane FRU part number 25R5780.

2. If your BladeCenter H chassis hardware is version v8 or later, install midplane FRU part number 68Y6734.
3. If your BladeCenter H chassis hardware is version v11, install midplane FRU part number 46C9700.

Attention: The different midplane FRUs are not interchangeable. A failed midplane FRU should only be replaced with a midplane having the same FRU part number.

Removing the midplane

To remove the midplane, complete the following steps.
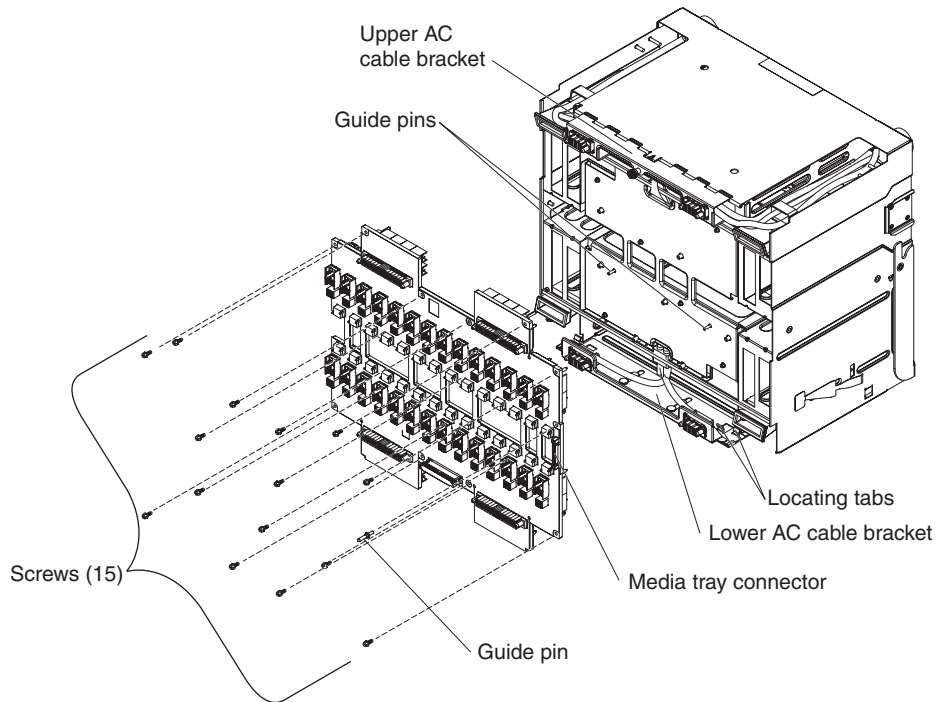
1. Read the safety information that begins on page v and "Installation guidelines" on page 29.
2. Shut down the operating systems and turn off any blade servers in the BladeCenter unit. See the documentation that comes with the blade server for detailed instructions.
3. Disconnect the power from the BladeCenter unit (see "Disconnecting power from the BladeCenter unit" on page 9).
4. Remove the shuttle from the BladeCenter unit (see "Removing the shuttle" on page 50).
5. Disconnect the rear LED/serial connector assembly cable from the midplane connector.
6. Remove the guide pin on the right side of the midplane, above the media tray connector.
7. Loosen the captive thumbscrew on the upper ac cable bracket.
8. Remove the 15 screws that secure the midplane to the shuttle. Rotate the upper ac cable bracket up as needed to access the upper midplane screws.
9. Rotate the upper ac cable bracket up and hold it in position; then, pull the top of the midplane away from the shuttle. Lift the cables from the upper ac cable bracket as necessary to provide clearance for the midplane.

Attention: Note the position of the midplane between the locating tabs on each end of the lower ac cable bracket. The replacement midplane must be positioned correctly between the tabs to avoid damaging the midplane.
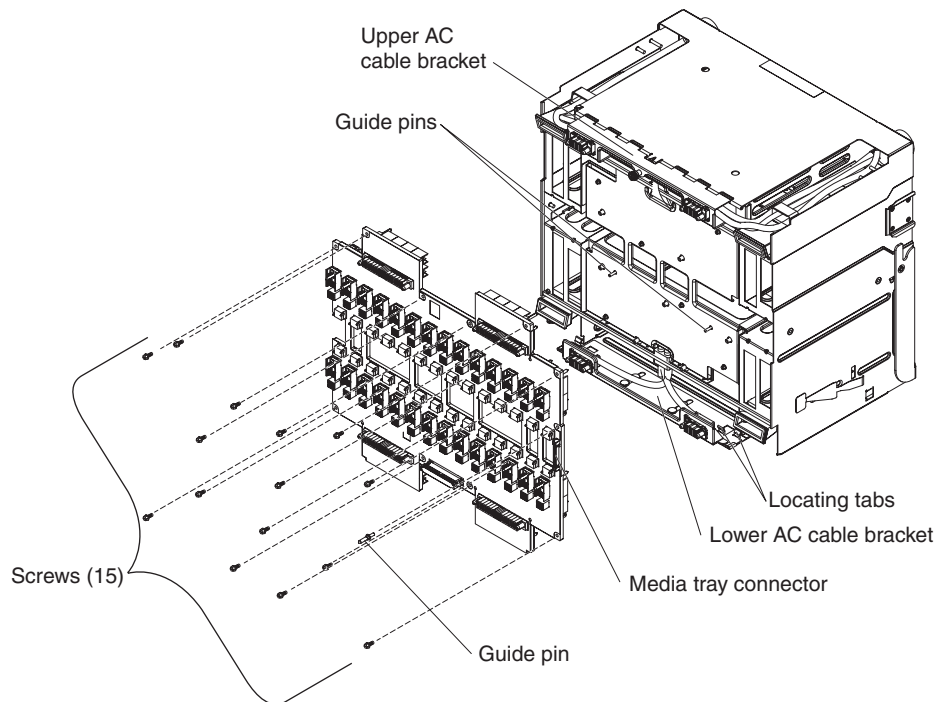
10. Pull the bottom of the midplane away from the shuttle; then, lift the midplane out of the tabs in the lower ac cable bracket.

    Note: The lower ac cable bracket will slide out as you pull the midplane away from the shuttle.

11. If you are instructed to return the midplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the midplane

To install the midplane, complete the following steps.

1. Make sure that the lower ac cable bracket is pulled away from the shuttle.

   Attention: Make sure that the midplane is properly positioned *between* the locating tabs to prevent damage to the midplane.

2. Place the bottom edge of the midplane between the locating tabs on each end of the lower ac cable bracket.

3. Rotate the upper ac cable bracket up and hold it in position; then, push the midplane into position. Make sure that the guide pins in the center of the shuttle are properly seated in the corresponding holes in the midplane.

   Note: You may have to lift the cables from the upper ac cable bracket to provide clearance for the midplane.

4. Install the 15 screws that attach the midplane to the shuttle.

5. Install the guide pin on the right side of the midplane, above the media tray connector.

6. Tighten the captive thumbscrew on the upper ac cable bracket.

7. Reconnect the rear LED/serial connector assembly cable to the midplane connector.

8. Install the shuttle into the BladeCenter unit (see "Installing the shuttle" on page 52).
9. Reconnect the power to the BladeCenter unit (see "Supplying power to the BladeCenter unit" on page 9).
10. Restart any blade servers that were shut down in the BladeCenter unit. See the documentation that comes with the blade server for detailed instructions.
11. Update the vital product data (VPD) for the BladeCenter unit:
    a. Log into the advanced management module Web interface.
    b. In the navigation pane, click **Monitor → Hardware VPD**.
    c. Click **Chassis**.
    d. Click **Edit BladeCenter System Vital Product Data**.
    e. Obtain the model number and serial number on the ID label on the BladeCenter; then, enter the information in the **Type/Model** and **Serial Number** fields.
    f. If the advanced management module is using firmware version BPET54R or older, restart the advanced management module.

Chapter 5. Configuration information and guidelines

This chapter provides information about updating the firmware, configuring the BladeCenter unit and its components, and networking guidelines.

Updating the firmware

The firmware for the management module and other BladeCenter components is periodically updated and is available for download on the Web. Go to http://www.ibm.com/supportportal/ to get the latest level of firmware, such as BIOS code and device drivers.

Note: When replacing BladeCenter components, you might have to update the management module or other components with the latest version of firmware.

Configuring the BladeCenter unit

General configuration of the BladeCenter unit and installed components is performed through the management module. See the *BladeCenter Management Module User's Guide* and the *BladeCenter Management Module Command-Line Interface Reference Guide* for information and instructions. Some devices in the BladeCenter unit, such as I/O modules and blade servers, might also require additional configuration. See the documentation that comes with each device for information and instructions.

Configuring the management module

All management modules are preconfigured with the same static IP address. You can use the management module to assign a new static IP address. To establish connectivity, the management module attempts to use Dynamic Host Control Protocol (DHCP) to acquire its initial IP address for the management-module Ethernet port. If DHCP is not installed or is enabled and fails, the management module uses the static IP address. Use the management module to configure other BladeCenter component settings, such as, user accounts, DHCP, or Wake on LAN. See the *BladeCenter Management Module User's Guide* and the *BladeCenter Management Module Command-Line Interface Reference Guide* for instructions.

Configuring I/O modules

You must install and configure at least one external (in-band) port on an Ethernet switch module in I/O-module bay 1 or 2 to communicate with the Ethernet controllers that are integrated in each blade server. See the *BladeCenter Management Module User's Guide* and the *BladeCenter Management Module Command-Line Interface Reference Guide* for information about configuring external ports on I/O modules. For I/O-device settings, see the documentation that comes with your I/O device.

Note: If a pass-thru module is installed in I/O-module bay 1 or 2, you must configure the network switch that the pass-thru module is connected to; see the documentation that comes with the network switch.

Configuring blade servers

To achieve communication redundancy on a blade server, you must configure the Ethernet controllers on the blade servers for failover. When failover occurs on a blade server, the secondary Ethernet controller takes over network communications, using the I/O module that is associated with that controller. Install a pair of Ethernet switches in I/O-module bays 1 and 2; then, configure them and your network infrastructure so that they can direct traffic to the same destinations. You can also install a pass-thru module that is connected to an external Ethernet switch in either or both of these I/O-module bays. See the documentation that comes with your blade server and operating system for instructions.

Using IBM FastSetup

IBM FastSetup is a no-cost software tool that helps simplify the maintenance and deployment of selected IBM BladeCenter chassis, servers, and components. The intuitive graphical interface initializes all phases of server setup, including discovery, update, and configuration. Features include templates that enable replication of settings to many servers and automation that reduces hands-on time and user errors. Wizards and other default settings enable customization capabilities. The low-touch, set-once and walk-away feature reduces the hands-on server setup time from days to minutes, particularly for larger deployments. For information about this tool, see http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=TOOL-FASTSET.

BladeCenter networking guidelines

Make sure that the network infrastructure is configured before you connect the BladeCenter unit to network.

Each blade server has two independent Ethernet controllers, each with its own MAC address and a dedicated 1000-Mbps link to one of the switch modules in I/O module bays 1 and 2. There is no internal data path between the two switches within the BladeCenter unit; an external network device is required for data packets to flow from one internal switch to the other.

The management module has a separate internal 100-Mbps link to each switch. These links are for internal management and control only. No data packets are allowed to flow from application programs on the blade servers to the management module over this path.

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. Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine 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.
- Check for updated firmware and operating-system device drivers for your IBM product. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to make sure that the hardware and software is supported by your IBM product.
- Go to http://www.ibm.com/supportportal/ to check for information to help you solve the problem.
- Gather the following information to provide to IBM Support. This data will help IBM Support quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  - Hardware and Software Maintenance agreement contract numbers, if applicable
  - Machine type number (IBM 4-digit machine identifier)
  - Model number
  - Serial number
  - Current system UEFI and firmware levels
  - Other pertinent information such as error messages and logs
- Go to http://www.ibm.com/support/entry/portal/Open_service_request/ to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to IBM Support quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

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 IBM systems also describes the diagnostic tests that you can perform.

Most 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 operating system or program.

Using the documentation

Information about your IBM 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/supportportal/. 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, up-to-date information about IBM systems, optional devices, services, and support is available at http://www.ibm.com/supportportal/. The address for IBM System x® information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/systems/intellistation/.

How to send Dynamic System Analysis data to IBM

Use the IBM Enhanced Customer Data Repository to send diagnostic data to IBM. Before you send diagnostic data to IBM, read the terms of use at http://www.ibm.com/de/support/ecurep/terms.html.

You can use any of the following methods to send diagnostic data to IBM:
- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
- **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw
- **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure
- **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload_hw

Creating a personalized support web page

At http://www.ibm.com/support/mynotifications/, you can create a personalized support web page by identifying IBM products that are of interest to you. From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your IBM products. For information about which products are supported by Support Line in your country or region, see http://www.ibm.com/services/supline/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 your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to http://www.ibm.com/partnerworld/ and click **Find Business Partners** on the right side of the page. For IBM support telephone numbers, see http://www.ibm.com/planetwide/. 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.

IBM Taiwan product service

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

IBM Taiwan product service contact information:
    IBM Taiwan Corporation
    3F, No 7, Song Ren Rd.
    Taipei, Taiwan
    Telephone: 0800-016-888

Appendix B. Notices

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Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Important notes

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

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

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

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

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

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

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as "total bytes written" (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. IBM is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the server IBM may condition provision of repair or replacement of servers or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 1. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days
[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.	
[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.	
[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

Information Development
IBM Corporation
205/A015
3039 E. Cornwallis Road
P.O. Box 12195
Research Triangle Park, North Carolina 27709-2195
U.S.A.

In the request, be sure to include the publication part number and title.

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Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

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.

European Union EMC Directive conformance statement

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

Attention: This is an EN 55022 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.

Responsible manufacturer:
    International Business Machines Corp.
    New Orchard Road
    Armonk, New York 10504
    914-499-1900

European Community contact:
    IBM Deutschland GmbH
    Technical Regulations, Department M372
    IBM-Allee 1, 71139 Ehningen, Germany
    Telephone: +49 7032 15 2941
    Email: lugi@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis:

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

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

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

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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

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

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

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
    International Business Machines Corp.
    New Orchard Road
    Armonk, New York 10504
    914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
    IBM Deutschland GmbH
    Technical Regulations, Abteilung M372
    IBM-Allee 1, 71139 Ehningen, Germany
    Telephone: +49 7032 15 2941
    Email: lugi@de.ibm.com

Generelle Informationen:

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

VCCI Class A 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

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для
снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

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。

Taiwan Class A compliance 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。

Index

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Part Number: 00V9749

Printed in USA