

BladeCenter E Type 8677 and 1881



Hardware Maintenance Manual and Troubleshooting Guide

BladeCenter E Type 8677 and 1881



Hardware Maintenance Manual and Troubleshooting Guide

Note

Before using this information and the product it supports, be sure to read the information in Appendix C, "Notices," on page 131, and the *IBM Safety Information* and *IBM Systems Environmental Notices and User Guide* documents on the IBM Documentation CD.

The most recent version of this document is available at <http://www.ibm.com/systems/support/>.

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About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the BladeCenter® E Type 8677 and 1881 unit.

Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions. See "Safety information" on page 87.

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

注意和危險聲明 (简体中文)

重要事項：

本書中的所有注意和危險聲明之前都有編號。該編號用於英語的注意或危險聲明與 *Safety Information* 一書中可以找到的翻譯版本的注意或危險聲明進行交叉引用。

例如，如果一個注意聲明以編號 1 開始，那麼對該注意聲明的翻譯出現在 *Safety Information* 一書中的聲明 1 中。

在按說明執行任何操作前，請務必閱讀所有注意和危險聲明。

注意及危險聲明 (中文)

重要資訊：

本書中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在「安全資訊」(Safety Information) 一書中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在「安全資訊」(Safety Information) 一書的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

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

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

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

중요:

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

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

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

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

Online support

You can download the most current diagnostic, H8 flash, and device driver files from <http://www.ibm.com/systems/support> on the World Wide Web.

Support telephone numbers

View support telephone numbers at <http://www.ibm.com/planetwide/> on the World Wide Web.

Chapter 1. General information

The IBM® BladeCenter E Type 8677 and 1881 unit is a high-density, high-performance rack-mounted system developed for medium-to-large businesses. It supports up to 14 blade servers, making it ideally suited for networking environments that require a large number of high-performance servers in a small amount of space. The BladeCenter system provides common resources that are shared by the blade servers, such as power, cooling, system management, network connections, and input/output (I/O) ports (diskette drive, optical drive, ports for USB, keyboard, video, mouse, and network interfaces). The use of common resources enables small blade server size, minimizes the cabling required in a working configuration, and eliminates resources sitting idle.

Performance, ease of use, reliability, and expansion capabilities were key considerations during the design of your BladeCenter system. These design features make it possible for you to customize the system hardware to meet your needs today, while providing flexible expansion capabilities for the future.

Notes:

1. Current BladeCenter E models *do not* have a diskette drive in the media tray. Older BladeCenter E models do have a diskette drive in the media tray. In this document, this difference is noted, when necessary, to describe differences that exist between current and older model offerings.
2. The illustrations in this document might differ slightly from your actual hardware: the illustrations do not depict a particular model offering unless noted in text.
3. Throughout this document, the terms I/O module and switch module are used to refer to switch modules and all other types of I/O module.

This *Hardware Maintenance Manual and Troubleshooting Guide* provides information to troubleshoot your BladeCenter unit and replace damaged parts.

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

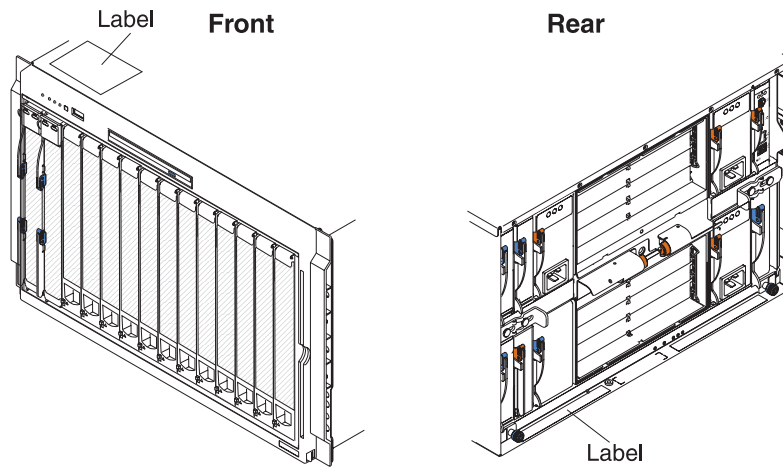
The latest version of this publication is available from the IBM support Web site at <http://www.ibm.com/systems/support>.

If you have access to the World Wide Web, you can obtain up-to-date information about your BladeCenter model and other IBM server products at <http://www.ibm.com/eserver/xseries/> on the World Wide Web.

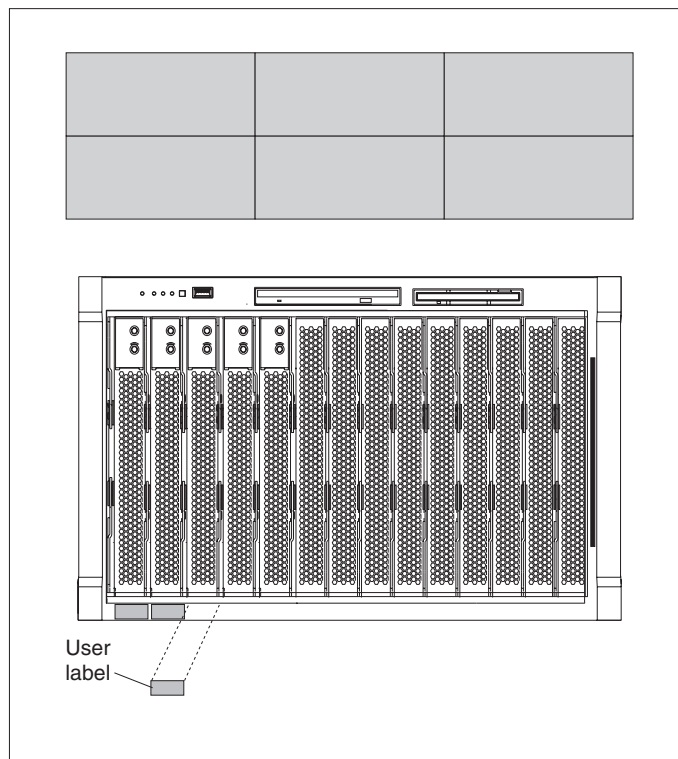
You can register the BladeCenter unit and blade servers on the World Wide Web. To register, go to <http://www.ibm.com/support/mysupport/> on the World Wide Web.

The serial number and model number are on labels on the top, front, and rear of the chassis, as shown in the following illustration.

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



A set of user labels comes with each blade server. Write whatever identifying information you want on a label, and place it on the BladeCenter bezel just below the blade server, as shown in the following illustration.



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

The IBM Documentation CD

Use the IBM Documentation CD to access the blade server documentation in PDF format.

You can run the IBM *Documentation* CD on any personal computer that meets the hardware and software requirements.

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

Hardware and software requirements

Use this information to determine the minimum hardware and software requirements for the blade server.

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

- Microsoft Windows XP, Windows 2000, or Red Hat Enterprise Linux 5 Server
- 100 MHz microprocessor
- 32 MB of RAM
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems

Using the Documentation Browser

Use these instructions to start the Documentation Browser.

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

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

- If Autostart is enabled, insert the CD into the CD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
 - If you are using a Windows operating system, insert the CD into the CD or DVD drive and click **Start → Run**. In the **Open** field, type
`e:\win32.bat`
where *e* is the drive letter of the CD or DVD drive, and click **OK**.
 - If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the `/mnt/cdrom` directory:
`sh runlinux.sh`

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

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

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

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

Related publications

This *Hardware Maintenance Manual and Troubleshooting Guide* is provided in Portable Document Format (PDF). It contains information to help you solve the problem yourself or to provide helpful information to a service technician.

In addition to this *Hardware Maintenance Manual and Troubleshooting Guide*, the following IBM *BladeCenter Type 8677 Documentation* is provided with the unit:

- *Safety Information*: This document contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* book.
- *BladeCenter Type 8677 Rack Installation Instructions*: This document contains instructions for installing the BladeCenter unit in a rack.
- *BladeCenter Management Module Installation Guide*: This document contains instructions for installing the management module in a BladeCenter unit and creating the initial configuration. There is a unique *Installation Guide* for each management module type.
- *BladeCenter Management Module User's Guide*: This document provides general information about the management module for your BladeCenter unit, including information about features, how to configure the management module, and how to get help. There is a unique *User's Guide* for each management module type.
- *BladeCenter 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. There is a unique *Command-Line Interface Reference Guide* for each management module type.

Additional publications might be included on the IBM *BladeCenter E Type 8677 Documentation* CD.

Notices and statements used in this book

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

The following types of notices and statements are used in this book:

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

Features and specifications

Current BladeCenter E models *do not* have a diskette drive in the media tray. Older BladeCenter E models do have a diskette drive in the media tray. A separate features and specifications table is provided for each of these model types.

Notes:

1. For information about which types of I/O modules can be installed in which I/O-module bays, see “I/O (switch) modules” on page 34.
2. The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard, mouse, and optical drive. The BladeCenter unit uses USB for internal communication with these devices.

The following table provides a summary of the features and specifications for a BladeCenter unit that *does not* have a diskette drive bay in the media tray.

<p>Media tray (on front):</p> <ul style="list-style-type: none"> • SATA CD/DVD drive • USB v2.0 port • Front system LED panel <p>Module bays (on rear):</p> <ul style="list-style-type: none"> • Four hot-swap power-module bays • Two hot-swap management-module bays • Four hot-swap I/O-module bays • Two hot-swap blower bays <p>Blade-server bays (on front):</p> <p>14 hot-swap blade-server bays</p> <p>Redundant cooling:</p> <p>Two variable-speed hot-swap blowers</p> <p>Power modules:</p> <ul style="list-style-type: none"> • Minimum: Two 2000-watt or greater hot-swap power modules <ul style="list-style-type: none"> – Both power modules supply power to all modules and to blade-server bays 1 through 6. – Both power modules provide redundancy to each other. • Maximum: Four <ul style="list-style-type: none"> – Power modules 1 and 2 supply power to all modules and to blade-server bays 1 through 6. – Power modules 3 and 4 supply power to blade-server bays 7 through 14. – Power modules 1 and 2 provide redundancy to each other. – Power modules 3 and 4 provide redundancy to each other. <p>I/O modules:</p> <ul style="list-style-type: none"> • Minimum: One • Maximum: Four 	<p>Management module:</p> <ul style="list-style-type: none"> • Minimum: One hot-swap advanced management module providing the following features: <ul style="list-style-type: none"> – System-management functions for the BladeCenter unit – Video port (analog) – Two USB ports for keyboard and mouse – Serial management connection – 10/100 Mb Ethernet remote management connection • Maximum: Two hot-swap advanced management modules: one active, one redundant <p>Upgradeable microcode:</p> <ul style="list-style-type: none"> • Management-module firmware • I/O-module firmware (some I/O module types) • Blade-server firmware <p>Security features:</p> <ul style="list-style-type: none"> • Login password for remote connection. • Secure Socket Layer (SSL) security for Web interface access, Secure Shell (SSH) for remote command-line access, and Lightweight Directory Access Protocol (LDAP) and role-based security for user authentication and authorization. <p>Size (7 U):</p> <ul style="list-style-type: none"> • Height: 304.2 mm (12 in. or 7 U) • Depth: 711.2 mm (28 in.) • Width: 444 mm (17.5 in.) • Weight: <ul style="list-style-type: none"> – Fully configured with modules and blade servers: Approximately 102 kg (225 lb) – Fully configured without modules and blade servers: Approximately 38.6 kg (85 lb) 	<p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Without acoustic attenuation module: Sound power, operating, and idle: 7.4 bels • With acoustic attenuation module: Sound power, idle, and operating: 6.9 bels <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – On: <ul style="list-style-type: none"> - 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 89.6°F) – Off: -40° to 60°C (-40° to 140°F). • Humidity: 8% to 80% <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz single-phase) required • Input voltage: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 1365 Btu/hour (400 watts) • Maximum configuration: Varies depending on the type of power modules installed. <ul style="list-style-type: none"> – Four 2000-watt power modules: 20 094 Btu/hour (5889 watts) – Four 2320-watt power modules: 23 672 Btu/hour (6938 watts)
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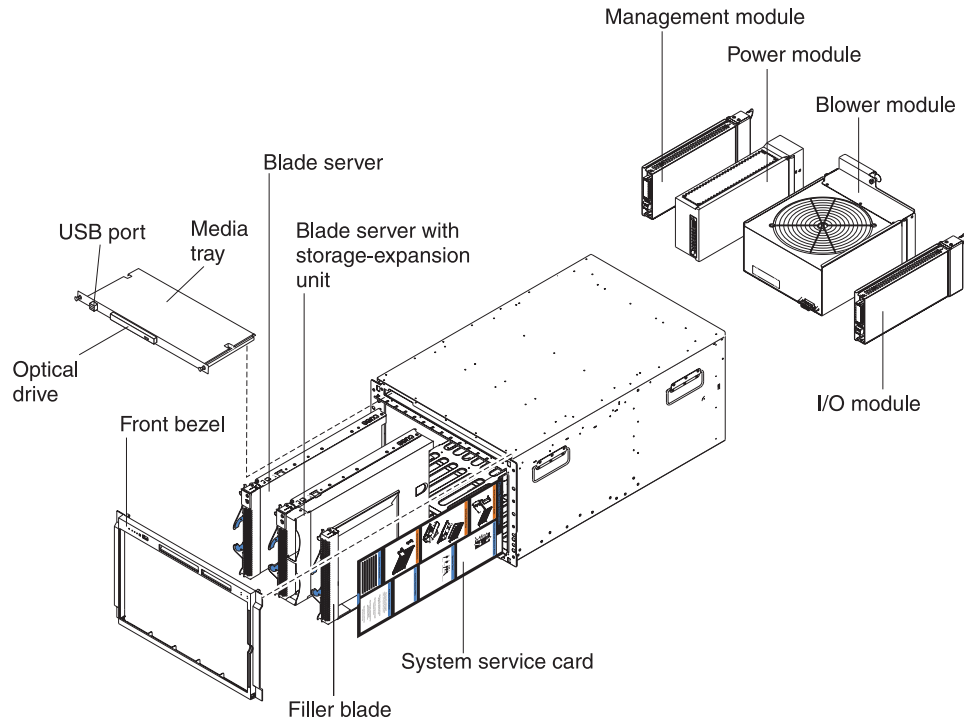
The following table provides a summary of the features and specifications for a BladeCenter unit that has a diskette drive bay in the media tray.

<p>Media tray (on front):</p> <ul style="list-style-type: none"> • Diskette drive: 1.44 MB • IDE CD or DVD • USB v1.1 port • Front system LED panel <p>Module bays (on rear):</p> <ul style="list-style-type: none"> • Four hot-swap power-module bays • Two hot-swap management-module bays • Four hot-swap I/O-module bays • Two hot-swap blower bays <p>Blade-server bays (on front):</p> <p>14 hot-swap blade-server bays</p> <p>Redundant cooling:</p> <p>Two variable-speed hot-swap blowers</p> <p>Power modules:</p> <ul style="list-style-type: none"> • Minimum: Two hot-swap power modules <ul style="list-style-type: none"> – Both power modules supply power to all modules and to blade-server bays 1 through 6. – Both power modules provide redundancy to each other. • Maximum: Four <ul style="list-style-type: none"> – Power modules 1 and 2 supply power to all modules and to blade-server bays 1 through 6. – Power modules 3 and 4 supply power to blade-server bays 7 through 14. – Power modules 1 and 2 provide redundancy to each other. – Power modules 3 and 4 provide redundancy to each other. <p>I/O modules:</p> <ul style="list-style-type: none"> • Minimum: One • Maximum: Four 	<p>Management module:</p> <ul style="list-style-type: none"> • Minimum: One hot-swap management module providing the following features: <ul style="list-style-type: none"> – System-management functions for the BladeCenter unit – Video port (analog) – Keyboard connection (PS/2 port or USB port depending on the management module-type) – Mouse connection (PS/2 port or USB port depending on the management module type) – Serial management connection (advanced management module only) – 10/100 Mb Ethernet remote management connection • Maximum: Two hot-swap management modules: one active, one redundant <p>Upgradeable microcode:</p> <ul style="list-style-type: none"> • Management-module firmware • I/O-module firmware (some I/O module types) • Blade-server firmware <p>Security features:</p> <ul style="list-style-type: none"> • Login password for remote connection. • Secure Socket Layer (SSL) security for Web interface access, Secure Shell (SSH) for remote command-line access, and Lightweight Directory Access Protocol (LDAP) and role-based security for user authentication and authorization. <p>Size (7 U):</p> <ul style="list-style-type: none"> • Height: 304.2 mm (12 in. or 7 U) • Depth: 711.2 mm (28 in.) • Width: 444 mm (17.5 in.) • Weight: <ul style="list-style-type: none"> – Fully configured with modules and blade servers: Approximately 102 kg (225 lb) – Fully configured without modules and blade servers: Approximately 38.6 kg (85 lb) 	<p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Without acoustic attenuation module: Sound power, operating, and idle: 7.4 bels • With acoustic attenuation module: Sound power, idle, and operating: 6.9 bels <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – On: <ul style="list-style-type: none"> - 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 89.6°F) – Off: -40° to 60°C (-40° to 140°F). • Humidity: 8% to 80% <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz single-phase) required • Input voltage: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 1365 Btu/hour (400 watts) • Maximum configuration: Varies depending on the type of power modules installed. <ul style="list-style-type: none"> – Four 1200-watt power modules: 9622 Btu/hour (2820 watts) – Four 1400-watt power modules: 11 111 Btu/hour (3256 watts) – Four 1800-watt power modules: 13 650 Btu/hour (4000 watts) – Four 2000-watt power modules (for use with a Gigabit Ethernet expansion card): 18 425 Btu/hour (5400 watts)
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Major components of the BladeCenter Type 8677 and 1881 unit

The following illustration shows the locations of major components in your BladeCenter unit.

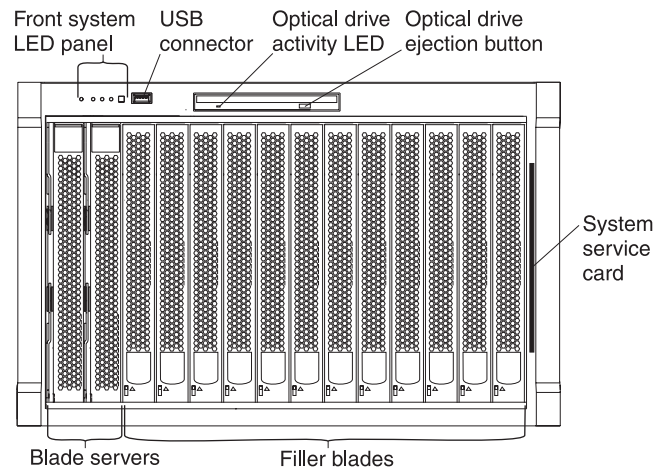
Note: The illustrations in this document might differ slightly from your hardware.



Attention: To maintain proper system cooling, each module bay must contain either a module or a filler module; each blade bay must contain either a blade server or a filler blade.

Front view

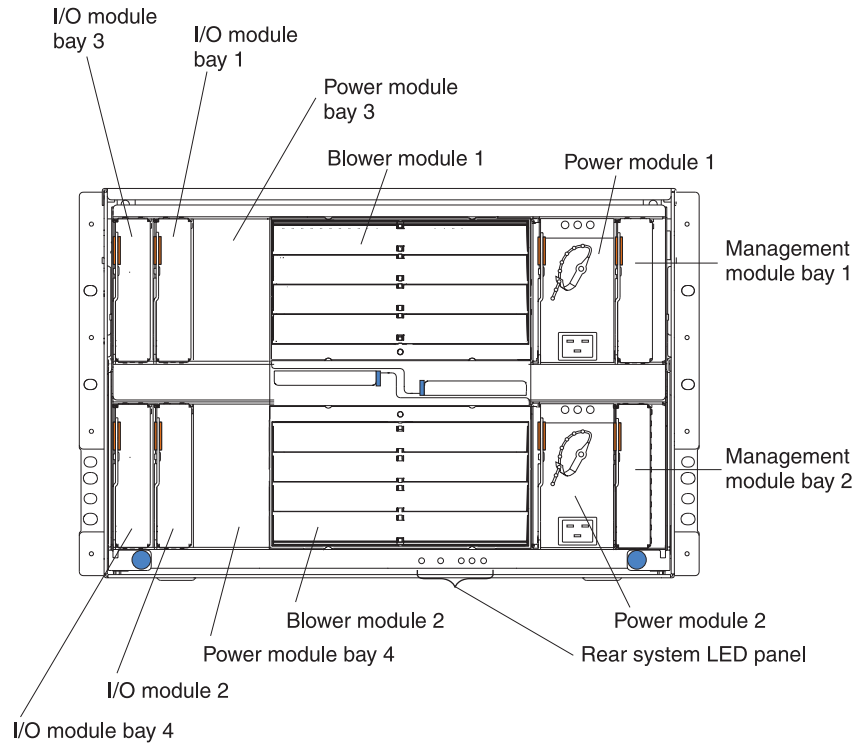
The following illustration shows the locations of components and indicators on the front of the BladeCenter Type 8677 and 1881 unit.



See “BladeCenter components, controls, and LEDs” on page 13 for details about these components and indicators.

Rear view

The following illustration shows the locations of components and indicators on the rear of the BladeCenter Type 8677 and 1881 unit.



See “BladeCenter components, controls, and LEDs” on page 13 for details about these components and indicators.

BladeCenter unit power, controls, and indicators

This section describes the controls and light-emitting diodes (LEDs) and how to start and shut down the BladeCenter unit.

Notes:

1. The removable media drives, keyboard, and mouse in the BladeCenter unit are viewed as USB devices by the blade server operating system.
2. Local media tray support can be turned off preventing the blade servers from accessing the removable media drives.
3. Local KVM switching support can be turned off preventing the blade servers from accessing the keyboard, video, and mouse.

Press keyboard keys in the following sequence to switch KVM control between blade servers:

NumLock *<blade server number>* **Enter**

Where *<blade server number>* is the two-digit number for the blade bay in which the blade server is installed.

You will need to press the **Shift** key to switch KVM control when using the 28L3644 (37L0888) keyboard. If pressing the **Shift** key does not switch KVM control, complete the following steps:

1. Press and hold the **Shift** key.
2. Press keyboard keys in the following sequence:
NumLock *<blade server number>* **Enter**
3. Release the **Shift** key.

Starting the BladeCenter unit

Important: For the LEDs on each system LED panel to function correctly, be sure to install the management module before turning on the BladeCenter unit. See Chapter 4, “Installing options,” on page 31 for instructions for installing the management module.

To start the BladeCenter unit, plug one end of each power cord into a power module on the rear of the BladeCenter unit and the other end of each power cord into a 220-volt power distribution unit (PDU) that is plugged into an appropriate electrical outlet.

After you start the BladeCenter unit, it has dc power. The blade servers in the BladeCenter unit are connected to dc power but are not turned on. Press the power-control button on the front of each blade server to obtain full power for the blade server and start its operating system (see the documentation that comes with your blade server for information about turning on the blade server).

Note: If a power failure occurs, the BladeCenter unit restarts automatically when power is restored.

Shutting down 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.

Complete the following steps to shut down the BladeCenter unit:

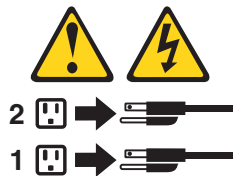
1. Refer to your blade server operating-system documentation for the proper procedure to shut down the operating system in the blade servers; then, shut down each operating system.

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. Press the power-control button on the front of each blade server. Wait at least 30 seconds for the blade server drives to stop spinning.
3. Disconnect all power cords on the BladeCenter unit from all the power modules.

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

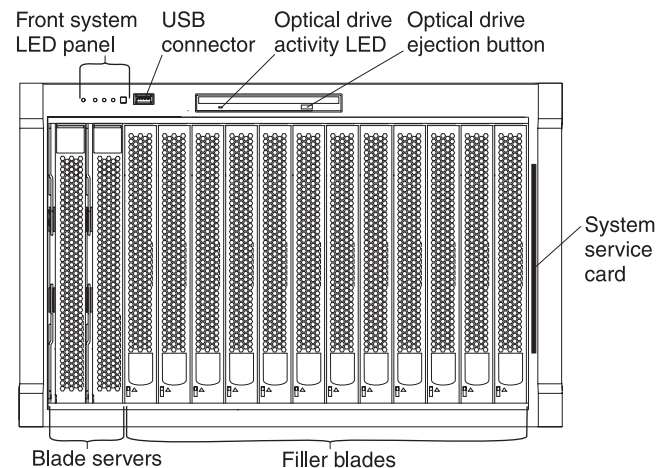
BladeCenter components, controls, and LEDs

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

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

Front view

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



Front system LED panel: The LEDs on this panel provide status information for your BladeCenter unit. See “System LED panel” on page 17 for more information.

USB port: Use this port to attach an external USB device.

Optical-drive activity LED: When this LED is lit, it indicates that the optical drive is in use.

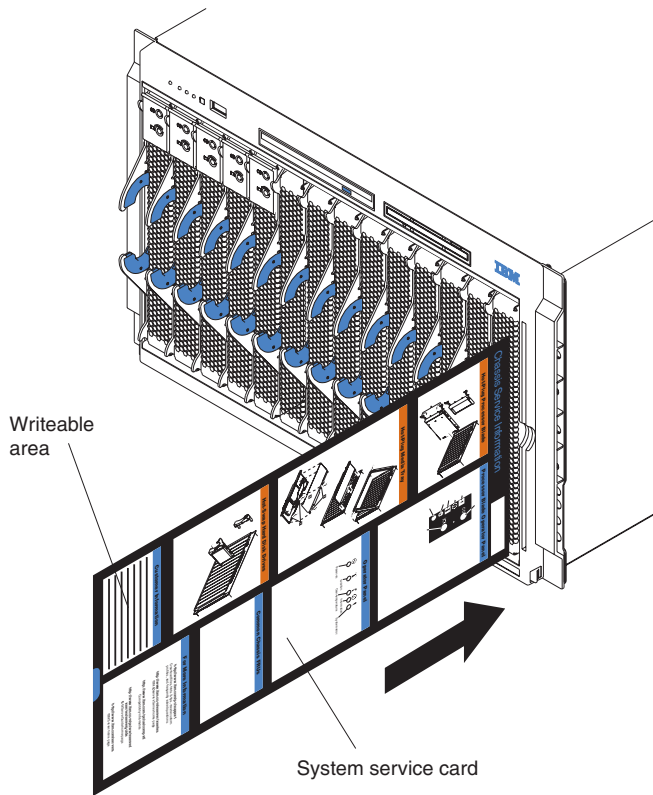
Optical-drive eject button: Press this button to release a CD or DVD from the optical drive.

Diskette-drive activity LED (not shown in illustration): For media trays that have a diskette drive, when this LED is lit, it indicates that the diskette drive is in use.

Diskette-drive eject button (not shown in illustration): For media trays that have a diskette drive, press this button to release a diskette from the drive.

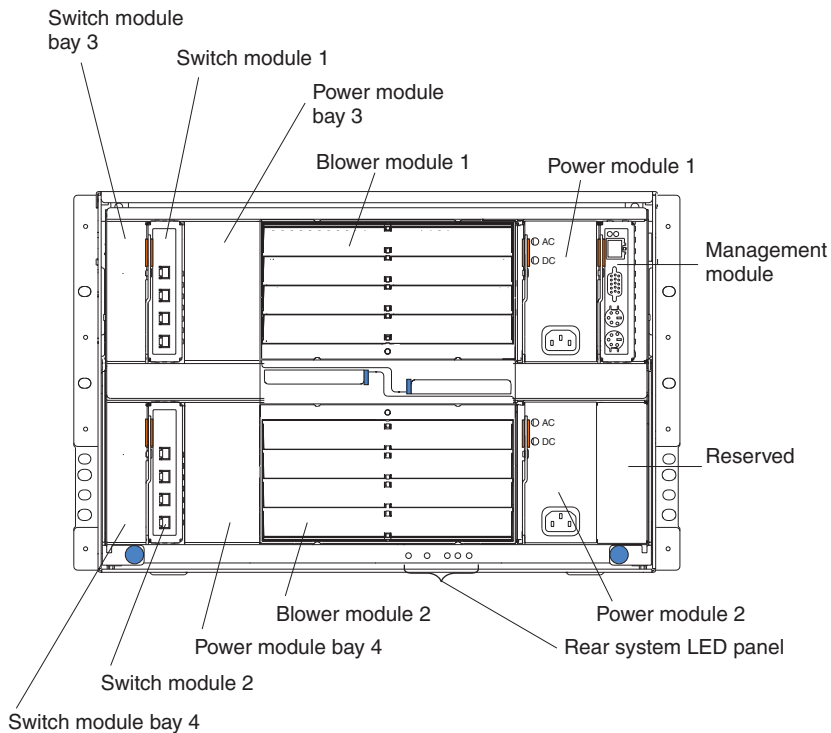
Blade control panel: This panel contains indicators and controls for the blade server. See the documentation that comes with your blade server for information about the blade control panel.

System service card: This card contains system service instructions and a writable area for your use.



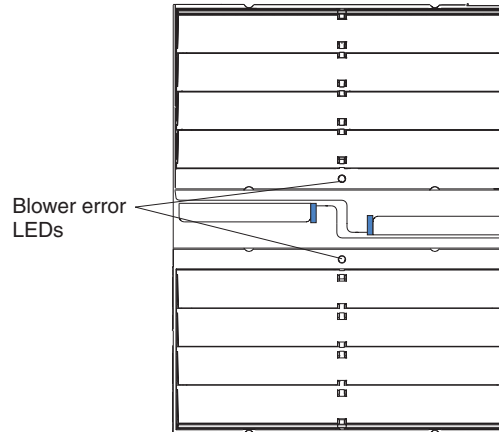
Rear view

This section identifies the components and indicators on the rear of your BladeCenter unit.



Rear system LED panel: The LEDs on this panel provide status information for your BladeCenter unit. These LEDs duplicate the LEDs in the front system LED panel, see “System LED panel” on page 17 for more information about these LEDs.

Blower module:



Important: If the ambient temperature is 72° F or below, the BladeCenter blowers will run at 30% of their maximum rotational speed, increasing their speed as required to control internal BladeCenter temperature. If ambient temperature is above 72° F, the blowers will run at 80% of their maximum rotational speed increasing their speed as required to control internal BladeCenter temperature.

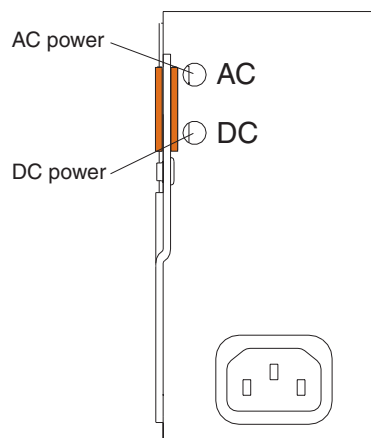
Blower error LEDs: The amber LED on each blower is lit and stays lit when an error has been detected in the blower. The system-error LED on the BladeCenter system LED panels is also lit. For additional information, see “Identifying problems using the Light Path Diagnostics feature” on page 29.

I/O (switch) module: See the documentation that comes with each I/O module for a description of the LEDs on the I/O module.

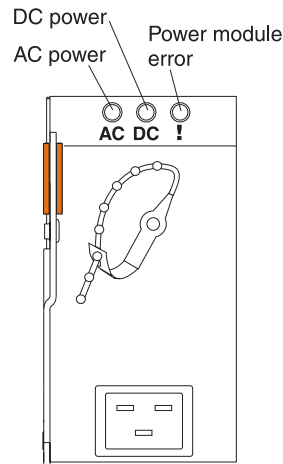
Power module: Several types of power module, with different wattage ratings, can be used in the BladeCenter E unit.

The following illustration shows the rear view for older power modules.

Note: The illustrations might differ slightly from your hardware.



The following illustration shows the rear view for the currently available power modules.



Power module LEDs: These LEDs indicate the condition of the power module. For additional information, see “Identifying problems using the Light Path Diagnostics feature” on page 29.

- **AC power:** When this green LED is lit, ac input to the power module is present and within specifications. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see “Identifying problems using the Light Path Diagnostics feature” on page 29.
- **DC power:** 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 and dc power LEDs are lit. For any other combination of LEDs, see “Identifying problems using the Light Path Diagnostics feature” on page 29.
- **Power module error LED (2320-watt power modules only):** When this amber LED is lit, it indicates that an error has been detected in the power module. When this LED is lit, the BladeCenter unit system error LED is also lit.

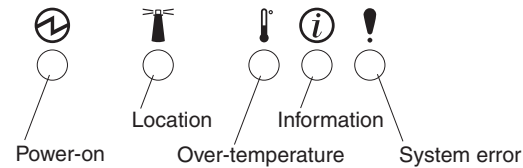
Management module: The type of management module that is installed in your BladeCenter unit depends on the BladeCenter unit model and devices that are installed.

- A BladeCenter unit that has a media tray with a diskette drive can use either a management module or an advanced management module, depending on which devices are installed in the BladeCenter unit.
- A BladeCenter unit that has a media tray without a diskette drive must use an advanced management module.
- If 2320-watt power modules are installed in the BladeCenter unit, you must use an advanced management module.
- See the documentation that comes with your BladeCenter device to determine if a specific management module type is required to support the device.

See the documentation for your management module for additional information and instructions.

System LED panel

The following illustration shows the status LEDs on the system LED panels on the front and rear of the BladeCenter unit.



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 unplug all power cords from all power modules.

Note: You can turn off the location LED and the information LED through the Web interface or the IBM Director console.

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.

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 has reported 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 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. After the situation is handled, have the system administrator turn off the information LED.

Note: The information LED will also light if the system error log is 75% full.

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. (For more information, see “Identifying problems using the Light Path Diagnostics feature” on page 29.)

Setting up the BladeCenter unit

This section briefly discusses considerations for the setup of your BladeCenter unit.

- Blade bays must be occupied at all times.

To help ensure proper cooling, performance, and system reliability, make sure that each of the blade bays on the front of the BladeCenter unit has a blade server, expansion unit, or filler blade installed.

Important: When replacing a blade server or installing an expansion option, do not operate the BladeCenter unit for more than one minute without either a blade server, an expansion option, or a filler blade installed in each blade bay.

- Module bays must be occupied at all times.
To help ensure proper cooling, performance, and system reliability, make sure that each of the module bays on the rear of the BladeCenter unit has a module or filler module installed.

Important: When replacing a module, do not operate the BladeCenter unit for more than one minute without either a module or a filler module installed in each module bay.

- There is no power switch on the BladeCenter unit.
The BladeCenter unit does not have a power switch. Plugging the power cords into the power modules and a 220 V ac power source (rack-mounted 220-volt PDU) starts the BladeCenter unit (the management module, I/O modules, and blowers start running).

Each blade server in the BladeCenter unit has an individual power-control button behind the control-panel door on the blade front that turns on or turns off the blade server. Be sure to shut down the operating system before turning off the blade server, to avoid damaging the hard disk drives.

Notes:

1. The blade server power button turns on or turns off the blade server if local power control has not been disabled through the management module.
2. The blade server power button turns on the blade server only if the green power light on the blade server is flashing slowly. If the light flashes rapidly, the blade server has not yet synchronized with the management module, and the power button will have no effect.

See the *IBM BladeCenter Type 8677 Installation and User's Guide* for more information about the BladeCenter unit. See the *Installation and User's Guide* for your blade server for more information about the blade server power controls and turning on or turning off the blade server.

- The removable media drives are detected as a Universal Serial Bus (USB) device

The removable media drives in the BladeCenter unit are viewed as a USB devices by the operating system in the blade server. Make sure that your operating system provides USB support.

- Hot-swap capabilities

The front bays on the BladeCenter unit are hot-swap blade bays; the rear bays on the BladeCenter unit are hot-swap module bays. You can add, remove, or replace blade servers or management, I/O, power, or blower modules in hot-swap bays without removing power from the BladeCenter unit.

Attention: To maintain proper system cooling, each unoccupied bay must contain a filler blade and an expansion or filler module. When replacing a blade server or installing an expansion option, do not operate the BladeCenter unit for more than one minute without either a blade server, an expansion option, or a filler blade installed in each blade bay or without a module or filler installed in each rear bay.

Connecting to the default IP address on a new BladeCenter

A newly-installed (out-of-the-box) BladeCenter unit tries to locate a DHCP server on the network before it will default to the factory-configured static IP address in the management module. This is the initial configuration setting. When there is no DHCP server on the network the BladeCenter unit is connected to, it can take several minutes before the management module uses the default (static) IP address. When the DHCP search times out and the management module uses the static IP address, you can change the management module configuration so that it will not attempt to locate a DHCP server.

See the *Installation Guide* and *User's Guide* or *Command-Line Interface Reference Guide* for your management module type for information about connecting to and configuring the BladeCenter management module.

Registering and profiling the BladeCenter products

You can register and profile the BladeCenter unit and blade servers on the World Wide Web.

- To register, go to: <http://www.ibm.com/support/mysupport/>
- To profile, go to: <http://www.ibm.com/systems/support/>

Important:

1. Do not switch control of a shared removable media drive to another blade server until the activity lights on the drive is off, indicating that no read or write operations are in progress. Before you remove a hot-swap blade server from the BladeCenter unit, you must shut down the operating system and turn off the blade server. You do not have to shut down the BladeCenter unit itself.
2. It can take approximately 20 seconds for the operating system in the switched-to blade server to recognize the removable media drives and USB port or the keyboard, video, and mouse.
 - a. The system-error LED might light, and a KVM allocation error might be logged if the change in ownership for the removable media drives and USB port or the keyboard, video, and mouse takes more than 8 seconds. The system-error LED will go off after the ownership change is complete.
 - b. It can take up to 48 seconds after a blade server is initially turned on before you can attempt to switch KVM control to that blade server.

Chapter 2. Configuring your BladeCenter unit

The BladeCenter unit automatically detects the modules and blade servers that are installed and stores the vital product data (VPD) information. When the BladeCenter unit is started, it automatically configures the remote-management port on the management module, so that you can configure and manage the BladeCenter unit and blade servers. You configure and manage the BladeCenter unit remotely through the management module using the Web-based user interface.

Note: You can also configure the I/O modules directly through an external I/O-module port using a Telnet interface or a Web browser. See the documentation that comes with the I/O module for more information.

For the management module to communicate with the blade servers in the BladeCenter unit, you will need to configure the IP addresses for the following internal and external ports:

- The external Ethernet (remote management) port on the management module (see the *User's Guide* or *Command-Line Interface Reference Guide* for your management module type for instructions). The initial management-module autoconfiguration enables the network-management station to connect to the management module to configure the port completely and to configure the rest of the BladeCenter unit.
- The internal Ethernet port on the management module for communication with the I/O modules (see the *User's Guide* or *Command-Line Interface Reference Guide* for your management module type for instructions).
- The internal Ethernet management port on each I/O module for communication with the management module. You configure this port by configuring the IP address for the I/O module (see the *User's Guide* or *Command-Line Interface Reference Guide* for your management module type for instructions).

Note: Pass-thru modules have no internal Ethernet port.

To communicate with the blade servers for functions such as deploying an operating system or application program, you also will need to configure at least one external (in-band) port on an Ethernet switch module. See the *BladeCenter Management Module User's Guide* or the *BladeCenter Management Module Command-Line Interface Reference Guide* for information about configuring external ports on I/O modules.

Note: If a pass-thru module is installed in I/O-module bay 1 or 2 (instead of an Ethernet switch module), you will need to configure a port on the network switch to which the pass-thru module is connected.

Management module and advanced management modules support different types of remote access. See the documentation for your management module type for information and instructions.

The Web-based user interface and command-line interface communicate with the management and configuration programs that are part of the firmware that comes with the management module. You can use these programs to perform tasks such as:

- Defining the login IDs and passwords
- Selecting recipients for alert notification of specific events

- Monitoring the status of the BladeCenter unit and blade servers
- Controlling the BladeCenter unit and blade servers
- Accessing the I/O modules to configure them
- Changing the drive startup sequence in a blade server
- Setting the date and time
- Using a remote console for the blade servers
- Changing ownership of the keyboard, video, and mouse
- Changing ownership of the optical drive, and USB port. (The optical drive in the BladeCenter unit is viewed as a USB device by the blade server operating system.)

Note: The IBM Director program is a system-management tool that comes with the BladeCenter unit. To configure the remote alert recipients for IBM Director over LAN, the remote alert recipient must be an IBM Director-enabled server.

You also can use the management and configuration programs to view some of the blade server configuration settings. See the *User's Guide* or *Command-Line Interface Reference Guide* for your management module type for more information.

BladeCenter unit power requirement

The power supply modules in the BladeCenter unit must be connected to 220 V ac power only. The BladeCenter unit comes with two power cords to connect the BladeCenter unit to the power distribution unit (PDU).

BladeCenter power configuration

The power modules in power bays 1 and 2 provide power to blade bays 1 through 6 and to common components in the BladeCenter unit. The power modules in power bays 3 and 4 provide power to blade bays 7 through 14. Power modules must always be present in power bays 1 and 2.

Attention:

Non-redundant power is not supported by the BladeCenter E unit. Power modules must always be present in power bays 1 and 2. When any blade server or option is in blade bay 7 through 14, power modules must be present in power bays 1 and 2, and power modules must be present in power bays 3 and 4.

If a power module fails or an ac power failure occurs, a BladeCenter unit configured for redundant power operation will operate in a nonredundant mode, and the blower modules will run at full speed. You must replace the failing power module or restore ac power as soon as possible to regain redundant power operation and to reset the blower modules to their normal operating speed.

See the *IBM BladeCenter Power Supply Modules* option documentation and the *BladeCenter Type 8677 Installation and User's Guide* for more information.

Firmware updates

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/support/> to get the latest level of firmware, such as BIOS code and device drivers.

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

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.

Communicating with the IBM Director software

Notes:

1. See the illustration on page 27 for an example of a typical network configuration. See the *IBM BladeCenter Planning and Installation Guide* for more examples of network configurations. You can obtain the planning guide from <http://www.ibm.com/systems/support/>.
2. The IBM Director CD comes with the BladeCenter unit.

To communicate with the BladeCenter unit, the IBM Director software needs a managed object (in the Group Contents pane of the IBM Director Management Console main window) that represents the BladeCenter unit. If the BladeCenter management module IP address is known, the network administrator can create an IBM Director managed object for the unit. If the IP address is not known, the IBM Director software can automatically discover the BladeCenter unit (out-of-band, using the Ethernet port on the BladeCenter management module) and create a managed object for the unit.

For the IBM Director software to discover the BladeCenter unit, your network must initially provide connectivity from the IBM Director server to the BladeCenter management-module Ethernet port. To establish connectivity, the management module attempts to use DHCP to acquire its initial IP address for the Ethernet port. If the DHCP request fails, the management module uses a static IP address. Therefore, the DHCP server (if used) must be on the management LAN for your BladeCenter unit.

Notes:

1. All management modules are preconfigured with the same static IP address. You can use the management-module Web interface or command-line interface to assign a new static IP address for each BladeCenter unit. If DHCP is not used and you do not assign a new static IP address for each BladeCenter unit before attempting to communicate with the IBM Director software, only one BladeCenter unit at a time can be added to the network for discovery. Adding multiple units to the network without a unique IP address assignment for each BladeCenter unit results in IP address conflicts.
2. For I/O-module communication with the IBM Director server through the management-module external Ethernet port, the I/O module internal network interface and the management-module internal and external interfaces must be on the same subnet.

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 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. See "I/O (switch) modules" on page 34 for information about the location and purpose of each I/O module.

Notes:

1. If a pass-thru module is installed in I/O-module bay 1, you must configure the network switch that the pass-thru module is connected to; see the documentation that comes with the network switch.
2. You can set up Ethernet failover by installing an Ethernet switch module in I/O-module bay 2.

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 Director

The IBM Director program is a system-management product that comes with the BladeCenter unit. Through the remote connection on the management module, you can use the IBM Director software at the IBM Director console to configure the BladeCenter unit, modify the configuration, and set up more advanced features.

Notes:

1. Some tasks, such as software distribution, require an in-band connection from the Director server through a campus (public) LAN to an I/O module port.
2. To manage BladeCenter redundant management modules with the IBM Director software, IBM Director version 4.1.01 or greater is required.

The IBM Director software includes the IBM BladeCenter Deployment Wizard.

About the wizard

The BladeCenter Deployment Wizard is integrated into the IBM Director management software. The wizard walks you through initial startup and configuration of one or more BladeCenter units.

In addition to performing initial configuration on BladeCenter units, you can use the built-in IBM Director tasks in the wizard to modify the configuration and to set up more advanced features.

You can also create a reusable profile in the wizard for configuring or reconfiguring BladeCenter units. The profile is a noninteractive script that can run as scheduled or as part of an Event Action Plan. With this feature you can define policies to reconfigure a BladeCenter unit on demand, responding to hardware failures or other IBM Director events.

Specifically, you can use the BladeCenter Deployment wizard to perform the following tasks:

- Perform all initial network configuration, including configuring IP addresses for the management module and the I/O-module internal configuration ports.
- Set up the initial security profile for the BladeCenter unit, including user names, passwords, enablement or disablement of management services, and so forth.
- Optionally configure external switch module ports for multi-port link aggregation (trunking).

Starting the wizard

Start the wizard from the IBM Director Management Console on the Director server.

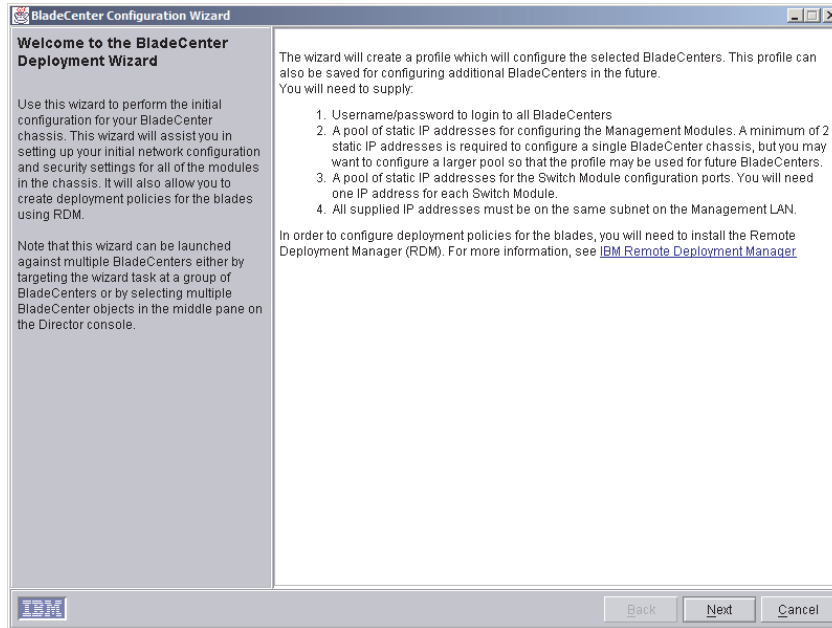
1. Select one or more BladeCenter units from the middle (contents) pane of the console window.

Note: A lock icon beside a newly discovered BladeCenter unit indicates that the Director server cannot log into the management module for that BladeCenter unit, which can mean that the management module has not been configured yet. You might want to select that BladeCenter unit for initial configuration through the wizard.

2. Perform either of the following actions:
 - Right-click the selected BladeCenter units (managed objects).
 - Drag the wizard task from the right-most pane (under BladeCenter in the task list) to any of the selected BladeCenter units (managed objects).

The wizard starts, and guides you through the login and configuration tasks needed.

The following illustration shows the main window on the BladeCenter Deployment wizard.



Using Remote Deployment Manager Version 4.1 or later

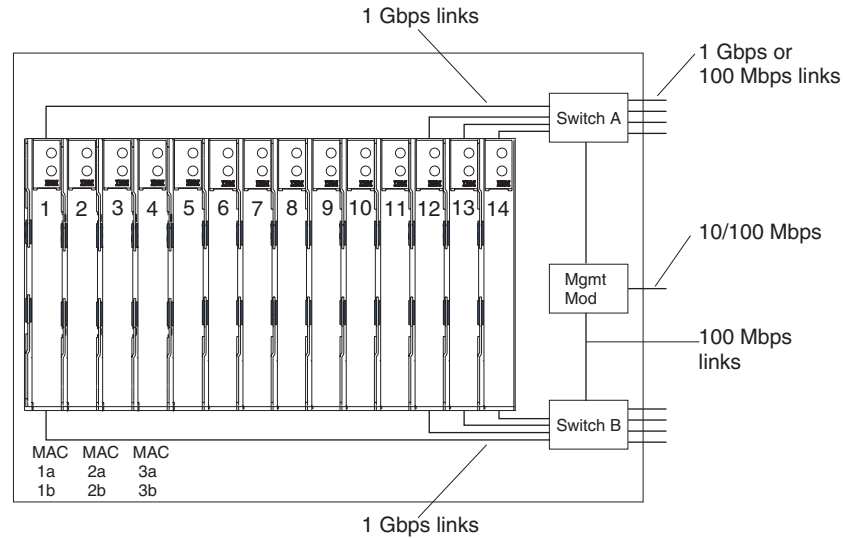
You can use the Remote Deployment Manager (RDM) Version 4.1 (or later) program to install a supported Microsoft Windows operating system or a BIOS update onto a blade server. Follow the instructions in the documentation that comes with the RDM program to log into the BladeCenter system and install a supported Microsoft Windows operating system or BIOS update.

Go to <http://www-03.ibm.com/systems/management/director/about/director52/extensions/rdm.html> on the World Wide Web for updated information about the RDM program and to download the software:

BladeCenter networking guidelines

Your networking administrator should assist in the configuration of the network infrastructure prior to connecting the BladeCenter unit to the LAN switch or similar network device. This section provides additional guidelines that might be useful in setting up your system.

A BladeCenter chassis with two Ethernet switch modules and one management module has the following internal configuration:

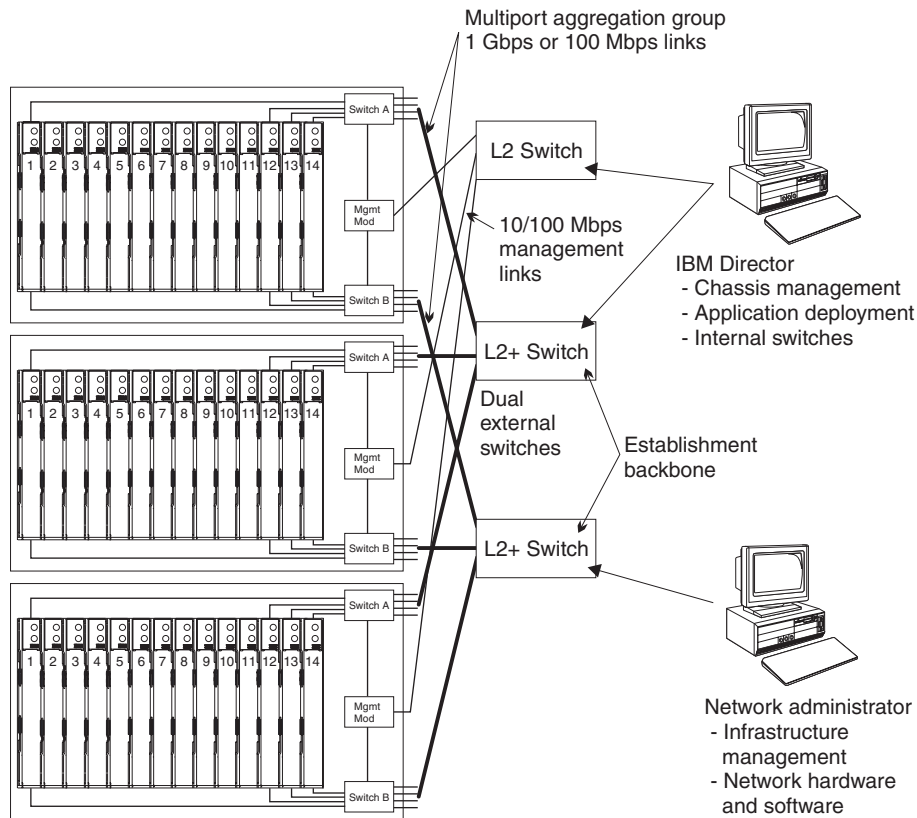


Note: 2nd switch module is optional

Each blade server has two independent Ethernet controllers, each with its own MAC address and a dedicated 1000-Mbps link to one of the I/O modules (Controller 1 to Switch A and Controller 2 to Switch B in this diagram). In this configuration (the default), the blade servers share access to four external ports on each I/O module. There is no internal data path between the two switches within the BladeCenter chassis; 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. A separate, nonswitched path (not shown) is used for communication between the management module and a service processor on each blade server.

A typical, preferred BladeCenter network topology is shown in the following illustration. See the *IBM BladeCenter Planning and Installation Guide* for more information and other topologies and guidelines.



In this configuration, each BladeCenter unit contains two Ethernet switch modules and one management module. The external ports on the switch modules are configured for multi-port link aggregation groups, or trunks, as are the corresponding ports on the attaching external LAN switches. Additionally, every port in the switch module in I/O-module bay 1 (switch A in this illustration) in the BladeCenter units is connected to the same external LAN switch and every port in the switch module in I/O-module bay 2 (switch B in this illustration) in the BladeCenter units is connected to the second external LAN switch.

Observe the following guidelines when creating this topology:

1. The external ports on the BladeCenter switch modules are designed for point-to-point, full-duplex operation to a compatible LAN switch or router. Configure a corresponding multi-port link aggregation group, or trunk, in both the switch module and the attaching LAN switch prior to installing the cables. The connection options are as follows, in order of preference:
 - Multi-port Link Aggregation Group or Trunk, 1 Gbps (1000 Mbps) per port
 - Single-uplink port, 1 Gbps
 - Multi-port Link Aggregation Group or Trunk, 100 Mbps per port
2. Connect the management module 10/100 Mbps Ethernet port to a separate Layer 2 network if possible, for the best security. If a separate network is not available, you can attach the Ethernet ports of the management module and switch modules to the same Layer 2 network.
3. Avoid network configurations that could lead to data loops, if possible. Loops will be created if you connect multiple ports from the same switch module to the same Layer 2 network device without first enabling link aggregation. If you implement configurations that include data loops, it is essential that you enable Spanning Tree Protocol on the I/O module external ports.

Chapter 3. Diagnostics

This section provides basic troubleshooting information to help you resolve some common problems that might occur with your BladeCenter unit.

If you cannot locate and correct the problem using the information in this section, see Appendix A, “Getting help and technical assistance,” on page 85 for more information.

Diagnostic tools overview

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

- **Troubleshooting charts**

These charts list problem symptoms and steps to correct the problems. See the Chapter 6, “Symptom-to-FRU index,” on page 59 for more information.

- **Diagnostic programs and error messages**

The built-in self-test (BIST) program checks the BladeCenter unit during startup and generates error messages if problems are found.

The system diagnostic program, Real Time Diagnostics Version 1.3, tests the major components of your BladeCenter unit. The Real Time Diagnostics software is available from the IBM Support Web site at <http://www.ibm.com/systems/support>. It is run from the IBM Director Management Console window (under the **BladeCenter** task in the Task panel).

To obtain the Real Time Diagnostics program, go to the following Web site: <http://www.ibm.com/systems/support>.

1. Select **Servers** from the list at the left of the window.
2. Select **Downloadable files** from the list at the left of the window.
3. In the **Downloadable files by category** list, select **Diagnostic**.
4. Click the entry for Real Time Diagnostics and follow the instructions on that page.

- **Light Path Diagnostics feature**

Use the Light Path Diagnostics feature to identify system errors quickly. On the BladeCenter unit, the Light Path Diagnostics feature consists of the LEDs on the front and rear of the BladeCenter unit and on the front of the modules and blade servers.

Identifying problems using the Light Path Diagnostics feature

If the system-error LED on the system LED panel on the front or rear of the BladeCenter unit is lit, one or more error LEDs on the BladeCenter components also might be on. These LEDs help identify the cause of the problem.

This section provides the information to identify problems that might arise during installation using the Light Path Diagnostics feature.

To locate the actual component that caused the error, you must locate the lit error LED on that component.

For example:

A system error has occurred, and you have noted that the BladeCenter system-error LED is lit on the system LED panel. You then locate the module or blade server that also has an error LED lit (see “BladeCenter unit power, controls, and indicators” on page 11 for the location of error LEDs; see the documentation that comes with your blade server for the location of error LEDs on the blade). If the component is a module, replace the module. If the component is a blade server with its system-error LED lit, follow the instructions in the documentation that comes with the blade server to isolate and correct the problem.

Chapter 4. Installing options

This chapter provides instructions for adding options to your BladeCenter unit. Some option-removal instructions are provided in case you need to remove one option to install another.

Installing the BladeCenter unit in a rack

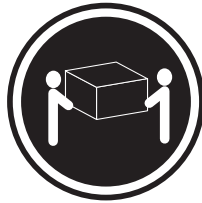
Statement 20:



CAUTION:

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

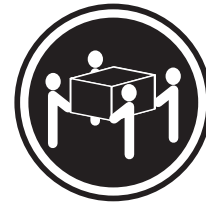
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Install the BladeCenter unit in a rack before installing any blade servers in the BladeCenter unit. If your BladeCenter unit has blade servers already installed, remove them first. Blade servers are installed from the front of the BladeCenter unit, without sliding the BladeCenter unit into or out of the rack. Detailed instructions for installing a BladeCenter unit in a rack are in the *Rack Installation Instructions* that come with your BladeCenter unit.

Installation guidelines

Before you begin to install options in your BladeCenter unit, read the following information:

- Read the “Important safety information” on page vii and the guidelines in “Handling electrostatic discharge-sensitive devices” on page 90. This information will help you work safely with your BladeCenter unit and options.
- The orange color on components and labels in your BladeCenter unit identifies hot-swap components. You can install or remove hot-swap modules and, with

some restrictions, hot-swap blade servers while the BladeCenter unit is running. For complete details about installing or removing a hot-swap component, see the detailed information in this chapter.

- The blue color on components and labels identifies touch points where you can grip a component, move a latch, and so on.
- You do not need to disconnect the BladeCenter unit from power to install or replace any of the hot-swap modules on the rear of the BladeCenter unit. You need to shut down the operating system and turn off a hot-swap blade server on the front of the BladeCenter unit before removing the blade server, but you do not need to shut down the BladeCenter unit itself.
- For a list of supported options for your BladeCenter unit, go to <http://www.ibm.com/pc/compat/> on the World Wide Web.

System reliability considerations

To help ensure proper cooling and system reliability, make sure that:

- Each of the module bays on the rear of the BladeCenter unit has either a module or filler module installed.
- Each of the blade bays on the front of the BladeCenter unit has either a blade server or filler blade installed.
- Each of the drive bays in a blade server storage expansion option has either a hot-swap drive or a filler panel installed.
- A removed hot-swap module, blade server, or drive is replaced within two minutes of removal.
- Cables for the option 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 electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

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

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

Installing and removing modules

The procedures for installing or removing a module on the BladeCenter unit are nearly identical for all modules except the blower modules. To install or remove a blower module, see “Replacing a blower module” on page 47. To install or remove all other modules, follow the instructions in this section.

Every module is keyed so that it can be inserted only in an appropriate bay. You can insert an I/O module only in an I/O-module bay, for example. In addition, most modules must be installed in a specific sequence or under specific circumstances.

The BladeCenter modules

Your BladeCenter unit contains the following hot-swap modules: power modules, I/O modules, management module, and blower modules. See “Rear view” on page 10 for the location of each module. These modules supply common functions to the blade servers that are installed in the blade bays in the front of the BladeCenter unit.

The chassis and the management module supply I/O (optical drive, USB port, keyboard, video, and mouse) that is available to all the blade servers, selected by any one blade server at a time. The chassis can contain up to 14 blade servers.

Attention: To help ensure proper cooling, performance, and system reliability, make sure that each of the module bays on the rear of the BladeCenter unit has a module or filler module installed. When replacing a module, do not operate the BladeCenter unit for more than one minute without either a module or a filler module installed in each module bay.

Management module

Your BladeCenter unit comes with one hot-swap management module in the management bay. You can add a management module in management bay 2.

Note: Only one management module will be active; the second management module, if present, provides redundancy.

The management module functions as a service processor and a keyboard/video/mouse (KVM) multiplexor for the multiple blade servers. The management module also configures the BladeCenter unit and modules, configuring information such as the I/O module IP addresses. The management module provides the following external connections: keyboard, mouse, and video for use by a local console, and one RJ-45 connector for a 10/100 Mbps Ethernet remote management connection. Advanced management modules also provide an RJ-45 connector for serial management connection.

The service processor in the management module communicates with the service processor in each blade server for functions such as:

- Blade server power-on requests
- Blade server error and event reporting
- Blade server requests for keyboard, mouse, and video
- Blade server requests for removable media drives

The management module also communicates with the I/O modules, power modules, blower modules, and blade servers to detect presence or absence and any error conditions, sending alerts when required.

I/O (switch) modules

For blade server communication with the network, your BladeCenter unit supports from one to four hot-swap I/O modules. Table 1 on page 35 identifies the type of I/O module you can install in each I/O-module bay. Go to the IBM Support Web site at <http://www.ibm.com/systems/support> to see the list of supported I/O modules. Your BladeCenter unit supports a minimum of one hot-swap Ethernet switch module or pass-thru module, in I/O-module bay 1. This I/O module provides an internal connection to Ethernet Link 1 in all the blade servers in the BladeCenter unit, up to 14 internal connections per I/O module. To provide an internal connection for Ethernet Link 2 in each blade server, install an Ethernet switch module or pass-thru module in I/O-module bay 2.

The BladeCenter unit also supports two additional I/O modules, for a total of four I/O modules. The two additional I/O modules support the network interface on the I/O expansion option installed on one or more blade servers in the BladeCenter unit.

Note: The BladeCenter unit supports either four Ethernet switch modules or two Ethernet switch modules and up to two fibre channel switch modules. No more than two fibre channel switch modules can be connected to the BladeCenter unit.

If you install an I/O expansion option on any blade server, you must install a hot-swap I/O module of the same network interface (or an optical pass-thru module) in I/O-module bay 3 to obtain network connection 3 for the option; to provide network connection 4 for the option, install the same type of I/O module in I/O-module bay 4 as you installed in I/O-module bay 3. For example, if you install a Fibre Channel I/O expansion option on a blade server, the I/O modules you install in I/O-module bays 3 and 4 must both be Fibre Channel or both be optical pass-thru, and all other I/O expansion options in the BladeCenter unit must also be Fibre Channel I/O expansion options.

Notes:

1. All blade server I/O expansion options in the BladeCenter unit must use the same type of network interface.
2. You can mix four-port 1-Gb Ethernet switch modules with other supported Ethernet switch modules to achieve the total number of Ethernet switch modules you need in the BladeCenter unit.
3. You can use a pass-thru module in any I/O-module bay, provided that the controller in the blade servers or I/O expansion options is compatible with the network switch to which the pass-thru module is connected.

The following table summarizes the types of modules that can be used in each I/O-module bay. See “Rear view” on page 10 for the location of the I/O-module bays on the BladeCenter unit.

Table 1. Hot-swap I/O module types by location

Bays	I/O-module function	Permissible I/O module
1 and 2	Network connections 1 and 2 (Ethernet) for all blade servers in the BladeCenter unit	One of the following combinations: <ul style="list-style-type: none"> • Two Ethernet switch modules • Two pass-thru modules • One Ethernet module and one pass-thru module
3 and 4	Network connections 3 and 4 (from all blade server I/O expansion options on blade servers in the BladeCenter unit)	One of the following combinations: <ul style="list-style-type: none"> • Two Ethernet switch modules • Two Fibre Channel switch modules • Two pass-thru modules • One pass-thru module and one Ethernet switch module • One pass-thru module and one Fibre Channel switch module <p>Important:</p> <ul style="list-style-type: none"> • The modules used must support the network interface used on the I/O expansion options. • You cannot combine Ethernet and Fibre Channel switch modules in bays 3 and 4.

Notes:

1. The enumeration of the Ethernet controllers in a blade server is operating-system dependent. You can verify the Ethernet controller designations a blade server uses through your operating system settings.
2. The routing of an Ethernet controller to a particular I/O-module bay depends on the type of blade server. You can verify which Ethernet controller is routed to which I/O-module bay by using the following test:
 - a. Install only one Ethernet switch module or pass-thru module, in I/O-module bay 1.
 - b. Make sure the ports on the switch module or pass-thru module are enabled (see the *User's Guide* or *Command-Line Interface Reference Guide* for your management module type for instructions).
 - c. Enable only one of the Ethernet controllers on the blade server. Note the designation the blade server operating system has for the controller.
 - d. Ping an external computer on the network connected to the switch module. If you can ping the external computer, the Ethernet controller you enabled is associated with the switch module in I/O-module bay 1. The other Ethernet controller in the blade server is associated with the switch module in I/O-module bay 2.
3. If you have installed an I/O expansion option on a blade server, communications from the option are routed to I/O-module bays 3 and 4. You can verify which controller on the option is routed to which I/O-module bay by performing the test in note 2, using a controller on the I/O expansion option and a compatible switch module or pass-thru module in I/O-module bay 3 or 4.

Power modules

Note: The IBM BladeCenter E type 8677 and 1881 chassis must be configured to support 2320-watt power modules. See the *IBM BladeCenter E 2320 Watt Power Modules Installation Guide* for specific information and instructions.

Your BladeCenter unit comes with one pair of 220-volt hot-swap power modules in power bays 1 and 2 that provides power to all the BladeCenter modules and to blade bays 1 through 6. The BladeCenter unit supports a second pair of power modules in power bays 3 and 4 that provides power to blade bays 7 through 14.

Each pair of power modules is redundant. If either power module fails, the remaining power module continues to supply power, but there is no redundancy; the failed power module must be replaced as soon as possible.

To provide true redundant power, BladeCenter power modules 1 and 3 must connect to a different ac power source than power modules 2 and 4. Connect BladeCenter power modules 1 and 3 to a different PDU than power modules 2 and 4; then, connect each PDU to an ac power source (building power source or service entrance) that is controlled by a separate circuit breaker.

The following table summarizes the application for each power module

Bays	Power module function
1 and 2	Provides power to all the BladeCenter modules and to blade bays 1 through 6
3 and 4	Provides power to blade bays 7 through 14

Power modules are not needed in bays 3 and 4 until you begin installing blade servers and options in blade bays 7 through 14.

Note: If you install a blade server that has a storage expansion unit option attached in blade bay 6, the option will use blade bay 7; power modules will be required in power bays 1, 2, 3 and 4.

Each active power module supplies 12 volts of power to the blade bays it services.

Important: Plug one end of each power-module power cord into the power module; plug the other end of the power cord into a 220-volt power distribution unit (PDU).

Blower modules

Your BladeCenter unit comes with two hot-swap blowers for cooling redundancy. The blower speeds vary depending on the ambient air temperature at the front of the BladeCenter. If the ambient temperature is 72°F or below, the BladeCenter blowers will run at 30% of their maximum rotational speed, increasing their speed as required to control internal BladeCenter temperature. If the ambient temperature is above 72°F, the blowers will run at 80% of their maximum rotational speed, increasing their speed as required to control internal BladeCenter temperature. If a blower fails, the remaining blower continues to cool the BladeCenter unit and blade servers.

Important: Replace a failed blower as soon as possible, to restore cooling redundancy.

Installing a module

The following illustration shows how to install a power module, management module, or I/O module in the rear of the BladeCenter unit. See “Replacing a blower module” on page 47 for information about replacing a blower module.

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

Statement 8:



CAUTION:

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

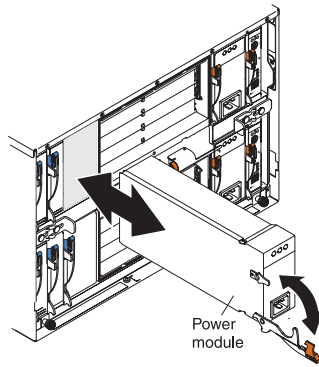


Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Complete the following steps to install a module:

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

1. Read the safety information beginning on page 87 and “Installation guidelines” on page 31 through “Handling static-sensitive devices” on page 32.
2. Remove the acoustic module option, if installed, from the rear of the BladeCenter unit. See “Installing and removing the acoustic module option” on page 40 for instructions.
3. Remove the filler module from the bay.
4. Ensure that the release lever on the module is in the open position (perpendicular to the module).
5. Slide the module into the appropriate module bay until it stops.
6. Push the release lever on the front of the module closed.



7. Attach any cables or cords required by the module. See “Input/output connectors” on page 46 for the location of connectors on the BladeCenter unit. Be sure to route the power cord on a power module through the strain-relief clamp on the power module.
8. Make sure the LEDs on the module indicate that it is operating properly. Verify that:
 - The dc power LED and the ac power LED on each power module are lit and that the power module error LED (2320-watt power modules only) on each power module is *not* lit.
 - The OK LED on the management module is lit.
 - The OK LED on each I/O module is lit.
9. If you have other modules to install, do so now; otherwise, go to step 10.
10. Replace the acoustic module option, if you removed it in step 2.

Removing a module

Complete the following steps to remove a power module, management module, or I/O module.

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

Statement 8:



CAUTION:

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

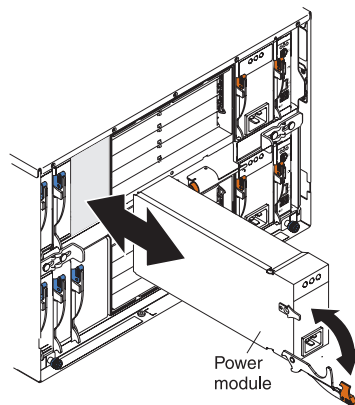


Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

1. Read the safety information beginning on page 87 and “Installation guidelines” on page 31 through “Handling static-sensitive devices” on page 32.
2. Remove the acoustic module option, if installed, from the rear of the BladeCenter unit. See “Installing and removing the acoustic module option” on page 40 for instructions.

Important:

- a. If you are removing a functional power module, make sure before you remove the module that both the ac power LED and the dc power LED on the remaining power module are lit and that the power module error LED (2320-watt power modules only) on the remaining power module is *not* lit; otherwise, shut down the operating systems, and turn off all blade servers that are supported by the power module you are removing before you remove it. (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.)
 - b. If you are removing a management module, you might prefer to stop all management module local and remote sessions before proceeding, to avoid unexpected termination of sessions.
3. Disconnect any cables from the module. For a power module, disconnect the power cord from the module.
 4. Pull the release lever all the way toward the bottom of the module until it stops, as shown in the illustration. The module moves out of the bay approximately 0.6 cm (0.25 inch).
 5. Slide the module out of the bay, and set it aside. Within 1 minute, place either another module of the same type or a filler module in the bay.



6. If you placed another module in the bay, reconnect any cables or power cords you disconnected in step 3; then, make sure the LEDs on the module indicate that it is operating properly. Verify that:
 - The dc power LED and the ac power LED on each power module are lit and that the power module error LED (2320-watt power modules only) on each power module is *not* lit.
 - The OK LED on the management module is lit.
 - The OK LED on each I/O module is lit.
7. Replace the acoustic module option, if you removed it in step 2.

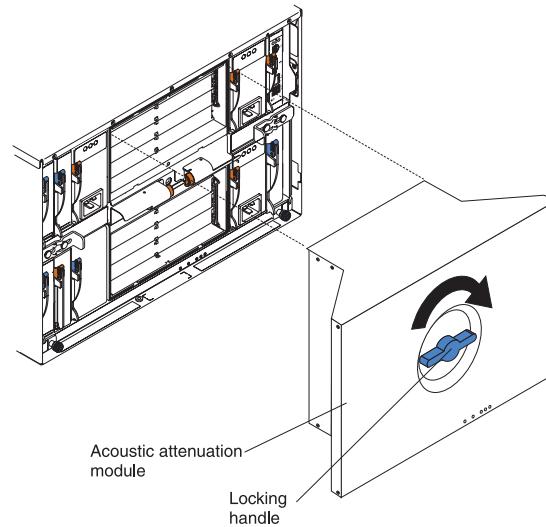
Installing and removing the acoustic module option

For server environments where noise reduction is essential, you might choose to install the BladeCenter acoustic attenuation module option (acoustic module) on the BladeCenter unit. The acoustic module reduces the sound level of the BladeCenter unit to below 7.2 Bel using a T-shaped baffle. The acoustic module is installed on the back of the BladeCenter unit, directly covering the blower modules and partially covering the other modules. The system LED panel is replicated on the acoustic module for visibility. Installing an acoustic module increases the length of a BladeCenter unit and requires use of an enterprise rack.

Installing the acoustic module option

Complete the following steps to install an acoustic module option on the BladeCenter unit:

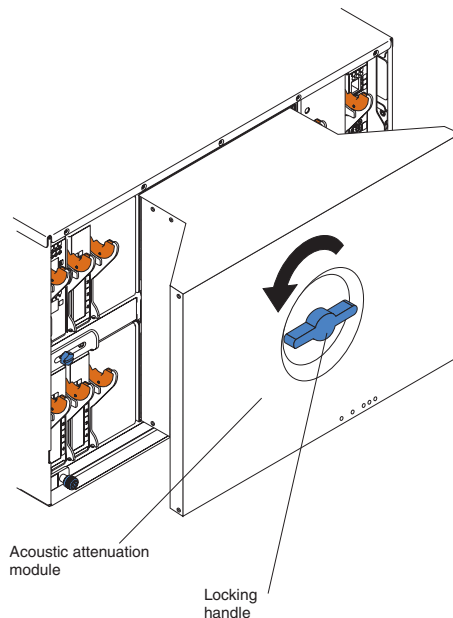
1. Place the acoustic module over the blower modules, aligning the corners of the acoustic module back with the guides on the chassis, and pushing the shaft into the hole between the blower modules.
2. Rotate the acoustic module handle approximately 2 turns clockwise until it tightens the acoustic module firmly into place.



Removing the acoustic module option

Complete the following steps to remove an acoustic module option from the BladeCenter unit:

1. Rotate the acoustic module handle approximately 2 turns counter-clockwise until it stops.
2. Carefully pull the acoustic module away from the BladeCenter unit, and set it aside.



Installing and removing blade servers

Your BladeCenter unit supports up to 14 high-performance blade servers. Each blade server is an enclosure that contains microprocessors, memory, a control chip set, an I/O bus, Ethernet controllers, hard disk drives, customer interface controls, and connectors for expansion options. The blade server receives its power, network connection, and I/O devices (removable media drives, keyboard, mouse, and video ports, USB port, remote monitoring port) from the BladeCenter unit, reducing the server physical size and reducing the number of cables needed.

Blade server expansion options

Some blade servers contain connectors for options that add capabilities to the blade server. You can add these options before installing the blade server in the BladeCenter unit.

Go to <http://www.ibm.com/pc/compat/> on the World Wide Web for a list of available options for your IBM blade server.

I/O expansion option

Some blade servers have connectors for adding an I/O expansion option, such as the IBM HS20 Fibre Channel Expansion Card. The BladeCenter unit routes network communication signals from the I/O expansion option to I/O modules 3 and 4 on the BladeCenter unit. The I/O expansion option is attached directly to the blade server but does not occupy an additional blade bay.

Note: If an I/O expansion option is installed on any blade server, I/O modules for that network interface must be installed in I/O-module bays 3 and 4 on the BladeCenter unit. See “I/O (switch) modules” on page 34 for more information.

Storage-expansion option

Some blade servers have a connector for adding a SCSI expansion unit, such as the IBM HS20 SCSI Storage Expansion Unit. The storage expansion unit supports up to two hot-swap SCSI hard disk drives. The expansion option is attached directly to the blade server.

Note: The SCSI controller in the SCSI storage expansion unit supports RAID level-1 (embedded mirroring).

Important:

1. To ensure proper cooling and system reliability, make sure that each of the SCSI hard disk drive bays on the SCSI storage expansion unit contains either a hot-swap SCSI hard disk drive or a filler panel.
2. Do not install a drive into IDE connector 2 on the blade server if you intend to also install an I/O expansion option. The I/O expansion option occupies the same area as the second IDE drive.
3. Two IDE drives can be used to implement and manage RAID level-1 under both the Linux and Microsoft Windows 2000 operating systems. Details of the implementation for Microsoft Windows 2000 can be found at <http://support.microsoft.com/default.aspx?scid=kb;EN-US;q302969> on the World Wide Web.

Installing a blade server

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

Statement 21:



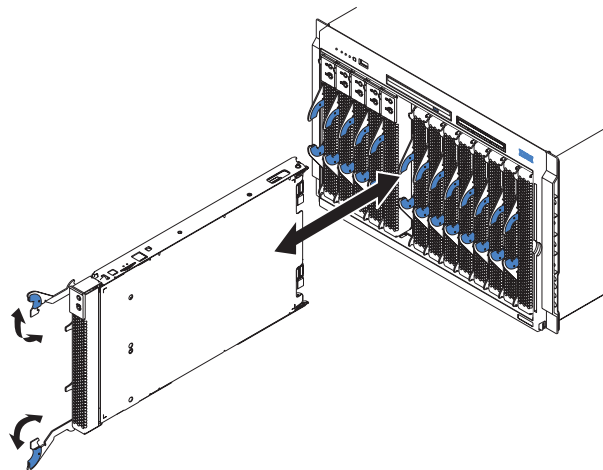
CAUTION:

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

1. Read the “Important safety information” on page vii, “Installation guidelines” on page 31, and “Handling electrostatic discharge-sensitive devices” on page 90.
2. Install any options needed, such as disk drives or memory, in the blade server. See the documentation that comes with the blade server for instructions.
3. Select the bay for the blade server.

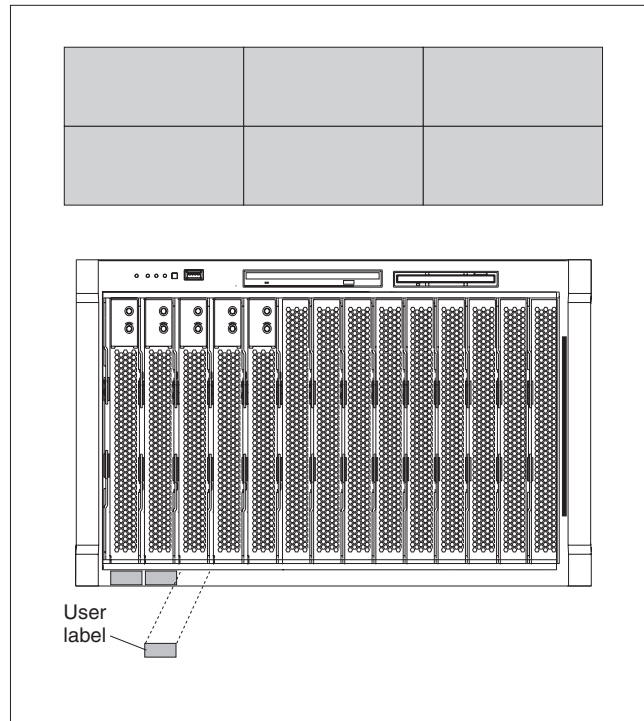
Notes:

- a. If a blade server has an expansion option installed on it, the blade server and expansion option require two adjacent blade bays.
 - b. If you install a blade server or option in bay 7 through 14, you must install power modules in power bays 3 and 4.
4. Remove the filler blade from the bay, and store it in a safe place.
 5. Ensure that the release levers on the blade server are in the open position (perpendicular to the blade server).
 6. Slide the blade server into the bay until it stops. The spring-loaded doors that cover the bay opening move out of the way as you insert the blade server.
 7. Push the release levers on the front of the blade server until they are closed.



8. Turn on the blade server by pressing the power-control button on the blade server control panel. See the documentation that comes with the blade server for more instructions.
9. Verify that the power LED on the blade server control panel is lit, indicating that the blade server is receiving power.

10. If desired, write identifying information on one of the user labels that come with the blade server; then, place the label on the BladeCenter bezel just below the blade server, as shown in the following illustration.



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

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

Important: Reinstalling a blade server into a different bay than the one from which it was removed could have unintended consequences. Some configuration information and update options are established according to bay number. You might need to reconfigure the blade server.

If this is the initial installation for a blade server in the BladeCenter unit, you need to 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.

Removing a blade server

Complete the following steps to remove a blade server from the BladeCenter unit.

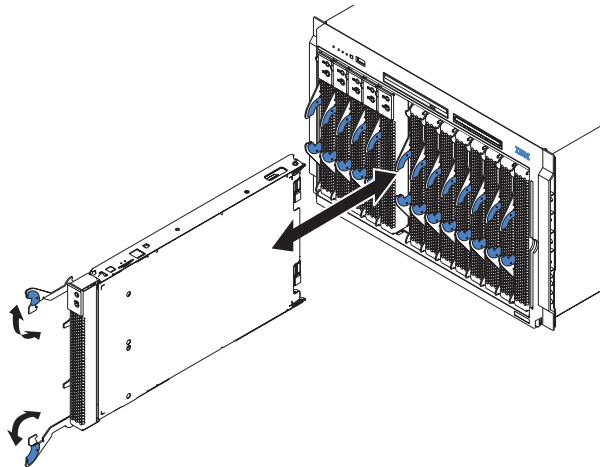
Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit for more than one minute without either a blade server or a filler blade installed in each blade bay. If you fail to replace a blade server or filler blade within one minute, system performance might be affected.
- Make note of the bay number. Some configuration information and update options are established according to bay; if you reinstall the blade server in a different bay than the one from which it was removed, unintended consequences could occur.

1. Read the “Important safety information” on page vii, “Installation guidelines” on page 31, and “Handling electrostatic discharge-sensitive devices” on page 90.
2. Shut down the blade server operating system; then, press the blade server power-control button (behind the blade server control panel door) to turn off the blade server.

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

3. Open the two release levers as shown in the illustration. The blade server moves out of the bay approximately 0.6 cm (0.25 inch).
4. Pull the blade server out of the bay. Spring-loaded doors move down to cover the bay temporarily.
5. Place either a filler blade or another blade server in the bay within two minutes. The spring-loaded doors will move out of the way as you insert the blade server or filler blade.



Completing the installation

After you connect the cables to the modules and route the cables (if necessary, see the *Rack Installation Instructions* for information about routing the cables), start the BladeCenter unit (if it is not already started), and verify that it is working properly, as follows:

1. Start the BladeCenter unit by connecting the power-module power cords to a 220-volt power source (a 220-volt power distribution unit (PDU) that is connected to a 220-volt ac power outlet or directly to a 220-volt ac power outlet).
2. Make sure the LEDs on the modules indicate that they are operating properly. Verify that:
 - The dc power LED and the ac power LED on each power module are lit and that the power module error LED (2320-watt power modules only) on each power module is *not* lit.
 - The OK LED on each management module is lit.
 - The OK LED on each I/O module is lit.
3. Make sure the Power-on LED on each blade server is lit, either steady or blinking.

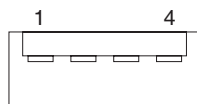
See “BladeCenter unit power, controls, and indicators” on page 11 for information about starting the BladeCenter unit and the location of the LEDs on the modules. See the *Installation and User's Guide* for your blade server for the location of the LEDs on the blade servers.

Input/output connectors

Your BladeCenter has one Universal Serial Bus (USB) version 1.1 or 2.0 connector, depending on BladeCenter unit type, on the front of the BladeCenter unit. All other input/output connectors are provided by devices installed in the BladeCenter unit, such as management modules or I/O modules. See the documentation for these devices for information about the input/output connectors and their function.

Use the USB connector to connect a USB device other than a mouse or keyboard to the BladeCenter unit. Using Plug and Play technology, USB devices are configured automatically.

The following illustration shows a USB connector.



Use a USB cable to connect a device to a USB connector. If you need to connect more USB devices than the BladeCenter unit has USB connectors, use a USB hub to connect additional devices.

If you connect a USB keyboard that has a mouse port, the keyboard emulates a mouse, and you cannot disable the mouse settings in the blade server Configuration/Setup Utility program.

Chapter 5. Service replaceable units

This chapter describes the removal of server components.

Important: The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM products. See the parts listing in Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine if the component being replaced is a customer replaceable unit (CRU) or a FRU.

Note: Blade modules (I/O, management, power), servers, and blowers must be replaced during service within two minutes.

Replacing a blower module

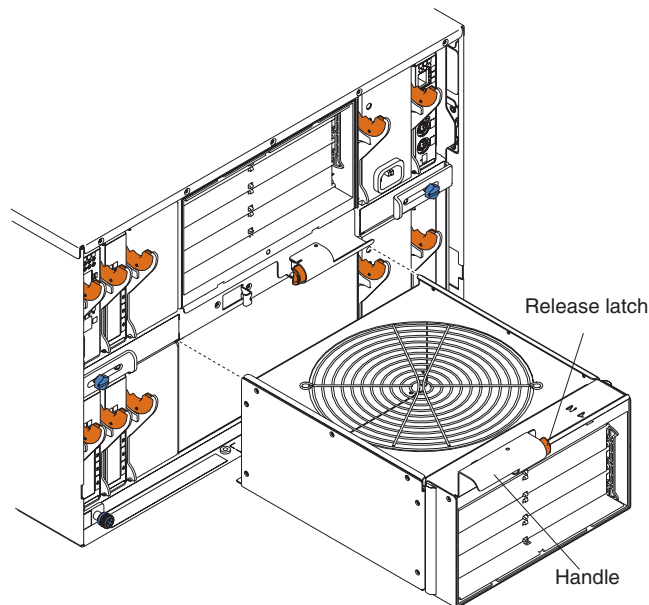
Your BladeCenter comes with two hot-swap blowers for cooling redundancy. The blower speeds vary depending on the thermal load. If a blower fails, the remaining blower continues to cool the BladeCenter and blades.

Important:

1. The failed blower module must be replaced within two minutes during service.
2. If ambient temperature is 72° F or below, the BladeCenter blowers will run at 30% of their maximum rotational speed, increasing their speed as required to control internal BladeCenter temperature. If ambient temperature is above 72° F, the blowers will run at 80% of their maximum rotational speed increasing their speed as required to control internal BladeCenter temperature.

Complete the following steps to replace a blower in the BladeCenter.

1. Press the release lever on the blower handle.
2. Grasp the handle and pull the blower module out of the bay.
3. Slide another blower module into the bay, pushing it until the release lever clicks; the release lever secures the blower module in the bay.



Media tray

This section describes removing and opening the media tray.

Removing the media tray

Complete the following steps to remove the media tray.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Remove the BladeCenter bezel.
 - a. Press the release pads at the bottom corners of the bezel.
 - b. Swing the bezel up and off the BladeCenter.
 2. Push the tabs on the left and right sides of the tray to the left and right respectively; then, pull the media tray out of the BladeCenter.

Reverse these instructions to reinstall the media tray.

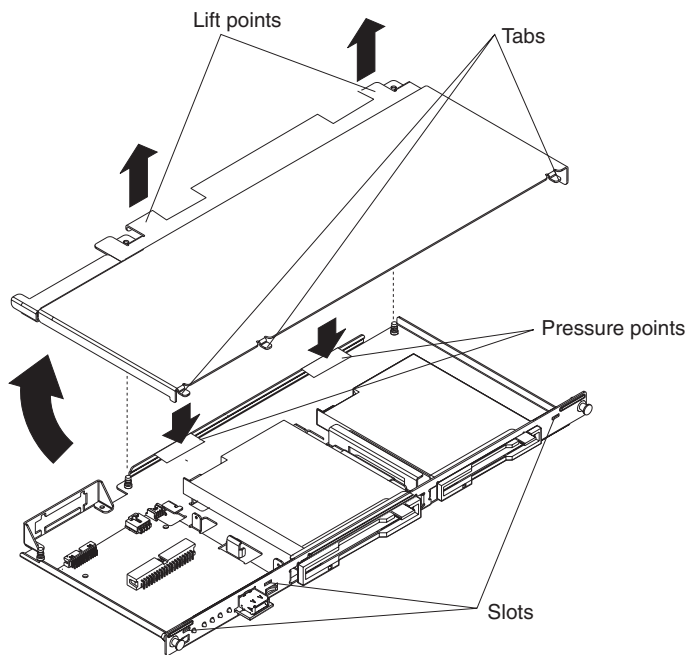
Removing the media-tray cover

Complete the following steps to remove the media tray cover.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Lift at the points indicated in the illustration to lift the rear of the tray cover off the fasteners.
 2. Slide the cover toward the rear of the tray until the front tabs are clear of the slots in the tray; then, lift the cover off the tray.

Note: The diskette drive shown in the following illustration is not present in all BladeCenter unit models.



Reverse these instructions to reinstall the media tray cover. Press the rear of the cover down onto the two fasteners to secure the cover in place.

Optical or diskette drive

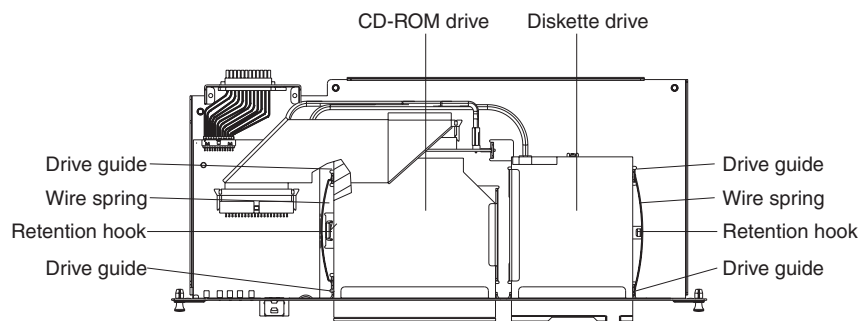
Note: The diskette drive is not present in all BladeCenter unit models.

The optical drive and the diskette drive have the same securing mechanism, a wire-retention spring. On the optical drive, the wire spring is on the left; on the diskette drive, the wire spring is on the right.

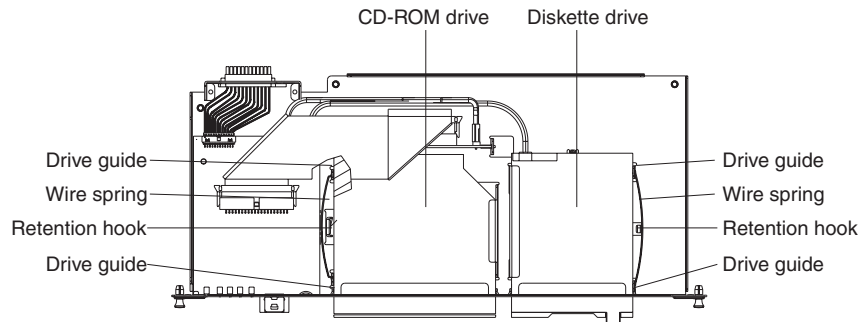
Complete the following steps to replace the optical drive or the diskette drive.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Remove the media tray (see “Media tray” on page 48).
 2. Remove the media-tray cover (see “Removing the media-tray cover” on page 48).



3. If you are removing the diskette drive, disconnect the cable from the rear of the drive.
4. Slip the wire spring out from under the retention hook, and pull it away from the drive. Set the wire spring aside.
5. Slide the drive out of the front of the media tray, and set it aside.
6. Set any jumpers or switches on the replacement drive to match the drive you just removed.
7. Slide the replacement drive all the way into the bay on the media tray.



8. Align the holes in the side of the drive with the hole in each drive guide.
9. Push each end of the wire spring through the hole in the drive guide and into the hole in the drive; then, push the middle of the wire spring under the retention hook.
10. Try to move the drive, to make sure the wire spring is holding it in place. If the drive slides forward, remove the wire spring and repeat steps 7 through 10.
11. If you replaced the diskette drive, reconnect the cable at the rear of the drive.

Installing SuSE to a SCSI drive

The SuSE Linux operating system sees the diskette drive as a SCSI device. When you are trying to install SuSE to a SCSI hard disk drive in a blade server SCSI storage expansion unit and the blade server is the current owner of the media tray (optical drive, diskette drive, and USB port), the SCSI identification of the diskette drive can cause problems. SuSE might not install properly to the SCSI hard disk drive.

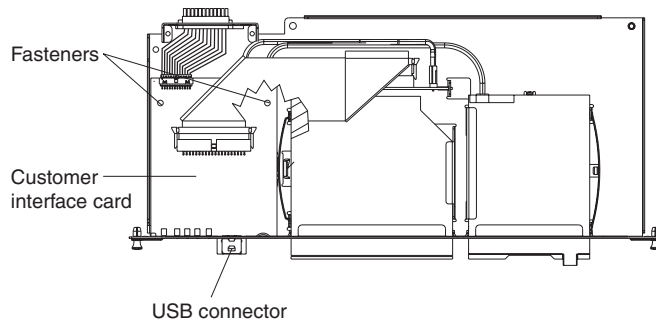
For a remote (network) installation, make sure the blade server is not the current owner of the media tray before you attempt to install the SuSE Linux operating system on the blade server.

Customer interface card and USB connector

Complete the following steps to remove the customer interface card from the media tray.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Remove the media tray (see “Media tray” on page 48).
 2. Remove the media tray cover (see “Removing the media-tray cover” on page 48).



3. Disconnect the cables from the customer interface card.
4. Lift the two rear corners of the customer interface card to release it from the fasteners.
5. Slide the customer interface card toward the rear of the media tray until the USB connector is free of the opening; then, lift the board off the media tray.
6. To replace the customer interface card, reverse the previous steps. Press down on the rear of the board to secure it to the fasteners.

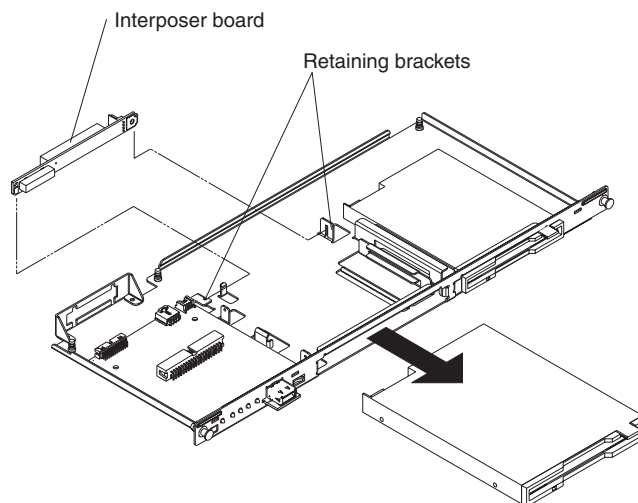
CD interposer board

Note: The CD interposer board is only present in BladeCenter unit models that have a media tray with a diskette drive.

Complete the following steps to replace the CD interposer board.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Remove the media tray (see “Media tray” on page 48).
 2. Remove the media-tray cover (see “Removing the media-tray cover” on page 48).
 3. Remove the CD-ROM drive (see “Optical or diskette drive” on page 49.)



4. Remove the cables from the interposer board.

5. Lift the end of the interposer board that is closer to the customer interface card, and slide it toward the customer interface card until the other end of the interposer board is free of the retaining bracket.

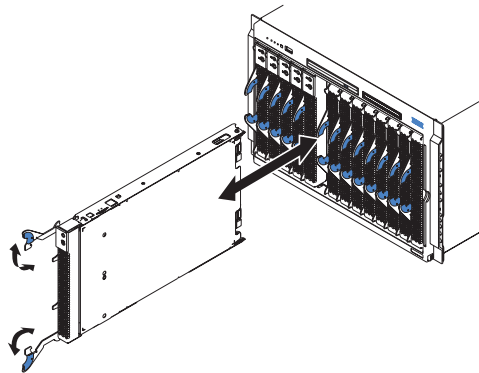
To install the replacement CD interposer board, reverse the previous steps, making sure to insert the tab on one end of the interposer board into the guide that is near the diskette drive.

Switch, power, and cooling (SPC) chassis

Complete the following steps to remove the sub-chassis that contains the switch (I/O), power, and cooling (SPC) modules.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Shut down the operating systems, and turn off any blades in the BladeCenter.
 2. Turn off the BladeCenter and any attached devices (see “Shutting down the BladeCenter unit” on page 12).
 3. Disconnect the cables from the modules in the rear of the BladeCenter.
 4. Remove the modules from the rear of the BladeCenter.
 5. Disengage all the blades from the BladeCenter midplane.

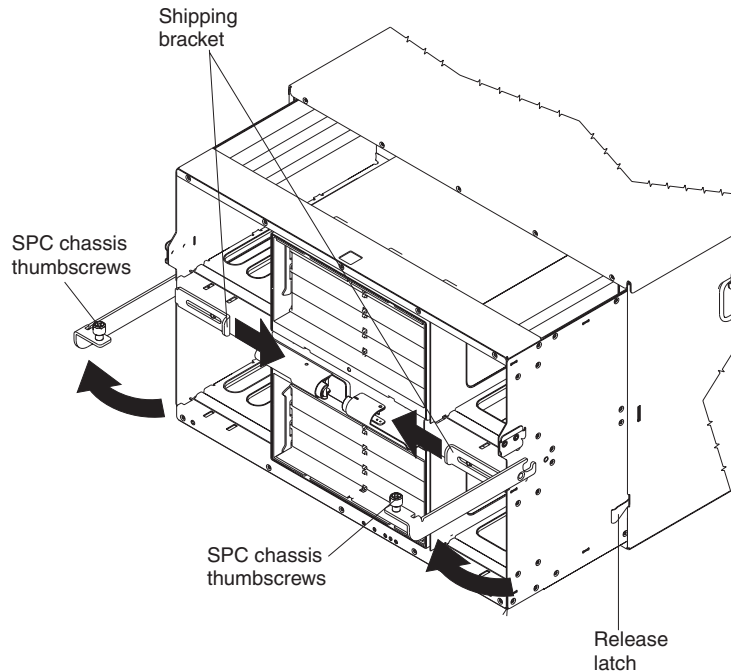


- a. Open the two release levers on each blade as far as they will go.
- b. Pull each blade out about 2.54 cm (1 inch).

Important: If you completely remove any blades, each blade must be reinstalled in the same bay from which it was removed.

Note: It is not necessary to release or remove any filler blades.

6. On the rear of the BladeCenter, release the shipping brackets.



- a. To disengage the shipping brackets, slide the shipping brackets towards the blowers.
7. Unscrew the captive thumbscrews at the bottom corners of the chassis, and pull them until the SPC chassis moves out about 1.27 cm (0.5 inches).
8. Pull the SPC chassis out until it stops (about half-way out).
9. While supporting the SPC chassis with your hands, press the release levers on the sides, and pull the SPC chassis out of the BladeCenter unit. Place the SPC chassis on a strong, flat surface.

To reinstall the SPC chassis, reverse the previous steps.

Media-cable tray

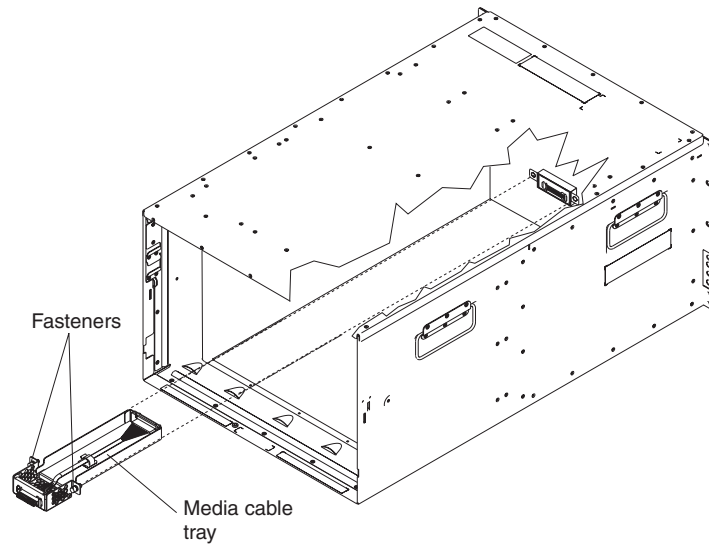
Note: The media cable is only present in BladeCenter unit models that have a media tray with a diskette drive.

The media-cable tray is between the media tray and the SPC chassis.

Complete the following steps to remove the media cable tray.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Remove the BladeCenter bezel.
 - a. Press the release pads at the bottom corners of the bezel.
 - b. Swing the bezel up and off the BladeCenter.
 2. Push the tabs on the left and right sides of the tray to the left and right respectively; then, pull the media tray out of the BladeCenter.



3. Remove the media tray cable.

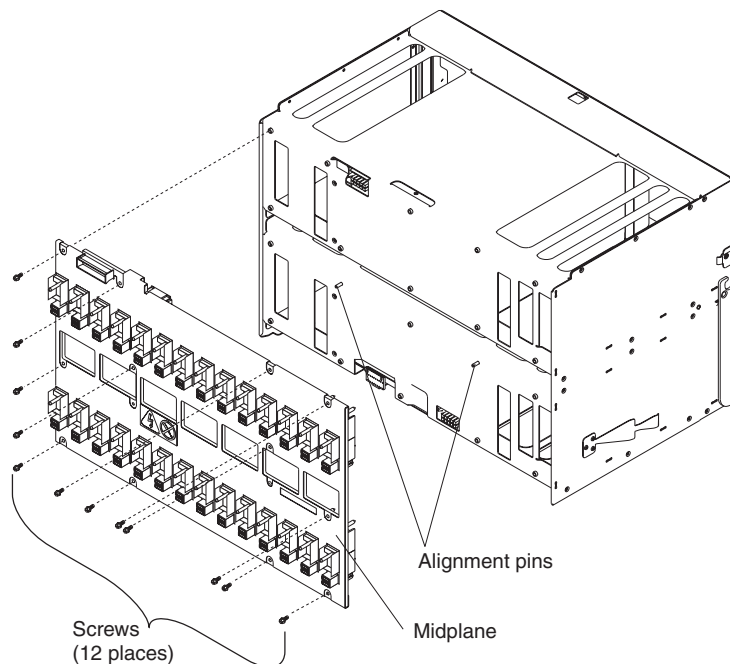
To replace or reinstall the media cable tray, reverse the previous steps.

Midplane

Complete the following steps to replace the midplane.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Shut down the BladeCenter, and remove the SPC chassis (see “Switch, power, and cooling (SPC) chassis” on page 52).
 2. Unplug the cable at the bottom of the midplane.
 3. Unscrew the 12 fasteners that hold the midplane to the SPC chassis.
 4. Pull the midplane away from the SPC chassis.



5. Install the replacement midplane by reversing the previous steps.
6. Update the vital product data (VPD) for the BladeCenter:
 - 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.

System LED panel

There are two system LED panels on the BladeCenter: one is on the front of the BladeCenter; the other is on the rear.

Front system LED panel

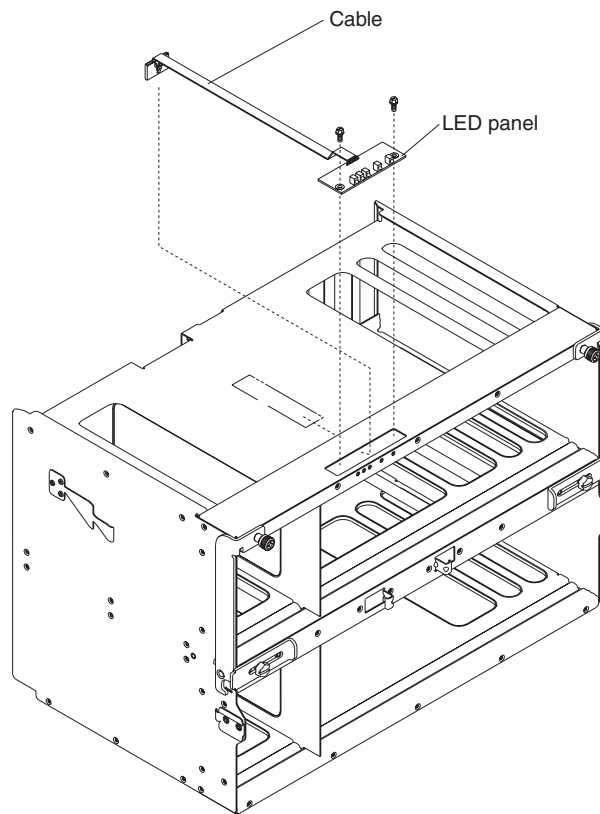
The front system LED panel is on the customer interface card in the media tray. To replace the front system LED panel, replace the customer interface card. See “Customer interface card and USB connector” on page 50 for instructions.

Rear system-LED panel

The rear system-LED panel is on the SPC chassis. Complete the following steps to replace the rear system-LED panel.

Note:

- Read “Installation guidelines” on page 31.
 - Read the safety notices at “Safety information” on page 87.
 - Read “Handling electrostatic discharge-sensitive devices” on page 90.
1. Shut down the BladeCenter, and remove the SPC chassis (see “Switch, power, and cooling (SPC) chassis” on page 52).
 2. Turn the SPC chassis upside-down.
 3. Unplug the cable at the bottom of the midplane.
 4. Unscrew the two fasteners on the LED panel.
 5. Remove the LED panel from the SPC chassis.



Note: You might need to push the LED panel cable toward the panel to leverage the panel out of the chassis opening.

6. Install the replacement rear system LED panel by reversing the previous steps.

Note: The cable of the new rear system LED panel must be adhered to the SPC chassis. Once the panel is positioned on the SPC chassis, the release liner that covers the adhesive on the cable must be removed for the cable to adhere to that chassis. The cable can then be plugged to the midplane.

Chapter 6. Symptom-to-FRU index

This index supports the BladeCenter Type 8677 and 1881.

Notes:

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by this index, refer to the manual for that device.
3. Blade modules (I/O, management, power) and blowers must be replaced during service within two minutes.

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

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

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

Note: Try reseating a suspected component or reconnecting a cable before replacing the component.

Error symptoms

You can use the following information to find solutions to problems that have definite symptoms.

Attention: If diagnostic error messages appear that are not listed in the following tables, make sure that your BladeCenter unit has the latest level of firmware code installed.

If you have just added a new option and your system is not working, complete the following procedure before using the troubleshooting charts:

1. Remove the option that you just added.
2. Run the diagnostic tests to determine if your system is running correctly.
3. Reinstall the new device.

Table 2. Troubleshooting charts

Device	Suggested action
Blade server problem	
Blade servers turn off for no apparent reason.	All blade bays must have a blade server, expansion unit, or filler blade in them. Blade bays that do not have these items installed or have them installed improperly disturb airflow in the BladeCenter unit with an adverse effect on BladeCenter unit cooling. If the BladeCenter unit begins to overheat, blade server processors will begin to slow down and will eventually turn off the system.
Blade server does not turn off during Red Hat Linux 7.3 shutdown.	<p>Issuing any of the Linux shutdown commands shuts down the operating system, but does not turn off the blade server. The blade server shuts down to the point where a message is displayed on the management module saying that the blade server is off, but the blade server power-on LED remains lit.</p> <p>Complete the instructions provided for Red Hat Linux in the <i>User's Guide</i> or the <i>Command-Line Interface Reference Guide</i> for your management module type to enable Wake On LAN for both onboard Broadcom integrated Ethernet controllers. This will allow the blade server to restart using Wake on LAN even if the Linux shutdown is incomplete and the blade server does not turn off.</p> <p>Forcing a blade server to turn off</p> <p>Complete the following steps to turn off a blade server after an incomplete Linux shutdown:</p> <ol style="list-style-type: none"> 1. Manually press the power-control button on the front of the blade server (behind the control panel door) to turn off the blade server. Turning off the blade server in this way is considered an improper shutdown by the Wake on LAN feature, and the Wake on LAN feature will not restart the blade server. 2. Unlatch and slide the blade server partially out of the BladeCenter; then, reinstall it to reset the blade server power state and re-enable its previously programmed Wake on LAN capability.
Blade server does not turn off during SuSE Linux 8.0 shutdown.	<p>Issuing any of the Linux shutdown commands shuts down the operating system but does not turn off the blade server. The blade server shuts down to the point where a message is displayed on the management module saying that the blade server is off, but the blade server power-on LED remains lit.</p> <p>A blade server running SuSE Linux 8.0 will not turn off during shutdown if ACPI is not enabled. Complete the following steps to enable ACPI:</p> <ol style="list-style-type: none"> 1. Type the following command: <code>modprobe ospm_system</code> 2. Type the following command to save this setting upon subsequent reboots: <code>echo "/sbin/modprobe ospm_system" >> /etc/init.d/boot.local</code>
Blade server does not turn on, the amber system-error LED on the BladeCenter system-LED panel is lit, the amber blade error LED on the blade server LED panel is lit, and the system-error log contains the following message: "CRUs MisMatched".	<p>The problem occurs after installing the second microprocessor option or after replacing a failed microprocessor in a two-way Blade server.</p> <p>The processor with the lowest feature set and stepping level must be used as the Bootstrap Processor (BSP). This is Microprocessor 1 in location U66. Move the microprocessor in location U66 to location U70, and move the microprocessor in location U70 to location U66.</p>

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>CD-ROM cannot be configured with a JS20 blade server but works with a HSxx blade server.</p>	<p>The customer interface card (FRU number 59P6629) is not compatible with the JS20 blade server and must be replaced with the latest level FRU.</p> <p>Note: The customer interface card installed in the BladeCenter is listed as the "media tray" instead of the "customer interface card" on the Hardware VPD view of the management-module web interface. The FRU number is also printed on the customer interface card. Replace the customer interface card with the latest level, see Chapter 7, "Parts listing, BladeCenter Type 8677 and 1881," on page 79 for the correct FRU number.</p>
<p>Some components do not report environmental status (temperature, voltage).</p>	<p>The green status dot for a component is not automatically a link to environmental information (temperature and voltage) for the component. Only the management module and blade servers have environmental information, and only the green dot for those components contains a link to environmental information.</p>
<p>Switching KVM control between blade servers gives USB device error.</p>	<p>If a blade server is under heavy load, it can take several minutes before it enumerates the USB devices connected to it. If control of the KVM and media tray is switched away from the blade server before this enumeration is complete, a USB device installation error might be displayed. Do not switch KVM control between blade servers until the mouse and keyboard are both working on the blade server that has control of the KVM and media tray.</p>
<p>"Unsafe Removal of Device" error message appears on blade server running Microsoft Windows 2000.</p>	<p>Before switching ownership of the media tray to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, similar to the following:</p> <ol style="list-style-type: none"> 1. Double-click the Unplug or Eject Hardware icon in the Windows taskbar at the bottom right of the screen. 2. Select USB Floppy, and click Stop. 3. Select USB Mass Storage Device, and click Stop. 4. Click Close. <p>You can now safely switch ownership of the media tray to another blade server.</p>
<p>"Media not found" error message and other file system error occur on a blade server running Linux or DOS.</p>	<p>Attempting to access the mounted optical drive or diskette drive (media tray) after it has been switched to another blade server results in I/O errors, even if the media tray has been switched back.</p> <p>Note: Because the BladeCenter unit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device.</p> <ul style="list-style-type: none"> • If a blade server tries to access the optical drive after it has been switched to another blade server, a "Media not found" error occurs. • If a blade server is running a DOS environment, such as when updating firmware on the blade server, the firmware can be interrupted or corrupted when the media tray is switched away; you might need to call for service on the blade server. • If a file handle was left open by switching the media tray away, the system administrator will not be able to do a clean unmount (umount command) unless the unmount is forced by umount command parameters ("lazy unmount"). • If the system administrator is sharing out the optical drive for multiple users, that network share is broken. <p>Before switching ownership of the media tray to another blade server, ensure that the optical drive and diskette drive are not mounted for the current blade server owner (check for open file handles and sharing out). If a firmware update is taking place on the blade server, do not switch the media tray to another blade server.</p>

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>Linux does not install from the BladeCenter optical drive or will not start afterward.</p>	<p>Neither Red Hat Linux 7.3 nor SuSE Linux version 8.0 will install locally, although Red Hat Linux might appear to install.</p> <ul style="list-style-type: none"> • If you try to install Red Hat Linux to the blade server IDE drive, Linux does not install. • If you try to install Red Hat Linux to the SCSI drive on a blade server expansion unit, Linux appears to install but the operating system will not start properly. • If you try to install SuSE Linux, Linux does not install. <p>Download the latest operating system installation instructions for your operating system from the IBM Support Web page at http://www.ibm.com/systems/support/. The necessary workaround is described in the instructions for your operating system.</p>
<p>X does not start in Red Hat 7.3 when the blade server does not own the KVM.</p>	<p>The X Window does not start in a blade server if the blade server is not the current owner of the keyboard, video, and mouse (KVM). Because the blade server does not own the KVM, the X Window cannot find the mouse.</p> <p>Depending on the Red Hat Linux kernel version, do one of the following:</p> <ul style="list-style-type: none"> • Red Hat Linux 7.3, kernels prior to 2.4.18-17.7.x, and Red Hat Advanced Server kernels 2.1: Add the following line to the <code>/etc/modules.conf</code> file. <pre>alias char-major-13 mousedev</pre> • Red Hat Linux 7.3, kernel 2.4.18-17.7.x or later: Install the 2.4.18-17.7.x or later kernel errata, available from https://rhn.redhat.com/errata/rh73-errata.html.

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>Remote control does not work with default SuSE Linux, version 8.0, display settings.</p>	<p>The remote console requires a display setting of 1024x768@60Hz in the blade server operating system. The default resolution in SuSE is 1024x768, but the default refresh rate falls somewhere between 50Hz and 60Hz. The remote console does not work for a blade server running SuSE with a display refresh rate other than exactly 60Hz. The message "eServer/No video available" displays.</p> <p>Other operating systems do not exhibit the problem.</p> <p>Set the refresh rate in the XF86Config file to exactly 60Hz.</p> <p>There are two methods.</p> <ul style="list-style-type: none"> • Method 1 (unattended network install, prevent the problem): Modify the AutoYaST control file to specify 1024x768@60Hz. <ol style="list-style-type: none"> 1. Run the graphical interface to the AutoYaST control file to set the VESA video mode to 1040x768@60Hz. The graphical interface creates the AutoYaST control file. 2. Edit the resulting AutoYaST control file to set the value for min_vsync to 60. <p>During an unattended network install, the YaST program uses the AutoYaST control file to modify the XF86Config file (/etc/X11/XF86Config); these changes will cause XF86Config to set the display resolution to 1040x768 with a refresh rate of 60Hz.</p> <p>-- OR --</p> • Method 2 (situation has already occurred): Modify the xF86Config file. <ol style="list-style-type: none"> 1. In the Monitor section of /etc/X11/XF86Config, change the value of VertRefresh to 60, as shown in these sample lines. <pre>Section "Monitor" Option "CalcAlgorithm" "IteratePrecisely" HorizSync 31-48 Identifier "Monitor[0]" ModelName "AutoDetected" Option "DPMS" VendorName "AutoDetected" VertRefresh 60 UseModes "Modes[0]" EndSection</pre> 2. Shut down X; then, restart it.
<p>Diskette drive problems</p>	

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>Diskette drive is seen as /dev/sdx by Red Hat Linux 7.3 and SuSE version 8.0</p>	<p>Both Red Hat Linux and SuSE Linux see the diskette drive as /dev/sdx (where x is the last SCSI device in the line) instead of /dev/fd0. When you try to mount the drive as fd0, the Linux operating system does not recognize the device (“not a valid block device”).</p> <p>There are two options:</p> <ul style="list-style-type: none"> • (For SuSE Linux version 8.0) Modify the /etc/fstab file to include the following line: <code>/dev/sdx /media/floppy auto noauto,user,sync 0 0</code> <p>where x is the letter that was assigned to the diskette drive.</p> <ul style="list-style-type: none"> • (For Red Hat Linux 7.3) <ol style="list-style-type: none"> 1. Modify the /etc/fstab file to include the following line: <code>/dev/fdx /mnt/floppy auto noauto,user 0 0</code> <p>where x is the letter that was assigned to the diskette drive.</p> <ol style="list-style-type: none"> 2. Create a directory for the diskette drive under /mnt by running: <code>mkdir /mnt/floppy</code> 3. Mount the diskette drive by typing: <code>mount /mnt/floppy</code> <p>Note: When running Linux, you must unmount the diskette drive before changing ownership of the media tray.</p>
<p>Diskette drive problem.</p>	<ol style="list-style-type: none"> 1. Replace the diskette drive 2. Replace the diskette drive signal/power cable
<p>Optical drive problems</p>	
<p>Optical drive is seen as /dev/sr0 by SuSE.</p>	<p>If the SuSE Linux operating system is installed remotely onto a blade server that is not the current owner of the media tray (optical drive, diskette drive, and USB port), SuSE sees the optical drive as /dev/sr0 instead of /dev/cdrom, establish a link between /dev/sr0 and /dev/cdrom as follows:</p> <ol style="list-style-type: none"> 1. Enter the following command: <code>rm /dev/cdrom; ln -s /dev/sr0 /dev/cdrom</code> 2. Insert the following line in the /etc/fstab file: <code>/dev/cdrom /media/cdrom auto ro,noauto,user,exec 0 0</code>

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>Optical drive is not recognized after being switched back to blade server running on Windows 2000 Advanced Server with SP3 applied.</p>	<p>When the optical drive is owned by blade server x, is switched to another blade server, then is switched back to blade server x, the operating system in blade server x no longer recognizes the optical drive. This happens when you have not safely stopped the drives before switching ownership of the optical drive, diskette drive, and USB port (media tray).</p> <p>Note: Because the BladeCenter unit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device. Before switching ownership of the optical drive (media tray) to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, as follows:</p> <ol style="list-style-type: none"> 1. Double-click the Unplug or Eject Hardware icon in the Windows taskbar at the bottom right of the screen. 2. Select USB Floppy and click Stop. 3. Select USB Mass Storage Device and click Stop. 4. Click Close. <p>You can now safely switch ownership of the media tray to another blade server.</p>
<p>Optical drive problem.</p>	<ol style="list-style-type: none"> 1. Replace the optical drive 2. Replace the CD interposer card 3. Replace the optical drive signal cable 4. Replace the optical drive power cable
<p>Ethernet controller problems</p>	
<p>Operating systems number Ethernet controllers differently.</p>	<p>Enumeration of the Ethernet controllers in a blade server is operating-system dependent. In the blade server Configuration/Setup Utility program, the Ethernet port designated as Planar Ethernet 1 is routed to Ethernet switch module 2 and the Ethernet port designated as Planar Ethernet 2 is routed to Ethernet switch module 1.</p> <p>Verify the designations through your operating system settings or by testing:</p> <ol style="list-style-type: none"> 1. Install only one switch module, in I/O-module bay 1. 2. Enable only one of the Ethernet controllers on the blade server. Make note of the designation the blade server operating system has for the controller. 3. Ping an external computer on the network connected to the switch module. <p>If you can ping the external computer, the Ethernet controller you enabled is the upper controller in the blade server and is associated with Ethernet switch 1.</p>
<p>Ethernet switch module problems</p>	
<p>First ping from Ethernet switch module through Telnet reports failure.</p>	<p>When you use the Ethernet switch module Telnet interface to request the switch module to ping something, the first ping response reports a failure, although the other repetitions might report success. This occurs regardless of whether the switch module port the pinged object is connected to is internal or external, and applies to pinging blade servers but not to pinging the management module or objects connected to its external Ethernet port, such as the network management station. To get accurate results, always specify multiple repetitions (>1) in the ping request, and ignore the first ping response from that request. See the <i>IBM 4-Port Gb Ethernet Switch Module for BladeCenter Installation Guide</i> for instructions on how to ping through the Telnet interface.</p>

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>Ethernet switch-module firmware graphics shows a blank panel when the blade server is present but powered off.</p>	<p>If the Wake-on-LAN (WOL) feature is disabled on a blade server, and the blade server is turned off, the switch module internal port link to that blade is down. This is not an error, but the graphic of the BladeCenter unit might show a blank panel instead of a blade server in that bay.</p> <p>Note: You can enable or disable the WOL feature on a blade server through the management-module Web interface or through the IBM Director console. Do not rely on the BladeCenter graphic in the Ethernet switch-module firmware Web interface to determine the presence or absence of blade servers in the BladeCenter unit.</p>
<p>Ethernet switch-module log reports elapsed time, not time of day.</p>	<p>The timestamp on entries in the Ethernet switch module log uses elapsed time (since last switch restart). The timestamp on entries restarts from 0 each time the switch is restarted, although the entries do remain in order of occurrence.</p>
<p>Ethernet disconnect notice will not appear when running Windows 2000.</p>	<p>If an Ethernet cable is accidentally removed from the back of the BladeCenter unit, the small red X (disconnect notice) that normally would appear to indicate that the cable was disconnected will not appear in the bottom right of the screen. The disconnect notice does not appear because the blade server Ethernet controller connects to the Ethernet switch module through integrated circuitry inside the BladeCenter unit.</p> <p>When troubleshooting Ethernet-related problems, ensure that the Ethernet cables on the back of the BladeCenter unit are connected properly.</p>
<p>The default IP address set by the Ethernet switch module does not match the one assigned by the management module.</p>	<p>When troubleshooting Ethernet-related problems, ensure that the Ethernet cables on the back of the BladeCenter unit are connected properly.</p>
<p>Updating the Ethernet switch module configuration through the management module does not save the switch NVRAM.</p>	<p>When you use the management-module Web interface to update the Ethernet switch module configuration, the management module firmware writes its settings for the switch module only to the management module NVRAM; it does not write its settings for the switch module to the switch-module NVRAM.</p> <p>If the switch module restarts when the management module is not able to apply the IP address it has in NVRAM for the switch module, the switch module will use whatever IP address it has in its own NVRAM. If the two IP addresses are not the same, you might not be able to manage the Ethernet switch module any more.</p> <p>The management module cannot apply the switch IP address from its NVRAM if:</p> <ul style="list-style-type: none"> • The management module is restarting • The management module has failed • The management module has been removed from the unit. <p>When you use the management-module Web interface to update the Ethernet switch module configuration, the management module firmware writes its settings for the switch module only to the management module NVRAM; it does not write its settings for the switch module to the switch module NVRAM.</p> <p>If the switch module restarts when the management module is not able to apply the IP address it has in NVRAM for the switch module, the switch module will use whatever IP address it has in its own NVRAM. If the two IP addresses are not the same, you might not be able to manage the Ethernet switch module any more.</p> <p>The management module cannot apply the switch IP address from its NVRAM if:</p> <ul style="list-style-type: none"> • The management module is restarting • The management module has failed • The management module has been removed from the unit.
<p>Keyboard problems</p>	

Table 2. Troubleshooting charts (continued)

Device	Suggested action
The keyboard is very slow when using an operating system that does not have USB drivers.	<p>Although the keyboard attached to the BladeCenter unit is a PS/2-style keyboard, communication with it is through a USB bus. When you are running an operating system that does not have USB drivers, such as in the following instances, the keyboard responds very slowly.</p> <ul style="list-style-type: none"> • Run the blade server integrated diagnostics • Run a BIOS update diskette on a blade server • Update the diagnostics on a blade server • Run the Broadcom firmware CD for a blade server
The keyboard is very slow when using an operating system that does not have USB drivers.	Sometimes when switching ownership of the KVM to a blade server, the video for the blade server appears almost immediately, but it takes up to 10 or 20 seconds for the mouse and keyboard to be usable. No action required.
Pressing F1 brings up browser help instead of performing BladeCenter management functions.	<p>Connecting to the BladeCenter management module through the Web interface does not provide proper coverage for the F1 key. In particular, pressing F1 to access the Configuration/Setup Utility when a blade server is started brings up browser help instead of the Configuration/Setup Utility.</p> <p>This problem is peculiar to the Sun Java browser plug-in. Use the Microsoft virtual machine (VM) that is built in to the browser.</p>
Remote console has keyboard entry problems with Sun Java plug-	<p>When you are redirecting the server console (remote console function) of a blade server that is running Microsoft Windows 2000 or Windows XP and using the Sun Java plug-in (Java Virtual Machine), the remote console can have keyboard entry problems.</p> <p>Use the Microsoft Java Virtual Machine (JVM) or Java Runtime Environment (JRE) on the blade server instead of using the Sun Java Virtual Machine. The Microsoft JVM comes with the Windows XP Service Pack 1. You can obtain the Microsoft JVM for Windows 2000 from the Microsoft corporation. If you are using the Internet Explorer browser, version 6.0 or later, to log into the management module and use the remote control function, you must also adjust the browser settings:</p> <ol style="list-style-type: none"> 1. Click Tools → Internet Options → Advanced tab. 2. Under the Java (Sun) section, uncheck the checkbox next to 'Use Java 2 v1.4. for <applet> (requires restart)'
Management-module problems	
The management module password cannot be reset.	If you forget the management-module password, you will not be able to access the BladeCenter management module. The management-module password cannot be overridden, and the management module will need to be replaced.
Management module does not complete takeover to redundant module on hardware failure.	Replace the management module.
Media tray problems	
Media tray access is lost temporarily during management module restart.	<p>When the BladeCenter management module is restarted, use of the media tray (removable media drives) is lost temporarily. If you or a failure condition initiates a management module restart while I/O activity is taking place on the media tray, the disruption can interrupt reads to the optical drive or lose data being written to a diskette or USB device.</p> <p>Note: You can restart the management module through the Web interface to the management module or from a network management station such as the IBM Director console. Some failures on the BladeCenter unit can result in the management module restarting automatically.</p> <p>Make sure there is no I/O activity on the media tray before you restart the management module.</p>

Table 2. Troubleshooting charts (continued)

Device	Suggested action
Monitor problems	
The monitor works when you start the BladeCenter unit, but goes blank when you start some application programs in the blade servers.	See the <i>IBM 4-Port Gb Ethernet Switch Module for BladeCenter Installation Guide</i> for instructions on how to ping through the Telnet interface.
The monitor displays video for blade server 14 during management module restart.	The monitor attached to the BladeCenter management module normally shows the video output from the blade server that is the current owner of the keyboard, video, and mouse (KVM). When there is no actively selected video from any blade server, the video from blade server 14 is routed to the management module. While the management module is restarting, there is temporarily no current KVM owner. The video from blade server 14 displays on the monitor briefly until the management module uses its NVRAM values to reestablish ownership of the KVM and media tray (optical drive, diskette drive, and USB port). After that, the video from the blade server that is the current KVM owner displays on the monitor.
The screen is blank.	Verify that: <ol style="list-style-type: none"> 1. The system power cord is plugged into the BladeCenter power module and a working 220-volt PDU or electrical outlet. 2. The monitor cables are connected properly. 3. The monitor is turned on and the brightness and contrast controls are adjusted correctly. 4. If you have verified these items and the screen remains blank, replace: <ol style="list-style-type: none"> a. Monitor b. Management module
Only the cursor appears.	See “Undetermined problems” on page 77.
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	If the monitor self-tests show the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. <p>Notes:</p> <ol style="list-style-type: none"> 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. <p>If the problem remains, replace the monitor.</p>
Wrong characters appear on the screen.	If the wrong language is displayed, update the firmware in the management module with the correct language. If the problem remains, replace the management module.
Mouse problems	
Mouse function lost during Red Hat installation.	If, while installing Red Hat Linux 7.3 to a blade server, you or someone else selects a different blade server as owner of the keyboard, video, and monitor (KVM), you might lose mouse function for the installation process. <p>Do not switch KVM owners until the installation process begins to install the packages (after the 'About to Install' window).</p>

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>Mouse is not detected during SuSE installation.</p>	<p>The installation of the SuSE Linux version 8.0 operating system does not detect the mouse.</p> <p>You will need to select the mouse manually. Download the latest operating system installation instructions for your operating system from the IBM Support Web page at http://www.ibm.com/systems/support/. The steps for selecting the mouse are described in the instructions for your operating system.</p>
<p>Mouse offset problems occur when using remote console and running X.</p>	<p>When you are using the remote console on a blade server that is running X Windows in Red Hat Linux 7.3 or SuSE Linux version 8.0, you see two cursor arrows on the screen, widely spaced, one white and one black.</p> <p>Configure Linux and X Windows for accurate mouse tracking. See the online help information in the management module configuration and management software for instructions (Blade Tasks → Remote Control, click the circled question mark next to Redirect Server Console, read the section titled Notes on mouse support under Linux).</p>
<p>Power problems</p>	
<p>The system does not power on.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The power cables are properly connected to the power modules in the BladeCenter unit. 2. The 220-volt PDU functions properly. 3. The ac and dc power LEDs on the power module are on and the power module error LED (2320-watt power modules only) on the power module is off. 4. If you just installed an option, remove it, and restart the BladeCenter unit. If the BladeCenter unit now turns on, you might have installed more options than the power module supports. You might need to install a power module in power bay 3 or 4. <p>If the problem remains, go to “Undetermined problems” on page 77.</p>
<p>Option problems</p>	
<p>An IBM option that was just installed does not work.</p>	<p>Verify that:</p> <ul style="list-style-type: none"> • The option is designed for the BladeCenter unit. See the “Server Support” flowchart for information about obtaining ServerProven® compatibility information from the World Wide Web. • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. <p>If the problem remains, replace the option.</p>
<p>An IBM option that used to work does not work now.</p>	<p>Verify that all of the option hardware and cable connections are secure. If the option comes with its own test instructions, use those instructions to test the option. If the problem remains, replace the option.</p>
<p>Service processor problems</p>	
<p>Service processor in the management module reports a general monitor failure.</p>	<p>Disconnect the BladeCenter unit from all electrical sources, wait for 30 seconds, reconnect the BladeCenter unit to the electrical sources, and restart the server. If a problem remains, replace the management module.</p>
<p>I/O-module problems</p>	

Table 2. Troubleshooting charts (continued)

Device	Suggested action
<p>Updating the I/O-module configuration through the I/O-module does not save the management-module NVRAM.</p>	<p>If you log in to the Ethernet switch module directly (through the Ethernet switch-module Web interface or Telnet interface instead of through the management module Web interface) and update the I/O module configuration, saving the new configuration saves only to the I/O-module NVRAM, not to the management-module NVRAM. The management module will not be able to communicate with the I/O module.</p> <p>See the <i>User's Guide</i> or <i>Command-Line Interface Reference Guide</i> for your management module type for information about how to change the New Static IP Configuration values to match the ones in Current IP Configuration, and apply the configuration.</p>

Light Path Diagnostics table

The system-error LED on the system LED panel is lit when certain system errors occur. If the system-error LED on your BladeCenter unit is lit, use the following table to help determine the cause of the error and the action you should take.

Table 3. Light Path Diagnostics

Lit LED	Cause	Action
BladeCenter system LED panel		
Location	A condition has occurred in this BladeCenter unit that has caused the remote system management to identify this BladeCenter unit as needing attention.	Look for any information or error LEDs on the system-LED panel, the modules, and the blades in the this BladeCenter unit, and follow the instructions in this table for those LEDs.
Over-temperature	The system temperature has exceeded a threshold level.	<ol style="list-style-type: none"> 1. Check to see if a blower module has failed. If it has, replace the blower module as soon as possible to regain redundancy. 2. Make sure the room temperature is not too high. (See "Features and specifications" on page 5 for temperature information.) 3. Check to see if a blade server has a temperature LED lit. If it has, see the documentation that comes with the blade server. 4. Make sure there is a blade, module, or filler plugged in each bay. <p>If the problem remains, have the system serviced.</p>
Information	A noncritical event has occurred that should be looked at, such as the wrong I/O module inserted in a bay, or power needs that exceed the capacity of power modules currently installed.	Check the error log for the messages. 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 non-redundancy on the power modules or a system error in a blade.	<ol style="list-style-type: none"> 1. Check the error log for messages. 2. Look for an error LED on the modules and blades to locate the component. <ul style="list-style-type: none"> • If the error LED is on a module, follow the instructions for the module in this table. • If the error LED is on a blade, see the documentation that comes with the blade.
Management module		
Management-module error	A critical error has occurred in the management module.	Unplug the management module and reinsert it, then, restart the BladeCenter unit. If the problem remains, replace the management module.
Management-module Web interface to Ethernet switch module does not refresh	After adding or restarting an Ethernet switch module through the management-module Web interface, the Web page does not refresh. You will also be unable to connect to the Ethernet switch module through the Telnet interface.	You must wait until the Ethernet switch module completes POST. After Ethernet switch module POST is complete, you will be able to connect to the Ethernet switch module.
Power module		

Table 3. Light Path Diagnostics (continued)

Lit LED	Cause	Action
Power module error	A critical error has occurred in the power module.	Replace the module. If your BladeCenter unit has a redundant module for this power module, the BladeCenter unit continues to function using the redundant module.
Blower module		
Blower-module error	The blower has failed or is operating too slowly.	Replace the blower module as soon as possible to regain cooling redundancy. The BladeCenter unit continues to function. The redundant blower module provides cooling to the BladeCenter unit and blades.
I/O module		
I/O module error	A critical error has occurred in the I/O module.	Replace the module.

Temperature error messages

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Power supply x temperature fault	<ol style="list-style-type: none"> 1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 32. 2. Replace power supply x.
Power supply x temperature warning	<ol style="list-style-type: none"> 1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 32. 2. Replace power supply x.
Switch x temperature fault	<ol style="list-style-type: none"> 1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 32. 2. Replace I/O module x.
System over ambient temperature	Ensure that the system is being properly cooled; see “System reliability considerations” on page 32.
Switch x temperature fault	Ensure that the system is being properly cooled; see “System reliability considerations” on page 32.

Blower error messages

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Blower x outside recommended speed	Replace blower x.
Blower x failure	Replace blower x.
Blower x fault	Replace blower x.

Power error messages

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Power module 3 or 4 is required to power blades 7 to 14	Ensure power modules 3 and 4 are installed and connected to ac power.
Power supply x fault	Replace power module x.
Power supply x 12V over voltage fault	Replace power module x.
Power supply x 12V over current fault	<ol style="list-style-type: none"> 1. An over current condition is typically caused by an external load fault. Attempt to restart the faulted power module by removing ac to the system components one at a time to isolate the failing component. 2. Replace power module.
Power supply x 12V under voltage fault	Replace power module x.
Power supply x 12V current fault	Replace power module x.
Power supply x DC good fault	Replace power module x.
Power supply x removed	Reinstall power supply x.
System over recommended voltage for +12V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Reseat the power modules. 3. Replace the power modules. 4. Replace the management module.
System over recommended voltage for +1.8V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System over recommended voltage for +2.5V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System over recommended voltage for +3.3V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System over recommended voltage for 5V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System over recommended voltage for +5V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System under recommended voltage for +12V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System under recommended voltage for +1.8V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System under recommended voltage for +2.5V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System under recommended voltage for 3.3V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System under recommended voltage for 5V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
System is under recommended voltage for +5V	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Replace the management module.
System running nonredundant power	Ensure that power modules 1 and 2 are installed and operating correctly. If blade servers are installed in bay 7 or higher, ensure that power modules 3 and 4 are installed and working correctly.

Blade server error messages

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Blade server x was installed	Information only. Take action as required.
Blade server x was removed	Information only. Take action as required.
Received an [xxx] alert from an unsupported ISMP type xxxx, via the interconnect network	Ensure that all blade servers in the blade center are supported by the management module.

KVM error message

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Error encountered switching KVM owner, see system error log	<ol style="list-style-type: none"> 1. Reseat the blade server. 2. Reseat the management module. 3. Reflash the blade server H8 firmware. 4. Replace the blade server. 5. Replace the management module. 6. Replace the midplane.

I/O module error messages

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Switch fault x	<ol style="list-style-type: none"> 1. Reseat I/O module x. 2. Replace I/O module x.
Switch module x was removed	Information only. Take action as required.
Switch module x was installed	Information only. Take action as required.
Switch module x was powered on	Information only. Take action as required.
Switch module x was powered on	Information only. Take action as required.
Switch System running nonredundant switch modules	Information only. Take action as required.

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Switch module%d IP configuration was changed	Information only. Take action as required.
ENET [X] DHCP HSTN=X, DN=X, IP @= XXX.XXX.XXX.XXXGW @= XXXX.XXX.XXX.XXX, SN= XXX,XXX,XXX,XXX, DNS1@= XXX.XXX.XXX.XXX	Ethernet configuration information. Take action as required.
ENET [X] IP Cfg:HstName= XXXX, IP@= XXX.XXX.XXX.XXX ,GW@= XXX.XXX.XXX.XXX, NetMsk= XXX.XXX.XXX.XXX Switch module x was installed	Ethernet configuration information. Take action as required.
LAN: Ethernet [x] interface is no longer active	Check cables to I/O module.
LAN: Ethernet [x] interface now longer active	Information only. Take action as required.

Management-module error messages

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Application posted alert to ASM	The alert button on the Web interface was tested. Information only. Take action as required.
System log 75% full	Information only. Take action as required.
System log full	Information only. Take action as required.
Management module network initialization complete	Information only. Take action as required.
Remote login successful. Login ID	Information only. Take action as required.
ASM reset was caused by restoring default values	The management-module assembly was reset after restoring the default settings. Information only. Take action as required.
ASM reset was initiated by the user	Information only. Take action as required.
Pushbutton reset activated: Ethernet configuration reset to default values and MM ASM reset due to watchdog timeout	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Reflash the management-module firmware. 3. Replace the management module.
ASM reset due to XXXXX, instruction fault: XXXXXXXX YYYYYYYY ZZZZZZ	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Reflash the management-module firmware. 3. Replace the management module.
ASM reset reason unknown	Information only.
Possible ASM reset occurred reason unknown	Information only.
Remote access attempt failed. Invalid userid or password received. User is XXX from CMD mode client at IP@=XXX.XXX.XXX.XXX	Failed attempt to log into the management module.

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Remote access attempt failed. Invalid userid or password received. User is XXX from WEB browser IP@=XXX.XXX.XXX.XXX	Failed attempt to log into the management module.
DHCP [X] failure, no IP @ assigned (retry X), rc=X	Failed to get IP address by DHCP server. Check the DHCP server connection and settings.
LAN: Command mode tamper triggered. Possible break in attempt.	Unsuccessful attempt to access the management module in command mode. Information only. Take action as required.
LAN: WEB server tamper delay triggered. Possible break in attempt.	Unsuccessful attempt to access the management module in command mode. Information only. Take action as required.
System log cleared.	Information only. Take action as required.

Bus error messages

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Failure reading I2C device. Check devices on bus 1.	<ol style="list-style-type: none"> 1. Reset the management module. 2. Reseat the management module. 3. Reflash the management module. 4. Replace the management module.
Failure reading I2C device. Check devices on bus 2.	<ol style="list-style-type: none"> 1. Reset the management module. 2. Reseat the management module. 3. Replace the management module. 4. Replace the midplane.
Failure reading I2C device. Check devices on bus 3.	<ol style="list-style-type: none"> 1. Reseat the power modules. 2. Reseat the management module. 3. Replace the power modules. 4. Replace the management module. 5. Replace the midplane.
Failure reading I2C device. Check devices on bus 4.	<ol style="list-style-type: none"> 1. Reseat the management module. 2. Reseat the cables connected to the front panel customer interface card. 3. Reseat the cables connected to the rear panel customer interface card. 4. Replace the front panel customer interface card. 5. Replace the rear panel customer interface card. 6. Replace the management module. 7. Replace the midplane.

Note: See Chapter 7, “Parts listing, BladeCenter Type 8677 and 1881,” on page 79 to determine which components should be replaced by a field service technician.

Message	Action
Failure reading I2C device. Check devices on bus 5.	<ol style="list-style-type: none">1. Reseat the I/O modules.2. Reseat the management module.3. Replace the I/O modules.4. Replace the management module.5. Replace the midplane.

Undetermined problems

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

Notes:

1. When troubleshooting a BladeCenter problem, you must determine if the problem is actually a blade server problem.
 - If the BladeCenter unit contains more than one blade server installed and only one of the blade servers exhibits the symptom, most likely it is a blade server problem.
 - If all blade servers exhibit the same symptom, most likely it is a BladeCenter unit problem.
2. Damaged data in CMOS can cause undetermined problems.
3. Damaged data in BIOS code can cause undetermined problems.

Check the LEDs on all the power supplies. If the LEDs indicate the power modules are working correctly and reseating the BladeCenter components does not correct the problem, remove or disconnect the BladeCenter components one at a time to a minimal configuration or until you locate the problem. You do not need to remove power from the system. Complete the following steps to remove the components.

1. Remove the acoustic attenuation models, if attached.
2. Shut down the operating system on all blade servers.
3. Turn off the blade servers; then, open the release lever on each blade server and slide it out of the bay approximately 1 inch.
4. Disconnect power modules 2, 3, and 4 one at a time. To do this, first remove the power cord; then, pull the release lever all the way down. Slide the power module out of its bay approximately 1 inch.
5. Disconnect the I/O modules one at a time. To do this, remove all cables connected to the I/O module; then, pull the release lever all the way down. Slide the I/O module out of the bay approximately 1 inch.

Note: The minimum configuration is:

- 8677 or 1881 unit (media tray may be connected).
- power module in bay 1.
- management module.

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. Disconnect 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 bay 2.
4. Remove and reconnect the power cord to the power module.
5. Replace the management module.
6. Replace the power module.
7. Replace the midplane.

Problem determination tips

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

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

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

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

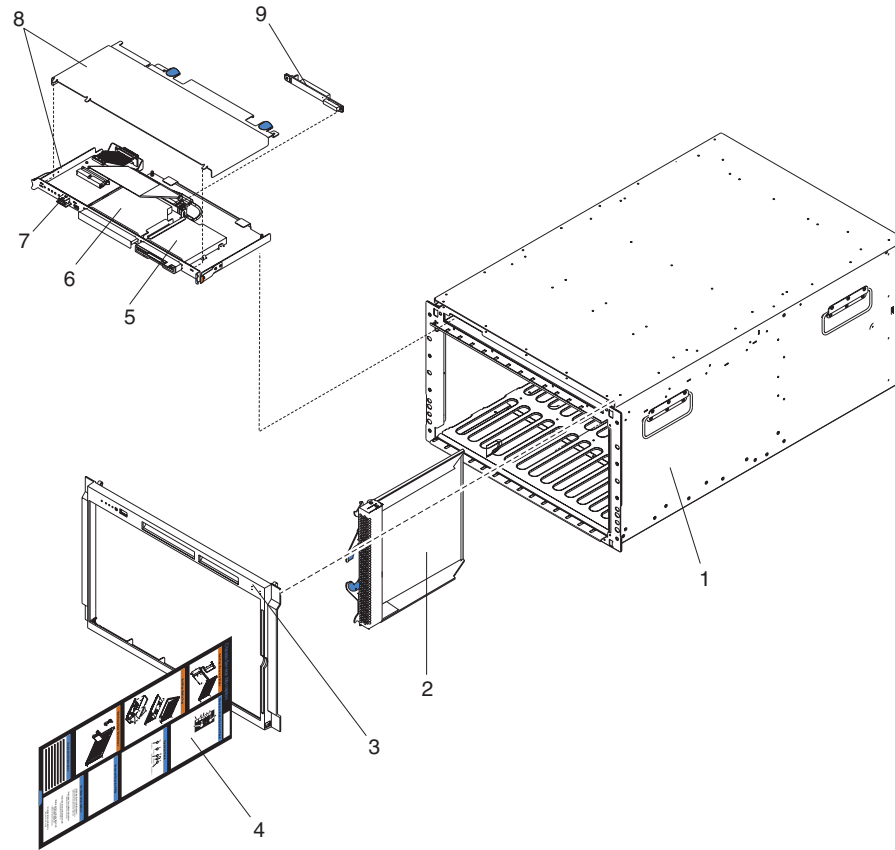
Comparing the configuration and software set-up between “working” and “non-working” systems will often lead to problem resolution.

Chapter 7. Parts listing, BladeCenter Type 8677 and 1881

This parts listing supports the xSeries® Type 8677 and 1881. To check for an updated parts listing on the Web, complete the following steps:

1. Go to <http://www.ibm.com/support/>
2. Under **Search technical support**, type 8677 or 1881 and click **Search**.
3. Under Document type, select **Parts information** and click **Go**.

Front view

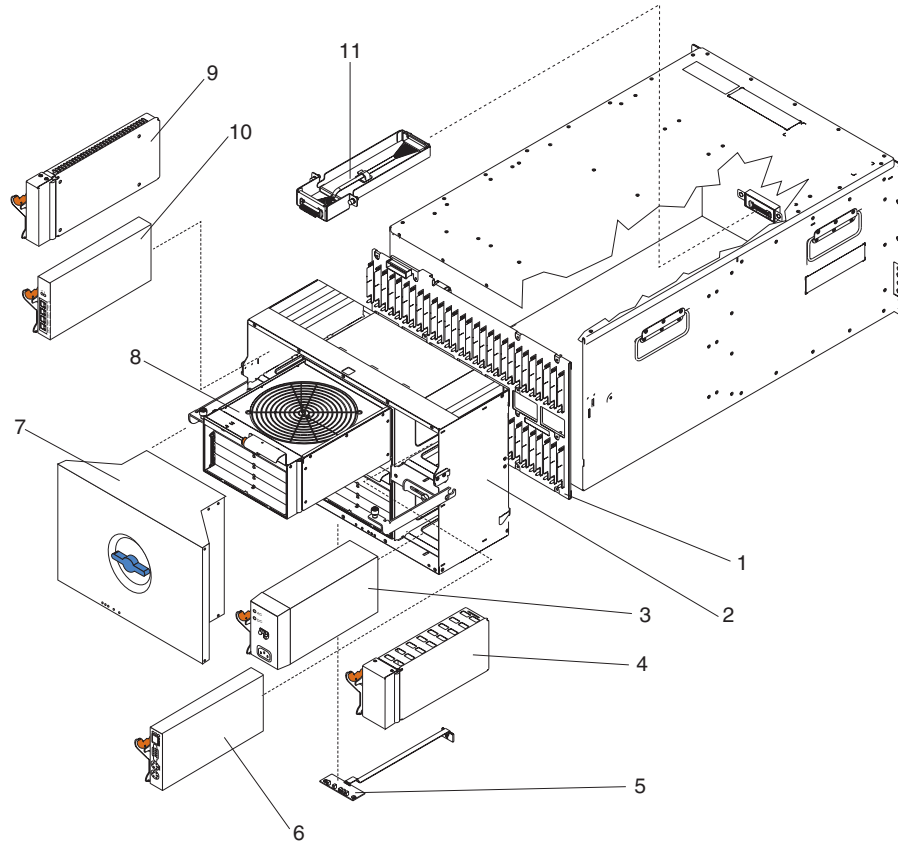


Note: Field replaceable units (FRUs) should be serviced only by qualified field service technicians. Customer replaceable units can be replaced by the customer.

Index	System (BladeCenter Type 8677 and 1881)	FRU No.	CRU/FRU
1	Chassis assembly (all models)	25R8172	FRU
2	Filler blade (all models)	49P2517	CRU
2	Filler blade (models 1Xx, 2Xx, 2Gx, 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	39M3317	CRU
2	Filler blade (model 3Rx) (optional all models)	39M3264	CRU
3	Bezel assembly (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	49P2521	CRU
3	Bezel assembly (models 3Rx, 3Xx)	39M3200	CRU
3	Front Bezel (models 3Sx, 3Tx, 4Sx, 4Tx)	46C5450	CRU
4	BladeCenter system service label (all models except 3Rx, 3Sx, 3Tx, 4Sx, 4Tx, 3Xx)	26K9419	CRU
4	BladeCenter system service label (models 3Rx, 3Xx)	39M3313	CRU
4	BladeCenter system service label (models 3Sx, 3Tx, 4Sx, 4Tx)	46C5451	CRU

Index	System (BladeCenter Type 8677 and 1881)	FRU No.	CRU/FRU
5	Diskette drive, USB (primary) (all models except 3Sx, 3Tx, 4Sx, 4Tx)	39M0109	CRU
5	Diskette drive, USB (alternate) (all models except 3Sx, 3Tx, 4Sx, 4Tx)	39M0109	CRU
6	CD-RW/DVD-ROM, slim (primary) (models 3Rx, 3Xx)	43W4581	CRU
6	CD-RW/DVD-ROM (alternate) (models 3Rx, 3Xx)	39M3551	CRU
6	CD-RW/DVD-ROM (alternate) (models 3Rx, 3Xx)	39M3561	CRU
6	CD-ROM, 24X (primary) (all models except 3Xx, 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	39M3505	CRU
6	CD-ROM, 24X (alternate) (all models except 3Xx, 3Rx, 3Sx, #tx, 3Xx, 4Sx, 4Tx)	26K5423	CRU
6	CD-ROM, 24X (alternate) (all models except 3Xx, 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	06P5263	CRU
6	CD-ROM, 24X (alternate) (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	26K5423	CRU
6	Combo drive, 24/24/24/8X (alternate) (models 3Rx, 3Xx)	26K5439	CRU
6	DVD-ROM, 8X (primary) (model 3Rx)	39M3531	CRU
6	DVD-ROM, 8X (alternate) (model 3Xx)	26K5393	CRU
6	UltraSlim Enhanced SATA DVD-ROM (models 3Sx, 4Sx) (optional all models)	44W3254	CRU
6	UltraSlim Enhanced SATA Multi-Burner (models 3Sx, 4Sx)	44W3256	CRU
6	Optical Blank filler (models 3Sx, 3Tx, 4Sx, 4Ts) (optional all models)	49Y4868	CRU
7	Customer interface card (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	90P4703	FRU
7	Customer interface card (model 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	26R0368	FRU
8	Media tray (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	49P2522	FRU
8	Media tray (models 3Rx, 3Xx)	39M3207	FRU
8	Media tray (models 3Sx, 3Tx, 4Sx, 4Tx)	46C5447	FRU
9	CD-ROM Interposer card (all models)	39R8542	CRU

Rear view



Index	System (BladeCenter Type 8677 and 1881)	FRU No.	CRU/FRU
1	Midplane card (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	26K9450	FRU
1	Midplane card (models 3Sx, 3Tx, 4Sx, 4Tx)	46M0540	FRU
1	Midplane card (models 3Rx, 3Xx)	39R8563	FRU
2	SPC chassis (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	49P2530	FRU
2	SPC chassis (models 3Rx, 3Sx, 4Sx, 3Xx)	39M3223	FRU
2	SPC chassis (models 3Sx, 3Tx, 4Sx, 4Tx)	46C5453	FRU
3	Power supply module, 1400 watt (model 1Xx)	73P7501	CRU
3	Power supply module, 1800 watt (models 2Gx, 2Xx, CXx)	74P4401	CRU
3	Power supply module, 2000 watt (models 3Rx, 3Sx, 3Tx, 3Xx)	39Y7360	CRU
3	Power supply module, 2320 watt (model 4Sx, 4Tx)	39Y7400	CRU
4	Power supply filler (models 1Xx, 2Xx)	49P2519	CRU
4	Power supply filler (models 1Xx, 22x, 3Rx, 3Xx)	39M3262	CRU
4	Power Supply Filler (models 3Sx, 3Tx, 4Sx, 4Tx)	46C5470.	CRU
5	Rear interface card (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	59P6602	FRU
5	Rear interface card (models 3Rx, 3Xx)	26R0361	FRU
5	Rear interface card (models 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	26R0368	FRU
6	Management module (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	39M4945	CRU
6	Advanced management module 2 (models 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	60Y0621	CRU
7	Acoustic attenuation module (optional all models)	39M3330	CRU
8	Blower with damper (all models)	39M3225	CRU
9	Filler module (models 1Xx, 2Gx, 2Xx)	49P2518	CRU
9	Filler module (models 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	39M3261	CRU
11	Media cable with bracket (models 3Rx, 3Xx)	39M3222	CRU

Index	System (BladeCenter Type 8677 and 1881)	FRU No.	CRU/FRU
11	Media cable with bracket (models 3Sx, 3Tx, 4Sx, 4Tx)	46C5452	CRU
	1Gb 4-Port Ethernet Expansion Card (optional all models)	44W4488	CRU
	6 Port Server Connectivity module (optional all models)	46M6151	CRU
	10GbE 850NM Fibre SFP Plus Transceiver	44W4411	CRU
	Bezel assembly, (optional all models)	43X0438	CRU
	BladeCenter system board assembly (optional all models)	43W4506	CRU
	Blade filer (optional all models)	26K9624	CRU
	Cable, 3 m 12X -4X IB (optional all models)	44V5085	CRU
	Cable, 8 m 12X -4X IB (optional all models)	44V5086	CRU
	Cable, 8 m OB (optional all models)	42R6157	CRU
	Cable, 10 m 4X IB (optional all models)	44V5084	CRU
	Cable 10 m 12X IB (optional all models)	42R6158	CRU
	Cable, 4000 mm IBT (optional all models)	42R6155	CRU
	Cable, 8000 mm 4X IB (optional all models)	44V5083	CRU
	Cable, copper (optional) all models)	32R1848	CRU
	Cable, diskette drive to CI card (model 1Xx)	49P2526	CRU
	Cable, diskette drive to CI card (model 3Rx, 3Xx)	39M3220	CRU
	Cable, DDR IB 4x to 4x 3.0 m	45D2238	CRU
	Cable, DDR IB 4x to 4x 8.0 m	45D2239	CRU
	Cable, Fibre Optic adapter (optional all models)	39Y9223	CRU
	Cable, Fibre Channel (model CXx)	02R9024	CRU
	Cable, FO Adapter Duplex RECP (optional all models)	41V0573	CRU
	Cable, Infiniband (optional all models)	44V5082	CRU
	Cable, Nortel (optional all models)	26K6541	CRU
	Cable, Nortel CX4 1.5 meter (optional all models)	32R1940	CRU
	Cable, Nortel CX4 3 meter (optional all models)	32R1944	CRU
	Cable, Optical Passthru OPC (optional all models)	39Y9174	CRU
	Cable, Optical Passthru OPC (optional all models)	39Y9176	CRU
	Cable, SDR 11 m Octopus 12x to (3) 4x's (optional all models)	45D2409	CRU
	Cable, serial breakout (optional all models)	74P5186	CRU
	Chassis Muffler (optional all models)	02R9004	CRU
	Clip, power cord (all models)	26K6038	CRU
	Connector, Nortel fibre channel (optional all models)	26R0808	CRU
	Damper (all models)	42C0826	CRU
	Damper (all models)	49P2532	CRU
	Ethernet dongle cable (model CXx)	02R9024	CRU
	Filler, front (models 1Xx, 2Xx, 2Gx, 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	39M3317	CRU
	Filter (optional all models)	43X0439	CRU
	ICPM Intelligent Copper Passthru module (optional all models)	44W4486	CRU
	Insulator kit (optional all models)	39M6608	CRU
	I/O card (optional all models)	32R1845	CRU
	IRCL module (all models)	73P9044	CRU
	Label, CRU/FRU (models 3Rx, 3Sx, 3Xx, 4Sx)	46C5472	CRU
	Line cord (optional all models)	39M5393	CRU
	Miscellaneous Parts Kit (all models except 3Rx, 3Sx, 3Tx, 3Xx, 4Sx, 4Tx)	49P2523	CRU
	<ul style="list-style-type: none"> • CD-ROM spring retainer (1) • Diskette drive spring retainer (1) • Mounting hardware assembly (1) • Damper spring (4) • Screw, M3.5 slotted (8) • Label, customer write on (2) 		

Index	System (BladeCenter Type 8677 and 1881)	FRU No.	CRU/FRU
	Miscellaneous Parts Kit (all models)	26K9699	CRU
	<ul style="list-style-type: none"> • CD-ROM spring retainer (1) • Diskette drive spring retainer (1) • Mounting hardware assembly (1) • Upper damper (4) • Lower damper (4) • Screw, M3.5 slotted (8) • Label, customer write on (2) 		
	Miscellaneous Parts Kit (model 3RX)	26K9699	CRU
	<ul style="list-style-type: none"> • Lower damper (4) • Upper damper (4) • Mounting hardware assembly (1) • CD spring (1) • Screw, M3.5 slotted (8) • Label, customer write on (2) 		
	Miscellaneous Parts Kit (models 3Rx, 3Xx)	39M3217	CRU
	<ul style="list-style-type: none"> • Diskette drive spring (1) 		
	Miscellaneous Parts Kit (models 3Sx, 3Tx, 4Sx, 4Tx)	46C5454	CRU
	<ul style="list-style-type: none"> • Backflow Damper (1) • Lower Damper (4) • Upper Damper (4) • Mounting hardware assembly (1) • CD Spring (1) • Rear Combo Bay (1) • Combo (1) • Blower Damper (1) • Screw, M3.5 slotted (14) 		
	Module, 3+7 port (optional all models)	32R1820	CRU
	Module, 3+7 port (optional all models)	32R1821	CRU
	Module, 4GB fibre channel (optional all models)	32R1836	CRU
	Module, 4GB Qlogic (optional all models)	26R0888	CRU
	Module, CPM (optional all models)	46C7101	CRU
	Module, CPM (optional all models)	39Y9169	CRU
	Module, fibre channel (model CXx) (optional all models)	59P6621	FRU
	Module, optical (optional all models)	02R9082	CRU
	Module, serial port (optional all models)	71P8600	CRU
	PCI-E Expansion Card (optional all modes)	44W4487	CRU
	Power cord (primary) (models 1Xx, 2Gx, 2Xx, 3Xx, 3Rx, 3Sx, 3Tx, 4Sx, 4Tx, CXx, ERx, 2Gx)	39M5389	CRU
	PDU cord (model 1Xx)	36L8886	CRU
	Power cable, interposer to CI card (model 1Xx)	49P2525	FRU
	Power cable, interposer to CI card (models 3Rx, 3Xx)	39M3219	FRU
	Rack Kit (model 3Rx, 3Sx, 3Tx, 4Sx, 4Tx, 3Xx)	39M3256	CRU
	<ul style="list-style-type: none"> • Bracket, lower rack (1) • Bracket, rear chassis (1) • Rail, left (1) • Rail, right (1) • Upper shipping bracket (1) • Rail, rack mounting hardware (1) 		
	Rails, left and right (all models except 3Rx, 3Sx, 3Tx, 31x, 4Sx, 4Tx)	49P2610	CRU
	Signal cable, interposer to CI card (model 1Xx)	49P2524	CRU
	Signal cable, CI card to media (model 1Xx)	74P5227	FRU
	Signal cable, CI card to media (models 3Rx, 3Xx)	39M3221	CRU
	Signal cable, CI card interposer to chassis (model 3Rx, 3Xx)	39M3218	FRU
	Switch, 10 port 4GB McDATA (optional all models)	32R1911	CRU

Index	System (BladeCenter Type 8677 and 1881)	FRU No.	CRU/FRU
	Switch, 10 port Qlogic (optional all models)	32R1910	CRU
	Switch, BladeCenter SAS module (optional all models)	39Y9193	CRU
	Switch, Brocade (optional all models)	90P0164	CRU
	Switch, CISCO Ethernet (optional all models)	13N2285	CRU
	Switch, CISCO Ethernet (optional all models)	25R5391	CRU
	Switch, CISCO Fibre Channel Ethernet module assembly (optional all models)	32R1891	CRU
	Switch, CISCO Copper Ethernet module (optional all models)	32R1895	CRU
	Switch, CISCO 4GB 20 Port Fiber Channel module (optional all models)	39Y9278	CRU
	Switch, CISCO 4GB 10 Port Fiber Channel module (optional all models)	39Y9282	CRU
	Switch, CISCO 4GB Shortwave SFP module (optional all models)	41Y8602	CRU
	Switch, CISCO 4GB Longwave SFP module, single (optional all models)	41Y8603	CRU
	Switch, Copper Passthru module (optional all models)	44X1986	CRU
	Switch, Copper SFP 10GB Ethernet module (optional all models)	32R1936	CRU
	Switch, Ethernet module (models 2Gx, CXx) (optional all models)	26K6482	CRU
	Switch, Infiniband (optional all models)	26K6452	CRU
	Switch, Infiniband card module (optional all models)	32R1903	CRU
	Switch, McDATA fibre channel (optional all models)	32R1792	CRU
	Switch, Nortel Ethernet 6 Pt Fiber (optional all models)	32R1870	CRU
	Switch, Nortel Ethernet 6 Pt Copper (optional all models)	32R1869	CRU
	Switch, Nortel Ethernet (optional all models)	32R1868	CRU
	Switch, Nortel 10GB Uplink Ethernet (optional all models)	32R1785	CRU
	Switch, Nortel ESM (optional all models)	26K6526	CRU
	Switch, Nortel fibre channel (optional all models)	26K6529	CRU
	Switch, Nortel 10GB 850NM Fiber XFP Transceiver SR assembly (optional all models)	32R1883	CRU
	Switch, Nortel 10GB 1310 NM Fibre XFP Transceiver LR assembly (optional all models)	32R1884	CRU
	Switch, Nortel 1/10GB Uplink Ethernet module (optional all models)	44W4407	CRU
	Switch, Nortel 10 port 10 Gb switch module (optional all models)	46C7194	CRU
	Switch, Optical Passthru module (optional all models)	44W3323	CRU
	Switch, port, Nortel (optional all models)	39Y9131	CRU
	Switch, Qlogic 6 port (optional all models)	26K6481	CRU
	Tray, Fibre Channel adapter card mount (optional all models)	49P2514	CRU

Appendix A. Getting help and technical assistance

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

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the *IBM Documentation CD* that comes with your system.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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/systems/support/> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x[®] and xSeries 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/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/systems/support/>.

Software service and support

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

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

Hardware service and support

You can receive hardware service through 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 a Business Partner** 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. Related service information

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

Safety information

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

General safety

Follow these rules to ensure general safety:

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

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

Electrical safety



CAUTION:

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

Observe the following rules when working on electrical equipment.

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

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

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

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

- Regularly inspect and maintain your electrical hand tools for safe operational condition.

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

Safety inspection guide

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

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

Consider these conditions and the safety hazards they present:

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

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

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Turn off the computer. Disconnect the power cord.

3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (Is) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the server, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD-protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those in the following list, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

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

Safety notices (multi-lingual translations)

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

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

Important: All caution and danger statements in this IBM documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in this section.

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

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

Statement 1



DANGER

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

To avoid a shock hazard:

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

To Connect	To Disconnect
<ol style="list-style-type: none">1. Turn everything OFF.2. First, attach all cables to devices.3. Attach signal cables to connectors.4. Attach power cords to outlet.5. Turn device ON.	<ol style="list-style-type: none">1. Turn everything OFF.2. First, remove power cords from outlet.3. Remove signal cables from connectors.4. Remove all cables from devices.

Statement 2



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

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



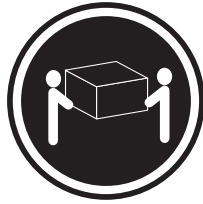
DANGER

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

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

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

Statement 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

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 6:



CAUTION:

If you install a strain-relief bracket option over the end of the power cord that is connected to the device, you must connect the other end of the power cord to an easily accessible power source.

Statement 20:



CAUTION:

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

CAUTION:

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

Statement 21



CAUTION:

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

Importante:

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

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

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

Instrução 1



PERIGO

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

Para evitar risco de choque:

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

Para Conectar:	Para Desconectar:
<ol style="list-style-type: none">1. DESLIGUE Tudo.2. Primeiramente, conecte todos os cabos aos dispositivos.3. Conecte os cabos de sinal aos conectores.4. Conecte os cabos de alimentação às tomadas.5. LIGUE os dispositivos.	<ol style="list-style-type: none">1. DESLIGUE Tudo.2. Primeiramente, remova os cabos de alimentação das tomadas.3. Remova os cabos de sinal dos conectores.4. Remova todos os cabos dos dispositivos.

Instrução 2



CUIDADO:

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

Não:

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

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

Instrução 3



PRECAUCIÓN:

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

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

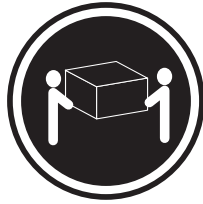
PERIGO

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

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

Laser Klasse 1.

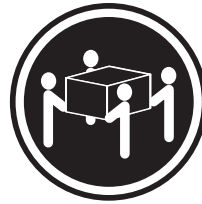
Instrução 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5



CUIDADO:

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



CUIDADO:

Instrução 10



CUIDADO:



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

Instrução 20



CUIDADO:

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

Instrução 21



CUIDADO:

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

重要:

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

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 1



危险

电源、电话和通信电缆中带有危险电流。

为避免电击：

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将与本产品连接的所有设备连接至正确布线的插座上。

尽量只使用单手拆接信号电缆。

有水、火及结构损坏迹象时，请勿打开任何设备。

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

安装、移动或打开本产品及其附带设备的机盖时，应按下表所述连接和断开电缆。

连接时：

1. 关闭所有设备。
2. 首先将所有电缆连接至设备。
3. 将信号电缆连接至接口。
4. 将电源线连接至插座。

断开连接时：

1. 关闭所有设备。
2. 首先从插座中拔出电源线。
3. 从接口上拔下信号电缆。

声明 2



警告:

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

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

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

声明 3



警告:

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

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

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。



危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。
打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，避免直接暴露于光束之下。

Laser Klass 1.

声明 4



≥18 kg (37 磅)



≥32 kg (70.5 磅)



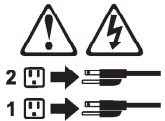
≥55 kg (121.2 磅)

警告：
抬起时请采用安全操作方法。

声明 5



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



声明 6



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

声明 7



警告:

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

声明 8



警告:

不要拆除电源外盖或贴有下列标签的任何部件。



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

声明 9



警告:

为避免人员伤害，拆除设备上的风扇前应拨下热插拔风扇电缆。

声明 10



警告:

机柜安装的设备上面不能放置重于 82kg (180 磅) 的物品。



> 82 kg (180 磅)

声明 11



警告:

下面的标签表明附近有锋利的边、角或接头。



声明 12



警告:

下面的标签表明附近有高热表面。



• 声明 20



警告:

为避免人身伤害，请在抬起设备之前卸下所有刀片服务器以减轻重量。

• 声明 21



警告:

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

重要資訊：

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

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

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1



危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

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

連接：

1. 關閉所有開關。
2. 先將所有電纜線接上裝置。
3. 將信號電纜接上接頭。
4. 再將電源線接上電源插座。
5. 開啓裝置的電源。

切斷：

1. 關閉所有開關。
2. 先自電源插座拔掉電源線。
3. 拔掉接頭上的所有信號電纜。
4. 再拔掉裝置上的所有電纜線。

聲明 2



注意：

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

請勿將電池：

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

請遵照當地法令規章處理廢棄電池。

聲明 3



注意：

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

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



危險

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

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

Luokan 1 Laserlaite

聲明 4



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

注意：

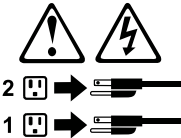
抬起裝置時，請注意安全措施。

聲明 5



注意：

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



聲明 10



注意：

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



> 82 公斤 (180 磅)

聲明 20



警告：
為了避免人身傷害，抬起裝置之前，請先卸下所有的螺旋槳，以便減輕重量。

聲明 21



警告：
當螺旋槳連到電源時可能有危險之虞。安裝螺旋槳之前，請先更換螺旋槳外蓋。

Important:

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

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

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

Notice n° 1



DANGER

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

Pour éviter tout risque de choc électrique:

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

Connexion	Déconnexion
<ol style="list-style-type: none">1. Mettez les unités hors tension.2. Commencez par brancher tous les cordons sur les unités.3. Branchez les câbles d'interface sur des connecteurs.4. Branchez les cordons d'alimentation sur des prises.5. Mettez les unités sous tension.	<ol style="list-style-type: none">1. Mettez les unités hors tension.2. Débranchez les cordons d'alimentation des prises.3. Débranchez les câbles d'interface des connecteurs.4. Débranchez tous les câbles des unités.

Notice n° 2



ATTENTION:

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

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

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

Notice n° 3



ATTENTION:

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

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



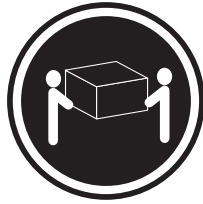
DANGER

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

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

Appareil A Laser de Classe 1.

Notice n° 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5



ATTENTION:

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



Notice n° 10



ATTENTION:

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

Notice n° 20



ATTENTION:

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

Notice n° 21



ATTENTION:

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

Wichtig:

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

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

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1



VORSICHT

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

Aus Sicherheitsgründen:

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

Kabel anschließen:	Kabel lösen:
<ol style="list-style-type: none">1. Alle Geräte ausschalten und Netzstecker ziehen.2. Zuerst alle Kabel an Einheiten anschließen.3. Signalkabel an Anschlußbuchsen anschließen.4. Netzstecker an Steckdose anschließen.5. Gerät einschalten.	<ol style="list-style-type: none">1. Alle Geräte ausschalten.2. Zuerst Netzstecker von Steckdose lösen.3. Signalkabel von Anschlußbuchsen lösen.4. Alle Kabel von Einheiten lösen.

Hinweis 2



ACHTUNG:

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

Die Batterie nicht:

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

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3



ACHTUNG:

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

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

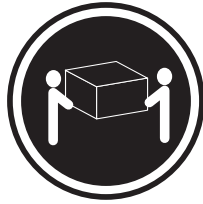


VORSICHT

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

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

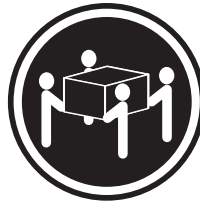
Hinweis 4



≥18 kg



≥32 kg



≥55 kg

ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5



ACHTUNG:

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



Hinweis 10



ACHTUNG:



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

Hinweis 20



ACHTUNG:

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

Hinweis 21



ACHTUNG:

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

Importante:

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

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

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

Avviso 1



PERICOLO

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

Per evitare il pericolo di scosse elettriche:

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

Per collegare:	Per scollegare:
<ol style="list-style-type: none">1. SPEGNERE tutti i dispositivi.2. Collegare prima tutti i cavi alle unità.3. Collegare i cavi di segnale ai connettori.4. Collegare i cavi di alimentazione alle prese elettriche.5. ACCENDERE le unità.	<ol style="list-style-type: none">1. SPEGNERE tutti i dispositivi.2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.3. Rimuovere i cavi di segnale dai connettori.4. Rimuovere tutti i cavi dalle unità.

Avviso 2



ATTENZIONE:

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

Evitare di:

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

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

Avviso 3



ATTENZIONE:

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

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

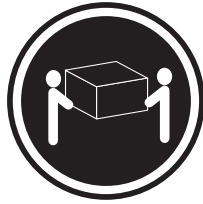


PERICOLO

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

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

Avviso 4



≥18 kg



≥32 kg



≥55 kg

ATTENZIONE:

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5



ATTENZIONE:

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



Avviso 10



ATTENZIONE:



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

Avviso 20



ATTENZIONE:

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

Avviso 21



ATTENZIONE:

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

重要:

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

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

手順を実施する前に、すべての注意:

⚠ 危険

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

感電を防止するため：

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

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

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

接続するには	取り外すには
1. すべての電源を切る	1. すべての電源を切る
2. まず、装置にすべてのケーブルを接続する。	2. まず、電源コンセントから電源コードを取り外す
3. 次に、通信ケーブルをコネクタに接続する	3. 次に、通信ケーブルをコネクタから取り外す。
4. その後、電源コンセントに電源コードを接続する	4. その後、装置からすべてのケーブルを取り外す
5. 装置の電源を入れる。	

⚠ 注意

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

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

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

電池は幼児の手の届かない所に置いてください。

万一、幼児が電池を飲み込んだときは、直ちに医師に相談してください。

以下の行為は絶対にしないでください。

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

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

・記述 3

⚠ 注意

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

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

⚠ 危険

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

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

・記述 4

⚠ 注意



10kg 以上



32kg 以上



55kg 以上

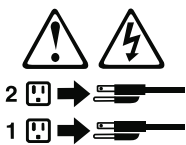
装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

・記述 5

⚠ 注意 ⚡

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

サーバーには、複数の電源コードが接続されているかもしれません。サーバーから電流を完全に遮断するために、すべての電源コードが電源から取り外されていることを確認してください。



・記述 10

注意

ラック・モデルのサーバーの上に 82 Kg 以上の物を置かないでください。



▪ 記述 20



危険：

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

▪ 記述 21



危険：

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

중요:

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

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

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

경고문 1



위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

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

연결하려면:

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

연결을 끊으려면:

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

경고문 2



주의:

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

다음은 주의하십시오.

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

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



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

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

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



위험

일부 레이저 제품에는 클래스 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.
열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4



≥ 18 kg (37 lbs)



≥ 32 kg (70.5 lbs)



≥ 55 kg (121.2 lbs)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 5



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



경고문 10



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



>82 kg (180 lbs)

경고문 20



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

경고문 21



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

Importante:

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

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

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

Declaración 1



PELIGRO

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

Para evitar una descarga eléctrica:

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

Para la conexión	Para la desconexión
<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, conecte los cables a los dispositivos.3. Conecte los cables de señal a los conectores.4. Conecte cada cable de alimentación a la toma de alimentación.5. ENCIENDA el dispositivo.	<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, retire cada cable de alimentación de la toma de alimentación.3. Retire los cables de señal de los conectores.4. Retire los cables de los dispositivos.

Declaración 2



PRECAUCIÓN:

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

No realice las acciones siguientes:

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

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

Declaración 3



PRECAUCIÓN:

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

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

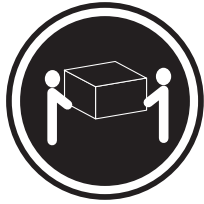


PELIGRO

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

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

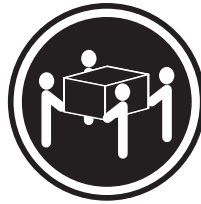
Declaración 4



≥18 kg



≥32 kg



≥55 kg

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5



PRECAUCIÓN:

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



Declaración 10



PRECAUCIÓN:



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

Declaración 20



PRECAUCIÓN:

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

Declaración 21



PRECAUCIÓN:

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

Appendix C. Notices

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Important notes

Processor 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.

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

Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 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.

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

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

European Community contact:
IBM Technical Regulations
Pascalstr. 100, Stuttgart, Germany 70569
Telephone: 0049 (0)711 785 1176
Fax: 0049 (0)711 785 1283
E-mail: tjahn@de.ibm.com

Taiwanese Class A warning statement

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

Chinese Class A warning statement

中华人民共和国“A类”警告声明

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

Japanese Voluntary Control Council for Interference (VCCI) statement

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

VCCI-A

Korean Class A warning statement

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Power cords

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
39M5354	China
39M5330	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
39M5282	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
39M5322	Denmark
39M5290	Bangladesh, Lesotho, Maceo, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda

IBM power cord part number	Used in these countries and regions
39M5294	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
39M5322	Liechtenstein, Switzerland
39M5298	Chile, Italy, Libyan Arab Jamahiriya
39M5310	Israel
39M5262	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
39M5346	Korea (Democratic People's Republic of), Korea (Republic of)
39M5262	Japan
39M5342	Argentina, Paraguay, Uruguay
39M5396	India
39M5358	Brazil

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