Chapter 1. General information

The IBM® BladeCenter E Type 8677 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.
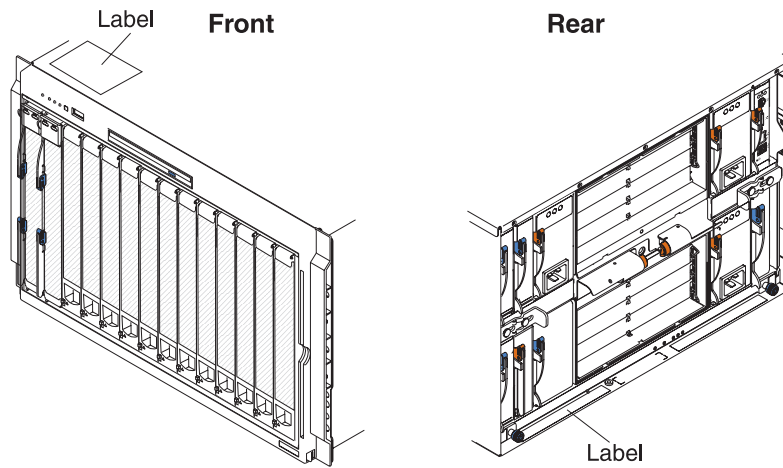
A set of user labels comes with each blade server. Write whatever identifying information you want on a label, and place it on the BladeCenter bezel just below the blade server, as shown in the following illustration.
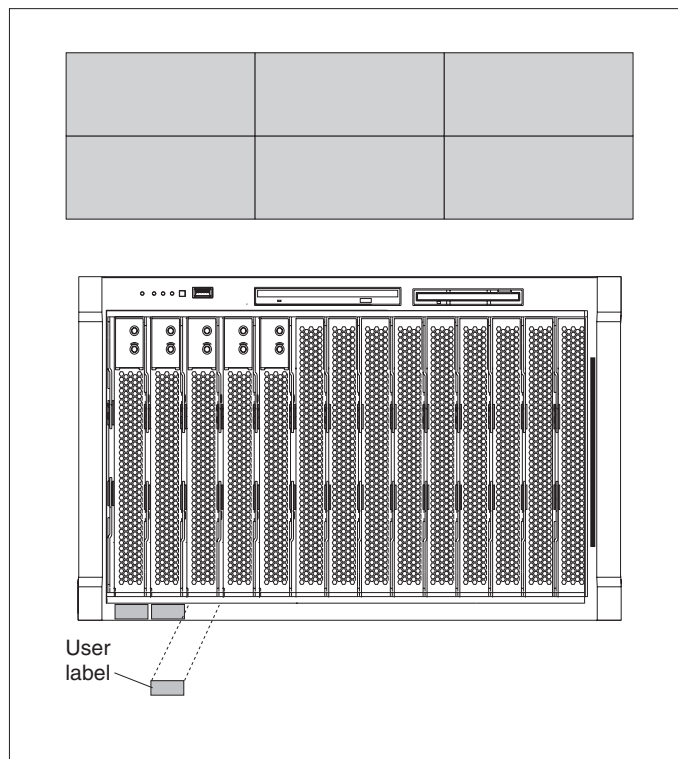
Important: Do not place the label on the blade server itself or in any way block the ventilation holes on the blade server.

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 Crtl+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.

Media tray (on front):
- SATA CD/DVD drive
- USB v2.0 port
- Front system LED panel

Module bays (on rear):
- Four hot-swap power-module bays
- Two hot-swap management-module bays
- Four hot-swap I/O-module bays
- Two hot-swap blower bays

Blade-server bays (on front):

14 hot-swap blade-server bays

Redundant cooling:

Two variable-speed hot-swap blowers

Power modules:
- Minimum: Two 2000-watt or greater hot-swap power modules
  - 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
  - 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.

I/O modules:
- Minimum: One
- Maximum: Four

Management module:
- Minimum: One hot-swap advanced management module providing the following features:
  - 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

Upgradeable microcode:
- Management-module firmware
- I/O-module firmware (some I/O module types)
- Blade-server firmware

Security features:
- 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.

Size (7 U):
- Height: 304.2 mm (12 in. or 7 U)
- Depth: 711.2 mm (28 in.)
- Width: 444 mm (17.5 in.)
- Weight:
  - 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)

Acoustical noise emissions:
- Without acoustic attenuation module: Sound power, operating, and idle: 7.4 bels
- With acoustic attenuation module: Sound power, idle, and operating: 6.9 bels

Environment:
- Air temperature:
  - On:
    - Altitude: 0 to 914 m (3000 ft) - 10° to 35°C (50° to 95°F)
    - Altitude: 914 m to 2134 m (3000 ft to 7000 ft) - 10° to 32°C (50° to 89.6°F)
  - Off: -40° to 60°C (-40° to 140°F).
- Humidity: 8% to 80%

Electrical input:
- Sine-wave input (50-60 Hz single-phase) required
- Input voltage:
  - Minimum: 200 V ac
  - Maximum: 240 V ac

Heat output:

Approximate heat output in British thermal units (Btu) per hour:
- Minimum configuration: 1365 Btu/hour (400 watts)
- Maximum configuration: Varies depending on the type of power modules installed.
  - Four 2000-watt power modules: 20 094 Btu/hour (5889 watts)
 - Four 2320-watt power modules: 23 672 Btu/hour (6938 watts)

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.

Media tray (on front):
- Diskette drive: 1.44 MB
- IDE CD or DVD
- USB v1.1 port
- Front system LED panel

Module bays (on rear):
- Four hot-swap power-module bays
- Two hot-swap management-module bays
- Four hot-swap I/O-module bays
- Two hot-swap blower bays

Blade-server bays (on front):

14 hot-swap blade-server bays

Redundant cooling:

Two variable-speed hot-swap blowers

Power modules:
- Minimum: Two hot-swap power modules
  - 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
  - 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.

I/O modules:
- Minimum: One
- Maximum: Four

Management module:
- Minimum: One hot-swap management module providing the following features:
  - 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

Upgradeable microcode:
- Management-module firmware
- I/O-module firmware (some I/O module types)
- Blade-server firmware

Security features:
- 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.

Size (7 U):
- Height: 304.2 mm (12 in. or 7 U)
- Depth: 711.2 mm (28 in.)
- Width: 444 mm (17.5 in.)
- Weight:
  - 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)

Acoustical noise emissions:
- Without acoustic attenuation module: Sound power, operating, and idle: 7.4 bels
- With acoustic attenuation module: Sound power, idle, and operating: 6.9 bels

Environment:
- Air temperature:
  - On:
    - Altitude: 0 to 914 m (3000 ft) - 10° to 35°C (50° to 95°F)
    - Altitude: 914 m to 2134 m (3000 ft to 7000 ft) - 10° to 32°C (50° to 89.6°F)
  - Off: -40° to 60°C (-40° to 140°F).
- Humidity: 8% to 80%

Electrical input:
- Sine-wave input (50-60 Hz single-phase) required
- Input voltage:
  - Minimum: 200 V ac
  - Maximum: 240 V ac

Heat output:

Approximate heat output in British thermal units (Btu) per hour:
- Minimum configuration: 1365 Btu/hour (400 watts)
- Maximum configuration: Varies depending on the type of power modules installed.
  - 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)

Major components of the BladeCenter Type 8677 unit

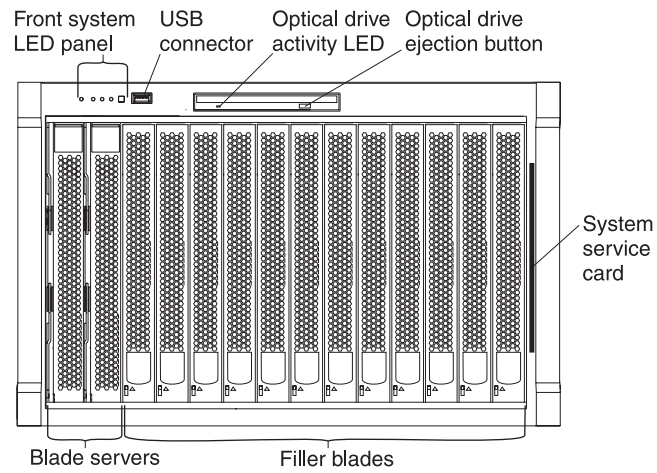The following illustration shows the locations of major components in your BladeCenter unit.

Note: The illustrations in this document might differ slightly from your hardware.
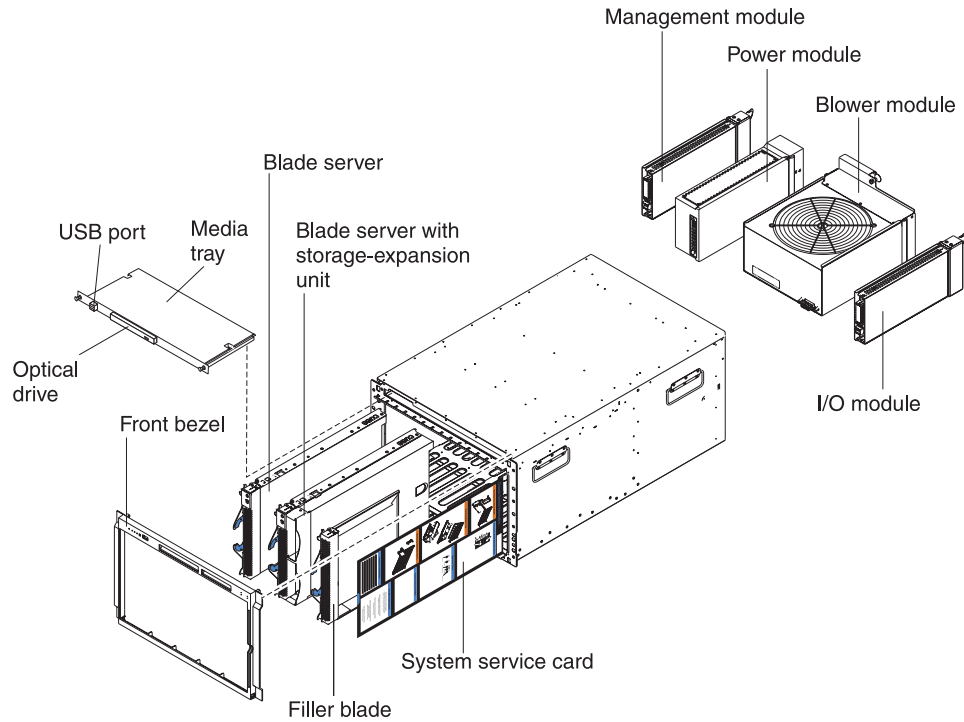
Attention: To maintain proper system cooling, each module bay must contain either a module or a filler module; each blade bay must contain either a blade server or a filler blade.

Front view

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

See "BladeCenter components, controls, and LEDs" on page 13 for details about these components and indicators.
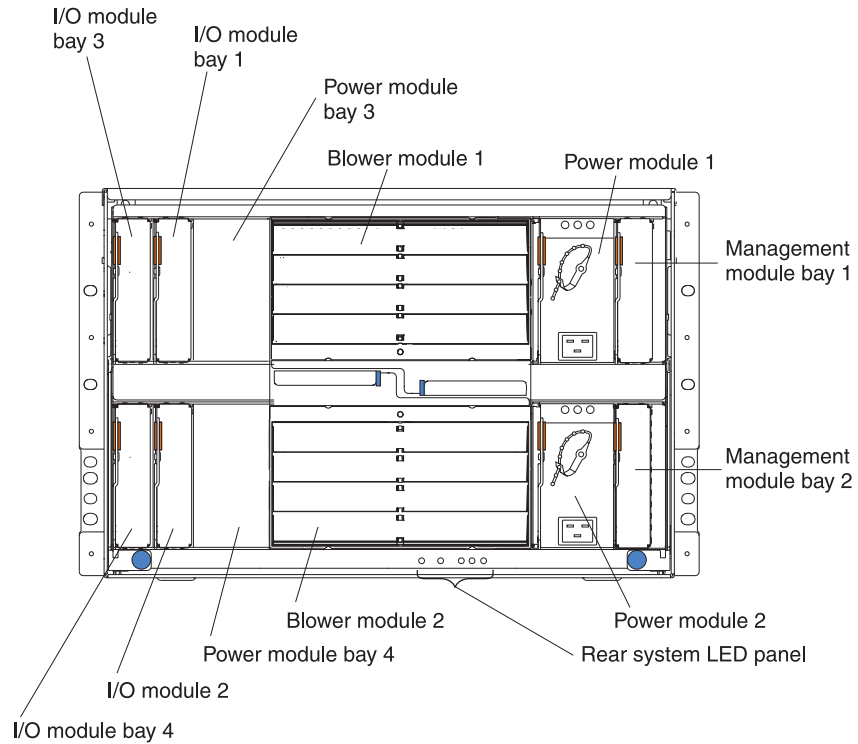
Rear view

The following illustration shows the locations of components and indicators on the rear of the BladeCenter Type 8677 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 form 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.
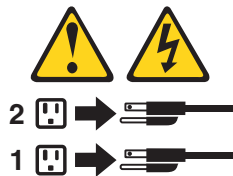
2. Press the power-control button on the front of each blade server. Wait at least 30 seconds for the blade server drives to stop spinning.
3. Disconnect all power cords on the BladeCenter unit from all the power modules.

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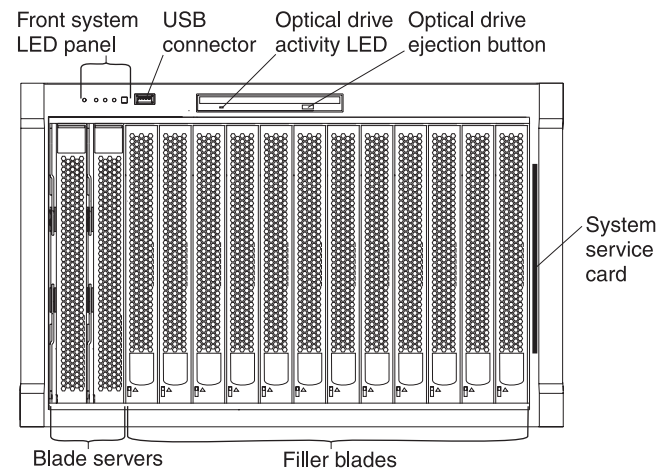
BladeCenter components, controls, and LEDs

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   USB connector   Optical drive activity LED   Optical drive ejection button

System service card

Blade servers   Filler blades

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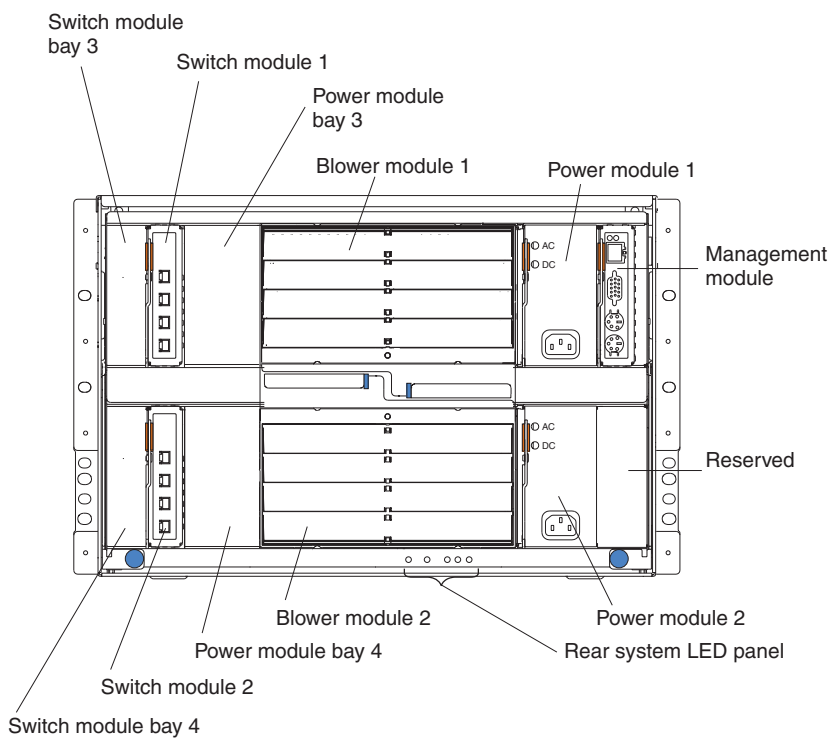
Blade control panel: This panel contains indicators and controls for the blade server. See the documentation that comes with your blade server for information about the blade control panel.

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

Writeable area

System service card
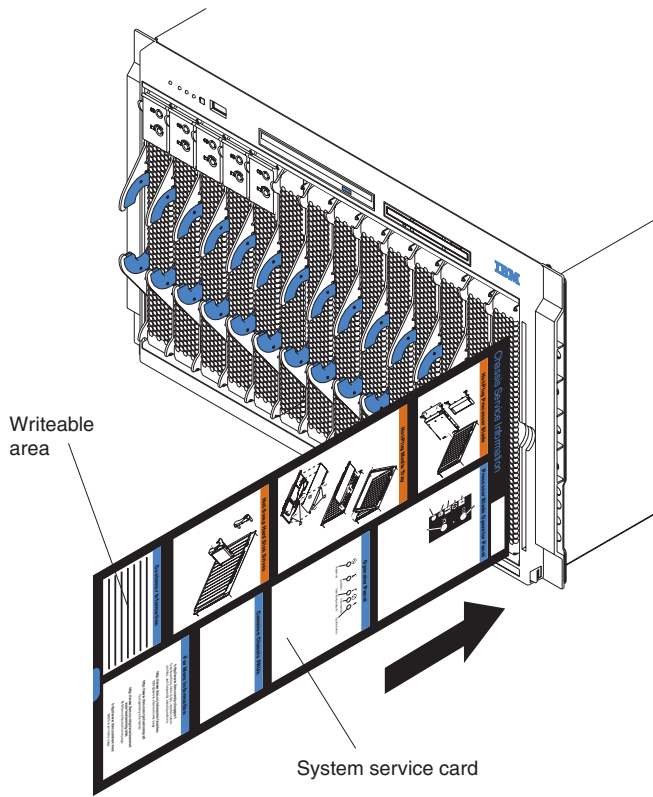
Rear view

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

Switch module bay 3

Switch module 1

Power module bay 3

Blower module 1

Power module 1

Management module

Reserved

Blower module 2

Power module 2

Power module bay 4

Rear system LED panel

Switch module 2

Switch module bay 4

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:

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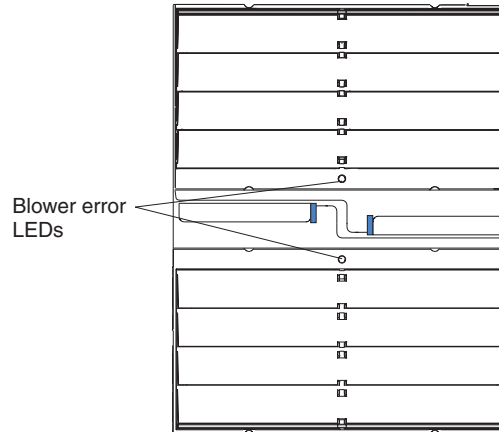
Important: If the ambient temperature is 72° F or below, the BladeCenter blowers will run at 30% of their maximum rotational speed, increasing their speed as required to control internal BladeCenter temperature. If ambient temperature is above 72° F, the blowers will run at 80% of their maximum rotational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

AC power

AC

DC

DC power
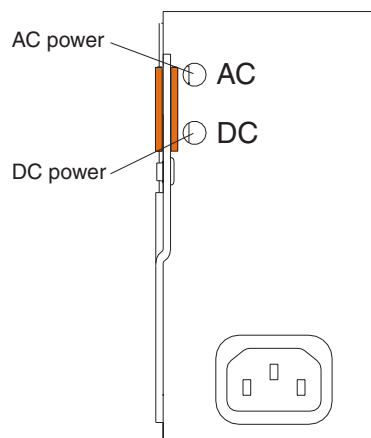
The following illustration shows the rear view for the currently available power modules.
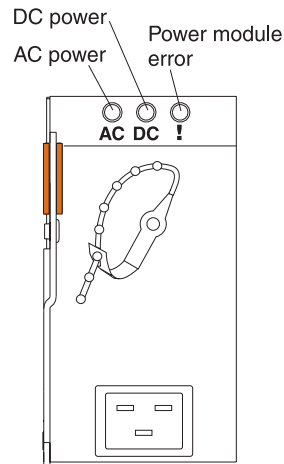
Power module LEDs: These LEDs indicate the condition of the power module. For additional information, see "Identifying problems using the Light Path Diagnostics feature" on page 29.

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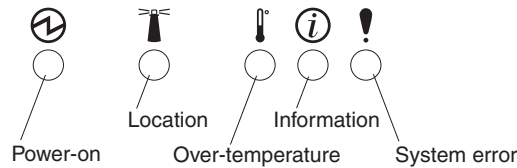
Attention: If the power-on LED is off, it does not mean there is no electrical current present in the BladeCenter unit. The LED might be burned out. To remove all electrical current from the BladeCenter unit, you must unplug all power cords from all power modules.

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.