



IBM BladeCenter S
Type 7779/8886

Problem Determination and Service Guide





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Type 7779/8886

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Note

Note: Before using this information and the product it supports, read the general information in Notices; and read the *IBM Safety Information* and the *IBM Systems Environmental Notices and User Guide* on the *IBM Documentation CD*.

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Chapter 1. Introduction

The BladeCenter S Type 8886 is a high-density, high-performance rack-mounted server system. It supports up to six blade servers that can share common resources, such as power, cooling, management, and I/O resources within a single BladeCenter S chassis. In addition, it provides support for up to twelve 3.5-inch, hot-swappable SAS or SATA hard disk drives or twenty-four 2.5-inch, hot-swappable SAS hard disk drives.

The BladeCenter S system provides the following features:

- **IBM® Enterprise X-Architecture Technology**

IBM Enterprise X-Architecture Technology leverages proven innovative IBM technologies to build powerful, scalable, and reliable blade servers. It provides features such as IBM Predictive Failure Analysis (PFA) and real-time diagnostics.

- **Server expansion capabilities**

You can add up to six blade servers to the BladeCenter S chassis. Some blade servers have connectors for additional optional devices that you can use to add capabilities to the blade server. For example, you can connect either a storage expansion unit or a PCI expansion unit to a blade server. Alternatively, you can add optional I/O expansion cards to add network interfaces or storage through I/O modules. SAS expansion cards provide access through SAS connectivity modules or SAS RAID controller modules that are installed in I/O bays 3 and 4 to the hard disk drives in the BladeCenter S chassis.

Note: SAS connectivity modules support the use of SAS or SATA hard disk drives. SAS RAID controller modules support the use of SAS hard disk drives only.

- **Hot-swap capabilities**

Bays in the BladeCenter S chassis are hot-swappable. For example, you can add, remove, or replace a blade server or a SAS or SATA hard disk drive without removing power from the BladeCenter S chassis.

The midplane provides hot-pluggable connectors for the following components:

- Six blade servers
- Four I/O modules
- One advanced management module
- One serial pass-thru module
- Four power modules
- Four fan modules
- Two disk storage modules
- One media tray

- **High-availability design**

Components in the BladeCenter S system enable continued operation if one of the components fails:

- **Power modules.** In normal operation, the power modules provide power to share the system load. If a power module fails, the working power modules can continue to handle the entire load. You can replace a power module without shutting down the BladeCenter S system.

Note: The power management policy that you have implemented for the BladeCenter S system determines the result of a power module failure.

Power modules also provide cooling fans for the disk storage modules. Therefore, if you are using disk storage module 1, you must install power modules 1 and 2. If you are using disk storage module 2, you must install power modules 3 and 4.

- **Fan modules.** In normal operation, fan modules share the cooling in the BladeCenter S system. If one fan module fails, the other three fan modules handle the entire load. You can replace a fan module without shutting down the BladeCenter S system.
- **BladeCenter S system midplane.** The midplane has the following characteristics:
 - Redundant high-speed serialize/deserialize (SERDES) interconnects between blade servers and switches
 - I2C communication between the advanced management module and all modules (except blade servers)
 - RS-485 (EIA 485) communication between the advanced management module and blade servers
 - Analog video connectors from the blade servers to the advanced management module
 - USB connections between the blade servers and the advanced management module

- **Systems management**

The advanced management module is used to communicate with the service processor in each blade server to provide system monitoring, event recording, and alerts. You can manage the BladeCenter S chassis, its devices, and the blade servers remotely.

Related documentation

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

Note: The latest and most up-to-date product information for the BladeCenter S Types 7779 and 8886 can be found at the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the BladeCenter S system documentation from this site, click **Systems hardware > BladeCenter information > Chassis > BladeCenter S (8886)**.

In addition to the product documentation, online education is also available at this location.

- *BladeCenter S Types 7779 and 8886 Planning Guide*

This document contains information to plan for the physical installation and configuration of the BladeCenter S Types 7779 and 8886.

- *BladeCenter S Types 7779 and 8886 Installation and User's Guide*

This document contains information about setting up and configuring your BladeCenter S Types 7779 and 8886 and its components.

- *Serial over LAN Setup Guide*

This guide provides detailed Serial over LAN configuration information for your BladeCenter S system.

- *Safety Information*

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

- *Warranty and Support*

This document contains information about the terms of the warranty and getting service and assistance.

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

The BladeCenter S chassis might have features that are not described in the documentation that comes with the BladeCenter S chassis. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the BladeCenter documentation. These updates are available from the IBM Web site. To check for updated documentation, go to <http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp>.

The IBM BladeCenter Documentation CD

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

Hardware and software requirements

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

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

Using the Documentation CD

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 presents the information in the language for that region (if available). If a topic 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 DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users:
 - If you are using a Windows operating system, insert the CD into the DVD drive, and click **Start > Run**. In the **Open** field, type:
`e:\win32.bat`
where *e* is the drive letter of your DVD drive, and click **OK**.

- If you are using a Red Hat Linux, insert the CD into the DVD drive; then, run the following command from the /mnt/cdrom directory:
sh runlinux.sh

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

When you select a document, a description of the document appears 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.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

The following table provides a summary of the features and specifications of the BladeCenter S chassis.

<p>Media tray (on front):</p> <ul style="list-style-type: none"> • One DVD drive (can be either a CD-RW/DVD-ROM or DVD/RW drive) • Two USB v2.0 ports • Front system LED panel • Two battery backup unit bay locations, which support the SAS RAID controller modules <p>Blade bays (on front): Six hot-swap blade server bays</p> <p>Disk storage module bays (on front): Two storage bays, each containing up to six 3.5-inch disk drive bays or twelve 2.5-inch disk drive bays.</p> <p>Module bays (on rear):</p> <ul style="list-style-type: none"> • One hot-swap advanced management module bay • Four hot-swap power module bays • Four hot-swap fan module bays • Four hot-swap I/O module bays • One hot-swap serial pass-thru module bay <p>Power modules:</p> <ul style="list-style-type: none"> • Minimum: Two hot-swap power modules. • Maximum: Four hot-swap power modules <p>Cooling:</p> <p>Four variable-speed, hot-swap fan modules</p> <p>Two fans in each power supply cool the disk storage modules</p> <p>Management module:</p> <ul style="list-style-type: none"> • One hot-swap advanced management module 	<p>Upgradeable microcode:</p> <ul style="list-style-type: none"> • Advanced management module firmware • I/O module firmware • Blade server firmware • Disk storage module firmware <p>Security features:</p> <ul style="list-style-type: none"> • Login password for remote connection • Secure Sockets Layer (SSL) security for remote management access • Lightweight Directory Access Protocol (LDAP) <p>Predictive Failure Analysis (PFA) alerts:</p> <ul style="list-style-type: none"> • Fan modules • Blade-dependent features <p>Size (7 U):</p> <ul style="list-style-type: none"> • Height: 306.3 mm (12 in.) • Depth: 733.4 mm (28.9 in.) • Width: 444 mm (17.5 in.) • Weight: <ul style="list-style-type: none"> – Fully configured weight with blade servers: approximately 108.86 kg (240 lb) – Empty chassis without modules or blade servers: approximately 40.82 kg (90 lb) 	<p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – BladeCenter S system 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 90°F) – BladeCenter S system off: -40° to 60°C (-40° to 140°F). • Humidity: 8% to 80% • Acoustics: declared sound power level: 6.3 to 6.8 bels <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50 - 60 Hz single-phase) required • Input voltage (110 V ac): <ul style="list-style-type: none"> – Minimum: 100 Vrms – Maximum: 127 Vrms • Input voltage (220 V ac): <ul style="list-style-type: none"> – Minimum: 200 Vrms – Maximum: 240 Vrms <p>Heat output: Approximate heat output in British thermal units (BTU) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 1365 Btu per hour (400 watts) • Maximum configuration: 11942 Btu per hour (3500 watts)
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Components of the BladeCenter S system

BladeCenter S system components include an advanced management module, blade servers, I/O modules, disk storage modules, power modules, fan modules, a serial pass-thru module, and a media tray.

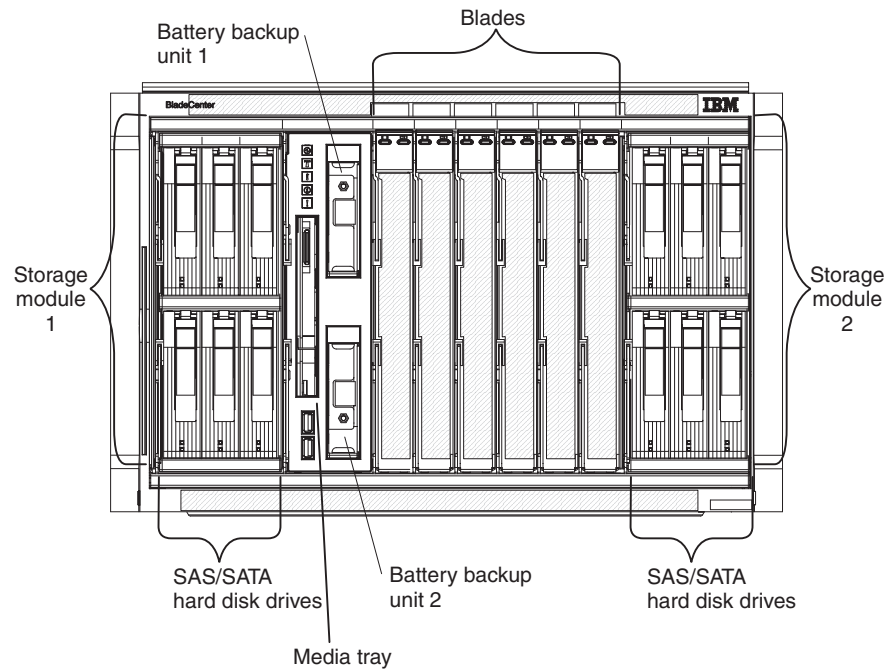
Front view of the BladeCenter S chassis

Blade servers, disk storage modules, and the media tray are installed in the front of the BladeCenter S chassis.

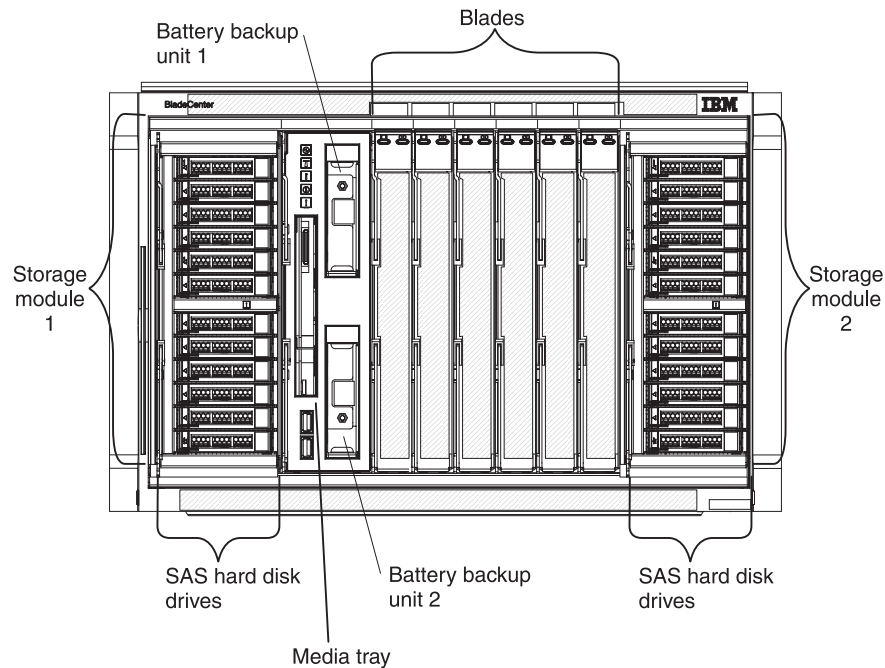
Note: For proper cooling, each bay in the BladeCenter S chassis must have either a device or a filler installed.

As the BladeCenter S chassis can support either 3.5-inch disk drives or 2.5-inch disk drives in the storage bays, the front view of the chassis can appear as either of the following.

3.5-inch disk drive configuration:



2.5-inch disk drive configuration:



Disk storage modules

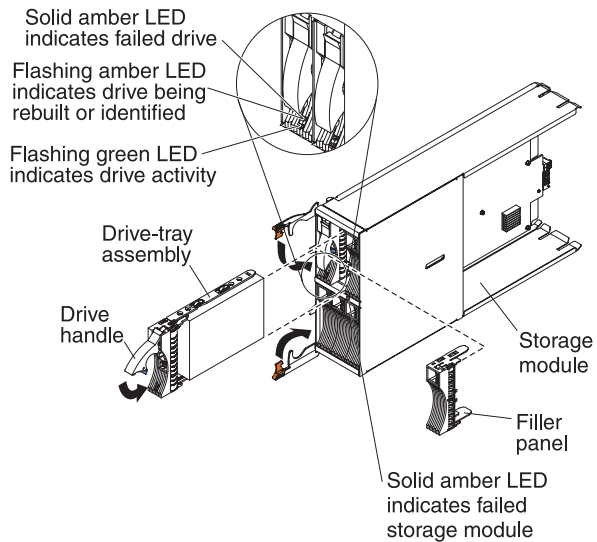
You can install a maximum of two disk storage modules in the BladeCenter S chassis and each disk storage module contains hot-swap hard disk drives. A disk storage module and the hard disk drives installed in that disk storage module are commonly referred to as *integrated shared storage* because this storage is integrated in the BladeCenter S chassis and shared among the blade servers in the BladeCenter S system.

Each disk storage module can support up to six hot-swap, 3.5-inch or twelve hot-swap, 2.5-inch hard disk drives. For 3.5-inch hard disk drives, if you are installing SAS connectivity modules, both SAS and SATA hard disk drives are supported, and you can use both types of hard disk drives in each disk storage module. If you are installing SAS RAID controller modules, you must install SAS hard disk drives. For 2.5-inch hard disk drives, please note that only SAS hard disk drives are supported. Thus, only SAS RAID controllers can be used.

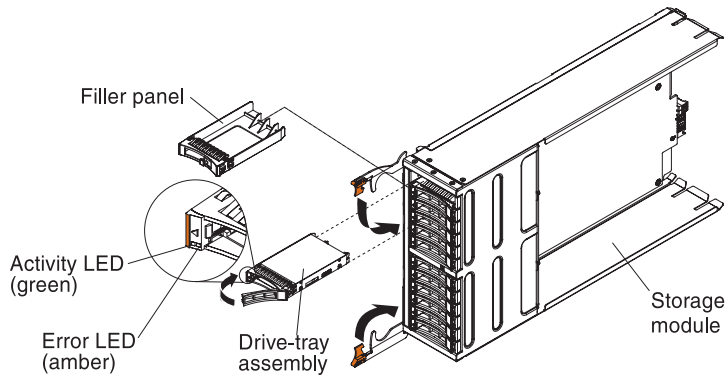
Within each disk storage module, hard disk drives are numbered either 1 through 6 from left to right, and top to bottom for the 3.5-inch hard disk drive configuration or 1 through 12 for the 2.5-inch hard disk drive configuration.

Note: Each hard disk drive bay must contain either a hard disk drive or a drive-bay filler.

Graphic showing close up of 6-disk disk storage module and indicators



Graphic showing close up of 12-disk disk storage module and indicators



Note: Four power modules are required in the BladeCenter S chassis if both disk storage modules are installed.

To access the hard disk drives in the disk storage module, the following devices must be installed:

- SAS I/O modules. For the 6-disk storage module, you can choose to install either SAS connectivity modules or SAS RAID controller modules. As for the 12-disk storage module, only the SAS RAID controller module can be installed.

Note: You cannot mix these module types in the same BladeCenter S chassis.

- SAS connectivity module. At least one SAS connectivity module must be installed. If a single SAS connectivity module is installed, it controls access to both disk storage modules in the BladeCenter S chassis. If two SAS connectivity modules are installed, the module in I/O module bay 3 controls access to disk storage module 1, and the module in I/O module bay 4 controls access to disk storage module 2.
- SAS RAID controller module. Two SAS RAID controller modules must be installed, one in I/O module bay 3 and the other in I/O module bay 4. Each SAS RAID controller module will have access to both storage modules (for high availability).

- A SAS expansion card in each of the blade servers, which provides access through the SAS I/O modules in I/O module bays 3 and 4 to the SAS or SATA hard disk drives in each disk storage module. This only applies to the 6-disk storage module.

There is one LED on each disk storage module:

Fault Solid (amber) when there is a disk storage module failure.

There are two LEDs on each hard disk drive:

Green Flashing when an operation, such as a read or a write, is being performed.

Amber

Flashing when the hard disk drive is being rebuilt (fast blink) or identified (slow blink).

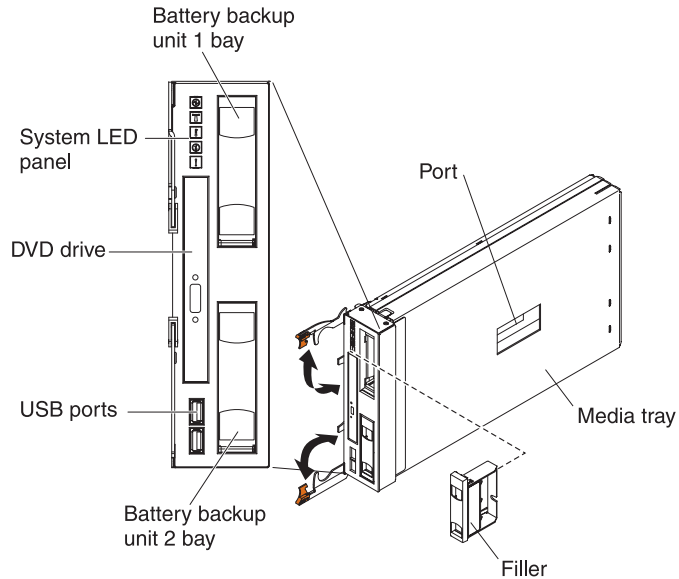
Note: When power is restored to the BladeCenter S chassis after a complete loss of power and you have implemented the hard disk drives as a mirrored array, the fault light will blink as the hard disk drive is being resynchronized.

This resynchronization occurs because the blade servers are attempting to power on before all of the disk storage modules and SAS connectivity modules or SAS RAID controller module are powered up and available. The mirrored array is accessible during resynchronization although performance may be slightly slower.

Solid when there is a drive failure.

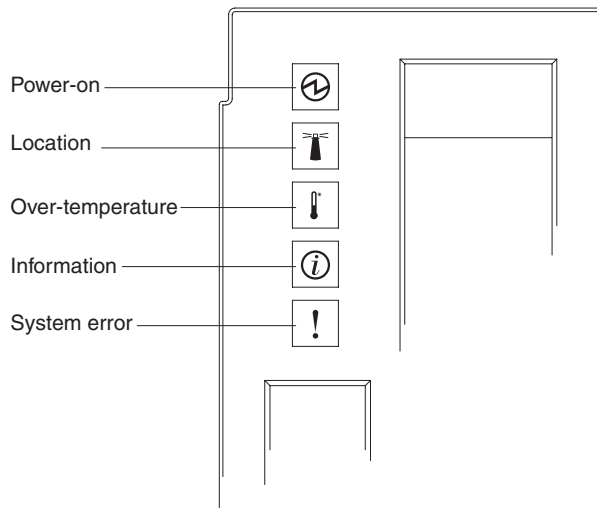
Media tray

The media tray contains the DVD drive (which can be either a CD-RW/DVD-ROM drive or a DVD/RW drive) and two USB v2.0 ports, which are shared by the blade servers. The media tray also contains two battery backup units, which provide backup for SAS RAID controller modules cache.



Note: The port on the side of the media tray is reserved for future use.

Controls and indicators



The media tray provides the following controls and indicators:

System LED panel

The LEDs on this panel provide status information for the BladeCenter S chassis.

Note: These LEDs are also displayed on the rear of the BladeCenter S chassis.

Power-on

Lit (green). Power is being supplied to the BladeCenter S chassis.
Off. The power subsystem, ac power, or the LED has failed.

Note: Even if the power-on LED is off, always remove the power cords from all power modules before you service the BladeCenter S chassis.

Location

Lit or flashing (blue). It has been turned on by the system administrator to aid in visually locating the BladeCenter S chassis. You can turn off the location LED through the Web interface or the IBM Director console.

Over-temperature

Lit (amber). The temperature in the BladeCenter S chassis exceeds the temperature limits, or a blade server reports an over-temperature condition. The BladeCenter S chassis might have already taken corrective action, such as increasing the fan speed. This LED turns off automatically when there is no longer an over-temperature condition.

Information

Lit (amber). A noncritical event has occurred that requires attention, such as the wrong I/O module being inserted into a bay, or power demands within the BladeCenter S chassis exceeding the capacity of the installed power modules.

You can turn off the information LED through the Web interface or the IBM Director console.

System error

Lit (amber). A system error has occurred, such as a module failure or a system error in a blade server. An LED on the failing component is also lit to assist in isolating the error.

DVD drive activity LED

Lit (green). The drive is in use.

DVD drive eject button

Press this button to open the DVD drive.

USB ports

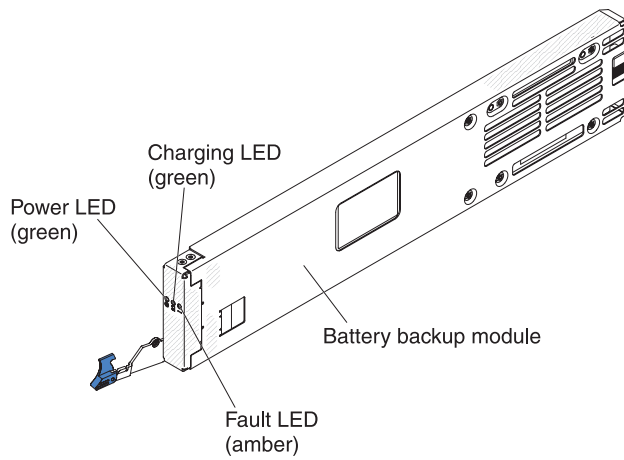
Connect USB devices to these ports.

Battery backup unit:

Battery backup units provide backup for SAS RAID controller modules cache.

Battery backup units are installed in the battery backup unit bays located in the media tray when you install SAS RAID controller modules. The battery backup unit in battery backup bay 1 provides backup support for the SAS RAID controller module in I/O module bay 3; the battery backup unit in battery backup bay 2 provides backup support for the SAS RAID controller module in I/O module bay 4.

Note: Both battery backup units are required if you install SAS RAID controller modules.



Controls and indicators

The battery backup unit provides the following indicators:

Power Lit (green). Power is being supplied to the battery backup unit.

Charging

Lit (green). The battery backup unit is being charged.

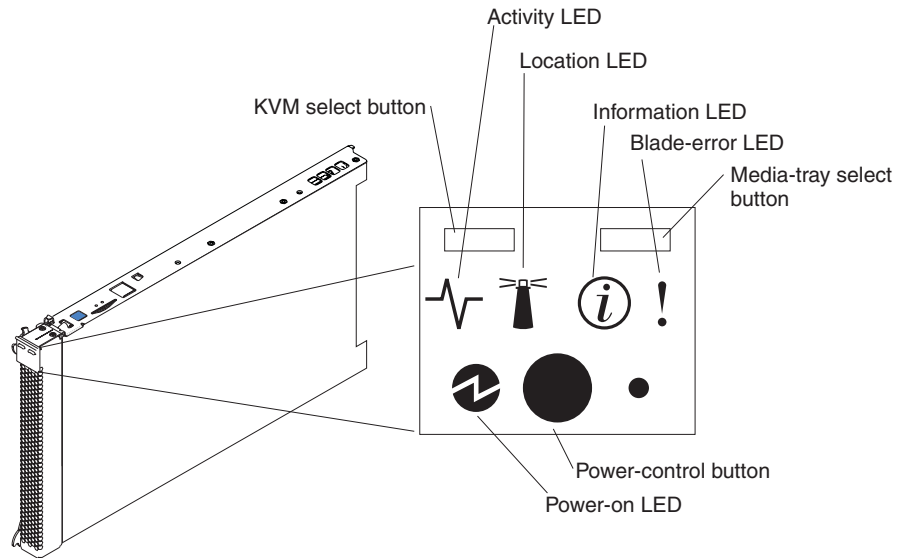
Fault Lit (amber). The battery backup unit has a failure. If the Fault LED is lit, replace the battery backup unit.

Blade server

Blade servers can contain components such as microprocessors, memory, Ethernet controllers, and hard disk drives. They receive power, network connection, and I/O devices (such as DVD drive, keyboard, mouse, video port, USB ports, and a remote monitoring port) from the BladeCenter S chassis.

A SAS expansion card must be installed in each blade server that will access the integrated shared storage.

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



You can find the documentation for blade servers in the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the blade server documentation from this site, click **Systems hardware > BladeCenter information > Blade servers**.

To determine which blade servers are compatible with the BladeCenter S chassis, see the IBM ServerProven Web site at <http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html>.

Controls and indicators

Blade servers typically provide the following controls and indicators:

KVM select button

When using an operating system that supports a local console and keyboard, press this button to associate the shared BladeCenter S chassis keyboard and video ports with the blade server.

Activity LED

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

Location LED

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

can be turned off through the Web interface of the advanced management module or through the IBM Director Console.

Information LED

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

Blade-error LED

When this amber LED is lit, it indicates that a system error has occurred in the blade server. The blade-error LED will turn off after one of the following events:

- Correcting the error
- Reseating the blade server in the BladeCenter S chassis
- Cycling the BladeCenter S chassis power

Media-tray select button

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

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

Power-control button

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

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

Press down the power button for five seconds to begin powering down the blade server.

Power-on LED

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

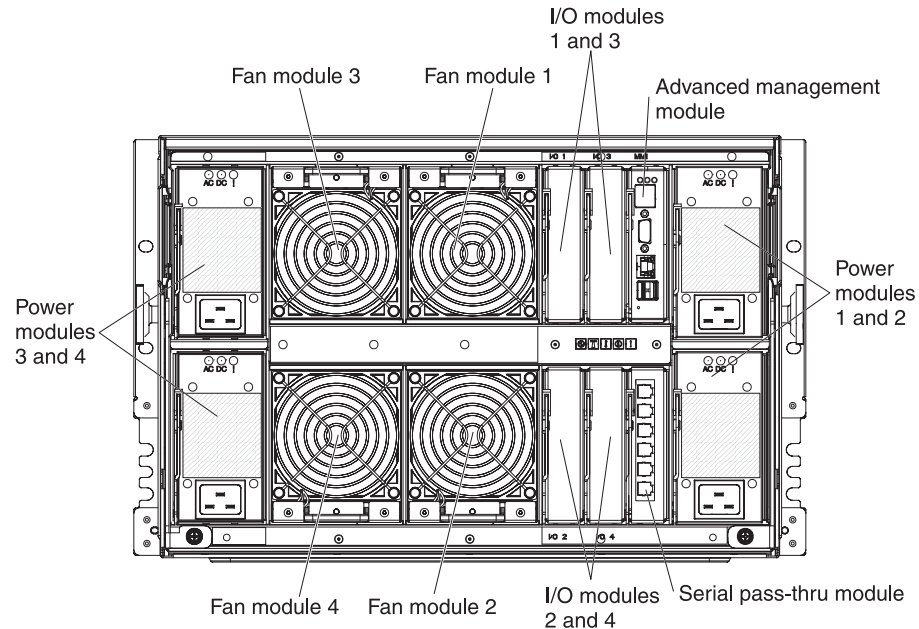
- Flashing rapidly: The service processor (BMC) is initializing the blade server.
- Flashing slowly: The blade server has completed initialization and is waiting for a power-on command.
- Lit continuously: The blade server has power and is turned on.

Rear view of the BladeCenter S chassis

Fan modules, I/O modules, power modules, the advanced management module, and the serial pass-thru module are in the rear of the BladeCenter S chassis.

Note: Each bay in the BladeCenter S chassis must have either a device or a filler installed.

The following illustration shows the rear of the BladeCenter S chassis.



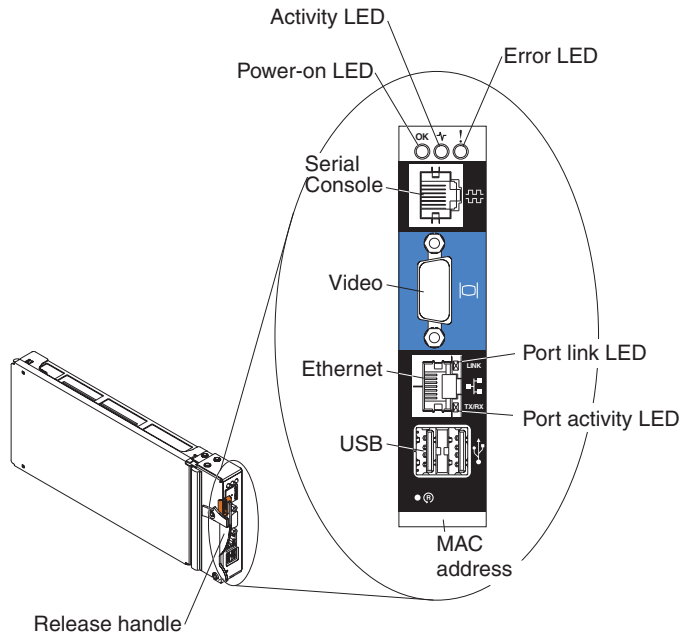
Advanced management module

The advanced management module is a hot-swap module that you use to configure and manage all installed BladeCenter components. The BladeCenter S chassis comes with one advanced management module in the advanced management module bay.

The advanced management module provides systems-management functions and keyboard/video/mouse (KVM) multiplexing for all blade servers in the BladeCenter S chassis that support KVM. It controls the following connections:

- A serial port for a local connection to another computer, such as a notebook computer
- The external video and USB connections for keyboard and mouse
- A 10/100 Mbps Ethernet connection

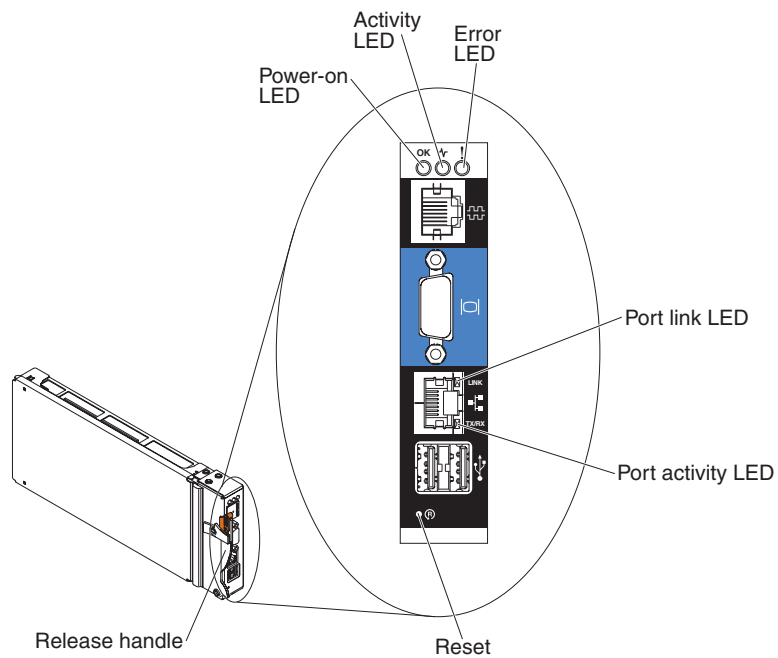
The advanced management module communicates with the service processor (also called the baseboard management controller, or BMC) in each blade server to support features such as blade server power-on requests, error and event reporting, KVM requests, and requests to use the BladeCenter S chassis shared media tray.



The BladeCenter S chassis supports a single advanced management module, and it must be installed in the advanced management module bay.

Advanced management module indicators and controls:

The advanced management module has several LEDs that you can use to obtain status about the advanced management module and the Ethernet connection.



The following advanced management module LEDs provide status information about the advanced management module and Ethernet connection:

Power-on

Lit (green). The advanced management module has power.

Activity

Lit (green). The advanced management module is actively controlling the BladeCenter S system.

Error

Lit (amber). An error has been detected in the advanced management module. When the error LED is lit, the BladeCenter system error LED is also lit.

Port Link

Lit (green). There is an active connection through the Ethernet port to the network.

Port activity

Flashing (green). There is activity through the Ethernet port over the network link.

Reset

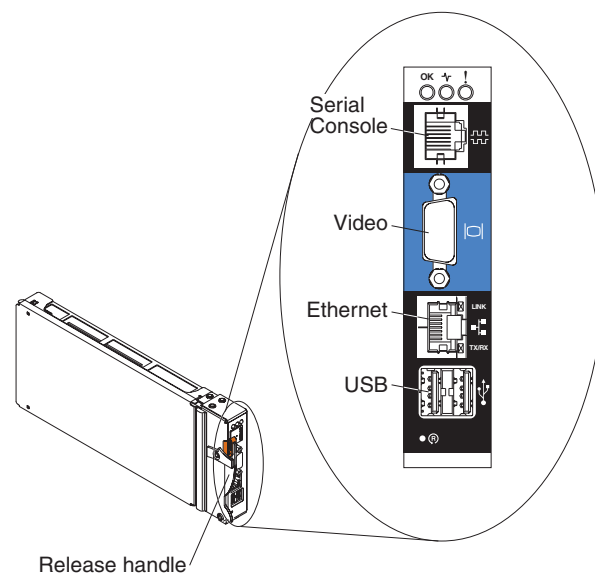
Insert a straightened paper clip into the reset pinhole and remove it to restart the advanced management module. The fan modules operate at full speed while the advanced management module is initializing.

Attention: If you push the paper clip in all the way and hold it for approximately 10 seconds, the advanced management module will be reset to the default configuration. Therefore, you should always make sure that you save your current configuration before resetting the advanced management module.

For more information about saving and restoring configurations, see the *IBM BladeCenter Advanced Management Module User's Guide*.

Advanced management module input and output connectors:

The advanced management module has a serial connector, a video connector, two USB connectors for keyboard and mouse, and an Ethernet connector for remote management.



Serial Console

Use this connection to configure and manage the BladeCenter components through the advanced management module command-line interface (CLI). For example, you can connect a notebook computer to the serial connector and use a terminal emulator program to configure the IP addresses, user accounts and other settings.

The serial pinout for the advanced management module is an EIA-561, as shown in the following table:

Contact (pin number)	Signal name
1	DSR (Data set ready)
2	DCD (Data carrier detect)
3	DTR (Data terminal ready)
4	GND (Ground)
5	Receive (RX)
6	Transmit (TX)
7	CTS (Clear to send)
8	RTS (Request to send)

Video Use this connector to connect a compatible SVGA or VGA video monitor to the BladeCenter S system.

Ethernet

Use this connector to connect the BladeCenter S system to a the management station, either through an Ethernet cable or on the network.

USB connectors

Use these connectors to connect a mouse and keyboard (or other USB devices). Unlike the USB connectors on the media tray, these connectors are shared by the blade servers through the BladeCenter Keyboard, Video, Mouse (KVM) interface. The KVM interface owns these ports.

Note: If you connect a USB storage device to these connectors, the blade server has ownership of the media tray and can access the device. To switch ownership of the media tray to a specific blade server, press the

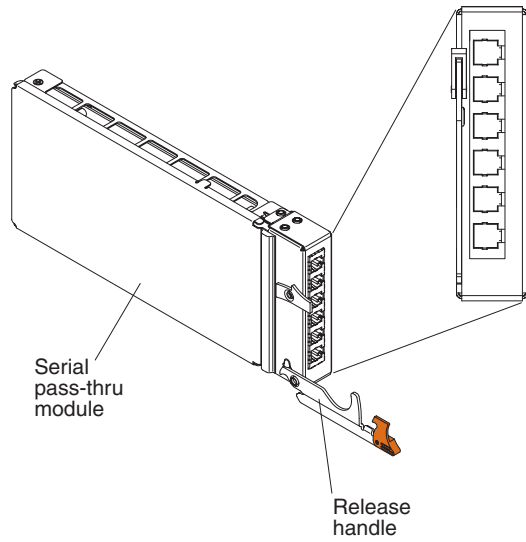
CD button on that blade server.

Serial pass-thru module

The serial pass-thru module has six serial ports that you can use to directly attach a four-wire serial RJ-45 connector to each of the blade servers in the BladeCenter S chassis. If you use the serial pass-thru module, it must be installed in the serial pass-thru module bay.

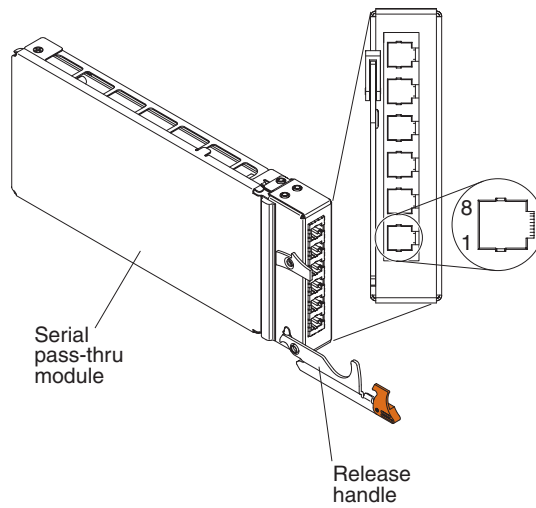
Note: See the documentation for the blade server that you are using to ensure that it supports this type of serial access.

The connectors are numbered 1 through 6, from top to bottom, and correspond to blade servers in blade server bays 1 through 6.



Serial pass-thru connector pinout

There are eight pins on each RJ-45 port, numbered 1 through 8, from bottom to top.

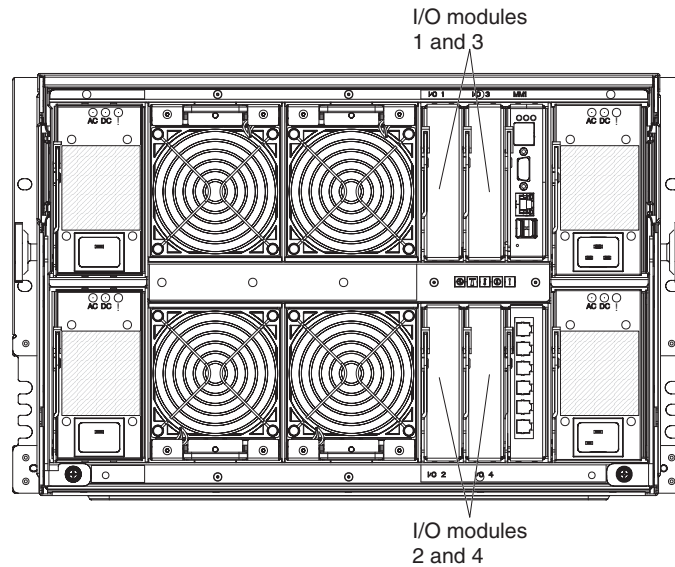


Contact (pin number)	Signal name	Signal direction
1	RTS (Request to send)	Output from blade server
2	Not used	n/a
3	RXD (Receive data)	Input to blade server
4	GND (Ground)	n/a
5	Not used	n/a
6	TXD (Transfer data)	Output from blade server
7	Not used	n/a
8	CTS (Clear to send)	Input to blade server

Note: The serial pass-thru module uses the DTE convention.

I/O modules

You can install up to four I/O modules in the BladeCenter S chassis, including Ethernet switch modules, Fibre Channel switch modules, pass-thru modules (optical and copper), SAS connectivity modules, and SAS RAID controller modules.



Note:

You can find the documentation for I/O modules at the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the I/O module documentation from this site, click **Systems hardware > BladeCenter information > I/O modules**.

To determine which I/O modules are compatible with the BladeCenter S chassis, see the IBM ServerProven Web site at <http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html>.

I/O module bay 1

I/O module bay 1 supports any standard Ethernet or pass-thru module that connects to the two integrated Ethernet controllers in each of the blade servers.

Note: This I/O module bay is wired differently from I/O module bay 1 in a BladeCenter E or BladeCenter H chassis.

I/O module bay 2

I/O module bay 2 supports an optional I/O module, such as an Ethernet switch or a pass-thru module, that connects to the two integrated Ethernet controllers in each of the blade servers.

Note: If you install an I/O module in I/O module bay 2, you will also need to install an expansion card option, such as the 2/4 Port Ethernet Expansion Card, in each blade server that will access the external Ethernet network through the switch module in I/O module bay 2.

I/O module bays 3 and 4

I/O module bays 3 and 4 support SAS connectivity modules or SAS RAID controller modules.

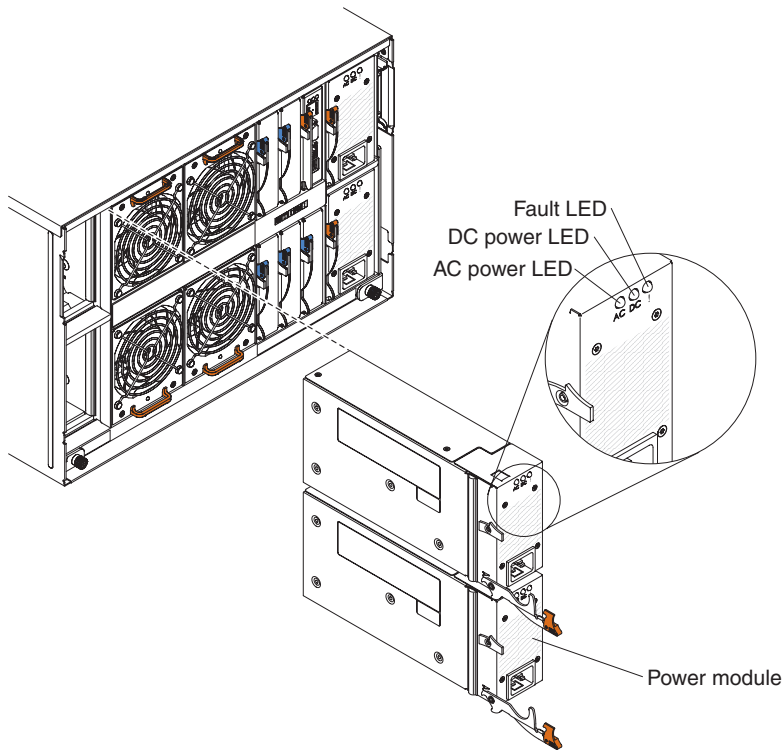
- If you are using the RAID storage solution, you must install two SAS RAID controller modules, one in I/O module bay 3 and one in I/O module bay 4. SAS RAID controller modules require a SAS expansion card option in each blade server that will access the integrated shared storage.
- If you are using only one SAS connectivity module, install the module in I/O module bay 3. You can install an additional SAS connectivity module in bay 4. A SAS connectivity module requires a SAS expansion card option in each blade server that will access the integrated shared storage.

The two bays also support Ethernet switch modules, Fibre Channel switch modules, and pass-thru modules (optical and copper) if the disk storage modules are not being used.

Important: I/O module bays 3 and 4 must both contain the same type of switch (either SAS connectivity modules, SAS RAID controller modules, Ethernet switch modules, pass-thru modules, or Fibre Channel switch modules).

Power modules

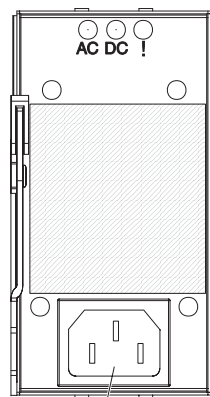
The BladeCenter S system supports up to four autoranging power modules that are capable of supporting either 110 V ac or 220 V ac.



There are two types of power modules. These power modules are identical except for the power cord connector; one power module has a C14 connector and the other power module has a C20 connector. Both types of power modules can be installed in the same chassis.

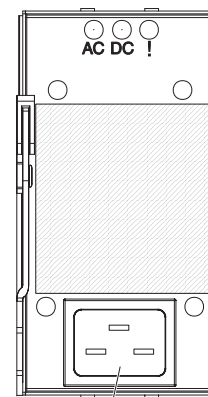
Table 1. Power modules used in the BladeCenter S system

Power module with C14 connector



C14 connector

Power module with C20 connector



C20 connector

Within the BladeCenter S chassis, all power supplies are combined into a single power domain, which distributes power to each of the blade servers and modules through the system midplane.

You must install a minimum of two power modules. If you install only two power modules, install them in power module bays 1 and 2 (the top and bottom power module bays on the right as you face the rear of the BladeCenter S chassis).

Note: You must install all four power modules if you are using both disk storage modules.

If you disengage or remove all devices from the front of the BladeCenter S chassis (media tray, blade servers, and disk storage modules), the power modules will be disabled.

Indicators and controls

There are three LEDs on each power module:

AC power

Lit (green). Power is being supplied to the power module.

DC power

Lit (green). Power is being supplied from the power module to the BladeCenter S chassis midplane.

Fault Lit (amber). There is a fault with the power module.

Note: Before unplugging the AC power cord from the power module or removing the power module from the BladeCenter S chassis, verify that the capacity of the remaining power modules are sufficient to meet the minimum power requirements for all components in the BladeCenter S chassis. You can view power status and requirements through the advanced management module.

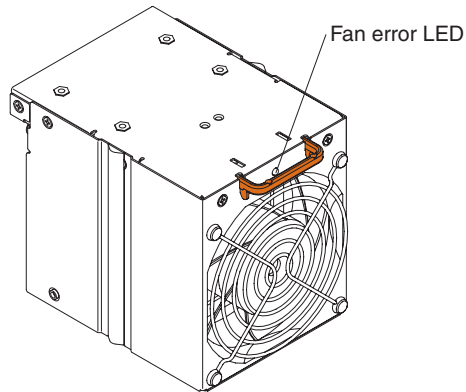
For information on accessing and using the advanced management module, see the *Advanced Management Module User's Guide*.

1. Verify that the power modules are properly connected to an AC power source. All power modules in the BladeCenter S chassis must be connected to the same power input voltage (either 110 V ac or 220 V ac). Do not mix power input voltages.
2. Unplug the AC power cord from the power module and plug it in again.
3. Reseat the power supply.
4. Swap the AC power cord with a power cord that is known to be working.
5. Move the power module to another power module bay in the BladeCenter S chassis.

Fan modules

The BladeCenter S chassis comes with four installed hot-swap fan modules.

The fan modules (sometimes called *fan packs*) are designed to provide cooling airflow to the blade servers and I/O modules. Each fan module contains two fans.



Indicators and controls

Each fan module has a single LED:

Error Lit (amber). One of the fans in the fan module has failed.

Note: If one of the fans in the fan module fails, the other fan will begin operating at full speed.

Systems and storage management

IBM provides products that you can use to manage your BladeCenter S system and the integrated shared storage that is available.

IBM Director

IBM Director provides a comprehensive entry-level workgroup hardware manager. It includes advanced self-management capabilities for maximum system availability and support for multiple operating systems, including Microsoft Windows, AIX, Linux, and i5/OS.

With IBM Director, a systems or network administrator can perform the following tasks:

- View and modify the hardware configuration of remote systems
- Monitor the usage, health, and performance of critical components, such as microprocessors, disks, and memory
- Centrally manage individual or large groups of IBM and non-IBM x86-processor-based servers, desktop computers, workstations, and notebook computers on a variety of platforms
- Inventory your environment
- Perform updates to managed systems, such as device drivers and firmware
- Automatically perform an action based on events or schedules, if IBM Director is configured to do so

By deploying IBM Director, you can achieve reductions in ownership costs through the following benefits:

- Reduced downtime
- Increased productivity of IT personnel and users
- Reduced service and support costs

For more information about IBM Director and to download the latest version of IBM Director, go to <http://www.ibm.com/systems/management/director/>.

Storage Configuration Manager

Storage Configuration Manager is a Web based device management application.

Storage Configuration Manager provides user and programmatic interfaces that you need to configure and monitor multiple instances of different types of storage related devices, including either the SAS connectivity modules or the SAS RAID controller modules, and the SAS controllers on the expansion cards in each blade server. It includes a Web-based graphical user interface. It can be installed as a stand-alone application or as an extension to IBM Director 5.20.2.

You can connect to the Storage Configuration Manager component of the application from any computer on the network that it is installed on, using a standard Web browser (Internet Explorer 6.x or later, Firefox 1.0 or later).

Instead of using Storage Configuration Manager, you have the option of configuring the integrated shared storage from the configuration wizard of the advanced management module if you choose one of the predefined configurations that are provided. However, you must install Storage Configuration Manager if you decide to modify an existing configuration or create your own customized configuration.

To download Storage Configuration Manager go to <http://www.ibm.com/systems/support/management> and select **IBM Storage Configuration Manager**.

Disconnecting power from the BladeCenter unit

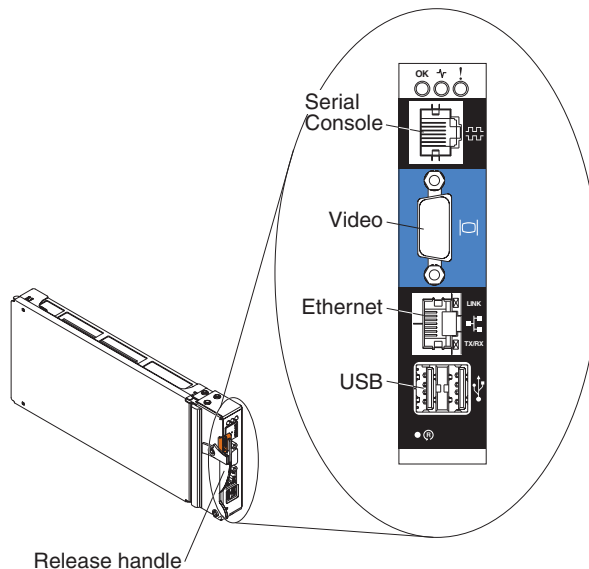
Disconnect power from the BladeCenter S chassis by shutting down all blade servers and disconnecting the BladeCenter S chassis from all power sources.

1. Shut down each blade server. See the documentation that comes with your blade server for information about shutting down the operating system on the blade server.
2. Disconnect all power cords on the BladeCenter unit from the power connectors.

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

Connecting to your BladeCenter S Types 7779 and 8886

To perform the initial configuration, you will typically connect to the advanced management module through the Ethernet port on the advanced management module. Using the advanced management module Ethernet port, you can either connect a client computer, such as a notebook computer using an Ethernet cable, or you can connect the advanced management module to your network.



Note: Optionally, you can connect to the advanced management module through the serial port on the advanced management module (using a terminal emulation program such as Telnet, PuTTY, or Hyperterm).

If you are connecting using a client computer, you must set the client computer to a static IP address and make sure that the computer is on the same IP subnet (255.255.255.0) as the advanced management module. When you choose an IP address, be sure to choose an address (such as 192.168.70.120) that will not conflict with any of the components that are installed in the BladeCenter S chassis.

There are two interfaces that you can use to connect to the advanced management module through an Ethernet port:

- **Web based interface.** From a browser, enter the IP address (or host name if you are using DHCP) and sign in using the user ID and password.

By default, the advanced management module is configured to respond to DHCP when it is first powered on. If a DHCP server is not found, the advanced management module uses its static IP address.

If you are connecting to a network on which DHCP is implemented, you can access the advanced management module using its host name. The host name for the advanced management module is provided on the advanced management module MAC address tag.

The advanced management module has the following default settings:

- IP address: 192.168.70.125
- Subnet: 255.255.255.0
- User ID: USERID (all capital letters)

- Password: PASSWORD (note the number zero, not the letter O, in PASSWORD)
- **Command-line interface.** From a console window, access the advanced management module IP address or host name using Telnet or SSH. Then, log in using the user ID and password.

Chapter 2. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the BladeCenter S Types 7779 and 8886.

Diagnostic tools

Use the lightpath diagnostic LEDs and the event log to diagnose and solve hardware related problems

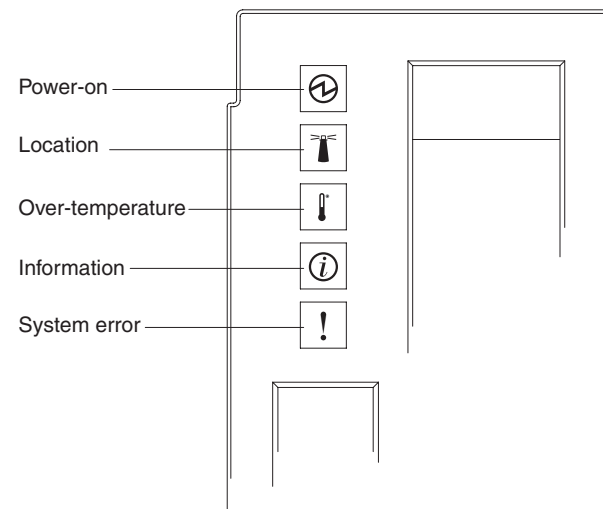
In addition, you can use the advanced management module service data tool to collect a complete set of diagnostics that can be used by IBM service personnel for analysis. To access the service data tool from the advanced management module Web interface, click **Service Tools > MM Service Data**.

Light path diagnostic LEDs

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

BladeCenter S chassis system LED panel

The system LEDs are displayed on the front and rear of the BladeCenter S chassis.



Lit LED	Description	Action
Power-on	This green LED is lit (solid) when 12 VDC is present on the midplane.	
Location	This blue LED is lit (solid or flashing) to indicate the location of the BladeCenter S system or that a condition has occurred that has caused the remote system management to identify the BladeCenter S system as needing attention.	Look for any information or error LEDs on the system LED panels, the modules, and the blade servers in the BladeCenter S system.
Over-temperature	This amber LED is lit (solid) to indicate that the system temperature has exceeded a threshold level.	<ol style="list-style-type: none"> 1. Determine whether a fan module has failed. If it has, replace the fan module as soon as possible. 2. Make sure that the room temperature is not too high. (See “Features and specifications” on page 5 for temperature information.) 3. Make sure that there is a blade server, module, or filler installed in each bay
Information	This amber LED is lit (solid) to indicate that a noncritical event has occurred, such as the wrong I/O module inserted in a bay, or power requirements that exceed the capacity of the power modules currently installed.	<ol style="list-style-type: none"> 1. Check the advanced management module event log for errors. 2. Check to see if there are any other LEDs lit on the BladeCenter S system. 3. Check to see if an LED on one or more blade servers is lit. If so: <ol style="list-style-type: none"> a. Check the advanced management module event log for errors related to that blade server. b. Remove the blade server and open the cover to view the system board LEDs. Note: You can view the status of the LEDs on the blade server without opening the blade server cover. From the advanced management module Web interface, click the name of the blade server in the Blade LEDs section of the LEDs link.

Lit LED	Description	Action
System error	This amber LED is lit (solid) to indicate that a critical system error has occurred, such as an error in a power module or a system error in a blade server.	<ol style="list-style-type: none"> 1. Check the advanced management module event log for errors. 2. Check to see if there are any other LEDs lit on the BladeCenter unit. 3. Check to see if an LED on one or more modules is lit. If so, following the instructions for that LED in "Module LEDs." 4. Check to see if an LED on one or more blade servers is lit. If so: <ol style="list-style-type: none"> a. Log in to the advanced management module and view the event log for errors related to that blade server. b. Remove the blade server and open the cover to view the system board LEDs. Note: You can view the status of the LEDs on the blade server without opening the blade server cover. From the advanced management module Web interface, click the name of the blade server in the Blade LEDs section of the LEDs link. 5. Contact IBM support.

Module LEDs

Each module contains LEDs that can be used to troubleshoot and resolve problems.

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

You can find the documentation for I/O modules and blade servers at the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the I/O module or blade server documentation from this site, click **Systems hardware > BladeCenter information**. Then click either **Blade servers** or **I/O modules**.

LED status	Description	Action
Advanced management module error LED	This amber LED is lit when a critical error has occurred in the management module. The system error LED on the BladeCenter S chassis will also be lit.	<ol style="list-style-type: none"> 1. Reset the advanced management module. 2. Reseat the advanced management module. 3. Replace the advanced management module.
Power module ac power LED	This green LED is not lit if there is an ac power problem.	<ol style="list-style-type: none"> 1. Make sure that all power cords are plugged into power sources and that the power sources are working. 2. Reseat the power module. 3. Replace the power module.

LED status	Description	Action
Power module dc power LED	The green LED is not lit if there is an dc power problem.	<ol style="list-style-type: none"> 1. Make sure that all power sources are supplying the same voltage. All power sources must be either 110 V ac or 220 V ac. You cannot mix power sources in the same BladeCenter S chassis. 2. Determine whether a failed component caused the shut down. If a component failed: <ol style="list-style-type: none"> a. Replace the failed component. b. Reseat the power module. 3. Replace the power module.
Power module fault LED	This amber LED is lit if the power module has failed.	<p>Note: Before unplugging the AC power cord from the power module or removing the power module from the BladeCenter S chassis, verify that the capacity of the remaining power modules are sufficient to meet the minimum power requirements for all components in the BladeCenter S chassis. You can view power status and requirements through the advanced management module.</p> <p>For information on accessing and using the advanced management module, see the <i>Advanced Management Module User's Guide</i>.</p> <ol style="list-style-type: none"> 1. Verify that the power modules are properly connected to an AC power source. All power modules in the BladeCenter S chassis must be connected to the same power input voltage (either 110 V ac or 220 V ac). Do not mix power input voltages. 2. Unplug the AC power cord from the power module and plug it in again. 3. Reseat the power supply. 4. Swap the AC power cord with a power cord that is known to be working. 5. Move the power module to another power module bay in the BladeCenter S chassis. <p>View the advanced management module event log for errors related to this power module and resolve those errors.</p>
Fan module fault LED	This amber LED is lit if one of the fans in the fan module has failed. Note: If one of the fans in the fan module fails, the other fan will begin operating at full speed.	Replace the fan module.

LED status	Description	Action
Disk storage module fault LED	This amber LED is lit if the disk storage module has failed.	<ol style="list-style-type: none"> 1. Make sure the advanced management module is present and functioning. 2. Make sure that there is at least one power module installed in a power module bay behind the disk storage module. 3. Log in to the advanced management module and view the event log for power or cooling problems. 4. Make sure that there is enough power allocated to allow the disk storage module to power on. You can view information about the allocated power in the advanced management module Web Interface (click Monitors > Power Management). For more information about the advanced management module Web interface, see the <i>Advanced management module User's Guide</i>. 5. Reseat the disk storage module and allow the advanced management module to power it on. 6. Replace the disk storage module.
Hard disk drive amber LED	This LED is lit (solid) if the hard disk drive has failed.	Replace the hard disk drive if the amber LED is solid.
	This LED is flashing if the hard disk drive is being rebuilt or identified. If this LED is flashing fast, the hard disk drive is being rebuilt. If it flashes slowly, the hard disk drive is being identified.	No action is required.
Hard disk drive green LED	This LED is flashing if there is drive activity.	No action required.
Battery backup unit power LED	This green LED is lit if power is being provided to the battery backup unit	No action required.
Battery backup unit charging LED	This green LED is lit if the battery backup unit is charging.	No action required.
Battery backup unit fault LED	This amber LED is lit if the battery backup unit has failed.	Replace the battery backup unit.

Event log

The advanced management module event log contains messages that are generated while the advanced management module is monitoring the BladeCenter S system.

Messages in the event log have the following format:

- Severity error level. The severity level can be information (I), warning (W), or error (E).
- Source. The source device that generated the message, such as SERVPROC for the advanced management module or BLADE_XX for a blade server, where XX is the blade server number.
- Timestamp. Date and time that the message was generated.
- Text description. Text describing the message.

The following example shows an event log error message:

E BLADE_05 06/05/06 10:39:02 (RXPS01181US) Service Processor watchdog.

For some messages, the event log will display a message beginning with the word Recovery and followed by the same text as the original message when a problem has been resolved.

By default, entries are sorted by timestamp, which the most recent entries listed first. You can sort the entries by severity, source, or timestamp by clicking on the appropriate column heading. In addition, you can filter entries based on severity, source, or date.

For more information about advanced management module event log messages, see the *Advanced Management Module Messages Guide*.

Viewing the event log

To view the event log:

- From the advanced management module Web interface, click **Monitors > Event log**.

For more information about the advanced management module Web interface, see the *Advanced Management Module User's Guide*.

- From the advanced management module command-line interface, enter the `displaylog` command.

For more information about the advanced management module command-line interface, see the *Advanced Management Module Command-Line Interface Reference Guide*.

Working with the event log

When attempting to resolve problems using the messages in the event log, review messages with earlier timestamps before taking action on more recent messages. For example, an error message about a failing component with a recent timestamp may be related to an error message about the prior failure of another component.

When a message identifies a problem with a specific device within the BladeCenter S system, check the LEDs on that device for additional troubleshooting information.

Watchdog timeout messages

Watchdog timeout messages are displayed in the advanced management module event log. They can occur any time a hardware or software problem causes a CPU on the blade server to become nonresponsive.

Each blade server has a service processor (called a Baseboard Management Controller or BMC) that operates independently of the CPUs on the blade server. It runs whenever the blade server is installed in the BladeCenter S system and connected to active power supplies; the blade server does not need to be powered on.

The service processor communicates with the advanced management module to provide vital product data (VPD) and health status about the blade server. In addition, the service processor is used to perform tasks such as powering on, powering off, and restarting the blade server when you remotely manage the blade server through the advanced management module.

The service processor uses timers, called watchdog timers, to measure blade server events:

- The BIOS or POST watchdog timer triggers a watchdog event if the blade server becomes nonresponsive during the POST process.
- The OS watchdog timer triggers a watchdog event if the blade server becomes nonresponsive during the starting of the operating system.

Note: The Automatic Server Restart (ASR) driver must be installed on the blade server. This driver communicates with the blade service processor and keeps the watchdog timer from counting down to 0 as long as the system processor is still running. To find this driver, complete the following steps:

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product Support**, click **BladeCenter**.
3. Under **Popular links**, select **Software and device drivers**.
4. Under BladeCenter device driver file matrices, select the appropriate blade server. The ASR driver is typically listed under Advanced Systems Management.

The OS watchdog timer may be enabled or disabled by default, depending to the type of blade server. You can enable it or disable it using the advanced settings of the BIOS configuration utility for the blade server.

I-error messages

I-error messages are displayed in the advanced management module event log. They occur any time the CPU on the blade server encounters a problem on the system. Typically, they are the result of a nonresponsive I/O device.

I-errors related to Intel-based blade servers

The root cause of most I-errors is normally one of the following:

- I/O device drivers
- Hard disk drive failure
- PCI device timeout
- Non-terminated SCSI bus
- Real CPU internal failure
- Power supply problems

The following example shows I-error messages:

```
E BLADE_01 03/10/04 14:13:02 (SN#ZJ1TS1234567) PFA Alert, see preceding error
    in system error log.
E BLADE_01 03/10/04 14:13:02 (SN#ZJ1TS1234567) 00151200 MCA: Unrecoverable Error
    Detected Proc=1
I BLADE_01 03/10/04 14:13:01 (SN#ZJ1TS1234567) 00151352 MachineCheck Data Status:
    A2000000 8C010400
```

I-errors related to AMD-based blade servers

I-errors result when the CPU encounters a machine check error that cannot be recovered. Most often, these errors are memory errors, but occasionally they can be related to the processor. When a machine check error occurs, you will need to restart the blade server.

Below is an example of a memory error on an AMD blade server reported in the advanced management module log:

```
I   BLADE_07 08/24/06, 17:40:53 (id14c2n07) Power unit power off event received
E   BLADE_07 08/24/06, 17:38:25 (id14c2n07) POSTBIOS: 289 DIMM D02 is Affected.
E   BLADE_07 08/24/06, 17:38:25 (id14c2n07) POSTBIOS: 289 DIMM D01 is Affected.
E   BLADE_07 08/24/06, 17:38:25 (id14c2n07) Memory disabled: DIMM number 2
E   BLADE_07 08/24/06, 17:38:25 (id14c2n07) Memory disabled: DIMM number 1
```

I2C errors

Error messages related to the BladeCenter S system hardware components and communications between the components (known as I2C errors) are displayed in the advanced management module event log.

The following example shows an I2C error message:

Failure reading I2C device. Check devices on bus 7.

Perform these actions to resolve I2C error messages:

1. Restart the advanced management module.
2. Wait two minutes to allow the advanced management module to reset the I2C bus. If an I2C bus error recovery message does not appear in the event log after two minutes, reseal the advanced management module.
3. Wait five minutes to allow the advanced management module to reset the I2C bus. If an I2C bus error recovery message does not appear in the event log after five minutes, contact IBM support.

Chapter 3. Troubleshooting

This chapter explains how to troubleshooting and resolve any problems that you may have with the BladeCenter S Types 7779 and 8886.

Updating firmware

Several components in the BladeCenter S chassis contain firmware that you can update.

You can determine the level of firmware currently installed for a device in the BladeCenter S chassis from the advanced management module Web Interface by clicking **Firmware VPD**.

The following BladeCenter S system components have firmware that can be updated:

- Advanced management module
- Blade servers
- I/O modules, including the SAS connectivity module and the SAS RAID controller module
- Disk storage modules

In addition, some of the optional hardware devices that you can order for the BladeCenter S system have device drivers that you must install.

For example, Ethernet controllers are integrated on each blade server system board. The Ethernet controllers provide 1000-Mbps full-duplex capability only, which enables simultaneous transmission and reception of data to the external ports on the Ethernet switches. You do not have to set any jumpers or configure the controller for the blade server operating system. However, you must install a device driver in the blade server to enable the blade server operating system to address the Ethernet controller.

See the documentation that comes with your hardware options for information about installing any required device drivers.

To obtain the latest firmware and device drivers, complete the following steps:

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product Support**, click **BladeCenter**.
3. Under **Popular links**, select **Software and device drivers**.
4. Select **BladeCenter S** to display the matrix of downloadable files.
5. Select the blade servers and other devices that are installed in the BladeCenter S chassis to download the firmware and device drivers.

Service bulletins

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system.

To find any service bulletins that are available for the BladeCenter S Types 7779 and 8886, go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020>. In the Search field, enter the following terms: 8886 and retain.

Isolating component failures

There are times when the only way to isolate the cause of a problem is to start removing components until the problem is resolved. Use this procedure to assist in isolating the root cause of a problem.

Problem

You are having problems with the BladeCenter S system, but you are unable to isolate the problem to a single component.

Note: Before you begin attempting to isolate problems to a specific component, you should first view the advanced management module and attempt to resolve any problems that are found.

To view the event log:

- From the advanced management module Web interface, click **Monitors > Event log**.

For more information about the advanced management module Web interface, see the *Advanced management module User's Guide*.

- From the advanced management module command-line interface, enter the `displaylog` command.

For more information about the advanced management module command-line interface, see the *Advanced management module Command-Line Interface Reference Guide*.

Investigation

Perform these steps to isolate problems to a specific component:

1. Power down and disengage all blade servers from the BladeCenter S chassis midplane. Open the release handles and the blade servers will slide out of the bay approximately one inch.
2. Make sure there is a working power supply in power module bay 1 and disengage power supplies 2, 3, and 4 (pull them out approximately one inch).
3. Disengage the following components from the midplane:
 - a. Open the release handles on all I/O modules.

Important: Disengaging an I/O module will disrupt communications with any external devices that are attached to that I/O module. Make sure that all external devices are powered down before disengaging an I/O module.

- b. Open the release handles on the disk storage modules.

Note: Make sure that all drive activity is stopped (the green LED on the hard disk drive is not blinking) before removing the disk storage module.

Note: If you disengage or remove all devices from the front of the BladeCenter S chassis (media tray, blade servers, and disk storage modules), the power modules will be disabled.

4. Verify that the ac and dc LEDs are lit for power module 1. If not, see “Troubleshooting power problems” on page 71.
5. Verify that the advanced management module is working. If not, see “Troubleshooting advanced management module problems” on page 40.
 - a. Log in to the advanced management module and check the System Status page for any problems.
 - b. Verify that the power supply is displayed in advanced management module Power Management page.
 - c. Check the event log for new error messages and resolve any errors that you find. You can ignore messages related to non-redundant modules because components have been removed from the BladeCenter S chassis.
6. Plug in power supply 2 and verify that the ac and dc LEDs are lit.
7. Log in to the advanced management module and verify that the power supply is displayed in the advanced management module Power Management page. If so, remove power supply 1.
8. If you still do not have a minimum configuration that works, contact IBM Support.
9. Bring up a blade server by reengaging the blade server and starting it. Choose a blade server that does not require the disk storage modules to boot.
 - a. Install a blade server in blade server bay 1. Power it up and use the local KVM connection to ensure that it completes POST and starts the operating system.
 - If you do not see any video display while the blade is starting, see “Troubleshooting monitor or video problems” on page 68
 - If the blade server fails with a POST error message or checkpoint code, see the documentation for that blade server.
 - If the blade server starts, but the keyboard or mouse does not work, try a different blade server.
 - If the keyboard or mouse only fails for one blade server, suspect that blade server.
 - If the keyboard or mouse fails for multiple blade servers, suspect the advanced management module. Verify the firmware level of the advanced management module and replace the advanced management module if necessary.
 - b. Start the blade server on-board diagnostics (press F2 during POST and run diagnostics). If any errors are returned, see “Troubleshooting blade server problems” on page 45.

Note: For more information about on-board diagnostics and troubleshooting a blade server, see the blade server troubleshooting procedures provided for that blade server.

10. Install the Ethernet switch module in I/O module bay 1 and connect it to the network. Check the advanced management module system status to ensure that it completes POST with no errors in the advanced management module System Status page or the event log.

11. You should now have a working BladeCenter S system that contains the advanced management module, one blade server, one I/O module, one power supply, the media tray, and the fan modules. Begin installing components back into the BladeCenter S chassis, one at a time, until you see the failure symptom again. Start with the power supplies, then the other I/O modules, and then the blade servers.
12. If the failure symptom returns after replacing a module or blade server, contact IBM Support for additional resolution procedures.

Troubleshooting symptoms by component

After isolating the problem to a specific component, use this information to resolve the problem based on the symptom.

For more information about advanced management module event log messages, see the *Advanced Management Module Messages Guide*.

Troubleshooting advanced management module problems

Use this information to resolve problems with the management module.

The advanced management module is the central point of management for the BladeCenter S system. If it is not present and functioning, you will not be able to perform normal management functions for the devices in the BladeCenter S system.

To determine the level of firmware currently installed for the advanced management module from the advanced management module Web Interface by clicking **Firmware VPD**.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: management module, 8886, and retain.

Can ping the advanced management module but cannot access it

If you cannot establish network connectivity to the advanced management module (through Telnet, SSH, or the Web browser), but you can ping the advanced management module, the problem is typically related to firmware or configuration.

Problem

You are unable to establish any login services to the advanced management module (through Telnet, SSH, or the Web browser), but you can ping it.

Investigation

Perform these steps to resolve the problem:

1. Ensure that a supported Web browser is being used.

The advanced management module supports the following Web browsers for remote (client) access:

- Microsoft Internet Explorer 5.5 or later (with latest Service Pack installed)
- Mozilla Firefox version 1.07 or later

The client Web browser that you use must be Java-enabled, must support JavaScript version 1.2 or later, and must have the Java Virtual Machine (JVM) Plug-in version 1.4.2_08 or later. The JVM Plug-in is available at <http://www.java.com/>.

2. Connect to the serial port on the advanced management module and attempt to log in. For more information about the serial port (including the pinout for the serial port), see “Advanced management module input and output connectors” on page 17.

3. If possible, verify whether the advanced management module is running the network servers on their default network ports. If you cannot log in at all, check with the administrator for the BladeCenter S system.

If you are connected through the serial port, use the ports command to ensure that all interfaces are enabled and the TCP ports are correct. For example,

```
ports -T system:mm[1]
```

For more information about using this command, see the *Management Module Command-Line Interface Reference Guide*.

4. Verify whether this client workstation can connect to other advanced management modules. If it cannot, the problem is most likely due to a firewall running on the client workstation or the network. Shutdown any firewalls on the client workstation and try again. If the client workstation still has problems connecting to multiple advanced management modules, consult the network administrator for the LAN.
5. Connect a laptop (that is known to be able to connect to other advanced management modules) to the advanced management module through the Ethernet port. Verify that the Ethernet link is up and that the laptop is configured so that it is on the same IP subnet as the advanced management module.
6. If you can ping the advanced management module, attempt to log in to the advanced management module Web interface using a supported Web browser. If you can, suspect a problem in the network. Contact the network administrator for assistance.
7. Reset the advanced management module to the default configuration, which will restore the default user ID and password:

Important: Resetting the advanced management module will shut down the external ports for all I/O modules, which will disrupt all network and fibre connectivity. After the advanced management module resets with the default configuration, it will attempt to obtain a DHCP address for two minutes before using the default IP address (192.168.70.125) and subnet mask (255.255.255.0). Remove the Ethernet cable from the advanced management module if you do not want it to attempt to obtain a DHCP address.

If you previously saved your configuration, you will be able to restore it after resolving the problem with the advanced management module. For more

information about restoring a previously saved configuration, see the *IBM BladeCenter Advanced Management Module User's Guide*.

- a. Insert a paper clip into the pin hole on the back of the advanced management module.
 - b. Push the paper clip in all the way and hold it for approximately 10 seconds. The advanced management module will reset and the fans will run at full speed, which is clearly audible.
 - c. Remove the paper clip from the pin hole.
8. If the problem persists, contact IBM support.

Cannot connect to the advanced management module

Use this procedure to troubleshoot the advanced management module if you cannot establish network connectivity to the module at all (through Telnet, SSH, ping, or the Web browser).

Problem

You are unable to establish any network connectivity to the advanced management module.

Investigation

Perform these steps to resolve the problem:

1. Connect a laptop (that can log in to other advanced management modules) to the advanced management module. Make sure that the IP configuration on the laptop puts it in the same subnet as the advanced management module and that the laptop is not running a local firewall.
2. Try to connect to the advanced management module:
 - If you can ping the advanced management module and connect to it using a Web browser and Telnet, the problem is either in the network or in the other workstation used to access the advanced management module.
 - If you can ping the advanced management module, but you cannot connect using a Web browser or Telnet, see “Can ping the advanced management module but cannot access it” on page 40.
 - Connect to the serial port on the advanced management module and attempt to access the advanced management module from the command-line interface. If you can log in:
 - a. Use the `ifconfig` command to check the network configuration of the advanced management module. For example,

```
ifconfig -T system:mm[1] -eth0
```
 - b. Use the `ports` command to ensure that all interfaces are enabled and the TCP ports are correct. For example,

```
ports -T system:mm[1]
```

For more information about using these commands, see the *Management Module Command-Line Interface Reference Guide*.
 - c. If you cannot access the advanced management module at all:
 - 1) Clear the Address Resolution Protocol (ARP) cache on the laptop. On Microsoft Windows, you can clear ARP cache with the command `arp -d`. See the documentation that comes with the operating system that you are using to determine how to clear the cache.
 - 2) Reseat the advanced management module:

- a) Remove the advanced management module from the BladeCenter S chassis. The fan modules will begin to run at full speed, which is clearly audible.
 - b) Install the advanced management module. The fans will return to their normal level (in speed and noise) after the advanced management module has completed its POST process.
 - c) Look at the LEDs for the advanced management module. If, after installing the advanced management module and connecting an Ethernet cable, the amber Error LED is lit, there is a fault in the advanced management module.
- 3) Reset the advanced management module to the default configuration, which will restore the default user ID and password:

Important: Resetting the advanced management module will shut down the external ports for all I/O modules, which will disrupt all network and fibre connectivity. After the advanced management module resets with the default configuration, it will attempt to obtain a DHCP address for two minutes before using the default IP address (192.168.70.125) and subnet mask (255.255.255.0). Remove the Ethernet cable from the advanced management module if you do not want it to attempt to obtain a DHCP address.

If you previously saved your configuration, you will be able to restore it after resolving the problem with the advanced management module. For more information about restoring a previously saved configuration, see the *IBM BladeCenter Advanced Management Module User's Guide*.

- a) Insert a paper clip into the pin hole on the back of the advanced management module.
 - b) Push the paper clip in all the way and hold it for approximately 10 seconds. The advanced management module will reset and the fans will run at full speed, which is clearly audible.
 - c) Remove the paper clip from the pin hole.
- 4) Contact IBM support for assistance.

Cannot log in to the advanced management module

If you can establish network connectivity to the advanced management module, but you cannot log in (user ID or password not valid), the problem may be due to an incorrect ID or password, or it may be related to too many unsuccessful attempts.

Problem

When you attempt to log in to the advanced management module, you receive errors related to the user ID or password not being valid.

Investigation

Perform these steps to resolve the problem:

1. Verify that you are using a valid user ID and password. The user ID and password are case-sensitive.
2. Wait a few minutes before attempting to log in again. Five unsuccessful login attempts results in the advanced management module locking out the user ID. The default wait time is two minutes, but it might have been changed during the management module user profile configuration.
3. Attempt to log in through both the Web and the Telnet interfaces. If you cannot log in, reset the advanced management module to the default configuration, which will restore the default user ID and password:

Important: Resetting the advanced management module will shut down the external ports for all I/O modules, which will disrupt all network and fibre connectivity. After the advanced management module resets with the default configuration, it will attempt to obtain a DHCP address for two minutes before using the default IP address (192.168.70.125) and subnet mask (255.255.255.0). Remove the Ethernet cable from the advanced management module if you do not want it to attempt to obtain a DHCP address.

If you previously saved your configuration, you will be able to restore it after resolving the problem with the advanced management module. For more information about restoring a previously saved configuration, see the *IBM BladeCenter Advanced Management Module User's Guide*.

- a. Insert a paper clip into the pin hole on the back of the advanced management module.
- b. Push the paper clip in all the way and hold it for approximately 10 seconds. The advanced management module will reset and the fans will run at full speed, which is clearly audible.
- c. Remove the paper clip from the pin hole.
4. Connect a laptop to the management module. Set the IP address on the laptop to the IP address 192.68.70.100 and subnet mask 255.255.255.0 so that it does not conflict with any default IP address in the BladeCenter S system.
5. Attempt to log in using the default user ID and password. The default user ID is USERID and the default password is PASSWORD (with a zero in place of the letter O).
6. Contact IBM support.

Advanced management module is displaying BIST errors

When the management module powers on, it performs a built-in self test (BIST). Any errors that result from BIST are displayed in the advanced management module.

To access BIST errors from the advanced management module Web interface, click the status icon for the advanced management module on the System Status page to display the Management Module Status page. Then, click **MM Built-in Self Test (BIST) Results**.

Perform these steps if you receive BIST errors:

1. Restart the advanced management module. From the advanced management module Web interface, click **Restart MM** under the MM Control tasks.
2. Reseat the advanced management module.
3. Update the firmware for the advanced management module.
4. Replace the advanced management module.

Troubleshooting blade server problems

Use this information to resolve problems with a blade server.

Note:

You can find the documentation for blade servers in the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the blade server documentation from this site, click **Systems hardware > BladeCenter information > Blade servers**.

To determine which blade servers are compatible with the BladeCenter S chassis, see the IBM ServerProven Web site at <http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html>.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: 8886, retain, and blade. In addition, see the product information for the specific blade server for more troubleshooting information.

In addition:

- If the blade servers cannot see the hard disk drives in the disk storage module, see “Hard disk drives not available to blade servers” on page 78.
- If the blade servers cannot communicate through ports on a copper pass-thru module (CPM), see “Blade server cannot communicate through CPM ports” on page 61.
- If one or more blade servers is not able to access or communicate with the media tray, see “Troubleshooting media tray problems” on page 65.

Blade server cannot communicate with external network

If a blade server cannot communicate with the external network, there may be an I/O connectivity problem.

Problem

A blade server starts but cannot communicate with the external network.

Investigation

Perform these steps to resolve the problem.

1. Log in to the advanced management module and verify that external ports are enabled for the I/O module. From I/O Module tasks, click **Configuration**, choose the I/O module and click **Admin/Power/Restart**.
2. If the problem persists, see “Troubleshooting I/O module problems” on page 59.

Blade server will not power on

If a blade server will not power on, the problem may be caused by the blade itself, power supplies, or by configuration settings within the advanced management module.

Problem

You attempted to power on a blade server using the power-on button on the blade server, but it will not power on.

Investigation

Perform these steps to resolve the problem:

1. Look at the LEDs on the front of the blade.
 - If no LEDs are lit, see “No LEDs appear” on page 51.
 - If the fault or information light is lit, suspect a system power configuration problem.
 - If the power LED flashes rapidly for more than two minutes, this is an indication that the service processor (BMC) on this blade server is not communicating with the advanced management module. When the blade server begins to communicate with the advanced management module, the power LED blinking will slow. See “Power LED continually flashes rapidly” on page 52.
2. Attempt to power on the blade from the advanced management module:
 - a. From the Blade Tasks, click **Power/Restart** and verify that local power control has not been disabled.
 - b. From the Blade Tasks, click **Remote Control** to start a remote session to the blade server.
 - c. Switch to the remote session to verify that the blade server is starting up.
 - d. If the blade starts and is functional, but there are no lights on the front bezel, there is a hardware failure in the bezel. Order the proper bezel assembly for the blade server.
3. Verify that there is sufficient power availability configured to power on the blade server.

Click **Power Management** and then click **Power Domain** to find the domain policy in place for the BladeCenter S system. You can configure one of the following policies:

- **AC power source redundancy**

With this policy, the total allowable power draw is limited to the capacity of two power modules. If you use dual ac power sources, one ac power source can fail without affecting the operation of the blade servers. However, some blade servers may not be able to power on if doing so will exceed the power policy limit.

The policy is intended for use when you have four power modules installed and two separate 220-volt AC power sources.

- **AC power source redundancy with blade throttling allowed**

This policy is similar to AC power source redundancy. With this policy, the total allowable power draw is limited to the capacity of two power modules. If you use dual ac power sources, one ac power source can fail without affecting the operation of the blade servers.

If power module redundancy is lost, processors on blade servers that are capable of throttling will throttle to reduce the power consumed to less than or equal to the total power. *Throttling* refers to achieving lower power consumption for a blade by temporarily reducing the CPU throughput. The advanced management module utilizes power management technologies built into certain processors to throttle the blades.

Note: Not all blade servers are capable of throttling.

The policy is intended for use when you have four power modules installed and two separate 220-volt AC power sources.

- **Power module redundancy**

With this policy, the total allowable power draw is limited to one less than the number of power modules when more than one power module is present. One power module can fail without affecting blade server operation. Blade servers will power on only if they can operate without throttling if there is a power module failure. The number of blade servers allowed to power on is determined by the power available from one less than the total number of power modules. If a single power module fails, all the blade servers that are powered on will continue to operate at normal performance levels. If two or more power modules fail, the BladeCenter S chassis could power off.

This policy is intended when you have two to four power modules installed and a single 110-volt or 220-volt AC power source. Each power module is on its own dedicated circuit.

- **Power module redundancy with blade throttling allowed**

With this policy, the total allowable power draw is limited to one less than the number of power modules when more than one power module is present. One power module can fail without affecting blade server operation, but multiple power module failures can cause the chassis to power off.

This policy allows you to draw more total power from the chassis. However, in case of a power module failure, the advanced management module might have to throttle down some blade servers to keep the chassis operational. Blade servers will be allowed to power on as long as the power consumed is less than or equal to the total power under this policy. If a single power module fails, processors on blade servers that are capable of throttling, will throttle in order to reduce the power consumed to less than or equal to the

rated capacity of the power module. Blade servers will power up in a throttled state in some configurations. Upon restoration of power redundancy, the blade processors will return to their normal performance levels.

This policy is intended when you have two to four power modules installed and a single 110-volt or 220-volt AC power source. Each power module is on its own dedicated circuit.

- **Non-redundant**

Blade servers will be allowed to power on as long as the power consumed is less than or equal to the total power of all installed power modules.

Processors return to their normal power states when power redundancy is restored.

Note: There may be certain configurations that might result in loss of power in the domain.

4. Verify that the blade server is supported in the BladeCenter S chassis.
5. Contact IBM support.

I-error messages displayed for an Intel-based blade server

I-error messages are displayed in the advanced management module event log. Use this procedure to resolve problems that cause I-error messages.

Problem

The advanced management module event log displays I-error messages for one of the Intel-based blade servers.

Investigation

Perform these steps to resolve the problem:

1. For the I-error message, look at the third hexadecimal character from the right. In the following example, the third hexadecimal character is a 4:

```
I BLADE_01 03/10/04 14:13:01 (SN#ZJ1TS1234567) 00151352 MachineCheck
Data Status: A2000000 8C010400
```
2. If the third hexadecimal character from the right is 1, 2, 3, 8, 9, a, or b, replace the CPU on the blade server.
3. If the third hexadecimal character from the right is 4, 5, 6, 7, c, d, e, or f, the problem is with the communication between the CPU and an I/O device (the I/O data stream has stalled).
 - a. View the operating system logs and search for hard disk drive errors. If the timestamps for the hard disk drive errors in the system log correspond to the timestamp for the I-error in the event log, the problem may be with the hard disk drive.
 - b. Update all firmware for the blade server. This includes the Ethernet, Ethernet expansion cards, Fibre Channel expansion cards as well as the BIOS and service processor (BMC).
 - c. Reseat all expansion cards and the storage expansion unit (if installed) on the blade server. See the blade server documentation for information on reseating blade server components.

Note: Make sure that you shut down the blade server operating system before you attempt to reseat the blade server

- d. If the blade server storage expansion unit is not installed, verify that the blade storage expansion (BSE) terminator is installed. The BSE terminator ships with the blade server.
- e. Start the blade server on-board diagnostics (press F2 during POST and run diagnostics). For more information about running diagnostics, refer to the documentation that was provided with the blade server.
- f. Determine what is being stressed when the failure occurs. If the failure only seems to occur when performing I/O over one of the expansion cards, replace the expansion card.
- g. Contact IBM support.

I-error messages displayed for an AMD-based blade server

I-error messages are displayed in the advanced management module event log. Use this procedure to resolve problems that cause I-error messages with Opteron-based blade servers.

Problem

The advanced management module event log displays I-error messages for one of the Opteron-based blade servers.

Investigation

Perform these steps to resolve the problem:

1. For the I-error message, look at the message text:
E BLADE_07 08/24/06, 17:38:25 (id14c2n07) Memory disabled: DIMM number 2
E BLADE_07 08/24/06, 17:38:25 (id14c2n07) Memory disabled: DIMM number 1
2. Check to see if any of the Light Path diagnostic LEDs on the blade server are lit. See “Module LEDs” on page 31.
3. If the problem is associated with the memory DIMMs, the failing memory banks on the blade server are disabled. If either of the LEDs for the blade server memory DIMMs are lit:
 - a. Replace both memory DIMMs.
 - b. Press F1 while restarting the blade server to bring up the POST BIOS CMOS settings.
 - c. Re-enable the disabled memory bank.

Kernel mode displayed for blade server

The advanced management module Web interface will display kernel mode on the vital product data (VPD) panel for a blade server when the advanced management module is able to communicate with the service processor on the blade server, but the blade server firmware has a problem. This error will typically occur after updating the firmware for a blade server. In addition to the kernel mode error, the event log will typically display service processor communication errors for multiple blade servers in the BladeCenter S chassis.

Problem

The advanced management module Web interface displays kernel mode on the VPD panel for a blade server. The event log may also display service processor communication errors for other blade servers in the chassis.

Important: Do not attempt to update the firmware for a blade server that has kernel mode errors until instructed to do so.

Investigation

Perform these steps to resolve the problem:

1. Examine the advanced management module event log and verify how many blades are reporting service processor communication or kernel mode errors.
 - a. Remove all blade servers reporting either error.
 - b. Verify that no errors exist on other blade servers or I/O modules. If other errors exist, resolve them before proceeding.
2. Install one blade server into the chassis and update the service processor firmware to the version desired using the Web browser of the advanced management module.

Note: You cannot use a boot diskette when the blade is in this state. Also, do not use any scripts or other tools to update the service processor firmware because they might have caused the problem.

Another option is to consider updating the version of service processor firmware because service processor communication errors are sometimes resolved in updated service processor firmware.

To update the service processor firmware from the advanced management module:

- a. Go to the Web site <http://www.ibm.com/support/>.
 - 1) In the choose support type field, select **BladeCenter** and click **Go**.
 - 2) Under Popular links, select **Software and Device Drivers**.
 - 3) Under BladeCenter device driver file matrices, select the appropriate blade server.
- b. Download the file for the blade server.

Note: Consider downloading the README file as well. The README contains additional installation instructions.

- c. Extract the image to diskette (puts the *.pkt files on the diskette). The packet file is on the second DOS diskette.
- d. Log in to the advanced management module Web interface and click **Blade Tasks > Firmware Update**.
- e. Click **Browse** and select the *.pkt file from the diskette.
- f. Click **Update** and follow the prompts to complete the update process.

Important: Do not attempt to switch the control of the media tray to another blade server during this process.

3. If the blade server works after the firmware update, repeat the same process for all the blade servers having service processor communications or kernel mode errors. Remember to insert only one blade server at a time.
4. If the problem persists, contact IBM support.

No LEDs appear

If LEDs are not lit for a blade server, the problem could be in the power supplies, the device itself, or the bay where the device is installed.

Problem

The LEDs for one of the blade servers are not lit, but LEDs for other blade servers are lit.

Investigation

Perform these steps to resolve the problem:

1. Verify that the ac and dc LEDs are lit for all power supplies.
 - If the dc LED is not lit on one or more power supplies, see “The dc LED is not lit but ac LED is lit” on page 72.
 - If neither the ac LED or the dc LED is lit for a power supply, see “The ac and dc LEDs are not lit for multiple power supplies” on page 72.
2. From the advanced management module Web interface, attempt to power on the blade server by clicking **Power/Restart** from the Blade Tasks:
 - a. From the Blade Tasks, click **Remote Control** to start a remote session to the blade server.
 - b. Switch to the remote session to verify that the blade server is starting up.
 - c. If the blade server powers on and is functional, but there are no lights on the front bezel, there is a hardware failure in the bezel. Order the proper bezel assembly for the blade server.
3. Swap the blade server with a working blade server of the same type. If the problem persists with the blade server in the new location, contact IBM support for possible replacement.
4. If the LEDs on the replacement blade server are not lit, the problem may be in the blade server bay. See “Isolating component failures” on page 38.

No VPD available from advanced management module

Vital Product Data (VPD) for each blade server in the BladeCenter S chassis is available from the advanced management module interface. Use this procedure to troubleshooting the situation where VPD does not appear.

Problem

You have accessed the Hardware VPD panel from the advanced management module Web interface and no VPD data is displayed for one or more blade servers.

Investigation

Perform these steps to resolve the problem:

1. Verify that the advanced management module has discovered all blade servers. From the advanced management module Web interface, view the System Status page and verify that there is a solid green circle next to the blade server.
2. From the advanced management module Web interface, select **Monitors > Firmware VPD** to display the firmware VPD for all blade servers in the BladeCenter S chassis and ensure that the firmware VPD is properly displayed.

3. If the firmware VPD is not displayed, check the event log for any communications errors. If errors are found, see “Service processor communication (SP COMM) errors displayed for a blade server.” If no errors are found, call IBM support.
4. If the hardware VPD is still not displayed, click **Reload VPD**. The advanced management module will attempt to read the firmware VPD for the blade server.

Power LED continually flashes rapidly

A power LED that continually flashes rapidly for more than two minutes is an indication that the firmware in the advanced management module does not support this blade server or that there is a communications problem between the advanced management module and the blade server.

Problem

You attempted to power on a blade server but instead of powering on, the power LED flashes rapidly for more than two minutes.

Investigation

Perform these steps to resolve the problem:

1. Log in to the advanced management module and view the event log for errors associated with this blade server.

Note: If there are service processor communication error messages or kernel mode error messages, see “Service processor communication (SP COMM) errors displayed for a blade server” and “Kernel mode displayed for blade server” on page 49.

2. If no errors are present, verify that the installed version of the advanced management module firmware supports the blade server.

See the BladeCenter software and devices drivers Web site at <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-63017&brandind=5000020> for more information about firmware.

3. Contact IBM support.

Service processor communication (SP COMM) errors displayed for a blade server

When a blade server is installed in the BladeCenter S chassis, the advanced management module initiates communication with the service processor on the blade server. Disruptions in this communications results in service processor communication errors being logged in the advanced management module event log. These errors are typically caused by problems in firmware or configuration (either on the advanced management module or on the blade server).

Problem

You installed a new blade server in the BladeCenter S chassis, and the advanced management module log is displaying service processor communication errors.

Investigation

Perform these steps to resolve the problem:

1. Verify that the blade server machine type and service processor (or BMC) firmware level is supported by the BladeCenter S chassis.
 - a. Check to see if there are any other working blade servers that are the same machine type and firmware level.
 - b. Go to the IBM support Web site and verify that the advanced management module firmware and the blade server service processor (BMC) firmware supports the blade server. If not, update the advanced management module and blade server firmware.
 - 1) Go to <http://www.ibm.com/support/>.
 - 2) In the choose support type field, select **BladeCenter** and click **Go**.
 - 3) Under Popular links, select **Software and Device Drivers**.
 - 4) Under BladeCenter device driver file matrices, select the appropriate blade server.
2. Log in to the advanced management module Web interface and view the event log to determine how many blade servers are having service processor communications errors. If multiple blade servers have having service processor communications errors, restart the advanced management module. If that resolves the error, continue monitoring the advanced management module for these errors.
3. Install the blade server into a blade server bay that is known to be working in another BladeCenter S chassis that has a working blade server of the same machine type. If the blade server works, the problem might be the blade server bay on the BladeCenter S chassis. Contact IBM support.
4. Check the IBM Support Web site to see if advanced management module firmware updates or blade server service processor firmware updates address the error. If not, contact IBM support.
5. Update the service processor firmware on the blade server. If the failure occurs during the update process or the problem persists after updating the firmware, replace the planar on the blade server.

Service processor communication error displayed for multiple blade servers

When attempting to resolve service processor communication errors on multiple blade servers in a BladeCenter S chassis that has been functioning normally, you need to ensure that you have physical access to the BladeCenter S chassis.

Problem

The advanced management module event log displays service processor communication errors for multiple blade servers in a BladeCenter S chassis that has been functioning normally.

Investigation

Perform these steps to resolve the problem:

1. Restart the advanced management module. If that resolves the error, continue monitoring the advanced management module for these errors.
2. See “Service processor communication (SP COMM) errors displayed for a blade server” on page 52 to isolate the problem blade servers and update the service processor (BMC) firmware.

Watchdog timeout messages displayed for a blade server

Watchdog timeout messages are displayed in the advanced management module event log. Use this procedure if there are multiple blade servers in a BladeCenter S chassis and you are seeing these messages for only one of the blade servers.

Problem

The advanced management module event log displays watchdog timeout messages for only one of the blade servers in a BladeCenter S chassis.

Investigation

Perform these steps to resolve the problem:

1. Find firmware updates for the blade server and service processor. Look in the firmware change history for information related to watchdog timeout errors and update the firmware if necessary.
 - a. Go to <http://www.ibm.com/support/>.
 - b. In the choose support type field, select **BladeCenter** and click **Go**.
 - c. Under Popular links, select **Software and Device Drivers**.
 - d. Under BladeCenter device driver file matrices, select the appropriate blade server.
2. Find firmware updates for the advanced management module. Look in the firmware change history for information related to watchdog timeout errors and update the firmware if necessary.
3. Verify the operation of the blade server. If it is responsive, the problem may be a false error condition.
 - a. Verify that the IBM Automatic Server Restart (ASR) driver is installed on the blade server.
 - b. Update the firmware for the service processor on the blade server
4. If the blade server is nonresponsive, determine the cause of the problem:
 - If there are POST watchdog timeout messages for this blade server in the event log, the BIOS flash image on the blade server may be corrupt.

- a. If an I/O expansion card is installed in the blade server, remove it and reboot the blade server.
 - If the blade server boots properly, replace the I/O expansion card.
 - If the blade server is still nonresponsive, force the blade server to boot from the backup flash image. You will need to remove the blade server from the BladeCenter S chassis, open the cover, and move one of the jumpers. See the documentation that came with the blade server for information about this procedure.
 - If the blade server boots from the backup flash image, update the firmware for the blade server.
 - If the blade server continues to be nonresponsive, replace the blade server.
 - If there are OS watchdog timeout messages for this blade server in the event log, access the operating system logs to determine why the blade server is nonresponsive.
 - Determine if the nonresponsiveness is due to a software driver or module problem.
 - Look for machine checks or memory errors in the event log.
 - Verify that the disk and communications drivers are up to date.
5. Check the event log for other hardware related errors such as CPU or DIMM errors. If you see hardware faults occurring before the watchdog timeout occurs, the problem may be in one of the blade server hardware components. Follow normal debug procedures to isolate the faulty hardware component and replace it.

Note: Hard disk drives, I/O cards, and I/O expansion modules can cause CPU faults because of bus errors.

Watchdog timeout messages displayed for multiple blade servers

Watchdog timeout messages are displayed in the advanced management module event log. Use this procedure if you are seeing these messages for multiple blade servers in a BladeCenter S chassis.

Problem

The advanced management module event log displays watchdog timeout messages for multiple blade servers in a BladeCenter S chassis.

Investigation

Perform these steps to resolve the problem:

1. Find firmware updates for the blade server and service processor. Look in the firmware change history for information related to watchdog timeout errors and update the firmware if necessary.
 - a. Go to <http://www.ibm.com/systems/support/>.
 - b. Under **Product Support**, click **BladeCenter**.
 - c. Under **Popular links**, select **Software and device drivers**.
 - d. Under BladeCenter device driver file matrices, select the appropriate blade server.

2. Search the IBM support page to find firmware updates for the advanced management module. Look in the firmware change history for information related to watchdog timeout errors and update the firmware if necessary.
3. Verify that the service processor (Integrated Systems Management Processor and Baseboard Management Controller) code levels are up to date or are at least not missing a critical fix.
4. Verify the operation of the blade servers. If they are responsive, the problem may be a false error condition.
 - a. Verify that the IBM Automatic Server Restart (ASR) driver is installed on the blade server.
 - b. Update the firmware for the service processor on the blade server.
 - c. Update the firmware for the advanced management module.
 - d. Replace the advanced management module.
5. If all the blade servers are nonresponsive and are running the same level of operating system as well as similar applications, start several of the blades again and access the operating system logs for each blade server.
 - Determine if the blades are nonresponsive because of a common software driver or module problem.
 - Verify that the disk and communications drivers are up to date.
6. Although rare, it is possible that there is enough noise on the RS-485 communication channel to the blade servers to tie up the service processors. Check the event log to see if there are many service processor communication errors occurring for all of the blade servers. If so, then see "Service processor communication (SP COMM) errors displayed for a blade server" on page 52 for additional troubleshooting procedures.

Troubleshooting fan module problems

Use this information to resolve problems with a fan module.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: fan, 8886, and retain.

Fan module running at full speed

If a fan module is running at full speed, check to see if the fault LED is lit on any of the fan modules.

Problem

One of the fan modules in the BladeCenter S chassis is running at full speed.

Investigation

Perform these steps to resolve the problem:

1. Make sure that the advanced management module is installed and working. If a fan module loses communication with the advanced management module, it will run at full speed.
2. Make sure the media tray is installed and working.
3. Check the fan module to see if the fault LED is lit. If the fault LED is lit, replace the fan module.
4. Reseat the fan module.
5. From the advanced management module Web interface, go to the System Status page and check the fan module speed.
6. Swap the fan module with another working fan module.
 - a. If the problem fan module does not work, but the other fan module does work, replace the fan module.
 - b. If the problem fan module now works, but the other fan module no longer works, call IBM support.
7. Replace the fan module.

Fan module is stopped

If a fan module is stopped, check to see if the fault LED is lit on any of the fan modules.

Problem

One of the fan modules in the BladeCenter S chassis is stopped.

Investigation

Perform these steps to resolve the problem:

1. Check the fan modules to see if the fault LED is lit. If the fault LED is lit, replace the fan module.
2. From the advanced management module Web interface, go to the System Status page and check the status of the fan module. If the System Status page shows that the fan module has failed, replace the fan module.
3. Reseat the fan module.
4. Swap the fan module with another working fan module.
 - a. If the problem fan module does not work, but the other fan module does work, replace the fan module.
 - b. If the problem fan module now works, but the other fan module no longer works, call IBM support.

Fan modules continually cycle to full speed

If fan modules continually cycle between normal speed and full speed, disconnect all power from the BladeCenter S chassis, wait a few minutes, and reconnect the power modules.

Problem

When you remove a device such as the media tray or a power module from the BladeCenter S chassis, the fan modules will run at full speed. When you replace the device, the fan modules will return to normal speed.

After replacing a device, the fan modules continually cycle between normal speed and full speed for an extended period of time.

Investigation

Perform these steps to resolve the problem:

1. Disconnect power from all power modules in the BladeCenter S chassis.

Important: Before disconnecting power, make sure that you shut down each blade server. See the documentation that comes with your blade server for information about shutting down the operating system on the blade server.

2. Wait approximately three to five minutes, and connect power to all power modules.
3. If the problem persists, call IBM support.

Troubleshooting I/O module problems

Use this information to resolve problems with an I/O module.

If the I/O module has been functional in the BladeCenter S chassis, the first step is to determine if anything has changed. For example, verify that the configuration has not been updated or new components added to the BladeCenter S chassis.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: I/O module, 8886, and retain.

Note:

You can find the documentation for I/O modules at the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the I/O module documentation from this site, click **Systems hardware > BladeCenter information > I/O modules**.

To determine which I/O modules are compatible with the BladeCenter S chassis, see the IBM ServerProven Web site at <http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html>.

If you are having problems related to a SAS RAID controller module, refer to the *IBM BladeCenter S SAS RAID Controller Module Installation and User's Guide* for additional troubleshooting information.

I/O module will not power on

If an I/O module will not power on, the problem may be caused by the blade itself, power supplies, or by configuration settings within the advanced management module.

Problem

You attempted to power on an I/O module, but it will not power on. All other components in the BladeCenter S chassis appear to be functioning normally.

Investigation

Perform these steps to resolve the problem:

1. Verify that all power supplies are operating normally and that the wattage requirements for this configuration meet the overall wattage guidelines for this BladeCenter S chassis.

To view power consumption from the advanced management module Web interface, click **Monitors > Power Management**.

2. Check all LEDs.
 - a. Check the LEDs on the I/O module to ensure that the OK LED is lit and that the Error LED is not lit.
 - 1) If the OK LED is not lit, reseal the module and wait 60 seconds for the OK LED to light.
 - 2) Check the advanced management module event log for I/O module power errors.

- b. Check all LEDs for the BladeCenter S chassis. Verify that the power LED is lit and that the over-temperature, information, and system-error LEDs are not lit.
 - c. Check the LEDs on the advanced management module to ensure there are no error conditions.
 3. Log in to the advanced management module and check any problems.
 - a. Check the System Status page for any messages.
 - b. Check the advanced management module hardware Vital Product Data (VPD) to validate the VPD for the I/O module. If the I/O module is a switch module and it is located in bay 3 or 4, the type of expansion card option installed on the blade server must match the I/O module type. For example, if the I/O module is an SAS connectivity module, a SAS expansion card option in each blade server that will access the integrated shared storage.
 - c. Check the advanced management module firmware VPD to ensure that it is compatible with the I/O module firmware. Update the firmware if needed.
 - d. Check the advanced management module event log to determine whether there are power recovery event or service processor communications errors. If there are errors for multiple BladeCenter S chassis components, the problem may be related to the chassis. See “Isolating component failures” on page 38.
 4. Use the advanced management module to restart the I/O module.
 5. Verify that the module bay is functioning
 - a. If you have another functioning I/O module, replace the I/O module that will not power on with the functioning I/O module. If the replacement module works in the bay, the original I/O module needs to be replaced.

Note: The module that you use as a replacement must be the same type of I/O module as the original. For example, you can only replace an Ethernet switch module with another Ethernet switch module.
 - b. If you do not have another functioning I/O module, move the I/O module to another I/O bay in a different chassis (in the same bay).
 - 1) If the I/O module powers up, the problem may be related to the chassis. See “Isolating component failures” on page 38.
 - 2) If the I/O module does not power up, replace it.
 - c. If you have neither a functioning I/O module nor another chassis:
 - 1) See “Isolating component failures” on page 38. Keep in mind that this will require bringing down all components in the chassis.
 - 2) Replace the I/O module. However, if the problem is related to the chassis, it will persist even if you replace the I/O module.
 6. Check the I/O module settings. In most cases, unless you are very familiar with the setup of your company's internal server network, you will want to set up the I/O module so that it is managed on the advanced management module management network with the setting External Management over all ports disabled.

LEDs are not lit for an I/O module

If LEDs are not lit for an I/O module, the problem could be in the power supplies, the device itself, or the bay where the device is installed.

Problem

The LEDs for one of the I/O modules are not lit, but LEDs for other I/O modules are lit.

Investigation

Perform these steps to resolve the problem:

1. Verify that the ac and dc LEDs are lit for all power supplies.
 - If the dc LED is not lit on one or more power supplies, see “The dc LED is not lit but ac LED is lit” on page 72.
 - If neither the ac LED nor the dc LED is lit for a power supply, see “The ac and dc LEDs are not lit for multiple power supplies” on page 72.
2. Swap the I/O module with a working I/O module of the same type. If the problem persists with the device in the new location, contact IBM support for possible replacement.
3. If the LEDs on the replacement I/O module are not lit, the problem may be in the device bay. See “Isolating component failures” on page 38.

Cannot communicate with external ports on I/O module

If a blade server cannot communicate with the external ports on an I/O module, verify through the advanced management module that the ports are enabled.

Problem

One or more blade servers cannot communicate with the external ports on an I/O module.

Investigation

Perform these steps to resolve the problem:

1. Log in to the advanced management module Web interface.
2. Make sure the external ports option is enabled in the management module Web interface. Select **I/O Module Tasks** → **Admin/Power/Restart** to determine whether the external ports are enabled or not.
3. Reseat the I/O module.
4. Replace the I/O module.

Blade server cannot communicate through CPM ports

If a blade server cannot communicate to the network through a copper pass-thru module (CPM), verify that the pass-thru module is functioning, that the expansion cards in the blade server are compatible, and that the network switch setting match the settings on the copper pass-thru module.

Problem

A blade server is unable to communicate through a CPM.

Investigation

The Copper Pass-thru module (CPM) is a gigabit-only device; connections to 10/100 switches will not work. All blade server-to-blade server connectivity requires the CPM to be connected to a properly configured external switch. The external switch ports must be copper gigabit ports configured for autonegotiation. All other configurations are unsupported and can result in errors that make it appear that the CPM is not functioning correctly.

The CPM does not have switch functionality, which requires that you be able to see the configuration of the external switch when troubleshooting CPM connectivity problems. In addition, Serial over LAN (SoL) will not work if there is a CPM in I/O-bay 1.

The following link indications are available for isolating a connection problem:

- The external (upstream) switch likely provides a link indication. It indicates a link in the conventional networking sense of layer 1 link being up between the CPM and the upstream switch. Even with all blade servers removed from the BladeCenter S chassis, the upstream (external) switch link light will be on if the external cables are properly connected.
- The advanced management module provides internal and external link status (from the CPM perspective). If the external link indicates up, it means that both sides of the connection (external switch to CPM and CPM to blade server) have successfully negotiated the speed and duplex mode and that carrier is detected from the blade for that connection. If no internal signal is detected, the external indication will not provide an indication (it will not indicate a connection whether one exists or not).

The internal link indication does not indicate a successful negotiation of speed and duplex. It only tells you that a blade server is in the slot, and some electrical current has been detected. For example, if you boot a blade server into BIOS and disable the NIC, the link still shows up, even though speed and duplex have obviously not been successfully negotiated. (The one exception to this is that if the system is booting Linux, and the NIC driver module is removed, the link will show down after about 15 minutes).

Unlike the advanced management module external link status, the internal link status, as seen from the advanced management module Web interface, is independent of the external link and is accurate with and without an external connection. Link up indicates that the Ethernet port, Ethernet driver, cable, and upstream port and blades are configured correctly for layer 1 of the OSI model.

- The operating system on the blade server provides link indication from the Ethernet port.
- The LEDs on the CPM are equivalent to the advanced management module viewable external link status. Only one physical CPM LED is associated with each blade connection. When that CPM link LED lights, both the internal (CPM to blade) and external (CPM to switch) connections recognize electrical signals are connected.

No connectivity on any ports

If none of the blade servers in the BladeCenter S chassis can communicate through the CPM:

1. Check POST codes for the CPM. Resolve any POST errors that are found.
2. Make sure that external ports are enabled for the CPM through the advanced management module Web interface.
3. If there is another Ethernet module that is working, swap this CPM with the other Ethernet module to verify whether the problem follows the module or stays with the I/O module bay. If it stays with the I/O module bay, see the Ethernet troubleshooting document.

Connectivity on some ports but not others

In the BladeCenter S chassis, all blade server Ethernet ports are connected to I/O module bay 1. The mapping of blade server ports to the CPM ports are as follows:

- Switch Port 1 - Cable 1A - blade server ethernet port 1A
- Switch Port 2 - Cable 1B - blade server ethernet port 2A
- Switch Port 3 - Cable 1C - blade server ethernet port 3A
- Switch Port 4 - Cable 1D - blade server ethernet port 4A
- Switch Port 5 - Cable 1E - blade server ethernet port 5A
- Switch Port 6 - Cable 2A - blade server ethernet port 6A
- Switch Port 7 - Cable 2B - reserved
- Switch Port 8 - Cable 2C - blade server ethernet port 1B
- Switch Port 9 - Cable 2D - blade server ethernet port 6B
- Switch Port 10 - Cable 2E - reserved
- Switch Port 11 - Cable 3A - blade server ethernet port 4B
- Switch Port 12 - Cable 3B - blade server ethernet port 5B
- Switch Port 13 - Cable 3C - blade server ethernet port 2B
- Switch Port 14 - Cable 3D - blade server ethernet port 3B
- Switch Port 15 - Cable 3E - reserved

If some ports on the CPM work but others do not:

1. Make sure the CPM cables are oriented correctly. These cables are not keyed and can be connected upside down. An upside down connection results in internal link down on some ports and link up on others. The cables join the metal cable connector at an angle. When the cable is properly oriented, the cable will go **up** from the metal connector.
2. Verify that all external cables have links indicated by the upstream (external) switch. If some do not, examine the switch configuration to ensure that the upstream switch ports support gigabit and are configured for autonegotiation.
3. Examine the statistics for the upstream switch and verify the speed and mode the link is running at now. The speed/duplex results should be 1000/full. If not, swap the RJ-45 connector between a working and non-working port to isolate this to a cable or upstream port problem.
4. If the step above indicates that the octopus cable is at fault, move the cable between the three connectors on the CPM to determine whether the issue is with the cable or the connector. Replace the component that appears to be bad.

5. Verify that the blade server Ethernet ports are correctly configured within the operating system and show link up. Remember that seeing internal link up does not mean that the Ethernet port has a proper layer 1 link.
6. Replace the CPM.

Troubleshooting keyboard, mouse, or pointing-device problems

Use this information to resolve problems with a keyboard, mouse, or pointing device.

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

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: keyboard, mouse, 8886, and retain.

Keyboard or mouse device not working

Use this procedure if a keyboard, mouse, or pointing device is not working.

Problem

A keyboard, mouse or pointing device no longer works.

Investigation

Perform these steps to resolve the problem:

1. Verify that the device is connected to the advanced management module.
2. Verify that the KVM is owned by the blade server.

Tip: On a keyboard that is directly attached to the advanced management module, you can press keyboard keys in the following sequence to switch KVM control between blade servers:

NumLock NumLock *blade_server_number* Enter

Where *blade_server_number* is the two-digit number for the blade bay in which the blade server is installed. If you press NumLock twice and then do not enter a blade server bay, the keyboard may appear to be locked. In this case, either enter a blade server bay number or press Enter.

3. Reseat the device cable.
4. Replace the device.

Keyboard or mouse device not working after KVM ownership change

Use this procedure if a keyboard, mouse, or pointing device stops working after you switch the KVM to another blade server.

Problem

You attempted to change the ownership of the KVM to a different blade server, and the keyboard, mouse or pointing device no longer works.

Investigation

Perform these steps to resolve the problem:

1. Verify that the device cables are connected to the advanced management module and not the USB ports on the media tray.
2. Verify that the KVM is owned by a blade server that supports KVM. The JS20 and JS21 blade servers do not support KVM.

Troubleshooting media tray problems

Use this information to resolve problems with the media tray.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: media tray, 8886, and retain.

The media tray contains the front system LED panel, DVD drive, and USB ports that are shared by all blade servers in the BladeCenter S chassis.

The advanced management module is connected to the media tray using a dedicated serial control interface, called the I2C bus (there are several I2C bus connections throughout the BladeCenter S chassis). This interface is used by the advanced management module to detect the presence of the media tray and to control all media tray functions, including the USB connection between the media tray and blade servers.

Only one blade server at a time can access the media tray USB device and DVD drive. The ability to manually select which blade is connected to the media tray using the blade front panel button can be disabled through the advanced management module Web interface. Always check this setting first if the selection button on the front of the blade server does not appear to be working.

If you are having trouble booting a blade server to a media tray device, check the boot sequence for the blade server to make sure that the DVD device is listed. From the advanced management module Web interface, click **Blade Tasks** → **Configuration** → **Boot Sequence**.

If the eject button of the optical drive is not working, first unmount or uninstall the optical drive from the OS then reseal the media tray.

Blade server cannot access the media tray

If a blade server cannot access the media tray, the problem could be with the blade server, the blade server bay, the media tray, or the advanced management module.

Problem

A blade server is unable to access the media tray in the BladeCenter S chassis.

Investigation

Perform these steps to resolve the problem:

1. Log in to the advanced management module and view the event log to determine if there are service processor communication errors for multiple blade servers. If so, see “Service processor communication error displayed for multiple blade servers” on page 54.
2. If you are unable to select KVM from the front panel of the blade server, make sure the KVM options are enabled:
 - a. From the advanced management module Web interface, click **Blade Tasks > Remote Control**.
 - b. Verify that the following options are checked:
 - Enable local KVM switching
 - Enable local media tray switching
3. Check the System Status page to make sure that all the blade servers have been discovered. Media tray selection will not work properly for any blade for which status is being discovered.
4. Check the power LED on the front of the blade server. This LED should blink when the blade server is powered off and stay lit when the blade server is powered on.
5. Verify that the CD LED on the blade server lights up solid when pressed.
 - a. If the LED blinks instead, wait 30 seconds to give the advanced management module time to communicate with the blade server.
 - b. If the LED still does not light up, press the CD button on another blade server in the BladeCenter S chassis. If it does not light up either, see “Multiple blade servers cannot access the media tray” on page 67.

Note: It is possible to get ahead of the advanced management module when pressing media selection buttons between the blades. Always allow a few seconds for the advanced management module to respond before selecting another blade

6. Determine whether the problem is with the blade server or the BladeCenter S chassis.
 - a. Swap this blade with another blade in the BladeCenter S chassis that works or just move the blade to an empty slot in the same chassis.
 - b. If the CD button problem follows the blade, then suspect the blade.
 - 1) From the advanced management module Web interface, click **Firmware VPD** to check the current service processor (BMC) firmware level.
 - 2) Find firmware updates for the BMC. Look in the firmware change history for and update the firmware if necessary.
 - a) Go to <http://www.ibm.com/systems/support/>.
 - b) Under **Product Support**, click **BladeCenter**.
 - c) Under **Popular links**, select **Software and device drivers**.

- d) Under BladeCenter device driver file matrices, select the appropriate blade server.
- 3) Call IBM support.
- c. If the CD button problem stays with the blade server bay, move the blade back to the original bay and try again.
- d. If the problem persists, see “Isolating component failures” on page 38.
- 7. If the blade server cannot boot or read data from the device in the media tray
 - a. Make sure the appropriate entry for the DVD drive is listed in the blade boot sequence, shown in the advanced management module under **Blade Tasks > Configuration > Boot Sequence**.
 - b. See “Blade servers cannot communicate with the media tray” on page 68.
- 8. Verify that the DVD drive itself works with another blade server in the BladeCenter S chassis.
- 9. If the problem seems to be a USB device, verify that the device is compatible with the BladeCenter USB interface and the software running on the blade.
 - a. Verify the latest device driver is installed.
 - b. Try the USB device on a non-blade server or blade server in another chassis running the same operating system type and version.
 - c. Try another USB device.
 - d. If no external USB devices work in the USB port, replace the media tray.

Multiple blade servers cannot access the media tray

Use this procedure if multiple blade servers are unable to access the media tray.

Problem

Multiple blade servers (or a single blade server in multiple blade server bays) are unable to access the media tray in the BladeCenter S chassis.

Investigation

Perform these steps to resolve the problem:

1. Reseat the media tray.

Note: When you remove the media tray, the fan modules will operate at full speed. However, they will return to normal operation when you install the media tray back in the BladeCenter S chassis.

2. Log in to the advanced management module and check the event log for service processor communication errors for multiple blade servers. If so, see “Service processor communication error displayed for multiple blade servers” on page 54.
3. Plug a USB device into the USB v2.0 port on the media tray to verify that the selection and communication paths are working. If the blade servers can access this device, replace the DVD drive.
4. Replace the media tray.

Blade servers cannot communicate with the media tray

Use this procedure if no blade servers in the BladeCenter S chassis can communicate with the media tray.

Problem

One or more blade servers is unable to communicate with the media tray in the BladeCenter S chassis.

Investigation

Perform these steps to resolve the problem:

1. Log in to the advanced management module and view the event log for I2C errors for devices on bus 7.
2. If there are no error messages in the event log, look at the System LED panel on the front of the media tray and resolve any issues that you find. See “BladeCenter S chassis system LED panel” on page 29 for more information.
3. If the media tray is still not working properly, see “I2C errors” on page 36.

Troubleshooting monitor or video problems

Use this information to resolve monitor or video problems.

Blade servers contain a video controller. Blade servers send video signals to the BladeCenter S chassis midplane, which routes the signal to the advanced management module. When a cKVM card is installed in the blade server, the video signal is sent to the advanced management module over the internal Ethernet chassis network.

For local video, the advanced management module outputs the video signal to the physical RGB connector on the back of the advanced management module. For remote video, the advanced management module redirects the video signal over TCP/IP to a Java-based remote control session.

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

Blade servers send video signals to the BladeCenter S chassis midplane, which routes the signal to the advanced management module. When a cKVM card is installed in the blade server, the video signal is sent to the AMM over the internal Ethernet chassis network.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: monitor, video, 8886, and retain. In addition, see the product information for the specific blade server for more troubleshooting information.

Local and remote video not working

If both the local and remote video is not working, make sure that the controls are adjusted correctly, the monitor is connected the advanced management module, and the KVM is owned by a blade server that supports KVM.

Problem

Nothing appears on either the local video or the remote video.

Investigation

Perform these steps to resolve the problem:

1. Make sure that the blade server support video (for example, the IBM BladeCenter JS20 and JS21 blade servers do not support video).
2. Verify that the monitor is turned on, and that the brightness and contrast controls are adjusted correctly.
3. Verify that the monitor is connected to the advanced management module.
4. Verify that the KVM is owned by a blade server that supports KVM, and that the blade server is powered on.
5. Reseat the monitor cable.
6. Replace the monitor.

Remote video displays but local video does not

If remote video displays, but local video does not, the problem might be caused by the advanced management module.

Problem

Remote video sessions display normally, but local video does not display.

Investigation

Perform these steps to resolve the problem:

1. Verify that the local monitor is powered on and that it is operational.
2. Reseat the advanced management module.
3. Save the configuration for the advanced management module.

For more information about saving and restoring previously saved configurations, see the *IBM BladeCenter Advanced Management Module User's Guide*.

4. Reset the advanced management module to the default configuration.

Important: Resetting the advanced management module will shut down the external ports for all I/O modules, which will disrupt all network connectivity. After the advanced management module resets with the default configuration, it will attempt to obtain a DHCP address before using the default IP address (192.168.70.125) and subnet mask (255.255.255.0). Remove the Ethernet cable from the advanced management module if you do not want it to attempt to obtain a DHCP address.

- a. Insert a paper clip into the pin hole on the back of the advanced management module.
- b. Push the paper clip in all the way and hold it for approximately 10 seconds. The advanced management module will reset and the fan modules will run at full speed, which is clearly audible.

- c. Remove the paper clip from the pin hole.
5. If the local video now works, the problem is in the configuration of the advanced management module.
6. If the problem persists, call IBM .

Local video displays but remote video does not

If local video displays, but remote video does not, there might be a problem with the network or with the browser.

Problem

Local video sessions display normally, but remote video does not display.

Investigation

Perform these steps to resolve the problem:

1. Verify that the browser you are using does not have pop up windows disabled.
2. Verify that the video for the blade server is configured to a supported video mode:
 - 640 x 480 resolution - 60 Hz, 72 Hz, 75 Hz, or 85 Hz refresh rate
 - 800 x 600 resolution - 60 Hz, 72 Hz, 75 Hz, or 85 Hz refresh rate
 - 1024 x 768 resolution - 60 Hz, 70 Hz, or 75 Hz
3. To eliminate the network as a source of the problem, connect a laptop directly to the advanced management module Ethernet connection. Make sure the laptop used is known to work when using remote control to other BladeCenter S chassis. If this laptop connects correctly, either the network or the previously used workstation is part of the problem.
4. Make sure that any firewalls between the advanced management module and any remote control workstation allows traffic to and from the IP address of the advanced management module on the TCP port running remote video. The default port for the advanced management module is 5900. Remote disk, which is displayed in the remote control window, uses TCP port 1045 by default.
5. Verify that the network is working correctly.
6. Verify that you are using JVM 1.42 or higher.
7. Try using different Web browsers such as Internet Explorer, Mozilla, or Firefox to see if the problem only occurs with a particular browser.
8. If remote control works, but remote disk does not work, close remote control, delete all local copies of the file remotedriver.dll (on the computer from which you are using remote control) and restart remote control.

Troubleshooting power problems

Use this information to resolve problems with power.

All devices have an LED that indicates that power is present. If the LED indicates that power is present but the device will not boot, begin problem determination by troubleshooting the device.

There is a single power domain for the BladeCenter S chassis. All power supplies provide power to all devices at either voltage. At 220, the domain has two separate 12 volt power planes that power all devices. At 110, there is a single 12 volt plane powering all devices.

Points to consider regarding power include:

- For safety reasons, the power supplies are turned off when the shuttle is disengaged from the BladeCenter S chassis. However 5 volts of dc current will still be present.
- If you disengage or remove all devices from the front of the BladeCenter S chassis (media tray, blade servers, and disk storage modules), the power modules will be disabled.
- Each BladeCenter S chassis device is powered by 12 volts. Regulators on the blade server and I/O modules convert the 12 volts down to the voltage needed by the device logic. A short in the regulators or logic will shut down the blade server, and the error (a planar fault) will be logged in the advanced management module event log. In addition, LEDs will be lit on the blade server.
- If the ac LED is lit on a power supply, ac power is present at the power supply. If the dc LED is lit, the power supply is delivering 12-volts dc to the midplane on the BladeCenter S chassis.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: power, 8886, and retain.

BladeCenter S chassis has no power

Use this procedure if it appears that none of the devices in the BladeCenter S chassis has power.

Problem

None of the devices in the BladeCenter S chassis seems to be receiving power.

Investigation

Perform these steps to resolve the problem:

1. Verify that all power cords are plugged into 110-V ac or 220-V ac power sources and that the power sources are working.

Note: All power cords for a BladeCenter S chassis must be plugged into the same type of ac power source. For example, all power cords must be plugged into 110-V ac power sources or all power cords must be plugged into 220-V ac power sources.

2. Verify that the ac power and dc power LEDs on the power modules are lit.

3. If you just installed an option, remove it. If the BladeCenter S chassis now powers on, you might have installed more options than the power modules support. You might need to install additional power modules in power module bays 3 and 4.
4. If the problem persists, go to “Isolating component failures” on page 38.

The ac and dc LEDs are not lit for multiple power supplies

Use this procedure when the ac and dc LEDs are not lit for one or more power supplies in the BladeCenter S chassis.

Problem

The ac and dc LEDs are not lit for one or more power supplies within a BladeCenter S chassis.

Investigation

Perform these steps to resolve the problem:

1. Verify that the power supplies are connected to an ac power source.

Note: All power supplies must be connected to either 110-V ac or 220-V ac power sources. You cannot mix power sources withing a single BladeCenter S chassis.

2. Unplug the ac power cord from each power supply and plug it in again.
3. Reseat each power supply.
4. Swap the ac power cord with a power cord that is known to be working.
5. Check the ac sockets on the power distribution unit (PDU) to confirm they are working.
6. Contact IBM support.

The dc LED is not lit but ac LED is lit

If the dc LED is not lit for a power supply, the problem could be in the power supply or the power supply bay.

Problem

For a power supply, the ac LED is lit, but the dc LED is not lit.

Investigation

Perform these steps to resolve the problem:

1. Log on to the advanced management module and view the event log to determine if there are any power-related error messages. If so, contact IBM support.
2. Swap this power supply with another supply that is working correctly. If the ac and dc leds are lit for the swapped power supply, replace the other power supply.
3. If the dc LED on the replacement power supply is not lit, or if multiple power supplies have the ac LED on and dc LED off, remove the SPC chassis and reinsert it.

Note: The System Power and Cooling chassis (SPC chassis) is a field-replaceable unit (FRU). Therefore, it should be removed only by a trained service technician.

4. If the problem persists, contact IBM support.

Fault LED is lit

Use this procedure if the fault LED on the power module is lit.

Problem

The fault LED for the power module is lit.

Investigation

Perform these steps to resolve the problem:

Note: Before unplugging the AC power cord from the power module or removing the power module from the BladeCenter S chassis, verify that the capacity of the remaining power modules are sufficient to meet the minimum power requirements for all components in the BladeCenter S chassis. You can view power status and requirements through the advanced management module.

For information on accessing and using the advanced management module, see the *Advanced Management Module User's Guide*.

1. Verify that the power modules are properly connected to an AC power source.
All power modules in the BladeCenter S chassis must be connected to the same power input voltage (either 110 V ac or 220 V ac). Do not mix power input voltages.
2. Unplug the AC power cord from the power module and plug it in again.
3. Reseat the power supply.
4. Swap the AC power cord with a power cord that is known to be working.
5. Move the power module to another power module bay in the BladeCenter S chassis.

Troubleshooting Serial over LAN (SoL) problems

Use this information to resolve problems with Serial over LAN.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: Serial over LAN, 8886, and retain.

Blade server does not support SoL (as reported in the advanced management module)

If you receive a message in the advanced management module stating that the blade server is not supported, you may need to update firmware for the blade server or the advanced management module.

Problem

From the SoL configuration page within the advanced management module interface, you see an indication that the blade server does not support Serial over LAN.

Investigation

Perform these steps to resolve the problem:

1. If you have just supplied power to the BladeCenter S chassis or you have just reset the advanced management module, wait five minutes to ensure that the advanced management module has completed its communication with each of the blade servers in the BladeCenter S chassis.
2. Reseat the blade server by removing the blade server from the BladeCenter S chassis and installing it again.

Note: Before removing the blade server, shut down the blade server operating system; then, shut down the blade server. See the documentation that comes with your blade servers for the procedure to shut down the operating system.

3. Install the blade server in a different blade server bay.
4. Update the blade server service processor firmware (also known as the BMC or ISMP code).
5. Update the advanced management module firmware.
6. Suspect the system board in the blade server.

Blade server SoL status enabled but not ready (in management module)

Use this procedure to troubleshoot SoL when the SoL is enabled but is not ready.

Problem

From the SoL configuration page with the advanced management module interface, you see an indication that the blade server is enabled but not ready.

Investigation

Perform these steps to resolve the problem:

1. Verify that the Ethernet switch module installed in I/O module bay 1 is not a pass-thru module. The IBM copper pass-thru module does not support Serial over LAN.
2. Verify that the Serial over LAN port assignment was not changed to the internal Ethernet port 2 in the blade server. The default SoL port assignment is internal Ethernet port 1 in the blade server, which connects to the switch module in I/O module bay 1. Most blade servers, except the BladeCenter HS40, provide a setting in the network controller firmware to change the SoL port assignment. This setting can be changed only when updating the blade server firmware.
3. Verify that Serial over LAN is set up properly in the firmware (BIOS) for the blade server.

Note: The blade may boot extremely slow and/or become unresponsive if COM 1 is configured for Serial over LAN instead of COM 2.

For more information see the *IBM BladeCenter Serial over LAN Setup Guide*.

4. Verify that the Serial over LAN IP address range (BSMP) is not already being used on the external network. The default BSMP address range starts at 10.1.1.80 and ends at 10.1.1.85 for all six blade servers in the BladeCenter S chassis. If any blade servers or other external devices use this range of addresses for production traffic, an IP conflict will occur and Serial over LAN traffic may be blocked.

You can change the Serial over LAN BSMP starting address using the advanced management module Web interface. Any IP address range can be used as long as the same addresses are not used for production traffic.

5. If the blade server boots to an operating system, verify that the Ethernet drivers are loaded and up to date. A downlevel Ethernet driver under Linux can cause Serial over LAN to go into the Not Ready state.
6. Verify that the blade servers are powered up. Some blade servers need to be powered up for Serial over LAN. It can take up to two minutes after some blade servers are powered up for SoL to be ready.
7. Verify that the advanced management module can communicate with the switch module in I/O module bay 1. From the advanced management module Web interface, click **I/O Tasks > Configuration > Advanced > Ping Switch Module**.
8. Verify that the switch module in I/O-module bay 1 is configured properly for Serial over LAN.

For most switch modules, you can use the default configuration settings for the advanced management module and the switch.

9. Restart the blade server. From the advanced management module Web interface, click **Blade Tasks > Power/Restart**. Click the box next to the blade server, and then scroll down and select **Restart Blade System Mgmt Processor**.
 - a. Make sure the blade server is powered up.
 - b. Check the status of Serial over LAN.

- c. If it is ready, attempt to open a Serial over LAN console.
- 10. From the advanced management module Web interface, click **Blade Tasks > SOL Management**. Disable SoL for the blade server and then enable it again.
 - a. Make sure the blade is powered up.
 - b. Check the status of Serial over LAN.
 - c. If it is ready, attempt to open a Serial over LAN console.
- 11. Restart the advanced management module and check the status of Serial over LAN. If it is ready, attempt to open a Serial over LAN console.
- 12. Restart the switch module in I/O module bay 1 and check the status of Serial over LAN. If it is ready, attempt to open a Serial over LAN console.
- 13. Reset the blade server by powering it down, disengaging it from the BladeCenter S chassis (opening the release handles) and installing it again (closing the release handles).
- 14. Power up the blade server and check the status of Serial over LAN. If it is ready, attempt to open a Serial over LAN console.
- 15. Contact IBM support.

SoL session will not stay up

Use this procedure to troubleshoot when the SoL session drops unexpectedly.

Problem

You can establish a Serial over LAN session, but the session drops unexpectedly.

Investigation

Perform these steps to resolve the problem:

1. Verify that the advanced management module has a sufficient timeout value. The default timeout value is 120 seconds for console sessions, but it can be changed. For example, to change this value to infinity using the advanced management module command-line interface, enter the command:


```
telnetcfg -T system:mm[1] -t 0
```

 For more information about using this command, see the *Management Module Command-Line Interface Reference Guide*.
2. Make sure that you are not attempting to access a blade server through Serial over LAN and attempting to boot the blade server using PXE at the same time. Serial over LAN traffic shares blade server internal Ethernet port 1 with regular Ethernet traffic. Traffic from a network install server running through blade port 1 can block Serial over LAN traffic which will cause the Serial over LAN session to become nonresponsive.
3. Verify that the latest Ethernet driver is installed on the blade server, especially for blade servers running a Linux operating system.
4. Make sure that you do not type on the keyboard while the blade server is rebooting or the operating system network drivers are loading. This can cause the Serial over LAN session to drop.

Trouble entering commands or receiving double prompts

Use this procedure to troubleshoot problems entering command or receiving double prompts within a Serial over LAN session.

Problem

Within a Serial over LAN session, you have trouble entering commands or you are receiving double prompts.

Investigation

Perform these steps to resolve the problem:

1. Check the Return key settings for the keyboard in your terminal program. Make sure that only a line feed character is sent whenever the Return key is pressed.
 - This is the default for Telnet sessions.
 - The terminal application PuTTY has a configuration setting for the Return key. From the Configuration menu, click **Connection** → **Telnet**.
2. The service processor on older blade servers might block SOL output to a blade server running Linux. If this occurs, type Ctrl-q in the Serial over LAN session to clear the keystroke buffer.
3. Verify that the operating system running on the blade server supports Serial over LAN. For more information see the *IBM BladeCenter Serial over LAN Setup Guide*.
4. Make sure that the operating system running on the blade server has been set up correctly for Serial over LAN console access. For more information see the *IBM BladeCenter Serial over LAN Setup Guide*.

Characters received or typed are incorrect

Use this procedure when you are having trouble typing or receiving correct characters in a Serial over LAN session.

Problem

Within a Serial over LAN session, the characters that you type appear differently on the terminal.

Investigation

Perform these steps to resolve the problem:

1. Verify that the serial port settings in your terminal emulation program match the settings in the blade server BIOS configuration. In addition, verify that hardware flow control is enabled.
2. Try a different terminal emulation program, such as Telnet, PuTTY, or Hyperterm.
3. Make sure the Ethernet switch in I/O module bay 1 is powered on.
4. Check the external link statistics for the Ethernet switch in I/O module bay 1. Look for high packet loss and/or high packet error rates.
5. Attempt to set up a Serial over LAN session to another blade server in the BladeCenter S chassis. If the problem persists for multiple blade servers, suspect the advanced management module.

6. Restart the blade server. From the advanced management module Web interface, click **Blade Tasks > Power/Restart**. Click the box next to the blade server, and then scroll down and select **Restart Blade System Mgmt Processor**.
 - a. Make sure the blade server is powered up.
 - b. Check the status of Serial over LAN.
 - c. If it is ready, attempt to open an Serial over LAN console.
7. Update the Baseboard Management Controller (BMC) and the Ethernet driver for the blade server.
8. If the blade server supports local KVM, attempt to access the blade server using the KVM connection on the advanced management module and type some characters. If the problem persists, suspect the advanced management module.

Troubleshooting disk storage module problems

Use this information to solve problems with the disk storage module and hard disk drives.

IBM continually updates the support Web site with tips and techniques that you can use to resolve any problems that you may be having with the BladeCenter S system. Go to the BladeCenter support search Web site at <http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020> to see if any service bulletins have been generated. In the Search field, enter the following terms: storage, 8886, and retain.

Hard disk drives not available to blade servers

Use this information to resolve problems when the blade server is not able to see the hard disk drives in the disk storage module.

Problem

The disk storage module is powered on, but the blade servers cannot see the drives.

Investigation

Perform these steps to resolve the problem:

1. If the problem affects the hard disk drives in disk storage module 1, make sure that there is at least one power supply in power module bay 1 or 2. If the problem affects the hard disk drives in disk storage module 2, make sure that there is at least one power supply in power module bay 3 or 4.
2. Make sure that there is at least one SAS connectivity module installed and functioning. If you are using one SAS connectivity module, it should be installed in I/O bay 3. If you are using two SAS connectivity modules, they should be installed in I/O bays 3 and 4.
3. View the amber fault LED on the front of the disk storage module. If it is lit:
 - a. Make sure the advanced management module is present and functioning.
 - b. Log in to the advanced management module and view the event log for power or cooling problems.
 - c. Make sure that there is enough power allocated to allow the disk storage module to power on. You can view the power budget through the advanced management module Web interface by clicking **Power Management**.
 - d. Reseat the disk storage module and allow the advanced management module to power it on.

- e. Replace the disk storage module.
4. Verify that each of the blade servers accessing the hard disk drives in the disk storage modules has a SAS expansion card installed. You may need to update the firmware for the SAS expansion card.
5. Verify that the blade server is zoned to see the hard disk drives in the disk storage module. You can see the zone configuration implemented for the BladeCenter S system from the advanced management module Web interface by clicking **Storage Tasks**.
6. Power on the blade server and when prompted, press Ctrl-c to start the SAS LSI Configuration Utility.

Note: Some blade servers, such as the LS20 have an onboard SCSI controller. If you are using one of these blade servers, you will notice that the LSI Configuration prompt will appear twice. Make sure that you choose the SAS LSI Configuration Utility.

- a. Select the SAS expansion card.
- b. Select SAS Topology.
- c. Verify that you can see the SAS connectivity modules and that the hard disk drives are shown for each disk storage module.
7. Update the firmware for the disk storage module.
8. Replace the disk storage module.

IBM FastSetup

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

Chapter 4. Removing and replacing BladeCenter components

There are three types of replaceable components: Tier 1 CRU, Tier 2 CRU, and FRU, based on who is responsible for installing the component.

- **Consumable part.** Purchase and replacement of consumable parts (components, such as batteries and printer cartridges, that have depletable life) is your responsibility. If IBM acquires or installs a consumable part at your request, you will be charged for the service.
- **Tier 1 customer replaceable unit (CRU).** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit.** You can install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designed for your computer.
- **Field replaceable unit (FRU).** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty, see the *Warrant and Support* document. For information about getting service and assistance, see Getting help and technical assistance.

Installation guidelines

Before you remove or replace a component, read the following information.

- Read Safety and “Handling static-sensitive devices” on page 82. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- You do not have to disconnect the BladeCenter S system from power to install or replace any of the hot-swap modules. You must shut down the operating system and turn off a hot-swap blade server before you remove it, but you do not have to remove power from the BladeCenter S system itself.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the BladeCenter S system.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- Orange on a component or an orange label on or near a component indicates that the component may be hot-swapped, which means that you can remove or install the component while the BladeCenter S system is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for

removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the BladeCenter S chassis, open or close a latch, and so on.

System reliability guidelines

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

- Each of the module bays on the front and rear of the BladeCenter S chassis has either a module or a module bay filler installed in it.
- Each of the blade bays on the front of the BladeCenter S chassis has either a blade server or a blade bay filler installed in it.
- Each of the disk storage module bays has a disk storage module or disk storage module filler installed in it. If a disk storage module is installed, each of the drive bays has a hard disk drive or a hard disk drive bay filler installed in it.
- Each of the drive bays in a blade server storage expansion option has either a hot-swap drive or a filler panel installed.
- You have followed the cabling instructions that come with optional adapters.
- Cables for the optional modules are routed correctly.
- A failed fan module is replaced as soon as possible.

Handling static-sensitive devices

Make sure that you read these guidelines before handling static-sensitive devices.

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

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

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

Returning a device or component

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

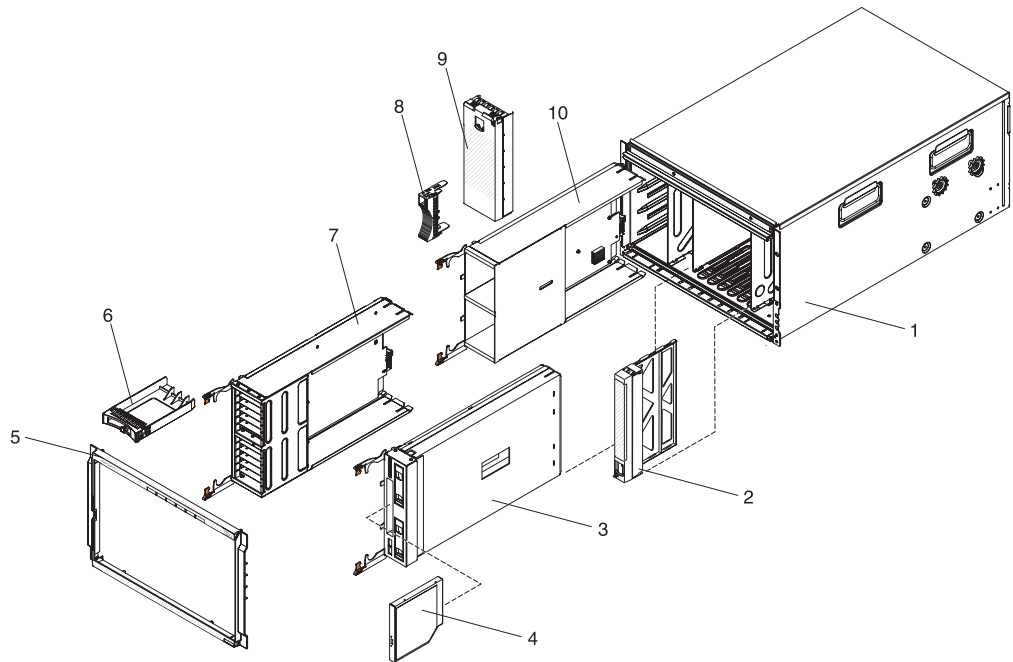
Parts listing

These illustrations identify the replaceable components that are available for the BladeCenter S Types 7779 and 8886 unit.

- **Consumable part.** Purchase and replacement of consumable parts (components, such as batteries and printer cartridges, that have depletable life) is your responsibility. If IBM acquires or installs a consumable part at your request, you will be charged for the service.
- **Tier 1 customer replaceable unit (CRU).** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit.** You can install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designed for your computer.
- **Field replaceable unit (FRU).** FRUs must be installed only by trained service technicians.

Front view parts listing

The front of the BladeCenter S chassis contains components such as the media tray and bays for disk storage modules and blade servers.



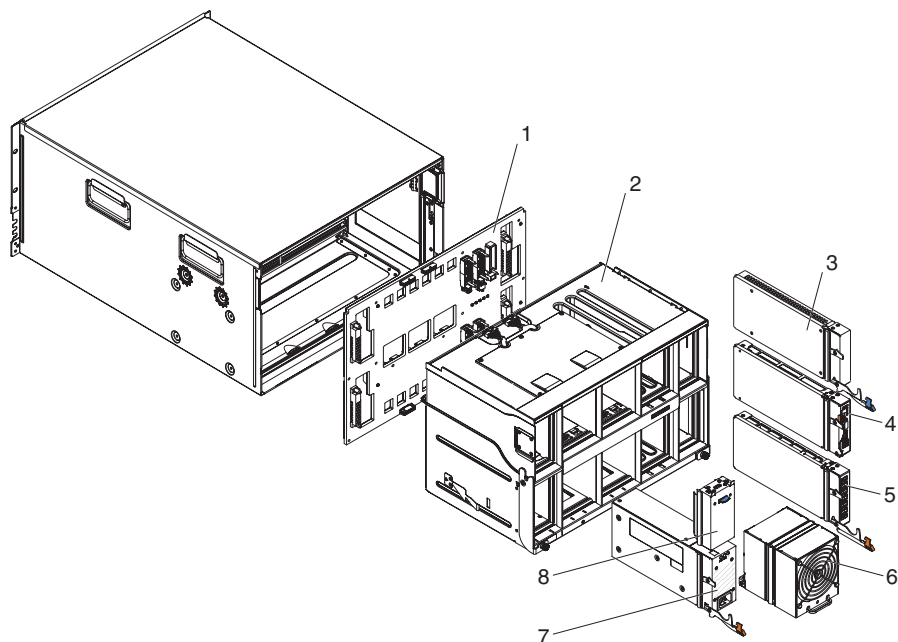
Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Chassis shell (without shuttle)			44E8050
2	Filler, blade server	39M3317		
3	Media tray (PATA)	44E8052		
	Media tray (SATA)	44E8167		
4	DVD drive (PATA)	43W4603		
	DVD drive (SATA Multi-Burner)	44W3256		
5	Bezel	44E8055		
6	Filler, 2.5" hard disk drive	44T2248		
7	12-disk storage module	46C5494		
8	Filler, 3.5" hard disk drive	39M4375		
9	Filler, disk storage module	44E8060		
10	6-disk storage module	44E8057		
	Filler, DVD drive (SATA)	46C5496		

Consumable parts (parts that are purchased separately) are not covered by the IBM Statement of Limited Warranty. The following consumable parts are available for purchase from the retail store.

Index	Description	Part number
	Battery backup unit	45W5002

Rear view parts listing

The rear of the 8886 BladeCenter unit contains components such as the management module, fan modules, and I/O modules.



Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Midplane			43W3631
2	Shuttle (with card and cable assembly)			44E8051
3	Filler, I/O module	25R9934		
4	Advanced management module	39Y9661		
5	Serial pass-thru module		44E8054	
6	Fan module	44E8053		
7	1450W Power supply module - C20	39Y7367		
	1450W Power supply module - C14	39Y7403		
8	Filler, power supply	44E8059		
	Cable, fan module to midplane			44E8061
	Miscellaneous parts kit			44E8062
	Kit, rack		39M3256	

Power cords - C14 power module

Several power cords are available for use with the C14 power module (CRU part number 39Y7403), depending on the location in the world where the cord will be used.

The following table lists the PDU power cord CRU part numbers.

Table 2. PDU power cords

CRU part number	Description
39M5508	2.0m, 13A/125-10A/250V, C13 to IEC 320-C14 Rack Power Cable
39M5509	2.8m, 13A/125-10A/250V, C13 to IEC 320-C14 Rack Power Cable
39M5510	4.3m, 13A/125-10A/250V, C13 to IEC 320-C14 Rack Power Cable
39M5392	2.8m, 15A/125-10A/250V, C13 to IEC 320-C20 Rack Power Cable

The following table lists the power cord CRU part numbers.

Table 3. Power cords

Country	CRU part number	Description
Argentina	39M5067	1.8m, 10A/220V, C13 to IRAM 2073
	39M5068	2.8m, 10A/220V, C13 to IRAM 2073
	39M5069	4.3m, 10A/220V, C13 to IRAM 2073
Australia / New Zealand	39M5101	1.8m, 10A/230V, C13 to AS/NZS 3112
	39M5102	2.8m, 10A/230V, C13 to AS/NZS 3112
	39M5103	4.3m, 10A/230V, C13 to AS/NZS 3112
Brazil	39M5239	1.8m, 10A/220V, C13 to NBR 6147
	39M5240	2.8m, 10A/220V, C13 to NBR 6147
	39M5241	4.3m, 10A/220V, C13 to NBR 6147

Table 3. Power cords (continued)

Country	CRU part number	Description
China	39M5205	1.8m, 10A/220V, C13 to GB 2099.1
	39M5206	2.8m, 10A/220V, C13 to GB 2099.1
	39M5207	4.3m, 10A/220V, C13 to GB 2099.1
Denmark	39M5129	1.8m, 10A/230V, C13 to DK2-5a
	39M5130	2.8m, 10A/230V, C13 to DK2-5a
	39M5131	4.3m, 10A/230V, C13 to DK2-5a
Europe	39M5122	1.8m, 10A/230V, C13 to CEE7-VII
	39M5123	2.8m, 10A/230V, C13 to CEE7-VII
	39M5124	4.3m, 10A/230V, C13 to CEE7-VII
India	39M5225	1.8m, 10A/240V, C13 to IS 6538
	39M5226	2.8m, 10A/240V, C13 to IS 6538
	39M5227	4.3m, 10A/240V, C13 to IS 6538
Israel	39M5171	1.8m, 10A/230V, C13 to SI 32
	39M5172	2.8m, 10A/230V, C13 to SI 32
	39M5173	4.3m, 10A/230V, C13 to SI 32
Italy	39M5164	1.8m, 10A/230V, C13 to CEI 23-16
	39M5165	2.8m, 10A/230V, C13 to CEI 23-16
	39M5166	4.3m, 10A/230V, C13 to CEI 23-16
Japan	39M5185	1.8m, 12A/200V, C13 to JIS C-8303
	39M5186	2.8m, 12A/200V, C13 to JIS C-8303
	39M5187	4.3m, 12A/200V, C13 to JIS C-8303
	39M5198	1.8m, 12A/100V, C13 to JIS C-8303
	39M5199	2.8m, 12A/100V, C13 to JIS C-8303
	39M5200	4.3m, 12A/100V, C13 to JIS C-8303
Korea	39M5218	1.8m, 12A/250V, C13 to KSC 8305
	39M5219	2.8m, 12A/250V, C13 to KSC 8305
	39M5220	4.3m, 12A/250V, C13 to KSC 8305
South Africa	39M5143	1.8m, 10A/230V, C13 to SABS 164
	39M5144	2.8m, 10A/230V, C13 to SABS 164
	39M5145	4.3m, 10A/230V, C13 to SABS 164
Switzerland	39M5157	1.8m, 10A/230V, C13 to SEV 1011
	39M5158	2.8m, 10A/230V, C13 to SEV 1011
	39M5159	4.3m, 10A/230V, C13 to SEV 1011
Taiwan	39M5253	1.8m, 10A/250V, C13 to CNS 10917-3
	39M5254	2.8m, 10A/250V, C13 to CNS 10917-3
	39M5255	4.3m, 10A/250V, C13 to CNS 10917-3
	39M5462	1.8m, 13A/125V, C13 to CNS 10917-3
	39M5463	2.8m, 13A/125V, C13 to CNS 10917-3
	39M5464	4.3m, 13A/125V, C13 to CNS 10917-3

Table 3. Power cords (continued)

Country	CRU part number	Description
United Kingdom	39M5150	1.8m, 10A/230V, C13 to BS 1363/A
	39M5151	2.8m, 10A/230V, C13 to BS 1363/A
	39M5152	4.3m, 10A/230V, C13 to BS 1363/A
United States	39M5094	1.8m, 10A/208V, C13 to NEMA 6-15P
	39M5095	2.8m, 10A/208V, C13 to NEMA 6-15P
	39M5096	4.3m, 10A/208V, C13 to NEMA 6-15P
	39M5511	1.8m, 13A/120V, C13 to NEMA 5-15P
	39M5512	2.8m, 13A/120V, C13 to NEMA 5-15P
	39M5513	4.3m, 13A/120V, C13 to NEMA 5-15P

Power cords - C20 power module

Several power cords are available for use with the C20 power module (CRU part number 39Y7367), depending on the location in the world where the cord will be used.

The following table lists the PDU power cord CRU part numbers.

Table 4. PDU power cords

CRU part number	Description
39M5388	2.0m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable
39M5389	2.5m, 16A/100-240V, C19 to IEC 320-C20 Rack Power Cable

The following table lists the power cord CRU part numbers.

Table 5. Power cords

Country	CRU part number	Description
Argentina	39M5341	1.8m, 16A/220V, C19 to IRAM 2073
	39M5342	2.5m, 16A/220V, C19 to IRAM 2073
	39M5343	4.3m, 16A/220V, C19 to IRAM 2073
Australia / New Zealand	39M5329	1.8m, 15A/230V, C19 to AS/NZS 3112
	39M5330	2.5m, 15A/230V, C19 to AS/NZS 3112
	39M5331	4.3m, 15A/230V, C19 to AS/NZS 3112
Brazil	39M5349	1.8m, 15A/125V, C19 to NBR 6147
	39M5350	2.5m, 15A/125V, C19 to NBR 6147
	39M5351	4.3m, 15A/125V, C19 to NBR 6147
	39M5357	1.8m, 16A/220V, C19 to NBR 6147
	39M5358	2.5m, 16A/220V, C19 to NBR 6147
	39M5359	4.3m, 16A/220V, C19 to NBR 6147
China	39M5353	1.8m, 16A/220V, C19 to GB 2099.1
	39M5354	2.5m, 16A/220V, C19 to GB 2099.1
	39M5355	4.3m, 16A/220V, C19 to GB 2099.1

Table 5. Power cords (continued)

Country	CRU part number	Description
Denmark	39M5321	1.8m, 16A/230V, C19 to IEC 309-P+N+G
	39M5322	2.5m, 16A/230V, C19 to IEC 309-P+N+G
	39M5323	4.3m, 16A/230V, C19 to IEC 309-P+N+G
Europe	39M5281	1.8m, 16A/230V, C19 to CEE7-VII
	39M5282	2.5m, 16A/230V, C19 to CEE7-VII
	39M5283	4.3m, 16A/230V, C19 to CEE7-VII
India	39M5444	1.8m, 16A/240V, C19 to IS 6538
	39M5396	2.5m, 16A/240V, C19 to IS 6538
	39M5397	4.3m, 16A/240V, C19 to IS 6538
Israel	39M5309	1.8m, 16A/230V, C19 to SI 32
	39M5310	2.5m, 16A/230V, C19 to SI 32
	39M5311	4.3m, 16A/230V, C19 to SI 32
Italy	39M5297	1.8m, 16A/230V, C19 to CEI 23-16
	39M5298	2.5m, 16A/230V, C19 to CEI 23-16
	39M5299	4.3m, 16A/230V, C19 to CEI 23-16
Japan	39M5333	1.8m, 15A/200V, C19 to JIS C-8303
	39M5334	2.5m, 15A/200V, C19 to JIS C-8303
	39M5335	4.3m, 15A/200V, C19 to JIS C-8303
	39M5337	1.8m, 15A/100V, C19 to JIS C-8303
	39M5338	2.5m, 15A/100V, C19 to JIS C-8303
	39M5339	4.3m, 15A/100V, C19 to JIS C-8303
Korea	39M5345	1.8m, 15A/250V, C19 to KSC 8305
	39M5346	2.5m, 15A/250V, C19 to KSC 8305
	39M5347	2.5m, 15A/250V, C19 to KSC 8305
South Africa	39M5289	4.3m, 15A/250V, C19 to KSC 8305
	39M5290	2.5m, 16A/230V, C19 to SABS 164
	39M5291	4.3m, 16A/230V, C19 to SABS 164
Switzerland	39M5440	1.8m, 16A/230V, C19 to SEV 1011
	39M5441	2.5m, 16A/230V, C19 to SEV 1011
	39M5442	4.3m, 16A/230V, C19 to SEV 1011
Taiwan	39M5361	1.8m, 16A/125V, C19 to CNS 10917-3
	39M5362	2.5m, 16A/125V, C19 to CNS 10917-3
	39M5363	4.3m, 16A/125V, C19 to CNS 10917-3
	39M5365	1.8m, 16A/250V, C19 to CNS 10917-3
	39M5366	2.5m, 16A/250V, C19 to CNS 10917-3
	39M5367	4.3m, 16A/250V, C19 to CNS 10917-3
United Kingdom	39M5293	1.8m, 13A/230V, C19 to BS 1363/A
	39M5294	2.5m, 13A/230V, C19 to BS 1363/A
	39M5295	4.3m, 13A/230V, C19 to BS 1363/A

Table 5. Power cords (continued)

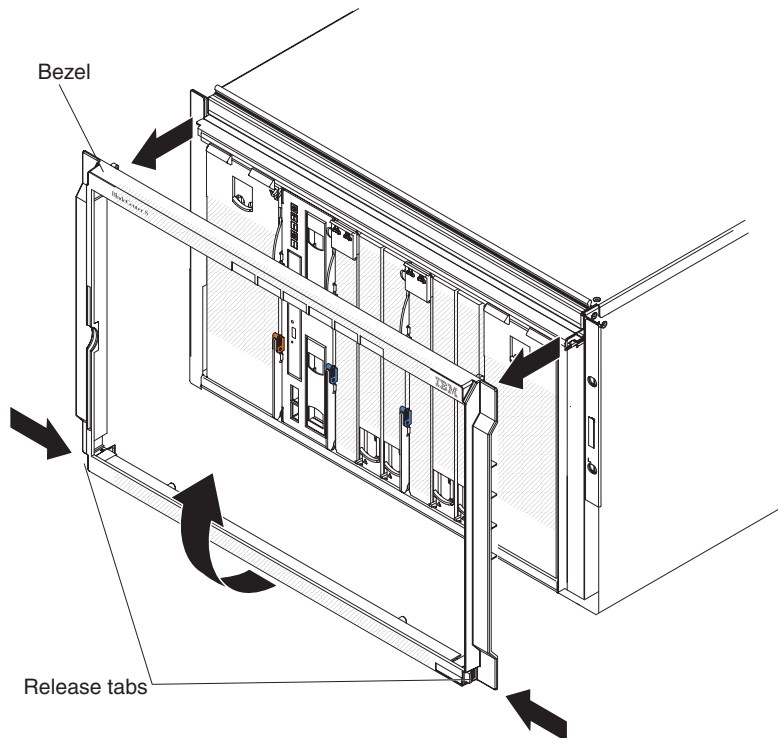
Country	CRU part number	Description
United States	39M5257	1.8m, 15A/120V, C19 to NEMA 5-15P
	39M5258	2.5m, 15A/120V, C19 to NEMA 5-15P
	39M5259	4.3m, 15A/120V, C19 to NEMA 5-15P
	39M5261	1.8m, 15A/208V, C19 to NEMA 6-15P
	39M5262	2.5m, 15A/208V, C19 to NEMA 6-15P
	39M5263	4.3m, 15A/208V, C19 to NEMA 6-15P
	39M5270	2.5m, 16A/120V, C19 to NEMA L5-20P
	39M5271	4.3m, 16A/120V, C19 to NEMA L5-20P
	39M5278	2.5m, 16A/208V, C19 to NEMA L6-20P
	39M5279	4.3m, 16A/208V, C19 to NEMA L6-20P

Removing and replacing CRUs

Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation. However, IBM will replace a Tier 2 CRU at your request for no additional charge.

Removing a bezel

To remove the bezel, press the release buttons and pull the bezel away from the BladeCenter S chassis.

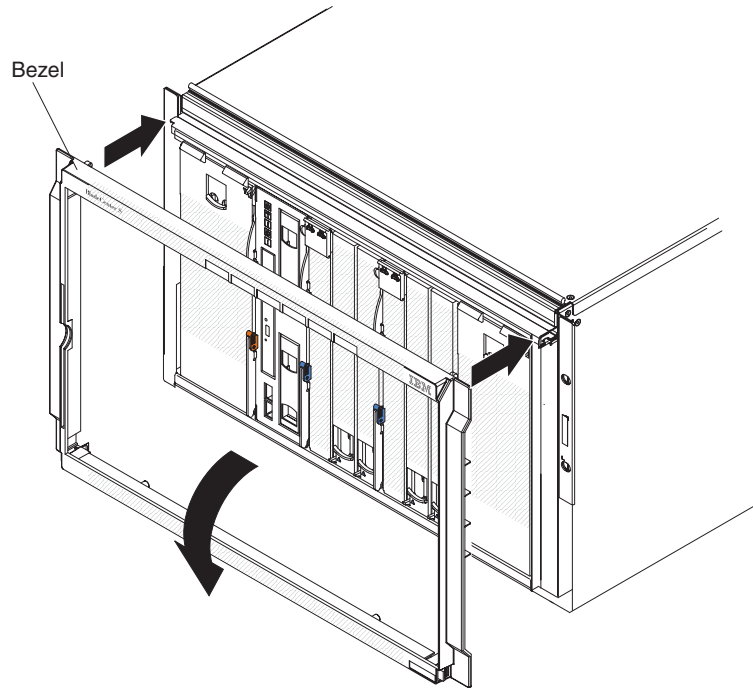


1. Press and hold the blue release tabs on the bezel.
2. Rotate the bottom of the bezel outward and pull the bezel away from the BladeCenter S chassis.

Note: You should store the bezel away for future use.

Installing a bezel

To install a bezel, align the bezel on the BladeCenter S chassis and press the bezel into place until the release buttons lock.



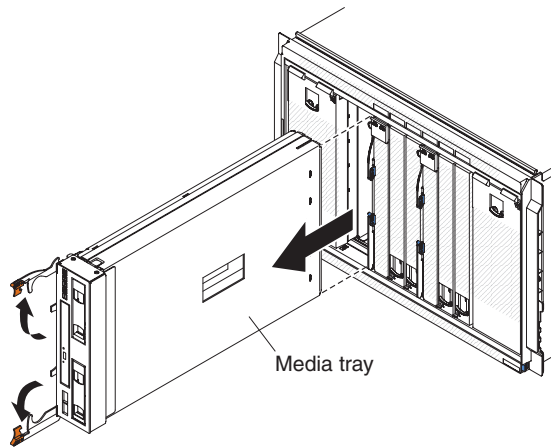
1. Align the bezel pegs with the openings in the top of the BladeCenter S chassis.
2. Rotate the lower portion of the bezel toward the BladeCenter S chassis until the tabs lock it into place.

Removing the media tray

You can remove the media tray while the BladeCenter S system is powered on. To remove it, open the release handles and slide the media tray from the BladeCenter S chassis.

Note: Make sure that the USB ports and the DVD drive are not in use before removing the media tray.

Important: If you are removing the media tray from a BladeCenter S chassis in which SAS RAID controller modules are installed, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.



1. Open the release handles (rotate the top handle up and the bottom handle down) to disengage the media tray from the BladeCenter S chassis.
2. Slide the media tray out of the BladeCenter S chassis.

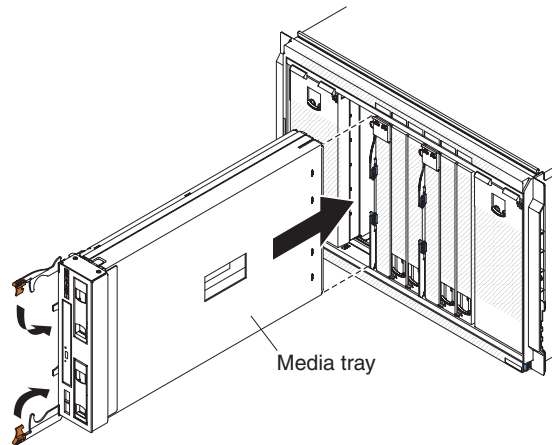
Note: When you remove the media tray, the fan modules will begin to run at full speed.

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

Installing the media tray

You can install the media tray while the BladeCenter S system is powered on. To install it, slide it into the BladeCenter S chassis and close the release handles.

Important: If you are installing the media tray in a BladeCenter S chassis in which SAS RAID controller modules are installed, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.



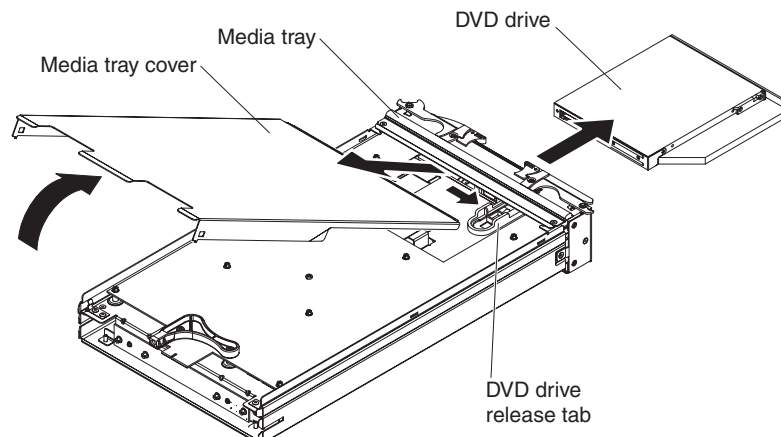
1. Open the release handles (rotate the top handle up and the bottom handle down).
2. Slide the media tray into the BladeCenter S chassis until it stops.
3. Close the release handles (rotate the top handle down and the bottom handle up).

Removing the DVD drive

To remove a DVD drive, open the media tray cover, pinch the DVD retention release, and slide the DVD drive out of the media tray.

Make sure the media tray release handles are closed to keep them from being damaged.

Note: The procedure for removing the CD-RW/DVD-ROM drive or the DVD-RW drive is the same.

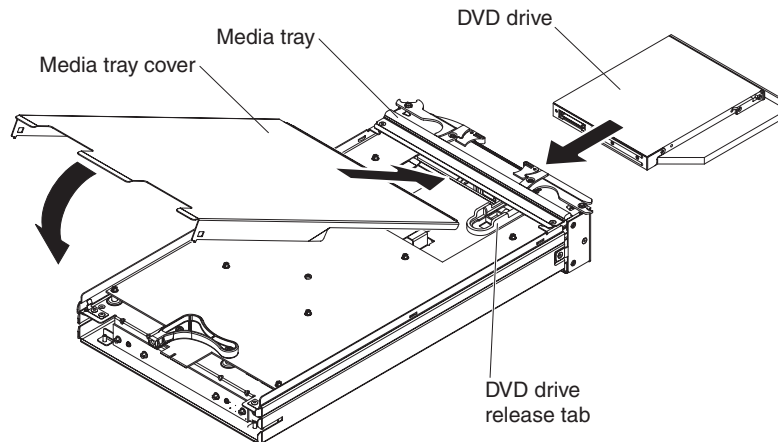


1. Remove the media tray from the BladeCenter S chassis. See "Removing the media tray" on page 92.
2. Position the media tray so that the cover is facing up and the front of the media tray is facing you.
3. Remove the media tray cover by pulling up from the rear of the cover and lifting the cover away from the media tray.
4. Pinch and hold the blue DVD drive release.
5. Place your finger on the rear of the DVD drive and slide it out of the media tray.

Installing the DVD drive

To install a DVD drive, slide the DVD drive into the media tray until the DVD drive release locks. Then, close the media tray cover.

Note: The procedure for installing the CD-RW/DVD-ROM drive or the DVD-RW drive is the same.

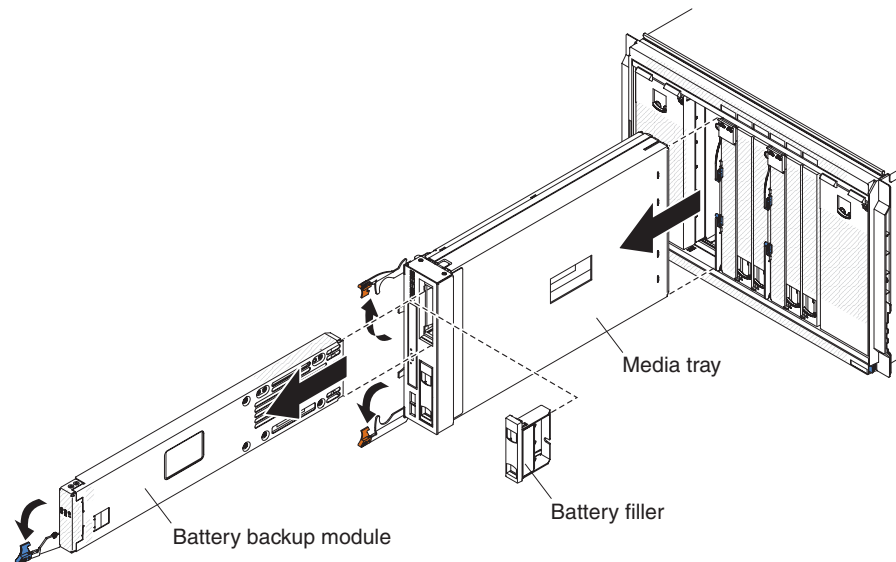


1. Position the media tray so that the front of the media tray is facing you.
2. Slide the DVD drive into the media tray until the DVD drive release locks.
3. Insert the front of the cover into the front of the media tray.
4. Rotate the rear of the cover down until it closes.
5. Install the media tray from the BladeCenter S chassis. See "Installing the media tray" on page 93.

Removing the battery backup unit

To remove the battery backup unit, open the release handle on the battery backup unit and slide the battery backup unit out of the media tray.

Important: If you are removing one or both battery backup units from a BladeCenter S chassis in which SAS RAID controller modules are installed, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.

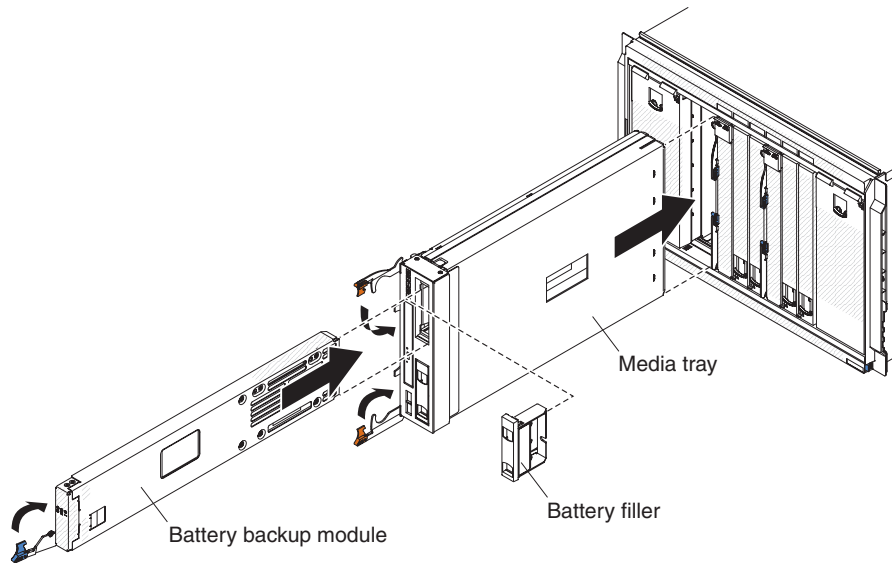


1. Open the release handle (rotate the handle down)
2. Slide the battery backup unit out of the media tray.

Installing the battery backup unit

To install the battery backup unit, slide the unit into the media tray and close the release handle.

Important: If you are installing battery backup units in a BladeCenter S chassis in which SAS RAID controller modules are installed, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.



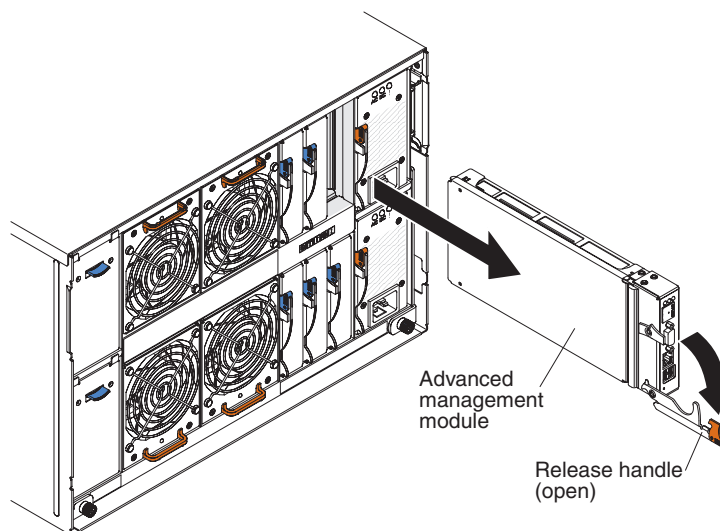
1. Open the release handle (rotate the handle down).
2. Slide the battery backup unit into the media tray.
3. Close the release handle (rotate the handle up)

Removing an advanced management module

You can remove the advanced management module while the BladeCenter S system is powered on. To remove it, disconnect all cables, open the release handle, and slide the advanced management module out of the BladeCenter S chassis.

If the advanced management module that is currently installed in the BladeCenter S chassis is functioning, make sure that the configuration file has been saved before replacing the BladeCenter S Types 7779 and 8886.

See the *Advanced Management Module User's Guide* or the *Advanced Management Module Command-Line Interface Reference Guide* for instructions for saving and restoring a configuration file.



1. Disconnect all cables from the advanced management module.

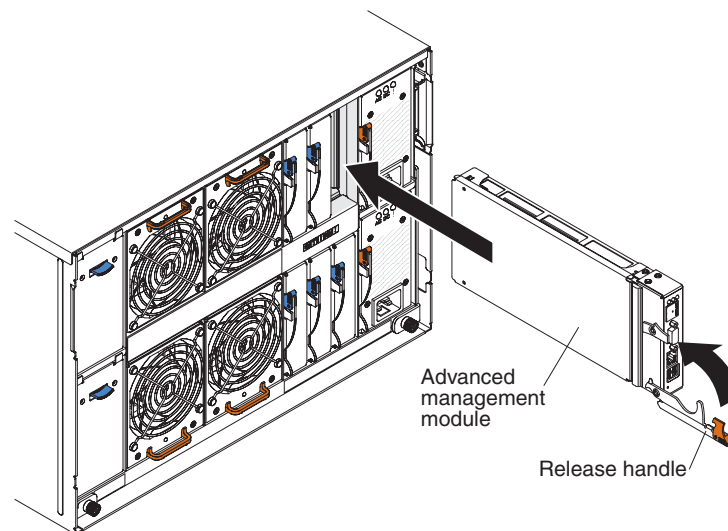
2. Open the release handle (rotate the handle down) to disengage the advanced management module from the BladeCenter S chassis.
3. Slide the advanced management module out of the BladeCenter S chassis.

Note: When you remove the advanced management module, the fan modules will begin to run at full speed.

Installing an advanced management module

You can install the advanced management module while the BladeCenter S system is powered on. To install it, open the release handle on the module and slide advanced management module into the advanced management module bay.

Before installing the advanced management module, read the installation instructions that come with the advanced management module.



1. Open the release handle (rotate the handle down).
2. Slide the advanced management module into the advanced management module bay until it stops.
3. Close the release handle (rotate the handle up).
4. Connect all cables to the advanced management module.

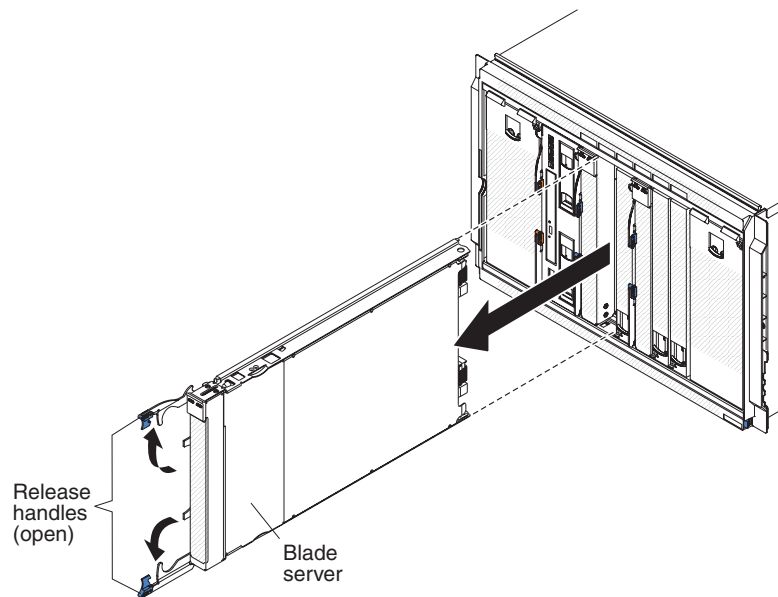
After installing the advanced management module, you will need to configure it, either by loading a previously saved configuration or going through the advanced management module configuration wizard.

Removing a blade server

To remove a blade server, open the release handles and slide it out of the BladeCenter S chassis.

Attention:

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



1. Shut down the blade server operating system; then, shut down the blade server. See the documentation that comes with your blade servers for the procedure to shut down the operating system.
2. Open the release handles (rotate the top handle up and the bottom handle down) to disengage the blade server from the BladeCenter S chassis.
3. Slide the blade server out of the blade server bay.

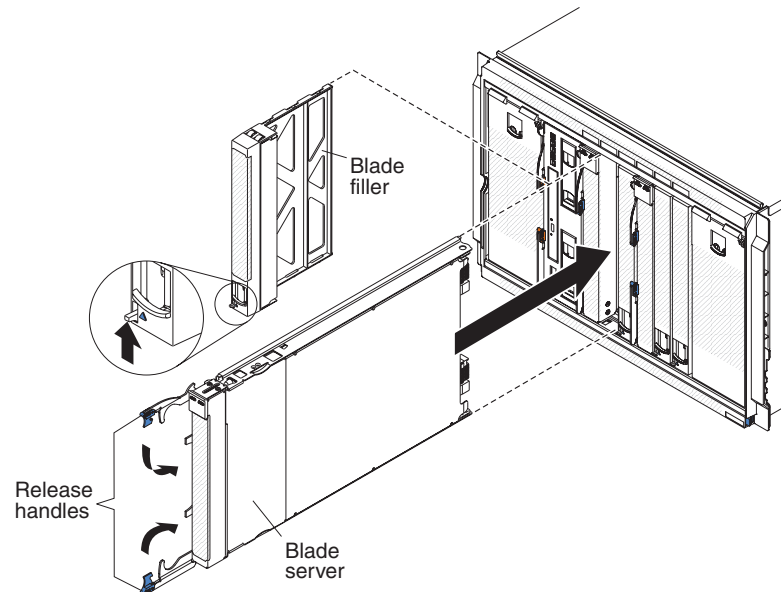
Installing a blade server

To install a blade server in the front of the BladeCenter S chassis, opening the release handles on the blade server, slide it into a blade server bay, and close the release handles.

Before installing a blade server into BladeCenter S chassis, read the instructions that come with that blade server. In addition, make sure that you have installed any optional hardware devices, such as a SAS expansion card option, in the blade server.

You can find the documentation for blade servers in the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the blade server documentation from this site, click **Systems hardware > BladeCenter information > Blade servers**.

To determine which blade servers are compatible with the BladeCenter S chassis, see the IBM ServerProven Web site at <http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html>.



1. Select the bay for the blade server. Depending on the blade server type and the optional devices that are installed in the blade server, two or more adjacent bays might be required.

Important: If SAS connectivity modules are installed in the BladeCenter S chassis, the blade server bay that you use when installing a blade server is determined by the SAS connectivity module zoning configuration that you have selected for the BladeCenter S system. See the *IBM BladeCenter S Type 8886 Planning Guide* for more information about zoning configuration.

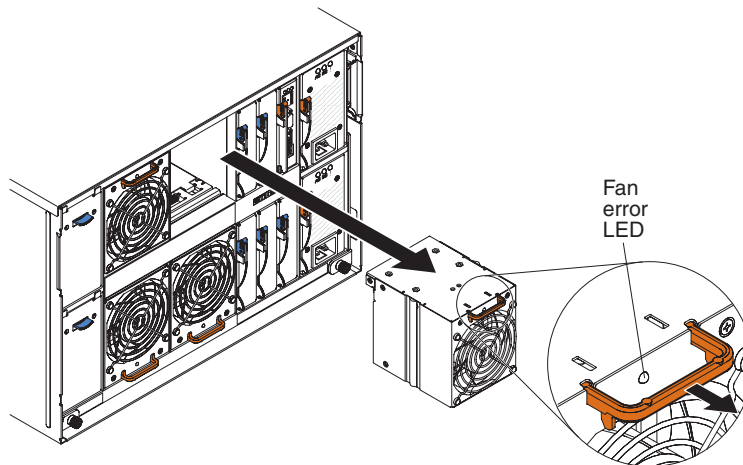
2. Open both release handles (rotate the top handle up and the bottom handle down).
3. Slide the blade server into the blade server bay until it stops.
4. Close both release handles (rotate the top handle down and the bottom handle up).

5. (Optional) Write identifying information on one of the labels that come with the BladeCenter S chassis; then, place the label on the BladeCenter S chassis top bezel, just above the blade server.

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

Removing a fan module

You can remove a fan module while the BladeCenter S system is powered on. To remove it, grasp the fan handle and slide the fan module out of the BladeCenter S chassis.

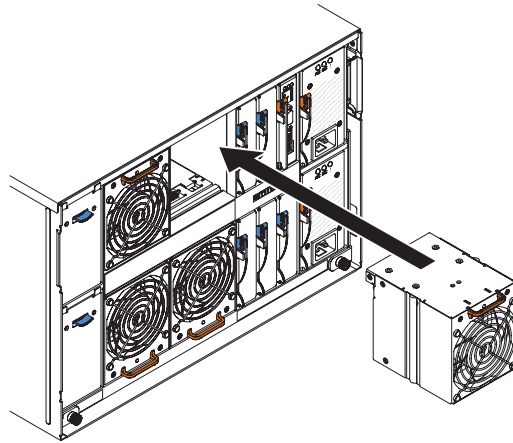


1. Grasp the fan handle.
2. Slide the fan module out of the BladeCenter S chassis.

Note: When you remove a fan module, the power modules will begin to run at full speed, which will be clearly audible.

Installing a fan module

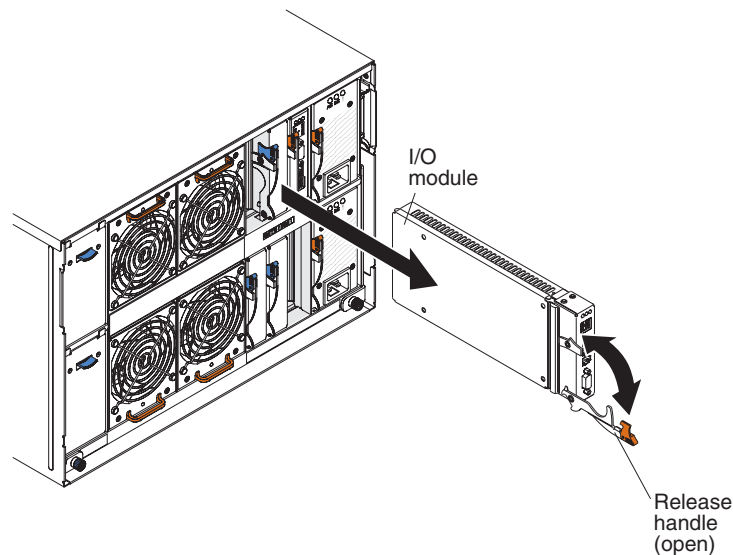
You can install a fan module while the BladeCenter S system is powered on. To install it, slide the fan module into the fan module bay until the fan handle locks.



Removing an I/O module

You can remove an I/O module while the BladeCenter S system is powered on. To remove it, disconnect all cables, open the release handle, and slide the module out of the BladeCenter S chassis.

Important: If you are removing one or both SAS RAID controller modules from a BladeCenter S chassis, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.



1. Disconnect all cables from the module.
2. Open the release handle (rotate the handle down) to disengage the I/O module from the BladeCenter S chassis.
3. Slide the module out of the I/O module bay.

Installing an I/O module

You can install an I/O module while the BladeCenter S system is powered on. To install an I/O module, open the release handle, slide the module into the I/O module bay of the BladeCenter S chassis, and connect appropriate cables to the module.

Before installing an I/O module, read the installation instructions that were provided for the I/O module.

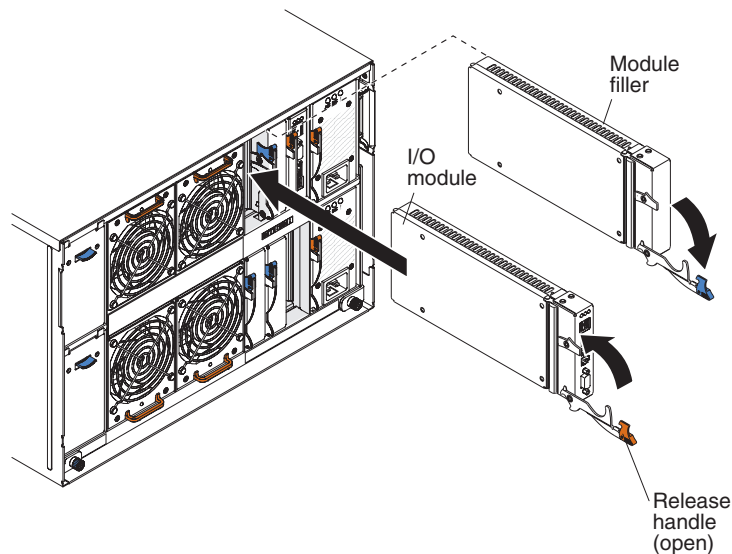
Note:

You can find the documentation for I/O modules at the IBM Systems Information Center, which is at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>. To access the I/O module documentation from this site, click **Systems hardware > BladeCenter information > I/O modules**.

To determine which I/O modules are compatible with the BladeCenter S chassis, see the IBM ServerProven Web site at <http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html>.

Important: If you are installing SAS RAID controller modules in a BladeCenter S chassis, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.

Important: If you are installing SAS RAID controller modules in a BladeCenter S chassis, refer to the *BladeCenter S SAS RAID Controller Module Installation and User's Guide* for additional steps that might need to be performed.



1. Open the release handle (rotate the handle down).
2. Slide the module into the module bay until it stops.
3. Close the release handle (rotate the handle up).
4. Connect all cables to the module.

The placement of the I/O module in the BladeCenter S chassis depends on the type of I/O module being installed. For example, an Ethernet switch module is typically deployed in I/O module bay 1 or I/O module bay 2. SAS connectivity modules or SAS RAID controller modules are deployed in I/O module bays 3 and 4.

Note:

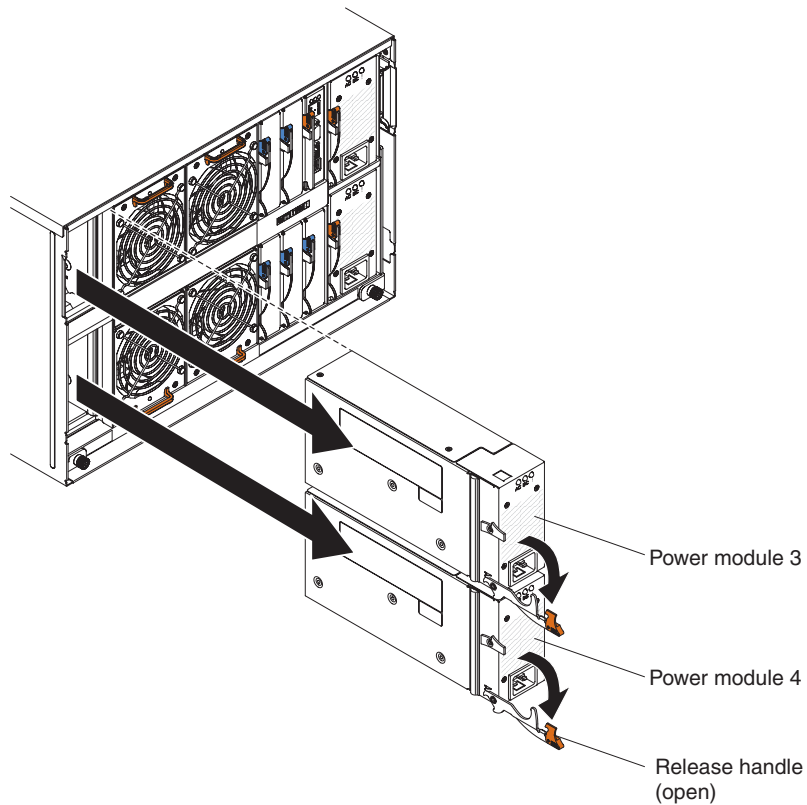
- If you install an Ethernet switch module in I/O module bay 2, you must also install an expansion card option, such as the 2/4 Port Ethernet Expansion Card, in each of the blade servers that will access the Ethernet network through that I/O module.
- If you install SAS connectivity modules, you must also install a SAS expansion card option in each of the blade servers that will access the integrated shared storage. You can install SAS or SATA hard disk drives in the disk storage modules.
- If you install SAS RAID controller modules, you must also install a SAS expansion card option in each of the blade servers that will access the integrated shared storage. In addition, you must install SAS hard disk drives in the disk storage modules.

Removing a power module

You can remove a power module while the BladeCenter S system is powered on. To remove it, open the release handle and slide the power module out of the power module bay.

Attention:

- To maintain proper system cooling, do not operate the BladeCenter S system without a power module or power module filler in each power module bay. Install a power module or filler within one minute of the removal of a power module.
- If you are removing a functioning power module, make sure that power LEDs on the remaining power modules are lit and the power management policy you have chosen supports the removal of the power module. If not, shut down the operating systems and turn off all of the blade servers, before you proceed. (See the documentation that comes with the blade server for instructions for shutting down the blade server operating system and turning off the blade server.)



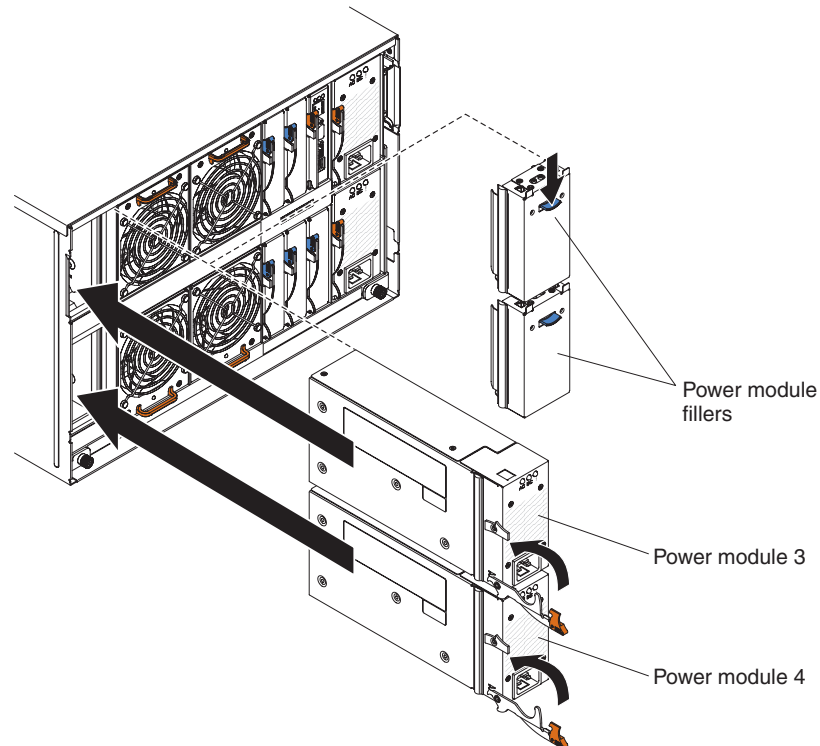
1. Disconnect the power cable.
2. Open the release handle (rotate the handle down).
3. Slide the power module out of the power module bay.
4. If you are instructed to return the power module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a power module

You can install a power module while the BladeCenter S system is powered on. To install it, open the release handle, slide the power module into the power module bay, and close the release handle.

Notes:

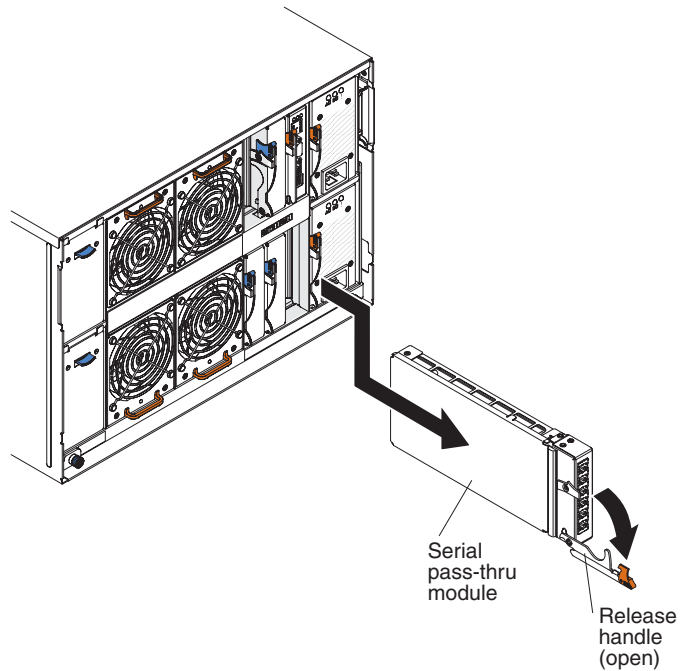
- Make sure the power cord is not connected to the power module when installing the power module in a BladeCenter S chassis.
- On the rear of the power module, there is a plastic strain-relief tie that should not be removed.



1. Open the release handle (rotate the handle down).
2. Slide the module into the power module bay until it stops.
3. Close the release handle (rotate the handle up).
4. Plug in the power cable.
5. Fasten the plastic retention tie.

Removing a serial pass-thru module

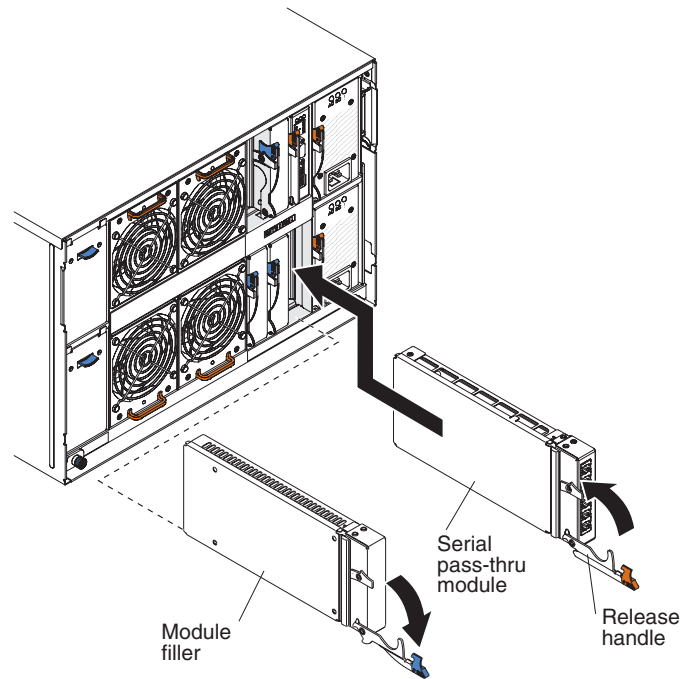
You can remove a serial pass-thru module while the BladeCenter S system is powered on. To remove it, disconnect all cables, open the release handle, and slide the serial pass-thru module out of the BladeCenter S chassis.



1. Disconnect all cables from the module.
2. Open the release handle (rotate the handle down) to disengage the serial pass-thru module.
3. Slide the module out of the BladeCenter S chassis.

Installing a serial pass-thru module

You can install a serial pass-thru module while the BladeCenter S system is powered on. To install it in the serial pass-thru module bay, open the release handle and slide the serial pass-thru module into the serial pass-thru module bay.



1. Open the release handle (rotate the handle down).
2. Slide the module into the serial pass-thru module bay until it stops.
3. Close the release handle (rotate the handle up).
4. Connect all cables to the module.

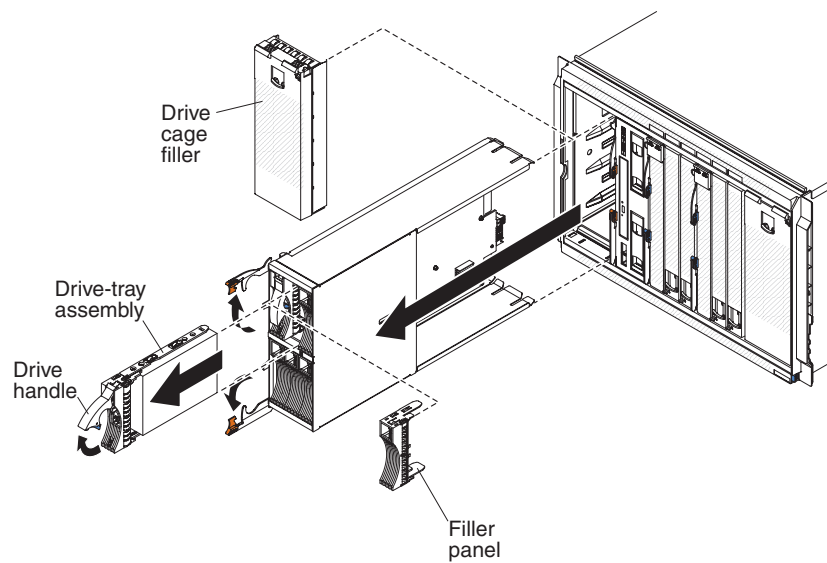
Removing a disk storage module

You can remove a disk storage module while the BladeCenter S system is powered on. To remove it, remove the hard disk drives, open the release handles on the disk storage module, and slide the module out of the BladeCenter S chassis.

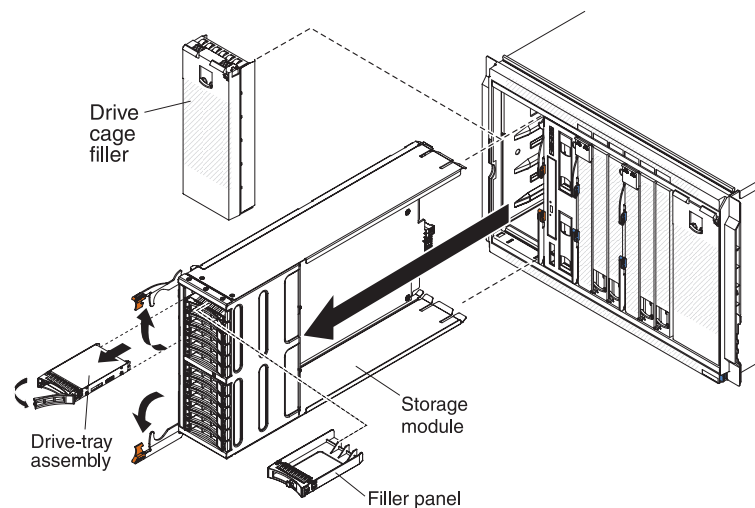
Note: Make sure that all drive activity is stopped (the green LED on the hard disk drive is not blinking) before removing the disk storage module.

Important: If you are removing disk storage modules or hard disk drives from a BladeCenter S chassis in which SAS RAID controller modules are installed, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.

Graphic illustrating the removal of a 6-disk disk storage module



Graphic illustrating the removal of a 12-disk disk storage module



1. Remove hard disk drives:

- a. Open the release handle on the hard disk drive (rotate the handle up) to disengage the hard disk drive from the disk storage module.
- b. Slide the hard disk drive out of the disk storage module.

Important: If SAS connectivity modules are installed in the BladeCenter S chassis, note the bay number from which you are removing the hard disk drive so that you can install it back in the same bay location. The hard disk drive bay location that you use when installing a hard disk drive is determined by the SAS connectivity module zoning configuration that you have selected for the BladeCenter S system.

2. Open the release handles on the disk storage module (rotate the top handle up and the bottom handle down) to disengage the disk storage module from the BladeCenter S chassis.
3. Slide the disk storage module out of the BladeCenter S chassis.

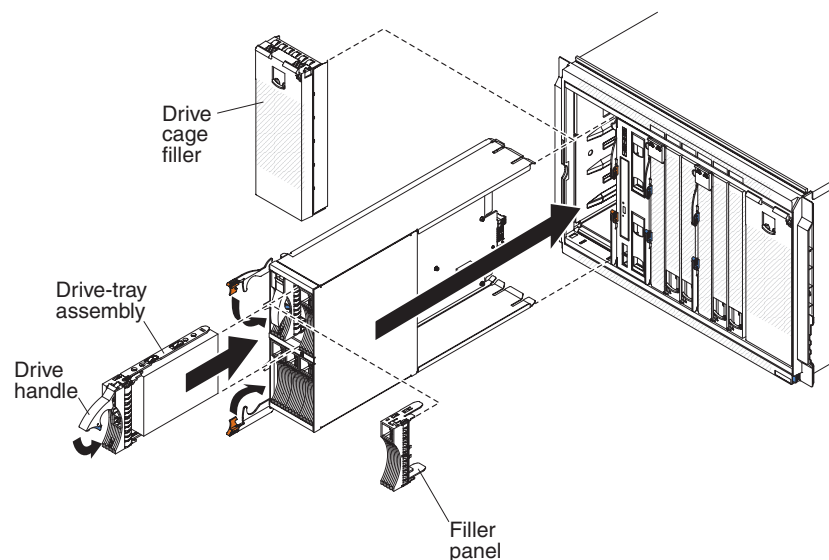
Installing a disk storage module

You can install a disk storage module while the BladeCenter S system is powered on. To install it, open the release handles on the disk storage module and slide the disk storage module into the disk storage module bay. Then, you can install hard disk drives into the disk storage module.

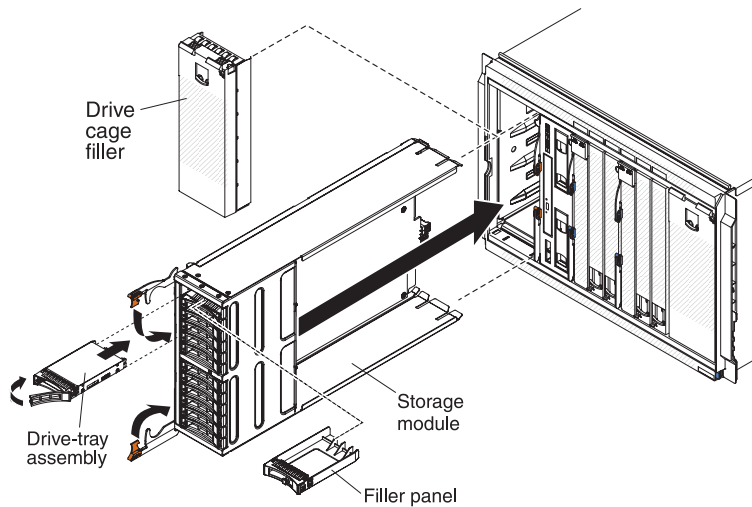
Note: Four power modules are required in the BladeCenter S chassis if two disk storage modules are installed. If you are installing a disk storage module in disk storage module bay 2, you must have power modules installed in power module bays 3 and 4.

Important: If you are installing disk storage modules or hard disk drives in a BladeCenter S chassis in which SAS RAID controller modules are installed, refer to the *IBM BladeCenter SAS RAID Controller Installation and User's Guide* for additional steps that might need to be performed.

Graphic illustrating the installation of a 6-disk disk storage module



Graphic illustrating the installation of a 12-disk disk storage module



1. Open the release handles on the disk storage module (rotate the top handle up and the bottom handle down).
2. Slide the disk storage module into the disk storage module bay until it stops.
3. Close the release handles (rotate the top handle down and the bottom handle up).
4. Install hard disk drives:
 - a. Open the release handle on the hard disk drive (rotate the handle up).
 - b. Slide the hard disk drive into the disk storage module until it stops.

Important: If SAS connectivity modules are installed in the BladeCenter S chassis, the drive bay that you use is determined by the SAS connectivity module zoning configuration that you have selected for the BladeCenter S system. Please note this only applies to the 6-disk storage module.

If SAS RAID controller modules are installed in the BladeCenter S chassis, make sure that you install SAS hard disk drives. SATA hard disk drives are not currently supported when using SAS RAID controller modules.

- c. Close the release handle (rotate the handle down).

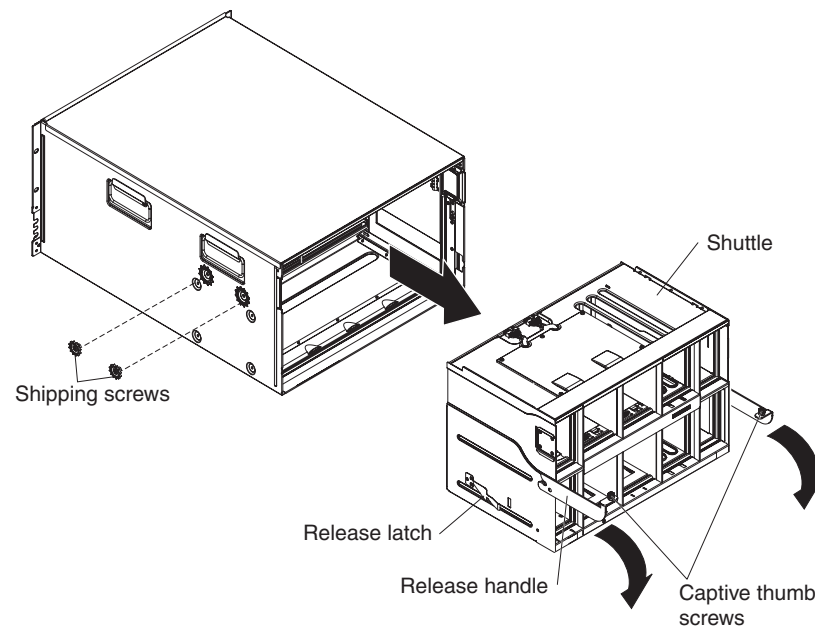
Removing and replacing FRUs

Field-replaceable units (FRUs) must be removed and replaced only by trained service technicians.

Removing the SPC chassis (shuttle)

The removal of a System Power and Cooling (SPC) chassis (also called a shuttle) should only be performed by a trained service technician.

Read Safety and “Installation guidelines” on page 81 before performing this procedure.

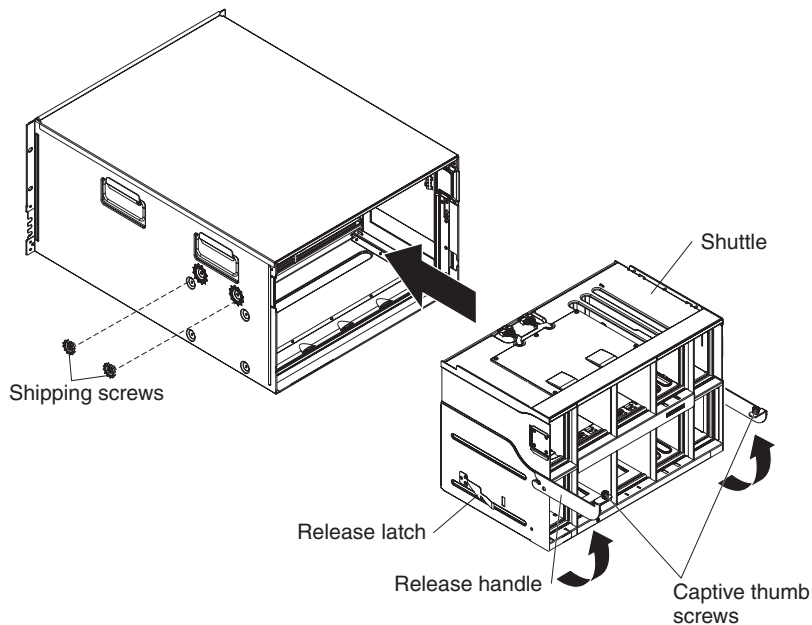


1. Shut down the operating systems and turn off any blade servers in the BladeCenter S chassis. See the documentation that comes with the blade server for detailed instructions.
2. Disengage the blade servers from the front of the BladeCenter S chassis by opening the release handles on all blade servers.
3. Disengage the media tray from the front of the BladeCenter S chassis by opening the release handle.
4. Disengage the disk storage modules from the front of the BladeCenter S chassis by opening the release handle on each disk storage module.
5. Disconnect the power from the BladeCenter S chassis.
6. Disconnect all cables from the modules in the rear of the BladeCenter S chassis.
7. Remove any of the following modules that are installed in the rear of the BladeCenter S chassis:
 - I/O modules (see “Removing an I/O module” on page 101).
 - Advanced management module (see “Removing an advanced management module” on page 96).
 - Serial pass-thru module (see “Removing a serial pass-thru module” on page 106).
 - Fan modules (see “Removing a fan module” on page 100).

- Power supplies (see “Removing a power module” on page 103).
8. Remove the left and right shipping brackets from the BladeCenter S chassis and the rack, if they are installed.
 9. Loosen the captive thumbscrews on the SPC chassis release handles.
 10. Open the release handles on the shuttle (rotate the handles up) to disengage the SPC chassis from the BladeCenter S chassis.
 11. Using the handles, pull the SPC chassis out until it stops (approximately half way out).
 12. While supporting the shuttle with your hands, press the release latches on each side, and pull the SPC chassis out of the BladeCenter S chassis.
 13. If you are replacing the SPC chassis with a new SPC chassis, remove the midplane (see “Removing the midplane” on page 114) and any remaining module fillers for installation on the replacement part.

Installing the SPC chassis (shuttle)

The installation of a System Power and Cooling (SPC) chassis (also called a shuttle) should only be performed by a trained service technician.



1. If you are installing a new SPC chassis, install the midplane from the removed SPC chassis (see “Installing the midplane” on page 115).
2. Open the release handles on the SPC chassis (rotate the handles up).
3. Align the SPC chassis with the BladeCenter S chassis and push the SPC chassis frame into the BladeCenter S chassis until it stops.

Note: Do not push the SPC chassis using the release handles.

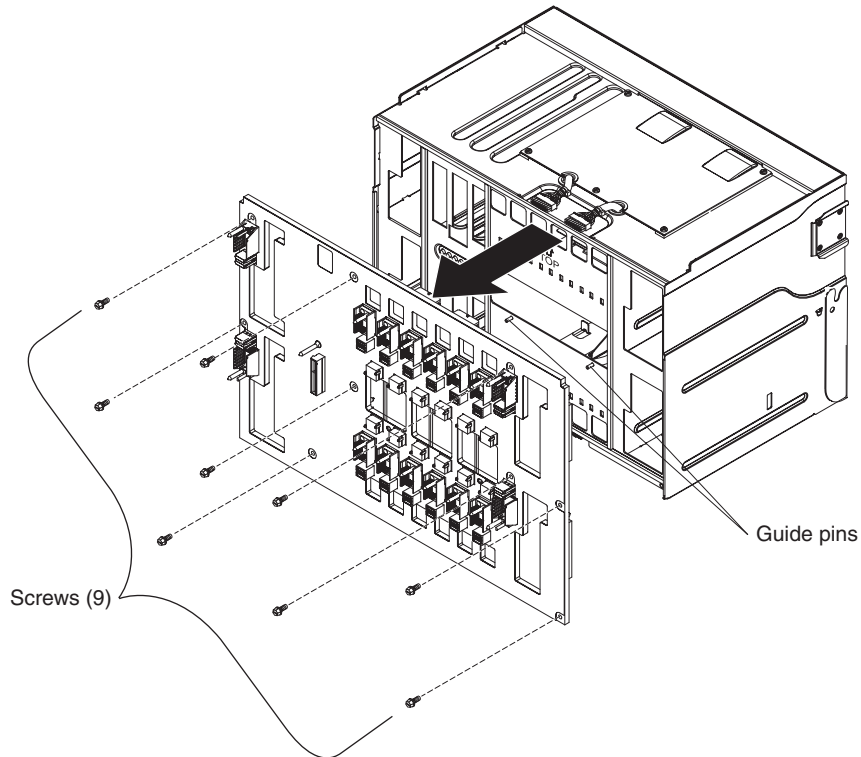
4. Push the SPC chassis the remainder of the way into the BladeCenter S chassis until the release handles rotate down.
5. Close the release handles completely. The SPC chassis will move back fully into the BladeCenter S chassis.
6. Tighten the captive thumbscrews on the release handles.
7. Install the left and right shipping brackets on the BladeCenter S chassis and the rack, if they were removed.

8. Install the two shipping screws in each side of the chassis, if they were removed.
9. Install any of the following modules that were removed from the rear of the BladeCenter S chassis:
 - I/O modules (see “Installing an I/O module” on page 102).
 - Advanced management module (see “Installing an advanced management module” on page 97).
 - Serial pass-thru module (see “Installing a serial pass-thru module” on page 107).
 - Fan packs (see “Installing a fan module” on page 101).
 - Power supplies (see “Installing a power module” on page 105).
10. Push the following components fully into the front of the BladeCenter S chassis to engage the midplane:
 - Blade servers (see “Installing a blade server” on page 99).
 - Media tray (see “Installing the media tray” on page 93).
 - Disk storage modules (see “Installing a disk storage module” on page 109).
11. Connect any cables that were disconnected from the modules in the rear of the BladeCenter S chassis.
12. Connect the power to the BladeCenter S chassis.
13. Restart any blade servers that were shut down. See the documentation that comes with each blade server for detailed instructions.

Removing the midplane

The removal of a midplane should only be performed by a trained service technician.

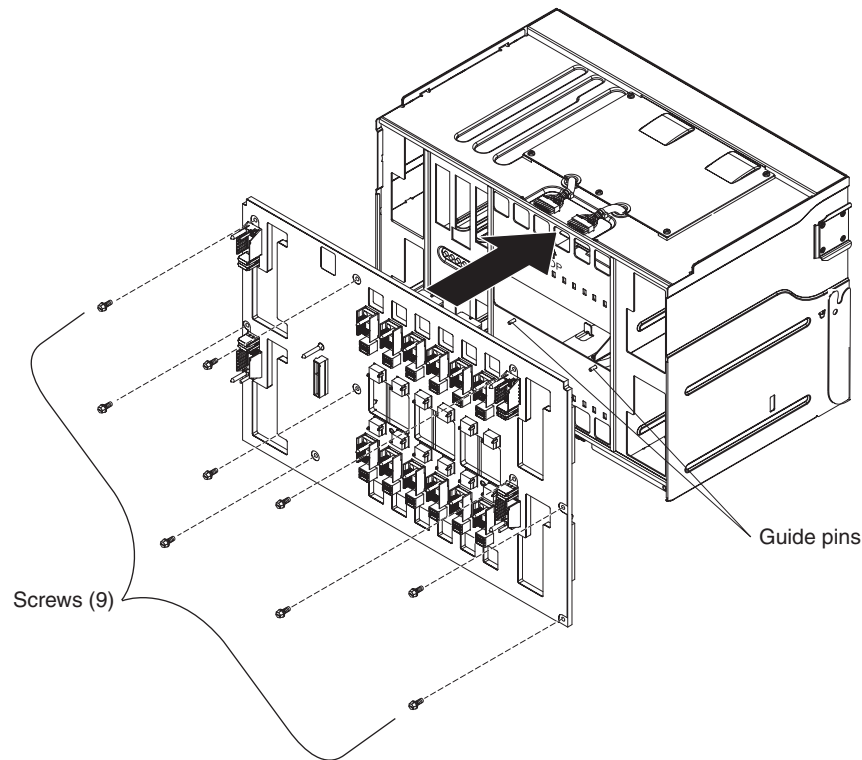
Read Safety and "Installation guidelines" on page 81 before performing this procedure.



1. Remove the SPC chassis (shuttle) from the BladeCenter S chassis (see "Removing the SPC chassis (shuttle)" on page 111).
2. Make sure the release handles are closed and position the SPC chassis so that the midplane is facing up.
3. Disconnect the two upper fan-to-midplane cable plugs from the midplane connectors.
4. Disconnect the two lower fan-to-midplane cable plugs from the midplane connectors.
5. Remove the nine screws that secure the midplane to the shuttle.
6. Lift the midplane away from the SPC chassis.

Installing the midplane

The installation of a midplane should only be performed by a trained service technician.



1. Make sure the release handles are closed and position the SPC chasis (shuttle) so that the location where the midplane will be placed is facing up.
2. Carefully place the midplane onto the SPC chasis, aligning the screw holes on the midplane with the holes in the SPC chasis.
3. Install the nine screws that attach the midplane to the SPC chasis.
4. Reconnect the two upper fan-to-midplane cable plugs to the midplane connectors.
5. Reconnect the two lower fan-to-midplane cable plugs to the midplane connectors.
6. Install the SPC chasis into the BladeCenter S chassis (see “Installing the SPC chasis (shuttle)” on page 112).
7. Update the vital product data (VPD) for the BladeCenter unit:
 - a. Log into the advanced management module Web interface.
 - b. In the navigation pane, click **Monitor** → **Hardware VPD**.
 - c. Click **Chassis**.
 - d. Click **Edit BladeCenter System Vital Product Data**.
 - e. Obtain the model number and serial number on the ID label on the BladeCenter; then, enter the information in the **Type/Model and Serial Number** fields.
 - f. If the advanced management module is using firmware version BPET54R or older, restart the advanced management module.

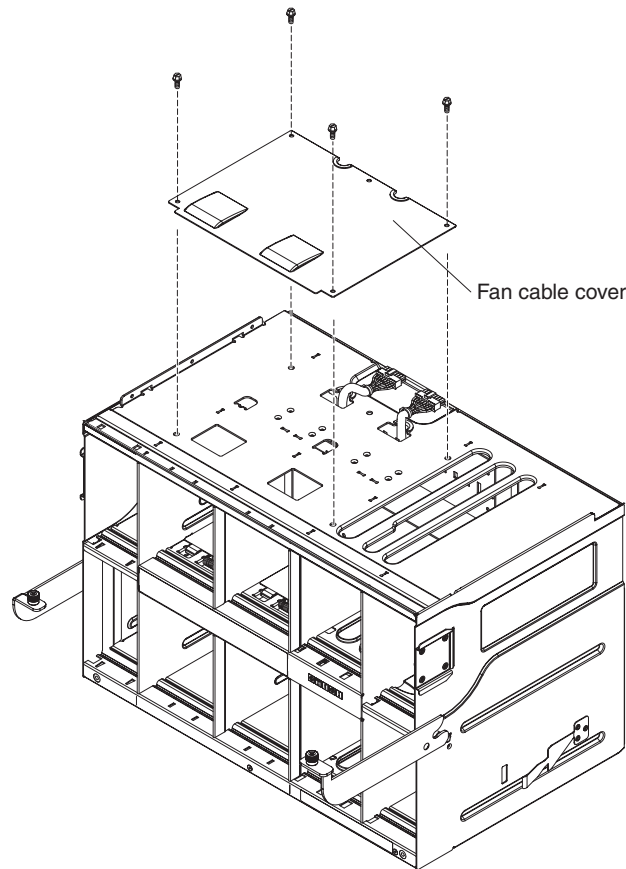
Removing a midplane-to-fan cable

The removal of a midplane-to-fan cable should only be performed by a trained service technician.

Read Safety and “Installation guidelines” on page 81 before performing this procedure.

There are four midplane-to-fan cables in the BladeCenter S chassis.

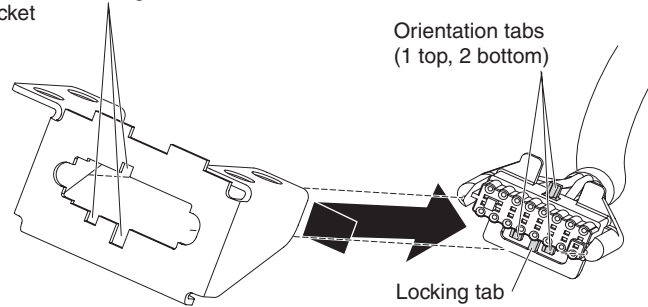
1. Remove the SPC chassis (shuttle) from the BladeCenter S chassis (see “Removing the SPC chassis (shuttle)” on page 111).
2. Remove the midplane from the SPC chassis (see “Removing the midplane” on page 114).
3. Remove the midplane-to-fan cable from the midplane.
 - a. Disconnect the midplane-to-fan cable plug from the midplane connector.
 - b. Remove the fan cable cover.



- c. Push the cable plug back down through the fan cable hole in the SPC chassis.
4. Remove the midplane-to-fan cable from the BladeCenter S chassis.
 - a. Position the SPC chassis so that you are facing the front of the SPC chassis. You will be able to see the air flow dampers in the fan module bays.
 - b. Depress the air flow damper in a fan module bay so that you can see the midplane-to-fan cable and fan cable mounting bracket.
 - c. Using a tool such as a small screw driver, carefully depress the locking tab on the midplane-to-fan cable.

Note: If you depress the locking tab too hard, it is easy to break off the locking tab.

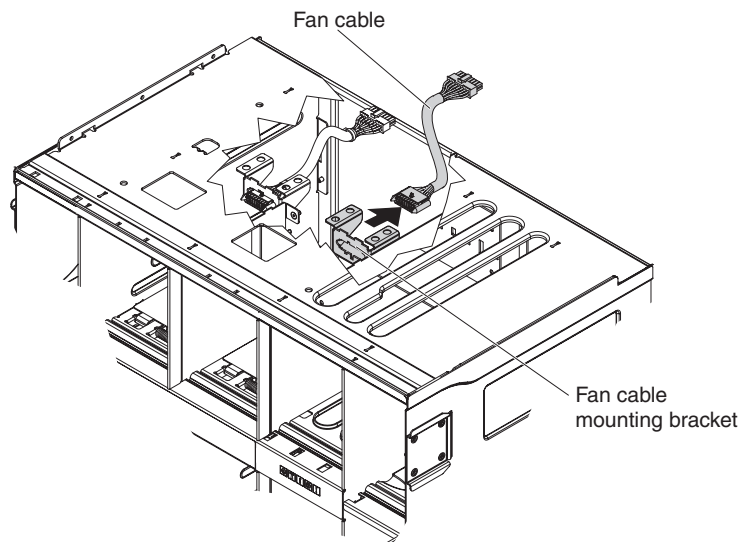
Orientation slots in fan cable mounting bracket



Orientation tabs
(1 top, 2 bottom)

Locking tab

- d. Slide the cable plug to the right to align the one top and two bottom orientation tabs on the cable plug with the slots in the fan cable mounting bracket.
- e. Remove the midplane-to-fan cable from the fan cable mounting bracket.



- f. Remove the midplane-to-fan cable from the BladeCenter S chassis.

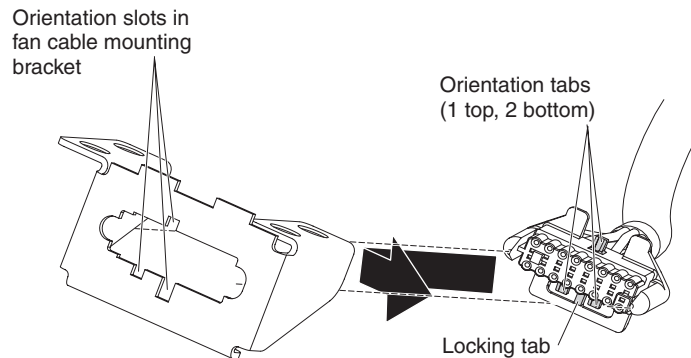
Installing a midplane-to-fan cable

The installation of a midplane-to-fan cable should only be performed by a trained service technician.

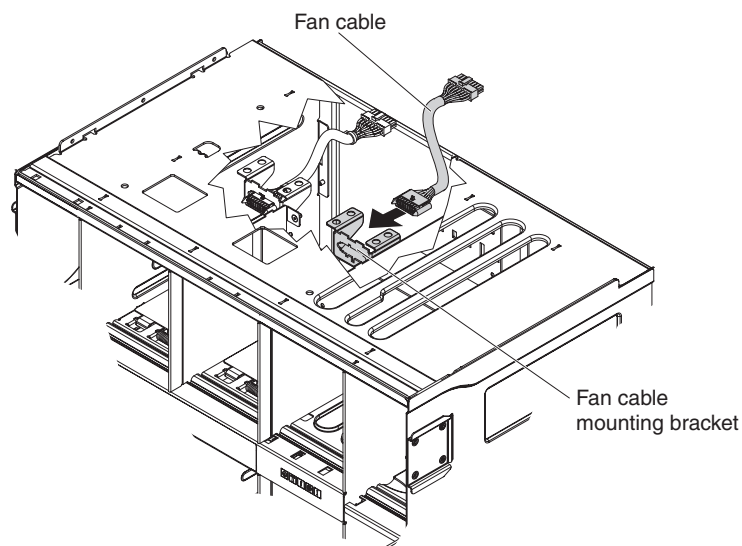
Read Safety and “Installation guidelines” on page 81 before performing this procedure.

There are four midplane-to-fan cables in the BladeCenter S Types 7779 and 8886.

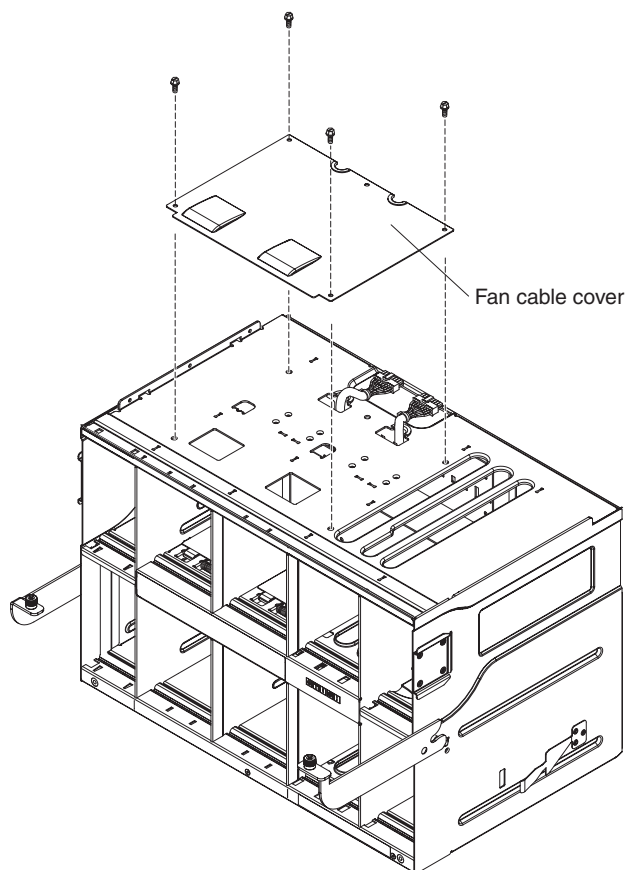
1. Connect the appropriate end of the midplane-to-fan cable to the fan cable mounting bracket in the BladeCenter S chassis.
 - a. Position the SPC chassis so that you are facing the front of the SPC chassis. You will be able to see the air flow dampers in the fan module bays and all the labeling for the bays. The midplane will be facing away from you.
 - b. Depress the air flow damper in a fan module bay so that you can see the midplane-to-fan cable and fan cable mounting bracket.
 - c. From behind the fan cable mounting bracket, push the plug through the mounting bracket by aligning the one top and two bottom orientation tabs on the plug with the slots in the fan cable mounting bracket.



- d. Slide the plug slightly to the right to lock the plug in place.
2. Thread the other end of the cable up through the fan cable hole in the SPC chassis.



3. Install the fan cable cover.



4. Install the midplane if needed (see “Installing the midplane” on page 115).
5. Install the SPC chassis into the BladeCenter S chassis (see “Installing the SPC chassis (shuttle)” on page 112).

Removing an air damper

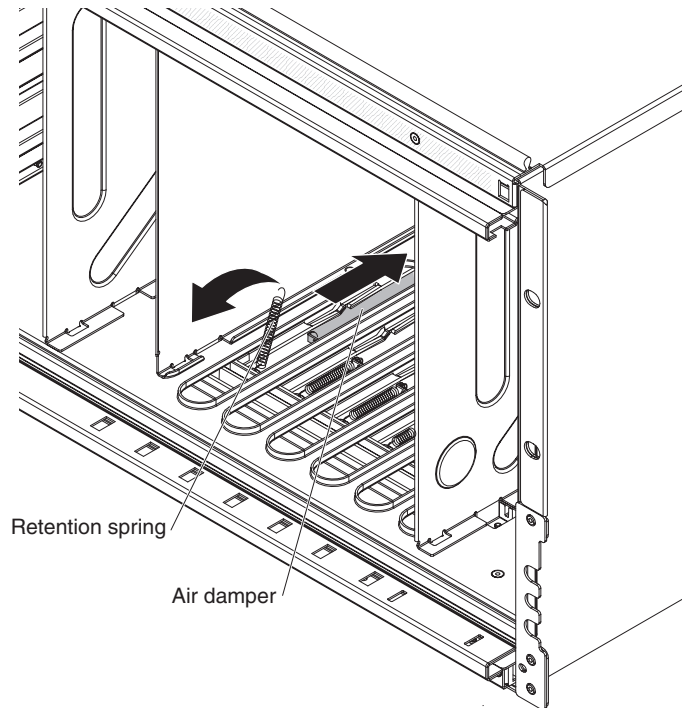
The removal of an air damper should only be performed by a trained service technician.

Read Safety and “Installation guidelines” on page 81 before performing this procedure.

There are upper and lower air dampers inside each of the BladeCenter S chassis blade server bays.

Perform these steps to remove an air damper.

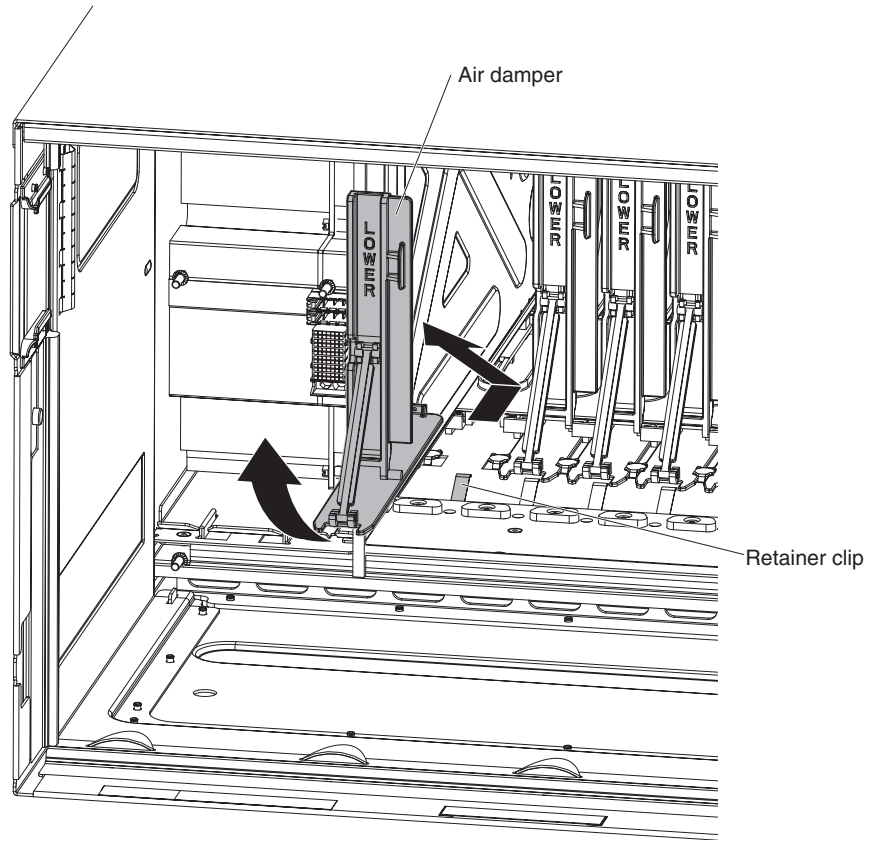
1. Disconnect the BladeCenter S chassis from power.
2. Remove all blade servers (see “Removing a blade server” on page 98).
3. Remove the air damper.
 - a. From the front of the BladeCenter S chassis, reach into the blade server bays and detach the spring from air damper and the front of the chassis.



- b. From the rear of the BladeCenter S chassis, detach the air damper from the chassis.

Note: You may need to carefully work the air damper from side to side to detach it.

- c. Slide the damper out of the rear of the BladeCenter S chassis, lifting the back of the damper slightly to clear the metal tabs on the chassis.



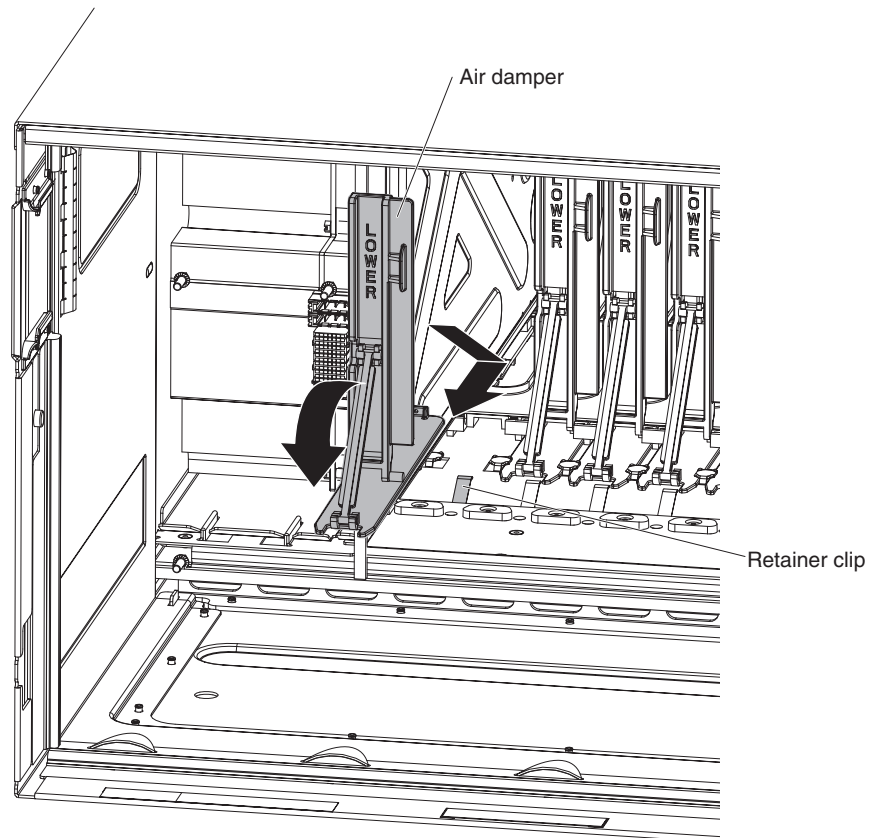
Installing an air damper

The installation of an air damper should only be performed by a trained service technician.

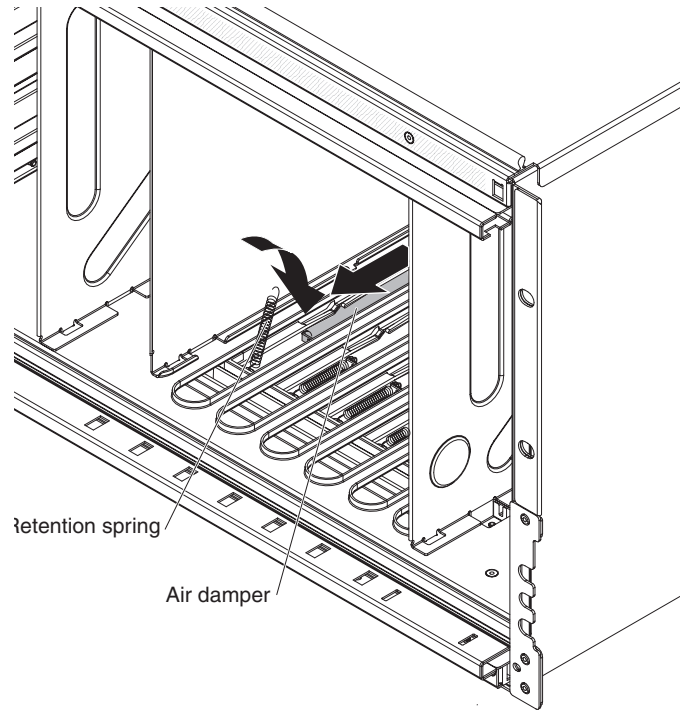
Read Safety and “Installation guidelines” on page 81 before performing this procedure.

There is an air damper inside each of the BladeCenter S chassis blade server bays. Perform these steps to install the air damper.

1. Make sure all blade servers are removed from the BladeCenter S chassis, and that it is disconnected from power.
2. From the rear of the BladeCenter S chassis, slide the air damper into the air damper slot towards the front of the chassis.



3. Attach the air damper to the BladeCenter S chassis.
4. From the front of the BladeCenter S chassis, connect the spring to the air damper, orienting the spring so that it fits into the spring hole.



5. Connect the other end of the spring to the BladeCenter S chassis, orienting the spring so that it fits into the spring hole.
6. Install blade servers (see “Installing a blade server” on page 99).
7. Connect the BladeCenter S chassis to power.

Appendix. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine whom to call for service, if it is necessary.

Before you call

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

If you believe that you require IBM to perform warranty service on your IBM product, the IBM service technicians will be able to assist you more efficiently if you prepare before you call.

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

quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

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

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files.

See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to the <http://www.ibm.com/supportportal/> IBM Support Portal .

Getting help and information from the World Wide Web

Up-to-date information about IBM products and support is available on the World Wide Web.

On the World Wide Web, up-to-date information about IBM systems, optional devices, services, and support is available at the <http://www.ibm.com/supportportal/> IBM Support Portal . IBM System x information is at the <http://www.ibm.com/systems/x/> IBM System x website . IBM BladeCenter information is at the <http://www.ibm.com/systems/bladecenter/> IBM BladeCenter website . IBM IntelliStation information is at the <http://www.ibm.com/systems/intellistation/> IBM Workstations website .

How to send DSA data to IBM

Use the IBM Enhanced Customer Data Repository to send diagnostic data to IBM.

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

You can use any of the following methods to send diagnostic data to IBM:

- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html Enhanced Customer Data Repository standard upload website
- **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw/ Standard Upload website
- **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure Enhanced Customer Data Repository secure upload website
- **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload_hw/ Secure Upload website

Creating a personalized support web page

You can create a personalized support web page by identifying IBM products that are of interest to you.

To create a personalized support web page, go to the <http://www.ibm.com/support/mysupport/> IBM Registration website . From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your IBM products.

For information about which products are supported by Support Line in your country or region, see the <http://www.ibm.com/services/supline/products/> IBM Support Line Supported Product List website .

For more information about Support Line and other IBM services, see the <http://www.ibm.com/services/> IBM IT Services website or see the <http://www.ibm.com/planetwide/> "Directory of worldwide contacts" website 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 the <http://www.ibm.com/partnerworld/> IBM PartnerWorld website and click **Find Business Partners** on the right side of the page. For IBM support telephone numbers, see the <http://www.ibm.com/planetwide/> "Directory of worldwide contacts" website. 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

Use this information to contact 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:

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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.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write

cycles that it can be subjected to, expressed as “total bytes written” (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. IBM is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

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

Table 6. Limits for particulates and gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none"> • The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2¹. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%². • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	<ul style="list-style-type: none"> • Copper: Class G1 as per ANSI/ISA 71.04-1985³ • Silver: Corrosion rate of less than 300 Å in 30 days

Table 6. Limits for particulates and gases (continued)

Contaminant	Limits
	<ol style="list-style-type: none">1. ASHRAE 52.2-2008 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.2. The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.3. ANSI/ISA-71.04-1985. Environmental conditions for process measurement and control systems: Airborne contaminants. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Documentation format

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

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Electronic emission notices

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

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

European Union EMC Directive conformance statement

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

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Responsible manufacturer:

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

European Community contact:

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

Germany Class A statement

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

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

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

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

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

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Technical Regulations, Abteilung M372

IBM-Allee 1, 71139 Ehningen, Germany
Telephone: +49 7032 15 2941
Email: lugi@de.ibm.com

Generelle Informationen:

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

Japan VCCI Class A statement

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Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

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

Japan Electronics and Information Technology Industries Association (JEITA) statement

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Russia Electromagnetic Interference (EMI) Class A statement

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People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

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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。

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