BladeCenter T Type 8267

Hardware Maintenance Manual and Troubleshooting Guide

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Note: Before using this information and the product it supports, read the general information in "Notices" on page 107, the *IBM Safety Information* and the *Environmental Notices and User Guide* on the IBM *Documentation* CD, and the *Warranty Information* document.

The most recent version of this document is available at http://www.ibm.com/supportportal/ .

First Edition (September 2011)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

Use this information to help you identify potential unsafe conditions in an IBM® product that you are working on.

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

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

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

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

1. Make sure that the power is off and the power cords are disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cords:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cords are the correct type.

- Make sure that the insulation is not frayed or worn.

4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the system for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe these guidelines when you service electrical equipment.

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

- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Safety statements

These statements provide the caution and danger information that is used in this documentation.

Important:

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

For example, if a caution statement is labeled "Statement 1," translations for that caution statement are in the *Safety Information* document under "Statement 1."

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

Statement 1

DANGER

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

To avoid a shock hazard:

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

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

Statement 2

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

Do not:

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

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

Statement 3

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

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

DANGER

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

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

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

Statement 4

≥ 18 kg (39.7 lb)

≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 8

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

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

Statement 12

CAUTION:
The following label indicates a hot surface nearby.

Statement 13

DANGER

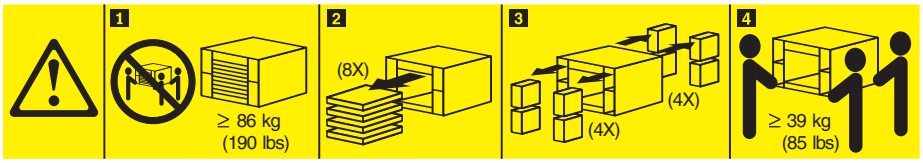
Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical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

Statement 21

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

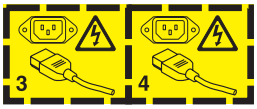
Statement 32

CAUTION:
To avoid personal injury, before lifting the unit, remove all the blades, power supplies, and removable modules to reduce the weight.



Statement 33

CAUTION:
This device does not provide a power control button. Removing power supply modules or turning off the server blades does not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Rack Safety Information, Statement 2

DANGER

- **Always lower the leveling pads on the rack cabinet.**
- **Always install stabilizer brackets on the rack cabinet.**
- **Always install servers and optional devices starting from the bottom of the rack cabinet.**
- **Always install the heaviest devices in the bottom of the rack cabinet.**

United Kingdom telecommunications safety requirement

Notice to Customers

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

Start here

You can solve many problems without outside assistance by following the troubleshooting procedures in this documentation and on the World Wide Web.

This *Hardware Maintenance Manual and Troubleshooting Guide* describes the diagnostic tests that you can perform, troubleshooting procedures, and explanations of error messages and error codes. The documentation that comes with your operating system and software also contains troubleshooting information.

Diagnosing a problem

Before you contact IBM or an approved warranty service provider, follow these procedures in the order in which they are presented to diagnose a problem with your blade server:

1. **Determine what has changed.** Determine whether any of the following items were added, removed, replaced, or updated before the problem occurred:
   - Hardware components
   - Device drivers and firmware
   - System software
   - UEFI firmware
   - System input power or network connections

   If possible, return the blade server to the condition it was in before the problem occurred.
2. **View the light path diagnostics LEDs and event logs.** The blade server is designed for ease of diagnosis of hardware and software problems.
   - **Light path diagnostics LEDs:** See "Light path diagnostics LEDs" on page 92 for information about light path diagnostics LEDs that are lit and actions that you should take.
   - **Event logs:** See "Error symptoms" on page 83 for information about notification events and diagnosis.
   - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's website for documentation.
3. **Run IBM Dynamic System Analysis (DSA) and collect system data.** Run Dynamic System Analysis (DSA) to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. For instructions for running DSA, see the *Dynamic System Analysis Installation and User's Guide*.

   To download the latest version of DSA code and the *Dynamic System Analysis Installation and User's Guide*, go to http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SERV-DSA .
4. **Check for and apply code updates.** Fixes or workarounds for many problems might be available in updated UEFI firmware, device firmware, or device drivers.

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

a. **Install Update*Xpress* system updates.** You can install code updates that are packaged as an Update*Xpress* System Pack or Update*Xpress* CD image. An UpdateXpress System Pack contains an integration-tested bundle of online firmware and device-driver updates for your blade server. In addition, you can use IBM ToolsCenter Bootable Media Creator to create bootable media that is suitable for applying firmware updates and running preboot diagnostics. For more information about Update*Xpress* System Packs, see http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SERV-XPRESS . For more information about the Bootable Media Creator, see http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=TOOL-BOMC .

   Be sure to separately install any listed critical updates that have release dates that are later than the release date of the Update*Xpress* System Pack or Update*Xpress* image (see step 4b).

b. **Install manual system updates.**

   1) **Determine the existing code levels.**

      From the advanced management module Web interface, click **Monitors** and then click **Firmware VPD**.

      In DSA, click **Firmware/VPD** to view system firmware levels, or click **Software** to view operating-system levels.

   2) **Download and install updates of code that is not at the latest level.**

      To display a list of available updates for the server, go to http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FSystemx .

      To display a list of available updates for the blade server, go to http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

      When you click an update, an information page is displayed, including a list of the problems that the update fixes. Review this list for your specific problem; however, even if your problem is not listed, installing the update might solve the problem.

5. **Check for and correct an incorrect configuration.** If the blade server is incorrectly configured, a system function can fail to work when you enable it; if you make an incorrect change to the blade server configuration, a system function that has been enabled can stop working.

   a. **Make sure that all installed hardware and software are supported.** See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to verify that the blade server supports the installed operating system, optional devices, and software levels. If any hardware or software component is not supported, uninstall it to determine whether it is causing the problem. You must remove nonsupported hardware before you contact IBM or an approved warranty service provider for support.

   b. **Make sure that the server, operating system, and software are installed and configured correctly.** Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the blade server, reconnecting cables, reseating adapters, and turning the blade server back on. For information about configuring the blade server, see Chapter 2, “Configuring the BladeCenter T unit,” on page 19.

6. **See controller and management software documentation.** If the problem is associated with a specific function (for example, if a RAID hard disk drive is marked offline in the RAID array), see the documentation for the associated controller and management or controlling software to verify that the controller is correctly configured.

   Problem determination information is available for many devices such as RAID and network adapters.

   For problems with operating systems or IBM software or devices, go to http://www.ibm.com/supportportal/ .
7. **Check for troubleshooting procedures and RETAIN tips.** Troubleshooting procedures and RETAIN tips document known problems and suggested solutions. To search for troubleshooting procedures and RETAIN tips, go to http://www.ibm.com/supportportal/ .
8. **Use the troubleshooting tables.** See Table 4 on page 84Table 4 on page 84 to find a solution to a problem that has identifiable symptoms.

   A single problem might cause multiple symptoms. Follow the troubleshooting procedure for the most obvious symptom. If that procedure does not diagnose the problem, use the procedure for another symptom, if possible.

   If the problem remains, contact IBM or an approved warranty service provider for assistance with additional problem determination and possible hardware replacement. To open an online service request, go to http://www.ibm.com/support/electronic/portal/ . Be prepared to provide information about any error codes and collected data.

Undocumented problems

If you have completed the diagnostic procedure and the problem remains, the problem might not have been previously identified by IBM. After you have verified that all code is at the latest level, all hardware and software configurations are valid, and no light path diagnostics LEDs or log entries indicate a hardware component failure, contact IBM or an approved warranty service provider for assistance.

To open an online service request, go to http://www.ibm.com/support/electronic/portal/ . Be prepared to provide information about any error codes and collected data and the problem determination procedures that you have used.

Chapter 1. General information

The IBM BladeCenter® T Type 8267 unit is rack-mounted, high-density, high-performance blade server system developed for demanding environments requiring physical robustness and improved cooling support .

The BladeCenter T unit uses blade servers, switches, and other components that are common to the IBM BladeCenter product line. This common component strategy makes it ideal for applications in telecommunications networks that need high levels of computing power and access to common off-the-shelf middleware packages that are used in IT data centers. The BladeCenter T unit supports up to eight blade servers and four I/O modules, making it ideally suited for networking environments that require a large number of high-performance servers in a small amount of space. The BladeCenter T unit provides common resources that are shared by the blade servers, such as power, cooling, system management, network connections, backplane, and I/O (CD-ROM drive and connectors for USB, network interfaces, and – for blade servers that support the KVM function – keyboard, video, and mouse).

Performance, ease of use, reliability (designed for NEBS Level 3 compliance), and expansion capabilities were key considerations during the design of the BladeCenter T system. These design features make it possible for you to customize the system hardware to meet your needs today, while providing flexible expansion capabilities for the future.

This *Hardware Maintenance and Troubleshooting Guide* provides information to:

- Set up and cable a BladeCenter T unit
- Start and configure a BladeCenter T unit
- Install and remove modules, options, and blades
- Replace field replaceable units
- Perform troubleshooting and servicing of the BladeCenter T unit

Packaged with the *Hardware Maintenance and Troubleshooting Guide* are software CDs that help you to configure and manage the BladeCenter T unit.

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

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

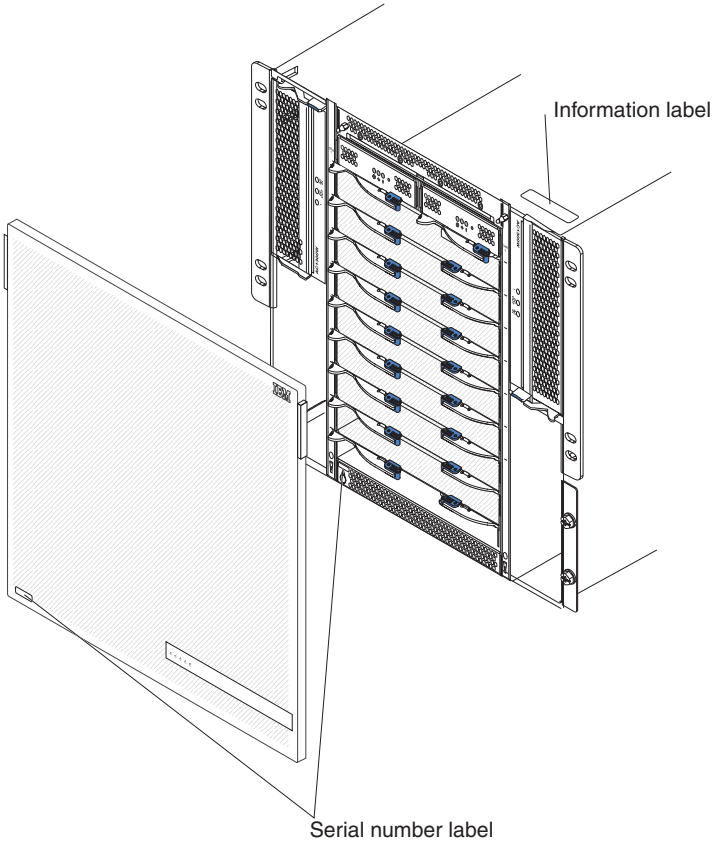
Record information about your BladeCenter T unit in the following table. You will need this information when you register your BladeCenter T unit with IBM.

Product name	IBM BladeCenter T
Machine type	8267
Model number	_____
Serial number	_____

The serial number and model number are located in three places on the BladeCenter T unit:

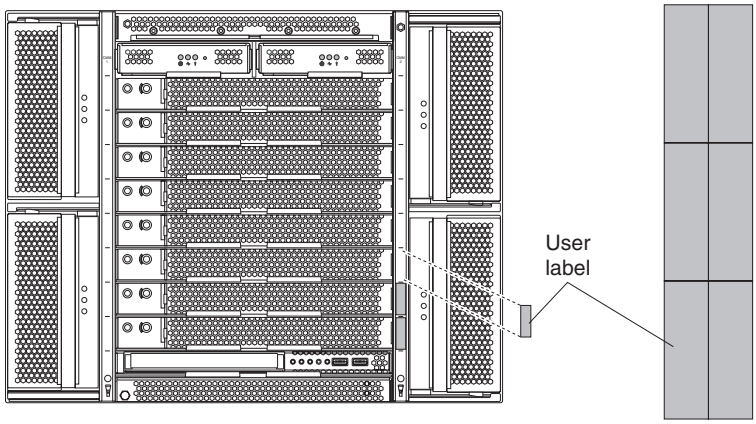
- Top of the BladeCenter T unit
- Front of the bezel assembly (if ordered with your system)
- Front of the BladeCenter T unit

The labels on the top and the front of the bezel assembly of the BladeCenter T unit are shown in the following illustration.



A set of user labels comes with each blade server. When you install a blade server in the BladeCenter T unit, write identifying information on a label and place the label on the BladeCenter T unit bezel.

The following illustration shows the placement of the label, to the side of the blade server, on the BladeCenter T unit.



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

Related publications

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

In addition to this *Hardware Maintenance and Troubleshooting Guide*, the following documentation is provided in PDF on the IBM *Documentation* CD that comes with your BladeCenter T unit:

- *Safety Information:* This document is in PDF on the IBM Documentation CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the Safety Information document.
- *Installation and User's Guide:* The *Installation and User's Guide* contains general information about the chassis, including how to install supported optional devices.
- BladeCenter T *Rack Installation Instructions:* These documents contain instructions for installing the BladeCenter T unit in a 4-post and 2-post rack.

  Note: The BladeCenter T can also be installed in some xSeries and pSeries racks, such as the IBM Netbay42 Enterprise Rack Model 9308. See the installation instructions that come with those racks.
- *Management Module Installation Guide:* This document contains instructions for installing an IBM management module option in a BladeCenter T unit and creating the initial configuration.
- *Management Module User's Guide:* This document contains instructions for using the web interface to configure the management modules in a BladeCenter T unit.

Additional publications might be included on the IBM *Documentation* CD that comes with your BladeCenter T unit.

Notices and statements used in this book

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

The following notices and statements are used in the documentation:

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

Features and specifications

The following table provides a summary of the features and specifications of the BladeCenter T unit.

Table 1. Features and specifications

Media tray (on front):
- DVD/CD-RW drive: slim SATA
- Two Universal Serial Bus (USB) v2.0 high speed ports
- System-status panel

Module bays (on front):
- Eight hot-swap blade bays
- Four hot-swap power-module bays
- Two hot-swap management module bays

Module bays (on rear):
- Four hot-swap I/O module bays
- Four hot-swap blower bays
- One hot-swap KVM (keyboard, video, mouse) module
- One hot-swap LAN module

Power modules:
- Four 1300-watt power modules
  - Power modules 1 and 2 supply power to:
    - Blade bays 1 through 4
    - Management modules 1 and 2
    - I/O modules 1 and 2
    - Media tray
    - All KVM, LAN, and serial interfaces
    - All four blower modules
  - Power modules 1 and 2 provide redundancy to each other
  - Power modules 3 and 4 supply power to:
    - Blade bays 5 through 8
    - I/O modules 3 and 4
  - Power modules 3 and 4 provide redundancy to each other
  - Blowers are powered by all four power modules

LAN module:
- Two 10/100 Mb Ethernet remote management connections
- One DB60 serial port connector

KVM module:
- Video port (analog)
- USB keyboard port
- USB mouse port
- System-status panel

I/O modules:
- Standard: None
- Maximum: Four
  - Two hot-swap 1 Gb Ethernet four-port switch modules
  - Two hot-swap switch modules of another network-communication standard, such as Fibre Channel

Management module: Two hot-swap management modules (one active, one redundant) providing system-management functions for the BladeCenter T unit.

Redundant cooling: Four variable-speed hot-swap blowers

Front bezel with changeable filter (depending on model)

Upgradeable microcode:
- management module firmware
- I/O-module firmware (not all I/O module types)
- Blade server service processor firmware (UEFI, service processor)

Size (8 U):
- Height: 349.25 mm (13.75 in. or 8 U)
- Depth: 508 mm (20 in.) from front of chassis to rear I/O connector plane. Maximum depth: 600 mm (23.62 in.) including bezel, handles, and cable bend radius.
- Width: 442 mm (17.4 in.)
- Weight:
  - Fully configured with modules and blade servers: Approx. 89.4 kg (197 lb)
  - Shipping without blade servers: Approx. 52.6 kg (116 lb)

Security features:
- Login password for remote connection
- Lightweight Directory Access Protocol (LDAP) and role based security for user authentication and authorization
- Secure Shell (SSH) for remote command-line interface
- Secure socket layer (SSL) security for remote web interface access

Environment:
- Air temperature:
  - Altitude: -60 to 1800 m (-197 ft to 6000 ft)
    - BladeCenter T on: 5° to 40°C (41° to 104°F)
    - BladeCenter T on (short term(Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in one year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that one-year period.))): -5° to 55°C (23° to 131°F)(For operation above 40°C (104°F), all power moduels must be installed and energized to allow current-sharing between the paired power modules.)
  - Altitude: 1800 m to 4000 m (6000 ft to 13000 ft)
    - BladeCenter T on: 5° to 30°C (41° to 86°F)
    - BladeCenter T on (short term): -5° to 45°C (23° to 113°F)
  - System unit off: uncontrolled
- Rate of temperature change: 30°C/hour (54°F/hour)
- Humidity:
  - BladeCenter T on: 5% to 85%
  - BladeCenter T on (short term): 5% to 90% not to exceed 0.024 water/kg of dry air
  - BladeCenter T off: 95%, non-condensing at temperatures of 23°C (73°F) to 40°C (104°F)

Electrical input:
- Sine-wave input (50 or 60 Hz single-phase) required
- Input voltage low range:
  - Minimum: 100 V ac
  - Maximum: 127 V ac
- Input voltage high range:
  - Minimum: 200 V ac
  - Maximum: 240 V ac
- Input current:
  - Chassis:
    - (2x) 14.8 Amps (Irms nominal) at 100VAC
    - (2x) 7.2 Amps (Irms nominal) at 200VAC
- Input connector type: Four (4) C20 inputs, rated at 20 amps each

Table 1. Features and specifications (continued)

Declared acoustical noise emission levels for normal operations: • Sound-power levels (upper-limit): 7.8 bels • Sound-pressure levels (average), for four one-meter bystander positions: 63 dBA The noise emission levels stated are the declared upper limit sound-power levels, in bels, for a random sample of machines. All measurements made in accordance with ISO 7779 and reported in conformance with ISO 9296.	**Predictive Failure Analysis (PFA) alerts:** • Blowers • Blade-dependent features • Power supplies	**Heat output:** • Input kilovolt-amperes (kVA) approx. – Minimum configuration: 0.2 kVA – Maximum configuration: 3.7 kVA • BTU output – Ship configuration: 673 Btu/hour (197 watts) – Full configuration: 12640 Btu/hour (3707 watts)

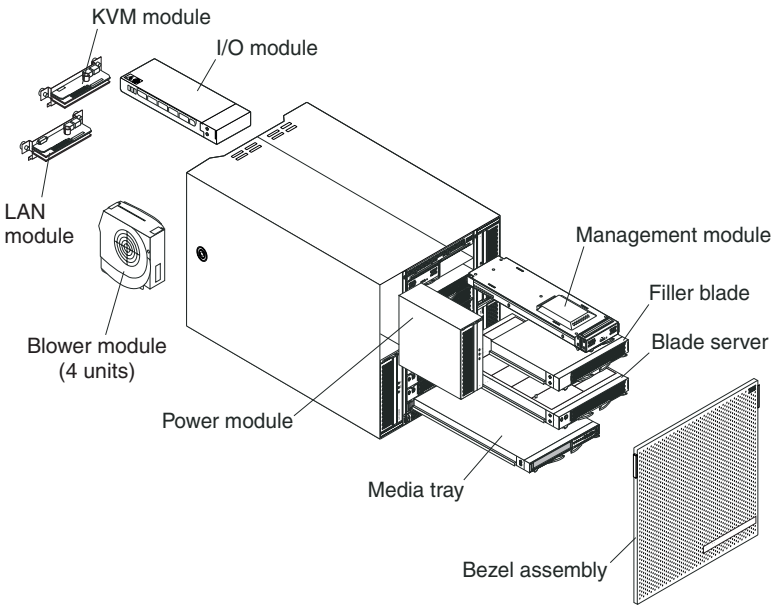
Notes:

1. For details about the BladeCenter T unit port specifications, see "BladeCenter T unit power, controls, and indicators" on page 15.
2. For information about which types of I/O modules can be installed in which I/O-module bays, see "I/O modules" on page 15.
3. The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard, mouse, and DVD/CD-RW drive. The BladeCenter T unit uses USB for internal communication with these devices.

Major components of the BladeCenter T Type 8267 unit

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

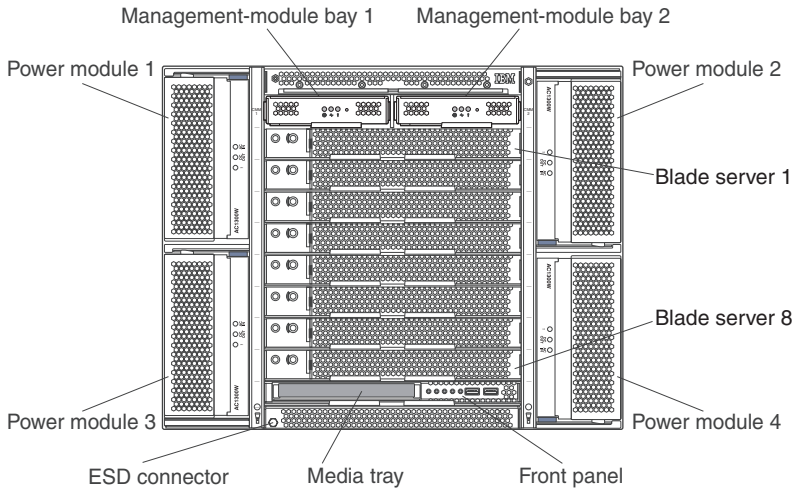
Note: The illustrations in this document might differ slightly from your hardware.



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

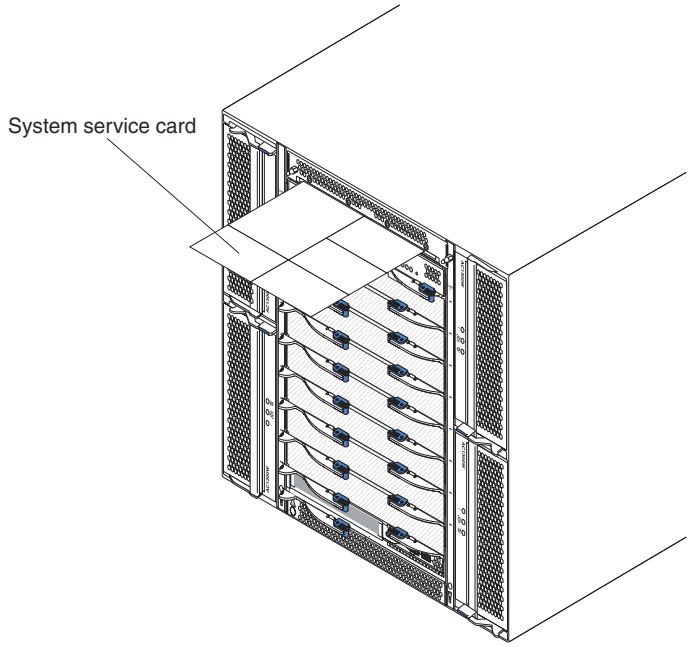
Front view

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



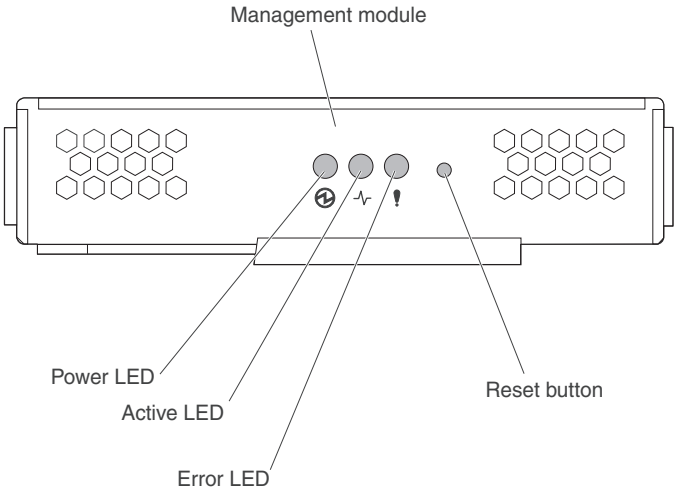
System service cards

These cards contain system service instructions and a writable area for your use. The cards are located in a slot just above the management-module bays. To access the service cards, slide out the cards as shown in the following illustration.



Management module controls and indicators

These management-module controls and indicators provide status information about the management module and remote management connection. For additional information, see the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *Documentation* CD that comes with the BladeCenter T unit.



Management module LEDs: These LEDs provide status information about the management module and remote management connection.

- **Power:** When this green LED is lit, it indicates that the management module has power.
- **Active:** When this green LED is lit, it indicates that the management module is actively controlling the BladeCenter T unit. Only one management module actively controls the BladeCenter T unit. If two management modules are installed in the BladeCenter T unit, this LED is lit on only one.
- **Error:** When this amber LED is lit, it indicates that an error has been detected somewhere on the management module. When this LED is lit, the system error LED (critical, major, or minor) on each of the BladeCenter T system-status panels is also lit.

Management module IP reset button: *Do not* press this button unless you intend to erase your configured IP addresses for the management module and lose connection with the remote management station, the switch modules, and the blade servers. If you press this button, you must reconfigure the management module settings (see the information beginning with "Configuring management ports on I/O modules" on page 26 for instructions).

Press this recessed button to reset the IP configuration of the management module network interfaces (Ethernet 1, Ethernet 2, gateway address, and so on) to the factory defaults and then restart the management module.

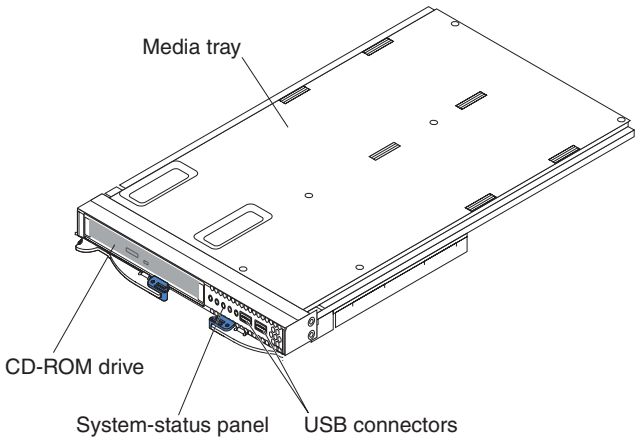
Use a straightened paper clip to press the button.

Serial connector: Use this connection for configuring and managing the BladeCenter components over a serial line through the command-line interface (CLI) user-interface. This port provides access and redirection to the serial-over-LAN (SOL) interface of any processor blade server. For example, you can connect a laptop device to the serial connector and use a terminal-emulator

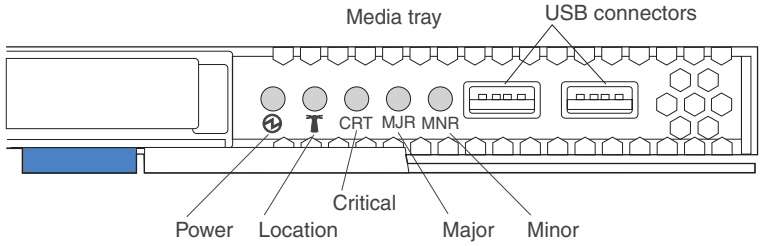
program to configure the assorted IP addresses, user accounts, and other management settings through the CLI user-interface.

Media tray

The media tray is a hot-swap unit that is installed on the front of the BladeCenter T unit and contains the system-status panel, I/O, and CD-ROM drive.



The following illustration shows the system-status LEDs on the system-status panel on the front of the BladeCenter T unit.



The system-status panel on the front of the BladeCenter T system has five system-status LEDs and two USB connectors.

System status LEDs: The LEDs on this part of the panel provide status information for the BladeCenter T unit.

- **Power:** When continuously lit, this green LED indicates the presence of power in the BladeCenter T unit. The LED turns off when the power source is interrupted.

  Attention: If the power LED is off, it does not mean electrical power is not present in the BladeCenter T unit. The LED might be burned out. To remove all electrical power from the BladeCenter T unit, you must disconnect all power cords from the rear of the BladeCenter T unit.
- **Location:** This blue LED is for system identification. A system administrator or servicer uses this LED to locate a specific BladeCenter T unit for service or repair. You can turn off the location LED through the web interface or a remote management console.

Alarm LEDs: These LEDs provide alarm notifications for the BladeCenter T unit.

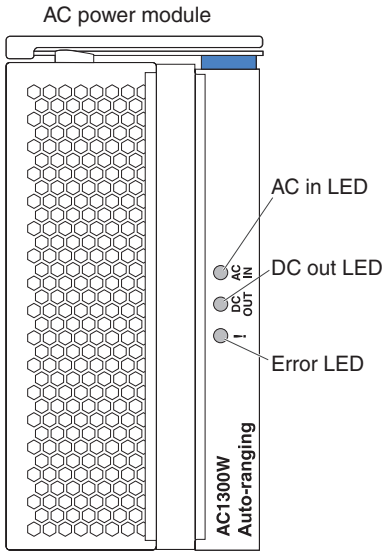
- **CRT (Critical alarm, amber (default) or red):** When continuously lit, this LED indicates the presence of a critical system fault. The system comes with amber as

the default. See the document for the management model for information on setting the color of this LED. A critical system fault is an error or event that is unrecoverable. In this case, the system cannot continue to operate. An example is the loss of a large section of memory that causes the system to be incapable of operating.

- **MJR (Major alarm, amber (default) or red):** When continuously lit, this LED indicates the presence of a major system fault. The system comes with amber as the default. See the document for the management module for information on setting the color of this LED. A major system fault is an error or event that has a discernible impact to system operation. In this case, the system can continue to operate but with reduced performance. An example is the loss of one of two mirrored disks.
- **MNR (Minor alarm, amber):** When continuously lit, this LED indicates the presence of a minor system fault. A minor system fault is an error or event that has little impact to system operation. An example is a correctable ECC error.

USB connectors: There are two USB connectors on the front system-status panel. You can use these USB connectors to connect two USB peripheral devices without an external hub. If more devices are required, you can connect an external hub to any of the built-in connectors.

Power modules



Power module LEDs: Each power module has three LEDs to indicate the status of the power module.

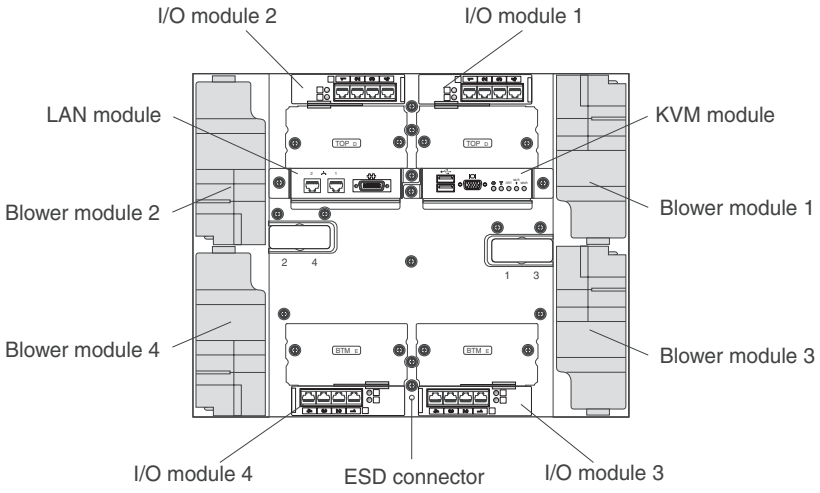
- **AC in:** When continuously lit, this green LED indicates that the input power source is working. If the LED is not lit, it indicates that the input power source is not present or is incorrect.
- **DC out:** When continuously lit, this green LED indicates that the output power is present. If the LED is not lit, it indicates that the output power is not present.
- **! (Error):** When continuously lit, this amber LED indicates that there is a error condition within the power module.

Table 2. Power module LEDs

AC IN	DC OUT	! (Error) (amber)	Description and action
On	On	Off	The power module is on and operating correctly.
On	Off	Off or On*	There is an output power problem. A system error has shut down the power module. Actions: Determine the cause of the shutdown using the diagnostics and replace the failed component. When the fault has been cleared, reset the power module in one of the following ways: • Issue a power-module reset through the management module. • Remove the power module from the unit for at least 10 seconds. If the problem remains, have the unit serviced. *Error LED will operate only if a redundant power supply is installed.
Off	Off	Off or On*	There is an input power problem. Possible causes: • There is no power to the power module. Actions: Make sure that: 1. The power is correctly connected to the unit. 2. The power is connected to 110 v ac or 220 v ac. 3. The power source functions properly. • The power module has failed. Action: Replace the power module. If the problem remains, have the unit serviced. *Error LED will operate only if a redundant power supply is installed.
On	On	On	There is a fault condition in the power supply. Possible causes: • Thermal fault. Action: Replace the power module. • 12 v over-voltage power condition or 12 v under-voltage power condition. Actions: Determine the cause of shutdown using diagnostics and replace the failed component. When the fault has been cleared, reset the power module. – Issue a power-module reset through the management module. – Remove the power module from the unit for at least 10 seconds.

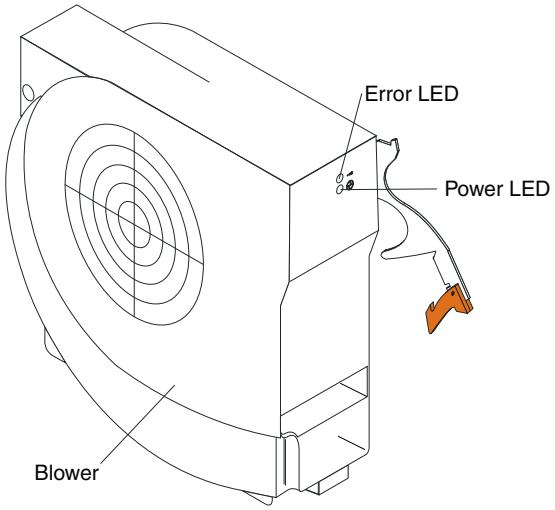
Rear view

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



Blower modules

The blower modules are hot-swap units that are installed into the rear of the system. The BladeCenter T unit comes with four blowers that are in a 3+1 redundancy configuration. All the cooling requirements are met if one blower fails. All blowers contain a backflow device that prevents the system from drawing air into the exhaust port of a failed blower. The management module in the BladeCenter T unit controls the blower speed and detects blower failures.



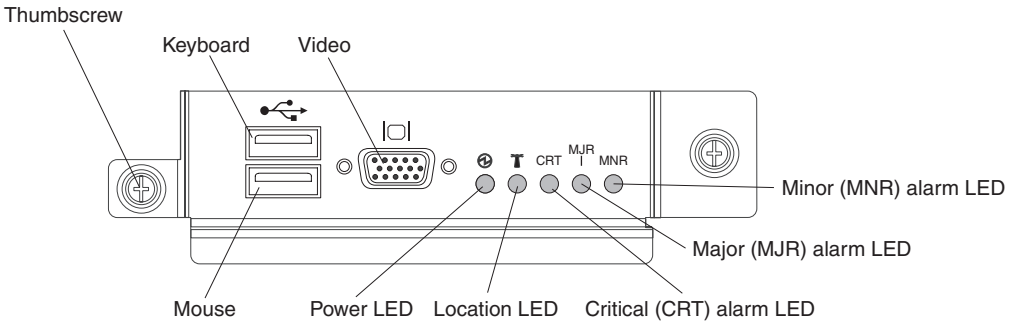
Blower LEDs: The LEDs on each blower provide status information about the blower.

- **Power:** When this green LED is lit, it indicates that the blower module has power.

- **Error:** This amber LED is lit and stays lit when an error has been detected in the blower. The system error LED on the BladeCenter system-status panels is also lit.

KVM (keyboard, video, mouse) module indicators and input/output connectors

The KVM module is a hot-swap module that is installed on the rear of the BladeCenter T unit and is held in place by captive thumbscrews. This module contains two USB connectors for the keyboard and mouse, a video connector, and a system-status panel.



System-status LEDs: These LEDs provide status information for the BladeCenter T unit.

- **Power:** When continuously lit, this green LED indicates the presence of power in the BladeCenter T unit. The LED turns off when the power source is interrupted.

  Attention: If the power LED is off, it does not mean electrical power is not present in the BladeCenter T unit. The LED might be burned out. To remove all electrical power from the BladeCenter T unit, you must disconnect all power cords from the rear of the BladeCenter T unit.
- **Location:** This blue LED is for system identification. A system administrator or servicer uses this LED to locate a specific BladeCenter T unit for service or repair. You can turn off the location LED through the web interface or a remote management console.

Alarm LEDs: These LEDs provide alarm notifications for the BladeCenter T unit.

- **CRT (Critical alarm, amber (default) or red):** When continuously lit, this LED indicates the presence of a critical system fault. The system comes with amber as the default. See the documentation that comes with the management module for information on setting the color of this LED. A critical system fault is an error or event that is unrecoverable. In this case, the system cannot continue to operate. An example is the loss of a large section of memory that causes the system to be incapable of operating.
- **MJR (Major alarm, amber (default) or red):** When continuously lit, this LED indicates the presence of a major system fault. The system comes with amber as the default. See the documentation that comes with the management module for information on setting the color of this LED. A major system fault is an error or event that has a discernible impact to system operation. In this case, the system can continue to operate but with reduced performance. An example is the loss of one of two mirrored disks.
- **MNR (Minor alarm, amber):** When continuously lit, this LED indicates the presence of a minor system fault. A minor system fault is an error or event that has little impact to system operation. An example is a correctable ECC error.

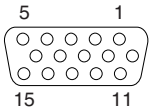
Connectors: The KVM module has the following I/O connectors:

- **Keyboard connector:** The KVM module contains one USB keyboard connector.

  Use this connector to connect a USB keyboard to the BladeCenter T unit.
- **Mouse connector:** The KVM module contains one USB mouse connector.

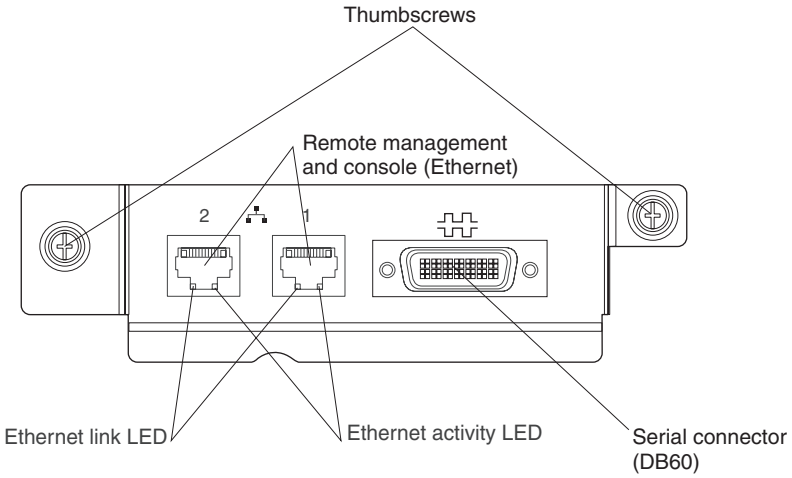
  Use this connector to connect a USB mouse to the BladeCenter T unit.
- **Video connector:** The T KVM module contains one standard video connector. The integrated video controller on each blade server is compatible with SVGA and VGA and communicates through this video port.

  Use this connector to connect a video monitor to the BladeCenter T unit.



LAN-module indicators and input/output connectors

The LAN module is a hot-swap module that is installed on the rear of the BladeCenter T unit and is held in place by captive thumbscrews. The LAN module provides the electrical and mechanical interface to the BladeCenter T unit for the two local area network (Ethernet) connections, as driven from each management module, and the telco external alarms. This module contains two RJ-45 connectors with LEDs and one DB60 serial connector.



LAN-module LEDs: These LEDs provide status information about the LAN connection:

- **Ethernet link:** When this green LED is lit, there is an active connection through the port to the network.
- **Ethernet activity:** When this green LED is flashing, it indicates that there is activity through the port over the network link.

LAN-module connectors:

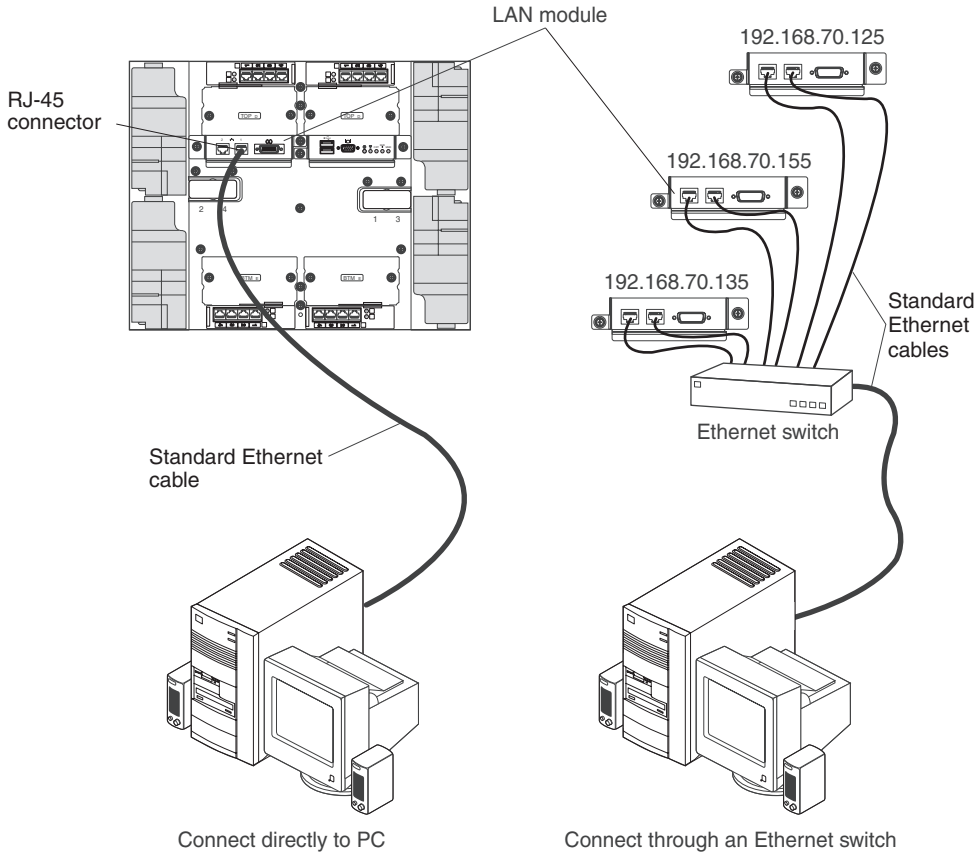
- **Remote management and console (Ethernet) connectors:** The LAN module provides two Ethernet RJ-45 connectors.

  The BladeCenter T LAN module contains two 10/100 Mb Ethernet connectors that provide the remote connections, driven from each management module, to the network management station on the network.

  Use these ports for remote management and remote console.

The network management station, through these connectors, can access control functions running in the management module, the service processor on each blade server, or within each switch module. However, it cannot use these ports to communicate with application programs running in the blade servers. The network management station must direct those communications through a network connected to the external ports in the I/O modules in the BladeCenter T unit.

- **Serial connector:** The LAN module provides one DB60 serial connector (female) for direct serial connection to each blade server using an external serial breakout cable (IBM part number 40K9605).



I/O modules

You can install a maximum of four I/O modules at the rear of the system (a maximum of four Gigabit Ethernet switches, or a maximum of two Gigabit Ethernet switches and two Fibre Channel switches). The minimum system configuration requires one Gigabit Ethernet switch or pass-thru module. The I/O switch modules provide high-performance connectivity between the blade servers.

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

BladeCenter T unit power, controls, and indicators

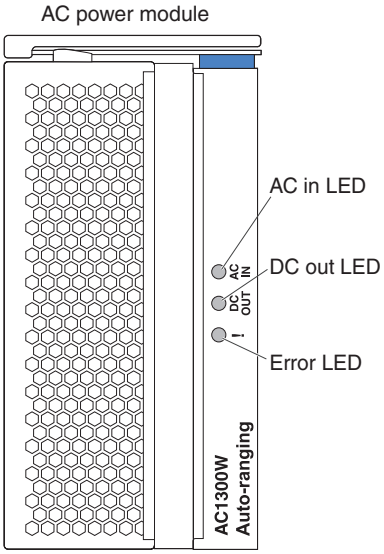
This section describes the controls and light-emitting diodes (LEDs) and how to start and shut down the BladeCenter T unit.

Starting the BladeCenter T unit

Complete the following steps to start the BladeCenter T unit:

1. Read the information in "System reliability considerations" on page 36.
2. Reinstall the four blowers into the rear of the BladeCenter T unit if you have not done so already. See "Removing and installing blower modules" on page 50 for detailed instructions.

   Note: The blowers will not start until the power modules are installed.
3. When the power connections are in place, you can reinstall the power modules in the BladeCenter T unit. After you connect power to the BladeCenter T unit, all the power-module bays receive power. To start the BladeCenter T unit, install power modules in all four power-module bays or install power modules in power-module bays 1 and 2 and filler modules in bays 3 and 4. See "Installing a power module" on page 45 for detailed instructions.

   Make sure that the LEDs on the power modules indicate that they are operating correctly. Make sure that the input and output power LEDs on each power module are lit, and the error LEDs are not lit.
4. Before proceeding, make sure that the LEDs on the blower modules indicate that they are operating correctly. Make sure that the power LED on each blower is lit, and the error LEDs are not lit.
5. Make sure that the following BladeCenter T modules are installed correctly. See "Media tray" on page 9 for the location of the LEDs on these modules.
   - Media tray
   - KVM module
   - LAN module
   - Management module
   - I/O modules
6. Install the blade servers or filler modules in all of the blade server bays before you power on any of the blade servers. See "Removing and installing a blade server or filler module" on page 60 for detailed instructions. Make sure that the power LED on each blade server is flashing.

7. Install the bezel assembly on the front of the BladeCenter T unit by inserting the bottom bezel hooks into the bezel slots at the bottom of the BladeCenter T unit. Push in the bottom and the top of the bezel assembly until they both lock firmly into place.

Notes:

1. Within 2 minutes after power has been connected to the BladeCenter T unit, the management module applies power to the I/O modules.
2. If a power failure occurs, the BladeCenter T unit restarts automatically when power is restored.
3. The blade-server power button turns on or turns off the blade server if local power control has not been disabled through the management module.
4. The blade-server power button turns on the blade server only if the green power light on the blade server is flashing slowly. If the light flashes rapidly, the blade server has not yet synchronized with the management module, and pressing the power button will have no effect. See "Media tray" on page 9 for more information about the controls and indicators on the BladeCenter T unit modules.

See the *Installation and User's Guide* for your blade server on the IBM *Documentation* CD that comes with the blade server for the location of the blade server LEDs.

Shutting down the BladeCenter T unit

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

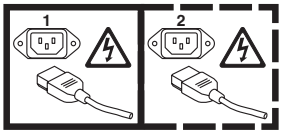
Complete the following steps to shut down the BladeCenter T unit.

1. See your blade server operating-system documentation for the procedure to shut down the operating system in the blade servers; then, shut down each operating system.
2. Press the power-control button on the front of each blade server. Wait until the solid green power LED on the blade server goes to a slow flash indicating that the blade server drives have stopped spinning.

   Statement 5

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

   Note: The IBM BladeCenter T Type 8267 units do not have a power switch. The units also have more than one connection to power. To remove all electrical

current from the unit, make sure that all connections to input power are disconnected at the power input terminals or connectors.

3. Disconnect all power cords on the BladeCenter T unit from the ac power distribution unit (PDU).

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

Chapter 2. Configuring the BladeCenter T unit

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

Note: There are two ways to configure the switch modules; through the management-module web interface, or through an external switch-module port enabled through the management module, using a Telnet interface or a web browser. See the documentation that comes with the switch module for more information.

For the active management module to communicate with the I/O modules in the BladeCenter T unit, you must configure the IP addresses for the following internal and external ports:

- The external Ethernet (remote management) port on the management module, accessed through the LAN module on the rear of the BladeCenter T unit (see "Configuring the external Ethernet port" on page 25 for instructions). The initial management module autoconfiguration enables the network management station to connect to the management module to configure the port completely and to configure the rest of the BladeCenter T unit.
- The internal Ethernet port on the management module for communication with the I/O modules (see "Configuring the internal Ethernet port" on page 25 for instructions).
- The management port on each switch module provides for communication with the management module. You configure this port by configuring the IP address for the switch module (see "Configuring management ports on I/O modules" on page 26 for instructions).

  Note: Some types of I/O modules, such as the pass-thru module, have no management port.

See the documentation that comes with the I/O module to determine what else you must configure in the I/O module.

To communicate with the blade servers for functions such as deploying an operating system or application program over the network, you must also configure at least one external (in-band) port on an Ethernet switch module in I/O-module bay 1 or 2. See "What to configure" on page 26 for information about configuring external ports on Ethernet switch modules.

The management module supports the following web browsers for remote access. The web browser that you use must be Java-enabled, must support JavaScript 1.2 or later, and must have the Java Virtual Machine (JVM) 1.4.1 or later Plug-in installed. The JVM Plug-in is available at the Java website at http://www.java.com/.

- Microsoft Internet Explorer 5.5 (with latest Service Pack installed), or later

- Netscape Navigator 4.72, or later (version 6 is not supported)
- Mozilla version 1.3, or later

For best results when using the web browser, set the monitor to 256 colors. Use only the video resolutions and refresh rates given in the following table. These are the only video resolution and refresh rate combinations that are supported for all system configurations.

Resolution	Refresh rate
640 x 480	60 Hz
640 x 480	72 Hz
640 x 480	75 Hz
640 x 480	85 Hz
800 x 600	60 Hz
800 x 600	72 Hz
800 x 600	75 Hz
800 x 600	85 Hz
1024 x 768	60 Hz
1024 x 768	75 Hz

The web interface does not support the double-byte character set (DBCS) languages.

The web-based user interface communicates with the management and configuration program that is part of the firmware that comes with the management module. You can use this program to perform the following tasks:

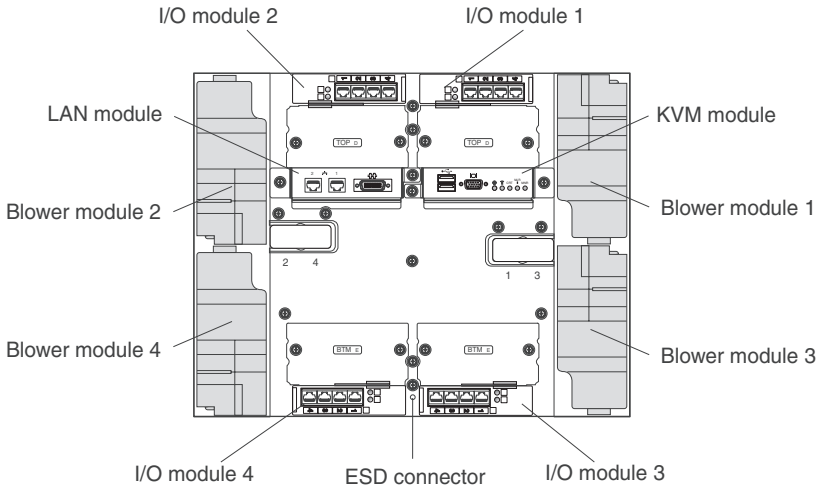
- Defining the login IDs and passwords.
- Selecting recipients for alert notification of specific events.
- Monitoring the status of the BladeCenter T unit and blade servers.
- Controlling the BladeCenter T unit and blade servers.
- Accessing the I/O modules to configure them.
- Changing the startup sequence in a blade server.
- Setting the date and time.
- Using a remote console for the blade servers.
- Changing ownership of the keyboard, video, and mouse.

  Note: Some blade server models do not support the keyboard, video, and mouse feature. Ownership of the keyboard, video, and mouse cannot be transferred to those blade servers.
- Changing ownership of the CD-ROM drive and USB ports. (The CD-ROM drive in the BladeCenter T unit is viewed as a USB device by the blade server operating system.)
- Activating On Demand blade servers.
- Setting the active color of the critical (CRT) and major (MJR) alarm LEDs

You also can use the management and configuration program to view some of the blade server configuration settings. See “Management and configuration program” on page 23 for more information.

Setting up the remote connection

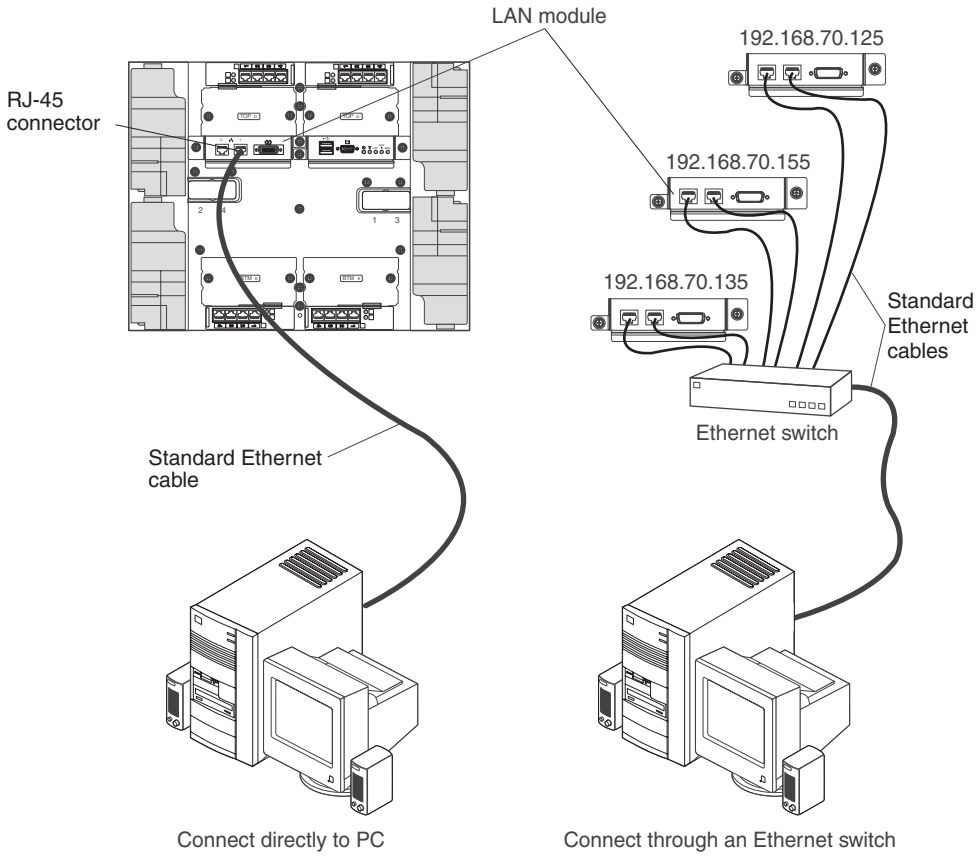
To configure and manage the BladeCenter T unit and blade servers, you must first set up the remote connection through an Ethernet port on the LAN module. The LAN module is on the rear of the BladeCenter T unit at the top-right side.



Cabling the Ethernet port

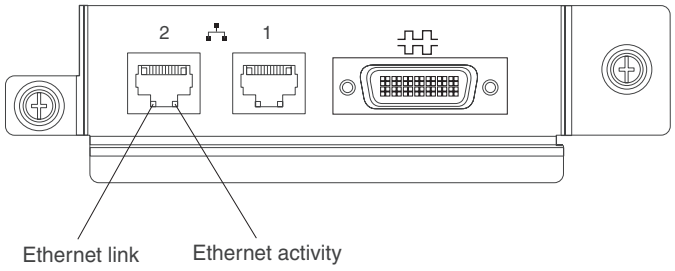
You can connect to an Ethernet port directly from a personal computer (PC), or you can make the connection through an Ethernet switch.

Ethernet port 1 on the LAN module is driven by management module 1, and Ethernet port 2 of the LAN module is driven by management module 2.



Complete the following steps to connect the Ethernet cable to the management module.

1. Connect one end of a Category 5 or higher Ethernet cable to an Ethernet connector on the LAN module. Connect the other end of an Ethernet cable to the network.
2. Check the Ethernet LEDs to make sure that the network connection is working. The following illustration shows the locations of the Ethernet LEDs on the LAN module.



Ethernet link LED

When this green LED is lit, there is an active connection through the port to the network.

Ethernet activity LED

When this green LED is flashing, it indicates that there is activity through the port over the network link.

Management and configuration program

This section provides the instructions for setting up and using the management and configuration program in the management module.

Setting up the management and configuration program

Complete the following steps to set up the management and configuration program:

1. Connect a PC to the BladeCenter T management network.
2. At initial power-on, the management module configures the Ethernet port connection in one of the following ways:
   - If you have an accessible, active, and configured dynamic host configuration protocol (DHCP) server on the network, the host name, IP address, gateway address, subnet mask, and DNS server IP address are set automatically.
   - If the DHCP server does not respond within 2 minutes after the port is connected, the management module uses a default IP address of 192.168.70.125 and subnet mask of 255.255.255.0.

   Either of these actions enables the Ethernet to assign a connection.

   If you cannot communicate with a replacement management module through the web interface. Press the IP reset button on the front of the management module to set the management module to the factory default IP addresses; then, access the management module using the factory IP address (see "Setting up the management and configuration program" for the factory IP addresses) and configure the management module.

   Note: If the IP configuration is assigned by the DHCP server, the network administrator can query the MAC address of the management-module network interface on the DHCP server to determine what IP address and host name are assigned.

Starting the management and configuration program

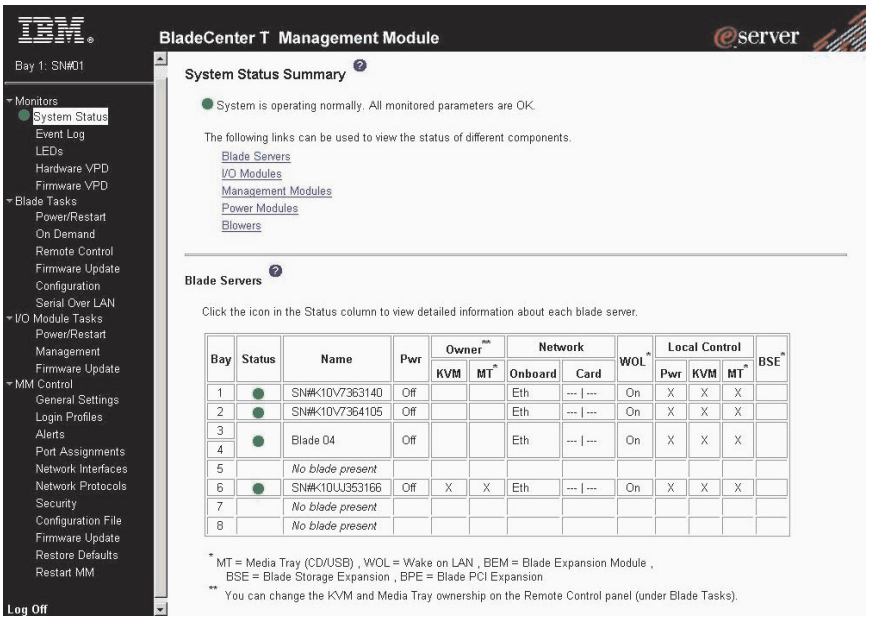
Complete the following steps to start the management and configuration program:

1. Open a web browser. In the address or URL field, type the IP address or host name that is defined for the management-module remote connection (see "Setting up the management and configuration program" for more details).

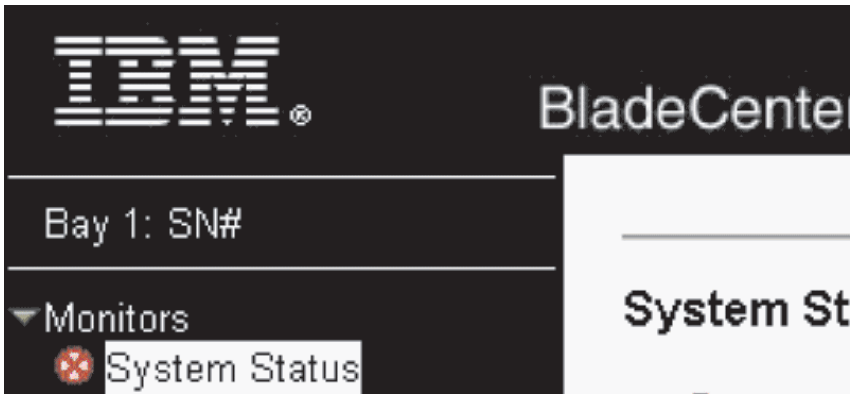
   The Enter Network Password window opens.
2. Type your user name and password. If you are logging in to the management module for the first time, you can obtain your user name and password from your system administrator. All login attempts are documented in the event log.

   Note: The initial user ID and password for the management module are as follows:
   - User ID: USERID (all capital letters)
   - Password: PASSW0RD (note the zero, not O, in PASSW0RD)
3. Follow the instructions that appear on the screen. Be sure to set the timeout value that you want for your Web session.

The BladeCenter T management and configuration window opens.



Note: The upper left corner of the management and configuration window shows the location and identity of the active management module.



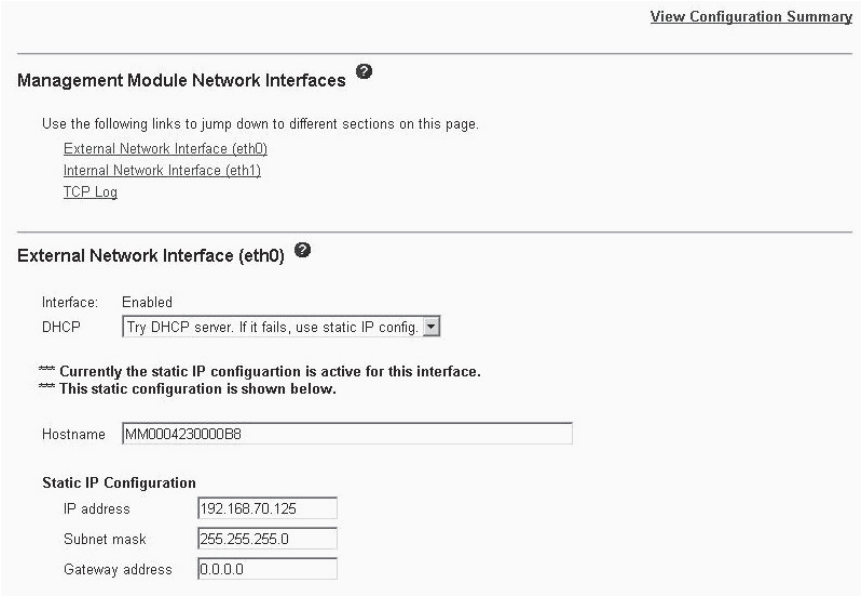
Setting management and configuration program options

From the management and configuration program main menu, you can select settings that you want to view or change.

The navigation pane (on the left side of the management module window) contains navigational links that you use to manage the BladeCenter T unit and check the status of the components (modules and blade servers). The following information describes the choices that you have to configure the external Ethernet port on the management module, the internal Ethernet port on the management module, and the external management port on each I/O module. See the documentation that comes with the management module for a description of all the navigational links.

Configuring the external Ethernet port

Under **MM Control**, click **Network Interfaces ” External Network Interface (eth0)**. This is the interface for the remote management and console port.



- Set **Interface** to **Enabled** to use the Ethernet connection.
- If you plan to use redundant management modules and want both to use the same IP address, disable DHCP and configure and use a static IP address (the IP configuration information will be transferred to the redundant management module automatically when needed). Otherwise, configure the DHCP setting as you prefer. You must configure the static IP address only if DHCP is disabled.
  - **IP address** - The IP address for the management module. The IP address must contain four integers from 0 through 255, separated by periods, with no spaces or consecutive periods. The default setting is 192.168.70.125.
  - **Subnet mask** - The subnet mask must contain four integers from 0 to 255, separated by periods, with no spaces. The default setting is 255.255.255.0
  - **Gateway address** - The IP address for your network gateway router. The gateway address must contain four integers from 0 through 255, separated by periods, with no spaces.

Configuring the internal Ethernet port

Under **MM Control**, click **Network Interfaces ” Internal Network Interface (eth1)**. This interface communicates with the network-interface I/O modules, such as the Ethernet switch module or the Fibre Channel switch module.

- Specify the IP address to use for this interface. The IP addresses for the internal Ethernet port (eth1) and external Ethernet port (eth0) must be on the same subnet.
- (Optional) Configure the locally-administered MAC address for this interface; the other fields (data rate, duplex mode, maximum transmission unit (MTU), and burned-in MAC address) are read-only.

Configuring management ports on I/O modules

Under **I/O Module Tasks**, click **Management**; then, click the bay number that corresponds to the I/O module that you are configuring.

- In the **New Static IP address** fields, specify the IP address to use for this interface. The new static IP address must be on the same subnet as the internal network interface (eth1).
- Click **Advanced Management ″ Advanced setup**. Enable the external ports.
- Click **Advanced Management ″ Advanced setup**. (Optional) Enable external management.

Saving and restoring the configuration file

After you have configured the management module, you can save the configuration file to a drive attached to the system running the management-module Web interface. Then, if the configuration in the management module becomes damaged or if the management module is replaced, you can restore the saved configuration file to the management module. Use the management-module web interface to save and restore the configuration file (**MM Control > Configuration File**).

Configuring an I/O module

To connect any of the blade servers to the network, you must have an Ethernet switch module installed in I/O-module bay 1 or 2, or a pass-thru module in I/O-module bay 1 or 2 connected to an external Ethernet switch. If you have an I/O expansion option installed on one or more blade servers, you must have compatible I/O modules (switch modules or other compatible modules) in I/O module bays 3 or 4. See “Removing and installing I/O modules” on page 56 for information about the location and purpose of each I/O module.

What to configure

You must configure switch-module IP addresses and subnet masks through the management-module web interface to communicate with the management module and remote management station. This is in addition to the IP addresses that are configured on the management module. You might also have to use the user interface on the switch module to configure the switch external ports to operate in the correct link aggregation (trunking) mode, or to configure any VLANs or other special conditions.

To allow blade servers to communicate with the network, make sure that the External ports configuration item in the management module is set to **Enabled**. In the management-module web interface, under **I/O Module Tasks**, click **Management ″ Bay *n* ″ Advanced Management ″ Advanced Setup** and enable the item (where *n* is the number of the I/O bay).

To access the user interface using external ports on the switch module, make sure that the **External management over all ports** configuration item is set to enabled. See your network administrator before enabling this feature.

Because all blade servers in the BladeCenter T unit share access to the external LAN through the switch ports, you can configure the ports on a switch module to

operate together as an aggregate link, or trunk. An aggregate link provides more bandwidth than a single link to the attached LAN.

Notes:

1. The attaching LAN switch must have a compatible multiport trunk configuration.
2. Configure link aggregation before you attach cables between the external ports and your LAN equipment.

Configure the switch through the user interface on the switch module, which you can access through the Web interface to the management module (click **I/O Module Tasks ″ Management ″ Advanced Management ″ Start Telnet/Web Session in the navigation pane**).

Important: For a remote management station, such as a management server, to communicate with the switch modules in the BladeCenter T unit, the management port of the switch module must be on the same subnet as the management module.

Supporting Ethernet failover

To have the BladeCenter T unit support Ethernet failover on the blade servers, set up the BladeCenter T unit and blade servers as follows:

1. Configure the Ethernet controllers in one or more blade servers for failover (see the blade server documentation and the operating-system documentation for information). When failover occurs on a blade server, the secondary Ethernet controller takes over network communication, using the I/O module associated with that controller.
2. Install a switch module or a pass-thru module that is connected to external Ethernet switches in both I/O-module bays 1 and 2.
3. Configure the Ethernet switch modules and your network infrastructure so that they can direct traffic to the same destinations.

Configuring the Ethernet controllers in the blade servers

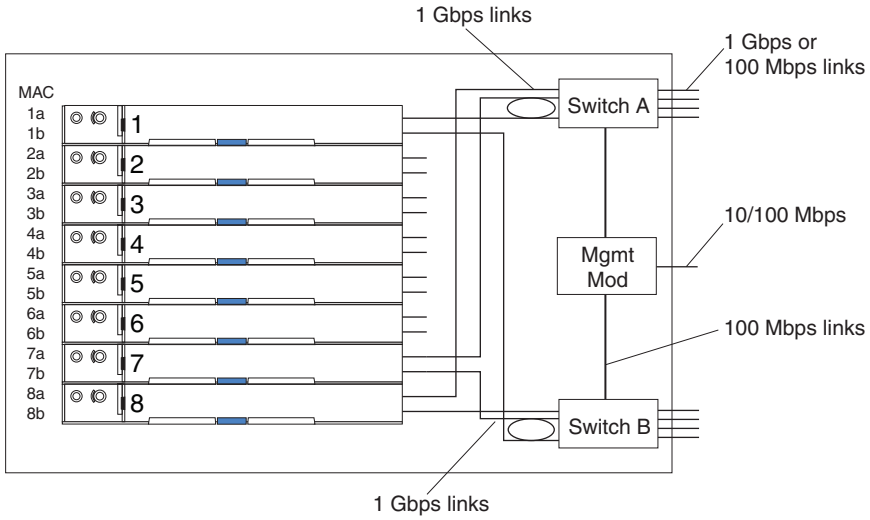
Note: The BladeCenter T unit does not include an Ethernet switch module; this is an optional feature that must be purchased separately. An Ethernet switch module or a pass-thru module is connected to an external Ethernet switch must be installed in the BladeCenter T unit in I/O-module bay 1 or 2, or both, before the integrated Ethernet controllers on each blade server system board can be used.

The Ethernet controllers are integrated on each blade server system board. The Ethernet controllers provide 1-Gbps full-duplex capability only, which enables simultaneous transmission and reception of data to the external ports on the Ethernet switches. You do not need to set any jumpers or configure the controller for the blade server operating system. However, you must install a device driver on the blade server to enable the blade server operating system to address the Ethernet controller. For blade server device drivers and information about configuring the Ethernet controllers, go to http://www.ibm.com/supportportal/ .

BladeCenter T networking guidelines

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

A BladeCenter T unit with two Ethernet switch modules and one management module has the internal configuration that is shown in the following illustration:

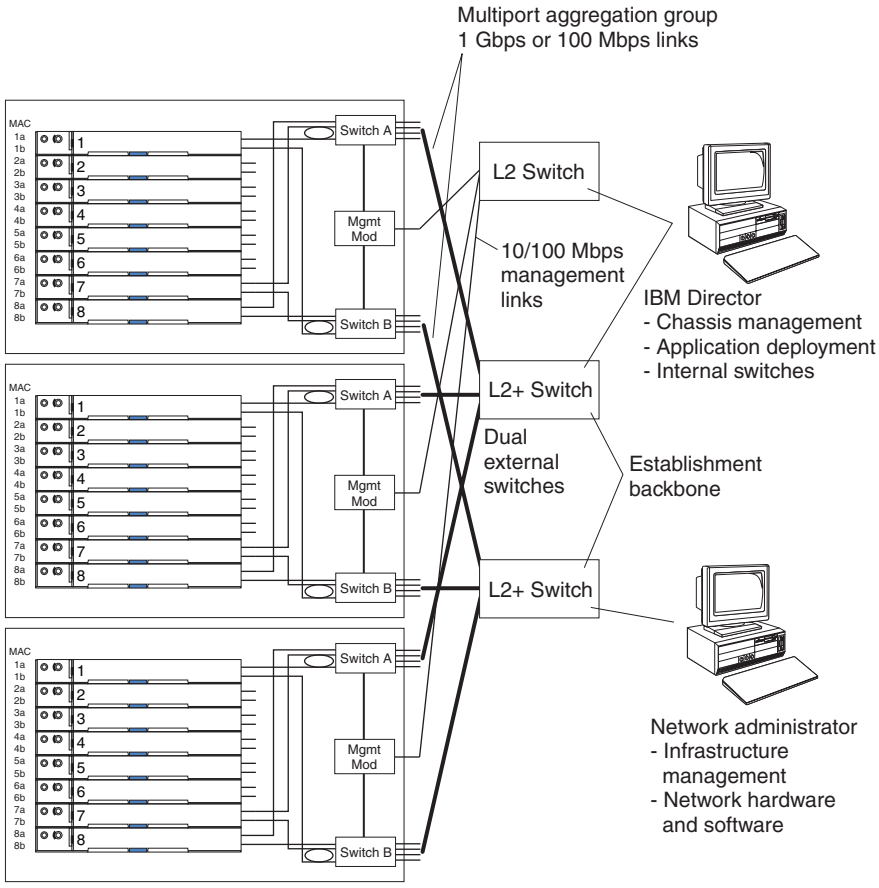


Note: 2nd switch module is optional

Each blade server has two independent Ethernet controllers, each with its own MAC address and a dedicated 1 Gbps link to one of the switch modules in I/O module bays 1 and 2 (controller 1 to switch A and controller 2 to switch B in the illustration). In this configuration (the default), the blade servers share access to four external ports on each switch. There is no internal data path between the two switches within the BladeCenter T unit; an external network device is required for data packets to flow from one internal switch to the other.

The management module has a separate internal 100 Mbps link to each switch. These links are for internal management and control only. No data packets are allowed to flow from application programs on the blade servers to the management module over this path. A separate, nonswitched path (not shown) is used for communication between the management module and a service processor on each blade server.

A typical, preferred network topology is shown in the following illustration. See the document that comes with the management module for more information and other topologies and guidelines.



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

Observe the following guidelines when creating this topology:

1. The external ports on the BladeCenter T switch modules are designed for point-to-point, full-duplex operation to a compatible LAN switch or router. Configure a corresponding multiport link aggregation group, or trunk, in both the switch module and the attached LAN switch before installing the cables. The connection options are as follows, in order of preference:
   - Multiport link aggregation group or trunk, 1 Gbps (1000 Mbps) per port
   - Single-uplink port, 1 Gbps
   - Multiport link aggregation group or trunk, 100 Mbps per port
2. Connect the management-module 10/100 Mbps Ethernet port to a separate layer 2 network for security. If a separate network is not available, you can attach the Ethernet ports of the management module and switch modules to the same layer 2 network.
3. Avoid network configurations that could lead to data loops, if possible. Loops will be created if you connect multiple ports from the same switch module to the same layer 2 network device without first enabling link aggregation. If you

implement configurations that include data loops, you must enable Spanning Tree Protocol on the switch-module external ports.

Using Remote Deployment Manager Version 4.11 Update 3 or later

You can use the Remote Deployment Manager (RDM) Version 4.11 Update 3 (or later) program to install a supported Microsoft Windows operating system or a BIOS update onto a blade server. Follow the instructions in the documentation that comes with the RDM program to install a supported Microsoft Windows operating system, supported Red Hat Advanced server 2.1, or BIOS code update.

Go to the following website for updated information about the RDM program and information about how to purchase the software or download an update: http://www.ibm.com/pc/ww/eserver/xseries/systems_management/sys_migration/rdm.html

Using IBM Director

For a complete list of operating systems that support IBM Director, see the IBM Director compatibility document. This document is in PDF http://www.ibm.com/servers/eserver/xseries/systems_management/sys_migration/ibmdiragent.html. This document is updated every 6 to 8 weeks.

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

Notes:

1. Some tasks, such as software distribution, require an in-band connection from IBM Director Server through a campus (public) LAN to a switch-module port.
2. See the IBM Support website at http://www.ibm.com/support/ for the version of IBM Director software that you can use to manage redundant management modules.

Communicating with the IBM Director software

For a complete list of operating systems that support IBM Director, see the IBM Director compatibility document. This document is in PDF at http://www.ibm.com/servers/eserver/xseries/systems_management/sys_migration/ibmdiragent.html. It is updated every 6 to 8 weeks.

Note: See the illustration on page 28 for an example of a typical network configuration. See the *IBM eServer BladeCenter T Planning and Installation Guide* for more examples of network configurations. You can obtain the planning guide from http://www.ibm.com/support/.

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

Director software can automatically discover the BladeCenter T unit (out-of-band, using the Ethernet port on the management module) and create a managed object for the unit.

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

Notes:

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

Chapter 3. Diagnostics

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

If you cannot locate and correct the problem using the information in this section, see “Getting help and technical assistance,” on page 103 for more information.

Diagnostic tools overview

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

- **Troubleshooting charts**

  These charts list problem symptoms and steps to correct the problems. See the Chapter 6, “Symptom-to-FRU index,” on page 83 for more information.

- **Diagnostic programs and error messages**

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

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

  To obtain the Real Time Diagnostics program, go to the following website: http://www.ibm.com/supportportal/ .

- **Light Path Diagnostics feature**

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

Identifying problems using the light path diagnostics feature

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

This section provides the information to identify problems that might arise during installation using the light path diagnostics feature.

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

For example:

A system error has occurred, and you have noted that the BladeCenter T system-error LED is lit on the system LED panel. You then locate the module or blade server that also has an error LED lit (see “BladeCenter T unit power, controls, and indicators” on page 15 for the location of error LEDs; see the documentation that comes with your blade server for the location of error LEDs on the blade). If the component is a module, replace the module. If the component is a blade server with its system-error LED lit, follow the instructions in the documentation that comes with the blade server to isolate and correct the problem.

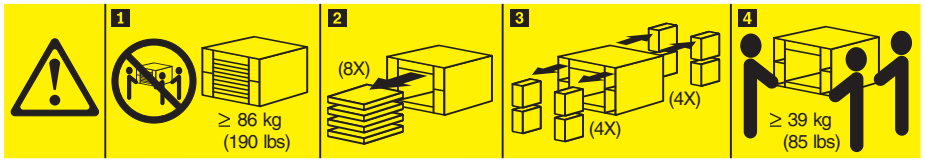
Chapter 4. Setting up the BladeCenter T hardware

This chapter provides instructions for setting up the BladeCenter T unit and installing and removing modules, options, and blade servers.

Setting up the BladeCenter T unit

Statement 32

CAUTION:
To avoid personal injury, before lifting the unit, remove all the blades, power supplies, and removable modules to reduce the weight.



CAUTION:
Use safe practices when lifting.

Install the BladeCenter T unit in a rack before installing any blade servers in the BladeCenter T unit. If your BladeCenter unit has blade servers already installed, remove them first. Detailed instructions for installing and cabling a BladeCenter T unit in a rack are in the *Rack Installation Instructions* that come with the BladeCenter T unit.

Installation guidelines

This section includes guidelines for:

- Preparing and making power connections before installing the BladeCenter T modules, options, and blade servers.
- System reliability considerations.
- Handling static-sensitive devices and the use of the electro-static discharge (ESD) connector.

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

- Read the safety information in "Safety" on page v and the guidelines in "Handling static-sensitive devices" on page 37. This information will help you work safely with your BladeCenter T unit and options.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that you can remove or install the component while the BladeCenter Tunit 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.
- You do not need to disconnect the BladeCenter T unit from power to install or replace any of the hot-swap modules in the BladeCenter T unit. You need to shut down the operating system and turn off a hot-swap blade server on the front of the BladeCenter T unit before removing the blade server, but you do not need to shut down the BladeCenter T unit itself.
- For a list of supported options for your server, go to http://www.ibm.com/supportportal/ .

Preparing for system power

The BladeCenter T unit can support two or four power modules.

The BladeCenter T unit does not have a power switch. To start the BladeCenter T unit, connect one end of a power cord into input power connector 1 and 2 on the rear of the BladeCenter T unit, and the other end of each power cord into a 220-volt power distribution unit (PDU) that is connected into an appropriate electrical outlet.

There are four IEC 60320 (C20) power connectors on the rear of the BladeCenter T unit, marked 1-4 on the rear panel. Power is applied to the respective power module according to the numbering convention on the rear panel.

- Power connector 1 supplies power to power module 1
- Power connector 2 supplies power to power module 2
- Power connector 3 supplies power to power module 3
- Power connector 4 supplies power to power module 4

System reliability considerations

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

- Each of the module bays on the front and rear of the BladeCenter T unit has either a module or filler module installed.
- Each of the blade bays on the front of the BladeCenter T unit has either a blade server or filler blade installed.
- Each of the drive bays in a blade server storage expansion option has either a hot-swap drive or a filler panel installed.
- Each of the PCI slots in a blade server PCI I/O expansion option has either a PCI adapter or a PCI filler bracket installed
- A removed hot-swap module or drive is replaced within 1 minute of removal.
- A removed hot-swap blade is replaced within 20 minutes of removal.
- A failed blower is replaced as soon as possible, to restore cooling redundancy.

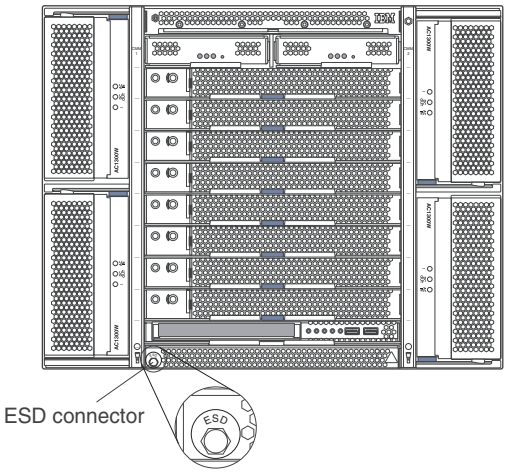
Handling static-sensitive devices

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

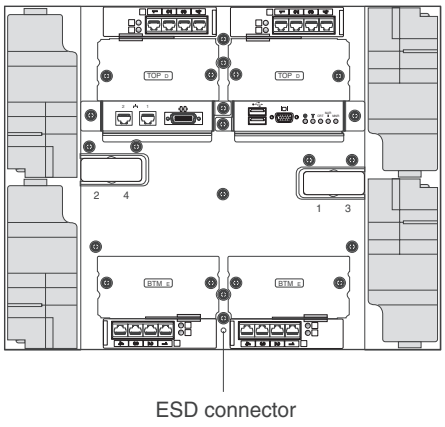
Use an ESD wrist strap and the ESD connectors on the BladeCenter T unit. Electrostatic discharge (ESD) is the release of stored static electricity that can damage electric circuits. Static electricity is often stored in your body and discharged when you come in contact with an object with a different potential. The ESD wrist strap safely channels the electricity from your body to a proper ground (the BladeCenter T unit).

Use an ESD wrist strap whenever you are working on the BladeCenter T unit, especially when you are handling modules, options, and blade servers. To work properly, the wrist strap must have a good contact at both ends (touching your skin at one end and connected to the ESD connector on the front or back of the BladeCenter T unit.)

Location of ESD connector (front of unit)



Location of ESD connector (rear of unit)



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

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

This chapter provides instructions for installing and removing modules, options, and blade servers in the BladeCenter T unit.

Each module is keyed so that it can be inserted only in an appropriate bay. For example, you can insert an I/O module only in an I/O-module bay.

This section describes the following BladeCenter T modules and how to install and remove them:

- Bezel assembly
- Bezel air filter
- Power module
- Media tray
- Management module
- Blower module
- KVM module
- LAN module
- I/O modules
- Blade server

See the “Rear view” on page 12 and “Front view” on page 7 for the location of each module. These modules supply common functions to the blade servers that are installed in the blade bays at the front of the BladeCenter T unit.

The KVM module and media tray supply I/O (CD-ROM drive, USB ports, keyboard, video, and mouse) that is available to all the blade servers that support those I/O functions, selected by any one blade server at a time.

Attention: To help ensure proper cooling, performance, and system reliability, make sure that each of the module bays on the front and rear of the BladeCenter T unit has a module or filler module installed. When replacing components, do not operate the BladeCenter T unit for more than the following time limits:

- 1 minute without either a module or a filler module installed in each module bay
- 20 minutes without a server blade or blade filler

Preinstallation steps

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

Statement 8

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

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

Complete the following steps before you install or remove a module or option in the BladeCenter T unit.

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

1. Read the safety information in "Safety" on page v and the guidelines in "Handling static-sensitive devices" on page 37. This information will help you work safely with your BladeCenter T unit and options.
2. If you are installing or removing a module at the front of the BladeCenter T unit, complete the following steps:
   a. Remove the bezel assembly from the front of the BladeCenter T unit. See "Removing the bezel assembly" on page 40 for instructions.
   b. Connect an ESD wrist strap to the ESD connector at the front of the BladeCenter T unit (see the illustration on page 37 for the location of the ESD connector).
3. If you are installing or removing a module at the rear of the BladeCenter T unit, connect an ESD wrist strap to the ESD connector at the rear of the BladeCenter T unit (see the illustration on page 37 for the location of the ESD connector).

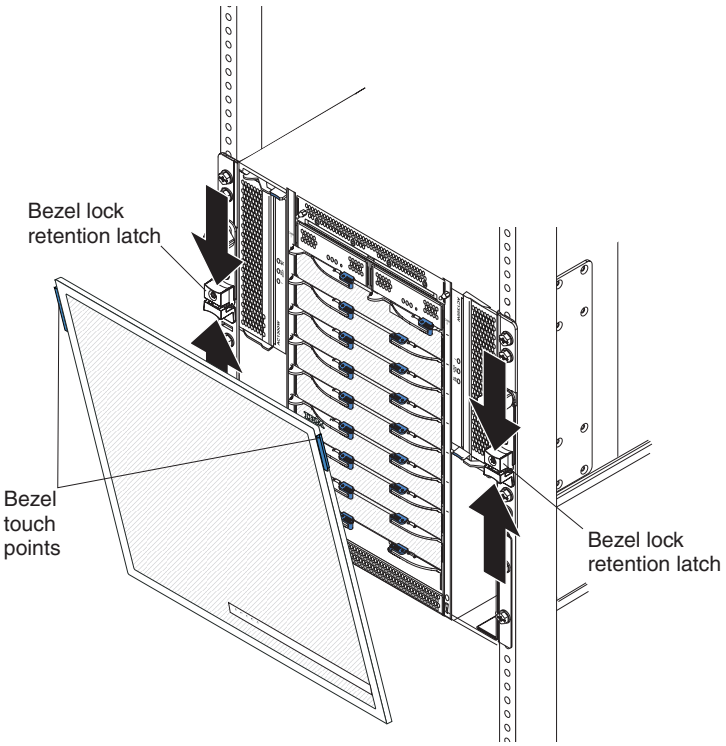
4. Go to the instructions for the module or option you wish to install.

Removing and installing the bezel assembly

Depending on your model, the BladeCenter T unit comes with a bezel assembly containing a removable and replaceable air filter. There are software features in the management-module that detect a clogged filter and generate system alerts based on the severity of the airflow reduction. The typical service interval for the filter is approximately three to six months depending on your environment. Be sure to replace the air filter when indicated.

Important: If the BladeCenter T unit contains any blade servers with standard (high-profile) release levers, the bezel assembly will not fit on the chassis. The bezel assembly and air filter can be used only if all blade servers in the chassis have low-profile release levers.

See "Removing and installing the bezel air filter" on page 41 for instructions for removing and replacing the bezel air filter.



Removing the bezel assembly

Complete the following steps if you are removing the bezel assembly from the front of the BladeCenter T unit:

1. Squeeze the upper and lower halves of the bezel lock retention latches together to open the bezel locks on each side as shown in the illustration; then, forcefully pull forward on the blue touch points at the top sides of the bezel.

2. Lift the bezel assembly up and out of the BladeCenter T unit. Carefully set the bezel assembly aside in a safe location.

Installing the bezel assembly

Complete the following steps if you are installing the bezel assembly at the front of the BladeCenter T unit:

1. Ensure that the bezel lock is open; then, insert the bottom bezel hooks into the bezel slots at the bottom of the BladeCenter T unit.
2. Push in the bottom and the top of the bezel assembly until they both click firmly into place; then, close the bezel locks by sliding the bottom half of the bezel lock retention latch down until it stops.

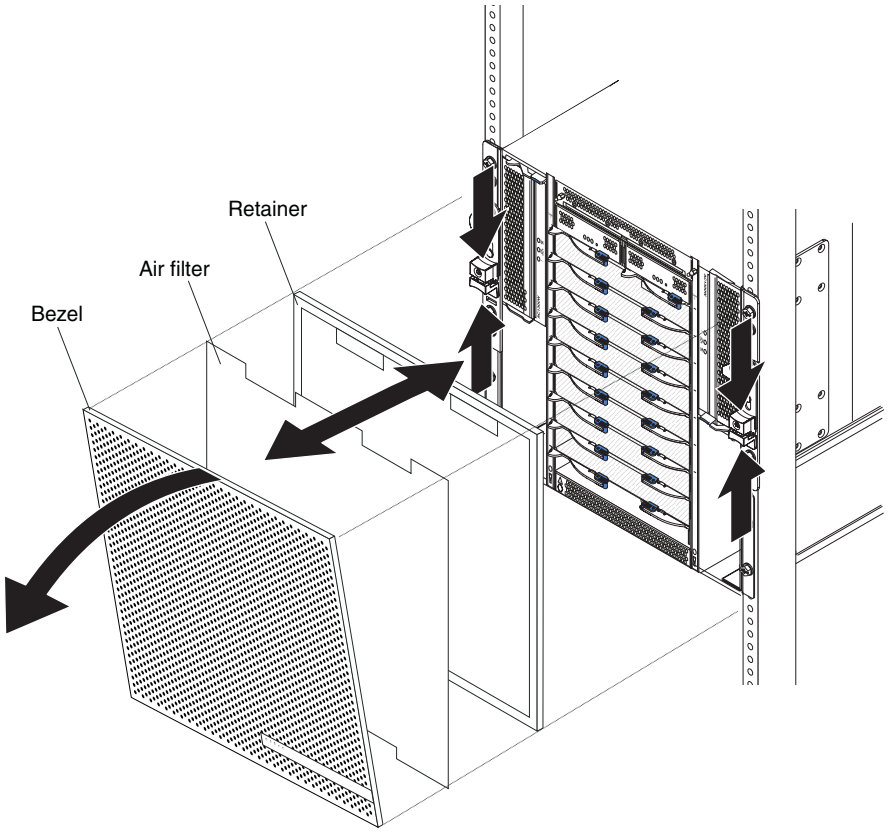
Removing and installing the bezel air filter

The air filter is installed behind the front bezel of the BladeCenter T unit.

Important: If the BladeCenter T unit contains any blade servers with standard (high-profile) release levers, the bezel assembly will not fit on the chassis. The bezel assembly and air filter can be used only if all blade servers in the chassis have low-profile release levers.

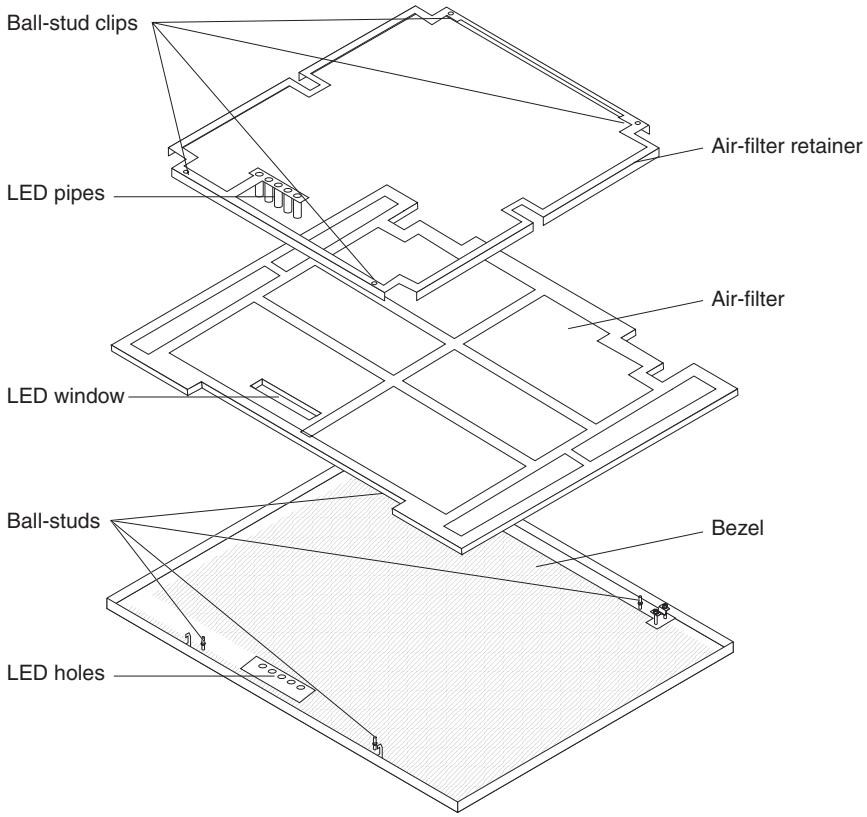
Note:

- Read "Installation guidelines" on page 35.
- Read "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.



Complete the following steps to replace the front bezel air filter in the BladeCenter T unit:

1. Remove the bezel from the front of the BladeCenter T unit (see "Removing the bezel assembly" on page 40 for instructions).
2. Place the bezel front-side down on a work surface.
3. Remove the air-filter retainer by pulling the retainer upwards and off the ball-stud fasteners on the bezel.
4. Remove the old air filter from the bezel frame.
5. Remove the new air filter from its packaging.



6. Align the LED window of the filter with the holes for the LEDs on the bezel and lay the filter into the bezel frame.
7. Align the air-filter retainer over the filter with the ball-stud clips facing down and the LED light pipe lined up with the LED holes on the bezel.
8. Gently push the air-filter retainer down until it snaps into the ball-stud fasteners on the back of the bezel.
9. Install the bezel on the front of the system (see "Installing the bezel assembly" on page 41 for instructions).

Removing and installing power modules

The BladeCenter T unit is separated into two power domains. To support devices in power domain B, a power-supply module option (consisting of two power modules) must be installed.

The following table summarizes the modules that are powered by each power domain.

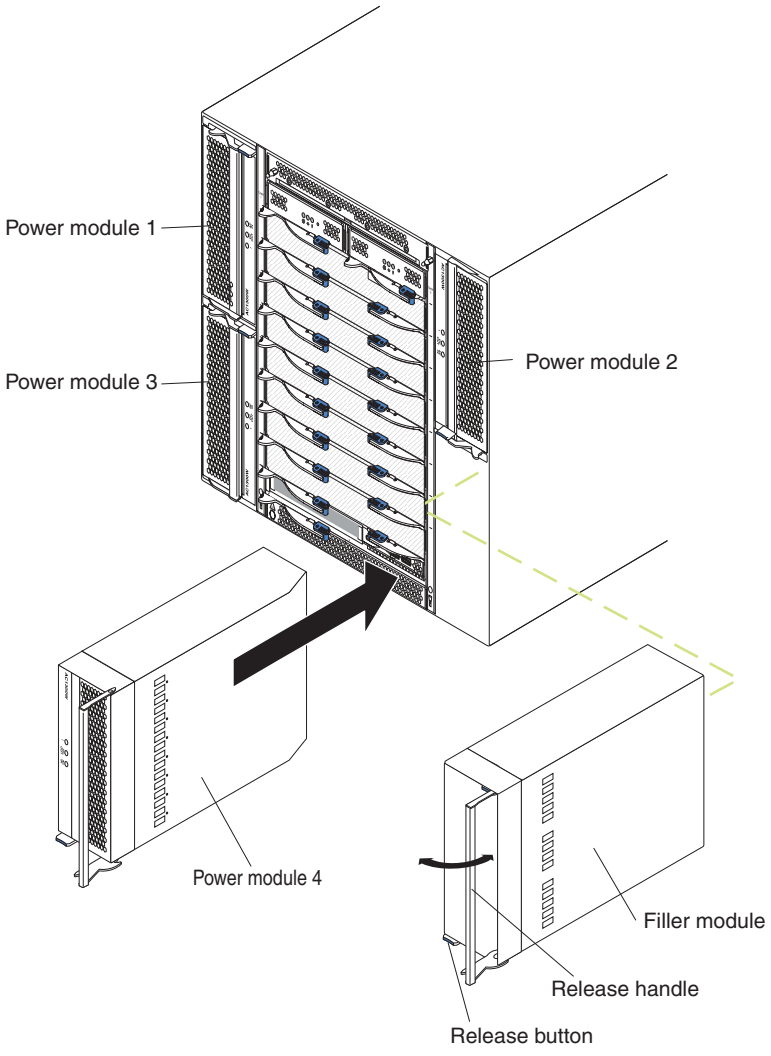
Power domain	Power-module bays	Modules powered by the power domain
A	1 and 2	I/O-module bays 1 and 2 Management-module bays 1 and 2 Media tray Blade bays 1 through 4
B	3 and 4	Blade bays 5 through 8 I/O-module bays 3 and 4

All four blowers are required for redundant system operation. Power for all four blowers is shared by all installed power modules. One failed blower creates a nonredundant configuration.

If a power module fails or an input power failure occurs in normal operation (5° to 40°C or 41° to 104°F), BladeCenter T units that are configured for redundant power operation will operate in a nonredundant mode. You must replace the failing power module or restore input power as soon as possible to regain redundant power operation. For operation above 40°C (104°F), all power modules must be installed and energized to allow current-sharing between the paired power modules.

Important:

1. The power modules must be installed in pairs in a domain and must match each other in capacity (wattage, amperage, and so on).
2. To provide true redundant power, BladeCenter T power modules 1 and 3 must be connected to a different input power source than power modules 2 and 4.



Removing a power module

Complete the following steps to remove a power module or filler panel from the front of the BladeCenter T unit.

Attention: To help ensure proper cooling and system reliability, make sure that you replace a removed power module or filler panel with a power module within 1 minute.

Important: If you are removing a functional power module, make sure that both the ac-power LED and the dc-power LED on the remaining power module are lit; otherwise, shut down the operating systems and turn off all of the blade servers that are supported by the power module you are removing, before you remove it. (See the documentation that comes with the blade server for instructions for shutting down the blade server operating system and turning off the blade server.)

1. Press the blue release button on the front of the new power module to release the power-module handle; then, move the power-module handle outward until it is in the open position (90° from the closed position).
2. Grip the power-module handle with one hand and slowly pull the power module out of the bay. Use your other hand to support the bottom of the power module as you pull the power module out from the bay.

   Attention: Do not carry the power module by only the power-module handle. You must support the weight of the power module.
3. Place the power module in a safe location.
4. Within 1 minute, install either another power module or a filler module into the selected power-module bay.

Installing a power module

Complete the following steps to install a power module at the front of the BladeCenter T unit.

Attention: To help ensure proper cooling and system reliability, make sure that you replace a removed power-module filler panel with a power module within 1 minute.

1. Note the orientation of the power module or filler you are removing; then, remove the filler or power module from the selected power-module bay and set it aside.
2. Press the blue release button on the front of the new power module to release the power-module handle; then, move the power-module handle outward until it is in the open position (90° from the closed position).
3. Grip the power-module handle with one hand and support the bottom of the power module with the other hand.

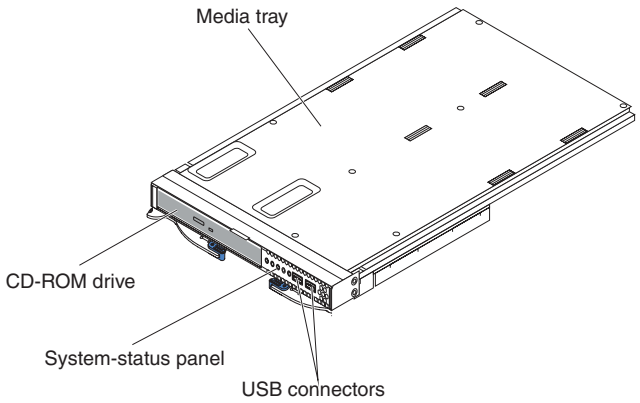
   Attention: Do not carry the power module by only the power-module handle. You must support the weight of the power module.
4. Orient the new power module to the selected power-module bay; then, slide the power module into the bay until it stops.
5. Push the power-module handle in until it locks into the latch next to the blue release button.
6. Make sure the LEDs on the power module indicate that it is operating correctly. Make sure that:
   - The input power LED is lit.

- The output power LED is lit.
- The error LED is not lit.

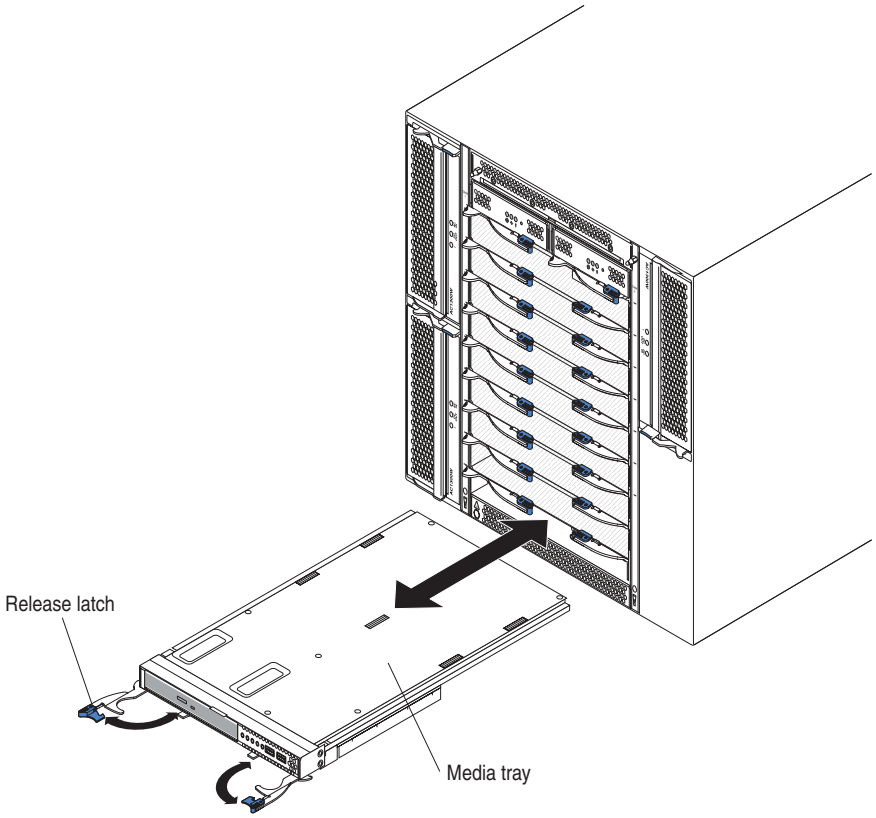
7. If you have other modules to install at the front of the unit, do so now. Otherwise reinstall the bezel assembly at the front of the BladeCenter T unit.

Removing and installing the media tray

The media tray is a hot-swap unit that is installed in the front of the BladeCenter T unit and contains the system-status panel, two USB connectors, and the CD-ROM drive. See “Media tray” on page 9 for information about the system-status panel controls and indicators.



Use the instructions in this section to remove or install the media tray at the front of the BladeCenter T unit.



Removing the media tray

Complete the following steps to remove the media tray in the front of the BladeCenter T unit:

1. Open the two release levers as shown in the illustration. The media tray moves out of the bay approximately 0.6 cm (0.25 inch).
2. Make sure that the release latches are in the open position (90° from the closed position).
3. Grasp the media tray at the front of each side of the module and carefully pull the module all the way out of the bay. Set it in a safe place.
4. Within 1 minute, install another media tray into the BladeCenter T unit.

Installing the media tray

Complete the following steps to install the media tray in the front of the BladeCenter T unit:

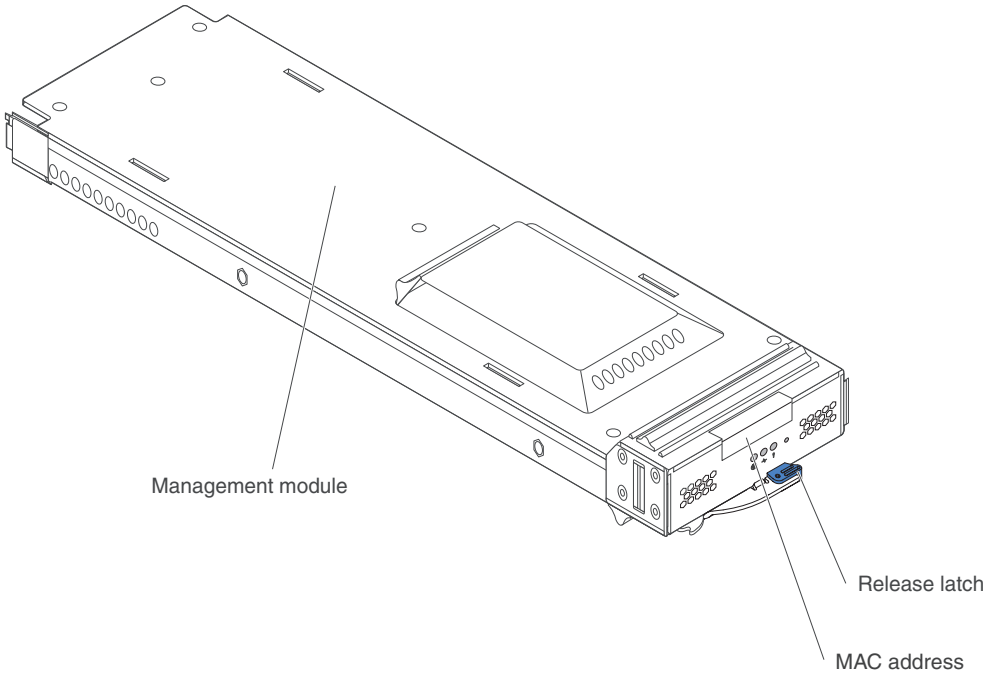
1. Hold the media tray at the front of each side of the module and orient the media tray to the top of the media-tray bay. Carefully position the module into the rails in the media-tray bay.
2. Make sure that the release latches are in the open position (perpendicular to the front panel of the media tray).
3. Slide the media tray forward into the media-tray bay until it stops on the ends of the release latches.
4. Rotate in the release latches until they lock. This fully seats the media tray into the connectors in the media-tray bay and secures the media tray in the BladeCenter T unit.

5. Make sure that the power LED is lit on the system-status panel.
6. If you have other modules to install at the front of the unit, do so now. Otherwise, reinstall the bezel assembly at the front of the unit.

Removing and installing management modules

The BladeCenter T unit comes with two hot-swap management modules.

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



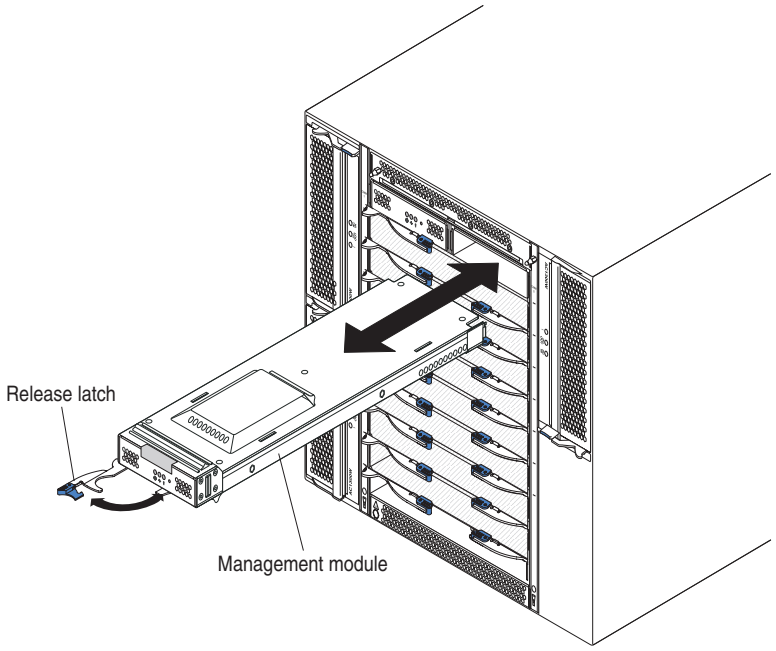
The management module functions as a service processor for the multiple blade servers. The management module configures the BladeCenter T unit and modules, configuring information such as switch module IP addresses. The management module can also send the VGA signal stream to a remote console for viewing. See "Management module controls and indicators" on page 8 for information about the controls and indicators.

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

- Blade server power-on requests
- Blade server error and event reporting
- Blade server requests for keyboard, mouse, and video
- Blade server requests for CD-ROM drive and USB ports

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

Use the instructions in this section to remove or install a management module at the front of the BladeCenter T unit.



Removing a management module

Notes:

1. If you are removing the only management module in the BladeCenter T unit, to avoid unexpected termination of sessions, stop all management-module local and remote sessions before proceeding.
2. If you are removing the only management module in the BladeCenter T unit, be aware that as soon as you remove the module, the BladeCenter T blowers will increase to full speed.
3. If you are replacing the only management module in the BladeCenter T unit and the management module is functional, save the configuration file to another medium before you proceed (in the **MM Control** section in the navigation pane, click **Configuration File** and follow the instructions under **Save MM Configuration**); you will be able to restore the saved configuration file to the replacement management module.
4. If you have just installed a second management module in the BladeCenter T unit, do not remove the first (primary) management module for approximately 2 minutes; the second (secondary) management module needs the time to receive initial status information.

Complete the following steps to remove a management module or filler module from the front of the BladeCenter T unit:

1. Pull the release latch all the way toward the left side of the management module until it stops, as shown in the illustration. The module moves slightly out of the bay.
2. Grip the management module with one hand and slowly pull the management module out of the bay. Use your other hand to support the bottom of the management module as you pull it out from the bay.

   Important: Within 1 minute, you must place either another module of the same type or a filler module in the bay.

Installing a management module

Complete the following steps to install a management module in the BladeCenter T unit:

1. If you are replacing a management module, remove the current module from the bay (see “Removing a management module” on page 49). If you are adding a management module, remove the filler module from the selected management-module bay and store the filler module for future use.

   Note: You will be able to apply a saved configuration file to the replacement management module. For more information about applying a saved configuration file, see “Saving and restoring the configuration file” on page 26.
2. If you have not already done so, touch the static-protective package that contains the new management module to an unpainted metal part of the BladeCenter T unit or any unpainted surface on any other grounded rack component for at least 2 seconds.
3. Remove the management module from its static-protective package.
4. Pull the release latch and make sure that the release latch on the management module is in the open position (90° from the closed position).
5. Holding the management module at the front with one hand, and in the middle with the other hand, orient the management module to the bottom of the selected management-module bay and gently slide the management module into the bay until it stops. Push the management module in until the release latch starts to close.
6. Push the release latch on the front of the management module to the closed position.
7. Make sure that the error LED on the management module is not lit, indicating that the management module is operating correctly.
8. If this is the primary management module in the BladeCenter Tunit, configure the new management module. See the documentation that comes with the management module for detailed instructions. If this is the secondary management module and you followed the instructions in the documentation for the management module, no configuring is necessary. The secondary management module receives the configuration and status information automatically from the primary management module when necessary. However, you must apply the latest level of firmware from the IBM Support website at http://www.ibm.com/support/ to ensure smooth changeovers (see the documentation for the management module for more information).

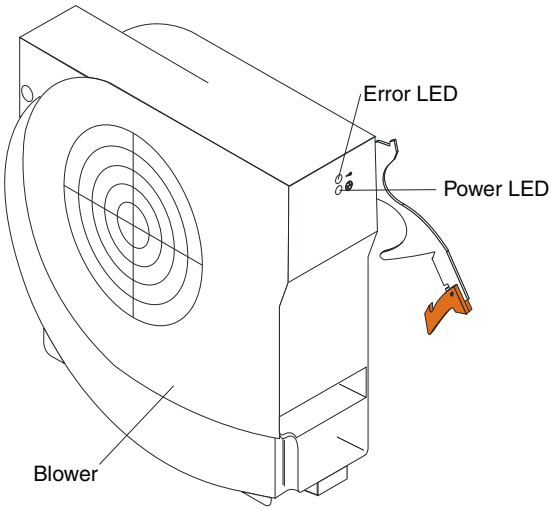
   Note: Do not initiate any management module changeover for approximately 2 minutes after installing the secondary management module; the secondary management module needs the time to receive initial configuration and status information.
9. If you have other modules to install at the front of the unit, do so now. Otherwise reinstall the bezel assembly on the front of the BladeCenter T unit.

Removing and installing blower modules

The BladeCenter T unit comes with four hot-swap blowers for cooling redundancy. The blowers are installed at the rear of the system. The blower speeds vary depending on the ambient air temperature at the front of the BladeCenter T unit. If a blower fails, the remaining blowers increase their speed to cool the BladeCenter T unit and blade servers.

All flour blowers are required for redundant system operation. Power for all four blowers is shared by all installed power modules. One failed blower creates a nonredundant configuration.

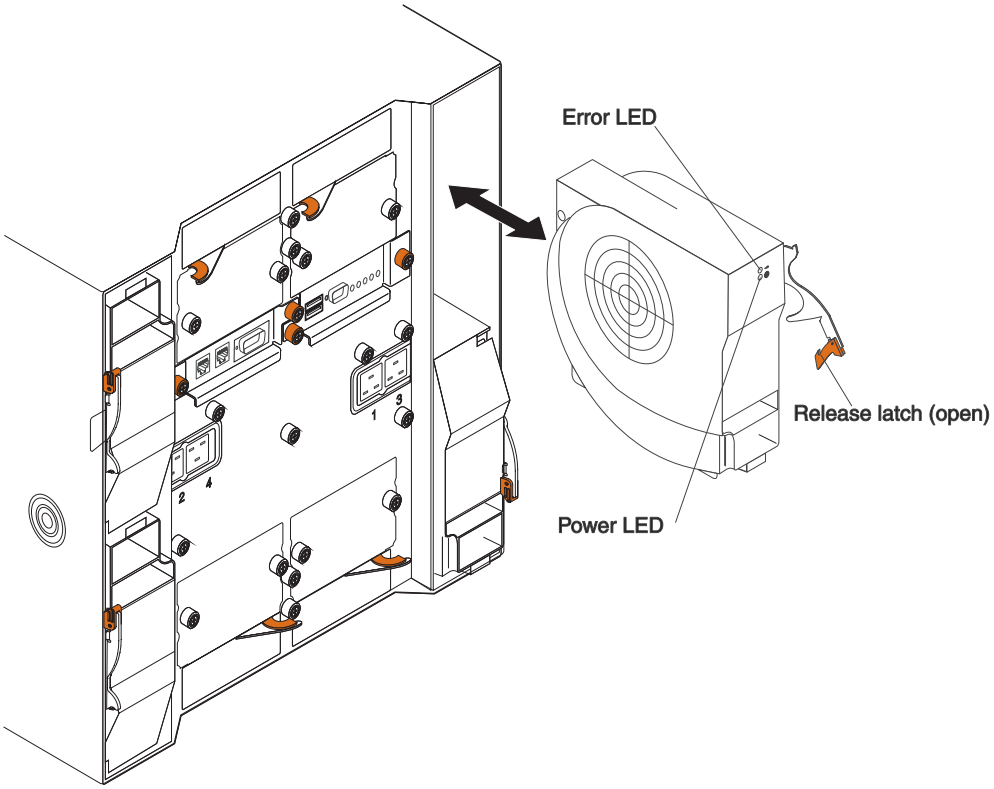
Note: Each power module has cooling fans that are independent from the system cooling.



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

Use the instructions in this section to remove or install a blower module at the rear of the BladeCenter T unit.

Note: Blowers on the left side of the system are installed with the release lever pointing upward, and blowers on the right side are installed with the release lever facing downward.



Removing a blower module

Use the following instructions to remove a blower at the rear of the BladeCenter T unit.

1. Press the release lever at the end of the release latch and pull the latch to the open position. The blower module moves slightly out of the bay.
2. Slide the module out of the blower bay and set it aside.
3. Within 1 minute, install another blower module into the bay.

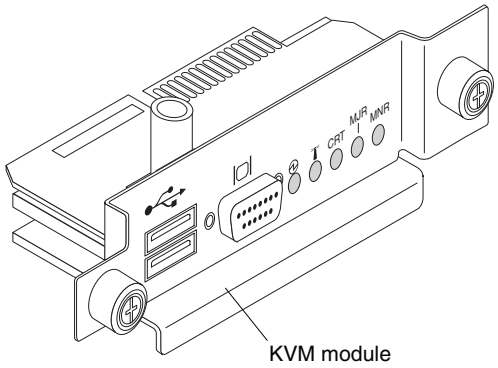
Installing a blower module

Complete the following steps to install a blower module into the rear of the BladeCenter T unit.

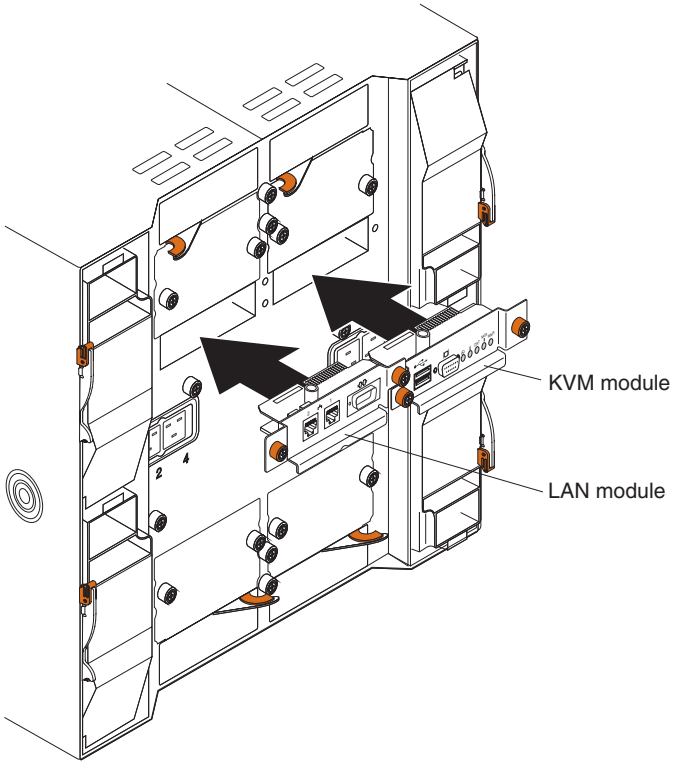
1. Press the release lever at the end of the release latch and pull the latch to the open position.
2. Insert the blower into the selected blower bay.
3. Push the blower module into the bay until it stops. The release latch moves slightly toward the closed position.
4. Close the release latch until it locks into position.
5. Make sure that the blower power LED is lit and the blower error LED is not lit.

Removing and installing the KVM (keyboard, video, mouse) module

The KVM module is a hot-swap unit that is installed in the rear of the BladeCenter T unit and is held in place by captive thumbscrews. The KVM module provides the electrical and mechanical interface to the BladeCenter T unit for a local keyboard, RGB VGA video monitor, and a mouse. Five LEDs on the KVM module system-status panel are used for system status information: power, location, minor alarm, major alarm, and critical alarm. See “KVM (keyboard, video, mouse) module indicators and input/output connectors” on page 13 for information about the controls and indicators.



Use the instructions in this section to remove or install the KVM module from the rear of the BladeCenter T unit. The KVM module is held in place by captive thumbscrews. You can use your fingers to install or remove the KVM module. Make sure that you do not overtighten the thumbscrews.



Removing the KVM module

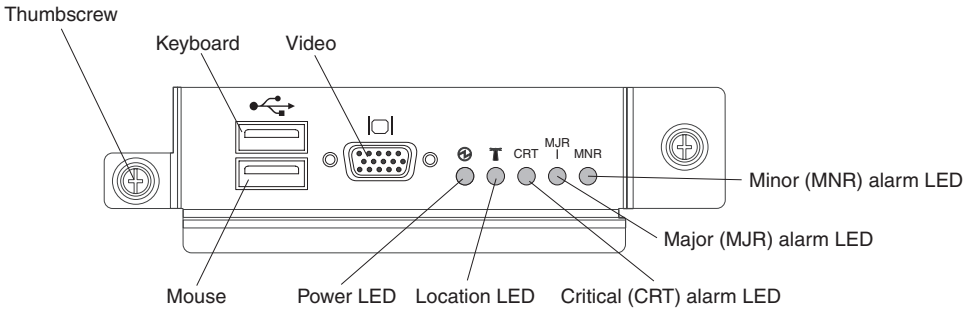
Complete the following steps to remove the KVM module at the rear of the BladeCenter T unit.

1. Remove the keyboard, mouse, and video cables if any are connected.
2. Fully loosen each thumbscrew counterclockwise.
3. Hold the KVM module by both thumbscrews.
4. Carefully pull the KVM module outward from the KVM module bay until you feel it release.
5. Remove the KVM module from the bay and set it aside.
6. Within 1 minute, install a new KVM module.

Installing the KVM module

Complete the following steps to install the KVM module at the rear of the BladeCenter T unit:

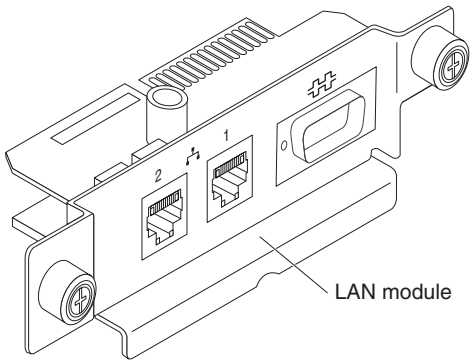
1. Hold the KVM module by both thumbscrews.



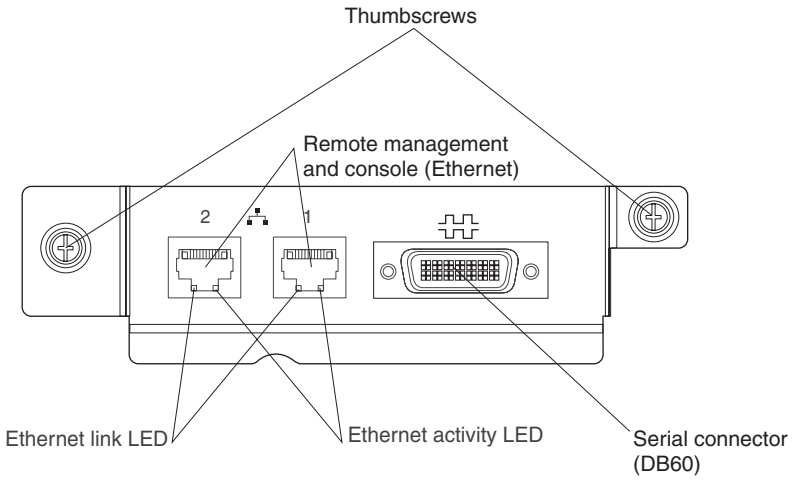
2. Position the KVM module into the rails inside the KVM-module bay.
3. Push the KVM module into the bay until you feel it stop. Make sure that it is snug.
4. Turn each thumbscrew clockwise until it is finger tight. Make sure that you do not overtighten the thumbscrews.
5. Make sure that the power LED on the front of the KVM module is lit.
6. Connect any peripheral devices that you want to use at this time (for example, keyboard, mouse, and video monitor).

Removing and installing the LAN module

The LAN module is a hot-swap unit that is installed in the rear of the BladeCenter T unit and is held in place by captive thumbscrews. The LAN module provides the electrical and mechanical interface to the BladeCenter T system for the two local area network (Ethernet) connections, as driven from each management module, and the telco external alarms. This module contains two RJ45 connectors with LEDs for the management interface and one serial connector. See “LAN-module indicators and input/output connectors” on page 14 for more information.



Use the instructions in this section to remove or install the LAN module into the rear of the BladeCenter T unit (see the illustration of the KVM and LAN modules in "Removing and installing the KVM (keyboard, video, mouse) module" on page 53). The LAN module is held in place by captive thumbscrews. You can use your fingers to turn the thumbscrews to install or remove the LAN module. Make sure that you do not overtighten the thumbscrews.



Removing the LAN module

Complete the following steps to remove a LAN module from the rear of the BladeCenter T unit:

1. Fully loosen each thumbscrew counter clockwise.
2. Grasp the LAN module by both thumbscrews.
3. Carefully pull the LAN module outward from the LAN module bay until you feel it release from the card edge connector on the backplane.
4. Remove the LAN module from the bay and set it aside.
5. Within 1 minute, install the new LAN module.

Installing the LAN module

Complete the following steps to install a LAN module into the rear of the BladeCenter T unit:

1. Hold the LAN module by both thumbscrews.

2. Position the LAN module into the rails inside the LAN module bay (see the illustration of the KVM and LAN modules in “Removing and installing the KVM (keyboard, video, mouse) module” on page 53).
3. Push the LAN module into the bay until it stops. Make sure that it is snug.
4. Turn each thumbscrew clockwise until it is finger tight. Make sure that you do not overtighten the thumbscrews.

Removing and installing I/O modules

For blade server communication with the network, the BladeCenter T unit supports up to four hot-swap I/O modules. Table 3 on page 57 identifies the types of I/O modules that you can install in each I/O-module bay. Go to the IBM Support website at http://www.ibm.com/supportportal/ to see the list of supported I/O modules.

The BladeCenter T unit supports a minimum of one hot-swap Ethernet switch module or pass-thru module, in I/O-module bay 1 or 2. This I/O module provides an internal connection to an integrated Ethernet controller in all the blade servers in the BladeCenter T unit, up to eight internal connections per I/O module. To provide an internal connection for the second integrated Ethernet controller in each blade server, install an Ethernet switch module or pass-thru module in the available I/O-module bay of the pair (I/O-module bay 1 or bay 2). The management modules are connected to the switch module through the backplane using a transformerless 100 Mbps connection and an I2C interface.

The BladeCenter T unit supports two additional I/O modules in I/O-module bays 3 and 4. Each of these I/O modules provides an internal connection to one of the two network-interface controllers on each of the I/O expansion options that are installed on blade servers in the BladeCenter T unit. The I/O module must be compatible with the network interface on each of the I/O expansion options. For example, if you install a Fibre Channel I/O expansion card on a blade server, the I/O modules that you install in I/O-module bays 3 and 4 must be Fibre Channel switch modules or pass-thru modules.

Important: The switch modules in I/O module bays 3 and 4 and all blade server interface options in the BladeCenter T unit, must use the same interface type. For example, if you install an Ethernet interface option on a blade server, the switch modules that you install in I/O module bays 3 and 4 must be Ethernet. All other interface options in the BladeCenter T unit must also be Ethernet interface options.

Note: You can use a pass-thru module in any I/O-module bay, provided that the associated controller in the blade servers or I/O expansion options is compatible with it.

The following table summarizes the types of modules that can be used in each I/O-module bay. See “Rear view” on page 12 for the location of the I/O-module bays on the BladeCenter T unit.

Table 3. Hot-swap I/O module types by location for redundancy

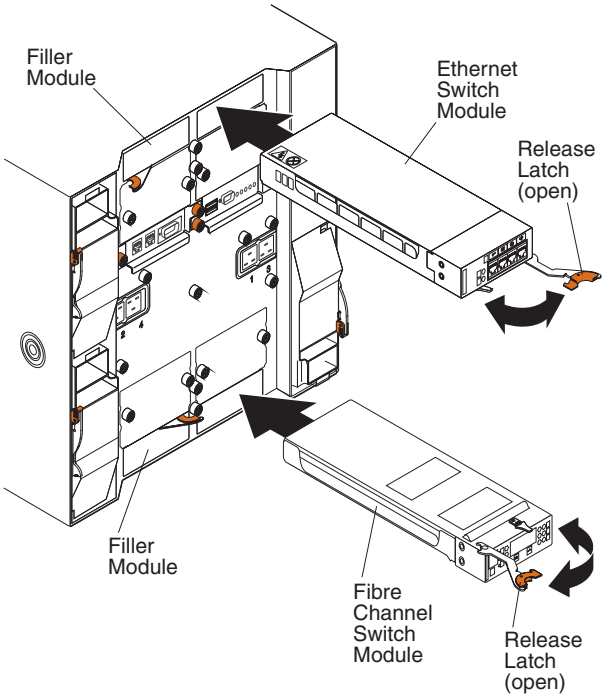
Bays	I/O-module function	Permissible I/O module
1 and 2	Network connections 1 and 2 (Ethernet) for all blade servers in the BladeCenter T unit	One of the following combinations: • Two Ethernet switch modules • Two pass-thru modules • One Ethernet switch module and one pass-thru module
3 and 4	Network connections 3 and 4 (for all I/O expansion options on blade servers in the BladeCenter T unit)	One of the following combinations. • Two Ethernet switch modules • Two Fibre Channel switch modules • Two pass-thru modules **Important:** • The modules used must support the network interface that is used on the blade server I/O expansion options. • The I/O modules in bays 3 and 4 must be the same type.

Notes:

1. The enumeration of the Ethernet controllers in a blade server is operating-system dependent. You can verify the Ethernet controller designations that a blade server uses through your operating-system settings.
2. The routing of an Ethernet controller to a particular I/O-module bay depends on the type of blade server. You can verify which Ethernet controller is routed to which I/O-module bay by using the following test:
   a. Install only one Ethernet switch module or pass-thru module, in I/O-module bay 1.
   b. Make sure that the ports on the switch module or pass-thru module are enabled (**I/O Module Tasks ″ Management ″ Advanced Management** in the management module web-based user interface).
   c. Enable only one of the Ethernet controllers on the blade server. Note the designation that the blade server operating system has for the controller.
   d. Ping an external computer on the network that is connected to the switch module or pass-thru module.

   If you can ping the external computer, the Ethernet controller that you enabled is associated with the I/O module in I/O-module bay 1. The other Ethernet controller in the blade server is associated with the I/O module in I/O-module bay 2.
3. If you have installed an I/O expansion option on a blade server, communications from the option are routed to I/O-module bays 3 and 4. You can verify which controller on the option is routed to which I/O-module bay by performing the test in note 2, using a controller on the I/O expansion option and a compatible switch module or pass-thru module in I/O-module bay 3 or 4.

Use the instructions in this section to remove or install an I/O module at the rear of the BladeCenter T unit.



Removing an I/O module

Use the following instructions to remove an I/O module or filler module from the rear of the BladeCenter T unit.

1. Press the release lever at the end of the release latch and pull the latch to the open position. The I/O module moves slightly out of the bay.
2. Slide the I/O module out of the I/O-module bay and set it aside.
3. Within 1 minute, install another I/O module or filler module into the bay.

Installing an I/O module

Complete the following steps to install an I/O module into the rear of the BladeCenter T unit.

1. Press the release lever at the end of the release latch and pull the latch to the open position.
2. Insert the I/O module into the selected I/O-module bay.
3. Push the I/O module into the bay until it stops. The release latch moves slightly toward the closed position.
4. Close the release latch until it locks into position.

Blade servers

The BladeCenter T unit supports up to eight high-performance blade servers. Each blade server is an enclosure that contains microprocessors, memory, a control chip set, an I/O bus, Ethernet controllers, hard disk drives or flash drives, and user-interface controls, and connectors for expansion options. The blade server receives its power, network connection, and I/O devices (CD-ROM, keyboard, mouse, and video ports, USB port, remote monitoring port) from the BladeCenter T unit, reducing the number of cables that are required.

Blade server expansion options

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

Go to http://www.ibm.com/supportportal/ for a list of available options for your IBM blade server.

I/O expansion option

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

Note: If an I/O expansion option is installed on any blade server, I/O modules that are compatible with that network interface must be installed in I/O-module bays 3 and 4 on the BladeCenter T unit. See "Removing and installing I/O modules" on page 56 for more information.

Expansion unit option

You can install an optional BladeCenter SCSI Storage Expansion Unit or Peripheral Card Interface (PCI) I/O Expansion Unit on your blade server.

Storage Expansion Unit option:

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

PCI I/O-expansion Unit option:

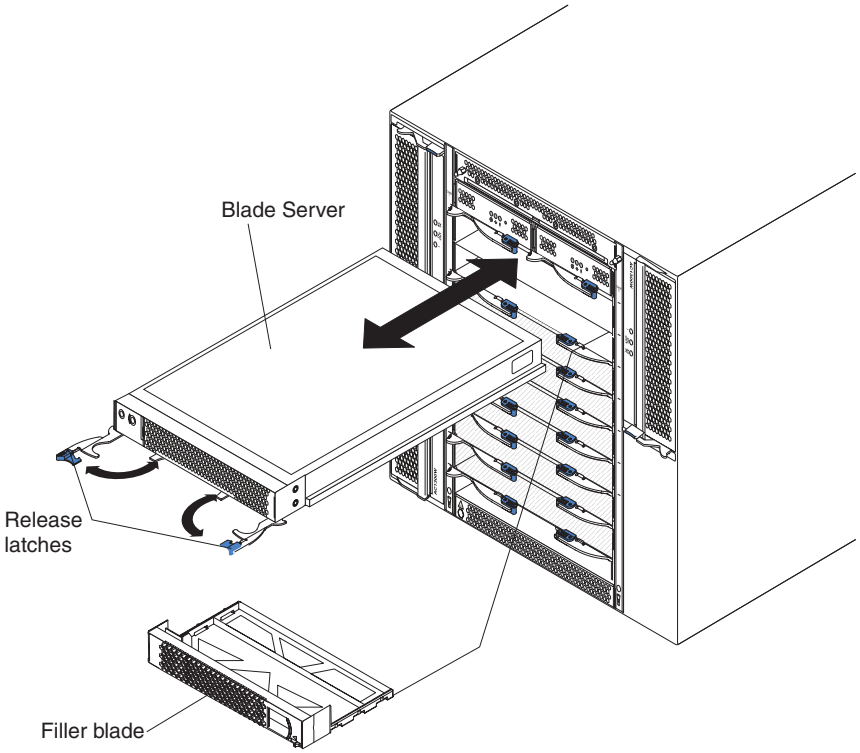
Some blade servers have a connector for adding an expansion unit, such as an IBM BladeCenter PCI I/O Expansion Unit. The PCI I/O-expansion unit supports up to two PCI-X adapters. The expansion unit is attached directly to the blade server and occupies an additional blade server bay.

Removing and installing a blade server or filler module

Use the instructions in this section to remove or install a blade server at the front of the BladeCenter T unit.

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

Attention: To maintain proper system cooling, do not operate the BladeCenter T unit for more than 20 minutes without either a blade server or a filler blade installed in each blade bay. If you fail to replace a blade server or filler blade within 20 minutes, system performance might be affected.



Installing a blade server

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

Statement 21

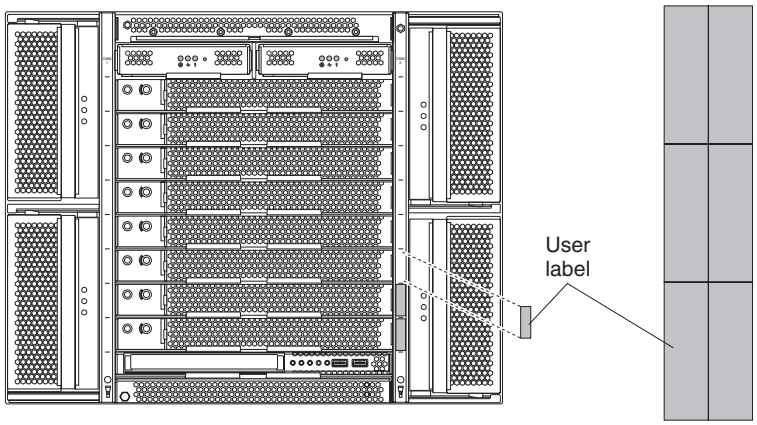
CAUTION:
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

1. Install any options that you need, such as hard disk drives or memory, in the blade server. See the documentation that comes with the blade server for instructions.
2. Select the bay for the blade server.

   Notes:

   a. If a blade server has a SCSI Storage Expansion Unit or PCI I/O-expansion Unit installed on it, the blade server and expansion option require an additional adjacent blade bay.

   b. If you install a blade server or option in bay 5 through 8, you must install power modules in power-module bays 3 and 4.
3. Remove the filler blade from the bay and store in a safe place.
4. Make sure that the release latches on the blade server are in the open position (horizontal to the blade server).
5. Slide the blade server into the bay until it stops.
6. Push the release latches on the front of the blade server until they are closed.
7. Turn on the blade server by pressing the power-control button on the blade server control panel. See the documentation that comes with the blade server for more instructions.
8. Make sure that the power LED on the blade server control panel is lit, indicating that the blade server is receiving power.
9. (Optional) Write identifying information on one of the user labels that come with the blade server; then, place the label on the BladeCenter T unit to the right of the blade server, as shown in the following illustration.



   Important: Do not place the label on the blade server or in any way block the ventilation holes on the blade server.
10. If you have other modules to install at the front of the unit, do so now. Otherwise reinstall the bezel assembly on the front of the BladeCenter T unit.

    Note: Reinstall the bezel assembly on the BladeCenter T unit after you have finished installing the blades. However, if you installed an option such as a PCI I/O Expansion Unit with PCI adapters that require cables, you will not be able to install the bezel assembly, which contains an air filter for the BladeCenter T unit. If you cannot install the bezel assembly, a filter must be provided on the rack.

If this is the initial installation for a blade server in the BladeCenter T unit, you must configure the blade server with the blade server Setup utility and install the blade server operating system. See the documentation that comes with the blade server for instructions.

Removing a blade server

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

Note: If you do not shut down a blade server properly, it cannot be restarted using the Wake on LAN feature.

1. Shut down the blade server operating system; then, press the blade server power-control button (behind the blade server control panel door) to turn off the blade server. Wait at least 30 seconds until the drives stop spinning, before proceeding to the next step.
2. Open the two release latches as shown in the illustration on page "Removing and installing a blade server or filler module" on page 60. The blade server moves slightly out of the bay.
3. Pull the blade server out of the bay.
4. Place either a filler blade or another blade server in the bay within 20 minutes.

Completing the installation

After you install modules and route and secure any power cords (if necessary, see the *Rack Installation Instructions* for information about routing the cords), start the BladeCenter T unit (if it is not already started) and verify that it is working correctly.

1. Make sure the LEDs on the modules indicate that they are operating correctly. Make sure that:
   - The input and output power LEDs on each power module are lit, and the fault LEDs are not lit.
   - The power LED on each management module is lit.
   - The power LED on each I/O module is lit.
2. Make sure that the power LED on each blade server is lit, either steady or blinking.

See "BladeCenter T unit power, controls, and indicators" on page 15 for information about starting the BladeCenter T unit and the location of the LEDs on the modules. See the documentation that comes with the blade server for the location of the LEDs on the blade server.

Chapter 5. Service replaceable units

This chapter describes the removal of server components.

Important: The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM products. See the parts listing in Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine if the component being replaced is a customer replaceable unit (CRU) or a FRU.

As further guidance, the components in the BladeCenter T unit have an alphabetical stamp in the metal that identifies the order they were assembled at the factory (for example, a, b, c, etc.).

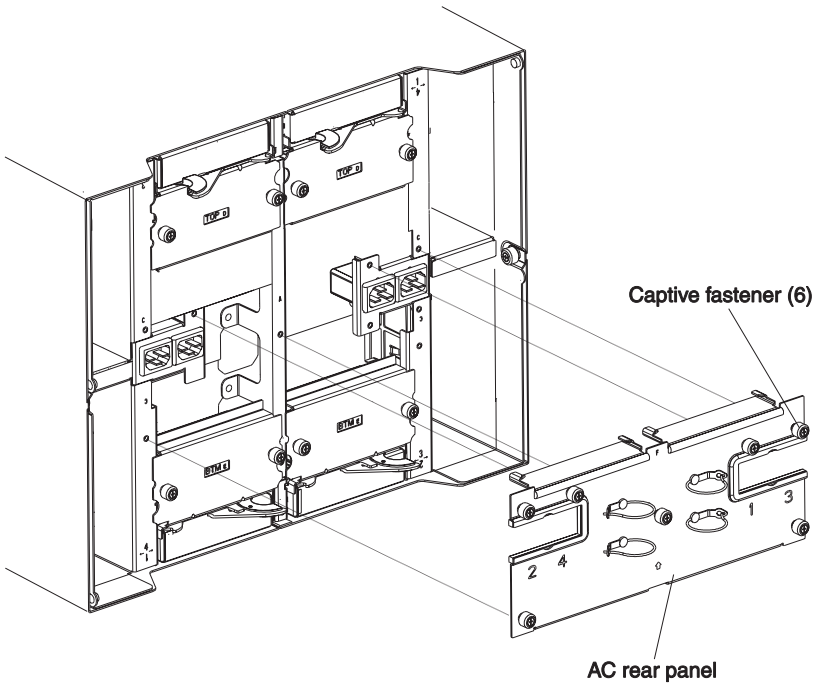
Rear panel

Complete the following steps to replace the ac rear panel located at the rear of the unit.

Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.

1. Shut down and remove power from the system (see "Shutting down the BladeCenter T unit" on page 17).
2. Remove each power cord from the input power connections on the rear of the BladeCenter T unit.
3. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 54).
4. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 55).
5. Using a screwdriver, fully loosen the seven captive fasteners on the old ac rear panel.



6. Remove the old ac rear panel from the system.
7. Remove the new ac rear panel from its packaging.
8. Position the new ac rear panel so that it aligns with the power inlet receptacles on the system. Make sure that the ac rear panel is well seated on the system.
9. Using a screwdriver, tighten the seven captive fasteners on the new ac rear panel. Torque the screws to 8 inch-pounds.

   Note: Torque the captive fasteners to 8 inch-pounds.
10. If you have no other replacement procedures to perform at the rear of the system, reinstall the LAN module (see "Installing the LAN module" on page 55) and the KVM module (see "Removing and installing the KVM (keyboard, video, mouse) module" on page 53).
11. Plug each power cord into the input power connections on the rear of the BladeCenter T unit (see "Starting the BladeCenter T unit" on page 16).
12. Start the system (see "Starting the BladeCenter T unit" on page 16).

Upper flex circuit assembly

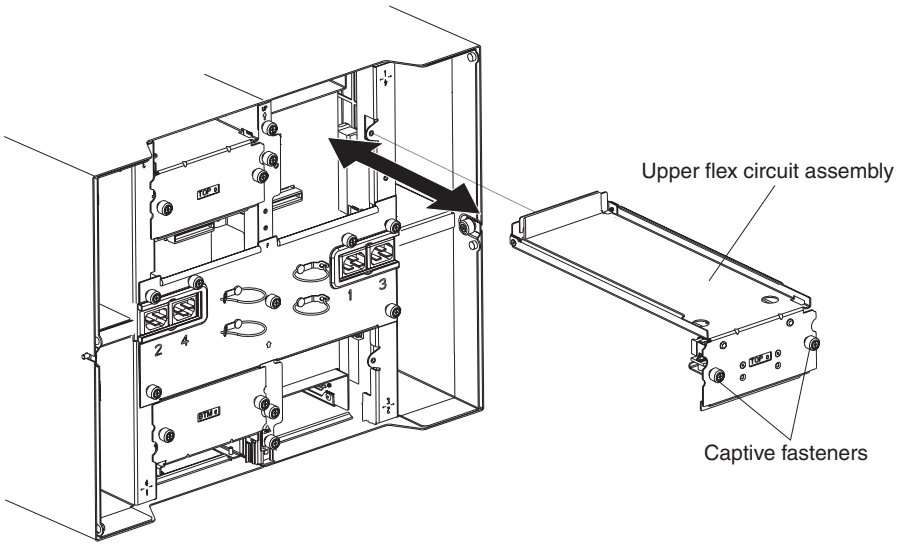
Complete the following steps to replace the upper flex circuit assembly.

Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.

1. Shut down and remove power from the system (see "Shutting down the BladeCenter T unit" on page 17).
2. Remove each power cord from the input power connections on the rear of the BladeCenter T unit.

3. Remove the KVM module from the rear of the system (see “Removing the KVM module” on page 54).
4. Remove the LAN module from the rear of the system (see “Removing the LAN module” on page 55).
5. Remove the I/O switch that is above the upper flex circuit assembly that you are removing.
6. Using a screwdriver, fully loosen the two captive fasteners on the old upper flex circuit assembly.



7. Carefully remove the old upper flex circuit assembly by placing your fingers under the lower edge of the assembly and pulling the unit out of the chassis.
8. Remove the new upper flex circuit assembly from the packaging.
9. Align the assembly so that the stamped position identifier "Top" is facing you.
10. Position the front end of the new upper flex circuit assembly into the assembly bay in the chassis, making sure the leading edge rests on the lower shelf of the bay.

    CAUTION:
    Be careful not to damage the EMI gaskets located on the vertical sides of the upper flex circuit assembly bay.
11. Carefully push the assembly all the way into the bay.
12. Using a screwdriver, tighten the two captive fasteners on the new upper flex circuit assembly.

    Note: Torque the screws to 8 inch-pounds.
13. Reinstall the I/O switch that you removed.
14. If you have no other replacement procedures to perform at the rear of the system, reinstall the LAN module (see “Installing the LAN module” on page 55) and the KVM module (see “Installing the KVM module” on page 54).
15. Reconnect the power to the system (see “Starting the BladeCenter T unit” on page 16).
16. Start the system (see “Starting the BladeCenter T unit” on page 16).

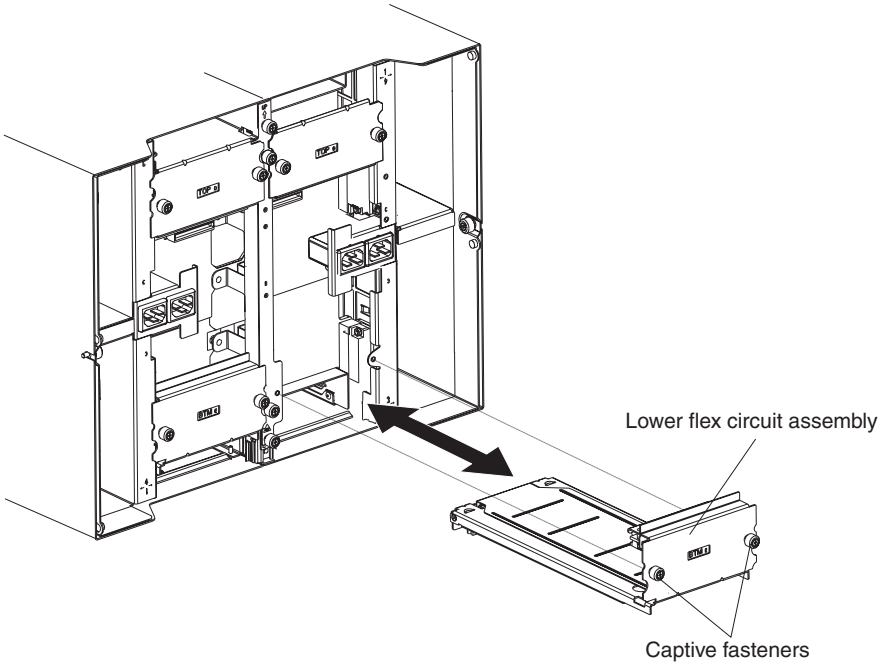
Lower flex circuit assembly

Complete the following steps to replace the lower flex circuit assembly.

Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.

1. Shut down and remove power from the system (see "Shutting down the BladeCenter T unit" on page 17).
2. Remove each power cord from the input power connections on the rear of the BladeCenter T unit.
3. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 54).
4. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 55).
5. Remove the rear panel.
6. Remove the I/O switch or filler that is below the lower flex circuit assembly that you are removing.
7. Using a screwdriver, loosen the two captive fasteners on the old lower flex circuit assembly.



8. Carefully remove the old lower flex circuit assembly by gripping the top edge of the assembly and pulling the unit out of the chassis.
9. Remove the new lower flex circuit assembly from the packaging.
10. Align the assembly so that the stamped position identifier "BTM" is facing you, and position the front end of the new lower flex circuit assembly into the assembly bay in the chassis, making sure the leading edge rests against the ceiling of the bay.
11. Carefully push the assembly all the way into the bay.

12. Using a screwdriver, tighten the two captive fasteners on the new lower flex circuit assembly.

    Note: Torque the screws to 8 inch-pounds.
13. Reinstall the I/O switch that you removed.
14. If you have no other replacement procedures to perform at the rear of the system, reinstall the LAN module (see "Installing the LAN module" on page 55) and the KVM module (see "Installing the KVM module" on page 54).
15. Reconnect the power to the system (see "Starting the BladeCenter T unit" on page 16).
16. Start the system (see "Starting the BladeCenter T unit" on page 16).

Docking board/blower housing assembly

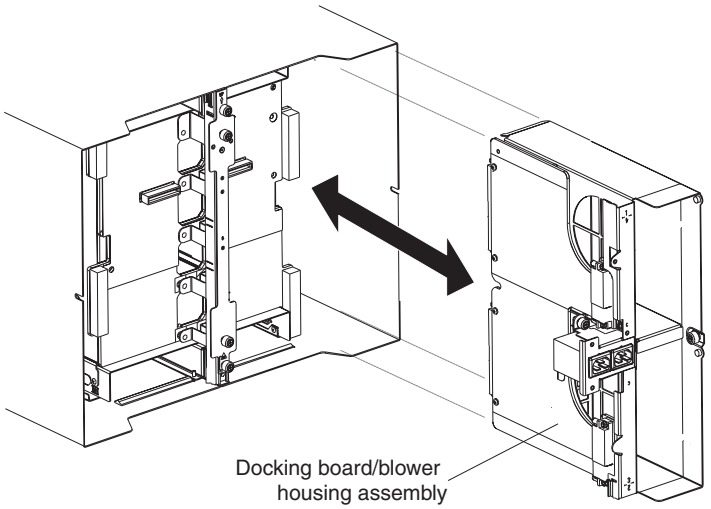
Complete the following steps to replace the docking board/blower housing assembly.

Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.

1. Shut down and remove power from the system (see "Shutting down the BladeCenter T unit" on page 17).
2. Remove each power cord from the input power connections on the rear of the BladeCenter T unit.
3. Remove the power modules from the bays at the front of the unit on the same side of the docking board/blower housing assembly that you are replacing.

   Note: The power modules dock into the docking board on the assembly and must be removed before you can remove the assembly.
4. At the rear of the unit, remove the two blowers from the docking board/blower housing assembly that you are replacing (see "Removing and installing blower modules" on page 50).
5. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 54).
6. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 55).
7. Remove all I/O switches and switch fillers from the rear of the unit. See "Removing and installing I/O modules" on page 56.
8. Remove the ac rear panel from the rear of the unit (see "Rear panel" on page 63).
9. Remove the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 64) and the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 66).
10. Loosen the two captive fasteners located above and below the power inlet receptacles.
11. Loosen the captive fastener that attaches the old docking board/blower housing assembly to the system chassis.



12. Grasp the housing by the housing frame above and below the power inlet receptacles, and carefully pull the housing out from the system chassis.
13. Remove the new docking board/blower housing assembly from its packaging.
14. Align the new assembly at the rear of the unit so that the connectors on the assembly align with the connectors on the backplane, and carefully position and push in the assembly until it is firmly seated in the system chassis.
15. Tighten to 8 inch-pounds the two captive fasteners located above and below the power inlet receptacles.
16. If you have no other replacement procedures to perform at the rear of the system:
    - Reinstall the two upper flex circuit assemblies (see page "Upper flex circuit assembly" on page 64).
    - Reinstall the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 66).
    - Reinstall the rear panel (see "Rear panel" on page 63).
    - Reinstall the LAN module (see "Installing the LAN module" on page 55).
    - Reinstall the KVM module (see page "Installing the KVM module" on page 54).
    - Reinstall the I/O switches or switch fillers.
    - Reinstall the two blowers (see "Installing a blower module" on page 52).
    -
    - Plug each power cord into the input power connections on the rear of the BladeCenter T unit.
    - Reinstall the power modules at the front of the unit (see "Installing a power module" on page 45).
17. Start the system (see "Starting the BladeCenter T unit" on page 16).

Rear chassis stiffener bracket

Complete the following steps to replace the rear chassis stiffener bracket.

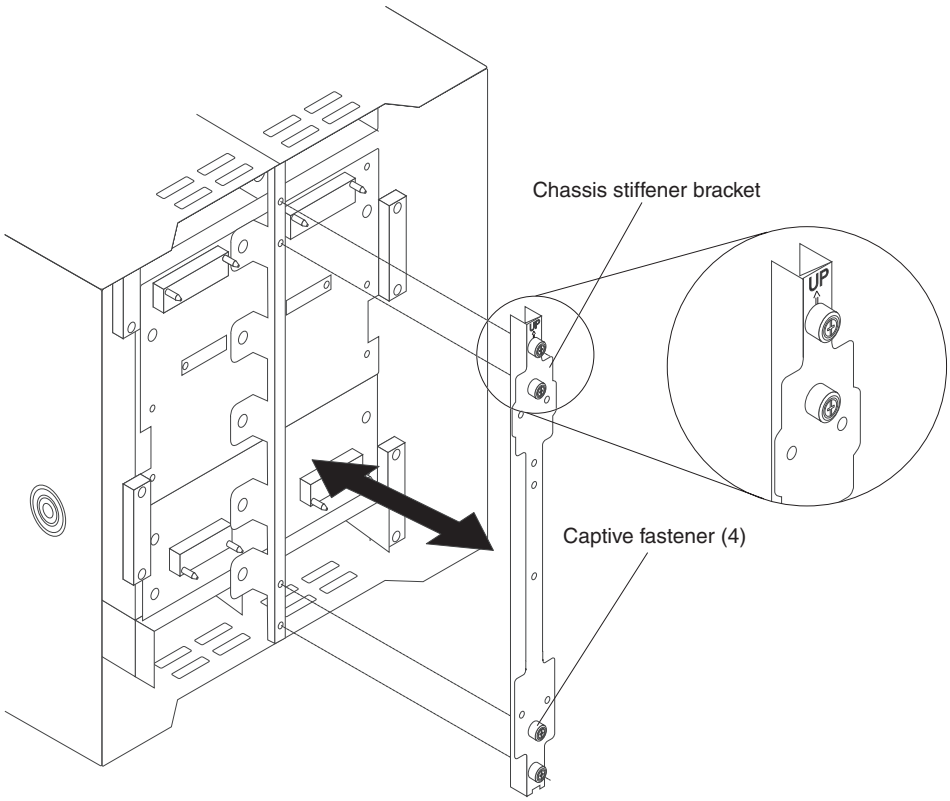
Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.

- Read “Handling static-sensitive devices” on page 37.

1. Shut down and remove power from the system (see “Shutting down the BladeCenter T unit” on page 17).
2. Remove each power cord from the input power connections on the rear of the BladeCenter T unit.
3. Remove the power modules from the bays at the front of the unit.

   Note: The power modules dock into the docking board on the assembly and must be removed before you can remove the assembly.
4. Remove the KVM module from the rear of the system (see “Removing the KVM module” on page 54).
5. Remove the LAN module from the rear of the system (see “Removing the LAN module” on page 55).
6. Remove all I/O switches and switch fillers from the rear of the unit.
7. Remove the ac rear panel from the rear of the unit (see “Rear panel” on page 63).
8. Remove the two upper flex circuit assemblies (see “Upper flex circuit assembly” on page 64) and the two lower flex circuit assemblies (see “Lower flex circuit assembly” on page 66).
9. Loosen the four captive fasteners on the old rear chassis stiffener bracket.



10. Pull the old rear chassis stiffener bracket off the chassis.
11. Remove the new rear chassis stiffener bracket from its packaging.
12. Align the stiffener bracket with the "Up" arrow pointing upwards.
13. Position the bracket on the chassis, and tighten the four captive fasteners.
14. If you have no other replacement procedures to perform at the rear of the system:

- Reinstall the two upper flex circuit assemblies (see page "Upper flex circuit assembly" on page 64).
- Reinstall the two lower flex circuit assemblies (see page "Lower flex circuit assembly" on page 66).
- Reinstall the rear ac panel (see "Rear panel" on page 63).
- Reinstall the LAN module (see "Installing the LAN module" on page 55).
- Reinstall the KVM module (see "Installing the KVM module" on page 54).
- Reinstall the I/O switches or switch fillers.
- Plug each power cord into the input power connections on the rear of the BladeCenter T unit.
- Reinstall the power modules at the front of the unit (see "Installing a power module" on page 45).

15. Start the system (see "Starting the BladeCenter T unit" on page 16).

Backplane

Complete the following steps to replace the backplane in your BladeCenter T unit:

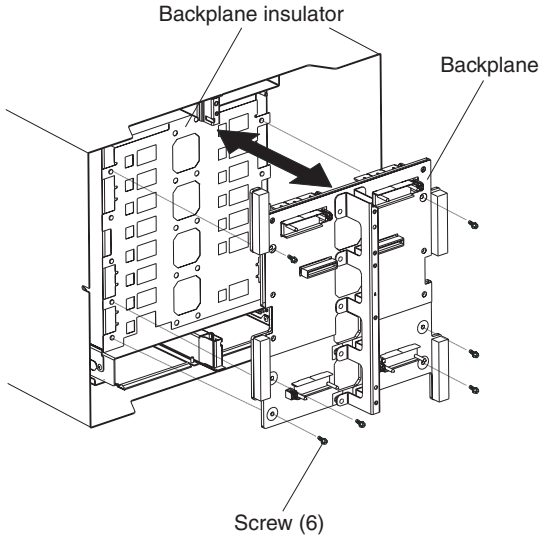
Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.

1. Shut down and remove power from the system (see "Shutting down the BladeCenter T unit" on page 17).
2. Remove each power cord from the input power connections on the rear of the BladeCenter T unit.
3. Remove the power modules from the bays at the front of the BladeCenter T unit.

   Note: The power modules dock into the docking board on the assembly and must be removed before you can remove the assembly.
4. At the rear of the unit, remove all four blowers from both docking board/blower housing assemblies (see "Removing a blower module" on page 52).
5. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 54).
6. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 55).
7. Remove all I/O switches and switch fillers from the rear of the unit.
8. Remove the ac rear panel from the rear of the unit (see "Rear panel" on page 63).
9. Remove the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 64) and the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 66).
10. For each docking board/blower housing assembly, loosen the two captive fasteners located above and below the power inlet receptacles.
11. Grasp the left docking board/blower assembly housing by the frame and carefully pull the housing out from the system chassis.
12. Grasp the right docking board/blower assembly housing by the frame and carefully pull the housing out from the system chassis.

13. Loosen the four captive fasteners on the rear chassis stiffener bracket.
14. Pull the rear chassis stiffener bracket off the chassis.
15. Loosen and remove the six non-captive screws that mount the old backplane to the chassis.



16. Holding the backplane at the top near the guide pins, pull the backplane out and off of the guide pins. Set the old backplane aside.
17. Remove the new backplane from its packaging.
18. Install the new backplane.
19. Insert and tighten the six non-captive screws that mount the backplane to the chassis.

    Note: Tighten the screws to 8 inch-pounds.
20. If you have no other replacement procedures to perform at the rear of the system:
    - Reinstall the rear chassis stiffener bracket (see page12 on page 69).
    - Reinstall the left and right docking board/blower housing assemblies (see page 15 on page 68).
    - Reinstall the two upper flex circuit assemblies (see “Upper flex circuit assembly” on page 64).
    - Reinstall the two lower flex circuit assemblies (see “Lower flex circuit assembly” on page 66).
    - Reinstall the rear ac panel (see “Rear panel” on page 63).
    - Reinstall the LAN module (see “Installing the LAN module” on page 55).
    - Reinstall the KVM module (see “Installing the KVM module” on page 54).
    - Reinstall the I/O switches or switch fillers.
    - Reinstall the four blowers (see “Installing a blower module” on page 52).
    - Plug each power cord into the input power connections on the rear of the BladeCenter T unit.
    - Reinstall the power modules at the front of the unit (“Installing a power module” on page 45).
21. Start the system (see “Starting the BladeCenter T unit” on page 16).

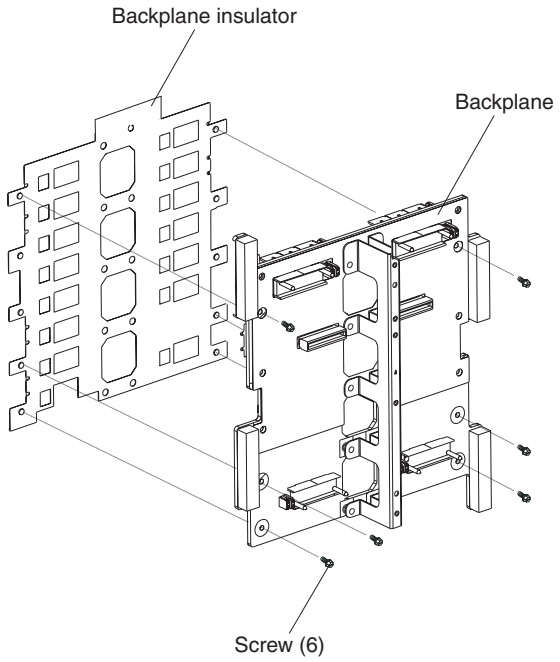
Backplane insulator

Complete the following steps to replace the backplane insulator.

Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.

1. Perform steps 1 on page 70 through 15 on page 71 in "Backplane" on page 70. When you have completed these steps, go to step 2 of this procedure.
2. Holding the backplane at the top near the guide pins, pull the backplane out and off of the guide pins.
3. Lift the old backplane insulator out of the chassis.



4. Remove the new backplane insulator from its packaging.

   Note: The backplane insulator is keyed to the screws and VHDM connectors and installs in only one correct orientation.
5. Install the new backplane insulator over the round alignment studs in the chassis.
6. If you have no other replacement procedures to perform at the rear of the system:
   - Reinstall the backplane (see page18 on page 71).
   - Reinstall the rear chassis stiffener bracket (see "Rear chassis stiffener bracket" on page 68).
   - Reinstall the left and right docking board/blower housing assemblies (see page 15 on page 68).
   - Reinstall the two upper flex circuit assemblies (see page "Upper flex circuit assembly" on page 64).
   - Reinstall the two lower flex circuit assemblies (see page "Lower flex circuit assembly" on page 66).

- Reinstall the rear ac panel (see “Rear panel” on page 63).
- Reinstall the LAN module (see “Installing the LAN module” on page 55).
- Reinstall the KVM module (see “Installing the KVM module” on page 54).
- Reinstall the I/O switches or switch fillers.
- Reinstall the two blowers (see “Installing a blower module” on page 52).
- Plug each power cord into the input power connections on the rear of the BladeCenter T unit.
- Reinstall the power modules at the front of the BladeCenter T unit (see “Installing a power module” on page 45).

7. Start the system (see “Starting the BladeCenter T unit” on page 16).

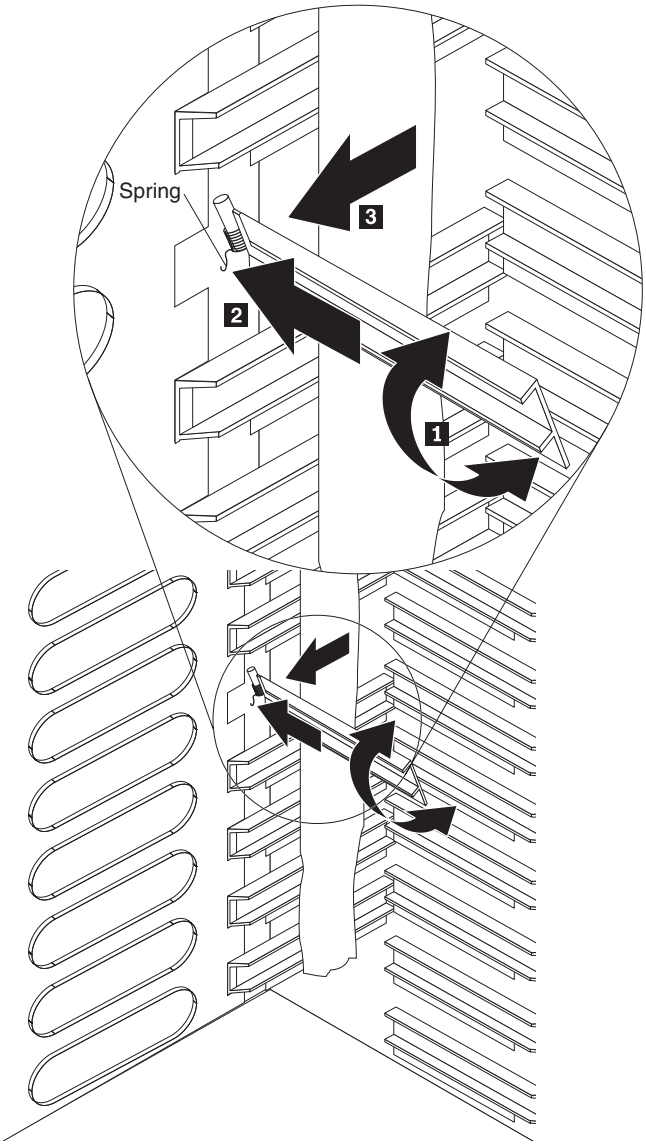
Air damper

Complete the following steps to replace an air damper.

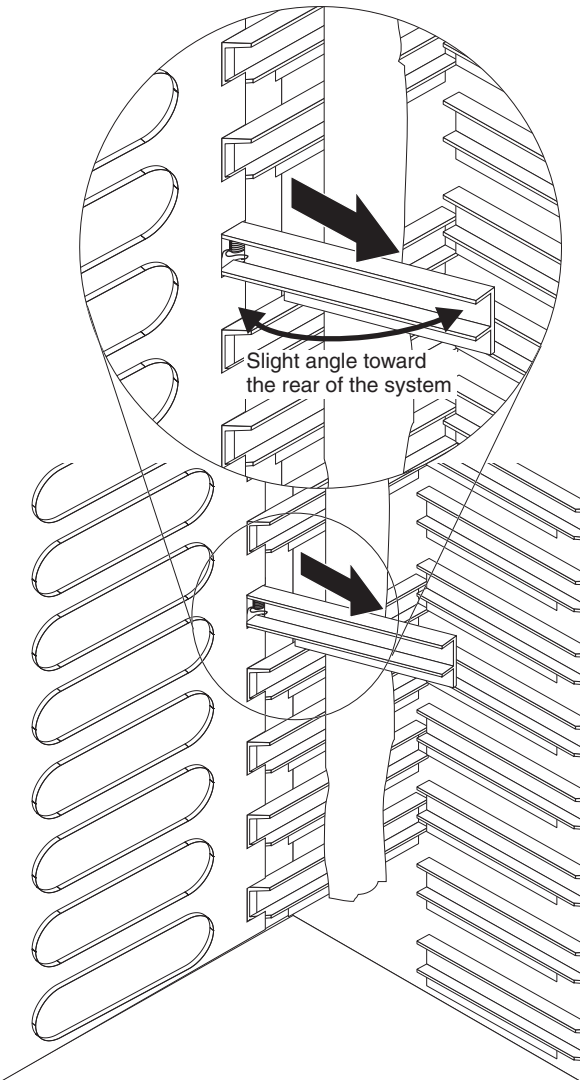
Note:

- Read “Installation guidelines” on page 35.
- Read the safety notices in “Safety” on page v.
- Read “Handling static-sensitive devices” on page 37.

1. Shut down and remove power from the system (see “Shutting down the BladeCenter T unit” on page 17).
2. Remove the power modules and fillers from the bays at the front of the unit (see “Removing a power module” on page 45).
3. Remove the management modules and fillers from the bays at the front of the unit (see “Removing a management module” on page 49).
4. Remove the media tray from the front of the unit (see “Removing the media tray” on page 47).
5. Remove the server blades and fillers from the front of the unit (see “Removing a blade server” on page 62).
6. Remove the broken air damper from the server.



7. Use tape to hold the air dampers above and below the empty air damper slot in the open position. This will provide more room to install the air damper and reduce the chance of breaking additional air dampers.
8. Turn the air damper on an angle **1** and insert the end with the pins into the air damper slot in the side panel **2**. Be sure the pins on the air damper are behind the side panel.
9. Slide the air damper towards the rear of the chassis until it contacts the back of the slot.
10. Use your thumb to push and hold the spring down; then, slide the air damper all the way towards the front of the chassis **3** until it contacts the front of the slot. Be sure the spring is behind the side panel.



11. Hold the air damper angled slightly towards the back of the server; then, pull the air damper towards the center of the chassis until the pins on the air damper snap into the slots located on the back side of the air damper slot. Rock the air damper up and down while pulling on it to help it seat.
12. Remove the tape used to hold the air dampers open in step 7 on page 74.
13. Install the power modules and fillers in the bays at the front of the unit (see "Installing a power module" on page 45).
14. Install the management modules and fillers from the bays at the front of the unit (see "Installing a management module" on page 50).
15. Install the media tray at the front of the unit (see "Installing the media tray" on page 47).
16. Install the server blades and fillers from the front of the unit (see "Removing and installing a blade server or filler module" on page 60).
17. Start the system (see "Starting the BladeCenter T unit" on page 16).

Mechanical chassis

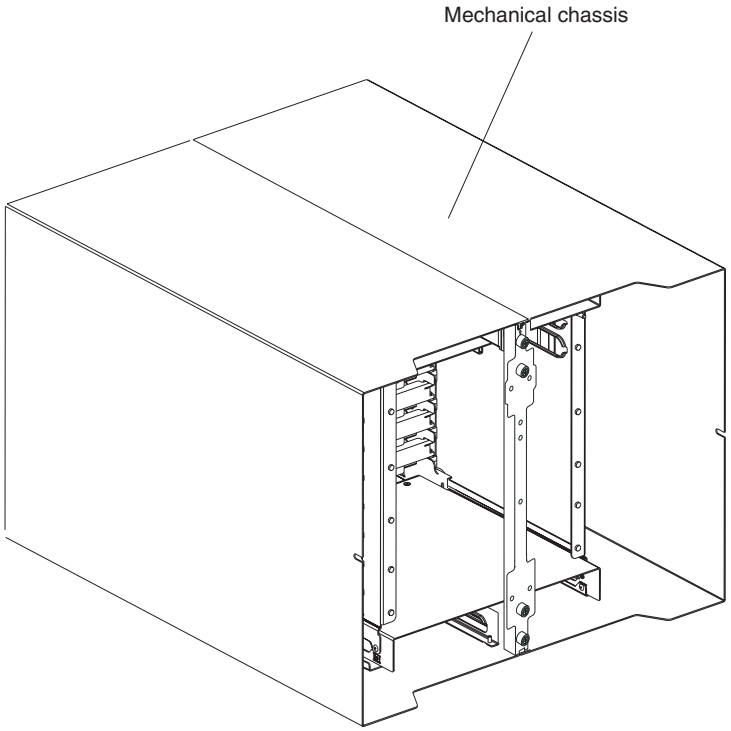
Complete the following steps to replace the mechanical chassis of the BladeCenter T unit.

Note:

- Read "Installation guidelines" on page 35.
- Read the safety notices in "Safety" on page v.
- Read "Handling static-sensitive devices" on page 37.

1. Shut down and remove power from the system (see "Shutting down the BladeCenter T unit" on page 17).
2. Remove each power cord from the input power connections on the rear of the BladeCenter T unit.
3. Remove the power modules and fillers from the bays at the front of the unit (see "Removing a power module" on page 45).
4. Remove the management modules and fillers from the bays at the front of the unit (see "Removing a management module" on page 49).
5. Remove the media tray at the front of the unit (see "Removing the media tray" on page 47).
6. Remove the server blades and fillers from the front of the unit (see "Removing and installing a blade server or filler module" on page 60).
7. At the rear of the unit, remove the blowers from the docking board/blower housing assemblies (see "Removing and installing blower modules" on page 50).
8. Remove all I/O switches and switch fillers from the rear of the unit.
9. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 54).
10. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 55).
11. Remove the ac rear panel from the rear of the unit (see "Rear panel" on page 63).
12. Remove the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 64) and the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 66).
13. For each docking board/blower housing assembly, loosen the two captive fasteners located above and below the power inlet receptacles.
14. Grasp the left docking board/blower assembly housing by the frame, and carefully pull the housing out from the system chassis.
15. Grasp the right docking board/blower assembly housing by the frame, and carefully pull the housing out from the system chassis.
16. Loosen the four captive fasteners on the rear chassis stiffener bracket.
17. Pull the rear chassis stiffener bracket off the chassis.
18. Loosen and remove the six non-captive screws that mount the backplane to the chassis.
19. Holding the backplane at the top near the guide pins, pull the backplane out and off of the guide pins.
20. Remove the backplane insulator.
21. Remove the old mechanical chassis, and set it aside.

22. Remove the new mechanical chassis from its packaging, and set it into position to reassemble all the parts.
23. Install the backplane insulator into the new chassis.



24. Install the backplane on the chassis; then, insert and tighten the six non-captive screws that mount the backplane to the chassis.

    Note: Tighten the screws to 8 inch-pounds.
25. Install the rear chassis stiffener bracket (see page 12 on page 69).
26. Install the left and right docking board/blower housing assemblies (see page 15 on page 68).
27. Install the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 64).
28. Install the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 66).
29. Reinstall the rear ac panel (see "Rear panel" on page 63).
30. Install the blowers at the rear of the unit (see "Installing a blower module" on page 52).
31. Install the KVM module at the rear of the unit (see "Installing the KVM module" on page 54).
32. Install the LAN module at the rear of the unit (see "Installing the LAN module" on page 55).
33. Install the I/O switches at the rear of the unit.
34. Install the media tray at the front of the unit (see "Installing the media tray" on page 47).
35. Install the management modules at the front of the unit (see "Installing a management module" on page 50).
36. Install the blade servers at the front of the unit (see "Removing and installing a blade server or filler module" on page 60).

37. Plug each power cord into the input power connections on the rear of the BladeCenter T unit. See “Starting the BladeCenter T unit” on page 16).
38. Install the power modules at the front of the unit (see “Installing a power module” on page 45).
39. Install the blade servers (see “Removing and installing a blade server or filler module” on page 60).
40. Install the I/O modules (see “Removing and installing I/O modules” on page 56).
41. Start the system (see “Starting the BladeCenter T unit” on page 16).

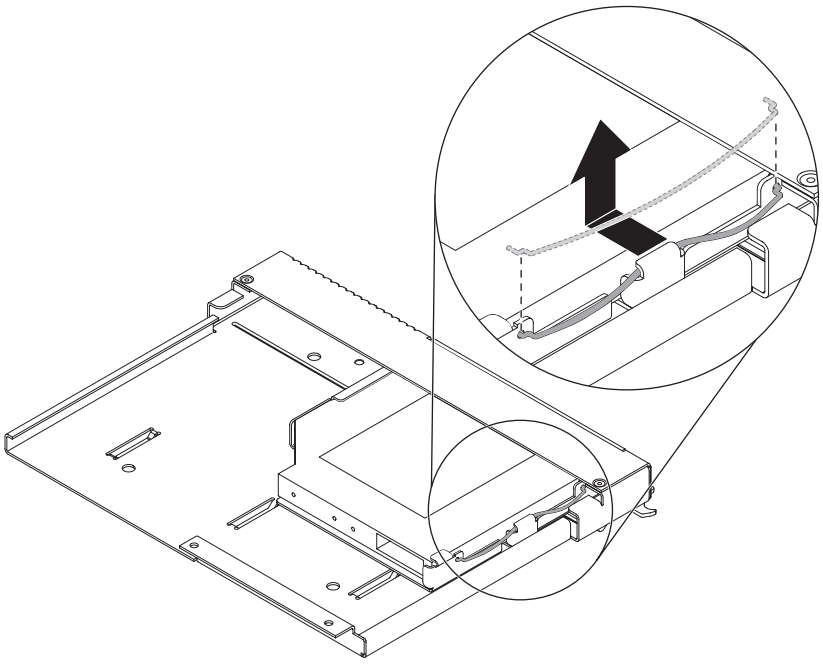
Removing and installing the optical drive

Use the instructions in this section to remove or install the optical drive in the media tray. See “Media tray” on page 9 for information about the system-status panel controls and indicators.

Removing the optical drive

Complete the following steps to remove the optical drive from the media tray:

1. Remove the media tray from the BladeCenter chassis (see “Removing the media tray” on page 47 for more information).
2. Remove the screws that secure the media-tray front panel and optical drive cage to the media-tray base.
3. Carefully lift and slide the optical drive cage off of the media-tray base.
4. Turn over the optical drive cage and disconnect the optical drive power and signal cables from the connectors on the media-tray board.
5. Disconnect the optical drive cable from the connector on the rear of the optical drive.
6. Remove the wire retention spring.

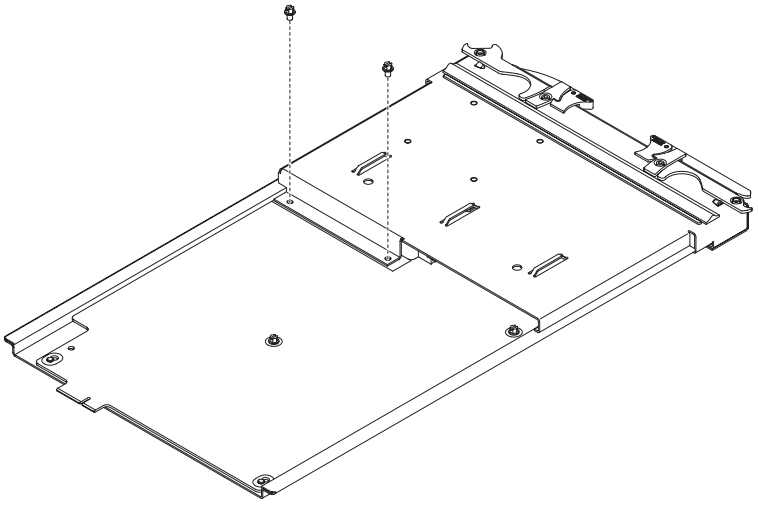


7. Slide the optical drive out of the drive bay.

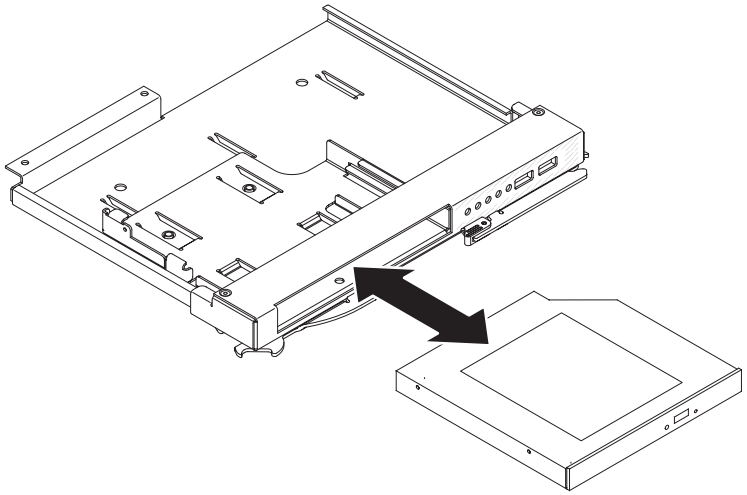
Installing the optical drive

Complete the following steps to install the optical drive in the media tray:

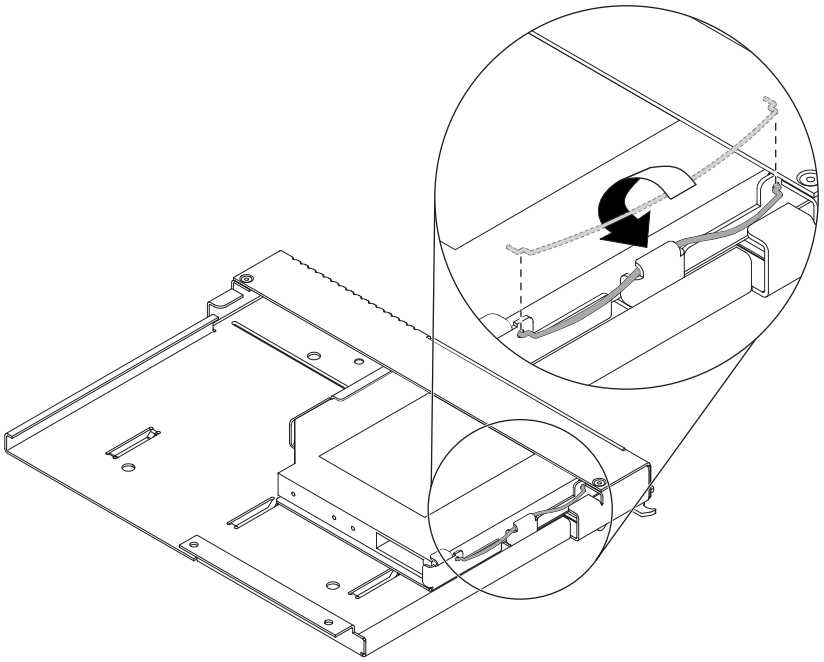
1. Remove the media tray from the BladeCenter chassis (see "Removing the media tray" on page 47 for more information).
2. Remove the screws that secure the media-tray front panel and optical drive cage to the media-tray base. Save the screws for use later.



3. Follow the instructions that come with the optical drive to set any jumpers or switches.
4. Remove the optical drive or optical drive filler if it is installed.
5. Touch the static-protective package that contains the optical drive to any unpainted metal surface on the BladeCenter unit or any unpainted metal surface on any other grounded rack component; then, remove the optical drive from the package.
6. Slide the optical drive all the way into the drive bay.

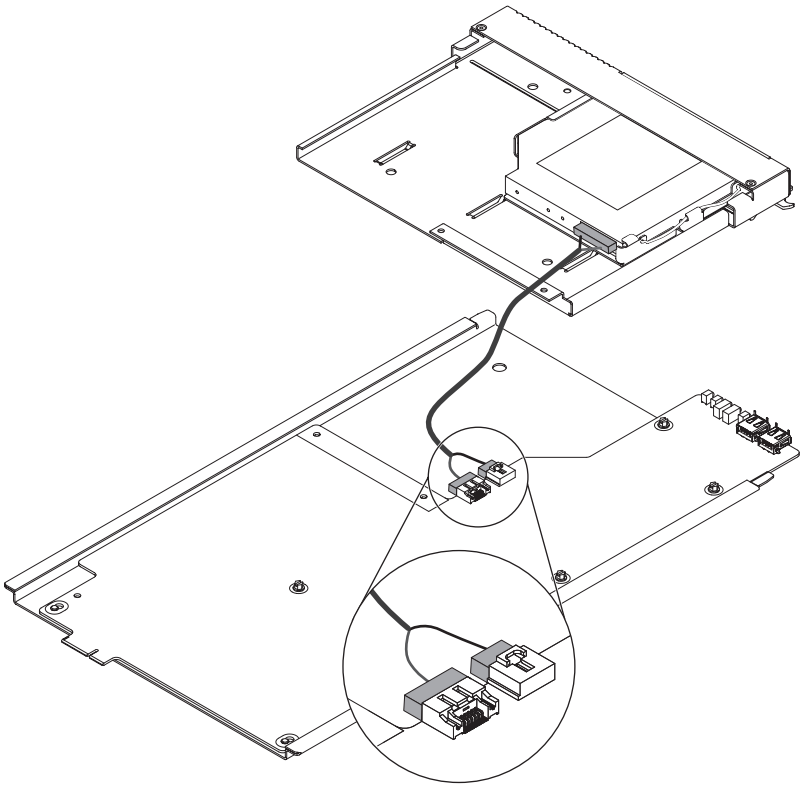


7. Attach the wire retention spring to secure the optical drive in the drive bay:



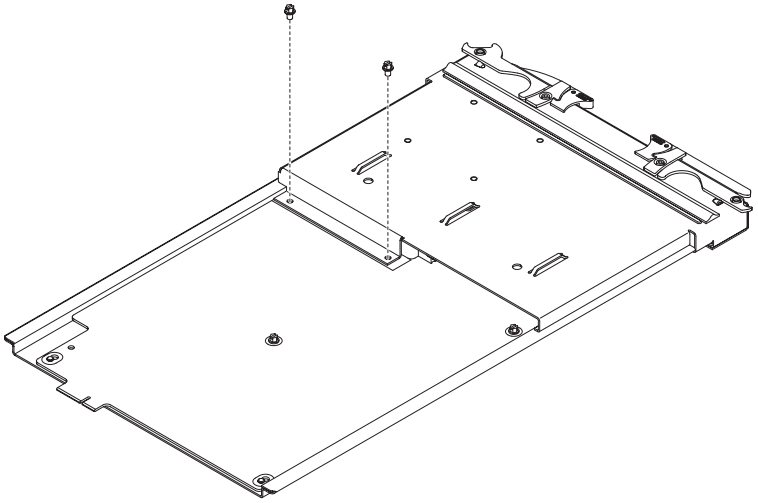
a. First insert both ends of the wire retention spring through the alignment holes in the drive bay and into the holes on the optical drive.
b. Make sure both ends are secure; then, press on the center of the wire retention spring to tuck it under the retention tab.
c. Make sure the retention tab on the chassis securely holds the retention clip in place.

8. Connect the optical drive power and signal cables to the connectors on the media-tray board.



9. Connect the other end of the optical drive cable to the connector on the rear of the optical drive.
10. Slide the media-tray front panel and optical drive cage onto the media-tray base.

    Attention: Make sure the optical drive cable is not pinched.
11. Align the screw holes on the optical drive cage with the screw holes on the media-tray base.
12. Install the screws that you removed in step 2 on page 79.



13. Install the media tray (see "Installing the media tray" on page 47 for more information).

Chapter 6. Symptom-to-FRU index

This index supports the BladeCenter T Type 8267 unit.

Note:

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by this index, refer to the manual for that device.
3. A removed hot-swap module or drive must be replaced within one minute of removal.
4. A removed hot-swap blade must be replaced within 20 minutes of removal.

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

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

Note: In tables with more than two columns, multiple columns are required to describe the error symptoms.

Take the action or replace the FRU suggested first in the list of the right-hand column, then try the server again to see if the problem has been corrected before taking further action.

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

Error symptoms

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

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

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

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

Table 4. Troubleshooting charts

Device	Suggested action
Blade server problem	
Blade servers turn off for no apparent reason.	All blade bays must have a blade server, expansion unit, or filler blade in them. Blade bays that do not have these items installed or have them installed improperly disturb airflow in the BladeCenter T unit with an adverse effect on BladeCenter T unit cooling. If the BladeCenter T unit begins to overheat, blade server processors will begin to slow down and will eventually turn off the system.
Blade server does not turn on, the amber system-error LED on the BladeCenter T system-LED panel is lit, the amber blade error LED on the blade server LED panel is lit, and the system-error log contains the following message: "CRUs MisMatched".	The problem occurs after installing the second microprocessor option or after replacing a failed microprocessor in a two-way blade server. The processor with the lowest feature set and stepping level must be used as the Bootstrap Processor (BSP). This processor must be in the Microprocessor 1 location. Switch the processors in the Microprocessor 1 and Microprocessor 2 locations.
Some components do not report environmental status (temperature, voltage).	The green status dot for a component is not automatically a link to environmental information (temperature and voltage) for the component. Only the management module and blade servers have environmental information, and only the green dot for those components contains a link to environmental information.
Switching KVM control between blade servers gives USB device error.	If a blade server is under heavy load, it can take several minutes before it enumerates the USB devices connected to it. If control of the KVM and media tray is switched away from the blade server before this enumeration is complete, a USB device installation error might be displayed. Do not switch KVM control between blade servers until the mouse and keyboard are both working on the blade server that has control of the KVM and media tray.
"Unsafe Removal of Device" error message appears on blade server running Microsoft Windows 2000.	Before switching ownership of the media tray to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, as follows: 1. Double-click the **Unplug or Eject Hardware** icon in the Windows taskbar at the bottom right of the screen. 2. Select **USB Mass Storage Device**, and click **Stop**. 3. Click **Close**. You can now safely switch ownership of the media tray to another blade server.

Table 4. Troubleshooting charts (continued)

Device	Suggested action
"Media not found" error message and other file system error occur on a blade server running Linux or DOS.	Attempting to access the mounted CD-ROM drive (media tray) after it has been switched to another blade server results in I/O errors, even if the media tray has been switched back. **Note:** Because the BladeCenter T unit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device. • If a blade server tries to access the CD-ROM after it has been switched to another blade server, a "Media not found" error occurs. • If a blade server is running a DOS environment, such as when updating firmware on the blade server, the firmware can be interrupted or corrupted when the media tray is switched away; you might need to call for service on the blade server. • If a file handle was left open by switching the media tray away, the system administrator will not be able to do a clean unmount (umount command) unless the unmount is forced by umount command parameters ("lazy umount"). • If the system administrator is sharing out the CD-ROM drive for multiple users, that network share is broken. Before switching ownership of the media tray to another blade server, ensure that the CD-ROM drive is not mounted for the current blade server owner (check for open file handles and sharing out). If a firmware update is taking place on the blade server, do not switch the media tray to another blade server.
Linux does not install from the BladeCenter T CD-ROM drive or will not start afterward.	• If you try to install Red Hat Linux to the blade server IDE drive, Linux does not install. • If you try to install Red Hat Linux to the SCSI drive on a blade server expansion unit, Linux appears to install but the operating system will not start properly. • If you try to install SuSE Linux, Linux does not install. Download the latest operating system installation instructions for your operating system from the IBM Support Web page at http://www.ibm.com/supportportal/ . The necessary workaround is described in the instructions for your operating system.

Table 4. Troubleshooting charts (continued)

Device	Suggested action

Remote control does not work with default SuSE Linux version 8.0 display settings.	The remote console requires a display setting of 1024x768@60Hz in the blade server operating system. The default resolution in SuSE is 1024x768, but the default refresh rate falls somewhere between 50Hz and 60Hz. The remote console does not work for a blade server running SuSE with a display refresh rate other than exactly 60Hz. The message "eServer/No video available" displays.
	
	Other operating systems do not exhibit the problem.
	
	Set the refresh rate in the XF86Config file to exactly 60Hz.
	
	There are two methods.
	• **Method 1 (unattended network install, prevent the problem):** Modify the AutoYaST control file to specify 1024x768@60Hz.
	1. Run the graphical interface to the AutoYaST control file to set the VESA video mode to 1040x768@60Hz. The graphical interface creates the AutoYaST control file.
	2. Edit the resulting AutoYaST control file to set the value for min_vsync to `60`.
	During an unattended network install, the YaST program uses the AutoYaST control file to modify the XF86Config file (/etc/X11/XF86Config); these changes will cause XF86Config to set the display resolution to 1040x768 with a refresh rate of 60Hz.
	-- OR --
	• **Method 2 (situation has already occurred):** Modify the xF86Config file.
	1. In the Monitor section of **/etc/X11/XF86Config**, change the value of VertRefresh to `60`, as shown in these sample lines.
	`Section "Monitor"`
	`Option "CalcAlgorithm" "IteratePrecisely"`
	`HorizSync 31-48`
	`Identifier "Monitor[0]"`
	`ModelName "AutoDetected"`
	`Option "DPMS"`
	`VendorName "AutoDetected"`
	`VertRefresh 60`
	`UseModes "Modes[0]"`
	`EndSection`
	2. Shut down X; then, restart it.

CD-ROM drive problems	

CD-ROM drive is seen as /dev/sr0 by SuSE.	If the SuSE Linux operating system is installed remotely onto a blade server that is not the current owner of the media tray (CD-ROM drive and USB ports), SuSE sees the CD-ROM drive as /dev/sr0 instead of /dev/cdrom, establish a link between /dev/sr0 and /dev/cdrom as follows:
	1. Enter the following command:
	`rm /dev/cdrom; ln -s /dev/sr0 /dev/cdrom`
	2. Insert the following line in the /etc/fstab file:
	`/dev/cdrom /media/cdrom auto ro,noauto,user,exec 0 0`

Table 4. Troubleshooting charts (continued)

Device	Suggested action
CD-ROM drive is not recognized after being switched back to blade server running on Windows 2000 Advanced Server with SP3 applied.	When the CD-ROM drive is owned by blade server *x*, is switched to another blade server, then is switched back to blade server *x*, the operating system in blade server *x* no longer recognizes the CD-ROM drive. This happens when you have not safely stopped the drives before switching ownership of the CD-ROM drive and USB ports (media tray). **Note:** Because the BladeCenter Tunit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device. Before switching ownership of the CD-ROM drive (media tray) to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, as follows: 1. Double-click the **Unplug or Eject Hardware** icon in the Windows taskbar at the bottom right of the screen. 2. Select **USB Mass Storage Device** and click **Stop**. 3. Click **Close**. You can now safely switch ownership of the media tray to another blade server.
CD-ROM problem.	Replace the CD-ROM drive.
Ethernet controller problems	
Operating systems number Ethernet controllers differently.	Enumeration of the Ethernet controllers in a blade server is operating-system dependent. In the blade server Setup utility, the Ethernet port designated as Planar Ethernet 1 is routed to Ethernet switch module 2 and the Ethernet port designated as Planar Ethernet 2 is routed to Ethernet switch module 1. Verify the designations through your operating system settings or by testing: 1. Install only one switch module, in switch bay 1. 2. Enable only one of the Ethernet controllers on the blade server. Make note of the designation the blade server operating system has for the controller. 3. Ping an external computer on the network connected to the switch module. If you can ping the external computer, the Ethernet controller you enabled is the upper controller in the blade server and is associated with Ethernet switch 1.
Ethernet switch module problems	
First ping from Ethernet switch module through Telnet reports failure.	When you use the Ethernet switch module Telnet interface to request the switch module to ping something, the first ping response reports a failure, although the other repetitions might report success. This occurs regardless of whether the switch module port the pinged object is connected to is internal or external, and applies to pinging blade servers but not to pinging the management module or objects connected to its external Ethernet port, such as the network management station. To get accurate results, always specify multiple repetitions (>1) in the ping request, and ignore the first ping response from that request. See the documentation that comes with the Ethernet switch module for instructions on how to ping through the Telnet interface.
Ethernet switch-module firmware graphics shows a blank panel when the blade server is present but powered off.	If the Wake-on-LAN (WOL) feature is disabled on a blade server, and the blade server is turned off, the switch module internal port link to that blade is down. This is not an error, but the graphic of the BladeCenter T unit might show a blank panel instead of a blade server in that bay. **Note:** You can enable or disable the WOL feature on a blade server through the management-module Web interface or through the IBM Director console. Do not rely on the BladeCenter T graphic in the Ethernet switch-module firmware Web interface to determine the presence or absence of blade servers in the BladeCenter T unit.

Table 4. Troubleshooting charts (continued)

Device	Suggested action
Ethernet switch-module log reports elapsed time, not time of day.	The timestamp on entries in the Ethernet switch module log uses elapsed time (since last switch restart). The timestamp on entries restarts from 0 each time the switch is restarted, although the entries do remain in order of occurrence.
Ethernet disconnect notice will not appear when running Windows 2000.	If an Ethernet cable is accidentally removed from the back of the BladeCenter T unit, the small red X (disconnect notice) that normally would appear to indicate that the cable was disconnected will not appear in the bottom right of the screen. The disconnect notice does not appear because the blade server Ethernet controller connects to the Ethernet switch module through integrated circuitry inside the BladeCenter T unit. When troubleshooting Ethernet-related problems, make sure that the Ethernet cables on the back of the BladeCenter T unit are connected properly.
The default IP address set by the Ethernet switch module does not match the one assigned by the management module.	When troubleshooting Ethernet-related problems, make sure that the Ethernet cables on the back of the BladeCenter T unit are connected properly.
Updating the Ethernet switch module configuration through the management module does not save the switch NVRAM.	When you use the management-module Web interface to update the Ethernet switch module configuration, the management module firmware writes its settings for the switch module only to the management module NVRAM; it does not write its settings for the switch module to the switch-module NVRAM. If the switch module restarts when the management module is not able to apply the IP address it has in NVRAM for the switch module, the switch module will use whatever IP address it has in its own NVRAM. If the two IP addresses are not the same, you might not be able to manage the Ethernet switch module any more. The management module cannot apply the switch IP address from its NVRAM if: • The management module is restarting • The management module has failed • The management module has been removed from the unit. When you use the management-module Web interface to update the Ethernet switch module configuration, the management module firmware writes its settings for the switch module only to the management module NVRAM; it does not write its settings for the switch module to the switch module NVRAM. If the switch module restarts when the management module is not able to apply the IP address it has in NVRAM for the switch module, the switch module will use whatever IP address it has in its own NVRAM. If the two IP addresses are not the same, you might not be able to manage the Ethernet switch module any more. The management module cannot apply the switch IP address from its NVRAM if: • The management module is restarting • The management module has failed • The management module has been removed from the unit.
Keyboard problems	
The keyboard is very slow when using an operating system that does not have USB drivers.	When you are running an operating system that does not have USB drivers, such as in the following instances, the keyboard responds very slowly. 1. Run the blade server integrated diagnostics 2. Run a BIOS update diskette on a blade server 3. Update the diagnostics on a blade server 4. Run the Broadcom firmware CD for a blade server

Table 4. Troubleshooting charts (continued)

Device	Suggested action
The keyboard is very slow when using an operating system that does not have USB drivers.	Sometimes when switching ownership of the KVM to a blade server, the video for the blade server appears almost immediately, but it takes up to 10 or 20 seconds for the mouse and keyboard to be usable. No action required.
Pressing F1 brings up browser help instead of performing BladeCenter T management functions.	Connecting to the BladeCenter T management module through the web interface does not provide proper coverage for the F1 key. In particular, pressing F1 to access the Setup utility when a blade server is started brings up browser help instead of the Setup utility. This problem is peculiar to the Sun Java browser plug-in. Use the Microsoft virtual machine (VM) that is built in to the browser.
Remote console has keyboard entry problems with Sun Java plug-	When you are redirecting the server console (remote console function) of a blade server that is running Microsoft Windows 2000 or Windows XP and using the Sun Java plug-in (Java Virtual Machine), the remote console can have keyboard entry problems. Use the Microsoft Java Virtual Machine (JVM) or Java Runtime Environment (JRE) on the blade server instead of using the Sun Java Virtual Machine. The Microsoft JVM comes with the Windows XP Service Pack 1. You can obtain the Microsoft JVM for Windows 2000 from the Microsoft corporation. If you are using the Internet Explorer browser version 6.0 or later to log into the management module and use the remote control function, you must also adjust the browser settings: 1. Click **Tools → Internet Options → Advanced** tab. 2. Under the Java (Sun) section, uncheck the checkbox next to 'Use Java 2 v1.4. for <applet> (requires restart)'
Management-module problems	
The management module password cannot be reset.	If you forget the management-module password, you will not be able to access the BladeCenter T management module. The management-module password cannot be overridden, and the management module will need to be replaced.
Management module does not complete changeover to redundant module on hardware failure.	Replace the management module.
Media tray problems	
Media tray access is lost temporarily during management module restart.	When the BladeCenter T management module is restarted, use of the media tray (CD-ROM drive and USB ports) is lost temporarily. If you or a failure condition initiates a management module restart while I/O activity is taking place on the media tray, the disruption can interrupt reads to the CD-ROM drive or lose data being written to a diskette. **Note:** You can restart the management module through the web interface to the management module or from a network management station, such as the IBM Director console. Some failures on the BladeCenter T unit can result in the management module restarting automatically. Make sure there is no I/O activity on the media tray before you restart the management module.
Monitor problems	

Table 4. Troubleshooting charts (continued)

Device	Suggested action
The monitor works when you start the BladeCenter T unit, but goes blank when you start some application programs in the blade servers.	See the documentation that comes with the Ethernet switch module for instructions on how to ping through the Telnet interface.
The monitor displays video for blade server 8 during management module restart.	The monitor attached to the BladeCenter T management module normally shows the video output from the blade server that is the current owner of the keyboard, video, and mouse (KVM). When there is no actively selected video from any blade server, the video from blade server 8 is routed to the management module. While the management module is restarting, there is temporarily no current KVM owner. The video from blade server 8 displays on the monitor briefly until the management module uses its NVRAM values to reestablish ownership of the KVM and media tray (CD-ROM drive, diskette drive, and USB port). After that, the video from the blade server that is the current KVM owner displays on the monitor.
The screen is blank.	Make sure that: 1. The input and output indicators on the power supplies are lit, indicating that input and output power are present. 2. The monitor cables are connected properly. 3. The KVM module LEDs indicate that the module is functioning. 4. The monitor is turned on and the brightness and contrast controls are adjusted correctly. 5. The monitor is owned by a blade server that is turned on and supports the KVM feature. 6. If you have verified these items and the screen remains blank, replace: a. Monitor b. KVM module **Note:** Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the information that comes with the monitor for adjusting and testing instructions.
Only the cursor appears.	See "Undetermined problems" on page 98.
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	If the monitor self-tests show that the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. **Note:** 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. If the problem remains, replace the monitor.
Wrong characters appear on the screen.	If the wrong language is displayed, update the firmware in the management module with the correct language. If the problem remains, replace the management module.
Mouse problems	

Table 4. Troubleshooting charts (continued)

Device	Suggested action
Mouse function lost during Red Hat installation.	If, while installing Red Hat Linux to a blade server, you or someone else selects a different blade server as owner of the keyboard, video, and monitor (KVM), you might lose mouse function for the installation process. Do not switch KVM owners until the installation process begins to install the packages (after the 'About to Install' window).
Mouse is not detected during SuSE installation.	The installation of the SuSE Linux operating system does not detect the mouse. You will need to select the mouse manually. Download the latest operating system installation instructions for your operating system from the IBM Support website at http://www.ibm.com/supportportal/ . The steps for selecting the mouse are described in the instructions for your operating system.
Mouse offset problems occur when using remote console and running X.	When you are using the remote console on a blade server that is running X Windows in Red Hat Linux or SuSE Linux, you see two cursor arrows on the screen, widely spaced, one white and one black. Configure Linux and X Windows for accurate mouse tracking. See the online help information in the management module configuration and management software for instructions (**Blade Tasks → Remote Control**, click the circled question mark next to **Redirect Server Console**, read the section titled **Notes on mouse support under Linux**).
Power problems	
The system does not power on.	Make sure that: 1. The power cords are plugged into the input power connections on the rear of the BladeCenter T unit, and the other end of each power cord is plugged into a 220-volt power distribution unit (PDU) that is plugged into an appropriate electrical outlet. 2. The 220-volt PDU functions properly. 3. The LEDs on the power module are on. 4. If you just installed an option, remove it, and restart the BladeCenter T unit. If the BladeCenter T unit now turns on, you might have installed more options than the power module supports. You might need to install a power module in power bay 3 or 4. If the problem remains, go to “Undetermined problems” on page 98.
Option problems	
An IBM option that was just installed does not work.	Make sure that: • The option is designed for the BladeCenter T unit. See the “Server Support” flowchart for information about obtaining ServerProven® compatibility information from the World Wide Web. • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. If the problem remains, replace the option.
An IBM option that used to work does not work now.	Make sure that all of the option hardware and cable connections are secure. If the option comes with its own test instructions, use those instructions to test the option. If the problem remains, replace the option.
Service processor problems	
Service processor in the management module reports a general monitor failure.	Disconnect the BladeCenter T unit from all electrical sources, wait for 30 seconds, reconnect the BladeCenter T unit to the electrical sources, and restart the server. If a problem remains, replace the management module.

Table 4. Troubleshooting charts (continued)

Device	Suggested action
Switch-module problems	
Updating the switch-module configuration through the switch does not save the management-module NVRAM.	If you log in to the Ethernet switch module directly (through the Ethernet switch-module web interface or Telnet interface instead of through the management module web interface) and update the switch module configuration, saving the new configuration saves only to the switch NVRAM, not to the management-module NVRAM. The management module will not be able to communicate with the switch module. In the management module web interface, in **Switch Tasks → Management**, change the New Static IP Configuration values to match the ones in Current IP Configuration, and apply the configuration.

Light path diagnostics LEDs

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

Note: You can configure the major and critical alarm LEDs to be either amber or red through the management module.

Table 5. Light path diagnostics

Lit LED	Cause	Action
BladeCenter T system LED panel		
Location	A condition has occurred in the BladeCenter T unit that has caused the remote system management to identify the BladeCenter T unit as needing attention.	Look for any information or error LEDs on the system LED panels, the modules, and the blade servers in this BladeCenter T unit, and follow the instructions in this table for those LEDs.
Minor	A noncritical event has occurred that should be looked at, such as the wrong I/O module inserted in a bay, or power needs that exceed the capacity of power modules currently installed.	Check the error log for the messages. Check the LEDs on the BladeCenter T unit and the blade servers to isolate the component.
Major	A major system error has occurred, such as the loss of one of two mirrored disks. **Note:** You can configure the major error LED to be either red or amber through the management module.	• Check the error log for messages. • Look for an error LED on the modules and blade servers to locate the component: – If the error LED is on a module, follow the instructions for the module in this table. – If the error LED is on a blade server, see the documentation that comes with the blade server.

Table 5. Light path diagnostics (continued)

Lit LED	Cause	Action
Critical error	A critical system error has occurred, such as nonredundancy on the power modules or a system error in a blade. **Note:** You can configure the critical error LED to be either red or amber through the management module.	• Check the error log for messages. • Look for an error LED on the modules and blade servers to locate the component: – If the error LED is on a module, follow the instructions for the module in this table. – If the error LED is on a blade server, see the documentation that comes with the blade server.
Management module		
System error	A critical error has occurred in the management module.	• If your BladeCenter T unit has only one management module: 1. Try reseating the management module. 2. Restart the management module. If the problem remains, replace the management module. • If your BladeCenter T unit has two management modules, the BladeCenter T unit continues to function using the redundant module. Replace the failed management module.
Active	Primary management module.	If your BladeCenter T has two management modules, the Active LED indicates which is the primary management module.
Power module		
System error	A critical error has occurred in the power module.	Reseat the power module. If the problem remains, replace the module. If your BladeCenter T unit has a redundant module for this power module, the BladeCenter T unit continues to function using the redundant module.
Blower module		
System error	The blower has failed or is operating too slowly.	Reseat the blower module. If the problem remains, replace the blower module as soon as possible, to regain cooling redundancy. The BladeCenter T unit continues to function. The redundant blower module provides cooling to the BladeCenter T unit and blade servers.
I/O module		
System error	A critical error has occurred in the I/O module.	Reseat the I/O module. If the problem remains, replace the module.

Temperature error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Power supply x temperature fault	1. **Make sure that the system is being properly cooled**; see "System reliability considerations" on page 36. 2. Replace power supply x.
Power supply x temperature warning	1. **Make sure that the system is being properly cooled**; see "System reliability considerations" on page 36. 2. Replace power supply x.
Switch x temperature fault	1. **Make sure that the system is being properly cooled**; see "System reliability considerations" on page 36. 2. Replace switch x.
System over abbient temperature	**Make sure that the system is being properly cooled**; see "System reliability considerations" on page 36.
Switch x temperature fault	**Make sure that the system is being properly cooled**; see "System reliability considerations" on page 36.

Blower error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Blower x outside recommended speed	**Replace blower x.**
Blower x failure	**Replace blower x.**
Blower x fault	**Replace blower x.**

Power error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Power module 3 or 4 is required to power blades 5 to 8	**Make sure that power modules 3 and 4 are installed and connected to power.**
Power supply x fault	**Replace power module x.**
Power supply x 12V over voltage fault	**Replace power module x.**
Power supply x 12V over current fault	1. **An over current condition is typically caused by an external load fault. Attempt to restart the faulted power module by removing power to the system components one at a time to isolate the failing component.** 2. Replace power module.
Power supply x 12V under voltage fault	**Replace power module x.**
Power supply x 12V current fault	**Replace power module x.**
Power supply x removed	**Reinstall power supply x.**

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
System over recommended voltage for +12V	1. **Reseat the management module.** 2. Reseat the power modules. 3. Replace the power modules. 4. Replace the management module.
System over recommended voltage for +1.8V	1. **Reseat the management module.** 2. Replace the management module.
System over recommended voltage for +2.5V	1. **Reseat the management module.** 2. Replace the management module.
System over recommended voltage for +3.3V	1. **Reseat the management module.** 2. Replace the management module.
System over recommended voltage for 5V	1. **Reseat the management module.** 2. Replace the management module.
System over recommended voltage for +5V	1. **Reseat the management module.** 2. Replace the management module.
System under recommended voltage for +12V	1. **Reseat the management module.** 2. Replace the management module.
System under recommended voltage for +1.8V	1. **Reseat the management module.** 2. Replace the management module.
System under recommended voltage for +2.5V	1. **Reseat the management module.** 2. Replace the management module.
System under recommended voltage for 3.3V	1. **Reseat the management module.** 2. Replace the management module.
System under recommended voltage for 5V	1. **Reseat the management module.** 2. Replace the management module.
System is under recommended voltage for +5V	1. **Reseat the management module.** 2. Replace the management module.
System running nonredundant power	**Make sure that power modules 1 and 2 are installed and operating correctly. If blade servers are installed in bay 5 or higher, make sure that power modules 3 and 4 are installed and working correctly.**

Blade server error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Blade server x was installed.	**Information only. Take action as required.**
Blade server x was removed.	**Information only. Take action as required.**
Received an [xxx] alert from an unsupported ISMP type xxxx, via the interconnect network.	**Ensure that all blade servers in the blade center are supported by the management module.**

KVM error message

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Error encountered switching KVM owner, see system error log.	1. **Reseat the blade server.** 2. Reseat the KVM module. 3. Reflash the blade server H8 firmware. 4. Replace the blade server. 5. Replace the KVM module. 6. Replace the midplane.

Switch error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Switch fault x	1. **Reseat switch x.** 2. Replace switch x.
Switch module x was removed	**Information only. Take action as required.**
Switch module x was installed	**Information only. Take action as required.**
Switch module x was powered on	**Information only. Take action as required.**
Switch module x was powered on	**Information only. Take action as required.**
Switch System running nonredundant switch modules	**Information only. Take action as required.**
Switch module%d IP configuration was changed	**Information only. Take action as required.**
ENET [X] DHCP HSTN=X, DN=X, IP @= XXX.XXX.XXX.XXXGW @= XXXX.XXX.XXX.XXX, SN= XXX,XXX,XXX,XXX, DNS1@= XXX.XXX.XXX.XXX	**Ethernet configuration information. Take action as required.**
ENET [X] IP Cfg:HstName= XXXX, IP@= XXX.XXX.XXX.XXX ,GW@= XXX.XXX.XXX.XXX, NetMsk= XXX.XXX.XXX.XXX Switch module x was installed	**Ethernet configuration information. Take action as required.**
LAN: Ethernet [x] interface is no longer active	**Check cables to switch.**
LAN: Ethernet [x] interface now longer active	**Information only. Take action as required.**

Management-module error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Application posted alert to ASM	**The alert button on the Web interface was tested. Information only. Take action as required.**
System log 75% full	**Information only. Take action as required.**
System log full	**Information only. Take action as required.**
Management module network initialization complete	**Information only. Take action as required.**
Remote login successful. Login ID	**Information only. Take action as required.**
ASM reset was caused by restoring default values	**The management-module assembly was reset after restoring the default settings. Information only. Take action as required.**
ASM reset was initiated by the user	**Information only. Take action as required.**
Pushbutton reset activated: Ethernet configuration reset to default values and MM ASM reset due to watchdog timeout	1. **Reseat the management module.** 2. Reflash the management-module firmware. 3. Replace the management module.
ASM reset due to XXXXX, instruction fault: XXXXXXXX YYYYYYYY ZZZZZZ	1. **Reseat the management module.** 2. Reflash the management-module firmware. 3. Replace the management module.
ASM reset reason unknown	**Information only.**
Possible ASM reset occurred reason unknown	**Information only.**
Remote access attempt failed. Invalid userid or password received. User is XXX from CMD mode client at IP@=XXX.XXX.XXX.XXX	**Failed attempt to log into the management module.**
Remote access attempt failed. Invalid userid or password received. User is XXX from WEB browser IP@=XXX.XXX.XXX.XXX	**Failed attempt to log into the management module.**
DHCP [X] failure, no IP @ assigned (retry X), rc=X	**Failed to get IP address by DHCP server. Check the DHCP server connection and settings.**
LAN: Command mode tamper triggered. Possible break in attempt.	**Unsuccessful attempt to access the management module in command mode. Information only. Take action as required.**
LAN: WEB server tamper delay triggered. Possible break in attempt.	**Unsuccessful attempt to access the management module in command mode. Information only. Take action as required.**
System log cleared.	**Information only. Take action as required.**

Bus error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8267**," on page 101 to determine which components should be replaced by a field service technician.	
Message	**Action**
Failure reading I2C device. Check devices on bus 1.	1. **Reset the management module.** 2. Reseat the management module. 3. Reflash the management module. 4. Replace the management module.
Failure reading I2C device. Check devices on bus 2.	1. **Reset the management module.** 2. Reseat the management module. 3. Replace the management module. 4. Replace the midplane.
Failure reading I2C device. Check devices on bus 3.	1. **Reseat the power modules.** 2. Reseat the management module. 3. Replace the power modules. 4. Replace the management module. 5. Replace the midplane.
Failure reading I2C device. Check devices on bus 4.	1. **Reseat the management module.** 2. Reseat the cables connected to the front panel customer interface card. 3. Reseat the cables connected to the rear panel customer interface card. 4. Replace the front panel customer interface card. 5. Replace the rear panel customer interface card. 6. Replace the management module. 7. Replace the midplane.
Failure reading I2C device. Check devices on bus 5.	1. **Reseat the switch modules.** 2. Reseat the management module. 3. Replace the switch modules. 4. Replace the management module. 5. Replace the midplane.

Undetermined problems

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

Note:

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

3. Damaged data in BIOS code can cause undetermined problems.

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

1. Shut down the operating system on all blade servers.
2. Turn off the blade servers; then, open the release lever on each blade server, and slide it out of the bay approximately 1 inch.
3. Disconnect power modules 2, 3, and 4 one at a time:
   - Press the blue release button on the power module.
   - Open the release handle all the way out to the open position.
   - Slide the power module out of its bay approximately 1 inch.
4. Disconnect the switch modules, one at a time. To do this, remove all cables connected to the switch module; then, pull the release lever all the way down. Slide the switch module out of the bay approximately 1 inch.

The BladeCenter T unit can be checked with the management module web interface at each stage as components are removed and will work in the minimal configuration. If the minimal configuration does not work, do the following:

1. Recheck the management-module network settings.
2. Unlatch the media tray, and slide it out of the bay approximately 1 inch.

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

Problem determination tips

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

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

  - BIOS level
- Operating system software — type and version level

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

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

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

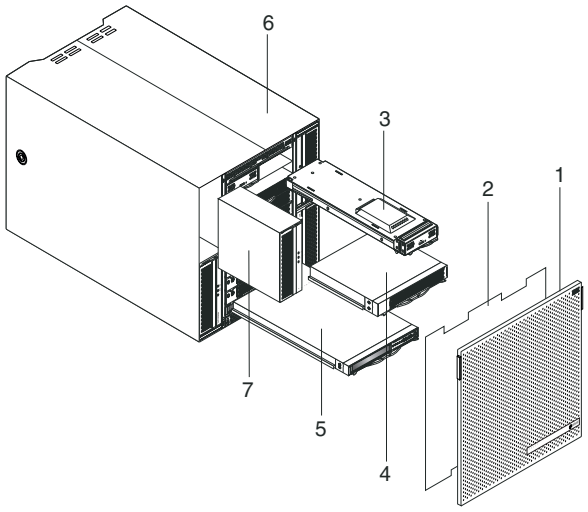
Chapter 7. Parts listing, BladeCenter T Type 8267

This chapter contains the parts listing for the BladeCenter T Type 8267. To check for an updated parts listing on the web, go to http://www.ibm.com/supportportal/ .

Replaceable components are of three types:

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

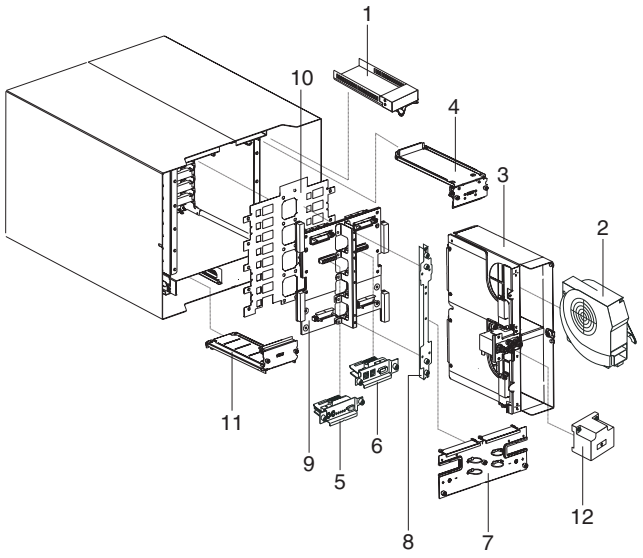
Front view



Index	Description	FRU No.	CRU/FRU
1	Bezel assembly	81Y4160	CRU
2	Air filter	90P3794	CRU
3	Management module	40K6284	CRU
4	Blade filler	39M3317	CRU
5	Media module (without optical drive)	81Y1797	FRU
6	Chassis assembly	43V5571	FRU
7	Power supply, 1300 watt - AC	39Y7220	CRU
7	Power supply filler	39M4297	CRU
	Optical drive, UltraSlim Enhanced SATA Multi-Burner	44W3256	FRU
	2-Post rack mount kit	39M4299	FRU
	4-Post rack mount kit	39R8313	FRU
	Chassis lift handle	39M4258	CRU

Index	Description	FRU No.	CRU/FRU
	Rack mounting kit	39R8334	FRU
	• Bezel lock (1) • Front top rail (2) • Left bracket (1) • M4x8 screw (10) • M6 hex head screw (32) • Rear bracket (2) • Right bracket (1)		
	System service cards	81Y4150	CRU

Rear view



Index	Description	FRU No.	CRU/FRU
1	Switch filler	39M3261	CRU
2	Blower module	44X1978	CRU
3	Docking board/blower housing assembly - AC	81Y4107	FRU
4	Upper flex circuit assembly	81Y4101	FRU
5	KVM module	81Y1798	CRU
6	LAN/serial module	81Y1799	FRU
7	Rear panel - AC	81Y4108	CRU
8	Rear chassis bracket	39M4289	FRU
9	Backplane assembly	81Y1796	FRU
10	Backplane insulator	81Y4100	FRU
11	Lower flex circuit assembly	81Y4102	FRU
	Jumper cord, C19/C20, 2.5M	39M5389	CRU

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 for updated firmware and operating-system device drivers for your IBM product. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.

  You can obtain the latest downloads for your IBM product from http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FSystemx http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to make sure that the hardware and software is supported by your IBM product.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your IBM product. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the IBM *Documentation* CD that comes with your product.
- Go to http://www.ibm.com/supportportal/ to check for information to help you solve the problem.
- Gather the following information to provide to IBM service. This data will help IBM service 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 (or BIOS) and firmware levels
  - Other pertinent information such as error messages and logs

- Go to http://www.ibm.com/support/electronic/portal/ 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 service quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Using the documentation

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

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

You can find the most up-to-date information for System x products at http://www.ibm.com/systems/x/ .

You can find the most up-to-date information for BladeCenter products at http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp .

Getting help and information from the World Wide Web

Put your short description here; used for first paragraph and abstract.

On the World Wide Web, up-to-date information about IBM systems, optional devices, services, and support is available at http://www.ibm.com/supportportal/ .

You can find the most up-to-date product information for System x products at http://www.ibm.com/systems/x/ .

You can find the most up-to-date product information for BladeCenter products at http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp .

Software service and support

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

For information about which products are supported by Support Line in your country or region, see http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp .

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

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services.

To locate a reseller authorized by IBM to provide warranty service, go to http://www.ibm.com/partnerworld/ and click **Find Business Partners** on the right side of the page. For IBM support telephone numbers, see http://www.ibm.com/planetwide/ . In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

IBM Taiwan product service

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:

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

Notices

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Important notes

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

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

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

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

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

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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	• 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	• Copper: Class G1 as per ANSI/ISA 71.04-19853 • Silver: Corrosion rate of less than 300 Å in 30 days
1 ASHRAE 52.2-2008 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 2 The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction. 3 ANSI/ISA-71.04-1985. Environmental conditions for process measurement and control systems: Airborne contaminants. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Documentation format

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

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This product is not intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks, nor is it intended to be used in a public services network.

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.

Attention: This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:

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

European Community contact:

IBM Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
Email: tjahn@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

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

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

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

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
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Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

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IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
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Generelle Informationen:

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

Japan VCCI Class A statement

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

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

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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В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

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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