BladeCenter T Type 8720 and 8730

IBM

Hardware Maintenance Manual and Troubleshooting Guide

BladeCenter T Type 8720 and 8730

Hardware Maintenance Manual and Troubleshooting Guide

> **Note**
> Before using this information and the product it supports, be sure to read Appendix C, "Notices," on page 157.

Sixth Edition (August 2006)

About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the BladeCenter® Type 8720 and 8730.

Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions. See "Safety information" on page 113.

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

注意和危险声明(简体中文)

重要事项：

本书中的所有注意和危险声明之前都有编号。该编号用于英语的注意或危险声明与 *Safety Information* 一书中可以找到的翻译版本的注意或危险声明进行交叉引用。

例如，如果一个注意声明以编号 1 开始，那么对该注意声明的翻译出现在 *Safety Information* 一书中的声明 1 中。

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

注意及危險聲明 （中文）

重要資訊：

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

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

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

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

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

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

중요:

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

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

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

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

Online support

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

Support telephone numbers

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

Contents

Chapter 1. General information

The IBM® BladeCenter®T Types 8720 and 8730 units are rack-mounted, high-density, high-performance blade server systems developed for telecommunications network applications and other applications requiring physical robustness.

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 (NEBS/ETSI 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 *BladeCenter T 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 @server BladeCenter T
Machine type (8720 or 8730) **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.
- 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.

Information label

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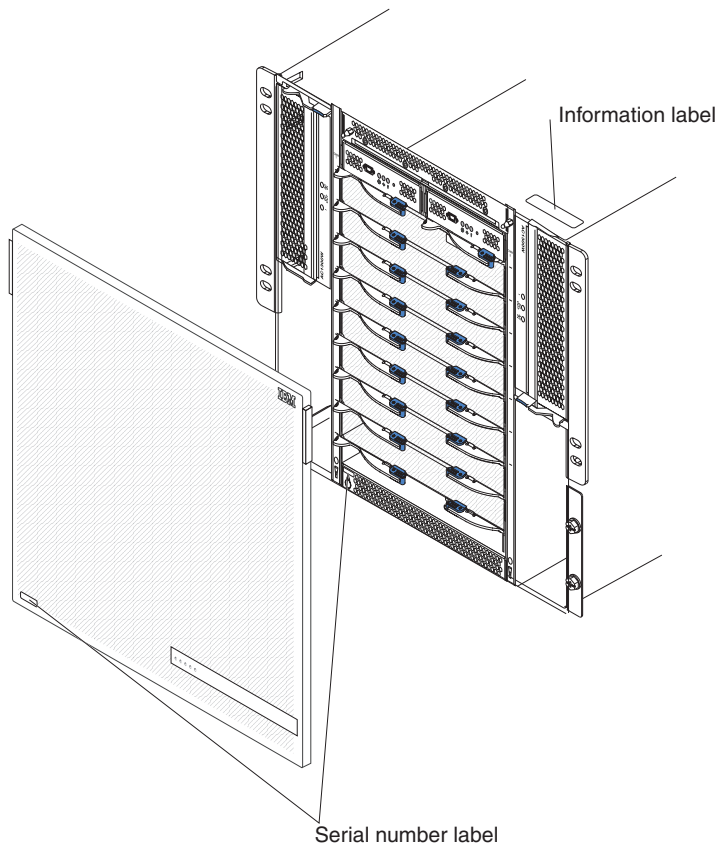
A set of user labels comes with each blade server. When you install a blade server in the BladeCenter T unit, write identifying information on a label and place the label on the BladeCenter T unit bezel.

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

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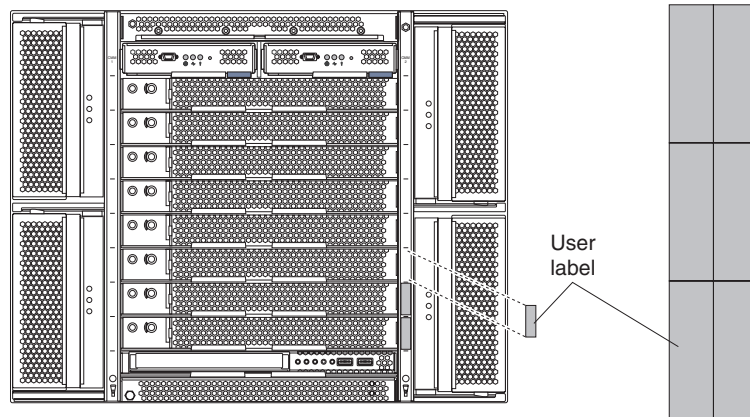
Important: Do not place the label on the blade server itself or in any way block the ventilation holes on the blade server.

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 *BladeCenter T Documentation* CD that comes with your BladeCenter T unit:

- *Safety Information:* This document contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Installation and User's Guide* This publication provides general information about the server, including information about features, how to configure the server, and how to get help.
- 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.

- *BladeCenter T Management Module Installation Guide*
  This document contains instructions for installing an IBM BladeCenter T management module option in a BladeCenter T unit and creating the initial configuration.
- *BladeCenter T 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 *BladeCenter T Documentation* CD.

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 *BladeCenter T 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 for the BladeCenter T Type 8720 unit

The following table provides a summary of the features and specifications of the BladeCenter T Type 8720 unit.

Table 1. BladeCenter T Type 8720 features and specifications

Media tray (on front):
- DVD/CD-RW drive: slim IDE
- Two Universal Serial Bus (USB) v2.0 full 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:
- Standard: Two 1300-watt or greater hot-swap -48 V dc (-40 to -60 V dc) 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 alarm interfaces
    - All four blower modules
  - Power modules 1 and 2 provide redundancy to each other
- Maximum: Four 1300-watt or greater hot-swap -48 V dc (-40 to -60 V dc) power modules
  - 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 DSUB 15P alarm connector

KVM module:
- Video port (analog)
- PS/2 keyboard port
- PS/2 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:
- Standard: One hot-swap management module providing system-management functions for the BladeCenter T unit
- Maximum: Two hot-swap management modules (one active, one redundant)

Redundant cooling:
Four variable-speed hot-swap blowers

Front bezel with changeable filter

Upgradeable microcode:
- management module firmware
- I/O-module firmware (not all I/O module types)
- Blade server service processor firmware (BIOS, 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. 100.2 kg (221 lb)
  - Fully configured without blade servers: Approx. 61.7 kg (136 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

Predictive Failure Analysis® (PFA) alerts:
- Blowers
- Blade-dependent features
- Power supplies

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.

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): -5° to 55°C (23° to 131°F)
  - 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: uncontrolled

Electrical input:
- dc power
- Input voltage: -48 V dc (-38 V dc to -75 V dc)
- Input current:
  - Chassis: 70 amp maximum
  - Single power-supply feed: 70 amp maximum
- Input connector type: Two (2) four post DC terminals, rated at 70 amps each.

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 19.
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 19.
3. The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard, mouse, and CD-ROM drive. The BladeCenter T unit uses USB for internal communication with these devices.

Features and specifications for the BladeCenter T Type 8730 unit

The following table provides a summary of the features and specifications of the BladeCenter T Type 8730 unit.

Table 2. BladeCenter T Type 8730 features and specifications

Media tray (on front):
- DVD/CD-RW drive: slim IDE
- Two Universal Serial Bus (USB) v2.0 full 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:
- Standard: Two 1300-watt or greater 220-volt (200-240 V ac) hot-swap 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 alarm interfaces
    - All four blower modules
  - Power modules 1 and 2 provide redundancy to each other
- Maximum: Four 1300-watt or greater 220-volt (200-240 V ac) hot-swap power modules
  - 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 DSUB 15P alarm connector

KVM module:
- Video port (analog)
- PS/2 keyboard port
- PS/2 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:
- Standard: One hot-swap management module providing system-management functions for the BladeCenter T unit
- Maximum: Two hot-swap management modules (one active, one redundant)

Redundant cooling:
Four variable-speed hot-swap blowers

Front bezel with changeable filter

Upgradeable microcode:
- management module firmware
- I/O-module firmware (not all I/O module types)
- Blade server service processor firmware (BIOS, 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. 100.2 kg (221 lb)
  - Fully configured without blade servers: Approx. 61.7 kg (136 lb)

Security features:
- Login password for remote connection
- Secure Shell (SSH) for command-line interface
- Secure socket layer (SSL) security for remote Web management access

Predictive Failure Analysis (PFA) alerts:
- Blowers
- Blade-dependent features
- Power supplies

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.

Environment:
- Air temperature:
  - BladeCenter T on: 10° to 35°C (50° to 95°F). Altitude: 0 to 914 m (2998.69 ft).
  - BladeCenter T on: 10° to 32°C (50° to 89.6°F). Altitude: 914 m to 2134 m (2998.69 ft to 7000 ft).
  - BladeCenter T off: -40° to 60° C (-40° to 140°).
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%

Electrical input:
- Sine-wave input (50 or 60 Hz single-phase) required
- Input voltage:
  - Minimum: 200 V ac
  - Maximum: 240 V ac
- Input current:
  - Chassis: 18 amp maximum @ 208 V ac
  - Single power-supply feed: 9 amp maximum
- Input connector type: Four (4) C13 inputs, rated at 8 amps each

Heat output:
- Input kilovolt-amperes (kVA) approx.
  - Minimum configuration: 0.2 kVA
  - Maximum configuration: 3.5 kVA
- BTU output
  - Ship configuration: 673 Btu/hour (197 watts)
  - Full configuration: 11900 Btu/hour (3490 watts)

Notes:

1. For details about the BladeCenter T unit port specifications, see "BladeCenter T unit power, controls, and indicators" on page 19.

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 19.

3. The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard, mouse, and CD-ROM drive. The BladeCenter T unit uses USB for internal communication with these devices.

Major components of the BladeCenter T Types 8720 and 8730 unit

The following illustration shows the locations of major components in your BladeCenter T unit.
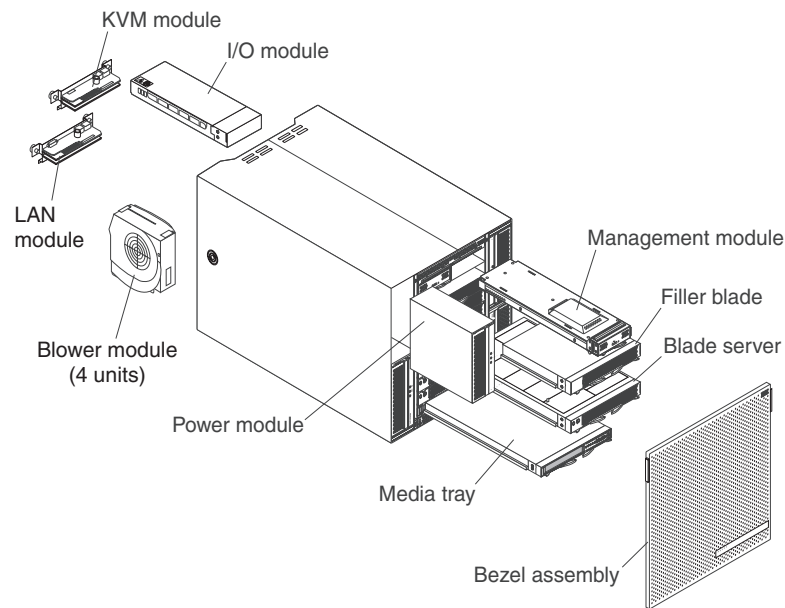
Attention: To maintain proper system cooling, each module bay must contain either a module or a filler module; each blade bay must contain either a blade server or a filler blade.

Front view

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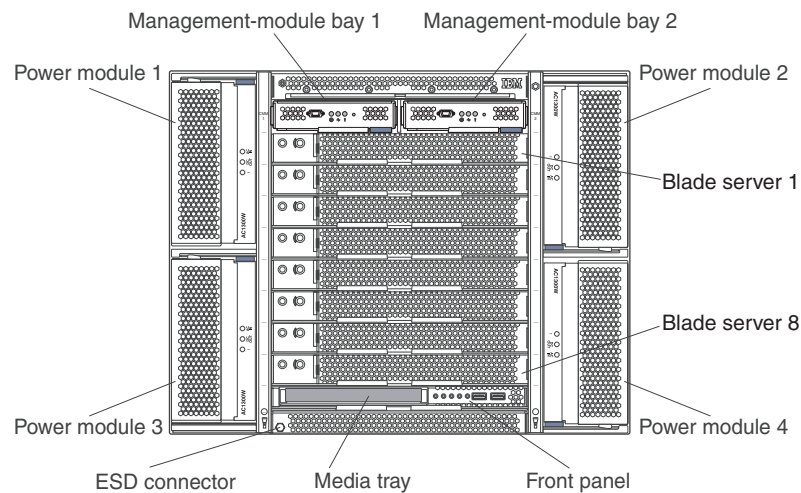
System service cards

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.

System service card
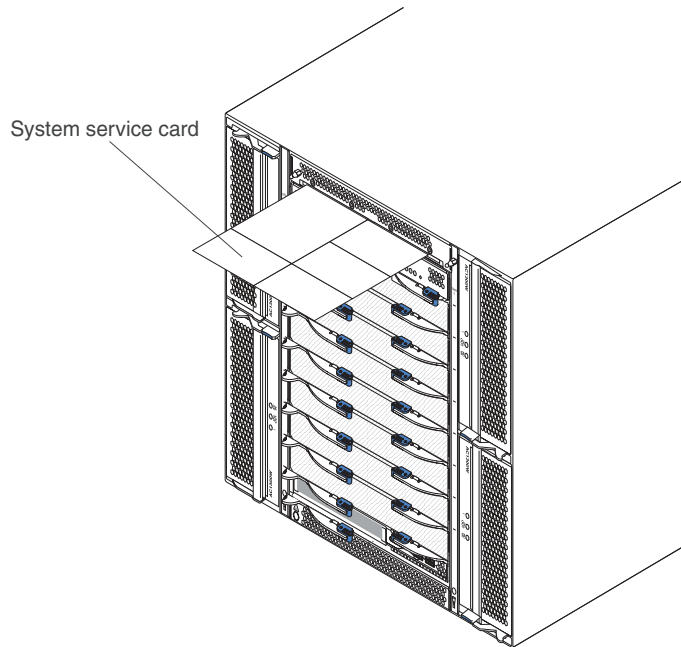
Management module controls and indicators

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 *BladeCenter T Documentation* CD.

Management module

Serial port

Power LED

Active LED

Reset button

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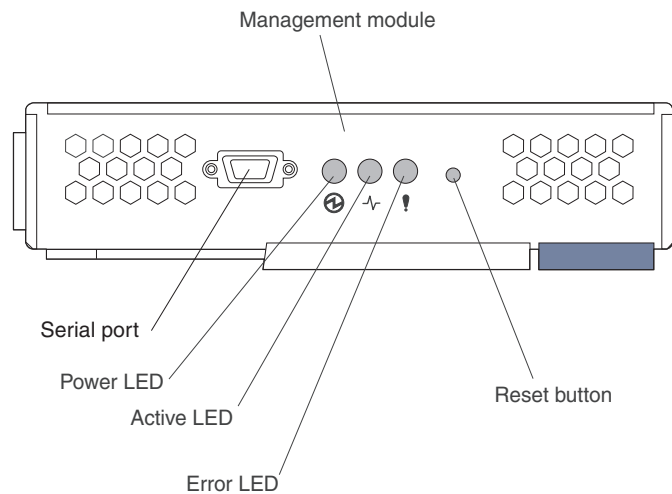
Management module LEDs: These LEDs provide status information about the management module and remote management connection.

- **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 will have to reconfigure the management module settings (see the information beginning with "Setting up the remote connection" on page 25 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.
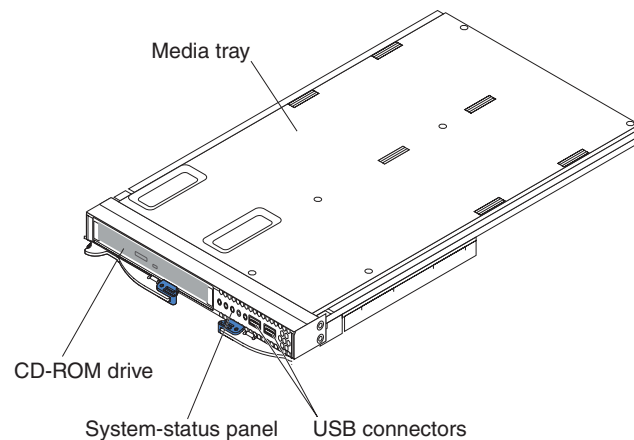
The following illustration shows the system-status LEDs on the system-status panel on the front of the BladeCenter T unit.
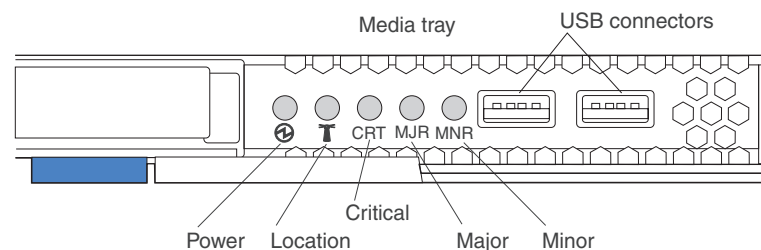
The system-status panel on the front of the BladeCenter T system has five system-status LEDs and two USB connectors.

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 *BladeCenter T Management Module User's Guide* 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 *BladeCenter T Management Module User's Guide* 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

AC power module   DC power module

AC in LED

DC out LED

Error LED

AC1300W

DC in LED

DC out LED

Error LED

DC1300W
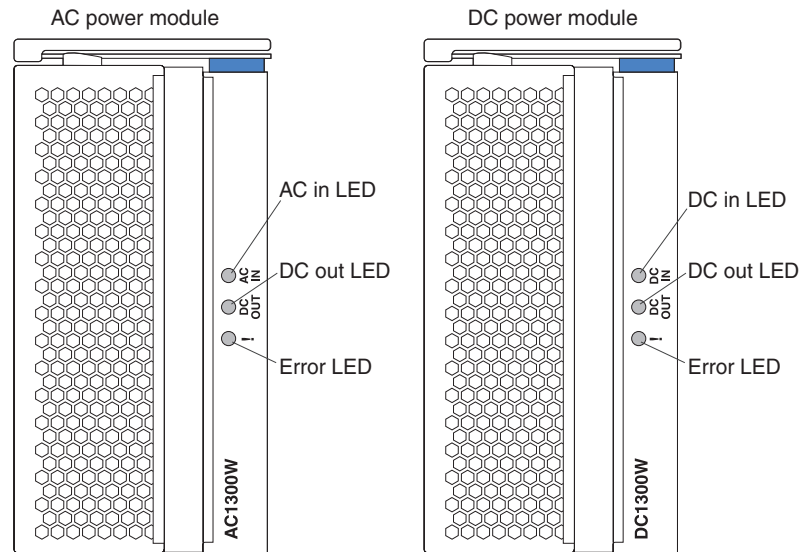
Power module LEDs: Each power module has three LEDs to indicate the status of the power module.

- **AC (or DC) 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 3. Power module LEDs

DC IN or 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.

Table 3. Power module LEDs (continued)

DC IN or AC IN	DC OUT	! (Error) (amber)	Description and action

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 220 v ac (8730) or –48 v dc (8720).
			  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 ben 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.
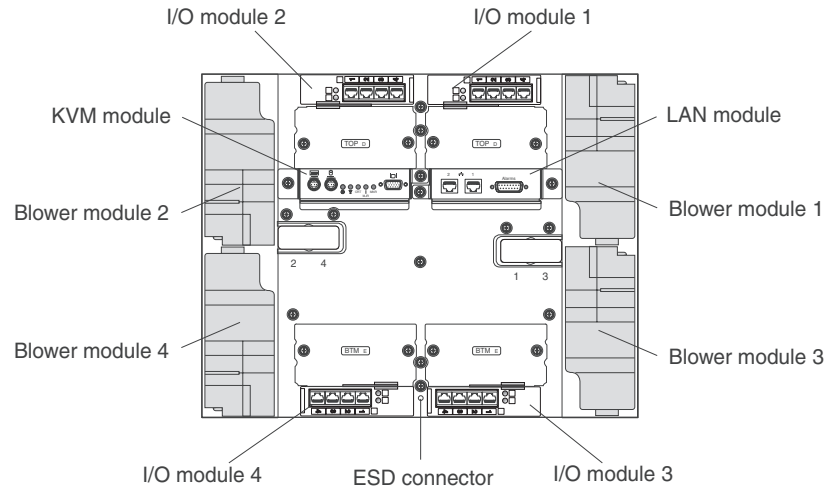
Blower modules

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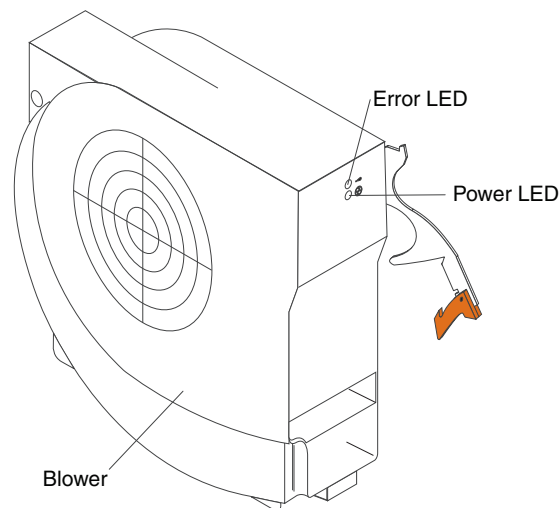
Blower LEDs: The LEDs on each blower provide status information about the blower.

- **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 PS/2 connectors for the keyboard and mouse, a system-status panel, and an HD-15 video connector.
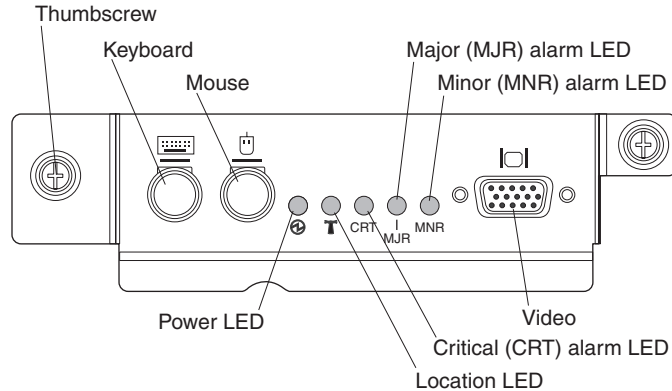
System-status LEDs: These LEDs provide status information for the BladeCenter T unit.

- **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 *BladeCenter T Management Module User's Guide* 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 *BladeCenter T Management Module User's Guide* 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 BladeCenter T KVM module contains one PS/2-style keyboard connector.

  Use this connector to connect a PS/2 keyboard to the BladeCenter T unit.

  ```
  6  5
  4  3
  2  1
  ```
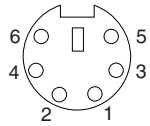
- **Mouse connector:** The BladeCenter T KVM module contains one PS/2-style mouse connector.

  Use this connector to connect a PS/2 mouse to the BladeCenter T unit.

  ```
  6  5
  4  3
  2  1
  ```
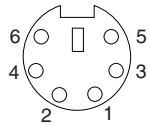
- **Video connector:** The BladeCenter T KVM module contains one standard video connector. The integrated video controller on each blade server is compatible with SVGA and VGA and communicates through this video port.

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

  ```
  5       1
  15      11
  ```
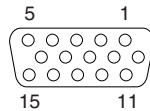
LAN-module indicators and input/output connectors

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 DSUB 15P telco alarm connector.
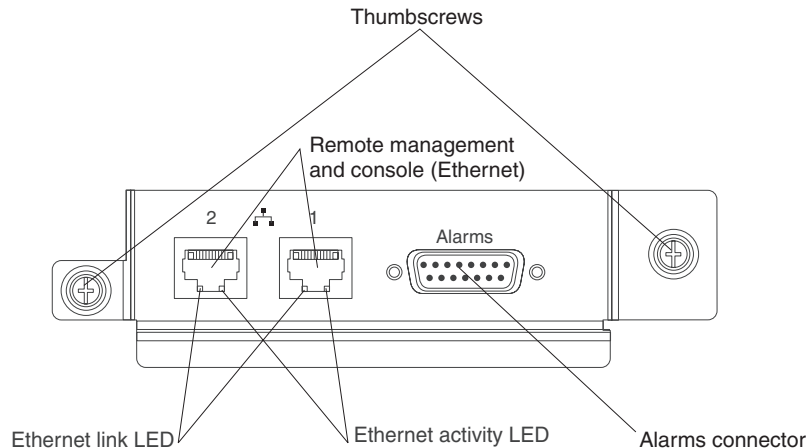
LAN-module LEDs: These LEDs provide status information about the LAN connection:

- **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.

- **Alarms connector:** The LAN module provides one telco DB15 alarms connector (male) for critical, major, and minor telco alarms. Each of the alarms has a relay that enables multiple system alarm indicators to be daisy-chained together. Table 4 on page 19 shows the pinouts for the telco alarms connector.
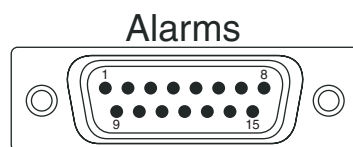
Note: The service processor, management module, or systems-management function must monitor the alarm reset inputs to maintain the fault condition that you set for the unit. The alarm reset inputs can be voltages in excess of standard logic levels, so you must electrically or optically isolate them from the monitoring logic.

Table 4. Alarms connector pinout

Pin #	Description	I/O	Pin #	Description	I/O
1	Minor alarm reset +	I	9	Minor alarm normally closed	O
2	Minor alarm reset -	I	10	Minor alarm common	O
3	Major alarm reset +	I	11	Major alarm normally open	O
4	Major alarm reset -	I	12	Major alarm normally closed	O
5	Critical alarm normally open	O	13	Major alarm common	O
6	Critical alarm normally closed	O	14	Reserved	O
7	Critical alarm common	O	15	Reserved	O
8	Minor alarm normally open	O			

The electrical specifications for the alarms connector are as follows:

– **Outputs**
  - Voltage range: 0 V dc to -100 V dc (maximum current 0.3 A at 100 V dc)
  - Current range: 0 A to 1 A (maximum voltage 30 V dc at 1 A)
  - Worst-case VA: 1 A at -30 V dc (30 VA maximum) indefinitely
– **Inputs**
  - Voltage range: 0 V dc to -100 V dc (including transients)
  - Differential input voltage: 3 V dc to 72 V dc
– **Reset input activation**
  Pulse width: 200 ms (minimum) to 300 ms

I/O modules

You can install a maximum of four I/O modules at the rear of the system (a maximum of four Gbit Ethernet switches, or a maximum of two Gbit Ethernet switches and two Fibre Channel switches). The minimum system configuration requires one Gbit 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 39.

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 54 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 48 for detailed instructions.

AC power module   DC power module

AC in LED   DC in LED
DC out LED   DC out LED
Error LED   Error LED

AC1300W   DC1300W
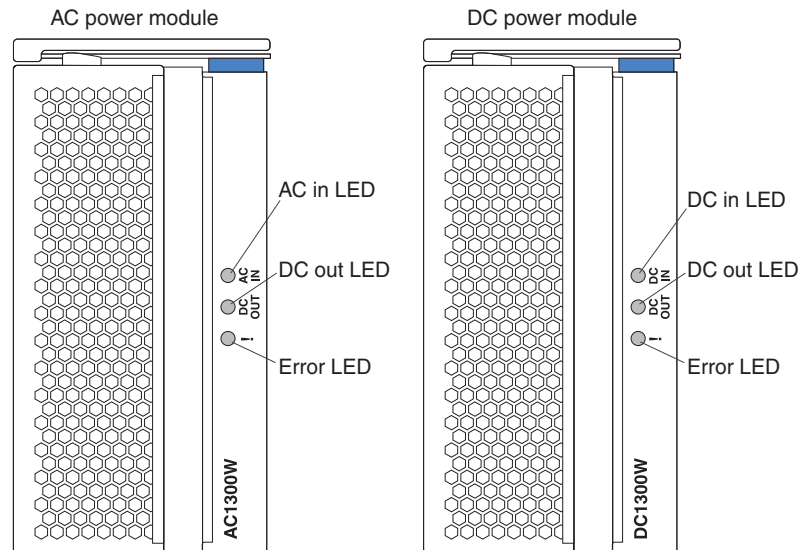
   Make sure that the LEDs on the power modules indicate that they are operating correctly. Make sure that the input and output power LEDs on each power module are lit, and the error LEDs are not lit.

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 11 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 64 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 11 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.
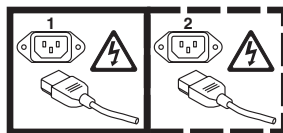
   Note: The BladeCenter T Type 8720 and 8730 units do not have a power switch. The units also have more than one connection to power. To remove all electrical current from the unit, make sure that all connections to input power are disconnected at the power input terminals or connectors.

3. If you have a BladeCenter T Type 8720 (dc-power) unit, disconnect the unit from the input power at the dc power distribution panel by switching the circuit

breakers to the Off position or removing the fuses as applicable. Make sure that both circuits are disconnected or turned off.

If you have a BladeCenter T Type 8730 (ac-power) unit, 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 28 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 29 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 29 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 29 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 Web site 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

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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 26 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.
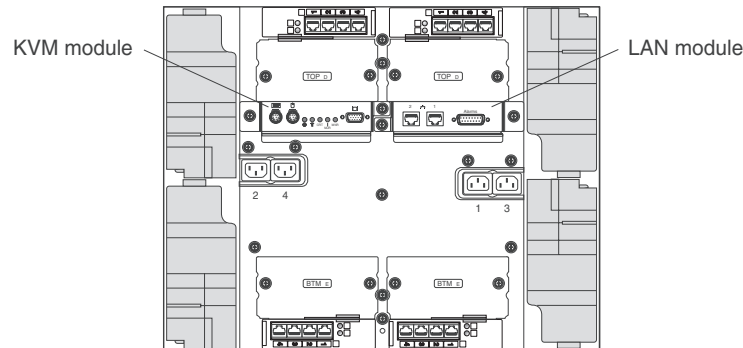
Cabling the Ethernet port

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

The right Ethernet port on the LAN module is driven by management module 1, and the left Ethernet port of the LAN module is driven by management module 2.
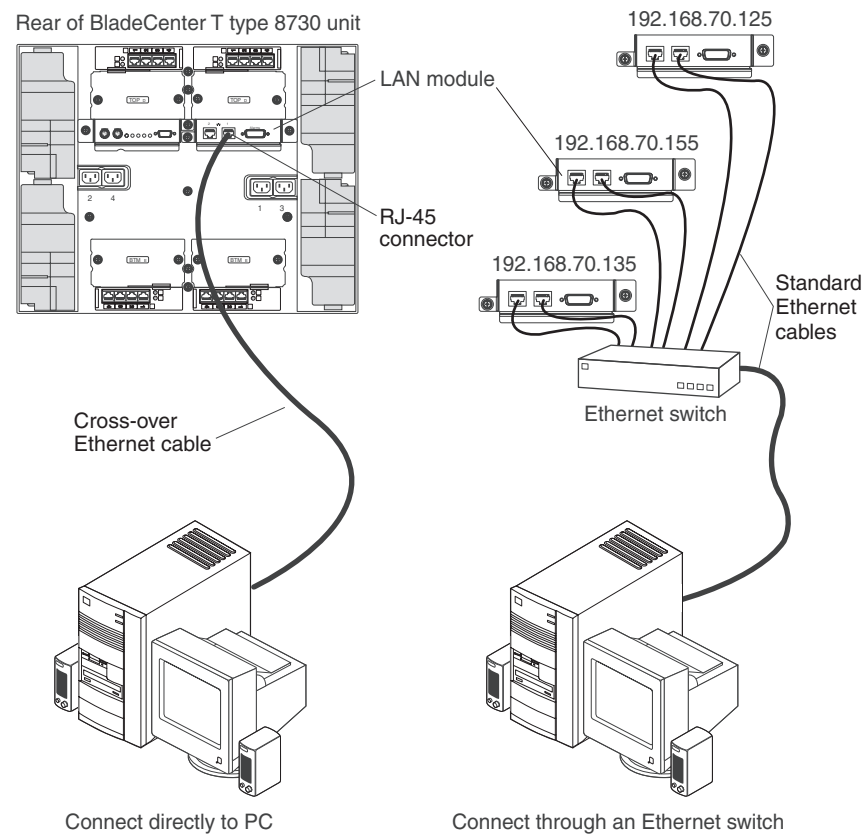
Complete the following steps to connect the Ethernet cable to the management module.

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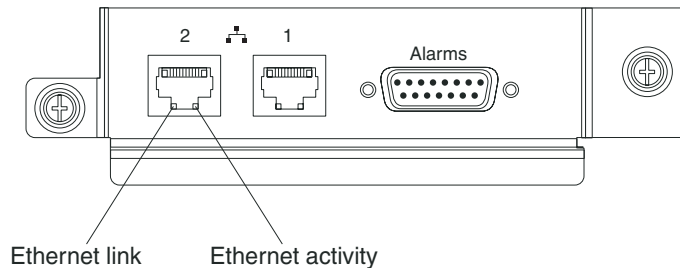
Ethernet link LED
    When this green LED is lit, there is an active connection through the port to the network.

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" on page 26 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.
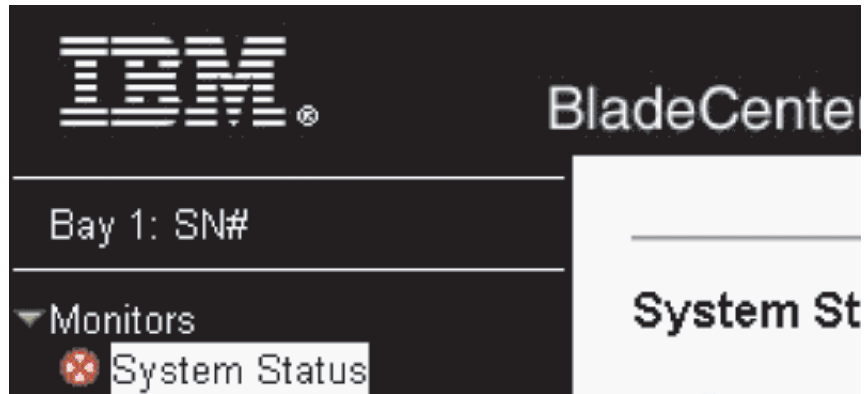
Setting management and configuration program options

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 *BladeCenter T Management Module User's Guide* on the *BladeCenter T Documentation* CD that comes with the BladeCenter T unit 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 60 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, see the Ethernet software CD that comes with your blade server.

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:
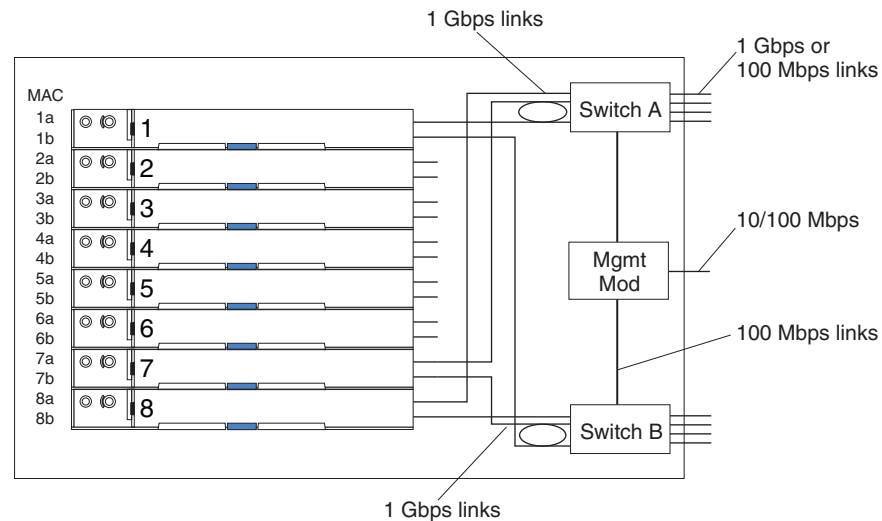
Note: 2nd switch module is optional

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 BladeCenter T network topology is shown in the following illustration. See the *IBM @server BladeCenter T Planning and Installation Guide* for more information and other topologies and guidelines.
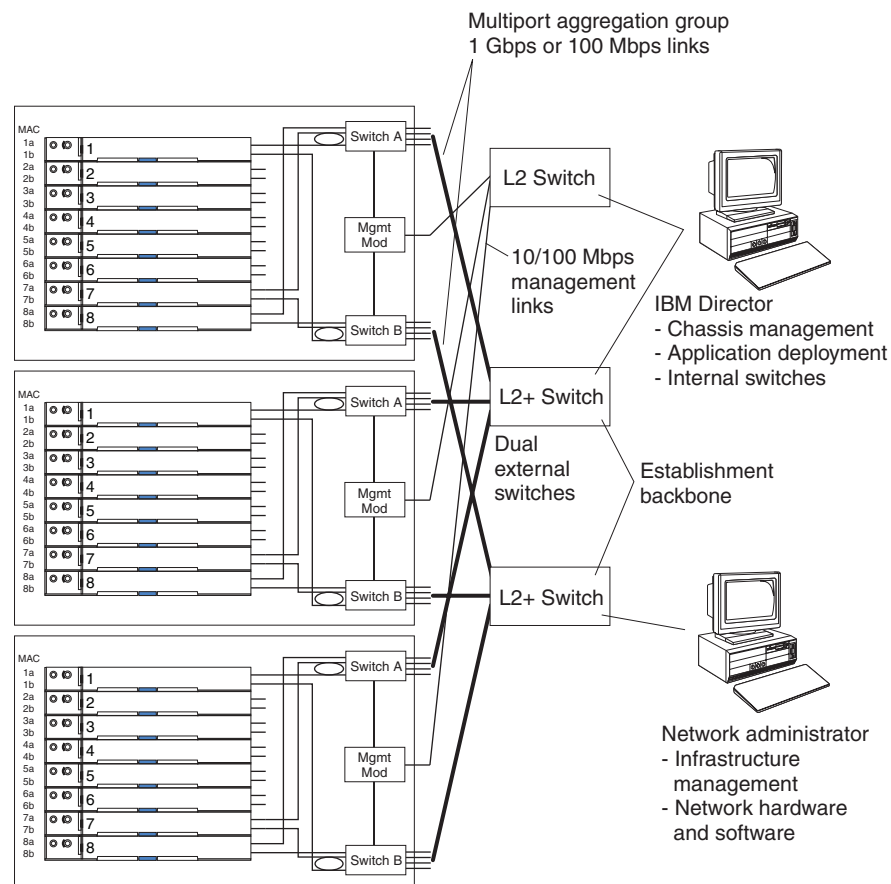
In this configuration, each BladeCenter T unit contains two Ethernet switch modules and one management module. The external ports on the switch modules are configured for multiport link aggregation groups, or trunks, as are the corresponding ports on the attached external LAN switches. Additionally, 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 Web site 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 Web site 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 32 for an example of a typical network configuration. See the *IBM @server 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 Appendix A, "Getting help and technical assistance," on page 111 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 89 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 Web site at http://www.ibm.com/pc/support. 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 Web site: http://www.ibm.com/pc/support, and complete the following steps:

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

- **Light Path Diagnostics feature**

  Use the Light Path Diagnostics feature to identify system errors quickly. On the BladeCenter 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 19 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 20:

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

Statement 4:
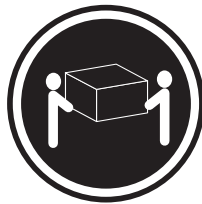
| ≥ 18 kg (39.7 lb) | ≥ 32 kg (70.5 lb) | ≥ 55 kg (121.2 lb) |
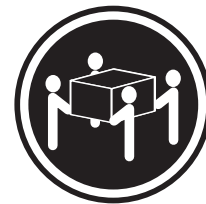
CAUTION:
Use safe practices when lifting.

Install the BladeCenter 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 ac or dc 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 beginning on page 113 and the guidelines in "Handling static-sensitive devices" on page 40. 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 T unit is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- 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/pc/compat/.

Preparing for system power

There a number of basic differences in preparing for system power between the Type 8720 (dc power) and Type 8730 (ac power) units.

Type 8720 (dc power)

The BladeCenter T unit does not have a power switch. The BladeCenter Type 8720 (dc power) unit has two dc-power terminal connectors each powering two power modules. The left connection (looking from the rear) supplies power to power-module bays 2 and 4, while the connection on the right supplies power to power-module bays 1 and 3.

Each dc terminal has four #M6 (1/4 in.) studs, one for -48 V dc, one for RETURN, and two for connecting the safety ground wire. The following guidelines are provided for connecting to the -48 V dc power source:

- DC wire rating of 4AWG (7x7x34/36 TC), 105C, 300V UL 10198, CSA approved and VW1 rated.
- Ring terminal designed for M6 stud, 4AWG wire, wire size (circular Mil area) of 33100-52600, and a wire insulation diameter of 12.8mm to 13.1mm.

  Note: The actual wire gauge and ring terminal will be determined by the current draw and the length of the wire run or as specified by the customer premises guidelines.

- A two-lug ring terminal is required by NEBS for connecting the single safety ground wire.

Attention: Remove the power modules before installing the power connections. Once the power connections are in place, the power modules can be re-installed in the BladeCenter T unit.

After you connect power to the BladeCenter T unit, all the power-module bays receive power. The blade servers in the BladeCenter T unit are connected to dc power but are not turned on. Press the power-control button on the front of each blade server to obtain full power for the blade server and start its operating system

(see the documentation that comes with your blade server for information about turning on the blade server). Make sure that you shut down the blade-server operating system before turning off a blade server, to avoid damaging the hard disk drives.

Notes:

1. Within two 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.

Type 8730 (ac 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 Type 8730 (ac power) 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 IEC320 power connectors on the rear of the Type 8730 (ac power) 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)
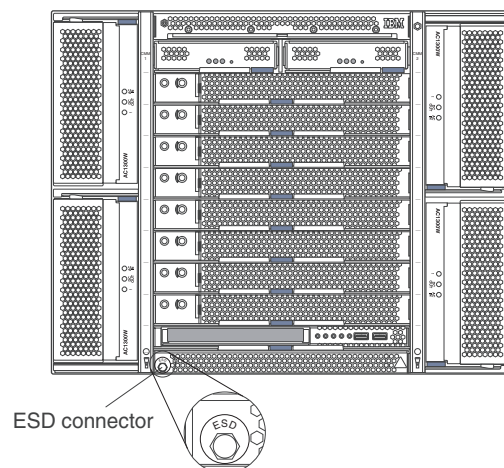
ESD connector

Location of ESD connector (rear of unit)

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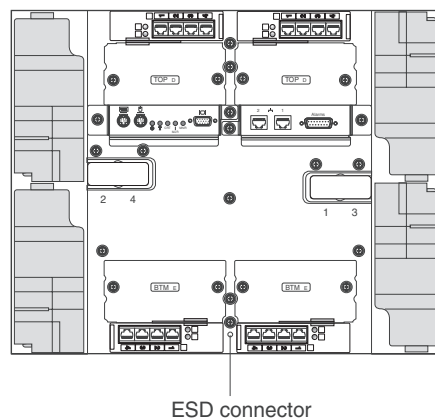
To reduce the possibility of electrostatic discharge, observe the following precautions:

- 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 15 and "Front view" on page 9 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 beginning on page 113 and the guidelines in "Handling static-sensitive devices" on page 40. 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 43 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 40 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 40 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

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 44 for instructions for removing and replacing the bezel air filter.
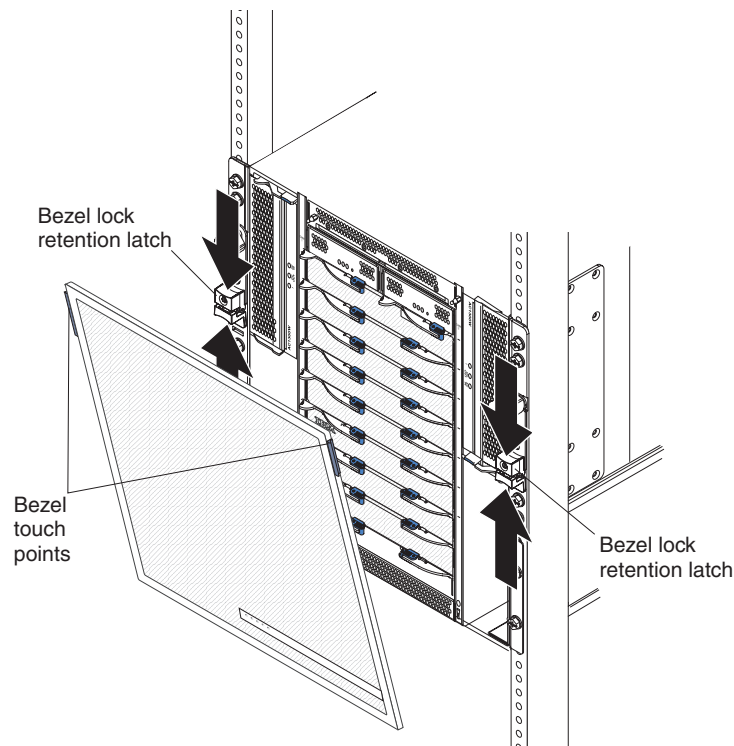
Removing the bezel assembly

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 37.
- Read "Important safety information" on page iii.
- Read "Handling static-sensitive devices" on page 40.
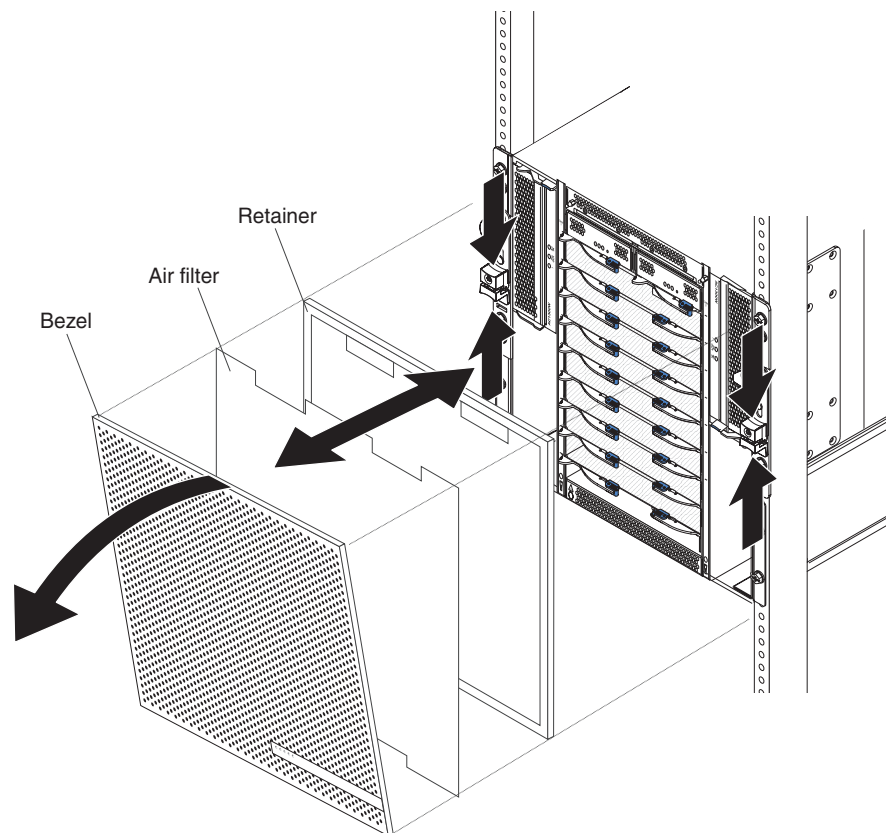
Complete the following steps to replace the front bezel air filter in the BladeCenter T unit:

1. Remove the bezel from the front of the BladeCenter T unit (see "Removing the bezel assembly" on page 43 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.
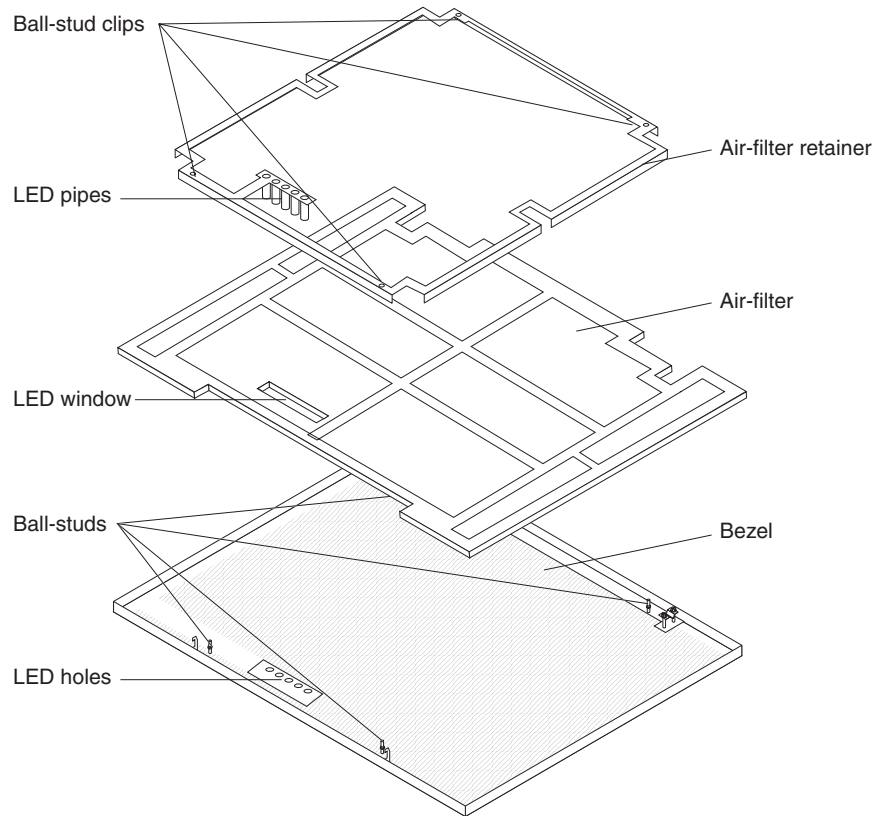
6. Align the LED window of the filter with the holes for the LEDs on the bezel and lay the filter into the bezel frame.
7. Align the air-filter retainer over the filter with the ball-stud clips facing down and the LED light pipe lined up with the LED holes on the bezel.
8. Gently push the air-filter 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 44 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, 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.

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.

Power module 1

Power module 2

Power module 3

Power module 4

Filler module

Release handle

Release button
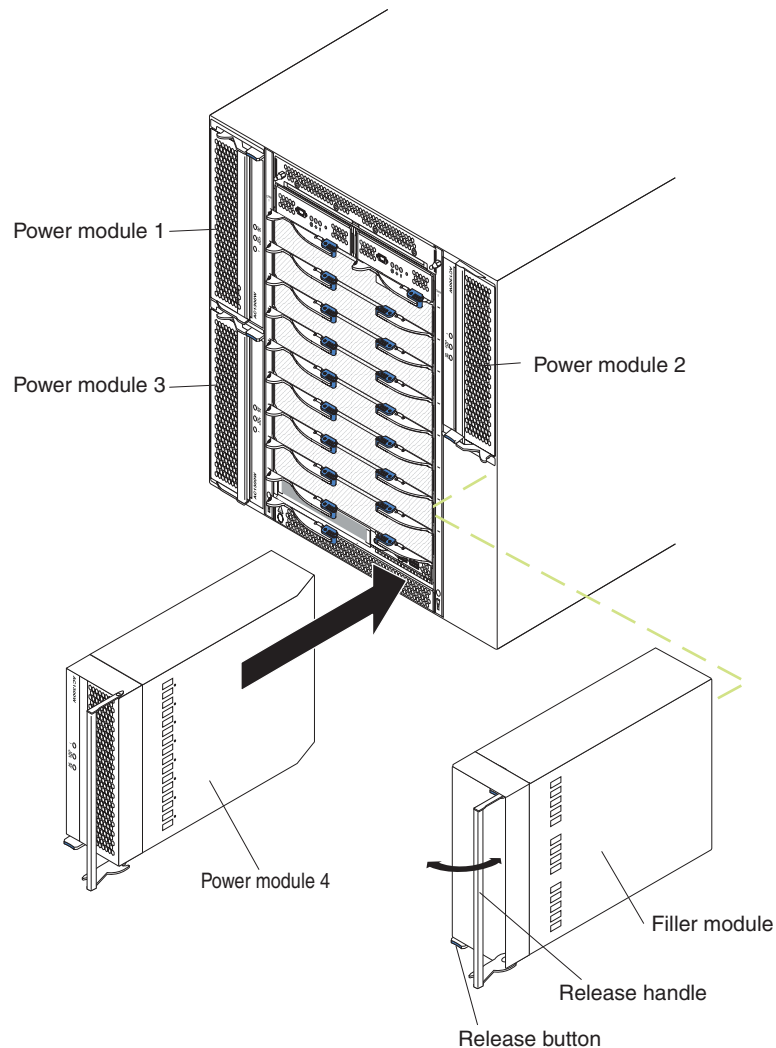
Removing a power module

Complete the following steps to remove a power module or filler panel from the front of the BladeCenter T unit. The procedure is the same for both ac-power and dc-power modules.

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. The procedure is the same for both ac-power and dc-power modules.

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 11 for information about the system-status panel controls and indicators.
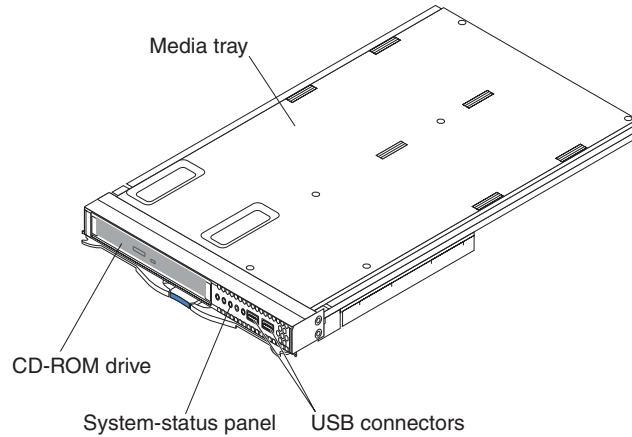
Media tray

CD-ROM drive

System-status panel   USB connectors

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

Release latch

Media tray

Release button
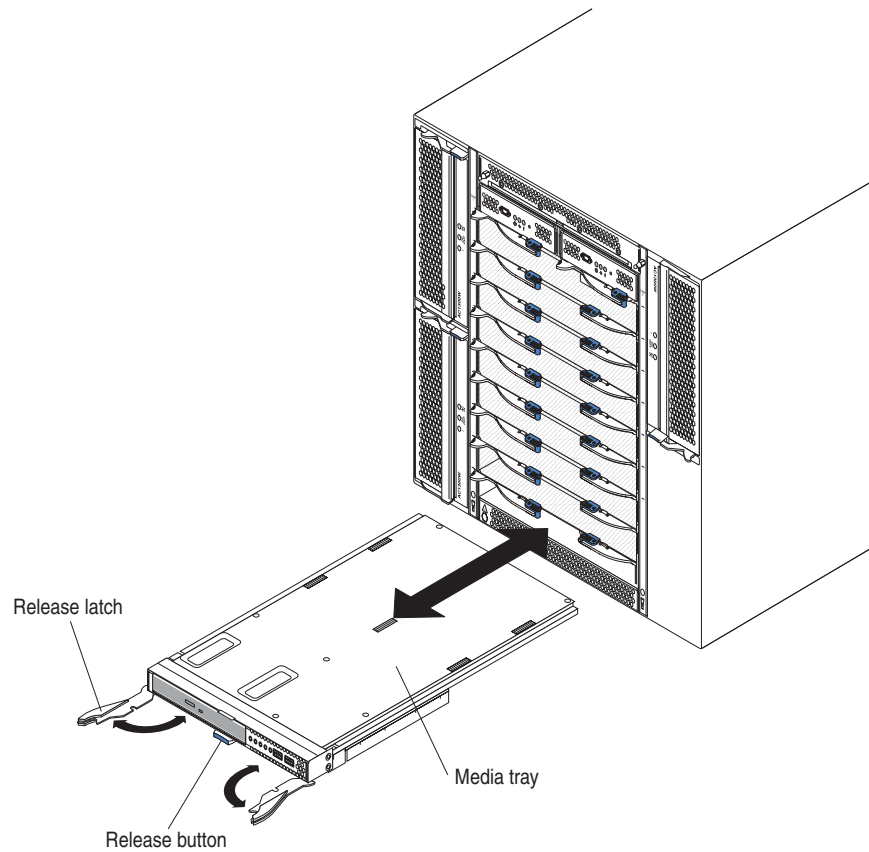
Removing the media tray

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 (90° from the closed position).
3. Slide the media tray forward into the media-tray bay until it stops.
4. Push the media tray in until you feel it lock into position.
5. Push both release latches in until they lock.
6. Make sure that the power LED is lit on the system-status panel.
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 unit.

Removing and installing management modules

The BladeCenter T unit comes with one hot-swap management module in management-module bay 1. You can add a second management module in management-module bay 2.

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

Release button

Management module

Release latch

Serial port

MAC address
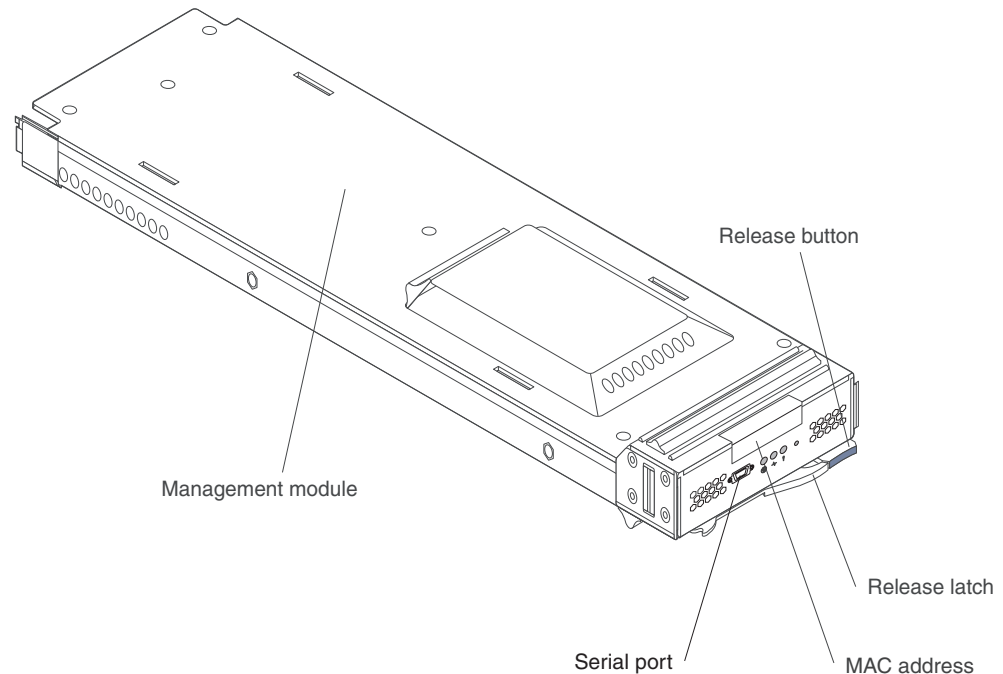
The management module functions as a service processor for the multiple blade servers. The management module configures the BladeCenter T unit and modules, configuring information such as switch module IP addresses. The management module also performs USB-to-PS/2 conversions for the system keyboard and mouse and can send the VGA signal stream to a remote console for viewing. See "Management module controls and indicators" on page 10 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.

Release latch
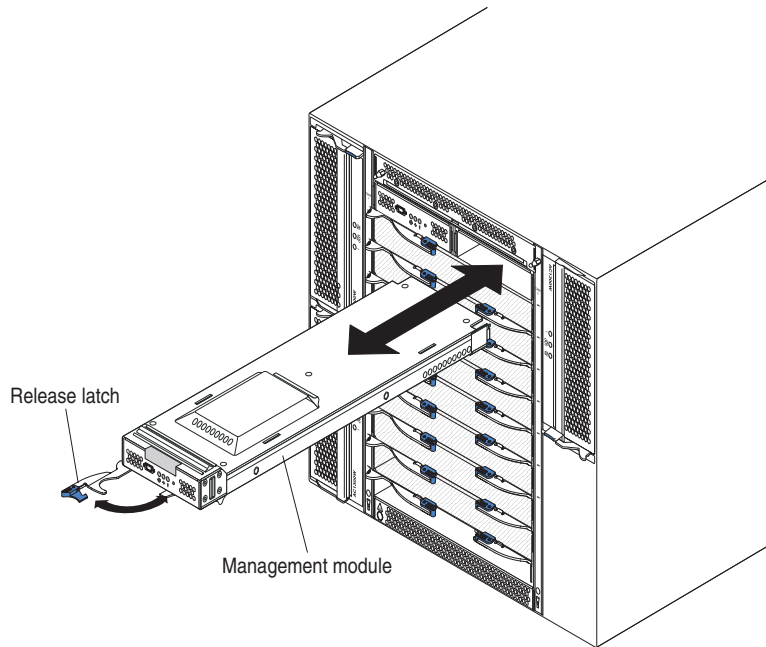
Management module

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. Press the blue release button at the front of the management module.

2. 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.

3. 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 installing a second management module, see the *IBM BladeCenter T Management Module User's Guide* for information about management-module redundancy.

2. If you are replacing a management module, remove the current module from the bay (see "Removing a management module" on page 52). 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 29.

3. 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.

4. Remove the management module from its static-protective package.

5. Press the blue release button on the management module to open the release latch. Make sure that the release latch on the management module is in the open position (90° from the closed position).

6. 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.

7. Push the release latch on the front of the management module to the closed position.

8. Make sure that the error LED on the management module is not lit, indicating that the management module is operating correctly.

9. If this is the only management module in the BladeCenter T unit, configure the new management module. See the *IBM BladeCenter T Management Module User's Guide* for detailed instructions. If this is the secondary management module and you followed the instructions in the *IBM BladeCenter* T *Management Module User's Guide*, 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 Web site at http://www.ibm.com/support/ to ensure smooth changeovers (see the *IBM BladeCenter T Management Module User's Guide* 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.

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.

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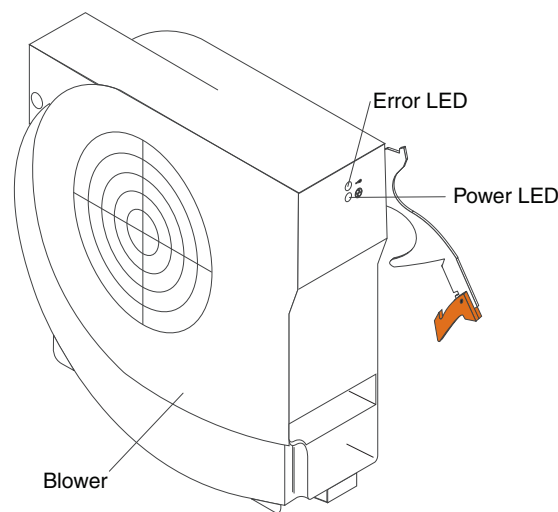
Important: Replace a failed blower as soon as possible to restore cooling redundancy.

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.

Error LED

Release latch (open)

Power LED
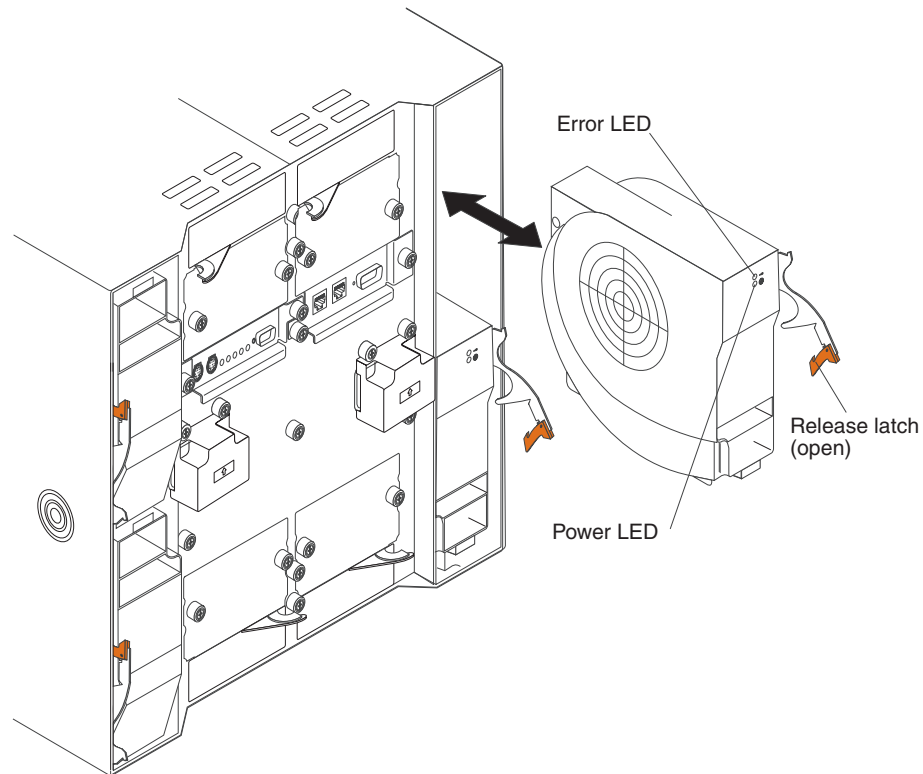
Removing a blower module

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 16 for information about the controls and indicators.
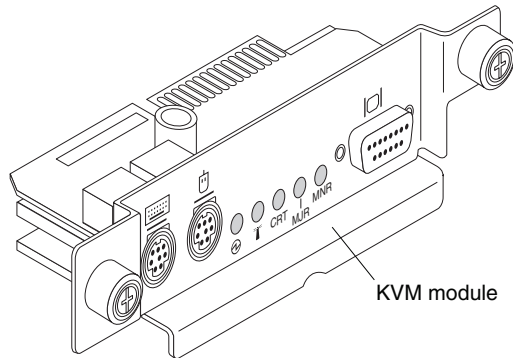
KVM module

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 either your fingers or a screwdriver to install or remove the KVM module. If you use a screwdriver, make sure that you do not overtighten the thumbscrews.

LAN module
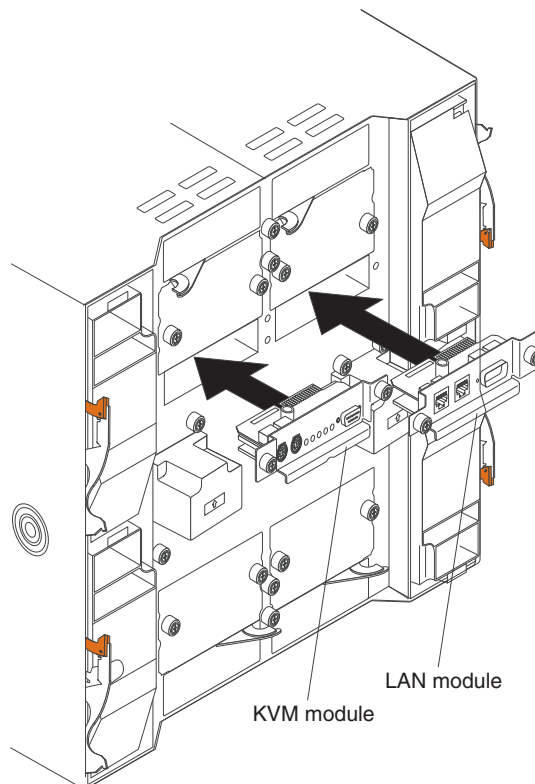
KVM module

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.

Thumbscrew   Thumbscrew

System-status panel
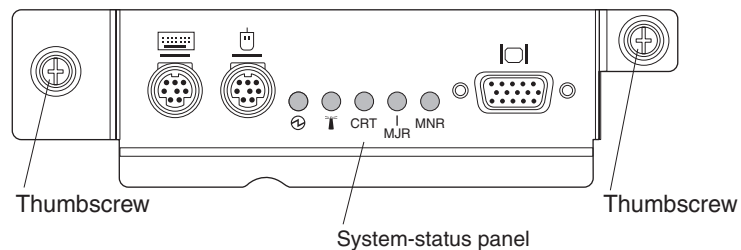
2. Position the KVM module into the rails inside the KVM-module bay.
3. Push the KVM module into the bay until you feel it stop. Make sure that it is snug.
4. Turn each thumbscrew clockwise until it is finger tight. If you use a screwdriver, make sure that you do not overtighten the thumbscrews.
5. Make 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 DSUB 15P male telco alarm connector. See the "LAN-module indicators and input/output connectors" on page 18 for more information.
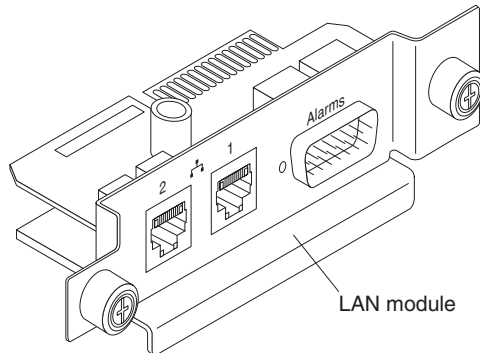
LAN module

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 on page 56). The LAN module is held in place by captive thumbscrews. You can either use your fingers or a screwdriver to install or remove the LAN module. If you use a screwdriver, make sure that you do not overtighten the thumbscrews.

Thumbscrews

Remote management
and console (Ethernet)

Alarms

Ethernet link LED   Ethernet activity LED   Alarms connector
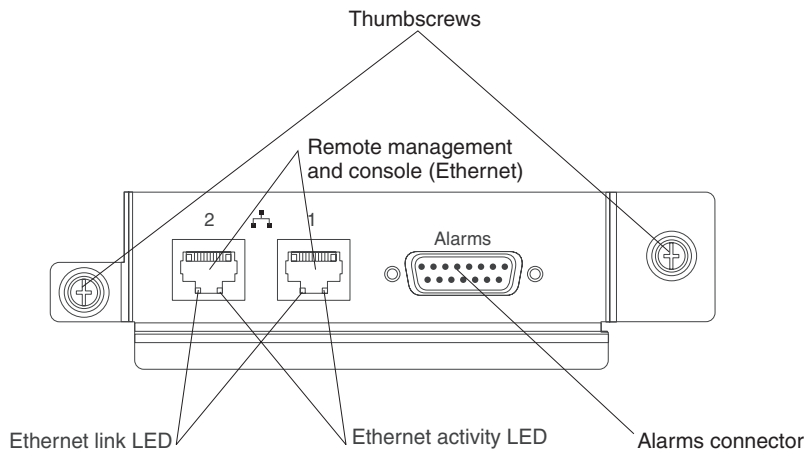
Removing the LAN module

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 on page 56).
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. If you use a screwdriver, 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 5 identifies the types of I/O modules that you can install in each I/O-module bay. Go to the IBM Support Web site at http://www.ibm.com/support/ 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 15 for the location of the I/O-module bays on the BladeCenter T unit.

Table 5. 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

Bays	I/O-module function	Permissible I/O 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.

Filler
module

Ethernet
switch
module

Release
latch
(open)

Filler
module

Fibre
Channel
switch
module
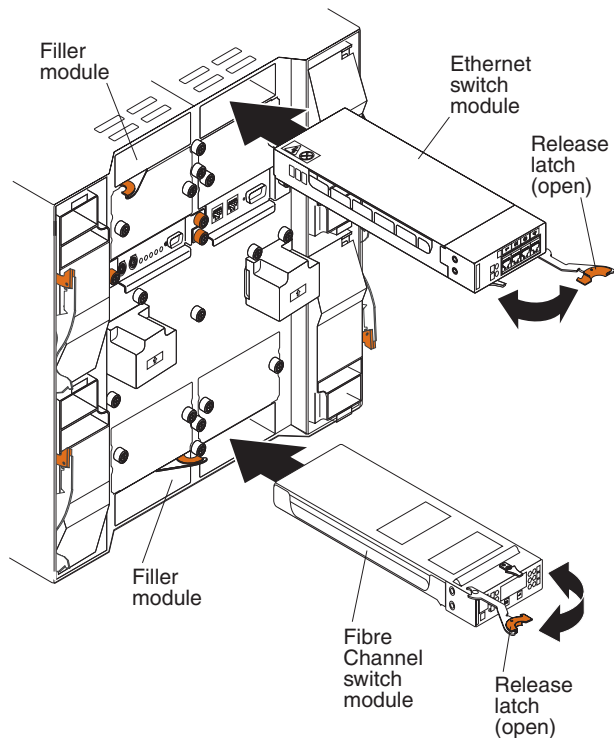
Release
latch
(open)

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/pc/compat/ 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 60 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.
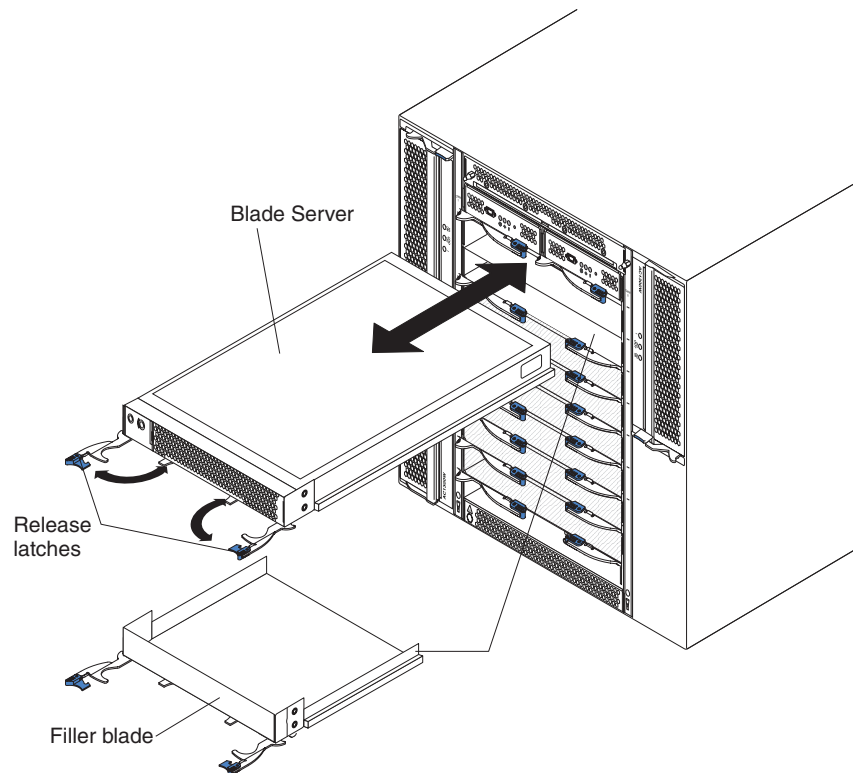
Installing a blade server

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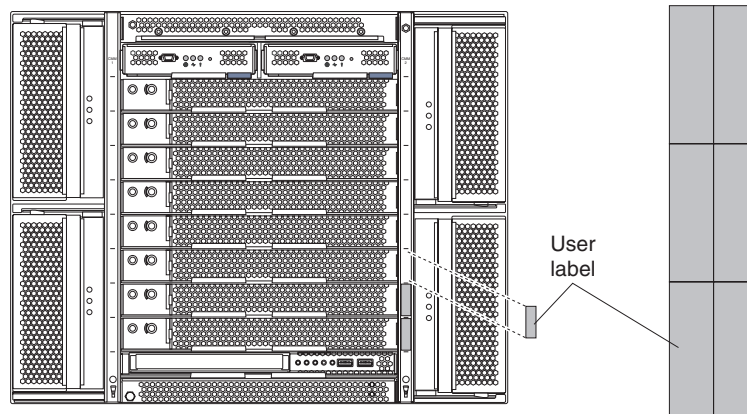
Important: Do not place the label on the blade server or in any way block the ventilation holes on the blade server.

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 Configuration/Setup Utility program and install the blade server operating system. See the documentation that comes with the blade server for instructions.

Removing a blade server

Complete the following steps to remove a blade server from the BladeCenter 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 64. 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 19 for information about starting the BladeCenter T unit and the location of the LEDs on the modules. See the *BladeCenter HS20 Installation and User's Guide* on the IBM *BladeCenter T Documentation* CD for the location of the LEDs on the blade servers.

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 xSeries products. See the parts listing in Chapter 7, "Parts listing, **BladeCenter T Type 8720 and 8730**," on page 107 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 server have an alphabetical stamp in the metal that identifies the order they were assembled at the factory (for example, a, b, c, etc.).

DC terminal cover with fasteners

Complete the following steps to replace the dc terminal cover on the Type 8720 unit.

Note:

- Read "Installation guidelines" on page 37.
- Read the safety notices at ″Safety information″ on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system, and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).
2. Loosen the two captive fasteners on the old DC terminal cover.

DC terminal cover

Captive fasteners (2)
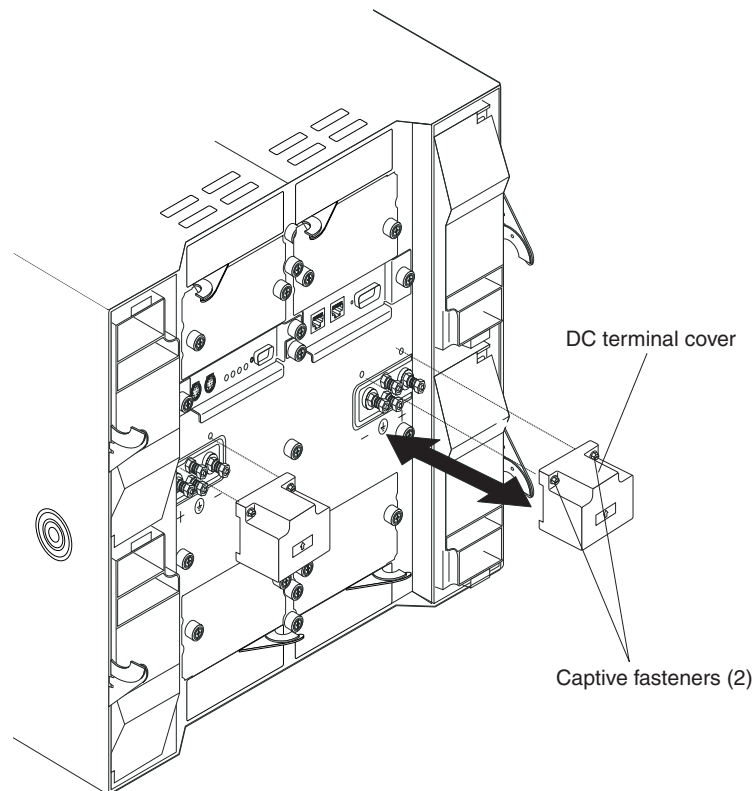
3. Remove the old dc terminal cover from the dc terminal.
4. Remove the new dc terminal cover from its packaging.
5. Align the new dc terminal cover so that the stamped arrow on the back is pointing up, and position the new dc terminal cover over the mounting holes on the dc terminal.
6. Tighten the two captive fasteners on the new dc terminal cover.

   Note: Torque the captive fasteners to 8 inch-pounds.
7. Connect power to the BladeCenter T unit (see page"Starting the BladeCenter T unit" on page 19).
8. Start up the system (see "Starting the BladeCenter T unit" on page 19).

AC 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 37.
- Read the safety notices at "Safety information" on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system, and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).
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 57).
4. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).
5. Using a screwdriver, fully loosen the seven captive fasteners on the old ac rear panel.

Captive fastener (6)
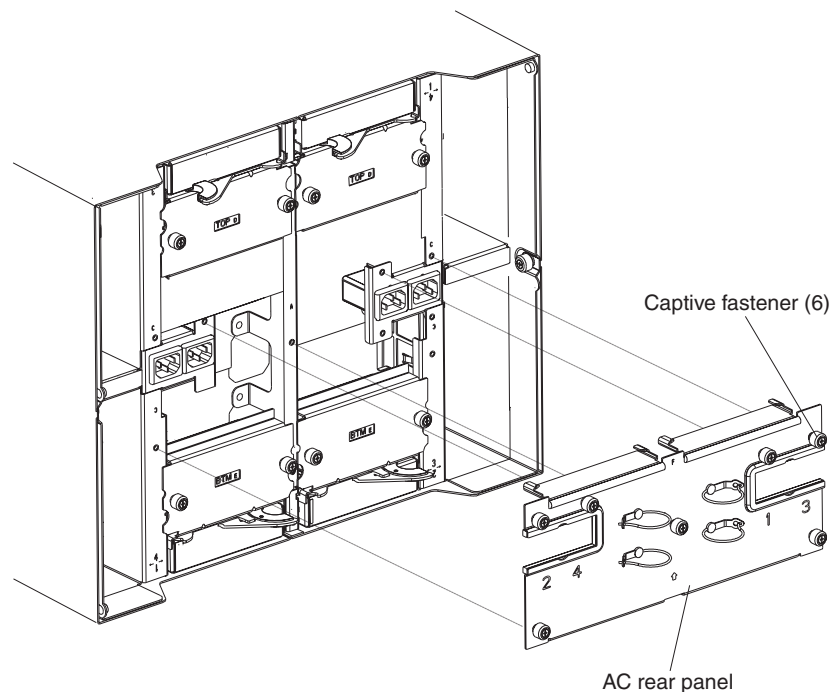
AC rear panel

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, re-install the LAN module (see "Installing the LAN module" on page 59) and the KVM module (see "Removing and installing the KVM (keyboard, video, mouse) module" on page 56).

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 19).

12. Start up the system (see "Starting the BladeCenter T unit" on page 19).

DC Rear Panel

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

Note:

- Read "Installation guidelines" on page 37.
- Read the safety notices at ″Safety information″ on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system, and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).

2. Remove dc terminal covers.

3. Remove the power connections to each of the dc terminals, and safely place the cables aside.

4. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 57).

5. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).

6. Using a screwdriver, fully loosen the three captive fasteners on the old dc rear panel.

Captive fasteners (3)

DC rear panel

7. Remove the old dc rear panel from the system.

8. Remove the new dc rear panel from its packaging.

9. Position the new dc rear panel so that it aligns with the dc power terminals on the system. Make sure that the dc rear panel is well seated on the system.

10. Using a screwdriver, tighten the three captive fasteners on the new dc rear panel.

   Note: Torque the screws to 8 inch-pounds.

11. If you have no other replacement procedures to perform at the rear of the system, re-install the LAN module (see "Installing the LAN module" on page 59) and the KVM module (see "Installing the KVM module" on page 57).

12. Connect the power cable connectors to the dc terminals of the BladeCenter T unit (see page19).

13. Reinstall dc terminal covers.

14. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Upper flex circuit assembly

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

Note:
- Read "Installation guidelines" on page 37.
- Read the safety notices at ″Safety information″ on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).

2. For Type 8720 systems, remove the dc terminal covers and power connections to each of the DC terminals. For Type 8730 systems, 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 57).

4. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).

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.

Upper flex circuit assembly

Captive fasteners
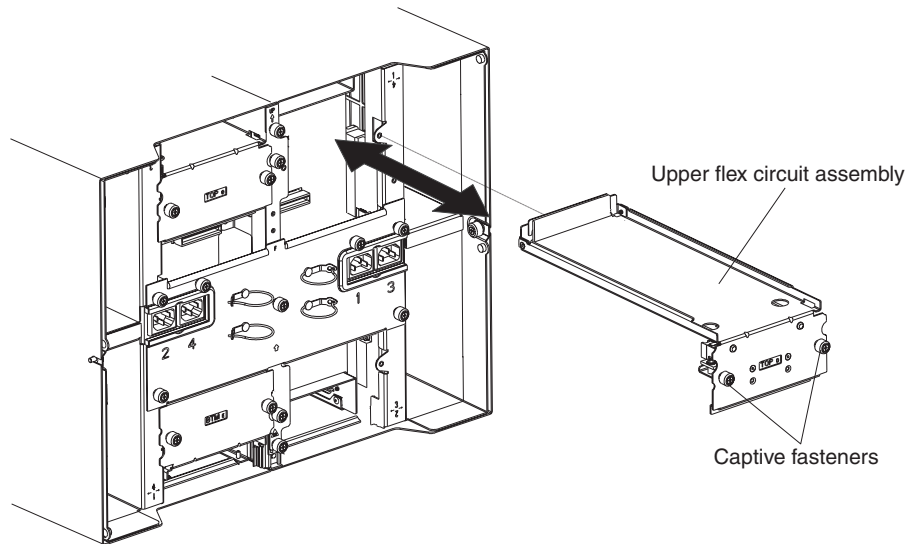
7. Carefully remove the old upper flex circuit assembly by placing your fingers under the lower edge of the assembly and pulling the unit out of the chassis.

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, re-install the LAN module (see "Installing the LAN module" on page 59) and the KVM module (see "Installing the KVM module" on page 57).

15. Reconnect the power to the system (see "Starting the BladeCenter T unit" on page 19).

16. For Type 8720 systems, reinstall dc terminal covers.

17. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Lower flex circuit assembly

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

Note:
- Read "Installation guidelines" on page 37.
- Read the safety notices at ″Safety information″ on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).

2. For Type 8720 systems, remove the dc terminal covers and power connections to each of the dc terminals. For Type 8730 systems, 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 57).

4. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).

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.

Lower flex circuit assembly

Captive fasteners
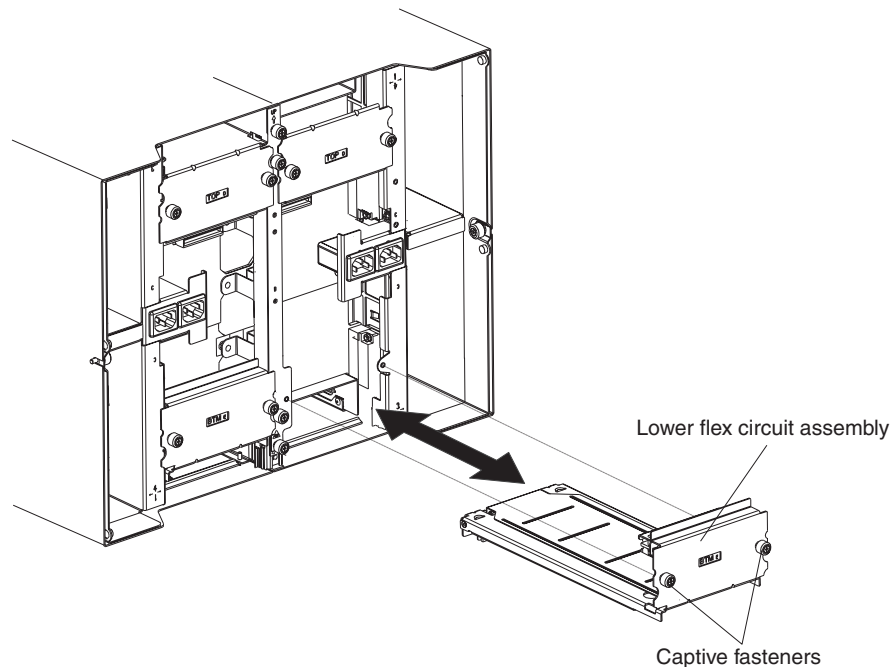
8. Carefully remove the old lower flex circuit assembly by gripping the top edge of the assembly and pulling the unit out of the chassis.

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.
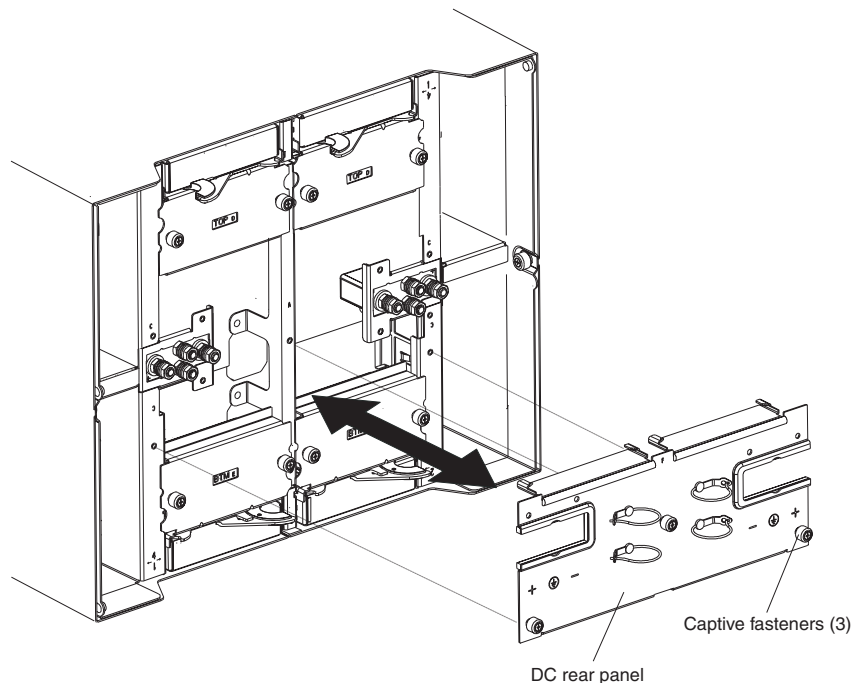
13. Reinstall the I/O switch they you removed.

14. If you have no other replacement procedures to perform at the rear of the system, re-install the LAN module (see "Installing the LAN module" on page 59) and the KVM module (see "Installing the KVM module" on page 57).

15. For Type 8720, reinstall dc terminal covers.

16. Reconnect the power to the system (see "Starting the BladeCenter T unit" on page 19).

Chapter 5. Service replaceable units   **73**

17. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Docking board/blower housing assembly - (dc Type 8720 and ac Type 8730)

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

Note:
- Read "Installation guidelines" on page 37.
- Read the safety notices at "Safety information" on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system, and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).
2. For Type 8720 (dc) systems, remove the dc terminal covers and power connections to each of the dc terminals. For Type 8730 (ac) systems, 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 54).
5. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 57).
6. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).
7. Remove all I/O switches and switch fillers from the rear of the unit. See "Removing and installing I/O modules" on page 60.
8. For Type 8720, remove the dc rear panel from the rear of the unit (see "DC Rear Panel" on page 70). For Type 8730, remove the ac rear panel from the rear of the unit (see "AC rear panel" on page 69).
9. Remove the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 71) and the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 72).
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.

Docking board/blower
housing assembly

(DC shown)
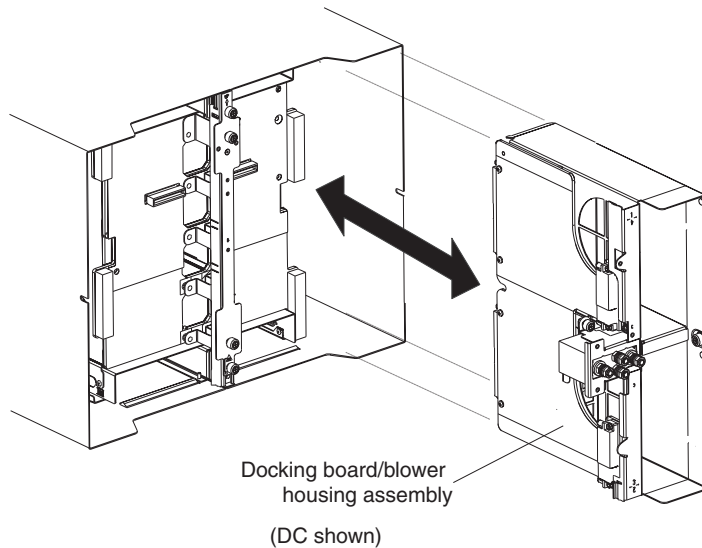
12. Grab the housing by the housing frame above and below the power inlet receptacles, and carefully pull the housing out from the system chassis.

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 71).
    - Reinstall the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 72).
    - Reinstall the rear dc panel (see "DC Rear Panel" on page 70) or rear ac panel (see "AC rear panel" on page 69).
    - Reinstall the LAN module (see "Installing the LAN module" on page 59).
    - Reinstall the KVM module (see page "Installing the KVM module" on page 57).
    - Reinstall the I/O switches or switch fillers.
    - Reinstall the two blowers (see "Installing a blower module" on page 55).
    - For Type 8720 (dc) units, connect the power cables to the dc terminals and dc terminal covers. For Type 8730 (ac) units, 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 48).

17. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Rear chassis stiffener bracket

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

Note:
- Read "Installation guidelines" on page 37.
- Read the safety notices at ″Safety information″ on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).
2. For Type 8720 (dc) systems, remove the dc terminal covers and power connections to each of the dc terminals. For Type 8730 (ac) systems, 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 57).
5. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).
6. Remove all I/O switches and switch fillers from the rear of the unit.
7. For a Type 8720 unit, remove the dc rear panel from the rear of the unit (see "DC Rear Panel" on page 70). For a Type 8730 unit, remove the ac rear panel from the rear of the unit (see "AC rear panel" on page 69).
8. Remove the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 71) and the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 72).
9. Loosen the four captive fasteners on the old rear chassis stiffner bracket.

Chassis stiffener bracket

UP

Captive fastener (4)
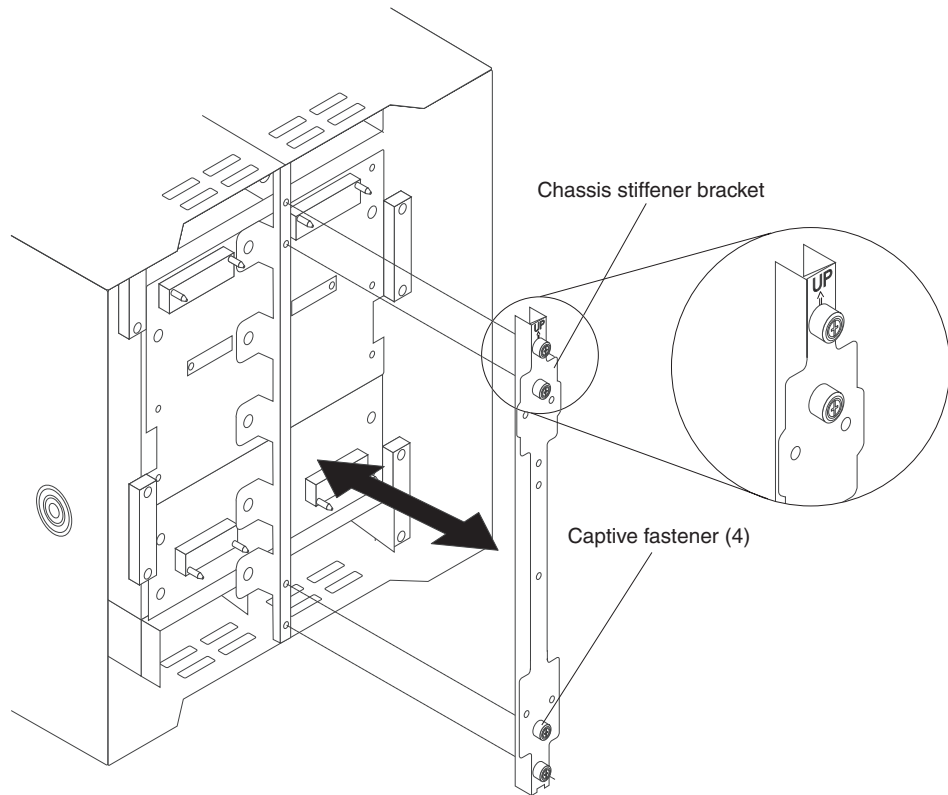
10. Pull the old rear chassis stiffner bracket off the chassis.

11. Remove the new rear chassis stiffner bracket from its packaging.

12. Align the stiffner 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 71).

   • Reinstall the two lower flex circuit assemblies (see page 72).

   • For Type 8720, reinstall the rear dc panel (see "DC Rear Panel" on page 70). For Type 8730, reinstall the rear ac panel (see "AC rear panel" on page 69).

   • Reinstall the LAN module (see "Installing the LAN module" on page 59).

   • Reinstall the KVM module (see "Installing the KVM module" on page 57).

   • Reinstall the I/O switches or switch fillers.

   • For Type 8730 (ac) units, plug each power cord into the input power connections on the rear of the BladeCenter T unit. For Type 8720 (dc) units, connect the power cables to the dc terminals and dc terminal covers.

   • Reinstall the power modules at the front of the unit (see "Installing a power module" on page 48).

15. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Backplane

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

Note:

- Read "Installation guidelines" on page 37.
- Read the safety notices at "Safety information" on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system, and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).
2. For Type 8720 (dc) systems, remove the power connections to each of the dc terminals. For Type 8730 (ac) systems, 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. At the rear of the unit, remove all four blowers from both docking board/blower housing assemblies (see "Removing a blower module" on page 55).
5. Remove the KVM module from the rear of the system (see "Removing the KVM module" on page 57).
6. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).
7. Remove all I/O switches and switch fillers from the rear of the unit.
8. For a Type 8720 unit, remove the dc terminal covers and the dc rear panel from the rear of the unit (see "DC Rear Panel" on page 70). For a Type 8730 unit, remove the ac rear panel from the rear of the unit (see "AC rear panel" on page 69).
9. Remove the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 71) and the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 72).
10. For each docking board/blower housing assembly, loosen the two captive fasteners located above and below the power inlet receptacles (Type 8730) or DC terminals (Type 8720).
11. Grab the left docking board/blower assembly housing by the frame and carefully pull the housing out from the system chassis.
12. Grab 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.
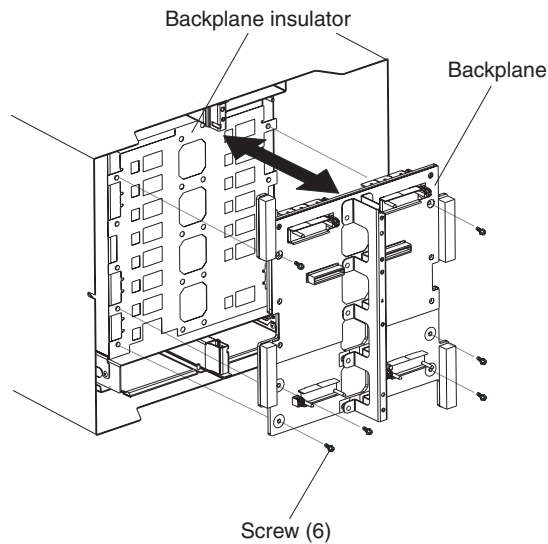
Backplane insulator

Backplane

Screw (6)

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 page78).
    • Reinstall the left and right docking board/blower housing assemblies (see page 76).
    • Reinstall the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 71).
    • Reinstall the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 72).
    • For Type 8720, reinstall the rear dc panel (see "DC Rear Panel" on page 70). For Type 8730, reinstall the rear ac panel (see "AC rear panel" on page 69).
    • Reinstall the LAN module (see "Installing the LAN module" on page 59).
    • Reinstall the KVM module (see "Installing the KVM module" on page 57).
    • Reinstall the I/O switches or switch fillers.
    • Reinstall the four blowers (see "Installing a blower module" on page 55).
    • For Type 8730 (ac) units, plug each power cord into the input power connections on the rear of the BladeCenter T unit. For Type 8720 (dc) units, connect the power cables to the dc terminals and dc terminal covers.
    • Reinstall the power modules at the front of the unit ("Installing a power module" on page 48).
21. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Backplane insulator

Complete the following steps to replace the backplane insulator.

Note:
- Read "Installation guidelines" on page 37.
- Read the safety notices at "Safety information" on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Perform steps 1 on page 79 through 15 on page 80 in "Backplane" on page 79. 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.
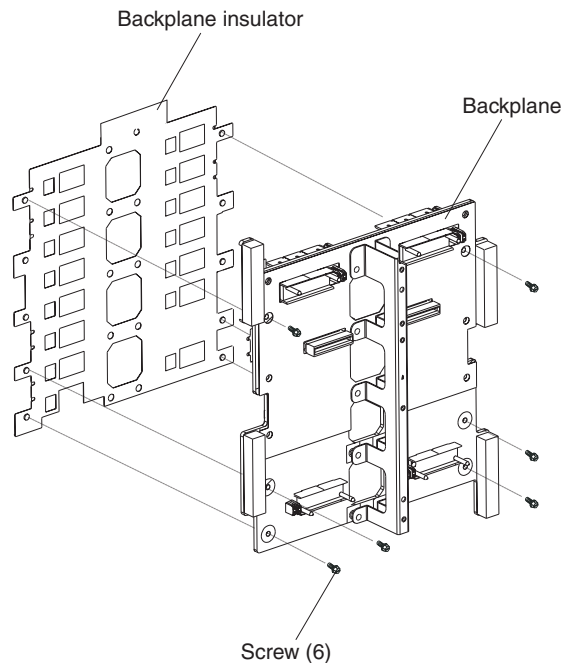
4. Remove the new backplane insulator from its packaging.

   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 page80).
   - Reinstall the rear chassis stiffener bracket (see "Rear chassis stiffener bracket" on page 77).
   - Reinstall the left and right docking board/blower housing assemblies (see page 76).
   - Reinstall the two upper flex circuit assemblies (see page 71).
   - Reinstall the two lower flex circuit assemblies (see page 72).
   - For Type 8720, reinstall the rear dc panel (see "DC Rear Panel" on page 70). For Type 8730, reinstall the rear ac panel (see "AC rear panel" on page 69).

- Reinstall the LAN module (see "Installing the LAN module" on page 59).
- Reinstall the KVM module (see "Installing the KVM module" on page 57).
- Reinstall the I/O switches or switch fillers.
- Reinstall the two blowers (see "Installing a blower module" on page 55).
- For Type 8720 (dc) units, connect the power cables to the dc terminals and dc terminal covers. For Type 8730 (ac) units, 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 48).

7. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Air damper

Complete the following steps to replace an air damper.

Note:
- Read "Installation guidelines" on page 37.
- Read the safety notices at ″Safety information″ on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).
2. Remove the power modules and fillers from the bays at the front of the unit (see "Removing and installing power modules" on page 46).
3. Remove the management modules and fillers from the bays at the front of the unit (see "Removing a management module" on page 52).
4. Remove the media tray at the front of the unit (see "Removing the media tray" on page 50).
5. Remove the server blades and fillers from the front of the unit (see "Removing a blade server" on page 66).
6. Remove the broken air damper from the server.
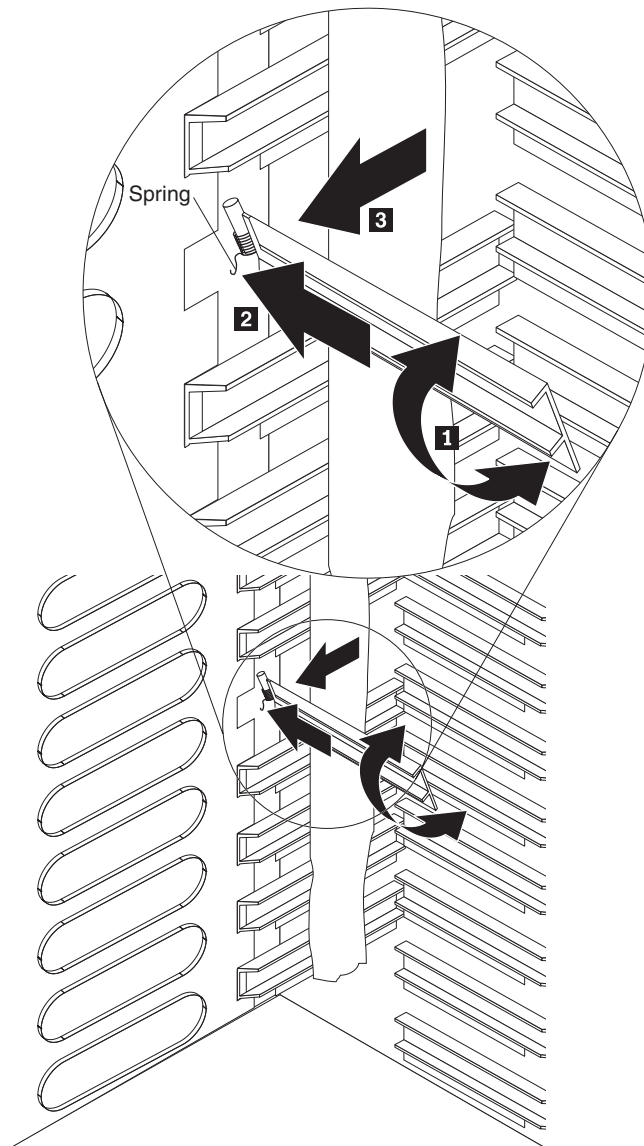
7. Use tape to hold the air dampers above and below the empty air damper slot in the open position. This will provide more room to install the air damper and reduce the chance of breaking additional air dampers.

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.

Slight angle toward
the rear of the system
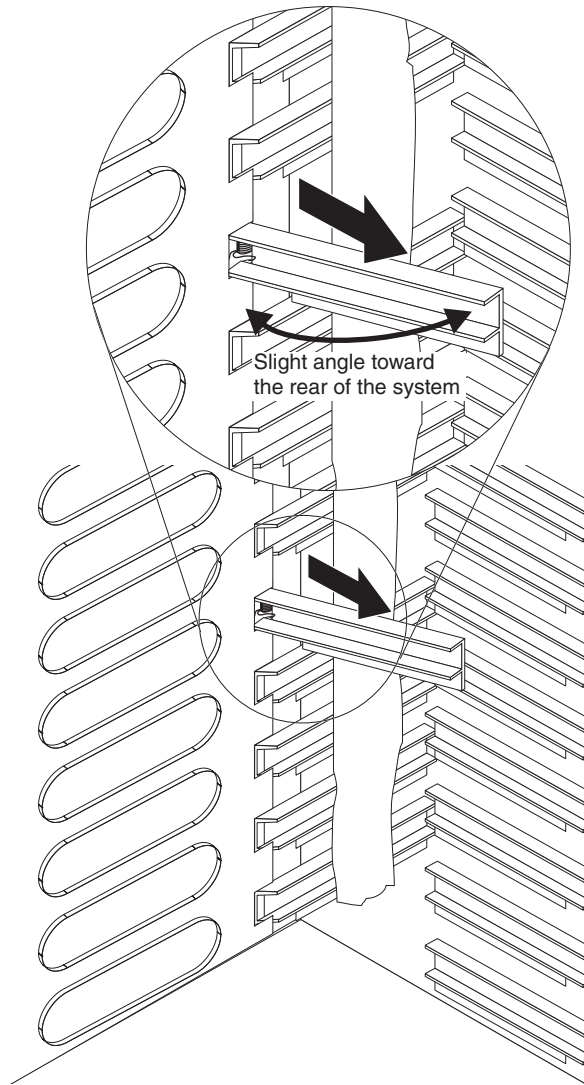
11. Hold the air damper angled slightly towards the back of the server; then, pull the air damper towards the center of the chassis until the pins on the air damper snap into the slots located on the back side of the air damper slot. Rock the air damper up and down while pulling on it to help it seat.

12. Remove the tape used to hold the air dampers open in step 7 on page 83.

13. Install the power modules and fillers in the bays at the front of the unit (see "Installing a power module" on page 48).

14. Install the management modules and fillers from the bays at the front of the unit (see "Installing a management module" on page 53).

15. Install the media tray at the front of the unit (see "Installing the media tray" on page 50).

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 64).

17. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Mechanical chassis

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

Note:

- Read "Installation guidelines" on page 37.
- Read the safety notices at "Safety information" on page 113.
- Read "Handling static-sensitive devices" on page 40.

1. Shut down the system and remove power from the system (see "Shutting down the BladeCenter T unit" on page 21).

2. For Type 8720 (dc) systems, remove the dc terminal covers and power connections to each of the dc terminals. For Type 8730 (ac) systems, 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 and installing power modules" on page 46).

4. Remove the management modules and fillers from the bays at the front of the unit (see "Removing a management module" on page 52).

5. Remove the media tray at the front of the unit (see "Removing the media tray" on page 50).

6. Remove the server blades and fillers from the front of the unit (see "Removing a blade server" on page 66).

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 54).

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 57).

10. Remove the LAN module from the rear of the system (see "Removing the LAN module" on page 59).

11. For a Type 8720 unit, remove the dc terminal covers and the dc rear panel from the rear of the unit (see "DC Rear Panel" on page 70). For a Type 8730 unit, remove the ac rear panel from the rear of the unit (see "AC rear panel" on page 69).

12. Remove the two upper flex circuit assemblies (see "Upper flex circuit assembly" on page 71) and the two lower flex circuit assemblies (see "Lower flex circuit assembly" on page 72).

13. For each docking board/blower housing assembly, loosen the two captive fasteners located above and below the power inlet receptacles (Type 8730) or dc terminals (Type 8720).

14. Grab the left docking board/blower assembly housing by the frame, and carefully pull the housing out from the system chassis.

15. Grab 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.

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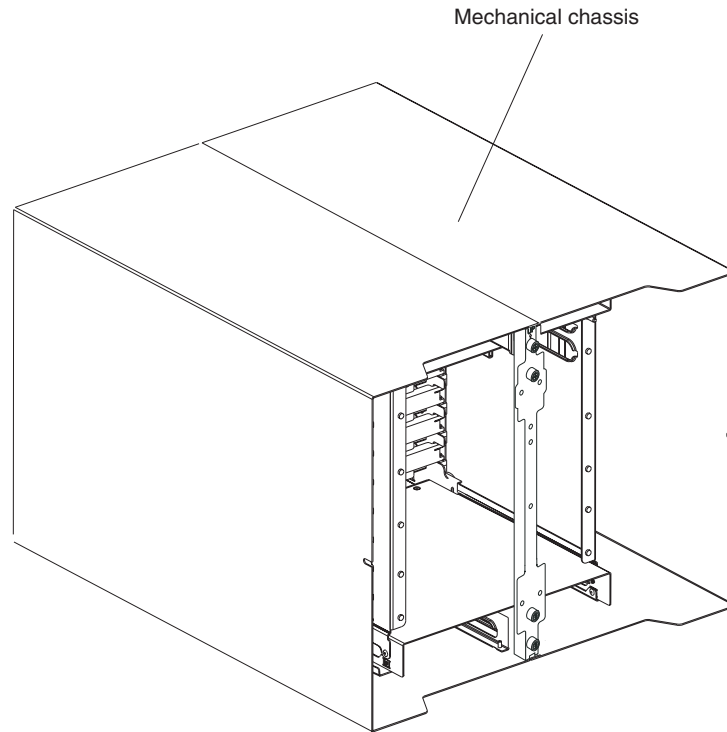
24. Install the backplane on the chassis; then, insert and tighten the six non-captive screws that mount the backplane to the chassis.

   Note: Tighten the screws to 8 inch-pounds.
25. Install the rear chassis stiffner bracket (see page 78).
26. Install the left and right docking board/blower housing assemblies (see page 76).
27. Install the two upper flex circuit assemblies (see page 71).
28. Install the two lower flex circuit assemblies (see page 72).
29. For Type 8720, reinstall the rear dc panel (see "DC Rear Panel" on page 70). For Type 8730, reinstall the rear ac panel (see "AC rear panel" on page 69).
30. Install the blowers at the rear of the unit (see "Installing a blower module" on page 55).
31. Install the KVM module at the rear of the unit (see "Installing the KVM module" on page 57).
32. Install the LAN module at the rear of the unit (see "Installing the LAN module" on page 59).
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 50).

35. Install the management module(s) at the front of the unit (see "Installing a management module" on page 53).

36. Install the blade servers at the front of the unit (see "Removing and installing a blade server or filler module" on page 64).

37. For Type 8720 (dc) units, connect the power cables to the dc terminals. For Type 8730 (ac) units, 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 19).

38. Install the power modules at the front of the unit (see "Installing a power module" on page 48).

39. Install the blade servers (see "Removing and installing a blade server or filler module" on page 64).

40. Install the I/O modules (see "Removing and installing I/O modules" on page 60).

41. Start up the system (see "Starting the BladeCenter T unit" on page 19).

Chapter 6. Symptom-to-FRU index

This index supports the @server BladeCenter T Type 8720 and 8730 systems.

Notes:
1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by this index, refer to the manual for that device.
3. 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 6. 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 6. 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/pc/support/. The necessary workaround is described in the instructions for your operating system.

Table 6. 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.
	<pre>Section "Monitor"
	 Option "CalcAlgorithm" "IteratePrecisely"
	    HorizSync 31-48
	 Identifier "Monitor[0]"
	    ModelName "AutoDetected"
	 Option "DPMS"
	 VendorName "AutoDetected"
	    VertRefresh 60
	    UseModes "Modes[0]"
	   EndSection</pre>
	 2. Shut down X; then, restart it.

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 6. 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 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. 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 Configuration/Setup Utility program, the Ethernet port designated as Planar Ethernet 1 is routed to Ethernet switch module 2 and the Ethernet port designated as Planar Ethernet 2 is routed to Ethernet switch module 1. 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 *IBM 4-Port Gb Ethernet Switch Module for BladeCenter T Installation Guide* 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.
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.

Table 6. Troubleshooting charts (continued)

Device	Suggested action
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.	Although the keyboard attached to the BladeCenter T unit is a PS/2-style keyboard, communication with it is through a USB bus. When you are running an operating system that does not have USB drivers, such as in the following instances, the keyboard responds very slowly. 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
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.

Table 6. Troubleshooting charts (continued)

Device	Suggested action
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 Configuration/Setup Utility when a blade server is started brings up browser help instead of the Configuration/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	
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 *IBM 4-Port Gb Ethernet Switch Module for BladeCenter T Installation Guide* for instructions on how to ping through the Telnet interface.

Table 6. Troubleshooting charts (continued)

Device	Suggested action
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 104.
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. **Notes:** 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	
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).

Table 6. Troubleshooting charts (continued)

Device	Suggested action
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 Web page at http://www.ibm.com/pc/support/. 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. **Type 8720 (dc) unit:** The power cables are connected to the DC power terminals at the rear of the system and the power breaker is ON. **Type 8730 (ac) unit:** 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. **Type 8720 (dc) unit:** The power breaker is ON and the fuses are good. **Type 8730 (ac) unit:** 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 104.
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 Server Proven® 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.
Switch-module problems	

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Table 6. Troubleshooting charts (continued)

Device	Suggested action
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 7. 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 7. 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 8720 and 8730**," on page 107 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 39. 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 39. 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 39. 2. Replace switch x.
System over abbient temperature	**Make sure that the system is being properly cooled**; see "System reliability considerations" on page 39.
Switch x temperature fault	**Make sure that the system is being properly cooled**; see "System reliability considerations" on page 39.

Blower error messages

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8720 and 8730**," on page 107 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 8720 and 8730**," on page 107 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 DC good fault	**Replace power module x.**

Message	Action
Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8720 and 8730**," on page 107 to determine which components should be replaced by a field service technician.	
Message	**Action**
Power supply x removed	**Reinstall power supply x.**
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

Message	Action
Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8720 and 8730**," on page 107 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.**

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8720 and 8730**," on page 107 to determine which components should be replaced by a field service technician.	
Message	**Action**
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 8720 and 8730**," on page 107 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 8720 and 8730**," on page 107 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.**

Note: See Chapter 7, "Parts listing, **BladeCenter T Type 8720 and 8730**," on page 107 to determine which components should be replaced by a field service technician.	
Message	**Action**
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 8720 and 8730**," on page 107 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 8720 and 8730**," on page 107 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.

Notes:

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 8720 and 8730

This parts listing supports the @server BladeCenter T Type 8720 and 8730. To check for an updated parts listing on the Web, complete the following steps:

1. Go to http://www.ibm.com/support/
2. Under **Search technical support**, type 8720 or 8730 and click **Search**.
3. Under Document type, select **Parts information** and click **Go**.

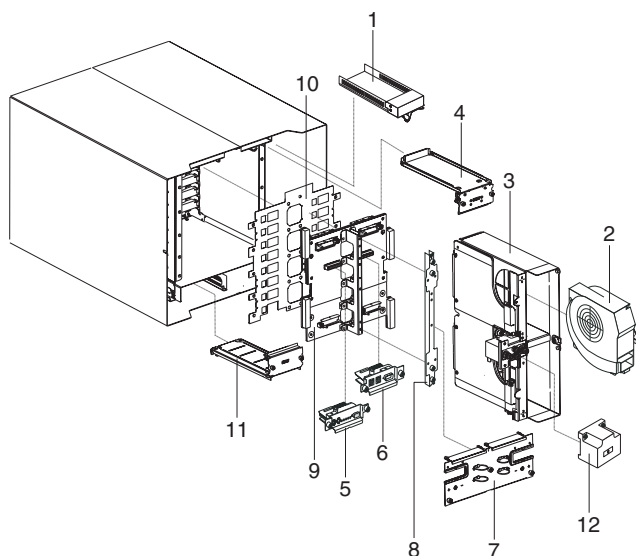## Type 8720 and 8730 - Front view
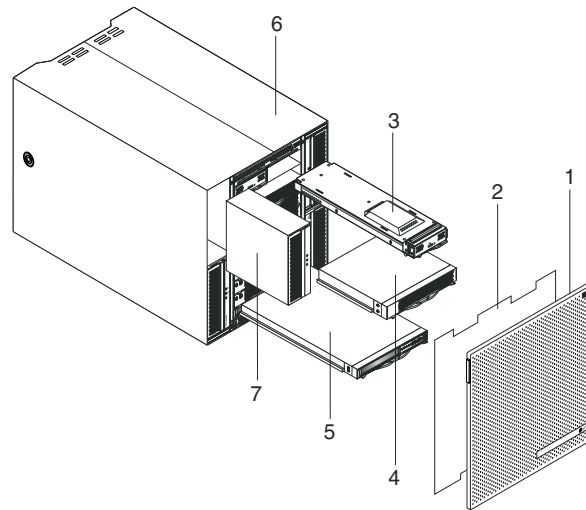
> **Note:** Field replaceable units (FRUs) should be serviced only by qualified field service technicians. Customer replaceable units can be replaced by the customer.

Index	System (@server BladeCenter T Type 8720 and 8730)	FRU No.	CRU/FRU
1	Bezel assembly (model 1Rx)	90P3716	CRU
1	Bezel assembly, slim (model 2Rx)	39M4294	CRU
2	Air filter (model 1Rx)	90P3794	CRU
3	Chassis management module (model 1Rx)	32R0864	CRU
3	Chassis management module (model 2Rx)	32R0854	CRU
4	Blade filler (model 1Rx)	90P3718	CRU
4	Blade filler (model 2Rx)	39M3317	CRU
5	CD-RW/DVD-ROM with media tray (model 1Rx)	90P3697	CRU
5	CD-RW/DVD-ROM (without tray) (model 1Rx)	26K5439	CRU
5	CD-RW/DVD-ROM (without tray) (model 1Rx option)	71P7359	CRU
5	CD-RW/DVD-ROM 24X (without tray) (primary, model 2Rx)	39M3551	CRU
5	CD-RW/DVD-ROM 24X (without tray) (alternate, model 2Rx)	39M3561	CRU
5	Media tray (model 2Rx)	32R0812	CRU
6	Chassis assembly (model 1Rx)	90P3729	FRU
6	Chassis assembly (model 2Rx)	39M4283	FRU
7	Power supply module, 1300 watt - DC (8720 model 1Rx)	90P3712	CRU
7	Power supply module, 1300 watt - DC (8720 model 2Rx)	32R0817	CRU
7	Power supply, 1300 watt - AC (8730 model 1Rx)	90P3714	CRU
7	Power supply, 1300 watt - AC (8730 model 2Rx)	32R0819	CRU
7	Power supply filler (model 1Rx)	90P3717	CRU
7	Power supply filler (model 2Rx)	39M4297	CRU

Index	System (@server BladeCenter T Type 8720 and 8730)	FRU No.	CRU/FRU
	2-Post rack mount kit (8720 model 1Rx)	90P3802	FRU
	2-Post rack mount kit (model 2Rx)	39M4299	FRU
	4-Post rack mount kit (8720 model 1Rx)	90P3803	FRU
	4-Post rack mount kit (model 2Rx)	39R8313	FRU
	73.4 GB hard disk drive (option)	32P0730	FRU
	Carrier kit model 2Rx)	39R8315	CRU
	• Interposer card		
	• Plastic DVD/CD		
	• DVD cover		
	Chassis lift handle (model 1Rx)	03K9069	CRU
	Chassis lift handle (2Rx)	39M4258	CRU
	Diskette drive (model 1Rx)	06P5223	CRU
	DVD multi-burner (option)	39M3525	CRU
	Ethernet GB switch (option)	32R0791	CRU
	Ethernet IRCL switch (option)	73P9044	CRU
	Fibre channel switch (option)	59P6621	CRU
	Filler, chassis management module (model 1Rx)	90P3795	CRU
	Filler, chassis management module (model 2Rx)	39M4296	CRU
	Rack mounting kit (model 2Rx)	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 label (model 1Rx)	90P3810	CRU
	System service label (model 2Rx)	32R0873	CRU

Type 8720 and 8730 - Rear view

Index	System (@server BladeCenter T Type 8720 and 8730)	FRU No.	CRU/FRU
1	Switch filler (model 1Rx)	49P2518	CRU

Index	System (@server BladeCenter T Type 8720 and 8730)	FRU No.	CRU/FRU
1	Switch filler (model 2Rx)	39M3261	CRU
2	Blower module (model 1Rx)	32R0914	CRU
2	Blower module (model 2Rx)	39M4285	CRU
3	Docking board/blower housing assembly - DC (8720 model 1Rx)	90P3790	FRU
3	Docking board/blower housing assembly - DC (8720 model 2Rx)	32R0815	FRU
3	Docking board/blower housing assembly - AC (8730 model 1Rx)	90P3791	FRU
3	Docking board/blower housing assembly - AC (8730 model 2Rx)	32R0818	FRU
4	Upper flex circuit assembly (model 1Rx)	90P3698	FRU
4	Upper flex circuit assembly (model 2Rx)	39R8317	CRU
5	KVM module (model 1Rx)	90P3710	CRU
5	KVM module (model 2Rx)	32R0814	CRU
6	LAN module (model 1Rx)	90P3709	CRU
6	LAN module (model 2Rx)	32R0813	CRU
7	Rear panel - DC (8720 model 1Rx)	90P3842	CRU
7	Rear panel - DC (8720 model 2Rx)	39M4291	CRU
7	Rear panel - AC (8730 model 1Rx)	25K8240	CRU
7	Rear panel - AC (8730 model 2Rx)	39M4292	CRU
8	Rear chassis bracket (model 1Rx)	25K8231	FRU
8	Rear chassis bracket (model 2Rx)	39M4289	FRU
9	Backplane assembly (model 1Rx)	25K8381	FRU
9	Backplane assembly (model 2Rx)	32R0811	FRU
10	Backplane insulator (model 1Rx)	90P3841	FRU
10	Backplane insulator (model 2Rx)	39M4286	FRU
11	Lower flex circuit assembly (model 1Rx)	90P3789	FRU
11	Lower flex circuit assembly (model 2Rx)	39R8316	FRU
12	Terminal cover with fasteners - DC (8720 model 1Rx)	90P3792	FRU
12	Terminal cover with fasteners - DC (8720 model 2Rx)	39M4293	FRU
	Cable, alarm panel (8720 model 1Rx)	73P7576	CRU
	Cable, alarm panel (model 2Rx)	39M4255	CRU
	Line cord (8720 model 1Rx)	36L8886	CRU
	Line cord (8730 model 1Rx)	74P4430	CRU
	Parts kit (model 1Rx)	13N2659	FRU

- CD spring (1)
- Diskette drive spring (1)
- Lower damper (4)
- Upper damper (4)
- Mounting hardware assembly (1)
- Label (2)
- M3.5 slotted screw (8)

	Wrist strap (model 1Rx)	6405959	CRU

Appendix A. Getting help and technical assistance

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

Before you call

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

* Check all cables to make sure that they are connected.
* Check the power switches to make sure that the system is turned on.
* Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
* Go to the IBM Support Web site at http://www.ibm.com/pc/support to check for technical information, hints, tips, and new device drivers.
* Use an IBM discussion forum on the IBM Web site to ask questions.

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

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, 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/pc/support and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is http://www.ibm.com/eserver/xseries/. The address for IBM IntelliStation information is http://www.ibm.com/pc/intellistation/.

You can find service information for your IBM products, including supported options, at http://www.ibm.com/pc/support. If you click **Profile** from the support page, you

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can create a customized support page. The support page has many sources of information and ways for you to solve problems, including:

- Diagnosing problems, using the IBM Online Assistant
- Downloading the latest device drivers and updates for your products
- Viewing Frequently Asked Questions (FAQ)
- Viewing hints and tips to help you solve problems
- Participating in IBM discussion forums
- Setting up e-mail notification of technical updates about your products

Software service and support

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

For more information about Support Line and other IBM services, go to http://www.ibm.com/services/, or go to http://www.ibm.com/planetwide/ for support telephone numbers.

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to http://www.ibm.com/planetwide/ for support telephone numbers.

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.

Appendix B. Related service information

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

Safety information

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

General safety

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

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Electrical safety

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

Observe the following rules when working on electrical equipment.

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

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

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

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

Safety inspection guide

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

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

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

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

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

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

Handling electrostatic discharge-sensitive devices

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

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

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

    Note: The use of a grounding system is desirable but not required to protect against ESD damage.
    – Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
    – Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
    – Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

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

Safety notices (multi-lingual translations)

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

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

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

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

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

Statement 1

DANGER

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

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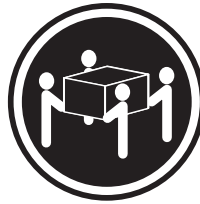beam.**

Class 1 Laser Product

Appendix B. Related service information **119**
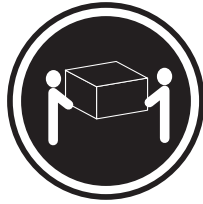
Statement 4

≥18 kg (37 lbs)   ≥32 kg (70.5 lbs)   ≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

Statement 5

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

Statement 10

CAUTION:

Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.

Statement 20

CAUTION:

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

Statement 21

CAUTION:

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

Importante:

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

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

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

Instrução 1

PERIGO

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

Para evitar risco de choque:

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

Para Conectar:	Para Desconectar:
1. DESLIGUE Tudo.	1. DESLIGUE Tudo.
2. Primeiramente, conecte todos os cabos aos dispositivos.	2. Primeiramente, remova os cabos de alimentação das tomadas.
3. Conecte os cabos de sinal aos conectores.	3. Remova os cabos de sinal dos conectores.
4. Conecte os cabos de alimentação às tomadas.	4. Remova todos os cabos dos dispositivos.
5. LIGUE os dispositivos.	

Instrução 2

CUIDADO:

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

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

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

Instrução 3

PRECAUCIÓN:

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ítica, transmissores, etc.) estiverem instalados, observe o seguinte:
- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

PERIGO

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

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos íticos, e evite exposição direta ao raio.
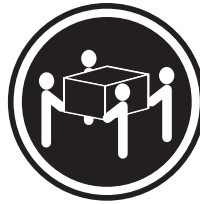
Laser Klasse 1.

Instrução 4

≥18 kg (37 lbs)   ≥32 kg (70.5 lbs)   ≥55 kg (121.2 lbs)

CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5

CUIDADO:

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

CUIDADO:

Instrução 10

CUIDADO:

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

Instrução 20

CUIDADO:

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

Instrução 21

CUIDADO:

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

重要：

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

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 1

⚠ ⚡

危险

电源、电话和通信电缆中带有危险电流。

为避免电击：

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将应与本产品连接的所有设备连接至正确布线的插座上。

尽量只使用单手拆接信号电缆。

有水、火及结构损坏迹象时，请勿打开任何设备。

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

安装、移动或打开本产品及其附带设备的机盖时，应按下表所述连接和断开电缆。

连接时：	断开连接时：
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆连接至设备。	2. 首先从插座中拔出电源线。
3. 将信号电缆连接至接口。	3. 从接口上拔下信号电缆。
4. 将电源线连接至插座。	

声明 2

⚠

警告:

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

如果系统模块中含有锂电池，则只能使用同一厂商制造的同一类型的模
块进行更换。电池中含有锂，如果使用、拿放或处理不当，可能会发生
爆炸。

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

声明 3

⚠

警告:

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

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

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的
危险。

⚠

危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，
避免直接暴露于光束之下。

Laser Klass 1.

声明 4

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

警告：
抬起时请采用安全操作方法。

声明 5

警告：

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。
另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确
保所有电源线均已与电源断开连接。
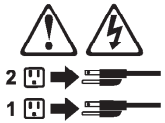
声明 6

警告：

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

声明 7

警告：

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

声明 8

警告：
不要拆除电源外盖或贴有下列标签的任何部件。

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

声明 9

警告：

为避免人员伤害，拆除设备上的风扇前应拨下热插拨风扇电缆。

声明 10

警告：

机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。

> 82 kg (180 磅)

声明 11

警告：

下面的标签表明附近有锋利的边、角或接头。

声明 12

警告：
下面的标签表明附近有高热表面。

- 声明 20

警告：
为避免人身伤害，请在抬起设备之前卸下所有刀片服务器以减轻重量。

- 声明 21

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

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重要資訊：

> **Server Library** 中所有「注意」及「危險」的聲明均以數字開
> 始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲
> 明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。
>
> 例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將
> 出現在本節的「聲明」1 中。
>
> 執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1

危險

> 電源、電話及通信電纜上所產生的電流均有危險性。
>
> 欲避免電擊危險：
>
> — 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架
>   構本產品。
> — 請將電源線接至接線及接地正確的電源插座。
> — 請將本產品隨附的設備連接至接線正確的插座。
> — 儘可能使用單手來連接或切斷信號電纜線。
> — 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啟該設備的電源。
> — 在安裝及架構之時，若非非常熟悉，在開啟裝置蓋子之前，請切斷電源線、電
>   信系統、網路及數據機。
> — 在安裝、移動本產品或附加裝置，或開啟其蓋子時，請依照下表中「連接」及
>   「切斷」電纜線的步驟執行。

連接：	切斷：
1. 關閉所有開關。	1. 關閉所有開關。
2. 先將所有電纜線接上裝置。	2. 先自電源插座拔掉電源線。
3. 將信號電纜接上接頭。	3. 拔掉接頭上的所有信號電纜。
4. 再將電源線接上電源插座。	4. 再拔掉裝置上的所有電纜線。
5. 開啟裝置的電源。	

聲明 2

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

請勿將電池：
— 丟入或浸入水中
— 加熱超過 100 ℃ (212 ℉)
— 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3

注意：
安裝雷射產品 (如 CD-ROM、DVD 光碟機、光纖裝置或發射器) 時，請注意下列
事項：
– 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。
　 裝置中沒有需要維修的組件。
– 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。

危險

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

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

Luokan 1 Laserlaite

聲明 4

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

注意：
抬起裝置時，請注意安全措施。

聲明 5

注意：
裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電
流。
本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所
有電源線已與電源分離。
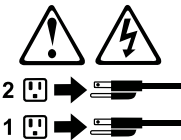
聲明 10

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

> 82 公斤 (180 磅)

聲明 20

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

聲明 21

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

Important:

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

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

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

Notice n° 1

DANGER

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

Pour éviter tout risque de choc électrique:

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

Connexion	Déconnexion
1. Mettez les unités hors tension.	1. Mettez les unités hors tension.
2. Commencez par brancher tous les cordons sur les unités.	2. Débranchez les cordons d'alimentation des prises.
3. Branchez les câbles d'interface sur des connecteurs.	3. Débranchez les câbles d'interface des connecteurs.
4. Branchez les cordons d'alimentation sur des prises.	4. Débranchez tous les câbles des unités.
5. Mettez les unités sous tension.	

Notice n° 2

ATTENTION:

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

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

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

Notice n° 3

ATTENTION:

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

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

DANGER

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

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.
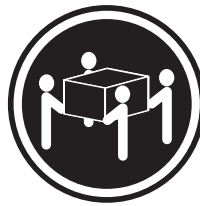
Appareil A Laser de Classe 1.

Notice n° 4
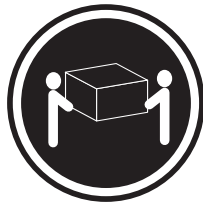
≥18 kg (37 lbs)   ≥32 kg (70.5 lbs)   ≥55 kg (121.2 lbs)

ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5

ATTENTION:

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

Notice n° 10

ATTENTION:

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

Notice n° 20

ATTENTION:

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

Notice n° 21

ATTENTION:

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

Wichtig:

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

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

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1

VORSICHT

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

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

Kabel anschlieβen:	Kabel lösen:
1. Alle Geräte ausschalten und Netzstecker ziehen. 2. Zuerst alle Kabel an Einheiten anschließen. 3. Signalkabel an Anschlußbuchsen anschließen. 4. Netzstecker an Steckdose anschließen. 5. Gerät einschalten.	1. Alle Geräte ausschalten. 2. Zuerst Netzstecker von Steckdose lösen. 3. Signalkabel von Anschlußbuchsen lösen. 4. Alle Kabel von Einheiten lösen.

Hinweis 2

ACHTUNG:

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

Die Batterie nicht:
- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3

ACHTUNG:

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.
- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

VORSICHT

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

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.
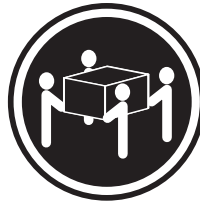
Hinweis 4
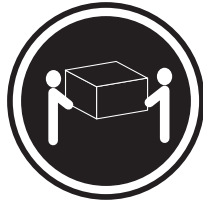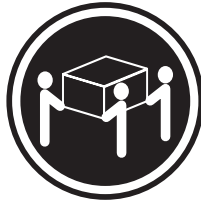
≥18 kg   ≥32 kg   ≥55 kg

ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5

ACHTUNG:

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

Hinweis 10

ACHTUNG:

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

Hinweis 20

ACHTUNG:

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

Hinweis 21

ACHTUNG:

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

Importante:

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

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

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

Appendix B. Related service information **141**

Avviso 1

PERICOLO

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

Per evitare il pericolo di scosse elettriche:

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

Per collegare:	Per scollegare:
1. SPEGNERE tutti i dispositivi. 2. Collegare prima tutti i cavi alle unità. 3. Collegare i cavi di segnale ai connettori. 4. Collegare i cavi di alimentazione alle prese elettriche. 5. ACCENDERE le unità.	1. SPEGNERE tutti i dispositivi. 2. Rimuovere prima i cavi di alimentazione dalle prese elettriche. 3. Rimuovere i cavi di segnale dai connettori. 4. Rimuovere tutti i cavi dalle unità.

Avviso 2

ATTENZIONE:

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

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

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

Avviso 3

ATTENZIONE:

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:
- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

PERICOLO

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

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.
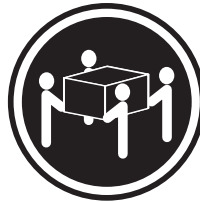
Avviso 4
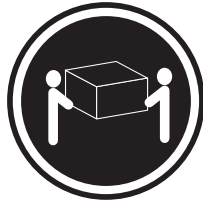
≥18 kg   ≥32 kg   ≥55 kg

ATTENZIONE:

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5

ATTENZIONE:

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

Avviso 10

ATTENZIONE:

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

Avviso 20

ATTENZIONE:

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

Avviso 21

ATTENZIONE:

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

重要：

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

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

手順を実施する前に、すべての注意;

・記述 1

⚠ 危険

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

感電を防止するため：

   – 電源コードは正しく接地および配線が行われている
     電源に接続してください。

   – 本製品が接続されるすべての装置もまた正しく配線
     された電源に接続されている必要があります。

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

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

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

・記述 2

⚠ 注意

本製品には、システム・ボード上にリチウム電池が使用さ
れています。電池の交換方法や取り扱いを誤ると、発熱、
発火、破裂のおそれがあります。
電池の交換には、IBM部品番号33F8354の電池またはメーカー
推奨の同等の電池を使用してください。
交換用電池の購入については、お買い求めの販売店または
弊社の営業担当までお問い合わせください。
電池は幼児の手の届かない所に置いてください。
万一、幼児が電池を飲み込んだときは、直ちに医師に相談
してください。
以下の行為は絶対にしないでください。
－水にぬらすこと
－100度C 以上の過熱や焼却
－分解や充電
－ショート
電池を廃棄する場合、および保存する場合にはテープなど
で絶縁してください。他の金属や電池と混ざると発火、
破裂の原因となります。電池は地方自治体の条例、または
規則に従って廃棄してください。ごみ廃棄場で処分される
ごみの中に捨てないでください。

・記述 3

⚠ 注意

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

- ここに記載されている制御方法、調整方法、または性能を超えて使用
 すると、危険な放射線を浴びる可能性があります。

- ドライブのカバーを開けると、危険な放射線を浴びる可能性があります。
 ドライブの内部に修理のために交換可能な部品はありません。カバーを
 開けないでください。

⚠ 危険

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

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

・記述 4

⚠ 注意

18Kg 以上   32Kg 以上   55Kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

・記述 5

⚠ 注意 ⚡

サーバーの前面にある電源制御ボタンは、サーバーに供給された
電流を遮断しません。
サーバーには、複数の電源コードが接続されているかもしれません。
サーバーから電流を完全に遮断するために、すべての電源コードが
電源から取り外されていることを確認してください。

2
1
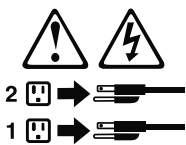
• 記述 10

⚠ 注意

ラック・モデルのサーバーの上に 82 Kg 以上の物を置かないで
ください。

• 記述 20

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

• 記述 21

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

중요:

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

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

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

경고문 1

위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는
위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의
  설치, 유지보수 또는 재구성을 하지 마십시오.

- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.

- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에
  연결하십시오.

- 가능한한 신호 케이블을 한 손으로 연결하거나
  끊으십시오.

- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지
  마십시오.

- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를
  열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크
  및 모뎀을 끊어 주십시오.

- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때
  다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:	연결을 끊으려면:
1. 모든 스위치를 끕니다.	1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.	2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에 연결합니다.	3. 신호 케이블을 커넥터에서 제거합니다.
4. 콘센트에 전원 코드를 연결합니다.	4. 장치에서 모든 케이블을 제거합니다.
5. 장치 스위치를 켭니다.	

경고문 2

주의:

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

다음을 주의하십시오.

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

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

Appendix B. Related service information   **149**

경고문 3

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

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

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

위험

일부 레이저 제품에는 클래서 3A 또는 클래스 3B 레이저
다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를
직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4

≥18 kg (37 lbs)   ≥ 32 kg (70.5 lbs)   ≥ 55 kg (121.2 lbs)

주의:
기계를 들 때는 안전하게 들어 올리십시오.

경고문 5

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

150   BladeCenter T Type 8720 and 8730: Hardware Maintenance Manual and Troubleshooting Guide

경고문 10

⚠

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

🚫

> 82 kg (180 lbs)

경고문 20

⚠

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

경고문 21

⚠ ⚡

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

Importante:

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

Por ejemplo, si una declaraciín de peligro empieza con el número 1, las
traducciones de esta declaraciín de precauciín aparecen en esta secciín bajo
Declaraciín 1.

Lea atentamente todas las declaraciones de precauciín y peligro antes de llevar a
cabo cualquier operaciín.

Declaración 1

PELIGRO

La corriente eléctrica de los cables telefínicos, de alimentaciín y de comunicaciones es perjudicial.

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

Para la conexión:	Para la desconexión:
1. APÁGUELO todo. 2. En primer lugar, conecte los cables a los dispositivos. 3. Conecte los cables de señal a los conectores. 4. Conecte cada cable de alimentación a la toma de alimentación. 5. ENCIENDA el dispositivo.	1. APÁGUELO todo. 2. En primer lugar, retire cada cable de alimentación de la toma de alimentación. 3. Retire los cables de señal de los conectores. 4. Retire los cables de los dispositivos.

Declaración 2

PRECAUCIÓN:

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

No realice las acciones siguientes:
- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

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

Declaración 3

PRECAUCIÓN:

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra íptica o transmisores), tenga en cuenta las advertencias siguientes:
- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realizaciín de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposiciín perjudicial a las radiaciones.

PELIGRO

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

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

Declaración 4

Appendix B. Related service information   **153**
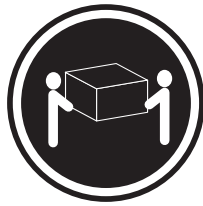
≥18 kg   ≥32 kg   ≥55 kg

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5

PRECAUCIÓN:

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

Declaración 10

PRECAUCIÓN:

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

Declaración 20

PRECAUCIÓN:

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

Declaración 21

PRECAUCIÓN:

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

Appendix C. Notices

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Important notes

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

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 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 may 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 available from IBM.

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

Product recycling and disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. Information on product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/prp.shtml.

Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/products/batteryrecycle.shtml or contact your local waste disposal facility.

In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

In the Netherlands, the following applies.
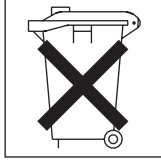
Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

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

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

Taiwanese Class A warning statement

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

Chinese Class A warning statement

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

Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を
引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求
されることがあります。

Power cords

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda

IBM power cord part number	Used in these countries and regions
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

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IBM

Part Number: 25K8107

(1P) P/N: 25K8107

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