BladeCenter HC10 Type 7996

Problem Determination and Service Guide

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Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 85, and the *Warranty and Support Information* document on the *IBM BladeCenter Documentation* CD.

Third Edition (April 2008)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

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

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

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

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

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type, as specified in the documentation for your BladeCenter unit type.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when servicing electrical equipment:

- Check the area for electrical hazards such as moist floors, non-grounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical current.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.

- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
  - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
  - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
  - When using a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when measuring high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Safety statements

Important:

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

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *Safety Information* document under statement 1.

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

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:

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

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

Statement 3:

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

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

DANGER

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

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

Statement 4:

≥ 18 kg (39.7 lb.)

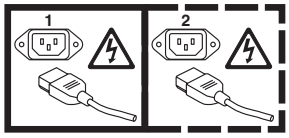
≥ 32 kg (70.5 lb.)

≥ 55 kg (121.2 lb.)

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 8:

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

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

Statement 10:

CAUTION:
Do not place any object on top of rack-mounted devices.

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.

Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® BladeCenter® HC10 Type 7996 blade workstation. It describes the diagnostic tools that come with the blade workstation, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of three types:

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

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Related documentation

In addition to this document, the following documentation also comes with the blade workstation:

- *Installation and User's Guide*

  This printed document contains general information about the workstation, including how to install supported options and how to configure the workstation.
- *Safety Information*

  This document is in Portable Document Format (PDF) on the IBM *Documentation* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Warranty and Support Information*

  This document is in PDF on the IBM *Documentation* CD. It contains information about the terms of the warranty and about service and assistance.

Depending on the workstation model, additional documentation might be included on the IBM *Documentation* CD.

The blade workstation might have features that are not described in the documentation that comes with the workstation. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the blade workstation documentation. The most recent versions of all BladeCenter documentation are at http://www.ibm.com/systems/support/. In addition to the documentation in this library, be sure to review the *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit type for information to help you prepare for system installation and configuration. This document is available at http://www.ibm.com/systems/bladecenter/.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

The following table provides a summary of the features and specifications of the blade workstation.

Notes:

1. Power, cooling, removable-media drives, external ports, and advanced system management are provided by the BladeCenter unit.
2. The operating system in the blade workstation must provide USB support for the blade workstation to recognize and use the removable-media drives and front-panel USB ports. The BladeCenter unit uses USB for internal communications with these devices.

Microprocessor:
Supports one microprocessor

- Dual-core Intel® Core 2 Duo 64-bit microprocessor
- High performance
- Low power consumption

Note: Use the Configuration/Setup Utility program to determine the size of the L2 cache, speed of the microprocessor, and speed of the front-side bus.

Memory:

- Dual channel 800/667/533 MHz DDR2 with four dual inline memory module (DIMM) connectors
- Minimum: 1 GB; maximum: 8 GB
- Type: Two-way interleaved, unbuffered non-ECC DDR2, PC2-5300, SDRAM DIMMs only
- Size: 512 MB, 1 GB, and 2 GB, in pairs

Drives:

- One internal small-form-factor pluggable (SFP), SATA International Organization (SATA-IO) storage drive
- 60 GB or larger
- 5400 rpm (if hard disk drive) or faster

Integrated functions:

- Q965 Express chip set with ICH8
- Broadcom Gigabit Ethernet controller with TCP/IP offload engine (TOE)
- Local service processor: Baseboard management controller (BMC) with Intelligent Platform Management Interface (IPMI) firmware and Serial over LAN (SOL)
- Local service processor (BMC)
- RS-485 interface for communication with the management module
- Automatic computer restart
- Four USB buses for communication with keyboard, mouse, and removable media drives

Keyboard/video/mouse:

- One of the following high-resolution video controllers (graphics cards), depending on the blade workstation model:
  - NVIDIA Quadro FX 1600M (3D)
  - NVIDIA Quadro NVS 120M (2D)
- Support for dual keyboard, video, and mouse (BladeCenter KVM and thin client KVM)
- Graphics and I/O Transmission Adapter (compression card) for communication with thin client

Electrical Input:
12 V dc

Environment:

- Air temperature:
  - Blade workstation on: 10° to 35°C (50° to 95°F). Altitude: 0 to 914 m (2998.69 ft)
  - Blade workstation on: 10° to 32°C (50° to 95°F). Altitude: 914 m to 2134 m (2998.69 ft to 7000 ft)
  - Blade workstation off: -40° to 60°C (-40° to 140°F)
- Humidity:
  - Blade workstation on: 8% to 80%
  - Blade workstation off: 5% to 80%

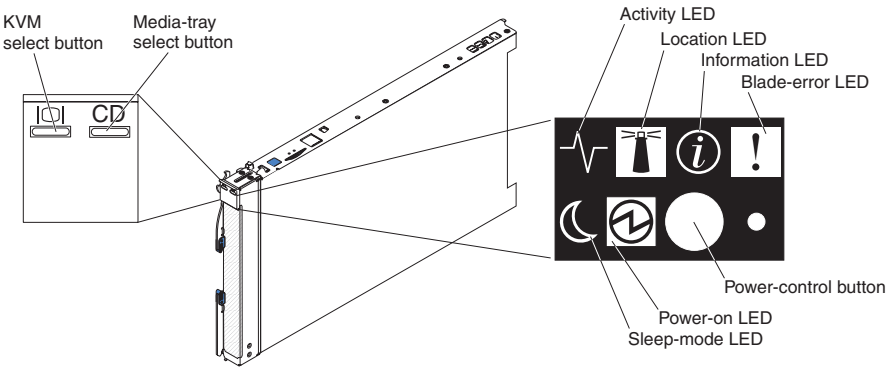
Size:

- Height: 24.5 cm (9.7 inches)
- Depth: 44.6 cm (17.6 inches)
- Width: 2.9 cm (1.14 inches)
- Maximum weight: 4.29 kg (9.46 lb)

Blade workstation controls and LEDs

This section describes the controls and LEDs on the blade workstation.

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



KVM select button: Press this button to associate the shared BladeCenter unit keyboard, video, and mouse (KVM) with the blade workstation. The LED on this button flashes while the request is being processed and then is lit when the ownership of the keyboard, video, and mouse has been transferred to the blade workstation. It can take approximately 20 seconds to switch the keyboard, video, and mouse control from one blade workstation to another.

Using a keyboard that is directly attached to the management module, you can also press keyboard keys in the following sequence to switch KVM control between blade workstations:

NumLock NumLock *bay_number* Enter

(*bay_number* is the two-digit number of the blade bay in which the blade workstation is installed.)

Only USB keyboard, video, and mouse are supported. The operating system in the blade workstation must provide USB support for the blade workstation to recognize and use the keyboard and mouse. When you are not running an operating system that has USB device drivers, such as in the following situations, the keyboard responds very slowly:

- Running the blade workstation integrated diagnostics
- Running a BIOS update diskette on a blade workstation
- Updating the diagnostics on a blade workstation
- Running the Broadcom firmware CD for a blade workstation

If there is no response when you press the KVM select button, you can use the management-module Web interface to determine whether local control has been disabled on the blade workstation.

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

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

The operating system in the blade workstation must provide USB support for the blade workstation to recognize and use the removable-media drives and USB ports. The BladeCenter unit uses USB for internal communication with these devices.

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

Location LED: The system administrator can remotely light this blue LED to aid in visually locating the blade workstation. When this LED is lit, the location LED on the BladeCenter unit is lit also. The location LED can be turned off through the management-module Web interface or through IBM Director Console.

Information LED: When this amber LED is lit, it indicates that information about a system error for the blade workstation has been placed in the system-error log. The information LED can be turned off through the management-module Web interface or through IBM Director Console.

Blade-error LED: When this amber LED is lit, it indicates that a system error has occurred in the blade workstation. The blade-error LED turns off only after the error is corrected.

Power-control button: This button is behind the control panel door. Press this button to turn on or turn off the blade workstation.

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

Power-on LED: This green LED indicates the power status of the blade workstation in the following manner:

- Flashing rapidly: The service processor (BMC) on the blade workstation is handshaking with the management module.
- Flashing slowly: The blade workstation has power but is not turned on.
- Lit continuously: The blade workstation has power and is turned on.

Sleep-mode LED: When this green LED is lit, it indicates that the blade workstation is in Sleep mode. The blade workstation can be put in the Sleep or Hibernate mode by the operating system or by the thin client. The blade workstation can be awakened through the management-module Web interface, through IBM Director Console, or by the thin client.

Turning on the blade workstation

After you connect the blade workstation to power through the BladeCenter unit, the blade workstation can start in any of the following ways:

- You can press the power-control button on the front of the blade workstation (behind the control panel door, see “Blade workstation controls and LEDs” on page 4) to start the blade workstation.

  Notes:

  1. Wait until the power-on LED on the blade workstation flashes slowly before pressing the power-control button. While the service processor in the management module is initializing, the power-on LED does not flash, and the power-control button on the blade workstation does not respond.
  2. While the blade workstation is starting, the power-on LED on the front of the blade workstation is lit. See “Blade workstation controls and LEDs” on page 4 for the power-on LED states.
- If a power failure occurs, the BladeCenter unit and then the blade workstation can start automatically when power is restored, if the blade workstation is configured through the management module to do so.
- You can turn on the blade workstation remotely using the management module.
- If the blade workstation is connected to power (the power-on LED is flashing slowly), the operating system supports the Wake on LAN® feature, and the Wake on LAN feature has not been disabled through the management module, the Wake on LAN feature can turn on the blade workstation.
- The thin client can turn on the blade workstation remotely.

Turning off the blade workstation

When you turn off the blade workstation, it is still connected to power through the BladeCenter unit. The blade workstation can respond to requests from the service processor, such as a remote request to turn on the blade workstation. To remove all power from the blade workstation, you must remove it from the BladeCenter unit.

Shut down the operating system before you turn off the blade workstation. See the operating-system documentation for information about shutting down the operating system.

The blade workstation can be turned off in any of the following ways:

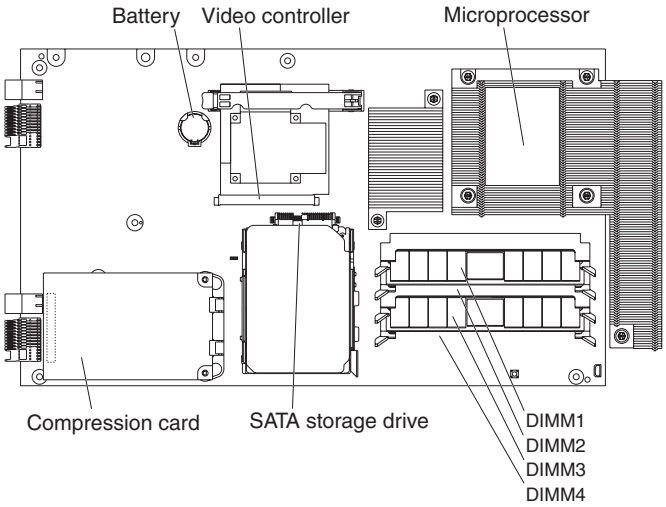
- You can press the power-control button on the blade workstation (behind the control panel door, see “Blade workstation controls and LEDs” on page 4). This starts an orderly shutdown of the operating system, if this feature is supported by the operating system.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the blade workstation.
- The management module can turn off the blade workstation.
  - If the system is not operating correctly, the management module will automatically turn off the blade workstation.
  - Through the management-module Web interface, you can also configure the management module to turn off the blade workstation. For additional information, see the *IBM BladeCenter Management Module User’s Guide*.
- The thin client can turn off the blade workstation.

System board layouts

The following illustrations show the connectors, LEDs, switches, and jumpers on the system board. The illustrations in this document might differ slightly from your hardware.

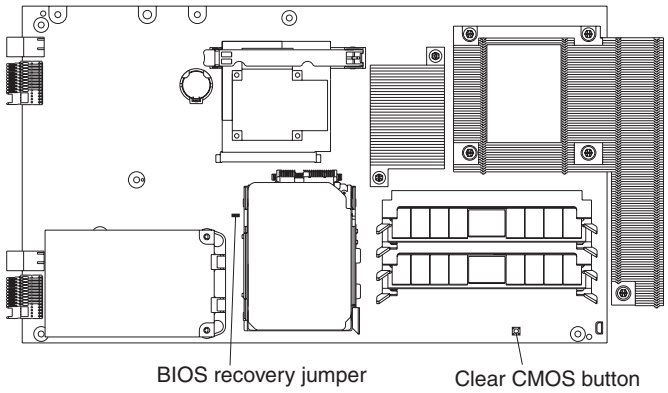
System board connectors

The following illustration shows the connectors on the system board.



System board jumpers and buttons

The following illustration shows the location of the BIOS recovery jumper and the clear CMOS button on the system board.



The following table defines the function of each jumper and button on the system board.

Name	Description
BIOS recovery jumper (J21)	The BIOS recovery jumper (J21) can be opened or closed. In the open position, the jumper is only connected to one pin. To set the jumper to the closed position, place the jumper on both pins. • Open (default): Normal operation. • Closed: Enables the BIOS recovery mode that allows the BIOS firmware to be restored or updated.

Name	Description
Clear CMOS button	Press this button to reset the CMOS settings stored in the blade workstation.

Chapter 2. Configuration information and instructions

This chapter provides information about updating the firmware and using the configuration utilities.

Firmware updates

IBM periodically makes BIOS, service processor (BMC), and diagnostic firmware updates available for the blade workstation. Go to http://www.ibm.com/systems/bladecenter/ to download the latest firmware for the blade workstation. Install any updates, using the instructions that are included with the downloaded file.

Important: To avoid problems and to maintain proper system performance, always ensure that the blade workstation BIOS, service processor, and diagnostic firmware levels are consistent for all blade workstations of the same type within the BladeCenter unit.

Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is part of the BIOS. You can use it to:

- Change interrupt request (IRQ) settings
- Change the startup drive sequence
- Configure serial-port assignments
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords and security settings

To start the Configuration/Setup Utility program, complete the following steps:

1. Turn on the workstation.
2. When the message `Press F1 for Configuration/Setup` appears, press F1. If an administrator password has been set, you must type the administrator password to access the full Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

Configuring the Gigabit Ethernet controllers

Two Ethernet controllers are integrated on the blade workstation system board. Each controller provides a 1-Gbps full-duplex interface for connecting to one of the Ethernet-compatible modules in I/O-module bays 1 and 2, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN). Each Ethernet controller on the system board is routed to a different module in I/O-module bay 1 or bay 2. See “Blade workstation Ethernet controller enumeration” on page 10 for information about how to determine the routing from Ethernet controller to I/O-module bay for your blade workstation.

Note: Other types of blade workstations, such as the BladeCenter HS20 Type 8678 blade workstation, that are installed in the same BladeCenter unit as the BladeCenter HS21 Type 7995 blade workstation might have different Ethernet controller routing. See the documentation that comes with the other blade workstations for information.

You do not have to set any jumpers or configure the controllers for the blade workstation operating system. However, you must install a device driver to enable the blade workstation operating system to address the Ethernet controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the blade workstation. To find updated information about configuring the controllers, see http://www.ibm.com/bladecenter/.

The Ethernet controllers support failover, which provides automatic redundancy for the Ethernet controllers. Without failover, you can have only one Ethernet controller from each server attached to each virtual LAN or subnet. With failover, you can configure more than one Ethernet controller from each server to attach to the same virtual LAN or subnet. Either one of the integrated Ethernet controllers can be configured as the primary Ethernet controller. If you have configured the controllers for failover and the primary link fails, the secondary controller takes over. When the primary link is restored, the Ethernet traffic switches back to the primary Ethernet controller. See your operating system device driver documentation for information about configuring for failover.

Important: To support failover on the blade workstation Ethernet controllers, the Ethernet switch modules in the BladeCenter unit must have identical configurations.

Blade workstation Ethernet controller enumeration

The enumeration of the Ethernet controllers in a blade workstation is operating-system dependent. Through the operating-system settings, you can verify the Ethernet controller designations that a blade workstation uses.

The routing of an Ethernet controller to a particular I/O-module bay depends on the type of blade workstation. You can verify which Ethernet controller is routed to which I/O-module bay by using the following test:

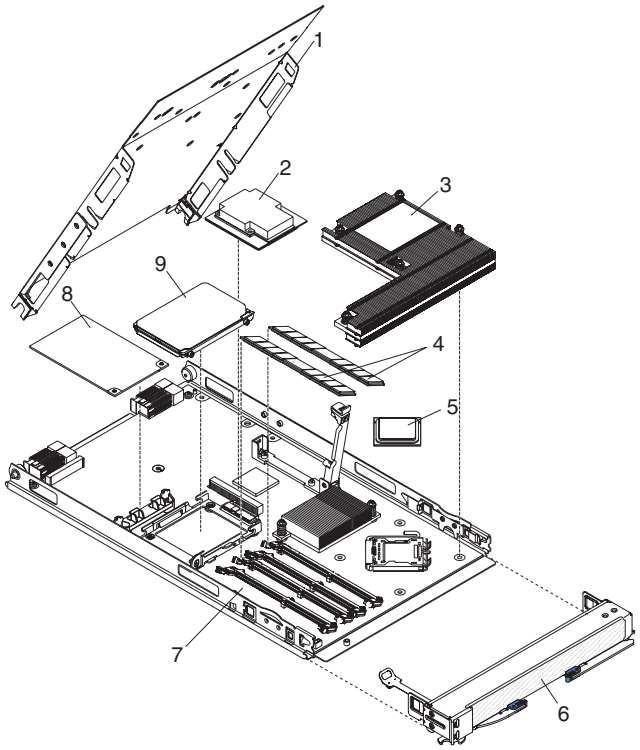
1. Install only one Ethernet switch module or pass-thru module in I/O-module bay 1.
2. Make sure that the ports on the switch module or pass-thru module are enabled (**I/O Module Tasks → Management → Advanced Management** in the management-module Web interface).
3. Enable only one of the Ethernet controllers on the blade workstation. Note the designation that the blade workstation operating system has for the controller.
4. Ping an external computer on the network that the switch module is connected to. If you can ping the external computer, the Ethernet controller that you enabled is associated with the switch module in I/O-module bay 1. The other Ethernet controller in the blade workstation is associated with the switch module in I/O-module bay 2.

If you have installed an expansion card in a blade workstation, communication from the expansion card is routed to I/O-module bays 3 and 4, if these bays are supported by your BladeCenter unit. You can verify which controller on the card is routed to which I/O-module bay by performing the same test and using a controller on the expansion card and a compatible switch module or pass-thru module in I/O-module bay 3 or 4.

Chapter 3. Parts listing, Type 7996

The following replaceable components are available for the IBM BladeCenter HC10 Type 7996 blade workstation, models 21x, 51x, 5Ax, 5Bx.

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



Replaceable components are of three types:

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

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Index	Description	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
1	Cover	43W6241		
2	Graphics card, Nvidia NVS 120M 2D graphic card (models 21x, 35x, 51x, 55x)	43W0936		
2	Graphics card, Nvidia FX 1600M 3D graphic card (models 5Ax, 5Bx, 5Rx, 5Sx)	43W0941		
2	Graphics card, video pass-thru	43W6265		
3	Heat sink, microprocessor	43W0979		
4	Memory, 512 MB DDR2 PC2-5300 (models 21x,, 35x)	41Y2821		
4	Memory, 1 GB DDR2 PC2-5300 (models 51x, 55x, 5Ax, 5Rx)	41Y2824		
4	Memory, 2 GB DDR2 PC2-5300 (models 5Bx, 5Sx)	41Y2827		
5	Microprocessor 3.20 GHz, 512KB L2 cache (option)			43W0956
5	Microprocessor 2.66 GHz, 4MB L2 cache (models 51x, 55x, 5Ax, 5Bx, 5Rx, 5Sx)			43W0948
5	Microprocessor 1.86 GHz, 2MB L2 cache (model 21x)			43W0954
6	Front bezel with LEDs and switches	43W0943		
7	System board assembly			43W6356
8	Compression card			43W6361
9	Hard disk drive, 60 GB 5400 rpm SATA (models 21x, 51x, 5Ax, 5Bx)	43W6176		
9	Hard disk drive, 80 GB 7200 rpm SATA (models 35x, 55x, 5Rx, 5Sx)	41Y8225		
	Battery, 3.0 volt	33F8354		
	Tray, hard disk drive with lever release	31R2239		
	Label, system service	43W0976		
	Label, FRU list	43W0977		
	Miscellaneous parts kit	43W0978		
	Alcohol wipe	59P4739		

Chapter 4. Removing and replacing blade workstation components

Replaceable components are of three types:

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

See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Installation guidelines

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

- Read the safety information that begins on page vii and the guidelines in “Handling static-sensitive devices” on page 15. This information will help you work safely.
- When you install your new blade workstation, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your blade workstation is ready to function at maximum levels of performance. To download the latest firmware, complete the following steps.

  Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **BladeCenter**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **BladeCenter HC10 Type 7996** to display the matrix of downloadable files for the BladeCenter product.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Back up all important data before you make changes to disk drives.
- Before you remove a blade workstation from the BladeCenter unit, you must shut down the operating system and turn off the blade workstation. You do not have to shut down the BladeCenter unit itself.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the blade workstation, 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 if the server and operating system support hot-swap capability, you can remove or install the component while the server 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.

- For a list of supported options for the blade workstation, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

System reliability guidelines

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

- You do not operate the BladeCenter unit without a blade workstation, blade server, expansion unit, or filler blade installed in each blade bay to ensure proper cooling. See the documentation for your BladeCenter unit for additional information.
- The blade workstation battery must be operational. If the battery becomes defective, replace it immediately.

Handling static-sensitive devices

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

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

- When you work on a BladeCenter unit that has an electrostatic discharge (ESD) connector, use a wrist strap when you handle modules, optional devices, or blade workstations. To work correctly, the wrist strap must have a good contact at both ends (touching your skin at one end and firmly connected to the ESD connector on the front or back of the BladeCenter unit).
- 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 circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in the static-protective package, touch it to an *unpainted* metal part of the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack you are installing the device in for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from the package and install it directly into the blade workstation without setting down the device. If it is necessary to set down the device, put it back into the static-protective package. Do not place the device on the blade workstation cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

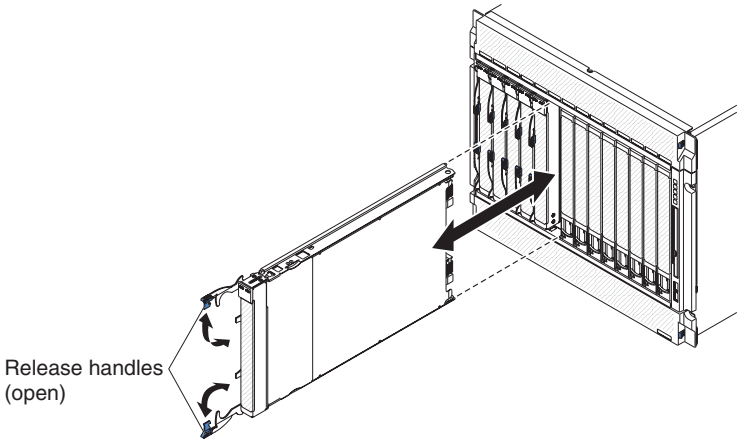
If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing the blade workstation from a BladeCenter unit

Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit without a blade workstation, blade server, expansion unit, or blade filler installed in each blade bay.
- Note the bay number. Reinstalling a blade workstation 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; if you reinstall the blade workstation into a different bay, you might have to reconfigure the blade workstation.

To remove the blade workstation from a BladeCenter unit, complete the following steps. The appearance of your BladeCenter unit might be different, see the documentation for your BladeCenter unit for additional information.

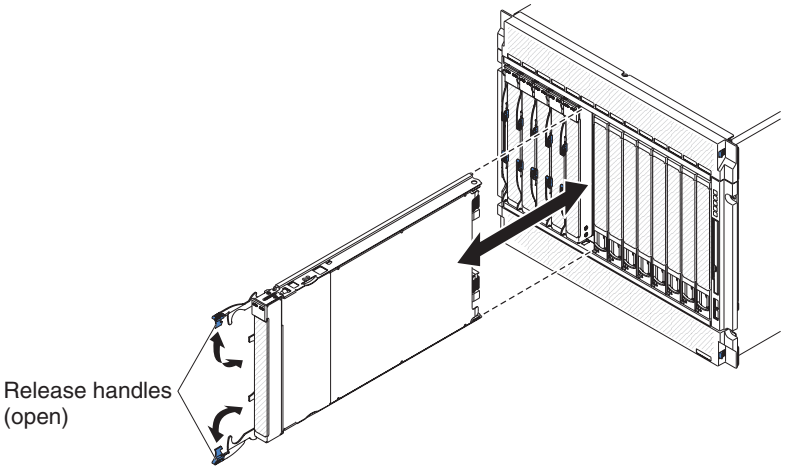


1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. (BladeCenter T and HT units only) Remove the bezel assembly on the BladeCenter T or HT unit. For detailed instructions for removing the bezel assembly, see the *Installation and User’s Guide* that comes with the BladeCenter T or HT unit.
3. If the blade workstation is operating, shut down the operating system; then, press the power-control button (behind the blade workstation control panel door) to turn off the blade workstation (see “Turning off the blade workstation” on page 6 for more information).

   Attention: Wait at least 30 seconds, until the hard disk drives stop spinning, before proceeding to the next step.
4. Pull the two release handles to the open position as shown in the illustration. The blade workstation moves out of the bay approximately 0.6 cm (0.25 inch).
5. Pull the blade workstation out of the bay.
6. Place either a blade filler or another blade workstation in the bay within 1 minute.

Installing the blade workstation in a BladeCenter unit

To install a blade workstation in a BladeCenter unit, complete the following steps. The appearance of your BladeCenter unit might be different, see the documentation for your BladeCenter unit for additional information.



Statement 21:

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. Make sure that the release handles on the blade workstation are in the open position (perpendicular to the blade workstation).
3. If you installed a blade filler or another blade workstation in the bay from which you removed the blade workstation, remove it from the bay.

   Attention: You must install the blade workstation in the same blade bay from which you removed it. Some blade workstation configuration information and update options are established according to bay number. Reinstalling a blade workstation into a different blade bay from the one from which it was removed could have unintended consequences, and you might have to reconfigure the blade workstation.
4. Slide the blade workstation into the blade bay from which you removed it until it stops.
5. Push the release handles on the front of the blade workstation closed.
6. Turn on the blade workstation (see “Turning on the blade workstation” on page 6 for instructions).
7. Make sure that the power-on LED on the blade workstation control panel is lit continuously, indicating that the blade workstation is receiving power and is turned on.

8. (Optional) Write identifying information on one of the labels that come with the blade workstations and place the label on the BladeCenter unit bezel. See the documentation for your BladeCenter unit for information about the label placement.

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

9. (BladeCenter T and HT unit only) Reinstall the bezel assembly on the BladeCenter T or HT unit. For detailed instructions for reinstalling the bezel assembly, see the *Installation and User's Guide* that comes with the BladeCenter T or HT unit.

If you have changed the configuration of the blade workstation or if you are installing a different blade workstation from the one that you removed, you must configure the blade workstation through the Configuration/Setup Utility, and you might have to install the blade workstation operating system. Detailed information about these tasks is available in the *Installation and User's Guide*.

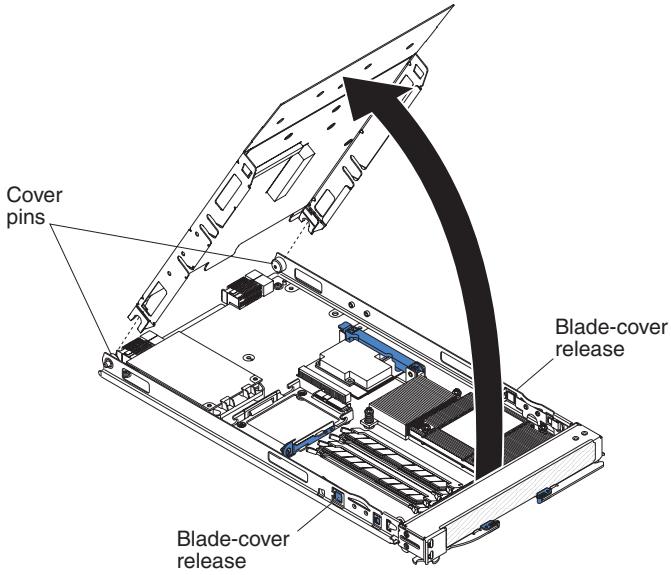
Removing and replacing Tier 1 CRUs

Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

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

Removing the blade workstation cover

To remove the blade workstation cover, complete the following steps.



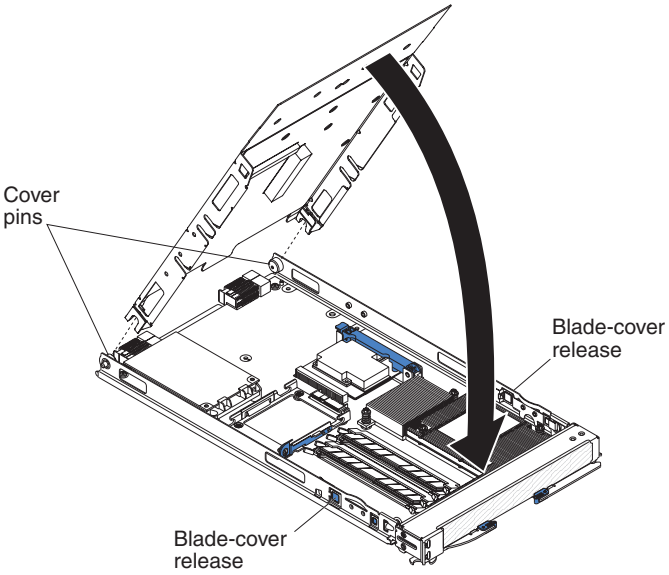
1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16 for instructions).
3. Carefully lay the blade workstation down on a flat, static-protective surface, with the cover side up.
4. Press the blade-cover release on each side of the blade workstation or expansion unit and lift the cover open, as shown in the illustration.
5. Lift the cover from the blade workstation and store it for future use.

Installing the blade workstation cover

To install the blade workstation cover, complete the following steps.

Statement 21:

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

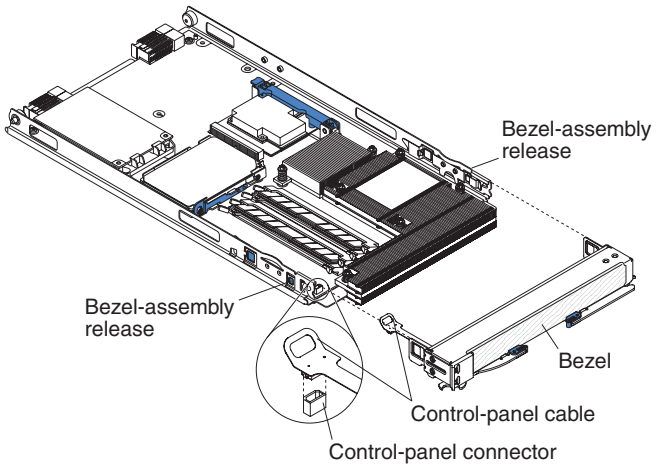


Attention: You cannot insert the blade workstation into the BladeCenter unit until the cover is installed and closed. Do not attempt to override this protection.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade workstation. Before closing the cover, check that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade workstation.
3. Pivot the cover to the closed position until it clicks into place.
4. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17 for instructions).

Removing the bezel assembly

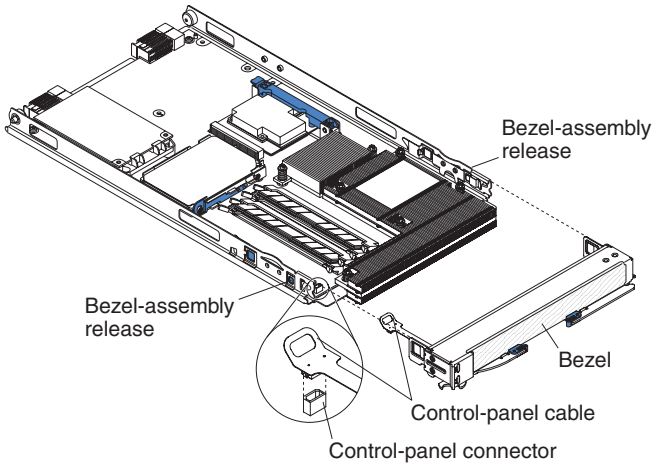
To remove the bezel assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16 for instructions).
3. Open the blade workstation cover (see “Removing the blade workstation cover” on page 19 for instructions).
4. Press the bezel-assembly release on each side of the blade workstation and pull the bezel assembly away from the blade workstation approximately 1.2 cm (0.5 inch).
5. Disconnect the control-panel cable from the control-panel connector.
6. Pull the bezel assembly away from the blade workstation.
7. Store the bezel assembly in a safe place.

Installing the bezel assembly

To install the bezel assembly, complete the following steps.

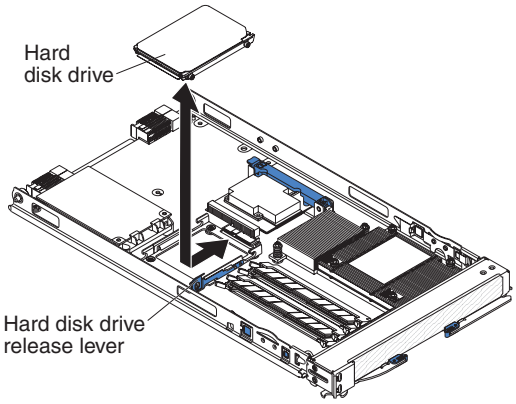


1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. Connect the control-panel cable to the control-panel connector on the system board.

3. Carefully slide the bezel assembly onto the blade workstation until it clicks into place.
4. Install the cover onto the blade workstation.
5. Install the blade workstation into the BladeCenter unit.

Removing a SATA storage drive

To remove a SATA storage drive, complete the following steps.

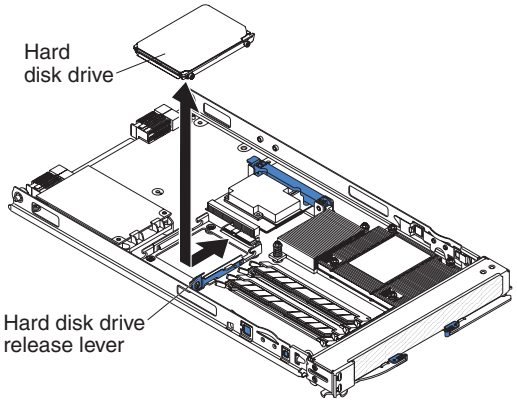


1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16).
3. Remove the blade workstation cover (see “Removing the blade workstation cover” on page 19 for instructions).
4. Locate the SATA storage drive.

   Attention: Do not press on the top of the drive. Pressing the top might damage the drive.
5. Push the blue release lever at the front of the drive tray away from the storage drive; then, slide the drive forward to disengage it from the connector at the rear of the drive tray.
6. Lift the storage drive out of the drive tray.
7. To remove the drive tray, remove the four screws that secure it to the system board and lift it out of the blade workstation.
8. If you are instructed to return the storage drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a SATA storage drive

To install a SATA storage drive, complete the following steps.

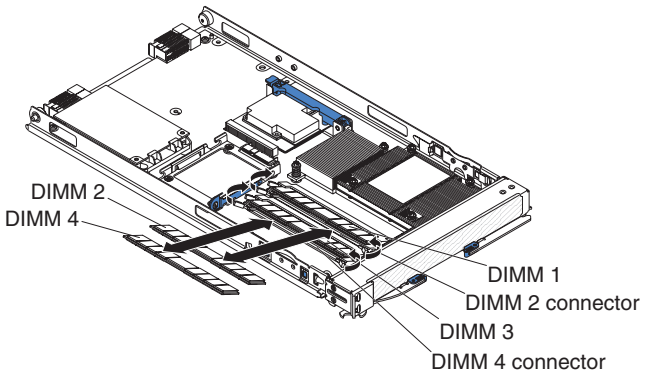


1. Identify the location where the SATA storage drive will be installed.
2. Touch the static-protective package that contains the hard disk drive to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the hard disk drive from the package.

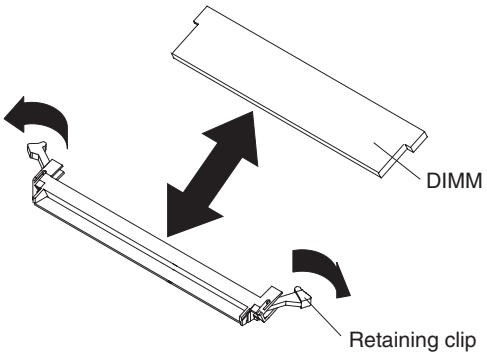
   Attention: Do not press on the top of the drive. Pressing the top might damage the drive.
3. Place the drive into the drive tray and push it toward the rear of the drive tray. The drive slides into the connector until the drive moves past the lever at the front of the tray.
4. Install the blade workstation cover (see “Installing the blade workstation cover” on page 20 for instructions).
5. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17 for instructions).

Removing a memory module

The following illustration shows the locations of the DIMM sockets on the system board.



To remove a DIMM, complete the following steps.



1. Read the safety information that begins vii and “Installation guidelines” on page 13
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16).
3. Remove the blade workstation cover (see “Removing the blade workstation cover” on page 19).
4. Locate the DIMM connectors.
5. Determine which DIMM you want to remove from the blade workstation.

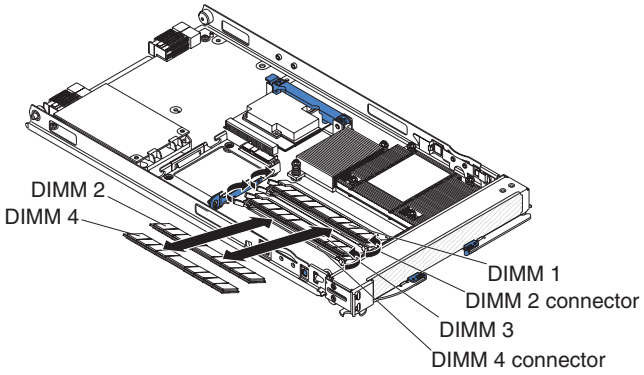
   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
6. Move the DIMM retaining clips on the side of the DIMM socket to the open position by pressing the retaining clips away from the center of the DIMM socket.
7. Using your fingers, pull the DIMM out of the DIMM socket.
8. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a memory module

When you install memory, you must install a pair of matched DIMMs. Install the DIMMs in the following order:

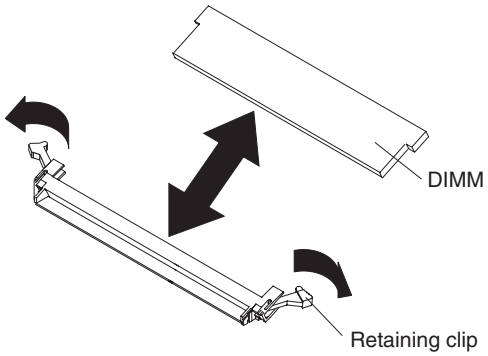
Pair	DIMM connectors
First	1 and 3
Second	2 and 4

To install a DIMM, complete the following steps.



1. Read the documentation that comes with the DIMM.
2. Locate the DIMM connectors.
3. Determine the connectors into which you will install the DIMMs.
4. Touch the static-protective package that contains the DIMM to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the DIMM from the package.

   Attention: To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.

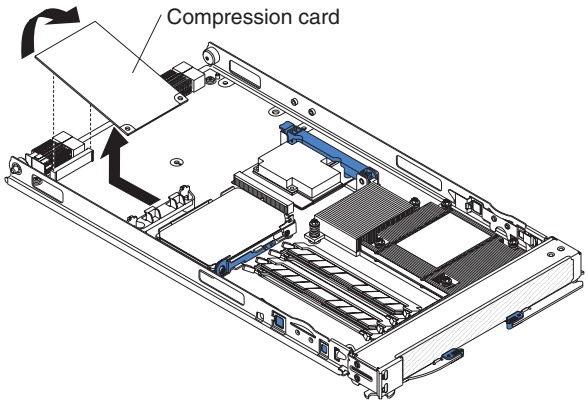


5. Make sure that both of the connector retaining clips are in the fully open position.
6. Turn the DIMM so that the DIMM keys align correctly with the connector on the system board.
7. Insert the DIMM by pressing the DIMM along the guides into the connector. Make sure that the retaining clips snap into the closed positions.

   Attention: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
8. Install the blade workstation cover (see “Installing the blade workstation cover” on page 20).
9. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17).

Removing a compression card

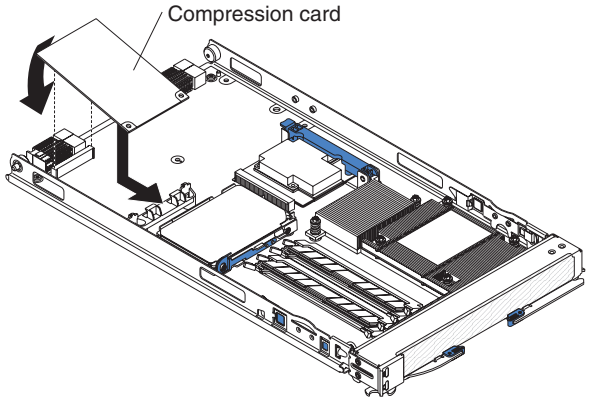
To remove a compression card, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16).
3. Remove the blade workstation cover (see “Removing the blade workstation cover” on page 19 for instructions).
4. Pivot the end of the card out of the compression-card connector; then, slide the card out of the compression-card bracket and lift the card out of the blade workstation.
5. If you are instructed to return the compression card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a compression card

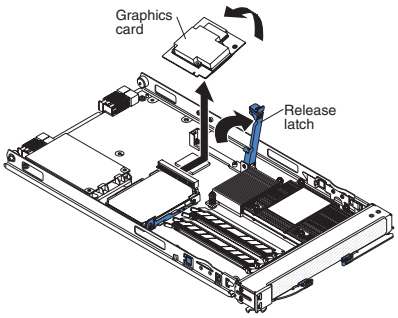
To install a compression card, complete the following steps.



1. Touch the static-protective package that contains the compression card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the compression card from the package.
2. Orient the compression card over the system board.
3. Slide the end of the card into the raised compression-card bracket; then, gently pivot the card into the compression-card connector.
4. Install the blade workstation cover (see “Installing the blade workstation cover” on page 20).
5. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17).

Removing a graphics card

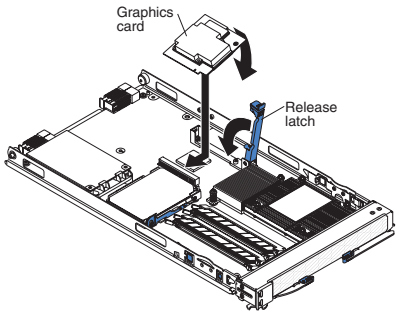
To remove a graphics card, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 13.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16).
3. Remove the blade workstation cover (see “Removing the blade workstation cover” on page 19 for instructions).
4. Lift the release latch that secures the graphics card to the system board.
5. Slide the card away from the graphics-card connector; then, lift the card out of the blade workstation.
6. If you are instructed to return the expansion card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a graphics card

To install a replacement graphics card, complete the following steps.

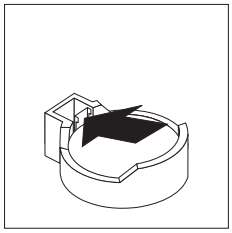


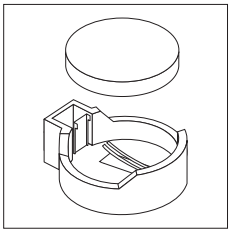
1. Touch the static-protective package that contains the expansion card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the expansion card from the package.
2. Orient the graphics card over the system board and slide the narrow end of the card into the graphics-card connector.
3. Lower the release latch to secure the graphics card to the system board.

   Note: For device-driver and configuration information to complete the installation of the graphics card, see the documentation that comes with the graphics card.
4. Install the blade workstation cover (see “Installing the blade workstation cover” on page 20).
5. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17).

Removing the battery

To remove the battery, complete the following steps.





1. Read the safety information that begins on page vii and “Installation guidelines” on page 13
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16 for instructions).
3. Remove the blade workstation cover (see “Removing the blade workstation cover” on page 19 for instructions).
4. Locate the battery on the system board (see “System board connectors” on page 7 for instructions).
5. Use one finger to press the top of the battery clip away from the battery. The battery pops up when released.
6. Use your thumb and index finger to lift the battery from the socket.
7. Dispose of the battery as required by local ordinances or regulations.

   Note: See “Battery return program” on page 89 for more information.

Installing the battery

The following notes describe information that you must consider when you are replacing the battery in the blade workstation.

- When you are replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer.
- To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM marketing representative or authorized reseller.
- After you replace the battery, you must reconfigure the workstation and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

Statement 2:

CAUTION:
When replacing the lithium battery, use only IBM Part Number 15F8409 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.

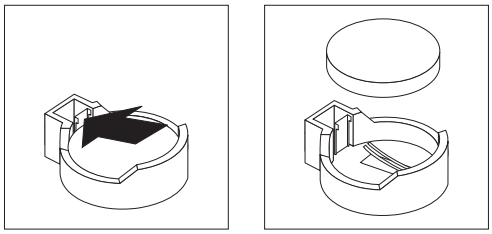
Do not:

- **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.

Note: See “Battery return program” on page 89 for more information.

To install the battery, complete the following steps.



1. Follow any special handling and installation instructions that come with the battery.
2. Insert the battery:
   a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
   b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.
3. Install the blade workstation cover (see “Installing the blade workstation cover” on page 20).
4. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17).
5. Turn on the blade workstation and run the Configuration/Setup Utility program. Set configuration parameters as needed (see “Using the Configuration/Setup Utility program” on page 9 for information).

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

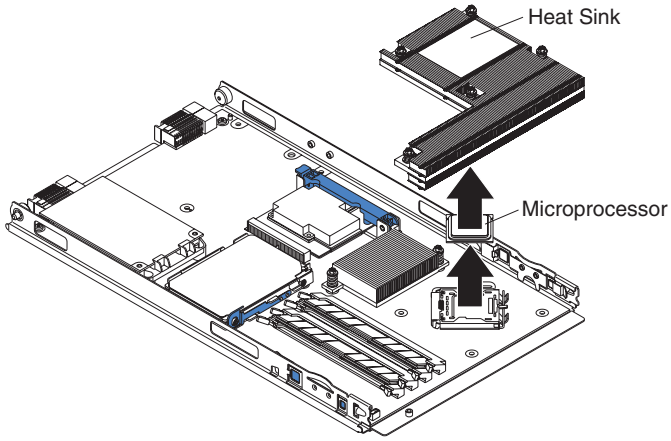
The illustrations in this document might differ slightly from your hardware.

Removing a microprocessor and heat sink

Notes:

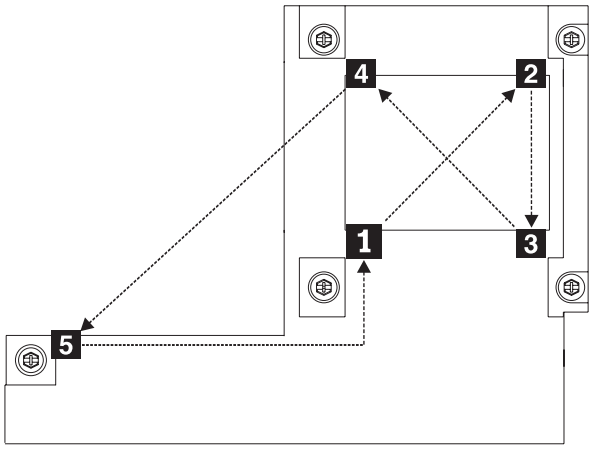
- If you are not replacing a defective heat sink or microprocessor, the thermal material on the heat sink and microprocessor will remain effective if you carefully handle the heat sink and microprocessor. When removing or installing these components, do not touch the thermal material or allow it to become contaminated.
- The heat-sink FRU is packaged with the thermal material applied to the underside. This thermal material is not available as a separate FRU. The heat sink must be replaced when new thermal material is required, such as when a defective microprocessor is replaced or if the thermal material is contaminated or has come in contact with another object other than its paired microprocessor.
- The microprocessor FRU for this system board includes a heat sink.
- A heat-sink FRU can be ordered separately if the thermal material becomes contaminated.

To remove a microprocessor, complete the following steps.



1. Read the safety information that begins on page vii, and “Installation guidelines” on page 13.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16 for instructions).
3. Remove the blade workstation cover (see “Removing the blade workstation cover” on page 19 for instructions).
4. Remove the bezel assembly (see “Removing the bezel assembly” on page 21 for instructions).
5. Identify the microprocessor that is to be removed.
6. Remove the heat sink.

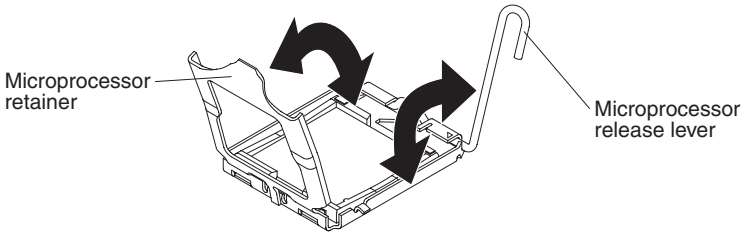
   Attention: Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, you must replace the heat sink.



a. Loosen each of the five captive screws that retain the heat sink with a screwdriver, alternating between each screw until they are loose.

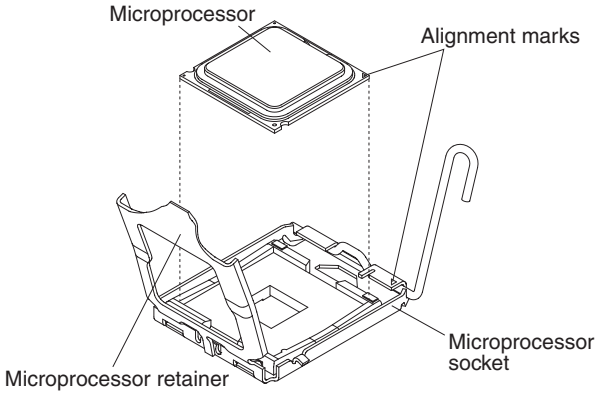
b. Use your fingers to gently pull the heat sink from the processor.

Attention: Do not use any tools or sharp objects to lift the release lever on the microprocessor socket. Doing so might result in permanent damage to the system board.



Attention: Do not touch the pins in the microprocessor socket. Touching these pins might result in permanent damage to the system board.

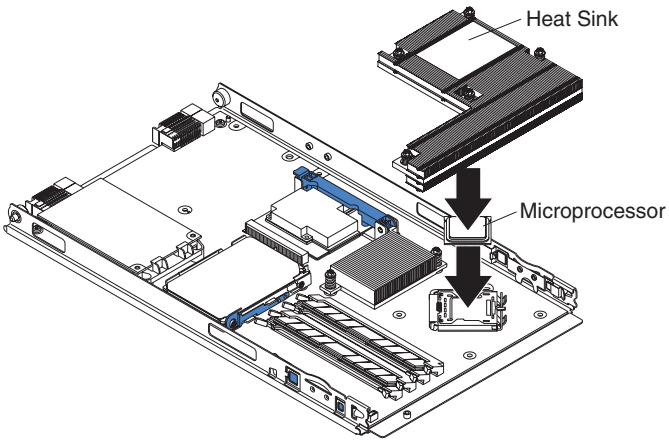
7. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops in the fully open position (approximately a 130° angle). Lift the microprocessor retainer upward.
8. Use your fingers to pull the microprocessor out of the socket.



9. If you are instructed to return the microprocessor and heat sink, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor and heat sink

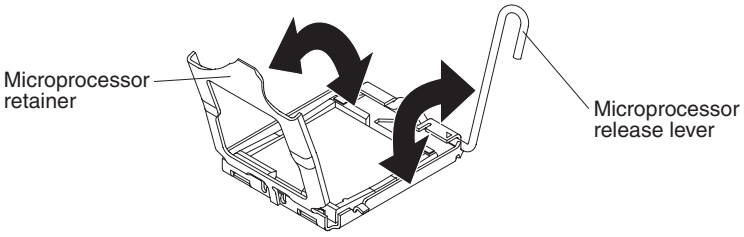
To install a microprocessor and heat sink, complete the following steps.



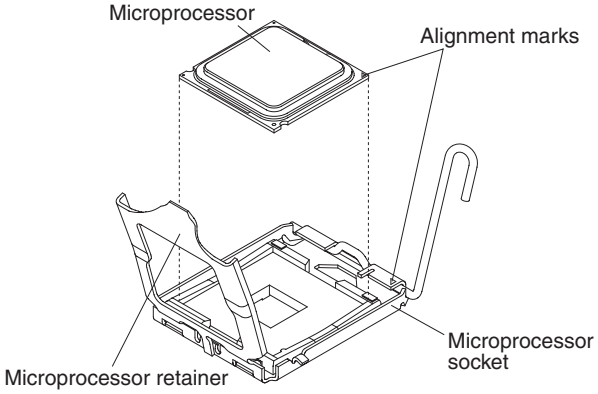
Attention: Do not touch the pins in the microprocessor socket. Touching these pins might result in permanent damage to the system board.

1. Install the microprocessor:

   Attention: Do not use any tools or sharp objects to lift the locking lever on the microprocessor socket. Doing so might result in permanent damage to the system board.



   a. Make sure the locking lever on the microprocessor socket from its closed and locked position until it stops in the fully open position (approximately a 130° angle), as shown.
   b. Make sure the microprocessor retainer on the microprocessor socket from is in the fully open position (approximately a 100° angle), as shown.
   c. Touch the static-protective package that contains the microprocessor to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the microprocessor from the package.
   d. Remove the cover from the bottom of the microprocessor.



e. Center the microprocessor over the microprocessor socket. Align the triangle on the corner of the microprocessor with the triangle on the corner of the socket and carefully place the microprocessor into the socket.

Attention:

- Do not press the microprocessor into the socket.
- Make sure that the microprocessor is oriented and aligned correctly in the socket before you try to close the microprocessor retainer.

f. Close the microprocessor retainer.

g. Rotate the locking lever on the microprocessor socket to the closed and locked position. Make sure that the lever is secured in the locked position by the tab on the microprocessor socket.

2. Install a heat sink on the microprocessor.

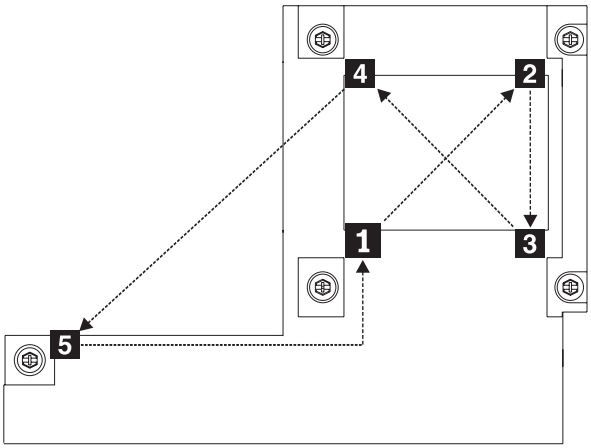
Attention:

- If you are installing a new heat sink, do not set down the heat sink after you remove the plastic cover.
- Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, contact your service technician.

a. If you are installing a new heat sink, remove the plastic protective cover from the bottom of the heat sink.

b. Make sure that the thermal material is still on the bottom of the heat sink; then, align and place the heat sink on top of the microprocessor in the retention bracket, thermal material side down. Press firmly on the heat sink.

c. Align the five captured screws on the heat sink with the holes on the system board.



d. Press firmly on the captive screws and tighten them with a screwdriver, alternating between screws until they are tight. If possible, each screw should be rotated two full rotations at a time. Repeat until the screws are tight. Do not overtighten the screws by using excessive force. If you are using a torque wrench, tighten the screws to 8.5 to 13 Newton-meters (Nm) (6.3 to 9.6 inch-pounds).

3. Install the bezel assembly (see “Installing the bezel assembly” on page 21).

4. Install the blade workstation cover (see “Installing the blade workstation cover” on page 20).

5. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17).

Removing the system board assembly

When replacing the system board, you will replace the system board and blade base as one assembly. After replacement, you must either update the blade workstation with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

Note: See “System board layouts” on page 7 for more information on the locations of the connectors, jumpers and LEDs on the system board.

To remove the system board assembly, complete the following steps:

1. Read the safety information that begins on page vii, and “Installation guidelines” on page 13.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from a BladeCenter unit” on page 16 for instructions).
3. Remove the blade workstation cover (see “Removing the blade workstation cover” on page 19).
4. Remove the blade workstation bezel assembly (see “Removing the bezel assembly” on page 21).
5. Remove all of the installed components in the following list from the system board assembly; then, place them on a non-conductive surface or install them on the new system board assembly.
   - Compression card. See “Removing a compression card” on page 26.
   - Graphics card. See “Removing a graphics card” on page 28.
   - DIMMs. See “Removing a memory module” on page 24.
   - Hard disk drive. See “Removing a SATA storage drive” on page 22.
   - Microprocessor and heat sink. See “Removing a microprocessor and heat sink” on page 32.
6. If you are instructed to return the system board assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the system board assembly

To install the system board assembly, complete the following steps:

1. Install all of the components in the following list that were removed from the old system board assembly onto the new system board assembly.
   - Microprocessor and heat sink. See “Installing a microprocessor and heat sink” on page 34.
   - Hard disk drive. See “Installing a SATA storage drive” on page 23.
   - DIMMs. See “Installing a memory module” on page 24.
   - Graphics card. See “Installing a graphics card” on page 29.
   - Compression card. See “Installing a compression card” on page 27.
2. Install the bezel assembly (see “Installing the bezel assembly” on page 21).
3. Install the blade workstation cover (see “Installing the blade workstation cover” on page 20).
4. Install the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 17).

Chapter 5. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the blade workstation.

Note: The blade workstation uses shared resources that are installed in the BladeCenter unit. Problems with these shared resources might appear to be in the blade workstation (see “Solving shared BladeCenter resource problems” on page 75 for information about isolating problems with these resources). See the *Problem Determination and Service Guide* or the *Hardware Maintenance Manual and Troubleshooting Guide* for your BladeCenter unit and other BladeCenter component documentation for diagnostic procedures for shared BladeCenter components.

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 83 for more information.

Diagnostic tools

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

- **POST beep codes, error messages, and error logs**

  The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” for more information.
- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 56 for more information.
- **Diagnostic programs, messages, and error codes**

  The diagnostic programs are the primary method of testing the major components of the blade workstation. These programs are stored in read-only memory (ROM) on the blade workstation. See “Diagnostic programs, messages, and error codes” on page 68 for more information.

POST

When you turn on the blade workstation, it performs a series of tests to check the operation of the blade workstation components and some optional devices in the blade workstation. This series of tests is called the power-on self-test, or POST.

If a power-on password is set, you must type the password and press Enter, when prompted, for POST to run.

If POST is completed without detecting any problems, a single beep sounds, and the blade workstation startup is completed.

If POST detects a problem, more than one beep might sound, or an error message is displayed. See “Beep code descriptions” on page 40 and “POST error codes” on page 43 for more information.

POST beep codes

A beep code is a combination of short or long beeps or a series of short beeps that are separated by pauses. For example, a “1-2-3” beep code is one short beep, a pause, two short beeps, a pause, and three short beeps. A beep code other than one beep indicates that POST has detected a problem. To determine the meaning of a beep code, see “Beep code descriptions.” If no beep code sounds, see “No-beep symptoms” on page 42.

Beep code descriptions

The following table describes the beep codes and suggested actions to correct the detected problems.

A single problem might cause more than one error message. When this occurs, correct the cause of the first error message. The other error messages usually will not occur the next time POST runs.

Exception: If there are multiple error codes that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 59 for information about diagnosing microprocessor problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Beep code	Description	Action
1-1-3	CMOS write/read test failed.	1. Reseat the battery 2. Clear CMOS. See “System board jumpers and buttons” on page 7 for information about how to clear CMOS. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Battery b. (Trained service technician only) System board assembly
1-1-4	BIOS ROM checksum failed.	1. Update the BIOS code. 2. Reseat the DIMMs (see “Removing a memory module” on page 24 and “Installing a memory module” on page 24). 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. DIMMs b. (Trained service technician only) System board assembly
1-2-1	Programmable interval timer failed.	(Trained service technician only) Replace the system board assembly.
1-2-2	DMA initialization failed.	(Trained service technician only) Replace the system board assembly.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Beep code	Description	Action
1-2-3	DMA page register write/read failed.	(Trained service technician only) Replace the system board assembly.
1-2-4	RAM refresh verification failed.	1. Reseat the DIMMs (see "Removing a memory module" on page 24 and "Installing a memory module" on page 24). 2. Replace the lowest-numbered pair of DIMMs; then, restart the workstation. If the beep code error remains, go to 3b. Return one DIMM at a time from the failed pair to its connector, restarting the server after each DIMM, to identify the failed DIMM. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. DIMMs b. (Trained service technician only) System board assembly
1-3-1	First 64K RAM test failed.	1. Reseat the DIMMs (see "Removing a memory module" on page 24 and "Installing a memory module" on page 24). 2. Replace the lowest-numbered pair of DIMMs; then, restart the workstation. If the beep code error remains, go to 3b. Return one DIMM at a time from the failed pair to its connector, restarting the server after each DIMM, to identify the failed DIMM. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. DIMMs b. (Trained service technician only) System board assembly
2-1-1	Primary DMA register test failed.	(Trained service technician only) Replace the system board assembly.
2-1-2	Secondary DMA register test failed.	(Trained service technician only) Replace the system board assembly.
2-1-3	Primary interrupt mask register test failed.	(Trained service technician only) Replace the system board assembly.
2-1-4	Secondary interrupt mask register test failed.	(Trained service technician only) Replace the system board assembly.
2-3-4	Search for video ROM failed.	1. Reseat the graphics card. 2. Replace the graphics card.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Beep code	Description	Action
3-3-2	Critical SMBUS error occurred.	1. Power down the blade workstation and reseat it in the BladeCenter unit. 2. Reseat the DIMMs (see "Removing a memory module" on page 24 and "Installing a memory module" on page 24). 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. DIMMs b. (Trained service technician only) System board assembly
3-3-3	Memory not detected or configured.	1. Reseat the DIMMS (see "Removing a memory module" on page 24 and "Installing a memory module" on page 24). 2. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. DIMMs b. (Trained service technician only) System board assembly

No-beep symptoms

The following table describes situations in which no beep code sounds when POST is completed.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

No-beep symptom	Action
No beep and the blade workstation operates correctly	(Trained service technician only) Replace the system board assembly.
No beep and no video (system-error LED is off)	See "Solving undetermined problems" on page 80.
No beep and no video (system attention LED is lit)	See "Solving undetermined problems" on page 80.

POST error codes

The following table describes the POST error codes and suggested actions to correct the detected problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
062	Three consecutive startup failures	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, make sure that the date and time are correct, and save the settings. 2. Reseat the following components one at a time, in the order shown, restarting the blade workstation each time: a. Battery b. (Trained service technician only) Microprocessor 1 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Battery b. (Trained service technician only) Microprocessor 1 c. (Trained service technician only) System board assembly
101	Timer tick interrupt failure	(Trained service technician only) Replace the system board assembly.
102	Timer 2 test failure	(Trained service technician only) Replace the system board assembly.
151	Real time clock failure	1. Reseat the battery. 2. Clear CMOS. See "System board jumpers and buttons" on page 7 for information about how to clear CMOS. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Battery b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
161	Real-time clock battery failure	1. Reseat the battery. 2. Clear CMOS. See "System board jumpers and buttons" on page 7 for information about how to clear CMOS. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Battery b. (Trained service technician only) System board assembly
162	Invalid configuration information or CMOS RAM checksum failure.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Battery b. (Trained service technician only) System board assembly
163	Time of day not set.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, make sure that the date and time are correct, and save the settings. 2. Reseat the battery. 3. Clear CMOS. See "System board jumpers and buttons" on page 7 for information about how to clear CMOS. 4. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Battery b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
164	Memory size does not match CMOS.	1. Run the Configuration/Setup Utility program, make sure that the memory configuration is correct, and save the settings. 2. Reseat the DIMMs (see "Removing a memory module" on page 24 and "Installing a memory module" on page 24). 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. DIMMs b. (Trained service technician only) System board assembly
184	Bad power-on password.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. Reseat the battery. 3. Clear CMOS. See "System board jumpers and buttons" on page 7 for information about how to clear CMOS. 4. (Trained service technician only) Replace the system board assembly.
187	VPD Serial Number not set	(Trained service technician only) Replace the system board assembly.
189	Three attempts to enter the incorrect password.	Restart the blade workstation, run the Configuration/Setup Utility program, and change the power-on password.
301	Keyboard failure.	1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 3. Make sure a key is not stuck on the keyboard. 4. Reseat the keyboard and restart the blade workstation. 5. Replace the following components: a. Keyboard b. (Trained service technician only) Replace the system board assembly
303	Keyboard controller error.	(Trained service technician only) Replace the system board assembly.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
602	Invalid diskette boot record.	1. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 2. Make sure the diskette works with another blade workstation. 3. (Trained service technician only) Replace the system board assembly
1162	Configuration change has occurred.	1. Run the Configuration/Setup Utility program and change the resources assigned to the serial port. 2. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 3. (Trained service technician only) Replace the system board assembly
1600	BMC failure.	Shutdown and remove the blade workstation from the BladeCenter unit, wait 30 seconds; then, reinstall the blade workstation in the BladeCenter unit and restart it. If the problem persists, perform the following tasks in the order shown, restarting the blade workstation each time: 1. Update the BMC firmware. 2. (Trained service technician only) Replace the system board assembly.
1601	BMC is not responding.	Shutdown and remove the blade workstation from the BladeCenter unit, wait 30 seconds; then, reinstall the blade workstation in the BladeCenter unit and restart it. If the problem persists, perform the following tasks in the order shown, restarting the blade workstation each time: 1. Update the BMC firmware. 2. (Trained service technician only) Replace the system board assembly.
1762	Hard disk configuration changed	1. Run the Configuration/Setup Utility program, make sure that the hard disk drive configuration is correct, and save the settings. 2. Reseat the hard disk drive. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Hard disk drive b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
1801	No more ROM available.	1. Run the Configuration/Setup Utility program and make sure that ROM resource settings are correct. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly
1802	No more I/O space available.	1. Run the Configuration/Setup Utility program and make sure that I/O resource settings are correct. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly
1803	No more extended memory.	1. Run the Configuration/Setup Utility program and make sure that extended memory settings are correct. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
1804	No more base memory.	1. Run the Configuration/Setup Utility program and make sure that base memory settings are correct. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly
1805	ROM checksum fails.	1. Run the Configuration/Setup Utility program and make sure that ROM resource settings are correct. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly
1806	PCI device failure.	1. Run the Configuration/Setup Utility program to verify device settings. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly
1807	Planar device is not responding or is disabled.	1. Run the Configuration/Setup Utility program to verify device settings. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
1808	Invalid PCI header.	1. Run the Configuration/Setup Utility program to verify device settings. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly
1810	PCI error.	1. Run the Configuration/Setup Utility program and make sure that interrupt resource settings are correct. 2. Remove each I/O-expansion card one at a time, restarting the blade workstation each time, until the problem is isolated. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Failed I/O-expansion card b. (Trained service technician only) System board assembly
1962	Boot sector error, no operating system installed.	1. Make sure that a bootable operating system is installed. 2. Reseat the hard disk drive. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Hard disk drive b. (Trained service technician only) System board assembly
2462	Video configuration error. **Note:** This message is displayed when using console redirection.	1. Run the Configuration/Setup Utility program, select **Devices and I/O ports**, and make sure the settings for the remote console redirection are configured. Save the settings and restart the blade workstation. 2. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Graphics card b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
00012000	Processor machine check error.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Reseat the microprocessor. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board assembly
00019700	Processor failed.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Reseat the microprocessor. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board assembly
01298000	BIOS does not support the current processor stepping.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Reseat the microprocessor. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board assembly
I999301	Fixed disk boot sector error.	1. Reseat the hard disk drive. 2. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Hard disk drive b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
I9990305	Operating system not found	1. Run the Configuration/Setup Utility program, select **Startup Options**. Configure the hard disk drive to be the primary startup device and save the settings. 2. Make sure that a bootable operating system is installed on the hard disk drive. 3. Reseat the hard disk drive. 4. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Hard disk drive b. (Trained service technician only) System board assembly

Error logs

The BMC log contains all system status messages from the blade workstation service processor. The management-module event log in your BladeCenter unit contains messages that were generated on each blade workstation during POST and status messages from the BladeCenter service processor. (See the *Management Module User's Guide* for more information.)

The following illustration shows an example of a BMC log entry.

```
                  BMC System Event Log
------------------------------------------------------------
Get Next Entry
Get Previous Entry
Clear BMC SEL



Entry Number=     00005 / 00011
Record ID=        0005
Record Type=      02
Timestamp=        2005/01/25  16:15:17
Entry Details:    Generator ID= 0020
                  Sensor Type= 04
                  Assertion Event
                  Fan
                  Threshold
                  Lower Non-critical - going high

                  Sensor Number= 40
                  Event Direction/Type= 01

                  Event Data= 52 00 1A
```

Important:

- A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After

you correct the cause of the first error message, the other error messages usually will not occur the next time you run the test.

- The management-module event log in your BladeCenter unit lists messages according to the position of the blade workstation in the blade bays. If a blade workstation is moved from one bay to another, the management-module event log will report messages for that blade workstation using the new bay number; messages for that blade workstation that were generated before the move will still be listed using the previous bay number.

The BMC log is limited in size. When the log is full, new entries will not overwrite existing entries; therefore, you must periodically clear the BMC log through the Configuration/Setup Utility program (the menu choices are described in the *Installation and User's Guide.)* When you are troubleshooting an error, be sure to clear the BMC log so that you can find current errors more easily.

Entries that are written to the BMC log during the early phase of POST show an incorrect date and time as the default time stamp; however, the date and time are corrected as POST continues.

Each BMC log entry appears on its own page. To display all the data for an entry, use the Up Arrow (↑) and Down Arrow (↓) keys or the Page Up and Page Down keys. To move from one entry to the next, select **Get Next Entry** or **Get Previous Entry**.

The BMC log indicates an assertion event when an event has occurred. It indicates a deassertion event when the event is no longer occurring.

Some of the error codes and messages in the BMC log are abbreviated.

You can view the contents of the BMC log from the Configuration/Setup Utility program and from the diagnostic programs.

When you are troubleshooting I/O slots, note that the error logs report the buses numerically. The numerical assignments vary depending on the configuration. You can check the assignments by running the Configuration/Setup Utility program (see the *Installation and User's Guide* for more information).

Viewing the BMC log from the Configuration/Setup Utility program

For complete information about using the Configuration/Setup Utility program, see the *Installation and User's Guide*.

To view the BMC log, complete the following steps:

1. Turn on the blade workstation.
2. When the prompt `Press F1 for Configuration/Setup` appears, press F1. If you have set a power-on password, you must type the password and press Enter to start the Configuration/Setup Utility program.
3. Select **Advanced Settings → Baseboard Management Controller (BMC) settings → BMC System Event Log**.

BMC error messages

The following table lists BMC error messages and suggested actions to correct the detected problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error message	Action
Front panel cable is not connected to system board	1. Reseat the control panel cable. 2. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Bezel assembly b. (Trained service technician only) System board assembly
Firmware (BIOS) halted, System management bus error	1. Update the blade workstation firmware. 2. Update the blade workstation and option device drivers.
PCI bus timeout - system error	1. Remove the blade workstation from the BladeCenter; then, reinstall it. 2. Reseat all the options installed in the blade workstation one at a time, restarting the blade workstation each time to determine where the problem is located. 3. Remove options from the blade workstation one at a time to determine where the problem is located. 4. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. All options installed in the blade workstation b. (Trained service technician only) System board assembly
Microprocessor 1 halted	1. Remove the blade workstation from the BladeCenter; then, reinstall it. 2. (Trained service technician only) Reseat the microprocessor. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error message	Action
Microprocessor 1 temperature warning	1. Make sure that the BMC firmware is the latest level. See "Firmware updates" on page "Firmware updates" on page 9. 2. Make sure that the blade workstation is sufficiently cooled. 3. Make sure that the that the front bezel on the blade workstation is not blocked. 4. (Trained service technician only) Make sure the heat sink installed in the microprocessor socket is installed properly and has thermal grease applied to the bottom. 5. (Trained service technician only) Replace the microprocessor.
Planar voltage fault (power 12V fault)	1. Remove the blade workstation from the BladeCenter unit; then, reinstall it. 2. (Trained service technician only) Replace the system board assembly.
Planar voltage fault (planar fault)	1. Remove the blade workstation from the BladeCenter unit; then, reinstall it. 2. (Trained service technician only) Replace the system board assembly.
Blade incompatible with chassis	1. Make sure that the management-module firmware is at the latest level. 2. If the firmware is at latest level, the blade device is not supported by BladeCenter unit in which it is installed.
Firmware (BIOS) ROM corruption detected	Update the BIOS code.
Internal error CPU fault	Make sure that all of the software and the drivers are at the latest levels.
CPU over temperature	Make sure that the blade workstation is sufficiently cooled.

Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the blade workstation.

About the checkout procedure

Before performing the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page vii.
- The diagnostic programs provide the primary methods of testing the major components of the blade workstation. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

  Exception: If there are multiple error codes that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 59 for information about diagnosing microprocessor problems.
- If the blade workstation is halted and a POST error code is displayed, see “POST error codes” on page 43. If the blade workstation is halted and no error message is displayed, see “Troubleshooting tables” on page 56 and “Solving undetermined problems” on page 80.
- For intermittent problems, check the error log; see “POST” on page 39 and “Diagnostic programs, messages, and error codes” on page 68.
- If no LEDs are lit on the blade workstation front panel, verify the blade workstation status and errors in the management-module Web interface; also see “Solving undetermined problems” on page 80.
- If device errors occur, see “Troubleshooting tables” on page 56.

Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. If the blade workstation is running, turn off the blade workstation.
2. Turn on the blade workstation. Make sure that the blade workstation has control of the video (the keyboard/video/mouse button is lit). If the blade workstation does not start, see “Troubleshooting tables” on page 56.
3. Record any POST beep codes that sound or POST error messages that are displayed on the monitor. If an error is displayed, look up the first error in the “POST error codes” on page 43.
4. Check for the following results:
   - Successful completion of POST, indicated by a single beep.
   - Successful completion of startup, indicated by a readable display of the operating-system desktop.
5. Did a single beep sound and are there readable instructions on the main menu?
   - **No:** Find the failure symptom in “Troubleshooting tables” on page 56; if necessary, see “Solving undetermined problems” on page 80.
   - **Yes:** Run the diagnostic programs (see “Running the diagnostic programs” on page 69).

– If you receive an error, see “Diagnostic error codes” on page 71.
– If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 80.

Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms. If these symptoms relate to shared BladeCenter unit resources, see “Solving shared BladeCenter resource problems” on page 75.

If you cannot find the problem in these tables, see “Running the diagnostic programs” on page 69 for information about testing the blade workstation.

If you have just added new software or a new optional device, and the blade workstation is not working, complete the following steps before using the troubleshooting tables:

1. Remove the software or device that you just added.
2. Run the diagnostic tests to determine whether the blade workstation is running correctly.
3. Reinstall the new software or new device.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.
The KVM buttons on the blade workstation do not respond.	1. Reseat the blade workstation. 2. Remove the bezel assembly, reseat the control-panel connector. 3. (Replace the bezel assembly.
The LEDs on the blade workstation are not working.	1. Reseat the blade workstation. 2. Remove the bezel assembly, reseat the control-panel connector. 3. Replace the bezel assembly. 4. (Trained service technician only) Replace the system board assembly.

SATA drive problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
The SATA drive is not recognized by the Configuration/Setup utility.	1. Reseat the SATA drive. 2. Replace the SATA drive.
The operating system does not recognize the SATA drive.	1. Make sure the SATA drive is listed in the Configuration/Setup utility. 2. Run the Fixed Disk diagnostic test. 3. For information on preparing the SATA drive to install and operating system, see the documentation that comes with your operating system. 4. Reseat the SATA drive. 5. Replace the SATA drive.
The blade workstation stops responding during the Fixed Disk diagnostic test.	Reseat the hard disk drive that was being tested when the blade workstation stopped responding, and run the diagnostic test again. If the Fixed Disk diagnostic test fails, replace the drive that you removed with a new one.
The SATA drive fails the Fixed Disk diagnostics test.	1. Reseat the SATA drive and run the Fixed Disk diagnostic test again. 2. If the Fixed Disk diagnostic test fails, replace the SATA drive.
A hard disk drive passes the Fixed Disk diagnostics test, but the problem remains.	Run the Fixed Disk diagnostic test again. If the diagnostics continue to pass but the drive continues to have a problem, replace the drive with a new one.

Intermittent problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • When the blade workstation is turned on, air is flowing from the rear of the BladeCenter unit at the blower grille. If there is no airflow, the blower is not working. This causes the blade workstation to overheat and shut down. • The SATA drive is configured correctly. 2. Check the BMC log (see "POST" on page 39).

Keyboard or mouse problems

The keyboard and mouse are shared BladeCenter unit resources. First, make sure that the keyboard and mouse are assigned to the blade workstation; then, see the following table and “Solving shared BladeCenter resource problems” on page 75.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
All keyboard and mouse problems.	1. Make sure that the keyboard/video/mouse select button LED on the front of the blade workstation is lit, indicating that the blade workstation is connected to the shared keyboard and mouse. 2. Reseat the keyboard and mouse cables. 3. Install another keyboard and mouse. If a new keyboard and mouse work, replace the component that does not work. 4. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75). 5. Make sure that: • The latest firmware updates are installed (see "Firmware updates" on page “Firmware updates” on page 9). • The device drivers are installed correctly. • The keyboard and mouse are recognized as USB, not PS/2, devices by the blade workstation. Although the keyboard and mouse might be a PS/2-style devices, communication with them is through USB in the BladeCenter unit. Some operating systems allow you to select the type of keyboard and mouse during installation of the operating system. If this is the case, select USB. 6. Replace the management module (see the documentation for your BladeCenter unit).

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The amount of system memory that is displayed during POST or by the Configuration/Setup Utility program is less than the amount of installed physical memory	1. Make sure that: • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program. • All banks of memory are enabled. The blade workstation might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check BMC log for error message 289: • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM. 3. Reseat the DIMM (see "Removing a memory module" on page 24 and "Installing a memory module" on page 24). 4. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Replace the DIMM. b. (Trained service technician only) System board assembly

Microprocessor problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The blade workstation emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	1. (Trained service technician only) Reseat the microprocessor. 2. (Trained service technician only) Replace the microprocessor.
The blade workstation powers on but does not POST.	1. (Trained service technician only) Reseat the microprocessor. 2. (Trained service technician only) Replace the microprocessor.

Monitor or video problems

The video monitor is a shared BladeCenter unit resource. First, make sure that the video monitor is assigned to the blade workstation; then, see the following table and “Solving shared BladeCenter resource problems” on page 75.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
The screen is blank.	1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75). 2. Make sure that: • Damaged BIOS code is not affecting the video; see “Recovering from a BIOS update failure” on page 74. **Important:** In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the Start Options of the Configuration/Setup Utility program is set to **Enabled** (its default setting), you must restart the blade workstation three times to force the system BIOS to reset the memory connector or bank of connectors from Disabled to Enabled. • The device drivers are installed correctly. 3. (Trained service technician only) Replace the system board assembly
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75). 2. (Trained service technician only) Replace the system board assembly.
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the firmware or operating system with the correct language in the blade workstation that has ownership of the monitor. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75). 3. (Trained service technician only) Replace the system board assembly.

Graphics card and compression card problems

The blade workstation has a graphics card that processes images for the applications programs in the blade workstation; it also has a compression card that compresses and transmits the graphics and data to the thin client communications module.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The operating system can not find the graphics card.	1. Make sure that: • The graphics card is configured correctly. • The correct device drivers are installed in the blade workstation. 2. Reseat the graphics card. 3. Replace the graphics card. 4. (Trained service technician only) Replace the system board assembly.
The thin-client is not receiving graphics or data from the blade workstation.	1. Shut down the thin-client session with the blade workstation; then, restart the session with the blade workstation. See the thin-client documentation for more information. 2. Make sure that: • The thin-client is connected to a power source and to the network. See the thin-client documentation for more information. • The network settings are configured on the thin-client and the blade workstation. Contact your network administrator to verify the network configuration. • The thin-client is configured correctly. See the thin-client documentation for more information. • The compression card is configured correctly. See "Configuring the blade workstation" in the *Installation and User's Guide*. • The correct device drivers are installed in the blade workstation. • The correct firmware for the graphics and compression cards are installed in the blade workstation. • I/O-module 2 in the BladeCenter unit is working. See the BladeCenter unit documentation for more information. 3. Reseat the following components one at a time, in the order shown, restarting the blade workstation each time: a. Compression card b. Graphics card 4. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Compression card. b. Graphics card. 5. (Trained service technician only) Replace the system board assembly.

Network connection problems

The blade workstation connects to the network using shared BladeCenter unit resources. See the following table and “Solving shared BladeCenter resource problems” on page 75.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
One or more blade workstations are unable to communicate with the network.	1. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75). 2. Make sure that: • The correct device drivers are installed. • Verify the network settings for your blade workstation. See "Configuring the blade workstation" in the *Installation and User's Guide*. 3. (Trained service technician only) Replace the system board assembly.

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
An IBM optional device that was just installed does not work.	1. Make sure that: • The device is designed for the blade workstation (see http://www.ibm.com/servers/eserver/serverproven/compat/us/. • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration. 2. If the device comes with its own test instructions, use those instructions to test the device. 3. Reseat the device that you just installed. 4. Replace the device that you just installed.

Power error messages

Power to the blade workstation is provided by shared BladeCenter unit resources. See the following table and “Solving shared BladeCenter resource problems” on page 75.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, “Parts listing, Type 7996,” on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Message	Action
System Power Good fault	1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75). 3. (Trained service technician only) Replace the system board assembly.
VRD Power Good fault	1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75). 3. (Trained service technician only) Replace the system board assembly.
System over recommended voltage for +12v.	Informational only. **Note:** If the problem persists, perform the following tasks. 1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75. 3. (Trained service technician only) Replace the system board assembly.
System over recommended voltage for +3.3v.	Informational only. **Note:** If the problem persists, perform the following tasks. 1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75. 3. (Trained service technician only) Replace the system board assembly.
System over recommended 5V fault.	Informational only. **Note:** If the problem persists, perform the following tasks. 1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75. 3. (Trained service technician only) Replace the system board assembly.
System under recommended voltage for +12v.	Informational only. **Note:** If the problem persists, perform the following tasks. 1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see “Solving shared BladeCenter resource problems” on page 75. 3. (Trained service technician only) Replace the system board assembly.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Action
System under recommended voltage for +3.3v.	Informational only. **Note:** If the problem persists, perform the following tasks. 1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75. 3. (Trained service technician only) Replace the system board assembly.
System under recommended 5V fault.	Informational only. **Note:** If the problem persists, perform the following tasks. 1. Reseat the blade workstation. 2. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75. 3. (Trained service technician only) Replace the system board assembly.
System under recommended voltage for Vbat	Informational only. **Note:** If the problem persists, replace the battery.

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
Power switch does not work.	1. Reseat the control-panel connector. 2. Replace the bezel assembly. 3. (Trained service technician only) Replace the system board assembly.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The blade workstation does not turn on.	1. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 2. Make sure that the power-on LED on the blade workstation control panel is flashing slowly. • If the power LED is flashing rapidly and continues to do so, the blade workstation is not communicating with the management-module; reseat the blade workstation and go to step 7. • If the power LED is off, the blade bay is not receiving power, the blade workstation is defective, or the LED information panel is loose or defective. 3. Check the power-management policies in the operating system for the blade workstation. 4. Check the management module log of the corresponding blade workstation for an error preventing the blade workstation from turning on. 5. Reseat the blade workstation. 6. If you just installed a device in the blade workstation, remove it and restart the blade workstation. If the blade workstation now starts, you might have installed more devices than the power to that blade bay supports. 7. (Trained service technician only) If you tried another blade workstation in the blade bay when checking the function of the shared BladeCenter unit resources and the other blade workstation worked, replace the system board assembly. 8. See "Solving undetermined problems" on page 80.
The blade workstation turns off for no apparent reason.	1. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 2. (Trained service technician only) If the microprocessor error LED is lit, replace the microprocessor. 3. (Trained service technician only) Replace the system board assembly.
The blade workstation does not turn off.	1. Verify whether you are using an Advanced Configuration and Power Interface (ACPI) or non-ACPI operating system. 2. If you are using a non-ACPI operating system, complete the following steps: a. Turn off the blade workstation by pressing the power-control button for 4 seconds. b. If the blade workstation fails during POST and the power-control button does not work, remove the blade workstation from the bay and reseat it. 3. If the problem remains or if you are using an ACPI-aware operating system, complete the following steps: a. Check the power-management policies in the operating system for the blade workstation. b. (Trained service technician only) Replace the system board assembly.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The blade workstation turns on but does not POST.	1. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 2. Check the management module log of the corresponding blade workstation for an error preventing the blade workstation from turning on. 3. Reseat the blade workstation. 4. If you just installed a device in the blade workstation, remove it and restart the blade workstation. If the blade workstation now starts, you might have installed more devices than the power to that blade bay supports. 5. (Trained service technician only) If you tried another blade workstation in the blade bay and the other blade workstation worked; then, replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Microprocessor b. System board assembly 6. See "Solving undetermined problems" on page 80.

Removable-media drive problems

The removable-media (CD, DVD, or diskette) drives are shared BladeCenter unit resources. First, make sure that the drives are assigned to the blade workstation; then, see the following table and "Solving shared BladeCenter resource problems" on page 75.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
All removable-media drive problems.	1. The media-tray select button LED on the front of the blade workstation is lit, indicating that the blade workstation is connected to the shared removable-media drives. 2. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 3. Run the Configuration/Setup Utility program and make sure that the drive is enabled. 4. For CD-ROM or DVD drive problems, make sure that the correct device driver is installed. 5. Reseat the battery. 6. Replace the battery. 7. (Trained service technician only) Replace the system board assembly.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The CD or DVD drive is not recognized after being switched back to the blade workstation running Windows® 2000 Advanced Server with SP3 applied. (When the CD or DVD drive owned by blade workstation *x* is switched to another blade workstation, then is switched back to blade workstation *x*, the operating system in blade workstation *x* no longer recognizes the CD or DVD drive. This happens when you have not safely stopped the drives before switching ownership of the media tray [CD or DVD drive, diskette drive, and USB port].)	**Note:** Because the BladeCenter unit uses USB to communicate with the media tray devices, switching ownership of the media tray to another blade workstation is the same as disconnecting a USB device. Before you switch ownership of the CD or DVD drive (media tray) to another blade workstation, safely stop the media tray devices on the blade workstation that currently owns the media tray, as follows: 1. Double-click the **Unplug/Eject Hardware** icon in the Windows taskbar. 2. Select **USB Floppy** and click **Stop**. 3. Select **USB Mass Storage Device** and click **Stop**. 4. Click **Close**. You can now safely switch ownership of the media tray to another blade workstation.

Service processor problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The management-module reports a general monitor failure.	Disconnect the BladeCenter unit from all electrical sources, wait for 30 seconds, reconnect the BladeCenter unit to the electrical sources, and restart the blade workstation. If the problem remains, see "Solving undetermined problems" on page 80, and the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* for your BladeCenter unit.

Software problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
You suspect a software problem.	1. To determine whether the problem is caused by the software, make sure that: • The blade workstation has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. **Note:** If you have just installed an adapter or memory, the blade workstation might have a memory-address conflict. • The software is designed to operate on the blade workstation. • Other software works on the blade workstation. • The software works on another server. 2. If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact your place of purchase of the software.

Universal Serial Bus (USB) port problems

The USB ports are shared BladeCenter unit resources. First, make sure that the USB ports are assigned to the blade workstation; then, see the following table and "Solving shared BladeCenter resource problems" on page 75.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
A USB device does not work.	1. Check the function of the shared BladeCenter unit resources (see "Solving shared BladeCenter resource problems" on page 75). 2. Reseat the USB device. 3. Make sure that: • The operating system supports USB devices. • The correct USB device driver is installed. 4. (Trained service technician only) Replace the system board assembly.

Diagnostic programs, messages, and error codes

The diagnostic programs are the primary method of testing the major components of the blade workstation. As you run the diagnostic programs, text messages and error codes are displayed on the screen and are saved in the test log. A diagnostic text message or error code indicates that a problem has been detected; to determine what action you should take as a result of a message or error code, see the table in "Diagnostic error codes" on page 71.

If you cannot find the problem using the diagnostic programs, see “Solving undetermined problems” on page 80 for information about testing the blade workstation.

Running the diagnostic programs

To run the diagnostic programs, complete the following steps:

1. If the blade workstation is running, turn off the blade workstation.
2. Turn on the blade workstation.
3. When the prompt `F2 for Diagnostics` appears, press F2.
4. From the top of the screen, select either **Extended** or **Basic**.
5. From the menu, select the test that you want to run, and follow the instructions on the screen.

For help with the diagnostic programs, press F1. You also can press F1 from within a help screen to obtain online documentation from which you can select different categories. To exit from the help information, press Esc.

To determine what action you should take as a result of a diagnostic text message or error code, see the table in “Diagnostic error codes” on page 71.

If the diagnostic programs do not detect any hardware errors but the problem remains during normal server operations, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

A single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

Exception: If there are multiple error codes that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 59 for information about diagnosing microprocessor problems.

If the blade workstation stops responding during testing and you cannot continue, restart the blade workstation and try running the diagnostic programs again. If the problem remains, replace the component that was being tested when the blade workstation stopped.

The diagnostic programs assume that a keyboard and mouse are attached to the BladeCenter unit and that the blade workstation controls them. If you run the diagnostic programs with either no mouse or a mouse attached to the BladeCenter unit that is not controlled by the blade workstation, you cannot use the **Next Cat** and **Prev Cat** buttons to select categories. All other mouse-selectable functions are available through function keys.

To view server configuration information such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, or device drivers, select **Hardware Info** from the top of the screen.

Diagnostic text messages

Diagnostic text messages are displayed while the tests are running. A diagnostic text message contains one of the following results:

Passed: The test was completed without any errors.

Failed: The test detected an error.

User Aborted: You stopped the test before it was completed.

Not Applicable: You attempted to test a device that is not present in the blade workstation.

Aborted: The test could not proceed because of the blade workstation configuration.

Warning: The test could not be run. There was no failure of the hardware that was being tested, but there might be a hardware failure elsewhere, or another problem prevented the test from running; for example, there might be a configuration problem, or the hardware might be missing or is not being recognized.

The result is followed by an error code or other additional information about the error.

Viewing the test log

To view the test log when the tests are completed, select **Utility** from the top of the screen and then select **View Test Log**. The test-log data is maintained only while you are running the diagnostic programs. When you exit from the diagnostic programs, the test log is cleared.

To save the test log to a file on a diskette or to the hard disk, select **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.

Note: To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette can contain other data.

Diagnostic error codes

The following table describes the error codes that the diagnostic programs might generate and suggested actions to correct the detected problems.

If the diagnostic programs generate error codes that are not listed in the table, make sure that the latest level of the BIOS code is installed.

In the error codes, *x* can be any numeral or letter. However, if the three-digit number in the central position of the code is 000, 195, or 197, *do not* replace a CRU or FRU. These numbers appearing in the central position of the code have the following meanings:

000 The blade workstation passed the test. Do not replace a CRU or FRU.

195 The Esc key was pressed to end the test. Do not replace a CRU or FRU.

197 This is a warning error, but it does not indicate a hardware failure; do not replace a CRU or FRU. Take the action that is indicated in the Action column, but *do not replace a CRU or a FRU*. See the description for **Warning** in the section "Diagnostic text messages" on page 70 for more information.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
001-292-000	Core system: failed/CMOS checksum failed.	Load the BIOS default settings by using the Configuration/Setup Utility program and run the test again (see the *Installation and User's Guide* for your blade workstation).
001-xxx-000	Failed core tests.	(Trained service technician only) Replace the system board assembly.
001-xxx-001	Failed core tests.	(Trained service technician only) Replace the system board assembly.
005-xxx-000	Failed video test.	(Trained service technician only) Replace the system board assembly.
030-xxx-000	Failed internal SATA interface test.	(Trained service technician only) Replace the system board assembly.
089-xxx-00n	Failed microprocessor test.	1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. (Trained service technician only) Microprocessor. b. (Trained service technician only) System board assembly

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
110-600-001	I/O and Graphics Adapter: Failed	1. Turn off the blade workstation and reseat the blade workstation in the chassis. 2. Update the BMC firmware. 3. Reseat the compression card. 4. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Compression card b. (Trained service technician only) System board assembly
110-4xx-yyy	I/O and Graphics Adapter: Aborted	1. Turn off the blade workstation and reseat the blade workstation in the chassis. 2. Update the BMC firmware. 3. Reseat the compression card. 4. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Compression card b. (Trained service technician only) System board assembly
165-060-000	Service Processor: ASM may be busy	1. Rerun the diagnostics test. 2. Correct other error conditions that might be keeping the Advanced System Management (ASM) network or components busy. See the error log and diagnostic panel. 3. Turn off the blade workstation and reseat it in the BladeCenter unit. 4. (Trained service technician only) Replace the system board assembly.
165-198-000	Service Processor: Aborted	1. Rerun the diagnostics test. 2. Correct other error conditions that might be keeping the Advanced System Management (ASM) network or components busy. See the error log and diagnostic panel. 3. Turn off the blade workstation and reseat it in the BladeCenter unit. 4. (Trained service technician only) Replace the system board assembly.
165-201-000	Service Processor: Failed	1. Power down blade workstation and reseat it in the chassis. 2. (Trained service technician only) Replace the system board assembly.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
165-330-000	Service Processor: Failed	Update the ROM diagnostic to the latest level and run the diagnostics again.
165-342-000	Service Processor: Failed	1. Make sure that the latest firmware levels for Advanced System Management (ASM) and BIOS are installed. 2. Turn off the blade workstation and reseat it in the BladeCenter unit. 3. (Trained service technician only) Replace the system board assembly.
201-xxx-0nn	Failed memory test. **Note:** nn = DIMM slot number, 01 to 04	1. Reseat the DIMM *nn* in the indicated slot. See "Removing a memory module" on page 24 and "Installing a memory module" on page 24). 2. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. DIMM *nn* in indicated slot b. (Trained service technician only) System board assembly
201-xxx-n99	Multiple DIMM failure, see error text. **Note:** n = number of failing pair; see "Installing a memory module" on page 24.	1. See the error text for failing DIMMs. 2. (Trained service technician only) Replace the system board assembly.
202-xxx-001	Failed system cache test.	1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board assembly
217-198-xxx	Could not establish drive parameters.	1. Reseat the hard disk drive. 2. Update the BIOS code. 3. Replace the following components one at a time, in the order shown, restarting the blade workstation each time: a. Hard disk drive b. (Trained service technician only) System board assembly
217-xxx-000	Failed hard disk drive test.	1. Reseat hard disk drive 1. 2. Replace hard disk drive 1.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing, Type 7996," on page 11 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
405-xxx-000	Failed Ethernet test on controller on the system board.	1. Make sure that Ethernet is not disabled in the Configuration/Setup Utility program. 2. (Trained service technician only) Replace the system board assembly.

Recovering from a BIOS update failure

The blade workstation has an advanced recovery feature that will automatically switch to a backup BIOS page if the BIOS code in the blade workstation has become damaged, such as from a power failure during an update.

The flash memory of the blade workstation consists of a primary page and a backup page. If the BIOS code in the primary page is damaged, the baseboard management controller will detect the error and automatically switch to the backup page to start the blade workstation. If this happens, a POST message `Booted from backup POST/BIOS image` is displayed. The backup page version may not be the same version as the primary image.

You can then recover or restore the original primary page BIOS by using a BIOS flash diskette.

To recover the BIOS code and restore the blade workstation operation to the primary page, complete the following steps:

1. Download the latest version of the BIOS code from http://www.ibm.com/bladecenter/.
2. Update the BIOS code, following the instructions that come with the update file that you downloaded. This will automatically restore and update the primary page.
3. Restart the blade workstation.

If that procedure fails, the blade workstation might not restart correctly or might not display video. To manually restore the BIOS code, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 13.
2. Turn off the blade workstation.
3. Remove the blade workstation from the BladeCenter unit (see "Removing the blade workstation from a BladeCenter unit" on page 16).
4. Remove the cover (see "Removing the blade workstation cover" on page 19).
5. Locate the BIOS recovery jumper on the system board (see "System board jumpers and buttons" on page 7).
6. Move the BIOS recovery jumper to the Closed position to enable the recovery mode.
7. Replace the cover and reinstall the blade workstation in the BladeCenter unit, making sure that the media tray is selected by the relevant blade workstation.

8. Insert the BIOS flash diskette into the media tray diskette drive.
9. Restart the blade workstation. The system begins the power-on self-test (POST).
10. Select **1 - Update POST/BIOS** from the menu that contains various flash (update) options.

    Attention: Do *not* type Y when you are prompted to back up the ROM location; doing so causes the damaged BIOS to be copied into the backup page.
11. When you are prompted whether you want to move the current POST/BIOS image to the backup ROM location, type N.
12. When you are prompted whether you want to save the current code to a diskette, type N.
13. Select **Update the BIOS**.

    Attention: Do *not* restart the blade workstation at this time.
14. When the update is complete, remove the flash diskette from the diskette drive.
15. Turn off the blade workstation and remove it from the BladeCenter unit.
16. Remove the cover of the blade workstation.
17. Move the BIOS recovery jumper to the Open position to return to the normal startup mode.
18. Replace the cover and reinstall the blade workstation in the BladeCenter unit.
19. Restart the blade workstation.

Solving SATA device problems

For any SATA error message, one or more of the following devices might be causing the problem:

- A failing SATA device (adapter, drive, or controller)
- An improper SATA configuration

For any SATA error message, make sure that the SATA device is configured correctly.

Solving shared BladeCenter resource problems

Problems with BladeCenter shared resources might appear to be in the blade workstation. The following sections provide procedures to help you isolate blade workstation problems from shared BladeCenter resource problems. If the problem is thought to be with a shared resource, see the *Problem Determination and Service Guide* or the *Hardware Maintenance Manual and Troubleshooting Guide* for your BladeCenter unit and other BladeCenter component documentation for additional information. If the problem cannot be solved, see “Solving undetermined problems” on page 80.

To check the general function of shared BladeCenter resources, complete the following operations:

- Make sure that:
  - The BladeCenter unit has the required power modules installed and is connected to a working power source.
  - Power management has been correctly set for your BladeCenter unit configuration.

- Check if the problem is being experienced with more than one blade workstation. Perform a test of the function on a known-good blade workstation.
- Try the blade workstation in a different blade bay.
- Try a known-good blade workstation in the blade bay.

Keyboard or mouse problems

To check for keyboard or mouse problems, complete the following steps until the problem is solved:

1. Make sure that:
   - Both the blade workstation and the monitor are turned on.
   - The keyboard/video/mouse select button LED on the front of the blade workstation is lit, indicating that the blade workstation is connected to the shared keyboard and mouse.
   - The keyboard or mouse cable is securely connected to the active BladeCenter management-module.
   - The keyboard or mouse works with another blade workstation.
2. Check for correct management-module operation (see the documentation for your BladeCenter unit).

   Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).
3. If you are using a USB keyboard or mouse connected to the media tray, see "Media tray problems"
4. Replace the keyboard or mouse.

If these steps do not resolve the problem, it is likely a problem with the blade workstation. See "Keyboard or mouse problems" on page 58.

Media tray problems

To check for problems with the media tray (removable media drives and USB ports), complete the following steps until the problem is solved:

1. Make sure that:
   - The media-tray select button LED on the front of the blade workstation is lit, indicating that the blade workstation is connected to the shared media tray.
   - The media tray devices work with another blade workstation.
2. Check if the problem affects more than one media tray component:
   - USB ports
   - Diskette drive
   - CD or DVD drive
3. For problems affecting only a USB port:
   a. Make sure that the USB device is operational. If using a USB hub, make sure that the hub is operating correctly and that any software the hub requires is installed. Plug the USB device directly into the USB port, bypassing the hub, to check its operation.
   b. Reseat the following components:
      1) USB device cable
      2) Media tray cable (if applicable)
      3) Media tray
   c. Replace the following components one at a time, in the order shown, restarting the blade workstation each time:
      1) USB cable (if applicable)
      2) Media tray cable (if applicable)
      3) Media tray
   d. Continue with step 7 on page 78.

4. For problems affecting only the diskette drive:
   a. If there is a diskette in the drive, make sure that:
      - The diskette is inserted correctly in the drive.
      - The diskette is good and not damaged; the drive LED light flashes once per second when the diskette is inserted. (Try another diskette if you have one.)
      - The diskette contains the necessary files to start the blade workstation.
      - The software program is working properly.
      - The distance between monitors and diskette drives is at least 76 mm (3 in).
   b. Continue with step 6.
5. For problems affecting only the CD or DVD drive:
   a. Make sure that:
      - The CD or DVD is inserted correctly in the drive. If necessary, insert the end of a straightened paper clip into the manual tray-release opening to eject the CD or DVD. The drive LED light flashes once per second when the CD or DVD is inserted.
      - The CD or DVD is clean and not damaged. (Try another CD or DVD if you have one.)
      - The software program is working properly.
   b. Continue with step 6.
6. For problems affecting one or more of the removable media drives:
   a. Reseat the following components:
      1) Removable-media drive cable (if applicable)
      2) Removable-media drive
      3) Media tray cable (if applicable)
      4) Media tray
   b. Replace the following components one at a time, in the order shown, restarting the blade workstation each time:
      1) Removable-media drive cable (if applicable)
      2) Media tray cable (if applicable)
      3) Removable-media drive
      4) Media tray
   c. Continue with step 7.
7. Check for correct management-module operation (see the documentation for your BladeCenter unit).

   Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).
8. Replace the management module (see the documentation for your BladeCenter unit).

If these steps do not resolve the problem, it is likely a problem with the blade workstation. See “Removable-media drive problems” on page 66 or “Universal Serial Bus (USB) port problems” on page 68.

Network connection problems

To check for network connection problems, complete the following steps until the problem is solved:

1. Make sure that:
   - The network cables are securely connected to the I/O module.
   - Power configuration of the BladeCenter unit supports the I/O module configuration.
   - Installation of the I/O-module type is supported by the BladeCenter unit and blade workstation hardware.
   - The I/O modules for the network interface that is being used are installed in the correct BladeCenter bays, and are configured and operating correctly.
   - The settings in the I/O module are correct for the blade workstation (settings in the I/O module are specific to each blade workstation).
2. Check for correct I/O-module operation; troubleshoot and replace the I/O module as indicated in the documentation for the I/O module.
3. Check for correct management-module operation (see the documentation for your BladeCenter unit).

   Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).
4. Replace the management module (see the documentation for your BladeCenter unit).

If these steps do not resolve the problem, it is likely a problem with the blade workstation. See “Network connection problems” on page 62.

Power problems

To check for power problems, make sure that:

- The LEDs on all the BladeCenter power modules are lit.
- Power is being supplied to the BladeCenter unit.
- Installation of the blade workstation type is supported by the BladeCenter unit.
- The BladeCenter unit has the correct power configuration to operate the blade bay where your blade workstation is installed (see the documentation for your BladeCenter unit).
- The BladeCenter unit power management configuration and status support blade workstation operation (see the *Management Module User’s Guide* or the *Management Module Command-Line Interface Reference Guide* for information).
- Local power control for the blade workstation is correctly set (see the *Management Module User’s Guide* or the *Management Module Command-Line Interface Reference Guide* for information).
- The BladeCenter unit blowers are correctly installed and operational.

If these operations do not solve the problem, it is likely a problem with the blade workstation. See “Power error messages” on page 63 and “Power problems” on page 64.

Video problems

To check for video problems, complete the following steps until the problem is solved:

1. Make sure that:
   - Both the blade workstation and the monitor are turned on, and that the monitor brightness and contrast controls are correctly adjusted.
   - The keyboard/video/mouse select button LED on the front of the blade workstation is lit, indicating that the blade workstation is connected to the shared BladeCenter monitor.
   - The video cable is securely connected to the BladeCenter management-module. Non-IBM monitor cables might cause unpredictable problems.
   - The monitor works with another blade workstation.
   - Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, see the information that comes with the monitor for instructions for adjusting and testing the monitor. If the monitor self-tests show that the monitor is working correctly, 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.

     Attention: Moving a color monitor while it is turned on might cause screen discoloration.

     Move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any diskette drive is at least 76 mm (3 in.).
2. Check for correct management-module operation (see the documentation for your BladeCenter unit).

   Note: Some BladeCenter unit types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your management module for more information).
3. Replace the monitor cable, if applicable.
4. Replace the monitor.
5. Replace the management module (see the documentation for your BladeCenter unit).

If these steps do not resolve the problem, it is likely a problem with the blade workstation. See “Monitor or video problems” on page 60.

Solving undetermined problems

Note: When you are diagnosing a problem in the blade workstation, you must determine whether the problem is in the blade workstation or in the BladeCenter unit.

- If all of the blade workstations have the same symptom, the problem is probably in the BladeCenter unit. For more information, see the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* for your BladeCenter unit.
- If the BladeCenter unit contains more than one blade workstation and only one of the blade workstations has the problem, troubleshoot the blade workstation that has the problem.

If the diagnostic tests did not diagnose the failure or if the blade workstation is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 68.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, remove and replace the battery to override the power-on password and clear the CMOS memory; see “Removing the battery” on page 30. If you suspect that the BIOS code is damaged, see “Recovering from a BIOS update failure” on page 74.

Check the LEDs on all the power supplies of the BladeCenter unit in which the blade workstation is installed. If the LEDs indicate that the power supplies are working correctly and reseating the blade workstation does not correct the problem, complete the following steps:

1. Make sure that the control panel connector is correctly seated on the system board (see “System board connectors” on page 7 for the location of the connector).
2. If no LEDs on the control panel are working, replace the bezel assembly; then, try to turn on the blade workstation from the management module (see the documentation for the BladeCenter unit and management module for more information).
3. Turn off the blade workstation.
4. Remove the blade workstation from the BladeCenter unit and remove the cover.
5. Remove or disconnect the following devices, one at a time, until you find the failure. Reinstall, turn on, and reconfigure the blade workstation each time.
   - I/O-expansion card
   - Hard disk drives
   - Memory modules. The minimum configuration requirement is 1 GB (two 512 MB DIMMs on the system board).

   The following minimum configuration is required for the blade workstation to start:
   - System board
   - Microprocessor
   - Two 512 MB DIMMs
   - A functioning BladeCenter unit
6. Install and turn on the blade workstation. If the problem remains, suspect the following components in the following order:
   a. DIMM
   b. Microprocessor
   c. System board

If the problem is solved when you remove an I/O-expansion card from the blade workstation but the problem recurs when you reinstall the same card, suspect the I/O-expansion card; if the problem recurs when you replace the card with a different one, suspect the system board.

If you suspect a networking problem and the blade workstation passes all the system tests, suspect a network cabling problem that is external to the system.

Calling IBM for service

See Appendix A, “Getting help and technical assistance,” on page 83 for information about calling IBM for service.

When you call for service, have as much of the following information available as possible:

- Machine type, model and serial number
- Management-module service data information (see the documentation for your BladeCenter unit management module).
- Microprocessor and hard disk drive upgrades
- Failure symptoms
  - Does the BMC error log report any errors? If so, what are the errors?
  - Does the blade workstation fail the diagnostic programs? If so, what are the error codes?
  - What occurs? When? Where?
  - Is the failure repeatable?
  - Has the current workstation configuration ever worked?
  - What changes, if any, were made before it failed?
  - Is this the original reported failure, or has this failure been reported before?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- BIOS code level
- Operating-system type and version level

You can solve some problems by comparing the configuration and software setups between working and nonworking workstations. When you compare workstations to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the blade workstations:

- Machine type and model
- BIOS level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

Appendix A. Getting help and technical assistance

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

Before you call

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

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

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

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/systems/support/ and follow the instructions. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x™ and xSeries® information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/intellistation/.

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

Software service and support

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

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

Hardware service and support

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

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

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

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

Appendix B. Notices

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Alert on LAN	Predictive Failure Analysis	XA-64
BladeCenter	ServeRAID	X-Architecture
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@server	System x	

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Important notes

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

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

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

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

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

Maximum memory might require replacement of the standard memory with an optional memory module.

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

Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/index.shtml.

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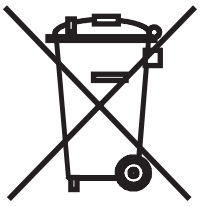

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This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

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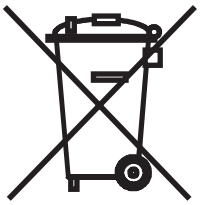
Battery return program

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/index.shtml or contact your local waste disposal facility.

In the United States, IBM has established a return 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.

For Taiwan: Please recycle batteries.

For the European Union:



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The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

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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.

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Avis de conformité à la réglementation d'Industrie Canada

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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.

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

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

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European Community contact:

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

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求採取某些適當的對策。

Chinese Class A warning statement

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서 비업무용으로 교환하시기 바랍니다.

Index

R

S

T

U

V

W

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