

BladeCenter HC10

Type 7996

Installation and User's Guide

Welcome.

Thank you for buying an IBM blade workstation. Your blade workstation features superior performance, availability, and scalability.

This *Installation and User's Guide* contains information for setting up, configuring, and using your blade workstation.

Additionally, a service information label is attached to each BladeCenter unit and blade workstation. This label provides a graphical summary of many of the installation and service activities that are associated with each device.

For more information about your BladeCenter components and features, you can view the publications on the *Documentation* CD or download them from the IBM Support Web site.

Go to <http://www.ibm.com/systems/support/>

Before installing the BladeCenter HC10 Type 7996 blade workstation in a BladeCenter unit, complete the following procedures:

- Install and configure the rack according to the documentation that came with the rack.
- Install the BladeCenter unit into the rack and configure it, according to the documentation provided with the BladeCenter unit.
- Supply 200-240 V ac to the BladeCenter unit.
- Install the latest firmware in all BladeCenter components.

Before you install the blade workstation into the BladeCenter unit, install options such as drives or memory modules in the blade workstation, if applicable. Install the blade workstation in the BladeCenter unit. See Chapter 3 for more information.

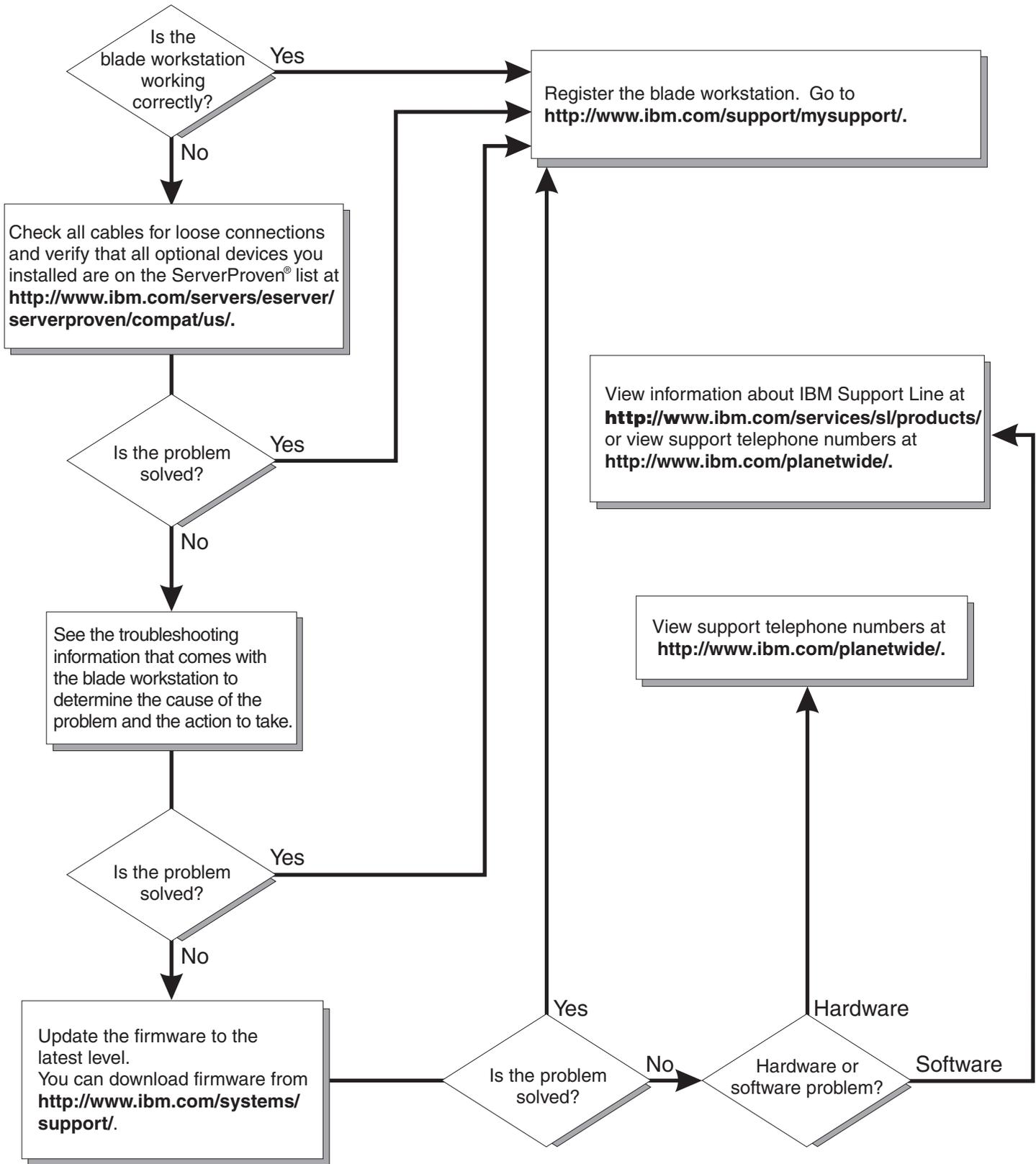
Configure the blade workstation. See Chapter 4 for more information.

If the operating system is not pre-installed, install the operating system. See Chapter 5 for more information.

Install additional applications according to the instructions provided with the applications.

The blade workstation is now ready to use. Be sure to register and profile your blade workstation on the IBM Support Web site.

Blade Workstation Support



BladeCenter HC10 Type 7996



Installation and User's Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 49 and the *Warranty and Support Information* document on the IBM *BladeCenter Documentation* CD that comes with your BladeCenter device.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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 pečítajte 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.

Important:

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

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

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the blade workstation 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:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

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.

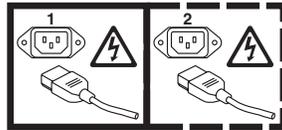
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Statement 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

The IBM® BladeCenter® HC10 Type 7996 blade workstation is a workstation computer in a blade structure, which is mounted in a BladeCenter unit that contains advanced management modules. The blade workstation consolidates desktop workstation computing resources with server-based computing solutions and communicates with the end-user “thin client”, which consists of a communications module, USB keyboard, monitor, mouse, and other USB end-user devices such as a printer.

Note: Unless otherwise stated, references to the BladeCenter unit apply to all BladeCenter, BladeCenter T, BladeCenter H, and other BladeCenter units.

This *Installation and User's Guide* provides information about:

- Setting up the blade workstation
- Starting and configuring the blade workstation
- Installing optional hardware devices
- Installing the operating system
- Performing basic troubleshooting of the blade workstation

Packaged with this document are software CDs that help you to configure hardware, install device drivers, and install the operating system. To download the latest device drivers or firmware, complete the following steps:

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** to display the matrix of downloadable files for the BladeCenter product.

The blade workstation comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document for your blade workstation on the IBM *BladeCenter Documentation* CD. You can obtain up-to-date information about the blade workstation at <http://www.ibm.com/systems/bladecenter/>. For more information about locating online documentation, see “Related documentation” on page 3.

If firmware and documentation updates are available, you can download them from the IBM Web site. The blade workstation might have features that are not described in the documentation that comes with the blade workstation, and 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. To check for updates, complete the following steps.

Note: Changes are made periodically to the IBM Web site. Procedures for locating firmware and documentation 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** for firmware updates, or click **Publications lookup** for documentation updates.

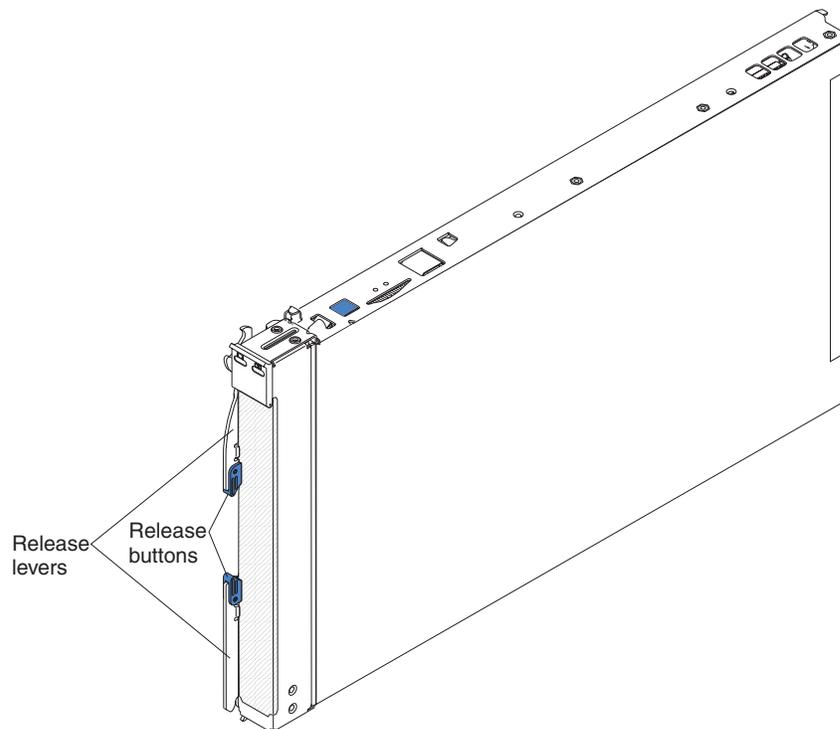
Record information about the blade workstation in the following table. You will need these numbers when you register the blade workstation with IBM. You can register the blade workstation at <http://www.ibm.com/support/mysupport/>.

Product name	BladeCenter HC10
Machine type	7996
Model number	_____
Serial number	_____

Note: The model number and serial number are on the ID label that is behind the control panel door on the front of the blade workstation, and on a label on the side of the blade workstation that is visible when the blade workstation is not in the BladeCenter unit.

The following illustration shows the HC10 blade workstation

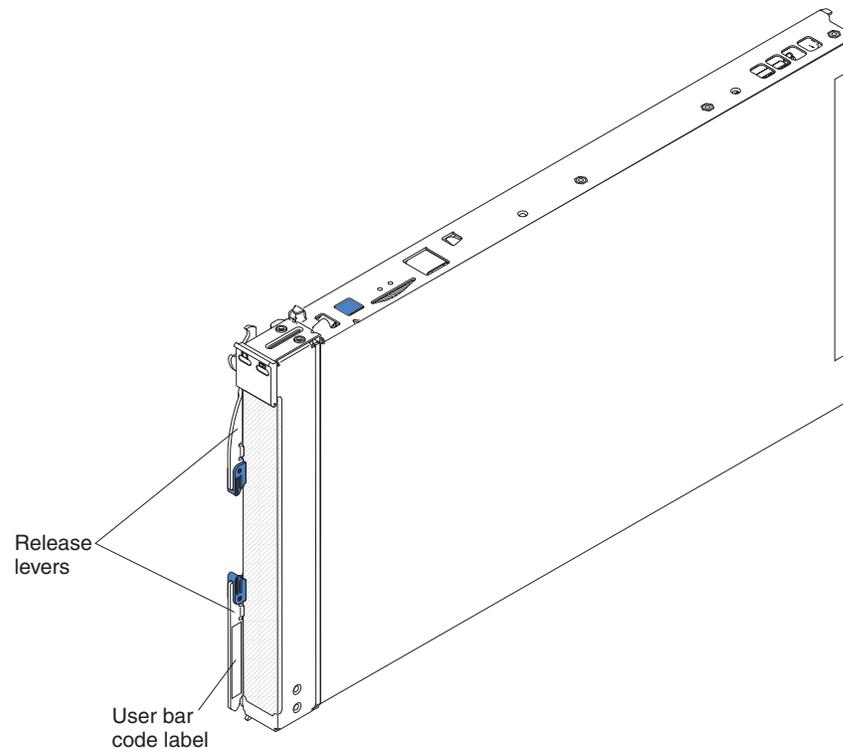
Note: The illustrations in this document might differ slightly from the hardware.



A set of blank labels comes with the blade workstation. When you install the blade workstation in the BladeCenter unit, write identifying information on a label and place the label on the BladeCenter unit bezel. See the documentation for your BladeCenter unit for recommended label placement.

If you use bar code labels to track your blade devices, place the bar code label on the release lever in the location that is shown in the following illustration.

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



Related documentation

This *Installation and User's Guide* contains general information about the blade workstation, including how to install supported optional devices and how to configure the blade workstation. The following documentation also comes with the blade workstation:

- *Problem Determination and Service Guide*

This document is in PDF on the IBM *BladeCenter Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.

- *Safety Information*

This document is in PDF on the IBM *BladeCenter 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 Portable Document Format (PDF) on the IBM *BladeCenter Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.

Depending on your BladeCenter product, additional documentation might be included on the IBM *BladeCenter Documentation* CD. In addition to the documentation in this library, be sure to review the *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit for information to help you prepare for system installation and configuration.

To check for updated documentation and technical updates, 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 **Publications lookup**.
4. From the **Product family** menu, select **BladeCenter HC10** and click **Continue**.

The IBM Documentation CD

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

Hardware and software requirements

You can run the IBM *BladeCenter Documentation* CD on any system that meets the hardware and software requirements.

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

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

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents, using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in the computer that you use to read the CD and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into the CD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:

- If you are using a Windows operating system, insert the CD into the CD drive and click **Start --> Run**. In the **Open** field, type
`e:\win32.bat`

where *e* is the drive letter of the CD drive, and click **OK**.

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

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

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press Ctrl+F to use the Acrobat search function, or press Alt+F to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

This section provides a summary of the features and specifications of the blade workstation. Use the Configuration/Setup Utility program to determine the specific microprocessor that is in 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 BladeCenter unit removable-media drives and front-panel USB ports. The BladeCenter unit uses USB for internal communications with these devices.

<p>Microprocessor: Supports one microprocessor</p> <ul style="list-style-type: none"> • Dual-core Intel® Core 2 Duo 64-bit microprocessor • High performance • Low power consumption <p>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.</p> <p>Memory:</p> <ul style="list-style-type: none"> • 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 <p>Drives:</p> <ul style="list-style-type: none"> • 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 	<p>Integrated functions:</p> <ul style="list-style-type: none"> • 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 blade workstation restart • Four USB buses for communication with keyboard, mouse, and removable media drives <p>Keyboard/video/mouse:</p> <ul style="list-style-type: none"> • One of the following high-resolution video controllers (graphics cards), depending on the blade workstation model: <ul style="list-style-type: none"> – 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 	<p>Electrical Input: 12 V dc</p> <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – 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: <ul style="list-style-type: none"> – Blade workstation on: 8% to 80% – Blade workstation off: 5% to 80% <p>Size:</p> <ul style="list-style-type: none"> • 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)
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What your blade workstation offers

The design of the blade workstation takes advantage of advancements in memory management and data storage. The blade workstation uses the following features and technologies:

- **Impressive performance using the latest microprocessor technology**

The blade workstation supports one dual-core Intel Core 2 Duo microprocessor. Because the microprocessor is dual-core, it provides enhanced performance and symmetric multiprocessing (SMP) capability. You might have to upgrade the operating system to support SMP. To use SMP, you must configure it to enable the dual-core function.

- **Large system-memory capacity**

The memory bus in the blade workstation supports up to 8 GB of system memory. The memory controller provides support for up to four industry-standard 240-pin double-data-rate (DDR2), PC2-5300, synchronous dynamic random-access memory (SDRAM) DIMMs. For the most current list of supported DIMMs, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

- **Included thin client support**

The remote user communicates with the blade workstation operating system and all application programs through a thin client, which consists of a supported communication module, USB keyboard, monitor, mouse, and other USB devices such as a printer. The Graphics and I/O Transmission Adapter in the blade workstation provides a high-speed user interface to the user location through a dedicated connection over an Ethernet network to the communication module of the thin client. The user interface has the same function and appearance as a workstation at the user location would provide.

- **High-speed high-resolution 2D or 3D graphics capability**

Depending on the graphics controller that is installed, the blade workstation supports either 2D or 3D high-resolution graphics when it communicates with the thin client. The Graphics and I/O Transmission Adapter that is also in the blade workstation compresses the video stream and rapidly transmits the video, audio, and USB signals over the Ethernet network to the thin client communication module. The thin client decompresses the video and presents it to the remote user. For simplicity, the Graphics and I/O Transmission Adapter is referred to in the HC10 blade workstation documentation as a compression card.

- **Ethernet TCP/IP offload engine (TOE) support**

The Ethernet controller in the blade workstation supports TOE, which is a technology that offloads the TCP/IP flow from the microprocessor and I/O subsystem to increase the speed of the TCP/IP flow. When an operating system that supports TOE is running on the blade workstation and TOE is enabled, the blade workstation supports TOE operation. See the operating-system documentation for information about enabling TOE.

- **Storage drive support**

The blade workstation supports one small-form-factor SATA storage drive, such as a hard disk drive.

- **PCI Express**

PCI Express is a fully serial interface that is used for high-speed connections to the NVIDIA graphics controller, the compression card, and the integrated Ethernet controller.

- **IBM Director**

IBM Director is a workgroup-hardware-management tool that you can use to centrally manage servers and blade workstations. For more information, see the IBM Director documentation on the *IBM Director CD*.

Reliability, availability, and serviceability features

Three of the most important features in blade workstation design are reliability, availability, and serviceability (RAS). These RAS features help to ensure the integrity of the data that is stored in the blade workstation, the availability of the blade workstation when you need it, and the ease with which you can diagnose and correct problems.

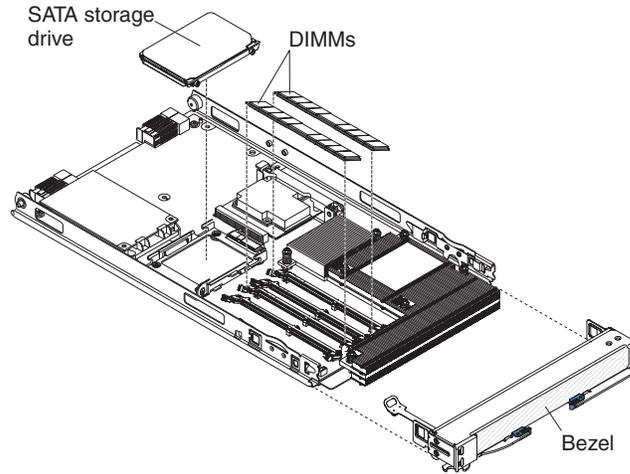
The blade workstation has the following RAS features:

- Advanced Configuration and Power Interface (ACPI)
- Automatic error retry or recovery
- Automatic restart
- Built-in monitoring for temperature and voltage
- Upgradeable basic input/output system (BIOS) code
- Support center 24 hours per day, 7 days a week¹
- Diagnostic support of the Ethernet controller
- Error codes and messages
- Power-on self-test (POST)
- Processor serial number access
- ROM resident diagnostics
- Service processor that communicates with the management module to enable remote blade workstation management
- SDRAM with serial presence detect (SPD) and vital product data (VPD)
- System error logging
- VPD (includes information stored in nonvolatile memory for easier remote viewing)
- Wake on LAN[®] capability

1. Service availability will vary by country. Response time will vary depending on the number and nature of incoming calls.

Major components of the blade workstation

You must remove the blade workstation from the BladeCenter unit and remove the cover to see the components. The following illustration shows the major components of a BladeCenter HC10 Type 7996 blade workstation.



Chapter 2. Power, controls, jumpers, switches, and indicators

This chapter describes the power features, how to turn on and turn off the blade workstation, and what the controls and indicators mean. This chapter also identifies the system board jumpers and switches.

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 “The control panel buttons and LEDs” on page 12) to start the blade workstation.

Notes:

1. Wait until the power-on LED on the blade workstation flashes slowly before you press the blade workstation 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 “The control panel buttons and LEDs” on page 12 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 by 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 “The control panel buttons and LEDs” on page 12). This starts an orderly shutdown of the operating system, if this feature is supported by the operating system.

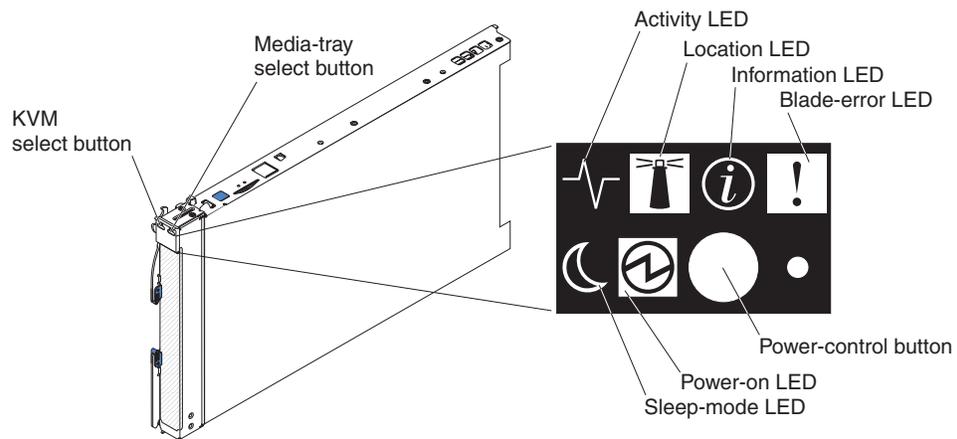
Note: After you turn off the blade workstation, wait at least 5 seconds before you press the power-control button to turn on the blade workstation again.

- 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.
- The thin client can turn off the blade workstation.

The control panel buttons 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.

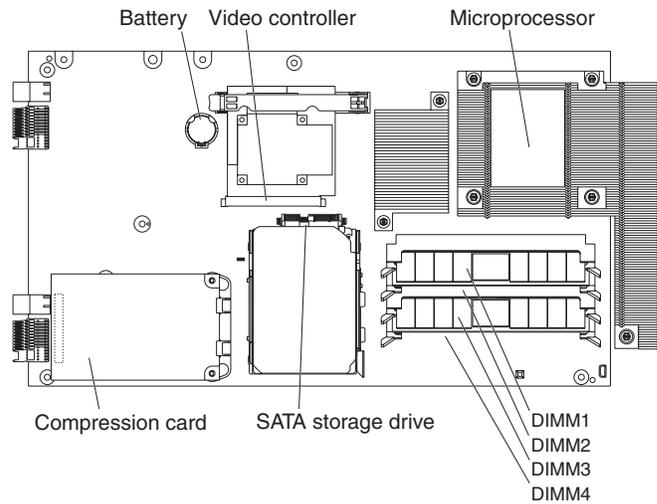
Power-on LED: This green LED indicates the power status of the blade workstation in the following manner:

- 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.

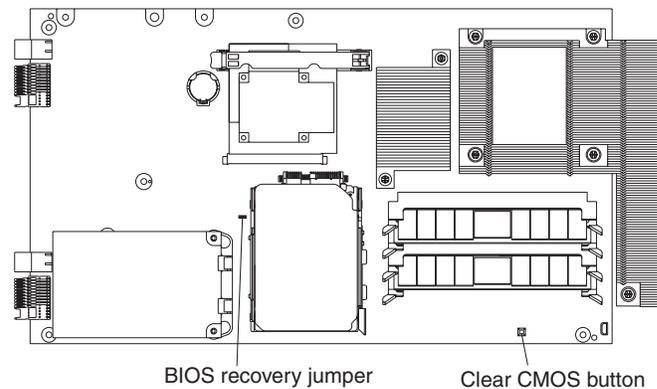
System-board connectors

The following illustration shows the system-board components and connectors, including connectors for user-installable optional devices, in the blade workstation.



System-board switches and jumpers

The following illustration shows the location of the clear CMOS button and the jumper that is used to recover BIOS. See the information about how and when to use the switches, jumpers, or buttons in the *Problem Determination and Service Guide* on the IBM *BladeCenter Documentation CD*.



Chapter 3. Installing optional devices

This chapter provides instructions for installing optional hardware devices in the blade workstation. Instructions for removing some optional devices are provided in case you have to remove one device to install another.

Installation guidelines

Before you install optional devices in the blade workstation, read the following information:

- Read the safety information that begins on page v and the guidelines in “Handling static-sensitive devices.” This information will help you work safely.
- Back up all important data before you make changes to disk drives.
- Before you remove a hot-swap 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, or open or close a latch.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that you can remove or install the component while the BladeCenter unit is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- For a list of supported optional devices for the blade workstation, go to <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

System reliability guidelines

To help ensure proper cooling and system reliability, do not operate the BladeCenter unit without a blade device or filler blade installed in each blade bay. See the documentation for your BladeCenter unit for additional information.

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.

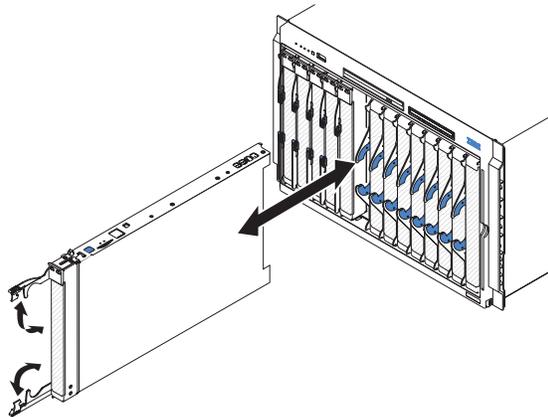
To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- When you work on the BladeCenter T unit, use an electrostatic discharge (ESD) wrist strap, especially when you will be handling 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 T 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 its 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 in which you are installing the device for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the blade workstation without setting it down. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the blade workstation cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing the blade workstation from the BladeCenter unit

The following illustration shows how to remove the blade workstation from a typical BladeCenter unit.



Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit without a blade workstation, expansion unit, or filler blade installed in each blade bay.
- When you remove the blade workstation, note the bay number. Reinstalling a blade workstation into a different bay than the one it was removed from can 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, complete the following steps:

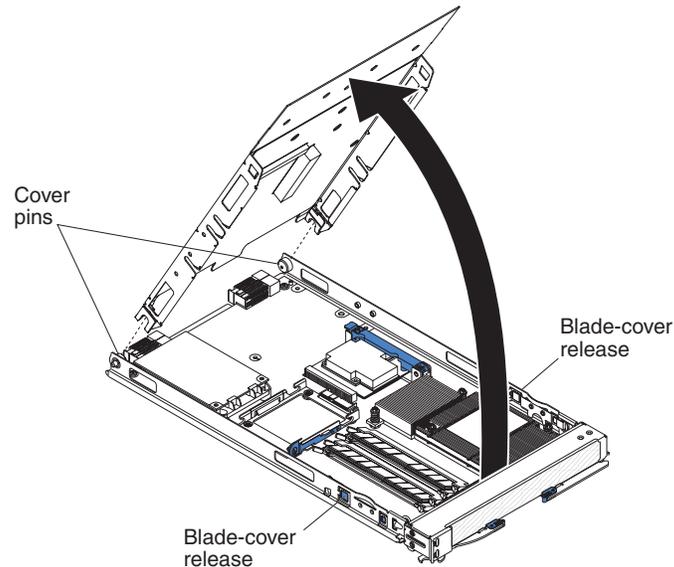
1. If the blade workstation is operating, shut down the operating system; then, press the power-control button (behind the blade workstation control panel door) to turn off the blade workstation (see “Turning off the blade workstation” on page 11 for more information).

Attention: Wait at least 30 seconds, until the hard disk drives stop spinning, before you proceed to the next step.

2. Open the two release levers as shown in the illustration. The blade workstation moves out of the bay approximately 0.6 cm (0.25 inch).
3. Pull the blade workstation out of the bay. Spring-loaded doors farther back in the bay move into place to cover the bay temporarily.
4. Place either a filler blade or another blade in the bay within 1 minute. The recessed spring-loaded doors will move out of the way as you insert the blade or filler blade.

Opening the blade workstation cover

The following illustration shows how to open the cover on a blade workstation.



To open the blade workstation cover, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 15.
2. If the blade workstation is installed in a BladeCenter unit, remove it (see “Removing the blade workstation from the BladeCenter unit” on page 16 for instructions).
3. Carefully lay the blade workstation on a flat, static-protective surface, with the cover side up.
4. Press the blade-cover release on each side of the blade workstation and lift the cover open, as shown in the illustration.
5. Lay the cover flat, or lift it from the blade workstation and store it for future use.

Statement 21:

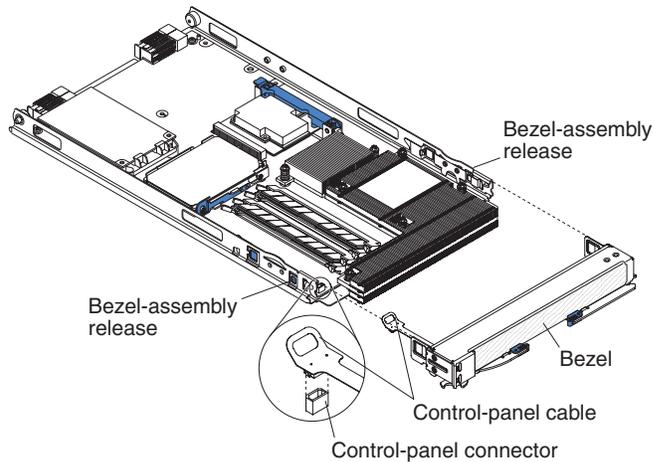


CAUTION:

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

Removing the blade workstation bezel assembly

To install certain optional devices, you might choose to first remove the blade workstation bezel assembly. The following illustration shows how to remove the bezel assembly.



To remove the blade workstation bezel assembly, complete the following steps:

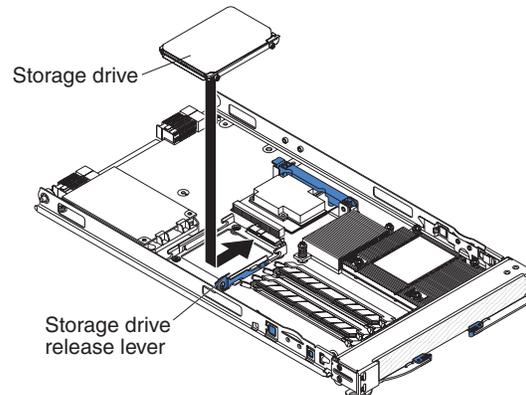
1. Read the safety information that begins on page v and “Installation guidelines” on page 15.
2. Open the blade workstation cover (see “Opening the blade workstation cover” on page 17 for instructions).
3. Disconnect the control-panel cable from the control-panel connector.
4. Press the bezel-assembly release and pull the bezel assembly away from the blade workstation approximately 1.2 cm (0.5 inch).
5. Pull the bezel assembly completely away from the blade workstation.
6. Store the bezel assembly in a safe place.

Installing a SATA storage drive

The blade workstation supports one small-form-factor SATA storage drive, such as a hard disk drive. The blade workstation comes with an installed SATA drive. If you have to replace or upgrade the SATA storage drive, see the instructions in “Removing a SATA storage drive,” and then complete the steps in this section.

See <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of supported SATA storage drives for the blade workstation.

The following illustration shows how to install a SATA storage drive.



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

1. Read the safety information that begins on page v and “Installation guidelines” on page 15.
2. Shut down the operating system, turn off the blade workstation, and remove the blade workstation from the BladeCenter unit. See “Removing the blade workstation from the BladeCenter unit” on page 16 for instructions.
3. Carefully lay the blade workstation on a flat, static-protective surface.
4. Open the blade workstation cover (see “Opening the blade workstation cover” on page 17 for instructions).
5. Locate the SATA connector.
Attention: Do not press on the top of the drive. Pressing the top might damage the drive.
6. Orient the drive so that the connector on the drive aligns with the SATA connector on the system board.
7. Put the drive into the tray and push it, from the rear edge of the drive, into the connector until the drive moves past the lever at the back of the tray.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 22.

Removing a SATA storage drive

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

1. Read the safety information that begins on page v and “Installation guidelines” on page 15.
2. Shut down the operating system, turn off the blade workstation, and remove the blade workstation from the BladeCenter unit. See “Removing the blade workstation from the BladeCenter unit” on page 16 for instructions.

3. Carefully lay the blade workstation on a flat, static-protective surface.
4. Open the blade workstation cover (see “Opening the blade workstation cover” on page 17 for instructions).
5. Locate the SATA storage drive in the SATA connector. Move the blue lever at the side of the storage drive tray away from the drive to release the drive.
6. From the rear edge of the drive, slide the drive out of the SATA connector.

Installing memory modules

The following notes describe the types of dual inline memory modules (DIMMs) that the blade workstation supports and other information that you must consider when you install DIMMs:

- The system board contains four DIMM connectors and supports two-way memory interleaving.
- The DIMMs that are available for the blade workstation are 512 MB, 1 GB, and 2 GB. Depending on the memory configuration that is set in the Configuration/Setup Utility program, the blade workstation can support a minimum of 1 GB and a maximum of 8 GB of system memory.
- The blade workstation comes with two DIMMs, in the DIMM 1 and DIMM 3 connectors.
- When you install additional DIMMs, you must install them as a pair, in DIMM connectors 2 and 4.
- Install the DIMMs in the following order:

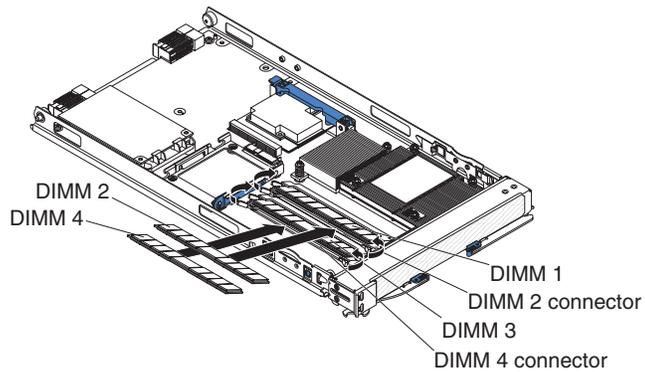
Pair	DIMM connectors
First	1 and 3
Second	2 and 4

- Both DIMMs in a pair must be of the same size, speed, type, technology, and physical design. You can mix compatible DIMMs from different manufacturers.
- The second pair of DIMMs does not have to be of the same size, speed, type, technology, and physical design as the first pair.
- Install only 1.8 V, 240-pin, DDR2, PC2-5300 SDRAM with non-ECC DIMMs that are compatible with the latest PC2-5300 SDRAM DIMM specification, which is available from <http://www.jedec.org/>. For a current list of supported DIMMs for the blade workstation, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
- Installing or removing DIMMs changes the configuration of the blade workstation. When you restart the blade workstation, a message indicates that the memory configuration has changed. Start the Configuration/Setup Utility program and select **Save Settings**. See “Configuration/Setup Utility menu choices” on page 31 for more information.

To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 15.
2. Read the documentation that comes with the DIMMs.
3. Shut down the operating system, turn off the blade workstation, and remove the blade workstation from the BladeCenter unit. See “Removing the blade workstation from the BladeCenter unit” on page 16 for instructions.
4. Carefully lay the blade workstation on a flat, static-protective surface.

5. Open the blade workstation cover (see “Opening the blade workstation cover” on page 17 for instructions).



6. Locate the DIMM connectors on the system board (see the illustration), and determine the connectors into which you will install the DIMMs.
7. Touch the static-protective package that contains the DIMM optional device to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack that you are installing the DIMM in for at least 2 seconds; then, remove the DIMM from its package.
8. Complete the following steps for each DIMM that you install:
 - a. Open the retaining clips on the DIMM connector.
 - b. Turn the DIMM so that the DIMM keys align correctly with the connector on the system board.

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
 - c. Insert the DIMM by pressing the DIMM along the guides into the connector. Make sure that the retaining clips snap into the closed position.

Important: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips and remove the DIMM; then, reinsert the DIMM.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 22.

Completing the installation

To complete the installation, complete the following tasks. Instructions for each task are in the following sections.

1. Reinstall the blade workstation bezel assembly, if you removed it (see “Installing the blade workstation bezel assembly” for information on installing the bezel assembly).
2. Close the blade workstation cover (see “Closing the blade workstation cover” on page 23).

Statement 21:



CAUTION:

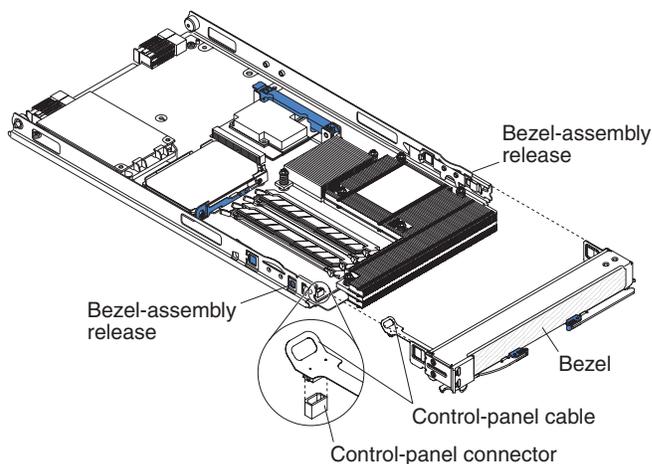
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

3. Reinstall the blade workstation into the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 24).
4. Turn on the blade workstation (see “Turning on the blade workstation” on page 11).
5. For certain optional devices, run the blade workstation Configuration/Setup Utility program (see “Updating the blade workstation configuration” on page 25).

Note: If you have just connected the power cords of the BladeCenter unit to electrical outlets, you must wait until the power-on LED on the blade workstation flashes slowly before you press the power-control button.

Installing the blade workstation bezel assembly

The following illustration shows how to install the bezel assembly.



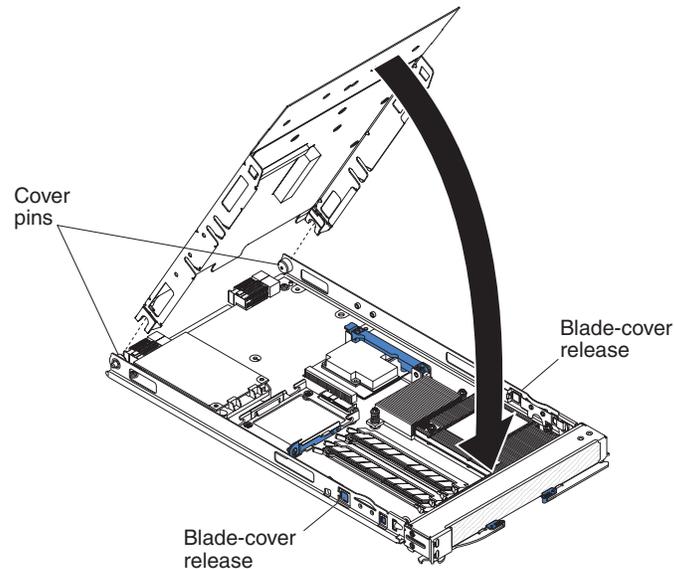
To install the blade workstation bezel assembly, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 15.
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.

Closing the blade workstation cover

Important: The blade workstation cannot be inserted into the BladeCenter unit until the cover is installed and closed. Do not attempt to override this protection.

The following illustration shows how to close the blade workstation cover.

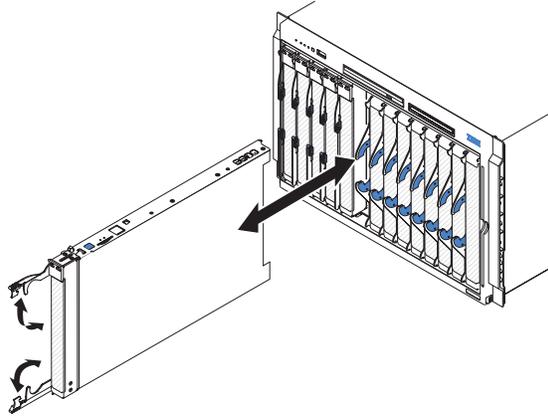


To close the blade workstation cover, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 15.
2. If you removed the blade bezel assembly, replace it now (see “Installing the blade workstation bezel assembly” on page 22 for instructions).
3. Make sure that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade workstation.
4. Make sure that the control-panel cable and all other cables are placed so that the cover does not crimp or pinch them.
5. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade workstation, as shown in the illustration.
6. Pivot the cover to the closed position, as shown in the illustration, until it clicks into place.

Installing the blade workstation in a BladeCenter unit

The following illustration shows how to install the blade workstation into a typical BladeCenter unit.



To install a blade workstation in a BladeCenter unit, complete the following steps.

Statement 21:



CAUTION:

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

1. Read the safety information that begins on page v and “Installation guidelines” on page 15 through “Handling static-sensitive devices” on page 15.
2. If you have not done so already, install any optional devices that you want, such as DIMMs, in the blade workstation.
3. Select the bay for the blade workstation.

Notes:

- a. When any blade workstation is in blade bay 7 through 14 (in a BladeCenter unit) or in blade bays 5 through 8 (in a BladeCenter T unit), power modules must be present in all four power-module bays.
 - b. To help ensure proper cooling, performance, and system reliability, make sure that each of the blade bays on the front of the BladeCenter unit has a blade workstation or filler blade installed. Do not operate a BladeCenter unit for more than 1 minute or a BladeCenter T unit for more than 20 minutes without a blade workstation or filler blade installed in each blade bay.
4. Make sure that the release levers on the blade workstation are in the open position (perpendicular to the blade workstation).
 5. Slide the blade workstation into the blade bay until it stops. The spring-loaded doors, farther back in the bay, that cover the bay opening move out of the way as you insert the blade workstation.
 6. Push the release levers on the front of the blade workstation to the closed position.
 7. Turn on the blade workstation (see “Turning on the blade workstation” on page 11 for instructions).

8. 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.
9. (Optional) Write identifying information on one of the user labels that come with the blade workstations and place the label on a BladeCenter unit bezel. See the illustrations in the documentation that comes with the 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.
10. (Optional) If you use bar codes to track your blade devices, place the bar code label in the label area on the blade workstation release lever. See the illustrations on page 3 for information about the label placement.
Important: Do not place the label anywhere else on the blade workstation or in any way block the ventilation holes on the blade workstation.
11. If you have other blade devices to install, do so now.

Note: Reinstall the bezel assembly on the BladeCenter T unit after you have finished installing the blade workstations (see the *BladeCenter T Types 8720 and 8730 Installation and User's Guide* for detailed instructions for reinstalling the bezel assembly). However, if you installed an optional device on another blade device in the BladeCenter unit, such as a PCI expansion card with PCI adapters that require cables, you will not be able to install the bezel assembly, which contains an air filter for a BladeCenter T unit. If you require an air filter, a filter must then be provided on the rack.

If you reinstall a blade device that you removed, you must install it in the same blade bay from which you removed it. Some blade device configuration information and update options are established according to bay number. Reinstalling a blade device into a different blade bay from the one from which it was removed might have unintended consequences, and you might have to reconfigure the blade device.

If this is the initial installation of the blade workstation in the BladeCenter unit, you must configure the blade workstation through the Configuration/Setup Utility program. If an operating system is not preinstalled in the blade workstation, you must install the blade workstation operating system. See “Updating the blade workstation configuration” and Chapter 6, “Installing the operating system,” on page 43 for details.

Updating the blade workstation configuration

When the blade workstation starts for the first time after you add or remove an internal optional device or an external SATA device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program automatically starts so that you can save the new configuration settings. See “Using the Configuration/Setup Utility program” on page 31 for more information.

Some optional devices have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each device.

The blade workstation comes with one microprocessor. Because the microprocessor is dual-core, the blade workstation can operate as a symmetric multiprocessing (SMP) computer. You might have to upgrade the operating system to support SMP,

and you must configure SMP to enable dual core. See Chapter 6, “Installing the operating system,” on page 43 and your operating-system documentation for additional information.

Input/output connectors and devices

The input/output connectors that are available to the blade workstation for external devices are supplied by the BladeCenter unit. See the documentation that comes with the BladeCenter unit for information about the input/output connectors.

The blade workstation has two selection buttons on the control panel: the media-tray select button and the keyboard/video/mouse (KVM) select button. See “The control panel buttons and LEDs” on page 12 for information about these buttons and their functions.

The Ethernet controller in the blade workstation communicates with the network through an Ethernet-compatible I/O module (the default is I/O module 1) on the BladeCenter unit. Network signals to and from the blade workstation are automatically routed to the I/O module through circuitry in the blade workstation and the BladeCenter unit.

The compression card in the blade workstation, which provides the user interface to the thin client, communicates with the remote thin client through an Ethernet-compatible I/O module in I/O bay 2 of the BladeCenter unit.

Note: When you use the BladeCenter management-module Web interface to view the hardware VPD information for the blade workstation, the compression card is listed as an expansion card.

Chapter 4. Configuring the blade workstation

Important: Configure the IP address of the blade workstation compression card and the thin client first, so that they can communicate with each other. Then, you can perform other configuration tasks. To configure the compression card IP address, follow the instructions in “Changing the IP address.”

The following configuration programs come with the blade workstation:

- **Configuration/Setup Utility program**

The Configuration/Setup Utility program is part of the basic input/output system (BIOS). Use it to change system settings, such as interrupt requests (IRQ), date and time, and passwords. See “Using the Configuration/Setup Utility program” on page 31 for more information.

- **Boot Menu program**

The Boot Menu program is part of the BIOS. Use it to override the startup sequence that is set in the Configuration/Setup Utility program and temporarily assign a device to be first in the startup sequence. For information about how to start the Boot Menu, see “Using the Boot Menu program” on page 34.

- **Broadcom NetXtreme II Ethernet Boot Agent**

The Broadcom NetXtreme II Ethernet Boot Agent is part of the BIOS. You can use it to configure the Ethernet boot options, such as the boot protocol to use, the link speed, and the VLAN mode and ID. Enable and disable the Broadcom NetXtreme II Ethernet Boot Agent from the Configuration/Setup Utility program. For information, see “Enabling the Broadcom NetXtreme II Ethernet Boot Agent” on page 35.

For information about configuring the integrated Ethernet controller, see “Configuring the Broadcom NetXtreme Gigabit Ethernet controller” on page 35.

For information about setting up the network configuration for remote management, such as with the IBM Director products, see the *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit. You can obtain the planning guides from <http://www.ibm.com/systems/support/>.

Changing the IP address

The blade workstation contains three IP addresses:

- The IP address on the compression card, for communication between the compression card and the thin client
- The IP address for the blade workstation integrated Ethernet controller, for workstation communication on the network
- The IP address for the Serial over LAN (SOL) function of the blade workstation BMC

The remote thin client also has an IP address, for communication with the blade workstation compression card. See the following sections for information about changing each IP address:

- “Changing the compression card IP address” on page 28
- “Changing the thin client IP address” on page 29
- “Changing the blade workstation IP address for the integrated Ethernet controller” on page 30
- “Changing the IP address for the SOL function” on page 30

Changing the compression card IP address

The IP address and communications firmware that is stored on the compression card in the blade workstation is used for communication with the thin client only.

All blade workstation compression cards have Dynamic Host Configuration Protocol (DHCP) enabled by default. If you are using DHCP on the network, DHCP assigns an IP address dynamically. If you configure the compression card to disable DHCP, the compression card uses the static network configuration. The compression card has the following default static network configuration:

IP address: 192.168.100.1
Subnet: 255.255.255.0
Gateway: 192.168.100.254

To avoid network conflicts, you must use DHCP or change the default static IP address to a unique IP address for each blade workstation compression card. You also must create a unique IP address for each thin client.

Important:

- Whether you use DHCP or use the static IP address, set the IP address of only one compression card at a time, with only one new blade workstation on the network at a time.
- I/O modules 1 and 2 on the BladeCenter unit must be Ethernet-capable.

If DHCP is enabled, the compression card automatically obtains its IP address from a DHCP server. The card then attempts to discover a DNS server, so that it can register itself with a connection manager or connection broker for connection to the thin client. For a description of the registration process, see the documentation that comes with the connection broker software that you purchased.

Note: The compression card DNS Discovery Prefix factory setting is *ws-broker*.

If DHCP is not enabled, you can change the compression card static IP address in either of two ways:

- Using the blade workstation Configuration/Setup Utility program. See “Using the Configuration/Setup Utility program to change the compression card IP address”.
- Using a computer, such as a notebook computer, on the same subnet and gateway as the blade workstation, and logging in to the blade workstation. You can connect the computer to the network or directly to the Ethernet-capable I/O module 2. See “Using another computer to change the compression card IP address” on page 29.

Using the Configuration/Setup Utility program to change the compression card IP address

To change the blade workstation compression card IP address through the Configuration/Setup Utility program, complete the following steps:

1. Turn on the blade workstation.
2. Immediately give the blade workstation control of the BladeCenter unit shared keyboard, video, and mouse ports.
3. At the prompt, press F1 to initiate the Configuration/Setup Utility program.
4. On the Configuration/Setup Utility program main menu, click **Advanced Setup** → **Compression Card Network Configuration**.

5. Change the IP address, subnet mask, and gateway address of the compression card.
6. Press Enter. Press Enter again in response to the **Save Network Settings in Compression Card** panel and the **Compression Card Settings Saved** panel.
7. Press Esc twice to return to the main menu.
8. Select **Save Settings**, confirm your choice, and then select **Exit Setup**.

Using another computer to change the compression card IP address

To change the blade workstation compression card IP address using another computer that is on the same subnet and gateway as the blade workstation, complete the following steps:

1. Turn on the blade workstation.
2. Connect a computer to the network to which I/O module 2 is connected. Make sure that the computer has an address with the same subnet mask and gateway as the blade workstation.
3. Open a Web browser on the computer and enter the blade workstation compression card IP address (192.168.100.1, or the last IP address the compression card was set to) in the browser address field; then, press Enter.
4. In the resulting window, click **Configuration → Network**.
5. Change the IP address, subnet mask, and gateway address of the compression card.
6. Click **Apply**.
7. Close the Web browser.
8. Turn off the blade workstation; then, turn it on again.
9. Determine the MAC address of the compression card; you will need the compression card IP address and MAC address when you establish a session from a thin client:
 - a. Open a Web browser on the computer and enter the new IP address in the browser address field; then, press Enter.
 - b. Click **Info → Version**. Record the MAC address that is displayed.
10. Continue with “Changing the thin client IP address.”

Changing the thin client IP address

The thin client has the following default network configuration:

IP address:	192.168.100.1
Subnet:	255.255.255.0
Gateway:	192.168.100.254

To avoid network conflicts, you must change the default IP address to a unique IP address for each thin client.

To change the thin client IP address, subnet mask, and gateway address, follow the instructions that come with the thin client. To learn the thin client MAC address, follow the instructions that come with the thin client.

Changing the blade workstation IP address for the integrated Ethernet controller

Use the blade workstation operating system to view or change the IP address of the integrated Ethernet controller. See the documentation that comes with the operating system for information about changing the Ethernet controller IP address.

Changing the IP address for the SOL function

The IP address of the SOL function of the BMC on the blade workstation is assigned automatically according to the specified IP address range for blades in the BladeCenter unit and the number of the blade bay in which the blade workstation is installed. To view the IP address of the SOL function of the BMC on the blade workstation, use the management module Web-based user interface, navigate to **Blade Tasks**, and click **Configuration → Management Network Configuration**. The IP address that the blade workstation uses is the value that is in the **BSMP IP address range** field, followed by a period and the blade workstation bay number. To change the blade workstation BMC SOL IP address, move the blade workstation to a different blade bay.

Establishing a session between the blade workstation and the thin client

If you have purchased and are using connection broker software and have established the correspondences between the thin clients and the blade workstation compression cards through Dynamic Host Configuration Protocol (DHCP), the connection broker automatically establishes a session between the thin client and the target blade workstation. See the documentation that comes with the connection broker software for instructions and information about session establishment.

If you are not using the Connection Broker software, you must explicitly establish the session yourself.

To explicitly establish a session between the blade workstation compression card and the thin client, complete the following steps at the thin client.

Note: See the documentation that comes with the thin client for the exact connection setup sequence and instructions.

1. Make sure that the thin client session is configured to communicate with the IP address and MAC address of the target blade workstation compression card (see the instructions that come with the thin client).
2. Turn on the thin client.
3. Turn on the blade workstation.
4. Follow the instructions in the thin client documentation to establish the connection. Conclude with steps 5 and 6 of this procedure if necessary.
5. Enter the password, if one has been established, or click **OK**.
6. Click **Connect**, or the equivalent, at the thin client.

Updating the compression card firmware

This section describes how to update the firmware on the compression card that is in the blade workstation. The compression card provides communication to and from the thin client. To update the BIOS or other blade workstation firmware, see “Firmware updates” on page 36.

Note: Updating the firmware on the blade workstation compression card requires the use of a computer, such as a notebook computer, on the same subnet and gateway as the blade workstation. You can connect the computer to the network or directly to the Ethernet-capable I/O module 2.

To update the firmware on the compression card, complete the following steps:

1. Connect a computer to the network to which I/O module 2 is connected. Make sure that the computer has an address with the same subnet mask and gateway as the blade workstation.
2. Download the compression card firmware update from <http://www.ibm.com/systems/support/> to a hard disk.
3. Open a Web browser on the computer and enter the compression card IP address in the browser address field; then, press Enter.
4. In the resulting window, click **Upload → Firmware**.
5. Direct the browser to the firmware file that you downloaded and copied to a hard disk.
6. Click **Upload**.
7. After the upload has completed, remove the blade workstation from the BladeCenter unit and reinstall it (see “Removing the blade workstation from the BladeCenter unit” on page 16 and “Installing the blade workstation in a BladeCenter unit” on page 24 for instructions).

Using the Configuration/Setup Utility program

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

1. Turn on the blade workstation (see “Turning on the blade workstation” on page 11).
2. Immediately give the blade workstation control of the BladeCenter unit shared keyboard, video, and mouse ports.
 - If you are managing the blade workstation by using the BladeCenter system console, press the KVM select button on the blade workstation (see “The control panel buttons and LEDs” on page 12 for information).
 - If you are managing the blade workstation from a remote location, see the *User’s Guide* or *Command-Line Interface Reference Guide* that came with your management module or the *IBM BladeCenter Serial over LAN Setup Guide* for information and instructions.
3. When the Configuration/Setup utility message opens, press F1.
4. Follow the instructions on the screen.

Configuration/Setup Utility menu choices

The following choices are on the Configuration/Setup Utility main menu. Depending on the version of the BIOS code in the blade workstation, some menu choices might differ slightly from these descriptions.

- **System Summary**

Select this choice to view configuration information, including the type, speed, and cache size of the microprocessor and the amount of installed memory. When you make configuration changes through other choices in the Configuration/Setup Utility program, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

This choice is on the full and limited Configuration/Setup Utility menu.

- **Processor summary**

Select this choice to view the information about the microprocessor, including the type, speed, and cache size.

- **System Information**

Select this choice to view information about the blade workstation, such as the version of the system BIOS code that is installed. When you make changes through other choices in the Configuration/Setup Utility program, some of those changes are reflected in the system information; you cannot change settings directly in the system information.

This choice is on the full Configuration/Setup Utility menu only.

- **Devices and I/O Ports**

Select this choice to view or change device assignments and input/output (I/O) ports. You can select this choice to enable or disable the Ethernet controller.

Enable is the default setting for all controllers. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the integrated Ethernet controller, the computer will have no Ethernet capability.

This choice is on the full Configuration/Setup Utility menu only.

- **Remote Console Redirection**

Select this choice to enable and configure serial remote video and keyboard redirection.

- **System MAC Addresses**

Select this choice to view the MAC addresses for network devices that are installed in the blade workstation.

Note: This choice is available only if at least one Preboot Execution Environment (PXE) option read only memory (ROM) starts during POST.

- **Video**

Select this choice to view information about the video controller and memory.

- **Date and Time**

Select this choice to set the date and time, in 24-hour format (*hour:minute:second*).

This choice is on the full Configuration/Setup Utility menu only.

- **System Security**

Select this choice to set password settings. See “Using passwords” on page 34 for more information about passwords. You can also enable the chassis-intrusion detector to alert you each time the blade workstation cover is removed.

- **Administrator Password**

This choice is on the full Configuration/Setup Utility menu.

Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If an administrator password is set, the full Configuration/Setup Utility menu is available only if you type the administrator password at the password prompt.

- **Power-on Password**

Select this choice to set or change a power-on password.

- **Startup Option**

Select this choice to view or change the start options. Changes in the start options take effect when you start the blade workstation.

You can set keyboard operating characteristics, such as keyboardless operation, or specify whether the blade workstation starts with the keyboard number lock on or off.

You can specify how or whether the blade workstation restarts when power is restored.

You can enable a virus-detecting test that checks for changes in the boot record when the blade workstation starts.

- **Startup Sequence Options**

Select this choice to view the **Startup Sequence** menu. The startup sequence specifies the order in which the blade workstation checks devices to find a boot record. The blade workstation starts from the first boot record that it finds.

- **Advanced Setup**

Select this choice to change values for advanced hardware features, such as CPU options and PCI configuration.

Important: The blade workstation might malfunction if these settings are incorrectly configured. Follow the instructions on the screen carefully.

This choice is on the full Configuration/Setup Utility menu only.

- **CPU Options**

Select this choice to view or change the microprocessor options.

- **PCI Bus Control**

Select this choice to view or change the system resources that are used by the installed PCI or PCI Express devices.

- **Baseboard Management Controller (BMC) Settings**

Select this choice to view the baseboard management controller (BMC) information and to change some items. You can enable or disable the BMC watchdog timer and enable or disable clearing the system event/error log.

- **BMC Network Configuration**

Select this choice to view and change the BMC network configuration.

- **BMC COM Port Sharing/Configuration**

Select this choice to enable or disable serial port sharing and specify the serial port access mode.

- **System Event Log**

Select this choice to view all entries in the system event/error log since the log was last cleared.

- **Compression Card Network Configuration**

Select this choice to view or change the IP address, subnet mask, or gateway of the compression card.

- **Error Logs**

Select this choice to view or clear error logs.

- **POST Error Log**

Select this choice to view the three most recent error codes and messages that were generated during POST.

– **System Event/Error Log**

Select this choice to view the system event and error messages that were generated during POST and runtime. Select **Clear event/error logs** to clear the event and error log.

• **Save Settings**

Select this choice to save the changes that you have made in the settings.

• **Restore Settings**

Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

• **Load Default Settings**

Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

• **Exit Setup**

Select this choice to exit from the Configuration/Setup Utility program. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Using passwords

From the **System Security** choice, you can set, change, and delete a power-on password.

If you set a power-on password, you must type the power-on password to complete the system startup and to have access to the full Configuration/Setup Utility menu.

You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password. Keep a record of your password in a secure place.

If you forget the power-on password, you can regain access to the blade workstation in any of the following ways:

- Remove the blade workstation battery and then reinstall it (see the *Problem Determination and Service Guide* on the IBM *BladeCenter Documentation CD*).
- Press the clear CMOS button on the system board to clear out CMOS information including the power-on password. See “System-board switches and jumpers” on page 14 for the location of the clear CMOS button.

Note: Shut down the operating system, turn off the blade workstation, and remove the blade workstation from the BladeCenter unit to access the system-board switches and buttons.

Using the Boot Menu program

The Boot Menu program is a built-in, menu-driven configuration program that you can use to temporarily redefine the first startup device without changing settings in the Configuration/Setup Utility program.

To use the Boot Menu program, complete the following steps:

1. Turn off the blade workstation.
2. Restart the blade workstation.
3. Press F12.
4. Select the startup device.

The next time the blade workstation is started, it returns to the startup sequence that is set in the Configuration/Setup Utility program.

Enabling the Broadcom NetXtreme II Ethernet Boot Agent

The Broadcom NetXtreme Gigabit Ethernet Boot Agent is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network startup option occurs in the startup sequence. Enable and disable the Broadcom NetXtreme Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program.

To enable the Broadcom NetXtreme Gigabit Ethernet boot agent, complete the following steps:

1. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
2. Select **Planar Ethernet** and press the Right Arrow (→) key to set it to **Enabled**.
3. Press Esc to return to the Configuration/Setup Utility main menu.
4. Select **Startup Option**, and press Enter.
5. Select **Startup Sequence Options** and set the Network-Planar device as the first startup device.
6. Press Esc to return to the Startup Option screen.
7. Select **Planar Ethernet PXE/DHCP** and press the Right Arrow (→) key to set it to **Planar Ethernet**.
8. Select **Save Settings** and press Enter.

Starting the Broadcom NetXtreme II Ethernet Boot Agent

To use the Broadcom NetXtreme II Ethernet Boot Agent program, complete the following steps:

1. Turn off the blade workstation.
2. Restart the blade workstation.
3. At the prompt for the NetXtreme II Ethernet Boot Agent program, press Ctrl+S.

Configuring the Broadcom NetXtreme Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provides full duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the BladeCenter unit Ethernet-capable I/O module supports auto-negotiation, the controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode.

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. For device drivers and updated information about configuring the Gigabit Ethernet controller, 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 **Publications lookup**.
4. From the **Product family** menu, select **BladeCenter HC10** and click **Continue**.

Using the PXE boot agent utility program

Use the Preboot Execution Environment (PXE) boot agent utility program to select the boot protocol and other boot options and to select a power-management option.

Note: The blade workstation does not support Remote Program Load (RPL) selection for the boot protocol option.

To start the PXE boot agent utility program, complete the following steps:

1. Turn on the blade workstation.
2. When the Broadcom NetXtreme Boot Agent vX.X.X prompt is displayed, press Ctrl+S. You have 2 seconds (by default) to press Ctrl+S after the prompt is displayed.

If the PXE setup prompt is not displayed, use the Configuration/Setup Utility program to set the **Enable Ethernet PXE/DHCP** option.

3. To select a choice from the menu, use the arrow keys and press Enter.
4. To change the setting of the selected item, follow the instructions on the screen.

Firmware updates

IBM periodically makes firmware updates available for the blade workstation. Go to <http://www.ibm.com/systems/support/> and check the firmware versions that are available. Click **Monitors** → **Firmware VPD** in the Advanced Management Module user interface to check the firmware levels in the blade workstation. If the date and revision level on the Web site is later than the date and revision level in the blade workstation, download and install the firmware from the Web.

To locate the blade workstation firmware updates, complete the following steps:

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** to display the matrix of downloadable files for the BladeCenter product.

The blade workstation ships with the following firmware levels, or later.

Table 1. Firmware shipped on the blade workstation

Firmware	Build ID	Date	Revision
BIOS	DOE114A	06/15/2007	1.14
Diagnostics	DOYT02A	06/15/2007	1.0
Blade sys. mgmt. proc.	DOBT12A	06/15/2007	0.12
Broadcom Ethernet NIC	T3.4.6	06/15/2007	Not applicable
Graphics and I/O Transmission Adapter	Build 12	06/21/2007	Not applicable

The firmware in the Advanced Management Module must be the following version or later. See the Advanced Management Module *User's Guide* for information about how to download and install firmware for the management module.

Table 2. Minimum level of management module firmware required

Firmware	Build ID	Date	Revision
AMM Firmware	BPET29I	06/15/2007	29

Use the following table to determine the methods that you can use to install the blade workstation firmware updates.

Important: To avoid problems and to maintain system performance, always make sure that the BIOS, service processor (BMC), and diagnostic firmware levels are consistent for all blade workstations within the BladeCenter unit.

Firmware	Update diskette	Update Xpress	Management- module Web interface	Switch-module Web interface	Switch-module Telnet interface	Connection Broker software
BIOS code	Yes	Yes	No	No	No	No
Diagnostic code	Yes	Yes	No	No	No	No
Service processor code (BMC code)	Yes	Yes	Yes	No	No	No
Compression card code	No	No	No	No	No	Yes ¹
NVIDIA graphics adapter code	Yes	No	No	No	No	No

¹ Alternatively, use a computer on the same subnet to install.

To update the firmware on the compression card that is in the blade workstation, use the connection broker software or see “Updating the compression card firmware” on page 30.

To update the management-module firmware by using the management-module Web-based user interface, complete the following steps:

1. Start the management-module management and configuration program. For more information, see the *Management Module User’s Guide*.
2. In the Management Module configuration window, under **MM Control**, click **Firmware Update**.
3. Under **Update MM Firmware**, click **Browse** to locate the firmware files that you downloaded. Follow the instructions in the readme file to update the firmware.
4. Click **Update**.

Blade workstation Ethernet controller I/O module association

The routing of an Ethernet controller to a particular I/O-module bay depends on the type of blade workstation. You can verify which I/O-module bay the blade workstation Ethernet controller is routed to 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 (click **I/O Module Tasks** → **Management** → **Advanced Management** in the management module Web-based user interface).
3. Enable the Ethernet controller 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 or pass-thru module is connected to. If you can ping the external computer, the Ethernet controller is associated with the switch module or pass-thru module in I/O-module bay 1.

Communication from the user-interface compression card is routed to the Ethernet-capable switch module or pass-thru module in I/O-module bay 2.

Chapter 5. Setting up Serial over LAN for the HC10 blade workstation

Serial over LAN (SOL) provides a means of managing the blade workstation remotely by using a command-line interface (CLI) over a Telnet or Secure Shell (SSH) connection.

SOL provides console redirection for both BIOS and the blade workstation operating system. The SOL feature redirects serial-connection data over a LAN without the need for special cabling. The SOL connection enables the blade workstation to be managed from any remote location that has network access. SOL has the following advantages:

- Remote administration without keyboard, video, or mouse
- Reduced cabling and no need for a serial concentrator
- A standard Telnet interface that eliminates the need for special client software

The IBM BladeCenter management-module command-line interfaces provide access to the text-console command prompt on each blade workstation through a SOL connection, enabling the blade workstation to be managed from a remote location.

Hardware and firmware requirements

The blade workstation is SOL capable. You must configure the blade workstation to enable SOL operation. The blade workstation supports SOL sessions on VLAN 4095 only; make sure to configure the SOL function to operate on VLAN 4095.

Hardware requirements

For the HC10 Type 7996 blade workstation, SOL uses the Ethernet 1 network interface (Planar Ethernet) and an Ethernet I/O module in the BladeCenter unit I/O bay 1 to communicate.

Software requirements

Make sure that you are using the latest versions of device drivers, firmware, and BIOS code for the blade workstation, advanced management module, and other BladeCenter components (see the minimum version levels in “Firmware updates” on page 36). Go to <http://www.ibm.com/systems/support/> for the latest information about upgrading the device drivers, firmware, and BIOS for BladeCenter components. The latest instructions are in the documentation that comes with the updates.

General configuration

This section provides instructions for configuring the blade workstation to operate using SOL, where that information differs from the information in the *BladeCenter Serial over LAN Setup Guide*. The *BladeCenter Serial over LAN Setup Guide* is on the IBM *BladeCenter Documentation CD* that comes with the blade workstation. You can also download the latest version of the guide from <http://www.ibm.com/systems/support/>.

Configuring the BladeCenter unit

If you have not done so already, follow the instructions in the *BladeCenter Serial over LAN Setup Guide* for the following tasks, substituting the term *blade workstation* for *blade server*:

- Configuring the global SOL settings for the BladeCenter unit
- Configuring the management module
- Installing and configuring Secure Shell (SSH) for SOL

Enabling SOL for a blade workstation

SOL must be enabled both globally for the BladeCenter unit (see “Configuring the BladeCenter unit”) and individually for each blade workstation on which you plan to start an SOL session.

To configure the blade workstation to use SOL, complete the following steps:

1. Follow the procedure in the *BladeCenter Serial over LAN Setup Guide* to enable SOL for blade servers, substituting the term *blade workstation* for *blade server*. Ignore the note about console redirection.
2. Follow the procedure in “Configuring the blade workstation BIOS for SOL” to configure the blade workstation BIOS. Make sure to configure the SOL function to operate on VLAN 4095.

Configuring the blade workstation BIOS for SOL

To configure the blade workstation BIOS to enable SOL, complete the following steps.

Note: The BladeCenter HC10 blade workstation supports the SOL connection on serial port A only.

1. Update the blade workstation BIOS:
 - a. Download the latest version of BIOS code for the blade workstation from <http://www.ibm.com/systems/support/>.
 - b. Update the blade workstation BIOS code, following the instructions that come with the update file that you downloaded.
2. Configure the blade workstation BIOS settings:
 - a. Restart the blade workstation and press F1 when you are prompted to start the Configuration/Setup Utility program.
 - b. Select **Devices and I/O Ports**.
 - c. Make sure that **Serial Port A** is set to **Auto**.
 - d. Select **Remote Console Redirection**; then, make sure that the values are set as follows:
 - **Remote Console Serial Port:** Serial Port A
 - **Baud Rate:** 19.2K
 - **Console Type:** VT100
 - **Flow Control:** None
 - **Console Connection:** Direct
 - **Continue C.R. after POST:** On
 - e. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.

Note: Do not use Planar Ethernet for PXE/DHCP booting or installation. When this network interface attempts to boot through PXE or DHCP, the network interface is reset, causing the current SOL session to be dropped and have a new status of Not Ready.

- f. Select **Startup Options**; then, set **Planar Ethernet PXE/DHCP** to **Disabled**.
- g. Press Esc to exit the **Startup Options** section of the Configuration/Setup Utility program.
- h. Select **Save Settings**; then, press Enter.
- i. Press Enter to confirm.
- j. Select **Exit Setup**; then, press Enter.
- k. Make sure that **Yes, exit the Setup Utility** is selected; then, press Enter.

Using SOL

Follow the instructions in the *BladeCenter Serial over LAN Setup Guide* to start an SOL session, end an SOL session, monitor an SOL session, and restart a blade workstation through SOL.

The following table contains the escape-key sequences to use during a blade workstation SOL session, when using the VT100 terminal emulation mode (the default).

Note: There is a time limit for entering an escape-key sequence. If an escape-key sequence does not appear to work, it might be because the time limit for entering the key sequence has expired.

Keyboard key	Escape-key sequence
Ctrl+Shift+F1	Esc [6 4 ~
Ctrl+Shift+F2	Esc [6 5 ~
Ctrl+Shift+F3	Esc [6 6 ~
Ctrl+Shift+F4	Esc [6 7 ~
Ctrl+Shift+F5	Esc [6 8 ~
Ctrl+Shift+F6	Esc [6 9 ~
Ctrl+Shift+F7	Esc [7 0 ~
Ctrl+Shift+F8	Esc [7 1 ~
Ctrl+Shift+F9	Esc [7 2 ~
Ctrl+Shift+F10	Esc [7 3 ~
Ctrl+Shift+F11	Esc [7 4 ~
Ctrl+Shift+F12	Esc [7 5 ~
Delete	Esc -
Down arrow	Esc [B
End	Esc k
F1	Esc 1
F2	Esc 2
F3	Esc 3
F4	Esc 4
F5	Esc 5

Keyboard key	Escape-key sequence
F6	Esc 6
F7	Esc 7
F8	Esc 8
F9	Esc 9
F10	Esc 0
F11	Esc !
F12	Esc @
Home	Esc h
Insert	Esc +
Left arrow	Esc [D
Page Down	Esc /
Page Up	Esc ?
Print Screen	Esc [i
Right arrow	Esc [C
Shift+Print Screen	Esc [2 i
Shift+Tab	Esc [Z
Up arrow	Esc [A

Chapter 6. Installing the operating system

The blade workstation comes with Microsoft Windows Vista Business Blade PC (64-bit) installed on it.

To install a different supported operating system on a blade workstation, download the latest operating-system installation instructions from <http://www.ibm.com/systems/support/> and install the operating system.

Go to <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of supported operating systems for the blade workstation.

Important: 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.

Downloading installation instructions

To download operating-system installation instructions, 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. From the menu on the left side of the page, click **BladeCenter support search**.
4. From the **Task** menu, select **Install**.
5. From the **Product family** menu, select **BladeCenter HC10**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

Chapter 7. Solving problems

This section provides basic information about the diagnostic tools that are available to help you solve some common problems that might occur while you are setting up the blade workstation.

If you install the blade workstation in the BladeCenter unit and the blade workstation does not start, perform the following actions:

- Make sure that the BladeCenter unit is correctly connected to a power source.
- Reseat the blade workstation in the BladeCenter unit (see “Installing the blade workstation in a BladeCenter unit” on page 24).
- If the power-on LED is flashing slowly, turn on the blade workstation (see “Turning on the blade workstation” on page 11).
- If you have just added a new optional device or component, make sure that it is correctly installed and compatible with the blade workstation and its components. If the device or component is not compatible, remove it from the blade workstation, reinstall the blade workstation in the BladeCenter unit, and then restart the blade workstation. If the blade workstation does not start after you have performed the preceding actions, see the *Problem Determination and Service Guide* for your blade workstation on the IBM *BladeCenter Documentation* CD.

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

- **POST beep codes**

The power-on self-test beep codes indicate the detection of a problem.

- One beep indicates successful completion of POST.
- More than one beep indicates a problem. Beep codes are listed in “Diagnostics” in the *Problem Determination and Service Guide* for the blade workstation.

- **Post error codes**

The POST error codes indicate the detection of a problem. See the *Problem Determination and Service Guide* for more information.

- **Troubleshooting tables**

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms. These tables are in the *Problem Determination and Service Guide* for your blade workstation.

- **Diagnostic programs and error messages**

ROM-resident diagnostic programs test the major components of the BladeCenter unit. To start the diagnostic programs, press F2 when you are prompted during blade workstation startup. See the *Problem Determination and Service Guide* for more information.

Note: If you are unable to find the system error logs in the blade workstation firmware code, view the system event log in the BladeCenter management module.

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 IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See <http://www.ibm.com/planetwide/> for support telephone numbers, or 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
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Appendix B. Notices

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Important notes

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

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

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

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

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

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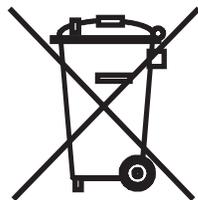
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For Taiwan: Please recycle batteries.



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Avis de conformité à la réglementation d'Industrie Canada

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