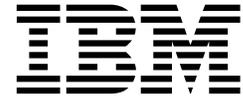


IBM® IntelliStation® Z Pro
Model 6894



User's Guide

NOTE:

Before using this information and the product it supports, be sure to read the general information in “Appendix A. Warranties and notices” on page 53.

First Edition (June 2001)

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Safety Information

Before installing this product, read the Safety Information book.

مج، يجب قراءة دات السلامة

Antes de instalar este produto, leia o Manual de Informações sobre Segurança

安裝本產品前請先閱讀《安全信息》手冊。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si pre ítajte Informa nú brožúrku o bezpe nosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Statement 1



DANGER:

Electrical current from power, telephone, and communications 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.**

<p>To connect:</p> <ol style="list-style-type: none">1. Turn everything OFF.2. First, attach all cables to devices.3. Attach signal cables to connectors.4. Attach power cords to outlets.5. Turn device ON.	<p>To disconnect:</p> <ol style="list-style-type: none">1. Turn everything OFF.2. First, remove power cords from outlets.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.

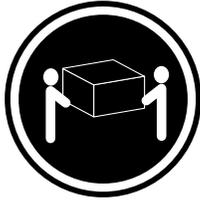
Use of controls or adjustments or performance other than those specified herein might result in hazardous exposure.



DANGER:

Some laser products contain an embedded Class 3A laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

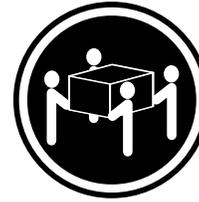
Statement 4



≥18 kg (39.7 lbs)



≥32 kg (70.5 lbs)



≥55kg (121.2 lbs)

CAUTION:

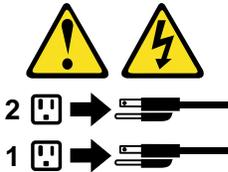
Use safe practices when lifting.

Statement 5



CAUTION:

The power control button on the device and 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.

Modem safety information

To reduce the risk of fire, electrical shock, or injury when using telephone equipment, always follow basic safety precautions, such as:

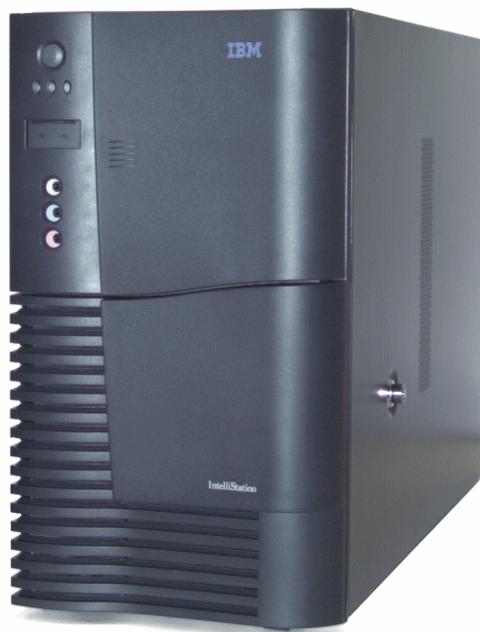
- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

Chapter 1. Introducing the IntelliStation Z Pro

The IBM® IntelliStation® Z Pro model 6894 incorporates many of the latest advances in computing technology and is easy to expand and upgrade as your needs change.

If you have access to the World Wide Web, you can obtain up-to-date information about your model and other IBM products at the following World Wide Web address: <http://www.ibm.com/pc/us/intellistation/>

The serial and model numbers are located on labels on the rear and the front of the computer. You will need these numbers when you register your computer with IBM.



Features and specifications

The following table provides a summary of the features and specifications for your IntelliStation Z Pro.

Table 1. Features and specifications

<p>Microprocessor:</p> <ul style="list-style-type: none"> • Standard: Two Intel® Itanium® microprocessors • 16KB* of level-1 cache • 2 MB* of level-2 cache • 133 MHz front-side bus (FSB) <p>Memory:</p> <ul style="list-style-type: none"> • Maximum: 16 GB* • Type: ECC, SDRAM, registered DIMMs • Slots: 4-way interleaved, 16 slots <p>Drives standard:</p> <ul style="list-style-type: none"> • CD-RW: 48X IDE • Hard disk drive <p>Expansion bays:</p> <ul style="list-style-type: none"> • Three 5.25-in. bays (one CD-RW drive installed) • One 3.5-in. bay (preinstalled) • Five 3.5-in. slim-high bays available (one hard disk drive preinstalled) 	<p>PCI expansion slots:</p> <ul style="list-style-type: none"> • Five 66 MHz 64-bit (one SCSI controller installed) • Two 33 MHz 64-bit <p>Power supply:</p> <p>One 800 watt (100-240 V ac)</p> <p>Video:</p> <ul style="list-style-type: none"> • Matrox™ or NVIDIA™ AGP video adapter • Compatible with SVGA and VGA • Matrox has 16 MB* SDRAM video memory • nVidia has 32 MB* SDRAM video memory <p>Size:</p> <ul style="list-style-type: none"> • Height: 45.72 cm (18 inches) with standard feet • Depth: 64.52 cm (25.4 inches) • Width: 25.4 cm (10 inches) • Weight: 38.18 kg (84 lb) depending on your configuration 	<p>AGP slot:</p> <ul style="list-style-type: none"> • Accelerated graphics port (AGP 4X) • Video adapter installed in the AGP slot on the system board <p>SCSI controller:</p> <p>One Ultra160 (LVD) SCSI controller, two external connectors, three internal connectors (two channels)</p> <p>Integrated functions:</p> <ul style="list-style-type: none"> • 10BASE-T/100BASE-TX Ethernet controller with an RJ-45 Ethernet port • Mouse port • Keyboard port • Serial port • Two Universal Serial Bus (USB) ports • Audio ports <ul style="list-style-type: none"> – Line out – Line in – Microphone • System controls and indicators • Basic input/output system (BIOS), power-on self test (POST), and BIOS setup utility stored in flash memory
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*KB equals approximately 1000 bytes. MB equals approximately 1000000 bytes. GB equals approximately 1000000000 bytes.

Notices used in this book

This information product contains notices that relate to specific topics. The Caution and Danger notices also appear in the multilingual safety booklet that comes with your IntelliStation product. Each notice is numbered for easy reference to the corresponding notices in the safety booklet.

The notice definitions are as follows:

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

What your IntelliStation Z Pro offers

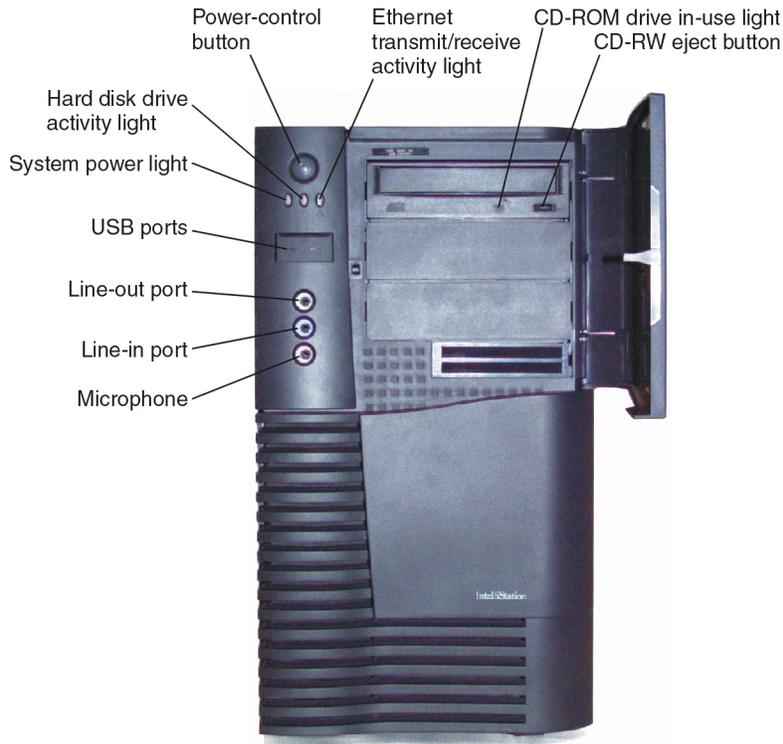
The unique design of your computer combines the following features:

- **Impressive performance**
Your system supports up to two Itanium microprocessors with 2 MB of level-2 cache. Your computer comes with two microprocessors installed.
- **Large system memory**
The memory controller in your computer supports up to 16 GB of system memory. The memory controller provides error correcting code (ECC) support for up to 16 PC 100-registered Version 1.2 buffered synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs). DIMM sizes supported are 256 MB, 512 MB, and 1 GB.
- **High-performance accelerated graphics port (AGP 4X) graphics**
Your computer comes with an AGP graphics adapter installed. This high-performance adapter supports high resolutions and includes many performance-enhancing features for your operating-system environment.
- **Integrated network environment support**
Your computer comes with an Ethernet controller on the system board. This Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The computer automatically selects between 10BASE-T and 100BASE-T environments. This controller provides full-duplex (DX) capability, which allows simultaneous transmission and reception of data on the Ethernet local area network (LAN).

Computer controls and indicators

This section identifies the controls and indicators on the front of your computer.

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



CD-RW eject button: Push this button to open the CD tray to remove a CD from the drive.

CD-RW drive in-use light: When this light is on, the CD-RW drive is in use.

Ethernet transmit/receive activity light: When this light is on, there is activity between the computer and the network.

Power-control button: Press this button to manually turn the computer on or off.

Hard disk drive activity light: When this light is on, the hard disk drive is in use.

System power light: This status indicator lights when you turn on your computer.

USB ports: Use the two Universal Serial Bus (USB) connectors to connect USB devices to your computer.

Line-out port: Use this connector to send audio signals to external devices.

Line-in port: Use this connector to accept audio signals into the computer.

Microphone: Use this connector to connect a microphone to your computer.

Chapter 2. Arranging your workspace

To get the most from your computer, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets also can affect the way you arrange your workspace.

Comfort

Although no single working position is ideal for everyone, here are a few guidelines to help you find a position that suits you best.

Sitting in the same position for a long time can cause fatigue. A good chair can make a big difference. The backrest and seat should adjust independently and provide good support. The seat should have a curved front to relieve pressure on the thighs. Adjust the seat so that your thighs are parallel to the floor and your feet are either flat on the floor or on a footrest.

When using the keyboard, keep your forearms parallel to the floor and your wrists in a neutral, comfortable position. Try to keep a light touch on the keyboard and your hands and fingers relaxed. You can change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.

Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also position other equipment you use regularly, such as the telephone or a mouse, within easy reach.

Glare and lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Even reflected light from shiny surfaces can cause annoying reflections on your monitor screen. Place the monitor at right angles to windows and other light sources, when possible. Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You might have to adjust the Brightness and Contrast controls on the monitor as the room lighting changes throughout the day.

Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have tried all other methods of reducing glare.

Dust buildup compounds problems that are associated with glare. Remember to clean your monitor screen periodically using a soft cloth that is moistened with a nonabrasive liquid glass cleaner.

Air circulation

Your computer and monitor produce heat. Your computer has one or more fans that pull in fresh air and force out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage. Place the computer and monitor so that nothing blocks the air vents; usually, 15 cm (6 inches) of air space is sufficient. Also, make sure that the vented air is not blowing on someone else.

Electrical outlets and cable lengths

The location of electrical outlets and the length of power cords and cables that connect to the monitor, printer, and other devices might determine the final placement of your computer. When arranging your workspace:

- Avoid the use of extension cords. When possible, plug the computer power cords directly into electrical outlets.
- Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

For more information about power cords, see “Power cords” on page 64.

Chapter 3. Operating your computer

This chapter provides information to help you in the day-to-day use of your computer.

Turning on your computer

After you plug one end of the computer power cord into the power supply connector on the rear of the computer, and the other end of the power cord into an electrical outlet, the computer can start as follows:

- You can press the power-control button on the front of the computer to start the computer.
- If the computer is turned on and a power failure occurs, the computer will start automatically when the power is restored.
- If your computer is properly connected and configured to load a startup image from the network, a request is sent and a startup image is loaded into your computer. If the request is unsuccessful or there is no network connection, the operating system and application programs are loaded from the hard disk drive.

Note: Insert a CD in the CD-RW drive before startup to enable the computer to recognize the device. The computer cannot use the device if the device is not recognized during startup.

Using video features

Your computer has an AGP graphics adapter that uses a standard video protocol for displaying text and graphic images on a monitor screen. The adapter supports a variety of video modes. Video modes are different combinations of resolution, refresh rate, and color defined by a video standard for displaying text or graphics.

Video device drivers

To take full advantage of the graphics adapter in your computer, some operating systems and application programs require custom software, known as video device drivers. These preinstalled device drivers provide support for greater speed, higher resolution, more available colors, and flicker-free images.

Changing monitor settings

To get the best possible image on your screen and to reduce flicker, you might need to reset the resolution and refresh rate of your monitor. You can view and change monitor settings through your operating.

Attention: Before you change any monitor settings, be sure to review the information that comes with your monitor. Using a resolution or refresh rate that is not supported by your monitor might cause the screen to become unreadable and could damage the monitor. The information that comes with your monitor usually includes the resolutions and refresh rates that the monitor supports. If you need additional information, contact the manufacturer of the monitor.

To minimize screen flicker and jitter, set your monitor for the highest noninterlaced refresh rate that the monitor supports. If your monitor complies with the VESA display data channel (DDC) standard, it is probably already set to the highest refresh rate that the monitor and video controller can support. If you are not sure if your monitor is DDC-compliant, see the documentation provided with the monitor.

If you have a dual-monitor video adapter and you connect both monitors but the video does not display on one monitor, go to **Start** → **Settings** → **Control Panel** → **Display Properties** → **Settings** → **Display Type** and enable the **Multi-head** option.

Using audio features

Your computer has an integrated audio controller that supports Sound Blaster applications and is compatible with the Microsoft® Windows® sound system. Your computer has three audio connectors. Using the audio controller, you can record sound and music. If you connect external speakers to the line-out connector, you can play sound with multimedia applications.

The audio connectors in your computer are 3.5 mm (.125-in.) mini-jacks.

Line out

This connector is used to send audio signals from the computer to external devices, such as powered speakers with built-in amplifiers, headphones, multimedia keyboards, or the audio line-in jack on a stereo system.

Line in

This connector is used to accept audio signals from external devices, such as line output from a stereo, television, or a musical instrument, into the computer sound system.

Mic

This connector is used to connect a microphone to your computer when you want to record voice or other sounds on the hard disk. This connector and a microphone can also be used by speech recognition software.

Note: If you experience interference or speaker feedback while recording, try reducing the microphone recording volume (gain).

Shutting down your operating system

When you are ready to shut down your operating system, save any files you are working on and close all open applications to prevent the loss of unsaved data or damage to your software programs. For more information about shutting down your operating system, refer to the operating system documentation that comes with your computer.

Turning off your computer

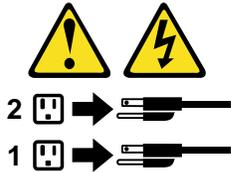
You can turn off your computer as follows:

Statement 5



CAUTION:

The power control button on the device and 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.



- You can press the power-control button on the front of the computer. This starts an orderly shutdown of the operating system, if this feature is supported by your operating system, and places the computer in standby mode.
Note: After turning off the computer, wait at least five seconds before you press the power-control button to turn on the computer again.
- You can press and hold the power-control button for more than four seconds to cause an immediate shutdown of the computer and place the computer in standby mode. You can use this feature if the operating system stops functioning.
- If you cannot use the power-control button to turn off your computer, disconnect the computer power cords from the electrical outlets.

Note: After disconnecting the power cords, wait approximately 15 seconds for your computer to stop running.

Chapter 4. Configuring your computer

The following configuration utilities are provided with your computer.

- **Configuration Manager program**

The Configuration Manager utility program is part of the basic input/output system (BIOS) code that comes with your computer. You can use this program to configure the primary and secondary IDE channels, set the date and time, and set passwords.

- **SCSI utility program**

The SCSI utility enables you to configure the devices attached to the SCSI controller.

- **Extensible Firmware Interface (EFI) Shell Utility program**

This program is an EFI application that enables you to launch other EFI applications. The EFI firmware and the EFI Shell Utility program provide an environment that can be modified to easily adapt to many different hardware configurations.

Using the Configuration Manager program

The Configuration Manager program is a menu-driven configuration program. To enter the Configuration Manager program, do the following:

1. Turn on the computer.
2. When prompted, click the choice to access the Configuration Manager program.
3. Follow the instructions that appear on the screen.

The following selections are available from the Configuration Manager program.

- **System Processors**

Select this option to display processor information and the front side bus (FSB) speed.

- **System Memory**

Select this option to display the amount of memory, the memory speed, the ECC setting, and the type of memory module in each slot.

- **System Event Log**

Select this option to configure the System Event log, define the System Event log as read-only, and view the System Event log.

- **Integrated IDE**

Select this option to enable or disable the IDE controller, define the IDE spin delay, and configure the primary and secondary IDE channels.

- **System BIOS**

Select this option to view the installed versions of BIOS code, SMBIOS, PAL (processor abstraction layer), SAL (system abstraction layer), and the boot block.

- **Power Events**

Select this option to enable or disable the S5 wake-up events.

- **Time/Date**

Select this option to view or change the time or date.

- **General**

Select this option to define the amount of time the introductory screen remains visible, enable or disable the on-board network interface card (NIC), enable or disable the on-board audio device, define if the server will restart after an ac power failure, enable or disable Num Lock at power-on, and define the COM port for serial port 1.

- **Security**

Select this option to define the user and administrator passwords.

Using the SCSI utility program

The SCSI utility program is a menu-driven configuration program. To enter the SCSI utility program, do the following:

1. Turn on the computer.
2. When the SCSI utility prompt appears, press Ctrl+A.
3. Follow the instructions that appear on the screen.

Using the Extensible Firmware Interface (EFI) Shell Utility program

Use the EFI Shell Utility program to start EFI applications, and start (boot) the network operating system. The EFI Utility program also provides a set of basic commands to manage files and the system clock.

Chapter 5. Installing options

This chapter provides the basic information that is needed to install hardware options in your computer.

Before you begin

Before you begin to install options in your computer, read the following information:

- Become familiar with the safety and handling guidelines provided in the Safety Information book, the requirements specified in “Safety Information” on page v, and the information in “Handling static-sensitive devices” on page 13. These guidelines will help you work safely while working with your computer or options.
- Make sure you have an adequate number of properly grounded electrical outlets for your computer, monitor, and any other options that you intent to install.
- Back up all important data before you make changes to disk drives.

For a list of supported options for your computer, refer to <http://www.ibm.com/pc/support> on the World Wide Web.

System reliability considerations

To help maintain proper cooling and system reliability, ensure that:

- All air baffles are properly installed
- The side cover is properly installed
- The cables for optional adapters are routed according to the instructions that are provided with the adapters
- A failed fan is replaced within 48 hours

Handling static-sensitive devices

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

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

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its anti-static package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective package. (If your device is an adapter, place it component side up.) Do not place the device on your system unit cover or on a metal table.
- Take additional care when handling devices during cold weather as heating reduces indoor humidity and increases static electricity.

Safety information

Before installing this product, read the Safety Information book.

مج، يجب قراءة دات السلامة

Antes de instalar este produto, leia o Manual de Informações sobre Segurança

安裝本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si pre ítajte Informa nú brožúrku o bezpe nosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Statement 1



DANGER:

Electrical current from power, telephone, and communications 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.**

<p>To connect:</p> <ol style="list-style-type: none">1. Turn everything OFF.2. First, attach all cables to devices.3. Attach signal cables to connectors.4. Attach power cords to outlets.5. Turn device ON.	<p>To disconnect:</p> <ol style="list-style-type: none">1. Turn everything OFF.2. First, remove power cords from outlets.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.

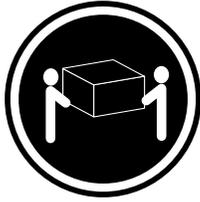
Use of controls or adjustments or performance other than those specified herein might result in hazardous exposure.



DANGER:

Some laser products contain an embedded Class 3A laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

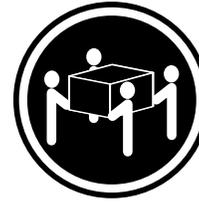
Statement 4



≥18 kg (39.7 lbs)



≥32 kg (70.5 lbs)



≥55kg (121.2 lbs)

CAUTION:

Use safe practices when lifting.

Statement 5



CAUTION:

The power cord button on the device and 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

Power and signal cables for internal drives

Your computer uses cables to connect IDE and SCSI drives to the power supply and to the system board. The following cables are provided:

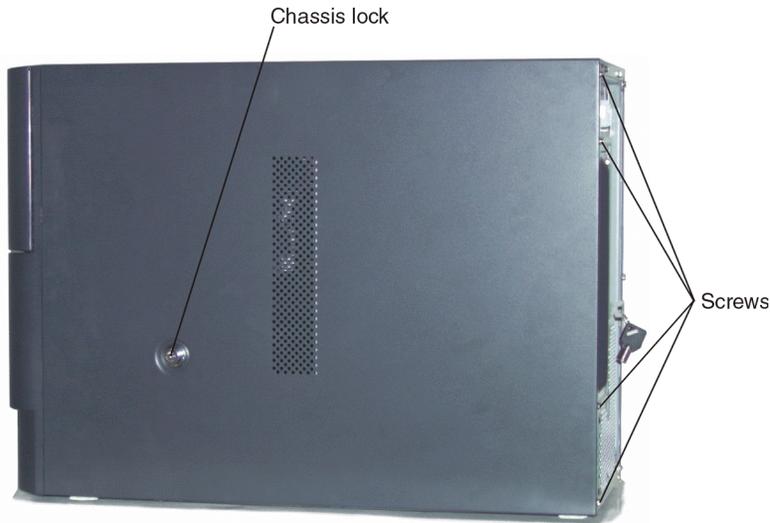
- Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.
- Flat signal cables, also called ribbon cables, connect IDE, SCSI, and diskette drives to the system board. There are two sizes of ribbon signal cables that come with your computer.
- Remember the following important points when connecting power and signal cables to internal drives:
 - The drives that are preinstalled in your computer come with power and signal cables attached. If you replace a drive, it is important to remember which cable is attached to which drive.
 - When you install a drive, ensure that the cable connector at the end of the signal cable is always connected to a drive; also, ensure that the cable connector at the other end is connected to the system board. This reduces electronic noise from the computer.
 - If two IDE devices are used on a single cable, one must be designated as the primary or master device and the other as the secondary or subordinate device; otherwise, some of the IDE devices might not be recognized by the system. The primary and secondary designation is determined by a switch or jumper setting on each IDE device.
 - If two IDE devices are on a single cable, and only one is a hard disk drive, the hard disk drive must be set as the master device.

Removing the side cover and front bezel

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

Removing the side cover

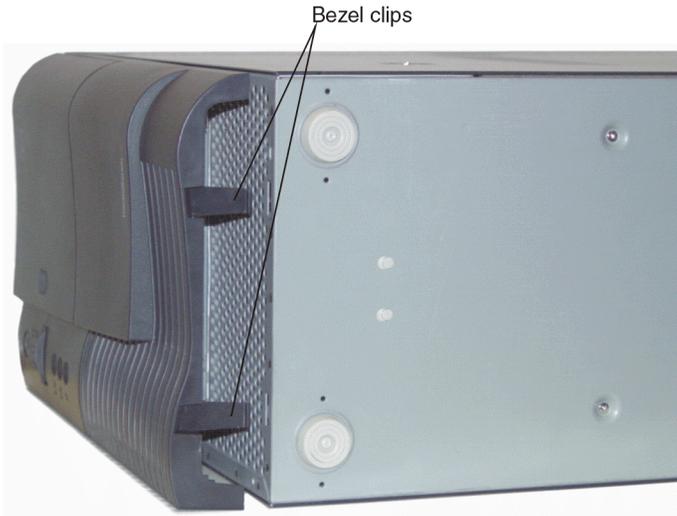
Review the information in “Before you begin” on page 13.



To remove the side cover, do the following:

1. Review the safety information in “Before you begin” on page 13.
2. Remove any media (diskettes, CDs, or tapes) from the drives and shut down your operating system.
3. Turn off the computer and all attached devices, and then disconnect all external cables and power cords.
4. If necessary, unlock the side cover.
5. Loosen the thumbscrews at the rear of the chassis and remove the side cover.

Removing the front bezel



To remove the front bezel, do the following:

1. Locate the bezel clips on the bottom-edge of the front of the computer and press to disengage the bezel from the chassis.
2. Carefully pull the front bezel away from the system.

Installing adapters

The computer contains five 66 MHz 64-bit and two 33 MHz 64-bit peripheral component interconnect (PCI) adapter slots.

Adapter considerations

Before you begin the adapter-installation procedure, do the following:

- Review the adapter documentation and follow those instructions in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that came with the adapter documentation.
- Determine if device drivers require that interrupts not be shared. For certain device drivers, it may be necessary to alter settings so that interrupts are not shared.
- Check PCI interrupt dependencies among slots and onboard devices.
- Install only PCI adapters that use IA-64 device drivers.

Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 13.

To install a PCI adapter, do the following:

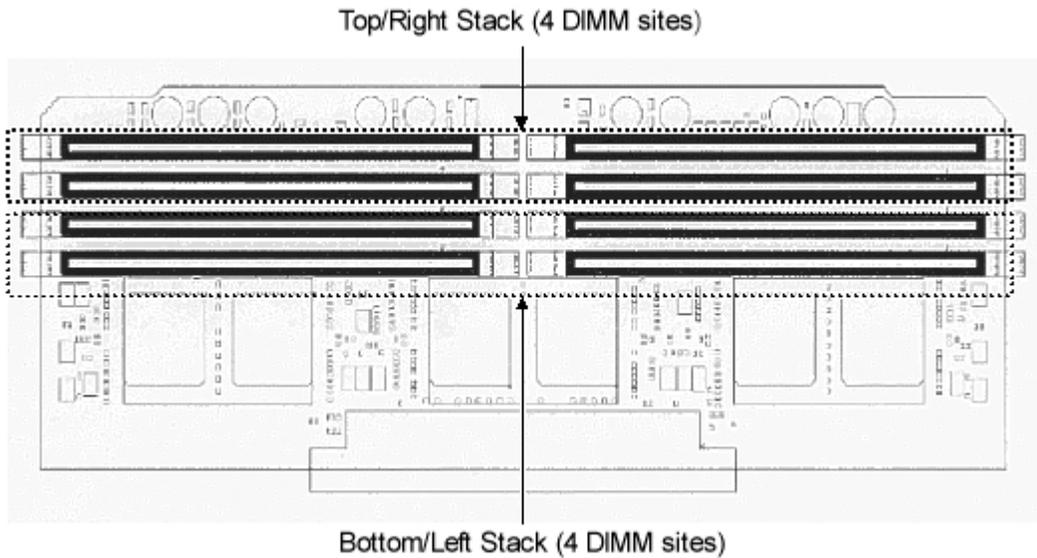
1. Review the information in “Before you begin” on page 13.
2. Turn off the computer and all attached devices. Disconnect all power cords and external cables and remove the side cover.
3. Loosen the thumbscrews on the system board cover and open the cover.
4. Remove the baseboard air baffle.
5. Determine which expansion slot you will use for the adapter.
Note: Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier for you to route cables before you install the adapter.
6. Remove the adapter from the static-protective package.
Attention: Avoid touching the components and gold-edge connectors on the adapter.
7. If you need to put down the adapter, place the adapter, component-side up, on a flat, static-protective surface.
8. Install the adapter:
 - a. Carefully grasp the adapter by its top edge or upper corners, and align it with the expansion slot on the system board.
 - b. Press the adapter firmly into the expansion slot.
9. Install the baseboard air baffle.
10. Install the system board cover.
11. Install the side cover.
12. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

Installing memory

Before you continue with the memory-installation procedure, review the following:

- Your computer comes with two memory boards. The system can operate with one or two memory boards installed. However, to gain maximum memory bandwidth, both boards must be installed.
- Each memory board contains eight DIMM connectors and supports 4-way memory interleaving.
- You must install DIMMs in sets of four. All the DIMMs in each set must be the same size and speed, but all the sets do not have to contain DIMMs of the same size and speed.
- Install only PC100 compliant 168-pin (x72) DIMMs. Only 256-MB, 512-MB, and 1-GB SDRAM DIMMs are supported.

The following illustration shows the location of the DIMM connectors on the memory board.

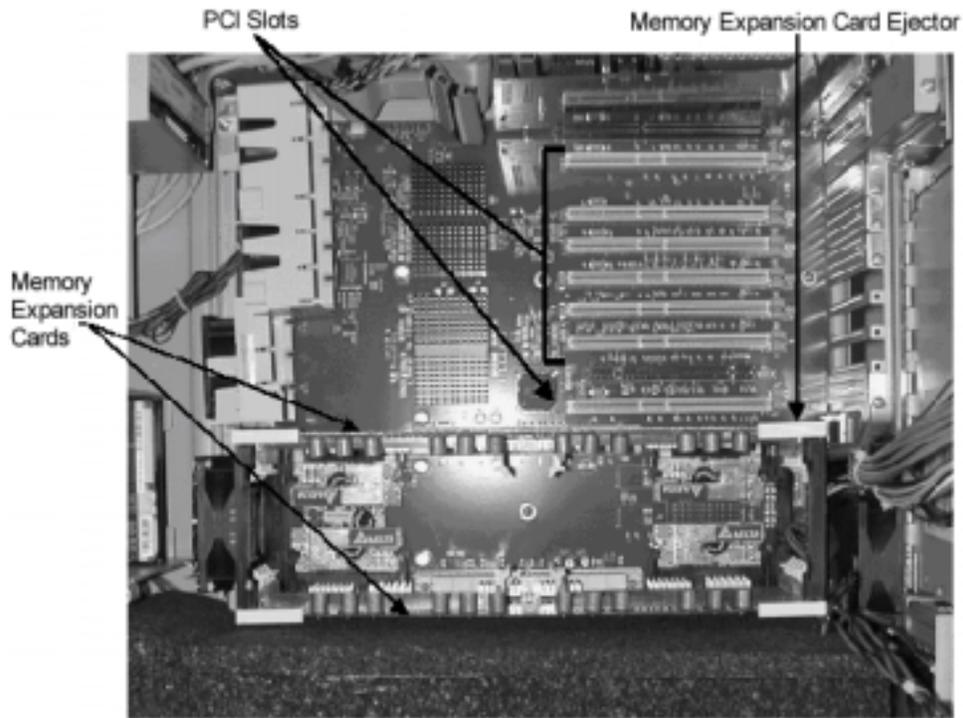


Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 13.

To install additional memory, do the following:

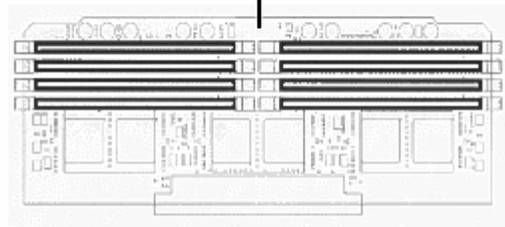
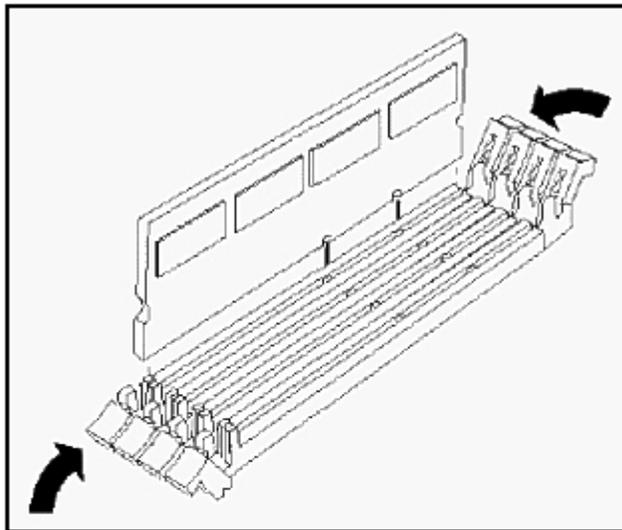
1. Review the information in “Before you begin” on page 13.
2. Turn off the computer and all attached devices. Disconnect all power cords and external cables, and then remove the side cover.
3. Loosen the two thumbscrews on the system board cover and open the cover.
4. Remove the baseboard air baffle.

5. Pull up on the ejector clips to remove the memory board.



6. Slide the board out of the computer.
7. Place the memory board on a static-protective surface, such as the static-protective package in which the option came.
8. Hold the DIMM by its edges and remove it from its anti-static package.

9. Position the DIMM above the connector and align the notches in the bottom-edge of the DIMM with the keys in the connector.



Memory Expansion Card

10. Insert the DIMM into the connector.
11. When the DIMM is seated, press down on the top-edge of the DIMM until the retaining clips snap into place.
12. Make sure that the clips are firmly in place.
13. Install the memory board:
 - a. Align it with the guides in the retention mechanism and slide it forward.
 - b. Press down on the ejector clips until the memory board is firmly in place.
14. Install the baseboard air baffle.
15. Install the system board cover.
16. Install the side cover.
17. Reconnect the external cables and power cord; then, turn on the attached devices and the computer.

Installing hard disk drives

Your computer supports five 1-inch (26 mm) slim, or three 1.6-inch (42 mm) half-high, SCSI or IDE hard disk drives in the hard disk drive cage.

Note: If you install an IDE hard disk drive with an active partition and with an operating system installed, the system will default to the IDE drive as the boot device even if the SCSI drive also has an operating system loaded.

Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 13.

To install a hard disk drive, do the following:

1. Review the information in “Before you begin” on page 13.
2. Turn off the computer and all attached devices. Disconnect all power cords and external cables, and remove the front bezel.
3. Remove the screws that secure the hard disk drive cage.



4. Slide the hard disk drive cage from the chassis.
5. Touch the static-protective bag containing the drive to any unpainted metal surface on the computer; then, remove the drive from the bag and place it on a static-protective surface.
6. Follow the manufacturer's directions for setting jumpers and other special requirements.
7. Align the mounting holes of the hard disk drive with the mounting holes on the drive cage and secure it with screws supplied with the hard disk drive. If you are installing a SCSI drive, attach the last connector of the SCSI cable to the SCSI drive.
8. Connect the power cable to the back of the drive.
9. Slide the hard disk drive cage into the chassis and reattach it with the screws.
10. Reconnect the external cables and power cord; then, turn on the attached devices and the computer.

Input/output connectors

This section provides information about the input/output (I/O) ports on the rear of your computer. These ports include the following:

- One video
- One keyboard
- One auxiliary pointing-device (mouse)
- One serial
- Two external SCSI
- One Ethernet
- Two Universal Serial Bus (USB)
- Three audio

Video connector

Your computer contains an SVGA controller that is fully compatible with industry video standards. The amount of video memory in your computer varies by model. You cannot add video memory to this system.

The following table shows the pin-number assignments for the video connector on the system board.

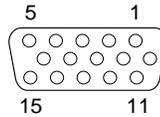
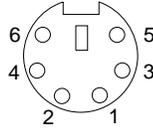


Table 2. Video connector pin-number assignments

Pin	Signal	Pin	Signal
1	Red	9	N/C
2	Green	10	GND
3	Blue	11	NC
4	N/C	12	DDCDAT
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCCLK
8	GND		

Keyboard connector

There is one keyboard port on the system board.



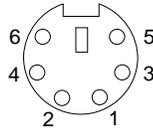
The following table shows the pin-number assignments for the keyboard connector on the system board.

Table 3. Keyboard connector pin-number assignments

Pin	Keyboard signal
1	KEYDAT
2	NC
3	GND
4	FUSED_VCC (+5 V)
5	KEYCLK
6	NC

Auxiliary-device (pointing device) connector

The system board has one auxiliary-device port that supports a mouse or other pointing device.



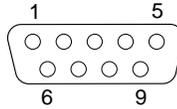
The following table shows the pin-number assignments for the auxiliary-device connector on the system board.

Table 4. Auxiliary-device connector pin-number assignments

Pin	Mouse signal
1	MSEDAT
2	NC
3	GND
4	FUSED_VCC (+5 V)
5	MSECLK
6	NC

Serial connector

Your computer has one standard serial (communication) port.



The following table shows the pin-number assignments for the serial-port connector on the system board. These pin-number assignments conform to the industry standard.

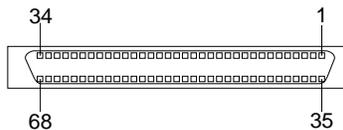
Table 5. Serial port connector pin-number assignments

Pin	Signal	Description
1	DCD	Data carrier detected
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RIA	Ring indication active

SCSI connectors

Your computer has two external small computer system interface (SCSI) ports.

Your computer has a dual-channel LVD SCSI controller. This controller supports two independent SCSI channels. Each of these channels support up to 15 SCSI devices. You can use the two external LVD SCSI channel connectors on the rear of your computer to connect different types of SCSI devices, such as drives or printers.



The following table shows the pin-number assignments for the 68-pin SCSI connector.

Table 6. Wide SCSI port connector pin-number assignments

Pin	Signal	Pin	Signal
1	S1 (+DB 12)	35	S35 (-DB 12)
2	S2 (-DB 13)	36	S36 (-DB 13)
3	S3 (+DB 14)	37	S37 (-DB 14)
4	S4 (+DB 15)	38	S38 (-DB 15)
5	S5 (+DB P1)	39	S39 (-DB P1)
6	S6 (+DB 0)	40	S40 (-DB 0)
7	S7 (+DB 1)	41	S41 (-DB 1)
8	S8 (+DB 2)	42	S42 (-DB 2)
9	S9 (DB 3)	43	S43 (-DB 3)
10	S10 (+DB 4)	44	S44 (-DB 4)
11	S11 (+DB5)	45	S45 (-DB 5)
12	S12 (+DB 6)	46	S46 (-DB 6)
13	S13 (+DB 7)	47	S47 (-DB 7)
14	S14 (+DB P)	48	S48 (-DB P)
15	S15	49	S49
16	S16 (DIFFSENS)	50	S50
17	S17 (TERMPWR)	51	S51 (TERMPWR)
18	S18 (TERMPWR)	52	S52 (TERMPWR)
19	S19 (RESERVED)	53	S53 (RESERVED)
20	S20	54	S54
21	S21 (+ATN)	55	S55 (-ATN)
22	S22	56	S56
23	S23 (+BSY)	57	S57 (-BSY)
24	S24 (+ACK)	58	S58 (-ACK)
25	S25 (+RST)	59	S59 (-RST)
26	S26 (+MSG)	60	S60 (-MSG)
27	S27 (+SEL)	61	S61 (-SEL)
28	S28 (+C/D)	62	S62 (-C/D)
29	S29 (+REQ)	63	S63(-REQ)
30	S30 (+I/O)	64	S64 (-I/O)
31	S31 (+DB 8)	65	S65 (-DB 8)
32	S32 (+DB 9)	66	S66(-DB 9)
33	S33 (DB 10)	67	S67 (-DB 10)
34	S34 (DB 11)	68	S68 (-DB 11)

Ethernet connector

Your computer comes with an integrated Ethernet controller. This controller provides an interface for connecting to 10-Mbps or 100-Mbps networks and provides full-duplex capability, which enables simultaneous transmission and reception of data on the Ethernet LAN.

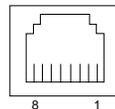
To access the Ethernet connector, attach a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of your computer.

Note: The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5.

Configuring the Ethernet controller: When you connect your computer to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps or 100 Mbps) on the network and then sets the controller to operate at the appropriate rate. In addition, if the Ethernet connector that your computer is connected to supports auto-negotiation, the Ethernet controller will set the appropriate duplex state. That is, the Ethernet controller will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). The controller supports HDX and FDX modes at both speeds.

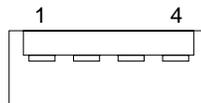
The Ethernet controller is integrated on the system board. You do not need to set any jumpers or configure the controller for your operating system before you use the Ethernet controller. However, you must install a device driver to enable your operating system to address the Ethernet controller.

Ethernet connector: There is an RJ-45 connector on the rear of the computer, see “Input/output connectors” on page 26 for the location of this connector.



Universal Serial Bus connectors

Your computer has two Universal Serial Bus (USB) connectors, which are configured automatically. USB is a serial interface standard for telephony and multimedia devices. It uses Plug and Play technology to determine the type of device that is attached to the connector.



Notes:

- If you attach a standard (non-USB) keyboard to the keyboard connector, the USB connectors and devices will be disabled during the power-on self-test.
- If you install a USB keyboard that has a mouse connector, the USB keyboard emulates a mouse, and you will not be able to disable the mouse settings in the Configuration/Setup Utility program.

USB cables and hubs: You need a 4-pin cable to connect devices to USB 2 or USB 3. If you plan to attach more than two USB devices, you must use a hub to connect the devices. The hub provides multiple connectors for attaching additional external USB devices.

USB technology transfers data at up to 12 megabits-per-second (Mbps) with a maximum of 127 external devices and a maximum signal distance of five meters (16 ft) per segment.

Audio connectors

The audio connectors are used to connect external audio equipment to your computer.

Line out

This connector is used to send audio signals from the computer to external devices, such as powered speakers with built-in amplifiers, headphones, multimedia keyboards, or the audio line-in connector on a stereo system.

Line in

This connector is used to accept audio signals into the computer from external devices, such as line output from a stereo, television, or musical instrument.

Mic

This connector is used to connect a microphone to your computer when you want to record voice or other sounds on the hard disk drive. It can also be used by speech recognition software.

Chapter 6. Solving problems

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

If you cannot locate and correct the problem using the information in this section, refer to “Getting help, service, and information” on page 49.

Diagnostic tools overview

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

- **POST error messages**

The power-on self-test (POST) generates messages to indicate successful test completion or the detection of a problem. See “POST” on page 34 for more information.

- **Diagnostic programs and error messages**

Diagnostic programs come with your computer on the Diagnostics CD. These programs are the primary method of testing the major components of your computer.

See “Diagnostic programs and error messages” on page 36 for more information.

- **Troubleshooting charts**

These charts list problem symptoms, and suggest steps to correct the problems. See “Troubleshooting charts” on page 40 for more information.

POST error codes

When you turn on your computer, it performs a series of tests to check the operation of computer components and some of the options installed in the computer. This series of tests is called the power-on self-test (POST).

The following table provides information about the POST error messages that can appear during startup.

Table 7. Post error codes

POST code (port 0x80)	POST code (port 0x81)	Description
01		Enter memory configuration transition state
	01	Configure SAC memory address space
	02	Configure PXB0 for memory address TOM and base
	03	Configure PXB1 for memory address TOM and base
	04	Configure F16s for IO space
	05	Configure memory mode, refresh rate, and cache size
	06	Configure DRAM information and population
	07	Configure memory ranges
	08	Configure memory addresses
	09	Configure memory sizes
	0a	Configure memory rows
	0b	Begin memory auto initialization
	0c	Execute memory reset for both memory cards
	0d	Enable memory range from 80000h to effffh for R/W access
02		Enter PID configuration transition state
	10	Configure PID SAPIC mode and memory map address
	11	Set I2BMST bit and enable serial IRQs bits for IRQ[1,4,12]
	12	Configure PCI mappings for INTIOs, INTIOs and serial IRQs
	13	Enable INTIO IRQs
	14	Enable Serial IRQ global and INTIO IRQ global
	15	Enable PID as a master for SAPIC mode
	16	Configure PID GPIOs
03		Enter IFB configuration transition state
	20	Configure IFB flash access to 4MB
	21	Program special cycle, XBCS, DMA, deterministic and master latency timer
	22	Configure ACPI base address
	23	Configure IFB GPIO base address and initialization
	24	Program IDE

POST code (port 0x80)	POST code (port 0x81)	Description
	25	Configure IRQ interrupt routings
	26	Configure LPC
	27	Configure SMBus
	28	Configure USB
	29	Enable 8259 initialization mode
04		Enter SIO transition state
	3A	set SIO GPIO attributes for address base configuration
	3B	set SIO GPIO attributes for GPIO10-17
	3C	set SIO GPIO attributes for GPIO20-27
	3D	set SIO GPIO attributes for GPIO30-37
	3E	set SIO GPIO attributes for GPIO40-43
	3F	set SIO GPIO attributes for GPIO50-57
	40	set SIO GPIO attributes for GPIO60-61
	41	set initial values for SIO GPIOs (input, output, LED)
	42	SIO – FDD
	43	SIO – Parallel Port
	44	SIO – Serial Port #1
	45	SIO – Serial Port #2 / DMA
	46	SIO – Keyboard
	47	SIO – Game Port
	48	SIO – MPU
	49	SIO – exit config.

Diagnostic programs and error messages

The system diagnostic programs are stored on the Diagnostics CD. These programs provide the primary methods of testing the major components of your computer.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing of complex problems that are indicated by error messages should be performed by trained service personnel.

Sometimes the first error to occur causes additional errors. In this case, the computer displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

The following sections contain the error codes that might appear in the detailed test log and summary log, when running the diagnostic programs.

The error code format is as follows:

fff-ttt-iii-date-cc-text message

where:

fff is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.

ttt is the three-digit failure code that indicates the exact test failure that was encountered. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

iii is the three-digit device ID. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

date is the date that the diagnostic test was run and the error recorded.

cc is the check value that is used to verify the validity of the information.

text message is the diagnostic message that indicates the reason for the problem.

Text messages

The diagnostic text message format is as follows:

Function Name: Result (test specific string)

where:

Function Name	is the name of the function being tested when the error occurred. This corresponds to the function code (fff) given in the previous list.
Result	can be one of the following:
Passed	This result occurs when the diagnostic test completes without any errors.
Failed	This result occurs when the diagnostic test discovers an error.
User Aborted	This result occurs when you stop the diagnostic test before it is complete.
Not Applicable	This result occurs when you specify a diagnostic test for a device that is not present.
Aborted	This result occurs when the test could not proceed because of the system configuration.
Warning	This result occurs when a possible problem is reported during the diagnostic test, such as when a device that is to be tested is not installed.
Test Specific String	This is additional information that is used to analyze the problem.

Starting the diagnostic programs

The diagnostics programs will isolate your hardware from software that you have installed on your hard disk drive. The programs run independently of the operating system. This method of testing is generally used when other methods are not accessible or have not been successful in isolating a problem suspected to be hardware related. A Diagnostics CD comes with your computer.

Using the diagnostics CD

To start the diagnostics using the CD, do the following:

1. Turn off your computer and any peripheral devices. Turn on all attached devices; then, turn on your computer.
2. Place the Diagnostics CD in the CD-ROM drive.
3. Follow the instructions on the screen to run the diagnostics.

Viewing the test log

The test log records data about system failures and other pertinent information. The test log will not contain any information until after the diagnostic program has run.

Do the following to view the test log:

1. Insert the diagnostics CD.
2. Shut down your operating system and restart the computer.
3. When the Diagnostic Programs screen appears, select **Utility**.
4. Select **View Test Log** from the list that is displayed; then, follow the instructions on the screen.
5. You can save the test log to a file on a diskette or to your hard disk drive.

Note: The system maintains the test-log data while the system is powered on. When you turn off the power to the server, the test log is cleared.

Diagnostic error message tables

The following tables provide descriptions of the error messages that might be listed in the test log after you run the diagnostic programs.

Attention: If diagnostic error messages appear that are not listed in the following tables, make sure that your system has the latest levels of BIOS, and diagnostics code.

Table 8. Diagnostic error codes

Code	Function	Result	Text message	Action
001	Core system	Failed	Processor board, ECC Test	Call for service.
			System board	
			Processor and system boards	
			Integrated serial port	
005	Video port		Integrated serial port	
011	Serial port		Integrated parallel port	
014	Parallel port			
015	USB interface	Aborted	Can NOT test USB interface while it is in use. Note: If you have a USB keyboard or mouse attached, you cannot run the diagnostic program for the USB interface.	<ol style="list-style-type: none"> 1. Turn off the system. 2. Replace the USB keyboard and mouse with a standard keyboard and mouse. 3. Turn on the system. 4. Run the diagnostic test again.
		Failed	System board	Call for service.
020	PCI interface	Failed	System board	Call for service.
030	SCSI interface	Failed	SCSI adapter in slot n failed register/counter/power test	Refer to the information provided with the adapter for instructions.
			SCSI controller on system board failed register/counter/power test	Call for service.
075	Power supply	Failed	Voltage sensed by the system is out of range	Call for service.

Code	Function	Result	Text message	Action
089	Microprocessor	Failed	Invalid microprocessor in slot xyz or BIOS setup problem (where xyz identifies the microprocessor that is causing the error message)	<ol style="list-style-type: none"> 1. Check the system error log for the related error messages. 2. If your system does not have the latest level BIOS installed, update the BIOS. 3. If the problem remains, replace the xyz microprocessor and run the test again. If the problem persists, call for service.
			Processor in socket id xyz is installed but not functioning (where xyz identifies the microprocessor that is causing the error message)	
			Microprocessor in socket id xyz (where xyz identifies the microprocessor that is causing the error message)	<ol style="list-style-type: none"> 1. Reseat the microprocessor. 2. If the problem remains, replace the microprocessor. If the problem persists, call for service.
			Processor in socket id xyz is defective (where xyz identifies the microprocessor that is causing the error message)	Replace the microprocessor. If the problem persists, call for service.
			Test setup error: Application microprocessor not installed or BIOS setup problem	<ol style="list-style-type: none"> 1. Verify that the application microprocessor is installed and seated correctly. 2. If your system does not have the latest level BIOS installed, update the BIOS. 3. If the problem remains, replace the application microprocessor and run the test again. If the problem persists, call for service.
			VRM corresponding to microprocessor in socket xyz is defective (where xyz identifies the microprocessor whose VRM is causing the error message)	Replace the VRM. If the problem remains, call for service.
			VRM corresponding to microprocessor in socket id xyz is not installed (where xyz identifies the microprocessor whose VRM is causing the error message)	Install a VRM. If the problem persists, call for service.
175	System thermal	Failed	Fan # <i>n</i> (where <i>n</i> is the number of the failing fan)	Replace the indicated fan.
			Temperature sensed on processor board is out of range	Call for service.
180	Status display	Failed	Any failure message	Call for service.

415	Analog/digital modem	Not applicable	No modem was detected	<ol style="list-style-type: none"> 1. Verify that the modem is properly attached to the system. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>
			PCI modem detected, but not enabled	<ol style="list-style-type: none"> 1. Change the configuration to enable the modem. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>
		Failed	Modem reset failed	<p>Replace the modem.</p> <p>If the problem persists, call for service.</p>
			No dial tone detected	<ol style="list-style-type: none"> 1. Make sure that the phone line attached to the modem has a dial tone. (Connect a phone to the line and listen, if necessary.) If there is no tone, have the phone line serviced. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>

Troubleshooting charts

You can use the troubleshooting charts in this section to find solutions to problems that have definite symptoms.

If you have just added new software or a new option and your computer is not working, do the following before using the troubleshooting charts:

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

Table 9. Troubleshooting charts

Symptom	Suggested action
Power light does not light	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The system is connected to a 110-240 V ac source. 2. The system is functioning properly. 3. The front panel cable is properly connected. <p>Note: If problem persists, call for service.</p>

System boots very slowly	<p>Make sure that the CACHE Enable jumper (J6C1) is set to CACHE On.</p> <p>Note: Booting to the EFI prompt takes approximately 45 seconds.</p>
No characters appear on the screen	<p>Verify that:</p> <ul style="list-style-type: none"> • The Num Lock light is functioning properly. • The video monitor is plugged in and turned on. Many modern video monitors shut down when inactive and may require a moment to warm up when activated. • The brightness and contrast controls on the video monitor are properly adjusted. • The video monitor switch settings are correct. • The video monitor signal cable is properly installed.
Characters are distorted or incorrect	<p>Verify that:</p> <ul style="list-style-type: none"> • The brightness and contrast controls are properly adjusted on the video monitor. Refer to the documentation that came with the monitor. • The video monitor signal and power cables are properly installed. • If the problem persists, the video monitor may be faulty or it may be an incorrect type. Refer to the documentation that came with the monitor.
System cooling fans do not rotate properly	<p>Verify that:</p> <ul style="list-style-type: none"> • AC power is available at the wall outlet. • The power cord is properly connected to the computer and the wall outlet. • The power-on light is lit. • The fan power connectors are properly connected to the system board. • There are no shorted or open wires caused by pinched cables or power connector plugs forced incorrectly into connectors. <p>If the problem persists, call for service.</p>
Hard disk drive activity light does not light	<p>Verify that:</p> <ul style="list-style-type: none"> • The power and signal cables are properly installed. • All switches and jumpers are set correctly. • The integrated IDE controller is enabled (IDE hard drives only). • The hard disk drive is properly configured. <p>Note: The hard disk drive activity light on the front panel lights when either an IDE hard disk drive or a SCSI device is in use.</p>

CD-RW drive activity light does not light	Verify that: <ul style="list-style-type: none"> • The power and signal cables to the CD-RW drive are properly installed. • All switches and jumpers on the drive are set correctly. • The drive is properly configured as the primary device. • The integrated IDE controller is enabled.
Startable CD-ROM is not detected	Verify that: <ul style="list-style-type: none"> • The BIOS is set to allow the CD-RW to be the first startable device. • A startable CD-ROM is in the CD-RW drive on system startup. • The peripheral bay is properly seated.

Software-generated error messages

These messages appear when a problem or conflict is detected by the application program, the operating system, or both. Error messages for operating system and other software problems are generally text messages, but they also can be numeric codes. For information about these software error messages, see the information supplied with the operating system and application program.

Table 10. Software-generated error messages

Symptom	Suggested action
Suspected software problem	<p>To determine if problems are caused by the software, verify that:</p> <ul style="list-style-type: none"> • Your computer has the minimum memory needed to use the software. For memory requirements, refer to the information that comes with the software. <p>Note: If you have just installed an adapter or memory, you might have a memory address conflict.</p> <ul style="list-style-type: none"> • The software is designed to operate on your system. • Other software works on your system. • The software that you are using works on another system. <p>If you received any error messages when using the software program, refer to the information that comes with the software for descriptions of the messages and solutions to the problem.</p> <p>If the items above are correct and the problem remains, contact your place of purchase.</p>

Troubleshooting the Ethernet controller

This section provides troubleshooting information for problems that might occur with the 10/100 Mbps Ethernet controller.

Network connection problems

If the Ethernet controller cannot connect to the network, check the following:

- Make sure that the cable is installed correctly.

The network cable must be securely attached at all connections. If the cable is attached but the problem persists, try a different cable.

If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.

If you directly connect two computers (without a hub), or if you are not using a hub with X ports, use a crossover cable.

Note: To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.

- Determine if the hub supports auto-negotiation. If not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the LAN activity light on the rear of the computer. The LAN activity light illuminates when the Ethernet controller sends or receives data over the Ethernet network. If the LAN activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.
- Make sure that you are using the correct device drivers, supplied with your system.
- Check for operating system-specific causes for the problem.
- Make sure that the device drivers on the client and system are using the same protocol.
- Test the Ethernet controller.

The way you test the Ethernet controller depends on which operating system you are using (see the Ethernet controller device driver README file).

Ethernet controller troubleshooting chart

You can use the following troubleshooting chart to find solutions to 10/100 Mbps Ethernet controller problems that have definite symptoms.

Table 11. Ethernet controller troubleshooting chart

Ethernet controller problem	Suggested action
The system stops running when loading device drivers.	<p>The PCI BIOS interrupt settings are incorrect.</p> <p>Check the following:</p> <ul style="list-style-type: none"> • Determine if the IRQ setting assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program. • Make sure that you are using the most recent device driver available from the World Wide Web. • Run the network diagnostic program. <p>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet controller or the other device.</p> <p>If the problem persists, call for service.</p>
The LAN activity light does not light	<p>Do the following:</p> <ul style="list-style-type: none"> • Make sure that you have loaded the network device drivers. • Run diagnostics on the LEDs. <p>Note: The function of this LED can be changed by device driver load parameters. If necessary, remove any LED parameter settings when you load the device drivers.</p>
Data is incorrect or sporadic	<p>Check the following:</p> <ul style="list-style-type: none"> • Make sure that you are using Category 5 cabling when operating the system at 100 Mbps. • Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.

Ethernet controller problem	Suggested action
The Ethernet controller stopped working when another adapter was added to the system	<p>Do the following:</p> <ul style="list-style-type: none"> • Make sure that the cable is connected to the Ethernet controller. • Make sure that your PCI system BIOS code is current. • Reseat the adapter and determine if the IRQ setting assigned to the Ethernet adapter is also assigned to another device in the Configuration/Setup Utility program. <p>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device.</p> <p>If the problem remains, call for service.</p>
The Ethernet controller stopped working without apparent cause	<p>Do the following:</p> <ul style="list-style-type: none"> • Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. Refer to your operating system documentation. <p>If the problem persists, call for service.</p>

NDIS 4.0 (Windows NT) driver driver messages

This section contains the error messages for the NDIS 4.0 device drivers. The explanation and recommended action are included with each message.

Table 12. NDIS 4.0 (Windows NT) device driver messages

Error code (hex)	Description
0x00	<p>Explanation: The device driver could not register the specified interrupt.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that a PCI interrupt is assigned to your Ethernet adapter, and that Ethernet is enabled.</p>
0x01	<p>Explanation: One of the PCI adapters did not get the required resources.</p> <p>Action: Using the BIOS Setup Utility program, make sure that a PCI interrupt is assigned to your Ethernet adapter, and that Ethernet is enabled.</p>
0x02	<p>Explanation: Bad node address (multicast address).</p> <p>Action: Make sure the locally administered address is valid, if one is specified. The address cannot be a multicast address.</p>

Error code (hex)	Description
0x03	<p>Explanation: Failed self-test.</p> <p>Action: Make sure a cable is attached to the Ethernet connector. If the problem persists, call for service.</p>
0x0D	<p>Explanation: Could not allocate enough memory for transmit queues.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows NT desktop, click Start --> Control Panel --> Networks --> Adapters. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties --> Advanced. 4. Lower the resource values that apply to the transmit queue.
0x0E	<p>Explanation: Could not allocate enough memory for other structures.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows NT desktop, click Start --> Control Panel --> Networks --> Adapters. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties --> Advanced. 4. Lower the value for the resource named in the message.
0x0F	<p>Explanation: Could not allocate enough memory for other structures.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows NT desktop, click Start --> Control Panel --> Networks --> Adapters. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties --> Advanced. 4. Lower the value for the resource named in the message.
0x10	<p>Explanation: Did not find any Ethernet controllers.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x11	<p>Explanation: Multiple Ethernet controllers found, but none matched the required ID.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x13	<p>Explanation: Did not find any Ethernet controllers that matched the required subven/subdev.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x16	<p>Explanation: Single adapter found, but multiple instances tried to load.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled, and that the slot containing the IBM IntelliStation 10/100 Ethernet Adapter or the IBM 10/100 Etherjet PCI adapter is enabled.</p>

Error code (hex)	Description
0x17	Explanation: Slot parameter not specified in the registry. Action: Remove the adapter device driver and reinstall it. If the problem persists, call for service.
All other 4-character hexadecimal codes	Action: Call for service.

NDIS (Windows NT) device driver messages for the Ethernet controller

This section displays the messages associated with Ethernet teaming.

Table 13. NDIS (Windows NT) device driver messages for the Ethernet controller

Event ID	Type	Description
01	Error	Explanation: Team name and physical adapter name are the same. This is an invalid configuration. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
02	Error	Explanation: Unable to allocate required resources. Action: Free some memory resources and restart.
03	Error	Explanation: Unable to read required registry parameters. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
04	Error	Explanation: Unable to bind to physical adapter. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
05	Error	Explanation: Unable to initialize an adapter team. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
06	Informational	Explanation: Team nn. Primary adapter is initialized. Action: None.
07	Informational	Explanation: Team nn. Secondary adapter is initialized. Action: None.

Event ID	Type	Description
08	Informational	Explanation: Team nn. Virtual adapter or team is initialized. Action: None.
09	Informational	Explanation: Team nn. Primary adapter is switching over. Action: None.
11	Informational	Explanation: Team nn. Secondary adapter took over. Action: None.
12	Warning	Explanation: Team nn. Secondary adapter is deactivated from the team. Action: Make sure the secondary adapter is functioning properly and that the adapter cable is securely connected to the LAN
13	Informational	Explanation: Team nn. Secondary adapter has rejoined the team. Action: None.
14	Informational	Explanation: Team nn. Secondary adapter link is working. Action: None.
15	Error	Explanation: Team nn. The last adapter has lost its link. Network connection has been lost. Action: Shut down the computer and replace the adapters; then, restart the system to reestablish the connection.
16	Informational	Explanation: Team nn. An adapter has reestablished the link. Network connection has been restored. Action: None.
17	Informational	Explanation: Team nn. Preferred primary adapter has been detected. Action: None.
18	Informational	Explanation: Team nn. Preferred secondary adapter has been detected. Action: None.
19	Informational	Explanation: Team nn. Preferred primary adapter took over. Action: None.
20	Informational	Explanation: Team nn. Preferred secondary adapter took over. Action: None.
21	Warning	Explanation: Team nn. Primary adapter does not sense any Probes. Possible reason: partitioned team. Action: Make sure the cables of the adapter team are connected to the same LAN segment. Reconfigure the team if necessary.

Getting help, service, and information

If you need help, service, 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 computer, and whom to call for service should it be necessary.

Getting information

Information about your IBM computer and preinstalled software, if any, is available in the documentation that comes with your computer. That documentation includes printed books, online books, README files, and help files. In addition, information about IBM products is available on the World Wide Web and through the IBM Automated Fax System.

Using the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM Personal Computer products and support. The address for the IBM Personal Computing home page is <http://www.ibm.com/pc>.

You can find support information for your IBM products, including supported options, at <http://www.ibm.com/pc/support>.

If you select Profile from the support page, you can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable Files. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products.

You also can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

Getting information by fax

If you have a touch-tone telephone and access to a fax machine, in the U.S. and Canada you can receive by fax marketing and technical information on many topics, including hardware, operating systems, and local area networks (LANs).

You can call the IBM Automated Fax System 24 hours a day, 7 days a week. Follow the recorded instructions, and the requested information will be sent to your fax machine. In the U.S. and Canada, to access the IBM Automated Fax System, call 1-800-426-3395.

Getting help and service

If you have a problem with your computer, you will find a wide variety of sources available to help you.

Using the documentation and diagnostic programs

Many computer problems can be solved without outside assistance. If you experience a problem with your computer, the first place to start is the troubleshooting information of your computer documentation. If you suspect a software problem, see the documentation, including README files and online help, that comes with the operating system or application program.

Most IBM computers and servers come with a set of diagnostic programs that you can use to help you identify hardware problems. See the troubleshooting information of your computer documentation for instructions on using the diagnostic programs.

The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support> and follow the instructions.

Calling for service

If you have tried to correct the problem yourself and still need help, during the warranty period, you can get help and information by telephone through the IBM PC HelpCenter®. The following services are available during the warranty period:

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.
- IBM hardware repair - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.
- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make selected Engineering Changes (ECs) available that apply to your hardware.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts
Note: All warranted parts contain a 7-character identification in the format IBM FRU XXXXXXXX.
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to your IBM hardware warranty for a full explanation of IBM warranty terms. Be sure to retain your proof of purchase to obtain warranty service.

In the U.S. and Canada, these services are available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9:00 a.m. to 6:00 p.m.

Note: Response time will vary depending on the number and complexity of incoming calls.

If possible, be at your computer when you call. Please have the following information ready:

- Machine Type and Model
- Serial numbers of your IBM hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

Phone numbers are subject to change without notice. For the most up-to-date phone numbers, go to <http://www.ibm.com/pc/support> and click **HelpCenter Phone List**.

Country		Telephone Number
Austria	Österreich	01-24 692 5901
Belgium - Dutch	Belgie	02-210 9820
Belgium - French	Belgique	02-210 9800
Canada	Toronto only	416-383-3344
Canada	Canada - all other	1-800-565-3344
Denmark	Danmark	35 25 02 91
Finland	Suomi	09-22 931 840
France	France	01 69 32 40 40
Germany	Deutschland	069-6654 9040
Ireland	Ireland	01-815 9200
Italy	Italia	02 4827 5040
Luxembourg	Luxembourg	298-977 5063
Netherlands	Nederland	020-504 0501
Norway	Norge	23 05 32 40
Portugal	Portugal	21-791 51 47
Spain	España	91-662 49 16
Sweden	Sverige	08-751 52 27
Switzerland	Schweiz/Suisse/Svizzera	0848-80 52 52
United Kingdom	United Kingdom	01475-555 055
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227

In all other countries, contact your IBM reseller or IBM marketing representative.

Other services

IBM Update Connector is a remote communication tool that you can use with some IBM computers to communicate with the HelpCenter. Update Connector® enables you to receive and download updates for some of the software that might come with your computer.

With some computer models, you can register for International Warranty Service. If you travel with your computer or need to move it to another country, you might be able to receive an International Warranty Service Certificate that is honored virtually worldwide, wherever IBM or IBM resellers sell and service IBM products.

For more information or to register for International Warranty Service:

- In the U.S. or Canada, call 1-800-497-7426.
- In Europe, call 44-1475-893638 (Greenock, U.K.).
- In Australia and New Zealand, call 61-2-9354-4171.
- In all other countries, contact your IBM reseller or IBM marketing representative.

IBM Integrated Technology Services offers a broad range of information technology support, implementation, and management services. For more information about these services, refer to the Integrated Technology Services Web site at <http://www.ibm.com/services/its>.

For technical assistance with the installation of, or questions related to, Service Packs for your preinstalled Microsoft Windows product, refer to the Microsoft Product Support Services Web site at <http://support.microsoft.com/directory/>, or you can contact the IBM HelpCenter. Some fees might apply.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for IBM and non-IBM hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country.

For more information about these services, see the online information.

Appendix A. Warranties and notices

This chapter contains warranty and emission notices. It also contains trademarks and general-information notices.

Warranty Information

Warranty Period

Machine – IntelliStation Z Pro model 6894

Warranty Period* - Three Years

* Contact your place of purchase for warranty service information. Some IBM Machines are eligible for On-site warranty service depending on the country where service is performed.

IBM Statement of Limited Warranty

Z125-4753-06 8/2000

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 -General Terms and Part 2 –Country-unique Terms. The terms of Part 2 replace or modify those of Part 1. The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM 's Official Published Specifications ("Specifications"). The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise. If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse accident, modification, unsuitable physical or operating environment, improper maintenance by you ,or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

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EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for a Machine, contact IBM or your reseller. If you do not register your Machine with IBM, you may be required to present proof of purchase. During the warranty period, IBM or your reseller, if approved by IBM to provide warranty service, provides without charge certain types of repair and exchange service to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. At its discretion, IBM or your reseller will 1) either repair or exchange the failing Machine and 2) provide the service either at your location or a service center. IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

Some parts of IBM Machines are designated as Customer Replaceable Units (called "CRUs"), e.g., keyboards, memory, or hard disk drives. IBM ships CRUs to you for replacement by you. You must return all defective CRUs to IBM within 30 days of your receipt of the replacement CRU. You are responsible for downloading designated Machine Code and Licensed Internal Code updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided:
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides;
 - b. secure all programs, data, and funds contained in a Machine;
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations; and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges. Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Limitation of Liability

Circumstances may arise where, because of a default on IBM 's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim),except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

1. damages for bodily injury (including death)and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the charges (if recurring,12 months ' charges apply)for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

This limit also applies to IBM 's suppliers and your reseller. It is the maximum for which IBM, its suppliers ,and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES, LOST PROFITS OR LOST SAVINGS, EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAM-AGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Governing Law

Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM 's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Part 2 - Country-unique Terms

AMERICAS

BRAZIL

Governing Law: *The following is added after the first sentence:*

Any litigation arising from this Agreement will be settled exclusively by the court of Rio de Janeiro.

NORTH AMERICA

Warranty Service: *The following is added to this Section:*

To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

CANADA

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws in the Province of Ontario.

UNITED STATES

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York.

ASIA PACIFIC

AUSTRALIA

The IBM Warranty for Machines: *The following paragraph is added to this Section:*

The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

Limitation of Liability: *The following is added to this Section:*

Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974 or other similar legislation, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State or Territory.

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York.

The following is added to this Section:

Disputes and differences arising out of or in connection with this Agreement shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own competence and on the validity of the Agreement to submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law. All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator.

The two arbitrators appointed by the parties shall appoint a third arbitrator before proceeding upon the reference. The third arbitrator shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the ICC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

The English language version of this Agreement prevails over any other language version.

HONG KONG AND MACAU

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of Hong Kong Special Administrative Region.

INDIA

Limitation of Liability: The following replaces items 1 and 2 of this Section:

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;

2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Limited Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

JAPAN

Governing Law: *The following sentence is added to this Section:*

Any doubts concerning this Agreement will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

NEW ZEALAND

The IBM Warranty for Machines: *The following paragraph is added to this Section:*

The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: *The following is added to this Section:*

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law: *The following replaces this Section:*

Both you and IBM consent to the application of the laws of the State of New York (except when local law requires otherwise) to govern, interpret, and enforce all your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Any disputes arising from or in connection with this Agreement will first be resolved by friendly negotiations, failing which either of us has the right to submit the dispute to the China International Economic and Trade Arbitration Commission in Beijing, the PRC, for arbitration in accordance with its arbitration rules in force at the time. The arbitration tribunal will consist of three arbitrators. The language to be used therein will be English and Chinese. An arbitral award will be final and binding on all the parties, and will be enforceable under the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958).

The arbitration fee will be borne by the losing party unless otherwise determined by the arbitral award.

During the course of arbitration, this Agreement will continue to be performed except for the part which the parties are disputing and which is undergoing arbitration.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:

The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

Warranty Service:

If you purchase an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM. If you purchase an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that

Machine in any of those countries from either (1)an IBM reseller approved to perform warranty service or (2)from IBM.

If you purchase an IBM Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM authorized ser-vice provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM authorized service provider.

Governing Law:

The applicable laws that govern, interpret and enforce rights, duties, and obligations of each of us arising from, or relating in any manner to, the subject matter of this Statement, without regard to conflict of laws principles, as well as Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided, except that in 1) Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Romania, Slovakia,Slovenia,Armenia,Azerbaijan,Belarus,Georgia,Kazakhstan,Kyrgyzstan, Moldova ,Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan, the laws of Austria apply;2)Estonia, Latvia, and Lithuania, the laws of Finland apply;3)Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo Djibouti, Democratic Republic of Congo, Equatorial Guinea, France, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia, this Agreement will be construed and the legal relations between the parties will be determined in accordance with the French laws and all disputes arising out of this Agreement or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris;4)

Angola,Bahrain,Botswana,Burundi,Egypt,Eritrea,Ethiopia,Ghana,Jordan,Kenya, Kuwait,Liberia,Malawi,Malta,Mozambique,Nigeria,Oman,Pakistan,Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe, this Agreement will be governed by English Law and disputes relating to it will be submitted to the exclusive jurisdiction of the English courts; and 5)in Greece, Israel, Italy, Portugal, and Spain any legal claim arising out of this Statement will be brought before, and finally settled by, he competent court of Athens, Tel Aviv, Milan, Lisbon, and Madrid, respectively.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

The IBM Warranty for Machines: *The following replaces the first sentence of the first paragraph of this Section:*

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine 's conformity to its Specifications.

The following paragraphs are added to this Section:

The minimum warranty period for Machines is six months. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: *The second paragraph does not apply.*

Warranty Service: *The following is added to this Section:*

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM 's expense.

Limitation of Liability: *The following paragraph is added to this Section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *The following replaces item 2 in this Section:*

as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

Applicability of suppliers and resellers (unchanged).

FRANCE

Limitation of Liability: *The following replaces the second sentence of the first paragraph of this Section:*

In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged)

IRELAND

Extent of Warranty: *The following is added to this Section:*

Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: *The following replaces items one and two of the first paragraph of this Section:*

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and
2. the amount of any other actual direct damages, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section:

IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY

Limitation of Liability: *The following replaces the second sentence in the first paragraph:*

In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than:

1. (unchanged)
2. as to any other actual damage arising in all situations involving nonperformance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

The following replaces the third paragraph of this Section:

Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: (items 1 and 2 unchanged) 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

Limitation of Liability: *The following is added to this Section:*

IBM's entire liability to you for actual damages arising in all situations involving non-performance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

UNITED KINGDOM

Limitation of Liability: *The following replaces items 1 and 2 of the first paragraph of this Section:*

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence;
2. the amount of any other actual direct damages or loss, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim;

The following item is added to this paragraph:

3. breach of IBM's obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

Applicability of suppliers and resellers (unchanged).

The following is added to the end of this Section:

IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

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Important notes

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

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

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

Unless otherwise stated, IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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

Electronic emission notices

Federal Communications Commission (FCC) Statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

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

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

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

Taiwan electrical emission statement

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

Japanese Voluntary Control Council for Interference (VCCI) statement

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基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を
引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求
されることがあります。

Power cords

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
6952301	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

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