

IntelliStation Z Pro

User Guide

Professional Workstation (Type 6865)

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Note

Before using this information and the product it supports, be sure to read the general information under Appendix B, "Product Warranties and Notices" on page 123.

First Edition (September 1998)

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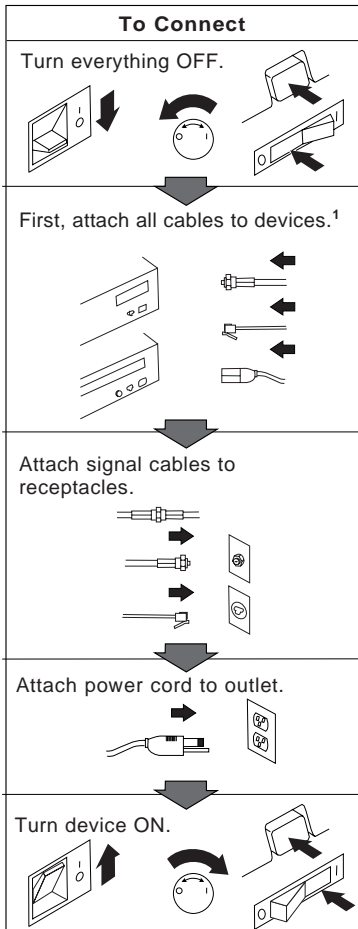
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Safety Information

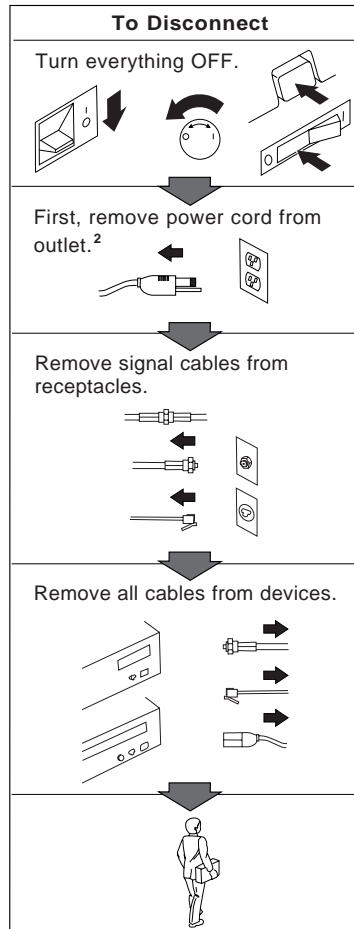


DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



¹ In the U.K., by law, the telephone cable must be connected after the power cord.



² In the U.K., by law, the power cord must be disconnected after the telephone line cable.

Danger

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.

Laser Compliance Statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive is installed, note the following.

CAUTION:

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

Removing the covers of the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not remove the CD-ROM drive covers.**

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

DANGER

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

Lithium Battery Notice

CAUTION:

Danger of explosion if battery is incorrectly replaced.

When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the 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.

ATTENTION

Danger d'explosion en cas de remplacement incorrect de la batterie.

Remplacer uniquement par une batterie IBM de type 33F8354 ou d'un type équivalent recommandé par le fabricant. La batterie contient du lithium et peut exploser en cas de mauvaise utilisation, de mauvaise manipulation ou de mise au rebut inappropriée.

Ne pas :

- **Lancer ou plonger dans l'eau**
- **Chauffer à plus de 100°C (212°F)**
- **Réparer ou désassembler**

Mettre au rebut les batteries usagées conformément aux règlements locaux.

Related Information

The following documentation, together with this document, contains information about your computer.

- *Understanding Your IntelliStation Z Pro*
This online publication (provided on the *Ready-to-Configure Utility Program CD* that comes with your computer) includes general information about using personal computers and in-depth information about the specific features of your computer. This document is also available as part of the IBM-preinstalled software.
- *About Your Software*
This publication (provided only with computers that have IBM-preinstalled software) contains information about the preinstalled software package.
- Intergraph PCI graphics adapter README File
This file on the *Ready-to-Configure Utility Program CD* contains instructions for installing device drivers for the Intergraph adapter installed in some models.
- Matrox AGP Adapter README File
This file on the *Ready-to-Configure Utility Program CD* contains instructions for installing device drivers for the Matrox AGP Adapter installed in some models.
- IBM Audio Feature README File
This file on the *Ready-to-Configure Utility Program CD* contains instructions for installing device drivers for the integrated audio controller.
- Ethernet Feature README File
This file on the *Ready-to-Configure Utility Program CD* contains instructions for installing device drivers for the integrated Ethernet controller.
- Adaptec SCSI Documentation
This documentation, included on the *Ready-to-Configure Utility Program CD*, contains information about installing SCSI device drivers, configuring the Adaptec SCSI adapter, and instructions for installing and configuring SCSI devices.

The following publications contain more information about your computer.

- *Hardware Maintenance Manual*

This publication contains information for trained service technicians. It can be found on the World Wide Web at:

<http://www3.pc.ibm.com/support?page=IBM+IntelliStation>

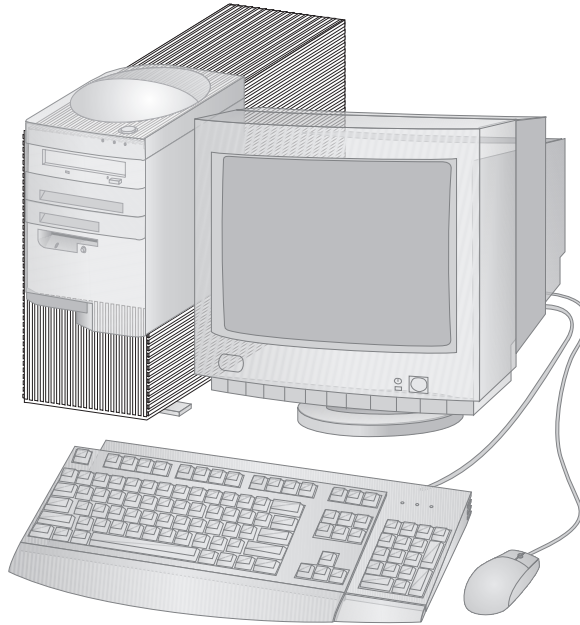
It can also be ordered from IBM. To purchase a copy, refer to Chapter 9, “Getting Help, Service, and Information” on page 109.

- *Technical Information Manual*

This publication contains information for individuals who want to know more about the technical aspects of their computer. It can be found on the World Wide Web at:

<http://www.pc.ibm.com/us/intellistation/>

Chapter 1. IBM IntelliStation Z Pro Overview



Thank you for selecting an IBM IntelliStation Z Pro. Your computer incorporates many of the latest advances in computer technology and is easy to expand and upgrade as your needs change.

This section provides an overview of the computer features, preinstalled software, and system specifications.

Features at a Glance

The following information covers a variety of models. For a listing of features for your specific model, refer to the System Summary screen in the *Ready-to-Configure Utility Program CD*. See Chapter 5, “Using the Configuration/Setup Utility Program” on page 27 for more information.

Microprocessor

- Intel® Pentium® II Xeon™ microprocessor
- Support for dual microprocessors

Memory

- Support for:
 - 3.3 V, synchronous, 168-pin, dual in-line (DIMM), registered, 100 MHz SDRAM with ECC
 - A maximum of 2048 MB (2 GB)
 - 128 MB, 256 MB, and 512 MB registered DIMMs
 - DIMM heights up to 2.5 inches
- Flash memory for system programs

L2 Cache Memory

- Up to 2 MB of L2 cache memory integrated into microprocessor

Removable Media Drives

- Standard: One 3.5-inch, 1.44 MB diskette drive
- Maximum: Two diskette drives and one tape backup drive
- Options: 5.25-inch, 1.2 MB diskette drive; 3.5-inch, 1.44 MB diskette drive; internal tape drive

Internal Hard Disk Drives

- Standard: One SCSI hard disk drive
- Maximum IDE and EIDE devices: Four total (includes CD-ROM drive)
- Maximum SCSI devices: Refer to the SCSI documentation on the *Ready-to-Configure Utility Program CD* that comes with your computer.

CD-ROM Drive

- One IDE CD-ROM drive

Video Subsystem

- One of the following is installed:
 - Matrox AGP graphics adapter
 - Intergraph PCI graphics adapter

Audio Subsystem

- Integrated Crystal 4235 audio subsystem
- SoundBlaster applications supported

Ethernet Subsystem

- Integrated Ethernet controller with Wake on LAN
- Provides both 10BASE-T and 100BASE-TX connectivity

System Management

- RPL (remote program load) and DHCP (dynamic host configuration protocol)
- Wake on LAN, wake up on ring, and wake up on alarm
- Alert on LAN (supported on certain models)
- Update POST and BIOS over the network
- Automatic power-on startup sequence
- Desktop Management Interface (DMI) BIOS and DMI software
- Store POST hardware test results
- Remote reset from LAN
- Built-in system-management hardware (temperature sensors, fan-speed monitor, chassis-intrusion detector, power supply and processor voltage monitor, and power-switch bypass)

Input/Output Features

- 25-pin, ECP/EPP parallel port
- Two 9-pin, 16550 UART serial ports
- Two 4-pin, USB ports
- Mouse port
- Keyboard port
- 15-pin monitor port (on graphics adapter)
- Three audio ports (line in, line out, and microphone)
- Ethernet RJ-45 port

Expansion

- Seven drive bays
- Seven expansion slots (one dedicated AGP, five dedicated PCI, and one shared PCI/ISA)
- Support for PCI/ISA Plug and Play adapters
- Support for dual microprocessors
- Support for additional internal and external SCSI devices (the number of internal devices that can be installed is limited by the number of available drive bays and power and cooling requirements)

Power

- 330 W, 115/230 V ac, 50/60 Hz
- Automatic ac voltage sensing in power supply
- Built-in overload and surge protection
- Advanced Power Management
- Wake on LAN support

Security

- AssetCare
- Asset ID
- Power-on and administrator passwords
- Lockable cover
- U-bolt
- Startup sequence control
- Startup without diskette drive, keyboard, or mouse
- Unattended start mode
- Diskette and hard disk I/O control
- Serial and parallel port I/O control

IBM Preinstalled Software

Your computer might come with preinstalled software. If so, an operating system, device drivers to support built-in features, and other support programs are included. See *About Your Software* for a detailed description of the preinstalled software.

IBM ViaVoice Gold

ViaVoice Gold is continuous speech dictation and desktop navigation CD-ROM software that comes with your computer. If you experience problems using ViaVoice Gold when Microsoft Internet Explorer 4.0 is installed, see the READ1ST.TXT file in the appropriate language folder on the ViaVoice Gold CD-ROM.

Operating Systems (Supported)

- Microsoft Windows NT Version 4.0
- Microsoft Windows 95
- Microsoft Windows 98

Operating Systems (Tested for Compatibility)¹

- IBM DOS Version 7.0
- MS DOS Versions 6.2, 7.0
- Novell NetWare Versions 3.12, 4.11
- SCO OpenServer 5.0.4
- Solaris V2.6
- DEC PathWorks V5
- DEC Net

¹ The operating systems listed here are being tested for compatibility at the time this publication goes to press. Additional operating systems might be identified by IBM as compatible with your computer following the publication of this booklet. Corrections and additions to the list are available in IBM's online compatibility report, which can be found on the World Wide Web. For World Wide Web pages, see Chapter 9, "Getting Help, Service, and Information" on page 109.

Euro Sign Support Information

The *Euro Sign* is the name given to the proposed currency symbol of the European Union. According to the European Commission, the Euro will exist as a currency beginning 1 January 1999, but will only gradually move into general use with the introduction of coins and notes in 2002.

IBM and various other personal computer industry companies plan to support the Euro Sign on products released in 1999. For support information on products released prior to that date, see the appropriate Web site for your product.

For your computer to support the Euro Sign, a proper combination of both hardware (computer, keyboard, and printer) and software (operating systems, application programs, and device drivers) is required.

There are many Web sites that provide Euro Sign information and support (some are listed below). First, determine the computer hardware and software you are using. Then, visit the Web sites that apply to your system for the latest Euro Sign information and support. In many cases, updates are available for Euro Sign support. These updates can be downloaded and installed on your computer.

- <http://www.adobe.com>
- <http://www.ibm.com>
- <http://www.microsoft.com/europe/euro>
(The “euro product update” is available for Windows 95 and Window NT)

System Specifications

Size

- Depth: 460 mm (18.1 in.)
- Width: 200 mm (7.9 in.)
- Height: 492 mm (19.4 in.)

Weight

- Maximum configuration (as shipped): 20.5 kg (45 lb)

Environment

- Air temperature:
 - System on: 10° to 32°C (50° to 95°F) at altitude 0–2134 m (7000 ft)
 - System off: –40° to 70°C (–40° to 158°F)
- Humidity:
 - System on: 8% to 80%
 - System off: 8% to 80%

Heat Output

- Approximate heat output in British thermal units (Btu) per hour:
 - Maximum configuration (as shipped): 361 Btu/hour (106 watts)
 - Maximum configuration (theoretical)²: 1564 Btu/hour (460 watts)

Electrical Input

- Sine-wave input (50/60 Hz) is required
- Input voltage/current:
 - Low range:
 - Minimum: 100 V ac
 - Maximum: 127 V ac
 - Current rating: 5.0 amps
 - High range:
 - Minimum: 200 V ac
 - Maximum: 240 V ac
 - Current rating: 3.0 amps
 - Input kilovolt-amperes (kVA) (approximately):
 - Maximum (configuration as shipped): 0.75 kVA

² Under typical maximum configurations, the heat output will be substantially below the theoretical maximum.

Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

Acoustical Noise-Emission Values

- Average sound-pressure levels:
 - At operator position:
 - 40 dBA idle
 - 44 dBA operating
 - At bystander position–1 meter (3.3 ft):
 - 37 dBA idle
 - 40 dBA operating
- Declared (upper limit) sound power levels:
 - 5.2 bels idle
 - 5.5 bels operating

These levels were measured in controlled acoustical environments according to procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779, and are reported in accordance with ISO 9296.

Actual sound-pressure levels in your location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound power levels indicate an upper limit, below which a large number of computers will operate.

Chapter 2. Setting Up Your Computer

This section provides information for connecting cables to your computer and turning on the power.

Before You Begin

Read the “Electrical Safety” on page 59 before setting up your computer.

CAUTION: Weight exceeds 40 lbs. (18.1 kg.)

You will need the following:

- Computer
- Computer power cord
- Keyboard
- Mouse
- Monitor (sold separately with signal cable and power cord)

If you are missing an item, contact your place of purchase.

Installing Options

Set up and start your computer before installing any internal options (such as memory or an adapter). Refer to Chapter 7, “Installing Options Overview” on page 59 for option installation instructions.

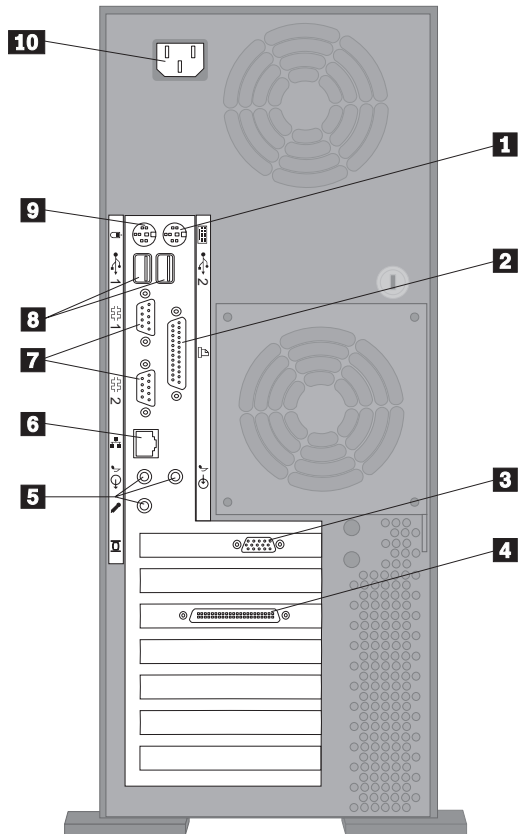
Important: Be sure that you set up any additional devices according to the manufacturer's instructions before you attach their cables to the connectors on the computer.

Locating Your Computer

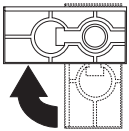
Make sure you have an adequate number of properly grounded electrical outlets for the computer, monitor, and any other devices. Select a location for the computer where it will remain dry. Leave about 50 mm (2 in.) of space around the computer for proper air circulation.

For information about arranging your computer for comfort and ease-of-use, refer to Chapter 3, “Arranging Your Workspace” on page 13.

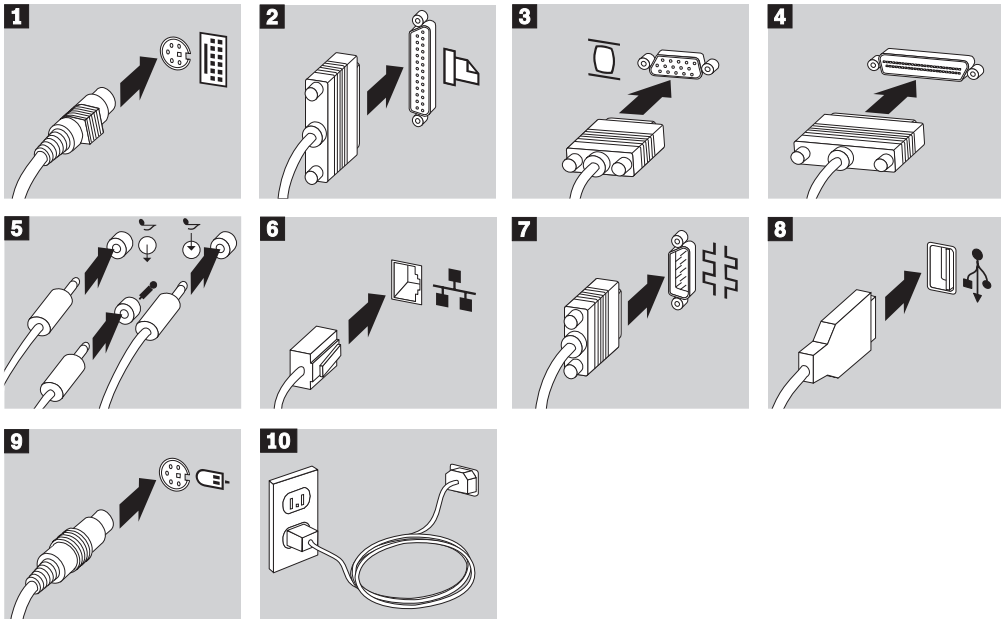
Connecting Cables



Keyboard	1
Printer	2
Monitor	3
SCSI	4
Audio	5
Ethernet	6
Serial Device/Modem	7
USB	8
Mouse	9
Power cord	10



For additional computer stability, turn the four feet a quarter turn away from the computer.

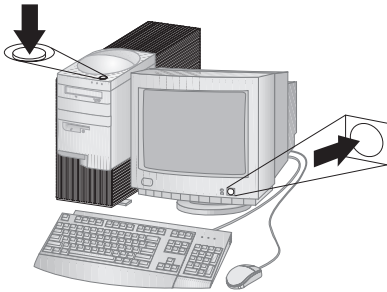


Important Information

- For operation of the system within FCC Class A limits, Class 5 Ethernet cabling must be used.
- If there is a label covering the power connector, remove it. Connect the power cords to the computer, monitor, and other devices first, then plug the cords into properly grounded electrical outlets.
- When the power cord is first plugged in, the computer powers on for a few seconds, then powers off. This is normal operation.
- In some circumstances, the computer might not power off immediately when the power switch is pressed. In this case, hold the power switch down until the power turns off.

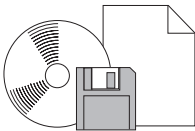
Turn on Power

Turn on the monitor and other external devices first, and then turn on the computer. You see a logo screen while the computer performs a short self-test. Upon successful completion the logo screen disappears, the BIOS is loaded, and the software is loaded (in models with preinstalled software).



Note: If you suspect a problem, see Chapter 8, “Solving Problems” on page 69.

Finish the Installation



Your computer has identification numbers (serial and model/type) that you might need if you ever have your computer serviced. To locate these numbers, and record this information, see Appendix A, “Computer Records” on page 119.

See “Related Information” on page x for sources of other information about your computer.

For information about IBM-installed software, see *About Your Software* in your applications package. Additional programs and device drivers are on the *Ready-to-Configure Utility Program CD* and in some cases on other CDs and diskettes. If you are installing your own operating system, make sure you install the device drivers after you install your operating system. Installation instructions are provided with the media or README files on the diskettes or CDs.

Chapter 3. Arranging Your Workspace

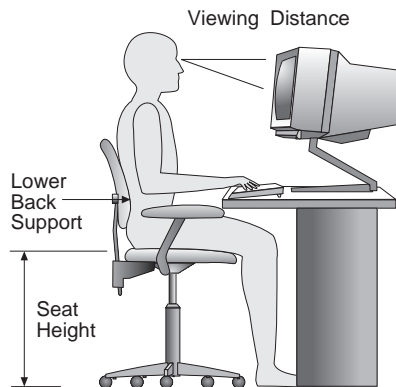
To get the most from your computer, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets also can affect the way you arrange your workspace.

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 causes 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.

Glare and Lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. 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 exhausted other methods of reducing glare.

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

Air Circulation

Your computer and monitor produce heat. The computer has a fan that pulls in fresh air and forces 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, 51 mm (2 in.) of air space is sufficient. Also, make sure 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 cord directly into an electrical outlet.
- 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 Cord Notice” on page 136.

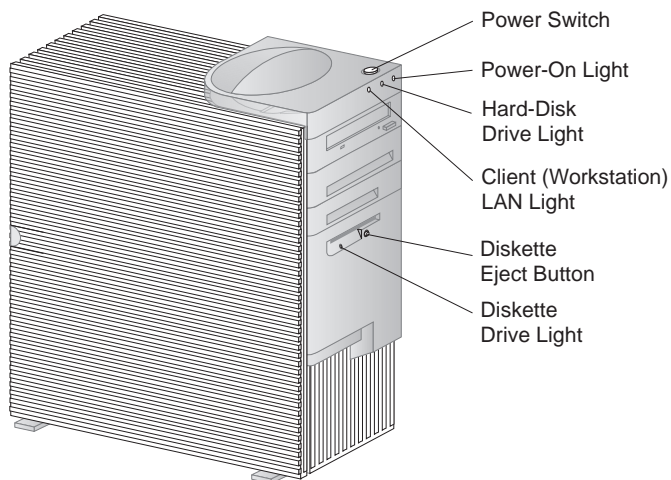
Chapter 4. Operating Your Computer

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

Important Information

- The power line and power control behavior of the IntelliStation Z Pro is different from some earlier computer models. Please observe the following:
 - When the power cord is first plugged in, the computer might appear to power on for a few seconds, then power off. This is a normal sequence to enable the computer to self initialize.
 - The power switch will normally operate with a single touch. However, in some circumstances the computer might not immediately power off. In this case, hold the power switch down for approximately 5 seconds. The computer will then turn off.
- Always shut down your operating system before turning off the computer. Refer to your operating system documentation for the proper procedure to shut down your operating system.
- Proper cooling is required for the reliable performance of internal components. Do not operate your computer with the cover off.

Controls and Status Indicators



Starting Your Computer

What you see and hear when you start up your computer depends upon the settings in the **Start Options** menu of the Configuration/Setup Utility Program. The default settings are **Power On Status [Disabled]** and **Power On Self Test [Quick]**.

Note: There are other selections that also might change what is displayed.

The following briefly describes what you see in the default mode when you turn on your computer:

1. The IBM logo appears.
2. The amount of system memory and extended memory appears in top-left corner of screen.
3. The Press F1 for Configuration/Setup prompt appears.
4. The keyboard is locked.
5. The SCSI BIOS installs (on models with a SCSI device).
6. The keyboard is unlocked.
7. If any errors were detected during POST, they are displayed.
8. If you have set a power-on password, a prompt appears on the screen. If you have set both power-on and administrator passwords, you can type either password at the password prompt. When you type your password at the

prompt and press **Enter**, the first screen of your operating system or application program appears.

For more information, see “Power-On Self-Test (POST)” on page 69.

If **Power On Status** is [*Enabled*], and power-on self-test (POST) finishes without detecting a problem, you hear one beep. If POST detects a problem when you start your computer, you hear multiple beeps or no beep. In most cases, an error code appears in the top-left corner of the screen, and in some cases a description of the error is displayed beside the code. (Note that the screen will sometimes display multiple error codes and descriptions.) Write down all error code numbers and descriptions.

If **Power On Self Test** is [*Enhanced*], numbers showing the amount of memory being tested appear in the top-left corner of the screen until the total amount of memory in the system is reached. Prompts for running a fast POST or accessing the Configuration/Setup Utility Program appear in the lower-left corner of the screen.

Shutting Down

When you are ready to turn off your computer, follow the shutdown procedure for your operating system to prevent the loss of unsaved data or damage to your software programs. See your operating system documentation for instructions.

System-Management Features

This section describes features that make it possible for a network administrator or file server to remotely manage and control your computer. For more information about system management, refer to *Understanding Your IntelliStation Z Pro* (provided on the *Ready-to-Configure Utility Program CD* that comes with your computer).

Desktop Management Interface (DMI)

DMI is a method for gathering information about the hardware and software in your computer. In a network environment, it enables network administrators to remotely monitor and control your computer. For more information about DMI, refer to *Understanding Your IntelliStation Z Pro* (provided on the *Ready-to-Configure Utility Program CD* that comes with your computer).

Wake on LAN

The Wake on LAN feature can be used by network administrators to turn on your computer from a remote location. When Wake on LAN is used in conjunction with network-management software, such as Netfinity (provided on the *Ready-to-Configure Utility Program CD* that comes with your computer), many types of functions, such as data transfers, software updates, and POST/BIOS updates to your computer can be initiated remotely.

Note: If the computer power cord is plugged into a surge protector, make sure that when you turn off power you use the computer power switch and not the surge protector switch. Otherwise, the Wake on LAN feature will not work.

Alert on LAN

Alert on LAN is a new hardware and software technology. It immediately alerts network administrators when the computer has a problem, even if the power is off or there is no operating system running. For system management, Alert on LAN helps the network administrator to react quickly and effectively when problems occur, rather than waiting for input from the end user. For more information about Alert on LAN, go to the World Wide Web at:

<http://www.pc.ibm.com/us/desktop/alertonlan/index.html>

RPL or DHCP

RPL (remote program load) and DHCP (dynamic host configuration protocol) enable a network administrator to control your computer. If you use RPL in conjunction with software such as LANClient Control Manager, you can use a

feature called *Hybrid RPL*, which installs hybrid images (or files) on the hard disk. Then, each time the computer starts from the network, LANClient Control Manager recognizes your computer as a Hybrid RPL client and a *bootstrap* program is downloaded to your computer hard disk. This bootstrap program is small which helps prevent network congestion. An advantage to Hybrid RPL is that the network traffic associated with a standard RPL is avoided.

Remote Administration

This feature makes it possible for the POST and BIOS in your computer to be updated remotely by a network administrator. Network-management software, such as LANClient Control Manager, is required in order to take advantage of this feature. Refer to “Setting Remote Administration” on page 42 for configuration information.

Using Video Features

Your computer has an SVGA (super video graphics array) controller located on the preinstalled graphics adapter. SVGA is a video standard for displaying text and graphic images on a monitor screen. Like other video standards, SVGA 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. For more information on video modes, refer to *Understanding Your IntelliStation Z Pro* (provided on the *Ready-to-Configure Utility Program CD* that comes with your computer).

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 device drivers provide support for greater speed, higher resolution, more available colors, and flicker-free images.

Device drivers for the graphics adapters as well as a README file with instructions for installing the device drivers, are provided on the *Ready-to-Configure Utility Program CD* that comes with your computer. If your computer has IBM-preinstalled software, video device drivers have already been installed on the hard disk. However, the device driver installation instructions will be helpful if you ever need to reinstall the device drivers; if you want to change video resolution, color depth, or monitor settings; or if you need information on obtaining and installing updated device drivers.

More information is available on the World Wide Web. See Chapter 9, “Getting Help, Service, and Information” on page 109.

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 system, using the instructions provided in the README files on *Ready-to-Configure Utility Program CD* that comes with your computer. Refer to your operating system documentation for further information on monitor settings.

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, refer to the documentation provided with the monitor.

Using Audio Features

Your computer has an integrated Crystal 4235 audio controller that supports SoundBlaster applications and is compatible with the Microsoft Windows Sound System. Your computer also has three audio ports. These ports provide you with the ability to play back and capture sound and music, and enable you to enjoy sound with multimedia applications.

The audio ports in your computer are 3.5 mm (1/8") mini-jacks. A description of the ports follows. (For the location of the ports, refer to “Input/Output Device Connectors” on page 66.)

- **Audio Line Out:** This jack is used to send audio signals from the computer to external devices, such as stereo-powered speakers with built-in amplifiers, headphones, multimedia keyboards, or the Audio Line-In jack on a stereo

system. In order to hear audio, you must connect one of these external devices to the Audio Line-Out port on your computer.

Note: The internal speaker in your computer is disabled when an external speaker is connected to the Line-Out port on your computer. There is no playback capability through the internal speaker.

- **Audio Line In:** This port is used to send audio signals from an external device (such as a CD player or stereo) to your computer so that the signals can be recorded on the hard disk. (However, you must go into the mixer provided in your operating system and reduce the input level accordingly.)
- **Microphone:** This port is used to connect a microphone to your computer when you want to record voice or other sounds on the hard disk. This port 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).

Procedures for recording and playing back sound vary by operating system. Refer to your operating system documentation for information and instructions.

Updating System Programs

System programs are the basic layer of software built into your computer. They include the power-on self-test (POST), the basic input/output system (BIOS) code, and the Configuration/Setup Utility Program. POST is a set of tests and procedures that is performed each time you turn on your computer. BIOS is a layer of software that translates instructions from other layers of software into electrical signals that the computer hardware can understand. The Configuration/Setup Utility Program enables you to view and change the configuration and setup of your computer.

Your computer system board has a module called *electrically erasable programmable read-only memory* (EEPROM, also referred to as *flash memory*). You can easily update POST information, the BIOS code, and the Configuration/Setup Utility Program by starting your computer using a flash update diskette or by using the Remote Administration feature, if enabled.

As part of the continuing work to improve quality, IBM might make changes and enhancements to the system programs. When updates are released, they are available as downloadable files on the World Wide Web or through the PC Company Bulletin Board Service (see Chapter 9, “Getting Help, Service, and Information” on page 109). Instructions for using the system programs updates are available in a README file included in the download files.

Recovering From a POST/BIOS Update Failure

If power to your computer is interrupted while POST/BIOS is being updated (flash update), your computer might not restart (reboot) correctly. If this happens, perform the following procedure to recover.

1. Turn off the computer and any attached devices, such as printers, monitors, and external drives.
2. Unplug all power cords from electrical outlets.
3. Remove the cover. See “Removing the Cover” on page 64.
4. Locate the ROM Recover Jumper on the system board. See the system board label inside your computer for the location of the jumper.
5. Remove any adapters that impede access to the jumper.
6. Move the jumper from its normal position (pins 1 and 2) to pins 2 and 3.
7. Replace any adapters that were removed.

CAUTION:

Do not touch internal components of the computer while the power is on.

8. Connect the power cords for the computer and monitor to electrical outlets.
9. Insert the POST/BIOS update (flash) diskette into drive A.
10. Turn on the computer and the monitor.
11. After the update session completes, turn off the computer and monitor.
12. Unplug the power cords from electrical outlets.
13. Remove the diskette from drive A.
14. Remove any adapters that impede access to the jumper.
15. Move the jumper from pins 2 and 3 back to its normal position (pins 1 and 2).
16. Replace any adapters that were removed.
17. Install the cover and reconnect any cables that were disconnected.
18. Turn on the computer to restart the operating system.

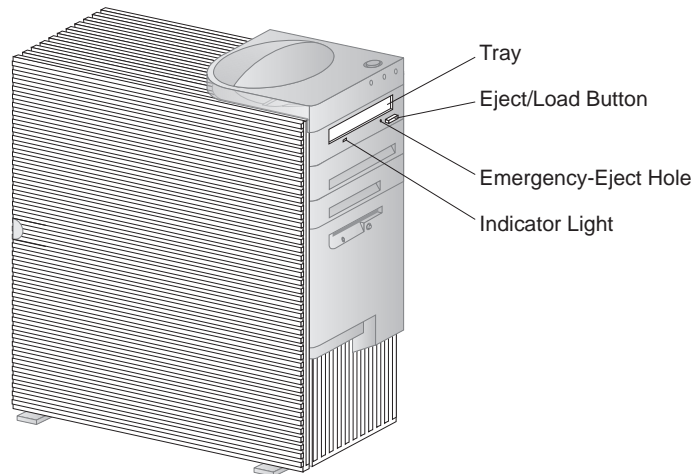
Using a CD-ROM Drive

Your computer has a preinstalled CD-ROM drive. CD-ROM drives can play back or read from a CD, but cannot write information to it. CD-ROM drives use industry-standard, 12 cm (4.75-inch) CDs.

Follow these guidelines when using a CD-ROM drive:

- Do not place the drive where there is:
 - High temperature
 - High humidity
 - Excessive dust
 - Excessive vibration or sudden shock
 - An inclined surface
 - Direct sunlight
- Do not insert any object other than a CD into the drive.
- Before moving the computer, remove the CD from the drive.

The following is an illustration of the front bezel of the CD-ROM drive.



Handling a CD

When handling a CD, follow these guidelines:

- Hold the disk by its edges. Do not touch the surface.
- To remove dust or fingerprints, wipe the disk with a clean, soft cloth from the center to the outside. Wiping the disk in a circular direction might cause loss of data.
- Do not write or stick paper on the disk.
- Do not scratch or mark the disk.
- Do not place or store the disk in direct sunlight.
- Do not use benzene, thinners, or other cleaners to clean the disk.
- Do not drop or bend the disk.

Loading a CD

To load a CD into a CD-ROM drive:

1. Press the Eject/Load button. The tray slides out of the drive. (Do not manually force the tray open.)
2. Place the CD in the tray with the label facing up.
3. Close the tray by pressing the Eject/Load button, or by gently pushing the tray forward. When the tray is closed, the indicator light on the front of the drive will activate to indicate that the drive is in use.
4. To eject the CD, press the Eject/Load button. When the tray slides out, carefully remove the CD.
5. Close the tray by pressing the Eject/Load button, or by gently pushing the tray forward.

Note: If the tray does not slide out of the drive when you press the Eject/Load button, insert the pointed end of a large paper clip into the emergency-eject hole located above and to the left of the CD-ROM indicator light.

If you have installed a CD-ROM drive yourself and need additional information, refer to the documentation that comes with the drive.

Using Locks

To deter unauthorized use of your computer, you can lock the cover and keyboard.

Locking the Cover

You can use the cover lock and keys to secure the outside cover.

Two identical keys are provided with your computer. Locksmiths are not authorized to duplicate these keys. You must order replacement keys from the key manufacturer. The key serial number and the address of the manufacturer are on a tag attached to the keys. Record this information in the space provided in Appendix A, “Computer Records” on page 119. Store the tag in a safe place.

Locking the Keyboard

You can disable the keyboard so that others are unable to use it. If a power-on password is set, the keyboard is locked when you turn on the computer. You must type the correct password before the keyboard will unlock. You can enable the power-on password feature with the Configuration/Setup Utility Program. See Chapter 5, “Using the Configuration/Setup Utility Program” on page 27.

Some operating systems have a keyboard and mouse lock-up feature. Check the documentation that comes with your operating system for more information.

Optional Security U-Bolt

With the optional U-bolt and a steel cable, you can secure your computer to a desk, table, or other fixture. This helps to protect against theft.

Chapter 5. Using the Configuration/Setup Utility Program

The Configuration/Setup Utility Program is stored in the EEPROM (electrically erasable programmable read-only memory) of your computer. You can use the Configuration/Setup Utility Program to view and change the configuration and setup of your computer, regardless of which operating system you are using. However, the settings you select in your operating system might override any similar settings in the Configuration/Setup Utility Program.

This section contains the following:

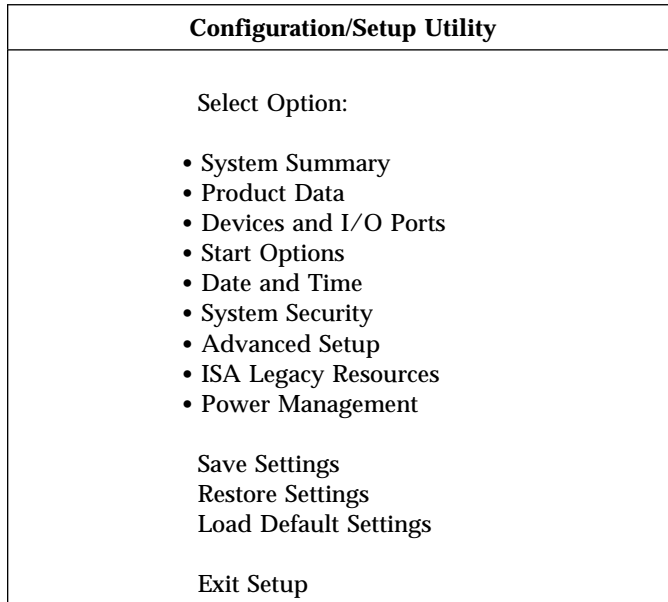
- “Starting and Using the Program” on page 28, which contains information about starting, using, and exiting from the Configuration/Setup Utility Program.
- Information about passwords, enhanced security, startup sequence, remote administration, and power management.
- “Quick Reference for Network-Related Settings” on page 46, which contains concise step-by-step instructions for enabling network-related settings for your computer.

Starting and Using the Program

To start the Configuration/Setup Utility Program:

1. Turn on your computer. If your computer is already on when you start this procedure, you must shut down the operating system, turn off the computer, wait a few seconds until all in-use lights go off, and restart the computer. (Do not use **Ctrl+Alt+Del** to restart the computer.)
2. When the Configuration/Setup Utility Program prompt appears in the lower-left corner of the screen during startup, press **F1**. (This prompt appears on the screen for only a few seconds. You must press **F1** quickly.)
3. If you have *not* set an administrator password, the Configuration/Setup Utility Program menu appears on the screen. If you have set an administrator password, the Configuration/Setup Utility Program menu will not appear until you type your administrator password and press **Enter**. See “Power-On Password” on page 30 and “Administrator Password” on page 34 for more information.

The menu you see on your computer might look slightly different from the menu shown here, but it will operate the same way.



Viewing and Changing Settings

The Configuration/Setup Utility Program menu lists items that identify system configuration topics. If a bullet (•) appears beside a menu item, then an additional menu is available. If a right arrowhead (▶) appears beside a menu item, then a change to that item has been made or the Configuration/Setup Utility Program detected an error and attempted to correct it. Also, an additional menu might follow a menu item with a ▶ beside it. If an asterisk (*) appears next to a menu item, it indicates a system resource conflict. Resolve this conflict before exiting from the Configuration/Setup Utility Program so that your computer will function properly. For information and instructions on resolving system resource conflicts, refer to the documentation that comes with the hardware you want to install and see “Configuring an ISA Legacy Adapter” on page 49.

When working with the Configuration/Setup Utility Program menu, you must use the keyboard. Refer to the following table for the keys used to accomplish various tasks.

Keys	Function
↑ ↓	Use these arrow keys to move between menu items until the item you want is highlighted.
← →	Use these arrow keys to display and toggle between choices for a menu item.
Enter	Press this key to select a highlighted menu item.
Esc	Press this key to exit from a menu after viewing or making changes to the settings in the menu.
+	Use this key in some menus to increase the numerical value of a setting.
-	Use this key (the minus or hyphen key) in some menus to decrease the numerical value of a setting.
0-9	Use these number keys in some menus to change the numerical value of a setting.
F1	Press this key for help on a selected menu item.
F9	Press this key if you changed and saved the setting of a selected menu item and you want to restore the setting that was active before you made the change.
F10	Press this key to return the setting of a selected menu item to a default value.

Note: Active keys are displayed at the bottom of each screen; not all of the above keys are active with every menu.

In the Configuration/Setup Utility Program menus, the configuration information you can change is enclosed in brackets like these []. You cannot change information that is not surrounded by brackets.

— Important Information about Saving Configuration Settings —

In most cases, when you add or remove hardware from your computer or erase passwords, the BIOS (basic input/output system) detects the changes and then updates the configuration automatically. However, you must *save* these changes before the new configuration takes effect. To save the configuration, select **Save Settings** from the Configuration/Setup Utility Program menu.

Exiting From the Program

When you finish viewing or changing settings in the Configuration/Setup Utility Program, follow these steps to exit from the program:

1. Press **Esc** to return to the Configuration/Setup Utility Program menu. (Depending on where you are in the program, you might have to press **Esc** several times to get back to the Configuration/Setup Utility Program menu.)
2. Before you exit from the Configuration/Setup Utility Program menu, select **Save Settings** if you want to save all settings as they currently appear. If you do not complete this step, your settings will not be saved.
3. From the Configuration/Setup Utility Program menu, press **Esc**, and follow the instructions on the screen.

Changing Keyboard Speed

You can change the speed at which the keyboard responds when you hold down a key. This setting can be found under Start Options in the Configuration/Setup Utility Program. The normal *typematic rate* is 10 (normal) characters per second, but can be increased to 30 characters per second (fast).

Power-On Password

The *power-on* password feature deters unauthorized persons from gaining access to the information stored in your computer. You do not need to set a power-on password, but doing so allows you to control who can use your computer. When a power-on password is set, you must type the password at a prompt that appears as the computer starts.

When you set the power-on password, you can choose one of three password prompt modes:

On In password prompt On mode, you are prompted for the power-on password when you turn on the computer. Until the correct password is entered, the computers operating system will not start, and the keyboard will remain locked. If you have a mouse connected to the mouse port, it also will remain locked. If you have a mouse connected to a serial port, it will be activated when the computer is started, regardless of whether a password is set.

Note: If **Remote Administration** is enabled, you cannot select **On**. In this case, select **Dual**. If you set this mode to **On**, when **Remote Administration** is enabled, it will automatically be reset to **Dual**.

Off In password prompt off mode (sometimes referred to as unattended start mode), you are not prompted to enter your power-on password when you turn on the computer. The computer will start the operating system. However, if you have a mouse connected to the mouse port, refer to the following:

Important Information for Mouse Users

This information applies only to those who have a mouse connected to the mouse port; a serial mouse is not affected by the password prompt off mode.

The password prompt off mode prevents the computer from detecting that a mouse is attached. In this mode, the mouse device driver will not be loaded automatically through the CONFIG.SYS or AUTOEXEC.BAT files; an error message displays that informs you that the mouse port is disabled. To enable the operating system to load without displaying the error message, read the information below that applies to your operating system.

If you are using Windows NT, Windows 95 or Windows 98, do the following:

- When the computer is started and the mouse-port-disabled error message appears, type either your power-on or administrator password to enable the keyboard. Then use the keyboard to put a check mark in the **Do not display this message in the future** check box.

Once the operating system starts in password prompt off mode, the keyboard will remain locked. If you have a mouse connected to the mouse port, it also will remain locked.

Although you are not prompted to type a password in this mode, you can type either your power-on or administrator password anytime after POST has completed, even after the operating system has loaded. If you type a password, the keyboard will unlock, but the mouse connected to the mouse port will remain disabled.

Password prompt off mode is useful for network servers and other computers that operate unattended. If a power failure occurs, the computer will automatically restart and resume operating when power is restored, without operator intervention.

Dual In the password prompt Dual mode, the startup behavior of the computer depends on whether the computer is started from the computer power switch or by an unattended method, such as a modem or timer.

If you start the computer by using the power switch, the computer operates the same as it does in password prompt On mode. Refer to page 31 for further information.

If the computer is started by an unattended method, such as remotely over a LAN, the computer operates the same as it does in password prompt off mode. Refer to page 31 for further information.

If both a power-on and administrator password are set, you can type either password at the password prompt. However, if you want to change any settings in the Configuration/Setup Utility Program, you must type your *administrator password* at the password prompt. If you type your power-on password at this prompt, you will be able to view limited information in the Configuration/Setup Utility Program, but you will not be able to change any settings.

The password does not appear on the screen as you type it. If you type the wrong password, you receive a screen message telling you so. If you type the wrong password three times, you must turn the computer off and start again. When you type the correct password, the keyboard and mouse will unlock, and the computer will begin normal operation.

Setting and Changing a Power-On Password: Use the Configuration/Setup Utility Program to set or change a power-on password. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for this password.

Attention

Keep a record of your power-on password in a secure place. When a power-on password has been set, you cannot activate the operating system without first using the password. If you lose or forget your password, you cannot change or delete it without removing the computer cover and moving a jumper on the system board. Refer to “Lost or Forgotten Administrator Password” on page 36 for further information.

To set, change, or delete a power-on password:

1. Start the Configuration/Setup Utility Program (see “Starting and Using the Program” on page 28).
2. Select **System Security** from the Configuration/Setup Utility Program menu.
3. Select **Power-On Password**.
4. To delete a power-on password, select **Delete Power-On Password** and go to step 9 on page 34.
5. Type your new password and press Down Arrow (↓).
6. Type your new password again.

7. At **Password Prompt**, select **Off**, **On**, or **Dual**. Press Left Arrow (←) or Right Arrow (→) to toggle between selections.
Note: If **Remote Administration** is enabled, you cannot select **On**. In this case, select **Dual**. If you set this mode to **On**, when **Remote Administration** is enabled, it will automatically be reset to **Dual**.
8. Select **Change Power-On Password**, and follow the instructions on the screen.
9. Press **Esc** twice to return to the Configuration/Setup Utility Program menu.
10. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility Program menu.
11. To exit from the Configuration/Setup Utility Program, press **Esc** and follow the instructions on the screen.

Administrator Password

Important

When enhanced security is *enabled*, it is vital that you keep a record of your administrator password in a secure place. If you forget or lose the administrator password, the system board in your computer must be replaced in order to recover. For more information on Enhanced Security, see “Enhanced Security” on page 38.

Setting an administrator password deters unauthorized persons from changing configuration settings using the Configuration/Setup Utility Program. If you are responsible for maintaining the settings of several computers, you might want to set an administrator password.

After you set an administrator password, a password prompt appears each time you try to access the Configuration/Setup Utility Program. If you type the wrong password, you receive a message telling you so. If you type the wrong password three times in succession, you must turn the computer off and start again.

If both a power-on and administrator password are set, you can type either of the passwords. However, in order to change any settings, you must use your administrator password. The power-on password will only allow you to view limited information.

Important Information

The AssetCare and Asset ID settings in the Configuration/Setup Utility Program are enabled when your computer is shipped. If you set an administrator password with the AssetCare and Asset ID settings enabled, the following occurs:

- The chassis-intrusion feature of your computer is enabled and each time you remove the computer cover and subsequently power on the computer, the power-on self-test (POST) notifies you that the cover has been removed. The message displayed is POST message 176. To bypass the message, you must enter your administrator password.
- Each time an asset security violation is detected by either the AssetCare or Asset ID features, a POST message notifies you the next time you turn on the computer. The message displayed is POST message 177. To bypass the message, you must enter your administrator password.

Setting or Changing an Administrator Password: Use the Configuration/Setup Utility Program to set or change an administrator password. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password.

Attention

Keep a record of your administrator password in a secure place. If you lose or forget the administrator password, you will not be able to access the Configuration/Setup Utility program. You must complete *one* of the following steps to regain access to the Configuration/Setup Utility program:

1. If enhanced security is disabled (default setting), you must remove the computer cover and move a jumper on the system board. (Refer to “Lost or Forgotten Administrator Password” on page 36 for further information.)
2. If enhanced security is enabled, you must have the system board in your computer replaced.

To set, change, or delete an administrator password:

1. Start the Configuration/Setup Utility Program (see “Starting and Using the Program” on page 28).
2. Select **System Security** from the Configuration/Setup Utility Program menu.
3. Select **Administrator Password**.

4. To delete an administrator password, select **Delete Administrator Password** and go to step 9 on page 36.
5. Type your password and press Down Arrow (↓).
6. Type your password again.
7. At **Power-On Password Changeable by User**, select **Yes** or **No**. Press Left Arrow (←) or Right Arrow (→) to toggle between selections. (If you select **Yes** and an administrator password is set, the power-on password can be changed without having to enter the administrator password. If you select **No** and an administrator password is set, the power-on password cannot be changed unless the administrator password is entered.)
8. Select **Change Administrator Password** and follow the instructions on the screen.
9. Press **Esc** until you return to the Configuration/Setup Utility Program menu.
10. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility Program menu.
11. To exit from the Configuration/Setup Utility Program, press **Esc** and follow the instructions on the screen.

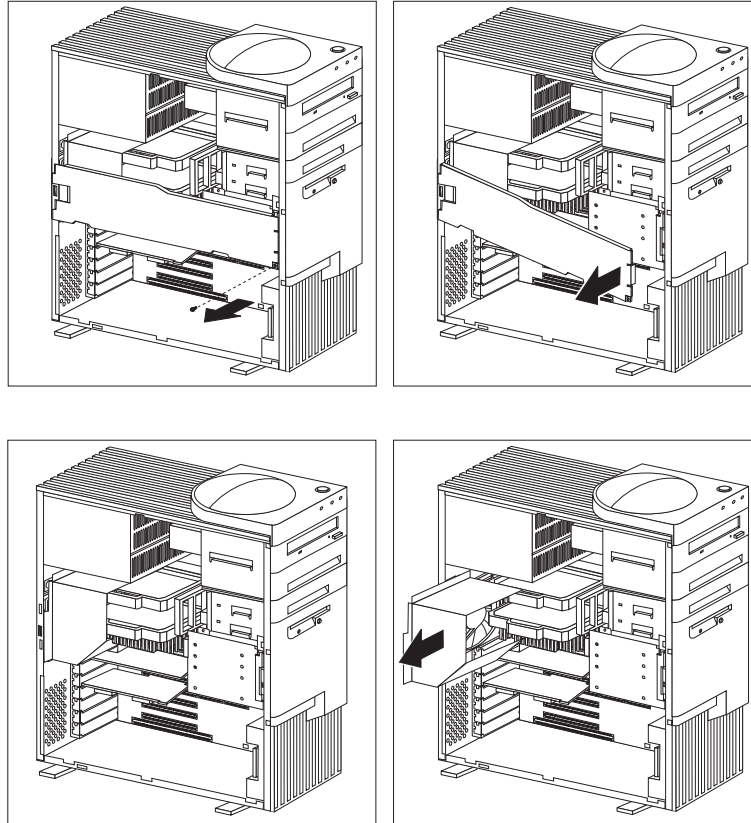
Lost or Forgotten Administrator Password: This section applies to lost or forgotten administrator passwords that are *not* protected by enhanced security. For information on lost or forgotten passwords that *are* protected by enhanced security, refer to “Erasing a Lost or Forgotten Administrator Password Protected by Enhanced Security” on page 41.

To Erase a Lost or Forgotten Password:

Important

If possible, record the configuration information of your computer *before* moving the CMOS jumper.

1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the cover. See “Removing the Cover” on page 64.
4. Remove the metal cover and the air baffle.



5. Refer to the system board label inside the computer to locate the *CMOS Clear Jumper*. See the jumper pin settings also on this label.
6. Move the jumper from its normal position (pins 1 and 2) to pins 2 and 3. It might be helpful to use needlenose pliers to move the jumper, but be careful not to damage any system board components or crush the jumper.

CAUTION:

Do not touch any components while power is on.

7. Plug in the power cord.
8. Turn on the computer for approximately 10 seconds.
9. Turn off the computer. CMOS memory is now cleared.
10. Unplug the power cord.

Note: You might not be able to power off with a single touch of the power switch until POST is nearly complete. Press and hold the power switch for 5 seconds or unplug the power cord to power off your computer.

11. Move the jumper back to its normal position (pins 1 and 2).
12. Replace the air baffle and the metal cover.
13. Replace the computer cover.
14. Plug in the power cord.

After clearing CMOS memory, you must reconfigure the computer. After reassembling the computer, use the Configuration/Setup Utility Program to reset the date and time, reset any passwords, and reconfigure the computer.

Enhanced Security

By default, your administrator password is stored in CMOS memory. CMOS memory is battery-powered memory that stores your configuration, setup, and security settings. The information stored in CMOS remains there for the life of the battery, as long as the battery is not removed.

Your computer has an enhanced security feature that provides extra protection for your administrator password, as well as your startup (boot) sequence settings. With enhanced security, your administrator password and boot sequence are stored in a highly-protected, nonvolatile, security EEPROM module that is separate from CMOS memory and the EEPROM module that stores system programs. When your administrator password and boot sequence are locked in the security EEPROM, they remain intact even if the battery in your computer expires or is removed by someone.

Enhanced security can be enabled or disabled only when you update system programs. The procedure for enabling enhanced security is explained under “Enabling and Disabling Enhanced Security” on page 39.

If enhanced security is enabled and you have *not* set an administrator password, your computer will operate as if enhanced security were disabled. If enhanced security is enabled and you *have* an administrator password set, your computer will operate as follows:

- The contents of the security EEPROM (your administrator password and boot sequence) will be protected from failure of the battery and CMOS memory.
- The security EEPROM will be protected from unauthorized access because it locks after your computer is turned on and the system programs have completed their startup routine. Once locked, the security EEPROM cannot be read from or written to by any software until the computer is turned off and back on again. In a networking environment, this might prevent certain functions from being performed remotely on your computer.

There is an extra measure of protection for the system programs in your computer. Normally, the entire contents of the system programs EEPROM is write protected with a *soft lock*. A soft lock allows the POST/BIOS update utility to function in a network environment. Enhanced security adds a *hard lock*. With a hard lock, when your computer is turned on and the system programs startup routine is completed, the POST/BIOS update utility is locked and cannot be unlocked until the computer is turned off and back on again and the administrator password is entered. Note that, in a networking environment, this prevents the system programs in your computer from being updated remotely. Someone must be present at your computer to turn it on and off in order to unlock the POST/BIOS update utility.

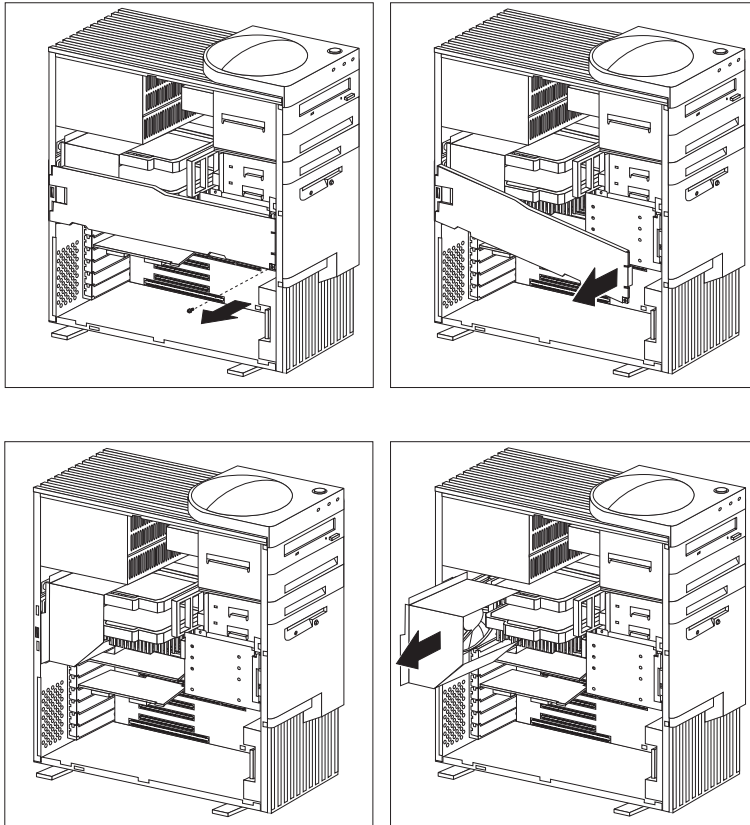
- A chassis-intrusion feature will alert you if the computer cover has been removed. This feature will work even if your computer is off when the cover is removed. If the cover has been removed, a prompt for your administrator password will appear on the screen, and your computer will remain in a halted state until your administrator password is entered.
- As with nonenhanced security, your configuration settings are protected. The settings cannot be changed in the Configuration/Setup Utility program until your administrator password is entered. This means that any changes in computer hardware that are detected by the system programs in your computer, such as removal of an adapter, will generate a configuration error until the administrator password is entered.

Enabling and Disabling Enhanced Security: Enhanced security can be enabled or disabled only when you update the system programs in your computer.

1. Shut down the operating system and turn off the computer.
2. Insert a system programs update diskette into drive A in your computer. System programs updates are available on the World Wide Web.
3. Turn on the computer.
4. The update begins, your computer halts, and you are prompted for your administrator password (if you have set an administrator password). The computer remains in a halted state until you enter the administrator password.
5. As the update diskette runs you are given the option of enabling or disabling enhanced security. Your choice is automatically recorded in the System Security menu of the Configuration/Setup Utility program.

Setting, Changing, or Deleting an Administrator Password Protected by Enhanced Security

1. Shut down the operating system and turn off the computer.
2. Turn off all attached devices.
3. Unplug the power cord.
4. Remove the cover. See “Removing the Cover” on page 64.
5. Remove the metal cover and the air baffle.



6. Refer to the system board label inside the computer to locate the *Admin Jumper*. See the jumper pin settings also on this label.
7. Move the jumper from its normal position (pins 2 and 3) to pins 1 and 2.
8. Plug in the power cord.
9. Turn on the computer and start the Configuration/Setup Utility program.

10. Set, change, or delete your administrator password in the Configuration/Setup Utility program. Refer to “Setting or Changing an Administrator Password” on page 35 or for instructions.

Note: You must know the administrator password to change or delete it.

11. Turn off the computer.
12. Unplug the power cord.
13. Move the jumper back to its normal position (pins 2 and 3).
14. Replace the air baffle and the metal cover.
15. Replace the cover.
16. Plug in the power cord.
17. Turn on the computer and all attached devices.

Erasing a Lost or Forgotten Administrator Password Protected by

Enhanced Security: When enhanced security is enabled, it is vital that you keep a record of your administrator password in a secure place. If you forget or lose the administrator password, the system board in your computer must be replaced in order to regain access to the Configuration/Setup Utility program.

Setting the Startup Sequence

Your computer can be started (or booted) from several devices including the hard disk drive, diskette drive, CD-ROM drive, and from the network. The startup program looks for these devices in a selected sequence. The Configuration/Setup Utility Program is used to select the startup sequence.

Note: The hard disk drive is the default startup device when no other devices are ready. It does not appear in the choices provided by the Configuration/Setup Utility Program.

To set the startup sequence:

1. Start the Configuration/Setup Utility Program (see “Starting and Using the Program” on page 28).
2. Select **Start Options** from the Configuration/Setup Utility Program menu.
3. Select **Startup Sequence** from the Start Options menu.
4. Select the sequence and devices from the choices provided.
5. If **Automatic Power On Startup Sequence** is *Enabled*, select the sequence and devices from the choices provided.

6. Press **Esc** until you return to the Configuration/Setup Utility Program menu.
7. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility Program menu and press **Enter**.
8. To exit from the Configuration/Setup Utility Program, press **Esc** and follow the instructions on the screen.

Setting Remote Administration

Enabling remote administration allows system programs, such as POST and BIOS, to be remotely updated from a network server. If you have set an administrator password for your computer, it does *not* have to be entered by the server. Consult your network administrator for information on setting up your network server to perform POST and BIOS updates.

To set remote administration:

1. Start the Configuration/Setup Utility Program. See “Starting and Using the Program” on page 28.
2. Select **System Security**.
3. Select **Remote Administration**.
4. Press **Enter**.
5. To enable update remote administration, select **Enabled**. To disable, select **Disabled**.
6. Press **Esc** until you return to the Configuration/Setup Utility Program main menu.
7. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility Program menu.
8. To exit from the Configuration/Setup Utility Program, press **Esc** and follow the instructions on the screen.

Understanding Power Management

Your computer comes with built-in energy-saving capabilities. You can view and change energy-saving settings using the Power Management menu in the Configuration/Setup Utility Program. This section describes the Power Management features in your computer and provides instructions for using these features.

Attention

If a device, such as a monitor, does not have power management capabilities, it can be damaged when exposed to a reduced-power state. Before you make energy-saving selections for your monitor, check the documentation that comes with your monitor to see if it supports Display Power Management Signaling (DPMS).

ACPI BIOS Mode: When Automatic Configuration and Power Interface (ACPI) BIOS mode is enabled, the operating system is allowed to control the power-management features of your computer and the settings for APM BIOS mode are ignored. Not all operating systems support ACPI BIOS mode. Refer to your operating system documentation to determine if ACPI is supported.

Setting Power Management Features: With power management, the computer and monitor (if the monitor supports DPMS) can be set to go into a reduced-power state if they are inactive for a specified length of time.

- **Time to Low Power:** With this option, you can specify the amount of time that the computer must be inactive before power management options take affect. You can select from 5 minutes to 1 hour.
- **System Power:** With this option, you can select **On** if you want the computer to remain on, or **Off** if you want the computer to shut down.
- **Display:** With this option, you can select one of the following reduced-power states:
 - **Standby:** In this mode, the screen is blanked, but the screen image is restored *immediately* when any activity is detected.
 - **Suspend:** In this mode, the monitor uses less power than in Standby mode. The screen is blanked, but the screen image is restored *within a few seconds* after any activity is detected.
 - **OFF:** In this mode, the monitor power is turned off. To restore power to the monitor, you must press the monitor power switch. On some monitors, you might have to press the power switch twice.

If *OFF* is selected, you must specify the **Time to Display 'off'**. You can select 5 minutes to 1 hour.

Note: Time to display off is the amount of time after the reduced-power state begins until the display enters the off state.

- **Disable:** In this mode, the monitor is unaffected by the power management settings.

- **IDE Drives:** This selection enables you to specify if the IDE drives should be enabled or disabled when power management options take affect.

To set Power Management features:

1. Start the Configuration/Setup Utility Program (see “Starting and Using the Program” on page 28).
2. Select **Power Management** from the Configuration/Setup Utility Program menu.
3. Select **APM**.
4. Set **APM BIOS Mode** to **Enabled**.
5. Select values for power management (time to low power, system power,, processor speed, display, and time to display off), as desired.
6. Set **IDE Drives** to **Enabled** or **Disabled**.

Note: SCSI drives are not affected by APM.

7. Press **Esc** twice to return to the Configuration/Setup Utility Program menu.
8. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility Program menu.
9. To exit from the Configuration/Setup Utility Program, press **Esc** and follow the instructions on the screen.

Setting Automatic Power-On Features: The Automatic Power-On features within the Power Management menu allow you to enable and disable features that automatically turn on your computer. You must also select the startup sequence you want to use for the type of power-on event selected. If you select **Automatic**, make sure **Automatic Power On Startup Sequence** in the Startup Sequence menu is set to **enabled**. Otherwise, the system will use the **Primary** startup sequence.

- **Wake on LAN:** If you have remote-network-management software, you can use the IBM-developed Wake on LAN feature built into the integrated Ethernet subsystem in your computer. (You can also use the Wake on LAN feature if you have disabled the integrated Ethernet subsystem and have installed a properly configured token-ring adapter that is enabled for Wake on LAN.) When you set Wake on LAN to **Enabled**, your computer will turn on when it receives a specific signal from another computer on your local area network (LAN).
- **Serial Port Ring Detect:** If your computer has an *external* modem connected to a serial port and you want the computer to turn on automatically when a ring is detected on the modem, set this feature to **Enabled**.

- **MODEM Ring Detect:** If your computer has an *internal* modem and you want the computer to turn on automatically when a ring is detected on the modem, set this feature to **Enabled**. The modem must also support this feature.
- **Wake Up on Alarm:** With this feature, you can specify a date and time at which the computer will be turned on automatically. This can be either a single event, a daily event, or a weekly event.
- **PCI Wake Up:** If enabled, this setting allows your system to power on in response to wake up requests from PCI devices that support this feature.

To set Automatic Power-On features:

1. Start the Configuration/Setup Utility Program (see “Starting and Using the Program” on page 28).
2. Select **Power Management** from the Configuration/Setup Utility Program menu.
3. Select **Automatic Power On**.
4. Select the menu item for the feature you want to set. Use Left Arrow (←) or Right Arrow (→) to select either **Enabled** or **Disabled**.
5. Select Startup Sequence for the feature. Use Left Arrow (←) or Right Arrow (→) to select either **Primary** or **Automatic**.
6. Press **Esc** until you return to the Configuration/Setup Utility Program menu.
7. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility Program menu.
8. To exit from the Configuration/Setup Utility Program, press **Esc** and follow the instructions on the screen.

Quick Reference for Network-Related Settings

The following tables are not intended to help determine which settings to choose. They are only intended to help you quickly find the steps necessary to get to the choices for specific network settings. You can then view the current setting or select a different setting. When finished, you can either save the settings and exit from the utility program or exit without saving the settings.

The steps in the following tables always start at the Configuration/Setup Utility Program main menu.

To Configure	Select	Comments/Notes
Remote Administration	<ol style="list-style-type: none">1. System Security2. Remote Administration3. Remote Administration a second time4. Enabled or Disabled	Enable Remote Administration to allow POST/BIOS updates over the LAN.
Integrated Ethernet and view the MAC address	<ol style="list-style-type: none">1. Devices and I/O Ports2. Ethernet Setup3. Enabled or Disabled4. Network Boot5. RPL or DHCP	Notes: <ol style="list-style-type: none">1. Your computer has an integrated Ethernet controller. If you install an optional network adapter, you must disable Ethernet support.2. If you install an optional network adapter, you do not have the option of selecting RPL or DHCP. Also, you do not have the viewable MAC address feature.

<i>Table 1 (Page 2 of 3). Network-Related Settings</i>		
To Configure	Select	Comments/Notes
Wake on LAN	<ol style="list-style-type: none"> 1. Power Management 2. Automatic Power On 3. Wake on LAN and press Enter. 4. Enabled or Disabled. If you select Enabled, continue to the next step. 5. Startup Sequence 6. Primary or Automatic. Go back to the main menu. 7. Start Options 8. The first, second, third, and fourth primary startup devices 9. Automatic Power On Startup Sequence 10. The first, second, third, and fourth startup devices 	Your model might not allow you to select four startup devices.
Serial Port Ring Detect	<ol style="list-style-type: none"> 1. Power Management 2. Automatic Power On 3. Serial Port Ring Detect 4. Enabled or Disabled. If you select Enabled, go to the next step. 5. Startup Sequence 6. Primary or Automatic. Go back to the main menu. 7. Start Options 8. The first, second, third, and fourth primary startup devices 9. Automatic Power On Startup Sequence 10. The first, second, third, and fourth startup devices 	Your model might not allow you to select four startup devices.

Table 1 (Page 3 of 3). Network-Related Settings

To Configure	Select	Comments/Notes
Modem Ring Detect	<ol style="list-style-type: none"> 1. Power Management 2. Automatic Power On 3. Modem Ring Detect 4. Enabled or Disabled. If you select Enabled, go to the next step. 5. Startup Sequence 6. Primary or Automatic. Go back to the main menu. 7. Start Options 8. The first, second, third, and fourth primary startup devices 9. Automatic Power On Startup Sequence 10. The first, second, third, and fourth startup devices 	Your model might not allow you to select four startup devices.
Remote Administration	<ol style="list-style-type: none"> 1. System Security 2. Remote Administration 3. Remote Administration 4. Enabled or Disabled 	

Configuring an ISA Legacy Adapter

To configure an installed ISA legacy adapter, you might need to alter switch or jumper settings on the adapter. Also, you must use the Configuration/Setup Utility Program to identify the ISA legacy resource requirements, such as memory locations, I/O assignments, and DMA and interrupt assignments.

Note: For more information about required resources and switch settings, refer to the documentation that comes with the adapter.

To store the legacy resource information for an installed adapter:

1. Start the Configuration/Setup Utility Program.
2. Select **ISA Legacy Resources** from the Configuration/Setup Utility Program.
3. As needed, select **Memory Resources**, **I/O Port Resources**, **DMA Resources**, or **Interrupt Resources**.
4. Set the appropriate resource to **ISA Resource** and press **Enter**.
5. Remember to save the changes when you exit from the Configuration/Setup Utility Program.

If you remove an ISA legacy adapter, you must set the system resources that are no longer being used to **Available**. To do this, follow the above procedures and select **Available** at step 4.

Note: For information on system resources, see “Interrupt and DMA Resources” on page 50.

Interrupt and DMA Resources

This section lists the settings for the default interrupt and direct-memory-access (DMA) resources for your computer. The interrupt and DMA settings might change when your computer is configured.

Table 2. Interrupt Resources

Interrupt Request	System Resource
0	Timer
1	Keyboard
2	Interrupt Controller
3 ³	Serial Port 2
4 ³	Serial Port 1
5	Available
6	Diskette
7 ³	Parallel Port
8	Real Time Clock
9	ACPI
10	Available
11	Available
12	Mouse
13	Coprocessor
14	IDE Drives on primary channel
15	IDE Drives on secondary channel

The Advanced Programmable Interrupt Controller (APIC) manages additional hardware interrupts to the system BIOS. The following interrupts are available to the APIC.

Interrupt Request	System Resource
16	PCI Device
17	PCI Device
18	PCI Device
19	PCI Device
20	Not available
21	Not available
22	Not available
23	Not available
24	SMI (System Management Interrupt)

³ Can be modified to alternative settings or disabled.

DMA Request	Data Width	System Resource
0	8 bits	Available
1	8 bits	Available
2	8 bits	Diskette
3	8 bits	Available
4	-	System Resource
5	16 bits	Available
6	16 bits	Available
7	16 bits	Available

Chapter 6. Taking Care of Your Computer

This section provides guidelines for the proper handling and care of your computer.

Basics

Here are some basic points about keeping your computer functioning properly:

- Keep your computer in a clean, dry environment. Make sure it rests on a flat, sturdy surface.
- Do not place items on top of the monitor or cover any of the vents in the monitor or computer. These vents provide air flow to keep your computer from overheating.
- Keep food and drinks away from all parts of your computer. Food particles and spills might make the keyboard and mouse sticky and unusable.
- Do not get the power switches or other controls wet. Moisture can damage these parts and cause an electrical hazard.
- Always disconnect a power cord by grasping the plug, not the cord.

Cleaning Your Computer

It is a good practice to clean your computer periodically to protect the surfaces and ensure trouble-free operation.

CAUTION:

Be sure to turn the computer and monitor power switches off before cleaning the computer and monitor screen.

Computer and Keyboard

Use only mild cleaning solutions and a damp cloth to clean the painted surfaces of the computer.

Monitor Screen

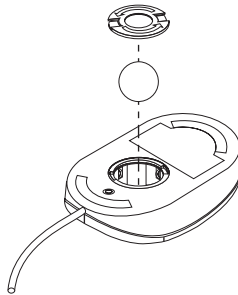
Do not use abrasive cleaners when cleaning the surface of the monitor screen. The screen surface is easily scratched, so avoid touching it with pens, pencil points, and erasers.

To clean the screen surface, wipe it gently with a soft, dry cloth, or blow on the screen to remove grit and other loose particles. Then use a soft cloth moistened with a nonabrasive liquid glass cleaner.

Mouse

If the pointer on the screen does not move smoothly with the mouse, you might need to clean the mouse.

1. Turn off the computer.
2. Disconnect the mouse cable from the computer.
3. Turn the mouse upside down. Unlock the retainer on the bottom of the mouse by moving it in the direction indicated by the arrow on the retainer.



4. Turn the mouse right-side up, and the retainer and ball will drop out.
5. Wash the ball in warm, soapy water, and dry it well.
6. Using a damp cloth, wipe the outside of the mouse and the retainer. Be sure to wipe the rollers inside the mouse.
7. Insert the ball and retainer. Lock the retainer by moving it in the opposite direction of the arrow.
8. Reconnect the mouse cable to the computer.

Replacing the Battery

Your computer has a special type of memory that maintains the date, time, and settings for built-in features, such as serial- and parallel-port assignments (configuration). A battery keeps this information active when you turn off the computer.

The battery requires no charging or maintenance throughout its life; however, no battery lasts forever. If the battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the computer.

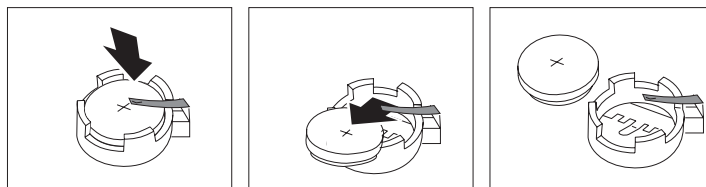
Refer to “Lithium Battery Notice” on page ix for information about replacing the battery.

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

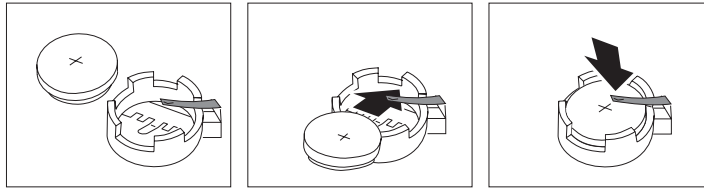
For further information on battery disposal, call IBM at 1-800-IBM-4333 (1-800-426-4333) in the U.S. For information outside of the U.S., contact your IBM reseller or marketing representative.

To change the battery:

1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the cover. See “Removing the Cover” on page 64.
4. Locate the battery. Refer to the system board label inside your computer or see “Identifying Parts on the System Board” on page 67.
5. If necessary, remove any adapters that impede access to the battery.
6. Remove the old battery.



7. Install the new battery.



8. Replace any adapters that were removed to gain access to the battery.

9. Replace the cover.

Note: When the computer is turned on for the first time after battery replacement, an error message might be displayed. This is normal after replacing the battery.

10. Plug in the power cord.

11. Turn on the computer and all attached devices.

12. Use the *Ready-to-Configure Utility Program CD* to set the date and time and any passwords.

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

Moving Your Computer

CAUTION:

Your computer's weight exceeds 40 Lbs. (18.1 Kg.). Do not risk injury by moving or lifting the computer by yourself. Ask another person to help you.

Normal shipping and handling can cause loss of data from a hard disk.

Take the following precautions

1. Back up all files and data from the hard disk.

Operating systems can vary in the way they perform backup procedures. Some operating systems save only data files, while others make copies of application program files *and* data files. Refer to your operating system documentation for information about software backup.

2. Remove all media (diskettes, compact discs, tapes, and so on) from the drives.
3. Turn off the computer and all attached devices. Your hard disk drive automatically parks the read/write heads in a nondata area. This process prevents damage to the hard disk.
4. Unplug the power cords from electrical outlets.
5. Note where you have attached your cables to the rear of the computer; then remove them.
6. If you saved the original shipping cartons and packing materials, use them to pack the units. If you are using different cartons, cushion the units to avoid any damage.

Chapter 7. Installing Options Overview

You can easily expand the capabilities of your computer by adding memory, drives, adapters, or an additional microprocessor. If you have installed options before, you might be able to perform some activities without detailed instructions.

For detailed instructions on installing options, refer to *Installing Options in Your IntelliStation Z Pro* which is available on the *Ready-to-Configure Utility Program CD* that comes with your computer. It is also available as a printable file (.PDF) on the World Wide Web at:

<http://www3.pc.ibm.com/support?page=IBM+IntelliStation>

DANGER

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.

Electrical Safety

CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described in the following information.

For your safety, always do the following *before* removing the cover:

1. Shut down all programs as described in your operating-system documentation.
2. Turn off the computer and any attached devices, such as printers, monitors, and external drives.

Note: Computer users in the United Kingdom who have a modem or fax machine attached to their computer must disconnect the telephone line from the computer *before* unplugging any power cords (also known as power cables). When the computer is reassembled, users must reconnect the telephone line *after* plugging in the power cords.

3. Unplug all power cords from electrical outlets.
4. Disconnect all communication cables from external receptacles.
5. Disconnect all cables and power cords from the back of the computer.

Note: Do not reconnect any cables or power cords until you reassemble the computer and put the cover back on.

Handling Static-Sensitive Devices

Have you ever walked across a carpeted floor, then touched an object and received a small electrical shock? That's static electricity, and although harmless to you, it can seriously damage computer components and options.

Important

When you add an option, do *not* open the static-protective package containing the option until you are instructed to do so.

When you handle options and other computer components, take these precautions to avoid static electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters and memory-modules by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

Available Options

The following are some available options:

- System memory, called dual in-line memory modules (DIMMs)
- A second microprocessor or microprocessor upgrades
- Expansion adapters
 - Accelerated Graphics Port (AGP) adapters
 - Industry standard architecture (ISA) adapters
 - Peripheral component interconnect (PCI) adapters
- Internal drives
- Cover lock
- Security U-bolt

For the latest information about available options, see the following World Wide Web pages:

<http://www.pc.ibm.com/us/options/>
<http://www3.pc.ibm.com/support?page=IBM+IntelliStation>

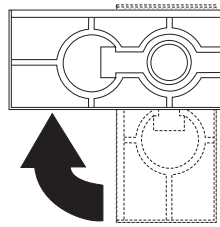
- Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your IBM reseller, or IBM marketing representative.
- Within Canada, call 1-800-565-3344 or 1-800-465-7999.
- Outside the United States and Canada, contact your IBM reseller or IBM marketing representative.

Using the Stabilizing Feet

The four feet attached to the bottom of your computer rotate 90° to provide additional stability for your computer.

When you need to access the inside of the computer to install options, you might find it easier to place the computer on its side. If you do so, rotate the feet in towards the computer so they do not break off due to the weight of the computer.

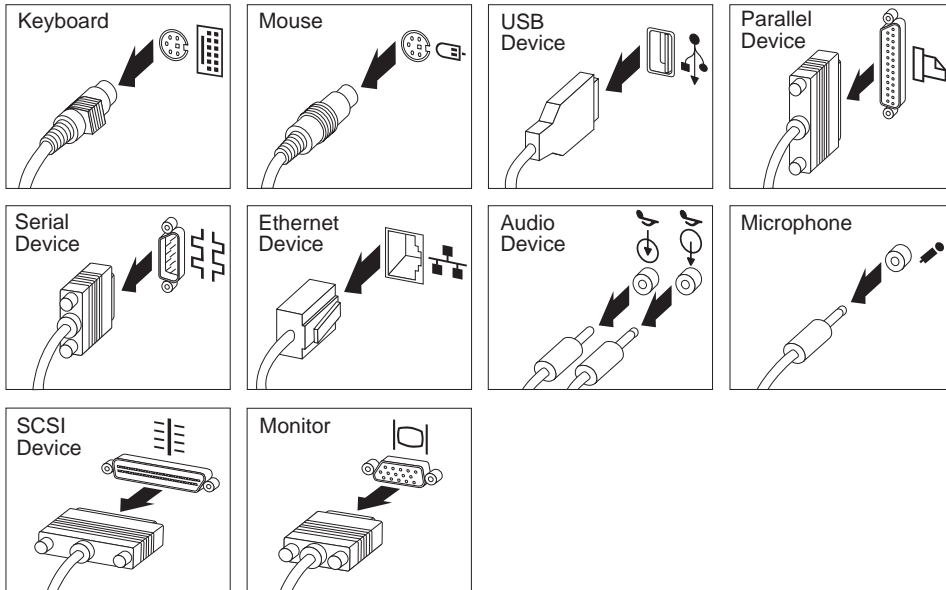
When you are finished installing options and have reattached the side cover, turn the four stabilizing feet a quarter turn out from the computer and set it carefully back on its feet.



Disconnecting Cables

Important

Read “Electrical Safety” on page 59 and “Handling Static-Sensitive Devices” on page 60 before disconnecting cables.

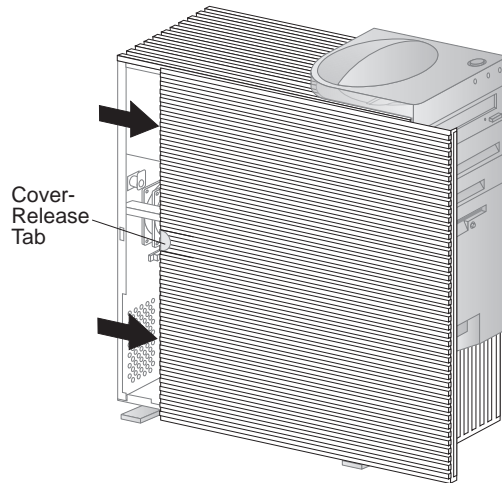


Removing the Cover

Important

Read “Electrical Safety” on page 59 and “Handling Static-Sensitive Devices” on page 60 before removing the cover.

CAUTION: Weight exceeds 40 Lbs. (18.1 Kg.)



Attention

Proper cooling is required for the reliable performance of internal components. Do not operate your computer with the cover removed.

Locating Components

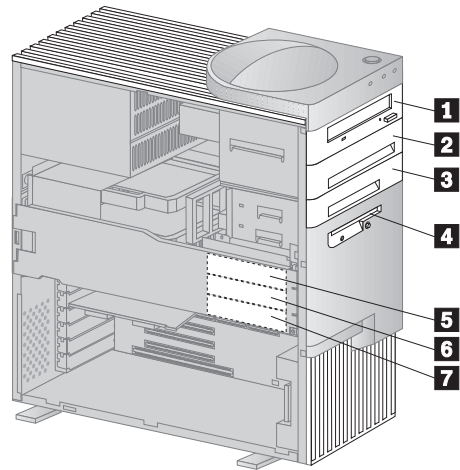
The following information helps you locate components and serves as a reference when you need to install options or connect input/output devices.

Your computer comes with the following adapters and devices preinstalled:

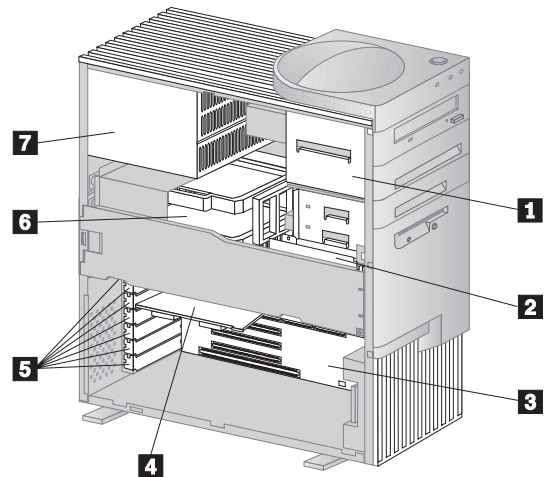
- A graphics adapter (slot location varies with model)
- A CD-ROM drive in drive bay 1
- A diskette drive in drive bay 4
- A hard disk drive in drive bay 5

Internal Views

- 1** 5.25-inch CD-ROM drive
- 2** 5.25-inch or 3.5-inch bay for optional drive
- 3** 3.5-inch bay for optional drive
- 4** 3.5-inch diskette drive
- 5** 3.5-inch bay for optional hard disk drive
- 6** 3.5-inch bay for optional hard disk drive
- 7** 3.5-inch hard disk drive



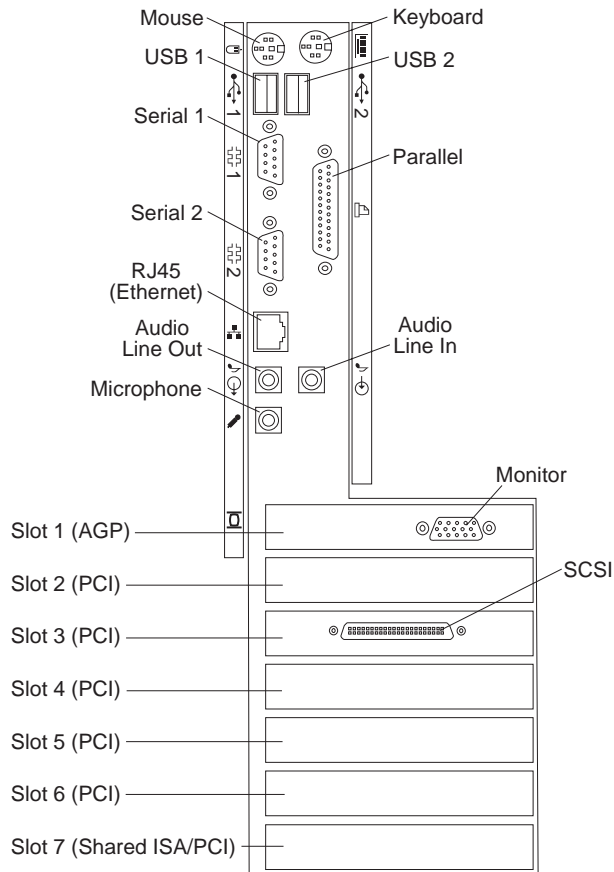
- 1** Upper drive bracket (bays 1–4)
- 2** Lower drive bracket (bays 5–7)
- 3** System board
- 4** Expansion adapter
- 5** Expansion slots
- 6** Microprocessor
- 7** Power supply



Input/Output Device Connectors

Input/output (I/O) connectors provide ports for transferring information into and out of your computer. You can connect a variety of I/O devices to your computer, including a monitor, keyboard, mouse, and printer.

At the rear of your computer is a panel that provides access to I/O connectors. Adapters installed in expansion slots might also provide I/O connectors. The following illustration shows the location of the external connectors.

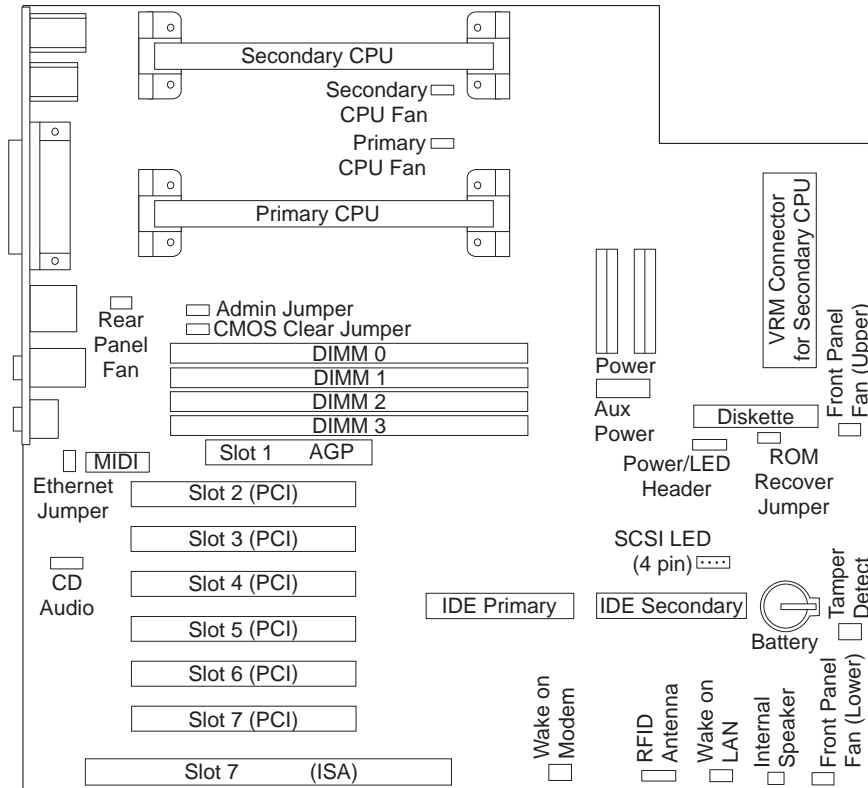


Note: The monitor connector is located on the graphics adapter installed in one of the expansion slots. The type of graphics adapter installed and the slot location varies with computer model.

Identifying Parts on the System Board

The system board, also called the *planar* or *motherboard*, is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are IBM-installed or that you can install later.

If you plan to install, remove or replace hardware in your computer, you need to know the layout of the system board.



Note: An illustration of the system board and additional information is provided on a label located inside the computer.

Chapter 8. Solving Problems

This chapter describes diagnostic tools that are available to you. You can use these tools to identify and correct problems that might come up as you use your computer. This chapter also contains information about option diskettes and terminate-and-stay-resident (TSR) programs.

Using Diagnostic Tools

Computer problems can be caused by hardware, software, or user error (for example, pressing the wrong key). Using the diagnostic aids discussed in this chapter, you might be able to solve such problems yourself or gather helpful information you can pass on to a service technician.

You can check the hardware by following the procedures in this chapter. You can also use the diagnostic programs provided with your computer (see “IBM Enhanced Diagnostics” on page 106 for a description of these programs).

If the hardware checks out OK, and you have not made a user error, you might have a software problem. If you suspect that you have a software problem and your computer came with IBM-preinstalled software, see *About Your Software* and the operating system documentation supplied with your computer. If you have installed software applications yourself, see the documentation supplied with the software.

The following tools are available to diagnose hardware-related problems:

- Power-on self-test (POST)
- Error messages
- POST message charts
- Troubleshooting charts
- Diagnostic programs

Descriptions of these tools follow.

Power-On Self-Test (POST)

Each time you turn on your computer, it performs a series of tests that check the operation of the base computer. This series of tests is called the *power-on self-test (POST)*.

Note

If your computer does not start when you press the power switch, do the following:

- Make sure all cables are securely connected to the correct locations.
- Make sure the computer cover is installed properly (pushed all the way on).

If this does not correct the problem, have the computer serviced.

POST does the following:

- Checks basic system-board operations
- Checks the memory operation
- Compares the current system configuration with that established by the Configuration/Setup Utility program
- Starts the video operation
- Verifies that the diskette drives are working
- Verifies that the hard disk drive and the CD-ROM drive are working

If **Power-On Self-Test** is set to [*Enhanced*], numbers showing the amount of memory being tested appear in the top-left corner of the screen until the total amount of memory in the system is reached. Options for running a quick POST or accessing the Configuration/Setup Utility Program appear in the lower-left corner of the screen. Quick mode is the default mode of operation.

Note: The amount of available memory shown might be somewhat less than expected because of basic input/output system (BIOS) shadowing in random access memory (RAM).

If POST finishes without detecting any problems, the first screen of your operating system or application program appears (if you have not set a power-on password). If you have set a power-on password, a password prompt appears. You must enter your password before the first screen of your operating system or application program will appear. (For more information on using passwords, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 27.)

If **Power On Status** is *Enabled* and POST detects a problem, you will hear multiple beeps or no beep. In most cases, an error code appears in the top left corner of the screen, and in some cases a description of the error is displayed beside the code. (Note that the screen will sometimes display multiple error codes and descriptions.) For more information about what caused an error message to appear and what action to take, see “Solving POST Error Message Problems” on page 72 and “POST Message Charts” on page 75.

If you hear no beep at all during POST, see “Troubleshooting Charts” on page 94. You might need to have your computer serviced.

Types of Error Messages

Error messages that appear on the screen might be text, numeric, or both. There are several types of error messages.

POST error messages: These messages appear when POST finds problems with the hardware during startup or when a change in the hardware configuration is found. POST error messages are 3-, 4-, 5-, 8-, or 12-character alphanumeric messages and include brief explanations (except I999XXXX errors).

For more information about what caused an error message to appear and what action to take, see “Solving POST Error Message Problems” on page 72 and “POST Message Charts” on page 75.

SCSI error messages: These messages appear if a problem or conflict is detected by the Adaptec SCSI subsystem. See the SCSI documentation on the *Ready-to-Configure Utility Program CD* that comes with your computer for information about these messages.

Software-generated error messages: These messages appear if 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 messages. For information about these software error messages, see the information supplied with the operating system and application program.

Diagnostic error codes and messages: These codes and messages appear if a hardware problem is detected by one of the IBM Enhanced Diagnostics test programs. Along with error codes, the messages present text information that can be used to identify a failing part.

Solving POST Error Message Problems

If you receive an error message during the power-on-self-test (POST), completing the steps outlined in this section might enable you to resolve the problem.

Note

If you have just added, removed, or changed the location of a device and you receive an error message, make sure you saved the configuration before exiting the Configuration/Setup Utility Program. If this does not eliminate the error message, then proceed with the following instructions.

1. Write down all error-code numbers and descriptions that appear on the screen as you start your computer. (Note that a single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on your computer.)
2. If you have set a power-on password, a password prompt appears. If you have set both power-on and administrator passwords, you can type either of the passwords at the password prompt. However, if you think you might need to change any settings in the Configuration/Setup Utility Program, you must type your administrator password at the password prompt. If you type your power-on password, you will be able to view error codes and error-code descriptions displayed on the POST Startup Errors screen, and you will also be able to view limited information in the Configuration/Setup Utility Program. However, you will not be able to change any settings.
3. In the case of most errors, the Configuration/Setup Utility Program starts automatically so that you can attempt to identify and correct the problem. When the Configuration/Setup Utility Program starts, a screen titled POST Startup Errors appears. (Note that the POST Startup Errors screen does not appear immediately. You must wait approximately one minute.) If the POST Startup Errors screen does not appear, proceed to step 6.
4. At the POST Startup Errors screen, select **Continue** if you want to access the Configuration/Setup Utility Program menu. Select **Exit Setup** if you want to exit the Configuration/Setup Utility Program. (See the **Important** text box in step 5 for information on exiting the Configuration/Setup Utility Program without making any changes to current settings.) To select an item, press Up Arrow (↑) or Down Arrow (↓) to highlight the item, and then press **Enter**.
5. If you selected **Continue** in step 4, the Configuration/Setup Utility Program menu appears on the screen. You will see a pointer next to any menu items that are malfunctioning or that have been changed since the last time you

turned on your computer. If you did not knowingly make a change to a flagged menu item, there is probably a malfunction in that item. If you made a change, continue here. If you did not make a change, go to the **Important** text box which follows step 5d.

To use the Configuration/Setup Utility Program, do the following:

- a. Select the menu item that is flagged (or that you wish to view) by pressing Up Arrow (↑) or Down Arrow (↓), and then press **Enter**.
- b. A new menu specific to the item that you selected appears. Press Left Arrow (←) or Right Arrow (→) to toggle between choices for a menu item. (Note that each menu item has a Help screen. To view the Help screen, select the menu item, and then press **F1**.)
- c. When you have finished viewing and changing settings, press **Esc** to return to the Configuration/Setup Utility Program menu.
- d. Before you exit from the program, select **Save Settings**. When you exit from the Configuration/Setup Utility Program menu (see step 5e), your operating system will start automatically (unless there is an unresolved problem with the startup device).

Important

If you did *not* change any settings in the Configuration/Setup Utility Program, note the following:

- You will get an error message if you exit from the Configuration/Setup Utility Program without selecting **Save Settings**. Your operating system will not start, but the computer will automatically restart. When the computer restarts, you will get a POST error message, and then the Configuration/Setup Utility Program will again start automatically.
- You will *not* get an error message if you select **Save Settings**, and then exit the Configuration/Setup Utility Program. Your system will save all settings as they currently appear in the Configuration/Setup Utility Program and your operating system will start (unless there is an unresolved problem with the startup device).

- e. To exit from the Configuration/Setup Utility Program, press **Esc** and follow the instructions on the screen.

6. For more information about what caused an error message to appear and what action to take, see the following chart.

Problem	Go to:
POST error code or message appears.	“POST Message Charts” on page 75.
After more than one beep, application program or operating system appears.	“IBM Enhanced Diagnostics” on page 106.
Blank screen, unreadable screen, or other unusual response occurs.	“Troubleshooting Charts” on page 94.

If you are unable to resolve a problem and need assistance, see Chapter 9, “Getting Help, Service, and Information” on page 109.

POST Message Charts

The computer might display more than one error message. Often, the first error to occur causes subsequent errors. When using the POST message charts in this section, always begin by following the suggested action for the *first* error message that appears on your computer screen. Note that, in these charts, “X” can be any alphanumeric character.

Important

If you find it necessary to remove the computer cover, first read “Electrical Safety” on page 59 and “Removing the Cover” on page 64 for important safety information and instructions.

POST Message	Description
101 102 106	A failure occurred during testing of the system board and microprocessor. Action: Have the computer serviced.
110 111	A memory parity failure occurred during testing of the system board. Action: Run the diagnostic programs to verify that a problem exists in a DIMM. (See “IBM Enhanced Diagnostics” on page 106 for information about diagnostic programs provided with your computer.) If you cannot identify the defective DIMM in this way, have the computer serviced.
114	An adapter read-only memory (ROM) error occurred. Action: Remove all adapters that are not required for system startup and reinstall them one at a time, powering on after each is reinstalled. When this message displays, replace the adapter just installed. If the problem cannot be isolated and corrected, have the computer serviced.
121	A hardware error occurred. Action: Have the computer serviced.
151	A real-time clock error occurred. Action: Have the computer serviced.

POST Message	Description
161	<p>The battery on the system board is dead.</p> <p>CAUTION: Danger of explosion if lithium battery is incorrectly replaced.</p> <p>Replace the battery with the same or equivalent type recommended by the manufacturer. Dispose of batteries as required by local ordinances or regulations. (See “Lithium Battery Notice” on page ix and “Replacing the Battery” on page 55 for important information on battery use, disposal, and replacement.)</p> <p>Action: Replace the battery</p> <p>Note: The computer can be used until you replace the battery.</p>
162	<p>A change in device configuration occurred. This message is displayed under one or more of the following conditions:</p> <ul style="list-style-type: none"> • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the computer. • An external device is not turned on. • Processor update code has not been installed or cannot be found. • The <i>Erasing Lost or Forgotten Passwords</i> procedure was performed. This also erases configuration data. • An invalid checksum is detected in CMOS memory (nonvolatile RAM). <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that all external devices are turned on. External devices must be turned on before the computer is turned on. 2. Verify that all devices are properly installed and securely connected. 3. If you added, removed, or changed the location of a device, or you erased passwords, you must save the new configuration before exiting the Configuration/Setup Utility Program.. 4. If you added or changed a microprocessor, you must update system programs. See “Updating System Programs” on page 21 for instructions. 5. If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic programs might isolate the failing device. See “IBM Enhanced Diagnostics” on page 106 for more information. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
163	<p>The clock is not working correctly.</p> <p>Action: Set the correct date and time. If the date and time are set correctly and saved and the 163 error message reappears, replace the battery.</p> <p>If this does not correct the problem, have the computer serviced.</p> <p>Note: The computer can be used until it is serviced, but any application programs that use the date and time will be affected.</p>
164	<p>A change in the memory configuration occurred. This error can be caused by adding, removing, or incorrectly installing memory.</p> <p>Note: The computer can be used with decreased memory capacity until the error is corrected.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you added memory, see <i>Installing Options in Your IntelliStation Z Pro</i> to verify that the new memory is correct for your computer and that it is installed correctly. 2. If you added or removed memory, you must save the new configuration before exiting the Configuration/Setup Utility Program. 3. Running the diagnostic programs might isolate the location of the problem DIMM and provide additional information. See “IBM Enhanced Diagnostics” on page 106 for more information. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
167	<p>A microprocessor was installed that is not supported by the current POST/BIOS (system programs).</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Obtain the latest POST/BIOS flash update diskette image. See “Updating System Programs” on page 21. 2. Perform the POST/BIOS flash update procedure. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
168	<p>Alert on LAN is not working correctly.</p> <p>Action: Set Alert on LAN to enabled in the Configuration/Setup Utility Program. See Chapter 5, “Using the Configuration/Setup Utility Program” on page 27. Verify that the Ethernet cable is attached to both the client and the server and that the appropriate software is installed on both the client and the server.</p> <p>If this does not correct the problem, have the computer serviced.</p>

POST Message	Description
175	<p>A failure occurred during testing of the system board and microprocessor.</p> <p>Action: Have the computer serviced.</p>
176	<p>The system cover has been removed.</p> <p>Action: You must enter the administrator password to clear this POST message. If the message recurs when the cover has not been removed, have the computer serviced.</p>
177	<p>An inventory violation occurred, such as a hardware component was removed. This error message is part of the AssetCare and Asset ID features of your computer.</p> <p>Action: You must enter the administrator password to clear this POST message.</p>
183	<p>Password message received if administrator password is set.</p> <p>Action: You must enter the administrator password to clear this POST message. If the message recurs when the cover has not been removed, have the computer serviced.</p>
184	<p>Asset control antenna not detected.</p> <p>Action: You must enter the administrator password to clear this POST message. If the message recurs when the cover has not been removed, have the computer serviced.</p>
186	<p>Security hardware control logic error. The security data could either not be read or written and the administrator password and startup sequence are not reliable.</p> <p>Action: If your computer is in enhanced security mode, the startup process will not continue. The system board must be replaced.</p>
187	<p>A problem occurred with the administrator password and startup (boot) sequence. POST message 167 will normally display, also.</p> <p>Action: If enhanced security is not enabled, use the Configuration/Setup Utility program to:</p> <ol style="list-style-type: none"> 1. Clear the startup sequence (Start Options, Startup sequence). 2. Clear the administrator password. For instructions, see “Administrator Password” on page 34. 3. Reload the default settings (Load Default Settings). 4. Reset an administrator password. For instructions, see “Setting or Changing an Administrator Password” on page 35. <p>For more information, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 27.</p>

POST Message	Description
190	The computer chassis-intrusion detector was cleared. This is an informational message. No action is required.
20X	<p>A failure occurred during the testing of memory. This error can be caused by incorrectly installed memory, a failing DIMM, or a system-board failure.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you have added memory, see <i>Installing Options in Your IntelliStation Z Pro</i> and Chapter 5, “Using the Configuration/Setup Utility Program” on page 27 of this booklet to verify that the new memory is correct for your computer, and that it is installed and configured correctly. 2. Run the diagnostic programs to verify the problem. See “IBM Enhanced Diagnostics” on page 106 for more information. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
301	A failure occurred during testing of the keyboard and keyboard controller.
303	
	<p>Action:</p> <p>Ensure that:</p> <ol style="list-style-type: none"> 1. Nothing is resting on the keyboard and pressing a key. 2. No key is stuck. 3. The keyboard cable is securely attached to the keyboard connector on the computer. See “Input/Output Device Connectors” on page 66 for the keyboard connector location. <p>Note: If you have just connected a new mouse or other pointing device, turn off the computer and disconnect that device. Wait at least 5 seconds, and then turn on the computer. If the error message goes away, replace the device. If the error message remains, have the keyboard and cable or the computer serviced.</p>
601	<p>A failure occurred during testing of the diskette drive and diskette-drive controller. This error can be caused by a loose or incorrectly connected cable, a failing drive, or a failing system board. The computer can be used, but one or more diskette drives might not work.</p> <p>Action: Verify that all diskette drive cables are properly installed and securely connected.</p> <p>Running the diagnostic programs might isolate the diskette drive that failed, but you must have your computer serviced. See “IBM Enhanced Diagnostics” on page 106 for more information.</p>

POST Message	Description
602	<p>The computer is not able to start the diskette in the drive. The diskette might be damaged or formatted incorrectly.</p> <p>Action: Try another startable diskette that is formatted correctly and is in good condition. For information and instructions on formatting diskettes, see your operating system documentation.</p> <p>If this does not correct the problem, have the computer serviced.</p>
604	<p>A failure occurred during the testing of a diskette drive.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the Configuration/Setup Utility Program correctly reflects the type of diskette drive you have installed. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. 2. Run the diagnostic programs. See "IBM Enhanced Diagnostics" on page 106 for more information. 3. If the diagnostic programs detect a failure, replace the diskette drive. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
662	<p>A diskette drive configuration error occurred.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the Configuration/Setup Utility Program correctly reflects the number of diskette drives you have installed. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. 2. If you installed or removed a diskette drive, you must save the new configuration before exiting the Configuration/Setup Utility Program. <p>If this does not correct the problem, have the computer serviced.</p>
762	<p>A math coprocessor configuration error.</p> <p>Action: Have the computer serviced.</p>
11XX	<p>Serial port error (XX=serial port number)</p> <p>Action: Have the computer serviced.</p>

POST Message	Description
1762	<p>A hard disk configuration error occurred.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the Configuration/Setup Utility Program correctly reflects the number of hard disk drives you have installed. For more information, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 27.) 2. If you added or removed a hard disk drive, you must save the new configuration before exiting the Configuration/Setup Utility Program. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
178X	<p>A failure occurred during testing of the hard disk drive or a primary or secondary IDE device.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Run the diagnostic programs. See “IBM Enhanced Diagnostics” on page 106 for more information. 2. If the diagnostic programs detect a failure, replace the defective hard disk drive or primary or secondary IDE or EIDE device. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1800	<p data-bbox="332 249 1103 276">A PCI adapter has requested a hardware interrupt that is not available.</p> <p data-bbox="332 296 415 322">Action:</p> <ol data-bbox="347 340 1159 1124" style="list-style-type: none"> <li data-bbox="347 340 1159 487">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the hardware interrupt settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required interrupt resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. <li data-bbox="347 699 1159 782">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="347 803 1159 921">3. If all hardware interrupts are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an interrupt available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. Note: If you remove an ISA legacy adapter, set the hardware interrupt used by the removed adapter to Available before installing another adapter. <li data-bbox="347 1043 1159 1124">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an interrupt available to the PCI adapter you want to install. <p data-bbox="332 1144 1061 1204">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1801	<p data-bbox="444 249 1200 272">A PCI adapter has requested memory resources that are not available.</p> <p data-bbox="444 296 525 319">Action:</p> <ol data-bbox="458 340 1268 1124" style="list-style-type: none"> <li data-bbox="458 340 1268 482">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the memory resource settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required memory resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. <li data-bbox="458 699 1250 782">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="458 803 1268 916">3. If all memory resources are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make memory available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. Note: If you remove an ISA legacy adapter, set the memory resources used by the removed adapter to Available before installing another adapter. <li data-bbox="458 1043 1258 1124">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make memory available to the PCI adapter you want to install. <p data-bbox="444 1145 1172 1197">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1802	<p data-bbox="332 249 1115 305">A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.</p> <p data-bbox="332 326 415 350">Action:</p> <ol data-bbox="347 371 1153 1159" style="list-style-type: none"> <li data-bbox="347 371 1153 517">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the I/O address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required I/O resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. <li data-bbox="347 730 1153 812">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="347 835 1153 951">3. If all I/O addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an I/O address available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. Note: If you remove an ISA legacy adapter, set the I/O address used by the removed adapter to Available before installing another adapter. <li data-bbox="347 1072 1153 1159">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an I/O address available to the PCI adapter you want to install. <p data-bbox="332 1177 1062 1229">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1803, 1804	<p data-bbox="444 249 1260 302">A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.</p> <p data-bbox="444 326 525 348">Action:</p> <ol data-bbox="458 371 1260 1187" style="list-style-type: none"> <li data-bbox="458 371 1260 513">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the memory address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required memory resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. <li data-bbox="458 730 1260 812">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="458 835 1260 977">3. If all memory addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a memory address available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. Note: If you remove an ISA legacy adapter, set the memory address used by the removed adapter to Available before installing another adapter. <li data-bbox="458 1104 1260 1187">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a memory address available to the PCI adapter you want to install. <p data-bbox="444 1208 1260 1255">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1880	<p data-bbox="332 249 1108 305">A Plug and Play adapter has requested a hardware interrupt that is not available.</p> <p data-bbox="332 326 415 348">Action:</p> <ol data-bbox="347 369 1108 517" style="list-style-type: none"> <li data-bbox="347 369 1108 517">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the hardware interrupt settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. <p data-bbox="375 534 1153 713">For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required interrupt resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27.</p> <ol data-bbox="347 730 1139 1190" style="list-style-type: none"> <li data-bbox="347 730 1139 817">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="347 835 1129 982">3. If all hardware interrupts are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an interrupt available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. <p data-bbox="375 999 1153 1086">Note: If you remove an ISA legacy adapter, set the hardware interrupt used by the removed adapter to Available before installing another adapter.</p> <ol data-bbox="347 1104 1146 1190" style="list-style-type: none"> <li data-bbox="347 1104 1146 1190">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an interrupt available to the Plug and Play adapter you want to install. <p data-bbox="332 1208 1061 1265">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1881	<p>A Plug and Play adapter has requested memory resources that are not available.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the memory resource settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. <p>For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required memory resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27.</p> <ol style="list-style-type: none"> 2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. 3. If all memory resources are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make memory available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. <p>Note: If you remove an ISA legacy adapter, set the memory resources used by the removed adapter to Available before installing another adapter.</p> <ol style="list-style-type: none"> 4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make memory available to the Plug and Play adapter you want to install. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1882	<p data-bbox="332 249 1153 305">A Plug and Play adapter has requested an I/O address that is not available, or the Plug and Play adapter might be defective.</p> <p data-bbox="332 326 415 350">Action:</p> <ol data-bbox="347 371 1153 1187" style="list-style-type: none"> <li data-bbox="347 371 1153 517">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the I/O address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required I/O resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. <li data-bbox="347 729 1153 812">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="347 833 1153 979">3. If all I/O addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an I/O address available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. Note: If you remove an ISA legacy adapter, set the I/O address used by the removed adapter to Available before installing another adapter. <li data-bbox="347 1104 1153 1187">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an I/O address available to the Plug and Play adapter you want to install. <p data-bbox="332 1208 1153 1263">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1883, 1884	<p data-bbox="444 249 1193 302">A Plug and Play adapter has requested a memory address that is not available, or the Plug and Play adapter might be defective.</p> <p data-bbox="444 326 525 348">Action:</p> <ol data-bbox="458 371 1268 979" style="list-style-type: none"> <li data-bbox="458 371 1268 510">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the memory address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required memory resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. <li data-bbox="458 730 1250 812">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="458 835 1260 979">3. If all memory addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a memory address available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. Note: If you remove an ISA legacy adapter, set the memory address used by the removed adapter to Available before installing another adapter. <li data-bbox="458 1100 1236 1182">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a memory address available to the Plug and Play adapter you want to install. <p data-bbox="444 1204 1172 1256">If the problem cannot be isolated and corrected, have the computer serviced.</p>
1885	<p data-bbox="444 1281 1168 1303">A Plug and Play adapter read-only memory (ROM) error occurred.</p> <p data-bbox="444 1326 1268 1407">Action: Remove all of the Plug and Play adapters that are not required for system startup and reinstall them one at a time, powering on after each is reinstalled. When this message displays, replace the adapter just installed.</p> <p data-bbox="444 1430 1172 1482">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1886	<p data-bbox="332 249 1053 305">A Plug and Play adapter has requested a DMA address that is not available.</p> <p data-bbox="332 326 415 350">Action:</p> <ol data-bbox="344 371 1153 1187" style="list-style-type: none"> <li data-bbox="344 371 1153 517">1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility Program. If the DMA address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to ISA Resource enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. For information about required DMA resource settings for ISA legacy adapters, see the documentation supplied with these adapters. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27. <li data-bbox="344 730 1139 814">2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, see the documentation supplied with the ISA legacy adapters. <li data-bbox="344 835 1153 980">3. If all DMA addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a DMA address available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. Note: If you remove an ISA legacy adapter, set the DMA address used by the removed adapter to Available before installing another adapter. <li data-bbox="344 1100 1159 1187">4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a DMA address available to the Plug and Play adapter you want to install. <p data-bbox="332 1208 1062 1265">If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1962	<p>A startup sequence error occurred.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure the startup options are set correctly in the Configuration/Setup Utility Program. If the settings are not correct, change and save them. For more information, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 27. 2. Make sure the primary IDE or SCSI cable is properly installed and securely connected. 3. Make sure all adapters are installed correctly. For instructions on adding adapters, see <i>Installing Options in Your IntelliStation Z Pro</i>. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
8603	<p>A pointing device or system board error occurred.</p> <p>Action: Have the computer serviced.</p>
19990301	<p>A hard disk failure occurred.</p> <p>Action: Have the computer serviced.</p>
Other Numbers	<p>The computer POST found an error.</p> <p>Action: Follow the instructions on the screen.</p>

Error Messages Specific to the Integrated Ethernet Subsystem

Note: The error messages shown in this section are available only with the integrated Ethernet subsystem. These error messages are not available when RPL (remote program load) or DHCP (dynamic host configuration protocol) is used through optional network adapters.

If a failure condition occurs after the Ethernet controller is initialized, an error message appears on the screen. The error messages that can occur are shown below. If you experience any error related to the integrated Ethernet subsystem, record the error message, and tell your network administrator about the problem.

RPL-Related Error Messages: These error messages are specific to the integrated Ethernet controller and the RPL environment of your computer.

The two most common error messages are shown below.

RPL-ROM-ERR: 105 The integrated Ethernet failed the loopback test.
RPL-ROM-ERR: 107 Media test failed; check the cable.

Error 105 indicates that a power-on diagnostic test performed by the Ethernet module did not execute correctly. If this error message appears, you must have the computer serviced. Error 107 indicates that the cable from the LAN is not securely connected to the Ethernet port on your computer. Check the cable to ensure that it is properly connected.

Other error messages that might occur are shown in the following table.

RPL-ROM-ERR: 100 The integrated Ethernet cannot be found.

RPL-ROM-ERR: 101 The integrated Ethernet was unable to initialize.

RPL-ROM-ERR: 102 The integrated Ethernet could not be reset.

RPL-ROM-ERR: 103 There are multiple Ethernets in the system.
Specify the correct serial number in NET.CFG.

RPL-ROM-ERR: 104 The integrated Ethernet EEPROM is faulty or not present.

RPL-ROM-ERR: 106 The integrated Ethernet is configured for Plug and Play in non-Plug and Play system.

RPL-ROM-ERR: 110 The integrated Ethernet RAM failed the memory test.

DHCP-Related Error Messages: Error messages related to DHCP and the integrated Ethernet controller are shown in the following table.

E61: Service boot canceled.	M38: Cannot open TFTP connection.
E62: Cannot initialize controller.	M39: Cannot read from TFTP connection.
E63: Cannot initialize controller.	M40: BOOTP canceled by keystroke.
E67: Cannot initialize controller.	M40: DHCP canceled by keystroke.
E6d: Cannot find BOOTP server.	M41: BOOTP timeout.
E6e: Cannot start from downloaded image.	M41: DHCP timeout.
E71: Too many MTFTP packages.	M42: No client or server IP.
M10: ARP canceled by keystroke.	M43: No bootfile name.
M11: ARP timeout.	M44: Cannot ARP redirected BOOTP server.
M20: Cannot copy memory.	M6f: System is locked! Press Ctrl+Alt+Del to restart.
M21: Cannot write to memory.	M90: Cannot initialize controller for multicast.
M22: Cannot write to memory.	M91: MTFTP canceled by keystroke.
M30: Cannot ARP TFTP address.	M92: MTFTP open timeout.
M31: TFTP canceled by keystroke.	M93: Unknown MTFTP opcode.
M32: TFTP open timeout.	M94: MTFTP read canceled by keystroke.
M33: Unknown TFTP opcode.	M95: MTFTP timeout.
M34: TFTP read canceled by keystroke.	M96: Cannot ARP MTFTP address.
M35: TFTP timeout.	M98: Cannot open MTFTP connection.
	M99: Cannot read from MTFTP connection.
	Txx: <message from TFTP error packet>

Note: An *x* value that follows an error code represents any alphanumeric character.

Troubleshooting Charts

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

Important

If you find it necessary to remove the computer cover, first read “Electrical Safety” on page 59 and “Removing the Cover” on page 64 for important safety information and instructions.

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

- Remove the software or device you just added.
- Run the diagnostic programs to determine if your computer is running correctly. (See “IBM Enhanced Diagnostics” on page 106 for information about diagnostic programs provided with your computer.)
- Reinstall the new software or new device.

The following directory will help you quickly locate problem categories in the troubleshooting charts.

Problem Type	Go to:
Diskette Drive	“Diskette Drive Problems” on page 95
General	“General Problems” on page 99
Intermittent	“Intermittent Problems” on page 99
Keyboard, Mouse, or Pointing-Device	“Keyboard, Mouse, or Pointing Device Problems” on page 100
Memory	“Memory Problems” on page 101
Monitor	“Monitor Problems” on page 96
Option	“Option Problems” on page 102
Parallel Port	“Parallel Port Problems” on page 103
Printer	“Printer Problems” on page 104
Serial Port 1	“Serial Port 1 Problems” on page 103
Serial Port 2	“Serial Port 2 Problems” on page 103
Software	“Software Problem” on page 105
Universal Serial Bus Ports	“Universal Serial Bus Port Problems” on page 105

Diskette Drive Problems

Diskette Drive Problems	Action
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	<p data-bbox="539 303 1021 338">If there is a diskette in the drive, verify that:</p> <ol data-bbox="549 347 1270 954" style="list-style-type: none"><li data-bbox="549 347 1270 477">1. The diskette drive is enabled. Use the Configuration/Setup Utility Program to check this. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27.<li data-bbox="549 486 1270 581">2. The computer is checking for the diskette drive in the startup sequence. Use the Configuration/Setup Utility Program to verify this.<li data-bbox="549 590 1270 651">3. The diskette you are using is good and not damaged. Try inserting another diskette if you have one.<li data-bbox="549 659 1270 720">4. The diskette is inserted correctly, with its label up and its metal-shutter end first in the drive.<li data-bbox="549 729 1270 798">5. The diskette contains the necessary files to start the computer (the diskette must be startable).<li data-bbox="549 807 1270 876">6. The diskette drive cable is properly installed and securely connected.<li data-bbox="549 885 1270 954">7. There is no problem with your software program (see "Software Problem" on page 105). <p data-bbox="539 963 1270 1029">If the problem cannot be isolated and corrected, have the computer serviced.</p>

Monitor Problems

Monitor Problems	Action
General monitor problems.	<p>Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the information supplied with the monitor for adjustment and testing instructions.</p> <p>If you cannot find the problem, check the other listings on monitor problems in this table.</p> <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>
Wavy, unreadable, rolling, distorted, or jittery screen images.	<p>If the monitor self-tests show that the monitor is working properly, verify that:</p> <ol style="list-style-type: none">1. The location of the monitor is appropriate. Magnetic fields around other devices, such as transformers, appliances, fluorescent lights, and other monitors might be causing the problem. To determine if the location is causing the problem:<ol style="list-style-type: none">a. Turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.)b. Adjust the placement of the monitor and other devices so that they are at least 305 mm (12 in.) apart. Also, when relocating the monitor, be sure it is at least 75 mm (3 in.) from the diskette drives to prevent diskette drive read/write errors.c. Turn on the monitor.2. An IBM monitor signal cable is properly connected to the monitor and computer, and that the cable is installed securely. Non-IBM monitor signal cables might cause unpredictable problems.3. You are not trying to run your monitor at a higher refresh rate than the monitor supports. See the documentation supplied with your monitor for supported refresh rates. <p>Note: An enhanced monitor signal cable with additional shielding might be available for your monitor. See your IBM reseller or marketing representative for information.</p> <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>

Monitor Problems	Action
Screen flickers.	<p>Set the monitor for the highest, noninterlaced refresh rate supported by your monitor and the video controller in your computer. For more information, see the documentation supplied with your monitor and the README files for the Matrox Millennium II AGP graphics adapter, the Matrox Millennium G200 AGP graphics adapter, or Intergraph Intense 3D Pro 3400 PCI graphics adapter. The README files are on the <i>Ready-to-Configure Utility Program CD</i> supplied with your computer.</p> <p>Attention: Using a resolution or refresh rate that is not supported by your monitor might damage it.</p> <p>You can reset the refresh rate through your operating system, using the instructions provided in the README files. See your operating system documentation for further information on monitor settings.</p> <p>If this does not correct the problem, have the monitor and computer serviced.</p>
The monitor works when you turn on the system, but goes blank when you start some application programs.	<p>Verify that:</p> <ol style="list-style-type: none"> <li data-bbox="554 805 1250 951">1. The monitor signal cable is securely connected to the monitor and the monitor connector on the graphics adapter. For the location of the monitor connector on the graphics adapter installed in your computer, see “Input/Output Device Connectors” on page 66. <li data-bbox="554 968 1250 1025">2. The necessary device drivers for the application programs are installed. <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>
The monitor works when you turn on the system, but goes blank after some period of computer inactivity.	<p>The computer is probably set for energy savings with the Advanced Power Management (APM) feature. If the APM feature is enabled, disabling APM or changing APM settings might solve the problem (see “Understanding Power Management” on page 42).</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

Monitor Problems	Action
Blank screen.	<p>Verify that:</p> <ol style="list-style-type: none"> <li data-bbox="444 265 1145 322">1. The computer power cord is plugged into the computer and a working electrical outlet. <li data-bbox="444 340 1100 397">2. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. <li data-bbox="444 414 1136 560">3. The monitor signal cable is securely connected to the monitor and the monitor connector on the graphics adapter. To find the monitor connector on the graphics adapter installed in your computer, see “Input/Output Device Connectors” on page 66. <li data-bbox="444 578 1145 723">4. If your computer comes with two PCI expansion slots and three shared PCI/ISA expansion slots, make sure the graphics adapter is installed in one of the primary PCI expansion slots. For the location of the primary PCI expansion slots, see <i>Installing Options in Your IntelliStation Z Pro</i>. <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>
Only the cursor appears.	Have the computer serviced.
Wrong characters appear on the screen.	Have the computer serviced.

General Problems

General Problems	Action
The computer does not start when you press the power switch.	Verify that: <ol style="list-style-type: none">1. All cables are securely connected to the proper connectors on the computer. For the location of the connectors, see “Input/Output Device Connectors” on page 66.2. The computer cover is properly installed. If the problem cannot be isolated and corrected, have the computer serviced.
Problems such as a broken cover lock or indicator lights not working.	Have the computer serviced.

Intermittent Problems

Intermittent Problems	Action
A problem occurs only occasionally and is difficult to detect.	Verify that: <ol style="list-style-type: none">1. All cables and cords are securely connected to the rear of the computer and attached devices.2. When the computer is turned on, the fan grill is not blocked (there is air flow around the grill), and the fans are working. If airflow is blocked or the fans are not working, the computer might overheat.3. If SCSI devices are installed, the last external device in each SCSI chain is terminated correctly. (See your SCSI documentation.) If the problem cannot be isolated and corrected, have the computer serviced.

Keyboard, Mouse, or Pointing Device Problems

Keyboard, Mouse, or Pointing-Device Problems	Action
All or some keys on the keyboard do not work.	Verify that: <ol style="list-style-type: none"><li data-bbox="444 392 965 414">1. The computer and the monitor are turned on.<li data-bbox="444 435 1148 522">2. The keyboard cable is securely connected to the keyboard connector on the computer. For the location of the keyboard connector, see “Input/Output Device Connectors” on page 66. If the problem cannot be isolated and corrected, have the keyboard and computer serviced.
The mouse or pointing device does not work.	Verify that: <ol style="list-style-type: none"><li data-bbox="444 657 1143 831">1. The mouse or pointing-device cable is securely attached to the proper connector on the computer. Depending on the type of mouse you have, the mouse cable will connect to either the mouse or serial connector. To find the mouse and serial connectors, see “Input/Output Device Connectors” on page 66.<li data-bbox="444 852 1072 874">2. The device drivers for the mouse are installed correctly. If the problem cannot be isolated and corrected, have the computer and the device serviced.

Memory Problems

Memory Problems	Action
The amount of memory displayed is less than the amount of memory installed.	<p>The amount of available memory shown might be somewhat less than expected because of basic input/output system (BIOS) shadowing in random access memory (RAM).</p> <p>Verify that:</p> <ol style="list-style-type: none">1. You have installed the correct type of DIMMs for your computer. See <i>Installing Options in Your IntelliStation Z Pro</i> for instructions on adding DIMMs.2. The DIMMs are properly installed and securely connected.3. If you added or removed memory, you saved the new configuration before exiting the Configuration/Setup Utility Program. <p>If the problem persists, run the memory test from the diagnostic program supplied with your computer. (See “IBM Enhanced Diagnostics” on page 106 for further information.) The system might have detected a bad DIMM and automatically reallocated memory to enable your computer to continue to operate.</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

Option Problems

Option Problems	Action
An IBM option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"><li data-bbox="444 331 929 354">1. The option is designed for your computer.<li data-bbox="444 374 1115 430">2. You followed the installation instructions supplied with the option and in <i>Installing Options in Your IntelliStation Z Pro</i>.<li data-bbox="444 449 1079 534">3. All option files (if required) are installed correctly. See "Installing Files from Option Diskettes" on page 108 for information about installing option files.<li data-bbox="444 553 1122 576">4. You have not loosened any other installed options or cables.<li data-bbox="444 595 1136 743">5. If the option is an adapter, you have provided enough hardware resources for the adapter to function correctly. See the documentation supplied with the adapter (as well as the documentation for any other installed adapters) to determine the resources required for each adapter.<li data-bbox="444 762 1143 874">6. You updated the configuration information in the Configuration/Setup Utility Program, if necessary, and have no conflicts. For more information, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 27.) <p>If the problem persists, run the diagnostic programs. (See "IBM Enhanced Diagnostics" on page 106 for information about diagnostic programs provided with your computer.)</p> <p>If the problem cannot be isolated and corrected, have the computer and the option serviced.</p>
An IBM option that previously worked does not work now.	<p>Verify that all of the option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the failing option is a SCSI option, verify that:</p> <ol style="list-style-type: none"><li data-bbox="444 1269 1150 1291">1. The cables for all external SCSI options are connected correctly.<li data-bbox="444 1310 1093 1366">2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.<li data-bbox="444 1385 1150 1440">3. All external SCSI options are turned on. External SCSI options must be turned on before the system is turned on. <p>For more information, see your SCSI documentation.</p> <p>If the problem cannot be isolated and corrected, have the computer and option serviced.</p>

Parallel Port Problems

Parallel Port Problems	Action
Parallel port cannot be accessed.	Verify that: <ol style="list-style-type: none">1. Each port is assigned a unique address.2. The parallel-port adapter, if you added one, is properly installed and firmly seated. See <i>Installing Options in Your IntelliStation Z Pro</i> for instructions on adding adapters. If the problem cannot be isolated and corrected, have the computer serviced.

Serial Port 1 Problems

Serial Port 1 Problems	Action
Serial port 1 cannot be accessed.	Verify that: <ol style="list-style-type: none">1. Each port is assigned a unique address.2. The serial-port adapter, if you added one, is properly installed and firmly seated. See <i>Installing Options in Your IntelliStation Z Pro</i> for instructions on adding adapters. If the problem cannot be isolated and corrected, have the computer serviced.

Serial Port 2 Problems

Serial Port 2 Problems	Action
Serial port 2 cannot be accessed.	Verify that: <ol style="list-style-type: none">1. Each port is assigned a unique address.2. The serial-port adapter, if you added one, is properly installed and firmly seated. See <i>Installing Options in Your IntelliStation Z Pro</i> for instructions on adding adapters. If the problem cannot be isolated and corrected, have the computer serviced.

Printer Problems

Printer Problems	Action
The printer does not work.	<p>Verify that:</p> <ol style="list-style-type: none">1. The printer is turned on and is online.2. The printer signal cable is securely connected to the correct parallel, serial, or USB port on the computer. (See “Input/Output Device Connectors” on page 66 for the location of the parallel, serial, and USB ports.) <p>Note: Non-IBM printer signal cables might cause unpredictable problems.</p> <ol style="list-style-type: none">3. You have assigned the printer port correctly in your operating system or application program.4. You have assigned the printer port correctly in the Configuration/Setup Utility Program. For more information, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 27.5. If the problem persists, run the tests described in the documentation that comes with your printer. <p>If the problem cannot be isolated and corrected, have the computer and printer serviced.</p>

Software Problem

Software Problem	Action
Is your software program OK?	<p>To determine if problems are caused by installed software, verify that:</p> <ol style="list-style-type: none">1. Your computer has the minimum memory requirements needed to use the software. See the information supplied with the software to verify memory requirements. <p>Note: If you have just installed an adapter or memory, you might have a memory address conflict.</p> <ol style="list-style-type: none">2. The software is designed to operate on your computer.3. Other software works on your computer.4. The software you are using works on another computer. <p>If you received any error messages while using the software program, see the information supplied with the software for a description of the messages and solutions to the problem.</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

Universal Serial Bus Port Problems

Universal Serial Bus Port Problems	Action
The Universal Serial Bus ports cannot be accessed.	<p>Verify that:</p> <ol style="list-style-type: none">1. Each port is assigned a unique address.2. The USB device is properly installed and firmly seated. <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

IBM Enhanced Diagnostics

IBM provides programs that you can run to diagnose hardware and some software problems. Several utility programs that provide helpful information about your computer are also included. The user interface for running these diagnostic and utility programs is provided by WaterGate Software's PC Doctor.

The IBM Enhanced Diagnostics will isolate your computer hardware from software that was preinstalled (or that you have installed) on your hard disk. The programs run independently of the operating system, and *must be run either from CD or diskette*. 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.

An *IBM Enhanced Diagnostics* CD-ROM comes with your computer. You can also download the latest image of the diagnostics from the IBM Web site.

To start the IBM Enhanced Diagnostics using the CD, do the following:

1. Turn off your computer and any attached devices.
2. Turn on all attached devices; then turn on your computer.
3. When you see Press F1 For Configuration/Setup, press the **F1** key.
4. When the Configuration/Setup Utility Program menu appears, select **Start Options**.
5. Select **Startup Sequence** from the Start Options menu.
6. Write down the device currently selected as the First Startup Device. You must restore this setting when you finish running diagnostics.
7. Select the First Startup Device. To start from the CD, select **CD-ROM**.
8. Press **Esc** two times to return to the Configuration/Setup Utility Program menu.
9. Select **Save Settings** and follow the prompts.
10. Place the IBM Enhanced Diagnostics CD in the CD-ROM drive.
11. Select **Exit Setup** and follow the prompts. The diagnostics will load. Follow the instructions on the screen to run the diagnostics.
12. When you finish running diagnostics and utilities, remove the CD from the CD-ROM drive and turn off the computer. You must restore the First Startup Device back to the original setting. Use steps 2 through 9 of the above procedure to do this.

To download the latest image of the IBM Enhanced Diagnostics from the Web site and create a startable Enhanced Diagnostics Diskette:

1. Go to the following Web site:
<http://www.pc.ibm.com/us/intellistation>
2. Download the .EXE file to a hard disk directory (not to a diskette).

3. Go to a DOS prompt and change the directory to where the file was downloaded.
4. Insert a blank high-capacity diskette in diskette drive A.
5. Key in the following and press Enter:

filename a:

Where *filename* is the name of the file you downloaded from the Web.

The downloaded file is self-extracting and will be copied to the diskette. When the copy completes you have a startable IBM Enhanced Diagnostics diskette.

To start the IBM Enhanced Diagnostics using the diagnostic diskette, do the following:

1. Turn off your computer and any attached devices.
2. Insert the IBM Enhanced Diagnostics diskette into diskette drive A.
3. Turn on all attached devices; then turn on your computer.
4. Follow the instructions on the screen.

Other Programs on the IBM Enhanced Diagnostics CD and Diskette: The *IBM Enhanced Diagnostics* CD and diskette also contain utility programs designed to provide information about your computer hardware and the way it is configured. This information might be useful in helping to isolate problems related to the operating system and device drivers.

Other Diagnostic Programs on the *Ready-to-Configure Utility Program CD*: The *Ready-to-Configure Utility Program CD* supplied with your computer also contains diagnostic programs designed specifically for certain operating environments (Windows 95, windows 98, and Windows NT). Because these versions work with the operating system, they not only test the hardware, but also analyze certain software components of your computer. They are especially useful in isolating problems related to the operating system and device drivers.

CoSession: CoSession availability varies by computer model and country. CoSession is a remote-control diagnostic program that can be used by another individual, such as your in-house administrator, to help diagnose problems with your computer from a remote location. CoSession is provided on the *Ready-to-Configure Utility Program CD* supplied with your computer. To use CoSession, this program must be installed in your computer, and your computer must have a modem or a LAN connection.

Important

Before attempting to use CoSession, contact your in-house administrator for specific instructions on setting up and using the program.

Installing Files from Option Diskettes

An optional device or adapter might come with a diskette. Diskettes that are included in option packages usually contain files that the system needs for recognizing and activating the options. Until you install the necessary files, the new device or adapter might cause error messages.

If your optional device or adapter comes with a diskette, you might need to install some configuration (.CFG) files or diagnostic files (.EXE or .COM) from the diskette to your hard disk. See the documentation that comes with the option to see if you need to install files.

Chapter 9. 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.

For example, IBM maintains pages on the World Wide Web where you can get information about IBM products and services, find the latest technical information, and download device drivers and updates. Some of these pages are:

http://www.ibm.com	Main IBM home page
http://www.pc.ibm.com	IBM Personal Computing
http://www.pc.ibm.com/support	IBM Personal Computing Support
http://www.pc.ibm.com/us/desktop/	IBM Commercial Desktop (U.S.)
http://www.pc.ibm.com/us/intellistation/	IBM IntelliStation (U.S.)
http://www.pc.ibm.com/us/netfinity/	IBM Netfinity and PC Servers (U.S.)
http://www.pc.ibm.com/us/options/	IBM Options (U.S.)

You can select a country-specific Web site from these pages.

Help is also available from bulletin boards and online services, as well as by fax and telephone. This section provides information about these sources.

Services available and telephone numbers listed are subject to change without notice.

Service Support

With the original purchase of an IBM hardware product, you have access to extensive support coverage. During the IBM hardware product warranty period, you may call the IBM Personal Computer HelpCenter (1-800-772-2227 in the U.S.) for hardware product assistance covered under the terms of the IBM Statement of Limited Warranty. See “Getting Help by Telephone” on page 114 for HelpCenter telephone numbers in other countries.

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 Engineering Changes (ECs) available that apply to your hardware.

Be sure to retain your proof of purchase to obtain warranty service.

Please have the following information ready when you call:

- 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

If possible, be at your computer when you call.

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 XXXXXXX.

- 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 the IBM Statement of Limited Warranty for a full explanation of IBM's warranty terms.

Before You Call for Service

Many computer problems can be solved without outside assistance, by using the online help or by looking in the online or printed documentation that comes with your computer or software. Also, be sure to read the information in any README files that come with your software.

Most computers, operating systems, and application programs come with documentation that contains troubleshooting procedures and explanations of error

messages. The documentation that comes with your computer also contains information about the diagnostic tests you can perform.

If you receive a POST error code when you turn on your computer, refer to the POST error-message charts in your hardware documentation. If you do not receive a POST error code, but suspect a hardware problem, refer to the troubleshooting information in your hardware documentation or run the diagnostic tests.

If you suspect a software problem, consult the documentation (including README files) for the operating system or application program.

Getting Customer Support and Service

Purchasing an IBM PC hardware product entitles you to standard help and support during the warranty period. If you need additional support and services, a wide variety of extended services are available for purchase that address almost any need.

Using Electronic Support Services

If you have a modem, you can get help from several popular services. Bulletin boards and online information services provide assistance through question-and-answer message areas, live chat rooms, searchable databases, and more.

Technical information is available on a wide range of topics, such as:

- Hardware setup and configuration
- Preinstalled software
- OS/2, DOS, and Windows
- Networking
- Communications
- Multimedia

In addition, the latest device driver updates are available.

The IBM Bulletin Board System (BBS) can be reached 24 hours a day, 7 days a week. Modem speeds of up to 14 400 baud are supported. Long distance telephone charges might apply. To access the IBM BBS:

- In the U.S., call 1-919-517-0001.
- In Canada:
 - In Montreal, call 514-938-3022.
 - In Toronto, call 905-316-4255 or 416-956-7877.

- In Vancouver, call 604-664-6464.
- In the U.K., call 01256 336655.

Commercial online services that contain information about IBM products include:

- CompuServe
Use the following GO words: APTIVA, IBMPS2, ThinkPad, PowerPC, ValuePoint, IBMSVR, or IBMObI.
- PRODIGY
Use the Jump command; type **IBM** and select **PC Product Support**.
- America Online
Use the “Go to” keyword **IBM Connect**.

Using the World Wide Web

On the World Wide Web, the IBM Personal Computing 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.pc.ibm.com>

You can find support information for your IBM products, including supported options, on the IBM Personal Computing Support page at:

<http://www.pc.ibm.com/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. You will have the information you need, all in one place. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products. You also can access online support forums, which are community sites monitored by IBM support staff.

For information about specific Personal Computer products, visit the following pages:

<http://www.pc.ibm.com/us/intellistation/>

<http://www.pc.ibm.com/us/desktop/>

<http://www.pc.ibm.com/us/netfinity/>

<http://www.pc.ibm.com/us/thinkpad/>

<http://www.pc.ibm.com/us/options/>

<http://www.pc.ibm.com/us/aptiva/>

You can select a country-specific Web site from these pages.

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.

To access the IBM Automated Fax System, do the following:

- In the U.S., call 1-800-426-3395.
- In Canada, call 1-800-465-3299.

Getting Help Online

Online Housecall is a remote communication tool that allows an IBM technical-support representative to access your PC by modem. Many problems can be remotely diagnosed and corrected quickly and easily. In addition to a modem, a remote-access application program is required. This service is not available for servers. There might be a charge for this service, depending on the request.

For more information about configuring your PC for Online Housecall:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-565-3344.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Getting Help by Telephone

During the warranty period, you can get help and information by telephone through the IBM PC HelpCenter. Expert technical-support representatives are available to assist you with questions you might have on the following:

- Setting up your computer and IBM monitor
- Installing and setting up IBM options purchased from IBM or an IBM reseller
- 30-day, preinstalled-operating-system support
- Arranging for service (on-site or carry-in)
- Arranging for overnight shipment of customer-replaceable parts

In addition, if you purchased an IBM PC Server or IBM Netfinity Server, you are eligible for IBM Start Up Support for 90 days after installation. This service provides assistance for:

- Setting up your network operating system
- Installing and configuring interface cards
- Installing and configuring network adapters

Please have the following information ready when you call:

- Machine Type and Model
- Serial numbers of your computer, monitor, and other components, or your proof of purchase
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information for your system

If possible, be at your computer when you call.

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.⁴

Country		Telephone number
Austria	Österreich	1-546 585 075
Belgium - Dutch	Belgie	02-717-2504
Belgium - French	Belgique	02-717-2503

⁴ Response time will vary depending on the number and complexity of incoming calls.

Country		Telephone number
Canada	Canada	1-800-565-3344
Denmark	Danmark	03-525-6905
Finland	Suomi	9-22-931805
France	France	01-69-32-40-03
Germany	Deutschland	069-6654-9003
Ireland	Ireland	01-815-9207
Italy	Italia	02-4827-5003
Luxembourg	Luxembourg	298-977-5060
Netherlands	Nederland	020-504-0531
Norway	Norge	2-305-3203
Portugal	Portugal	01-791-5147
Spain	España	091-662-4270
Sweden	Sverige	08-632-0063
Switzerland - German	Schweiz	01-212-1810
Switzerland - French	Suisse	022-310-0418
Switzerland - Italian	Svizzera	091-971-0523
United Kingdom	United Kingdom	01475-555555
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.

Getting Help Around the World

If you travel with your computer or need to move it to another country, you can register for International Warranty Service. When you register with the International Warranty Service Office, you will receive an International Warranty Service Certificate that is honored virtually worldwide, wherever IBM or IBM resellers sell and service IBM PC 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.

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 name might vary by country.

Enhanced PC Support Line

Enhanced PC Support is available for desktop and mobile IBM computers that are not connected to a network. Technical support is provided for IBM computers and IBM or non-IBM options, operating systems, and application programs on the Supported Products list.

This service includes technical support for:

- Installing and configuring your out-of-warranty IBM computer
- Installing and configuring non-IBM options in IBM computers
- Using IBM operating systems in IBM and non-IBM computers
- Using application programs and games
- Tuning performance
- Installing device drivers remotely
- Setting up and using multimedia devices
- Identifying system problems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Enhanced PC Support, see “Ordering Support Line Services” on page 117.

900-Number Operating System and Hardware Support Line

In the U.S., if you prefer to obtain technical support on a pay-as-you go basis, you can use the 900-number support line. The 900-number support line provides support for IBM PC products that are out of the warranty period.

To access this support, call 1-900-555-CLUB (2582). You will be notified of the charge per minute.

Network and Server Support Line

Network and Server Support is available for simple or complex networks made up of IBM servers and workstations using major network operating systems. In addition, many popular non-IBM adapters and network interface cards are supported.

This service includes all of the features of the Enhanced PC Support Line, plus:

- Installing and configuring client workstations and servers
- Identifying system problems and correcting problems on the client or the server
- Using IBM and non-IBM network operating systems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Network and Server Support, see “Ordering Support Line Services.”

Ordering Support Line Services

Enhanced PC Support Line and Network and Server Support Line services are available for products on the Supported Products list. To receive a Supported Products list:

- In the U.S.:
 1. Call 1-800-426-3395.
 2. Select document number 11683 for Network and Server support.
 3. Select document number 11682 for Enhanced PC support.
- In Canada, contact IBM Direct at 1-800-465-7999, or:
 1. Call 1-800-465-3299.
 2. Select the HelpWare catalog.
- In all other countries, contact your IBM reseller or IBM marketing representative.

For more information or to purchase these services:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your HelpCenter.

Warranty and Repair Services

You can upgrade your standard hardware warranty service or extend the service beyond the warranty period.

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service

If your warranty provides carry-in repair service, you can upgrade to on-site repair service, either standard or premium. The standard upgrade provides a trained servicer within the next business day (9 a.m. to 5 p.m., local time, Monday through Friday). The premium upgrade provides 4-hour average response, 24 hours a day, 7 days a week.

- On-site service to premium on-site service

If your warranty provides for on-site service, you can upgrade to premium on-site service (4-hour average on-site response, 24 hours a day, 7 days a week).

You also can extend your warranty. Warranty and Repair Services offers a variety of post-warranty maintenance options, including ThinkPad EasyServ Maintenance Agreements. Availability of the services varies by product.

For more information about warranty upgrades and extensions:

- In the U.S., call 1-800-426-4968.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Ordering Publications

Additional publications are available for purchase from IBM. For a list of publications available in your country:

- In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.
- In other countries, contact your IBM reseller or IBM marketing representative.

Appendix A. Computer Records

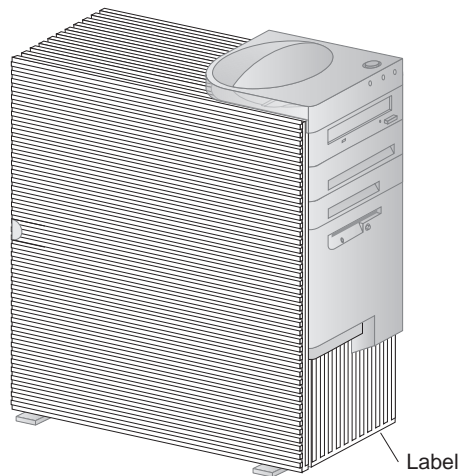
This appendix contains forms for recording information about your computer, which can be helpful if you decide to install additional hardware, or if you ever need to have your computer serviced.

Serial Numbers and Keys

Record and retain the following information.

Product Name	IntelliStation Z Pro
Model/Type (M/T)	_____
Serial Number (S/N)	_____
Key Serial Number	_____
Key Address	_____

The model and type (M/T) numbers and the serial number (S/N) for your computer are located on a label on the front of the computer, as shown in the illustration that follows.



Your computer keys cannot be duplicated by locksmiths. If you lose them, order replacement keys from the key manufacturer. The key serial number and the

address of the manufacturer are on a tag attached to the keys. Anyone who has the key serial number and manufacturer's address can order duplicate keys, so store the tag in a safe place. If you record the key serial number on this page, either remove the page and store it in a secure place, or store this manual in a secure place when you are not using it.

Device Records

Use the following tables to keep a record of the options in or attached to your computer. This information can be helpful when you install additional options, or if you ever need to have your computer serviced.

Location	Option Description
System Memory (Mem 1 DIMM) (Mem 2 DIMM) (Mem 3 DIMM) (Mem 4 DIMM)	<input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/> 512 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/> 512 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/> 512 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/> 512 MB
Expansion Slot 1 (AGP)	<input type="checkbox"/> Matrox graphics adapter <input type="checkbox"/> Other _____
Expansion Slot 2 (PCI)	_____
Expansion Slot 3 (PCI)	<input type="checkbox"/> Adaptec 2940 SCSI Adapter <input type="checkbox"/> Other _____
Expansion Slot 4 (PCI)	_____
Expansion Slot 5 (PCI)	_____
Expansion Slot 6 (PCI)	<input type="checkbox"/> Intergraph graphics adapter <input type="checkbox"/> Other _____
Expansion Slot 7 (ISA/PCI)	_____
Microprocessor 1	<input type="checkbox"/> Intel Pentium _____ MHz
Microprocessor 2	<input type="checkbox"/> Intel Pentium _____ MHz
Parallel Connector	_____
Serial Connector 1	_____
Serial Connector 2	_____
USB Connector 1	_____
USB Connector 2	_____
Monitor Connector	_____
Audio Connectors	_____

Location	Option Description
Keyboard Connector	104-key PC-Next keyboard <input type="checkbox"/> Other _____
Mouse Connector	<input type="checkbox"/> 3-button mouse <input type="checkbox"/> 2-button mouse <input type="checkbox"/> Other _____
5.25-Inch Bay 1	IDE CD-ROM drive <input type="checkbox"/> Other: _____
5.25-Inch Bay 2	_____
3.5-Inch Bay 3	<input type="checkbox"/> SCSI hard disk drive _____ Capacity <input type="checkbox"/> EIDE hard disk drive _____ Capacity <input type="checkbox"/> Other: _____
3.5-Inch Bay 4	1.44 MB diskette drive <input type="checkbox"/> Other: _____
3.5-Inch Bay 5	<input type="checkbox"/> SCSI hard disk drive _____ Capacity <input type="checkbox"/> EIDE hard disk drive _____ Capacity
3.5-Inch Bay 6	<input type="checkbox"/> SCSI hard disk drive _____ Capacity <input type="checkbox"/> EIDE hard disk drive _____ Capacity
3.5-Inch Bay 7	<input type="checkbox"/> SCSI hard disk drive _____ Capacity <input type="checkbox"/> EIDE hard disk drive _____ Capacity
_____	_____
_____	_____
_____	_____

Appendix B. Product Warranties and Notices

This appendix includes product warranties, trademarks and notices.

Warranty Statements

The warranty statements consist of two parts: Part 1 and Part 2. Part 1 varies by country. Part 2 is the same for both statements. Be sure to read both the Part 1 that applies to your country and Part 2.

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)**
(Part 1 - General Terms on page 123)
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)**
(Part 1 - General Terms on page 126)
- **Worldwide Country-Unique Terms**
(Part 2 - Country-Unique Terms on page 128)

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (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 may 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 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.

Machine - IntelliStation Z Pro

Warranty Period* - Parts: Three (3) years Labor: One (1) year

**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.*

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. 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.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

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. The replacement may not be new, but will be in good working order.

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.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT 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.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

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 the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-772-2227. In Canada, call IBM at 1-800-565-3344. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, 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. IBM may repair the failing Machine or exchange it at its discretion.

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.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. 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.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

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), 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 greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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 (INCLUDING LOST PROFITS OR 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 DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 may replace or modify those of Part 1. The warranties provided by IBM in this Statement of 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 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.

Machine - IntelliStation Z Pro

Warranty Period* - Parts: Three (3) years Labor: One (1) year

**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.*

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. 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.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

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. The replacement may not be new, but will be in good working order.

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.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE

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Items Not Covered by Warranty

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

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

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 the Machine, contact your reseller or IBM. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service centre, 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. IBM may repair the failing Machine or exchange it at its discretion.

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.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. 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 authorisation 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 fulfil 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.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

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), 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 greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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 (INCLUDING LOST PROFITS OR 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 DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Part 2 - Worldwide Country-Unique Terms

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 legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section: The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

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, 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.

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement:
The laws of the State of New York govern this Statement.

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 Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

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.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

The terms of this Statement of Warranty apply to Machines purchased from an IBM reseller. If you purchased this Machine from IBM, the terms and conditions of the applicable IBM agreement prevail over this warranty statement.

Warranty Service

If you purchased 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 purchased 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.

The applicable laws, Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided. However, the laws of Austria govern this Statement if the warranty service is provided in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Federal Republic of Yugoslavia, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine.

The following terms apply to the country specified:

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

2. 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.

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).

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 are 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.

Production Status: The following paragraph replaces this Section:

Each Machine is newly manufactured. It may incorporate in addition to new parts, re-used parts as well.

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

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

In item 2, replace "U.S. \$100,000" with "1.000.000 DEM."

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

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

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 the greater of Irish Pounds 75,000 or 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: (item 1 unchanged) 2) as to any other actual damage arising in all situations involving non-performance 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 second 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 nonperformance 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.

TURKIYE: Production Status: The following replaces this Section:
IBM fulfils customer orders for IBM Machines as newly manufactured in accordance with IBM's production standards.

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 the greater of Pounds Sterling 150,000 or 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 will be limited to damages.

NORTH AMERICA

CANADA: Warranty Service: The following is added to this Section:
To obtain warranty service from IBM, call **1-800-465-6666**.

UNITED STATES OF AMERICA: Warranty Service: The following is added to this Section:
To obtain warranty service from IBM, call **1-800-IBM-SERV**.

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A product is Year 2000 Ready if the product, when used in accordance with its associated documentation, is capable of correctly processing, providing and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange date data with it.

This IBM PC hardware product has been designed to process four-digit date information correctly within and between the 20th and 21st centuries. If your IBM computer is on when the century changes, you should turn it off and then back on again once, or restart the operating system, to ensure that the internal clock resets itself for the new century.

This IBM PC product cannot prevent errors that might occur if software you use or exchange data with is not ready for the Year 2000. IBM software that comes with this product is Year 2000 Ready. However, software from other companies might come with this IBM PC product. IBM cannot take responsibility for the readiness of that software.

You should contact the software developers directly if you wish to verify readiness, understand limitations, or look for any software updates.

To learn more about IBM PC products and the Year 2000, visit our Web site at <http://www.pc.ibm.com/year2000>. The information and tools there can help you with your Year 2000 transition plan, especially if you have multiple IBM PCs. IBM encourages you to check periodically for updated information.

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Electronic Emission Notices

Federal Communications Commission (FCC) Statement

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

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

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

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.

Industry Canada Class A Emission Compliance Statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

European Community 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.

Taiwan Class A Electronic 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
種情形下，使用者會被要
求採取某些適當的對策。

Statement of Conformity to the Voluntary Control Council for Interference from Information Technology Equipment (VCCI) Class A ITE for Regular Members.

To see the VCCI statement, refer to the hard copy of this document.

Power Cord Notice

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 are usually available only in that country:

IBM Power Cord Part Number	Used in These Countries
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
62X1045	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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