

IntelliStation M Pro

Types 6850 and 6233

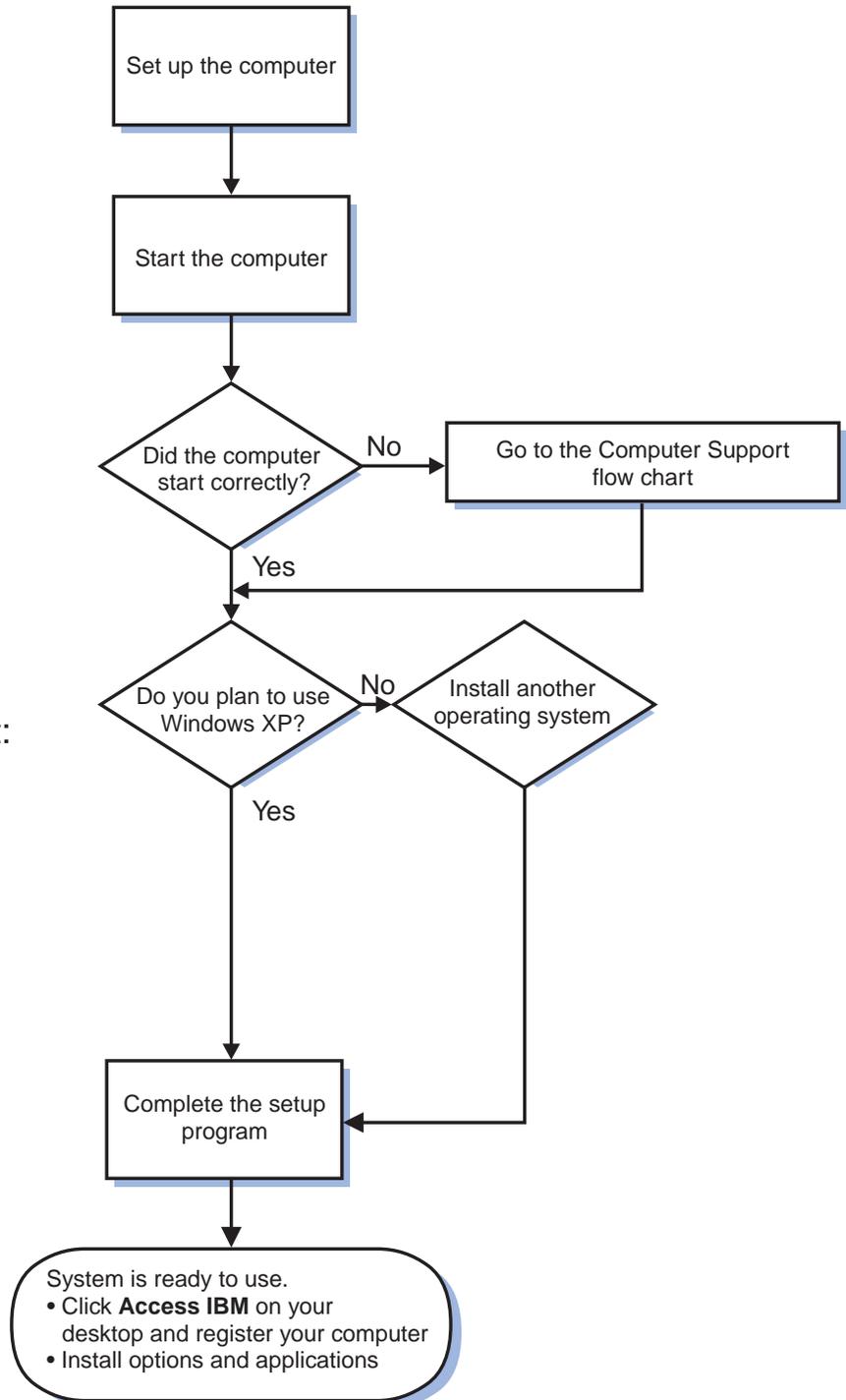
User's Guide

Welcome...

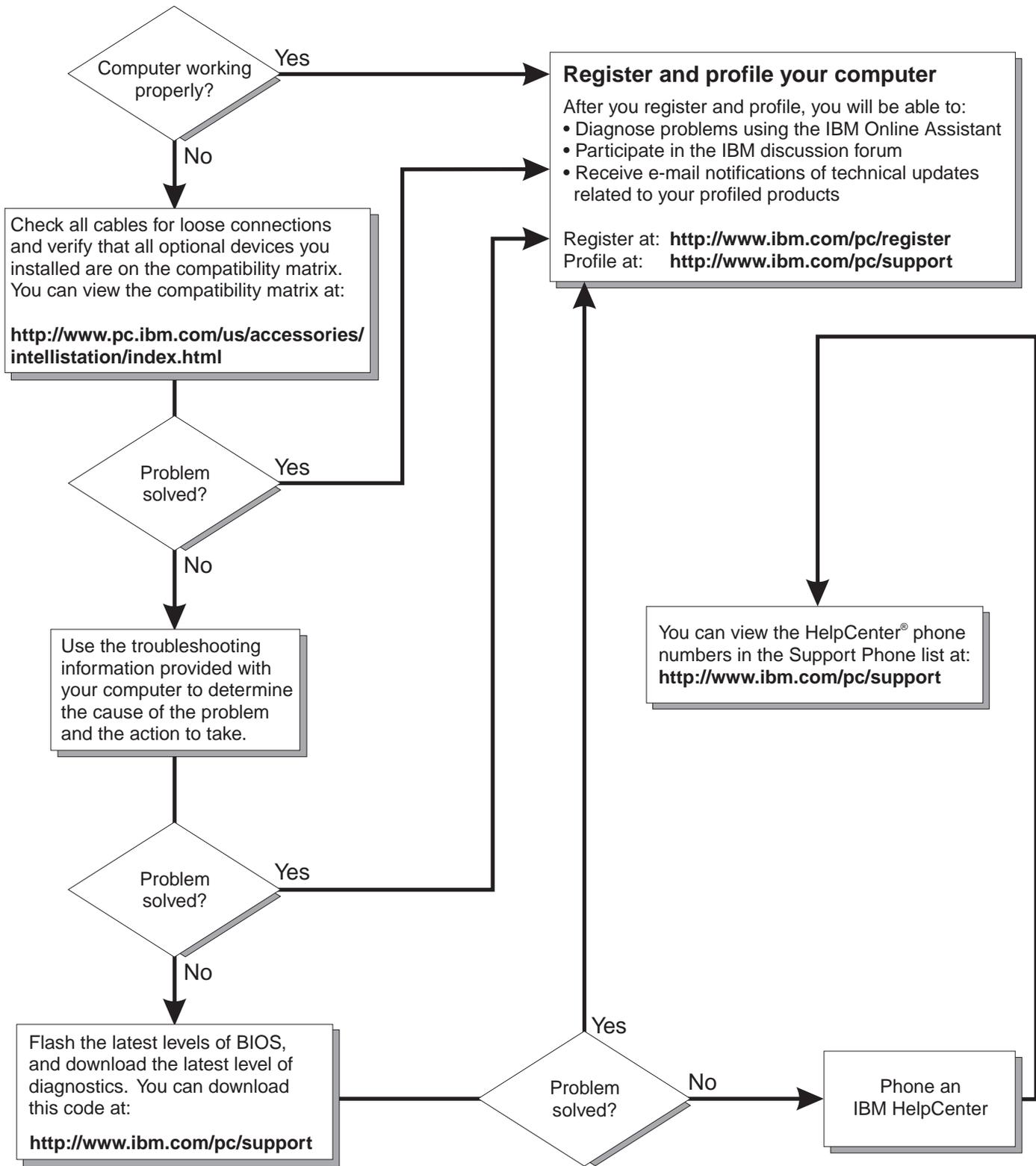
Thank you for buying an IBM IntelliStation M Pro computer.

This *User's Guide* contains information for setting up and configuring your computer. This book also contains information for every day use, and solving problems.

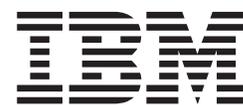
You can find the most current information about your computer on the IBM Web site at: <http://www.ibm.com/pc/support>



Computer Support



IBM IntelliStation M Pro
Types 6850 and 6233



User's Guide

Note:: Before using this information and the product it supports, be sure to read the general information in “Appendix C. Warranty information” on page 99 and “Appendix D. Notices” on page 111.

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Contents

Safety	vii
Preface	xiii
Related Publications	xiii
Notices and statements used in this book	xiii
Chapter 1. Introducing the IBM IntelliStation M Pro	1
Inventory checklist	2
Operating systems	2
Supported operating systems	2
Compatible operating systems	2
IntelliStation M Pro features and specifications	3
Software	5
Preinstalled software	5
Software available on the World Wide Web	7
Other software CDs	8
What your IBM IntelliStation M Pro offers	8
Computer controls and indicators	9
Chapter 2. Setting up your computer	11
Selecting a location for your computer	11
Arranging your workspace	11
Comfort	11
Glare and lighting	12
Air circulation	12
Electrical outlets and cable lengths	12
Input/output connector locations	13
Connecting computer cables	14
Starting your computer for the first time	14
Using the configuration or recovery utility	15
Running the setup program	15
Registering your computer	16
Using Access IBM	16
Viewing documentation	17
Installing other operating systems	17
Product recovery program	17
Additional setup tasks	18
Creating an IBM Enhanced Diagnostics Diskette	18
Creating an emergency repair diskette	18
Completing setup	18
Chapter 3. Operating your computer	19
Turning on your computer	19
Using video features	19
Video device drivers	19
Changing monitor settings	20
Using audio features	20
Line out	20
Line in	20
Mic	21
Updating system programs	21
Managing your computer	21
IBM Director Agent	21

Wake on LAN	21
Alert on LAN.	22
Remote Program Load or Dynamic Host Configuration Protocol	22
Remote Administration	22
Rapid Deployment Manager	22
System Migration Assistant	22
Desktop Management Interface	23
Using security features	23
Anti-intrusion features	23
Component protection	23
Data protection	23
Shutting down your operating system	24
Turning off your computer	25
Chapter 4. Configuring your computer	27
Using the Configuration/Setup Utility program (some models)	27
Starting the Configuration/Setup Utility program	27
The Configuration/Setup Utility main menu choices	28
Using passwords	30
Using the SCSISelect Utility program (some models)	30
Starting the SCSISelect Utility program	30
SCSISelect menu choices	31
Using the PXE Boot Agent Utility	32
Starting the PXE boot agent utility program	32
PXE boot agent utility menu choices	32
Chapter 5. Installing options	35
Major components of the IntelliStation M Pro Types 6850 and 6233	35
System board connectors	36
Memory board	36
Before you begin	37
System reliability considerations	37
Handling static-sensitive devices	38
Safety information.	39
Moving the stabilizing feet.	46
Removing the cover and front bezel	46
Removing the air baffle	48
Working with adapters	48
Adapter considerations	49
Installing an adapter	50
Installing internal drives.	51
Internal drive bays	52
Drive specifications	52
SCSI Controller.	53
Power and signal cables for internal drives	53
Installing a drive in bay 1	54
Installing drives in drive bays 4, 5, 6, 7, and 8	56
Installing memory modules	58
Removing a RIMM or C-RIMM	60
Installing a RIMM or C-RIMM	61
Installing a second microprocessor	62
Installing a second microprocessor on Windows NT	62
Installing a second microprocessor on Windows 2000	62
Second microprocessor installation	63
Security U-bolt	65
Replacing the cover and connecting the cables	65

Input/output connector locations	66
Mouse connector	67
Keyboard connector	67
Parallel connector	67
Serial connectors	68
Ethernet connector	68
Universal Serial Bus connectors	69
Audio connectors	70
Video connector	70
Completing the installation.	71
Updating the computer configuration	71
Configuring Plug and Play adapters	71
Starting the Configuration/Setup Utility program	72
Configuring startup sequence	72
Chapter 6. Solving problems	73
POST	75
Small computer system interface (SCSI) error messages	75
Software-generated error messages	75
Diagnostic error codes and messages	75
Troubleshooting charts	76
Diskette drive problems.	76
Hard disk drive problems	77
Monitor problems	78
General problems	80
Intermittent problems.	80
Keyboard, mouse, or pointing-device problems	80
Memory problems	81
Option problems	82
Parallel port problems	83
Serial port.	83
Printer problems	83
Software problems	84
Universal Serial Bus port problems	84
Changing the startup sequence to start from the CD	84
IBM Enhanced Diagnostics	85
PC-Doctor for Windows.	86
Using the IBM Product Recovery CD.	86
Recovering the operating system and support software	87
Installing other operating systems	88
Erasing a lost or forgotten password (clearing CMOS)	88
Recovering from a POST/BIOS update failure	89
Replacing the battery	89
Getting information, help, and service	91
Getting information	91
Getting help and service	92
Purchasing additional services	94
Appendix A. Computer records	95
Serial numbers and keys	95
Appendix B. Viewing the International License Agreement for Non-Warranted Programs	97
Appendix C. Warranty information	99
Warranty period	99

Warranty service and support	99
Before you call for service	99
Calling for service	100
IBM Statement of Limited Warranty Z125-4753-06 8/2000	101
Part 1 - General Terms	101
Part 2 - Country-unique Terms	103
Appendix D. Notices	111
Edition notice	111
Trademarks	112
Important notes	112
Electronic emission notices	113
Federal Communications Commission (FCC) statement	113
Industry Canada Class A emission compliance statement	113
Australia and New Zealand Class A statement	113
United Kingdom telecommunications safety requirement	113
European Union EMC Directive conformance statement	114
Taiwan electrical emission statement	114
Japanese Voluntary Control Council for Interference (VCCI) statement	114
Power cords	114
Index	117

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1



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

To avoid a shock hazard:

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

To connect:

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

To disconnect:

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

Statement 2

CAUTION:



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

Do not:

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

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

Statement 3



CAUTION:

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

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



Danger

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

Class 1 Laser Product

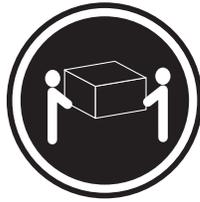
Laser Klasse 1

Laser Klass 1

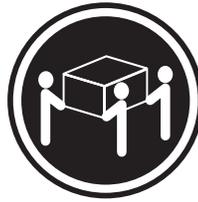
Luokan 1 Laserlaite

Appareil À Laser de Classe 1

Statement 4



≥18 kg (39.7 lbs)



≥32 kg (70.5 lbs)



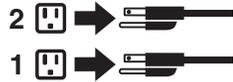
≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

Statement 5



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



Statement 8:



CAUTION:

Never remove the cover on a power supply or any part that has the following



label attached.

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

Preface

This book will help you become familiar with your IBM® IntelliStation® M Pro computer and its many features. It describes how to set up, configure, operate, maintain, and install options in your computer. Information about software, problem solving, and getting help is also included in this book.

Related Publications

The following documentation contains additional information about your computer. Because your computer comes with IBM-preinstalled software, you might be able to view some of these documents using Access IBM. See “Using Access IBM” on page 16 for information about how to use Access IBM. The IBM documents listed below can also be found at <http://www.ibm.com/pc/support> on the World Wide Web.

- *Hardware Maintenance Manual*

This publication contains information for trained service technicians.

- README files on the *Device Drivers and IBM Enhanced Diagnostics CD*

Several README files on this CD contain information about the various adapters and devices that might be attached to your computer.

- Adaptec SCSI documentation

This publication, accessible from Windows **Start** → **All Programs** → **Online Books** → **Online Books**, contains information and instructions for installing and configuring small computer systems interface (SCSI) device drivers and devices.

- *Safety Information*

This publication, accessible from Windows **Start** → **All Programs** → **Online Books** → **Online Books**, contains multilingual caution and danger notices.

Notices and statements used in this book

The caution and danger statements used in this book also appear in the multilingual safety information book that is accessible through Access IBM. Each caution and danger statement is numbered for easy reference to the corresponding statements in the safety book.

The following types of notices and statements are used in this book:

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

Chapter 1. Introducing the IBM IntelliStation M Pro

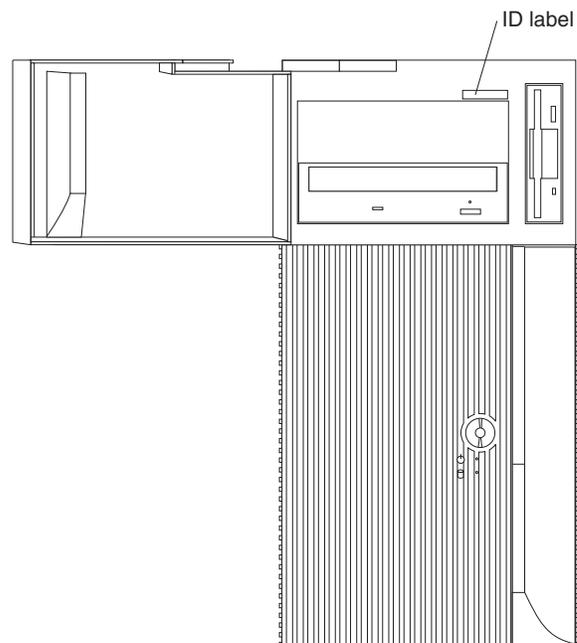
Thank you for selecting an IBM IntelliStation M Pro professional workstation. Your computer incorporates many of the latest advances in computer technology and is easy to expand and upgrade as your needs change.

Your IntelliStation M Pro computer is a rack mountable system. To install your computer in a rack, refer to the *Tower-to-Rack Conversion Kit* manual and the *Rack Installation Instructions* that are provided with your optional rack hardware for complete installation and removal instructions.

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

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

The computer model number and serial number are located on labels on top of the computer behind the bezel on the right. You will need these numbers when you register your computer with IBM. Record the numbers in “Appendix A. Computer records” on page 95.



Inventory checklist

Be sure to take an inventory of items as you unpack them to ensure that you have all of the components. If any items are missing or damaged, contact your place of purchase. The following is a list of items shipped with your IBM IntelliStation M Pro computer:

- One mouse (three-button)
- One keyboard
- One power cord (9 ft line cord)
- One compact disc with device drivers and diagnostic programs
- Microsoft® Windows® XP Professional publication pack
- This *User's Guide*

Operating systems

This section lists the operating systems that are either supported on or have been tested for compatibility with the IntelliStation M Pro Types 6850 and 6233.

Supported operating systems

IBM IntelliStation M Pro Type 6850 is supported on the following operating systems:

- Microsoft Windows 2000 Professional Workstation
- Microsoft Windows NT® Workstation Version 4.0
- Microsoft Windows XP Professional

Compatible operating systems

IBM IntelliStation M Pro Types 6850 and 6233 have been tested for compatibility with the following operating systems:

- IBM PC DOS Versions 7.0
- Red Hat Linux Version 7.1 or later
- SuSE Linux Version 7.1 or later
- TurboLinux Server Version 6.5 or later

IntelliStation M Pro features and specifications

The following table provides a summary of the features and specifications for your computer. Some features and specifications might not apply to your computer model.

<p>Microprocessor:</p> <ul style="list-style-type: none"> • Intel Xeon microprocessors • 256 KB or 512 KB Level-2 cache • Supports up to two microprocessors <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 256 MB • Maximum: 4 GB • Type: PC800 MHz, 400 MHz ECC Rambus RIMMs only • Slots: 8 <p>Drives: (depending on your model)</p> <ul style="list-style-type: none"> • Diskette: 1.44 MB (2 mode) • CD-ROM: 48X IDE • IDE hard disk drive (IDE model only) • SCSI Ultra160 hard disk drive (SCSI model only) 	<p>Video: (depending on your model)</p> <ul style="list-style-type: none"> • Matrox Millennium G450 (DVI-I) with 32 MB DDR SDRAM video memory and a single DVI-I or dual analog connectors • NVIDIA Quadro4 900XGL with 128 MB SDR SDRAM video memory and dual DVI-I connectors • NVIDIA Quadro4 200NVS (LFH-60) with 64 MB SDR SDRAM video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable) • ATI Fire GL8800 (DVI-I and VGA) with 128 MB DDR SGRAM video memory with one analog and one DVI-I connector • 3DLabs Wildcat III 6110 (DVI-I) with 128 MB texture buffer DDR SDRAM video memory and 64 MB frame buffer video memory, and dual DVI-I connectors <p>Size and Weight:</p> <ul style="list-style-type: none"> • Height: 440 mm (17.3 in.) • Width: 216 mm (8.50 in.) • Depth: 606 mm (23.9 in.) • Weight: <ul style="list-style-type: none"> – Minimum configuration as shipped: 25.0 kg (55 lb) – Maximum configuration: 29.5 kg (65 lb) 	<p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Operating: 10° to 35°C (50° to 95°F) – Storage: -40° to 60°C (-40° to 140°F) • Humidity: <ul style="list-style-type: none"> – Operating: 8% to 80% – Storage: 8% to 80% • Maximum altitude: 2134 m (7000 ft) <p>Heat output:</p> <p>Approximate heat output in British Thermal Units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 340 Btu/hr (100 watts) • Maximum configuration: 2385 Btu/hr (700 watts)
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<p>Expansion bays:</p> <ul style="list-style-type: none"> • Two 5.25-in. bays (one CD-ROM drive installed) • One 3.5-in. bay (diskette drive installed) • Six 3.5-in. slim-high bays available (one hard disk drive installed) <p>PCI expansion slots:</p> <ul style="list-style-type: none"> • Three 33 MHz/32-bit on the system board • Two 66 MHz/64-bit on the system board <p>AGP Pro 50 slot:</p> <ul style="list-style-type: none"> • Accelerated graphics port (AGP) • Video adapter installed in the 4X AGP Pro video slot on the system board <p>Power supply:</p> <p>One 480 watt (90-265 V ac)</p>	<p>Integrated functions:</p> <ul style="list-style-type: none"> • Dual-channel Ultra160 SCSI controller • 10BASE-T/100BASE-TX Ethernet controller on the system board with an RJ-45 Ethernet port • Two serial ports • One parallel port • Two USB ports • One keyboard port • One mouse port • Audio ports <ul style="list-style-type: none"> – Line out – Line in – Microphone • Dual-channel bus mastering IDE controller <p>Acoustical noise emission:</p> <ul style="list-style-type: none"> • Declared (upper limit) sound power levels: <ul style="list-style-type: none"> – Idle: 5.2 bels – Operating: 5.3 bels • Average sound-pressure levels: <ul style="list-style-type: none"> – At operator position: <ul style="list-style-type: none"> - Idle: 42 dBA - Operating: 45 dBA – At bystander position - 1 meter (3.3 ft): <ul style="list-style-type: none"> - Idle: 37 dBA - Operating: 39 dBA 	<p>Electrical input:</p> <ul style="list-style-type: none"> • Input voltage: <ul style="list-style-type: none"> – Low range: <ul style="list-style-type: none"> - Minimum: 90 V ac - Maximum: 137 V ac - Input frequency range: 57 - 63 Hz – High range: <ul style="list-style-type: none"> - Minimum: 180 V ac - Maximum: 265 V ac - Input frequency range: 47 - 53 Hz • Input kilovolt-amperes (kVA, approximately): <ul style="list-style-type: none"> – Minimum: configuration as shipped: 0.52 kVA – Maximum configuration: 1.50 kVA
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Software

Your computer comes with Microsoft Windows XP Professional¹ and a variety of software, including application programs, diagnostic tools, and device drivers. Some software is preinstalled, some is on the *Device Drivers and IBM Enhanced Diagnostics* CD, and some is located on the World Wide Web at <http://www.ibm.com/pc/support/>. Software other than Microsoft software is licensed under the terms of the IBM International License Agreement for Non-Warranted Programs. “Appendix B. Viewing the International License Agreement for Non-Warranted Programs” on page 97 contains instructions for viewing the license agreement.

Preinstalled software

In addition to the Microsoft operating system, the preinstalled software on your computer includes the following:

- **Access IBM**

This program provides a central menu of links on your desktop where you can easily access programs and utilities for many of the common tasks that you might want to perform.

- **Adobe Acrobat Reader**

You can use this program to read Portable Document Format (PDF) files, including your online documentation. You can download the most updated Adobe Acrobat Reader for other languages and operating systems from the Adobe Web site at <http://www.adobe.com/>.

- **Device drivers**

The device drivers for factory-installed features are preinstalled on your computer. The latest device drivers are also available at <http://www.ibm.com/pc/support/> on the World Wide Web.

1. The Microsoft Certificate of Authenticity is your assurance that the Windows software in your computer is legally licensed from Microsoft Corporation.

- **IBM Product Registration**

You can use this program to register your computer with IBM. When you register your computer with IBM, information is entered into an IBM database, which enables IBM to contact you in case of a recall or other problems. Some locations offer extended privileges and services to registered users.

- **Online Books**

You can use this program to access documentation that contains detailed information about your computer.

- **IBM Update Connector™**

You can use this program to update software data from an IBM server to your computer over an active Internet connection. After it is installed, you only need to start the program to be connected to the Update Connector database. When the connection is made, Update Connector automatically determines whether available updates are appropriate and, if so, downloads and installs them at your convenience. Update Connector automatically recognizes machine types and models as well as software versions and other criteria when determining which updates to download.

- **PC-Doctor for Windows**

This program contains diagnostic tools that you can use within your Windows operating system. In addition to isolating hardware problems, these tools provide information about your computer operating environment and some software components. Support documentation is built into the help system. (See also “IBM Enhanced Diagnostics” on page 85.)

- **Norton AntiVirus**

You can use this program to detect and remove viruses from your computer.

- **Product Recovery Program**

You can use this program to recover the Windows XP operating system and other software programs in the event of a system failure.

You must have Internet access to use some of these programs. For more information about connecting to the Internet, see the operating system documentation that comes with your computer. See “Chapter 2. Setting up your computer” on page 11 for additional information about preinstalled software. For more information about using the recovery programs and solving problems, see “Chapter 6. Solving problems” on page 73.

Notes:

1. Backup diskettes for your preinstalled software do not come with your computer. However, you can find the preinstalled programs in the c:\ibmtools\apps directory and device drivers in the c:\ibmtools\drivers directory.

If your hard disk drive, including the partition where the Product Recovery Program resides, becomes damaged or you replace the hard disk drive, contact IBM to order the *IBM Product Recovery CD* to recover your operating system, preinstalled applications, and device drivers. See “Getting information, help, and service” on page 91 for information about contacting IBM. For more information about recovering or installing the operating system, see “Using the IBM Product Recovery CD” on page 86.

2. The device drivers and some programs are also available at <http://www.ibm.com/pc/us/files.html> on the World Wide Web and on the *Device Drivers and IBM Enhanced Diagnostics CD*.

Software available on the World Wide Web

In addition to your IBM-preinstalled programs and device drivers, additional software is provided on the *Device Drivers and IBM Enhanced Diagnostics* CD, or other CDs. You decide which programs to install based on your needs.

The following list contains some of the software that is available on the World Wide Web at <http://www.ibm.com/pc/software/sysmgmt/>:

IBM Director Agent

You can use IBM Director Agent to view detailed information about your computer hardware and software, set up alerts, monitor a variety of system resources, and manage your asset security. For more information, go to <http://www.ibm.com/pc/software/sysmgmt/> on the World Wide Web and search for IBM Director Agent.

Rapid Deployment Manager

Rapid Deployment Manager is a graphical, server-based system deployment program that enables mass unattended installations of operating systems, software images, device drivers, and BIOS code updates to remote systems. When used with Wake on LAN[®], Rapid Deployment Manager can remotely turn on your computer so that the installation can be done while the computer is not being used.

System Migration Assistant

System administrators can use System Migration Assistant (SMA) to remotely transfer configurations, profile settings, printer device drivers, and files from an IBM or non-IBM computer to supported IBM systems.

Other software CDs

Some IntelliStation models come with additional CDs. Additional software might include the following:

Lotus SmartSuite®

Lotus® SmartSuite® is a package of award-winning productivity applications. Your computer comes with a Lotus *SmartSuite* CD or a proof of entitlement to receive one free CD version of Lotus SmartSuite.

Device Drivers and IBM Enhanced Diagnostics CD

Diagnostic test programs are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD that comes with your computer. These programs provide the primary methods of testing system components. Some preinstalled device drivers are also stored on this CD.

What your IBM IntelliStation M Pro offers

The IBM IntelliStation M Pro takes advantage of advancements in symmetric multiprocessing (SMP), data storage, graphics, memory, systems management, and network environments. Your computer includes:

- **High-performance accelerated graphics port (AGP) graphics**

Your computer comes with an AGP graphics adapter installed. This adapter supports high resolutions and includes many performance-enhancing features for your operating system environment.

- **Impressive performance using an innovative approach to SMP**

Your computer supports up to two Intel Xeon microprocessors. Your computer comes with one microprocessor installed; you can install an additional microprocessor to enhance performance and provide SMP capability.

- **Large system memory**

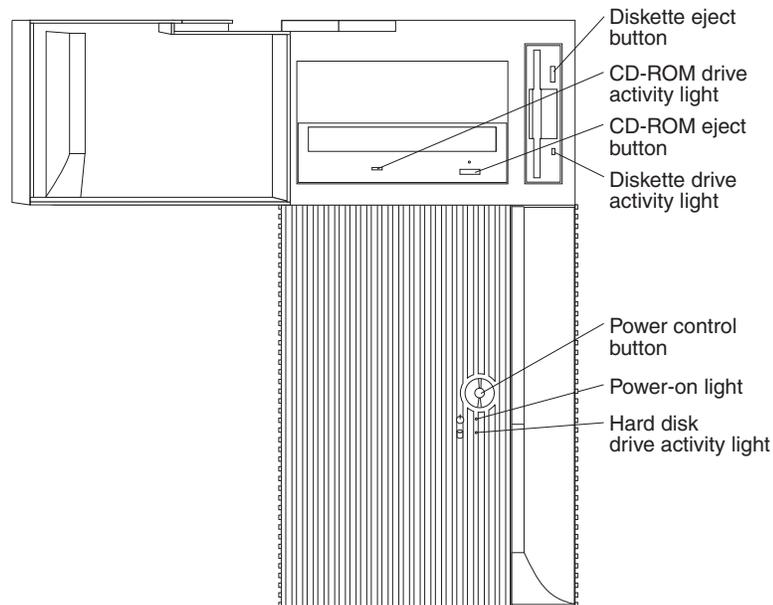
The memory bus in your computer supports up to 4 GB of system memory. The memory controller provides error correcting code (ECC) support for up to eight industry-standard PC800, 2.5 V, 184-pin, registered, Rambus dynamic random access memory (RDRAM) Rambus inline memory modules (RIMMs).

- **Integrated network environment support**

Your computer comes with two Ethernet controllers on the system board. Each Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The computer automatically selects between 10BASE-T and 100BASE-TX. Each controller provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

Computer controls and indicators

The button at the front of your computer enables you to turn on and turn off the computer. The lights are status indicators that tell you when a certain device, such as the hard disk drive, is in use.



The following list describes the controls and status indicators on your computer.

CD-ROM drive activity light

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

CD-ROM eject button

Press this button to open the CD tray and remove the CD from the CD-ROM drive.

Diskette drive activity light

When this light is on, the diskette drive is in use.

Diskette eject button

Press this button to release a diskette from the drive.

Hard disk drive activity light

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

Power control button

Press this button to turn your computer on or off. Do not turn off your computer if the in-use light for the hard disk drive or diskette drive is on.

Note: The power control button normally operates with a single touch. However in some circumstances, the computer might not immediately turn off. If this happens, hold the power control button down for 5 to 10 seconds, and the computer will turn off.

Power-on light

This status indicator lights when you turn on your computer.

Chapter 2. Setting up your computer

This chapter provides information about setting up your computer and preparing it to run your applications.

Before you begin to set up your computer, read the information in “Safety” on page vii.

You will need the following items:

- A computer
- A computer power cord
- A keyboard
- A mouse
- A monitor (sold separately with signal cable and power cord)

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

Selecting a location for 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 127 mm (5 in.) of space around the computer for proper air circulation.

For information about arranging your computer for comfort and ease-of-use, refer to “Arranging your workspace”.

Arranging your workspace

To get the most from your computer, arrange 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, the following guidelines will help you find a position that suits you best.

- Sitting in the same position for a long time can cause fatigue. A good chair can make a big difference. The backrest and seat should adjust independently and provide good support. The seat should have a curved front to relieve pressure on the thighs. Adjust the seat so that your thighs are parallel to the floor and your feet are either flat on the floor or on a footrest
- When using the keyboard, keep your forearms parallel to the floor and your wrists in a neutral, comfortable position. Try to keep a light touch on the keyboard and your hands and fingers relaxed. You can change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.
- Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also position other equipment you use regularly, such as the telephone or mouse, within easy reach.

Glare and lighting

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

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

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

Air circulation

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

Electrical outlets and cable lengths

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

When arranging your workspace:

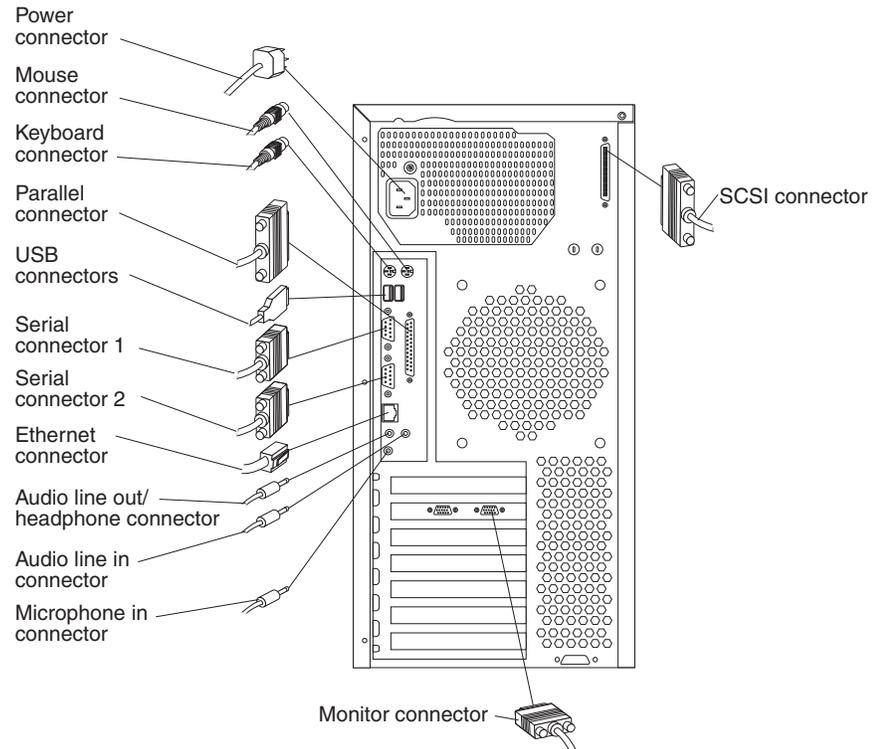
- Avoid the use of extension cords. When possible, plug the computer power cords directly into electrical outlets.
- Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

For more information about power cords, refer to “Power cords” on page 114.

Input/output connector locations

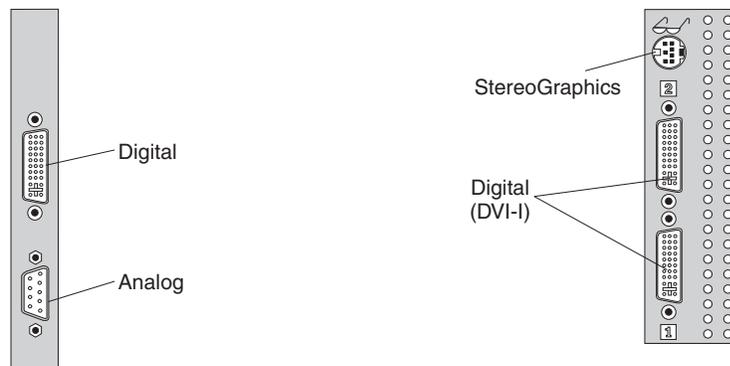
The following illustration shows the input/output connectors and the expansion slots on the rear of the computer.

Use the following illustration to help you connect cables to the rear of your computer. Some connectors are color-coded. You might not have devices for all connectors shown here.



Note: The location of the monitor connector is dependent on the video adapter installed on the computer.

The following illustration shows the video connectors on models with a Fire GL8800 or Wildcat III 6110 video adapter.



Note: The Wildcat III 6110 adapter occupies the AGP slot and the adjacent PCI slot. Be careful when you install an adapter in PCI slot 2 because the space

between the Wildcat III 6110 adapter and PCI slot 2 is very limited, which causes the adapters to be very close to each other.

If your software application supports it, the StereoGraphics connector on a Wildcat III 6110 or an NVIDIA Quadro4 900XGL video adapter is used for 3-D glasses or goggles.

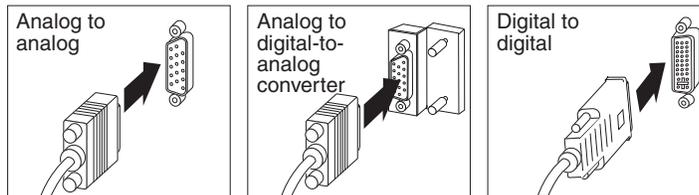
Connecting computer cables

Read the following before connecting cables:

- Connect all device cables before plugging any power cords into an electrical outlet.

Note: If your computer cables and connector panel have color-coded connectors, match the color of the cable end with the color of the connector. For example, connect a blue cable end with a blue panel connector, a red cable end with a red panel connector, and so on.

- Connect the monitor cable to the monitor, if it is not already attached.



Attention: On the Wildcat III 6110 video adapter, the first or only monitor must be connected to the bottom connector (connector number 1).

- If your computer comes with a ScrollPoint® mouse, the first time you start up your computer your mouse ScrollPoint function might not work. The ScrollPoint mouse function will be enabled after you shut down and restart your computer.
- Connect the power cords to the computer, monitor, and other devices before plugging them into an electrical outlet.
- In some circumstances, the computer might not turn off immediately when you press the power control button. If this happens, hold the power control button down for 5 to 10 seconds until the computer turns off.

Starting your computer for the first time

This section contains the information you will need to start using your computer.

For information about IBM-installed software, see “Software” on page 5. Additional programs are on the c:\ibmtools\apps directory and, in some cases, on other CDs and diskettes. If you are installing your own operating system, make sure that you install the device drivers after you install your operating system. Device drivers are provided on the *Device Drivers and IBM Enhanced Diagnostics* CD and on the World Wide Web. Installation instructions are provided with the option or in README files on the diskettes or CDs.

To start your computer, do the following:

1. Review the “Safety” on page vii.
2. Turn on all devices connected to the computer.
3. Press the power control button on your computer. For the location of the power control button, see “Computer controls and indicators” on page 9.

Attention: After you have turned on your computer for the first time, you must complete the setup procedure before you turn off your computer; otherwise, unexpected results might occur. See “Running the setup program”.

Using the configuration or recovery utility

When you start your computer, you can select one of the following messages to use the configuration program or the recovery program. If you do not select the following messages, your computer completes POST and the Windows desktop opens.

- Press F1 for Configuration/Setup

The Configuration/Setup program enables you to configure serial and parallel-connector assignments, change the drive startup sequence, set the date and time, and set passwords. See “Chapter 4. Configuring your computer” on page 27 for more information about using the Configuration and Setup Utility.

- To Start the Product Recovery Program, Press F11

The Product Recovery Program is provided on your computer to assist you with some recovery operations. This program enables you to recover Windows XP and other software programs. For more information about recovering your preinstalled software, see “Recovering the operating system and support software” on page 87.

- <<<Press <CTRL><A> for SCSISelect Utility!>>>

The SCSISelect Utility program is a built-in, menu-driven configuration utility program that you can use to view the default SCSI IDs and correct configuration conflicts. You will only see this message if your computer contains a SCSI adapter. For more information about using this program, see “Using the SCSISelect Utility program (some models)” on page 30.

If you experience any problems during startup, see “Chapter 6. Solving problems” on page 73.

Running the setup program

Before you start the setup procedure, you need the following information:

- The Microsoft operating system documentation that comes with your computer
- Network information (if applicable) from your network administrator
- The printer model and port that is used by the printer, if the printer is attached directly to your computer

The setup program starts when you turn on the computer for the first time, or after you have recovered your operating system. The program will prompt you to make choices or type information, as required.

Notes:

1. If the setup program has already been run once, it will not start when you turn on your computer.
2. The setup program is slightly different from the description in your operating system documentation. Some choices that are described in your operating system documentation do not appear because they are preset.
3. During the setup procedure, you must indicate that you accept the license agreement before you can complete the procedure.
4. In some instances, the registration information will already be entered into the registration fields. If the Product ID number is not already entered, you must

type the Product ID number from your Microsoft Certificate of Authenticity. The product ID number is located on the label attached to the bottom of your computer.

After the setup procedure finishes and the computer restarts, the Windows desktop opens and your computer is ready for use.

Registering your computer

Registering your computer helps IBM provide better service to you. When your registration information is received, it is placed into a central database accessible by IBM technical-support representatives. If you need technical assistance, the support representative will already have information about your computer, saving you time on the phone.

The registration program gathers your name, address, voice and fax telephone numbers, e-mail address, machine type, and machine serial number. If you do not register your computer during the initial setup, you can still do so at a later time.

To register your computer, use one of the following methods to access the registration program; then, follow the on-screen instructions:

- Double-click the **Register** icon on the Windows desktop and follow the directions.
- Double-click the **Access IBM** icon on the Windows desktop; then, click **How do I... → Get Started → Registering your IBM computer**.
- Click **Start → All Programs → IBM Information → Access IBM** on the Windows desktop.
- You can also register on the World Wide Web at <http://www.ibm.com/pc/register/>.

Note: The registration program, which starts through Access IBM or the **Register** icon, also has the capability of printing the registration information and supplying you with a mailing address, if no modem or Internet access is available.

Using Access IBM

Access IBM provides links to selected IBM Web sites and to the Access Help, a help system for many end-user tasks. Access IBM also provides shortcuts to help accomplish many of these tasks.

The options available from Access IBM are as follows:

- **How do I...**
Select this choice to display information about tasks that are typically performed immediately after installing a new computer and other tasks that might be performed during the life of the computer. These tasks include personalizing your computer to fit your needs, protecting your data, upgrading your computer hardware, purchasing IBM services, purchasing IBM options, solving problems, and viewing the IBM International License Agreement.
- **Tools & Tips**
Select this choice to display information about the diagnostic programs, data backup and recovery tools, AntiVirus tools, configuration and data backup and restoration tools, and online books.
- **On the Web**

Select this choice to display information about obtaining additional information and support on the World Wide Web.

Complete the following steps to use Access IBM:

1. Double-click the **Access IBM** icon on the Windows desktop. If the **Access IBM** icon is not available on your desktop, click **Start → All Programs → IBM Information → Access Help**.
2. Click one of the tabs listed on the Welcome window (for example, **How do I...**).
3. Click a topic.

Viewing documentation

Documentation about your computer hardware and software is provided in Portable Document Format (PDF) files that are read with Adobe Acrobat Reader. If you want to install a newer version of Adobe Acrobat Reader, you can download it from the Adobe Web site at <http://www.adobe.com/>.

To view online books, click **Start → All Programs → Online Books → Online Books**.

If no online books are installed, you can search for online documentation files at <http://www.ibm.com/pc/support/> on the World Wide Web.

Installing other operating systems

Your IBM computer comes with Microsoft Windows XP Professional preinstalled.

To install another operating system, follow the instructions in the documentation provided with the operating system and any updates.

Note: If you install another operating system, you might need additional software or device drivers. Hardware-specific support software is available on the *Device Drivers and IBM Enhanced Diagnostics* CD. If you experience problems with the device drivers installed from this CD, you can obtain the latest device drivers at <http://www.ibm.com/pc/support/> on the World Wide Web.

Before installing any operating system, be sure you obtain the latest updates. Contact the operating system manufacturer or, if applicable, check the manufacturer's World Wide Web site to obtain the updates.

Additional information about operating systems is posted periodically on the World Wide Web at <http://www.ibm.com/pc/support/>.

Product recovery program

The IBM Product Recovery Program is preinstalled on the hard disk drive that comes with your IBM computer. This program enables you to recover the Windows XP operating system in the event of a system failure. To access the IBM Product Recovery Program, press F11 when you see the following prompt during start up: To start the IBM Product Recovery Program, press F11.

This program is hidden from view to protect the program from accidental damage. If you are using fdisk, NT Disk Administrator, or another utility to reformat your hard disk drive, you might be able to see the partition where the IBM Product Recovery Program is stored. Do not delete this information, or your Product Recovery Program will be lost.

Backup diskettes for your preinstalled software are not provided with your computer. However, most of your IBM-preinstalled programs are located in the `c:\ibmtools\apps` directory on your hard disk drive. For complete instructions on recovering some of the preinstalled software, see “Recovering the operating system and support software” on page 87.

Additional setup tasks

This section includes information about several tasks that you might want to perform while setting up your computer. These optional tasks are helpful if performed when setting up your computer for the first time.

- Creating an IBM Enhanced Diagnostics diskette
- Creating an emergency repair diskette

Creating an IBM Enhanced Diagnostics Diskette

The *IBM Enhanced Diagnostics* diskette is a self-starting diagnostic diskette used to test hardware components on your computer.

To create the diskette, do the following:

1. From the Access IBM tabs, select the **How do I...** tab; then, click **Protect data**.
2. From the Protect data tab, click **Creating emergency diskettes → Diagnostic diskette**. A help panel card with instructions for creating a diagnostic diskette appears.
3. Follow the instructions on the screen to create the diskette.

You can also download the diagnostic program image from the IBM Web site at <http://www.ibm.com/pc/support> on the World Wide Web. For more information, see “IBM Enhanced Diagnostics” on page 85.

Creating an emergency repair diskette

At your earliest opportunity, create emergency repair diskettes. It is important to create these diskettes, such as a diagnostics diskette, Norton AntiVirus Rescue Disks, and the Repair Recovery diskette to use for recovery purposes.

If you add options to your computer, create a new emergency repair diskette to ensure that it reflects your current system configuration. For complete details about creating repair diskettes, click **Start → All Programs → Access IBM → How do I... → Protect data → Creating emergency diskettes**; then, follow the instructions on the screen to create a diskette.

Completing setup

Locate the serial and model numbers on the top of the front bezel, and then record this information in “Appendix A. Computer records” on page 95.

Chapter 3. Operating your computer

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

Turning on your computer

If you are starting your computer for the first time, see “Starting your computer for the first time” on page 14.

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

- You can press the power control button on the front of the computer to start the computer.
- If the computer is turned on and a power failure occurs, the computer will start automatically when the power is restored.

If the POST detects a problem when you turn on your computer, you will hear repeating beeps. If this occurs, see “Chapter 6. Solving problems” on page 73 for more information.

During POST, the following messages are displayed:

- Press F1 for Configuration/Setup
- To Start the Product Recovery Program, Press F11
- <<< Press <CTRL><A> for SCSISelect Utility! >>>

Note: The SCSI message only appears if a SCSI adapter is installed in your computer.

If your computer is properly connected and configured to load a startup image from the network, a request is sent and a startup image is loaded into your computer. If the request is unsuccessful or there is no network connection, the operating system and application programs are loaded from the hard disk drive.

Your computer can “wake up” and be started remotely over a network, if it has a properly configured network connection. For more information, see “Wake on LAN” on page 21 and “Remote Administration” on page 22.

Using video features

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

Video device drivers

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

Device drivers for the graphics adapter and a README file with instructions for installing the device drivers are provided on the *Device Drivers and IBM Enhanced Diagnostics* CD that comes with your computer. If your computer has preinstalled software, video device drivers are in the c:\ibmtools\drivers directory.

You can use the device driver installation instructions if you ever need to reinstall the device drivers, or if you need information about obtaining and installing updated device drivers.

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 the *Device Drivers and IBM Enhanced Diagnostics* CD or in the c:\ibmtools\drivers directory on your hard disk drive.

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

Note: Refer to the video adapter device driver README file and online help for more information about enabling dual-monitors.

Using audio features

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

The audio connectors in your computer are 3.5 mm mini-jacks. A description of the connectors follows. See "Connecting computer cables" on page 14 for the locations of these connectors.

Line out

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

Line in

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

Mic

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

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

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 are 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. You can use the Configuration/Setup Utility program to view and change the configuration and setup of your computer.

System programs are stored in an electrically erasable programmable read-only module (EEPROM) on the system board. This is sometimes referred to as *flash* memory.

IBM occasionally makes changes and enhancements to the system programs. When updates are released, they are available as downloadable files on the World Wide Web (see “Getting information, help, and service” on page 91).

You can update system programs by starting your computer using a flash update diskette or by using the Remote Administration feature, if it is enabled. Instructions for using system programs updates are included in a README file provided with the downloadable files.

Managing your computer

Your computer comes with features that a network administrator or file server can use to remotely manage and control your computer.

IBM Director Agent

IBM Director Agent streamlines and automates personal computer (PC) systems management and support tasks, such as asset deployment and tracking. These utilities are available for IBM computers at no additional charge, helping to reduce the total cost of ownership of your networked computers.

IBM Director Agent enables you to view detailed information about your computer hardware and software, set up alerts, monitor a variety of system resources, and manage your asset security. For more information, go to <http://www.ibm.com/pc/us/software/sysmgmt/> on the World Wide Web and search for IBM Director Agent.

Wake on LAN

A network administrator can use Wake on LAN to turn on your computer from a remote location. When Wake on LAN is used with network management software, many functions, such as data transfers, software updates, and POST or BIOS code updates can be initiated on your computer remotely.

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

Alert on LAN

Your computer supports Alert on LAN™ technology, which provides notification of changes in the computer system even when the computer is turned off. Working with desktop management interface (DMI) and Wake on LAN technologies, Alert on LAN helps manage and monitor the hardware and software features of your computer.

Alert on LAN generates notifications when the computer cover is removed, an error is detected during POST, or the computer is disconnected from the network or unplugged from the electrical outlet. Alert on LAN works in conjunction with IBM Director Agent.

Remote Program Load or Dynamic Host Configuration Protocol

A network administrator can use Remote Program Load (RPL) or Dynamic Host Configuration Protocol (DHCP) to control your computer. RPL, when used with software such as IBM Rapid Deployment Manager, uses a feature called *Hybrid RPL* to install hybrid images (or files) on the hard disk drive. If your computer is a Hybrid RPL client, each time the computer starts from the network, Rapid Deployment Manager downloads a small *bootstrap* program to your computer hard disk drive and avoids the network traffic associated with a standard RPL.

DHCP enables network administrators centrally to manage and automate the assignment of Internet Protocol (IP) addresses on a network.

Remote Administration

A network administrator can use the Remote Administration feature to remotely update the POST and BIOS code in your computer.

Network-management software, such as Rapid Deployment Manager, is required to take advantage of this feature.

Rapid Deployment Manager

Rapid Deployment Manager is a graphical, server-based system deployment program that enables mass unattended installations of operating systems, software images, device drivers, and BIOS code updates to remote systems. When used with Wake on LAN, Rapid Deployment Manager can remotely turn on your computer, so that the installation can be done while the computer is not being used.

For more information or to download this software, go to <http://www.ibm.com/pc/us/software/sysmgmt/> on the World Wide Web.

System Migration Assistant

System Migration Assistant (SMA) enables administrators to remotely transfer configurations, profile settings, printer device drivers, and files from an IBM or non-IBM computer to supported IBM systems.

For more information or to download this software, go to <http://www.pc.ibm.com/us/software/sysmgmt/> on the World Wide Web.

Desktop Management Interface

DMI is a method for gathering information about the hardware and software in your computer. In a network environment, network administrators can use DMI to remotely monitor and control your computer.

Using security features

To deter unauthorized use of your computer, anti-intrusion and other security features are provided with your computer.

Anti-intrusion features

IBM anti-intrusion features help protect against the theft of computer components, such as the microprocessor, system memory modules, or hard disk drives.

A cover lock is built into your computer to prevent the cover from being removed. Two identical keys for the cover lock are also supplied. A tag attached to the keys has the key serial number and the address of the key manufacturer.

Note: Record the “key code” number along with the manufacturer address and phone number in the space provided in “Appendix A. Computer records” on page 95. Because locksmiths are not authorized to duplicate the cover lock keys, you must order replacement keys from the key manufacturer. When ordering replacement keys, you will need the key code number.

You can also set a chassis-intrusion detector inside your computer to alert the system administrator each time the computer cover is removed. For more information about setting the chassis-intrusion alert, see “Chapter 4. Configuring your computer” on page 27.

If your computer uses the Alert on LAN feature and you are connected to a network that uses Intel LANDesk® Desktop Manager or IBM Rapid Deployment Manager, a message is also sent to the network administrator console indicating that the computer cover has been removed. For more information, see “Alert on LAN” on page 22 and contact your network administrator.

Component protection

The components in your computer have serial numbers on them. You can register the components with a third-party security company to improve the chances of identifying the components if they are ever stolen and recovered. For more information about component registration, see the IBM support page at <http://www.ibm.com/pc/us/desktop/assetid/> on the World Wide Web.

Data protection

You can lose data from the hard disk drive for a variety of reasons. Security violations, viruses, or hard disk drive failures can all contribute to data loss. To help protect against the loss of valuable information, IBM has incorporated a data-saving feature into your computer.

IBM security solutions

IBM security solutions help keep electronic business transactions safe. They include the following:

- Data protection
- Locked keyboard

SMART hard disk drive

Your computer comes with a SMART hard disk drive that is enabled to report potential hard disk failures. If an error is detected, a DMI-compliant warning message is sent to the computer screen and, if the computer is part of a network, to an administrator console. When an error is detected, the data on the hard disk can be backed up and the drive replaced.

SMART Reaction

To help back up important data, IBM provides SMART Reaction™ software on the computers with preinstalled software and also on the World Wide Web at <http://www.ibm.com/pc/support/>. SMART Reaction is a client/server software application that helps users and administrators respond effectively to a warning issued by the SMART hard disk drive.

Virus protection

Your computer has built-in virus protection that can be enabled through the Configuration/Setup Utility program. This built-in protection only checks for viruses in the boot record. Also, Norton AntiVirus for IBM is available on the World Wide Web at <http://www.ibm.com/pc/support/>.

Locking the keyboard

You can lock the keyboard so that others are unable to use it. If a user 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 user password feature with the BIOS Setup Utility program.

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

Shutting down your operating system

When you are ready to shut down your computer, follow these instructions to prevent the loss of unsaved data or damage to your software programs. For more information about shutting down your operating system, refer to the operating system documentation that comes with your computer.

Complete the following steps to shut down your operating system.

1. Save any files you are working on.
2. Close all open applications.
3. Click the Windows **Start** button.
4. Click **Shut Down**.
5. Select **Shut Down**; then, click **OK** to confirm the request.

Turning off your computer

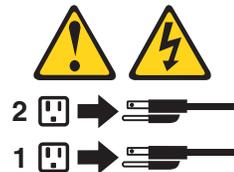
You can turn off your computer as follows.

Statement 5



CAUTION:

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



- You can press the power control button on the front of the computer. This starts an orderly shutdown of the operating system, if this feature is supported by your operating system, and places the computer in standby mode.

Note: After turning off the computer, wait at least five seconds before you press the power control button to turn on the computer again.

- You can press and hold the power control button for more than four seconds to cause an immediate shutdown of the computer and place the computer in standby mode. You can use this feature if the operating system stops functioning.
- If you cannot use the power control button to turn off your computer, disconnect the computer power cords from the electrical outlets.

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

Chapter 4. Configuring your computer

The following configuration programs are provided with your computer:

Configuration/Setup Utility program

The Configuration/Setup Utility program is part of the BIOS code that comes with your computer. You can use this program to configure serial and parallel-connector assignments, change the drive startup sequence, set the date and time, set passwords, and set the chassis-intrusion alert. See “Using the Configuration/Setup Utility program (some models)” for more information.

SCSISelect Utility program

The SCSISelect Utility is a built-in program that enables you to configure the devices that are attached to the SCSI adapter (on some models). Use this program to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive. See “Using the SCSISelect Utility program (some models)” on page 30 for more information.

PXE Boot Agent Utility

The Preboot eXecution Environment (PXE) Boot Agent Utility program is part of the BIOS code that comes with your computer. You can use this program to select operating-system wake-up support and to set menu wait times. For information about how to start this utility, see “Using the PXE Boot Agent Utility” on page 32.

Using the Configuration/Setup Utility program (some models)

This section provides instructions for starting the Configuration/Setup Utility program and descriptions of the menu choices that are available.

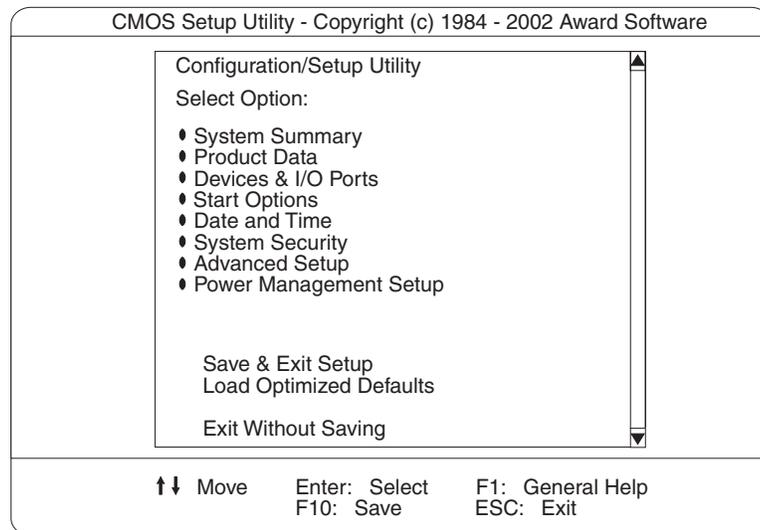
Starting the Configuration/Setup Utility program

Complete the following steps to start the Configuration/Setup Utility program.

1. Turn on the computer and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup displays, press F1.
3. Follow the instructions that appear on the screen.

The Configuration/Setup Utility main menu choices

From the Configuration/Setup Utility main menu, you can select settings that you want to change. The Configuration/Setup Utility main menu is similar to the following.



Notes:

1. Press F1 to display help information for a selected menu item.
2. Choices on some menus might differ slightly from the ones that are described in this book, depending on the version of BIOS code in your computer.
3. If both a power-on and administrator password are set, you can type either password at the password prompt that appears as you start your computer. However, if you want to change the settings in the Configuration/Setup, you must type the administrator password to access the full configuration menus. If you type the power-on password, you will see limited information in the Configuration/Setup program. For more information about setting passwords, see “Using passwords” on page 30.

The Configuration/Setup Utility main menu choices are as follows:

- **System Summary**

Select this choice to display configuration information. This includes the type and speed of the microprocessor and the amount of memory that is installed.

Changes that you make to configuration settings appear on this summary screen. You cannot edit the fields.

This choice appears on both the full and limited Configuration/Setup Utility menus.

- **Product Data**

Select this choice to view system information, such as the machine type and model, the computer serial number, and the revision level or issue date of the BIOS code that is stored in the flash EEPROM.

- **Devices and I/O Ports**

Select this choice to view or change the assignments for devices and input/output ports. This choice appears only on the full Configuration/Setup Utility main menu.

- **Start Options**

Select this choice to view or change the start options. Start options take effect when you start your computer.

You can designate keyboard operating characteristics, such as the keyboard speed, or specify whether the computer starts with the keyboard number lock on or off.

The computer uses a startup sequence to determine the device from which the operating system starts. For example, you can define a startup sequence that checks for a startable diskette in the diskette drive; then, checks the hard disk drive, and then checks a network adapter.

You can enable a virus-warning test that checks for changes in the master boot record at startup. You also can choose to run POST in the quick mode, or read the microprocessor serial number.

- **Date and Time**

Select this choice to set the system date and time.

The system time is in a 24-hour format: hour:minute:second.

- **System Security**

Select this choice to set a power-on or an administrator password. See “Using passwords” on page 30 for more information. You also can enable the chassis-intrusion detector to alert you each time the computer cover is removed.

- **Advanced Setup**

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

A message displays above the choices on this menu to alert you that the system might malfunction if these options are configured incorrectly. Follow the instructions on the screen carefully.

- **Cache Control**

Select this choice to enable or disable the microprocessor cache.

Attention: Do not make changes to the Cache Control unless directed to do so by an IBM authorized service representative.

- **Chipset Feature**

Select this choice to modify settings that control features of the core chip set on the system board.

Attention: Do not make changes to the Chipset Feature unless directed to do so by an IBM authorized service representative.

- **Memory Settings**

Select this choice to manually enable or disable a bank of memory.

If a memory error is detected during POST or memory configuration, the computer can automatically disable the failing memory bank and continue operating with reduced memory capacity. If this occurs, you must manually enable the memory bank after the problem is corrected. Select **Memory Settings** from the Advanced Setup menu, and use the arrow keys to highlight the bank that you want to enable; then, use the arrow keys to select **Enable**.

- **Processor Control**

Select this choice to display processor speed information. If the processor speed is accidentally changed, use this choice to reset the processor speed based on your computer model.

- **Power Management Setup**

Select this choice to enable or disable system power settings. This includes automatic power-on settings such as Wake on LAN and Wake on Alarm.

- **PC Health Status**

Select this choice to display the computer temperature and voltage status.

- **Save and Exit Setup**

Select this choice to save your customized settings.

- **Load Optimized Defaults**

Select this choice to discard your changes and restore the factory settings.

- **Exit Without Saving**

Select this choice if you want to exit without saving changes, or if no changes have been made.

Using passwords

You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the power-on password or the administrator password. When you have set one or both of the passwords, record the passwords and keep them in a secure place.

If both a power-on and administrator password are set, you can type either password at the password prompt that appears as you start your computer. However, if you want to change the settings in the Configuration/Setup, you must type the administrator password to access the full configuration menus. If you type the power-on password, you can only view limited information in the Configuration/Setup program.

If you forget the power-on password, you can regain access to the computer through one of the following methods:

- Start the Configuration/Setup Utility program and change the power-on password.
- Change the jumper position on the complimentary metal oxide semiconductor (CMOS) jumper as described in “Erasing a lost or forgotten password (clearing CMOS)” on page 88.

Using the SCSISelect Utility program (some models)

SCSISelect is a built-in, menu-driven configuration utility program that you can use to:

- View the default SCSI IDs
- Locate and correct configuration conflicts

The following sections provide instructions for starting the SCSISelect Utility program and descriptions of the menu choices that are available.

Starting the SCSISelect Utility program

Complete the following steps to start the SCSISelect Utility program:

1. Turn on the computer.
2. Press F1 to run the Configuration/Setup utility.
3. When the <<< Press <CTRL><A> for SCSISelect™ Utility! >>> prompt displays, press Ctrl+A.
4. When the Would you like to configure the host adapter or run the SCSI disk utility? question displays, make your selection; then, press Enter.
5. Use the arrow keys to select a choice from the menu.
 - Press Esc to exit the SCSISelect Utility program.
 - Press the F5 key to switch between color and monochrome modes (if your monitor permits).

6. Follow the instructions on the screen to change the settings of the selected items; then, press **Enter**.

SCSISelect menu choices

The following choices appear on the SCSISelect Utility menu:

Configure/View Host Adapter Settings

Select this choice to view or change the SCSI controller settings. To reset the SCSI controller to its default values, press F6; then, follow the on-screen instructions.

You can view or change the following controller settings:

- **Host Adapter SCSI ID**

Select this choice to view the SCSI controller identification (ID), which is usually 7.

- **SCSI Parity Checking**

Select this choice to view the assigned value of Enabled.

- **Host Adapter SCSI Termination**

Select this choice to view the assigned value of Automatic.

- **Boot Device Options**

Select this choice to configure startable-device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.

- **SCSI Device Configuration**

Select this choice to configure SCSI-device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.

Note: The Maximum Sync Transfer Rate represents the transfer rate for Ultra SCSI devices.

- The transfer rate for Ultra160 low voltage differential (LVD) devices is 160.0 MBps.
- The transfer rate for Ultra2 SCSI LVD devices is 80.0 MBps.
- The transfer rate for Fast SCSI devices is 20.0 MBps.

Advanced Configuration Options

Select this choice to view or change the settings for advanced configuration options. These options include enabling support for large hard disk drives and support for drives with Ultra SCSI speeds.

SCSI Disk Utilities

Select this choice to view the SCSI IDs that are assigned to each device or to format a SCSI device.

To use the utility program, select a drive from the list. Read the on-screen instructions carefully before making a selection.

Note: If you press Ctrl+A before the selected drives are ready, an Unexpected SCSI Command Failure screen might appear. Restart the computer and watch the SCSISelect messages as each drive starts. When the drive that you want to view or format starts, press Ctrl+A.

Using the PXE Boot Agent Utility

The PXE boot agent is a built-in, menu-driven configuration utility program that you can use to:

- Select whether or not to display setup prompt
- Set menu wait time
- Select OS wake up support

Attention: The network startup protocols and startup order options are not supported on this product.

The following sections provide instructions for starting the PXE Boot Agent Utility program and descriptions of the menu choices that are available.

Starting the PXE boot agent utility program

To start the PXE Boot Agent Utility program:

1. Turn on the computer.
2. When the Initializing Intel (R) Boot Agent Version X.X.XX PXE 2.0 Build XXX (WfM 2.0) prompt appears, press Ctrl+S.

Note: By default you will have two seconds after the prompt appears on the screen to press Ctrl+S.

3. Use the arrow keys or press Enter to select a choice from the menu.
 - Press Esc to return to the previous menu.
 - Press the F4 key to exit.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

PXE boot agent utility menu choices

The following choices appear on the PXE boot agent utility menu:

- **Network Boot Protocol**

PXE is the default value for this menu item.

Note: Do not change this value. There are no other network boot protocols supported.

- **Boot Order**

Attention: This option is not supported on this product. To change the boot order use the Configuration/Setup utility. See “Using the Configuration/Setup Utility program (some models)” on page 27 for more information.

- **Show setup prompt**

Select this choice to either display the PXE setup prompt or disable it. Disable is the default setting.

When this choice is enabled, the prompt Press Ctrl+S to enter the setup menu appears on the screen under the initializing prompt.

- **Setup time wait menu**

Select this choice to set the amount of time (in seconds) that the system will pause during initialization for a Ctrl+S input.

- 2 seconds (Default)
- 3 seconds
- 5 seconds

- 8 seconds
- **Legacy OS wake up support**
Select this choice to enable or disable the operating system wake-up support.
 - Disabled (Default)
 - Enabled

Notes:

1. Use the default setting for Advanced Configuration and Power Interface (ACPI) aware operating systems, such as Windows 2000 and Windows NT.
2. If your computer is running a non-ACPI operating system, you must set this selection to Enable to use the Wake-on-LAN support.
3. When using a non-ACPI operating system, do not send a wake up packet to the computer while it is turned on.

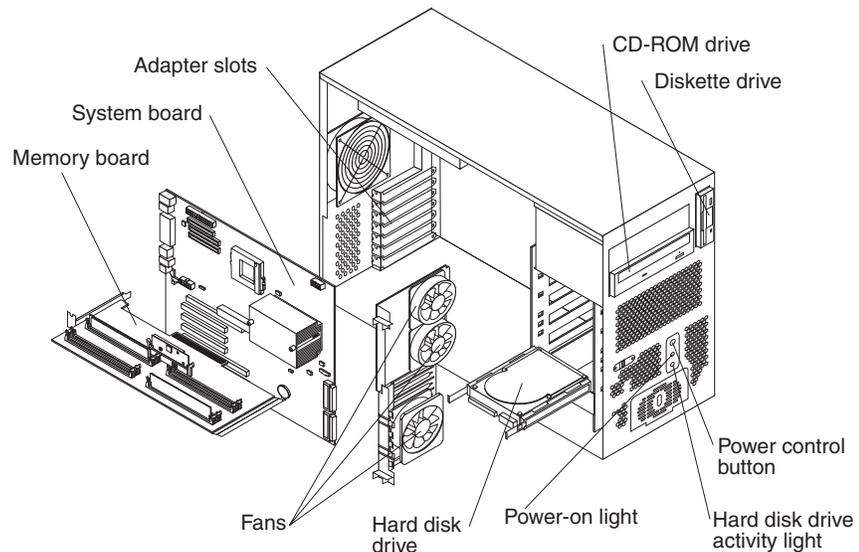
Chapter 5. Installing options

This chapter provides instructions to help you add options to your computer. Use these instructions along with the documentation that comes with the option. Some option-removal instructions are provided, in case you need to remove one option and install another. For a list of supported options for your computer, go to <http://www.ibm.com/pc/support/> on the World Wide Web.

Major components of the IntelliStation M Pro Types 6850 and 6233

The following illustration shows the locations of the major components of the IntelliStation M Pro computer.

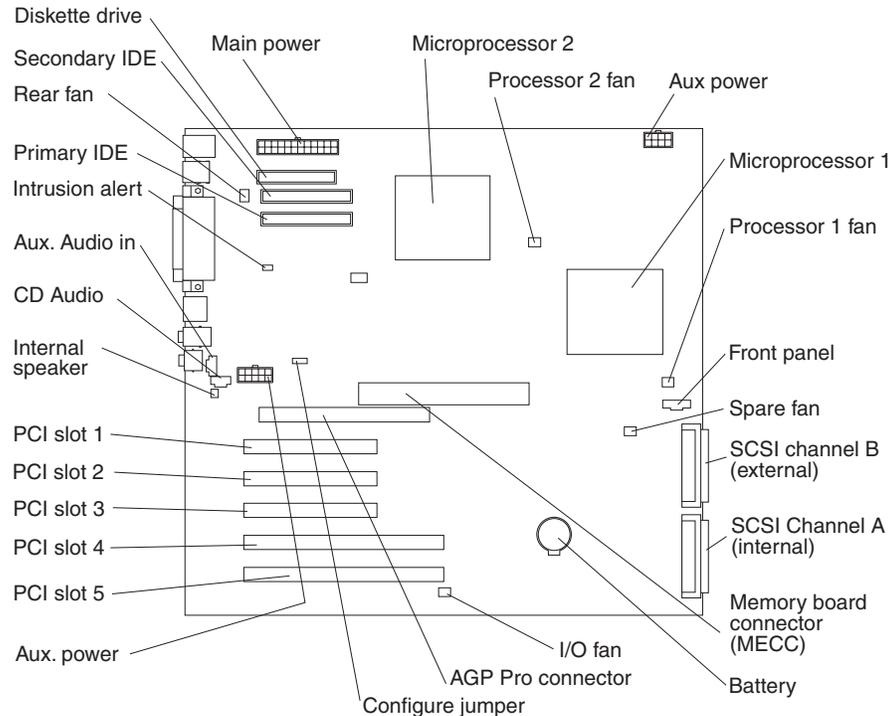
Note: The illustrations in this documentation might differ slightly from your hardware.



System board connectors

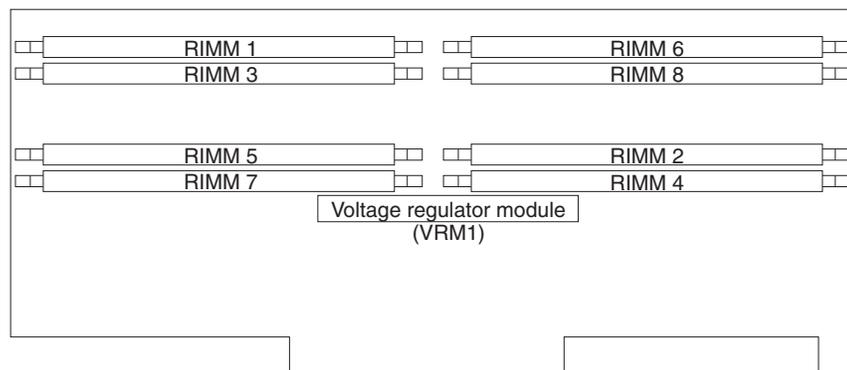
The following illustration shows the components on the system board.

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



Memory board

The memory board has RIMM connectors and a memory voltage regulator module (VRM). The memory board has eight RIMM connectors. When installing system memory, refer to the following illustration for the location of the RIMM connectors.



Before you begin

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

- Become familiar with the safety and handling guidelines specified under “Handling static-sensitive devices” on page 38, and “Safety information” on page 39. These guidelines help you work safely while working with your computer or options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your computer, monitor, and other options that you intend to install.
- Back up all important data before you make changes to disk drives.
- Have a small, flat-blade screwdriver available.
- For a list of supported options for your computer, refer to <http://www.ibm.com/pc/us/intellistation/> on the World Wide Web.

System reliability considerations

To help ensure proper cooling and system reliability, make sure:

- Each of the drive bays has a filler panel installed.
- The cover is in place during normal operations, or is removed for no longer than 30 minutes while the computer is operating.
- There is space around the computer to allow the computer cooling system to work properly. Leave about 127 mm (5 in.) of space around the front and rear of the computer.
- Cables for optional adapters are routed according to the instructions provided with the adapters.
- A failed fan is replaced within 48 hours.

Handling static-sensitive devices

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

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

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

Safety information

Before installing this product, read the safety information.

مج، يجب قراءة دات السلامة

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

安裝本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtete příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

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

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

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

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

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

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

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

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

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

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

Pred inštaláciou tohto produktu si prečítajte Informáciu brožúrku o bezpečosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous. To avoid a shock hazard:

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

To connect:

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

To disconnect:

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

Statement 2:

CAUTION:



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

Do not:

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

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

Statement 3:



CAUTION:

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

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



DANGER

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

Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

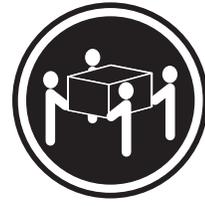
Statement 4:



≥18 kg (39.7 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:

Use safe practices when lifting.

Statement 5:

CAUTION:



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



Statement 8:



CAUTION:

Never remove the cover on a power supply or any part that has the following



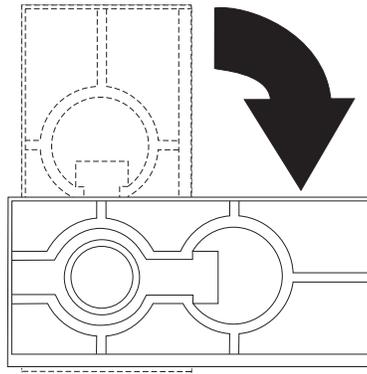
label attached.

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

Moving the stabilizing feet

The two front feet on the bottom of the computer rotate 90 degrees to provide additional stability.

When installing options in the computer, you might find it easier to lay 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.



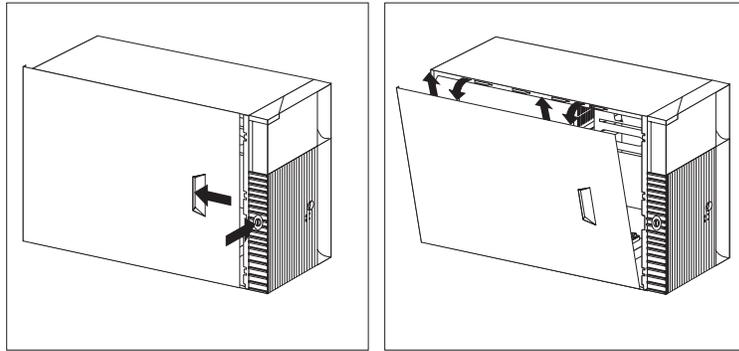
Removing the cover and front bezel

The following information describes how to remove the cover and bezel from the computer. When disconnecting cables, be sure to note where they attach, so that you can reattach them correctly later.

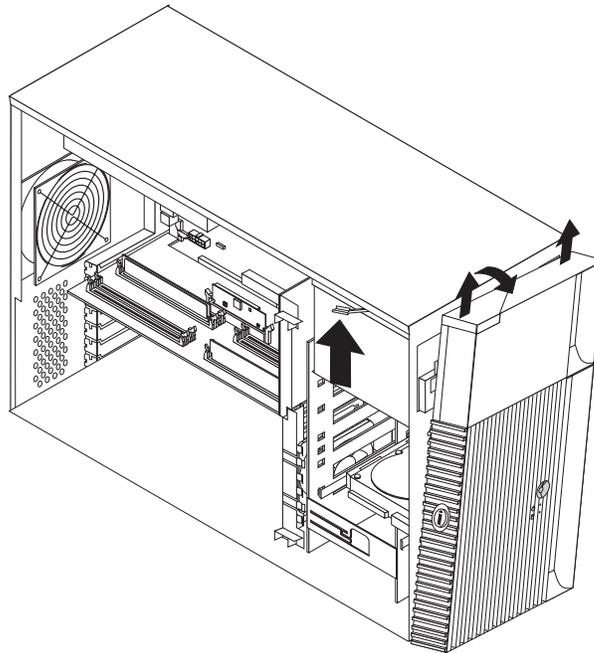
To remove the cover and front bezel, complete the following steps:

1. Review the information in “Before you begin” on page 37.
2. Remove any media (diskettes, CDs, or tapes) from the drives, and shut down your operating system.
3. Turn off the computer and all attached devices. Disconnect all external cables and power cords.
4. If the key-lock button is locked, unlock it.
5. Press the key-lock button on the left side of the front bezel, and slide the side cover toward the rear of the computer.

6. Lift the side cover from the computer.



7. Lift the lever at the top of the chassis and pull the front bezel from the front of the computer. You might need to move the computer closer to the edge of the desk to completely rotate the bezel down to remove it.



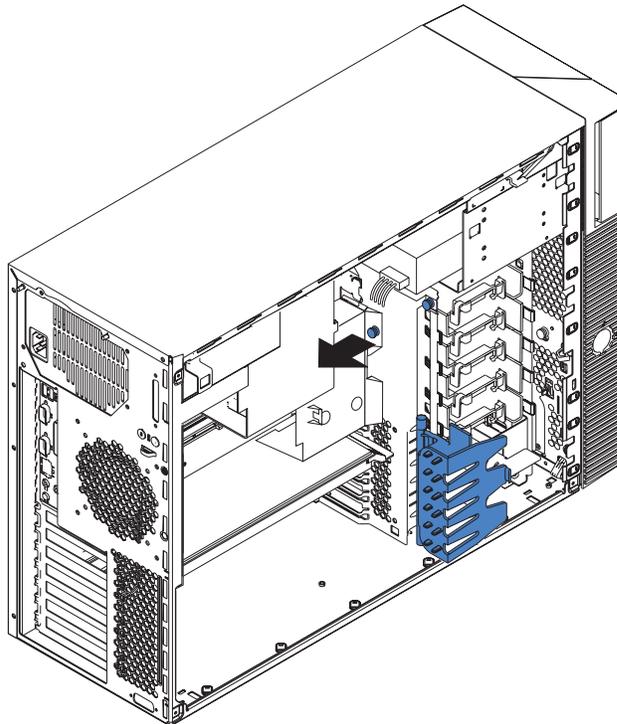
Attention: Proper cooling is required for the reliable performance of internal components. Do not operate your computer with the cover removed.

Removing the air baffle

Your computer might come with a plastic air baffle that directs air flow through the processor. When installing options, you might need to lift the air baffle out of the chassis to access some components. Place the baffle back into place before replacing the cover.

To remove the air baffle, do the following:

1. Pull the blue clip outward until the pins disengage.



2. Slide the air baffle back slightly and lift it to remove it.

Working with adapters

You can install a variety of adapters in the expansion slots on the system board. For help in locating the system board, see “Major components of the IntelliStation M Pro Types 6850 and 6233” on page 35.

Note: The computer power supply might not be able to support the installation of an adapter in all PCI slots. The ability of the power supply to support an adapter in all slots is dependent on the computer configuration and the type of PCI adapter installed.

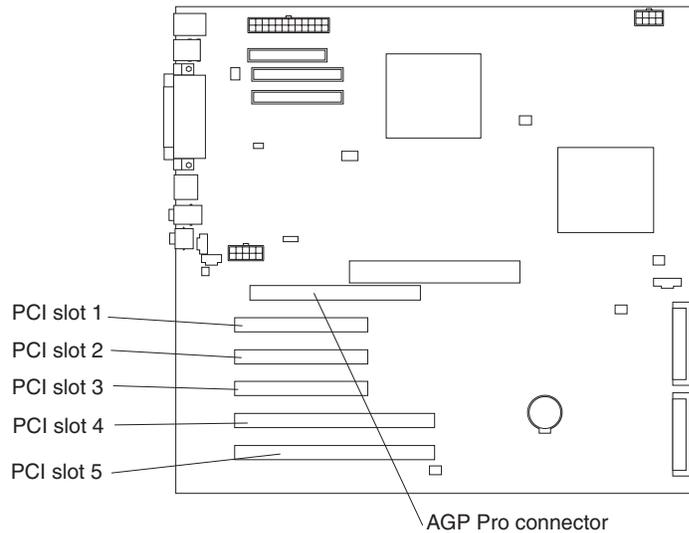
You can install various adapters in the expansion slots in your computer. The AGP Pro video adapter is installed in the AGP slot. You can install up to five PCI adapters in PCI expansion slots. There are three 32-bit PCI slots and two 64-bit slots.

Note: Because of its width, the Wildcat III 6110 video adapter requires both the AGP slot and the adjacent PCI slot. If your model contains this video adapter, be careful when you install an adapter in PCI slot 2 because the

space between the Wildcat III 6110 adapter and PCI slot 2 is very limited, which causes the adapters to be very close to each other.

The following illustration shows the location of the AGP and PCI expansion slots on the system board.

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



Adapter considerations

Before you install adapters, read the following:

- Review the documentation that comes with the adapter, and follow those instructions in addition to the instructions given in this chapter.
- You can install full-length adapters in all five PCI expansion slots.
- Your computer supports 5.0V and 3.3V PCI adapters. The 32-bit adapter slots support 5.0V PCI adapters and the 64-bit slots support 3.3V adapters.

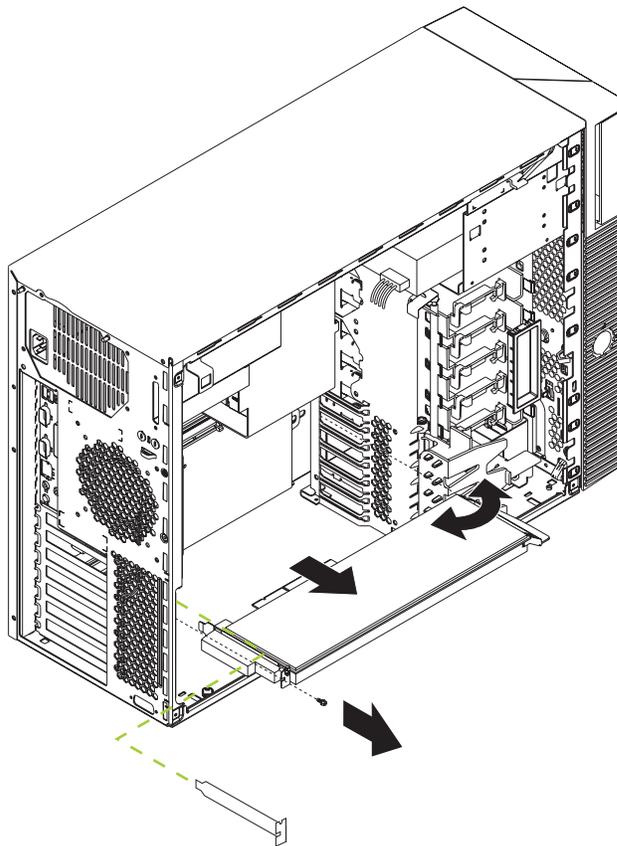
Note: The computer power supply might not be able to support the installation of an adapter in all PCI slots. The ability of the power supply to support an adapter in all slots is dependent on the computer configuration and the type of PCI adapter installed.

Installing an adapter

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to “Handling static-sensitive devices” on page 38.

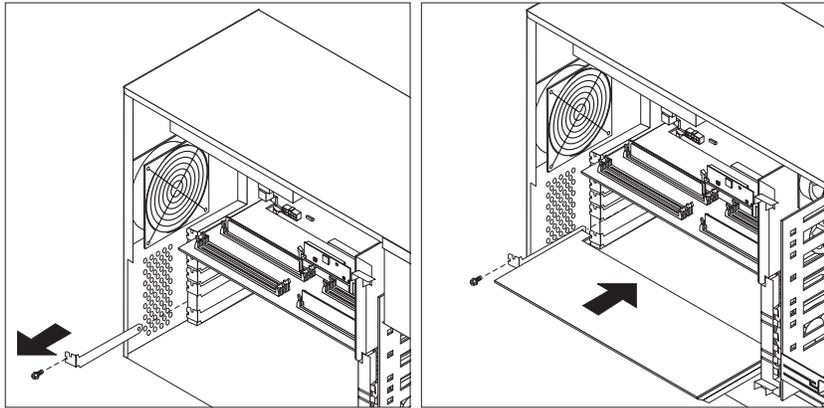
To install an adapter, complete the following steps:

1. Review the “Safety information” on page 39.
2. Turn off the computer and peripheral devices.
3. Remove all external cables from the computer; then remove the cover. For more information, see “Removing the cover and front bezel” on page 46.
4. Determine which PCI expansion slot you will use for the adapter.
5. If you are installing a full-sized adapter in one of the PCI slots on the system board, rotate the PCI support bracket out of your way.



6. Remove the PCI adapter retention bracket or the adapter retention screw (depending on the model) from the rear of the system and remove the expansion slot cover.
7. Touch the static-protective package containing the adapter to any unpainted metal surface in the computer; then, remove the adapter from the package.

8. Install the adapter in the expansion slot.



9. Replace the PCI adapter retention bracket or adapter retention screw (depending on the model).
10. Rotate the PCI adapter support bracket back into place.
11. Replace the cover, see “Replacing the cover and connecting the cables” on page 65.

Adapters supported by your computer use *Plug and Play* technology, which enables the computer to automatically configure the adapter. For more information, see “Updating the computer configuration” on page 71.

Installing internal drives

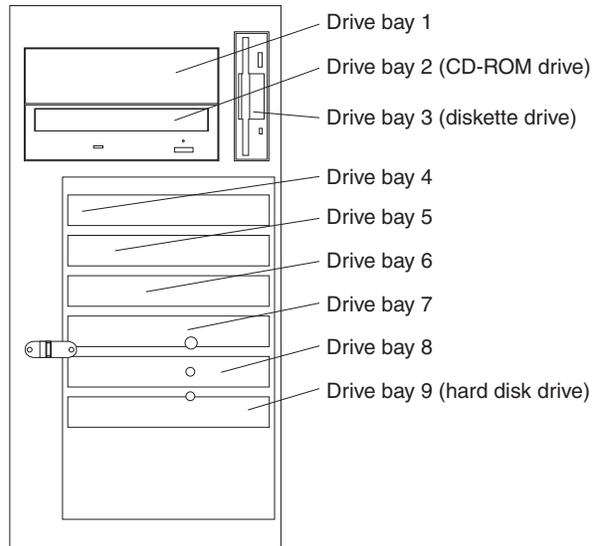
Different types of drives enable your computer to read multiple types of media and store data in different formats. Depending on your computer model, you might have one or more of the following drives installed.

- CD-ROM drive
- Diskette drive
- Hard disk drive

Internal drive bays

Your IBM IntelliStation M Pro computer comes with an IDE CD-ROM drive installed in bay 2, a 3.5-inch, 1.44 MB diskette drive (2 mode) installed in bay 3, a SCSI hard disk drive installed in bay 9 in SCSI models, and an IDE hard disk drive installed in bay 5 in IDE models. Your computer has a static shield and bay panel installed in bay 1.

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



Drive specifications

The following table describes some of the drives you can install in each bay and their height requirements.

Bay number	Type of drive
Bay 1 - Maximum height: 25.4 mm (1.0 in.)	<ul style="list-style-type: none"> • Tape drive • DVD • Jaz drive • Zip drive (bracket required) • CD-RW
Bay 2 - Maximum height: 25.4 mm (1.0 in.)	CD-ROM drive (preinstalled)
Bay 3 - Maximum height: 25.4 mm (1.0 in.)	3.5-inch diskette drive (preinstalled)
Bay 4 - Maximum height: 25.4 mm (1.0 in.)	3.5-inch hard disk drive
Bay 5 - Maximum height: 25.4 mm (1.0 in.)	3.5-inch hard disk drive (preinstalled in bay 5 on IDE models)
Bay 6 - Maximum height: 25.4 mm (1.0 in.)	3.5-inch hard disk drive
Bay 7 - Maximum height: 25.4 mm (1.0 in.)	3.5-inch hard disk drive
Bay 8 - Maximum height: 25.4 mm (1.0 in.)	3.5-inch hard disk drive
Bay 9 - Maximum height: 25.4 mm (1.0 in.)	3.5-inch hard disk drive (preinstalled in bay 9 on SCSI models)

Notes:

1. Install removable-media drives in bay 1.
2. Your computer supports only one diskette drive (bay 3).
3. IDE models are shipped with an IDE hard disk drive in bay 5. If you upgrade, install the second hard disk drive in bay 4.
4. Your computer supports up to four IDE hard disk drives. Install the first two hard disk drives in bay 4 and bay 5. You can install two more hard disk drives in bays 6 and 7 by removing the CD-ROM drive connection.
5. SCSI models are shipped with a SCSI hard disk drive in bay 9. If you upgrade, install the next hard disk drive in bay 8; then, bays 7, 6, 5, and 4 (in this order).

Before you install hard disk drives in your computer, verify that you have all the cables and other equipment specified in the documentation that comes with the hard disk drive. You might also need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option.

SCSI Controller

Your computer is equipped with a SCSI controller integrated on the system board for use with Ultra160 SCSI devices.

If your computer has preinstalled software, you can find information about the SCSI controller and connecting devices by clicking **Start → All Programs → Online Books → Online Books**.

Power and signal cables for internal drives

Your computer uses cables to connect internal drives to the power supply and system board. The drives that are preinstalled in your computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive. The following cables are provided:

- Four-wire power cables connect most drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.
- Flat signal cables, also called ribbon cables, connect SCSI, IDE, and diskette drives to the system board.
 - The wider gray signal cable has three connectors. One of these connectors attaches to the CD-ROM drive, one is available for a device installed in bay 1, and one attaches to the secondary IDE connector on the system board.
 - The narrower gray signal cable has two connectors for attaching the diskette drive to the diskette-drive connector on the system board.
 - An Ultra160 twisted ribbon cable connects the internal Ultra160 SCSI hard disk drive to the SCSI connector on the system board. This cable has five additional connectors for attaching more internal SCSI devices.
 - A round SCSI cable connects external SCSI devices to the SCSI connector on the system board and provides an additional connector for a SCSI device installed in bay 1. If a SCSI device is installed in bay 1 but no external SCSI devices are attached, a SCSI terminator must be attached to the external SCSI connector. For more information about connecting SCSI devices, see the Adaptec SCSI documentation by clicking **Start → All Programs → Online Books → Online Books** on the Windows desktop.

Note: To locate connectors on the system board, see “System board connectors” on page 36.

Considerations for cabling IDE internal drives

The following are some important points to remember when connecting IDE internal drives:

- When you install a hard disk drive, ensure that the drive connector at the end of the signal cable is always connected to a drive; also, ensure that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.
- IDE models ship with a gray ATA100 cable. Attach the blue connector to the primary IDE connector on the system board, attach the black connector to the master hard disk drive, and attach the gray connector to the subordinate hard disk drive.
- If two IDE devices are used on a single cable, one must be designated as the master device and the other as the subordinate device; otherwise, the system might not recognize some of the IDE devices. Switch or jumper settings on each IDE device determine the master or subordinate designation.
- If two IDE devices are on a single cable and only one is a hard disk drive, the hard disk drive must be set as the master device.
- If you have only one IDE device on a cable, it must be set as master.

Installing a drive in bay 1

Before you begin, do the following:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to “Handling static-sensitive devices” on page 38.

- For information about installing SCSI drives, see the Adaptec SCSI documentation by clicking **Start** → **All Programs** → **Online Books** → **Online Books** on the Windows desktop.
- Review the “Safety information” on page 39.
- Read the documentation that comes with the hard disk drive.
- Turn off the computer and all peripheral devices.
- Disconnect all external cables and power cords; then, remove the computer side cover. See “Removing the cover and front bezel” on page 46.

Statement 3:



CAUTION:

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

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



DANGER

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

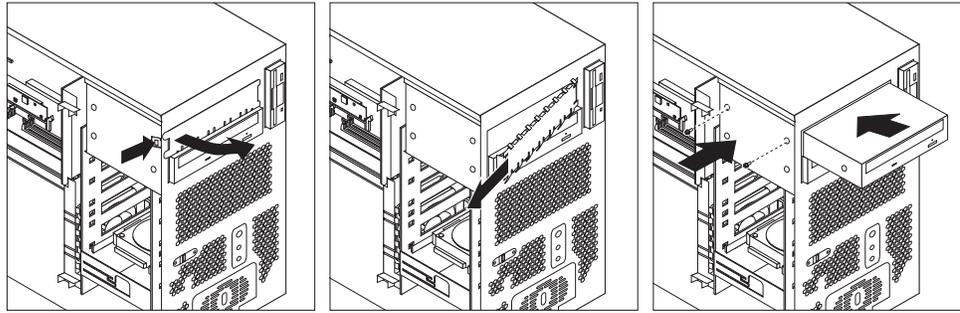
Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

To install a drive in drive bay 1, do the following:

Note: You need an industry standard bay adapter bracket to install a 3.5-inch hard disk drive in drive bay 1.

1. Touch the static-protective package containing the new drive to any unpainted metal surface in the computer; then, remove the drive from the package.

2. Remove the EMC shield covering drive bay 1 and insert the drive into the empty drive bay. Then, tighten the screws to hold the drive in place.



3. Attach all cables to the hard disk drive.
4. If the drive is a removable media drive, remove the front bay panel in the cover.
5. Replace the side cover and reconnect the external cables and power cords. See “Replacing the cover and connecting the cables” on page 65.

Installing drives in drive bays 4, 5, 6, 7, and 8

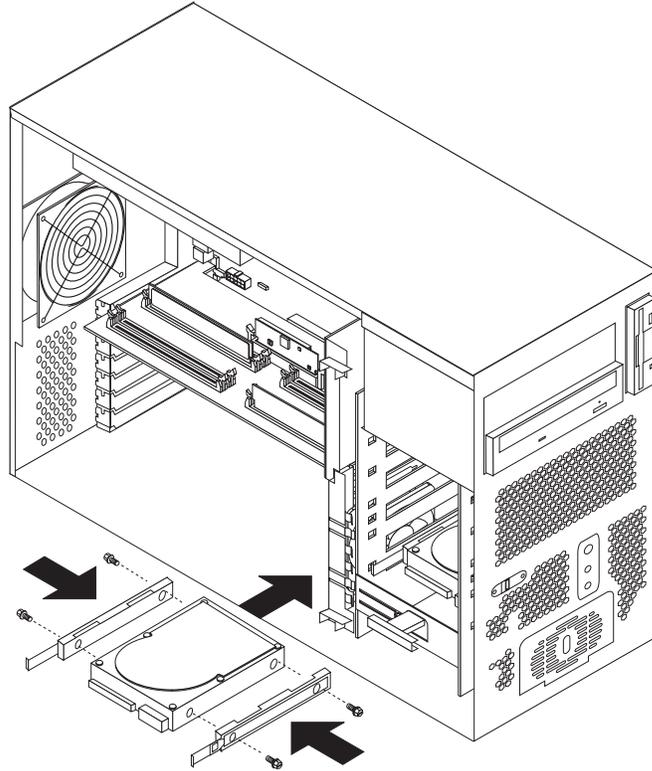
Before you begin, do the following:

Note: For IDE models, there are only four hard disk drives supported. The IDE models are shipped with a hard disk drive installed bay 5. If you upgrade, install hard disk drives in bay 4, 6, and 7 (in this order).

- SCSI models are shipped with a hard disk drive installed in bay 9. If you upgrade, install hard disk drives in bay 8, 7, 6, 5, and 4 (in this order).
- For information about installing SCSI drives, see the Adaptec SCSI documentation by clicking **Start** → **All Programs** → **Online Books** → **Online Books** on the Windows desktop.
- Review the “Safety information” on page 39.
- Read the documentation that comes with the hard disk drive.
- Turn off the computer and all peripheral devices.
- Disconnect all external cables and power cords; then, remove the computer side cover. See “Removing the cover and front bezel” on page 46.

To install a drive in drive bays 4, 5, 6, 7, and 8, do the following:

1. Touch the static-protective package containing the new drive to any unpainted metal surface in the computer; then, remove the drive from the package.
2. Get two sliding rail mounts from the plastic bag located underneath the hard disk drive cage.
3. Mount the sliding rails on the hard disk drive you want to install.

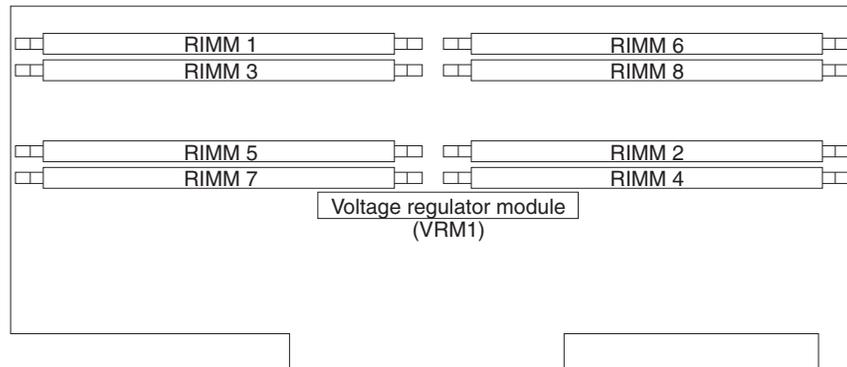


4. Slide the hard disk drive along the rail guides into the drive bay.
5. Attach all cables to the drive.
6. Replace the side cover and reconnect the external cables and power cords. See “Replacing the cover and connecting the cables” on page 65.

Installing memory modules

Adding memory to your computer is an easy way to make programs run faster. You can increase the amount of memory in your computer by installing options called memory modules.

Your computer has eight connectors for installing Rambus inline memory modules (RIMMs). The IBM-installed RIMMs that come with your computer are ECC (error checking and correction) RDRAM (Rambus dynamic random access memory) modules.



RIMM pairing is as follows:

- Pair 1 includes **RIMM 1** and **RIMM 2**.
- Pair 2 includes **RIMM 3** and **RIMM 4**.
- Pair 3 includes **RIMM 5** and **RIMM 6**.
- Pair 4 includes **RIMM 7** and **RIMM 8**.

When installing or replacing RIMMs, note the following:

- The memory board in your computer has eight RIMM connectors arranged in pairs. RIMMs must be installed in matched pairs. This means that the RIMMs installed in a RIMM connector pair must be the same speed, size, and technology. For example, you can install a pair of 144Mbit, ECC, 400 MHz, 128 MB RIMMs in RIMM 1 and RIMM 2 slots. You **cannot** install a pair that has one 144Mbit, ECC, 400 MHz, 128 MB RIMM in RIMM 1 and one 288Mbit, ECC, 400 MHz, 256 MB RIMM in RIMM 2, or vice versa. When you want to upgrade with another pair of RIMMs, you can install either a pair of 128 MB RIMMs, a pair of 256 MB RIMMs, or a pair of 512 MB RIMMs (as long as they are of the same speed, size, and technologies).
- The memory board in your computer has eight RIMM connectors, pairs 1 and 2 must have RIMMs or continuity RIMMs (C-RIMMs) installed in them. For the arrangement of the RIMM connector pairs on your computer memory board, see the following table.

Refer to the following sequence examples for upgrading memory. For these examples, we use 144Mbit, ECC, 400MHz, 128 MB, 256 MB, and 512 memory modules:

Sequence 1

The computer is shipped with a pair of 128 MB RIMMs installed in RIMM 1 and RIMM 2 connectors and a pair of C-RIMMs installed in RIMM 3 and RIMM 4. All other RIMM connectors are empty.

Sequence 2

The first upgrade with a pair of 256 MB RIMMs. Remove the C-RIMMs from RIMM 3 and RIMM 4 connectors, and insert them in RIMM 7 and RIMM 8 connectors. Install the new pair of RIMMs in RIMM 3 and RIMM 4 connectors. RIMM 5 and RIMM 6 connectors remain empty.

Sequence 3

The second upgrade with a pair of 512 MB RIMMs. Remember, you can mix and match memory modules as long as a pair is of the same size, speed, and technology. Install the pair of 512 MB RIMMs in RIMM 5 and RIMM 6 connectors. No other changes need to be made.

Sequence 4

The third upgrade with a pair of 128 MB RIMMs. Remove the C-RIMMs from RIMM 7 and RIMM 8 (keep the C-RIMMs for future use). Install the new pair of RIMMs into RIMM 7 and RIMM 8 connectors.

- C-RIMMs (termination card) must be populated for unused RIMM slots within the same paired channel.
- C-RIMMs are not needed if the RIMM connectors of the paired channel do not populate any RIMMs.
- Install only ECC RIMMs to enable ECC.
- **Do not** mix RIMM speed, technologies, density, non-ECC and ECC memory within a pair of RIMMs. This is not supported.
- RIMM connectors do not support dual inline memory modules (DIMMs).
- Use only PC800, 400 MHz RIMMs.
- Use only 144 Mbit or 288 Mbit technologies.
- The memory must be installed in matched pairs. To ensure that the RIMM pair match, use RIMMs with identical option part numbers (shown on RIMM labels).

Use the following table to help you to configure a memory card with eight RIMM connectors.

	Pair 1		Pair 2		Pair 3		Pair 4	
	RIMM 1	RIMM 2	RIMM 3	RIMM 4	RIMM 5	RIMM 6	RIMM 7	RIMM 8
2 RIMMs	RIMM	RIMM	C-RIMM	C-RIMM	Empty	Empty	Empty	Empty
4 RIMMs	RIMM	RIMM	RIMM	RIMM	Empty	Empty	C-RIMM	C-RIMM
6 RIMMs	RIMM	RIMM	RIMM	RIMM	RIMM	RIMM	C-RIMM	C-RIMM
8 RIMMs	RIMM							

Notes:

1. Your IBM IntelliStation M Pro computer supports 128 MB, 256 MB, and 512 MB RIMMs. Your computer supports a minimum of 256 MB and a maximum of 4 GB of system memory. Refer to <http://www.ibm.com/pc/support/> for a list of memory modules for use with your computer.

2. Installing or removing RIMMs changes the configuration information in the computer. Therefore, after installing or removing a RIMM, you must change and save the new configuration information by using the Configuration/Setup Utility program. When you restart the computer, the system displays a message indicating that the memory configuration has changed. You must start the Configuration/Setup Utility program and select **Save Settings** to save your changes. See “Chapter 4. Configuring your computer” on page 27 for more information.
3. The illustrations in this documentation might differ slightly from your computer.

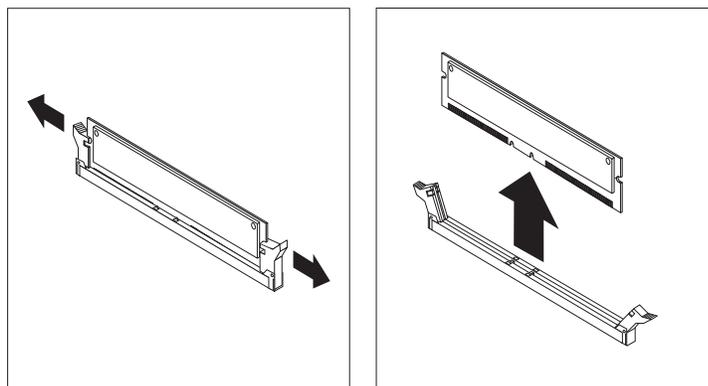
Removing a RIMM or C-RIMM

Complete the following steps to remove a RIMM or C-RIMM:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to “Handling static-sensitive devices” on page 38.

1. Review the “Safety information” on page 39.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords from the computer, and remove the computer cover (see “Removing the cover and front bezel” on page 46).
4. If your computer comes with an air baffle, you might need to lift it out to access parts of the system board. See “Removing the air baffle” on page 48 for more information.
5. Remove the PCI adapter retention bracket or the memory board retention screw (depending on the model).
6. Rotate the front adapter support bracket out of the way and pull the memory board out of the chassis.
7. At both ends of the RIMM connector on the memory board, push outward on the retaining clips until the module is loosened. Lift the RIMM or C-RIMM out of the connector.

Attention: Be careful not to push too hard on the retaining clips, because the RIMM or C-RIMM might eject too quickly.



8. Store the RIMM or C-RIMM in a static-protective package. Do not discard or lose this part. It might be needed later if you change your memory configuration.

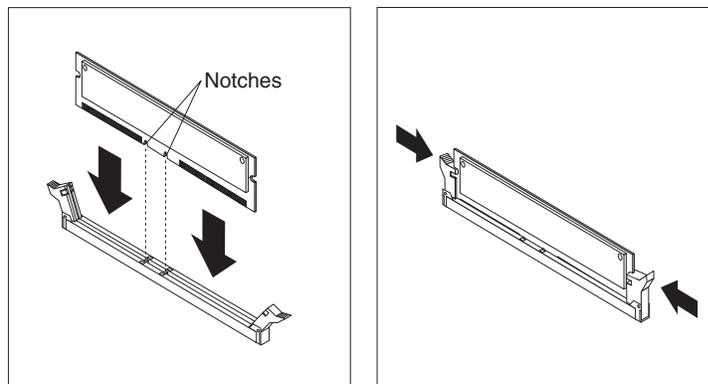
Installing a RIMM or C-RIMM

Complete the following steps to install a RIMM or C-RIMM:

1. Read the instructions that come with the new system memory.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords from the computer and remove the computer cover (see “Removing the cover and front bezel” on page 46).
4. Remove any C-RIMMs that are in the slots where you want to add RIMMs.
5. Touch the static-protective package containing the RIMM to any unpainted metal surface on the computer. Then remove the RIMM or C-RIMM from the package.
6. Install the RIMMs in the next highest numbered RIMM slots.
7. Position the RIMM or C-RIMM above the connector so that the two notches on the bottom edge of the module align properly with the empty connector.

Note: Pay attention to the orientation of the notches on the connectors and RIMMs. Adjacent connectors might not have the same orientation on the memory board.

8. Firmly push the module straight down into the connector until the retaining clips pop up and fit snugly around both ends of the module.



9. Place the memory board into the MEC connector on the system board.
10. Replace the PCI adapter retention bracket.
11. To replace the cover, see “Replacing the cover and connecting the cables” on page 65.
12. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

Installing a second microprocessor

Before you install a second microprocessor on a computer with a preinstalled operating system, do the following:

Notes:

1. Always check the IBM web site at <http://www.ibm.com/pc/support/> for the latest level of diagnostics code before running the diagnostic program.
2. Be sure to check the cache size, type, and speed of the microprocessor that is currently in the computer before installing a second microprocessor. The second microprocessor must be of the same cache size, type, and speed as the microprocessor currently in the computer. Do not install two microprocessors of different cache size, type, and speed.

Use the **System Summary** option on the Configuration/Setup Utility main menu to view the processor speed and other information about your computer. For information about how to start the Configuration/Setup Utility and additional information about configuring your computer, see “Chapter 4. Configuring your computer” on page 27.

Installing a second microprocessor on Windows NT

If Windows NT is preinstalled on the computer, follow these steps:

1. Backup the hard disk.
2. Run the Multiprocessor Upgrade Option program, *addcpu.exe*, located at <http://www.ibm.com/pc/support> before you install the second microprocessor. From the IBM support page, type **addcpu** in the Search field and press Enter. In addition, download and read the *addcpu.pdf* file for instructions about adding a second microprocessor.
3. Continue with step 1 of “Second microprocessor installation” on page 63.

Installing a second microprocessor on Windows 2000

If Windows 2000 is preinstalled on the computer, follow these steps:

Note: Be sure to check the Microsoft web page at <http://www.microsoft.com> for updates to these instructions. From the Microsoft web page, type **multiprocessor support** in the Search field and press Enter.

1. Backup the hard disk.
2. Do the following:
 - a. From the desktop, click **Start** → **Settings** → **Control Panel**.
 - b. On the Control Panel window, double-click the **System** icon.
 - c. On the System Properties window, select the **Hardware** tab; then, click the **Device Manager** button.
 - d. On the Device Manager window, click on the plus sign (+) next to the Computer node to expand the list; then, double-click on **ACPI Uniprocessor PC**.
 - e. On the Advanced Configuration and Power Interface (ACPI) PC Properties window, select the **Driver** tab; then, click the **Update Driver** button.
 - f. On the Update Device Driver Wizard window, click **Next**.
 - g. On the next window, click the **Display a known list of drivers for this device so that I can choose a specific driver** radio button; then, click **Next**.

- h. On the next window, click the **Show all hardware of this device class** radio button. Under the Models field, select **ACPI Multiprocessor PC**; then, click **Next**.
 - i. If the configuration shown in the wizard is satisfactory, click **Next** to save the configuration.
 - j. Click **Finish** to complete the process.
 - k. When prompted as to whether you want to restart your computer, select **Yes**.
3. Continue with step 1 of “Second microprocessor installation”.

Second microprocessor installation

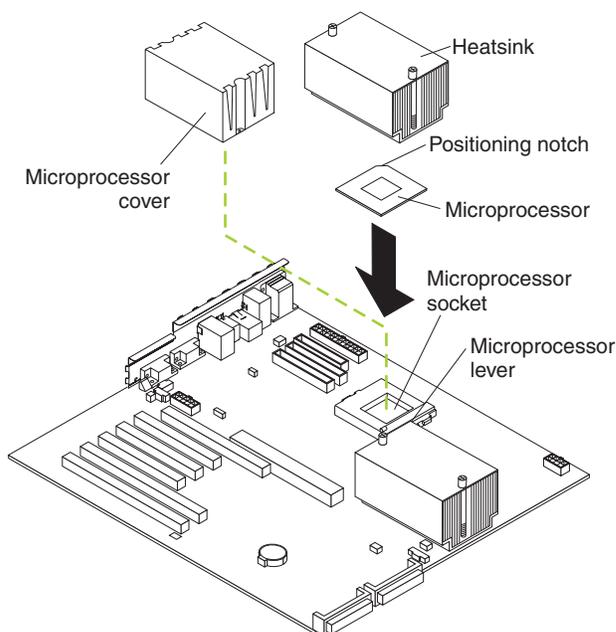
To install a second microprocessor, do the following:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to “Handling static-sensitive devices” on page 38.

1. Read the instructions that come with the new microprocessor.
 2. Turn off the computer and all attached devices.
 3. Disconnect all external cables and power cords from the computer and remove the computer cover (see “Removing the cover and front bezel” on page 46).
 4. Lay the computer on its side for better access to the computer components.
 5. Remove the memory board.
 6. If your computer has an air baffle, remove it (see “Removing the air baffle” on page 48).
 7. See the system board label inside your computer for the location of the second microprocessor socket (CPU).
 8. Remove the screws from the plastic microprocessor cover; then, remove the plastic microprocessor cover (keep the cover for future use).
- Note:** Some models have the plastic microprocessor cover attached to the air baffle. If this is the case, you must remove the air baffle and microprocessor together, after removing the screws for the plastic microprocessor cover.
9. Touch the static-protective package containing the microprocessor to any unpainted metal surface on the computer. Then, remove the microprocessor from the package.
 10. Rotate the microprocessor socket lever back as far as it will go.
 11. Insert the microprocessor in the microprocessor socket, lining pin number 1 up with the microprocessor.
 12. Rotate the microprocessor socket lever down to secure the microprocessor in place.
 13. Touch the static-protective package containing the heatsink to any unpainted metal surface on the computer. Then, remove the heatsink from package.
 14. Remove the plastic cap from the bottom of the heatsink. Do not touch the bottom of the heatsink or sit the heatsink down after you remove the plastic cap.

Notes:

- a. Removing the heatsink from the microprocessor or setting the heatsink down onto any surface when the protective cap is removed from the heatsink can cause the thermal grease on the bottom of the heatsink to become contaminated.
 - b. Do not touch the thermal grease on the bottom of the heatsink prior to installing the heatsink.
15. Ensure that you place the heatsink on top of the microprocessor correctly and press firmly.



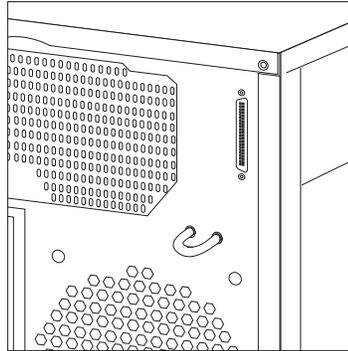
16. When you tighten the screws to secure the heatsink, alternate between the two screws. That is, tighten one screw a little then tighten the other screw a little. Continue switching between the screws until the heatsink is secured to the microprocessor. Alternating the tightening of the screws can help prevent damage to the microprocessor.

Attention: Ensure that the screws are completely tightened, otherwise, the system will not function properly.

17. Reinstall the air baffle.
18. Reinstall the memory board.
19. Replace the cover (see “Replacing the cover and connecting the cables” on page 65).

Security U-bolt

To help prevent hardware theft, a security U-bolt is attached to the chassis of the computer. To secure the computer, thread a security cable through the U-bolt and around an object that is a part of or permanently secured to the building structure or foundation, and from which it cannot be removed; then, fasten the cable ends together with a lock. Ensure that the security cable does not interfere with other cables that are connected to the computer.



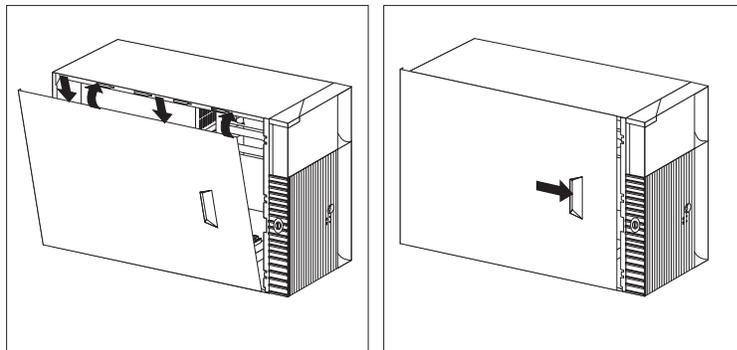
Replacing the cover and connecting the cables

This section provides instructions about how to replace the cover and connect the cables on your computer.

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

Complete the following steps to replace the cover and connect the cables:

1. Review the “Safety information” on page 39.
2. Ensure that all components have been reassembled correctly, and that no tools or loose screws are left inside the computer.
3. Clear any cables that might impede the replacement of the cover.
4. Place the front bezel back onto the front of the chassis and snap it into place.
5. Slide the side cover into place on the chassis and lock the key-lock button.

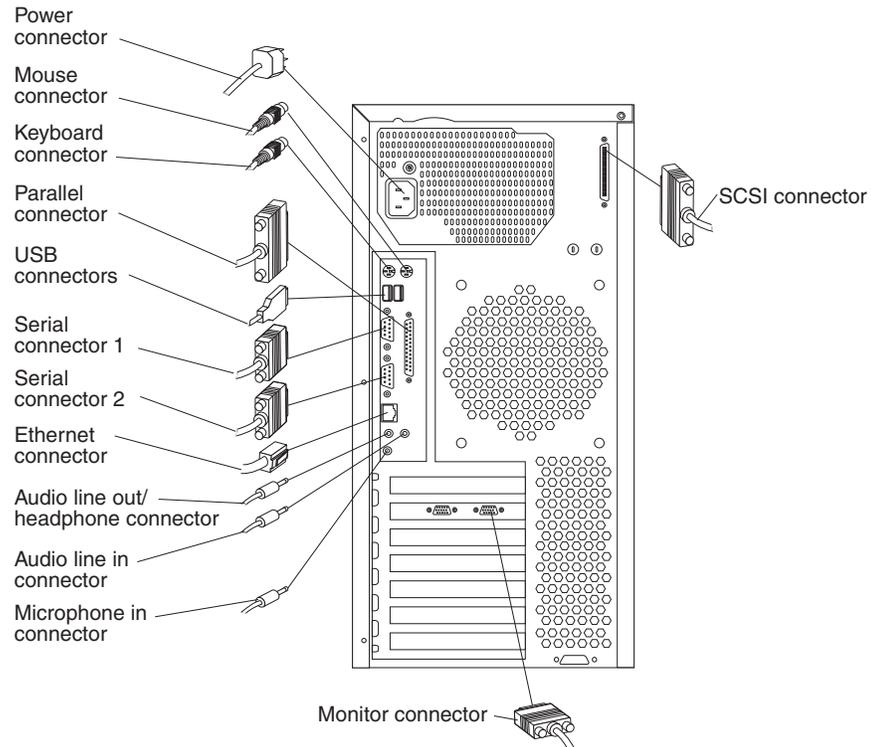


6. Reconnect the external cables and power cords to the computer; then, plug the power cords into properly grounded electrical outlets. Turn on the attached devices and the computer.
7. Update the computer configuration. See “Updating the computer configuration” on page 71.

Note: If an error message related to the chassis-intrusion detector appears after you restart your computer, you must type the administrator password. For more information, see “Using passwords” on page 30.

Input/output connector locations

The following illustrations show the input/output connectors and the expansion slots on the rear of the computer.

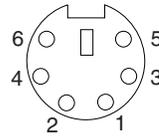


This section provides information about the I/O connectors on the rear of your computer. These connectors include the following:

- One mouse
- One keyboard
- One parallel
- Two USB
- Two serial
- One Ethernet
- Audio
 - Line out
 - Line in
 - Mic
- One video

Mouse connector

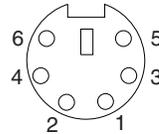
The system board has one mouse connector that supports a mouse or other pointing device. The mouse connector is located on the rear of your computer. See “Input/output connector locations” on page 66 for its location.



Keyboard connector

There is one keyboard connector on the rear of your computer. See “Input/output connector locations” on page 66 for its location.

Note: If you attach a standard (non-USB) keyboard to the keyboard connector, the USB connectors and devices will be disabled during the power-on self-test.



Parallel connector

Your computer has one parallel connector. This connector supports three standard Institute of Electrical and Electronics Engineers (IEEE) 1284 modes of operation: standard parallel port (SPP), enhanced parallel port (EPP), and extended capability port (ECP).

Viewing or changing the connector assignments

You can use the built-in Configuration/Setup Utility program to configure the parallel connector as bidirectional; that is, so that data can be both read from and written to a device. In bidirectional mode, the computer supports the ECP and EPP modes.

Complete the following steps to view or change the parallel-connector assignment.

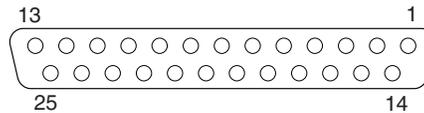
1. Restart the computer and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.
3. When the Configuration/Setup Utility menu appears, select **Devices & I/O Ports**; then, press Enter.
4. Select the parallel connector; then, use the arrow keys to advance through the settings available.

Note: When you configure the parallel connector as bidirectional, use an IEEE 1284-compliant cable. The cable must not exceed 3 meters (9.8 feet).

5. Press Esc twice to return to the Configuration/Setup main menu; then, select **Save & Exit Setup** to exit from the Configuration/Setup Utility program.

Parallel connector

There is a 25-pin, female D-shell parallel connector on the rear of your computer. See “Input/output connector locations” on page 66 for the location of this connector.



Serial connectors

Your computer has two standard serial connectors: serial connector A and serial connector B.

Some application programs require specific connectors, and some modems function properly only at certain communication connector addresses. You might need to use the Configuration/Setup Utility program to change communication connector address assignments to prevent or resolve address conflicts.

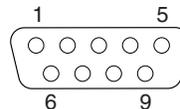
Viewing or changing the serial-connector assignments

Complete the following steps to view or change the serial-connector assignments.

1. Restart the computer and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.
3. When the Configuration/Setup Utility menu appears, select **Devices & I/O Ports**; then, press Enter.
4. Select the serial connector; then, use the arrow keys to advance through the available settings.
5. Press Esc twice to return to the Configuration/Setup Utility main menu; then, select **Save & Exit Setup** to exit from the Configuration/Setup Utility program.

Serial connectors

There are two 9-pin, male D-shell serial connectors located on the rear of your computer. See “Input/output connector locations” on page 66 for their locations.



Ethernet connector

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

To access the Ethernet connector, attach a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of your computer. See “Input/output connector locations” on page 66 for its location.

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

Configuring the Ethernet controller

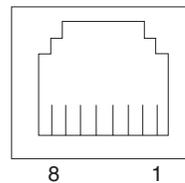
When you connect your computer to the network, the Ethernet controller automatically detects the data-transfer rate (10 MBps or 100 MBps) on the network and then sets the controller to operate at the appropriate rate. In addition, if the

Ethernet connector that your computer is connected to supports auto-negotiation, the Ethernet controller will set the appropriate duplex state. That is, the Ethernet controller will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). The controller supports HDX and FDX modes at both speeds.

The Ethernet controller is integrated on the system board. You do not need to set any jumpers or configure the controller for your operating system before you use the Ethernet controller. However, you must install a device driver to enable your operating system to address the Ethernet controller. The device drivers are provided on the preinstalled software and the *Device Drivers and IBM Enhanced Diagnostics* CD.

Ethernet connector

There is an RJ-45 connector on the rear of the computer. See “Input/output connector locations” on page 66 for the location of this connector.



Universal Serial Bus connectors

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

Notes:

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

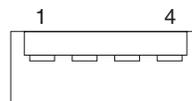
USB cables and hubs

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

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

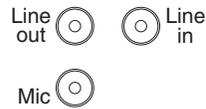
USB connectors

There are two USB connectors on the rear of the computer for attaching USB compatible devices. See “Input/output connector locations” on page 66 for the location of the USB connectors.



Audio connectors

The audio connectors are used to connect external audio equipment to your computer. See “Input/output connector locations” on page 66 for the location of these connectors.



Line out

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

Line in

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

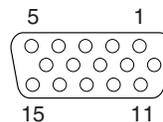
Mic

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

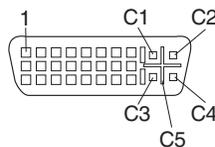
Video connector

Your computer uses an AGP video adapter located in the AGP Pro slot on the system board. The video connector is located on the adapter on the rear of your computer. See “Input/output connector locations” on page 66 for the location of this connector.

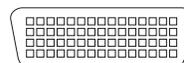
Analog video connector:



Digital (DVI-I) video connector:



Low force helical-60 (LFH-60) video connector:



Some models come with an AGP adapter that has dual video connectors. If you have problems viewing information with a second monitor, see “Changing monitor settings” on page 20.

Models with the Wildcat III 6110, ATI Fire GL8800, or NVIDIA Quadro4 900XGL video adapter come with a DVI-I to VGA style analog converter for each DVI-I connector.

Attention: On the Wildcat III 6110 video adapter, the first or only monitor must be connected to the bottom connector (connector number 1).

Models with the Matrox G450 DVI-I video adapter come with a DVI-I to dual-analog monitor pigtail cable.

Models with the NVIDIA Quadro4 200NVS video adapter come with a low force helical-60 (LFH-60) to dual-analog monitor pigtail cable. If you want to setup two digital monitors, you will need to purchase a separate dual-digital monitor cable.

Completing the installation

After working with options, you need to reinstall any removed parts, replace the cover, and reconnect cables, such as power cords and monitor cables. Also, depending on the option installed, you might need to update information in the Configuration/Setup Utility program or install device drivers. For instructions about how to install device drivers, see the instructions that come with your option. Some device drivers are included on the *Device Drivers and IBM Enhanced Diagnostics* CD that comes with your computer.

Updating the computer configuration

Note: The configuration information in this section applies to installing options. For more information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility program (some models)” on page 27.

After adding options, you must update the configuration settings. In most cases, system programs perform this configuration automatically. If the settings are not updated automatically, you can use the Configuration/Setup Utility program to reconfigure the appropriate settings. In either case, you must save the settings before exiting from the Configuration/Setup Utility program.

For information about error messages from resource conflicts, see “Chapter 6. Solving problems” on page 73.

Configuring Plug and Play adapters

Adapters designed for PCI slots are Plug and Play devices. Plug and Play adapters come with configuration specifications set in the operating system. These specifications provide installation information to the computer during startup. When you install or remove Plug and Play adapters, this information is interpreted by the basic input/output system (BIOS) code, which supports Plug and Play technology. If the required resources are available, the BIOS code automatically configures the adapter using resources not used by other devices. The system board of your computer supports operating systems that use Plug and Play technology.

For more information about error messages from resource conflicts, see “Chapter 6. Solving problems” on page 73.

Starting the Configuration/Setup Utility program

When you restart the computer for the first time after working with most options, a message similar to the following might appear indicating that a configuration change has occurred.

```
The following error(s) were detected when the system was started:  
162 Configuration Changes Has Occurred  
Select one of the following:  
Continue  
Exit Setup
```

If such a message appears, you are then prompted to start the Configuration/Setup Utility program to manually update the configuration settings or to confirm and save the settings that were automatically updated by the system programs.

Note: Depending on the configuration changes that occurred, the error message you see might be different from the one shown here. If the preceding message screen appears, select **Continue** until you reach the Configuration/Setup Utility program menu (see “Using the Configuration/Setup Utility program (some models)” on page 27).

If the preceding message does not appear, use the Configuration/Setup Utility program to configure your computer.

Configuring startup sequence

When your computer is turned on and after it completes loading the BIOS code and performs POST, it looks for an operating system. The order in which it searches devices for the operating system is determined by the primary startup sequence or the automatic startup sequence. After adding new devices to the computer, you might want to change the startup sequence. You can use the Configuration/Setup Utility program to configure startup devices.

Chapter 6. Solving problems

This chapter describes diagnostic tools that are available to you. You can use these tools to identify and correct problems that might occur as you use your computer.

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

- Make sure your computer and monitor are connected to working electrical outlets.
- Make sure all cables are securely connected to the correct locations.

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

Computer problems can be caused by hardware, software, or user error (for example, pressing the wrong key). Using the diagnostic tools 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.

Check the hardware by following the procedures in this chapter. You can also use the diagnostic programs provided with the computer (see “IBM Enhanced Diagnostics” on page 85 for a description of these programs).

If the hardware checks out and you have not made a user error, you might have a software problem. If you suspect that you have a software problem, see “Software problems” on page 84 and the operating system documentation that comes with your computer. If you have installed software applications yourself, see the documentation that comes with the software.

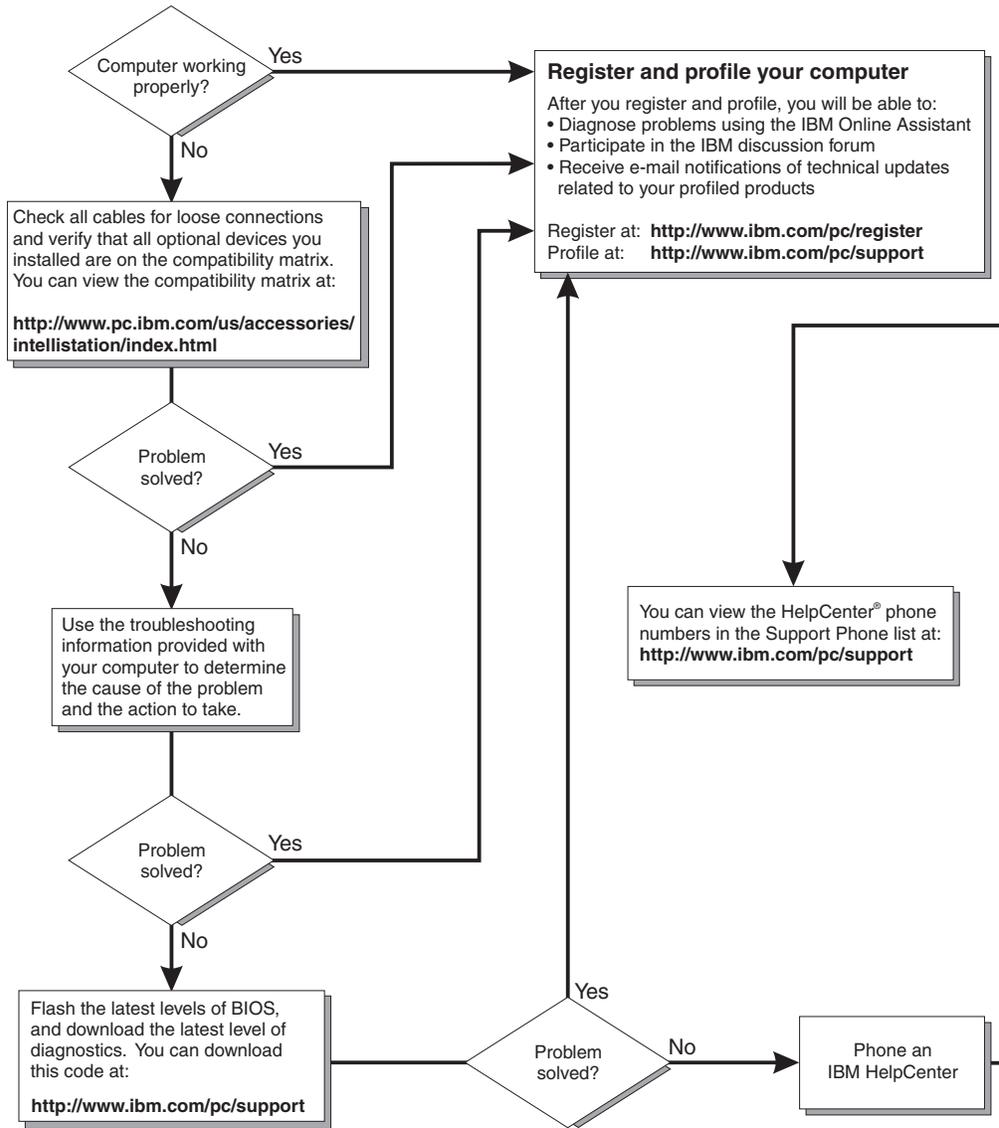
The following tools are available to diagnose hardware-related problems:

- Power-on self-test (POST)
- Troubleshooting charts
- IBM Enhanced Diagnostics program

After you register your IntelliStation products, you can diagnose problems using the IBM Assistant and participate in the IBM discussion forum. For more detailed information about registering your IBM products, go to the following addresses on the World Wide Web:

- <http://www.ibm.com/pc/register/>
- <http://www.ibm.com/pc/support/>

Computer Support



POST

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

If POST finishes without detecting any problems, the first window of your operating system or application program appears.

Notes:

1. If you have a power-on password set, you must type the password and press Enter, when prompted, before POST will continue.
2. A single problem might cause several error messages. When this occurs, correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will not occur the next time you run the test.

The possible types of beep codes that your system might emit are:

Repeating long beeps

Indicates that a memory error has occurred. Ensure that all RIMMs are correctly installed.

One long beep and two short beeps

Indicates that a video error has occurred and the BIOS code cannot initialize the video screen to display any additional information. Ensure that the video adapter is correctly installed.

Small computer system interface (SCSI) error messages

These messages appear if a problem or conflict is detected by the SCSI subsystem. See the Adaptec SCSI documentation by clicking **Start → All Programs → Online Books → Online Books** on the Windows desktop 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 might be numeric codes. For information about these software error messages, see the information supplied with the operating system or 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 programs. Along with error codes, the messages present text information that can be used to identify a failing part. For more information, see "IBM Enhanced Diagnostics" on page 85.

Troubleshooting charts

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

Note: If diagnostic error messages appear that are not listed in the following tables, make sure that your computer has the latest levels of BIOS code installed and you are using the most current level of diagnostic code.

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:

1. Remove the software or device you just added.
2. Run the diagnostic programs to determine if your computer is running correctly. (See “IBM Enhanced Diagnostics” on page 85 for information about the diagnostic programs provided with your computer.)
3. Reinstall the new software or new device.

Diskette drive problems

Diskette drive problems	Action
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none">1. The diskette drive is enabled. Use the Configuration/Setup Utility to check this. For more system information, see “Using the Configuration/Setup Utility program (some models)” on page 27.2. The computer is checking for the diskette drive in the startup sequence. Use the Configuration/Setup Utility to verify this.3. The diskette you are using is good and not damaged. Try inserting another diskette if you have one.4. The diskette is inserted correctly, with its label up and its metal-shutter end first in the drive.5. The diskette contains the necessary files to start the computer (the diskette must be startable).6. The diskette drive cable is properly installed and securely connected.7. There is no problem with your software program (see “Software problems” on page 84). <p>If you cannot correct the problem, have the computer serviced.</p>

Hard disk drive problems

Hard disk drive problems	Action
Hard disk drive in-use light stays on, or the system bypasses the hard disk drive.	<p>Verify the following:</p> <ol style="list-style-type: none"><li data-bbox="716 346 1448 430">1. The hard disk drive is enabled. Use the Configuration/Setup Utility to check this. For more system information, see “Using the Configuration/Setup Utility program (some models)” on page 27.<li data-bbox="716 441 1448 493">2. The computer is checking for the hard disk drive in the startup sequence. Use the Configuration/Setup Utility to verify this.<li data-bbox="716 504 1448 556">3. The hard disk drive cable is properly installed and securely connected.<li data-bbox="716 567 1448 619">4. There is no problem with your software program (see “Software problems” on page 84). <p>There is no problem with your software program (see “Software problems” on page 84).</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 that cover monitor problems in this table.</p> <p>If you cannot correct the problem, 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 300 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 you cannot correct the problem, have the monitor and computer serviced.</p>
The 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 graphics adapter that comes 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 about monitor settings.</p> <p>If this does not correct the problem, have the monitor and computer serviced.</p>

Monitor problems	Action
The monitor works when you turn on the computer, but goes blank when you start some application programs.	Verify that: <ol style="list-style-type: none"> 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 “Connecting computer cables” on page 14. 2. The necessary device drivers for the application programs are installed. If you cannot correct the problem, have the monitor and computer serviced.
The monitor works when you turn on the computer, but goes blank after some period of computer inactivity.	The computer is probably set for energy savings using one of the power-management settings. If the power-management features are enabled, disabling or changing power-management settings might solve the problem. If you cannot correct the problem, have the computer serviced.
Blank screen	Verify that: <ol style="list-style-type: none"> 1. The computer power cord is plugged into the computer and a working electrical outlet. 2. The monitor is turned on and the brightness and contrast controls are adjusted correctly. 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 “Connecting computer cables” on page 14. <p>CAUTION: Before removing the cover, see “Safety” on page vii</p> <ol style="list-style-type: none"> 4. Make sure the graphics adapter is properly installed in the AGP Pro slot. For the location of the AGP Pro slot, see “Chapter 5. Installing options” on page 35. You might need to reseat the adapter. 5. All added options have been properly installed and are correctly connected. If you cannot correct the problem, have the monitor and computer serviced.
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 control button.	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 "Connecting computer cables" on page 14. 2. The computer cover is properly installed. If you cannot correct the problem, 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 occasionally and is difficult to diagnose.	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 air flow 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 you cannot correct the problem, 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"> 1. The computer and the monitor are turned on. 2. The keyboard cable is securely connected to the keyboard connector on the computer. For the location of the keyboard connector, see "Connecting computer cables" on page 14. If you cannot correct the problem, have the keyboard and computer serviced.
The mouse or pointing-device does not work.	Verify that: <ol style="list-style-type: none"> 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 "Connecting computer cables" on page 14. 2. The device drivers for the mouse are installed correctly. If you cannot correct the problem, have the device and computer 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"><li data-bbox="721 426 1458 512">1. You have installed the correct type of RIMMs for your computer. See "Installing memory modules" on page 58 for instructions about adding RIMMs.<li data-bbox="721 518 1458 548">2. The RIMMs are properly installed and securely connected. <p>If the problem persists, run the memory test from the diagnostic program supplied with your computer. (See "IBM Enhanced Diagnostics" for further information.) The system might have detected a bad RIMM and automatically reallocated memory to enable your computer to continue to operate.</p> <p>If you cannot correct the problem, have the computer serviced.</p>

Option problems

Option problems	Action
<p>An IBM option that was just installed does not work.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The option is designed for your computer. 2. You followed the installation instructions supplied with the option and in "Chapter 5. Installing options" on page 35. 3. All option files (if required) are installed correctly. Refer to the documentation that comes with the option for information about installing option files. 4. You have not loosened any other installed options or cables. 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. 6. You updated the configuration information in the Configuration/Setup Utility, if necessary, and have no conflicts. For more information, see "Using the Configuration/Setup Utility program (some models)" on page 27. <p>If the problem persists, run the diagnostic programs. (See "IBM Enhanced Diagnostics" for information about diagnostic programs provided with your computer.)</p> <p>If you cannot correct the problem, have the option and computer serviced.</p>
<p>An IBM option that previously worked does not work now.</p>	<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"> 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 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 you cannot correct the problem, have the option and computer serviced.</p>

Parallel port problems

Parallel port problems	Action
The parallel port cannot be accessed.	Verify that: <ol style="list-style-type: none">1. Each port is assigned a unique address. See “Using the Configuration/Setup Utility program (some models)” on page 27 for more information.2. The parallel-port adapter, if you added one, is properly installed and firmly seated. See “Installing an adapter” on page 50 for instructions about adding adapters. If you cannot correct the problem, have the computer serviced.

Serial port

Serial port problems	Action
The serial port cannot be accessed.	Verify that: <ol style="list-style-type: none">1. Each port is assigned a unique address. See “Using the Configuration/Setup Utility program (some models)” on page 27 for more information.2. The serial-port adapter, if you added one, is properly installed and firmly seated. See “Installing an adapter” on page 50 for instructions about adding adapters. If you cannot correct the problem, have the computer serviced.

Printer problems

Printer problems	Action
The printer does not work.	Verify that: <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 “Connecting computer cables” on page 14 for the location of the parallel, serial, and USB ports.) Note: Non-IBM printer signal cables might cause unpredictable problems.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. For more information, see “Using the Configuration/Setup Utility program (some models)” on page 27.5. If the problem persists, run the tests described in the documentation that comes with your printer. If you cannot correct the problem, have the printer and computer serviced.

Software problems

Software problems	Action
Software does not function properly.	<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. Note: If you have just installed an adapter or memory, you might have a memory address conflict.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 you cannot correct the problem, 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. See "Using the Configuration/Setup Utility program (some models)" on page 27 for more information.2. The USB device is properly installed and firmly seated. <p>If you cannot correct the problem, have the computer serviced.</p>

Changing the startup sequence to start from the CD

If your computer does not start from the CD on the first try, you need to change your startup sequence in the Configuration/Setup Utility program. Follow these steps to change the startup sequence:

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 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. Select **Start Options** from the Configuration/Setup Utility program menu.
4. Select **Startup Sequence** from the Start Options from the menu.
5. Note the first startup device shown in the Primary Startup Sequence. You will need this information to restore your original startup sequence after you complete the recovery process.
6. Change your **First Startup Device** in the Primary Startup Sequence to the CD-ROM drive.

7. Press the Esc key until you 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 and press the Enter key.
9. Turn off your computer.

Note: Remember to restore your original startup sequence when you have finished using the CD.

IBM Enhanced Diagnostics

IBM provides programs that you can run to diagnose problems you suspect to be hardware related. 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 PC-Doctor for Windows.

The IBM Enhanced Diagnostics program will isolate your computer hardware from software that was preinstalled (or that you have installed) on your hard disk drive. 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.

The *Device Drivers and IBM Enhanced Diagnostics* CD comes with your computer. To run the IBM Enhanced Diagnostics program from the *Device Drivers and IBM Enhanced Diagnostics* CD, do the following:

1. Change the start up sequence for your computer. See “Changing the startup sequence to start from the CD” on page 84.
2. Insert the *Device Drivers and IBM Enhanced Diagnostics* CD into the CD-ROM drive.
3. Shut down the computer.
4. Start up the computer. The IBM Enhanced Diagnostics program will automatically run.
5. Follow the instructions on the screen.

You can also download the latest image of the diagnostic programs from the IBM Web site.

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

1. Go to <http://www.ibm.com/pc/us/intellistation> on the World Wide Web.
2. Click **Support**. From the Family drop-down list, select a family. Click **Downloadable files** on the left side of the screen; then, select **Diagnostics** from the Downloadable files by Category drop-down list.
3. Download the .exe file to a hard disk directory (not to a diskette).
4. Go to a DOS prompt and change to the directory where you downloaded the file.
5. Insert a blank high-capacity diskette in diskette drive A.
6. Type the following and press Enter:
filename a:

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

The self-extracting downloaded file is copied to the diskette, and a startable *IBM Enhanced Diagnostics* diskette is created.

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

1. Turn off your computer and all 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.

PC-Doctor for Windows

Your computer also contains diagnostic programs designed specifically for the Windows operating environment. Because these diagnostic programs work with the operating system, they not only test the hardware, but they also analyze certain software components of your computer. They are especially useful in isolating problems related to the operating system and device drivers.

To use PC-Doctor for Windows:

1. If you have not already done so, install the program onto your hard disk drive.
2. To run the program after it is installed, select it from the **All Programs** choice on the Windows **Start** menu and follow the instructions on the screen. Help is available online.

Using the IBM Product Recovery CD

If your hard disk drive, including the partition where the Product Recovery Program resides, becomes damaged or you replace the hard disk drive, contact IBM to order the *IBM Product Recovery CD* to recover your operating system, preinstalled applications, and device drivers. See “Getting information, help, and service” on page 91 for information about contacting IBM.

To use the *IBM Product Recovery CD*, insert the *IBM Product Recovery CD* in the CD-ROM drive; then, reboot the operating system and the Product Recovery program will automatically start. If the CD does not start, you may need to change your primary startup sequence. For more information, see “Changing the startup sequence to start from the CD” on page 84.

Recovering the operating system and support software

Attention: The recovery process deletes all information stored on the primary partition (drive C), including any personal files, data, and software stored on the hard disk drive. If possible, back up your data before starting this process.

For IDE models, if you make changes to the system BIOS code (for example, enable SCSI, load default settings, and others) or download a new level of the BIOS code from the Web, you must Disable the on-board SCSI adapter before you start the recovery process. To disable the on-board SCSI adapter, do the following:

1. Turn on the computer.
2. Press F1 at the prompt to enter the Configuration/Setup Utility.
3. In the Configuration/Setup Utility window, select **Devices & I/O Ports** and press Enter.
4. Select **Onboard SCSI** and press Enter.
5. Select **Disabled** and press Enter.
6. Press Esc.
7. Select **Save & Exit Setup** and press Enter.
8. Type "Y" and press Enter to save the settings and exit.
9. Proceed to the next paragraph to start the recovery process using the IBM *Product Recovery CD*.

To run the FDISK command from IBM *Product Recovery CD*, do the following:

1. Insert the IBM *Product Recovery CD* in the CD-ROM drive.
2. Press Esc at the Recover main menu; then, type **FDISK** at the command prompt.
3. Delete the primary partition, leave the IBM *Product Recovery CD* in the CD-ROM drive; then, restart the computer.

The IBM *Product Recovery CD* partitions your hard disk correctly.

To recover or reinstall the IBM preinstalled operating system and software, do the following:

1. Make backup copies of configuration files and any files you created. Any files not backed up will be lost.
2. Insert your IBM *Product Recovery CD* into your CD-ROM drive.
3. Restart your computer. If your computer does not start from the CD, you need to change your startup sequence. (See "Changing the startup sequence to start from the CD" on page 84.)
4. The Product Recovery program main menu appears with the following options:

Factory contents

Select this option to reformat your hard disk and restore your computer to the original preinstalled software.

System Utilities

Select this option to view the System Utilities main menu. The choices on the System Utilities main menu are:

Create a diagnostics diskette

Select this option to create a startable diagnostics diskette.

Make your selection and follow the instructions on the screen.

5. When the recovery is complete, remove the IBM *Product Recovery* CD and restart your computer.
6. If you changed your startup sequence, make sure you change it back immediately.

Installing other operating systems

If you install (or reinstall) another operating system, you might need additional software or device drivers. Hardware-specific support software is available on the *Device Drivers and IBM Enhanced Diagnostics* CD. If you experience problems with device drivers installed from this CD, you can obtain updated device drivers at <http://www.ibm.com/support> on the World Wide Web.

Before installing any operating system, be sure you obtain the latest updates. Contact the operating system manufacturer or, if applicable, check the manufacturer's World Wide Web site to obtain the updates.

To install an operating system, follow the instructions in the documentation provided with the operating system and any updates.

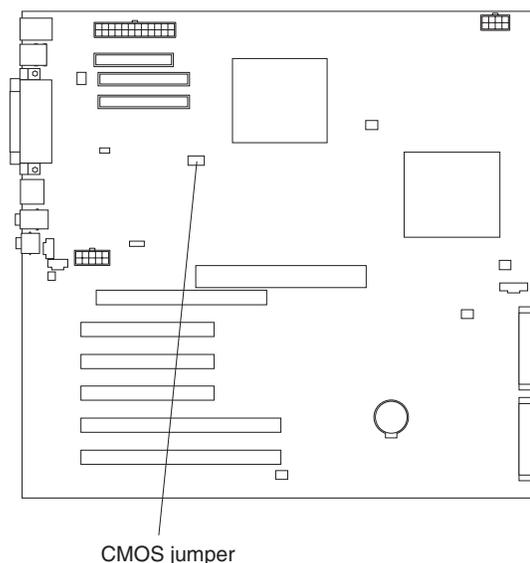
Additional information about operating systems might be available at <http://www.ibm.com/pc/support/> on the World Wide Web.

Erasing a lost or forgotten password (clearing CMOS)

This section describes how to erase lost or forgotten passwords. For more information about lost or forgotten passwords, see the online documentation by clicking **Start** → **All Programs** → **Online Books** → **Online Books** on the Windows desktop.

To erase a forgotten password, follow these steps:

1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the cover. See "Removing the cover and front bezel" on page 46.
4. See the illustration below for the CMOS jumper location.



5. Move the jumper (JBAT) from the normal position on pins 1 and 2 to the maintenance, or configure position (pins 2 and 3).
6. Wait 5 seconds before continuing.
7. Return the jumper (JBAT) to pins 1 and 2.

Note: You must return the jumper to pins 1 and 2. The system cannot operate with the jumper (JBAT) in the configure position (pins 2 and 3).

8. Replace the cover and connect the power cords. See “Removing the cover and front bezel” on page 46 and “Connecting computer cables” on page 14.
9. Restart the computer. A message is displayed stating that a CMOS checksum error was detected. You are prompted to press F1 to start setup. Press F1 at the prompt to start setup.
10. Select **Load Optimized Defaults** and press Y to confirm your selection.
11. Select **Save & Exit Setup** and press Y to confirm your selection. Press Enter to restart the system.

The CMOS password has been cleared and the defaults are restored.

Recovering from a POST/BIOS update failure

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

1. Insert the POST/BIOS update (flash) diskette into drive A. You can download a file to create this diskette from <http://www.ibm.com/pc/support> on the World Wide Web. For more information, see “Getting information, help, and service” on page 91.
2. Turn on the computer and the monitor.
3. After the update session completes, turn off the computer and monitor.
4. Remove the diskette from drive A.
5. Turn on the computer to restart the operating system.

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 are lost, and an error message is displayed when you turn on the computer.

Note: If Enhanced Security is enabled, the administrator password is not lost when the battery fails.

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.

Statement 2:

CAUTION:



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

Do not:

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

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

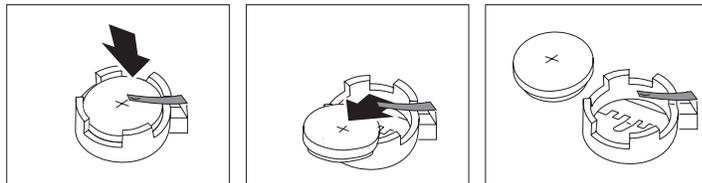
For further information about battery disposal, call IBM at 1-800-IBM-4333 (1-800-426-4333) in the U.S. For information outside of the U.S., contact your IBM reseller or marketing representative.

To change the battery, do the following:

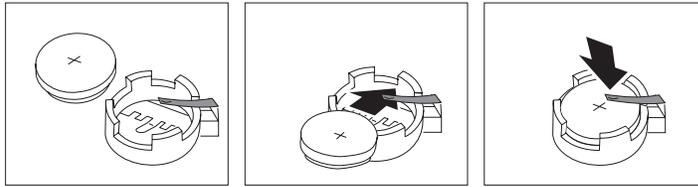
1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the cover. See “Removing the cover and front bezel” on page 46.
4. Disconnect the hard disk drive power cable and the hard disk drive fan cable on the memory board.
5. Push the tab on the back of the memory board inward and pull the memory board out of the chassis.

Note: If any long adapters are installed in PCI slots, they must also be removed. These adapters must also be replaced before replacing the memory board.

6. Locate the battery. Refer to the system board label inside your computer or see “System board connectors” on page 36.
7. Remove the old battery.



8. Install the new battery.



9. Replace the memory board and any adapters that were removed to gain access to the battery.
10. Install the cover. See “Completing the installation” on page 71.
11. Plug in the power cord.

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

12. Turn on the computer and all attached devices.
13. See “Using the Configuration/Setup Utility program (some models)” on page 27 to set the date and time and any passwords.
14. Dispose of the old battery as required by local ordinances or regulations.

Getting information, help, and service

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

Getting information

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

Using the World Wide Web

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

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

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

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

Getting information by fax

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

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

Getting help and service

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

Using the documentation and diagnostic programs

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

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

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

Calling for service

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

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

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts. 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 your IBM Statement of Limited Warranty for a full explanation of IBM warranty terms. Be sure to retain your proof of purchase to obtain warranty service.

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

Note: Response times vary; may exclude some holidays.

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

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

Telephone numbers

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

Country		Telephone number
Austria	Österreich	01-24 592 5901
Belgium - Dutch	Belgie	02-210 9820
Belgium - French	Belgique	02-210 9800
Canada	Toronto only	416-383-3344
Canada	Canada - all other	1-800-565-3344
Denmark	Danmark	45 20 82 00
Finland	Suomi	09-22 931 840
France	France	02 38 55 74 50
Germany	Deutschland	07032-1549 201
Ireland	Ireland	01-815 9200
Italy	Italia	02-7031 6101
Luxembourg	Luxembourg	298-977 5063
Netherlands	Nederland	020-514 5770
Norway	Norge	66 81 11 00
Portugal	Portugal	21-791 51 47
Spain	España	91-662 49 16
Sweden	Sverige	08-477 4420
Switzerland	Schweiz/Suisse/Svizzera	0583-33-09-00
United Kingdom	United Kingdom	01475-555 055
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227

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

Other services

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

If you travel with your computer or relocate it to a country where your IntelliStation machine type is sold and serviced by IBM or by IBM resellers who are authorized to perform warranty service, International Warranty Service is available for your computer.

Service methods and procedures vary by country, and some services might not be available in all countries. International Warranty Service is delivered through the method of service (such as depot, carry-in, or on-site service) that is provided in the servicing country. Service centers in certain countries might not be able to service all models of a particular machine type. In some countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty Service and to view a list of the countries where service is available, go to <http://www.ibm.com/pc/support/>, and click **Warranty Lookup**. Eligible IBM computers are identified by their four-digit machine types. For more information about International Warranty Service, see Service Announcement 601-034 at <http://www.ibm.com/>. Click **Support & downloads**, click **Announcement letters**, and click **Announcements search**. In the **Search by letter number only** field, type 601-034, and click **Search**.

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

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

Purchasing additional services

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

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

Appendix A. Computer records

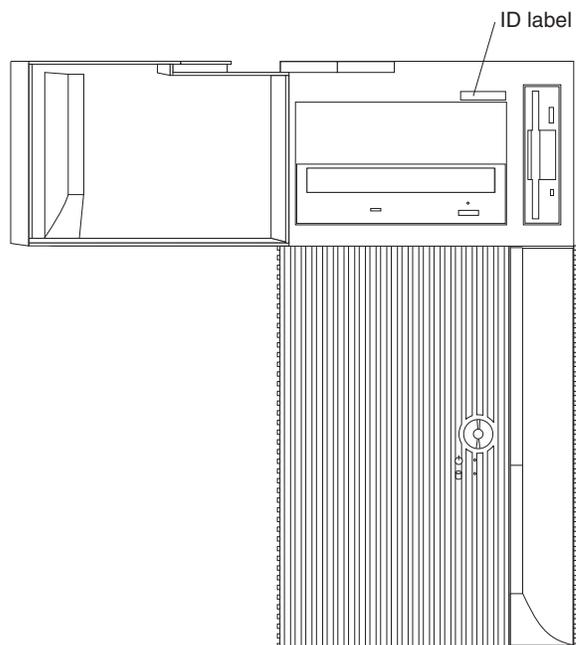
This appendix contains a form for recording information about your computer, which can be helpful if you ever need to have your computer serviced.

Serial numbers and keys

Record and retain the following information.

Product Name	IntelliStation M Pro
Model/Type (M/T)	
Serial Number (S/N)	
Key manufacturer address, phone number and key code number	

The model and type (M/T) numbers and the serial number (S/N) are located on label behind the front bezel of your computer.



Appendix B. Viewing the International License Agreement for Non-Warranted Programs

The IBM International License Agreement for Non-Warranted Programs is viewable through Access IBM. Use of your computer signifies acceptance of this agreement. Complete the following steps to view the license agreement:

1. Double-click the **Access IBM** icon.
2. Click the **How do I...** tab; then, click **Solve problems**.
3. Click **IBM International License Agreement**.

Appendix C. Warranty information

This appendix contains the warranty period for your product, information about obtaining warranty service and support, and the IBM Statement of Limited Warranty.

Warranty period

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

Machine - IBM IntelliStation M Pro Types 6850 and 6233

Warranty period - Three years

Warranty service and support

With the original purchase of an IBM server product, you have access to extensive support. During the IBM Machine warranty period, you may call IBM or your reseller for problem-determination assistance under the terms of the IBM Statement of Limited Warranty.

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, either on-site or at an IBM service center as determined by IBM.
- **Engineering Change management** - Occasionally, there might be changes that are required after a product has been shipped from IBM. In those instances, IBM will make Engineering Changes (ECs) available that apply to your hardware.

The following items are not covered under warranty service:

- Replacement or use of non-IBM parts. All IBM parts contain a 7-character identification in the format IBM FRU XXXXXXXX.
- Identification of non-IBM software problem sources.
- Installation of customer replaceable units (CRUs).
- Installation and configuration of machine code or licensed internal code that is designated as customer installable.

If you do not register your server with IBM, you might be required to present proof of purchase to obtain warranty service.

Before you call for service

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the publications that are provided with your server and software.

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

messages and error codes. The information that comes with your server also describes the diagnostic tests that you can perform.

If you suspect a software problem, refer to the information for the operating system or application program.

Calling for service

Please have the following information ready:

- Machine type, model, and serial number
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

To find the telephone number for the HelpCenter nearest you, see “Telephone numbers” in the “Getting information, help, and service” chapter.

IBM Statement of Limited Warranty Z125-4753-06 8/2000

This warranty statement consists of two parts: Part 1 and Part 2. Be sure to read Part 1 and the country-unique terms in Part 2 that apply to your country or region.

Part 1 - General Terms

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

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications"). The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded.

Extent of Warranty

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

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.

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

Warranty Service

To obtain warranty service for a Machine, contact IBM or your reseller. If you do not register your Machine with IBM, you may be required to present proof of purchase.

During the warranty period, IBM or your reseller, if approved by IBM to provide warranty service, provides without charge certain types of repair and exchange service to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. At its discretion, IBM or your reseller will 1) either repair or exchange the failing Machine and 2) provide the service either at your location or a service center. IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

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

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

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

You also agree to

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

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM’s possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Limitation of Liability

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

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

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

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

Governing Law

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

Part 2 - Country-unique Terms

AMERICAS

BRAZIL

Governing Law: *The following is added after the first sentence:* Any litigation arising from this Agreement will be settled exclusively by the court of Rio de Janeiro.

NORTH AMERICA

Warranty Service: *The following is added to this Section:* To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

CANADA

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence: laws in the Province of Ontario.*

UNITED STATES

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence: laws of the State of New York.*

ASIA PACIFIC

AUSTRALIA

The IBM Warranty for Machines: *The following paragraph is added to this Section:* The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

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

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence: laws of the State or Territory.*

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence: laws of the State of New York.*

The following is added to this Section: Disputes and differences arising out of or in connection with this Agreement shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own competence and on the validity of the Agreement to submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator.

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

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

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

HONG KONG AND MACAU

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence: laws of Hong Kong Special Administrative Region.*

INDIA

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

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM’s negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Limited Warranty, IBM’s liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

JAPAN

Governing Law: *The following sentence is added to this Section: Any doubts concerning this Agreement will be initially resolved between us in good faith and in accordance with the principle of mutual trust.*

NEW ZEALAND

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

Limitation of Liability: *The following is added to this Section: Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.*

PEOPLE’S REPUBLIC OF CHINA (PRC)

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

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

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

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

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES: The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

Warranty Service:

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

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

Governing Law:

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

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

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

The IBM Warranty for Machines: *The following replaces the first sentence of the first paragraph of this Section:* The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section:

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

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

Warranty Service: *The following is added to this Section:* During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this Section:* The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2: IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *The following replaces item 2 in this Section:* as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

Applicability of suppliers and resellers (unchanged).

FRANCE

Limitation of Liability: *The following replaces the second sentence of the first paragraph of this Section:* In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: *(items 1 and 2 unchanged).*

IRELAND

Extent of Warranty: *The following is added to this Section:* Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: *The following replaces items one and two of the first paragraph of this Section:* 1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section: IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY

Limitation of Liability: *The following replaces the second sentence in the first paragraph:* In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than: 1. *(unchanged)* 2. as to any other actual damage arising in all situations involving nonperformance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

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

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

Limitation of Liability: *The following is added to this Section:* IBM's entire liability to you for actual damages arising in all situations involving 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.

UNITED KINGDOM

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

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

The following item is added to this paragraph: 3. breach of IBM's obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

Applicability of suppliers and resellers (unchanged).

The following is added to the end of this Section: IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

Appendix D. Notices

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Important notes

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

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

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1000000 bytes, and GB stands for approximately 1000000000 bytes.

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

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

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

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

Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

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

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

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

Taiwan electrical emission statement

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

Japanese Voluntary Control Council for Interference (VCCI) statement

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Power cords

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, 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, China (Hong Kong S.A.R.), Cyprus, Dubai, Fiji, Ghana, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
6952301	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

Index

A

- Access IBM
 - overview 5
- Access IBM main menu 16
- adapters
 - installing 50
- adding
 - adapters 50
 - memory 58
- Adobe Acrobat Reader
 - overview 5
- advanced configuration options 31
- advanced setup 29
- air baffle
 - removing 48
- Alert on LAN 22
- arranging
 - your workspace 11
- audio
 - connectors 20
 - controller 20
 - features 20
- audio features 20

B

- battery
 - replacing 89
- bidirectional
 - parallel port configuration 67
- BIOS
 - recovering 89

C

- cables
 - connecting to IDE internal drives 54
 - connecting to internal drives 53
 - USB 69
- cabling
 - Ethernet 68
- cache control 29
- changing
 - the startup sequence to start from the CD 84
- Class A electronic emission notice 113
- clearing CMOS 88
- CMOS
 - clearing 88
- completing
 - setup 18
- completing the installation 71
- component protection 23
- components
 - of the IntelliStation M Pro 35
- computer
 - shutting down 24

- computer information
 - recording 95
- configuration
 - startup sequence 72
 - updating after adding options 71
- Configuration/Setup Utility 27
 - main menu 28
 - using 27
- configure host adapter settings 31
- configuring
 - Ethernet 68
- configuring your computer 27
- connecting
 - cables to IDE internal drives 54
 - cables to internal drives 53
- connecting cables 14
- connector
 - USB 69
- connectors
 - external 66
 - input/output 13, 66
- considerations
 - for system reliability 37
- controls and indicators 9
- core chipset control 29
- cover
 - removing 46
 - replacing 65
- creating
 - an emergency repair diskette 18
 - an IBM Enhanced Diagnostics diskette 18

D

- data protection
 - virus protection 24
- data rate
 - Ethernet 69
- date and time 29
- Desktop Management Interface 23
- drives
 - installing 51
- Dynamic Host Configuration Protocol 22

E

- electronic emission Class A notice 113
- emergency repair diskette
 - creating 18
- Ethernet
 - cabling 68
 - configuring 68
- Ethernet port 68

F

- FCC Class A notice 113

features
IntelliStation M Pro 3

H

handling
static-sensitive devices 38
hard drive
specifications 52
host adapter settings, configure 31

I

IBM Director Agent 21
IBM Enhanced Diagnostics diskette
creating 18
IBM Enhanced Diagnostics program
using 85
IBM Product Recovery CD
using 86
IBM Product Registration 6
input/output connectors 13, 66
installing
a RIMM or C-RIMM 61
a second microprocessor 62
a second processor 62
adapters 50
another operating system 17
internal drives 51
memory 58
memory modules 61
options 35
other operating systems 88
RIMMs or C-RIMMs 61
integrated
Ethernet 68
IntelliStation M Pro
capability 8
features and specifications 3
major components 35
international license agreement
viewing 97

K

keyboard
speed 29
keyboard port 67

L

local area network
Ethernet 68
location
of model and serial numbers 95

M

managing
your computer 21

maximum sync transfer rate 31
memory
adding 58
settings 29
memory board 36
memory module
specifications 8
memory modules
installing 61
removing 60
menu choices
for PXE Boot Agent Utility 32
microprocessor
cache 29
installing 62
model number 1
model number location 95

N

networks 68
Norton AntiVirus 6
notes, important 112
notices
electronic emission 113
FCC, Class A 113
used in this book xiii
number
model 1
serial 1

O

online
documentation
viewing 17
options
installing 35
other software CDs 8
overview 6

P

parallel port 67
pin-number assignments 68
parity checking, SCSI 31
password
forgotten power-on 30
passwords
administrator 24
power-on 24
using 30
PC-Doctor for Windows
overview 6
using 86
PCI configuration 29
pin-number assignments
parallel port 68
ports
Ethernet 68
input/output 13, 66

- ports (*continued*)
 - keyboard 67
 - universal serial bus (USB) 69
- POST (power-on self-test) 75
- preinstalled software 5
- product recovery program
 - using 17
- Product Recovery Program
 - overview 6
- PXE Boot Agent Utility
 - menu choices 32
 - using 32

R

- Rapid Deployment Manager 22
- recording
 - computer information 95
- recovering
 - POST/BIOS 89
- registering
 - your computer 16
- related information xiii
- Remote Administration 22
- Remote Program Load 22
- removing
 - memory modules 60
 - the air baffle 48
 - the computer cover and bezel 46
- replacing
 - the battery 89
 - the cover 65
- RIMMs
 - installing 61
- running
 - the setup program 15

S

- safety information 39
 - book 39
 - electrical ix
 - laser x
 - lifting xi
- Safety information 39
- SCSI
 - disk utilities 31
- SCSI controller 53
- SCSI device configuration 31
- SCSI parity checking 31
- SCSISelect
 - boot device options 31
 - menu 31
 - parity checking 31
 - starting 30
- SCSISelect Utility 27, 30
- security
 - anti-intrusion 23
 - chassis-intrusion detector 23
 - component protection 23
 - data protection 23

- security (*continued*)
 - features 23
 - IBM security solutions 23
 - locking the keyboard 24
 - passwords 24
 - SMART hard disk drive 24
 - SMART Reaction 24
 - virus protection 24
- security features 23
- security U-bolt 65
- selecting
 - a location for the computer 11
- serial number 1
- serial number location 95
- serial ports 68
- setting up your computer 11
- setup
 - advanced 29
 - SMART hard disk drive 24
 - software
 - for your computer 5
 - system management 21
 - software available from the internet 7
 - solving problems 73
 - specifications
 - IntelliStation M Pro 3
 - start options 28
 - starting
 - the computer 19
 - the Configuration/Setup Utility 27, 72
 - starting the computer 14
 - startup sequence 29
 - static-sensitive devices
 - handling 38
 - system
 - reliability considerations 37
 - system board
 - connectors 36
 - system management
 - Alert on LAN 22
 - Desktop Management Interface 23
 - Dynamic Host Configuration Protocol 22
 - Rapid Deployment Manager 22
 - Remote Administration 22
 - Remote Program Load 22
 - System Migration Assistant (SMA) 22
 - Wake on LAN 21
 - System Migration Assistant (SMA) 22
 - system programs
 - updating 21
 - system reliability considerations 37
 - system summary 28

T

- time and date 29
- trademarks 112
- troubleshooting 73
- troubleshooting charts 76
- turning off the computer 25

U

United States electronic emission Class A notice 113

United States FCC Class A notice 113

universal serial bus ports 69

updating

system programs 21

the computer configuration 71

USB ports 69

using

Access IBM 16

passwords 30

PC-Doctor for Windows 86

the audio features 20

the configuration utility 15

the IBM Enhanced Diagnostics program 85

the IBM Product Recovery CD 86

the product recovery program 17

the PXE Boot Agent Utility program 32

the recovery utility 15

the security features 23

the video features 19

Using

the Configuration/Setup Utility 27

utility

Configuration/Setup 27

SCSI disk 31

SCSISelect 30

V

video

features 19

monitor settings 20

video device drivers 19

viewing

online documentation 17

the international license agreement 97

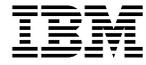
virus detection test 29

W

Wake on LAN 21

working

with adapters 48



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