IBM

IntelliStation M Pro
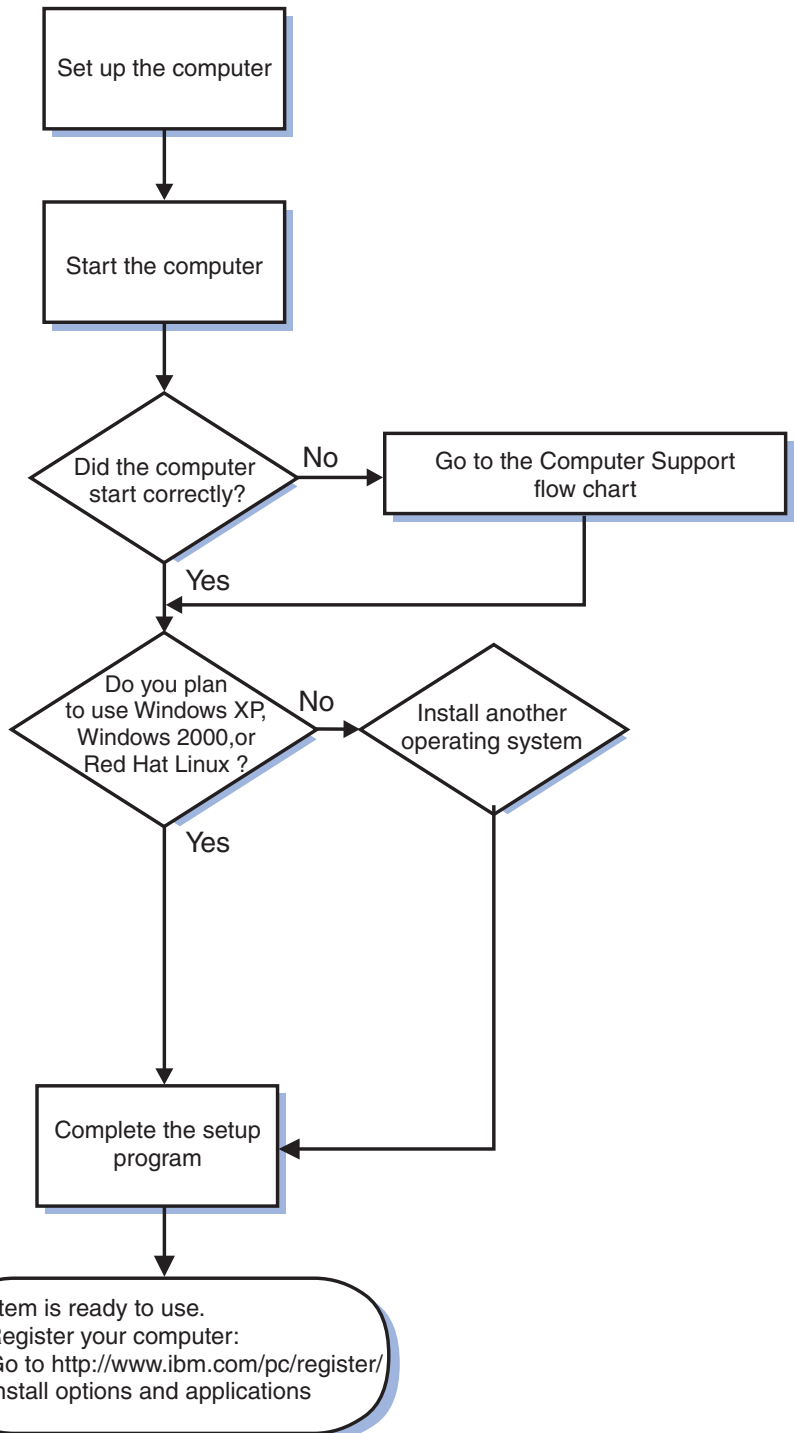Types 6220 and 6230

Installation Guide

Welcome. . .

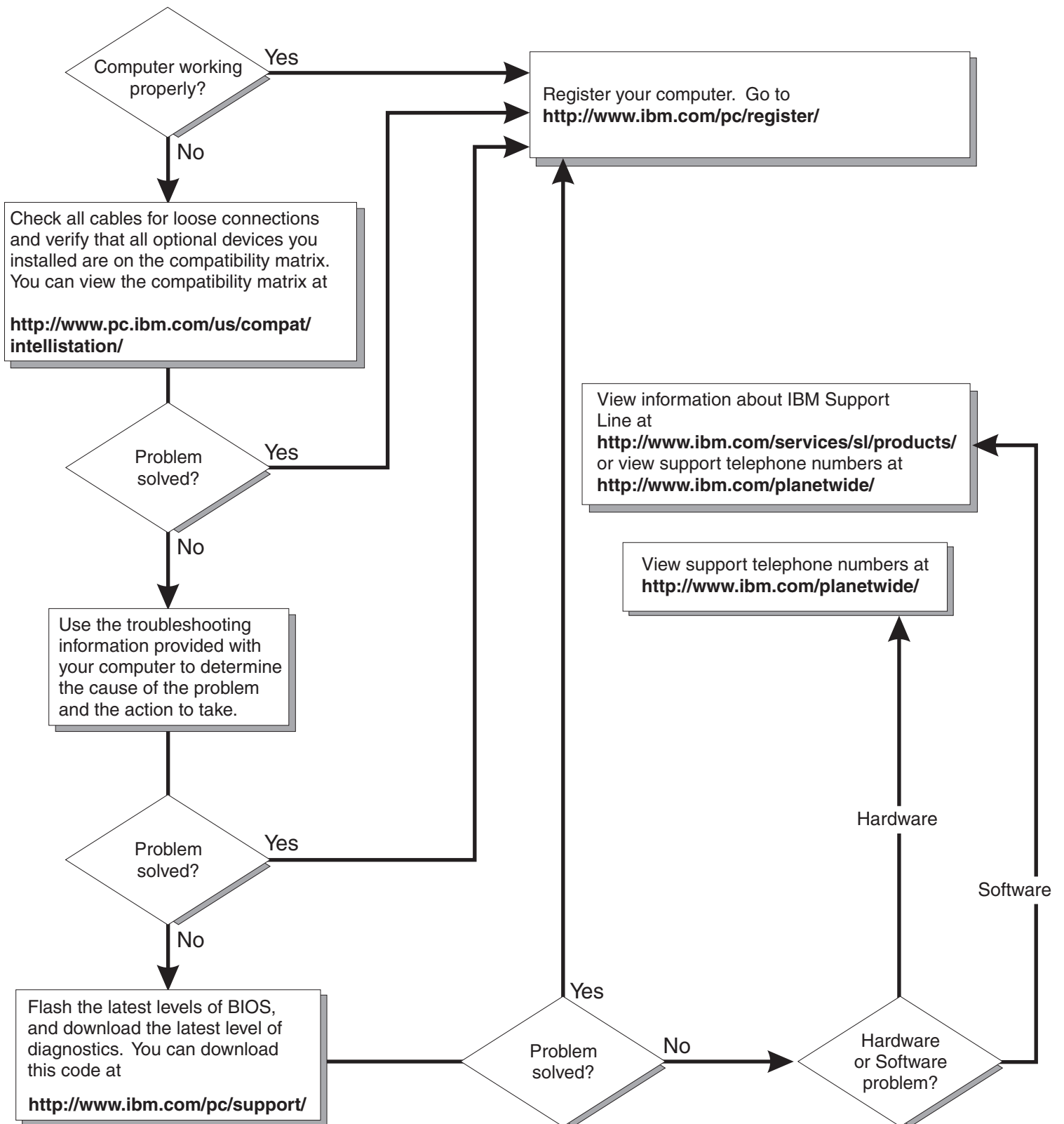Thank you for buying an IBM IntelliStation M Pro computer.

This *Installation Guide* contains information for setting up, installing options, 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

```
┌─────────────────────┐
│  Set up the computer │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Start the computer  │
└─────────────────────┘
           │
           ▼
      ◇ Did the computer      No   ┌─────────────────────────┐
        start correctly? ──────────▶│ Go to the Computer Support│
                                    │        flow chart         │
        Yes                         └─────────────────────────┘
           │                               │
           ▼                               │
      ◇ Do you plan            No    ◇ Install another
        to use Windows XP, ──────────▶  operating system
        Windows 2000, or
        Red Hat Linux ?
           │
         Yes
           │
           ▼
┌─────────────────────┐
│  Complete the setup  │◀──────────────
│       program        │
└─────────────────────┘
           │
           ▼
   ╭─────────────────────────────────────╮
   │ System is ready to use.              │
   │  • Register your computer:           │
   │     Go to http://www.ibm.com/pc/register/ │
   │  • Install options and applications  │
   ╰─────────────────────────────────────╯
```

Computer Support

Computer working properly? — Yes → Register your computer. Go to **http://www.ibm.com/pc/register/**

No ↓

Check all cables for loose connections and verify that all optional devices you installed are on the compatibility matrix. You can view the compatibility matrix at

http://www.pc.ibm.com/us/compat/intellistation/

↓

Problem solved? — Yes → Register your computer. Go to **http://www.ibm.com/pc/register/**

No ↓

Use the troubleshooting information provided with your computer to determine the cause of the problem and the action to take.

↓

Problem solved? — Yes → Register your computer. Go to **http://www.ibm.com/pc/register/**

No ↓

Flash the latest levels of BIOS, and download the latest level of diagnostics. You can download this code at

http://www.ibm.com/pc/support/

→ **Problem solved?** — Yes ↑ → Register your computer. Go to **http://www.ibm.com/pc/register/**

No → **Hardware or Software problem?**

Hardware ↑ → View support telephone numbers at **http://www.ibm.com/planetwide/**

Software → View information about IBM Support Line at **http://www.ibm.com/services/sl/products/** or view support telephone numbers at **http://www.ibm.com/planetwide/**

IBM IntelliStation M Pro
Types 6220 and 6230

Installation Guide

Note:

Before using this information and the product it supports, be sure to read the general information in Appendix B, "IBM Statement of Limited Warranty Z125-4753-07 11/2002," on page 63 and Appendix C, "Notices," on page 81.

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

Statement 3:

CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

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

Statement 4:

≥ 18 kg (39.7 lb)   ≥ 32 kg (70.5 lb)   ≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

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

Statement 8:

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

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

Statement 23

CAUTION:
Do not place any object weighing more than 50 kg (110 lb) on top of rack-mounted devices.

>50 kg (110 lb)

Declaración 23

PRECAUCIÓN:

No coloque ningún objeto que pese más de 50 kg (110 libras) encima de los dispositivos montados en bastidor.

>50 kg (110 libras)

Hinweis 23

ACHTUNG:

Keine Gegenstände, die mehr als 50 kg wiegen, auf Rack-Einheiten ablegen.

>50 kg

Notice nø 23

ATTENTION:

Ne posez pas d'objet dont le poids dépasse 50 kg sur les unités montées en armoire.

>50 kg

Varningsmeddelande 23

VARNING:

Placera inte något föremål som väger mer än 50 kg ovanpå rackmonterade enheter.

>50 kg

Merknad 23

ADVARSEL:

Ikke sett gjenstander som veier mer enn 50 kg oppå enheter som er montert i et kabinett.

>50 kg

Avviso 23

ATTENZIONE:

Non poggiare oggetti che pesano più di 50 kg sulla parte superiore delle unità montate in rack.

>50 kg

Turvaohje 23

Varoitus:

Telineeseen asennettujen laitteiden päälle ei saa asettaa yli 50 kilon painoista esinettä.

>50 kg

Voorschrift 23

WAARSCHUWING:

Plaats geen objecten die meer dan 50 kg wegen op apparaten die in het rek zijn gemonteerd.

>50 kg

Forskrift 23

Pas på!:

Anbring ikke genstande, der vejer mere end 50 kg, oven på enheder, der er monteret i rack.

>50 kg

Instrução 23

CUIDADO:

Não coloque nenhum objeto com peso superior a 50 kg (110 lbs.) sobre dispositivos montados em rack.

>50 kg (110 lbs)

عبارة ٢٣

⚠

تنبيه :

لا تضع أي عنصر يزن أكثر من ٥٠ كيلوجرام
(١١٠ رطل) أعلى سطح الأجهزة.

أكبر من ٥٠ كيلوجرام (١١٠ رطل)

- Izjava br. 23

OPREZ:
Ne postavljajte predmete teže od 50 kg (110 funti) na ormar u koji
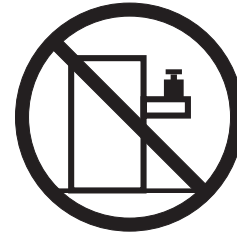su ugrađeni uređaji.

> 50 kg (110 lbs)

Δήλωση 23

ΠΡΟΣΟΧΗ:
Μην τοποθετείτε οποιοδήποτε αντικείμενο με βάρος μεγαλύτερο από 50 kg
επάνω σε συσκευές που έχουν προσαρμοσθεί σε ικρίωμα (rack).

> 50 kg

הודעה 23

זהירות:
אל תניחו שם חפץ שמשקלו יותר מ-50 ק״ג על גבי התקנים המורכבים על
מסדי מרווירית.

50 ק״ג

- 23. ismertető

FIGYELEM:
Keretszerelésű eszközök tetejére ne helyezzen olyan tárgyat, melynek
súlya több, mint 50 kg (110 lbs.).

> 50 kg (110 lbs)

- 記述 23

 注意

ラック・モデルのサーバーの上に 50 Kg 以上の物を置かないで
ください。

> 50 Kg

경고문 23

주의:
서랍형 모델의 장치 상단에 50 kg(110 lbs.)이 넘는 물체를 올려
놓지 마십시오.

> 50 kg (110 lbs)

Instrukcja 23

ZAGROŻENIE:
Nie należy umieszczać przedmiotów cięższych
niż 50 kg (110 funtów.)

> 50 kg (110 funtów)

· Положение 23

ОСТОРОЖНО:
Не ставьте предметы весом более 50 кг на верхнюю крышку
устройств, смонтированных на выдвижных полках.

> 50 кг

声明 23

警告：

机柜安装的设备上面不能放置重于 50kg（110 磅）的物品。

> 50 kg (110 磅)

- Príkaz 23

VÝSTRAHA:
Neumiestňujte žiadny predmet vážiaci viac ako 50 kg (110 lbs.)
na vrch zariadenia montovaného do stojana.

> 50 kg (110 lbs)

- **Navedba 23**

SVARILO:
Ne postavljajte nobenega predmeta, ki je težji od 50 kg, na vrh
naprav, montiranih v stojala.

> 50 kg (110 lbs)

聲明 23

注意：
請勿將任何重量超過 50 公斤 (110 磅) 的物品置於已安裝機架的裝置上方。

> 50 公斤 (110 磅)

Instrukce 23

POZOR:
Neumísťujte nic s hmotností vyšší než 50 kg navrch zařízení namontovaných do stojanu.

>50 kg (110 lbs)

· Инструкција 23

ПРЕДУПРЕДУВАЊЕ:
Не поставувајте предмети потешки од 50 кг. (110 lbs.) над уредите кои се монтирани во ормари.

> 50 kg (110 lbs)

Instrução 23

Instrução 23
CUIDADO:

Não coloque nenhum objeto com peso superior a 50 kg (110 lbs.) sobre dispositivos montados em rack.

>50 kg (110 lbs)

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

ADVERTENCIA: El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up your IBM® IntelliStation® M Pro Type 6220 or 6230 computer and basic instructions for installing some options. More detailed instructions for installing options are in the *User's Guide* on the IBM *IntelliStation Documentation* CD, which comes with your computer. This publication contains information about:

- Setting up and cabling your computer
- Starting and configuring your computer
- Setting up your operating system

Packaged with this *Installation Guide* is the *Device Drivers* CD, which contains device drivers and hardware-specific support software.

The IBM *IntelliStation Documentation* CD is also included. This CD provides detailed information about your computer (see "The IntelliStation Documentation CD" on page 2 for more detailed information).

You can obtain up-to-date information about your IntelliStation M Pro model and other IBM products at http://www.ibm.com/intellistation/.

The computer model and serial numbers for Type 6220 are on labels on the bottom of the computer and on the lower-left side of the bezel. The computer model and serial numbers for Type 6230 are on labels on the bottom of the computer and on the lower-right side of the bezel. You will need these numbers to register your computer with IBM.

Note: Your computer keys cannot be duplicated by locksmiths. If you lose them, order replacement keys from the key manufacturer. The key serial number and the telephone number of the manufacturer are on a tag attached to the keys.

If you plan to install your M Pro Type 6230 computer in a rack, you must purchase a *Tower-to-Rack Conversion Kit*. For a list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.

Your computer comes with Microsoft® Windows® XP Professional, Windows 2000 Professional Workstation, or Red Hat Enterprise Linux Workstation preinstalled (depending on your model).

To install another operating system, follow the instructions in the documentation that comes with the operating system and any updates. Then, follow the instructions in the readme file on the *Device Drivers* CD to install the support software.

Note: If you install another operating system, you might need additional software or device drivers. Some preinstalled device drivers are available on the *Device Drivers* 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/.

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

Additional information about operating systems is posted periodically at
http://www.ibm.com/pc/support/.

Your computer might have features that are not described in the documentation that
you received with the computer. The documentation might be updated occasionally
to include information about those features, or technical updates might be available
to provide additional information that is not included in your system documentation.
These updates are available from the IBM Web site. Complete the following steps
to check for updated documentation and technical updates:

1. Go to http://www.ibm.com/pc/support/.
2. In the **Learn** section, click **Online publications**.
3. On the "Online publications" page, in the **Brand** field, select **IntelliStation**.
4. In the **Family** field, select **IntelliStation M Pro**.
5. Click **Display documents**.

The IntelliStation Documentation CD

Your IBM computer comes with a documentation CD, which contains documentation
for your system in Portable Document Format (PDF) and includes the IBM
Documentation Browser to help you find information quickly.

Hardware and software requirements

To run the documentation CD, your computer must have the following minimum
hardware and software:

- Microsoft Windows NT® 4.0 (with Service Pack 3 or later), Windows 98, Windows
  2000, or Red Hat Linux.
- 100 MHz Intel™ Pentium® microprocessor.
- 32 MB RAM.
- Adobe Acrobat Reader 3.0 or later or xpdf, which comes with Linux operating
  systems.

  Note: Adobe Acrobat Reader software is included on the documentation CD,
  and you can install it when you run the Documentation Browser.

Using the IBM Documentation Browser

Use the IBM Documentation Browser to browse the contents of the documentation
CD, select from a list of available topics, see brief descriptions of the selected
topics, and view selected topics using Adobe Acrobat Reader or xpdf. The
Documentation Browser automatically detects the regional settings in use on your
system and presents the information in the language for that region (if available). If
a topic is not available in the language for that region, the English version is
displayed.

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

- If Autostart is enabled, insert the documentation CD into your CD-ROM drive.
  The Documentation Browser will start automatically.
- If Autostart is disabled or is not enabled for all users:
  - If you are using a Windows operating system, insert the documentation CD
    into your CD-ROM drive; then, click **Start --> Run**. In the **Open** field, type

    `e:\win32.bat`

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

       – If you are using Red Hat Linux, insert the documentation CD into your CD-ROM drive and run the following command from the /mnt/cdrom directory:

```
sh runlinux.sh
```

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

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

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

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

Related publications

This *Installation Guide* provides general information about your server, including information about features, how to configure the server, and how to get help. In addition to this *Installation Guide*, the following documentation comes with your computer.

- *User's Guide*

  This publication contains detailed information about your computer and how to use and configure the functions of the computer.

- *Safety Information*

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

- *Adaptec SCSI documentation*

  This publication is in PDF on the *Device Drivers* CD. It contains information and instructions for installing and configuring small computer system interface (SCSI) device drivers and devices.

- Readme files on the *Device Drivers* CD

  Several readme files on the CD contain information about preinstalled device drivers. Other readme files on the CD contain information about the various adapters and devices that might be installed in or attached to your computer.

- *Hardware Maintenance Manual*

  This publication is in PDF at http://www.ibm.com/pc/support/. It contains information for trained service technicians.

- IBM *IntelliStation Documentation* CD
  This CD contains all of the IBM IntelliStation M Pro Types 6220 and 6230 publications in Portable Document Format (PDF).

Notices and statements used in this book

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

The following notices and statements are used in this book:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information 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.

Inventory checklist

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 items come with your IBM IntelliStation M Pro computer:

- One keyboard
- One mouse
- One power cord (9-ft line cord)
- One *Device Drivers* CD
- One IBM *IntelliStation Documentation* CD
- This *Installation Guide*

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

Features and specifications — M Pro Type 6220 (desktop model)

The following information is a summary of the features and specifications of your IntelliStation M Pro Type 6220 desktop computer. Some features and specifications are not available on all models.

Table 1. Features and specifications

Microprocessor:	Integrated functions:	Electrical input:

• Intel Pentium 4 processor
• 512 KB Level-2 cache
• 800 MHz front-side bus (FSB)
 	
Memory:
• Minimum: 256 MB
• Maximum: 4 GB
• Type: PC2700 or PC3200
• Connectors: four dual inline memory module (DIMM) connectors
 	
Internal Drives:
• Hard disk drive: IDE or SATA
• One of the following drives:
  – CD-ROM: IDE
  – DVD/CD-RW combo: IDE
  – CD-RW: IDE
 	
Expansion bays:
• Two slim-high 3.5-inch drive bays (one hard disk drive installed in some models)
• One half-high 5.25-inch bay (optical drive installed in one bay)
 	
PCI expansion slots:
• Three 33 MHz/32-bit PCI slots on the system board
• One Accelerated Graphic Port (AGP) slot
 	
Power supply:
One 200 watts (90-240 V ac)
 	
Cooling:
One or two speed-controlled fans
	• Intel Ethernet controller on the system board with RJ-45 Ethernet connector
	• Two serial ports
	• One parallel port
	• Dual port serial ATA controller
	• Six Universal Serial Bus (USB) ports (two on front and four on rear)
	• Keyboard port
	• Mouse port
	• Audio ports
	  – Line out (front and rear)
	  – Mic (front and rear)
	  – Line in (rear)
	• Dual-channel IDE controller
	
	Video adapter: (depending on your model)
	• NVIDIA Quadro NVS 280 (LFH-60), AGP 8X, with 64 MB double-data-rate (DDR) synchronous dynamic random access memory (SDRAM) video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable)
	• NVIDIA Quadro4 580XGL (LFH-60), AGP 8X, with 64 MB DDR SDRAM video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable)
		• Sine-wave input (50 or 60 Hz) required
		• Input voltage and frequency ranges switch selected
		• Input voltage low range:
		  – Minimum: 90 V ac
		  – Maximum: 137 V ac
		• Input voltage high range:
		  – Minimum: 180 V ac
		  – Maximum: 265 V ac
		• Input kilovolt-amperes (kVA) approximately:
		  – Minimum: 0.13 kVA
		  – Maximum: 0.32 kVA
		
		Heat output:
		Approximate heat output in British thermal units (Btu) per hour
		• Minimum configuration: 421 Btu (124 watts)
		• Maximum configuration: 1050 Btu (308 watts)
		
		Environment:
		• Air temperature:
		  – Computer on: 10° to 35°C (50° to 95°F) Altitude: 0 to 2134 m (7000 ft)
		  – Computer off: -40° to +60°C (-40° to 140°F) Maximum altitude: 2133 m (7000 ft)
		• Humidity (operating and storage): 8% to 80%
		
		Acoustical noise emissions:
		• Sound power, idle: 4.8 bel
		• Sound power, operating: 4.9 bel
		
		Size:
		• Height: 104 mm (4.1 in.)
		• Depth: 412 mm (16.2 in.)
		• Width: 360 mm (14.2 in.)
		• Weight: 9.1 kg (20 lb) when fully configured or 6.8 kg (15 lb) minimum

Features and specifications —- M Pro Type 6230 (tower model)

The following table provides a summary of the features and specifications of your IntelliStation M Pro Type 6230 tower computer. Some features and specifications are not available on all models.
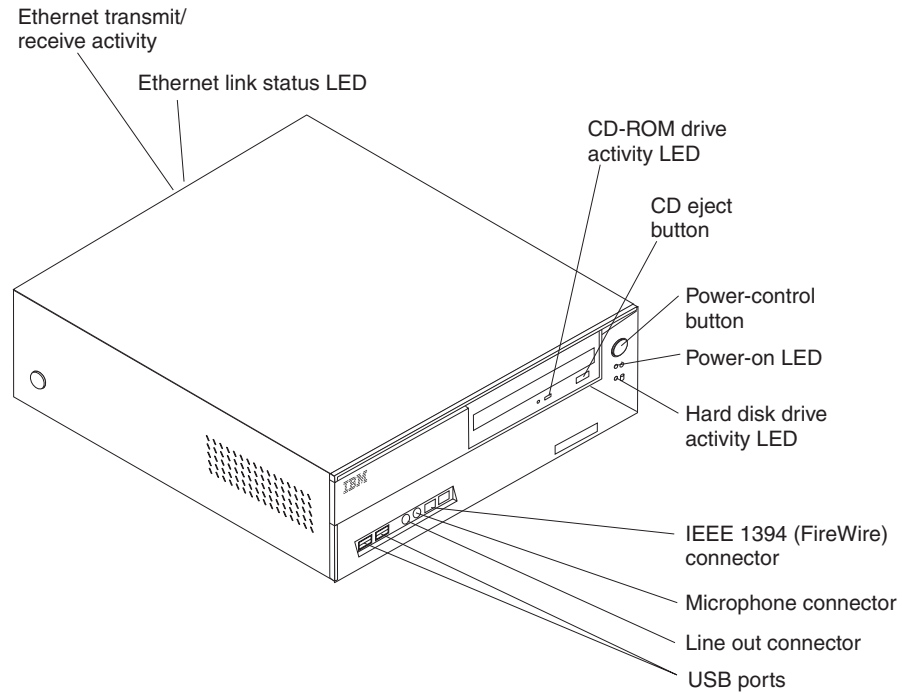
Table 2. Features and specifications

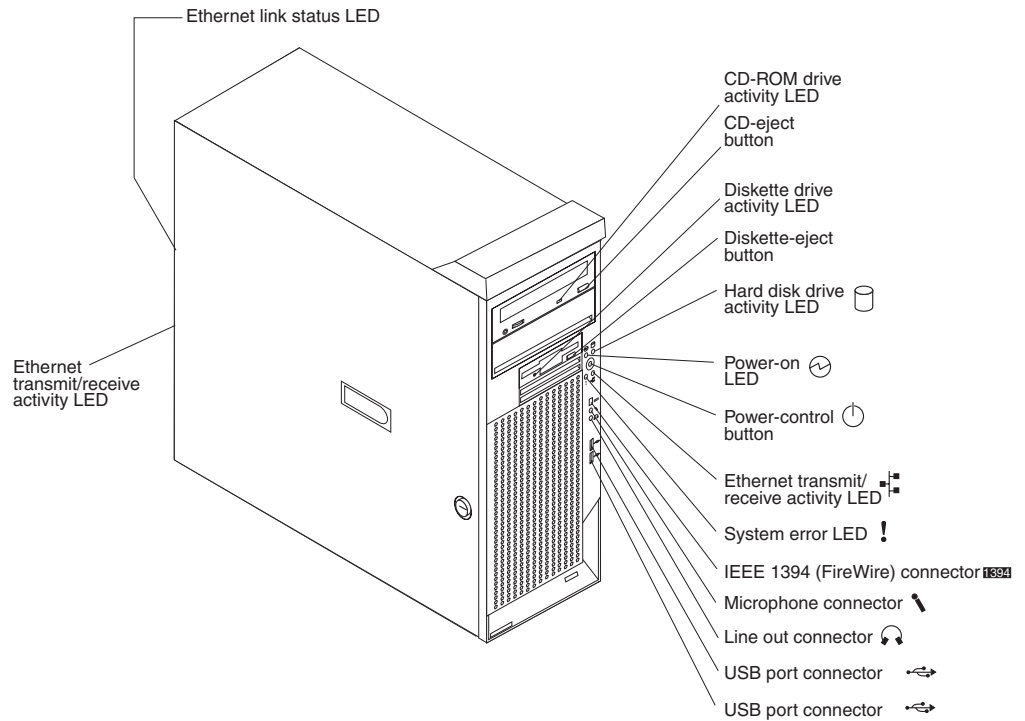| Microprocessor:	Integrated functions:	Electrical input:

• Intel Pentium 4 processor
• 512 KB Level-2 cache
• 800 MHz front-side bus (FSB)
 	
Memory:
• Minimum: 256 MB
• Maximum: 4 GB
• Type: PC2700 or PC3200
• Connectors: four dual inline memory module (DIMM) connectors
 	
Internal Drives:
• Diskette: 1.44 MB (two mode)
• Hard disk drive: IDE, SCSI, or SATA
• One of the following:
  – CD-ROM: IDE
  – DVD/CD-RW combo: IDE
  – CD-RW: IDE
 	
Expansion bays:
• Three slim-high 3.5-inch drive bays (one hard disk drive installed in some models)
• Two half-high 5.25-inch bays (optical drive installed in one bay)
• Two slim-high 3.5-inch removable-media drive bays (one diskette drive installed)
 	
PCI expansion slots:
• Five 33 MHz/32-bit PCI slots on the system board
• One Accelerated Graphic Port (AGP) Pro 110 slot
 	
Power supply:
One 340 watts (115-230 V ac)
 	
Cooling:
Two speed-controlled fans
	• Intel Ethernet controller on the system board with RJ-45 Ethernet connector
	• Two serial ports
	• One parallel port
	• Dual port serial ATA controller
	• (Some models) two IEEE 1394 (FireWire) ports (four-pin on front, six-pin on rear)
	• Six Universal Serial Bus (USB) ports (two on front and four on rear)
	• Keyboard port
	• Mouse port
	• Audio ports
	  – Line out (front and rear)
	  – Mic (front and rear)
	  – Line in (front and rear)
	• Dual-channel IDE controller
	
	Video adapter: (depending on your model)
	• NVIDIA Quadro NVS 280 (LFH-60), AGP 8X, with 64 MB double-data-rate (DDR) synchronous dynamic random access memory (SDRAM) video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable)
	• NVIDIA Quadro4 580XGL (LFH-60), AGP 8X, with 64 MB DDR SDRAM video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable)
	• NVIDIA Quadro FX 500 (DVI-I & VGA), AGP 8X, with 128 MB DDR SDRAM video memory with one DVI-I connector and one analog VGA connector
	• NVIDIA Quadro4 980XGL (DVI-I), AGP 8X, with 128 MB DDR synchronous graphics random access memory (SGRAM) video memory with dual DVI-I connectors
	• NVIDIA Quadro FX 1000 (DVI-I), AGP 8X, with 128 MB DDR2 SDRAM video memory with dual DVI-I connectors
	• NVIDIA Quadro FX 1100 (DVI-I), AGP 8X, with 128 MB DDR SDRAM video memory with dual DVI-I connectors
	• NVIDIA Quadro FX 3000 (DVI-I), AGP 8X, with 256 MB DDR SDRAM video memory with dual DVI-I connectors
		• Sine-wave input (50 or 60 Hz) required
		• Input voltage and frequency ranges automatically selected
		• Input voltage low range:
		  – Minimum: 90 V ac
		  – Maximum: 137 V ac
		• Input voltage high range:
		  – Minimum: 180 V ac
		  – Maximum: 265 V ac
		• Input kilovolt-amperes (kVA) approximately:
		  – Minimum: 0.13 kVA
		  – Maximum: 0.55 kVA
		
		Heat output:
		Approximate heat output in British thermal units (Btu) per hour
		• Minimum configuration: 431 Btu (124 watts)
		• Maximum configuration: 1782 Btu (523 watts)
		
		Environment:
		• Air temperature:
		  – Computer on: 10° to 35°C (50° to 95°F) Altitude: 0 to 2134 m (7000 ft)
		  – Computer off: -40° to +60°C (-40° to 140°F) Maximum altitude: 2133 m (7000 ft)
		• Humidity (operating and storage): 8% to 80%
		
		Acoustical noise emissions:
		• Sound power, idle: 4.9 bel
		• Sound power, operating: 5.0 bel
		
		Size:
		• Height: 438 mm (17.25 in.)
		• Depth: 483 mm (19 in.)
		• Width: 265 mm (6.5 in.)
		• Weight: 16.3 kg (36 lb) to 20.8 kg (45.8 lb) depending upon configuration

Controls and LEDs

This section identifies the controls and indicators on the M Pro Types 6220 and 6230.

Type 6220 - Desktop model

Ethernet transmit/
receive activity

Ethernet link status LED

CD-ROM drive
activity LED

CD eject
button

Power-control
button

Power-on LED

Hard disk drive
activity LED

IEEE 1394 (FireWire)
connector

Microphone connector

Line out connector

USB ports

Type 6230 - Tower model

Ethernet link status LED

CD-ROM drive
activity LED

CD-eject
button

Diskette drive
activity LED

Diskette-eject
button

Hard disk drive
activity LED

Ethernet
transmit/receive
activity LED

Power-on
LED

Power-control
button

Ethernet transmit/
receive activity LED

System error LED

IEEE 1394 (FireWire) connector

Microphone connector

Line out connector

USB port connector

USB port connector

CD-ROM drive activity LED
    When this LED is lit, it indicates that the CD-ROM drive is in use.

CD-eject button
    Press this button to release a CD from the CD-ROM drive.

Diskette drive activity LED
    When this LED is lit, it indicates that the diskette drive is in use.

Diskette-eject button
    Press this button to release a diskette from the diskette drive.

Hard disk drive activity LED
    When this LED is flashing, it indicates that the hard disk drive is in use.

Power-on LED
    When this LED is lit and is not flashing, it indicates that the computer is turned on. When this LED is flashing, it indicates that the computer is off and still connected to an ac power source (standby mode).

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

Ethernet transmit/receive activity LED
    When this LED is lit, it indicates that there is activity between the computer and the network. There are two of these LEDs, one on the front and one on the rear of the computer.

System-error LED
    When this amber LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. Detailed troubleshooting information is in the *User's Guide* on the IBM *IntelliStation Documentation* CD. See "System-board error LEDs" on page 58 for additional information.

Ethernet link status LED
    When this LED is lit, it indicates that there is an active connection on the Ethernet port. This LED is located on the rear of the computer.

IEEE 1394 (FireWire) ports
    Use these ports (four-pin on front and six-pin in rear) to connect FireWire devices, such as digital video cameras and external hard disk drives.

    Note: Some models are shipped with the IEEE 1394 (FireWire) adapter installed. If your computer did not come with this adapter installed, do not install any adapter in the mini-PCI slot. It is not supported.

Mic connector (pink)
    Use this connector to connect a microphone to your computer when you want to record voices or other sounds on the hard disk drive. You can also use this connector (and a microphone) with speech recognition software.

Line out connector (green)
    Use this connector 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.

USB ports
    Use these automatically configured ports to connect USB v2.0 devices to your computer, using Plug and Play technology.

Chapter 2. Installing the hardware

This chapter provides instructions for installing or replacing options in your computer. For a list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer. For more detailed installation information, see the *User's Guide* on the IBM *IntelliStation Documentation* CD.

Selecting a location for your computer

Ensure that 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 approximately 50 mm (2 in.) of space around the computer for proper air circulation. For information about arranging your computer and ease-of-use, see the following sections.

Arranging your workspace

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

Comfort

The following guidelines will help you decide what working position suits you best.

Choose a comfortable chair to reduce fatigue from sitting in the same position for long periods. 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. Change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.

Adjust the monitor so that 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 that you can view it without having to twist your body.

Glare and lighting

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

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

Dust compounds problems associated with glare. Clean your monitor screen periodically using a soft cloth moistened with a nonabrasive, liquid glass cleaner.

Air circulation

Your computer and monitor produce heat. The computer fan pulls in fresh air and forces out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, possibly resulting in malfunction or damage. Place the computer and monitor so that nothing blocks the air vents; usually 50 mm (2 in.) of air space is sufficient. Also, make sure the vented air is not blowing on someone else.

Electrical outlets and cable lengths

The location of electrical outlets and the length of device power cords and cables might determine the final placement of your computer.

When arranging your work space:
- Avoid the use of extension cords. Whenever possible, plug the computer power cord directly into an electrical outlet.
- Keep power cords and cables neatly routed away from walkways and other areas where they might be accidentally dislodged.

For more information about power cords, see "Power cords" on page 85.

Installing options

This section provides instructions for installing and replacing hardware options in your computer. These instructions are intended for users who are experienced with setting up IBM computer hardware. If you need more detailed instructions, see the *User's Guide* on the IBM *IntelliStation Documentation* CD. For a list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.

If you have no options to install, continue with "Cabling the computer" on page 41.

Installation guidelines

Before you begin installing options in your computer, read the following information:
- Read the safety information beginning on page v and the guidelines in "Handling static-sensitive devices" on page 11. This information will help keep you work safely with your computer and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your computer, monitor, and other devices that you will connect to the computer.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- When you need to access the inside of the computer to install options, you might find it easier to lay the computer on its side.
- The blue color on components and labels identifies touch points, where you can grip a component, move a latch, and so on.

System reliability considerations

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed.
- There is adequate space around the computer to allow the computer cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the computer. Do not place objects in front of the fans. For proper cooling and airflow, replace the computer cover before turning on the computer. Operating the computer for extended periods of time (over 30 minutes) with the computer cover removed might damage computer components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.

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 packages until you are ready to install them.

To reduce the possibility of damage from electrostatic discharge, observe the following precautions:
- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the system unit for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the computer without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on your computer cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Installing options in the M Pro Type 6220 (desktop model)

This section provides instructions for installing hardware options in your IntelliStation M Pro Type 6220 computer.
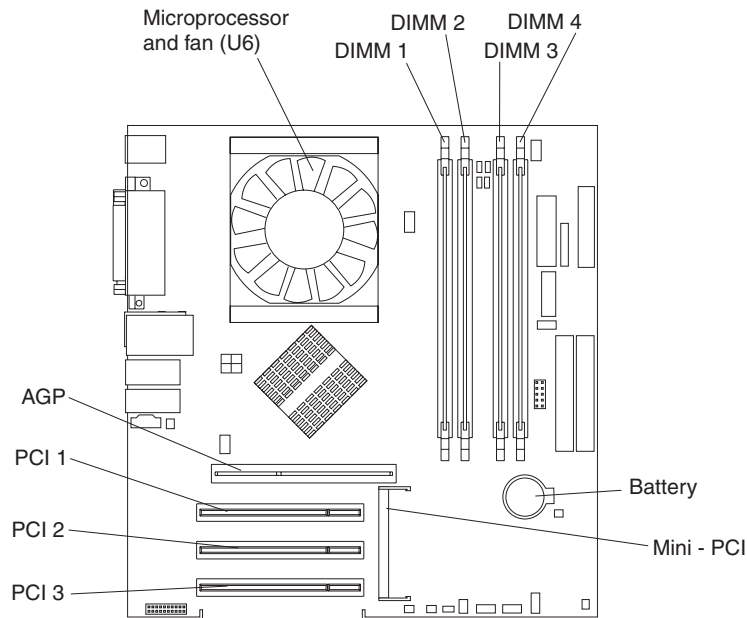
Major components of your computer

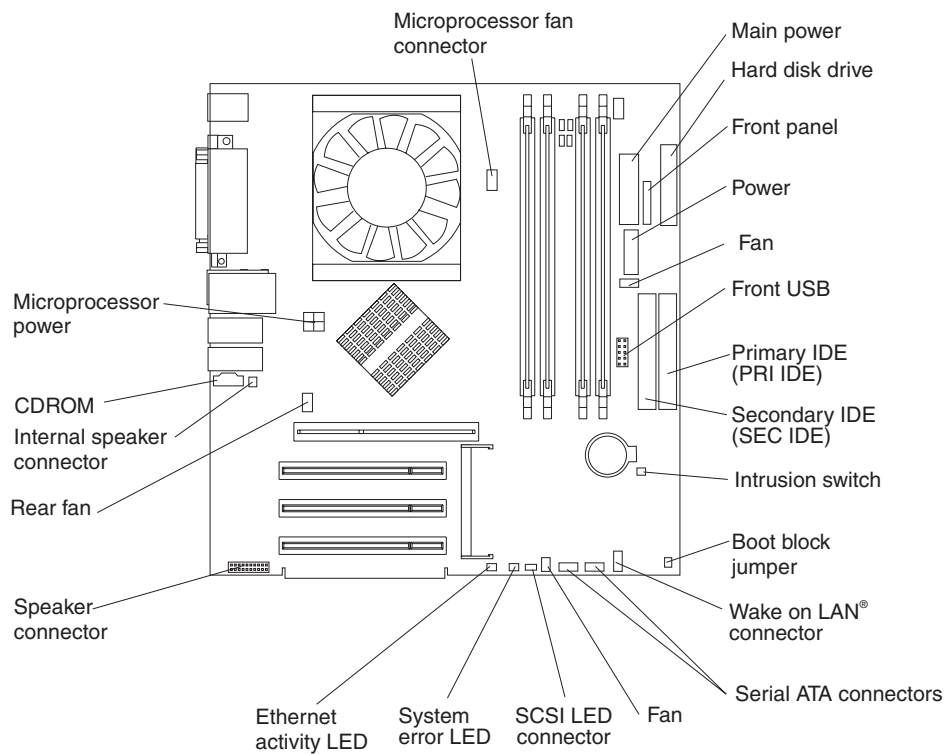The following illustration shows the major components of your M Pro Type 6220 desktop computer.
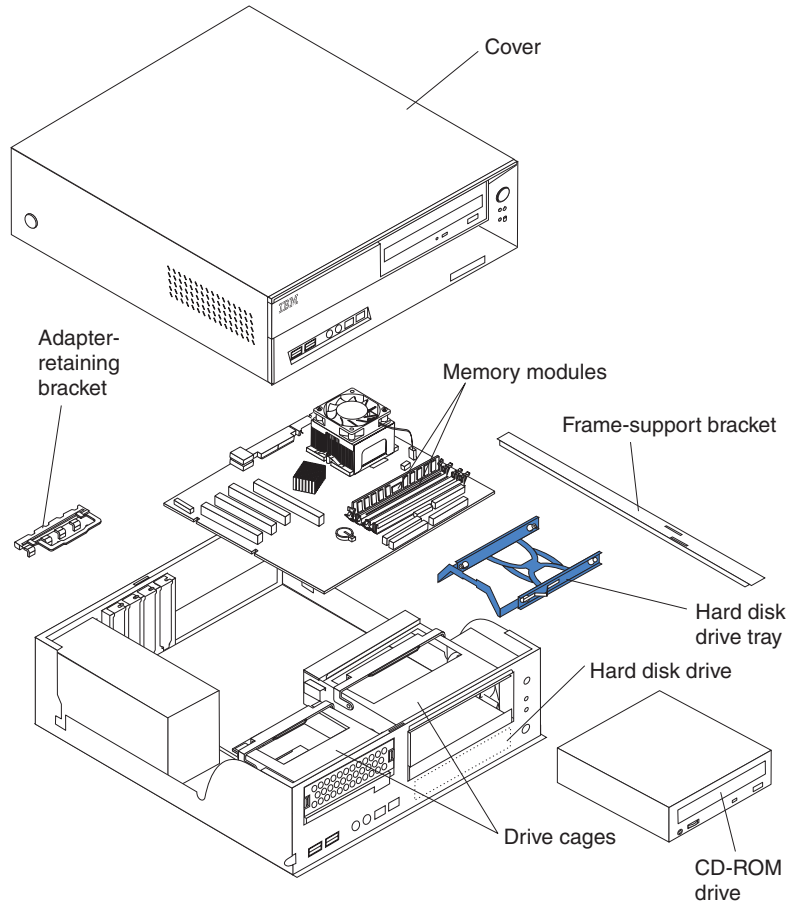
System-board option connectors

The following illustration shows the system-board connectors for user-installable options.

System-board internal connectors

The following illustration shows the internal connectors on the system board.

System-board external connectors

The following illustration shows the input/output port connectors on the system board.

Keyboard

Mouse

Serial ports

Parallel

Ethernet

USB ports

Audio
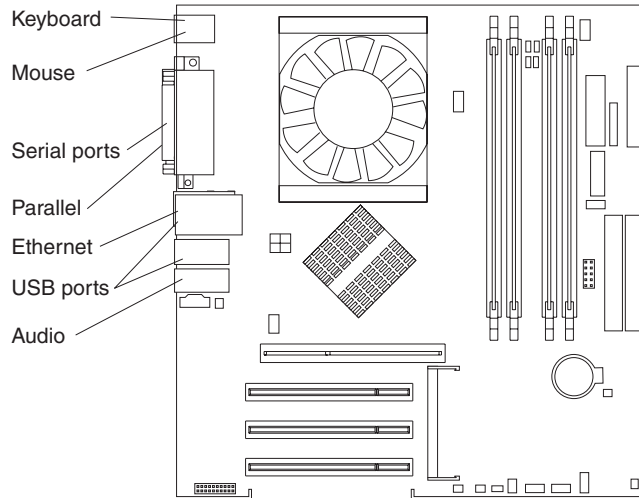
Removing the cover

Complete the following steps to remove the computer cover:

1. Read the safety information beginning on page v and the guidelines in "Handling static-sensitive devices" on page 11.
2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.
3. Press the buttons on both sides of the computer and lift the cover from the computer.
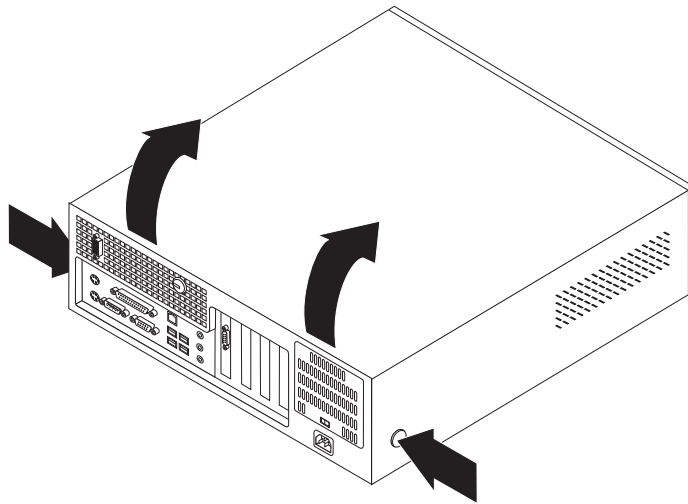
To replace the cover, see "Replacing the cover" on page 21.

Removing and installing the support bracket

When working with some options, such as hard disk drives and memory modules, you must first remove the support bracket to access the option.

Complete the following steps to remove the support bracket:

1. Read the safety information beginning on page v and the guidelines in "Handling static-sensitive devices" on page 11.

2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.

3. Remove the cover (see "Removing the cover" on page 14).

4. Pivot the drive cages until the pivot locks catch the front of the chassis, holding the drive cages in place.

5. Lift the support bracket out of the computer.
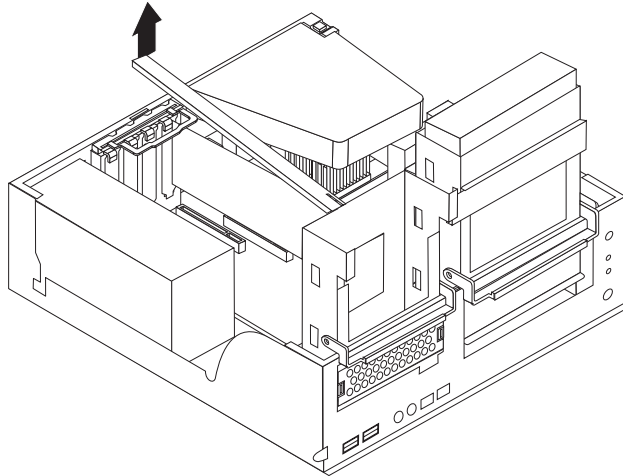
6. Continue with the option installation or removal procedure.

To reinstall the support bracket, reverse the previous steps.

Working with adapters

Your computer comes with adapter connectors or slots. The Accelerated Graphics Port (AGP) video adapter is installed in the AGP slot and some models have a IEEE 1394 (FireWire) controller adapter installed in the mini-PCI slot. You can install up to three additional optional adapters in your computer in PCI slots 1 through 3.

See "System-board option connectors" on page 13 for the location of expansion slots on the system board.

Adapter considerations: The following notes describe the types of adapters that your computer supports and other information that you must consider when installing an adapter:

• Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter.

• Your computer uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support sharing of PCI interrupts.

• You can install only low-profile, 32-bit adapters in PCI slots 1 through 3.

• Your computer supports 5.0 V signaling and universal PCI adapters; it does not support 3.3 V signaling adapters.

• PCI slots 1 through 3 are on PCI bus 3.

  The computer scans the AGP slot, mini-PCI slot, and PCI expansion slots 1 through 3 to assign system resources. Then, the system starts the PCI devices in the following order, if you have not changed the default startup sequence: AGP

slot, mini-PCI slot, PCI expansion slot 1, system-board integrated drive electronics (IDE) or small computer system interface (SCSI) devices, and then PCI slots 2 through 3.

- Some models come with a IEEE 1394 (FireWire) adapter installed in the mini-PCI slot. If your computer did not come with a IEEE 1394 (FireWire) adapter installed, do not install any adapter in the mini-PCI slot.
- For a list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.

Installing an adapter: Complete the following steps to install an adapter in your M Pro Type 6220 computer:

1. Read the safety information beginning on page v and the guidelines in "Handling static-sensitive devices" on page 11.
2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.
3. Remove the cover. See "Removing the cover" on page 14.
4. Grasp the drive cage and rotate each drive cage out until the drive cage latches on to the front of the computer chassis.
5. Lift the support bracket out of the computer. See "Removing and installing the support bracket" on page 14.
6. Rotate the rear adapter-support bracket to the open (unlocked) position and remove it from the computer.
7. Determine which PCI slot you will use for the adapter. Review the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route any cables before you install the adapter.
8. Remove the expansion-slot cover. From the rear of the computer, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

    Note: Expansion-slot covers must be installed on all empty slots. This maintains the electronic emissions standards of the computer and ensures proper ventilation of computer components.

9. Follow the instructions that come with the adapter to set jumpers or switches, if any.
10. Remove the adapter from the static-protective package, carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then, press the adapter *firmly* into the expansion slot. Move the adapter directly from the static-protective package to the adapter slot. Avoid touching the components and gold-edge connectors on the adapter.

    Attention: Make sure that the adapter is correctly seated in the expansion slot before you turn on the computer. Incomplete installation of an adapter might damage the system board or the adapter.

Expansion-slot cover   Adapter-support bracket
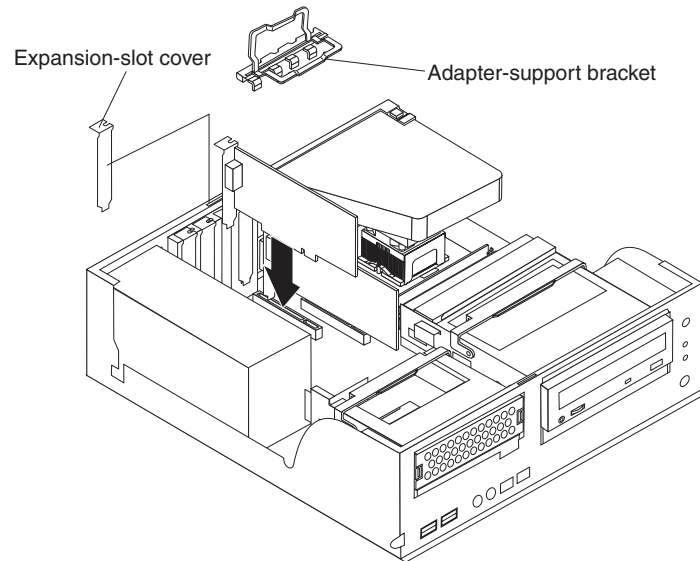
11. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.
12. If you have another adapter to install, repeat steps 1 through 9.
13. Reinstall the rear adapter-support bracket; then, rotate the bracket to the closed (locked) position.
14. Replace the frame-support bracket.
15. If you have other options to install or remove, do so now; otherwise, replace the cover (see "Replacing the cover" on page 21), reconnect the external cables and power cords, and turn on the computer. Then, go to "Completing the installation" on page 40.

Installing internal drives

Depending on your computer model, one or more of the following drives might be installed in your computer:
• Hard disk
• CD-ROM, CD-RW, or DVD/CD-RW combo

Internal drive bays: Your M Pro Type 6220 comes with an IDE CD-ROM, CD-RW, or DVD/CD-RW drive in bay 2 and a hard disk drive in bay 3. You can replace failed internal drives. For instructions on replacing an internal drive, see the

User's Guide.

Bay 3

Bay 2

Bay 1
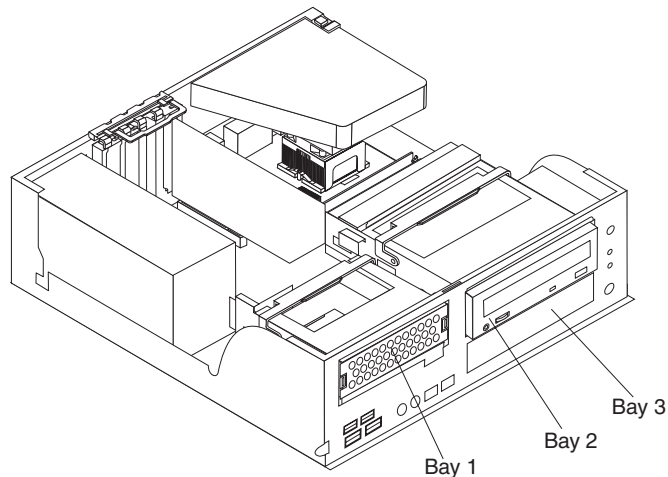
Notes:

1. Tape drives, CD-ROM, DVD/CD-RW, and DVD-ROM drives are examples of removable-media drives. You can install removable-media drives in bay 2 only.

2. You have two serial ATA hard disk drive connectors on the system board. Each serial ATA drive comes with a cable.

3. You can mix and match parallel IDE or serial ATA drives in bays 1 and 3.

4. The electromagnetic interference (EMI) integrity and cooling of the computer are protected by having all bays and PCI slots covered or occupied. When you install a drive or PCI adapter, save the EMC shield and filler panel from the bay or the PCI adapter slot cover in the event you later remove the option.

5. For a complete list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.

Installing memory modules

The following notes describe the types of dual inline memory modules (DIMMs) that your computer supports and other information that you must consider when installing DIMMs.

Notes:

1. When you restart the computer after adding or removing a DIMM, the computer displays a message that the memory configuration has changed.

2. Your IntelliStation M Pro Type 6220 computer uses industry-standard PC2700 or PC3200 double-data-rate (DDR) dual inline memory modules (DIMMs).

3. The system board contains four DIMM connectors and supports two-way memory interleaving.

4. The DIMM options available for your computer are 256 MB, 512 MB, and 1 GB memory modules . Your computer supports a minimum of 256 MB and a maximum of 4 GB of system memory.

5. The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS will display the total amount of installed memory and the amount of configured memory.

6. Your computer comes with either one or two 256 MB, 512 MB, or 1 GB memory DIMM installed. If your system has one DIMM installed, when you install an additional DIMM, it must be installed in DIMM 3 memory connector, and must

be the same size, speed, type, and technology as the DIMM installed in DIMM 1 memory connector. You can mix compatible DIMMs from various manufacturers. When one DIMM is installed in the system, the system runs as a single-channel machine. When you add a DIMM in DIMM 3 memory connector, your system defaults to a dual-channel machine.

7. DIMMs must be installed in matched pairs. The first pair of DIMMs you install in DIMM 1 and DIMM 3 memory connectors must be the same size, speed, type, and technology. You can mix compatible DIMMs from various manufactures. If you install a second pair of DIMMs in DIMM 2 and DIMM 4 memory connectors, they do not have to be the same size, speed, type, and technology as the DIMMs installed in DIMM 1 and DIMM 3 memory connectors. However, the size, speed, type, and technology of the DIMMs you install in DIMM 2 and DIMM 4 memory connectors must match each other.

8. Install only 2.5 V, 184-pin, double-data-rate (DDR) 333 or 400, PC2700 or PC3200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2700 or PC3200 SDRAM unbuffered DIMM specification. For a list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.
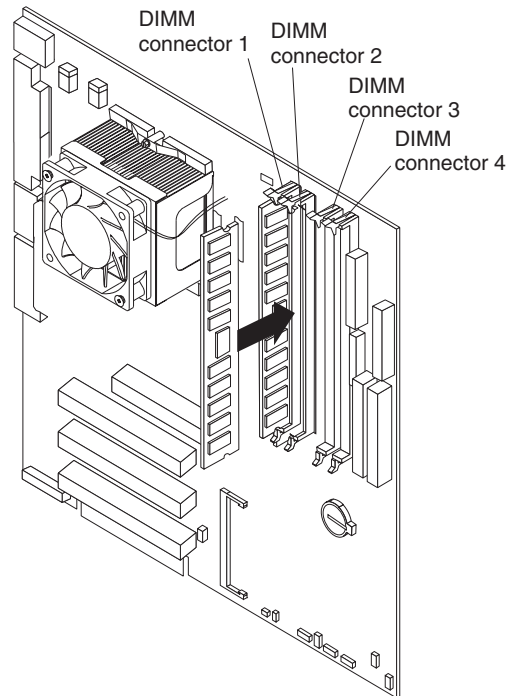
Complete the following steps to install a DIMM:

1. Read the safety information beginning on page v, and the guidelines in "Handling static-sensitive devices" on page 11.

2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.

3. Remove the cover (see "Removing the cover" on page 14).

4. Remove the support bracket (see "Removing and installing the support bracket" on page 14).

5. You might find it easier to install memory modules if you rotate the drive cage out of the computer. Grasp the drive cage and rotate it until it locks into place.

6. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Remember, DIMM 1 and DIMM 3 must be paired together (and must be the first pair installed) and DIMM 2 and DIMM 4 must be paired together. The following illustration shows the DIMM installation sequence.

Memory installation sequence	
DIMMs	Slots
1 DIMM	1
2 DIMMs	1, 3
4 DIMMs	1, 2, 3, 4

7. Open the retaining clips and, if necessary, remove any existing DIMM.

8. Touch the static-protective package containing the DIMM to any unpainted metal surface on the computer. Then, remove the new DIMM from the package.

9. Gently open the retaining clip on each end of the DIMM slot. Turn the DIMM so that the pins align correctly with the connector.

10. Insert the DIMM into the connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If a gap exists between the DIMM and the retaining

clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, then reinsert it.

11. If you have other options to install or remove, do so now. Otherwise, rotate the drive cage back into the computer and replace the support bracket (see "Removing and installing the support bracket" on page 27); then, go to "Completing the installation" on page 40.

Installing a security rope clip

To help prevent hardware theft, you can add a security rope clip and cable to your computer. After you add the security cable, make sure that it does not interfere with other cables that are connected to the computer.

Before you begin, obtain the following items:

- A flat-blade screwdriver
- An adjustable wrench
- A 19 mm (0.75 in.) rope clip or wire rope (similar to National Manufacturing number 3230, stock number 176-735)
- Threaded nuts that fit the rope clip
- A security cable
- A lock, such as a combination lock or padlock

Complete the following steps to install a rope clip:

1. Turn off the computer and all attached devices (see "Turning off the computer" on page 43; then, disconnect all external cables and power cords.
2. Remove the cover (see "Removing the cover" on page 14.
3. Use a screwdriver to remove the two metal knockouts.
4. Insert the rope clip through the rear panel; then, attach and tighten the nuts.
5. Thread the cable through the rope clip and around an object that is not part of or permanently secured to the building structure or foundation, and from which the cable cannot be removed. Fasten the cable ends together with a lock. After

you add the security cable, make sure that it does not interfere with other cables connected to the computer.


Rope clip
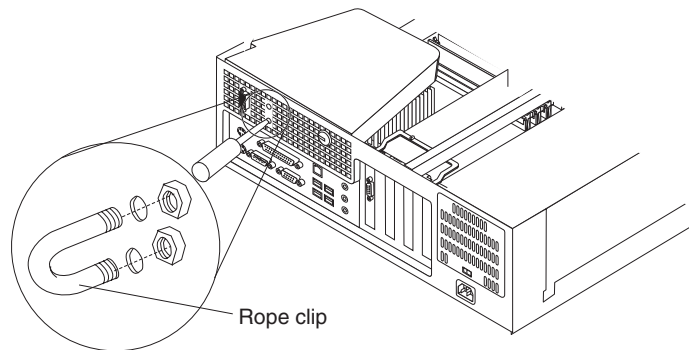
6. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 40.

Replacing the cover

Complete the following steps to replace the computer cover:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have removed all work tools from inside the computer.
2. Install the cover by placing it over the chassis and pivoting it down over the computer until it snaps into place.
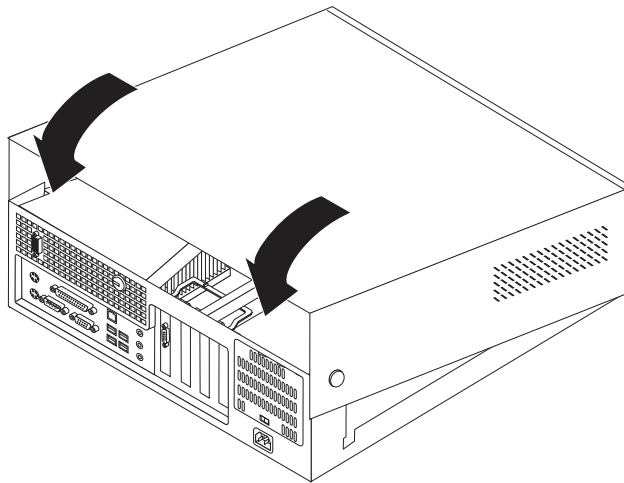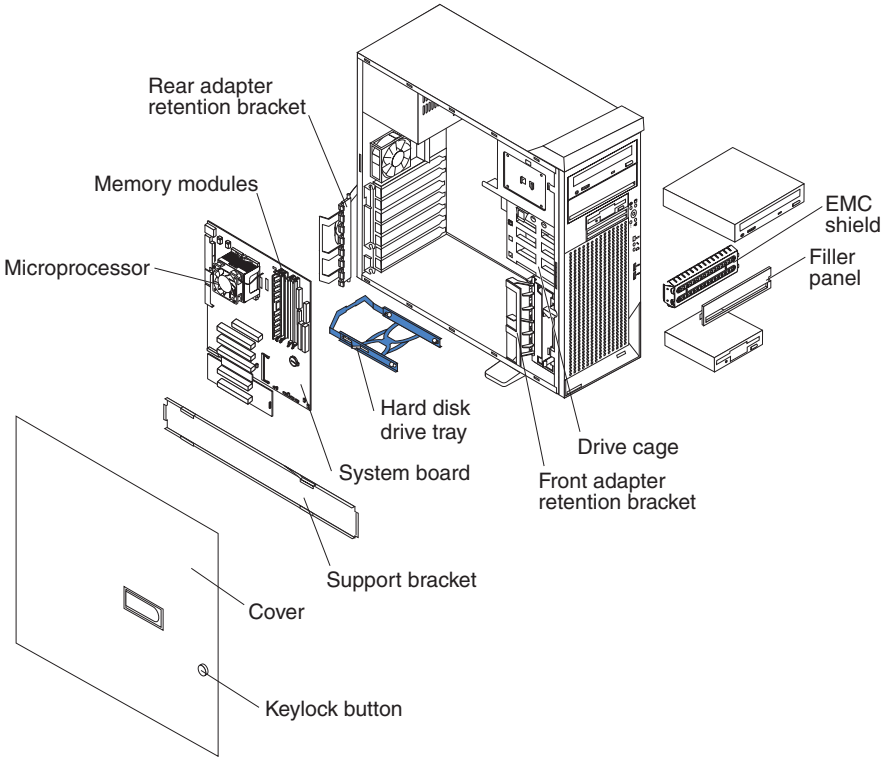

3. See "Completing the installation" on page 40.

Installing options in the M Pro Type 6230 (tower model)

This section provides instructions for installing hardware options in your IntelliStation M Pro Type 6230 computer.
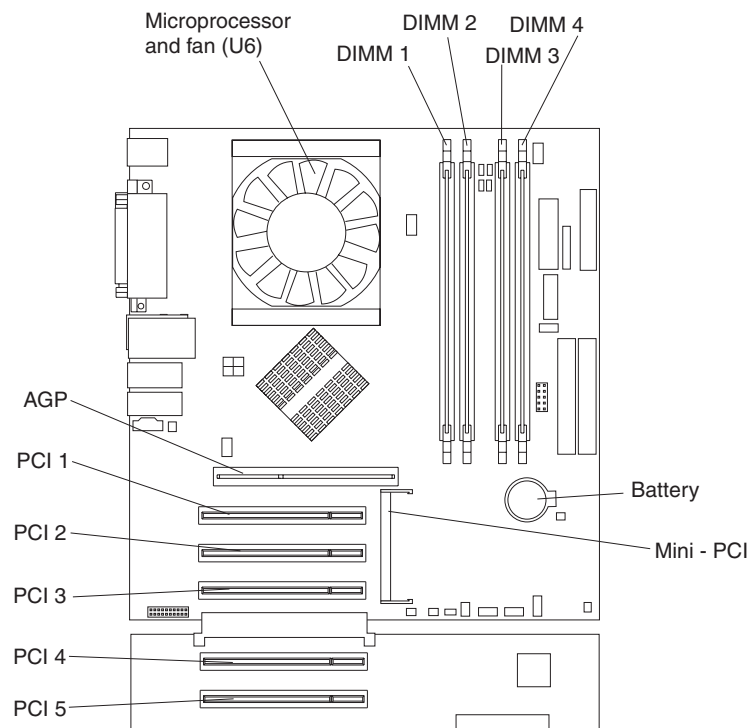
Major components of your computer

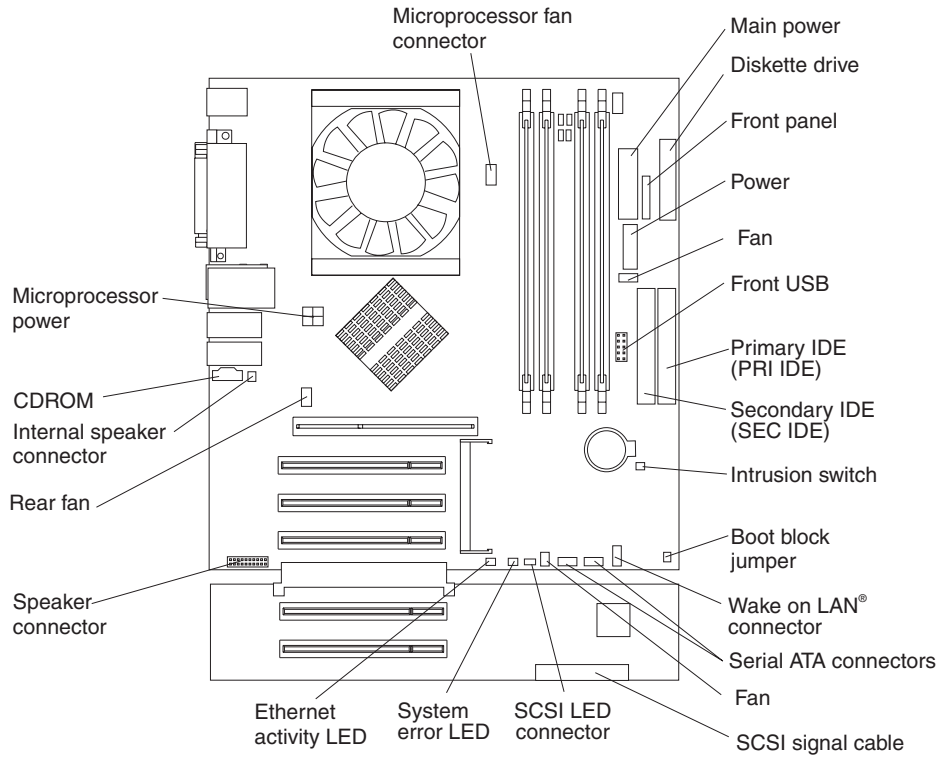The following illustration shows the major components in the M Pro Type 6230 tower computer.

Rear adapter retention bracket

Memory modules

Microprocessor

Hard disk drive tray

System board

EMC shield

Filler panel

Drive cage

Front adapter retention bracket

Support bracket

Cover

Keylock button

System-board option connectors

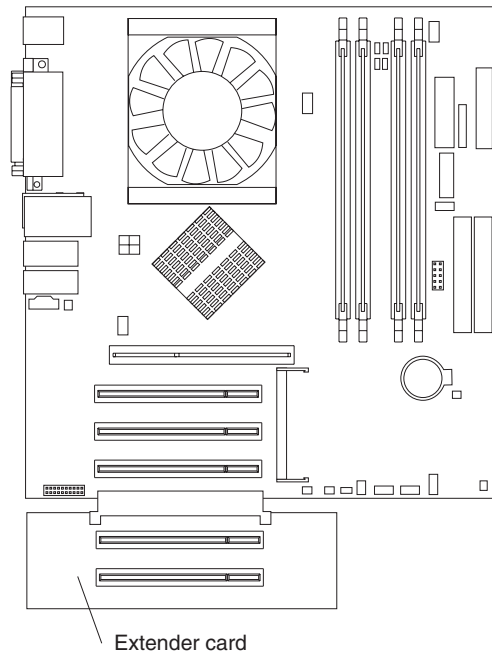The following illustration shows the system-board connectors for user-installable options.

System-board internal connectors

The following illustration shows the internal connectors on the system board.

Microprocessor fan connector

Main power

Diskette drive

Front panel

Power

Fan

Front USB

Primary IDE (PRI IDE)

Secondary IDE (SEC IDE)

Intrusion switch

Boot block jumper

Wake on LAN® connector

Serial ATA connectors

Fan

SCSI signal cable

Microprocessor power

CDROM

Internal speaker connector

Rear fan

Speaker connector

Ethernet activity LED

System error LED

SCSI LED connector

The IDE models for Type 6230 have a shorter extender card, as shown in the following illustration.

Extender card

System-board external connectors

The following illustration shows the input/output port connectors on the system board.

Keyboard

Mouse

Serial ports

Parallel

Ethernet

USB ports

Audio
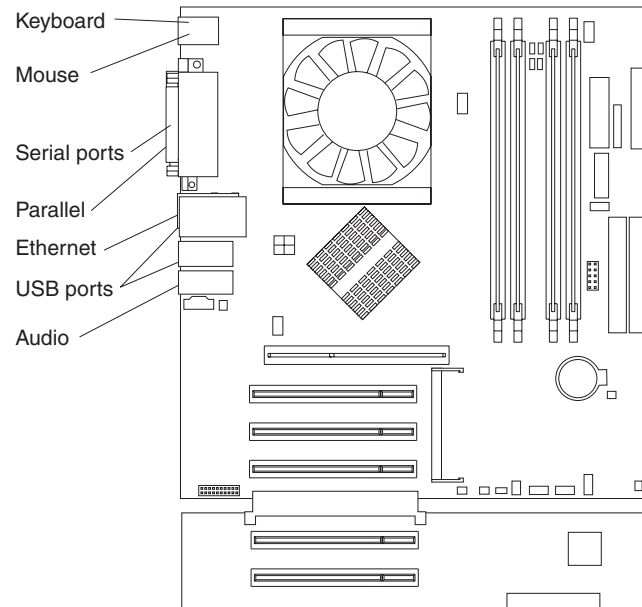
Removing the side cover

To remove the side cover, you might find it easier to lay the computer on its side.

Complete the following steps to remove the side cover of the computer:

1. Review the "Installation guidelines" on page 10.
2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.
3. Pull the cover-release latch away from the computer, and push the side cover toward the rear of the computer. Lift the side cover off the computer and set it aside.
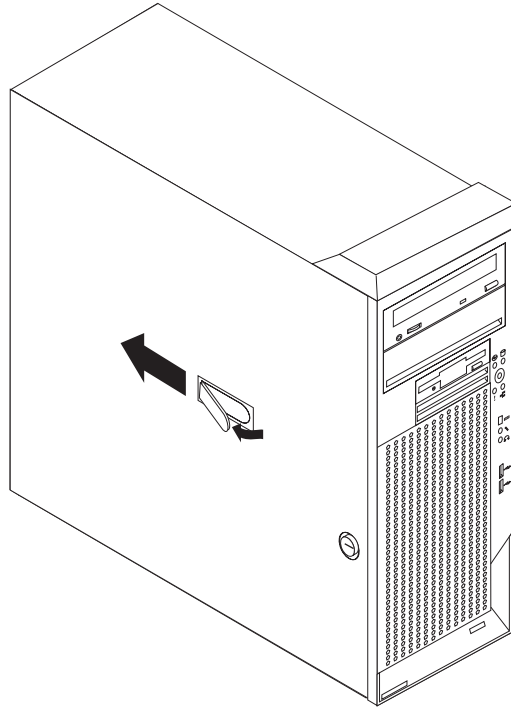
To replace the side cover, see "Replacing the side cover" on page 40

Attention: For proper cooling and airflow, replace the side cover before turning on the computer. Operating the computer with the cover removed might damage computer components.

Removing and installing the support bracket

When working with some options, such as hard disk drives and memory modules, you must first remove the support bracket to access the option.

Complete the following steps to remove the support bracket:

1. Read the safety information beginning on page v and the guidelines in "Handling static-sensitive devices" on page 11.
2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.
3. Remove the side cover (see "Removing the side cover" on page 26).
4. Pull out on the rear end of the support bracket approximately 150 mm (6 in.).
5. Disengage the front end of the support bracket from the computer and set the bracket aside.
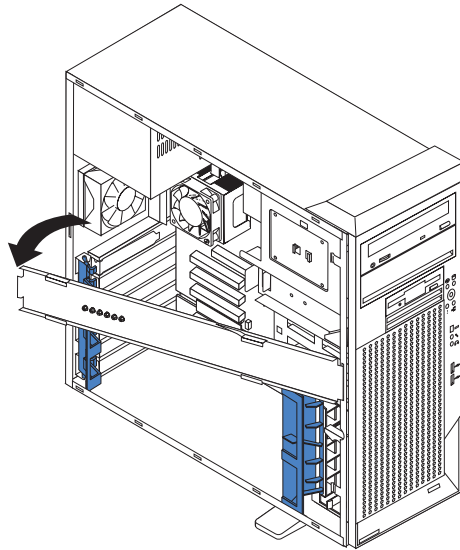
6. Continue with the option installation or removal procedure.

To reinstall the support bracket, reverse the previous steps.

Working with adapters

Your computer comes with adapter connectors or slots. The Accelerated Graphics Port (AGP) video adapter is installed in the AGP slot and some models have a IEEE 1394 (FireWire) controller adapter installed in the mini-PCI slot. You can install up to five additional optional adapters in your computer in PCI slots 1 through 5.

See "System-board option connectors" on page 23 for the location of expansion slots on the system board.

Adapter considerations: The following notes describe the types of adapters that your computer supports and other information that you might consider when installing an adapter:

- Read the documentation that comes with your operating system.
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter.
- You can install only 32-bit adapters in PCI slots 1 through 5.

- You can install full-length adapters in all five expansion slots. None of the expansion slots are hot-plug slots.
- Your computer supports 5.0 V signaling and universal PCI adapters; it does not support 3.3 V signaling adapters.
- Your computer uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support sharing of PCI interrupts.
- The system scans the AGP slot, mini-PCI slot, and PCI expansion slots 1 through 5 to assign system resources. Then, the system starts the PCI devices in the following order, if you have not changed the default startup sequence: AGP slot, mini-PCI slot, PCI expansion slot 1, system-board integrated drive electronics (IDE) or small computer system interface (SCSI) devices, and then PCI slots 2 through 5.
- Some models come with a IEEE 1394 (FireWire) adapter installed in the mini-PCI slot. If your computer did not come with a IEEE 1394 (FireWire) adapter installed, do not install any adapter in the mini-PCI slot.
- For a list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.

Installing an adapter: Complete the following steps to install an adapter in your computer:

1. Read the safety information beginning on page v and the guidelines in "Handling static-sensitive devices" on page 11.
2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.
3. Remove the side cover. See "Removing the side cover" on page 26.
4. Determine which PCI slot you will use for the adapter. Review the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route any cables before you install the adapter.
5. For full-length adapters, rotate the rear adapter-retention bracket to the open (unlocked) position and remove it from the computer. Rotate the front adapter-retention bracket to the open position. If you are installing a smaller adapter, remove only the rear adapter-retention bracket.
6. Remove the expansion-slot cover. From the rear of the computer, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

   Note: Expansion-slot covers must be installed on all empty slots. This maintains the electronic emissions standards of the computer and ensures proper ventilation of computer components.
7. Follow the instructions that come with the adapter to set jumpers or switches, if any.
8. Remove the adapter from the static-protective package, carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then, press the adapter *firmly* into the expansion slot. Move the adapter directly from the static-protective package to the adapter slot. Avoid touching the components and gold-edge connectors on the adapter. Ensure that the adapter is correctly seated in the expansion slot before you turn on the computer. Incomplete installation of an adapter might damage the system board or the adapter.

Expansion
slot cover

Rear
adapter
retention
bracket

Adapter

Front
adapter
retention
bracket
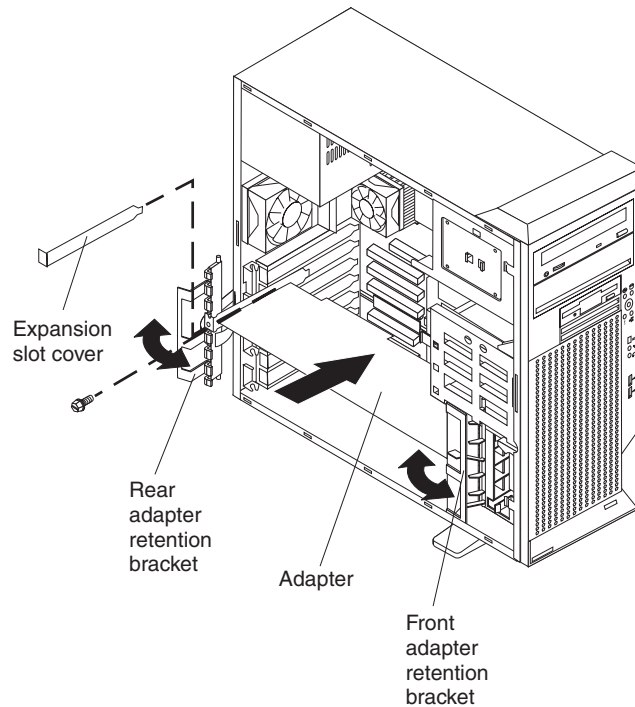
9. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans. If you are installing an optional SCSI adapter, see "Cabling an optional SCSI adapter" for additional information.

10. If you have another adapter to install, repeat steps 1 through 9.

11. If you have installed a full-length adapter, rotate the front adapter-support bracket to the closed (locked) position.

   Note: If any adapter in your computer is large or has heavy cables attached to it, you can secure the adapter with a screw: insert one backup expansion-slot screw (stored on the frame-support bracket) through the top of each adapter bracket into the screw hole and secure the adapter before proceeding to the next step. If you use a screw to secure an adapter, you will need to secure all adapters with screws. You cannot use both the screws and the retention brackets to secure an adapter. You must use one or the other.

12. Reinstall the rear adapter-retention bracket; then, rotate the bracket to the closed (locked) position.

   Note: The rear retention bracket rests against the computer side cover. You might find it easier to lay the computer on its side to replace the side cover.

13. If you have other options to install, do so now; otherwise, replace the side cover (see "Replacing the side cover" on page 40), reconnect the external cables and power cords, and turn on the computer. Then, go to "Completing the installation" on page 40.

Cabling an optional SCSI adapter: You can install an optional SCSI adapter in your computer to control the internal hard disk drives. With a SCSI adapter installed, you can configure the internal hard disk drives into disk arrays. You can also cable a SCSI adapter to external hard disk drives. See your SCSI adapter option documentation for complete instructions for installing a SCSI adapter in your computer and for additional information about SCSI adapters.

Notes:

1. An optional SCSI adapter is required to connect external SCSI devices.
2. The SCSI cables used by the integrated SCSI controller cannot be used with an optional SCSI adapter.

Complete the following steps to cable an optional SCSI adapter:

1. Install the SCSI adapter (see "Installing an adapter" on page 28).
2. Connect the SCSI-signal cable to the adapter and one or more of the signal cable connectors to the rear of the SCSI devices.
3. Connect the SCSI-activity-indicator cable to the adapter and to the SCSI-LED connector on the system board. See "System-board internal connectors" on page 24 for the location of the SCSI-LED connector.
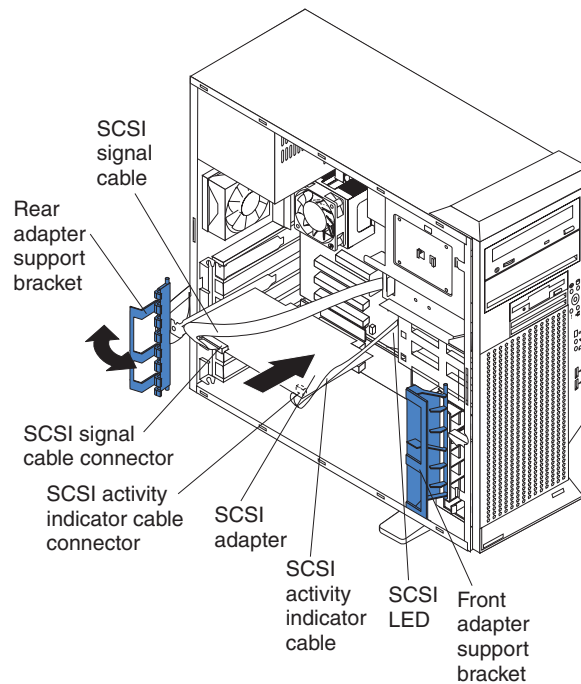

4. Complete the installation of the optional SCSI adapter.

Installing internal drives

Depending on your computer model, one or more of the following drives might be installed in your computer:
- Diskette
- Hard disk
- CD-ROM, CD-RW, or DVD/CD-RW combo

Internal drive bays: Your M Pro Type 6230 comes with an IDE CD-ROM, CD-RW, or DVD/CD-RW drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and a hard disk drive in bay 6 or 7.

Bay 1
Bay 2
Bay 3
Bay 4
Bay 5
Bay 6
Bay 7
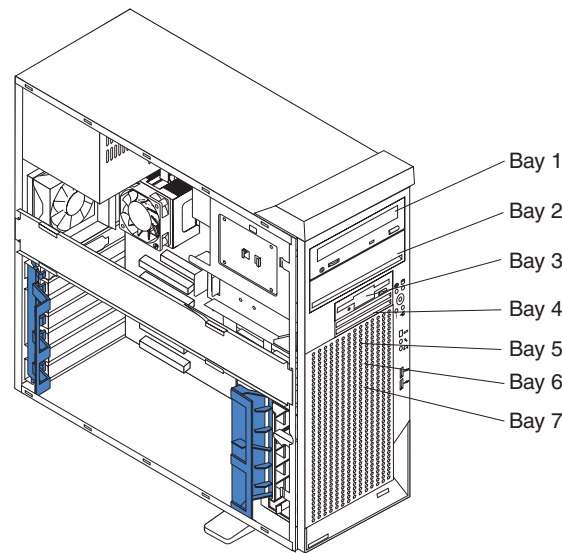
Notes:

1. Diskette drives, tape drives, CD-ROM, DVD/CD-RW, and DVD-ROM drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, 3, and 4 only.

2. You can install a 3.5-in. slim-high, or a 5.25-in. half-high removable-media drive, such as a tape backup drive, in bay 2.

3. You can install only a 3.5-in., slim-high, removable-media drive in bay 4.

4. The M Pro Type 6230 computer supports only one diskette drive.

5. To install a 3.5-in. drive in a 5.25-in. bay, you must use the 5.25-in. conversion kit, supplied with the option.

6. You have two serial ATA hard disk drive connectors on the system board. Each serial ATA drive comes with a cable.

7. You can mix and match parallel IDE and serial ATA drives in bays 2, 4, 5, 6, and 7.

8. The electromagnetic interference (EMI) integrity and cooling of the computer are protected by having all bays and PCI slots covered or occupied. When you install a drive or PCI adapter, save the EMC shield and filler panel from the bay or the PCI adapter slot cover in the event you later remove the option.

9. For a complete list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.

Preinstallation steps: Some of these steps are required only the first time you install a hard disk drive in a specific bay.

1. Read the safety information beginning on page v,, the guidelines in "Handling static-sensitive devices" on page 11, and the documentation that comes with your drive.

2. Verify that you have all the cables and other equipment specified in the documentation that comes with the drive.

3. Choose the bay in which you want to install the drive.

4. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive. If you are installing a SCSI device, be sure to set the SCSI ID for that device.

Installing a drive in bay 2 or 4: Complete the following steps to install a drive in bay 2 or 4:

1. Follow the instructions in "Preinstallation steps."

2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.

3. Remove the side cover (see "Removing the side cover" on page 26).

4. Remove the support bracket (see "Removing and installing the support bracket" on page 27).

5. Use a screwdriver to pry the filler panel and EMC shield away from the computer.

   Note: If you are installing a drive that contains a laser, review the following safety precaution.

Statement 3:

CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:
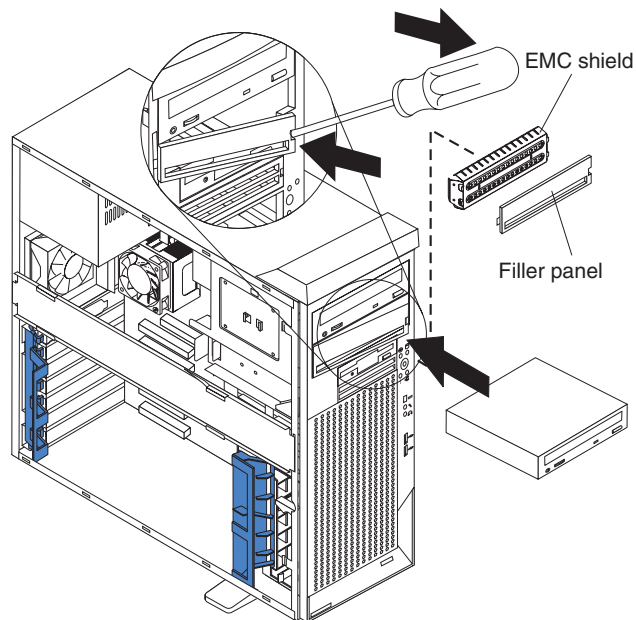- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous 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.

6. Touch the static-protective package containing the drive to any unpainted metal surface on the computer; then, remove the drive from the bag and place it on a static-protective surface.
7. Follow the instructions that come with the drive to set jumpers or switches, if any.

Note: You might find it easier to install the new drive into the appropriate opening on the front, and then attach the cables.

8. If you are installing a 5.25-in. drive in bay 2, push the drive into the bay; then, use the two screws to attach the drive to the drive cage. If you are installing a 3.5-in. drive in bay 2, you must attach the 5.25-in. conversion kit that came with the option.

9. Determine whether the drive is an IDE or SCSI device; then, connect one end of the appropriate signal cable into the back of the drive and the other end of this cable into the appropriate IDE or SCSI connector on the system board. See "Power and signal cables for internal drives" on page 35 for additional information about cabling drives and "System-board internal connectors" on page 24 for the location of IDE and SCSI connectors on the system board. If there are open connectors on the cables connecting existing IDE or SCSI drives, these cables can be used to connect the new drive.

10. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor.

11. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.

12. If you have other options to install or remove, do so now; otherwise, replace the support bracket and then go to "Completing the installation" on page 40.

Installing a hard disk drive in bay 5, 6, or 7: Bays 5, 6, and 7 are in the drive cage. The drive cage is behind the front of the adapter-support bracket.

Note: When installing options, you might find it easier to work with the computer lying on its side.

Complete the following steps to install a drive in bay 5, 6, or 7:

1. Follow the instructions in "Preinstallation steps" on page 32.

2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.

3. Remove the side cover (see "Removing the side cover" on page 26).

4. Remove the support bracket (see "Removing and installing the support bracket" on page 27).

5. If your computer has hard disk drives preinstalled in the drive cage, disconnect the power and signal cables from the rear of the drives.

6. Grasp the drive cage and rotate the cage out of the computer until it locks into place with the drive-cage retention tab. The open ends of the drive slots and installed drives will face you. Ensure that the drive cage locks into place over the drive-cage retention tab by rotating the drive cage all the way out of the computer.
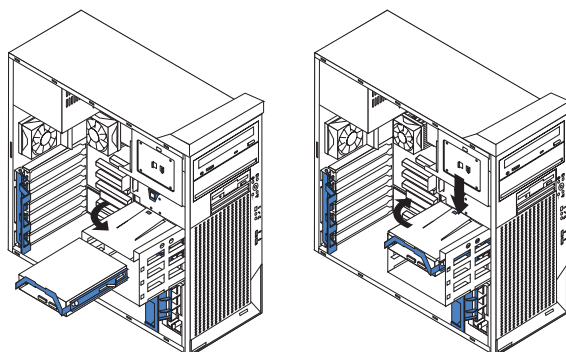
7. Slide the existing drive out of the drive bay. Remove the drive from the drive tray by gently pulling both sides of the drive tray outward until the mounting pins are disengaged from the holes on the drive; then, lift the drive out of the drive tray.

8. Touch the static-protective package containing the new drive to any unpainted metal surface on the computer; then, remove the drive from the package and place it on a static-protective surface.

9. Set any jumpers or switches on the new drive according to the documentation that comes with the drive.

10. Attach the new drive to the drive tray. Place the drive on the drive tray and align the holes on the drive with the mounting pins on the drive tray. Gently pull both sides of the drive tray outward and insert the mounting pins into the holes on the drive.

11. Slide the drive into the drive bay until the drive snaps into place.

12. Determine whether the new drive is a parallel IDE, serial ATA, or SCSI device; then, connect one end of the appropriate signal cable into the back of the drive and the other end of this cable into the appropriate parallel IDE, serial ATA, or SCSI connector on the system board. See "Power and signal cables for internal drives" for additional information about cabling drives and "System-board internal connectors" on page 24 for the location of parallel IDE, serial ATA, and SCSI connectors on the system board. If there are open connectors on the cables connecting existing parallel IDE, serial ATA, or SCSI drives, these cables can be used to connect the new drive.

13. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor.

14. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.

15. Push the drive cage outward, and press in on the drive-cage release tab; then, rotate the drive cage back into the computer.

16. If you have other options to install or remove, do so now; otherwise, replace the support bracket (see "Removing and installing the support bracket" on page 27) and then go to "Completing the installation" on page 40.

Power and signal cables for internal drives: Your computer uses cables to connect parallel IDE, serial ATA, and SCSI devices to the power supply and to the system board. (See "System-board internal connectors" on page 24 for the location of system-board connectors.) Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in your computer come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.

- When you install a drive, ensure that one of the drive connectors of the signal cable is connected to the drive and that the connector at the other end of the signal cable is connected to the system board.

- If you have only one IDE device on a cable, it must be set as a primary device.

- 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 computer might not recognize some of the IDE devices. The master (primary) and (subordinate (secondary) designation is determined by switch or jumper settings on each IDE device.

- If two IDE devices are on a single cable, and only one is a hard disk drive, the hard disk drive must be set as a master device.

The following cables are provided:

- **Power cables:** Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. You can use either a four-wire power cable or serial ATA power cable with serial ATA drives, but do not use both at the same time (use one or the other).
- **Signal cables:** Signal cables are typically flat cables, also called ribbon cables, that connect parallel IDE, serial ATA, SCSI, and diskette drives to the system board. Two or three types of signal cables come with your computer:
  - **IDE:** The wider IDE signal cable has three connectors.

    If the cable has three connectors, one of these connectors is attached to the drive, one is a spare, and the third attaches to the master or subordinate IDE connector on the system board. The spare connector can be used to connect additional IDE drives to your computer.

    Note: The CD-ROM drive is attached to an ATA 100 signal cable. ATA 100 signal cables are color-coded. The blue connector attaches to the system board. The black connector attaches to the master IDE device. The gray middle connector attaches to the subordinate IDE device. If you are installing an additional hard disk drive, you must change the switch or jumper setting on the CD-ROM drive to make the drive a subordinate device, set the switch or jumper setting on the new drive to master, and change the connector used for the CD-ROM drive to the gray middle connector. The new drive will connect to the black master IDE device connector.

  - **Diskette drive:** The narrower signal cable has two connectors, one attaches to the diskette drive, and the other attaches to the connector (FDD1) on the system board.
  - **Serial ATA:** The narrower, black signal cable has two connectors. One attaches to the serial ATA drive, and the other is attaches to the connector on the system board. Each serial ATA drive comes with a cable. If you install an additional serial ATA drive, you will need an additional cable.
  - **SCSI:** The following cables can be used to attach SCSI devices to the integrated SCSI controller on the system board:
    - An Ultra320 twisted ribbon cable connects the internal Ultra320 SCSI hard disk drive to the SCSI connector on the system board. This cable has four additional connectors for attaching more internal SCSI devices.
    - A round SCSI cable connects external SCSI devices to the integrated SCSI controller on the system board. For more information about connecting SCSI devices, see the SCSI documentation.

Installing memory modules

The following notes describe the types of dual inline memory modules (DIMMs) that your computer supports and other information that you must consider when installing DIMMs.

Notes:

1. Your IntelliStation M Pro computer uses industry-standard PC2700 or PC3200 double-data-rate (DDR) dual inline memory modules (DIMMs).
2. The system board contains four DIMM connectors and supports two-way memory interleaving.
3. The DIMM options available for your computer are 256 MB, 512 MB, and 1 GB memory modules. Your computer supports a minimum of 256 MB and a maximum of 4 GB of system memory.

4. The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS will display the total amount of installed memory and the amount of configured memory.

5. Your computer comes with either one or two 256 MB, 512 MB, or 1 GB memory DIMM installed. If your system has one DIMM installed, when you install an additional DIMM, it must be installed in DIMM 3 memory connector, and must be the same size, speed, type, and technology as the DIMM installed in DIMM 1 memory connector. You can mix compatible DIMMs from various manufacturers. When one DIMM is installed in the system, the system runs as a single-channel machine. When you add a DIMM in DIMM 3 memory connector, your system defaults to a dual-channel machine.

6. DIMMs must be installed in matched pairs. The first pair of DIMMs you install in DIMM 1 and DIMM 3 memory connectors must be the same size, speed, type, and technology. You can mix compatible DIMMs from various manufactures. If you install a second pair of DIMMs in DIMM 2 and DIMM 4 memory connectors, they do not have to be the same size, speed, type, and technology as the DIMMs installed in DIMM 1 and DIMM 3 memory connectors. However, the size, speed, type, and technology of the DIMMs you install in DIMM 2 and DIMM 4 memory connectors must match each other.

7. Install only 2.5 V, 184-pin, double-data-rate (DDR) 266, PC2700 or PC3200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2700 or PC3200 SDRAM unbuffered DIMM specification. For a list of supported options for your computer, go to http://www.ibm.com/pc/; then, select your country and navigate to the list of options for your computer.
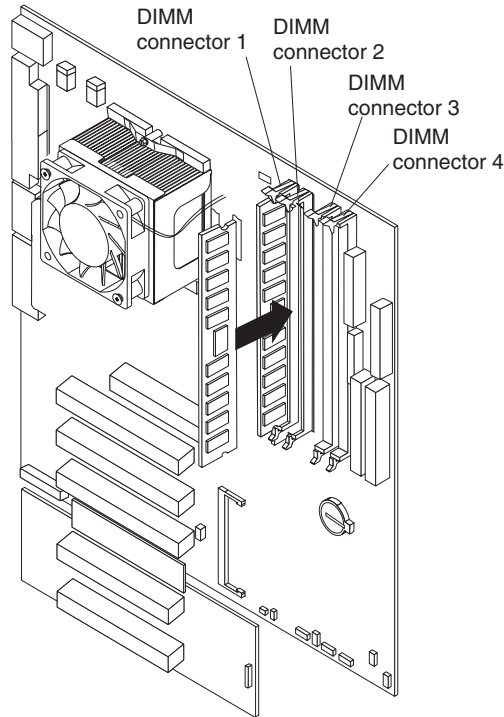
Complete the following steps to install a DIMM:

1. Read the safety information beginning on page v, and "Handling static-sensitive devices" on page 11.

2. Turn off the computer and all attached devices (see "Turning off the computer" on page 43); then, disconnect all power cords and external cables.

3. Remove the side cover (see "Removing the side cover" on page 26).

4. Remove the support bracket (see "Removing and installing the support bracket" on page 27).

5. You might find it easier to install memory modules if you rotate the drive cage out of the computer. Grasp the drive cage and rotate it until it locks into place.

6. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Remember, DIMM 1 and DIMM 3 must be paired together (and must be the first pair installed) and DIMM 2 and DIMM 4 must be paired together. The following illustration shows the DIMM installation sequence.

Memory installation sequence	
DIMMs	Slots
1 DIMM	1
2 DIMMs	1, 3
4 DIMMs	1, 2, 3, 4

7. Open the retaining clips and, if necessary, remove any existing DIMM.

8. Touch the static-protective package containing the DIMM to any unpainted metal surface on the computer. Then, remove the new DIMM from the package.

9. Gently open the retaining clip on each end of the DIMM slot. Turn the DIMM so that the pins align correctly with the connector.

10. Insert the DIMM into the connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If a gap exists between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, then reinsert it.

11. If you have other options to install or remove, do so now. Otherwise, rotate the drive cage back into the computer and replace the support bracket (see "Removing and installing the support bracket" on page 27); then, go to "Completing the installation" on page 40.

Installing a security rope clip

To help prevent hardware theft, you can add a security rope clip and cable to your computer. After you add the security cable, make sure that it does not interfere with other cables that are connected to the computer.

Before you begin, obtain the following items:
- A flat-blade screwdriver
- An adjustable wrench
- A 19 mm (0.75 in.) rope clip or wire rope (similar to National Manufacturing number 3230, stock number 176-735)
- Threaded nuts that fit the rope clip
- A security cable
- A lock, such as a combination lock or padlock

Complete the following steps to install a rope clip:

1. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the side cover. See "Removing the side cover" on page 26.

2. Use a screwdriver to remove the two metal knockouts.

3. Insert the rope clip through the rear panel; then, attach and tighten the nuts.

4. Thread the cable through the rope clip and around an object that is not part of or permanently secured to the building structure or foundation, and from which the cable cannot be removed. Fasten the cable ends together with a lock. After you add the security cable, be certain it does not interfere with other cables connected to the computer.
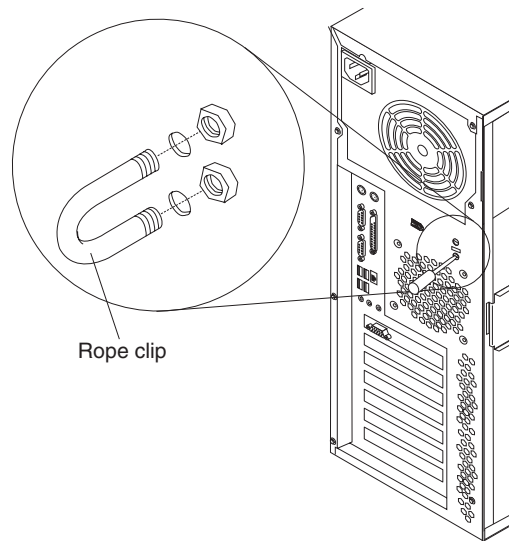
Rope clip

5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 40.

Replacing the side cover

If you removed the support bracket, reinstall it before you replace the side cover. See "Removing and installing the support bracket" on page 27.

Note: The rear adapter retaining bracket rests against the computer side cover. You might find it easier to lay the computer on its side to replace the side cover.

Complete the following steps to replace the side cover:

1. Before installing the cover, check that all cables, adapters, and other components are installed and seated correctly and that you have cleared all work tools from inside the computer.

2. Install the side cover by placing it into position on the computer. Be certain that the lip on the bottom of the cover rests on the ledge on the bottom of the chassis before rotating the cover up to the vertical position. Press down on the cover-release latch as you slide the side cover forward to lock the side cover.
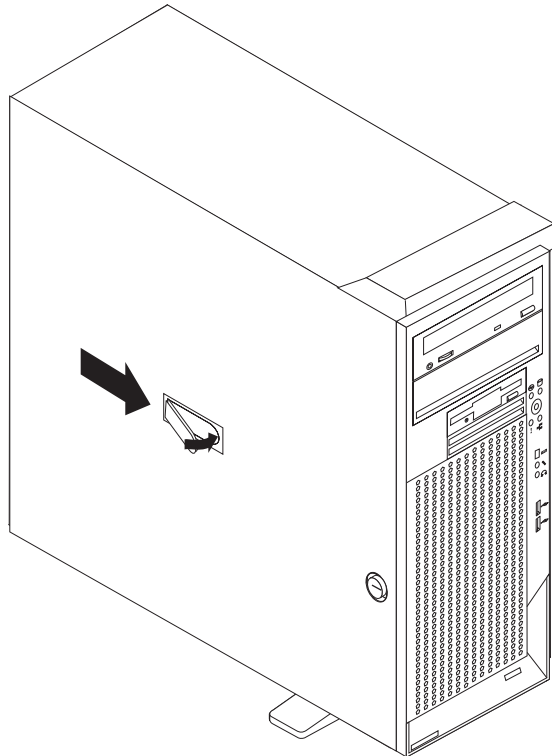
3. Reconnect the external cables and power cords to the computer.
4. Turn on the attached devices; then, turn on the computer.

Completing the installation

To complete your installation, reinstall the bezel, connect all the cables and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

Cabling the computer

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

Attention: To prevent damage to equipment, connect the power cord last.

The following illustration shows the input/output (I/O) connectors on the rear of the M Pro Type 6220 computer.
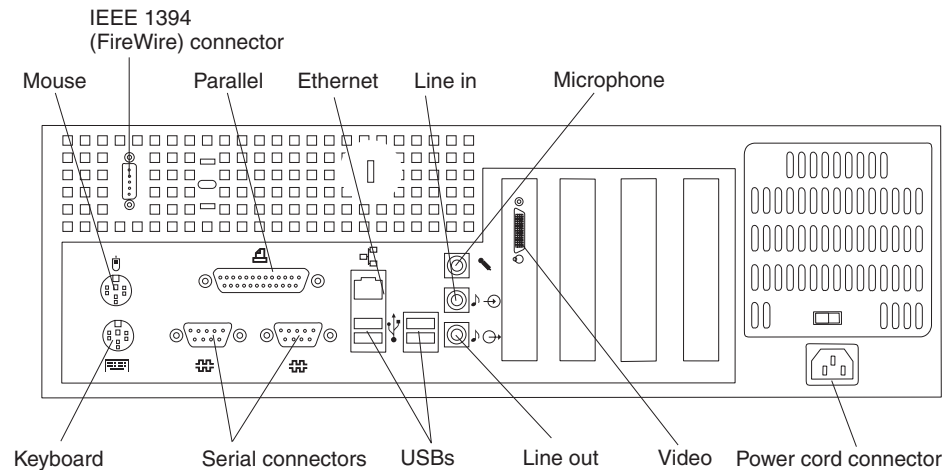
The following illustration shows the input/output (I/O) connectors on the rear of the M Pro Type 6230 computer.
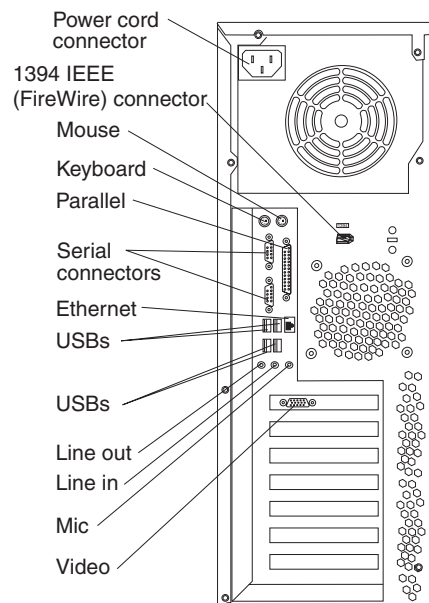
Depending on the video adapter installed in your computer and the monitor you want to use, you might need to use special video cables that convert signals or provide an additional connection point for dual-monitor capability. See the *User's Guide* on the IBM *IntelliStation Documentation* CD and the documentation that comes with your monitor for additional information.

Turning on the computer

When the computer is connected to an ac power source but is not turned on, the operating system does not run, and all core logic is shut down; however, the computer can respond to requests, such as a remote request to turn on the computer. The power-on LED flashes to indicate that the computer is connected to an ac power source but is not turned on (standby mode).

Notes:

1. Turn on all external devices, such as the monitor, before turning on the computer.

2. The power-on LED on the front of the computer is lit when the computer is on and while it is being turned on.

Approximately 20 seconds after the computer is connected to ac power, the power-control button becomes active, and you can turn on the computer and start the operating system by pressing the power-control button. The computer can also be turned on any of the following ways:

- If a power failure occurs while the computer is turned on, the computer will restart automatically when power is restored.
- When you connect your computer to power for the first time, the Wake on LAN® feature can turn on the computer. If your computer was previously turned on, it must be properly turned off for the Wake on LAN feature to turn on the computer.

Running the operating system setup program

If you are starting your computer for the first time, the setup program runs automatically when you start the computer. The program will prompt you to make choices or type information. If you need more detailed information other than what is provided in this *Installation Guide*, see your operating-system manual.

Important:

1. After turning on your computer for the first time, you must complete the operating system setup procedure before turning off your computer; otherwise, unexpected results might occur.

2. The setup program might be slightly different from the one described in your operating-system manual. Some choices do not appear because they are preset.

3. During the setup procedure, you must indicate that you accept the license agreement.

4. For Windows operating systems, the registration information will already be displayed in the registration field. If the Product ID number is not already displayed, you must type it. The Product ID is on a label attached to the computer.

You will need the following information to complete the setup program in Windows operating systems:

- The documentation that comes with your computer.
- Network information from your network administrator, if your computer is being connected to a network.
- The printer model and port, if a printer is attached directly to your computer.

After the setup procedure is completed and the computer restarts, the desktop opens. Your computer is ready for use.

Turning off the computer

When you turn off the computer and leave it connected to ac power, the computer can respond to requests, such as a remote request to turn on the computer. To remove all power from the computer, you must disconnect it from the power source.

Some operating systems require an orderly shutdown before you turn off the computer. See your operating-system documentation for information about shutting down the operating system.

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.

2

1

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

- You can turn off your computer from the operating system. If this feature is supported by your operating system, it will turn off the computer after performing an orderly shutdown of the operating system.

  To turn off the computer from the Microsoft Windows XP operating system, click **Start** → **Turn Off Computer**; then, select **Turn Off**. To turn off the computer from the Windows 2000 operating system, click **Start** → **Shut Down**; then, click **OK**.

  To turn off the computer from the Red Hat Linux operating system, click **Red Hat Linux Main Menu Button** → **Logout** → **Shutdown**; then, select **Yes**.

- You can press the power-control button on the front of the computer. If this feature is supported by your operating system, it will turn off the computer after performing an orderly shutdown of the operating system.

  Note: After turning off the computer, wait at least 5 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 4 seconds to cause an immediate shutdown of the computer. You can use this feature to turn off the computer if the operating system stops functioning.

Chapter 3. Installing software

This chapter describes how to install and configure software for your IBM IntelliStation M Pro Types 6220 and 6230 computers.

Viewing the license agreement

The IBM *International License Agreement for Non-Warranted Programs* is viewable from the Access IBM folder. Use of your computer signifies acceptance of this agreement.

Complete the following steps to view the license agreement in Windows XP:
1. From the Windows XP desktop, click **Start → All Programs → Access IBM**.
2. Select **IBM License Agreement**.

Complete the following steps to view the license agreement in Windows 2000:
1. From the Windows 2000 desktop, click **Start → Programs → Access IBM**.
2. Select **IBM License Agreement**.

For Red Hat Linux, when you start your computer, the License Agreement window opens. To accept the terms of the agreement, click **I Agree**. You can also view the license agreement by clicking on the **IBM License Agreement** icon on your desktop.

Using the built-in configuration programs

The following configuration programs are available to configure your computer:

- **Configuration/Setup Utility program**

  This program is part of the basic input/output system (BIOS) code in your computer. You can use this program to configure serial- and parallel-connector assignments, change the drive startup sequence, set the date and time, and set passwords. For more information on how to start this utility, see "Starting the Configuration/Setup Utility program" on page 46. For detailed information, see the *User's Guide*.

- **Boot Menu program**

  The Boot Menu program is part of the BIOS code in your computer. Use it to temporarily assign a device to be first in the startup sequence, overriding the startup sequence that is set in the Configuration/Setup Utility program. For information on how to start the Boot Menu, see "Starting the Boot Menu program" on page 46.

- **Intel Gigabit Ethernet Utility program**

  The Intel Gigabit Ethernet Utility is part of the BIOS code in your computer. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in your startup sequence. Enable the Intel Gigabit Etherne Utility from the Configuration/Setup Utility program. For information about how to enable this utility, see "Starting the Intel Gigabit Ethernet Utility program" on page 46.

- **SCSISelect Utility program (some models)**

  With the SCSISelect Utility program, you can configure the devices that are connected to the optional SCSI adapter. Use this program to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI

hard disk drive. For information about how to start this utility, see "Starting the SCSISelect utility program (some models)" on page 47.

- **Ethernet controller configuration**

  To configure the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 47.

Note: See the *User's Guide* on the IBM *IntelliStation Documentation* CD for detailed instructions for using the configuration programs.

The following sections provide the instructions for starting the utility programs.

Starting the Configuration/Setup Utility program

Configuration/Setup is a menu-driven utility that is part of the BIOS code in your computer. You can use it to:

- Configure serial connector assignments
- Change the startup sequence
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set an administrator password

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

1. Turn on the computer and watch the monitor screen. 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 LEDs go off, and restart the computer.
2. When the message `Press F1 for Configuration/Setup` appears on the screen during startup, press the F1 key. (This prompt appears on the screen for only a few seconds. You must press F1 quickly.) If you have set both a user password and an administrator password, you must type the administrator password to access the full Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

Starting the Boot Menu program

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

Complete the following steps to start the Boot Menu program to change the startup sequence of your computer:

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

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

Starting the Intel Gigabit Ethernet Utility program

The Intel Gigabit Ethernet Utility program is part of the BIOS code in your computer. You can use it to configure the network as a startable device, an you can customize

where the network startup option appears in your startup sequence. Enable the Intel Gigabit Ethernet Utility from Configuration/Setup Utility program.

Complete the following steps to enable Intel Gigabit Ethernet Utility program:

1. Turn on the computer and watch the monitor screen.
2. When the message `Press F1 for Configuration/Setup` appears during startup, press the F1.
3. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
4. Select **System Board Ethernet PXE/DHCP** and use the Right Arrow (→) key to set it to **Enabled**.
5. Select **Save Settings** and press Enter.

Starting the SCSISelect utility program (some models)

Complete the following steps to start the SCSISelect utility program:

1. Turn on the computer.
2. When the `<<< Press <CTRL><A> for SCSISelect Utility! >>>` prompt appears, press Ctrl+A. If you have set an administrator password, you are prompted to type the password.
3. Use the arrow keys to make your selection.
4. When the prompt `Would you like to configure the SCSI controller or run the SCSI disk utility?` appears, make your selection and press Enter.
5. Use the arrow keys to make your selection.
6. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

Configuring the Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps network and provides full duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet port in the computer supports auto-negotiation, the controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode. The Ethernet controller supports optional modes, such as teaming, priority packets, load balancing, fault tolerance, and virtual LANs, which provide better performance, security, and throughput. These modes apply to the integrated Ethernet controller and to controllers on supported Ethernet adapters.

You do not need to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. For device drivers and information about configuring your Gigabit Ethernet controller, go to http://www.ibm.com/pc/support/.

Chapter 4. Completing the installation

This chapter provides information to help you register your computer, record important information, and backup your system programs.

Recording important numbers

Record information about your computer in the following table. You will need this information when you register your computer with IBM.

Product name	IBM IntelliStation M Pro
Machine type	
Model number	_____
Serial number	_____
Key serial number	_____
Key manufacturer	_____
Key phone number	_____

Registering your computer

Registering your computer helps IBM provide better service to you. When IBM receives your registration information, the information is placed into a central technical support database. If you need technical assistance, the technical-support representative will have information about your computer. In addition, comments about your computer are reviewed by a team dedicated to customer satisfaction and are taken into consideration in making improvements to IBM computers.

Use one of the following methods to register your computer in Windows:

- From the Windows XP desktop, click **Start → All Programs → IBM Registration** and then follow the instructions. From the Windows 2000 desktop, click **Start → Programs → IBM Registration** and then follow the instructions. If you do not have access to the Internet, you can use the registration program that starts through the IBM Registration folder to print your registration information and provide IBM with a mailing address for future technical assistance.
- Register your computer at http://www.ibm.com/pc/register.

For Red Hat Linux, click the **Register PC** icon on the desktop to register your computer on the World Wide Web.

Creating an emergency recovery-repair diskette in Windows

At your earliest opportunity, create a recovery-repair diskette and an IBM Enhanced Diagnostics diskette, and store them in a safe place. In the unlikely event that your computer becomes unusable, you can use the recovery-repair diskette to access the Product Recovery program. For more information about using this diskette, see the *User's Guide* on the IBM *IntelliStation Documentation* CD.

You can use one of the following methods to create a recovery-repair diskette in Windows:

- Create a diskette from the c:\ibmtools directory
- Create a diskette from the Product Recovery program partition

Complete the following steps to create a recovery-repair diskette from the
c:\ibmtools directory:

1. Start your computer and operating system.
2. Use Windows Explorer to display the directory structure of your hard disk.
3. Open the c:\ibmtools folder.
4. Double-click **rrdisk.bat** and follow the instructions on the screen.

Complete the following steps to create a recovery-repair diskette from the Product
Recovery program partition:

1. Shut down the operating system and turn off the computer.
2. Wait for at least 5 seconds; then, press and hold the F11 key while you restart
   the computer. When a menu appears, release the F11 key.
3. Use one of the following procedures:
   - If a menu is displayed that gives you the opportunity to select an operating
     system, use the arrow keys to select the operating system that is currently
     installed, press Enter, and then continue with the next step.
   - If an operating system menu is not displayed, continue with the next step.
4. From the Product Recovery Main menu, use the arrow keys to select **System
   utilities**, and then press Enter.
5. Use the arrow keys to select **Create a Recovery Repair diskette**, and then
   press Enter.
6. Follow the instructions on the screen.

See "Creating an IBM Enhanced Diagnostics Diskette in Windows" for information
about how to create an IBM Enhanced Diagnostics diskette.

Creating an IBM Enhanced Diagnostics Diskette in Windows

The *IBM Enhanced Diagnostics* diskette is a self-starting diagnostic diskette used to
test hardware components on your computer. Use one of the following methods to
create a startable IBM Enhanced Diagnostics diskette.

Complete the following steps to create a startable IBM Enhanced Diagnostics
diskette from the Product Recovery program on the hard drive partition:

1. Restart your computer and watch the monitor.
2. When the message, `To start the Product Recovery Program`, Press F11
   appears, quickly Press F11.
3. Select **System utilities**.
4. Next, select **Create IBM Enhanced Diagnostics Diskette**.
5. Follow the instructions on the screen.

Complete the following steps to create a startable IBM Enhanced Diagnostics
diskette from the World Wide Web:

1. Go to http://www.ibm.com/pc/support/ on the World Wide Web.
2. Download the diagnostics file for your computer to a hard disk directory (not to
   a diskette).
3. Go to a DOS prompt and change to the directory where the file was
   downloaded.
4. Insert a formatted, blank, high-density diskette into the diskette drive.
5. Type `filename x:`

where *filename* is the name of the file you downloaded from the Web and *x* is the letter for the diskette drive; then, press Enter.

The downloaded file is self-extracting and will be copied to the diskette. When the file is copied, store the diskette in a safe place.

For more information about using the IBM Enhanced Diagnostics program, see the *User's Guide* on the IBM *IntelliStation Documentation* CD.

Chapter 5. Solving problems

This section provides basic troubleshooting information to help you diagnose and solve some problems that might occur with your computer.

If you cannot locate and correct the problem using the information in this section, see Appendix A, "Getting help and technical assistance," on page 61 and "Solving problems" in the *User's Guide* on the IBM *IntelliStation Documentation* CD.

Diagnostic tools overview

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

- **POST beep codes and error messages**

  The power-on self-test (POST) indicates the detection of a problem. See "Power-on self-test (POST)" on page 54 and "POST error messages" on page 54 for information. Additional information is recorded in the system error logs. (For detailed information, see Error Logs under Configuration/Setup Utility menu choices in the *User's Guide*.)

- **Diagnostic programs and error messages**

  The diagnostic programs are provided on a hidden partition on your computer hard disk. These programs test the major components of your computer.

  Note: See "Solving problems" in the *User's Guide* on the IBM *IntelliStation Documentation* CD for information about the diagnostic programs.

- **Troubleshooting chart**

  This chart lists problem symptoms and steps to correct the problems. See the "Troubleshooting charts" on page 55 for information.

- **System-board error LEDs**

  An LED on the system board might also be lit to help isolate an error indicated by the system error LED on the front of the computer. See the "System-board error LEDs" on page 58 for more information.

Power-on self-test (POST)

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

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

If POST detects a problem, more than one beep sounds and an error message appears on your screen.

Notes:

1. If you have a user password set, you must type the password and press Enter, when prompted, before the operating system will start.

2. A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will be resolved the next time you run the test.

POST beep codes

The possible types of beep codes are:

No beeps

If no beep occurs after your computer completes POST, call for service.

Continuous beep

Your microprocessor has failed, or your system board or speaker subsystem might contain a failing component. If the system continues through POST with no errors, call for service. If no video appears, the microprocessor has failed. Call for service.

POST error messages

The following table provides an abbreviated list of the error messages that might appear during POST.

Note: See the *User's Guide* on the IBM *IntelliStation Documentation* CD for more information about the POST error messages.

POST message	Failing device or problem found	Suggested action
162	Change in device configuration	Verify that your optional devices are turned on and installed correctly.
163	Time of day has not been set	Set the correct date and time.
164	Change in memory configuration	Verify that your memory is installed properly; then, restart the computer and run the Configuration/Setup Utility program.
201	Change in memory configuration	Verify that your memory is fully seated and installed properly.
289	Failing DIMM was disabled	Verify that your memory is correct for your computer and that it is installed properly.
301 303	Keyboard and keyboard controller	Ensure that the keyboard cable is connected and nothing is resting on the keyboard keys.

POST message	Failing device or problem found	Suggested action
1162	Serial port configuration error	Start the Configuration/Setup Utility program and ensure that the IRQ and I/O port assignments needed by the serial port are available.
2462	Video adapter and memory	Call for service.

Troubleshooting charts

Notes:

1. See "Solving Problems" in the *User's Guide* on the IBM *IntelliStation Documentation* CD for more detailed troubleshooting charts.

2. If you cannot find the problem in the troubleshooting chart, run the diagnostic programs. If you have run the diagnostic test programs, or if running the tests does not detect the problem, call for service.

CD-ROM drive problems

CD-ROM Drive symptom	Suggested action
CD-ROM drive is not recognized.	Verify that: • The IDE channel to which the CD-ROM drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. • All cables and jumpers are installed correctly. • The correct device driver is installed for the CD-ROM drive. If the problem remains, call for service.
CD is not working properly.	Clean the CD. If the problem remains, call for service.
CD-ROM drive tray is not working. (The computer must be turned on.)	Insert the end of a straightened paper clip into the manual tray-release opening. If the problem remains, call for service.

Diskette drive problems

Diskette drive symptom	Suggested action
Diskette drive activity LED stays on, or the system bypasses the diskette drive.	1. If there is a diskette in the drive, verify that: • The diskette drive is enabled in the Configuration/Setup utility program. • The diskette is good and not damaged. (Try another diskette if you have one.) • The diskette is inserted correctly in the drive. • The diskette contains the necessary files to start the computer. • The software program is working properly. • The cable is installed correctly (in the proper orientation). 2. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). If the problem remains, call for service.

Hard disk drive problems

Hard disk drive symptom	Suggested action
Not all drives are recognized by the hard disk drive diagnostic test (Fixed Disk test).	1. Remove the first drive not recognized and try the hard disk drive diagnostic test again. 2. If the remaining drives are recognized, replace the drive you removed with a new one. If the problem remains, call for service.

Keyboard, mouse, or pointing-device problems

Keyboard, mouse, or pointing-device symptom	Suggested action
All or some keys on the keyboard do not work.	Verify that: • The keyboard cable is securely connected to the system, and the keyboard and mouse cables are not reversed. • Both the computer and the monitor are turned on. • Try using another keyboard. If the problem remains, call for service.
The mouse or pointing device does not work.	Verify that: • The mouse or pointing-device cable is securely connected, and that the keyboard and mouse cables are not reversed. • The mouse device drivers are installed correctly. • Both the computer and the monitor are turned on. • Try using another mouse or pointing device. If the problem remains, call for service.

Memory problems

Memory symptom	Suggested action

The amount of system memory displayed is less than the amount of physical memory installed.	1. Verify that:
	  • The memory modules are seated properly.
	  • You have installed the correct type of memory.
	  • If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program.
	  • All banks of memory on the DIMMs are enabled. The computer might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled.
	2. Check the POST error log for error message 289:
	  • If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.
	  • If the DIMM was disabled by the user or by POST:
	    a. Start the Configuration/Setup Utility program.
	    b. Enable the DIMM.
	    c. Save the configuration and restart the computer.
	
	If the problem remains, call for service.

Microprocessor problems

Microprocessor symptom	Suggested action
The computer emits a continuous tone during POST. (The startup (boot) microprocessor is not working properly.)	Call for service.

Monitor problems

Monitor symptom	Suggested action
The screen is blank.	Verify that: • The computer power cord is plugged into the computer and a working electrical outlet. • The monitor cables are connected properly. • The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. If the problem remains, call for service.
Only the cursor appears.	Call for service.
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	If the monitor self-tests show the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then, move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. **Notes:** 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. If the problem remains, call for service.
Wrong characters appear on the screen.	If the wrong language is displayed, update the BIOS code with the correct language. If the problem remains, call for service.
No video.	1. Make sure the correct machine is selected, if applicable. 2. Make sure all cables are locked down. If the problem remains, call for service.

Power problems

Power symptom	Suggested action
The computer does not turn on.	Verify that: • The power cords are properly connected to the computer. • The electrical outlet functions properly. • The type of memory installed is correct. • If you just installed an option, remove it, and restart the computer. If the computer now turns on, you might have installed more options than the power supply supports. If the problem remains, call for service.

System-board error LEDs

The following illustration shows the location of the LEDs on the system board. You might need to refer to this illustration when solving problems with the computer.

Each error LED is lit to indicate a problem with a specific component. After a problem is corrected, its LED will not be lit the next time the computer is restarted; if the problem remains, the LED will be lit again. See "Solving problems" in the *User's Guide* on the IBM *IntelliStation Documentation* CD for additional information.

DIMM error LEDs
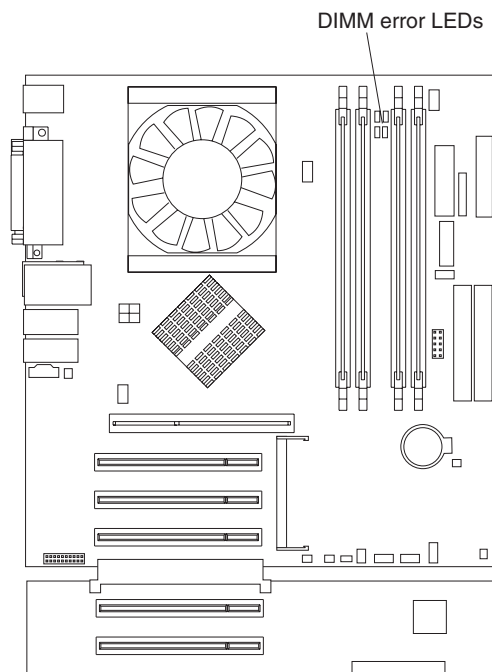
Product Recovery program

The Product Recovery program reinstalls your operating system and preinstalled software. It is on a hidden partition on the hard disk. The Product Recovery program runs independently of the operating system.

If you are using FDISK, Disk Management, or another utility to reformat the hard disk, you might see the partition where the Product Recovery program is stored. Do not delete this partition; otherwise, the Product Recovery program will be lost.

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 preinstalled operating system, application programs and device drivers. See Appendix A, "Getting help and technical assistance," on page 61 for details.

Appendix A. Getting help and technical assistance

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

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *xSeries Documentation* CD or in the IntelliStation *Hardware Maintenance Manual* at the IBM Support Web site.
- Go to the IBM Support Web site at http://www.ibm.com/pc/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/pc/support/ and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is http://www.ibm.com/eserver/xseries/. The address for IBM IntelliStation information is http://www.ibm.com/pc/intellistation/.

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

Software service and support

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

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

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to http://www.ibm.com/planetwide/ for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

Appendix B. IBM Statement of Limited Warranty Z125-4753-07 11/2002

This section contains information about your warranty period and the service and support that are provided by your warranty.

Part 1 - General Terms

Part 1 - General Terms

*This Statement of Limited Warranty includes Part 1 - General Terms, Part 2 - Country-unique Terms, and Part 3 - Warranty Information. 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. 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. **Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract.***

What this Warranty Covers

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications") which are available on request. The warranty period for the Machine starts on the original Date of Installation and is specified in Part 3 - Warranty Information. The date on your invoice or sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise. 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. Unless IBM specifies otherwise, these warranties apply only in the country or region in which you purchased the Machine.

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. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

What this Warranty Does not Cover

This warranty does not cover the following:
- any software programs, whether pre-loaded or shipped with the Machine, or installed subsequently;

- failure resulting from misuse (including but not limited to use of any Machine capacity or capability, other than that authorized by IBM in writing), accident, modification, unsuitable physical or operating environment, or improper maintenance by you;
- failure caused by a product for which IBM is not responsible; and
- any non-IBM products, including those that IBM may procure and provide with or integrate into an IBM Machine at your request.

The warranty is voided by removal or alteration of identification labels on the Machine or its parts.

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, is provided **WITHOUT WARRANTIES OF ANY KIND**.

How to Obtain Warranty Service

If the Machine does not function as warranted during the warranty period, contact IBM or your reseller to obtain warranty service. If you do not register the Machine with IBM, you may be required to present proof of purchase as evidence of your entitlement to warranty service.

What IBM Will Do to Correct Problems

When you call for service, you must follow the problem determination and resolution procedures that IBM specifies. A technician will attempt to make an initial diagnosis of your problem and help you resolve it over the telephone.

The type of warranty service applicable to your Machine is specified in Part 3 - Warranty Information.

You are responsible for downloading and installing designated Machine Code (microcode, basic input/output system code (called "BIOS"), utility programs, device drivers, and diagnostics delivered with an IBM Machine) and other software updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

If your problem can be resolved with a Customer Replaceable Unit ("CRU") (e.g., keyboard, mouse, speaker, memory, hard disk drive and other easily replaceable parts), IBM will ship these parts to you for replacement by you.

If the Machine does not function as warranted during the warranty period and your problem cannot be resolved over the telephone, through your application of Machine Code or software updates, or with a CRU, IBM or your reseller, if approved by IBM to provide warranty service, will either, at its discretion, 1) repair it to make it function as warranted, or 2) replace it with one that is at least functionally equivalent. If IBM is unable to do either, you may return the Machine to your place of purchase and your money will be refunded.

IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

Exchange of a Machine or Part

When the 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.

Your Additional Responsibilities

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 service request procedures that IBM or your reseller provides;
   b. backup or secure all programs, data, and funds contained in the Machine;
   c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit IBM to fulfill its obligations; and
   d. inform IBM or your reseller of changes in the Machine's location.
4. (a) ensure all information about identified or identifiable individuals (Personal Data) is deleted from the Machine (to the extent technically possible), (b) allow IBM, your reseller or an IBM supplier to process on your behalf any remaining Personal Data as IBM or your reseller considers necessary to fulfill its obligations under this Statement of Limited Warranty (which may include shipping the Machine for such processing to other IBM service locations around the world), and (c) ensure that such processing complies with any laws applicable to such Personal Data.

Limitation of Liability

IBM is responsible for loss of, or damage to, your Machine only 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 are responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM for any reason. You should remove all such information from the Machine prior to its return.

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 ("LIC").

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, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, DATA; 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR 4) LOST PROFITS, BUSINESS REVENUE, GOODWILL OR ANTICIPATED SAVINGS. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION 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 Statement of Limited Warranty, without regard to conflict of law principles.

THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR JURISDICTION TO JURISDICTION.

Jurisdiction

All of our rights, duties, and obligations are subject to the courts of the country in which you acquired the Machine.

Part 2 - Country-unique Terms

AMERICAS

ARGENTINA

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

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Ordinary Commercial Court of the city of Buenos Aires.

BRAZIL

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

PERU

Limitation of Liability: *The following is added at the end of this section:*

In accordance with Article 1328 of the Peruvian Civil Code the limitations and exclusions specified in this section will not apply to damages caused by IBM's willful misconduct ("dolo") or gross negligence ("culpa inexcusable").

<u>**NORTH AMERICA**</u>

How to Obtain 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

Limitation of Liability: *The following replaces item 1 of this section:*
1. damages for bodily injury (including death) or physical harm to real property and tangible personal property caused by IBM's negligence; and

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.

<u>**ASIA PACIFIC**</u>

AUSTRALIA

What this Warranty Covers: *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, United States of America.

CAMBODIA, INDONESIA, LAOS, AND VIETNAM

Arbitration: *The following is added under this heading:*
Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Singapore in accordance with the Arbitration Rules of Singapore International Arbitration Center ("SIAC Rules") then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

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 who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the SIAC. 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.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

HONG KONG S.A.R. OF CHINA AND MACAU S.A.R. OF CHINA

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 of China.

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; and
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, the charge paid by you for the individual Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Bangalore, India in accordance with the laws of India then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

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 who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Bar Council of India. 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.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

JAPAN

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

MALAYSIA

Limitation of Liability: *The word "**SPECIAL**" in item 3 of the fifth paragraph is deleted.*

NEW ZEALAND

What this Warranty Covers: *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 "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York, United States of America (except when local law requires otherwise).

PHILIPPINES

Limitation of Liability: *Item 3 in the fifth paragraph is replaced by the following:*

SPECIAL (INCLUDING NOMINAL AND EXEMPLARY DAMAGES), MORAL, INCIDENTAL, OR INDIRECT DAMAGES FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Metro Manila, Philippines in accordance with the laws of the Philippines then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

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 who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Philippine Dispute Resolution Center, Inc. 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.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

SINGAPORE

Limitation of Liability: *The words* "**SPECIAL**" *and* "**ECONOMIC**" *in item 3 in the fifth paragraph are deleted.*

<u>**EUROPE, MIDDLE EAST, AFRICA (EMEA)**</u>

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.

Hot to Obtain Warranty Service: If you purchase a Machine in Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom or Vatican State, 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, provided the Machine has been announced and made available by IBM in the country in which you wish to obtain service. If you purchased a Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kyrgyzstan, 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 a 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 approved service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM approved service provider.

Add the following paragraph in **Western Europe** *(Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom, Vatican State):*

The warranty for Machines acquired in Western Europe shall be valid and applicable in all Western Europe countries provided the Machines have been announced and made available in such countries.

Governing Law:

The phrase "the laws of the country in which you acquired the Machine" is replaced by:

1) "the laws of Austria" **in Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia;** 2) "the laws of France" **in Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna;** 3) "the laws of Finland" **in Estonia, Latvia, and Lithuania;** 4) "the laws of England" **in 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, the United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe;** and 5) "the laws of South Africa" **in South Africa, Namibia, Lesotho and Swaziland.**

Jurisdiction: *The following exceptions are added to this section:*

1) **In Austria** the choice of jurisdiction for all disputes arising out of this Statement of Limited Warranty and relating thereto, including its existence, will be the competent court of law in Vienna, Austria (Inner-City); 2) **in 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, West Bank/Gaza, Yemen, Zambia, and Zimbabwe** all disputes arising out of this Statement of Limited Warranty or related to its execution, including summary proceedings, will be submitted to the exclusive jurisdiction of the English courts; 3) in **Belgium** and **Luxembourg**, all disputes arising out of this Statement of Limited Warranty or related to its interpretation or its execution, the law, and the courts of the capital city, of the country of your registered office and/or commercial site location only are competent; 4) **in France, Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna** all disputes arising out of this Statement of Limited Warranty or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 5) **in Russia**, all disputes arising out of or in relation to the interpretation, the violation, the termination, the nullity of the execution of this Statement of Limited Warranty shall be settled by Arbitration Court of Moscow; 6) **in South Africa, Namibia, Lesotho and Swaziland**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the High Court in Johannesburg; 7) **in Turkey** all disputes arising out of or in connection with this Statement of Limited Warranty

shall be resolved by the Istanbul Central (Sultanahmet) Courts and Execution Directorates of Istanbul, the Republic of Turkey; 8) in each of the following specified countries, any legal claim arising out of this Statement of Limited Warranty will be brought before, and settled exclusively by, the competent court of a) Athens for **Greece**, b) Tel Aviv-Jaffa for **Israel**, c) Milan for **Italy**, d) Lisbon for **Portugal**, and e) Madrid for **Spain**; and 9) **in the United Kingdom**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the English courts.

Arbitration: *The following is added under this heading:*

In Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia all disputes arising out of this Statement of Limited Warranty or related to its violation, termination or nullity will be finally settled under the Rules of Arbitration and Conciliation of the International Arbitral Center of the Federal Economic Chamber in Vienna (Vienna Rules) by three arbitrators appointed in accordance with these rules. The arbitration will be held in Vienna, Austria, and the official language of the proceedings will be English. The decision of the arbitrators will be final and binding upon both parties. Therefore, pursuant to paragraph 598 (2) of the Austrian Code of Civil Procedure, the parties expressly waive the application of paragraph 595 (1) figure 7 of the Code. IBM may, however, institute proceedings in a competent court in the country of installation.

In Estonia, Latvia and Lithuania all disputes arising in connection with this Statement of Limited Warranty will be finally settled in arbitration that will be held in Helsinki, Finland in accordance with the arbitration laws of Finland then in effect. Each party will appoint one arbitrator. The arbitrators will then jointly appoint the chairman. If arbitrators cannot agree on the chairman, then the Central Chamber of Commerce in Helsinki will appoint the chairman.

EUROPEAN UNION (EU)

THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:

Consumers have legal rights under applicable national legislation governing the sale of consumer goods. Such rights are not affected by the warranties provided in this Statement of Limited Warranty.

How to Obtain Warranty Service: *The following is added to this section:*

To obtain warranty service from IBM in EU countries, see the telephone listing in Part 3 - Warranty Information.

You may contact IBM at the following address:
    IBM Warranty & Service Quality Dept.
    PO Box 30
    Spango Valley
    Greenock
    Scotland PA16 0AH

AUSTRIA, DENMARK, FINLAND, GREECE, ITALY, NETHERLANDS, PORTUGAL, SPAIN, SWEDEN AND SWITZERLAND

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:
1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty or due to any other cause related to this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault) or of such cause, for a maximum amount equal to the charges you paid for the Machine. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

    The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

FRANCE AND BELGIUM

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:
1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault), for a maximum amount equal to the charges you paid for the Machine that has caused the damages. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

    The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA

What this Warranty Covers: *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 warranty period for Machines is 12 months from the date of delivery. The limitation period for consumers in action for breach of warranty is the statutory period as a minimum. 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.

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *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 ("LIC").

Applicability of suppliers and resellers (unchanged).

FRANCE

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

GERMANY

What this Warranty Covers: *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 twelve 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.

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *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.

HUNGARY

Limitation of Liability: *The following is added at the end of this section:*

The limitation and exclusion specified herein shall not apply to liability for a breach of contract damaging life, physical well-being, or health that has been caused intentionally, by gross negligence, or by a criminal act.

The parties accept the limitations of liability as valid provisions and state that the Section 314.(2) of the Hungarian Civil Code applies as the acquisition price as well as other advantages arising out of the present Statement of Limited Warranty balance this limitation of liability.

IRELAND

What this Warranty Covers: *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 the terms of this section in its entirety:*

For the purposes of this section, a "Default" means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default occurring on the date of occurrence of the last such Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.
1. IBM will accept unlimited liability for death or personal injury caused by the negligence of IBM.
2. Subject always to the **Items for Which IBM is Not Liable** below, IBM will accept unlimited liability for physical damage to your tangible property resulting from the negligence of IBM.
3. Except as provided in items 1 and 2 above, IBM's entire liability for actual damages for any one Default will not in any event exceed the greater of 1) EUR 125,000, or 2) 125% of the amount you paid for the Machine directly relating to the Default.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM, its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:
1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

SLOVAKIA

Limitation of Liability: *The following is added to the end of the last paragraph:*

The limitations apply to the extent they are not prohibited under §§ 373-386 of the Slovak Commercial Code.

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 the terms of this section in its entirety:*

For the purposes of this section, a "Default" means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.
1. IBM will accept unlimited liability for:
    a. death or personal injury caused by the negligence of IBM; and

b. any breach of its obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982, or any statutory modification or re-enactment of either such Section.

2. IBM will accept unlimited liability, subject always to the **Items for Which IBM is Not Liable** below, for physical damage to your tangible property resulting from the negligence of IBM.

3. IBM's entire liability for actual damages for any one Default will not in any event, except as provided in items 1 and 2 above, exceed the greater of 1) Pounds Sterling 75,000, or 2) 125% of the total purchase price payable or the charges for the Machine directly relating to the Default.

These limits also apply to IBM's suppliers and resellers. They state the maximum for which IBM and such suppliers and resellers are collectively responsible.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM or any of its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:
1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

Part 3 - Warranty Information

This Part 3 provides information regarding the warranty applicable to your Machine, including the warranty period and type of warranty service IBM provides.

Warranty Period

The warranty period may vary by country or region and is specified in the table below.

Note: "Region" means either Hong Kong or Macau Special Administrative Region of China.

Machine - IBM IntelliStation M Pro Types 6220 and6230

Country or Region of Purchase	Warranty Period	Type of Warranty Service*
Worldwide	Parts - 3 years, labor - 3 years	2
* See "Types of Warranty Service" for the legend and explanations of warranty-service types.		

A warranty period of 3 years on parts and 1 year on labor means that IBM provides warranty service without charge for:
1. parts and labor during the first year of the warranty period; and
2. parts only, on an exchange basis, in the second and third years of the warranty period. IBM will charge you for any labor provided in performance of the repair or replacement(s) in the second and third year of the warranty period.

Types of Warranty Service

If required, IBM provides repair or exchange service depending on the type of warranty service specified for your Machine in the above table and as described

below. Warranty service may be provided by your reseller if approved by IBM to perform warranty service. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations, additional charges may apply outside IBM's normal service area, contact your local IBM representative or your reseller for country and location specific information.

1. **Customer Replaceable Unit ("CRU") Service**

    IBM will ship CRU parts to you for your replacement. If IBM instructs you to return the replaced CRU, you are responsible for returning it to IBM in accordance with IBM's instructions. If you do not return the defective CRU, if IBM so instructs, within 30 days of your receipt of the replacement CRU, IBM may charge you for the replacement.

2. **On-site Service**

    IBM or your reseller will either repair or exchange the failing Machine at your location and verify its operation. You must provide suitable working area to allow disassembly and reassembly of the IBM Machine. The area must be clean, well lit and suitable for the purpose. **For some Machines, certain repairs may require sending the Machine to an IBM service center.**

3. **Courier or Depot Service***

    You will disconnect the failing Machine for collection arranged by IBM. IBM will provide you with a shipping container for you to return your Machine to a designated service center. A courier will pick up your Machine and deliver it to the designated service center. Following its repair or exchange, IBM will arrange the return delivery of the Machine to your location. You are responsible for its installation and verification.

4. **Customer Carry-In or Mail-In Service**

    You will deliver or mail as IBM specifies (prepaid unless IBM specifies otherwise) the failing Machine suitably packaged to a location IBM designates. After IBM has repaired or exchanged the Machine, IBM will make it available for your collection or, for Mail-in Service, IBM will return it to you at IBM's expense, unless IBM specifies otherwise. You are responsible for the subsequent installation and verification of the Machine.

* This type of service is called ThinkPad® EasyServ or EasyServ in some countries.

The IBM Machine Warranty World Wide Web site at http://www.ibm.com/servers/support/machine_warranties/ provides a worldwide overview of IBM Limited Warranty for Machines, a Glossary of IBM definitions, Frequently Asked Questions (FAQs) and Support by Product (Machine) with links to Product Support pages. **The IBM Statement of Limited Warranty is also available on this site in 29 languages.**

To obtain warranty service contact IBM or your IBM reseller. In Canada or the United States, call 1-800-IBM-SERV (426-7378). In the EU countries, see the telephone numbers below.

EU Country Telephone List

Phone numbers are subject to change without notice.

Austria -- 43-1-24592-5901	Italy -- 39-02-482-9202
Belgium -- 02-718-4339	Luxembourg -- 352-360385-1
Denmark -- 4520-8200	Netherlands -- 020-514-5770

Finland -- 358-9-4591	Portugal -- 351-21-7915-147
France -- 0238-557-450	Spain -- 34-91-662-4916
Germany -- 07032-15-4920	Sweden -- 46-8-477-4420
Greece -- 30-210-688-1220	United Kingdom -- 01475-555-055
Ireland -- 353-1-815-4000	

Appendix C. Notices

This publication was developed for products and services offered in the U.S.A.

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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 1 000 000 bytes, and GB stands for approximately 1 000 000 000 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.

Product recycling and disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. For country-specific instructions, refer to the following Web site: http://www.ibm.com/ibm/environment/products/prp.shtml.

Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/products/batteryrecycle.shtml or contact your local waste disposal facility.

In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

In the Netherlands, the following applies.

Electronic emission notices

IBM IntelliStation M Pro Types 6220 and 6230

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. 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.

Responsible party:
International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193

Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Industry Canada Class B emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

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 B Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

Japanese Voluntary Control Council for Interference (VCCI) statement

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　取扱説明書に従って正しい取り扱いをして下さい。

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
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guiana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Loas (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Maceo, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya

IBM power cord part number	Used in these countries and regions
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

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xSeries
  Web address   1

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