IBM®

@server

xSeries 130

User's Reference

IBM xSeries 130

User's Reference

IBM

Note

Before using this information and the product it supports, be sure to read the general information in "Appendix A. Product warranties and notices," on page 109 .

Contents

Safety

Before installing this product, read the Safety Information book.

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

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

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

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

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

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

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

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

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

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

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

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

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

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

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Statement 1

Danger

Electrical current from power, telephone, and 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
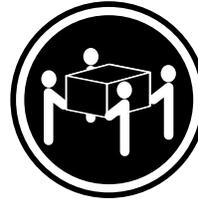
≥18 kg (37 lbs)   ≥32 kg (70.5 lbs)   ≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

Statement 5

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

Chapter 1. Introducing the IBM xSeries 130

Your IBM® @server xSeries 130 appliance server is a one-U-high[1] rack model server Web hosting appliance. This high-performance, symmetric multiprocessing (SMP) server is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and reliable data storage.

Packaged with the IBM xSeries 130 appliance server is a *Quick Setup Guide* and CDs. There is an *IBM xSeries Documentation* CD that provides detailed information about your server, as well as the *xSeries 130 User's Reference*, and the *xSeries 130 Installation Guide*. The *Supplementary* CD contains the enablement diskette information, the *Recovery* CD is for reinstalling the preinstalled software, and the *Multiple Language User Interface* CD. Use the *Multiple Language User Interface* CD to install any language on your system other than English.

If you have access to the World Wide Web, you can obtain up-to-date information about your IBM xSeries 130 model and other IBM server products on the World Wide Web at http://www.ibm.com/eserver/xseries.

For service, assistance, or additional information on IBM Server Start Up Support on the World Wide Web, see "Getting help, service, and support" in the *xSeries 130 User's Reference.*

Your server serial number and model number are located on the ID label located on the right edge of the bezel on the server as shown in the following illustration. You need these numbers when you register your server with IBM.

ID label

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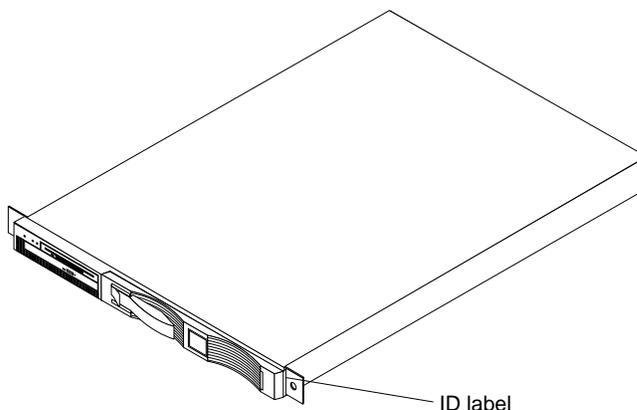
1. Racks are marked in vertical increments of 1.75 inches each. Each increment is referred to as a unit, or a "U". A one-U-high device is 1.75 inches tall.

Features and specifications

The following table provides a summary of the features and specifications for your xSeries 130 server.

Microprocessor:

- Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions
- 256 KB level-2 cache
- Supports up to two microprocessors

Memory:

- Standard: 256 MB (min)
- Maximum: 1 GB
- Type: 133 MHz, ECC, SDRAM, registered DIMMs
- Slots: 4 dual in-line

Drives standard:

- Diskette: 1.44 MB
- CD-ROM: 24X IDE
- One LVD hard disk drive

Expansion bays:

- Two 3.5-inch slim-high bays for LVD SCSI hard disk drives

PCI expansion slots:

- Two 33 MHz, 64-bit

Power supply:

One 200 watt (115-230 V ac)

Video:

- S3 video controller (integrated on system board)
- Compatible with SVGA
- 8 MB SDRAM video memory

Size

- Height 43.69 mm (1.72)
- Depth: 653.29 mm (25.72)
- Width: 439.93 mm (17.32)
- Weight: approximately 12.7 kg (28 lb) when fully configured

Integrated functions:

- One Ultra160 SCSI controller
- Two 10BASE-T/100BASE-TX Intel Ethernet controllers
- Two Universal Serial Bus (USB) ports
- Two RS-485 Advanced System Management processor ports (one in, one out)
- One serial port
- Two console ports (one in, one out)

Acoustical noise emissions:

- Sound power, idling: 6.1 bel maximum
- Sound power, operating: 6.2 bel maximum

Environment:

- Air temperature:
  - Server on: 10° to 35° C (50.0° to 95.0° F). Altitude: 0 to 914 m (2998.7 ft)
  - Server on: 10° to 32° C (50.0° to 89.6º F). Altitude: 914 m (2998.7 ft) to 2133 m (6998.0 ft)
  - Server off: 10° to 43° C (50.0° to 109.4° F). Maximum altitude: 2133 m (6998.0 ft)
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%

Heat output:

Approximate heat output in British thermal units (Btu) per hour

- Minimum configuration: 273 Btu (80 watts)
- Maximum configuration: 751 Btu (220 watts)

Electrical input:

- Sine-wave input (50-60 Hz) required
- Input voltage low range:
  - Minimum: 100 V ac
  - Maximum: 127 V ac
- Input voltage high range:
  - Minimum: 200 V ac
  - Maximum: 240 V ac
- Input kilovolt-amperes (kVA) approximately:
  - Minimum: 0.08 kVA
  - Maximum: 0.22 kVA

Table 1. Features and Specifications.

Notices used in this book

This information product contains notices that relate to a specific topic. The Caution and Danger notices also appear in the multilingual safety information that is provided on the documentation CD that comes with your product. Each safety notice is numbered for easy reference to the corresponding notices in the safety information on the *IBM xSeries Documentation* CD.

The following is a list of the notices and their definitions as used in this book:

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

What your xSeries 130 server appliance offers

The unique design of your server takes advantage of advancements in symmetric multiprocessing (SMP), data storage, and memory management. Your server combines:

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

  Your server supports up to two Pentium III microprocessors. Your server comes with one microprocessor installed. You can install an additional microprocessor to enhance performance and provide SMP capability.

- **Large system memory**

  The memory bus in your server supports up to 1 GB (GB equals approximately 1 000 000 000 bytes) of system memory. The memory controller provides error correcting code (ECC) support for up to four industry standard PC133, 3.3 V, 168-pin, 8-byte, registered, synchronous-dynamic-random access memory (SDRAM) dual in-line memory modules (DIMMs).

- **System-management capabilities**

  See the documentation provided with your systems-management software for more information.

- **Integrated network environment support**

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

Reliability, availability, and serviceability features

Three of the most important features in server design are reliability, availability, and serviceability (RAS). These factors help to ensure the integrity of the data that is stored on your server; that your server is available when you want to use it; and that should a failure occur, you can easily diagnose and repair the failure with minimal inconvenience.

The following is an abbreviated list of the RAS features that your server supports.

- Menu-driven setup, system configuration, and diagnostic programs
- Power-on self-test (POST)
- Predictive Failure Analysis® (PFA)
- Remote system problem-analysis support
- Power and temperature monitoring
- Error codes and messages
- System error logging
- Automatic restart after a power failure
- Parity checking on the PCI buses
- CRC checking on the SCSI buses
- Error checking and correcting (ECC) memory
- Redundant Ethernet capabilities
- Light Path Diagnostics™ panel on the system board
- Vital Product Data (VPD) on the system board, and SCSI backplane
- Customer support center 24 hours per day, 7 days a week[2]

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

Server controls and indicators

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

Front view
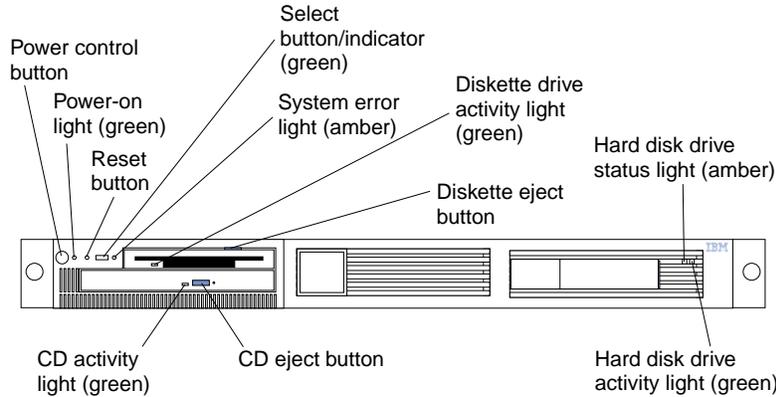
Power-control button: Press this button to manually turn the server on or off.

Power-on light: This green LED light blinks when the server is off, and stays on when you turn on your server.

Reset button: Press this button to reset the server and run the power-on self-test (POST). You might need to use a pen or the end of a straightened paper clip to press the button.

Select button/indicator: The green LED on this button lights when the monitor, keyboard, and mouse are logically connected to this server.

System-error light: This amber LED lights when a system error occurs. An LED on the Light Path Diagnostic panel on the system board will also be on to further isolate the error.

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

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

Hard disk drive status light: Each of the hot-swap drives has a hard disk drive status light. When this amber LED is on continuously, the drive has failed.

Hard disk drive activity light: Each of the hot-swap drives has a hard disk activity light. When this green LED is flashing, the controller is accessing the drive.

CD-eject button: Push this button to release a CD from the drive.

CD-ROM activity light: When this light is on, it indicates that the CD-ROM drive is in use.

Rear view

Ethernet 1 speed indicator (green)
Ethernet 1 link indicator (green)
Select light (green)
Console Out port
USB 2
USB 1
Serial port
Console In port
Ethernet 2 link indicator (green)
Ethernet 2 speed indicator (green)
Power-on light (green)
System error light (amber)
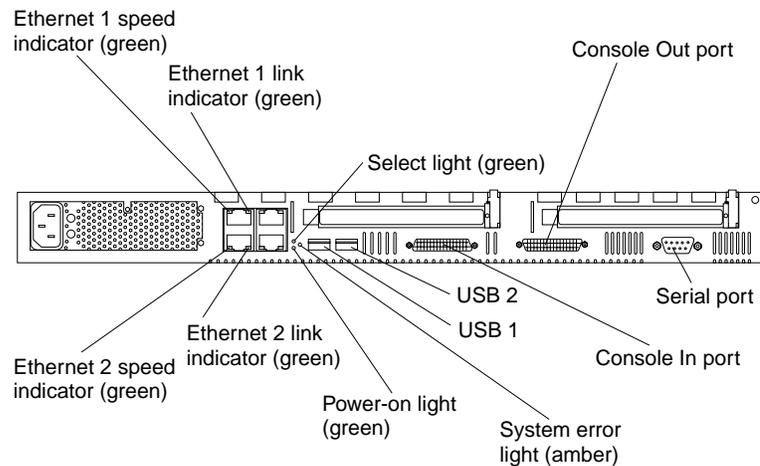
Ethernet 1 speed indicator: This green LED lights when the speed of the Ethernet LAN that is connected to Ethernet port 1 is 100 Mbps.

Ethernet 1 link indicator: This green LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 1.

Select light: This green LED lights when the monitor, keyboard, and mouse are logically connected to this server. This light duplicates the LED in the select button/ indicator on the front of the server.

Console out port: This port is used to connect the server to a keyboard, monitor, and pointing device. It is also used to connect multiple servers together to share a single keyboard, monitor, and pointing device.

Console in port: This port is not supported for configuration of this appliance server.

Serial port: Signal cables for modems or other serial devices connect here to the 9-pin serial port connector.

USB ports 1 and 2: These are not supported on your system configuration.

System-error light: This amber LED lights when a system error occurs. An LED on the Light Path Diagnostic panel on the system board will also be on to further isolate the error. This light duplicates the system-error light on the front of the server.

Power-on light: This green LED lights and stays on when you turn on your server. This light duplicates the power-on light on the front of the server.

Ethernet 2 link indicator: This green LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 2.

Ethernet 2 speed indicator: This green LED lights when the speed of the Ethernet LAN that is connected to Ethernet port 2 is 100 Mbps.

Chapter 2. Arranging your workspace

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

Comfort

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

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

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

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

Glare and lighting

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

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

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

Air circulation

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

Electrical outlets and cable lengths

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

When arranging your workspace:

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

For more information about power cords, refer to the power cord information in this on-line publication.

Chapter 3. Appliance configuration programs

Your xSeries 130 appliance server has a preinstalled operating system and application software. It is ready to add to a rack. Your xSeries 130 comes with programs that you can use to configure, manage, and maintain your appliance server. These programs include:

- **Universal Manageability Services**

  Universal Manageability Services (UM Services) provides point-to-point remote management of client systems through a Web browser window. Use UM Services to:

  — Learn detailed inventory information about your computers, including operating system, memory, network adapters, and hardware.

  — Track your computers proactively with features such as power management, event log, and system monitor capabilities.

- **IBM Advanced Appliance Configuration Utility**

  You can use the IBM Advanced Appliance Configuration Utility to set up and manage the network configuration on your appliance servers. The preinstalled Advanced Appliance Configuration Utility agent works with the Advanced Appliance Configuration Utility console to detect the presence of appliances on the network. When the appliance server is detected by the Advanced Appliance Configuration Utility console, use the Advanced Appliance Configuration Utility to set up and manage the network configuration for the appliance, including assigning the IP address, default gateway, subnet mask, and Domain Name System (DNS) for the appliance to use. You also can use the Advanced Appliance Configuration Utility to start UM Services on the appliance, enabling you to perform more advanced systems-management tasks. This utility enables you to automatically assign static IP addresses from a specified range to newly installed appliances. If you are using DHCP, you can reserve the range and let the IBM Advanced Appliance Configuration Utility assign them. You do not have to manually set the IP addresses for each machine.

- **Microsoft® Windows® Terminal Services Client**

  Because your xSeries 130 appliance server does not have a mouse or keyboard attached to it, you must perform systems-management tasks on the appliance from a remote systems-management console. The Terminal Services Client, when installed on a workstation that is attached to the same network as the appliance server, enables remote administration of the appliance.

- **Netfinity® Web Server Accelerator**

  The Netfinity® Web Server Accelerator (NWSA) is installed but disabled. Icons are provided for enabling or disabling NWSA.

Universal Manageability Services

Universal Manageability Services (UM Services) enhances the local or remote administration, monitoring, and maintenance of IBM systems that is found on each managed computer system. With UM Services, a client-system user or remote systems administrator can use a supported Web browser or the Microsoft Management Console (MMC) and UM Services Web console to support the inventory, monitor, and troubleshoot IBM systems.

You can use this "point-to-point" systems-management approach, in which a system administrator uses a Web browser to connect directly to a remote client system, to enhance support. This enables system administrators to maintain IBM systems without requiring the installation of additional systems-management software on the administrator consoles.

In addition to point-to-point systems-management support, UM Services also includes support for UM Services Upward Integration Modules (UIMs). UIMs enable systems-management professionals who use any supported systems-management platform (including Tivoli Enterprise™, CA Unicenter TNG Framework, and Microsoft Systems Management Server (SMS)) to integrate portions of UM Services into their systems-management console. Because it uses industry-standard information gathering technologies and messaging protocols, including Common Information Model (CIM), Desktop Management Interface (DMI), and simple network management protocol (SNMP), UM Services adds value to any of these supported workgroup or enterprise system-management platforms.

Complete documentation on how to use UM Services is found on the *IBM xSeries 130 Documentation CD.*

System Requirements

The UM Services client is preinstalled on your xSeries appliance server. However, you must have a supported Web browser installed on your systems management console. Supported browsers include:

- Microsoft Internet Explorer 4.01 or later

   Notes:

   1. If you are using Internet Explorer 5.x, you must install the optional Java™ Virtual Machine (VM) support to access a client system running UM Services.

   2. If you are using Internet Explorer and you reinstall Internet Explorer after installing UM Services, you must reapply the Microsoft VM update. The UM Services client requires Microsoft VM Build 3165 or later. Download the latest Microsoft VM from

      http://www.microsoft.com/java

- Netscape Navigator or Netscape Communicator 4.5 or later

   Note: If you install UM Services before you install MMC 1.1 or later, you will not have an icon for Microsoft Management Console in the IBM Universal Manageability Services section of your Start menu.

Starting UM Services

Before you can use UM Services, you must configure the network settings (such as IP address, subnet mask, and so forth) on your appliance server. You can use IBM Advanced Appliance Configuration Utility or Microsoft Windows Terminal Services Client to configure the network setting remotely, or you can attach a keyboard and mouse to your appliance server and configure the network settings using the Windows Control Panel. After you configure the network settings for your appliance, you are ready to use UM Services.

To start UM Services:

1. Start your Web browser; in the **Address** or **Location** field of the browser, type

   http://*ip_address*:1411

   where *ip_address* is the IP address of the appliance server, and then press Enter.

   Or type

```
http://ibm-xxxxxxx:1411
```

where *xxxxxxx* is the IBM serial number of the appliance, and then press Enter. A user login window appears.

Type

```
Administrator
```

in the **Username** field, and type

```
password
```

password in the **Password** field. You can leave the **Domain** field blank. Make sure the **Save this password in your password list** check box is cleared, and then click **OK**.

Note: The first time you connect, you might be prompted to install XML and Swing components. Follow the on-screen instructions to install these components, and then close and restart Internet explorer before you proceed.

The system is connected to the appliance through UM Services. Complete documentation on how to use UM Services is included on the *IBM xSeries 130 Documentation CD*. In addition to the standard UM Services functionality, your xSeries 130 appliance server includes additional functionality, available from the **Appliance** tab in the UM Services console. The default view displays a Windows 2000 Terminal Services Web Connection page when you connect your appliance to the Terminal Services panel. To connect to the appliance to manage it as though you were running Terminal Services Client from your desktop:

a. In the **IP address** field, type the IP address of the server (in the upper left corner of the UM Services pane), or type

```
IBM-{xxxxxxx}
```

(where xxxxxxx is the serial number that appears on the front of the appliance).

b. Select a size, other than full screen, that the appliance desktop will appear in, and then click **Connect** to start Terminal Services Client session on the appliance. A user login window appears.

c. Log in to the appliance. Type

```
Administrator
```

in the **Username** field, type

```
password
```

in the **Password** field, and then click **OK** to log in. After you log in, you can begin using Terminal Services Client to configure and manage your appliance.

Note: To ensure system security, use Windows Powered to change the administrator password from "password" to something else. After you do, or if you create another user in the Administrator group in the future, use your new user name/password combination instead of the default user name/password combination.

IBM Advanced Appliance Configuration Utility

You can use the IBM Advanced Appliance Configuration Utility to set up and manage the network configuration on your xSeries appliance server. The Advanced Appliance Configuration Utility agent, which is preinstalled on your IBM xSeries 130 appliance

server, works with the Advanced Appliance Configuration Utility console. This is a Java-based application that is installed on a network-attached system that you can use as a systems-management console to detect the presence of IBM xSeries appliances on the network. When other IBM xSeries appliances are detected by the Advanced Appliance Configuration Utility console, use the Advanced Appliance Configuration Utility to set up and manage the network configuration of the appliance, including assigning the IP address, default gateway, subnet mask, and DNS server to be used by the appliance. You also can use the Advanced Appliance Configuration Utility to start Universal Manageability Services (UM Services) on the appliance, enabling you to perform more advanced systems-management tasks.

If your network is not currently running Dynamic Host Configuration Protocol (DHCP) servers, the Advanced Appliance Configuration Utility is particularly useful for automatically configuring network settings for newly added appliance servers. In networks that currently have DHCP servers, using the Advanced Appliance Configuration Utility enables the system administrator to reserve and assign the appliance IP address in an orderly, automated fashion. If you decide to use DHCP and do not select to reserve an IP address for the appliance, the Advanced Appliance Configuration Utility can be used to discover appliances and to start UM Services Web-based systems management.

Notes:

1. The Advanced Appliance Configuration Utility configures and reports the TCP/IP settings of the first adapter on each appliance server only. The first adapter is the port 1 Ethernet controller. Be sure to connect the built-in Ethernet connector to the same physical network as your systems-management console.

2. The Advanced Appliance Configuration Utility must be running to configure newly installed appliance servers automatically.

3. The system that is running the Advanced Appliance Configuration Utility console automatically maintains a copy of its database (ServerConfiguration.dat) in the Advanced Appliance Configuration Station installation directory. To remove previous configuration data, close the Advanced Appliance Configuration Utility, delete this file, and then restart the utility. This deletes all previously configured families. However, the Advanced Appliance Configuration Utility will discover connected appliances and their network settings.

The Advanced Appliance Configuration Utility Agent

After your appliance is connected to your network, the Advanced Appliance Configuration Utility agent automatically reports the MAC address for the appliance (of the first NIC only), serial number, type of appliance, and whether DHCP is in use by the appliance. Furthermore, it reports the host name, primary IP address, subnet mask, primary DNS address, and primary gateway address, if these are configured on the system.

The Advanced Appliance Configuration Utility agent is preinstalled on your IBM xSeries appliance.

Note: The Advanced Appliance Configuration Utility agent periodically broadcasts the appliance server IP settings. To prevent the service from broadcasting this data periodically, stop the Advanced Appliance Configuration Utility service.

The Advanced Appliance Configuration Utility console

The Advanced Appliance Configuration Utility console is a Java application that you install on one system in your network that will be used as a systems-management console. For information on how to install the Advanced Appliance Configuration Utility Console, see "Using the Supplementary CD" on page 24.

Note: Do not install the Advanced Appliance Configuration Utility console on more than one systems-management console.

The Advanced Appliance Configuration Utility console enables you to:

* Automatically discover xSeries appliance servers that run the Advanced Appliance Configuration Utility agent and are attached to the same physical LAN segment as the Advanced Appliance Configuration Utility console.

  When you start the Advanced Appliance Configuration Utility console, it automatically detects all appliance servers on your physical LAN segment that are running the Advanced Appliance Configuration Utility agent.

* Use a simple, GUI-based application to configure the network settings of servers.

  Use the Advanced Appliance Configuration Utility to assign IP addresses, DNS and gateway server addresses, subnet masks, host names, and more.

* Automatically group discovered appliances into function-specific families.

  Appliances are added to a Family based on the appliance type. Appliances running different operating systems, but which perform the same function, appear in the same Family.

* Start UM Services Web-based systems-management console.

  Start UM Services on your appliance servers and perform advanced systems-management tasks on a selected appliance server with a single mouse click.

The Advanced Appliance Configuration Utility Console is divided into two panes:

* The Tree View pane

  The Tree View pane, on the left side of the Advanced Appliance Configuration Utility console window, presents a list of all discovered xSeries appliances and includes any families that were previously defined. The Tree View pane also includes groups for appliances that do not fit any of the defined families that were not configured using the Advanced Appliance Configuration Utility, or that have IP addresses that conflict with other devices on your network. When you click on any item in the Tree View, information about that item (and any items that are nested below that item in the tree view) appears in the Information Pane.

* The Information pane

  The Information pane, on the right side of the Advanced Appliance Configuration Utility console, displays information about the item that is currently selected in the Tree View pane. The information that appears in the Information pane varies depending on the item that is selected. For example, if you select the **All Appliance** tab from the Tree View pane, the Information pane displays configuration information (IP settings, host name, serial number, and so on) about all of the xSeries appliances that have been discovered by the Advanced Appliance Configuration Utility console. However, if you select a Family, the Information pane displays information about the Family settings for the selected Family.

The Advanced Appliance Configuration Utility console also has the following menus:

* File

  Use the selections available from the File menu to import or export the Advanced Appliance Configuration Utility console configuration data, to rescan the network, or to exit from the program.

* Family

  Use the selections available from the Family menu to add or delete families, or to move families up or down in the Tree View pane.

* Appliance

Use the selections available from the Appliance menu to remove a previously discovered appliance from a Family or group, and to add an appliance to the first matching Family in the tree view.

- Help

  Use the Help menu to display product information.

Discovering IBM xSeries appliances

Any IBM xSeries appliance server that is running and is connected to the same subnet as the system that is running the Advanced Appliance Configuration Utility console is automatically discovered when you start the Advanced Appliance Configuration Utility console. Discovered appliances appear in the Advanced Appliance Configuration Utility console Tree View pane (the left pane of the Advanced Appliance Configuration Utility console window). Each appliance appears in two locations in the tree view:

- In the tree view under **All Appliances**

- In one of the following portions of the tree view:

- In a Family

  If the discovered appliance fits the requirements of a Family, it will automatically appear as part of a Family.

  Note: If a discovered appliance fits the requirements of more than one Family, it is automatically added to the first appropriate Family that is listed in the tree view, starting from the top of the tree. For information on how to move appliances between families, see "Using families and groups in the tree view".

  - In the Orphaned Appliances group

    If the discovered appliance does not fit a previously configured Family, it is placed in the Orphaned Appliances group.

  - In the Orphaned Externally Configured Appliances group

    Appliances that are running the Advanced Appliance Configuration Utility agent but have a network configuration that was not set by the Advanced Appliance Configuration Utility agent or console appear in the Orphaned Externally Configured Appliances group. If an appliance is contained in the Orphaned Externally Configured Appliances group, you can use the Adopt By First Matching Family function to add it to a previously defined Family. For more information, see "Using the Adopt by First Matching Family function" on page 19.

Using families and groups in the tree view

Families are important elements of the Advanced Appliance Configuration Utility. They specify the parameters that the Advanced Appliance Configuration Utility uses to automatically categorize discovered appliances and to configure them with the appropriate network settings. Family rules are defined solely by appliance type or purpose. Each Family can contain only one type of appliance. The only way to automatically apply predetermined network settings to newly installed and discovered appliance servers is to create and use families.

Appliance servers that match the rules criteria for a Family group can be automatically configured to use predefined network settings. A Family can be configured to allow appliances to use DHCP to configure their IP settings, or can be defined to automatically assign IP settings (such as primary gateway and DNS server addresses, assigning an IP address from a specified IP address range, and specifying a

subnet mask). Host names for discovered appliances can also be defined so that they are allocated using either a prefix or serial number.

The IBM Advanced Appliance Configuration Utility is not the only way to configure network settings. For example, network settings can be configured using Windows Remote Terminal Services or by attaching a keyboard and mouse to the appliance and using the Windows Control Panel on the server. If the appliance network settings have been configured by a method other than using the Advanced Appliance Configuration Utility, the appliance will be discovered by the Advanced Appliance Configuration Utility and it will be added to an appropriate Family, if one exists. Appliances that have been configured using a method other than the Advanced Appliance Configuration Utility and for which no appropriate Family exists will appear in the Orphaned Externally Configured Appliances group.

The Tree View pane contains the following items:

- All Appliances

  Every discovered appliance is listed in the tree view under **All Appliances**.

- Families

  The Families group in the Tree View Panel shows all families that are defined, with appliance servers that are assigned to each Family nested beneath the Family name in the tree view. The appliance purpose is defined by a Family so that all appliances appearing in a Family are of the same type. If you select a Family from the Tree View Pane, a description of the Family and the rules that are used to describe the selected Family display in the Information Pane. If you select an appliance server from a Family in the Tree View Pane, the network settings display in the Information Pane.

  The IBM Advanced Appliance Configuration Utility automatically assigns one IP address per appliance server, using available addresses assigned within the Family rules. When a Family IP address range is exhausted, the IBM Advanced Appliance Configuration Utility searches for other families with rules that match the appliance server being configured. If a matching Family with an available address is found, the server automatically assigns to the Family with an available IP address. This enables you to define multiple families, each of which uses a range of non-contiguous IP address ranges.

  When an appliance is discovered on the network, the IBM Advanced Appliance Configuration Utility searches all previously defined families. Appliances are then added to the first Family that matches the appliance purpose. Therefore, the order in which families appears is important. To adjust the search order, right click on a Family to adjust its position within a Family list.

- Orphaned Appliances

  Any discovered appliance servers that have been configured using the Advanced Appliance Configuration Utility but that do not meet the rules for any existing Family are automatically added to the Orphaned Appliances group.

- Orphaned Externally Configured Appliances

  Any discovered appliance server that has been configured without using the Advanced Appliance Configuration Utility tool and that does not meet the rules for any existing Family is automatically added to the Orphaned Externally Configured Appliances group. Appliance servers that are configured without the Advanced Appliance Configuration Utility that meet the rules for any existing Family are automatically added to the matching Family. To add an Orphaned Externally configured Appliance to an appropriate Family that was created after the orphaned appliance was discovered, right-click the orphaned appliance and click **Adopt by First Matching Family**. For more information, see "Using the Adopt by First Matching Family function" on page 19.

Note: The Advanced Appliance Configuration Utility will not change manually configured network settings of discovered appliance servers. If the manually configured IP and Subnet addresses fit an existing Family, the Advanced Appliance Configuration Utility will place that appliance server into that Family, but will not change any other settings (such as host name or DNS or gateway addresses).

• Conflicting Network Addresses

Any discovered appliance server that has the same IP address as a previously discovered appliance server will be listed in the Conflicting Network Addresses group.

Creating a Family:

1. Click Create Family from the Family menu.

   The Advanced Appliance Configuration Utility Family Setup window appears.

2. Select the Appliance Family Rules.

   The Appliance Family Rules determine what purpose an appliance must serve to be included in the Family. You can select one of the following values:

   • IBM xSeries 150

   • IBM xSeries 130 and 135

3. Specify a Family name.

   In the **Family Name** field, type the name to use for the Family.

4. Specify network resources to be used by members of the Family.

   You can use the Advanced Appliance Configuration Utility to assign network resources for members of the Family, you can use a DHCP server to assign network resources.

   • To use the Advanced Appliance Configuration Utility to assign network resources, clear the **Use DHCP** check box and complete the following fields:

     Min IP Address
     The lowest IP address in a range of IP addresses that can be assigned to an appliance that is a member of the Family

     Max IP Address
     The highest IP address in a range of IP addresses that can be assigned to an appliance that is a member of the Family

     Subnet Mask
     The subnet mask value that will be used by appliances that are members of the Family

     Default Gateway
     The IP address of the default gateway that will be used by appliances that are members of the Family (optional)

     DNS   The IP address of the Domain Name System server that will be used by appliances that are members of this Family (optional)

   • To use a DHCP server to assign network resources, select the **Use DHCP** check box. This will enable a DHCP server on your network to assign an IP address and subnet mask and to specify the default gateway address and address of the Domain Name Server that will be used by appliances that are members of the Family.

5. Select a host name allocation type.

   The host name allocation type enables you to automatically select a specific host name that members of this Family will use. If a new hostname is assigned either manually or when the appliance joins the Family that automatically assigns a host

name, you need to restart the appliance to reset it. You can select one of the following host name allocation types:

No Allocation
> No preconfigured host name format will be assigned to appliances that are members of this Family.

Use Serial Number
> The serial number of the discovered appliance will be used as a host name for the appliance.

Use Prefix Name
> A user-specified prefix, along with an incremental number for each appliance, will be used for the host name of each appliance that is a member of this Family. Type the desired prefix in the **Host Name Prefix** field.

6. Click **OK** to save this Family.

Removing appliances from families: Use the Remove Appliance option to delete an appliance from the Advanced Appliance Configuration Utility console database. Removing an appliance that is no longer in use enables the IP address that was assigned to the appliance to be allocated to another appliance. You can also remove an appliance from a Family and then rescan the network to add it to an appropriate Family that appears higher in the Tree View pane.

To remove an appliance, right-click the appliance, and then click **Remove Appliance** from the pop-up menu.

- If the Advanced Appliance Configuration Utility is unable to communicate with the selected appliance (because, for example, it has been removed from the network or has failed) the appliance is removed immediately.

- If the Advanced Appliance Configuration Utility is able to communicate with the selected appliance, you will be asked to confirm removal of the appliance before the appliance-removal task is completed. This helps prevent accidental removal of an active and functional appliance.

Using the Adopt by First Matching Family function: Use the Adopt by First Matching Family function to:

- Add an Orphaned Externally Configured Appliance to an appropriate Family.

  Appliances that are configured without using the Advanced Appliance Configuration Utility and that do not meet the rules for any existing Family are automatically added to the Orphaned Externally Configured Appliances group. If, after the orphaned appliance is discovered, you create a Family that is appropriate for the orphaned appliance, right-click the orphaned appliance and click **Adopt by First Matching Family** to move the appliance from the Orphaned Externally Configured Appliances group to the newly created Family.

- Move an appliance from one Family to another appropriate Family that occurs higher in the list of previously defined families. If there is more than one appropriate Family for a newly discovered appliance, it automatically appears in the first appropriate Family in the list of families. If you want to move a discovered appliance from one appropriate Family to another appropriate Family:

  1. Right-click the Family that you want the appliance moved to.

  2. **Move Up in List** to move the selected Family up in the list of families.

  3. Repeat steps 1 and 2 until the Family that you want to add the appliance to appears above the Family that currently contains the appliance.

  4. Right-click the appliance that you want to move to another Family, and then click **Adopt by First Matching Family**.

Starting UM Services

You can use the Advanced Appliance Configuration Utility to quickly and easily start UM Services on your xSeries 130 appliance server.

Note: The selected appliance server must be running Universal Manageability (UM) Services as a UM Services client. Also, the systems-management console (the system that is running the Advanced Appliance Configuration Utility console) must use a Web browser that is supported for use with UM Services. If you have never used UM Services from this system previously, you will need to install several plug-ins before proceeding. If you are using an unsupported browser, or if your browser does not have the necessary plug-ins, you will be notified when you attempt to start UM Services on the appliance. For more information on UM Services, see the following Web site:

http://www.ibm.com/pc/ww/software/applications/ums/library.html

To use the Advanced Appliance Configuration Utility console to start UM Services on an appliance:

1. Click the appliance in the Advanced Appliance Configuration Utility console Tree View pane.

   When you select the appliance from the tree view, information about the selected appliance appears in the Information pane.

2. Click **Start Web-Based Management**.

   Your default Web browser starts, starting the UM Services console automatically.

3. Log in to the UM Services console.

For more information on using UM Services to manage your appliances, see the *Universal Manageability Services User's Guide*, which is included on your *IBM xSeries 130 Documentation CD*.

Windows Remote Terminal Services Client

To install the Windows Remote Terminal Services Client on the remote workstation and manage your xSeries appliance server:

1. Insert the *Supplementary CD* into the workstation CD-ROM drive.

2. Click **Start**-> **Run**.

3. In the **Open** field, type (with quotation marks)

   `"x:\Terminal Services Client\Disk 1\setup.exe"`

   where *x* is the drive letter that is assigned to the CD-ROM drive. Then click **OK** to begin the Terminal Services Client Setup program.

4. Accept the defaults in each window that opens, or see the Microsoft Windows documentation for more instructions. When Terminal Services Client Setup program completes, proceed to the next step.

5. Check the workstation network TCP/IP protocol configuration settings.

   The IP address that is used by the workstation must be obtained automatically. If the network interface card for the workstation is configured to obtain an IP address automatically, you can proceed to the next step. However, if the network interface card for the workstation is configured to use a static IP address, you must set the IP address and subnet mask properties as follows:

   a. Set the IP address in the subnet mask.

If the network interface card for the workstation is configured to use a static IP address, you must configure it to obtain an IP address automatically.

Notes:

a. You might be prompted to restart the workstation after you have changed the configuration.

b. Do not be concerned if you do not have a DHCP server on your network. This configuration automatically assigns a random IP address to the workstation that is on the same subnet as the xSeries appliance servers that are attached to the LAN. The IP address according to the Microsoft subnet is 169.254.X.X. The system randomly generates the remaining two digits.

6. Connect your remote management system to the xSeries 130 Appliance using the Terminal Services Client.

7. In the Terminal Services Client window, type

   `IBM-`*xxxxxxx*

   where *xxxxxxx* is the serial number which is located in the lower-right corner of the bezel, and then click **Connect**.

8. Log in to the xSeries 130 appliance server.

   Use the following case-sensitive user name and password to log into terminal services

   User ID
   > `administrator`

   Password
   > `password`

   When you log in to Terminal Services Client, you can view the Web Hosting Appliance graphical user interface (GUI) that is used to administer the appliance. However, when you first log in to Terminal Services, the Setup and Configuration Web page opens. This page provides links to documentation that is related to various xSeries software products.

• To complete the client installation, add to the appliance any Web content or applications that are required by your site.

• Refer to the Web page or the IBM xSeries 130 Documentation CD, or the following Web site for assistance in using preinstalled software:

   http:\\www.ibm.com\pc\netfinity

   After the Web page opens, click **Solutions**.

Chapter 4. Using the Recovery and Supplementary CDs

This chapter describes the applications that are included on the IBM *xSeries 130 Supplementary* CD and the *Recovery* CD, and how and when you should use them.

Note: The IBM xSeries 130 appliance server comes with preinstalled software. Changing the preinstalled software configuration in any way, including applying or installing unauthorized service packs or updates to preinstalled software, or installing additional software products that are not included in either the preinstalled software or on the *Supplementary* CD is not supported and could cause unpredictable results. To correct problems with a preinstalled software component, you must back up your user and system data; then, use the *Recovery* CD to restore the preinstalled software image. You can obtain IBM preinstalled authorized updates for the preinstalled appliance from:

http://www.ibm.com/eserver/xseries.

Using the Recovery Enablement Diskette and Recovery CD

The *Recovery* CD contains the preinstalled software for your IBM xSeries 130 and is used to recover the manufacturing preinstalled software on your server. You must start your server using the *Recovery Enablement* diskette which is created from the *Supplementary* CD, before you can use the *Recovery* CD.

Important

The *Recovery Enablement* diskette (RED) enables the xSeries 130 to start from the CD-ROM drive. You will not be able to restore the preinstalled software from the *Recovery* CD without first restarting the server using the *Recovery Enablement* diskette.

To recover the preinstalled software on your server:

1. Insert the *Supplementary* CD into the CD-ROM drive of a machine other than your IBM xSeries 130.

2. Insert a new diskette into the diskette drive and run the DiskCreator.exe file from the *Supplementary* CD to the diskette. This creates the *Recovery Enablement* diskette.

3. Follow the instructions on your screen to create a new enablement diskette.

4. Remove the *Recovery Enablement* diskette from the diskette drive.

5. Place the *Recovery CD* in the CD-ROM drive of the appliance, and the enablement diskette in the diskette drive, and restart the server.

Note: The *Recovery Enablement* diskette is a one-use-only diskette. To use the Recovery CD again, you need to run the DiskCreator.exe file from the *Supplementary* CD.

The recovery process begins automatically and the original manufacturing preinstalled software is restored. After the preinstalled software is restored, the system restarts automatically, and all final operating-system configuration changes are performed.

Important

After the server restarts, a series of configuration and system-preparation programs that finish configuring the Network Operating System are run automatically. These programs must finish running before you use any included applications (such as the IBM Advanced Appliance Configuration Utility or the Terminal Services Client) to connect to or configure your IBM xSeries 130. Do not connect to or configure the IBM xSeries 130 for at least 15 minutes after system restart. This notice applies only to the first time the IBM xSeries 130 is started after the *Recovery* CD is used.

Using the Supplementary CD

The *Supplementary* CD contains documentation and copies of key software applications that are preinstalled on your IBM xSeries 130. The following table lists the names of the directories on the *Supplementary* CD and a description of the contents of each directory.

Directory name	Contents
IBM Advanced Appliance Configuration	IBM Advanced Appliance Configuration console and agent installation files. The IBM Advanced Appliance Configuration agent is preinstalled as a Windows Powered service on the xSeries 130. To install the Advanced Appliance Configuration console, run setup.exe from the *x*:\IBM Advanced Appliance Configuration directory, where *x* is the drive letter assigned to your CD-ROM drive. You need to run this file before you install an appliance.
Recovery Enablement	DiskCreator.exe creates a recovery enablement disk for use when recovering the appliance. To make a diskette, run the executable file and insert a 1.44 MB diskette into drive A when prompted.
I386	Windows Powered installation files. If you add device drivers, or operating system features, you might be prompted to insert your Windows Powered CD. If so, insert the *Supplementary* CD, and specify path *x*:\i386 where *x* is the drive letter assigned to your CD-ROM drive.
Terminal Services Client	The stand-alone Windows Terminal Services Client application. The appliance supports Web-based terminal services, so this is an optional installation. To install the Terminal Services Client, run setup.exe from the Disk1 subdirectory.
Netfinity Web Server Accelerator (NWSA)	Netfinity Web Server Accelerator is installed and configured as part of the manufacturing preinstalled software. However, you can reinstall NWSA from this directory. Do not reinstall NWSA unless directed to do so by support personnel.
Netfinity Director Agent	Netfinity Director Agent is installed and configured as part of the manufacturing preinstalled software. If you reinstall the software incorrectly, parts of the appliance might stop functioning. Do not reinstall the Netfinity Director Agent unless directed to do so by support personnel.
Documentation	There is additional documentation for supporting the appliance server that is not found on the Documentation CD.

Using the Multiple Language User Interface (MUI) CD

You can change the language of the Windows Powered operating system using the *Multiple Language User Interface CD* that is included with the xSeries 130 Appliance Server. This CD changes the base operating-system language to any one of the following languages:

- Chinese (Simplified)
- Chinese (Traditional)
- Dutch
- French
- German
- Italian
- Japanese
- Korean
- Spanish
- Swedish

Note: The *Multiple Language User Interface CD* is provided by Microsoft, and changes the language of the base operating system only. Preinstalled applications and documentation remain in English. Languages such as Japanese or Chinese might prompt you to insert the Windows 2000 Advanced Server CD. If you are prompted to do this, insert the *Supplementary CD* instead. You may be prompted to restart, if so, select **Yes**.

To use the *Multiple Language User Interface* CD:

1. Insert the MUI CD into the CD-ROM drive of the appliance

2. Start a terminal services session, log in to the appliance, and run setup.exe from the CD.

3. When the Multi-Language User Interface Install window appears, click **Install MUI**. This begins the installation process.

   You can use the MUI CD only on IBM appliances; therefore a machine mode/type check is performed before the installation begins.

4. After the machine type verifies, an information window appears. Read the notices and, then click **OK**. The MUI CD unencrypts and decompresses the contents of the CD-ROM to drive C. This takes a few minutes. The MultiLanguage File Installation window appears.

5. Select the language that you want to install in the xSeries 130 appliance server. At the bottom of the window change the default language to correspond with the language you select.

6. Click **OK**. After a few seconds, an Installation Complete message appears. Click **OK**.

7. A MUISETUP window appears stating that changes do not occur until you log off and log back on. Click **OK**. When you are prompted to delete the MUI files for the xSeries 130 appliance server, click **Yes**.

Using the Documentation CD

The *Documentation* CD contains the *IBM xSeries 130 User's Reference*, *IBM xSeries 130 Installation Guide, Safety Information* and a duplicate copy of the *Quick Start Guide*. The *User's Reference* contains detailed information pertaining to the operation of your server.

Chapter 5. Installing Options

This chapter provides instructions to help you add options to your server. Some option-removal instructions are provided, in case you need to remove one option to install another. For a list of supported options for your server, see the ServerProven™ list at http://www.ibm.com/pc/compat.

Major components of the IBM xSeries 130 appliance server

The following illustration shows the locations of major components in your server.
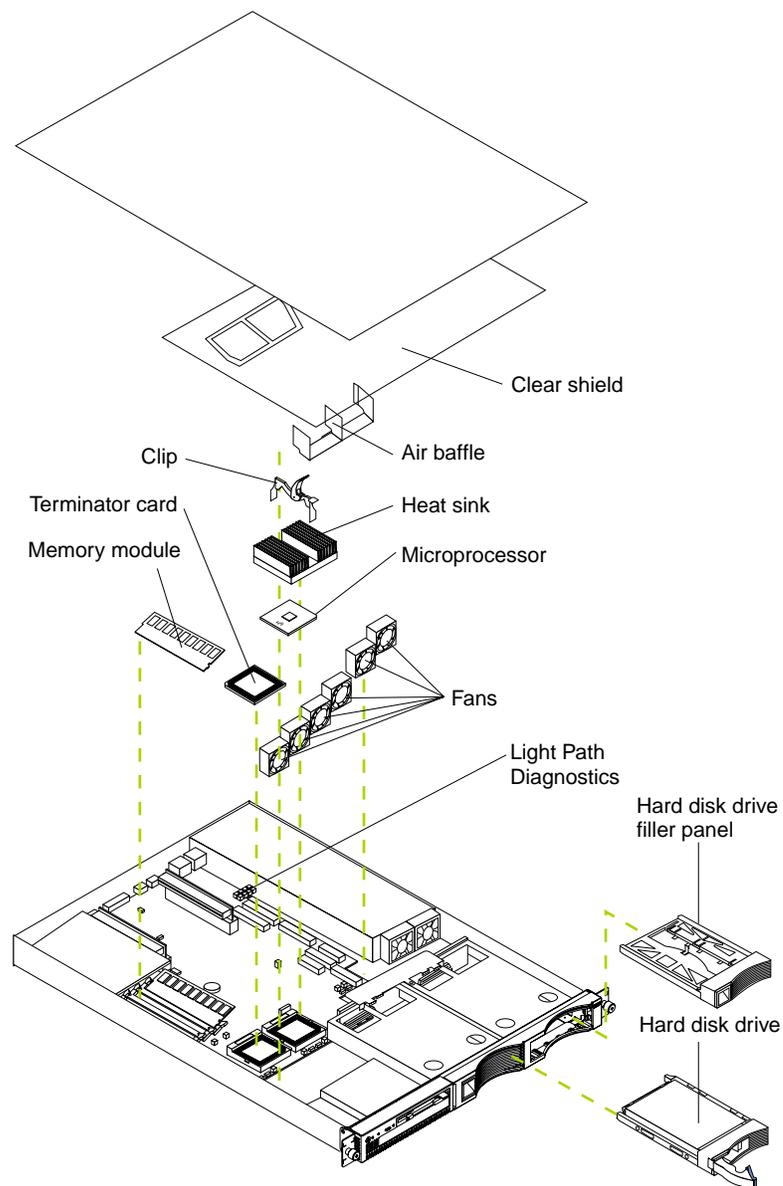
Clear shield

Clip

Air baffle

Terminator card

Heat sink

Memory module

Microprocessor

Fans

Light Path Diagnostics

Hard disk drive filler panel

Hard disk drive

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

System board

The illustrations in the following sections show the components on the system board.

System board options connectors

The following illustration identifies the connectors on the system board.
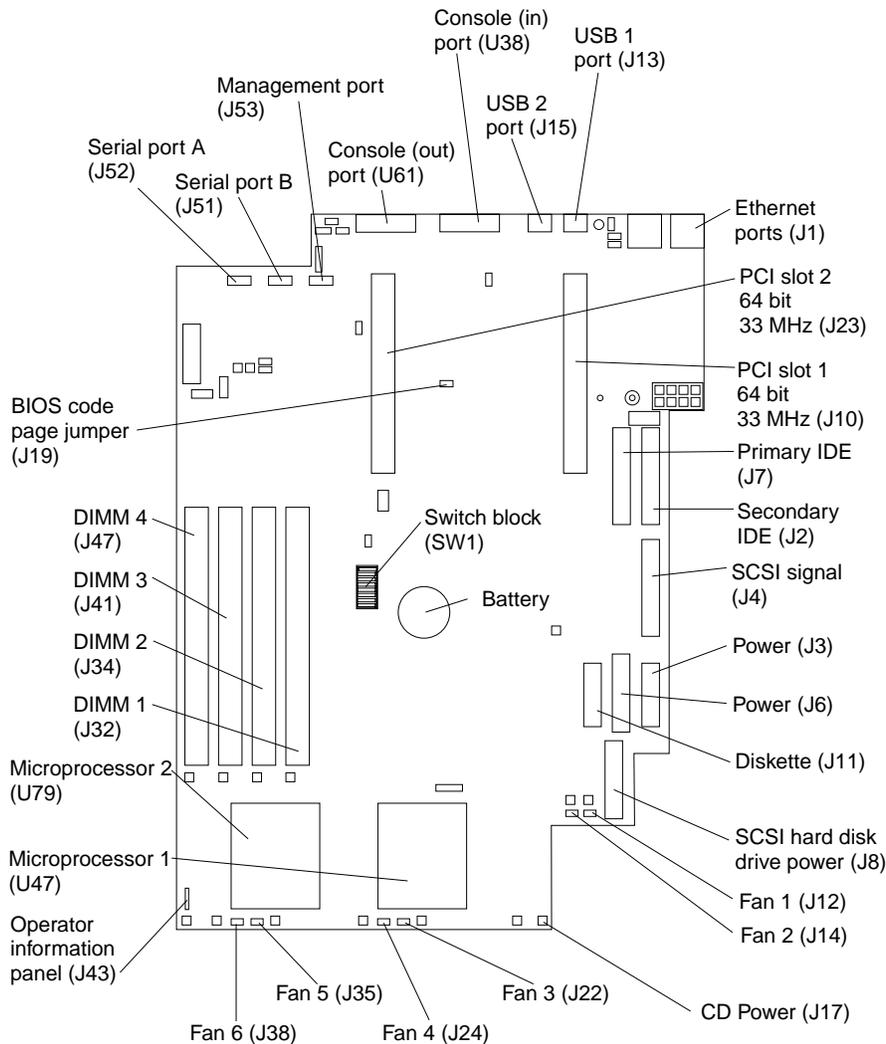
System board jumper blocks

Any jumper blocks on the system board that are not shown in the illustration are reserved. For typical operation of the system, no jumpers should be installed on any of the jumper blocks. See "Recovering BIOS" on page 82 for information about the Flash ROM page-swap jumper.

System board switch block

The switch block contains microswitches 1–8. As pictured in this illustration, switch 1 is at the top of the switch block, and switch 8 is at the bottom.

The following table describes the function for each switch.

Table 2. Switches 1-8.

Switch number	Switch description
1	Reserved.
2	Reserved.
3	Reserved.
4	Reserved.
5	Reserved. The default setting is Off (disabled).
6	Reserved. The default setting is Off.
7	Reserved. The default setting is Off.
8	Bypass power-on password. When toggled to the opposite position, bypasses the power-on password, if one is set.

System board LEDs

The following illustration identifies the LEDs on the system board.

Power-on indicator (CR47)

Light Path Diagnostics circuit verification LED

Light Path Diagnostics panel

Light Path Diagnostics button

DIMM 1 failure (CR 38)

DIMM 2 failure (CR 39)

DIMM 3 failure (CR 46)

DIMM 4 failure (CR 54)

Fan 1 failure (CR15)

Fan 2 failure (CR17)

Fan 6 failure (CR48)

Fan 4 failure (CR33)

Microprocessor 1 failure (CR26)

Microprocessor 2 failure (CR53)

Fan 5 failure (CR40)

Fan 3 failure (CR31)

Before you begin

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

- Become familiar with the safety and handling guidelines specified under "Handling static-sensitive devices" on page 32, and read the safety statements in "Safety information," beginning on page 33. These guidelines will help you work safely while working with your server or options.

- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options that you intend to install.

- Back up all important data before you make changes to disk drives.

- Have a small, flat-blade screwdriver available.

- Before you install an optional device in your appliance server, verify that IBM supports that device on your model. You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/us/compat.

System reliability considerations

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

- Each of the drive bays has either a drive or a filler panel installed.

- The cover is in place during operation, or is removed for no longer than 30 minutes while the server is operating.

- There is space around the server to allow the server cooling system to work properly. Leave approximately 127 mm (5 in.) of space around the front and rear of the server.

- A failed fan is replaced within 48 hours.

Working inside a server with power on

Your server is designed to operate safely while turned on with the cover removed. Follow these guidelines when you work inside a server that is turned on:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while working inside the server.

- Do not allow your necktie or scarf to hang inside the server.

- Remove jewelry, such as bracelets, rings, necklaces, and loose-fitting wrist watches.

- Remove items from your shirt pocket (such as pens or pencils) that could fall into the server as you lean over it.

- Take care to avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.

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 bags until you are ready to install them.

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

- Limit your movement. Movement can cause static electricity to build up around you.

- Handle the device carefully, holding it by its edges or its frame.

- Do not touch solder joints, pins, or exposed printed circuitry.

- Do not leave the device where others can handle and possibly damage the device.

- While the device is still in its static-protective bag, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body).

- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective bag. (If your device is an adapter, place it component side up). Do not place the device on your system unit cover or on a metal table.

- Take additional care when handling devices during cold weather because heating reduces indoor humidity and increases static electricity.

Safety information

Before installing this product, read the Safety Information book.

مج، يجب قراءة دات السلامة

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

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

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

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

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

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

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

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

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

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

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

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

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

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Statement 1

DANGER

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

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.

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

Statement 4
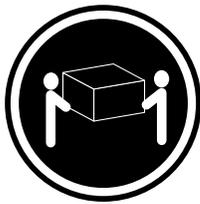
≥18 kg (37 lbs)   ≥32 kg (70.5 lbs)   ≥55 kg (121.2 lbs)
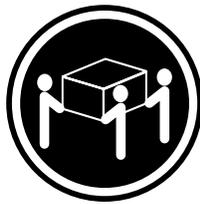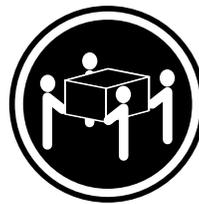
CAUTION:

Use safe practices when lifting.

Statement 5

CAUTION:

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

Statement 8

CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.
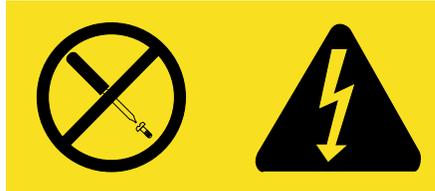
Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Removing the cover

The following information describes how to remove the cover.

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.
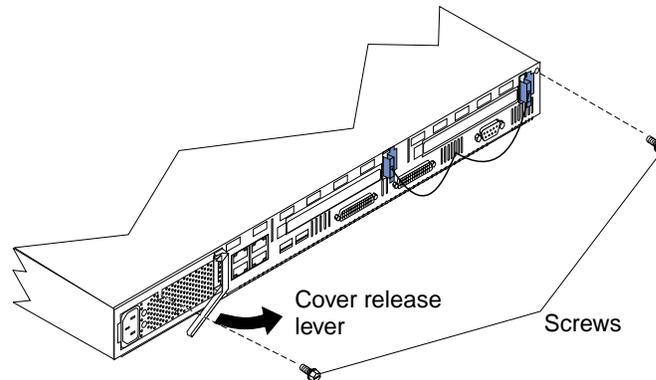
Complete the following steps to remove the server cover:

1. Review the information in "Safety information" on page 33 and "Working inside a server with power on" on page 31.

2. Turn off the server and all attached devices, and disconnect all external cables and power cords.

3. Remove the server from the rack.

4. Remove the two screws from the rear of the server.

5. Pull out on the cover- release lever at the back of the server, to release the cover.

6. Slide the cover back, then up and off the server.

   Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the cover removed might damage server components.

7. Remove the clear shield that covers the inside of the server.

   Note: It is not necessary to remove the shield when you are installing memory modules or installing an adapter in a PCI slot.

Adapter considerations

Before you install adapters, review the following:

- 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 settings or jumper settings on your adapter, follow the instructions that come with the adapter.

- You can install 32-bit or 64-bit full-length or half-length adapters in the expansion slots. Full-length adapters are installed in slot 1; half-length adapters are installed in either slot 1 or 2.

- Your server supports 5.0 V and universal PCI adapters; it does not support 3.3 V only adapters.

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

- PCI slots 1 and 2 and the integrated SCSI controller are on PCI bus B; the system board and all other integrated devices are on PCI bus A.

  Note: PCI bus A = bus 0; PCI bus B = bus 1.

- The system scans PCI slots 1 and 2 to assign system resources. By default the system starts (boots) devices in the following order: System SCSI devices, then PCI devices.

  Note: To change the boot precedence, start the Configuration/Setup Utility, select **Start Options** from the main menu; then, select the **PCI SCSI adapter boot option**.

Installing an adapter

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

Complete the following steps to install an adapter:

Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static-sensitive devices" on page 32.

1. Review the information in "Safety information" on page 33.
2. Turn off the server and peripheral devices.

3. Remove all external cables from the server; then, remove the server from the rack and remove the cover as shown. For more information, see "Removing the cover" on page 39 for instructions.
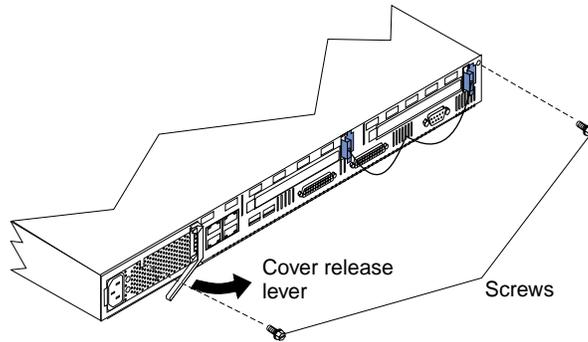
4. Remove the expansion slot clip that holds the expansion slot cover in place by sliding it upward and off the frame of the server.

   Note: The illustrations in this document might differ slightly from your hardware.
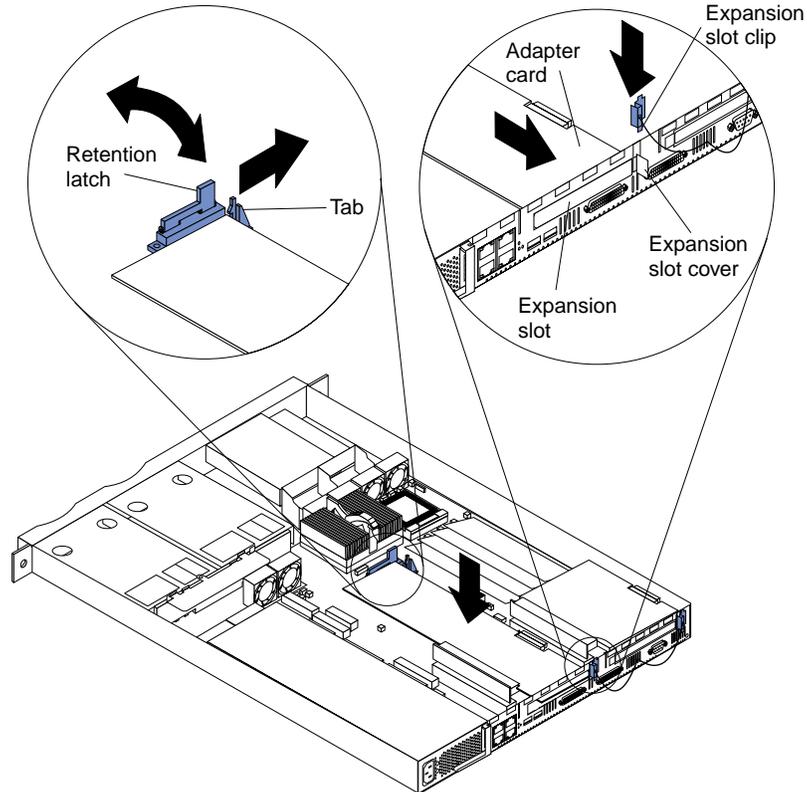
5. Remove the expansion-slot cover.
6. Refer to the documentation that comes with your adapter for any cabling instructions.

   Attention: You should route adapter cables before you install the adapter.

7. Set any jumpers or switches as described by the adapter manufacturer.

8. Install the adapter:

    Note: When installing an adapter into slot 2, skip steps a and d.

    a. Open the adapter retention latch by pushing the blue tab to release it. Then push the latch up to the full open position.

    b. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the PCI riser-card.

    c. Press the adapter *firmly* into the riser-card connector.

        Attention: When you install an adapter, be sure the adapter is correctly seated in the riser-card connector before you turn on the server. Improperly seated adapters might cause damage to the system board, the riser-card, or the adapter.

    d. Push down on the blue adapter retention latch until it clicks into place, securing the adapter.

    e. Replace the expansion slot clip by sliding it down until it latches into place and holds the adapter securely.

9. Connect the internal cables to the adapter.

    Attention: Route cables so that they do not block the flow of air from the fans.

10. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information see "Installing an adapter" on page 40 for instructions.

11. Turn on the server.

Hard disk drives

Your server supports two, 26-mm (1 in.) slim 3.5-inch low voltage differential (LVD) hard disk drives.

Each hard disk drive tray has a status light and an activity light on the upper-right corner of the tray (see "Major components of the IBM xSeries 130 appliance server" on page 27 for the location of the status and activity indicators). These lights are used to show when there is drive activity or, in some cases, when there is a problem with your hard disk drive.

- The drive must be a low voltage differential (LVD) drive and have a single connector attached (SCA) connector.
- The hard disk drive bays connect to a SCSI *backplane*. This backplane is the printed circuit board behind the bay that is connected to J4 on the system board.
- The backplane controls the SCSI IDs for the hard disk drives.

Preinstallation steps

Before you install a hard disk drive, review the following:

- Inspect the drive tray for any signs of damage.
- Ensure that the drive is installed properly in the tray.
- To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed in each bay.
- Review the information in "Safety information" on page 33 and "Handling static-sensitive devices" on page 32.
- Check the instructions that come with the drive for more information about installing your drive.

Installing or replacing a hard disk drive

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

Refer to the following illustration to install a hard disk drive.

Note: The illustrations in this document might differ slightly from your hardware.
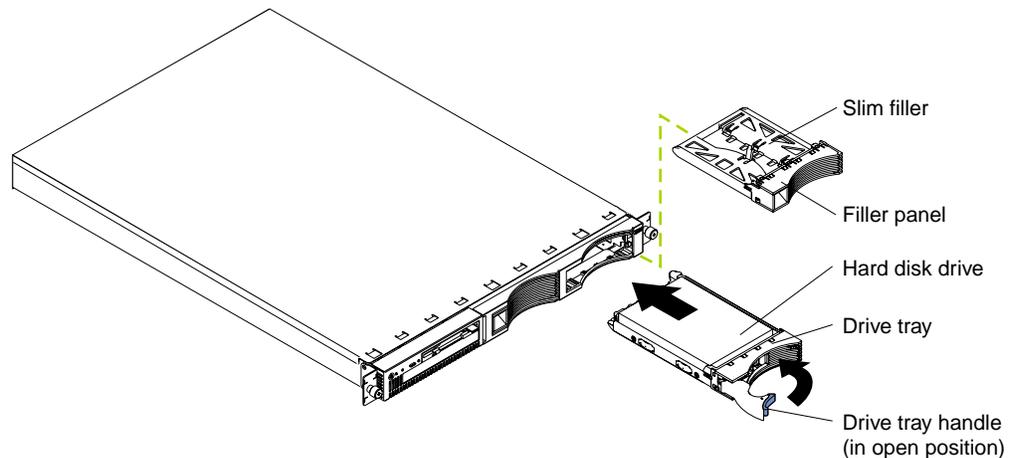
Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static-sensitive devices" on page 32.

Complete the following steps to install or replace a hard disk drive:

1. Review the information in "Safety information" on page 33.

2. If you are installing a non-hot-swap disk drive, turn off the server and all attached devices.

3. Remove the filler panel or defective hard drive from one of the hard disk drive bays.

4. Install the new hard disk drive in the drive bay:

    a. Ensure that the tray handle is open (that is, perpendicular to the drive).

    b. Align the rails on the drive assembly with the guide rails in the drive bay.

    c. Gently push the drive assembly into the bay until the drive connects to the backplane.

    d. Push the tray handle toward the closed position until it locks the drive in place.

5. If you are installing a non-hot-swap disk drive, connect the external cables and power cords; then, turn on the server.

6. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. (See "Major components of the IBM xSeries 130 appliance server" on page 27 for the location of the status indicators.)

    • If the amber light is on continuously, the drive has failed.

    • If the green light flashes slowly (one flash per second), the drive is being rebuilt.

- If the green light flashes rapidly (three flashes per second), the controller is identifying the drive.

Memory

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

Adding memory to your server is an easy way to improve system performance. You can increase the amount of memory in your server by installing options called *memory-module kits.* Each kit contains one industry-standard, dual in-line memory module (DIMM). Your server uses a noninterleaved memory configuration, which enables you to add, remove, or replace one DIMM at a time. In an interleaved system you would have to add, remove, or replace memory in sets.

Your server comes with a dual in-line memory module (DIMM) installed in a DIMM connector on the system board.

Note: Install additional DIMMs in the following order: DIMM connector 2, then 3, then 4. (See the following illustration for memory connector locations).

Connector 1
Connector 2
Connector 3
Connector 4
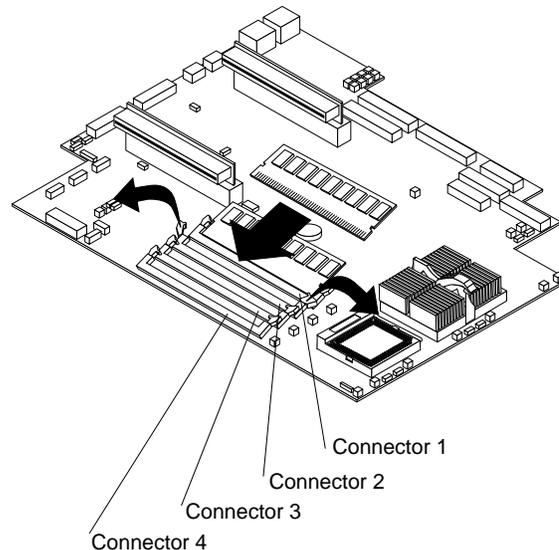
Installing memory modules

Complete the following steps to install a DIMM:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static-sensitive devices" on page 32.

1. Review the information in "Safety information" on page 33.

2. Turn off the server and peripheral devices.

3. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information see "Removing the cover" on page 39 for instructions.

4. If necessary, remove the PCI card in slot 2 for easier access to the DIMM connectors.

5. Touch the static-protective bag containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

6. Install the DIMM in the connector.

   Attention: To prevent damage to the DIMM connectors, do not force the memory module into the connector.

   a. Turn the DIMM so that the index slots align correctly with the connector.

      Note: The DIMM has two index slots, one in the center and the other on the left half of the DIMM connector edge.

   b. Insert the DIMM into the connector by pressing on both corners of the DIMM at the same time. Be sure to press straight into the connector.

   c. When installing a memory module, be sure that no gap exists between the DIMM and the retaining clips. If a gap does exist between the memory module and the retaining clips, remove the DIMM; then, reinsert the DIMM properly.

Connector 1
Connector 2
Connector 3
Connector 4
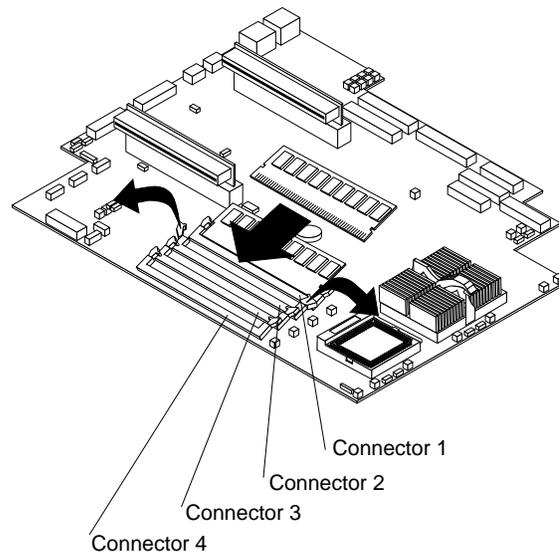
   Note: If you have other options to install, install them now.

7. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information, see "Installing the cover" on page 52 for instructions.

8. Turn on the server.

   Note: When you restart the server, the BIOS setup window appears with a "memory size changed" message. You need to connect a monitor, keyboard, and mouse, and confirm the change. Then, the machine starts to the operating system. This occurs the first time you start the machine after adding RAM.

   • If you installed additional memory, start the Configuration/Setup Utility program and select **Save Settings**.

   • If you just replaced a failed DIMM, you need to restart the Configuration/Setup Utility program, select **Advanced Setup**, select

Memory Settings, highlight the connector or bank of connectors that you want to enable, and then select **Enable**.

- In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank display screen. If this occurs and the Boot Fail Count feature in the Start/Options of the Configuration/Setup Utility is set to **Enabled** (its default setting), you must restart the server three times to force the BIOS to reset the memory connector or bank of connectors from **Disabled** to **Enabled**.

Microprocessor

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

Your server comes with one or two microprocessors installed on the system board. If you have two, or had one and you installed a second microprocessor, your server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load between the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.

Notes:

1. Before you install a new microprocessor, review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS). The latest level of BIOS for your server is available through the World Wide Web. See "Getting help, service, and information" on page 100 the appropriate World Wide Web addresses.

2. Obtain an SMP-capable operating system (optional). For a list of supported operating systems, see http://www.ibm.com/pc/us/compat/ on the World Wide Web.

   If your server comes with one microprocessor, it is installed in microprocessor connector 1, which is the microprocessor connector closer to the DIMM connectors. This is the startup (boot) microprocessor. If you install a second microprocessor in microprocessor connector 2, the two processors will share the system load after the system starts.

Attention: To avoid damage and ensure proper server operation, install microprocessors that are the same type, have the same cache size, and have the same clock speed. Microprocessor internal clock frequencies and external clock frequencies must be identical. See the ServerProven list at http://www.ibm.com/pc/compat for a list of microprocessors for use with your server.

Note: If you need to replace an existing microprocessor, call for service.

Installing the microprocessor

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

Complete the following steps to install an additional microprocessor:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to"Handling static-sensitive devices" on page 32.

1. Review the information in "Safety information" on page 33.

2. Turn off the server and peripheral devices.

3. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information see "Removing the cover" on page 39 for instructions.

4. Remove the clear shield from the server and store it in a safe place.

5. Lift up the microprocessor release lever and remove the terminator card from the microprocessor connector. (After you remove the new microprocessor from the static-protective bag, place the terminator card in the bag and store it in a safe place. If you ever remove the microprocessor and do not replace it you will need to reinstall the terminator card).
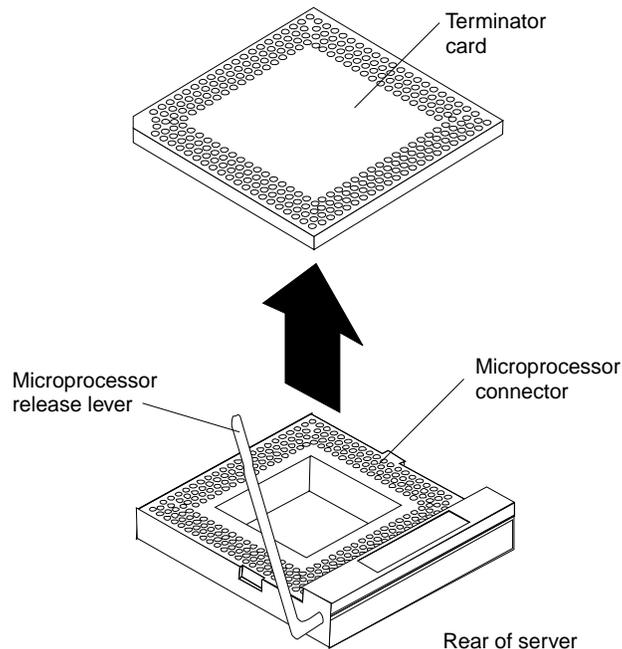
6. Install the microprocessor:

   a. Touch the static-protective bag containing the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.

   b. Orient the microprocessor over the microprocessor connector as shown in the following illustration. Carefully press the microprocessor into the connector.

Attention:

To avoid bending the pins on the microprocessor, do not use excessive force when pressing it into the connector.
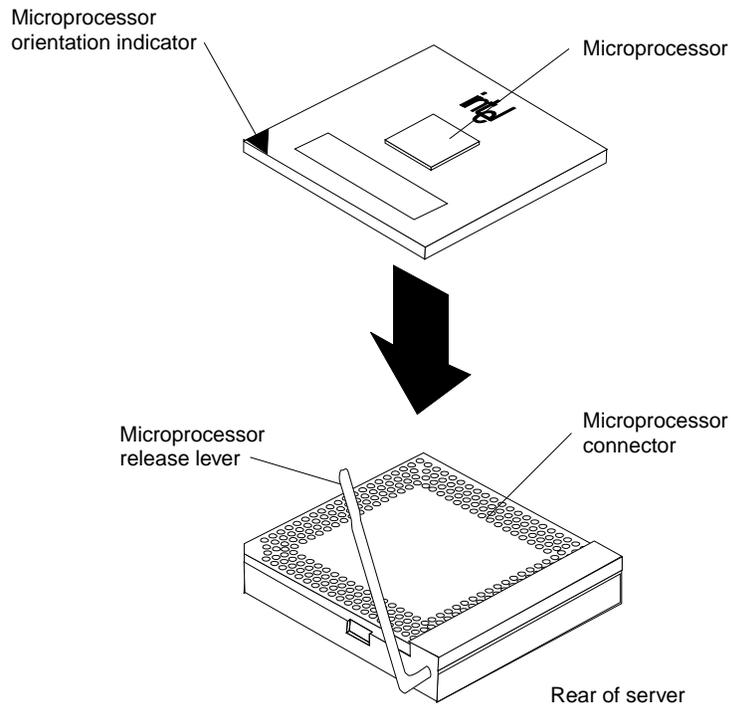
7. Push the microprocessor release lever down to lock the microprocessor in place.

8. Install the heat sink on the microprocessor:

   a. Peel the plastic protective strip off the bottom of the heat sink. Make sure that the square of thermal material is still on the bottom of the heat sink.

   b. Align and place the heat sink on top of the microprocessor.

      Note: Locate the slot in the channel of the heat sink. Orient the heat-sink so that the slot will be at the rear of the server.

   c. Align and place the clip over the heat sink; then, snap the clip into place over the heat sink with the heat-sink release lever in the up position.

      Note: If you remove the microprocessor later, remember to install the terminator card in the appropriate microprocessor connector.

   d. Press the heat-sink release lever down into the locked position, when the clip is in place.

Top view of heat sink

Slot

Terminator card

Heat sink release lever

Clip

Heat sink
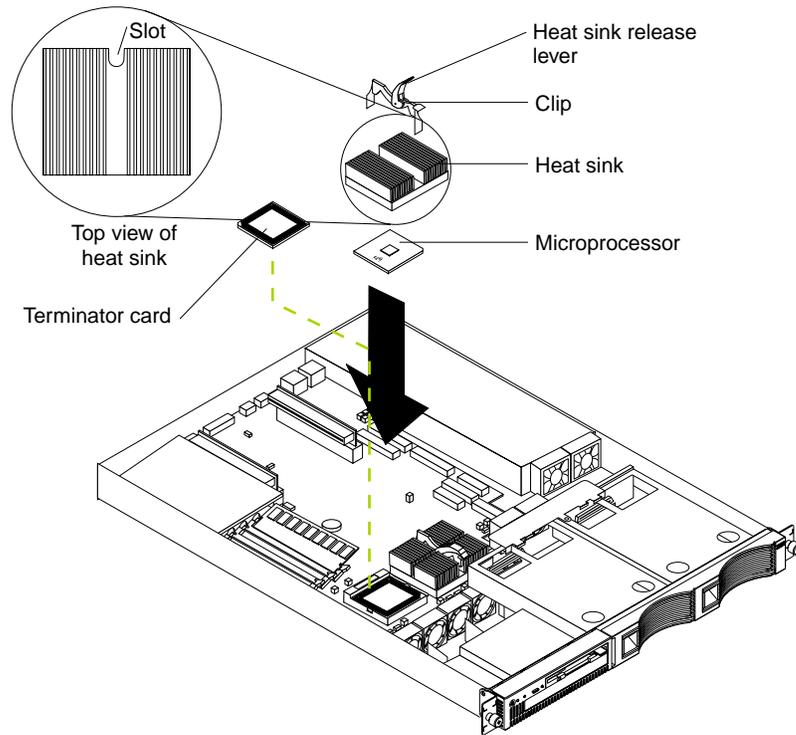
Microprocessor

9. Replace the clear shield.

   Note: If you need to replace an existing microprocessor, call for service.

10. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information, see "Installing the cover" on page 52 for instructions.

11. Start the server and run the Configuration/Setup Utility program.

Fan assembly replacement

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

Attention: Replace a fan that has failed within 48 hours to help ensure proper cooling.

The following illustration shows the replacement of a fan.

Note: The illustrations in this document might differ slightly from your hardware.
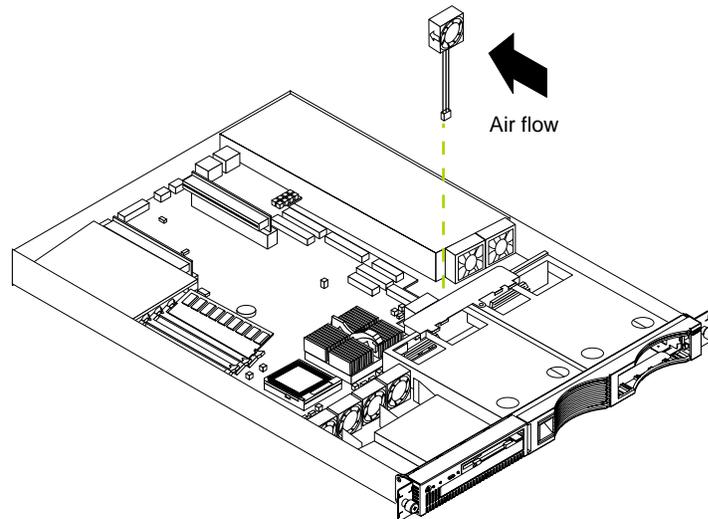
Complete the following steps to replace the fan assembly:

1. Review the information in "Safety information" on page 33.

2. Turn off the server and peripheral devices.

3. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information, see "Removing the cover" on page 39 for instructions.

4. Determine which fan to replace by checking the LED at each fan; a lit LED indicates the fan to replace.

   Note: The fan LEDs are illuminated by the Light Path Diagnostics circuit and will remain lit for up to 12 hours after the power is removed from the server.

5. Remove the fan from the server:

   a. Disconnect the fan cable from the system board.

   b. Lift the fan away from the server.

6. Orient the fan so that the airflow arrow on the side of the fan is facing or pointing toward the rear of the server.

   Note: Proper airflow is from the front to the rear of the server.

7. Push the replacement fan assembly into the server until it clicks into place.

8. Connect the fan cable to the system board.

9. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information, see "Installing the cover" for instructions.

10. Start up the system, the system error light will either remain on or turn off. If the system error light remains on, you will have to turn off the server to perform further troubleshooting.

Installing the cover

The following information describes the cover installation procedure.
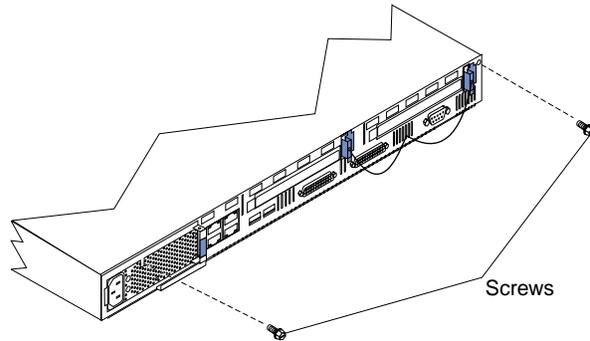
Complete the following to install the server cover:

1. Clear any cables that might impede the replacement of the clear shield or the cover.

2. Install the clear shield, if it was removed.

3. Install the cover by placing it into position and sliding it forward. Make sure that the cover engages the tabs at the front and rear of the server.

   Important:
   Before sliding the cover forward, make sure that all of the tabs on the cover will engage the ledge at the front of the server properly. If all the tabs do not engage the ledge properly, it is extremely difficult to remove the cover later

4. Install the screws and secure the cover.

5. Reinstall the server in the rack.

6. Reconnect the power cord and all external cables to the server, then plug the power cords into electrical outlets.

I/O connector locations and ports

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

The following illustration shows the input/output connectors (ports) and the expansion slots on the rear of the server. For pin assignments and other details about these connectors, see "Input/output ports".

Ethernet 1

PCI slot 1

PCI slot 2

Ethernet 2

USB 2

USB 1

Console Out port

Console In port

Serial port
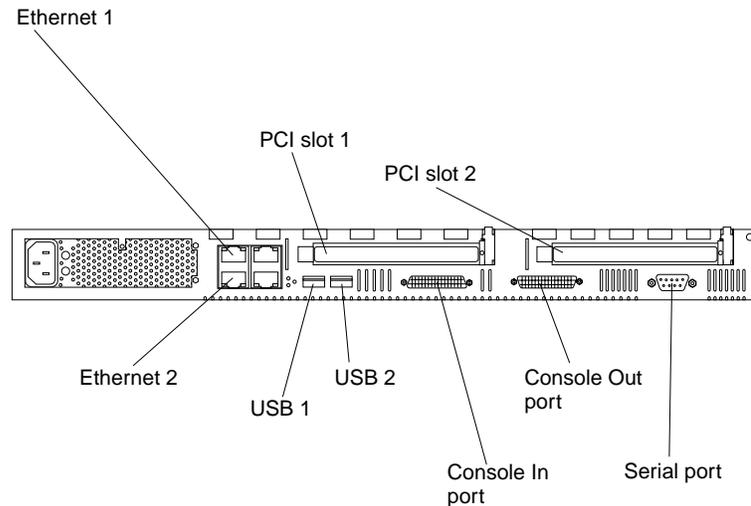
Input/output ports

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

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

- Serial port
- Universal Serial Bus (USB) ports
- Console ports
- Ethernet ports

Serial port

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

Your server has one standard serial port. Some application programs require specific ports, and some modems function properly only at certain communication port addresses. You might need to use the Configuration/Setup Utility program to change communication port address assignments to prevent or resolve address conflicts. This serial port is also manually configurable from inside the server. The following table lists the function of each of the connectors that can be used to manually configure the serial port. You will also need to refer to the figure in "System board options connectors" on page 28.

Table 3. Serial port connectors on the system board.

| Connectors	Port	Description
J52	Serial port A/systems management port	Default connection. Used by operating systems and Advanced Systems Management Processor. The modem can be connected so that the system can dial out during problems.
J51	Serial port B	Used by operating systems only.

Viewing or changing the serial-port assignments: Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

To view or change the serial-port assignments:

1. Restart the server and watch the monitor screen.

2. When the message `Press F1 for Configuration/Setup` appears, press F1.

3. From the main menu, select **Devices and I/O Ports**; then, press Enter.

   Note: The **Devices and I/O Ports** choice appears only on the full configuration menu. If you set two levels of passwords, you must type the administrator password to access the full configuration menu.

4. Select the serial port; then, use the arrow keys to advance through the available settings.

5. Select **Save Settings**; then, select **Exit Setup** to exit from the Configuration/Setup Utility main menu.

Universal Serial Bus ports

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

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

Notes:

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

2. If you install a USB keyboard that has a mouse port, the USB keyboard emulates a mouse, and you will not be able to disable the mouse settings in the Configuration/Setup Utility program.

USB cables and hubs: You need a 4-pin cable to connect devices to USB 1 or USB 2. If you plan to attach more than two USB devices, you must use a hub to connect the devices. The hub provides multiple connectors for attaching additional external USB devices.

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

USB-port connectors: Each USB port has an external connector on the rear of the server for attaching USB compatible devices.

The following table shows the pin-number assignments for the USB-port connectors on the rear of your server.

C2T device breakout cable

Important: Before you install an optional device in your appliance server, verify that IBM supports that device on your model.

You can view the list of supported devices for your model at the following Web site: http://www.ibm.com/pc/compat.

A keyboard, monitor, and mouse or pointing device are connected to your server through the C2T device breakout cable. The keyboard and mouse cables have icons of a keyboard and a mouse on their respective cable connectors for easy identification.
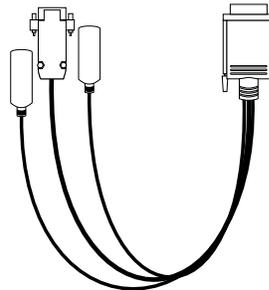
Keyboard connector

There is one keyboard connector on the end of the C2T device breakout cable. This connector is identified by the keyboard icon.

Video connector

The video connector on the end of the C2T device breakout cable. This cable is easily identified by the dark blue 15-pin connector.

Auxiliary-device (pointing device) connector

On the end of the C2T device breakout cable, there is one auxiliary-device connector that supports a mouse or other pointing device. This connector is identified by the mouse icon.

Working with cables

Use the cable ties and hook-and-loop straps that are supplied with your server to secure the cables.

Attention

Do not secure cables too tightly. Overtightening can cause internal damage to cables.

Chapter 6. Solving Problems

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

If you cannot locate and correct the problem using the information in this section, refer to "Getting help, service, and information" on page 100 for more information.

Diagnostic tools overview

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

- **POST beep codes, error messages, and error logs**

  The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See "POST" on page 59 for more information.

- **Diagnostic programs and error messages**

  The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of your server. See "Diagnostic programs and error messages" on page 72 for more information.

- **Light Path Diagnostics**

  The Light Path Diagnostics feature is for identifying system errors.

- **Troubleshooting charts**

  These charts list problem symptoms, along with suggested steps to correct the problems. See the "Troubleshooting charts" on page 88 for more information.

- **Customized support page**

  You can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, parts information, technical hints and tips, and downloadable files. In addition, you can choose to receive electronic mail (e-mail) notifications whenever new information becomes available about your registered products.

  After you register and create a profile for your xSeries products, you can diagnose problems using the IBM Online Assistant and you can participate in the IBM discussion forum. For more detailed information about registering and creating a customized profile for your IBM products, visit the following addresses on the Web:

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

Server Support

Server working properly? — **Yes** → **Register and profile your server**

After you register and profile, you will be able to:
- Diagnose problems using the IBM Online Assistant
- Participate in the IBM discussion forum
- Receive e-mail notifications of technical updates related to your profiled products

Register at: **http://www.ibm.com/pc/register**
Profile at: **http://www.ibm.com/pc/support**

No ↓

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

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

Problem solved? — **Yes** →

No ↓

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

Problem solved? — **Yes** →

No ↓

You can check the hints and tips web site at:

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

→ Problem solved? — **Yes** ↑ — **No** → Phone an IBM HelpCenter

You can view a list of IBM HelpCenter phone numbers at:
http://www.ibm.com/pc/support

POST

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

If POST finishes without detecting any problems, a single beep sounds, and the first screen 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. See "POST beep code descriptions" and "POST error messages" on page 63 for more information.

Notes:

1. If you have a power-on password set, you must type the password and press Enter, when prompted, before POST will continue.

2. A single problem might cause several error messages. When this occurs, 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 not occur the next time you run the test.

POST beep code descriptions

Beep codes are sounded in a series of long and short beeps.

The possible types of beep codes that your server might emit include the following:

No beeps
> If no beep occurs after your server completes POST, call for service.

Continuous beep
> Your startup (boot) 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 startup processor has failed; replace the startup processor.

One short beep
> One beep indicates that your server successfully completed POST. POST detected no configuration or functional errors. One beep also occurs after your server completes POST if you type an incorrect power-on password.

Two short beeps
> POST encountered an error. The Configuration/Setup Utility program will display additional information; follow the instructions that appear on the screen. See "POST error messages" on page 63 for descriptions of the text messages that might appear.

Three short beeps
> A system memory error has occurred. This combination occurs only if the video basic input/output system (BIOS) cannot display the error message. Replace the failing memory module.

Repeating short beeps
> The system board might contain a failing component, your keyboard might be defective, or a key on the keyboard might be stuck. Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, call for service. Ensure that:
>
> •   Nothing is resting on the keyboard and pressing the key.
>
> •   No key is struck.

- The keyboard cable is connected correctly to the keyboard and to the correct connector on the serve.

Note: If you just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds; then, turn on the server. If the error message goes away, replace the device.

Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, call for service.

One long and one short beep
POST encountered an error on a video adapter. If you are using the integrated video controller, call for service. If you are using an optional video adapter, replace the failing video adapter.

One long and two short beeps
A video I/O adapter ROM is not readable, or the video subsystem is defective. If you hear this beep combination twice, both the system board and an optional video adapter have failed the test. This beep combination might also indicate that the system board contains a failing component.

One long and three short beeps
The system-board video subsystem has not detected a monitor connection to the server. Ensure that the monitor is connected to the server. If the problem persists, replace the monitor.

Two long and two short beeps
POST does not support the optional video adapter. This beep combination occurs when you install a video adapter that is incompatible with your server. Replace the optional video adapter with one that the server supports, or use the integrated video controller.

POST beep codes

A 1-2-3 beep code is one beep, a pause, two consecutive beeps, another pause, and then three more consecutive beeps.

Beep code	Description	Action
1-1-2	Microprocessor register test has failed.	Call for service.
1-1-3	CMOS write/read test has failed.	
1-1-4	BIOS ROM checksum has failed.	
1-2-1	Programmable Interval Timer test has failed.	
1-2-2	DMA initialization has failed.	
1-2-3	DMA page register write/read test has failed.	
1-4-3	Interrupt vector loading test has failed.	
2-1-1	Secondary DMA register test has failed.	
2-1-2	Primary DMA register test has failed.	
2-1-3	Primary interrupt mask register test has failed.	
2-1-4	Secondary interrupt mask register test has failed.	
2-2-1	Interrupt vector loading has failed.	
2-2-2	Keyboard controller test has failed.	
2-2-3	CMOS power failure and checksum checks have failed.	
2-2-4	CMOS configuration information validation has failed.	
2-3-2	Screen memory test has failed.	
2-3-3	Screen retrace tests have failed.	
2-3-4	Search for video ROM has failed.	
2-4-1	Screen test indicates the screen is operable.	
3-1-1	Timer tick interrupt test has failed.	
3-1-2	Interval timer channel 2 test has failed.	
3-1-3	RAM test has failed above address hex 0FFFF.	
3-1-4	Time-of-Day clock test has failed.	
3-2-1	Serial port test has failed.	
3-2-2	Parallel port test has failed.	
3-2-4	Comparison of CMOS memory size against actual has failed.	
3-3-2	I2C bus has failed.	
2-3-1	Screen initialization has failed.	Turn off the server and then restart the server. If the problem persists, call for service.

Table 4. POST beep codes.

1-2-4	RAM refresh verification has failed.	Reset the memory modules or install a memory module. If the problem persists, call for service.
1-3-1	First 64 KB RAM test has failed.	
1-3-2	First 64 KB RAM parity test has failed.	
3-3-1	A memory size mismatch has occurred.	
3-3-3	**Attention:** In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the **Start Options** of the Configuration/Setup Utility is set to **Enabled** (its default setting), you must restart the server three times to force the system BIOS to reset the memory connector or bank of connectors from **Disabled** to **Enabled**.	

Table 4. POST beep codes.

POST error messages

The following tables provide information about the POST error messages that can appear during startup.

POST message	Description
062	The server failed to start on three consecutive attempts. All caches are disabled. Repeatedly turning the server on and then off or resetting the server might cause this problem. **Action:** Start the Configuration/Setup Utility program and verify that all settings are correct. Use the **Cache Control** selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the caches. If the problem persists, call for service. When the problem is corrected, be sure to enable the caches.
101 102 106	An error occurred during the system board and microprocessor test. **Action:** Call for service.
114	An adapter read-only memory (ROM) error occurred. **Action:** Remove the options. If you can start the server without the options installed, reinstall each option one at a time and retest after each is reinstalled. When an option fails, replace it. If you cannot isolate and correct the problem, call for service.
129	An error was detected in the L1 cache of one of the microprocessors. **Action:** 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, call for service.
151	A real-time clock (RTC) error occurred. **Action:** Call for service.
161	The real-time clock battery has failed. **Action:** Replace the battery yourself or call for service. You can use the server until you replace the battery. However, you must run the Configuration/Setup Utility program and set the time and date and other custom settings each time you turn on the server.

Table 5. POST error messages.

POST message	Description
162	A change in device configuration occurred. This error occurs under one or more of the following conditions: • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the server as being installed. • An external device is not turned on. • An invalid checksum is detected in the battery-backed memory. **Action:** Verify that all external devices are turned on. You must turn on external devices before turning on the server. If you did not add, remove, or change the location of a device, a device is probably failing. Running the Diagnostic program might isolate the failing device. If you cannot isolate and correct the problem, call for service.
163	The time of day has not been set. **Action:** Set the correct date and time. If the date and time are set correctly and saved, but the 163 error message reappears, call for service. You can use the server until the system is serviced, but any application programs that use the date and time will be affected.
164	A change in the memory configuration occurred. This message might appear after you add or remove memory. **Note:** The server can be used with decreased memory capacity. **Action:** 1. If POST error message 289 also occurred, follow the instructions for that error message first. 2. If you just installed or removed memory, run the Configuration/Setup Utility program; then, exit, saving the new configuration settings. If the message appears again, shut down the server, reset the memory modules, and restart the server. If the problem persists, call for service.
175	A vital product data (VPD) error occurred. **Action:** Call for service.
176 177 178	A security hardware error occurred. **Action:** Check for indications that someone has tampered with the server. If no one has tampered with the server, call for service.
184	The power-on password information stored in your server has been removed. **Action:** From the Configuration/Setup Utility program main menu, select **System Security.** Then, follow the instructions on the screen. If this information cannot be restored, call for service.
185	A power failure damaged the stored information about the drive-startup sequence. **Action:** From the Configuration/Setup Utility program main menu, select **Start Options**; then, follow the instructions on the screen. If this information cannot be restored, call for service.

Table 5. POST error messages.

POST message	Description
186	A system board or hardware error occurred. **Action:** Call for service.
187	The VPD serial number is not set. **Action:** The system serial number is set in the VPD EEPROM at the time of manufacturing. If the system board has been replaced, the system serial number will be invalid and should be set. From the main menu of the Configuration/Setup Utility program, select **System Information**, then select **Product Data.**If the problem persists, call for service.
188	A vital product data (VPD) error occurred. **Action:** Call for service.
189	An attempt has been made to access the server with invalid passwords. After three incorrect attempts, the server locks up; that is, the logon data fields are no longer available to the user.
201	An error occurred during the memory controller test. This error can be caused by: • Incorrectly installed memory • A failing memory module • A system board problem **Action:** 1. If you just installed memory, verify that the new memory is correct for your server. Also verify that the memory is installed and seated correctly. 2. If the problem persists, call for service.
229	An error was detected in the L2 cache of one of the microprocessors. **Action:** 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, call for service.
289	An error occurred during POST memory tests, and a failing DIMM was disabled. **Note:** You can use the server with decreased memory. **Action:** 1. If you just installed memory, verify that the new memory is correct for your server. Also verify that the memory is installed and seated correctly. Start the Configuration/Setup Utility program and select **Memory Settings** from the Advanced Setup menu to enable the DIMM. 2. If the problem remains, replace the failing DIMM. If the problem persists, call for service.
301 303	An error occurred during the keyboard and keyboard controller test. These error messages also might be accompanied by continuous beeping. **Action:** Ensure that: • Nothing is resting on the keyboard and pressing a key. • No key is stuck. • The keyboard cable is connected correctly to the keyboard and to the correct connector on the server. Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, call for service. **Note:** If you just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds; then, turn on the server. If the error message goes away, replace the device.

Table 5. POST error messages.

POST message	Description

602	Invalid diskette boot record
	
	Action: 1. Replace the diskette.
	
	      2. If the problem persists, make sure that the diskette drive cables are correctly and securely connected.
	
	      3. If the problem remains, replace the diskette drive.
	
	If the problem persists, call for service.

604	An error occurred during a diskette drive test. **Action:** 1. Verify that the Configuration/Setup Utility program correctly reflects the type of diskette drive that you have installed. 2. Run the diagnostic tests. If the diagnostic tests fail, call for service.
662	A diskette drive configuration error occurred. **Action:** If you removed a diskette drive, make sure that the diskette drive setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it. If the problem persists, call for service.
962	A parallel port configuration error occurred. **Action:** If you changed a hardware option, make sure that the parallel port setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it. If the problem persists, call for service.

11xx	An error occurred during the system-board serial port test.
	
	Action: If you have a modem, serial printer, or other serial device attached to your server, verify that the serial cable is connected correctly. If it is, use the following procedure:
	
	      1. Turn off the server.
	
	      2. Disconnect the serial cable from the serial port.
	
	      3. Wait five seconds; then, turn on the server.
	
	If the POST error message does not reappear, either the serial cable or the device is probably failing. See the documentation that comes with the serial device for additional testing information.
	
	If the POST error message reappears, call for service.

1162	The serial port configuration conflicts with another device in the system. **Action:** 1. Make sure the IRQ and I/O port assignments needed by the serial port are available. 2. If all interrupts are being used by adapters, you might need to remove an adapter to make an interrupt available to the serial port, or force other adapters to share an interrupt.
1601	An Advanced Systems Management update is needed. **Action:** Download and install the latest Advanced Systems Management flash update.
1800	A PCI adapter has requested a hardware interrupt that is not available. **Action:** 1. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the interrupt resource settings are not correct, change the settings. 2. If all interrupts are being used by other adapters, you might need to remove an adapter to make an interrupt available to the PCI adapter, or force other adapters to share an interrupt.

Table 5. POST error messages.

POST message	Description

1962	No valid startup devices were found. The system cannot find the startup drive or operating system.
	
	Action: Be sure that the drive that you want to start from is in the startup sequence.
	
	    1. Select **Start Options** from the Configuration/Setup Utility program main menu. If you are unable to set the startup sequence, call for service.
	
	    2. Check the list of startup devices in the **Startup device** data fields. Is the drive you want to start from in the startup sequence?
	
	        Yes Exit from this screen; then, select **Exit Setup** to exit from the Configuration/Setup menu. Go to step 3.
	
	        No Follow the instructions on the screen to add the drive; then, save the changes and exit from the Configuration/Setup menu. Restart the server.
	    3. Is an operating system installed?
	
	        Yes Turn off the server. Go to step 4.
	
	        No Install the operating system in your server; then, follow your operating system instructions to shut down and restart the server.
	    4. During server startup, watch for messages indicating a hardware problem.
	
	If the same error message appears, call for service.

2400	An error occurred during the testing of the video controller on the system board. This error can be caused by a failing monitor, a failing system board, or a failing video adapter (if one is installed). **Action:** Verify that the monitor is connected correctly to the video connector. If the monitor is connected correctly, call for service.
2462	A video memory configuration error occurred. **Action:** Make sure that the monitor cables are correctly and securely connected to the server. If the problem persists, call for service.
5962	An IDE CD-ROM configuration error occurred. **Action:** Check the signal and power cable connections to the CD-ROM drive. If the problem persists, call for service.

8603	An error occurred during the mouse (pointing device) controller test. The addition or removal of a mouse, or a failing system board can cause this error.
	
	Note: This error also can occur if electrical power was lost for a very brief period and then restored. In this case, turn off the server for at least 5 seconds; then, turn it back on.
	
	Action: Ensure that the keyboard and mouse (pointing device) are attached to the correct connectors. If they are connected correctly, use the following procedure:
	
	    1. Turn off the server.
	
	    2. Disconnect the mouse from the server.
	
	    3. Turn on the server.
	
	If the POST error message does not reappear, the mouse is probably failing. See the documentation that comes with the mouse for additional testing information. If the problem remains, replace the mouse or pointing device.
	
	If the POST error message reappears, run the diagnostic tests to isolate the problem. If the diagnostic tests do not find a problem and the POST error message remains, call for service.

Table 5. POST error messages.

POST message	Description
00012000	Processor machine check. **Action:** 1. Update the system BIOS. 2. If the problem persists, replace the microprocessor.
00019501	Processor 1 is not functioning. **Action:** Replace microprocessor 1. If the problem persists, call for service.
00019502	Processor 2 is not functioning. **Action:** Replace microprocessor 2. If the problem persists, call for service.
00019701	Processor 1 failed the built-in self test. **Action:** Replace microprocessor 1. If the problem persists, call for service.
00019702	Processor 2 failed the built-in self-test. **Action:** Replace microprocessor 2. If the problem persists, call for service.
00180100	A PCI adapter has requested memory resources that are not available **Action:** 1. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If all memory resources are being used, you might need to remove an adapter to make memory available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. See the documentation that is provided with the adapter.
00180200	A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective. **Action:** 1. Make sure that the I/O address for the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. 2. If the I/O port resource settings are correct, the PCI adapter might be defective. Call for service.
00180300	A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective. **Action:** 1. Make sure that the memory addresses for all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If the memory resource settings are correct, the PCI adapter might be defective. Call for service.
00180400	A PCI adapter has requested a memory address that is not available. **Action:** If all memory addresses are being used, you might need to remove an adapter to make memory address space available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation that is provided with the adapter.

Table 5. POST error messages.

POST message	Description
00180500	A PCI adapter ROM error occurred. **Action:** Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it. If you cannot isolate and correct the problem, call for service.
00180600	A PCI-to-PCI bridge error occurred. More than one PCI bus tried to access memory below 1 MB. **Action:** Remove the PCI adapter that has the PCI bridge. If you can start the server without the adapter, reinstall and retest the adapter. If the adapter fails, replace it. If you cannot isolate and correct the problem, call for service.
00180700	*xxxxyyyy* system board PCI device does not respond or was disabled by the user (where *xxxx* is the PCI vendor ID and *yyyy* is the PCI device ID). **Action:** Start the Configuration/Setup Utility program, select **Devices and I/O Ports**, and make sure that the device is enabled. If the problem persists, call for service.
00180800	An unsupported PCI device is installed. **Action:** Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it. If the problem persists, call for service.
00181000	PCI error. **Action:** Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it. If the problem persists, call for service.
01295085	The ECC checking hardware test failed. **Action:** Call for service.
01298001	No update data is available for processor 1. **Action:** Update the system BIOS to a level that supports the microprocessors that are installed in the server.
01298002	No update data is available for processor 2. **Action:** Update the system BIOS to a level that supports the microprocessors that are installed in the server.
01298101	The update data for processor 1 is incorrect. **Action:** Update the system BIOS to a level that supports the microprocessors that are installed in the server.
01298102	The update data for processor 2 is incorrect. **Action:** Update the system BIOS to a level that supports the microprocessors that are installed in the server.
01298200	Microprocessor speed mismatch **Action:** The microprocessors that are installed do not run at the same speed; install microprocessors with identical speeds.
I9990301	A hard disk drive error occurred. **Action:** Call for service.

Table 5. POST error messages.

POST message	Description
I9990305	POST could not find an operating system. **Action:** Install an operating system. If you have already installed the operating system, check the drive startup sequence. If the drive sequence is correct, run the diagnostic tests to verify that the hard disk drive is functioning correctly. If there is a problem with the hard disk drive (such as a bad sector), you might need to reinstall the operating system. If you cannot reinstall the operating system, call for service.
I9990650	Power is restored. **Action:** No action is required. This message appears each time power is restored to the server after a power loss.
Other Numbers	POST found an error. **Action:** Follow the instructions on the screen.

Table 5. POST error messages.

Event/error logs

The POST error log contains the three most recent error codes and messages that the system generated during POST. The System Event/Error log contains all messages that were issued during POST and all system status messages from the Advanced Systems Management processor.

To view the contents of the System Event/Error log, start the Configuration/Setup Utility program; then, select **Event/Error Logs** from the main menu.

Diagnostic programs and error messages

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of your server.

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

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

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

The error code format is as follows:

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

where:

fff	is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.
ttt	is the three-digit failure code that indicates the exact test failure that was encountered. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)
iii	is the three-digit device ID. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)
date	is the date that the diagnostic test was run and the error recorded.
cc	is the check value that is used to verify the validity of the information.
text message	is the diagnostic message that indicates the reason for the problem.

Text messages

The diagnostic text message format is as follows:

```
Function Name: Result (test specific string)
```

where:

Function Name
>is the name of the function being tested when the error occurred. This corresponds to the function code (fff) given in the previous list.

Result can be one of the following:

Passed	This result occurs when the diagnostic test completes without any errors.
Failed	This result occurs when the diagnostic test discovers an error.
User Aborted	This result occurs when you stop the diagnostic test before it is complete.
Not Applicable	This result occurs when you specify a diagnostic test for a device that is not present.
Aborted	This result occurs when the test could not proceed because of the system configuration.
Warning	This result occurs when a possible problem is reported during the diagnostic test, such as when a device that is to be tested is not installed.
Test Specific String	This is additional information that you can use to analyze the problem.

Starting the diagnostic programs

You can press F1 while running the diagnostic programs to obtain Help information. You also can press F1 from within a Help screen to obtain online documentation from which you can select different categories. To exit from Help, press **Esc**.

To start the diagnostic programs:

1. Turn on the server and watch the screen.
2. When the message `F2 for Diagnostics` appears, press F2.
3. Type in the appropriate password; then, press Enter.
4. Select either **Extended** or **Basic** from the top of the screen.
5. When the Diagnostic Programs screen appears, select the test you want to run from the list that appears; then, follow the instructions on the screen.

   Notes:

   a. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem persists, call for service.

   b. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.

   c. If you run the diagnostic programs with no mouse attached to your server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat**. All other functions that are provided by mouse-selectable buttons are also available using the function keys.

   d. You can test the USB keyboard by using the regular keyboard test. The regular mouse test can test a USB mouse. Also, you can run the USB hub test only if there are no USB devices attached.

   e. You can view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.

When the tests have completed, you can view the test log by selecting **Utility** from the top of the screen.

If the diagnostic programs do not detect an error, but the problem persists during typical server operations, a software error might be the cause. If you suspect a software problem, refer to the information that comes with the software package.

Viewing the test log

The test log will not contain any information until after the diagnostic program has run.

Note: If you already are running the diagnostic programs, begin with step 3.

To view the test log:

1. Turn on the server and watch the screen.

   If the server is on, shut down your operating system and restart the server.

2. When the message `F2 for Diagnostics` appears, press F2.

   If a power-on password is set, the server prompts you for it. Type the appropriate password; then, press Enter.

3. When the Diagnostic Programs screen appears, select **Utility** from the top of the screen.

4. Select **View Test Log** from the list that appears; then, follow the instructions on the screen.

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

Diagnostic error message tables

The following tables provide descriptions of the error messages that might appear when you run the diagnostic programs.

Important:

    If diagnostic error messages appear that are not listed in the following tables, make sure that your server has the latest levels of BIOS and diagnostics microcode installed.

Code	Function	Result	Text message	Action
001	Core system	Failed	Processor board, ECC Test	Call for service.
			System board	
005	Video port		Processor and system boards	
011	Serial port		Integrated serial port	
014	Parallel port		Integrated parallel port	
015	USB interface	Aborted	Can NOT test USB interface while it is in use. **Note:** If you have a USB keyboard or mouse attached, you cannot run the diagnostic program for the USB interface.	1. Turn off the server. 2. Replace the USB keyboard and mouse with a standard keyboard and mouse. 3. Turn on the server. 4. Run the diagnostic test again.
		Failed	System board	Call for service.
020	PCI interface	Failed	System board	Call for service.
030	SCSI interface	Failed	SCSI adapter in slot *n* failed register/counter/ power test (where *n* is the slot number of the failing adapter)	Refer to the information provided with the adapter for instructions. If the problem persists, call for service.
			SCSI controller on system board failed register/counter/power test	Call for service.
075	Power supply	Failed	Voltage sensed by the system is out of range	Call for service.

Table 6. Diagnostic error messages.

Code	Function	Result	Text message	Action
089	Microprocessor	Failed	Invalid microprocessor in slot *xyz* or BIOS setup problem (where *xyz* identifies the microprocessor that is causing the error message)	1. Check the system error log for the related error messages. 2. If your server does not have the latest level BIOS installed, update the BIOS. 3. If the problem remains, replace the *xyz* microprocessor and run the test again. If the problem persists, call for service.
			Processor in socket ID *xyz* is installed but not functioning (where *xyz* identifies the microprocessor that is causing the error message)	
			Microprocessor in socket ID *xyz* (where *xyz* identifies the microprocessor that is causing the error message)	1. Reseat the microprocessor. 2. If the problem remains, replace the microprocessor. If the problem persists, call for service.
			Processor in socket id *xyz* is defective (where *xyz* identifies the microprocessor that is causing the error message)	Replace the microprocessor. If the problem persists, call for service.
			Test setup error: Application microprocessor not installed or BIOS setup problem	1. Verify that the Application microprocessor is installed and seated correctly. 2. If your server does not have the latest level BIOS installed, update the BIOS. 3. If the problem remains, replace the application microprocessor and run the test again. If the problem persists, call for service.

Table 6. Diagnostic error messages.

Code	Function	Result	Text message	Action
075	Microprocessor	Failed	VRM corresponding to Microprocessor in socket *xyz* is defective (where *xyz* identifies the microprocessor whose VRM is causing the error message)	Replace the VRM. If the problem remains, call for service.
			VRM corresponding to Microprocessor in socket ID *xyz* is not installed (where *xyz* identifies the microprocessor whose VRM is causing the error message)	Install a VRM. If the problem persists, call for service.
175	System thermal	Failed	Fan # *n* (where *n* is the number of the failing fan)	Replace the indicated fan.
			Temperature sensed on processor board is out of range	Call for service.
180	Status display	Failed	Any failure message	Call for service.
201	System memory	Failed	DIMMs in location DIMM *n* (where *n* is the number of the socket that contains the failing DIMM)	1. Reseat the failing DIMM. 2. If the problem remains, replace the DIMM. If the problem persists, call for service.
			Test setup error: Corrupt BIOS in ROM	If your server does not have the latest level BIOS installed, update the BIOS to the latest level. If the problem persists, call for service.
			Test setup error: Corrupt DMI BIOS, information in BIOS is not as expected	

Table 6. Diagnostic error messages.

Code	Function	Result	Text message	Action
202	System cache	Aborted	Test setup error: BIOS cannot access VPD information	If your server does not have the latest level BIOS installed, update the BIOS to the latest level and run the diagnostic program again. If the problem persists, call for service.
			Test setup error: Corrupt DMI BIOS. Information in BIOS is not as expected	
			Test setup error: No L2 cache detected on microprocessor socket ID *xyz* or BIOS setup problem (where *xyz* identifies the microprocessor that is causing the error message)	1. If your server does not have the latest level BIOS installed, update the BIOS to the latest level 2. Run the diagnostic program again. 3. If the problem remains, replace the failing processor. If the problem persists, call for service.
			Test setup error: Unknown hardware problem associated with microprocessor in socket ID *xyz*. (where *xyz* identifies the microprocessor that is causing the error message)	
		Failed	Microprocessor in socket ID *xyz* (where *xyz* identifies the microprocessor that is causing the error message)	1. Reseat the identified microprocessor. 2. If the problem remains, replace the microprocessor. If the problem persists, call for service.
		Warning	Test setup error: Cache is disabled. Use system setup to enable before retrying the test	Use the **Cache Control** choice from the Advanced Setup menu to enable the cache. If the problem persists, call for service.
206	Diskette drive	Failed	Internal diskette drive bay	Call for service.
215	CD-ROM	Failed	On system board.	Call for service.
		Aborted	The CD-ROM drive is not present.	Verify that the cables are properly connected to the CD-ROM. If the problem persists, call for service.
217	Hard disk drive	Failed	BIOS drive # *n* (where *n* is the drive bay number)	Call for service.

Table 6. Diagnostic error messages.

Code	Function	Result	Text message	Action
264	Magnetic tape drive	Aborted	Test setup error: No tape drive found	Check the cable and power connections to the drive. Refer to the information that is provided with the tape drive. If the problem persists, call for service.
		Failed	The load/mount test failed for device *n* on adapter *m* (where *n* is the number of the device and *m* is the adapter number)	Refer to the information provided with the tape drive. If the problem persists, call for service.
			The self-diagnostic failed for device *n* on adapter *m* (where *n* is the number of the device and *m* is the adapter number)	
			The unload/eject test failed for device *n* on adapter *m* (where *n* is the number of the device and *m* is the adapter number)	
			The unload/eject push button test failed for device *n* on adapter *m* (where *n* is the number of the device and *m* is the adapter number)	
			The read/write self-diagnostic failed for device *n* on adapter *m* (where *n* is the number of the device and *m* is the adapter number)	Insert a new tape cartridge; then, run the diagnostic test again. Refer to the information that is provided with the tape drive. If the problem persists, call for service.
301	Keyboard	Failed	On system board keyboard test failed	1. Verify that the keyboard cable is connected. 2. If the problem remains, replace the keyboard cable. If the problem persists, call for service.
302	Mouse	Failed	On system board pointing device test failed.	Replace the pointing device. If the problem persists, call for service.

Table 6. Diagnostic error messages.

Code	Function	Result	Text message	Action
305	Video monitor		Any message	Refer to the information that comes with the monitor.
405	Ethernet	Failed	In PCI slot *n* (where *n* is the PCI slot number in which the failing Ethernet adapter is installed)	Replace the Ethernet adapter in slot *n*. If the problem persists, call for service.
			On system board	Call for service.
415	Analog/digital modem	Not applicable	No modem was detected	1. Verify that the modem is properly attached to the server. 2. If the problem remains, replace the modem. If the problem persists, call for service.
			PCI modem detected but not enabled	1. Change the configuration to enable the modem. 2. If the problem remains, replace the modem. If the problem persists, call for service.
		Failed	Modem reset failed	Replace the modem. If the problem persists, call for service.
			No dial tone detected	1. Make sure that the phone line attached to the modem has a dial tone. (Connect a phone to the line and listen, if necessary.) If there is no tone, have the phone line serviced. 2. If the problem remains, replace the modem. If the problem persists, call for service.

Table 6. Diagnostic error messages.

Recovering BIOS

If the BIOS is damaged, such as from a power failure during a flash update, you can recover the BIOS using the BIOS code page jumper and a BIOS flash diskette.

Note: You can obtain a BIOS flash diskette from one of the following sources:

- Download a BIOS flash diskette from the World Wide Web. Go to http://www.ibm.com/pc/support/, click **IBM Server Support**, and make the selections for your server.
- Contact your IBM service representative.

To recover the BIOS:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover.

2. Locate the BIOS code page jumper (J19) on the system board.
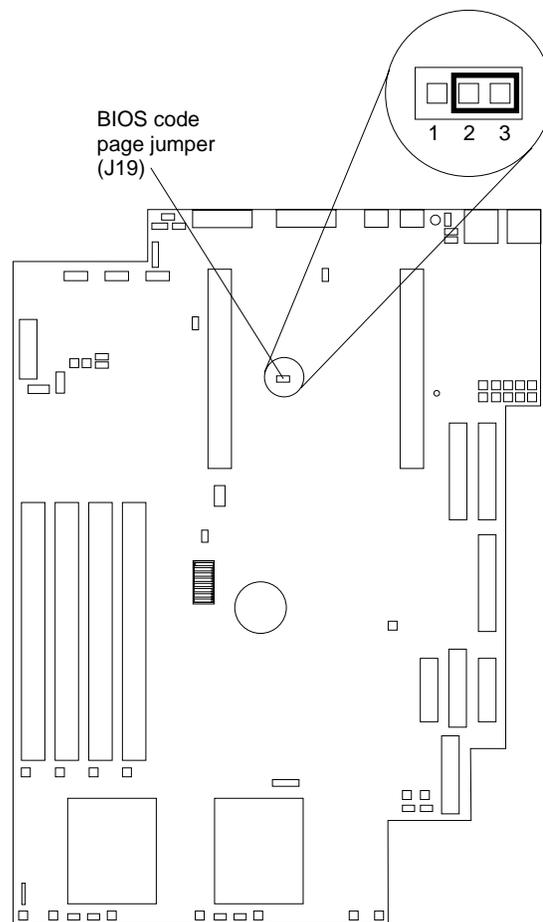
3. Place a jumper on pins 1 and 2 to enable the BIOS back page.

   Note: Before continuing, refer to "Working inside a server with power on" on page 31.

4. Reconnect all external cables and power cords and turn on the peripheral devices.

5. Insert the BIOS flash diskette in the diskette drive.

6. Restart the server. The system begins the power-on self-test (POST) and BIOS flash.

7. Select **1** - **Update POST/BIOS** from the menu that contains various flash (update) options.

8. When prompted whether you want to save the current code to a diskette, select **N**.

9. When prompted to choose a language, select a language (from 0 to 7) and press Enter to accept your choice.

10. Do not restart your system at this time.

11. Remove the BIOS flash diskette from the diskette drive.

12. Turn off the server.

13. Move the jumper on J19 to pins 2 and 3 to return to normal startup mode.

14. Restart the server. The system should start up normally.

15. Replace the cover.

Identifying problems using status LEDs

If the system-error light in the operator information panel on the front of the server is on, one or more LEDs inside the server might be on. Use the Light Path Diagnostics panel to identify the type of error that occurred.

For LED locations see "System board LEDs" on page 30.

Light Path Diagnostics

The Light Path Diagnostics panel in your server enables you to quickly identify the type of system error that occurred. The Light Path Diagnostics panel is located on the system board, just behind PCI adapter slot 1. When you press the Light Path Diagnostics button, the LED on the top-right corner of the panel illuminates. This shows that the diagnostic circuitry is working correctly.

Your server is designed so that any LEDs that are illuminated can be re-illuminated without AC power after you remove the cover. This feature helps you isolate the problem if an error causes the server to shut down. See "Light Path Diagnostics table" on page 86.

Important: You have up to 12 hours to use the Light Path Diagnostic LEDs after the power is removed from the server. After 12 hours, you must turn on the server again to be able to use the Light Path Diagnostic LEDs to help locate system errors.

To view the LEDs on the system board:

1. Turn off the server and peripheral devices.

2. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information see "Removing the cover" on page 39 for instructions.

3. Press and hold the Light Path Diagnostics (blue) button on the diagnostics panel. The LEDs will illuminate while the switch is pressed.

   Note: You can illuminate the LEDs for a maximum of two minutes. After that time, the circuit that powers the LEDs is exhausted.

4. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information see "Installing the cover" on page 52 for instructions.

Light Path Diagnostics panel

The following illustration shows the LEDs on the diagnostics panel on the system board. See "Light Path Diagnostics table" on page 86 for information on identifying problems using these LEDs.

Light Path

PS	MEM
TEMP	CPU
FAN	VRM
SP	PCI
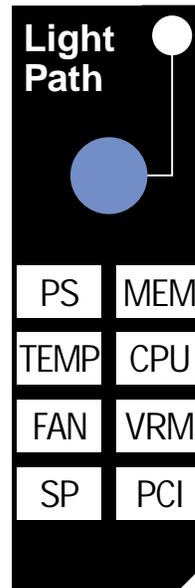
Light Path Diagnostics table

The system-error light on the operator information panel is lit when certain system errors occur. If the system-error light on your server is lit, use the following table to help determine the cause of the error and the action you should take.

Lit LED on diagnostics panel	Cause	Action
None	An error has occurred and cannot be isolated, or the Advanced Systems Management processor has failed.	An error has occurred that is not represented by a Light Path Diagnostics LED. Check the system error log for more information about the error.
PS	Power supply has failed.	Have the system serviced.
TEMP	The system temperature has exceeded a threshold level.	1. Check to see if a fan has failed. If it has, replace the fan. 2. Make sure that the room temperature is not too hot. (See "Features and specifications" on page 2.) If the problem persists, have the system serviced.
FAN	A fan has failed or is operating too slowly. **Note:** A failing fan can also cause the TEMP LED to be on.	Check the LEDs on the fans and replace the indicated fan.
SP	The service processor has failed.	Remove power from the server, and then restart the server. If the problem persists have the system serviced.
MEM	A memory error occurred.	1. Check the DIMM failure LEDs on the system board. 2. Replace the DIMM that is indicated by the lit DIMM failure LED.
CPU	One of the microprocessors has failed.	1. Check the microprocessor failure LEDs on the system board. 2. If a microprocessor failure LED is on, make sure that the microprocessor is installed correctly (see "Identifying problems using status LEDs" on page 84). 3. If the problem persists, replace the microprocessor. If the problem persists, have the system serviced.
VRM	One of the VRMs on the system board has failed.	Remove power from the server, and then restart the server. If the problem persists have the system serviced.

Table 7. Light Path Diagnostics.

Lit LED on diagnostics panel	Cause	Action
PCI	An error occurred on a PCI bus. The system board caused the error.	1. Check the error log for additional information. 2. If you cannot isolate the failing adapter from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus B (PCI slots 1 and 2) and restarting the server after each adapter is removed. If the problem persists, have the system serviced.

Table 7. Light Path Diagnostics.

Troubleshooting charts

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

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

See "Starting the diagnostic programs" on page 74 to test the server. If you have run the diagnostic test programs or if running the tests does not reveal the problem, call for service.

Look for the symptom in the left column of the chart. Instructions and probable solutions to the problem are in the right column. If you have just added new software or a new option and your server is not working, do the following before using the troubleshooting charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine if your server is running correctly.
- Reinstall the new software or new device.

Device	Suggested action
CD-ROM drive CD-ROM drive is not recognized.	Verify that: • The primary IDE channel is enabled in the Configuration/Setup Utility program. • All cables and jumpers are correctly installed. • The correct device driver is installed for the CD-ROM drive.
Diskette drive Diskette drive activity light stays on, or the system bypasses the diskette drive.	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.) • Your software program is working correctly. • The diskette contains the necessary files to start the server. If the diskette drive activity light stays on, or the system continues to bypass the diskette drive, call for service.
General problems Problems such as broken cover locks or indicator lights not working.	Call for service.
Intermittent problems A problem occurs only occasionally and is difficult to detect.	Verify that: • All cables and cords are connected securely to the rear of the server and attached options. • When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no airflow, the fan is not working. This causes the server to overheat and shut down. If the problem persists, call for service.

Table 8. Troubleshooting charts.

Device	Suggested action
Keyboard, mouse, or pointing-device problems. All or some keys on the keyboard do not work.	• Make sure that the server and the monitor are turned on. • Try using another keyboard. If the items above are correct, call for service.
The mouse or pointing device does not work.	• Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. • Try using another mouse or pointing device. If the problem persists, call for service.

Memory problems
 	
The amount of memory displayed is less than the amount of memory that is installed.
	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 server might have automatically disabled a DIMM bank when it detected a problem, or a DIMM bank could have been manually disabled.
	
	Look in the POST error log for error message 289:
	• If the DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.
	• If the DIMM was disabled by the user or by POST:
	  1. Start the Configuration/Setup Utility program.
	  2. Enable the DIMM.
	  3. Save the configuration and restart the server.
	• If you continue to get this error, replace the DIMM.
	
	If the problem persists, call for service.

Microprocessor problems The server emits a continuous tone during POST.	The startup (boot) microprocessor is not working properly. Verify that the startup microprocessor is seated properly. If it is, replace the startup microprocessor. If the problem remains, call for service.
Monitor problems	Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, refer to the information that comes with the monitor for adjusting and testing instructions. If you still cannot find the problem, call for service.

Table 8. Troubleshooting charts.

Device	Suggested action
The screen is blank.	Verify that: • The server power cord is plugged into the server 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. **Attention:** In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the **Start Options** of the Configuration/Setup Utility is set to **Enabled** (its default setting), you must restart the server three times to force the system BIOS to reset the memory connector or bank of connectors from **Disabled** to **Enabled**. If the screen remains blank, call for service.
Only the cursor appears.	Call for service.
The monitor works when you turn on the server, but goes blank when you start some application programs.	Verify that you installed the necessary drivers for the applications. If the screen remains blank, call for service.
Wavy, unreadable, rolling, distorted screen, or screen jitter.	If the monitor self-tests show the monitor is working correctly, 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**: • To prevent diskette drive read/ write errors, be sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). • Non-IBM monitor cables might cause unpredictable problems. • An enhanced monitor cable with additional shielding is available for the IBM model 9521 and 9527 monitors. For information about the enhanced monitor cable, see 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 with the correct language. If the problem remains, call for service.
Option problems	Verify that:
An IBM option that was just installed does not work.	• The option is designed for the server. Refer to the "Support for Netfinity Servers" flowchart for information about obtaining ServerProven compatibility information from the World Wide Web. • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. If the problem remains, call for service.

Table 8. Troubleshooting charts.

Device	Suggested action
Power problems	Verify that:
The server does not power on.	• The power cables are properly connected to the server. • The electrical outlet functions properly. • The type of memory installed is correct. • If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. If the problem remains, call for service.
Serial port problems	Verify that:
The number of serial ports identified by the operating system is less than the number of serial ports installed.	• Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports is disabled. **Note:** Management port is the same as a serial port connector, and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured. • The serial-port adapter, if you installed one, is seated properly. If the problem persists, call for service.
A serial device does not work. For more information about the serial port see "Serial port" on page 54.	Verify that: 1. The device is compatible with the server. 2. The serial port is enabled and is assigned a unique address. 3. The device is not connected to the management port C. If the problem still exists, call for service.
Software problem	To determine if problems are caused by the software, verify that:

Suspected software problem.	• Your server has the minimum memory requirements to use the software. For memory requirements, see the information that comes with the software.
	
	  Note:
	
	  If you have just installed an adapter or memory, you might have a memory address conflict.
	
	• The software is designed to operate on your server.
	
	• Other software works on your server.
	
	• The software that you are using works on another system.
	
	If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and solutions to the problem.
	
	If the problem remains, contact your place of purchase.

Universal Serial Bus (USB) port problems	Verify that:
A USB device does not work.	• You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. **Note:** If a standard (non-USB) keyboard is attached to the keyboard port, the USB is disabled and no USB device will work during POST. • The correct USB device driver is installed. • Your operating system supports USB devices. If the problem still exists, call for service.

Table 8. Troubleshooting charts.

Troubleshooting an Ethernet controller

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

Network connection problems

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

- Make sure that the cable is installed correctly.

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

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

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

  Note: To determine whether a hub has an X port, check the port label. If the label contains an *X*, the hub has an X port.
- Determine if the hub supports auto-negotiation. If not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Make sure that you are using the correct device drivers, supplied with your server.
- Check for operating-system-specific causes for the problem.
- Make sure that the device drivers on the client and server are using the same protocol.
- Test the Ethernet controller.

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

Ethernet controller troubleshooting chart

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

Ethernet controller problem	Suggested action
The server stops running when loading device drivers.	The PCI BIOS interrupt settings are incorrect. Check the following: • Determine if the interrupt (IRQ) setting that is assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program. Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ that is assigned to the Ethernet controller or the other device. For example, for NetWare Versions 3 and 4, it is recommended that disk controllers not share interrupts with LAN controllers. • Make sure that you are using the most recent device driver that is available from the World Wide Web. • Run the network diagnostic program. If the problem remains, call for service.
Data is incorrect or sporadic.	Check the following: • Make sure that you are using Category 5 cabling when operating the server at 100 Mbps. • Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.
The Ethernet controller stopped working when another adapter was added to the server.	Check the following: • Make sure that the cable is connected to the Ethernet controller. • Make sure that your PCI system BIOS is current. • Reseat the adapter. • Determine if the interrupt (IRQ) setting that is assigned to the Ethernet adapter is also assigned to another device in the Configuration/Setup Utility program. Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ that is assigned to the Ethernet adapter or the other device. If the problem remains, call for service.
The Ethernet controller stopped working without apparent cause.	Check the following: • Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. Refer to your operating-system documentation and to the ServerGuide information. If the problem remains, call for service.

Table 9. Ethernet troubleshooting chart.

NDIS 4.0 (Windows NT) device driver messages

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

Error code (hex)	Description
0x00	**Explanation:** The device driver could not register the specified interrupt. **Action:** Using the Configuration/Setup Utility, make sure that a PCI interrupt is assigned to your Ethernet adapter, and that Ethernet is enabled.
0x01	**Explanation:** One of the PCI adapters did not get the required resources. **Action:** Using the Configuration/Setup Utility, make sure that a PCI interrupt is assigned to your Ethernet adapter, and that Ethernet is enabled.
0x02	**Explanation:** Bad node address (multicast address). **Action:** Make sure the locally administered address is valid, if one is specified. The address cannot be a multicast address.
0x03	**Explanation:** Failed self-test. **Action:** Make sure a cable is attached to the Ethernet connector. If the problem persists, call for service.
0x0D	**Explanation:** Could not allocate enough memory for transmit queues. **Action:** 1. From the Windows NT desktop, click **Start** -> **Control Panel** -> **Networks** -> **Adapters**. 2. Select your IBM Ethernet adapter from the list. 3. Click **Properties** -> **Advanced**. 4. Lower the resource values that apply to the transmit queue.
0x0E	**Explanation:** Could not allocate enough memory for receive queue. **Action:** 1. From the Windows NT desktop, click **Start** -> **Control Panel** -> **Networks** -> **Adapters**. 2. Select your IBM Ethernet adapter from the list. 3. Select **Properties** -> **Advanced**. 4. Lower the resource values that apply to the receive queue.

Table 10. NDIS (Windows NT or Windows 2000) device driver messages for the Ethernet controller.

Error code (hex)	Description
0x0F	**Explanation:** Could not allocate enough memory for other structures. **Action:** 1. From the Windows NT desktop, click **Start** -> **Control Panel** -> **Networks** -> **Adapters**. 2. Select your IBM Ethernet adapter from the list. 3. Click **Properties** -> **Advanced**. 4. Lower the value for the resource named in the message.
0x10	**Explanation:** Did not find any Ethernet controllers. **Action:** Using the Configuration/Setup Utility, make sure that Ethernet is enabled.
0x11	**Explanation:** Multiple Ethernet controllers found, but none matched the required ID. **Action:** Using the Configuration/Setup Utility, make sure that Ethernet is enabled.
0x13	**Explanation:** Did not find any Ethernet controllers that matched the required subven/subdev. **Action:** Using the Configuration/Setup Utility, make sure that Ethernet is enabled.
0x16	**Explanation:** Single adapter found but multiple instances tried to load. **Action:** Using the Configuration/Setup Utility, make sure that Ethernet is enabled, and that the slot containing the IBM Netfinity 10/100 Ethernet Adapter or the IBM 10/100 Etherjet PCI adapter is enabled.
0x17	**Explanation:** Slot parameter not specified in the registry. **Action:** Remove the adapter device driver and reinstall it. If the problem persists, call for service.
All other 4-character hexadecimal codes	**Action:** Call for service.

Table 10. NDIS (Windows NT or Windows 2000) device driver messages for the Ethernet controller.

Event ID	Type	Description
01	Error	**Explanation:** Team name and physical adapter name are the same. This is an invalid configuration. **Action:** Reconfigure the adapter team by double-clicking the **PROSet** icon in the control panel.
02	Error	**Explanation:** Unable to allocate required resources. **Action:** Free some memory resources and restart.

Table 11. NDIS (Windows NT or Windows 2000) driver teaming messages for the Ethernet controller.

Event ID	Type	Description
03	Error	**Explanation:** Unable to read required registry parameters. **Action:** Reconfigure the adapter team by double-clicking the **PROSet** icon in the control panel.
04	Error	**Explanation:** Unable to bind to physical adapter. **Action:** Reconfigure the adapter team by double-clicking the **PROSet** icon in the control panel.
05	Error	**Explanation:** Unable to initialize an adapter team. **Action:** Reconfigure the adapter team by double-clicking the **PROSet** icon in the control panel.
06	Informational	**Explanation:** Team *nn*. Primary adapter is initialized. **Action:** None.
07	Informational	**Explanation:** Team *nn*. Secondary adapter is initialized. **Action:** None.
08	Informational	**Explanation:** Team *nn*. Virtual adapter or team is initialized. **Action:** None.
09	Informational	**Explanation:** Team *nn*. Primary adapter is switching over. **Action:** None.
10	Warning	**Explanation:** Team *nn*. Adapter link down. **Action:** Make sure the adapter is functioning properly.
11	Informational	**Explanation:** Team *nn*. Secondary adapter took over. **Action:** None.
12	Warning	**Explanation:** Team *nn*. Secondary adapter is deactivated from the team. **Action:** Make sure the secondary adapter is functioning properly and that the adapter cable is securely connected to the LAN.

Table 11. NDIS (Windows NT or Windows 2000) driver teaming messages for the Ethernet controller.

Event ID	Type	Description
13	Informational	**Explanation:** Team *nn*. Secondary adapter has rejoined the team. **Action:** None.
14	Informational	**Explanation:** Team *nn*. Secondary adapter link is up. **Action:** None.
15	Error	**Explanation:** Team *nn*. The last adapter has lost its link. Network connection has been lost. **Action:** Shut down the server and replace the adapters; then, restart the server to re-establish the connection.
16	Informational	**Explanation:** Team *nn*. An adapter has re-established the link. Network connection has been restored. **Action:** None.
17	Informational	**Explanation:** Team *nn*. Preferred primary adapter has been detected. **Action:** None.
18	Informational	**Explanation:** Team *nn*. Preferred secondary adapter has been detected. **Action:** None.
19	Informational	**Explanation:** Team *nn*. Preferred primary adapter took over. **Action:** None.
20	Informational	**Explanation:** Team *nn*. Preferred secondary adapter took over. **Action:** None.
21	Warning	**Explanation:** Team *nn*. Primary adapter does not sense any probes. Possible reason is a partitioned team. **Action:** Make sure the cables of the adapter team are connected to the same LAN segment. Reconfigure the team if necessary.

Table 11. NDIS (Windows NT or Windows 2000) driver teaming messages for the Ethernet controller.

Replacing the battery

When replacing the battery you must replace it with a lithium battery of the same type, from the same manufacturer. To avoid possible danger read and follow the safety statement below.

To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

Note: After you replace the battery, you must reconfigure your server and reset the system date and time.

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.

Complete the following steps to replace the battery:

1. Read "Safety information" on page 33, and follow any special handling and installation instructions supplied with the replacement battery.

2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the server cover.

3. Remove the battery:

   a. Use one finger to lift the battery clip over the battery.

   b. Use one finger to slightly slide the battery out from its socket. The spring mechanism will push the battery out toward you as you slide it from the socket.

   c. Use your thumb and index finger to pull the battery from under the battery clip.

   d. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.
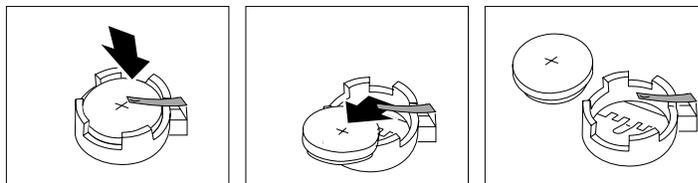
4. Insert the new battery:
   a. Tilt the battery so that you can insert it into the socket, under the battery clip.
   b. As you slide it under the battery clip, press the battery down into the socket.
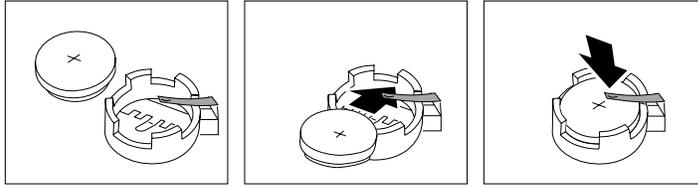
5. Reinstall the server cover and connect the cables.
6. Turn on the server.
7. Start the Configuration/Setup Utility program and set configuration parameters.
   • Set the system date and time.
   • Set the power-on password.
   • Reconfigure your server.

Getting help, service, and information

If you need help, service, technical assistance, or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

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

Table 12. Getting help, service, and information World Wide Web addresses.

`http://www.ibm.com`	Main IBM home page
`http://www.ibm.com/pc`	IBM Personal Computing
`http://www.ibm.com/pc/support`	IBM Personal Computing Support
`http://www.ibm.com/pc/us/ibmpc`	IBM Commercial Desktop PCs (U.S.)
`http://www.ibm.com/pc/us/intellistation`	IBM IntelliStation Workstations (U.S.)
`http://www.ibm.com/pc/us/accessories`	Options by IBM (U.S.)
`http://www.ibm.com/eserver/xseries`	IBM xSeries servers (U.S.)
`http://www.ibm.com/pc/us/server/sguide`	IBM ServerGuide (U.S.)
`http://www.ibm.com/pc/us/netfinity/` `system_management`	IBM Systems Management (U.S.)
`http://www.ibm.com/software/os/warp-server`	IBM OS/2 Warp Server
`http://www.ibm.com/pc/techconnect`	IBM TechConnect

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

You might also want to visit the Web pages of other companies for information about other operating systems, software, and accessories. The following are some other Web sites you might find helpful:

`http://www.lotus.com`

`http://www.tivoli.com`

`http://www.microsoft.com`

`http://www.novell.com`

`http://www.sco.com`

`http://www.adaptec.com`

`http://www.apcc.com`

`http://www.norton.com`

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

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

Service support

With the original purchase of an IBM hardware product, you have access to extensive support coverage. During the IBM hardware product warranty period, you may call the IBM HelpCenter (1-800-772-2227 in the U.S.) for hardware product assistance covered under the terms of the IBM hardware warranty. See "Getting help by telephone" on page 104 for HelpCenter telephone numbers in other countries.

The following services are available during the warranty period:

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.

- IBM hardware repair - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.

- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make Engineering Changes (ECs) available that apply to your hardware.

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

Please have the following information ready when you call:

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

If possible, be at your server when you call.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts

    Note: All warranted parts contain a 7-character identification in the format IBM FRU XXXXXXX.

- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to your IBM hardware warranty for a full explanation of IBM's warranty terms.

Before you call for service

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

Most computers, operating systems, and application programs come with documentation that contains troubleshooting procedures and explanations of error messages. The documentation that comes with your computer also contains information about the diagnostic tests you can perform.

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

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

Getting customer support and service

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

Using the World Wide Web

On the World Wide Web, the IBM Personal Computing Web site has up-to-date information about IBM Personal Computer products and support. The address for the IBM Personal Computing home page is:

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

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

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

If you select Profile from the support page, you can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable Files. You will have the information you need, all in one place. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products. You also can access online support forums, which are community sites monitored by IBM support staff.

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

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

```
http://www.ibm.com/pc/us/ibmpc
```

```
http://www.ibm.com/eserver/xseries
```

```
http://www.ibm.com/pc/us/thinkpad
```

```
http://www.ibm.com/pc/us/accessories
```

```
http://www.direct.ibm.com/content/home/en_US/aptiva
```

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

Using electronic support services

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

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

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

In addition, the latest device driver updates are available.

Commercial online services, such as America Online (AOL), contain information about IBM products. (For AOL, use the keyword **IBM**.)

Getting information by fax

If you have a touch-tone telephone and access to a fax machine, in the U.S. and Canada you can receive by fax marketing and technical information on many topics, including hardware, operating systems, and local area networks (LANs). You can call the IBM Automated Fax System 24 hours a day, 7 days a week. Follow the recorded instructions, and the requested information will be sent to your fax machine.

In the U.S. and Canada, to access the IBM Automated Fax System, call 1-800-426-3395.

Getting help online

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

For more information about configuring your PC for Online Housecall:

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

Getting help by telephone

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

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

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

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

Please have the following information ready when you call:

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

If possible, be at your computer when you call.

In the U.S. and Canada, these services are available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9:00 a.m. to 6:00 p.m.[1]

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

Table 13. International help phone numbers.

Country		Telephone number
Austria	Österreich	01-24 692 5901
Belgium - Dutch	Belgie	02-210 9820
Belgium - French	Belgique	02-210 9800
Canada	Toronto only	416-383-3344
Canada	Canada - all other	1-800-565-3344
Denmark	Danmark	35 25 02 91
Finland	Suomi	09-22 931 840
France	France	01-69 32 40 40
Germany	Deutschland	069-6654 9040
Ireland	Ireland	01-815 9202
Italy	Italia	02-482 9202
Luxembourg	Luxembourg	298-977 5063
Netherlands	Nederland	020-504 0501
Norway	Norge	23 05 32 40
Portugal	Portugal	21-791 51 47
Spain	España	91-662 49 16
Sweden	Sverige	08-751 52 27
Switzerland - German	Schweiz	0848-80 52 52
Switzerland - French	Suisse	0848-80 52 52
Switzerland - Italian	Svizzera	0848-80 52 52
United Kingdom	United Kingdom	01475-555 055
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227
Austria	Österreich	01-24 692 5901

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

Getting help around the world

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

For more information or to register for International Warranty Service:

- In the U.S. or Canada, call 1-800-497-7426.
- In Europe, call 44-1475-893638 (Greenock, U.K.).
- In Australia and New Zealand, call 61-2-9354-4171.

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

Purchasing additional services

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

Enhanced PC support line

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

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

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Enhanced PC Support, see "Ordering support line services" on page 107.

900-number operating system and hardware support line

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

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

Network and server support line

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

This service includes all of the features of the Enhanced PC Support Line, plus:
- Installing and configuring client workstations and servers
- Identifying system problems and correcting problems on the client or the server
- Using IBM and non-IBM network operating systems
- Interpreting documentation

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

Ordering support line services

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

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

For more information or to purchase these services:

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

Warranty and repair services

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

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service

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

- On-site service to premium on-site service

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

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

For more information about warranty upgrades and extensions:

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

Ordering publications

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

* In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.

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

Appendix A. Product warranties and notices

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

Warranty Statements

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

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)**

  ("IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)")

- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)**

  ("IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 – General Terms)" on page 112)

- **Worldwide Country-Unique Terms**

  ("Part 2 - Worldwide Country-Unique Terms" on page 114)

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)

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

Machine - IBM @server **xSeries 130**

Warranty Period* - Three Years

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

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

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

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

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

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty
IBM does not warrant uninterrupted or error-free operation of a Machine.

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

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

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

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

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

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

upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

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

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;

2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and

3. where applicable, before service is provided

   a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,

   b. secure all programs, data, and funds contained in a Machine,

   c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and

   d. inform IBM or your reseller of changes in a Machine's location.

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

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

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

Limitation of Liability
Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY.

SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

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

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

Machine - IBM @server **xSeries 330**

Warranty Period* - Three Years

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

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

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

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

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

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Items Not Covered by Warranty
IBM does not warrant uninterrupted or error-free operation of a Machine.

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

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

Warranty Service
To obtain warranty service for the Machine, contact your reseller or IBM. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

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

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

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

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;

2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and

3. where applicable, before service is provided

   a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,

   b. secure all programs, data, and funds contained in a Machine,

   c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and

   d. inform IBM or your reseller of changes in a Machine's location.

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

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

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

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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

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

Part 2 - Worldwide Country-Unique Terms

<u>ASIA PACIFIC</u>

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

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

Extent of Warranty: The following replaces the first and second sentences of this Section:

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment,

operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

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

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

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

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

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

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

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

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

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

The following terms apply to all EMEA countries.

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

Warranty Service

If you purchased an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchased an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those

countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

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

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section:
2. as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

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

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

The following paragraphs are added to this Section:
The minimum warranty period for Machines is six months.

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

Extent of Warranty: The second paragraph does not apply.

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

Production Status: The following paragraph replaces this Section:
Each Machine is newly manufactured. It may incorporate in addition to new parts, re-used parts as well.

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

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

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

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

Limitation of Liability: The following replaces items one and two of the first paragraph of this Section:
1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to the greater of Irish Pounds 75,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

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

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

Applicability of suppliers and resellers (unchanged).

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

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND: Limitation of Liability: The following is added to this Section:
IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

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

UNITED KINGDOM: Limitation of Liability: The following replaces items 1 and 2 of the first paragraph of this Section:
1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; 2. the amount of any other actual direct damages or loss, up to the greater of Pounds Sterling 150,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

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

Applicability of suppliers and resellers (unchanged).

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

NORTH AMERICA

CANADA: Warranty Service: The following is added to this section:
To obtain warranty service from IBM, call **1-800-565-3344**.

UNITED STATES OF AMERICA: **Warranty Service:** The following is added to this section:
To obtain warranty service from IBM, call **1-800-772-2227**.

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

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

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

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

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

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Federal Communications Commission (FCC) Statement

Federal Communications Commission (FCC) Class A Statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

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

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

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

Taiwan electrical emission statement

警告使用者:
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
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Japanese Voluntary Control Council for Interference (VCCI) statement

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Power cords

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
6952300	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

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