IBM

eserver

xSeries 135

User's Reference

IBM xSeries 135

User's Reference

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.

First Edition (December 2000)

Contents

Safety Information

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.

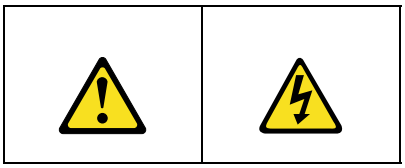
Antes de instalar este producto, lea la Información de Seguridad.

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

Statement 2

CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type

made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

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

Statement 3

CAUTION:

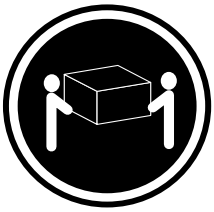
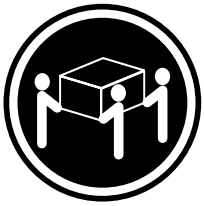
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

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

DANGER

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

Statement 4

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

CAUTION:

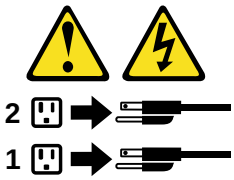
Use safe practices when lifting.

Statement 5

CAUTION:

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



Statement 6

CAUTION:

If you install a strain-relief bracket option over the end of the power cord that is connected to the device, you must connect the other end of the power cord to an easily accessible power source.

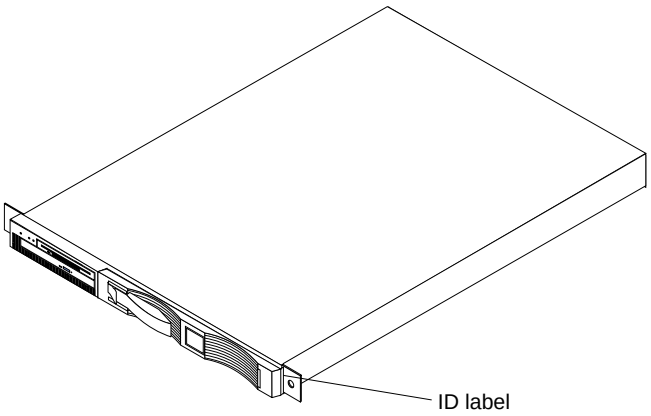
Chapter 1. Introducing the xSeries 135 appliance server

Your IBM® @server xSeries 135 appliance server is a one-U-high[1] rack model server for high-volume network transaction processing. This high-performance server is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and reliable data storage.

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

For service, assistance, or additional information on IBM Server Start Up Support and the World Wide Web, see “Getting help, service, and information” on page 100.

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 illustration below. You will need these numbers when you register your server with IBM.



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 IBM xSeries 135 appliance server.

Microprocessor:

- Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions
- 256 KB level-2 cache

Memory:

- Standard: 256 MB
- Type: 133 MHz, ECC, SDRAM, registered DIMMs
- Slots: 4 dual in-line

Drives standard:

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

PCI 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 in.)
- Depth: 653.29 mm (25.72 in.)
- Width: 439.93 mm (17.32 in.)
- 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
- 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 provided on the I*BM xSeries Documentation* CD that came 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 potentially lethal or extremely hazardous procedure step or situation.

What your IBM xSeries 135 appliance server offers

The design of your appliance server takes advantage of advancements in data storage and memory management. Your server combines:

- **Impressive performance**

  Your server comes with one microprocessor installed.

- **Large 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).

- **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).

- ***IBM Recovery* CD**

  The *IBM Recovery* CD that is included with your server provides programs to help you recover the network operating system (NOS) and preinstalled application programs. The Recovery program restores the preinstalled application programs in the original configuration. For more information about the *Recovery CD*, see “Chapter 4. Using the Recovery and Supplementary CDs,” on page 31.

- ***IBM Supplementary* CD**

  The *IBM Supplementary* CD contains additional programs that you can install on the appliance server. It also contains the program that is required to create a

recovery enablement diskette in case you need to recover preinstalled application programs.

- ***IBM Documentation* CD**

  The *IBM Documentation* CD contains documentation with information about the IBM xSeries 135 appliance server.

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 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, RAID configuration, and diagnostic programs
- Power-on self-test (POST)
- Predictive Failure Alerts (PFA)
- Remote system problem-analysis support
- Power and temperature monitoring
- Hot-swap drive bays
- Error codes and messages
- System error logging
- Upgradable BIOS and diagnostics
- Automatic restart after a power failure
- Parity checking on the PCI buses
- CRC checking on the SCSI bus
- Error checking and correcting (ECC) memory
- Redundant Ethernet capabilities
- Vital product data (VPD) on system board, and SCSI backplane
- Customer support center 24 hours per day 7 days a week[2]

Setting up the hardware

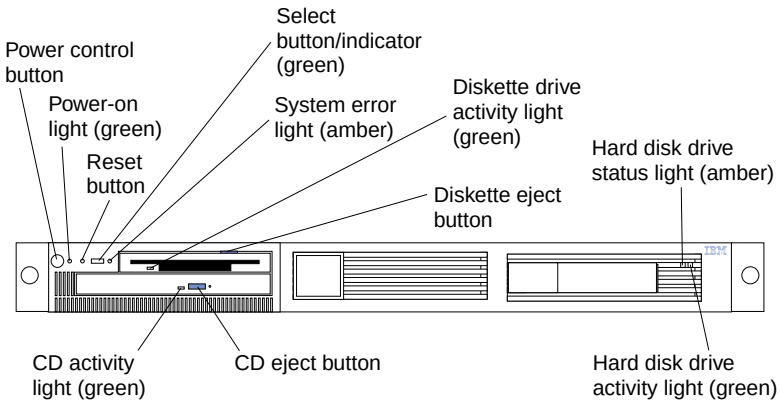
To set up the hardware, mount the appliance server in your rack, connect the appliance to your network, and then turn on the power to the appliance. For instructions to mount the server in your rack, see the *IBM xSeries 135 Appliance Server Quick Setup Guide*.

Server controls and indicators

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

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

Front view



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

Power-on light: This green LED lights and stays on when you turn on your server and blinks when the server is in standby mode.

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.

Diskette drive activity light: When this LED is on, it indicates that the diskette drive is in use. Push this button to release a diskette from the drive.

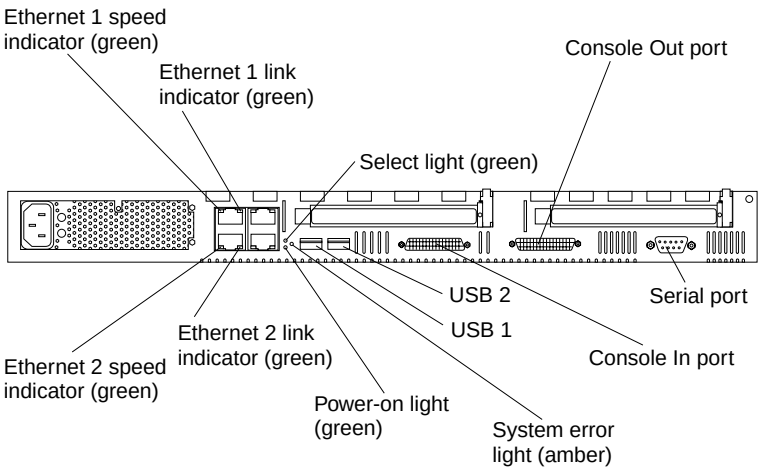
Hard disk drive status light: Each of the hot-swap drives has a hard disk drive status light. When this amber LED is on continuously, the drive has failed.

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

Rear view



Ethernet 1 speed indicator: This green LED lkights when the speed of the Ethernet LAN that is connected to the Ethernet port 1 is 100Mbps.

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 Select button LED 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.

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

Console In port: This port is used to connect multiple servers together to share a single keyboard, monitor, and pointing device.

Note: Connecting multiple servers together to share input/output devices is not supported.

USB port 1 and USB port 2: Signal cables for Universal Serial Bus (USB) 2 devices are connected to the USB connector.

Note: The addition of USB devices is not supported.

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 the Ethernet port 2 is 100Mbps.

Turning on the server

Complete the following steps to turn on the server:

1. Plug the power cord of your server into the power source.

   Note: Plugging the power cord into a power source might cause the server to start automatically. This is an acceptable action.

2. Wait 30 seconds, and then press the power-control button on the front of the server.

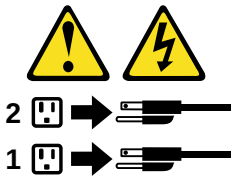
Turning off the server

Complete the following steps to turn off the server:

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.



1. Refer to your operating system documentation for the proper procedure to shut down the operating system.

   Note: Each operating system is different. Some will allow an immediate shut down; others require an orderly pocedure.

2. Press the power control button on the front of the server. This puts the server in standby mode.

3. Disconnect the server from the power source.

   Note: After you turn off the server, wait at least 5 seconds before you turn on the server again.

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. Configuring your server

The following configuration programs are provided with your server:

- **Configuration/Setup Utility program**

  The Configuration / Setup Utility program is part of the *basic input/output system* (*BIOS*) code that comes with your server. You can use this program to configure serial port assignments, change interrupt request (IRQ) settings, change the drive startup sequence, set the date and time, and set passwords.

- **SCSISelect Utility**

  With the built-in SCSISelect Utility program, you can configure the devices that are attached to the integrated SCSI controller. Use this program to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive.

- **PXE Boot Agent Utility**

  The Preboot eXecution Environment (PXE) Boot Agent Utility program is part of the basic input / output system (BIOS) code that comes with your server. You can use this program to change network boot protocols and boot order, to select operating-system wake-up support, and to set menu wait times.

- **Appliance System Manager**

  Appliance System Manager enables the creation of a common set of software administrative services that enables the delivery of solutions in a remotely managed, unattended, closed hardware server. The main functions of this software are as follows:

  — The ability to remotely manage the appliance through the World Wide Web

  — Web server

  — Encryption software for use by the Web server (for HTTP-S sessions)

  — DHCP-like services for discovering and configuring new appliances (IBM Advanced Appliance Configuration Utility)

- **IBM Advanced Appliance Configuration Utility**

  The IBM Advanced Appliance Configuration Utility aids in setting up and reconfiguring the network configuration on your appliance server. The Advanced Appliance Configuration Utility agent, which is preinstalled on your IBM xSeries appliance, works with the Advanced Appliance Configuration Utility console to automatically 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 of the appliance, including assigning the IP address, default gateway, network mask, and domain name sytem (DNS) server to be used by the appliance.

- ***IBM Supplementary* CD**

  The *Supplementary* CD includes software setup and installation tools that are specifically designed for IBM servers. You can use this CD during the initial installation of your server to configure the server hardware and simplify your network operating system installation. The *IBM Supplementary* CD contains a collection of application programs, which you can install after your server is up and running. See “Chapter 4. Using the Recovery and Supplementary CDs,” on page 31 for more detailed information.

Using the Configuration/Setup Utility program

This section provides the instructions needed to start the Configuration / Setup Utility program and descriptions of the available menu choices.

Note: Features of the Configuration / Setup Utility program are not accessible through the network.You must attach a keyboard, mouse, and monitor to the xSeries appliance server using a C2T device breakout cable (see “C2T device breakout cable” on page 59) to use features of the Configuration / Setup Utility program.

Starting the Configuration/Setup Utility program

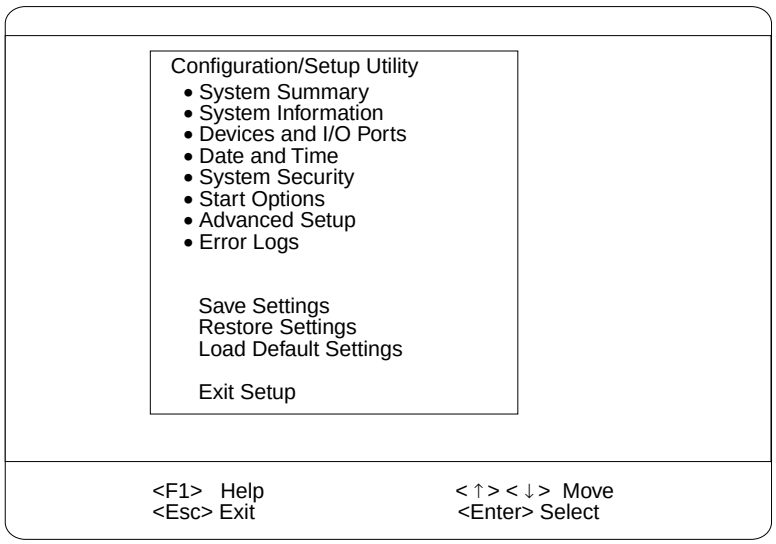
To start the Configuration / Setup Utility program:

1. Turn on the server and watch the monitor screen.
2. When the message `Press F1 for Configuration/Setup` appears, press F1.

   Note: If you have set both levels of passwords (user and administrator), you must type the administrator password to access the full Configuration / Setup Utility program menu.
3. Follow the instructions that appear on the screen.

Choices available from the Configuration/Setup main menu

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



Notes:

1. You can press F1 to display Help information for a selected menu item.
2. The choices on some menus might differ slightly, depending on the BIOS version in your server.

The following choices available from the main menu:

- **System Summary**

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

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

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

- **System Information**

  Select this choice to display information about your server. Changes that you make on other menus might appear on this summary screen. You cannot edit any fields. The **System Information** choice appears only on the full Configuration/Setup Utility program main menu.

  — **Product Data**

    Select this choice to view system information, such as the machine type and model, the server serial number, and the revision level or issue date of the BIOS stored in the flash electronically erasable programmable ROM (EEPROM).

  — **System Card Data**

    Select this choice to view vital product data (VPD) for some server components.

- **Devices and I/O Ports**

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

  You can use this choice to enable or disable the integrated SCSI and Ethernet controllers.

  — The default setting is **Enable** for all the controllers. If you select **Disable**, the system will not configure the disabled device and the operating system will not detect the device. (This is equivalent to unplugging the device.)

  — If the on-board SCSI controller is disabled and no other storage-device controller is installed, operating system startup cannot occur.

- **Date and Time**

  Select this choice to set the system date and time when the server is started. This choice appears only on the full Configuration/Setup Utility program main menu.

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

- **System Security**

  Select this choice to set passwords or a system owner's name. This choice appears only on the full Configuration/Setup Utility program main menu.

  You can implement two levels of password protection:

  — **Power-on Password**

    Select this choice to set or change a power-on password. See "Using passwords" on page 15 for more information.

  — **Administrator Password**

    Select this choice to set or change an administrator password.

    Attention: If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

The administrator password provides access to all choices on the Configuration/Setup Utility program main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user.

See "Using passwords" on page 15 for more information.

- **Start Options**

  Select this choice to view or change the start options. This choice appears only on the full Configuration/Setup Utility program main menu. Start options take effect when you start your server.

  The server uses a startup sequence to determine the device from which the operating system loads. For example, you can define a startup sequence that checks for a startable diskette in the diskette drive, then checks the hard disk drive in bay 1, and then checks a network adapter.

  If the **Boot Fail Count** choice is enabled, you must restart the system three times to restore the system BIOS default settings. If this choice is disabled, the system BIOS defaults can be restored only from the Configuration/Setup Utility program main menu.

  You can enable a virus-detection test that checks for changes in the master boot record at startup.

- **Advanced Setup**

  Select this choice to change values for advanced hardware features, such as cache control and PCI configuration. This choice appears only on the full Configuration/Setup Utility program main menu.

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

  — **Processor Serial Number Access**

    Select this choice to identify if the microprocessor serial number in the microprocessor is readable.

  — **System Partition Visibility**

    Select this choice to identify if the System Partition is visible. To make the System Partition visible, set this value to **Visible**. To make the System Partition invisible, set this value to **Hidden**.

  — **Core Chipset Control**

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

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

  — **Cache Control**

    Select this choice to enable or disable the microprocessor cache. In addition, you can set the microprocessor cache mode to write-back (WB) or write-through (WT). Selecting write-back mode will provide the maximum system performance.

  — **PCI Slot/Device Information**

    Select this choice to view and identify system resources that are used by PCI devices. PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device.

    Attention: You must use the menu selections to save custom settings for the PCI Slot/Device Information choice. The **Save Settings**, **Restore Settings**,

and **Load Default Settings** choices on the main menu of the Configuration/Setup Utility program do not save the PCI Slot/Device Information settings.

You can use PCI Device Control to enable or disable the PCI slots from this menu.

The default setting is **Enable** for all the PCI slots. If you select **Disable**, the system will not configure the disabled device, and the operating system will not detect the device. (This is equivalent to unplugging the device.)

— **Memory Settings**

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

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

- **Error Logs**

  Select this choice to view or clear error logs.

  — Select **POST Error Log** to view the three most recent error codes and messages that the system generated during POST.

  Select **Clear Error Logs** from the POST Error Log menu to clear the error log.

  — Select **System Event/Error Log** to view the system event/error log. The system event/error log contains all the system error and warning messages that the system has generated. You can use the arrow keys to move between pages in the system event/error log.

  Select **Clear Error Logs** from the System Event/Error Log menu to clear the error or event log.

- **Save Settings**

  Select this choice to save your customized settings.

- **Restore Settings**

  Select this choice to delete your changes and restore the previous settings.

- **Load Default Settins**

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

- **Exit Setup**

  If you have made any changes, the program will prompt you to save the changes or exit without saving the changes.

Using passwords

The **System Security** choice appears only on the full Configuration/Setup Utility program menu. After you select this choice, you can implement two levels of password protection: power-on password and administrator password.

Power-on password

After you set a power-on password, you can enable the unattended-start mode. This locks the keyboard and mouse, but allows the system to start the operating system. The keyboard and mouse remain locked until you type the correct password.

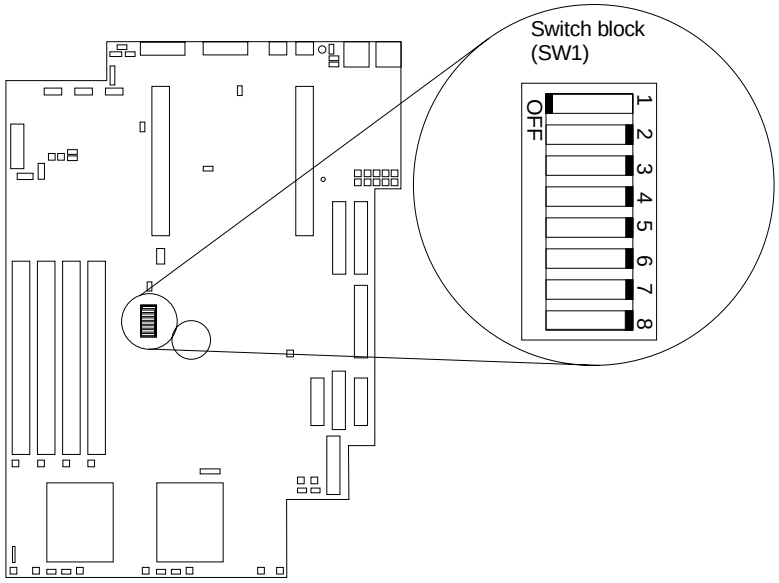
Note: You must attach a keyboard, mouse, and monitor to the xSeries appliance server using a C2T device breakout cable (see “C2T device breakout cable” on

page 59) to use features of the Configuration / Setup Utility program. Features of the Configuration / Setup Utility program are not accessible through the network.

You can use any combination of up to seven characters (A–Z, a–z, 0–9, and blanks) for your power-on password. Keep a record of your password in a secure place. If you forget the power-on password, you can regain access to the server through one of the following methods:

- If an administrator password is set, type the administrator password at the power-on prompt. Start the Configuration / Setup Utility program and change the power-on password.
- Change the position of the password override jumper as described in "Setting the password override switch".
- Remove the battery and then install the battery.

Setting the password override switch: The following illustration shows the location of the password override switch, switch 8 of switch block 1, on the system board.



To set the password override switch:

1. Review the information in "Safety information" on page 39.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See "Removing the cover" on page 44.
3. Toggle switch 8 on switch block 1 on the system board. This clears the power-on password for one boot cycle.

   Note: This means that you can now start or power-up the server one time without having to use the power-on password. But if you do not use the Configuration / Setup Utility program to change or delete the password, the next time you start the server the original power-on password will be reinstated.
4. Connect the server to a power source, keyboard, monitor, and mouse.
5. Start the server.

Note: You can now start the Configuration / Setup Utility program and either delete the old or set a new power-on password.

Administrator password

Select this choice to set an administrator password. The administrator password provides access to all choices on the Configuration / Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user.

Attention: If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

The following table provides a summary of the password features.

Table 2. Power-on and administrator password features

Type of password	Results
Power-on password	• Type the password to complete the system startup. • All choices are available on the Configuration / Setup Utility program main menu.
Administrator password	• No password is required to start the system. • Type the password to access the Configuration / Setup Utility program. • All choices are available on the Configuration / Setup Utility program main menu.
Administrator *and* power-on password	• You can type either password to complete the system startup. • The administrator password provides access to all choices on the Configuration / Setup Utility program main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user. • The power-on password provides access to a limited set of choices on the Configuration / Setup Utility program main menu. This limited access might include changing or deleting the power-on password.

Using the SCSISelect Utility program

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

- View the default SCSI IDs
- Locate and correct configuration conflicts
- Perform a low-level format on a SCSI hard disk

The following sections provide the instructions needed to start the SCSISelect Utility and descriptions of the available menu choices.

Starting the SCSISelect utility program

To start the SCSISelect utility program:

1. Turn on the server.
2. When the `<<< Press <CTRL><A> for SCSISelect™ Utility! >>>` prompt appears, press Ctrl+A.

Note: If an administrator password has been set, a prompt appears asking you to type the password to start the SCSISelect Utility program.

3. Use the arrow keys to select a choice from the menu.
   - Press Esc to return to the previous menu.
   - Press F5 to switch between color and monochrome modes (if your monitor permits).
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

Choices available from the SCSISelect menu

The following choices appear on the SCSISelect Utility menu:

- **Configure/View Host Adapter Settings**

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

  You can view or change the following controller settings:

  — **Host Adapter SCSI ID**

  Select this choice to view the SCSI controller ID, normally 7.

  — **SCSI Parity Checking**

  Select this choice to view the assigned value of **Enabled**

  — **Host Adapter SCSI Termination**

  Select this choice to view the assigned value of **Enabled**.

  — **Boot Device Options**

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

  — **SCSI Device Configuration**

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

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

  – The transfer rate for Ultra3 SCSI LVD devices is 160.0

  – The transfer rate for Ultra2 SCSI LVD devices is 80.0

  – The transfer rate for Fast SCSI devices is 20.0

  — **Advanced Configuration Options**

  Select this choice to view or change the settings for advanced configuration options.

- **SCSI Disk Utilities**

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

  To use the utility program, select a drive from the list. Read the screens carefully before making a selection.

  Note: If you press Ctrl+A before the selected drives are ready, an Unexpected SCSI Command Failure screen might appear. Restart the server and

watch the SCSISelect messages as each drive spins up. After the drive that you want to view or format starts up, press Ctrl+A.

Using the PXE boot agent utility program

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

- Change network startup (boot) protocols
- Change startup (boot) order
- Select whether to display a setup prompt
- Set menu wait time
- Select operating-system wake up support

Starting the PXE boot agent utility program

The following sections provide the instructions to start the PXE Boot Agent Utility and descriptions of the available menu choices.

To start the PXE Boot Agent Utility program:

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

   Note: By default you will have two seconds after the prompt appears on the screen to press Ctrl+S.
3. Use the arrow keys or press Enter to select a choice from the menu.
   - Press Esc to return to the previous menu.
   - Press F4 to exit.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

Choices available from the PXE boot agent utility

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

- **Network Boot Protocol**

  PXE is the default value for this menu item.

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

  Select this choice to change the order in which startup devices are queried:

  — **Try local drives first, then network** (default)

  — **Try network only**

  — **Try local drives only**

  — **Try network first, then local drives**
- **Show setup prompt**

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

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

- **Setup time wait menu**

  Select this choice and select one of the following options to set the amount of time (in seconds) that the system pauses during initialization for a Ctrl+S input:

  — **2 seconds** (default)

  — **3 seconds**

  — **5 seconds**

  — **8 seconds**

- **Legacy OS wake up support**

  Select this choice select one of the following options to allow / disallow a non-Windows operating system to use the adapter remote wake-up capability.

  — **Disabled** (default)

  — **Enabled**

Using Appliance System Manager

Appliance System Manager is a program that you can use to configure and manage the resources of the IBM xSeries 135 appliance server. For more information about this application program, see the *Appliance System Manager Administration Guide*.

Appliance System Manager is accessed through a Web browser on a computer that has network access to the appliance server. Appliance System Manager enables the system administrator to change system settings and other configuration settings for the appliance.

To access Appliance System Manager, do the following:

1. Open a browser on a computer that has network access to the appliance server.
2. Go to https://*appliance_IP_address*:1999 where *appliance_IP_adress* is the IP address of the appliance. The appliance main page appears.
3. Click **Appliance Administration**.
4. Accept the new site certificate when prompted.
5. When prompted, type `administrator` for the user name and `password` for the password. In the ASM Main Page, you can perform configuration tasks. See the *Appliance System Manager Administration Guide* for more information about configuring the appliance.

IBM Advanced Appliance Configuration Utility

The IBM Advanced Appliance Configuration Utility aids in setting up and reconfiguring the network configuration on your IBM xSeries 135 appliance servers. The Advanced Appliance Configuration Utility agent, which is preinstalled on your IBM xSeries 135 appliance server, works with the Advanced Appliance Configuration Utility console, a Java™-based application that is installed on a network-attached system that will be used as a systems management console that enables automatic detection of IBM xSeries appliance servers 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 of the appliance, including assigning the IP address, default gateway, network mask, and DNS server to be used by the appliance. You can also use the Advanced Appliance Configuration Utility to start Appliance System Manager, enabling you to perform more advanced systems-management tasks.

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 typically the built-in 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 appliance servers and their network settings.

The Advanced Appliance Configuration Utility agent

When 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 in use by the appliance. Furthermore, it will report 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 server.

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 IBM 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 32.

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 appliance servers that run the Advanced Appliance Configuration Utility agent and are attached to the same physical subnet 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 subnet that are running the Advanced Appliance Configuration Utility agent.
- Use a simple, GUI-based application to configure the network settings of the appliance 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 performing the same function appear in the same family.

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 appliances and includes any families that you have 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 any item in the Tree View, information about that item (and any that are nested below that item in the tree view), appears in the Information pane.

- The Information pane

  The Information pane at the right side of the Advanced Appliance Configuration Utility console window 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 Appliances** item 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 appliances

Any appliance server that is running and is connected to the same subnet as the system 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 automatically appears 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 will 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 26.

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 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 Advanced Appliance Configuration Utility is not the only way to configure network settings. For example, network settings can be configured using Appliance System Manager or by attaching a keyboard and mouse to the appliance and using Appliance System Manager 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 A**ll Appliances**.

- Families

  The Families group in the Tree View pane shows all families that have been defined, with appliance servers that have already been assigned to each family nested beneath the family name in the tree view. Families are defined by appliance purpose so all appliances that appear in a given 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 define the selected family are displayed in the Information pane. If you select an appliance server from a family in the Tree View pane, the selected appliance network settings are displayed in the Information pane.

  The Advanced Appliance Configuration Utility automatically assigns one IP address per appliance server, using available addresses within the range that is defined in the family rules. When a Family IP address range has been exhausted, the Advanced Appliance Configuration Utility automatically searches for other families that have rules matching the appliance server that is being configured. If a matching family with an available address is found, the server will automatically be assigned to the family that has available IP addresses. This enables you to define multiple families, each of which uses a range of noncontiguous IP address ranges.

  When an appliance is discovered on the network, the Advanced Appliance Configuration Utility automatically searches all previously defined families, starting with the first family listed in the families tree view and moving downward. Appliances are automatically added to the first defined family that matches the appliance purpose. Therefore, the order in which families appear is important. To adjust this search order, right-click a family and then click **Move Up** or **Move Down** to adjust its position within the families list.

- Orphaned Appliances

  Any discovered appliance servers that have been configured using the Advanced Appliance Configuration Utility but 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 the Advanced Appliance Configuration Utility tool and 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 and 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 26.

  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

To create 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 a name that will be used 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, or 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 this Family (optional)

     DNS The IP address of the Domain Name Server that will be used by appliances that are members of the 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 System (DNS) Server that will be used by appliances that are members of this family.

5. Select a host name allocation type.

   The host name allocation type enables you to automatically specify a specific host name that members of this family will use. 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 the family.

Removing appliances from families

Use the **Remove Appliance** choice 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; 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 have been 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 to which you want the appliance moved.
  2. Click **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**.

Setting the initial Internet protocol (IP) address

You must set the initial IP address for the appliance server before you can perform any other configuration procedure for the appliance. Be sure that you set the initial IP address for only one appliance at a time on the physical network.

Note: Before you logon, you need to have a valid IP address, netmask, host name, domain name, gateway, and primary DNS server address for the appliance to use in your IP network. If you do not have this information, contact your network administrator.

There are four methods that you can use to set the initial IP address. These methods are:

- Using Appliance System Manager. See "Setting the initial IP address using Appliance System Manager" for instructions.
- Using the command line if a locally attached browser is not available. See "Setting the initial IP address in a command line" on page 28 for instructions.
- Using the IBM Advanced Appliance Configuration Utility. See "Setting the initial IP address using the IBM Advanced Appliance Configuration Utility" on page 28 for instructions.
- Using a diskette. See "Setting the initial IP address using a diskette" on page 29 for instructions.

Setting the initial IP address using Appliance System Manager

To set the initial IP address for the appliance, do the following:

1. Open a browser on a computer that is attached to the same physical network as the appliance.
2. Disable the proxy settings for the browser.
3. Go to http://*appliance_IP_address*:3939 where *appliance_IP_address* is the IP address that you want to assign the appliance.
4. Type `administrator` for the user ID and `password` for the password.

   Notes:

   a. The **User Name** and **Password** fields are case sensitive.

   b. The user name and password are different from the root user.
5. Click **Next**. The **ASM Configuration** window appears, allowing you to change the password for the root user.
6. Change the password for the root user.

   a. Type a new password.

   b. Type the password again.

   c. Click **Next**. The ASM Configuration-Set Networking Parameters window appears. Type the information for the following required fields and then click **Next**:

      - Host Name
      - Domain Name
      - Gateway
      - IP Address (the IP address is already displayed, but you can change it to a different address)

- Netmask
- Primary DNS Server (optional)

d. Click **Next** to make the changes take effect. A `Machine rebooting` message appears. If the page does not load by itself in five minutes, click **Refresh**.

7. When prompted, type `administrator` for the user name and `password` for the password. In the ASM Main Page, you can perform additional configuration tasks.

See the *Appliance System Manager Administration Guide* for information about additional configuration tasks.

Setting the initial IP address in a command line

A command line script is provided if a locally attached browser is not accessible. To use this method of assigning the initial IP address, do the following:

1. Turn off the appliance server.
2. Attach a C2T device breakout cable to the appliance server Out connector. See “C2T device breakout cable” on page 59 for details.
3. Attach a keyboard, mouse, and monitor to the C2T device breakout cable to the C2T device breakout cable, or attach a serial terminal (VT100) to the serial port.
4. Turn on the appliance server.
5. Log in to the appliance server as the user `root` with the password of `password`.
6. Type `/opt/CSM/scripts/setup.pl` and press .
7. Respond to the questions as prompted.
8. Type `Y` and press Enter to restart the appliance when prompted.

Setting the initial IP address using the IBM Advanced Appliance Configuration Utility

To set the initial IP address using the IBM Advanced Appliance Configuration Utility, do the following:

1. Configure the IBM Advanced Appliance Configuration Utility with a scope that includes the newly deployed appliance.
2. Start the IBM Advanced Appliance Configuration Utility with the configuration and deploy the new appliance in the same subnet (the IBM Advanced Appliance Configuration Utility does not work outside of the subnet of the appliance).
3. Select the appliance in the left pane and click **Start Web Management**. An initial configuration page opens.
4. Complete the initial configuration of the appliance using the wizard. The appliance restarts.

Setting the initial IP address using a diskette

To set the initial IP address using a diskette, do the following:

1. Format a diskette using computer running DOS or Windows, or create a DOS file system on the diskette if you are using some other computer.
2. Create a file in the root directory of the diskette called initsys.ini with an initial configuration file containing the new IP address of the appliance.

   The diskette can contain the following information:

   - Initial IP address
   - Host name of the appliance
   - IP address of gateway device (default route)
   - Network mask
   - IP address of primary DNS name server
   - System password

     The following is an example configuration file:

     ```
     IPaddress=10.1.1.1
     Subnet=255.255.255.0
     GatewayAddress=9.27.67.1
     ```

   The configuration file contains only 7-bit standard ASCII characters. Lines beginning with # are treated as comments. All blank spaces are ignored. Keywords can appear in any order, and the keyword names are case-sensitive.

   The following keywords are available:

Keyword	Purpose	Default value
IPaddress	Initial IP address	
NetworkMask	Network mask	
HostName	Fully-qualified host name	
GatewayAddress	IP address of gateway device	
NameServerAddress	IP address of primary DNS name server	
Password	System password	existing system password

   Notes:

   a. The only required parameter in the initial configuration file is the initial IP address. The system password parameter default is `password`.

   b. If any parameters other than the initial IP address are not specified, the administrator must use the initial configuration wizard that is provided by the Appliance System Manager to complete the initial configuration of the appliance. Any values that are supplied in the file are automatically filled in when using the wizard, so that you do not have to type them again.

3. Insert the diskette into the appliance and turn on the appliance.

   Note: The diskette must be in the appliance when the appliance is started for the contents of the diskette to be read.

Changing default passwords

Passwords on new appliances are set to `password`. To change the passwords, do the following:

- If the root password has not been changed in the initial configuration page, click **Security/System Password** in Appliance System Manager, and change the password.
- The default user is `webroot` with a password of `password`. Click **Security/Manage Users** in Appliance System Manager, and change the default user password.
- The default Appliance System Manager administrator ID is `administrator` with a password of `password`. Click **Security/Manage Administrators/Edit Administrator** in Appliance System Manager, and change the administrator user password.

For greater security, create an Appliance System Manager administrator with a different user ID and password. Then delete the original administrator user ID.

Important

Do not delete the original administrator ID until you have created a new administrator ID that is valid.

Chapter 4. Using the Recovery and Supplementary CDs

This chapter describes the applications that are included on the *IBM xSeries 135 Supplementary* and *Recovery* CDs and information about how and when you should use them.

Using the recovery enablement diskette and Recovery CD

The *Recovery* CD is a startable CD that is used to recover the preinstalled programs on your xSeries 135 appliance server. You must start your server using a recovery enablement diskette to use the *Recovery* CD. You can create a recovery enablement diskette using a utility on the *Supplementary* CD.

To create a recovery enablement diskette, do the following:

1. Insert the *Supplementary* CD into the CD-ROM drive of a remote computer running Microsoft Windows 98, Windows NT, or Windows 2000.
2. Run \Recovery_Enablement_Disk\DiskCreator.exe.
3. Select either **Reload** or **Reformat**. The **Reload** option restores the original factory-installed programs and leaves the data partition (/home) unchanged. The **Reformat** option erases all data on the hard disk of the appliance and makes no attempt to save any information in any partition of the disk.
4. Select either to use a new diskette or an existing diskette. A warning message appears. Click **Yes** or **No**.
5. Click **Agree** at the license agreement.

Important

The recovery enablement diskette enables the IBM xSeries 135 appliance server to start from the CD-ROM drive. You will not be able to restore the preinstalled programs from the *Recovery* CD without restarting the server using a recovery enablement diskette.

The software can be reinstalled using the *Recovery* CD. The *Recovery* CD must be accompanied by a recovery enablementdiskette.

To recover the preinstalled programs on your server:

1. Insert the recovery enablement diskette into the diskette drive and the *Recovery* CD in the CD-ROM drive, and restart the server. The recovery process begins automatically and the preinstalled programs are restored with the original settings and configuration. After the preinstalled programs are restored, the system restarts automatically and all final operating system configuration changes are performed.
2. After the software has been reinstalled, the *Recovery* CD is ejected and the appliance is restarted with the initial software and configuration.
3. Perform the initial setup procedures that are required to setup the the appliance server. See “Setting the initial Internet protocol (IP) address” on page 27.

4. Finish restoring the software using the Application System Manager administrative interfaces to do any of the following tasks:
   - Install any required software upgrades.
   - Restore the appliance configuration using backed up configuration information.
   - Perform any other desired configuration and administrative actions to fully restore the appliance.
   - Restore the appliance application data, if required.
5. Restart the appliance using the restored system and configuration.

   Note: Although data is not affected by recovering the preinstalled programs on the appliance server when you use the **Reload** option, the data is not accessible until a backed-up system configuration is restored to redefine the system users who own the data. Store up-to-date configuration backups on a different computer.

Using the Supplementary CD

The Supplementary CD contains copies of key software applications that are preinstalled on your xSeries 135 appliance server. The following table lists the names of the directories on the *Supplementary* CD and a description of the contents of the 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 135. 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.
License	License information for the preinstalled IBM and non-IBM software
Recovery_Enablement_Disk	DiskCreator.exe and related files. See “Using the recovery enablement diskette and Recovery CD” on page 31 for a description of how to use the DiskCreator.exe utility to create a recovery enablementdiskette.
Sources	RPM packages of the source code of the open-source software that is preinstalled on the xSeries 135 appliance server.
readme.txt	A text file that describes the contents of the *Supplementary* CD.

Chapter 5. Installing options

This chapter provides reference instructions to help you in case you need to replace parts of your server.

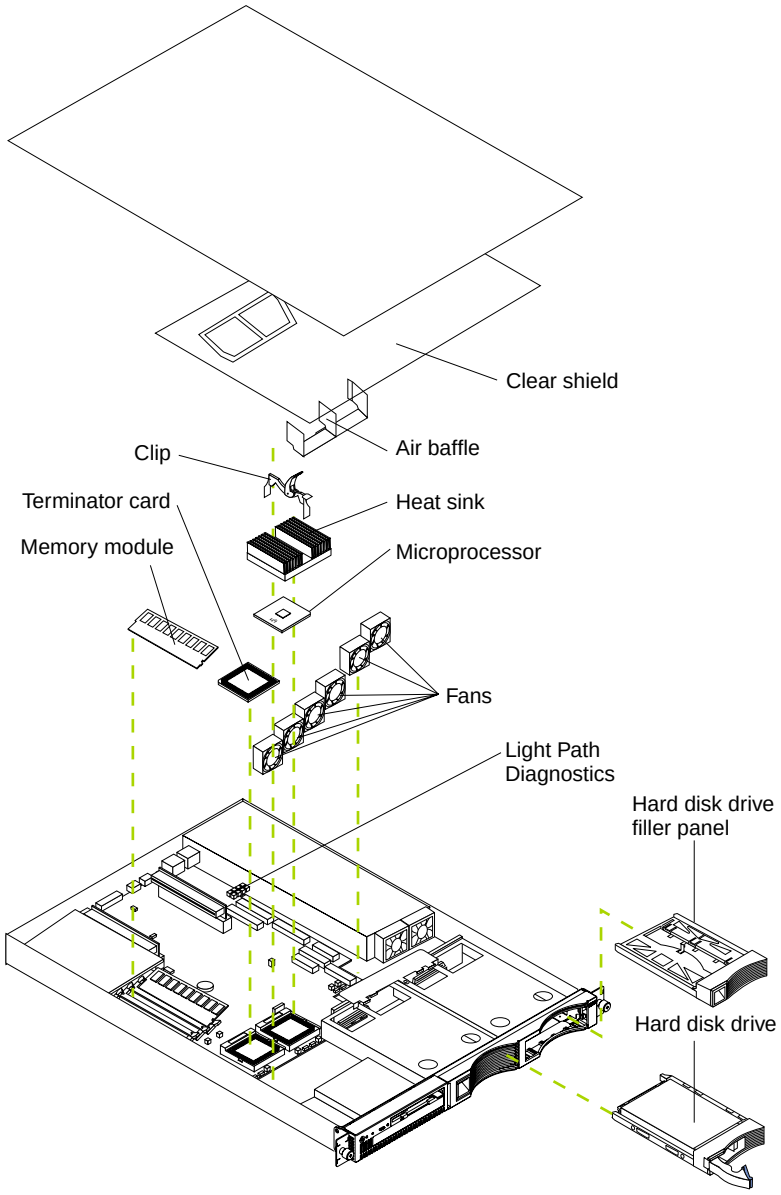
Important

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

These instructions are provided to help you to replace parts if needed. Your IBM xSeries 135 appliance server does not support the installation of additional optional devices.

Major components of the IBM xSeries 135 appliance server

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

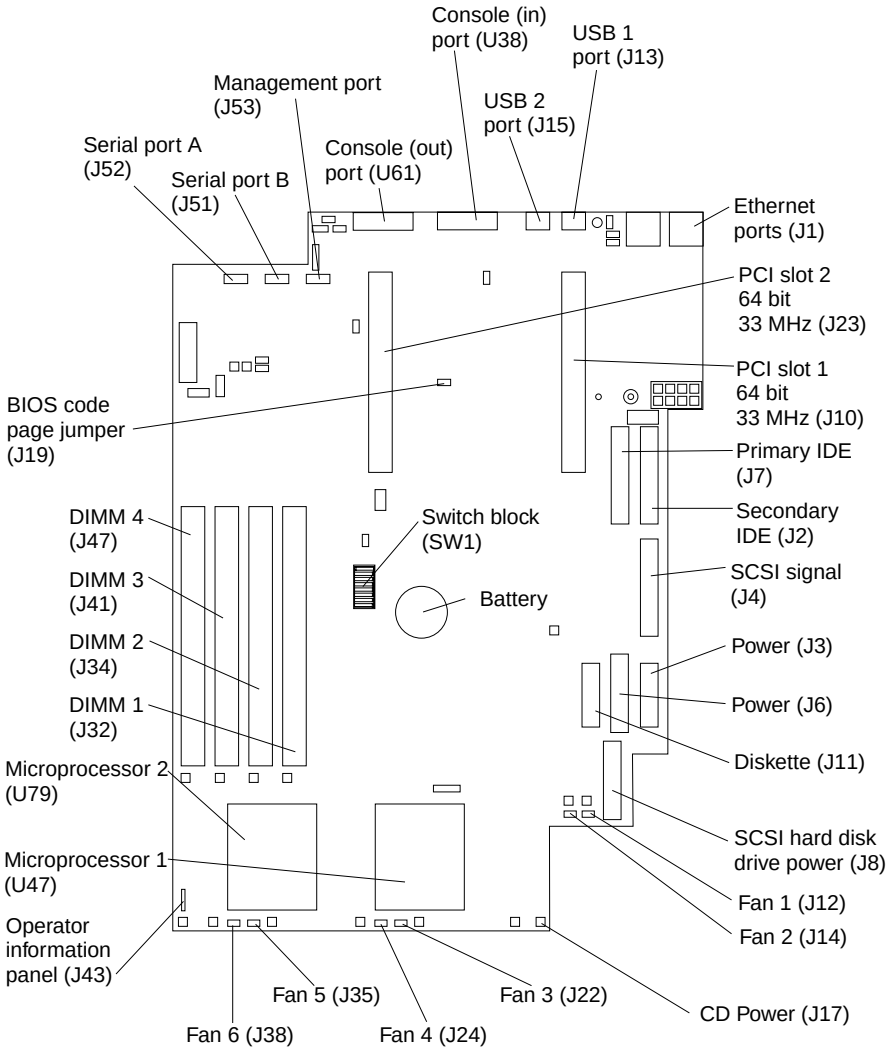


System board

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 88 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. For a more information about this switch block see “Setting the password override switch” on page 16.

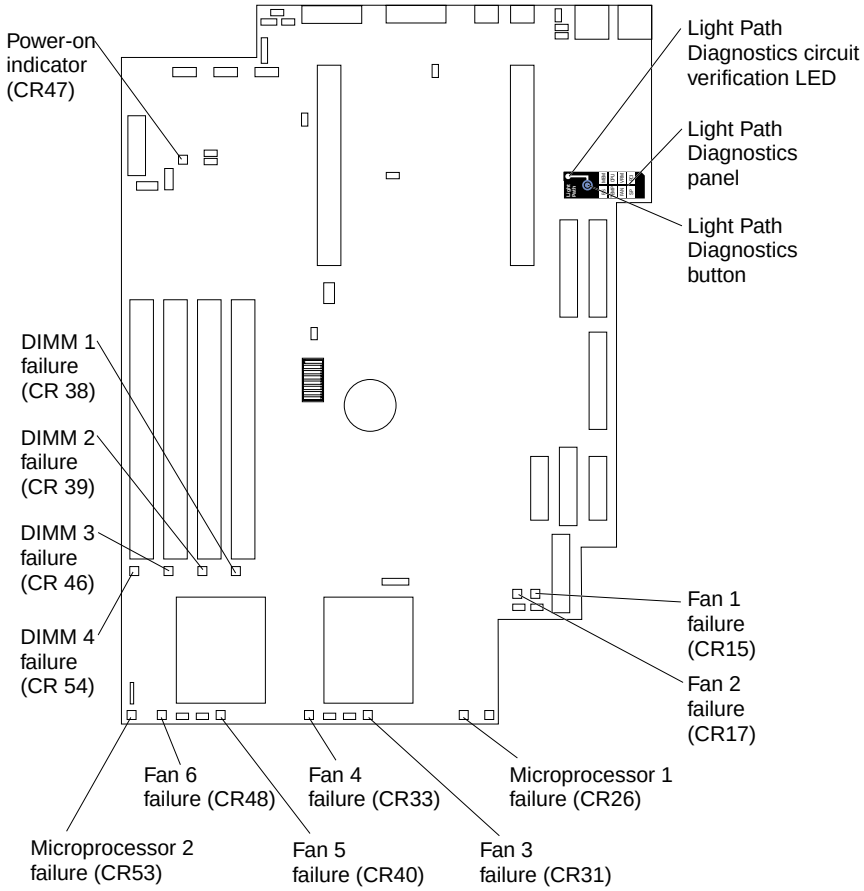
The following table describes the function for each switch.

Table 3. 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. Refer to “Setting the password override switch” on page 16.

System board LEDs

The following illustration identifies the LEDs on the system board.



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 38, and read the safety statements in "Safety information," beginning on page 39. 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.
- For a list of supported options for your server, refer to http://www.ibm.com/pc/us/compat on the World Wide Web.
- For your convenience during setup and service you might want to have a location separate from the network where you can temporarily connect the server to a power source (using a separate power cord), keyboard, monitor, and mouse (using a separate C2T device breakout cable).

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 enable the server cooling system to work properly. Leave approximately 127 mm (5 in.) of space around the front and rear of the server.
- Cables for optional adapters are routed according to the instructions that are provided with the adapters.
- 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 you are 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 bag until you are ready to install them.

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

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not 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.**
- **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:

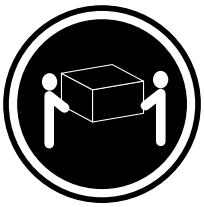
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous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

DANGER

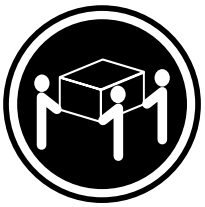
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

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

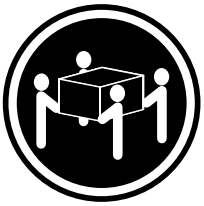
Statement 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

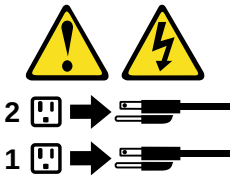
CAUTION:

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

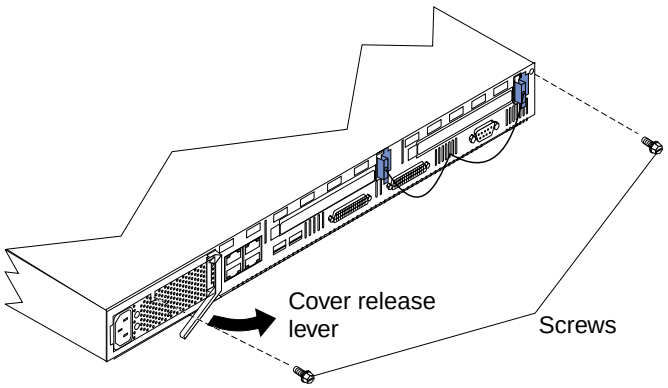
CAUTION:

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.



Complete the following steps to remove the server cover:

1. Review the information in "Safety information" on page 39 and "Working inside a server with power on" on page 38.
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.

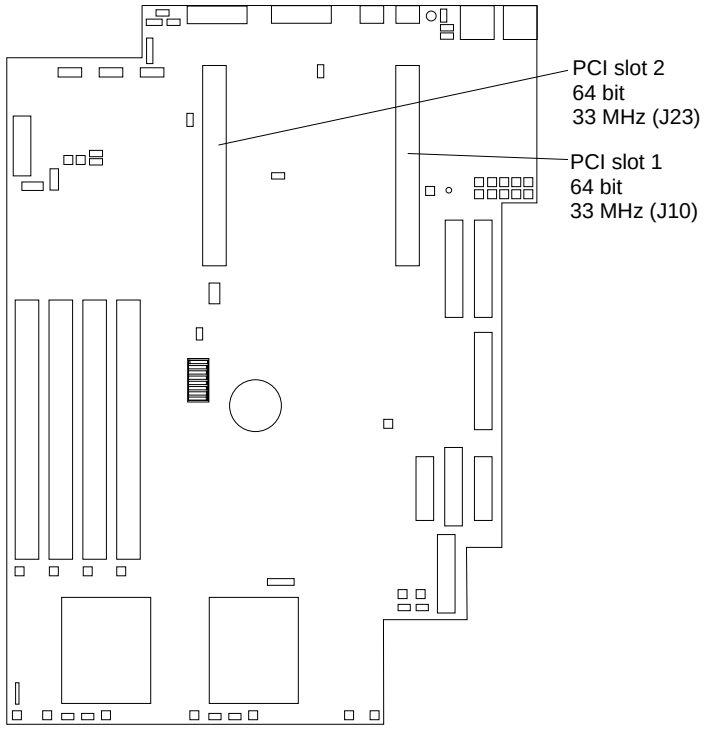
Working with adapters

Your server comes with two peripheral component interconnect (PCI) adapter slots on the system board with riser cards installed in them.

Attention: Your server also comes with an integrated video controller on the system board. When you install a video adapter in a PCI slot, the server BIOS automatically disables the integrated video controller. This enables the video adapter in the PCI slot to control the video functions for your monitor.

The following illustration shows the location of the 33 MHz PCI expansion slots on the system board.

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



Adapter considerations

Before you install adapters, 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 5.0V and universal PCI adapters; it does not support 3.3V 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) dystem SCSI devices first, then PCI devices.

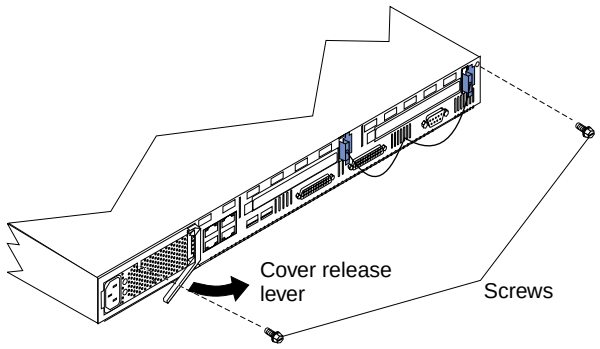
  Note: To change the boot precedence, start the Configuration/Setup Utility, select **Start Options** from the main menu; then, select the **PCI SCSI adapter boot option**.

Installing an adapter

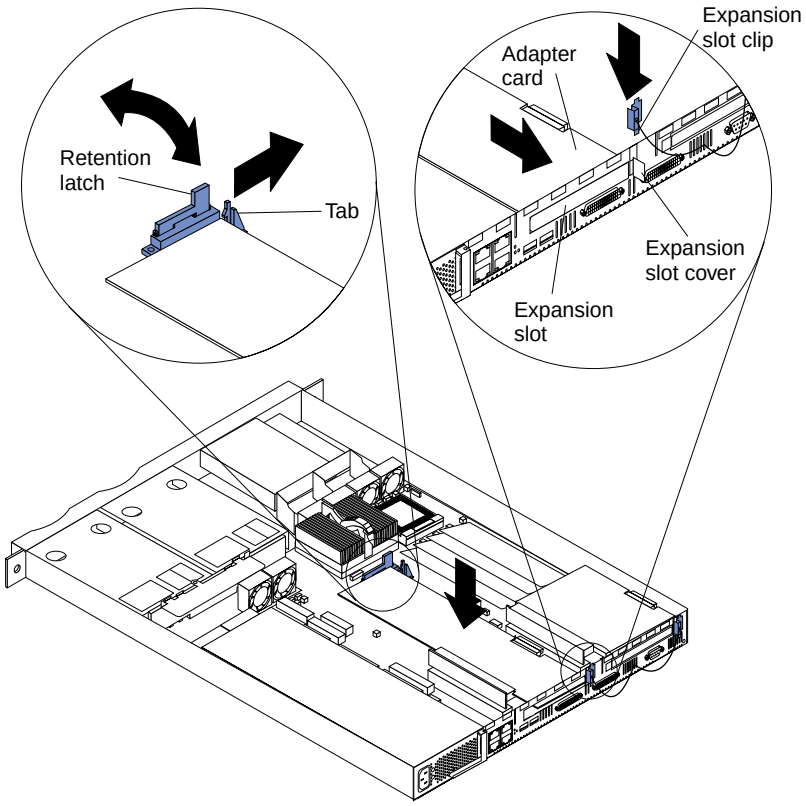
Complete the following steps to install an adapter:

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

1. Review the information in "Safety information" on page 39.
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 44 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.



5. Remove the expansion-slot cover.
6. See the documentation that comes with your adapter for any cabling instructions.

   Attention: 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.

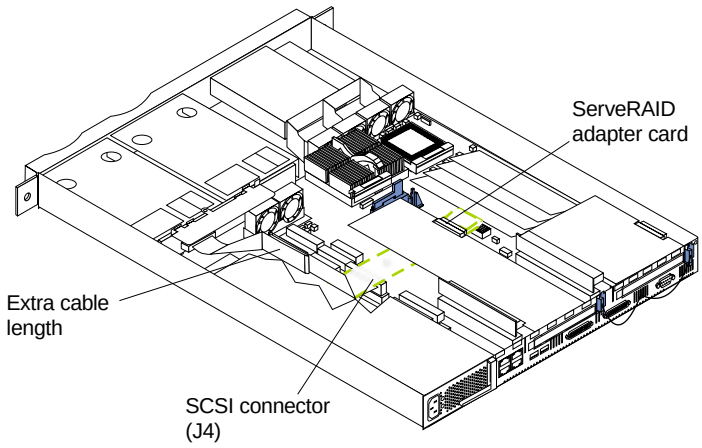
      Attention: When you install an adapter, be sure that the adapter is correctly seated in the riser-card connector before you turn on the server. Improperly seated adapters might cause damage to the system board, the riser card, or the adapter.

   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.

Note: When installing a ServeRAID adapter, remove the cable from the SCSI connector (J4) on the system board and attach it to the ServeRAID adapter.



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 56 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.

Note: You can hot-swap a hard disk drive only if a ServeRAID adapter that is configured as RAID 1 is installed in your system. If you use any other ServeRAID or SCSI configuration, you cannot hot-swap the hard disk drive.

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 135 appliance server” on page 34 for the location of the status and activity indicators). These lights 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 and is connected to J4 on the system board.
- The backplane controls the SCSI IDs for the hard disk drives.

Pre installation steps

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

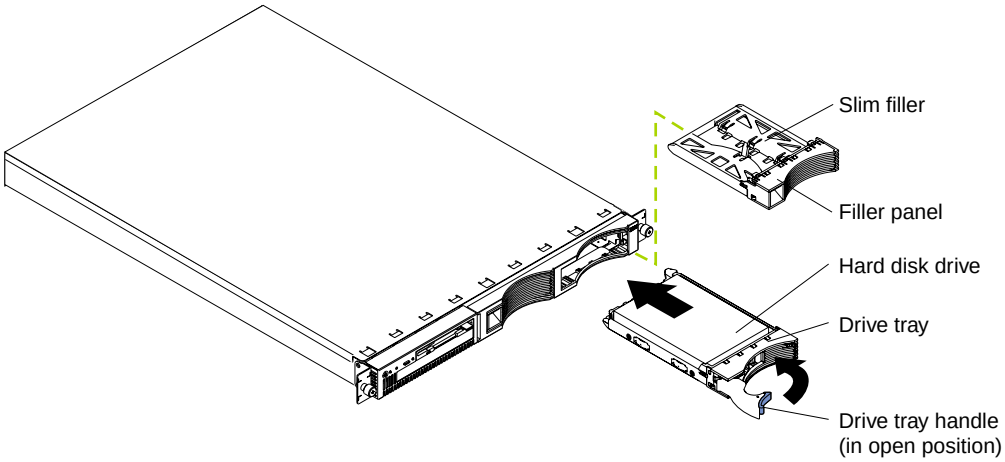
- Inspect the drive tray for any signs of damage.
- Ensure that the drive is installed properly in the tray.
- To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed in each bay.
- Review the information in “Safety information” on page 39 and “Handling static-sensitive devices” on page 38.

- Check the instructions that come with the drive for more information about installing your drive.

Installing or replacing a hard disk drive

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 38.

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

1. Review the information in "Safety information" on page 39.
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 135 appliance server" on page 34 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

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 on the system board in DIMM connector 1.

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 38.

1. Review the information in "Safety information" on page 39.
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 44 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.

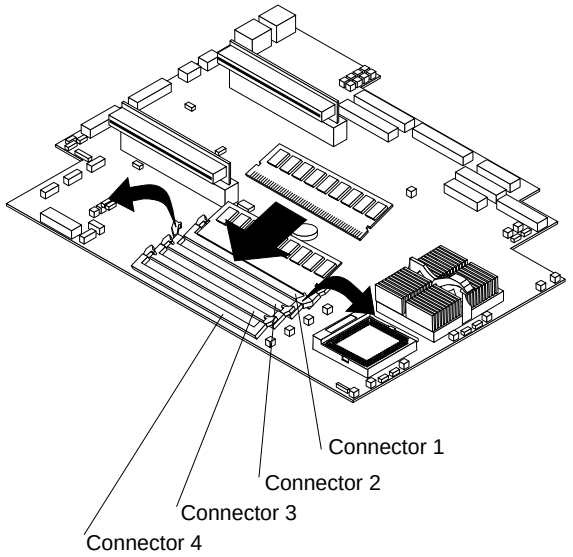
   Attention: To prevent damage to the DIMM connectors, do not force the memory module into the connector.

   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.



   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 56 for instructions.

8. Turn on the server.

   Note: When you restart the server, the system displays a message indicating that the memory configuration has changed.

   - If you just replaced a failed DIMM, you must start 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 system BIOS to reset the memory connector or bank of connectors from **Disabled** to **Enabled**.

Microprocessor

Your server comes with one microprocessor installed on the system board.

Notes:

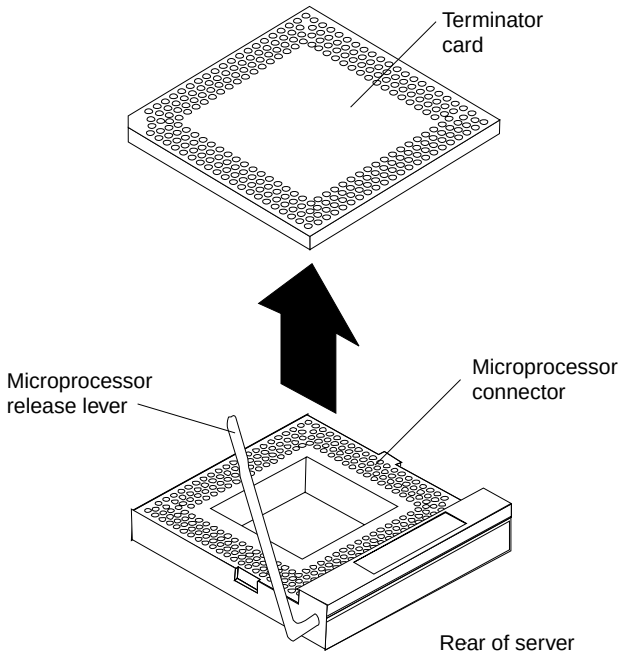
1. Before you install a microprocessor, review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS). The latest level of BIOS for your server is available through the World Wide Web. Refer to "Getting help,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

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

Complete the following steps to install a microprocessor:

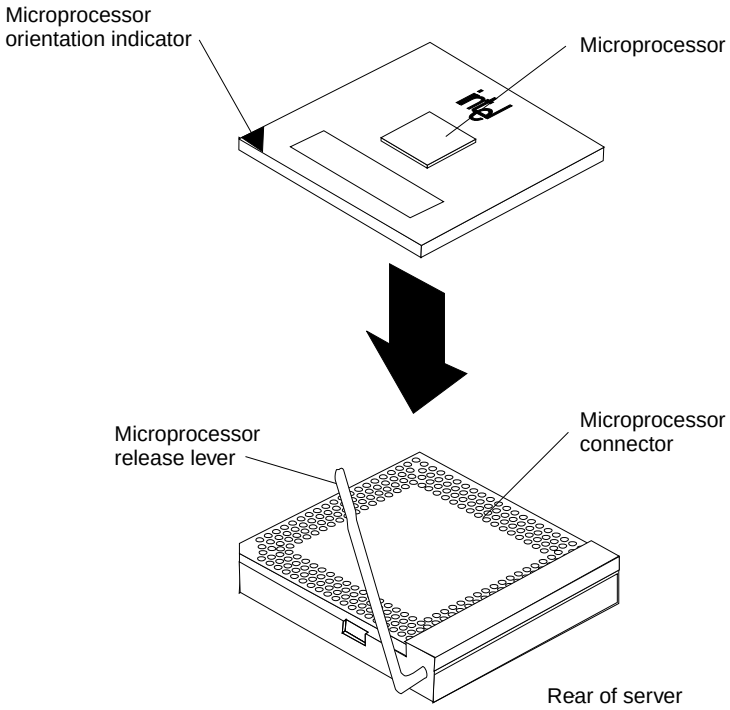
Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to"Handling static-sensitive devices" on page 38.

1. Review the information in "Safety information" on page 39.
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 44 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 the microprocessor, you will need to install the terminator card again.).



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.

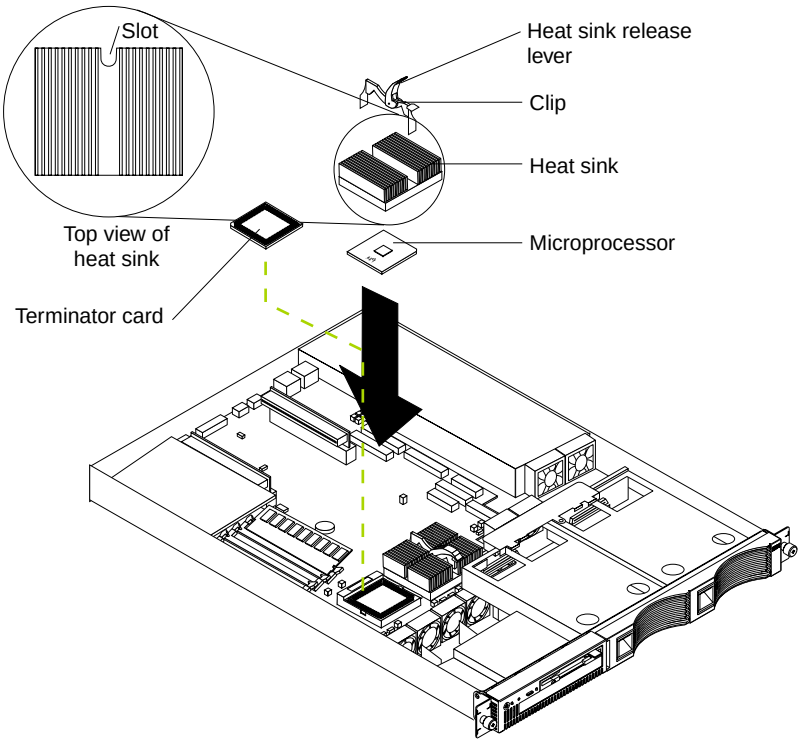
8. Install the heat sink on the microprocessor:
   a. Peel the plastic protective strip off the bottom of the heat sink. Make sure that the square of thermal material is still on the bottom of the heat sink.
   b. Align and place the heat sink on top of the microprocessor.

      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.



9. Replace the clear shield.

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

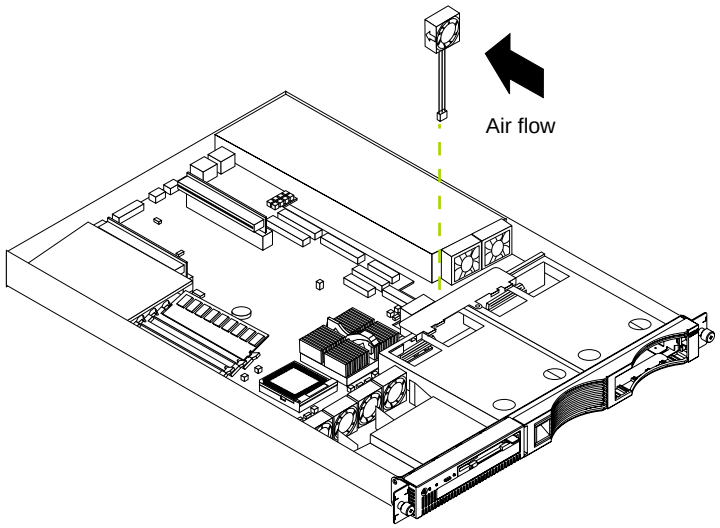
10. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information, see “Installing the cover” on page 56 for instructions.
11. Start the server and run the Configuration/Setup Utility program.

Fan assembly replacement

Your server comes with six replaceable fans.

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

The following illustration shows the replacement of a fan.



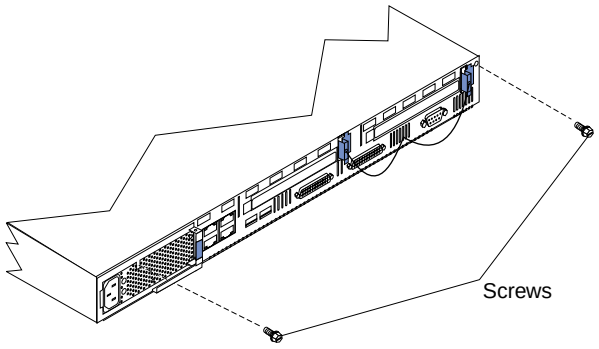
Complete the following steps to replace the fan assembly:

1. Review the information in "Safety information" on page 39.
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 44 for instructions.
4. Determine which fan to replace by checking the LED at each fan; a lit LED indicates the fan to replace.
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" on page 56 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.

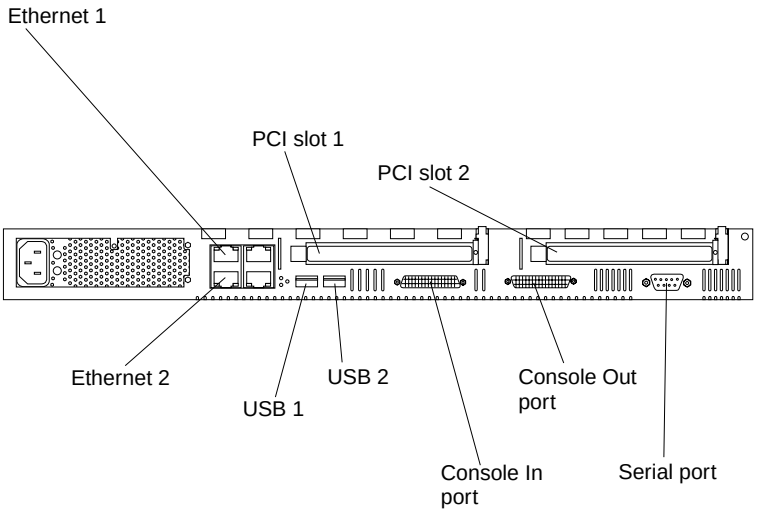
Important

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 will be extremely difficult to remove the cover later.

4. Install the screws and secure the cover as shown.
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

The following illustration shows the input/output connectors (ports) that are supported and the expansion slots on the rear of the server.



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

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 35.

Table 4. Serial port connectors on the system board

Connectors	Port	Description
J52	Serial port A	Default connection. Used by the operating system. Modem can be connected so that the system can dial out during problems.
J51	Serial port B	Used by the operating system only.

Viewing or changing the serial-port assignments

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.

Serial-port connector

The following table shows the pin-number assignments for the 9-pin, male D-shell serial-port connector on the rear of your server. These pin-number assignments conform to the industry standard.

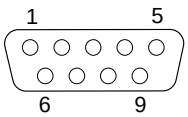


Table 5. Serial-port connectors pin-number assignments

Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

Universal Serial Bus ports

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

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.

Table 6. USB-port connector pin-number assignments

Pin	Signal
1	VCC
2	-Data
3	+Data
4	Ground

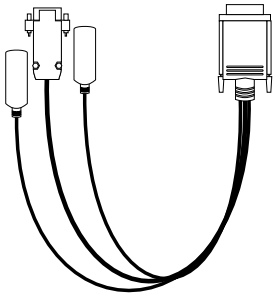
Console ports

There are two console ports on the rear of your server labeled In and Out. These ports are used to create a console communications chain between servers and a console (monitor, mouse, and keyboard). The xSeries 135 server does not support console communications chains.

Connect a C2T device breakout cable to the Console out connector of the server; then, connect your monitor, keyboard, and pointing device to the device breakout cable.

C2T device breakout cable

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.

Note: 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).

The following table shows the pin-number assignments for the keyboard connector on the end of the cable.

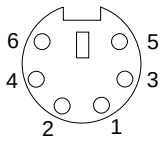


Table 7. Keyboard-connector (6-pin female) number assignments

Pin	I/O	Signal
1	I/O	Data
2	N/A	Reserved
3	N/A	Ground
4	N/A	+5 V dc
5	I/O	Keyboard clock
6	N/A	Reserved

Video connector

The following table shows the pin-number assignments for the 15-pin analog video connector on the end of the C2T device breakout cable. This cable is not labeled but is easily identified by the dark blue 15-pin connector.

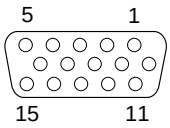


Table 8. Video-connector (15-pin female) number assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Ground	11	Not connected
2	Green or monochrome	7	Ground	12	DDC SDA
3	Blue	8	Ground	13	Horizontal synchronization (Hsync)
4	Not connected	9	+5 V dc DDC	14	Vertical synchronization (Vsync)
5	Ground	10	Ground	15	DDC SCL

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.

The following table shows the pin-number assignments for the auxiliary-device connector on the end of the cable.

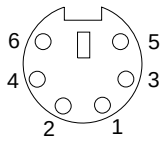


Table 9. Auxiliary or pointing-device connector (6 pin female) number assignments

Pin	Signal
1	Data
2	Not connected
3	Ground
4	+5 V dc
5	Clock
6	Not connected

Ethernet ports

Your server comes with two integrated Ethernet controllers. These controllers provide an interface for connecting to 10-Mbps or 100-Mbps networks and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

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

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

Configuring the Ethernet controllers

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

The Ethernet controllers are PCI Plug and Play devices. You do not need to set any jumpers or configure the controllers for your operating system before you use the Ethernet controllers. However, you must install a device driver to enable your operating system to address the Ethernet controllers.

Failover for redundant Ethernet

The IBM Netfinity 10/100 Ethernet Adapter or the IBM 10/100 EtherJet™ PCI family of adapters are optional redundant network interface cards (NIC adapter) that you can install in your server. If you install this NIC adapter and connect it to the same logical segment as the primary Ethernet controller, you can configure the server to support a *failover* function. You can configure either one of the integrated Ethernet controllers or the NIC adapter as the primary Ethernet controller. In failover mode, if

the primary Ethernet controller detects a link failure, all Ethernet traffic associated with it is switched to the redundant (secondary) controller. This switching occurs without any user intervention. When the primary link is restored to an operational state, the Ethernet traffic switches back to the primary Ethernet controller.

High-performance Ethernet modes

Your Ethernet controllers support optional modes, such as teaming, priority packets, and virtual LANs, which provide higher performance and throughput for your server.

Teaming mode: Your Ethernet controllers provide options, called *teaming options*. These options increase throughput and fault tolerance when running with Windows NT® 4.0 or NetWare 4.1x or later.

- **Adapter fault tolerance** (AFT) provides automatic redundancy for your adapter. If the primary adapter fails, the secondary adapter takes over. Adapter fault tolerance supports from two to four adapters per team.
- **Adaptive load balancing** (ALB) enables you to balance the transmission data flow among two to four adapters. ALB also includes the AFT option. You can use ALB with any 100BASE-TX switch.
- **Cisco Fast EtherChannel** (FEC) creates a team of 2 to 4 adapters to increase transmission and reception thoughput. FEC also includes the AFT option. You can use FEC only with a switch that has FEC capability.

Teaming requires you to install both integrated Ethernet controllers. For additional information about the teaming options, refer to the documentation that comes with these additional adapters.

Priority Packet mode: Priority Packet is a traffic-prioritization utility that enables you to set up filters to process high-priority traffic before normal traffic. You can send information from critical nodes or applications with an indicated priority. Because you set this priority at the host or entry point of the network, the network devices can base forwarding decisions on priority information defined in the packet.

Priority Packet information is available on the IBM Networking site at http://www.ibm.com/networking/support on the World Wide Web.

Priority Packet prioritizes traffic based on priority filters. These are parameters that you assign to outgoing (transmit) packets. Using the priority filter wizard, you can set up predefined or custom priority filters based on a node (MAC) address, Ethernet type, or by various properties of the protocol and port. Priority Packet provides two different methods for prioritizing traffic: IEEE 802.1p tagging and High Priority Queue.

IEEE 802.1p is an IEEE standard for tagging, or adding additional bytes of information to packets with different priority levels. Packets are tagged with 4 additional bytes, which increase the packet size and indicate a priority level. When you send these packets out on the network, the higher priority packets are transferred first. Priority-packet tagging (also known as Traffic Class Expediting) enables the adapter to work with other elements of the network (such as switches and routers) to deliver priority packets first. You can assign specific priority levels from 0 (low) to 7 (high).

You can assign values to packets based on their priorities when you use the IEEE 802.1p standard for packet tagging. This method requires a network infrastructure that supports packet tagging. The routing devices receiving and transferring these packets on your network must support 802.1p for tagging to be effective.

After you set up the priority filter in Priority Packet, start IBMSet and click **802.1p/802.1Q Tagging** on the **Advanced** tab.

Note: IEEE 802.1p tagging increases the size of the packets that it tags. Some hubs and switches will not recognize the larger packets and will drop them. Check your hub or switch documentation to see if they support 802.1p. (You can configure the switch to strip the tags from the packets and send it on to the next destination as normal traffic.) If these devices do not support 802.1p or if you are not sure, use High Priority Queue (HPQ) to prioritize network traffic.

The requirements for effectively using IEEE 802.1p tagging are:

- The other devices receiving and routing 802.1p tagged packets must support 802.1p.
- The adapters on these devices must support 802.1p. The Ethernet controller in your server, all IBM Netfinity 10/100 Ethernet Security Adapters, and IBM 10/100 Ethernet Server Adapters support 802.1p.
- The adapter cannot be assigned to an adapter team.
- If you are setting up virtual local area networks (VLANs) and packet tagging on the same adapter, 802.1p/802.1Q tagging must be enabled on the IBMSet **Advanced** tab.

If your network infrastructure devices do not support IEEE 802.1p or you are not sure, you can still define filters and send packets as high priority. While High Priority Queue (HPQ) does not provide the precise priority levels of 802.1p tagging, it does assign traffic as either high or low priority and sends high-priority packets first. Therefore, if there are multiple applications on a system sending packets, the packets from the application with a filter are sent out first. HPQ does not change network routing, nor does it add any information to the packets.

To assign HPQ, you can specify it using Priority Packet when you create or assign a filter.

To effectively use HPQ, the adapter cannot be assigned to an adapter team.

Virtual LAN mode: A VLAN is a logical grouping of network devices that are put together as a LAN, regardless of their physical grouping or collision domains. Using VLANs increases network performance and improves network security.

VLANs offer you the ability to group users and devices together into logical workgroups. This can simplify network administration when connecting clients to servers that are geographically dispersed in a building, campus, or enterprise network.

Typically, VLANs are configured at the switch and any computer can be a member of one VLAN per installed network adapter. Your Ethernet controller supersedes this by communicating directly with the switch, enabling multiple VLANs on a single network adapter (up to 64 VLANs).

To set up VLAN membership, your Ethernet controller must be attached to a switch that has VLAN capability.

To join a VLAN from TurboLinux 6.05:

1. Create a VLAN on the switch. Use the parameters you assign there to join the VLAN from the server. Refer to your switch documentation for more information.
2. Double-click the **Network** icon in the Control Panel window.
3. On the **Adapters** tab, select the adapter that you want to be on the VLAN, and click **Properties**.

4. In IBMSet, click **Join VLAN**. Note that VLANs cannot be assigned to adapters that are already defined to have an adapter teaming option.
5. Type the VLAN ID and VLAN name. The VLAN ID must match the VLAN ID of the switch. The ID range is from 1 to 1000. The VLAN name is for information only and does not need to match the name on the switch.
6. Click **Join VLAN**. Repeat steps 3 through 5 for each VLAN that you want the server to join. The VLANs that you add are listed on the **Adapters** tab.
7. Click **Close**, and restart the computer.

Ethernet port connector

The following table shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.

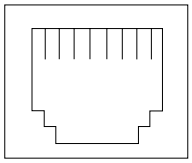


Table 10. Ethernet RJ-45 connector pin-number assignments.

Pin	Signal	Pin	Signal
1	Transmit data+	5	Not connected
2	Transmit data-	6	Receive data -
3	Receive data+	7	Not connected
4	Not connected	8	Not connected

Working with cables

The following sections discuss how to cable your appliance server to an existing network. For an illustration of the rear connectors of the appliance server, see “I/O connector locations and ports” on page 57.

Connecting the IBM xSeries 135 appliance server to the network

The IBM xSeries appliance server has two Ethernet connectors that you can use to integrate the appliance server to an existing local area network (LAN). You can use one or both Ethernet ports, but some software features can function properly only if the server is connected to the LAN through Ethernet port 1.

Connect Category 5 Ethernet cable to the server Ethernet ports to install the server in an existing network.

Cable management

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 67 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 79 for more information.

- **Troubleshooting charts**

  These charts list problem symptoms, along with suggested steps to correct the problems. See the “Troubleshooting charts” on page 89 for more information.

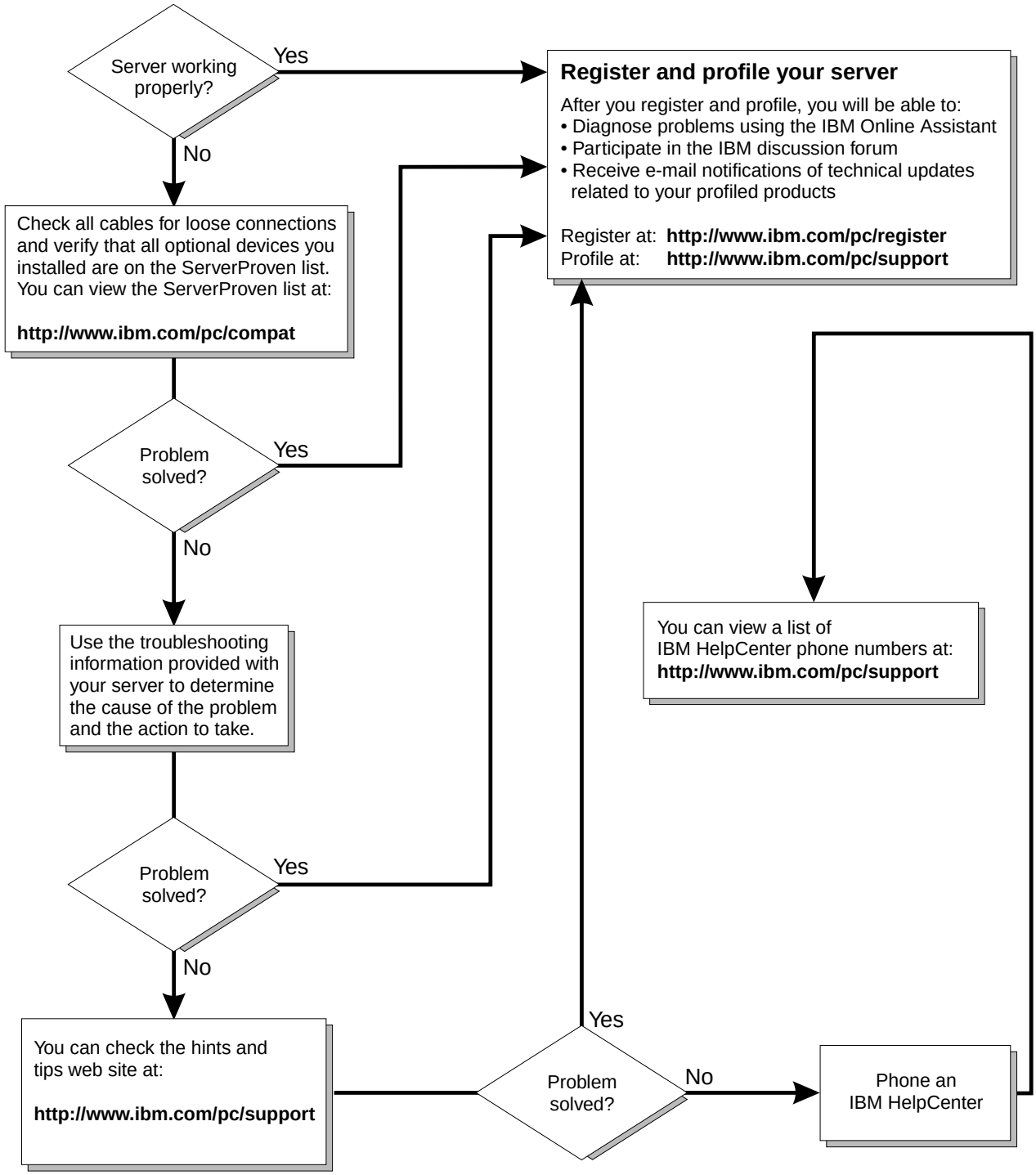
- **Customized support page**

  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



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 70 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 enter 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 70 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. 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.

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

In addition to the beep codes that are described in “POST beep code descriptions” on page 67, your computer might emit beep codes that are described in the following table. The numbers and hyphens below describe the sequence of beeps and pauses. For example, a 1-2-3 beep code is one beep, a pause, two consecutive beeps, another pause, and three more consecutive beeps.

Table 11. POST beep codes

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.	

Table 11. POST beep codes

2-3-1	Screen initialization has failed.	Turn off the server and then restart the server. If the problem persists, call for service.
1-2-4	RAM refresh verification has failed.	Reseat 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**.	

POST error messages

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

Table 12. POST error messages

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. See "Using the Configuration/Setup Utility program" on page 12 for more information. 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.

Table 12. POST error messages

POST message	Description
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.
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 a diagnostic test 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 (see “Using the Configuration/Setup Utility program” on page 12 for more information); then, exit, saving the new configuration settings. If the message appears again, shut down the server, reseat 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.

Table 12. POST error messages

POST message	Description
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.** See "Using the Configuration / Setup Utility program" on page 12). 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. See "Using the Configuration / Setup Utility program" on page 12. If this information cannot be restored, call for service.
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.** "Using the Configuration / Setup Utility program" on page 12. 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. See "Using the Configuration / Setup Utility program" on page 12. 2. If the problem remains, replace the failing DIMM. If the problem persists, call for service.

Table 12. POST error messages

POST message	Description
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.
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. See "Using the Configuration/Setup Utility program" on page 12. 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. See "Using the Configuration/Setup Utility program" on page 12. 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. See "Using the Configuration/Setup Utility program" on page 12. If the setting is not correct, change it. If the problem persists, call for service.

Table 12. POST error messages

POST message	Description
11*xx*	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.
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.
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. See "Using the Configuration/Setup Utility program" on page 12. 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 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.

Table 12. POST error messages

POST message	Description
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.
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.
00019701	Processor 1 failed the built-in self-test. **Action:** Replace microprocessor 1. 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. See "Using the Configuration/Setup Utility program" on page 12. 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. Refer to the documentation that is provided with the adapter.

Table 12. POST error messages

POST message	Description
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 addresses for the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. See "Using the Configuration/Setup Utility program" on page 12. 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. "Using the Configuration/Setup Utility program" on page 12. 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.
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 disabled by 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. See "Using the Configuration/Setup Utility program" on page 12. 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.

Table 12. POST error messages

POST message	Description
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 microprocessor that is installed in the server.
01298101	The update data for processor 1 is incorrect. **Action:** Update the system BIOS to a level that supports the microprocessor that is installed in the server.
I9990301	A hard disk drive error occurred. **Action:** Call for service.
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	AC power has been restored. **Action:** No action is required. This message appears each time ac power is restored to the server after an ac power loss.
Other Numbers	POST found an error. **Action:** Follow the instructions on the screen.

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.

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. See "Using the Configuration/Setup Utility program" on page 12.

Small computer system interface (SCSI) messages

The following table lists actions to take if you receive a SCSI error message.

Note: If your server does not have a hard disk drive, ignore any message that indicates that the BIOS is not installed.

You will get these messages only when running the SCSISelect Utility.

Table 13. SCSI messages

SCSI messages	Description
All	One or more of the following might be causing the problem. • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration • Duplicate SCSI IDs in the same SCSI chain • An improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable **Action:** Verify that: • The external SCSI devices are turned on. External SCSI devices must be turned on *before* the server. • The cables for all external SCSI devices are connected correctly. • The last device in each SCSI chain is terminated properly. • The SCSI devices are configured correctly. If you have verified these items and the problem persists, run the diagnostic programs to obtain additional information about the failing device. If the error remains or recurs, call for service.

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 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 Ca**t buttons. All other functions 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 any hardware 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.

Table 14. Diagnostic error messages

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 14. 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 14. Diagnostic error messages

Code	Function	Result	Text message	Action
	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 14. 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 14. 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. **Note:** The push button test is applicable only to SCSI tape drives that have a push button.
			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.
305	Video monitor		Any message	Refer to the information that comes with the monitor.

Table 14. Diagnostic error messages

Code	Function	Result	Text message	Action
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 dialtone 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.

Recovering BIOS

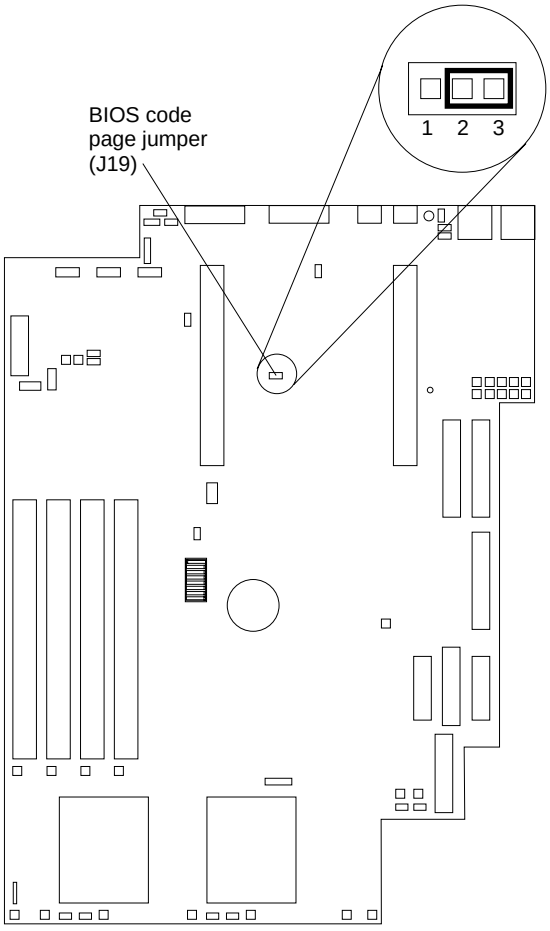
If the BIOS has become damaged, such as from a power failure during a flash update, you can recover the BIOS using the BIOS code page jumper and a BIOS flash diskette.

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

- Use the BIOS flash program to make a BIOS flash diskette.
- 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 38.

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.

   Note: Do not restart the appliance server at this time.
10. Remove the BIOS flash diskette from the diskette drive.
11. Turn off the server.
12. Move the jumper on **J19** to pins 2 and 3 to return to normal startup mode.
13. Restart the server. The system should start up normally.
14. 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.

For LED locations see “System board LEDs” on page 37.

Troubleshooting charts

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

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.

See “Starting the diagnostic programs” on page 80 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 installed correctly. • 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.) • The diskette contains the necessary files to start the server. • Your software program is working properly. If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, call for service.
Expansion enclosure problems The SCSI expansion enclosure used to work, but does not work now.	Verify that: • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. For more information, see your SCSI and expansion enclosure documentation.
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. • Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. If the problem persists, call for service.
Keyboard, mouse, or pointing-device problems. All or some keys on the keyboard do not work.	• Make sure that the keyboard cable is properly connected to the C2T device breakout cable. • Make sure that the C2T device breakout cable is properly connected to the server. • Make sure that the server and the monitor are turned on. • Try using another keyboard. If the problem persists, call for service.

Table 15. Troubleshooting charts

Device	Suggested action
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	

Table 15. Troubleshooting charts

Device	Suggested action
The screen is blank.	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. 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. • The C2T breakout cable is connected properly. • A powered-up server is selected. Verify that: **Important**: 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 program 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: • The primary monitor cable is connected to the C2T device breakout cable. • You installed the necessary device 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**: 1. To prevent diskette drive read / write errors, be sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 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.

Table 15. Troubleshooting charts

Device	Suggested action
Option problems	Verify that: • The option is designed for the server. Refer to the "Server Support" 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.
An IBM option that was just installed does not work.	
An IBM option that used to work does not work now.	Verify that all of the option hardware and cable connections are secure. If the option comes with its own test instructions, use those instructions to test the option. If the failing option is a SCSI option, verify that: • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. If the problem remains, call for service.
Power problems	Verify that: • 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.
The server does not power on.	
Serial port problems	Verify that: • Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports are disabled. • The serial-port adapter, if you installed one, is seated properly. If the problem persists, call for service.
The number of serial ports identified by the operating system is less than the number of serial ports installed.	
A serial device does not work. For more information about the serial port see “Serial port” on page 57.	Verify that: • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. If the problem persists, call for service.

Table 15. Troubleshooting charts

Device	Suggested action
Software problem	To determine if problems are caused by the software, verify that: • 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 persists, contact your place of purchase.
Suspected software problem.	
Universal Serial Bus (USB) port problems	Verify that: • 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.
A USB device does not work.	

Table 15. 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.

Table 16. Ethernet troubleshooting chart

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. See "Using the Configuration/Setup Utility program" on page 12. 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. If the problem remains, call for service.

Ethernet controller messages

The integrated Ethernet controllers might display messages from device drivers for TurboLinux 6.05.

This section provides explanations of the error messages for the TurboLinux Ethernet controller device driver, and suggested actions to resolve each problem.

Table 17. TurboLinux driver messages for the Ethernet controller

Error code (hex)	Description
0x00	**Explanation:** The device driver could not register the specified interrupt. **Action:** Using the Configuration / Setup Utility program, make sure that a PCI interrupt is assigned to your Ethernet adapter, and that Ethernet is enabled.
0x01	**Explanation:** One of the PCI cards did not get the required resources. **Action:** Using the Configuration / Setup Utility program, make sure that a PCI interrupt is assigned to your Ethernet card, and that Ethernet is enabled. See "Using the Configuration / Setup Utility program" on page 12.
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 -> Adapter**s. 2. Select your IBM Ethernet adapter from the list. 3. Select **Properties -> Advanced**. 4. Lower the resource values that apply to the receive queue.
0x0F	**Explanation:** Could not allocate enough memory for other structures. **Action:** 1. From the Windows NT desktop, select **Start -> Control Panel -> Networks -> Adapters**. 2. Select your IBM Ethernet adapter from the list. 3. Select **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 program, make sure that Ethernet is enabled. See "Using the Configuration / Setup Utility program" on page 12.
0x11	**Explanation:** Multiple Ethernet controllers found, but none matched the required ID. **Action:** Using the Configuration / Setup Utility program, make sure that Ethernet is enabled. See "Using the Configuration / Setup Utility program" on page 12.

Table 17. TurboLinux driver messages for the Ethernet controller

Error code (hex)	Description
0x13	**Explanation:** Did not find any Ethernet controllers that matched the required subven/subdev. **Action:** Using the Configuration/Setup Utility program, make sure that Ethernet is enabled. See "Using the Configuration/Setup Utility program" on page 12.
0x16	**Explanation:** Single adapter found but multiple instances tried to load. **Action:** Using the Configuration/Setup Utility program, 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. See "Using the Configuration/Setup Utility program" on page 12.
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 18. NetWare driver messages for the Ethernet controller

Message	Description
Couldn't allocate resources	**Explanation:** An unknown error has occurred when trying to allocate needed resources for the AFT Module. **Action:** • Check the server configuration. If the problem persists, contact your network supplier. • Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.
AFT group for primary adapter in slot *nnn* already exists.	**Explanation:** An attempt was made to rebind an adapter already in an AFT group. **Action:** Check the AFT slot numbers for existing AFT teams. If the problem persists, contact your network supplier.
Error locating DCT addresses in internal table. Make sure that you have loaded LAN drivers after loading AFT.NLM.	**Explanation:** The bind command was entered before loading the device driver. The device driver must be loaded after AFT.NLM but before any bind command can be issued. **Action:** Load the device driver for the supported adapter and try loading the AFT module again. If the problem persists, contact your network supplier.
Insufficient number of arguments specified.	**Explanation:** The appropriate or expected number of parameters was not entered in a command. **Action:** Check the parameters required for the given command. If the problem persists, contact your network supplier.
Duplicate slot numbers detected.	**Explanation:** An attempt has been made to bind the same slot number more than once. **Action:** Check the slot numbers entered during the bind. Adapter slot numbers must be valid and unique. If the problem persists, contact your network supplier.
'*Xxx*' is not supported for AFT team.	**Explanation:** A bind command has been issued for adapters that are not supported by AFT.NLM. **Action:** Make sure that you attempt to bind only adapters that are supported by AFT.NLM.

Table 18. NetWare driver messages for the Ethernet controller

Primary and secondary adapters do not match. AFT group is not created.	**Explanation:** A bind command was entered for an adapter team that is a combination of server and client adapters. An AFT team must be a grouping of the same classification of adapter. **Action:** Verify that all the adapters bound in a team are of the same classification.
Requested number of Secondary cards are not found.	**Explanation:** The number of adapters specified in the bind command could not be located. **Action:** Verify the numbers and slot locations of the adapters to be bound. If the problem persists, contact your network supplier.
Failed to create AFT group. Make sure that the drivers for supported adapters are loaded, primary adapter is bound to protocols, and secondary adapter is not bound to any protocols.	**Explanation:** Binding of protocol failed. Protocol is either not bound to any adapter or is bound to more than one adapter in the group. **Action:** Ensure that the protocol is bound to only one adapter in an AFT team.
Error identifying slot numbers for the specified board names.	**Explanation:** The mapping between the board name entered and the slot number for an adapter could not be established. **Action:** Check the board name for the adapter before issuing the bind command. If the problem persists, contact your network supplier.
Can't unbind specified slot from AFT group. Make sure that the slot you specified is for the primary adapter in an AFT group.	**Explanation:** The number entered in the unbind command was not the primary adapter in an AFT group. **Action:** Reissue the unbind command and specify the slot number for the primary adapter.
LAN adapter at slot *nnnn* (Port 0x*aa*) failed to reset. Check the state of the adapter.	**Explanation:** The adapter that you specified could not be initialized. **Action:** 1. Load the driver for the supported adapter. 2. Check that the adapter is seated properly in the slot and try loading the AFT module again. If the problem persists, contact your network supplier.
AFT is not supported on this version of NetWare.	**Explanation:** The NetWare on your server is not a version supported by AFT. **Action:** Load and bind AFT only on supported versions of NetWare (currently version 4.11 and later).
Failed to allocate resources tags.	**Explanation:** An unknown error has occurred when trying to allocate needed resources for the AFT module. **Action:** Check Server Configuration. If the problem persists, contact your network supplier.
Please unload all LAN drivers before unloading AFT.NLM.	**Explanation:** An attempt was made to unload the AFT.NLM module before unloading the adapter device driver. **Action:** Unload the adapter driver before unloading the AFT module.

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.

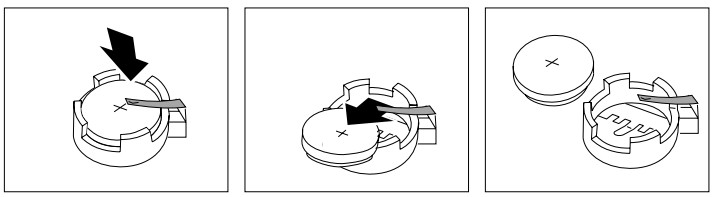
Do not:

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

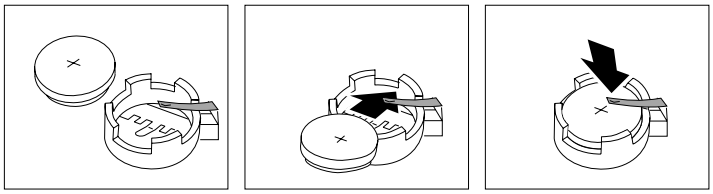
Dispose of the battery as required by local ordinances or regulations.

Complete the following steps to replace the battery:

1. Read “Safety information” on page 39, 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 19. 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]

Table 20. 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

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

Table 20. International help phone numbers

Country		Telephone number
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” on page 107.

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 135

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 W**ITHOUT 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 135**

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. 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

ASIA PACIFIC

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

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

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

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

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

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

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

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

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

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

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

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

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

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

Warranty Service

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

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

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

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

The following terms apply to the country specified:

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

Applicability of suppliers and resellers (unchanged).

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

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

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

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

Extent of Warranty: The second paragraph does not apply.

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

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

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

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

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

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

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

Applicability of suppliers and resellers (unchanged).

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

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

Applicability of suppliers and resellers (unchanged).

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

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

TURKIYE: Production Status: The following replaces this Section:
IBM 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**.

License Agreement for Warranted Programs

The Program consists of software components that are licensed pursuant to the terms of the IBM International Program License Agreement. These components are

Appliance System Manger, the Application Server, IBM HTTP Server and Distributed Debugger.

Except as provided below, you are authorized to install and use one copy of each component of the Program on the same machine for each valid Proof of Entitlement to the Program. In addition, for each Proof of Entitlement:

APPLIANCE SYSTEM MANAGER: Notwithstanding anything in this Agreement to the contrary, you are authorized to install and use an unlimited number of copies of the Appliance System Manager component of the Program on any of your machines.

ADMIN CLIENT AND DISTRIBUTED DEBUGGER COMPONENTS: Notwithstanding anything in this Agreement to the contrary, you are authorized to install and use an unlimited number of copies of the Admin Client and Distributed Debugger components of the Program on any of your machines.

The IBM HTTP Server component of the Program includes machine translation technology. You hereby acknowledge and agree that machine translation is an inherently statistical process designed to produce a translation which approximates the meaning of the original text. IBM does not warrant that translations generated using machine translation technology will be error free.

THIRD PARTY CODE: The Program contains third party code, some of which may be provided to you under terms and conditions which are different from this Agreement. In addition, IBM's license for some of this third party code may require IBM to provide you with certain notices and/or information. Such terms and conditions, notices and information are provided in the Program's "readme" file, or in a file or files referenced by the Program's "readme" file. You acknowledge and agree to all such terms and conditions, notices and information, including those provided only in the English language.

IBM HTTP SERVER AND THE APACHE HTTP SERVER: The IBM HTTP Server component of the Program includes software developed by The Apache Group for use in the Apache HTTP Server project (http://www.apache.org/). In addition, the Program is accompanied by source code for the Apache HTTP Server. The portions of the IBM HTTP Server which are based on software developed by The Apache Group and the source code for the Apache HTTP Server are Copyright (c) 1995-1999 The Apache Group. All rights reserved. Your use of the source code for the Apache HTTP Server accompanying the Program is subject to the terms and conditions of the license from The Apache Group, which is reproduced in the Program's "readme" file or in a file or files referenced by the Program's "readme" file, and not this Agreement. In particular, IBM is providing the source code for the Apache HTTP Server on an AS-IS BASIS, WITHOUT WARRANTY OF ANY KIND (EITHER EXPRESS OR IMPLIED) INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OF NON-INFRINGMENT. You may not disclose the results of any benchmark test of IBM HTTP Server to any third party without IBM's prior written approval. Notwithstanding anything to the contrary in this Agreement, you are authorized to install and use an unlimited number of copies of the IBM HTTP Server component of the Program on any of your machines, provided that only one such

copy of IBM HTTP Server will be subject to the representations and warranties of this Agreement and will be eligible for Program Services.

International License Agreement for Non-Warranted Programs

Part 1 — General Terms

PLEASE READ THIS AGREEMENT CAREFULLY BEFORE USING THE XSERIES 135 APPLIANCE SERVER. IBM WILL LICENSE THE XSERIES 135 APPLIANCE SERVER TO YOU ONLY IF YOU FIRST ACCEPT THE TERMS OF THIS AGREEMENT. BY USING THE XSERIES 135 APPLIANCE SERVER YOU AGREE TO THESE TERMS. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, PROMPTLY RETURN THE UNUSED XSERIES 135 APPLIANCE SERVER TO THE PARTY (EITHER IBM OR ITS RESELLER) FROM WHOM YOU ACQUIRED IT TO RECEIVE A REFUND OF THE AMOUNT YOU PAID.

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The term "Program" means the original program and all whole or partial copies of it. A Program consists of machine-readable instructions, its components, data, audio-visual content (such as images, text, recordings, or pictures), and related licensed materials.

This Agreement includes Part 1 - General Terms and Part 2 - Country-unique Terms and is the complete agreement regarding the use of this Program, and replaces any prior oral or written communications between you and IBM. The terms of Part 2 may replace or modify those of Part 1.

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Use of the Program

IBM grants you a nonexclusive license to use the Program.

You may 1) use the Program to the extent of authorizations you have acquired and 2) make and install copies to support the level of use authorized, providing you reproduce the copyright notice and any other legends of ownership on each copy, or partial copy, of the Program.

If you acquire this Program as a program upgrade, your authorization to use the Program from which you upgraded is terminated.

You will ensure that anyone who uses the Program does so only in compliance with the terms of this Agreement.

You may not 1) use, copy, modify, or distribute the Program except as provided in this Agreement; 2) reverse assemble, reverse compile, or otherwise translate the Program except as specifically permitted by law without the possibility of contractual waiver; or 3) sublicense, rent, or lease the Program.

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You may transfer all your license rights and obligations under a Proof of Entitlement for the Program to another party by transferring the Proof of Entitlement and a copy of this Agreement and all documentation. The transfer of your license rights and obligations terminates your authorization to use the Program under the Proof of Entitlement.

2. Proof of Entitlement

The Proof of Entitlement for this Program is evidence of your authorization to use this xSeries 135 appliance server and of your eligibility for future upgrade program prices (if announced) and potential special or promotional opportunities.

3. Charges and Taxes

IBM defines use for the Program for charging purposes and specifies it in the Proof of Entitlement. Charges are based on extent of use authorized. If you wish to increase the extent of use, notify IBM or its reseller and pay any applicable charges. IBM does not give refunds or credits for charges already due or paid.

If any authority imposes a duty, tax, levy or fee, excluding those based on IBM's net income, upon the Program supplied by IBM under this Agreement, then you agree to pay that amount as IBM specifies or supply exemption documentation.

4. No Warranty

SUBJECT TO ANY STATUTORY WARRANTIES WHICH CAN NOT BE EXCLUDED, IBM MAKES NO WARRANTIES OR CONDITIONS EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE WARRANTY OF NON-INFRINGEMENT AND THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THE PROGRAM OR TECHNICAL SUPPORT, IF ANY. IBM MAKES NO WARRANTY REGARDING THE CAPABILITY OF THE PROGRAM TO CORRECTLY PROCESS, PROVIDE AND/OR RECEIVE DATE DATA WITHIN AND BETWEEN THE 20TH AND 21ST CENTURIES.

The exclusion also applies to any of IBM's subcontractors, suppliers, or program developers (collectively called "Suppliers").

Manufacturers, suppliers, or publishers of non-IBM Programs may provide their own warranties.

5. Limitation of Liability

NEITHER IBM NOR ITS SUPPLIERS WILL BE LIABLE FOR ANY DIRECT OR INDIRECT DAMAGES, INCLUDING WITHOUT LIMITATION, LOST PROFITS, LOST SAVINGS, OR ANY INCIDENTAL, SPECIAL, OR OTHER ECONOMIC CONSEQUENTIAL DAMAGES, EVEN IF IBM IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

6. General

Nothing in this Agreement affects any statutory rights of consumers that cannot be waived or limited by contract.

IBM may terminate your license if you fail to comply with the terms of this Agreement. If IBM does so, you must immediately destroy the Program and all copies you made of it.

You agree to comply with applicable export laws and regulations.

Neither you nor IBM will bring a legal action under this Agreement more than two years after the cause of action arose unless otherwise provided by local law without the possibility of contractual waiver or limitation.

Neither you nor IBM is responsible for failure to fulfill any obligations due to causes beyond its control.

IBM does not provide program services or technical support, unless IBM specifies otherwise.

The laws of the country in which you acquire the Program govern this Agreement, except 1) in Australia, the laws of the State or Territory in which the transaction is performed govern this Agreement; 2) in Albania, Armenia, Belarus, Bosnia / Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, Ukraine, and Federal Republic of Yugoslavia, the laws of Austria govern this Agreement; 3) in the United Kingdom, all disputes relating to this Agreement will be governed by English Law and will be submitted to the exclusive jurisdiction of the English courts; 4) in Canada, the laws in the Province of Ontario govern this Agreement; and 5) in the United States and Puerto Rico, and People's Republic of China, the laws of the State of New York govern this Agreement.

Part 2 - Country-unique Terms

AUSTRALIA: No Warranty (Section 4):

The following paragraph is added to this Section:

Although IBM specifies that there are no warranties, you may have certain rights under the Trade Practices Act 1974 or other legislation and are only limited to the extent permitted by the applicable legislation.

Limitation of Liability (Section 3):

The following paragraph 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.

GERMANY: No Warranty (Section 4):

The following paragraphs are added to this Section:

The minimum warranty period for Programs is six months.

In case a Program is delivered without Specifications, we will only warrant that the Program information correctly describes the Program and that the Program can be used according to the Program information. You have to check the usability according to the Program information within the "money-back guaranty" period.

Limitation of Liability (Section 5):

The following paragraph is added to this Section:

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

INDIA: General (Section 6):

The following replaces the fourth paragraph of this Section:

If no suit or other legal action is brought, within two years after the cause of action arose, in respect of any claim that either party may have against the other, the rights of

the concerned party in respect of such claim will be forfeited and the other party will stand released from its obligations in respect of such claim.

IRELAND: No Warranty (Section 4):

The following paragraph 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.

ITALY: Limitation of Liability (Section 5):

This Section is replaced by the following:

Unless otherwise provided by mandatory law, IBM is not liable for any damages which might arise.

NEW ZEALAND: No Warranty (Section 4):

The following paragraph is added to this Section:

Although IBM specifies that there are no warranties, you may have certain rights 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 or services which IBM provides, if you require the goods and services for the purposes of a business as defined in that Act.

Limitation of Liability (Section 5):

The following paragraph is added to this Section:

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

PEOPLE'S REPUBLIC OF CHINA: Charges (Section 3):

The following paragraph is added to the Section:

All banking charges incurred in the People's Republic of China will be borne by you and those incurred outside the People's Republic of China will be borne by IBM.

UNITED KINGDOM: Limitation of Liability (Section 5):

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

The limitation of liability will not apply to any breach of IBM's obligations implied by Section 12 of the Sales of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

UNITED STATES AND CANADA: No Country-unique Terms apply.

IBM International License Agreement for Non-Warranted Programs Addendum for Linux and Other Open Source Programs These terms replace those in Section 1 and are in addition to those of the remaining sections of the IBM International License Agreement for Non-Warranted Programs. If there is a conflict among terms, those of this Addendum prevail. You accept these terms and the terms in the Agreement by using the Program.

The Linux and other open source Program(s) that were packaged with, or preloaded onto, your IBM computer system are distributed by Caldera Inc., Red Hat Inc., SuSE

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Important notes

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

When referring to hard disk drive capacity, MB stands for 1000000 bytes and GB stands for 1000000000 bytes. Total user-accessible capacity may vary depending on operating environments.

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

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

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

Electronic emission notices

Federal Communications Commission (FCC) Statement

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，使用者會被要求採取某些適當的對策。

Japanese Voluntary Control Council for Interference (VCCI) statement

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Power cords

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, 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

IBM power cord part number	Used in these countries and regions
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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