IBM

eserver

xSeries 330

Type 8674

User's Reference

xSeries 330

User's Reference

SC06-P457-40

Note

Before using this information and the product it supports, be sure to read the general information in Appendix A, “Product warranty and notices,” on page 107.

First Edition (August 2001)

Contents

Safety

Before installing this product, read the Safety Information.

مج، يجب قراءة دات السلامة

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1


DANGER

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

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

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

Statement 2

CAUTION:

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

Do not:

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

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

Statement 3

CAUTION:

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

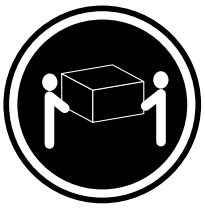
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous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

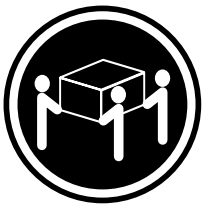
DANGER

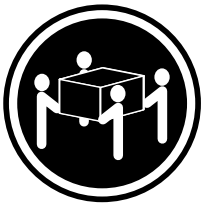
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

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

Statement 4







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

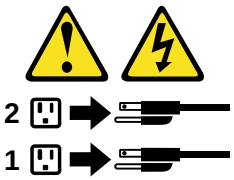
CAUTION:

Use safe practices when lifting.

Statement 5

CAUTION:

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



Statement 8

CAUTION:

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

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

Chapter 1. Introducing the xSeries 330 server

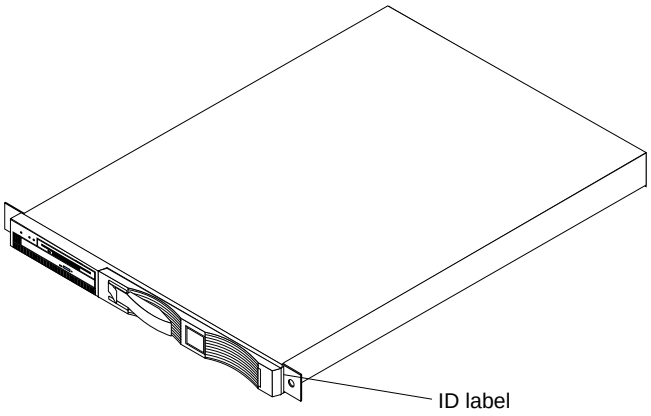
Your IBM® @server xSeries 330 is a 1-U-high[1] rack model server for high-volume network transaction processing. This high-performance, symmetric multiprocessing (SMP) server is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and reliable data storage.

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

For service, assistance, or information about IBM Server Start Up Support, see “Getting information, help, and service” on page 102.

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

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



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 server.

Table 1. Features and Specifications.

Microprocessor:

- Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions
- 133 MHz front-side bus (FSB)
- 512 KB Level-2 cache
- Supports up to two microprocessors

Memory:

- Standard: 256 MB
- Maximum: 4 GB
- Type: 133 MHz, ECC, SDRAM, registered DIMMs
- Slots: Four dual inline

Drives standard:

- Diskette: 1.44 MB
- CD-ROM: 24X IDE

Expansion bays:

Two 3.5-inch slim high bays for hard disk drives

PCI expansion slots:

Two 33 MHz/64-bit

Power supply:

One 200 watt (115-230 V ac)

Video:

- S3 Savage4PRO Graphics/Video Accelerator (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:

- Advanced System Management processor with support for IBM Remote Supervisor adapter
- One Ultra160 SCSI controller
- Two 10BASE-T/100BASE-TX Intel Ethernet controllers with support for Wake on LAN™ (WOL)
- Two Universal Serial Bus (USB) ports
- Two RS-485 Advanced System Management processor ports (one In, one Out)
- One serial port
- Two cable chaining technology (C2T) ports (one In, one Out)

Acoustical noise emissions:

- Sound power, idling: 6.1 bel maximum
- Sound power, operating: 6.1 bel maximum
- Sound pressure, idling: 47 decibels
- Sound pressure, operating: 47 decibels

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 89.6° 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

Notices and statements used in this book

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

The notices and statement definitions are as follows:

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

What your xSeries 330 offers

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

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

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

- **Large system memory**

  The memory bus in your server supports up to 4 GB of system memory. The memory controller provides error correcting code (ECC) support for up to four industry standard PC133, 3.3 V, 168-pin, 8-byte, registered, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

- **System-management capabilities**

  Your server comes with an Advanced System Management (ASM) processor on the system board. This processor, in conjunction with the systems-management software that is provided with your server, enables you to manage the functions of the server locally and remotely. The ASM processor also provides system monitoring, event recording, and dial-out alert capability.

  Note: The ASM processor is sometimes referred to as the service processor.

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

- **Integrated network environment support**

  Your server comes with two Ethernet controllers on the system board. Each Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The server automatically selects between 10BASE-T and 100BASE-

TX. Each controller provides full-duplex (FDX) capability, which allows simultaneous transmission and reception of data on the Ethernet local area network (LAN).

- **IBM ServerGuide CDs**

  The *ServerGuide*™ CDs that are included with your server provide programs to help you set up your server and install the network operating system (NOS). The ServerGuide program detects the hardware options that are installed, and provides the correct configuration programs and device drivers. In addition, the *ServerGuide* CDs include a variety of application programs for your server.

  For more information about the *ServerGuide* CDs, see the documentation provided with your ServerGuide software.

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.

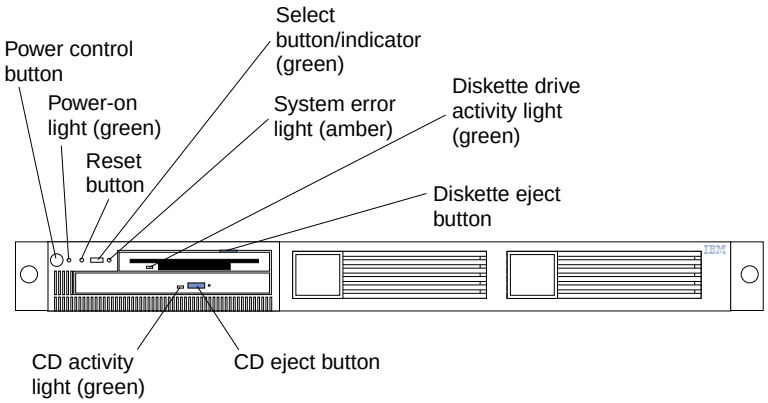
- Menu-driven setup, system configuration, RAID configuration, and diagnostic programs
- Power-on self-test (POST)
- Integrated ASM processor
- Predictive failure alerts (PFA)
- Remote system problem-analysis support
- Power and temperature monitoring
- Hot-swap drive bays (some models only)
- Error codes and messages
- System error logging
- Upgradable BIOS, diagnostics, and ASM processor code
- Automatic restart after a power failure
- Parity checking on the PCI buses
- CRC checking on the SCSI buses
- Error checking and correcting (ECC) memory
- Redundant Ethernet capabilities
- Light Path Diagnostics™ feature on the system board
- Vital product data (VPD) on system board and SCSI backplane
- Customer support center 24 hours per day, 7 days a week[1]

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

Server controls and indicators

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

Front view



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

Power-on light: This green LED 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: Press this button to select the server in the C2T chain. The green LED on this button lights when the monitor, keyboard, and mouse are logically connected to this server.

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

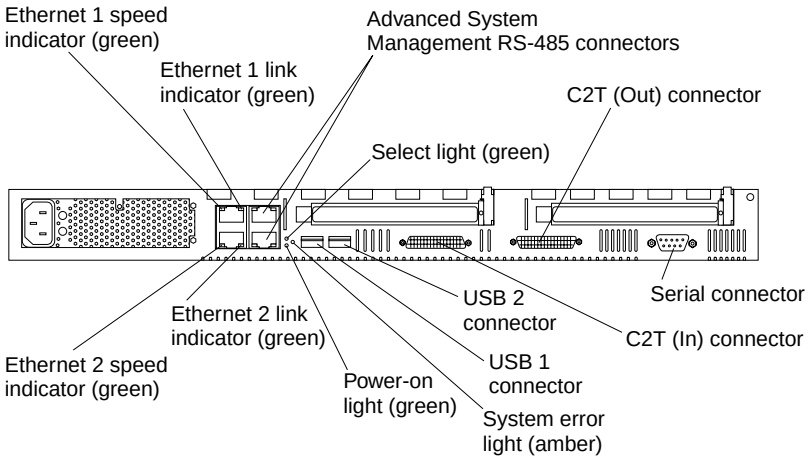
Diskette drive activity light: When this LED is on, it indicates that the diskette drive is in use.

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

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

CD 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 lights when the speed of the Ethernet LAN that is connected to Ethernet port 1 is 100 Mbps.

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

Advanced System Management connectors: The RS-485 connectors are used for creating a system-management bus between several servers.

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.

C2T (Out) connector: 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.

C2T (In) connector: This port is used to connect multiple servers together to share a single keyboard, monitor, and pointing device.

USB 2 connector: This connector is used to attach USB devices to Universal Serial Bus port 2.

USB 1 connector: This connector is used to attach USB devices to Universal Serial Bus port 1.

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

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

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

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

Server power features

The following sections contain information about turning on and turning off the server and using the standby feature.

Turning on the server

Turning on the server refers to the act of plugging the power cord of your server into the power source and starting the operating system.

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; then, press the power-control button on the front of the server.

Turning off the server

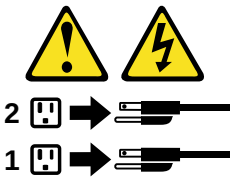
Turning off the server refers to the act of disconnecting the server from the power source.

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

   Note: Each operating system is different. Some allow an immediate shutdown. Others require an orderly shutdown procedure.

2. Press the power control button on the front of the server. This will put 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.

Standby mode

Standby mode puts the server into a wait state. When in a wait state, the server is not running the operating system, and all core logic is shut down except for the service processor.

Complete the following steps to put the server into the standby mode:

1. See your operating system documentation for the proper procedure to shutdown the operating system.

   Note: Each operating system is different. Read all the documentation about shutting down the operating system before continuing.

2. Press the power-control button on the front of the server.

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 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 program**

  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 program**

  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 startup order, select operating system wake-up support, and set menu wait times.

- **ServerGuide CDs**

  The ServerGuide CDs include software setup and installation tools specifically designed for IBM servers. You can use these CDs during the initial installation of your server to configure the server hardware and simplify your network operating system installation. The ServerGuide CDs also contain a collection of application programs, which you can install after your server is up and running. See Chapter 4, “Using the ServerGuide CDs,” on page 25 for more detailed information.

- **ServeRAID programs**

  If you have a ServeRAID™ adapter installed in your server, you must use the ServeRAID Configuration program to define and configure your disk-array subsystem before you install your operating system. ServeRAID programs come with optional ServeRAID adapters and with server models that have a preinstalled ServeRAID adapter. If your server has a ServeRAID adapter installed, you must use the ServeRAID Configuration program to define and configure your disk array subsystem before you install your operating system.

- **Advanced System Management configuration programs**

  You can download Advanced System Management (ASM) configuration programs from the IBM Support page at http://www.ibm.com/pc/support on the World Wide Web. Use these programs to create an *xSeries 330/IntelliStation R Pro Advanced System Management Processor Firmware Update* diskette and configure the settings for the ASM processor.

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.

Starting the Configuration/Setup Utility program

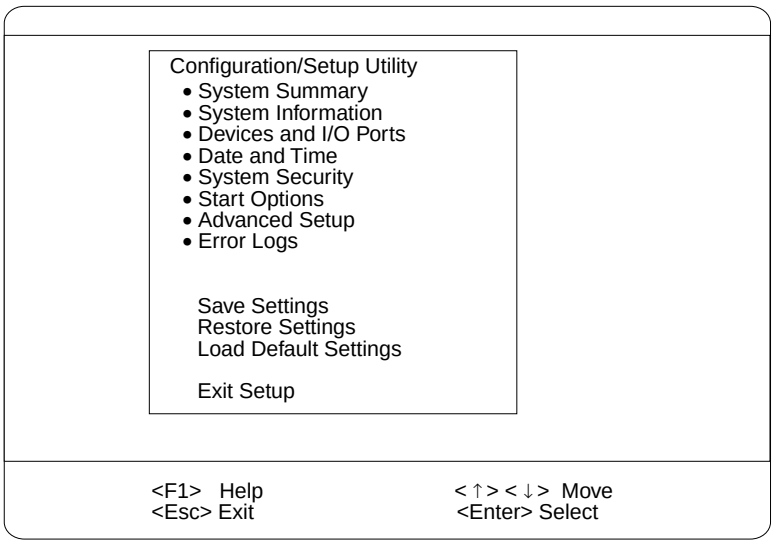
To start the Configuration/Setup Utility program:

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 menu.
3. Follow the instructions that appear on the screen.

Configuration/Setup main menu choices

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



Notes:

1. 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 are 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 installed.

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

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

- **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 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 electrically 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 main menu.

  This choice also allows you 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.

  Select **System Service Processor Settings** to view the interrupt-request setting (IRQ) used by the ASM processor. You can then use the arrow keys to select a new IRQ setting for the ASM processor from the list of available choices.

- **Date and Time**

  Select this choice to set the system date and time and to change the system time sent to the ASM processor when the server is started. This choice appears only on the full Configuration/Setup Utility 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 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 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 main menu. Start options take effect when you start your server.

  You can select keyboard operating characteristics, such as the keyboard speed. You also can specify whether the keyboard number lock starts on or off. You also can enable the server to run without a diskette drive, monitor, or keyboard.

Note: To determine if you should configure your server to operate without a keyboard, see the table on page 60.

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 server 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 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 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 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, restore, and load default settings choices on the Configuration/Setup Utility main menu do not save the PCI Slot/Device Information settings.

    Use the **PCI Device Control** choice 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 Settings**

  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 menu. After you select this choice, you can implement two levels of password protection: power-on password and administrator password.

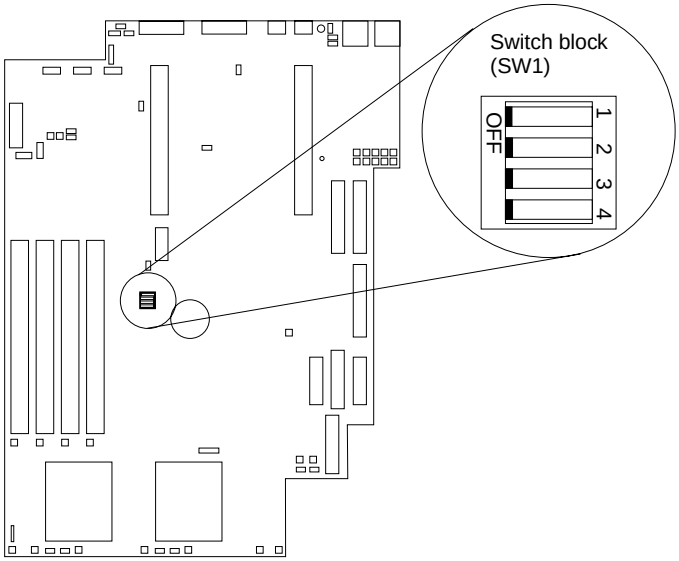
Power-on password

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

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 switch as described in “System board” on page 32.
- Remove the battery and then install the battery.

The following illustration shows the location of the password override switch, switch 4 of switch block 1, on the system board.



To set the password override switch:

1. Review the information in “Safety” on page vii.
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 36.
3. Toggle switch 4 on switch block 1 on the system board to the position opposite the current position. This clears the power-on password for one boot cycle.

   Note: This means that you can now start or power-on 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. Power-on the server.

Note: You can now start the Configuration/Setup Utility program and either delete the old password 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 enable 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 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 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 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 main menu. This limited access might include changing or deleting the power-on password.

Wake on LAN

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

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

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 program and descriptions of the menu choices available.

Note: If your server has a RAID adapter installed, use the configuration method supplied with the RAID adapter to view or change SCSI settings for attached devices.

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 the F5 key 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.

SCSISelect menu choices

The following choices appear on the SCSISelect Utility menu:

- **Configure/View Host Adapter Settings**

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

  – The transfer rate for Ultra2 SCSI LVD devices is 80.0 MBps

  – The transfer rate for Fast SCSI devices is 20.0 MBps

  — **Advanced Configuration Options**

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

- **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 spins up, press Ctrl+A.

Using the PXE Boot Agent Utility program

The PXE Boot Agent Utility program is a built-in, menu-driven configuration utility program that you can use to:

- Change startup (boot) order

  Attention: If you change the startup (boot) order using PXE Boot Agent Utility program, startup sequence settings in the Configuration/Setup Utility program might not function properly.
- Select whether to display 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 needed to start the PXE Boot Agent Utility program 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 2 seconds after the prompt appears on the screen to press Ctrl+S.
3. Use the arrow keys or press Enter to select a choice from the menu.
   - Press Esc to return to the previous menu.
   - Press the F4 key to exit.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

PXE Boot Agent Utility menu choices

The following choices appear on the PXE Boot Agent Utility menu:

- **Network Boot Protocol**

  PXE is the default value for this menu item.

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

- **Boot Order**

  Select this choice to change the order in which boot devices are queried.

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

  — Try network only

  — Try local drives only

  — Try network first, and then local drives

  Note: This option is not supported on this product. To change the boot order, use the Configuration/Setup Utility program. See "Using the Configuration/Setup Utility program" on page 11 for more information.

- **Show setup prompt**

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

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

- **Setup time wait menu**

  Select this choice to set the amount of time (in seconds) that the

  system will pause during initialization for a Ctrl+S input.

  — 2 seconds (default)

  — 3 seconds

  — 5 seconds

  — 8 seconds

- **Legacy OS wake up support**

  Select this choice to enable or disable a non-Windows operating system to use the adapter remote wake up capability.

  — Disabled (default)

  — Enabled

  Notes:

  1. Use the default setting for Advanced Configuration and Power Interface (ACPI) aware operating systems, such as Windows 2000 and Windows NT.
  2. If your server is running a non-ACPI operating system, you must set this selection to enable the server to use the Wake-on-LAN support.
  3. When using a non-ACPI operating system, do not send a wake-up packet to the server while it is turned on. If a wake up packet has been sent while the server is on and you are unable to turn the server off, see "Troubleshooting charts" on page 90 for more information.

Updating the ASM firmware and configuring the ASM processor

To update the Advanced System Managment (ASM) firmware or configure the ASM processor, you must download the image of the xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility program from the IBM Support page at http://www.ibm.com/pc/support on the World Wide Web.

Use the xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility program to create an *xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility* diskette. Use the *xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility* diskette to update the

ASM firmware or configure ASM processor settings. With the configuration utility, you can:

- Configure **Alert Setting** to enable or disable alert functions.
- Configure **Dial In/Out** settings.
- Configure **General Settings**, including the Name and Number that identify this ASM hardware, the date and time reported by the ASM hardware, assorted time-out values, and schedule a time for the system to be powered up.
- Configure **Modem Settings**.

The *xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility* diskette updates the ASM software only. It does not affect any device drivers.

Updating the ASM firmware

To update the ASM firmware using the *xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility* diskette, perform the following steps:

1. Turn off your server.
2. Insert the diskette in the diskette drive.
3. Restart your server to startup from the diskette drive. If your system does not startup from the diskette drive, use the Configuration/Setup Utility program to configure the diskette drive as a startup device. See “Using the Configuration/Setup Utility program” on page 11.
4. From the main menu, select **Update System Management Firmware** and press Enter.
5. Follow the on-screen instructions to complete the update.

If there is an error in loading the ASM software, try installing the software again.

ASM Firmware Update Utility diskette menu choices

The main menu options are as follows:

- Hardware Status and Information
- Configuration Settings
- Update System Management firmware
- Exit

Use the up-and-down arrow keys to highlight the options. Online help is available for each option by pressing F1 while the option is highlighted. General Help is available by pressing F1 from one of the Help windows. To select an option, highlight it and then press Enter.

Hardware Status and Information

Select **Hardware Status and Information** for information on the current state of the ASM processor. When you finish viewing this information, press Esc to return to the main menu.

Configuration Settings

Select **Configuration Settings** to view or change the configuration settings of the ASM processor. Select this choice to configure the following settings:

- Alert Settings
- Dial In/Out Settings
- General Settings
- Modem Settings

Alert Settings: Select this choice to enable or disable all critical, non-critical, and system alerts supported by the ASM processor.

Use the arrow keys and the Tab key to move between the fields. Use the left and right arrow keys to enable or disable each of the alerts. When you finish, press F6 to save and return to the main menu. To return to the main menu without saving, press Esc.

Dial In/Out Settings: Select this choice to configure dial in and dial out settings.

To use Dial In, use the Tab key or the arrow keys to move the cursor to **User Profile to Configure**. Then, use the left and right arrow keys to select a User Profile. When you have selected a User Profile, you can set the following values:

- Login ID
- Password
- Dialback (enable or disable)
- Number (used for dialback only)
- Read Only Access (enable or disable)
- Dial In (enable or disable)
- Dial In Delay (minutes)

When you finish, press F6 to save and return to the main menu. To return to the main menu without saving, press Esc.

To use Dial Out, use the Tab key or the arrow keys to move the cursor to **User Profile to Configure**. Then, use the left and right arrow keys to select a User Profile. When you have selected a User Profile, you can set the following values:

- Login ID
- Password
- Enable or disable the currently selected entry
- Number
- PIN
- Connection Type (numeric, alphanumeric, serial)
- Description
- Dialout Retry Limit
- Dialout Number Spacing
- Dialout Retry Delay

When you finish, press F6 to save and return to the main option menu. To return to the main option menu without saving, press Esc.

General Settings: Select this choice to set the identifying Name and Number for the ASM processor; set the time and date of the ASM clock, schedule a time and date for

the system to be automatically powered on, and to specify POST, Loader, and O/S Timeout values or the Power Off Delay value.

The Name and Number help you identify these systems on your network. The Name and Number values can be up to 15 characters in length.

Use the arrow keys and the Tab key to move between the fields. When you finish, press F6 to save the values and return to the main menu. To return to the main menu without saving, press Esc.

Modem Settings: Select this choice to configure the modem that the ASM processor uses.

Update System Management Firmware

Select this choice to update configuration settings for the ASM processor. For more information, see “Updating the ASM firmware” on page 21.

Exit

Select this choice to exit from the xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility program.

Configuring the ASM processor

To configure the ASM processor, do the following:

1. Insert the *xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update* diskette into the diskette drive and restart the server.
2. After your server starts up and the main menu appears, select **Configuration Settings** and press Enter.
3. Select **General Settings** and press Enter.
4. Type a name for the ASM processor of your server in the **Name** field. This value can be up to 15 characters long.
5. Type a number for the ASM processor of your server in the **Number** field. This value can be up to 15 characters long.

   Notes:

   a. The **Name** and **Number** designations apply to the ASM processor and not to the server.

   b. Designate the ASM processor with names and numbers that correspond to the server designations to which they apply.
6. Press F6 to save the values and return to the main menu. To return to the main menu without saving, press Esc.
7. When you are finished using the utility program, select **Exit Utility** from the main menu and press Enter.
8. Select **Yes, exit utility** and press Enter.
9. When prompted, remove the diskette from the diskette drive and press Enter to restart your server.

Chapter 4. Using the ServerGuide CDs

The ServerGuide CDs include easy-to-use software setup and installation tools that are specifically designed for your IBM server. The ServerGuide Setup and Installation program detects the server model and hardware options that are installed and uses that information during setup to configure the hardware. The ServerGuide tools simplify network operating system (NOS) installations by providing updated device drivers, and in some cases, installing them automatically.

If a newer version of the ServerGuide software is available, you can purchase an update package. For details, see the ServerGuide Updates form that comes with your server library, or go to the ServerGuide fulfillment Web site at http://www.ibm.com/pc/coupon

The ServerGuide software has these features to make setup easier:

- An easy-to-use interface with online help
- Diskette-free setup, and configuration programs that are based on detected hardware
- *Performance Optimizer* program, which easily tunes your server for your environment
- A system BIOS update program, which updates the BIOS directly from the CD
- Device drivers that are provided for your server model and detected hardware
- NOS partition size and file-system type that are selectable during setup
- Powerful application programs and administration tools

Features at a glance

The following is a summary of ServerGuide features.

Note: Exact features and functions can vary with different versions of the ServerGuide software. To learn more about the version that you have, start the *Setup and Installation* CD and view the Online Overview.

***Setup and Installation* CD**	***Setup and Installation* CD** (continued)	***System Updates and Applications* CD** (continued)
Note: The ServerGuide program requires a supported IBM server with an *enabled* startable (bootable) CD-ROM drive. Not all features are supported on all models. • Sets system date and time. • Detects the ServeRAID adapter or controller and runs the ServeRAID configuration program. • Updates the licensed internal code (firmware) level without creating diskettes. • Checks the system BIOS and microcode (firmware) levels of supported options to determine whether a later level is available from the CD. You can perform updates without the use of diskettes. • Provides the Performance Optimizer program to easily tune your server for your environment. • Creates a System Partition on the default drive. You can run server-specific utility programs after setup. • Detects installed hardware options and provides updated device drivers for most adapters and devices.	• Creates a *Setup Replication Diskette* for replicating setup selections for other servers of the same model. • Provides diskette-free installation for Microsoft® Windows® 2000, Windows NT®, and NetWare operating systems. • Provides a replicated installation path for multiple Windows 2000, Windows NT Server 4.0, and Windows Enterprise Edition, and Red Hat Linux®. • Includes an online README file with links to tips for your hardware and NOS installation. **Note:** Installation requires your NOS CD. ***System Updates and Applications* CD** • Creates diagnostic, RAID, device driver, and other support diskettes from the CD; or with an Internet connection, you can check for an update from a dedicated IBM file transfer protocol (FTP) server. • Installs some updates without requiring diskettes. Where applicable, you can run executable files directly from the CD or unzip files to any drive on your server or another server on your network.	• Includes a vast library of fully tested device drivers for your server. • Includes a search function to help you locate updates by title or keywords. • Installs powerful applications directly from the CD. See the CD label for a current list of applications.

Setup and configuration overview

When you use the *Setup and Installation* CD, you do not need setup diskettes. You can use the CD to configure any supported IBM server model. The setup program checks your system BIOS, service processors, and other system hardware to determine if system updates are available. The setup program provides a list of tasks that are required to set up your server model. On RAID servers, you can run the ServeRAID Manager program to create logical drives.

Note: Exact features and functions can vary with different versions of the ServerGuide software.

When you start the *Setup and Installation* CD, the following happens:

- You are prompted for your language, country, and keyboard layout. (This information is stored and later passed on to the NOS installation program.)
- ServerGuide displays choices for running the configuration programs. For example:
  - — The Express Configuration method runs the required programs for your server, based on the hardware that is detected.
  - — The Custom Configuration method displays all programs that are available for your server, and you decide which programs to run.
  - — The Replicated Configuration method provides the option of duplicating your setup selections to other servers that are the same model.
- If you select the Custom Configuration method, the following programs are optional. If you select the Express Configuration method, some or all of these programs are run, depending on the hardware that is detected.
  - — The Set Date and Time feature is provided so that you do not have to use the Configuration/Setup Utility program to access these settings.
  - — The Clear Hard Disks program is provided so you can delete all partitions on all hard disk drives. If the server has a ServeRAID adapter installed, you can select to restore the configuration on the ServeRAID adapter to the factory default settings.
  - — ServerGuide checks the server BIOS and microcode (firmware) levels for supported options and then checks the CD for a newer level. CD content can be newer than the hardware. ServerGuide can perform a flash update of the BIOS and supported microcode (firmware) options without the use of diskettes.
  - — The ServeRAID configuration program starts, leading you through the entire configuration process.
  - — The Performance Optimizer program easily tunes your server for your environment.
  - — ServerGuide creates a System Partition on the default drive.
- ServerGuide displays a confirmation summary, so that you will know when you have completed all the required tasks. Then, you are ready to install your NOS.

Notes:

1. Plug and Play adapters are configured automatically. Non-Plug and Play adapters or non-IBM adapters might require switch settings, additional device drivers, and installation after the NOS is installed. See the documentation that comes with the adapter.
2. Diagnostics for your server come in BIOS or on a separate diagnostics CD.

System Partition

ServerGuide creates a 50 MB System Partition on the default drive. The System Partition contains server-specific utility programs such as service processor disk operating system (DOS) utilities, system diagnostics, flash BIOS updates, and other programs.

Note: Programs in the System Partition vary by server model, and not all server models run utility programs from the System Partition. To determine which ones do, start the *Setup and Installation* CD and view the Online Overview.

After setup is complete, you can access programs in the System Partition by restarting the server and pressing Alt+F1 when the prompt is displayed. The System Partition menu displays the programs that are available on your server model.

Typical NOS installation

You can use ServerGuide to shorten your installation time. ServerGuide provides the necessary device drivers, based on the hardware that you have and the NOS that you are installing. The following is a brief explanation of a typical ServerGuide NOS installation.

Note: Exact features and functions can vary with different versions of the ServerGuide software

- After you have completed the setup process, the operating system installation program starts. (You will need your copy of the NOS CD to complete the installation.)
- ServerGuide stores information about the server model, service processor, hard disk controllers, and network adapters. It then checks the CD for newer device drivers. This information is stored and then passed to the NOS installation program.
- With some NOS installations, you can create a *NOS Replication Diskette* for setting up additional servers. The diskette will contain the Internet protocol (IP) address, server name, and other selections.
- ServerGuide presents NOS partition options that are based on your NOS selection and the installed hard disk drives.
- If you are installing the NOS from diskette, ServerGuide displays the required diskettes that you must create, and the optional diskettes that you might want to create. The diskettes that you can create are the device driver diskettes for the installed adapters or controllers.

ServerGuide prompts you to insert your NOS CD and restart the server. At this point, the installation program for the NOS (for example, Microsoft Windows 2000) takes control to complete the installation.

Setting up or updating multiple servers

You can use ServerGuide to create diskettes that help you set up or update multiple servers. You can modify information on the diskettes as you use them to set up or update other servers.

Note: Availability and function can vary by server model and by the hardware that is installed.

You can create a *Setup Replication Diskette*, which contains your hardware configuration selections. Use this diskette to replicate selections to other servers that are of the same model.

You can create a *NOS Replication Diskette*, which contains your server name, domain name, and other information that you need to complete multiple installations. This feature supports systems running Windows 2000, Windows NT Server 4.0, and Red Hat Linux.

Installing your NOS without ServerGuide

If you have already configured the server hardware and you decide not to use ServerGuide to install your NOS, download the latest NOS installation instructions:

1. Go to http://www.ibm.com/pc/support
2. Click **Servers**.
3. From the **Family** field, select your server model.
4. Click **OS installation**. The available installation instructions are listed.

Additional programs included with ServerGuide

As a convenience, ServerGuide comes with additional software to assist you with the server installation.

A variety of powerful applications are included with ServerGuide. Offerings can vary with the different versions of the ServerGuide software. Check the application CD labels for a list of applications, or start the *Setup and Installation* CD and view the Online Overview.

Error symptoms

This section provides ServerGuide error symptoms and probable solutions.

***Setup and Installation* CD**	**Action**
Setup and Installation CD will not start.	• Ensure that the system is a supported server model with a startable (bootable) CD-ROM drive. • If the startup (boot) sequence settings have been altered, be sure that the CD-ROM is first in the startup sequence. • If more than one CD-ROM drive is installed, be sure that only one drive is set as the primary drive. Start the CD from the primary drive.
ServeRAID program cannot view all installed drives or cannot install NOS.	• Ensure that there are no duplicate SCSI IDs or IRQ assignments. • Ensure that the hard disk drive is connected properly.
The operating system installation program continuously loops.	Free up more space on the hard disk.

***Setup and Installation* CD**	**Action**
ServerGuide will not start your NOS CD.	Ensure that the NOS CD is supported by ServerGuide. See the *Setup and Installation* CD label for a list of supported NOS versions.
Cannot install NOS.	Ensure that the NOS is supported on your server. If the NOS is supported, either there is no logical drive defined (ServeRAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide setup and configuration program and ensure that the setup is complete.

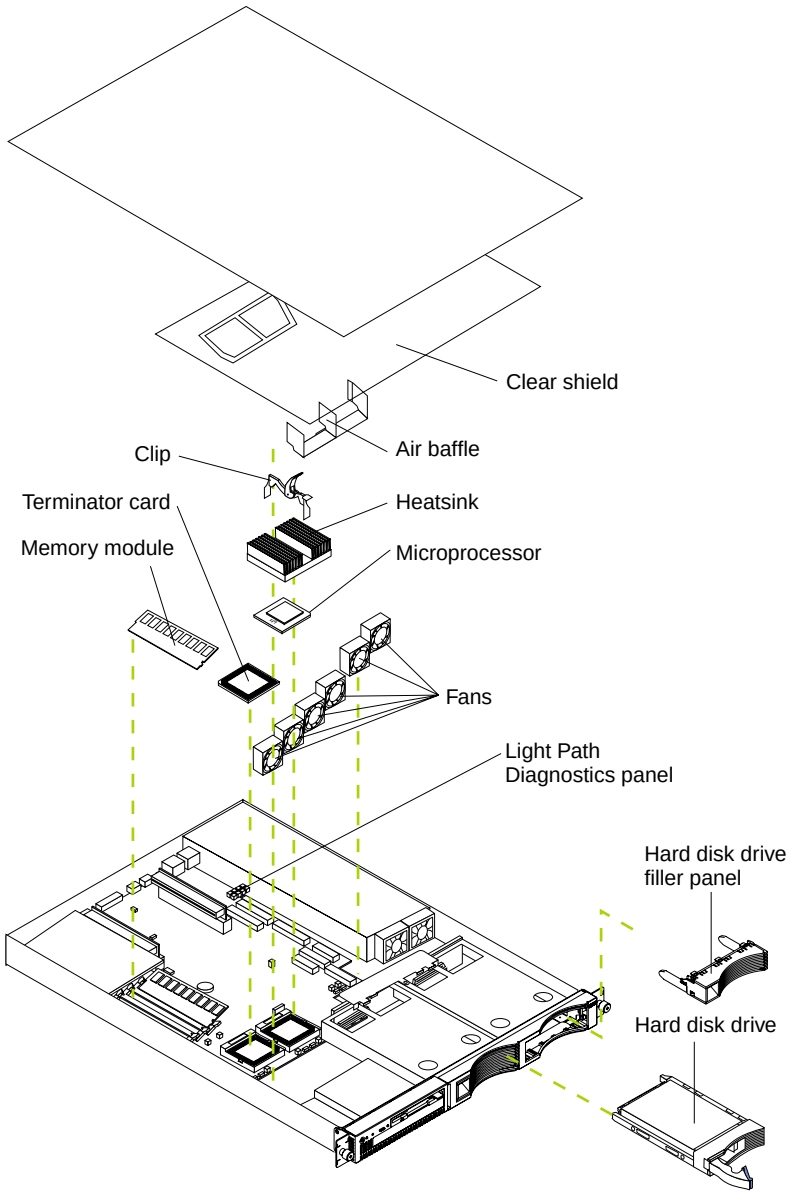
***System Updates and Applications* CD**	**Action**
Get "time out" or "Unknown host" errors.	Ensure that you have access to the Internet through FTP directly.

Chapter 5. Installing options

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

Major components of the xSeries 330

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



System board

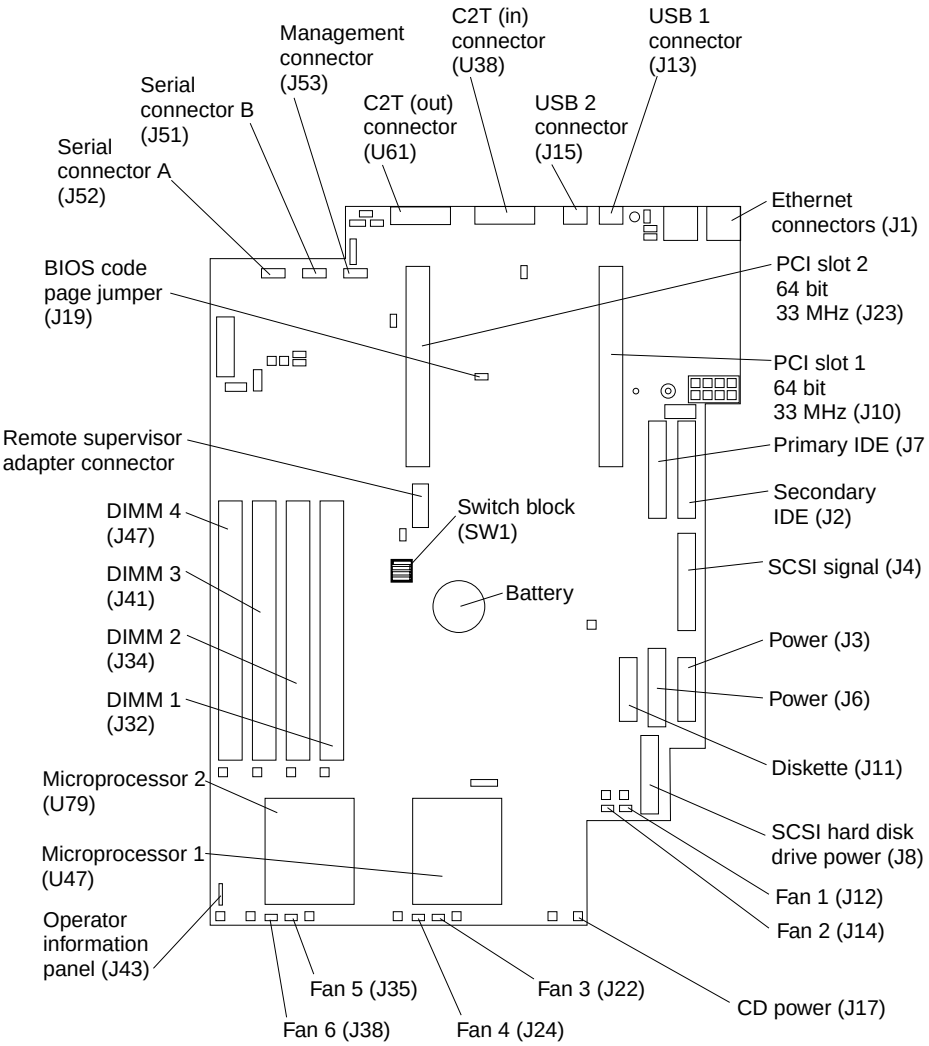
The illustrations in the following sections show the components on the system board.

System board option 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. See “Recovering BIOS code” on page 87 for information about the flash ROM page-swap jumper.



System board switch block

The switch block contains microswitches 1 through 4. Switch 1 is at the top of the switch block and switch 4 is at the bottom. For more information about this switch block see “Power-on password” on page 15.

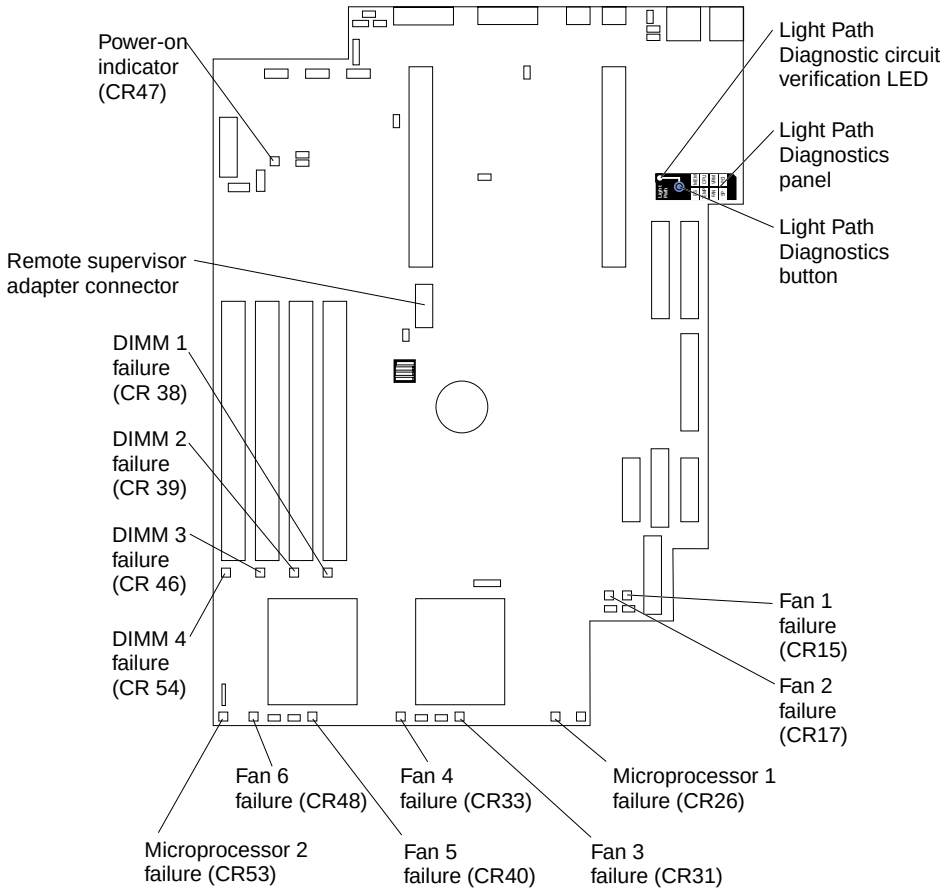
The following table describes the function for each switch.

Table 3. Switches 1-4.

Switch number	Switch description
1	Reserved. The default setting is Off (disabled).
2	Reserved. The default setting is Off.
3	Reserved. The default setting is Off.
4	Bypass power-on password. When toggled to the opposite position, the system bypasses the power-on password, if one is set. See “Power-on password” on page 15.

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”, and read the safety statements in "Safety," beginning on page vii. 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, see 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 separate location 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). Additional C2T cables are available in the cable option kit.

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 normal operations, or is removed for no longer than 30 minutes while the server is operating.
- There is space around the server to allow the server cooling system to work properly. Leave approximately 127 mm (5 in.) of space around the front and rear of the server.
- Cables for optional adapters are routed according to the instructions provided with the adapters.
- A failed fan is replaced within 48 hours.

Handling static-sensitive devices

Attention: Static electricity can damage electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective package 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 package, 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 in its

static-protective package. 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

Before installing this product, read the Safety Information.

مج، يجب قراءة دات السلامة

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

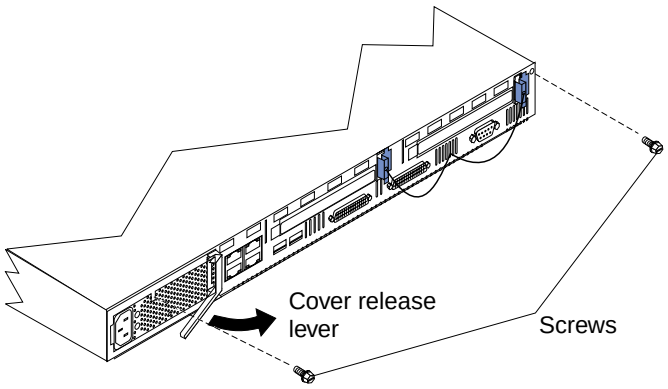
Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Removing the cover

Complete the following steps to remove the server cover:

1. Review the information in “Safety” on page 35.
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.



Note: You might need to remove the clear plastic shield to reach some parts in the server. For proper cooling and airflow, replace the clear plastic shield before replacing the cover.

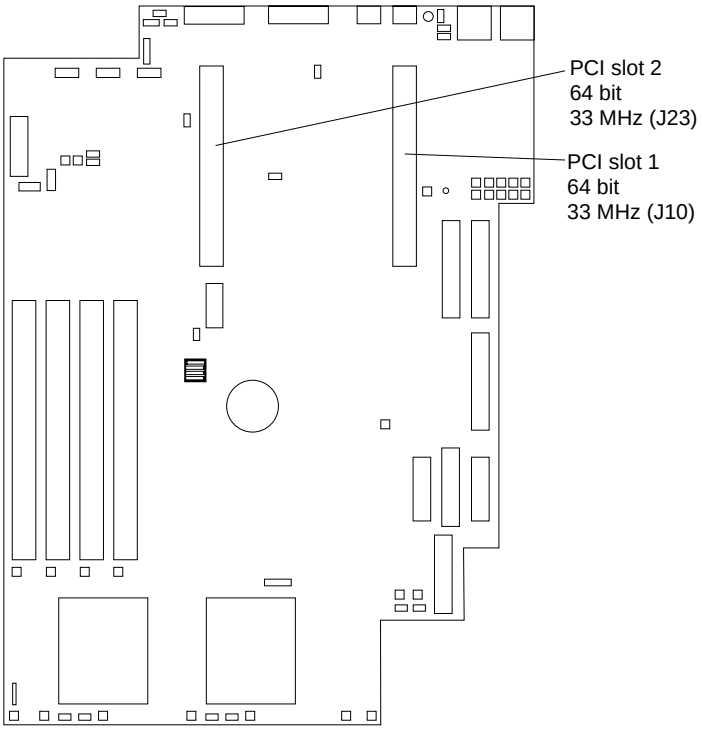
Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the cover removed might damage server components.

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.



Adapter considerations

Before you install adapters, review the following:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change the switch settings or jumper settings on your adapter, follow the instructions that come with the adapter.
- You can install 32-bit or 64-bit full-length or half-length adapters in the expansion slots. Full-length adapters are installed in slot 1; half-length adapters are installed in either slot 1 or 2.
- Your server supports 5.0 V and universal PCI adapters; it does not support 3.3 V only adapters.
- Your server uses a rotational interrupt technique to configure PCI adapters. You can use this technique to 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 is bus 0; PCI bus B is bus 1.

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

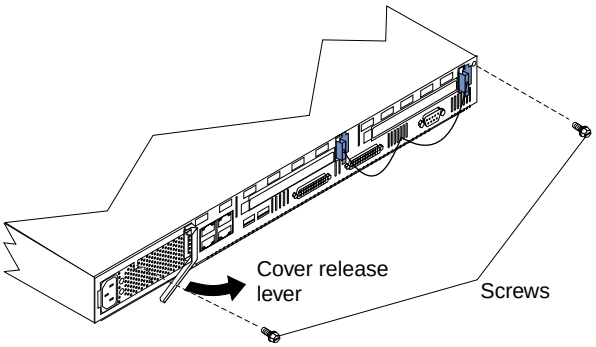
  Note: To change the boot precedence, start the Configuration/Setup Utility program, select **Start Options** from the main menu; then, select the **PCI SCSI adapter boot option**.

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 34.

1. Review the information in “Safety” on page vii.
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 36 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.

   Notes:

   a. Route internal adapter cables before you install the adapter.

   b. When installing a ServeRAID adapter to control the internal hard disk drives, remove the cable from the SCSI connector (J4) on the system board and attach it to the ServeRAID adapter.
7. Set any jumpers or switches as described by the adapter manufacturer.
8. Install the adapter:

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

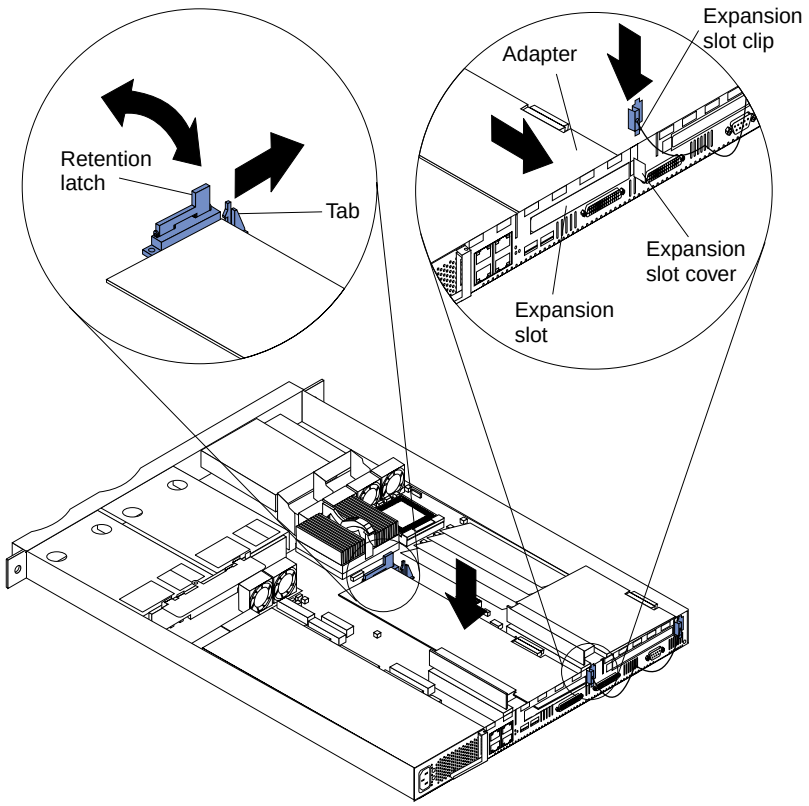
   b. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the PCI riser card.

   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.

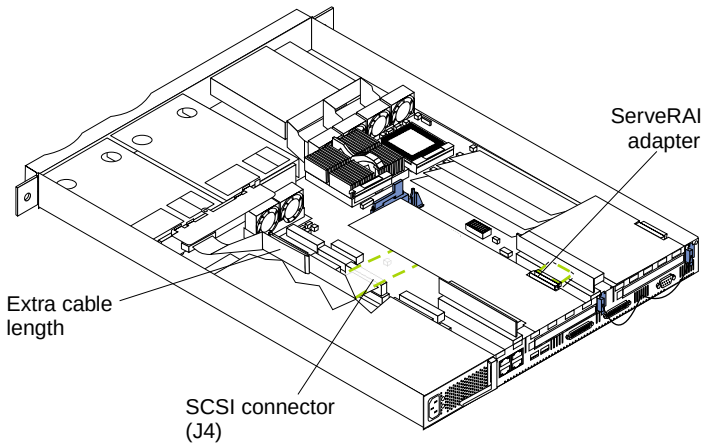
e. Replace the expansion-slot clip by sliding it down until it latches into place and holds the adapter securely.



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 to control the internal hard disk drives, 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 49 for instructions.

11. Turn on the server.

Hard disk drives

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

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

Some models of the xSeries 330 server come with a SCSI backplane that supports the installation of hot-swap hard disk drives. Each hot-swap hard disk drive tray has a status light and an activity light located on the upper-right corner of the tray (see “Major components of the xSeries 330” on page 31 for the location of the status and activity indicators). These lights are used to show when there is drive activity or, in some cases, when there is a problem with your hard disk drive.

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

Non-hot-swap disk drives do not have the activity light in the upper-right corner of the tray.

Preinstallation steps

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

- Inspect the drive tray for any signs of damage.
- Ensure that the drive is installed properly in the tray.
- To maintain proper system cooling, do not operate the server for more than 2 minutes without either a drive or a filler panel installed in each bay.
- If your server has a ServeRAID adapter installed, see the documentation provided with the ServeRAID adapter for information about adding a drive.
- Review the information in “Safety” on page vii and “Handling static-sensitive devices” on page 34.
- Check the instructions that come with the drive for more information about installing your drive.

Installing or replacing a non-hot-swap hard disk drive

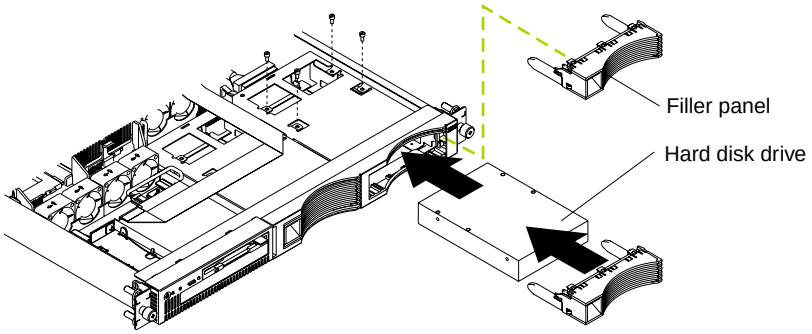
Complete the following steps to install or replace a non-hot-swap hard disk drive:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 34.

1. Review the safety precautions beginning on page vii.
2. If you are installing a SCSI hard disk drive, set the identification number of the disk drive to 0 or 1, depending on the configuration of your server. If you are installing an IDE hard disk drive, set the drive to primary (master) or secondary (subordinate), depending on the configuration of your server. See the documentation that comes with the drive for instructions.

3. Turn off the server and peripheral devices, and disconnect all external cables and power cords.
4. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information on removing the cover, see “Removing the cover” on page 36.
5. Pull the fans from behind the drive bay where you want to install or replace your drive. If you are replacing a failing hard disk drive, disconnect the power and signal cables from the hard disk drive.
6. Remove the filler panel or defective hard disk drive from one of the hard disk drive bays.
7. Install the new hard disk drive in the drive bay:
   a. Slide the drive into the bay, with the screw holes in the drive facing up, and align the screw holes in the drive with the screw holes in the server chassis.
   b. Use a screwdriver to tighten the screws and secure the drive to the server chassis.

      Note: You might have to hold the drive up and in place to carefully align the drive with the screw holes in the chassis.



   c. Connect signal and power cables to the rear of the drive. Be sure to keep the signal cable and power cable clear of the path of the fan behind the drive bay.
8. Replace the top cover. See “Installing the cover” on page 49 for instructions.
9. Reconnect the external cables and power cords; then, turn on the server.

Note: A hard disk drive is replaced in the same manner as a new hard disk drive is installed, but you must remove the old hard disk drive first.

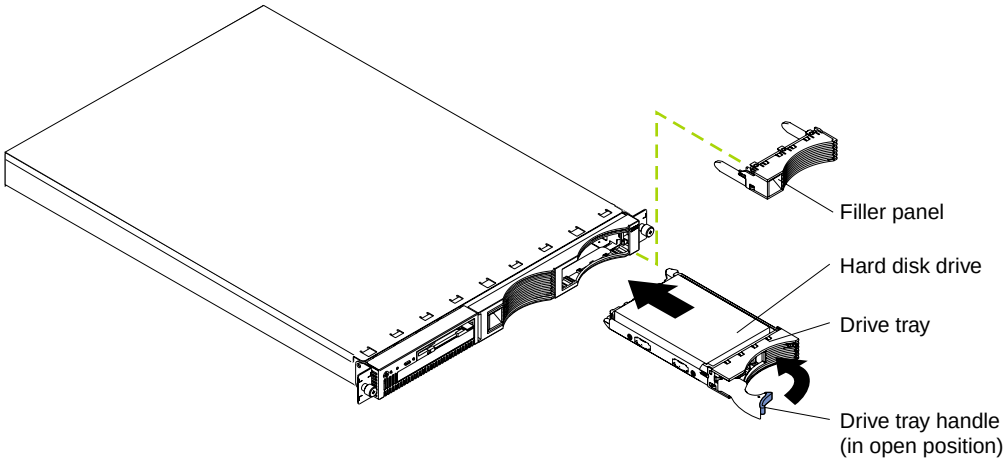
Installing or replacing a hot-swap SCSI hard disk drive

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

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 34.

1. Review the information in “Safety” on page vii.
2. Remove the filler panel or defective hard disk drive from one of the hard disk drive bays.

3. 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.



4. Check the hard disk drive status light and activity light to verify that the hard disk drives are operating properly. (See “Front view” on page 5 for the location of the status indicators.)
   - If the amber light is on continuously, the drive has failed (only when a ServeRAID adapter is installed).
   - If the amber light flashes slowly (one flash per second), the drive is being rebuilt (only when a ServeRAID adapter is installed).
   - If the amber light flashes rapidly (three flashes per second), the controller is identifying the drive.

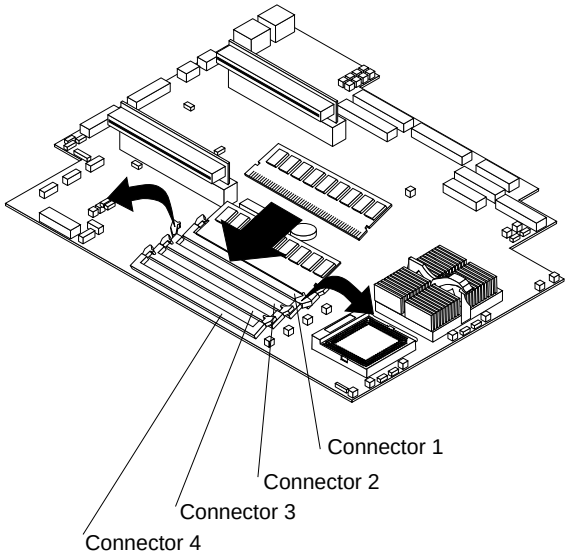
   Note: If your server has a ServeRAID adapter and the hot-swap backplane installed, you can hot-swap SCSI drives. For more information about hot-swapping drives, see the documentation provided with the ServeRAID adapter.

Installing 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 dual inline memory modules (DIMMs). 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 inline memory module (DIMM) installed on the system board in DIMM slot 1.

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



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, see “Handling static-sensitive devices” on page 34.

1. Review the information in “Safety” on page vii.
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 36 for instructions.
4. If necessary, remove the PCI adapter in slot 2 for easier access to the DIMM connectors.
5. Touch the static-protective package 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. See the illustration on page 43.

   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. See “Installing the cover” on page 49 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 installed additional memory, start the Configuration/Setup Utility program and select **Save Settings**.
   - 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 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**.

Installing a microprocessor

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

Notes:

1. Before you install a new microprocessor, review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS) code. The latest level of BIOS code for your server is available through the World Wide Web. See “Getting information, help, and service” on page 102 for the appropriate World Wide Web addresses.
2. Obtain an SMP-capable operating system (optional). For a list of supported operating systems, see http://www.ibm.com/pc/us/compat/ on the World Wide Web.
3. If your server comes with one microprocessor, it is installed in microprocessor connector 1, which is the microprocessor connector closer to the DIMM connectors. This is the startup (boot) microprocessor. If you install a second microprocessor in microprocessor connector 2, the two processors will share the system load after the system has started.

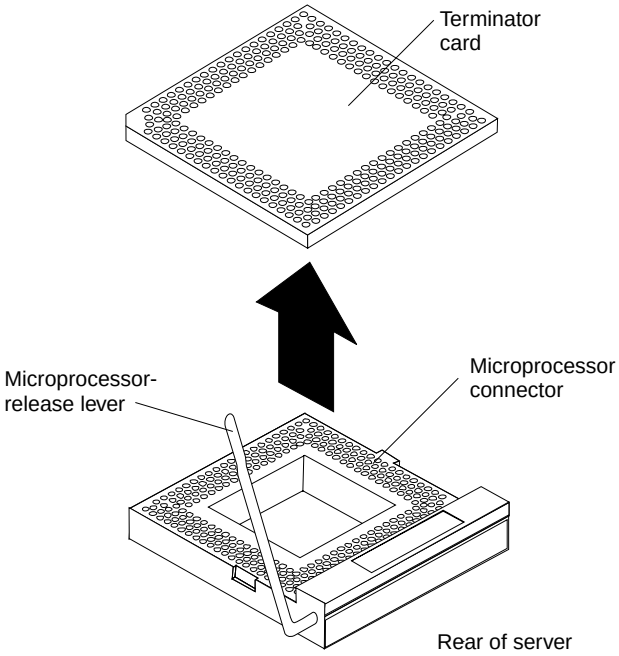
Attention: To avoid damage and ensure proper server operation, install microprocessors that are the same type, have the same cache size, and have the same clock speed. Microprocessor internal clock frequencies and external clock frequencies must be identical. See the ServerProven list at http://www.ibm.com/pc/compat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

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

Complete the following steps to install an additional microprocessor:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 34.

1. Review the information in “Safety” on page vii.
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 36 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 package, place the terminator card in the package and store it in a safe place. You will need to install the terminator card again, if you ever remove the microprocessor and do not replace the microprocessor).

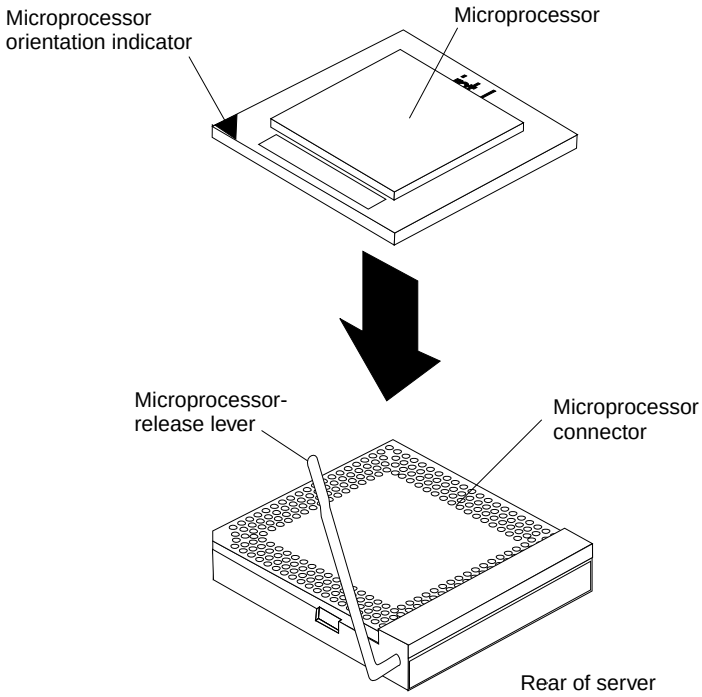


6. Install the microprocessor:

   a. Touch the static-protective package 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.

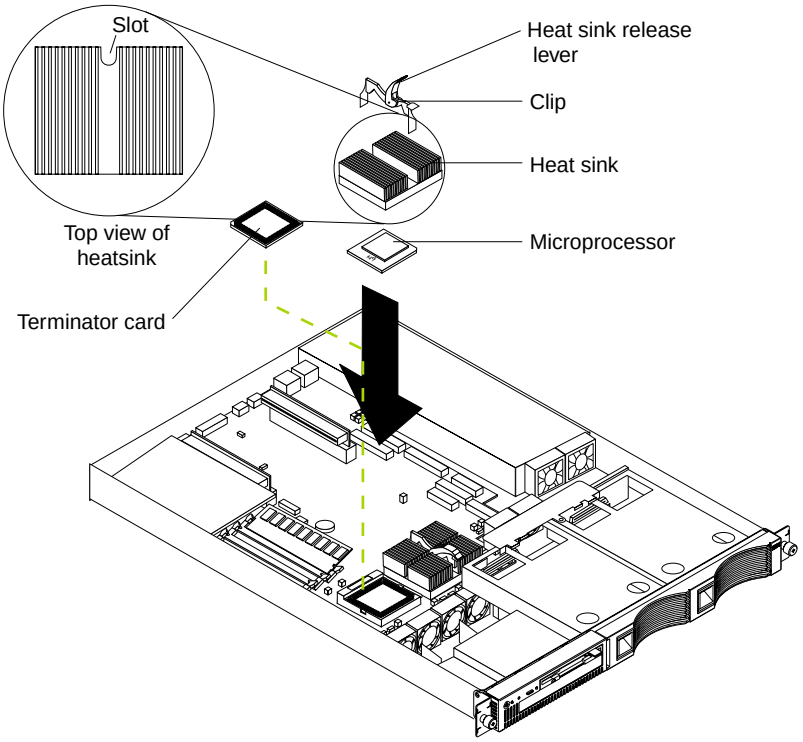
8. Install the heat sink on the microprocessor:
   a. Peel the plastic protective strip off the bottom of the heat sink. Make sure the square of thermal material is still on the bottom of the heat sink.
   b. Align and place the heat sink on top of the microprocessor.

      Note: Locate the slot in the channel of the heat sink. Orient the heat sink so 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. When the clip is in place, press the heat sink release lever down into the locked position.



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

Replacing a fan assembly

Your server comes with six replaceable fans.

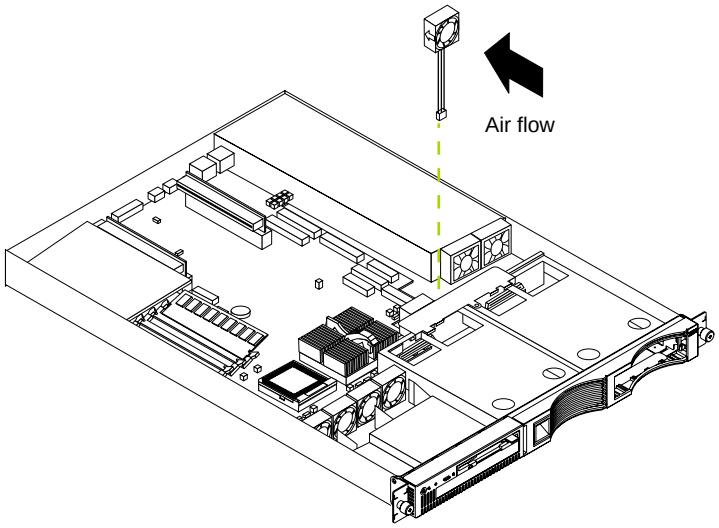
Attention: If a fan fails, replace it within 48 hours to help ensure proper cooling.

Complete the following steps to replace the fan assembly:

1. Review the information in “Safety” on page vii.
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 36 for instructions.
4. Determine which fan to replace by checking the LED at each fan; a lit LED indicates the fan to replace.

   Note: The fan LEDs are illuminated by the Light Path Diagnostics circuit. For more information about the LEDs and the Light Path Diagnostics circuit, see “Identifying problems using the Light Path Diagnostics feature” on page 88.
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 air flow arrow on the side of the fan is facing or pointing toward the rear of the server.

   Note: Proper air flow is from the front to the rear of the server.
7. Push the replacement fan assembly into the server until it clicks into place.



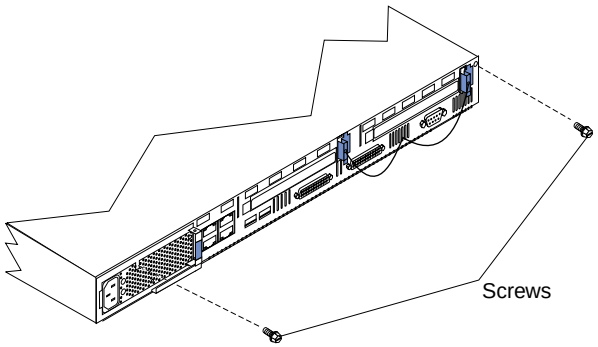
8. Connect the fan cable to the system board.
9. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. See “Installing the cover” on page 49 for instructions.
10. Start up the system. The system error light will either remain on or turn off. If the system error light remains on, you will have to turn off the server to perform further troubleshooting.

Installing the cover

Complete the following steps 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.

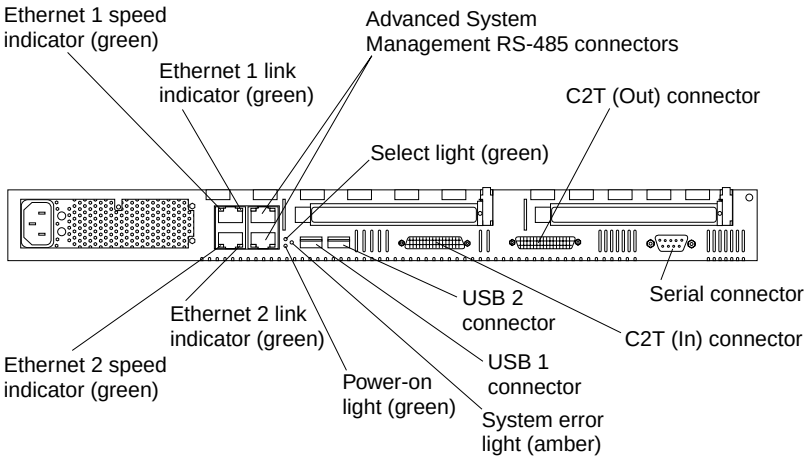
   Attention: Before sliding the cover forward, make sure that all of the tabs on the cover will engage the ledge at the front of the server properly. If all the tabs do not engage the ledge properly, it will be extremely difficult to remove the cover later.
3. Install the cover by placing it into position and sliding it forward. Make sure that the cover engages the tabs at the front and rear of the server.
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, and then plug the power cords into properly grounded electrical outlets.

Input/output ports and connectors

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



Your server has the following input/output (I/O) connectors:

- Serial connector
- Universal Serial Bus (USB) connectors
- Cable Chaining Technology (C2T) connectors
- Ethernet connectors
- Advanced System Management (ASM) connectors

Serial port and connector

Your server has one standard serial connector (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 of the server. The following table lists the function of each of the connectors that you can use to manually configure the serial port. You will also need to refer to the figure in "System board option connectors" on page 32.

Table 4. Serial port connectors on the system board.

Connector	Port	Description
J52	Serial A/Systems Management Port	Default connection. Used by operating system and ASM processor. Modem can be connected so that the system can dial out during problems.
J51	Serial Port B	Used by operating system only.
J53	Management Port	Used by ASM processor to use modem dial-up functions.

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 settings available.
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.

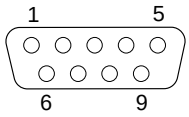


Table 5. Serial-port connectors pin-number assignments.

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) connectors. USB is a serial interface standard for telephony and multimedia devices. It uses Plug and Play technology to determine the type of device attached to the connector and configure it automatically.

Notes:

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

USB cables and hubs

You need a 4-pin cable to connect devices to USB 1 or USB 2. If you plan to attach more than two USB devices, you must use a USB 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.

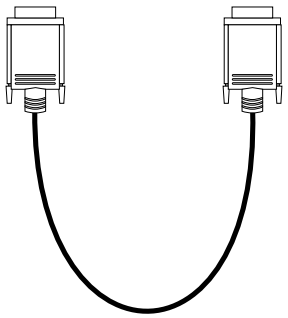
Table 6. USB-port connector pin-number assignments.

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

C2T ports

There are two Cable Chain Technology (C2T) connectors on the rear of your server labeled "IN" and "OUT." These connectors operate with the C2T ports to create a communications chain between servers and a console (monitor, mouse, and keyboard). To share the same monitor, keyboard, and pointing device with several servers, you must connect the servers together with C2T interconnect cables through the C2T (In) and C2T (Out) connectors.

The following illustration shows a C2T interconnect cable.

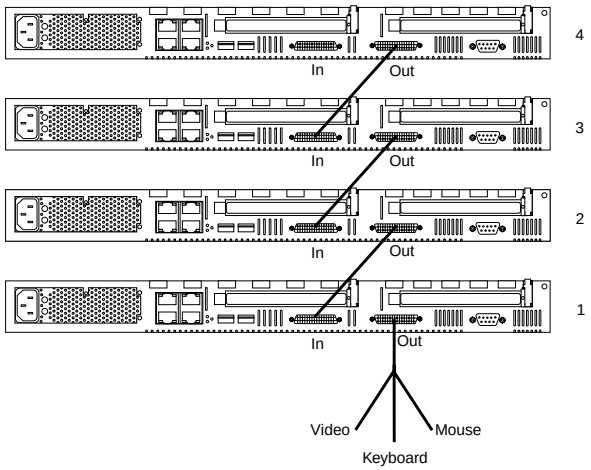


Note: The highest video mode supported in the C2T chain is 1024 x 768.

Connect a C2T cable from the C2T (Out) to the C2T (In) connector of another xSeries 330 server.

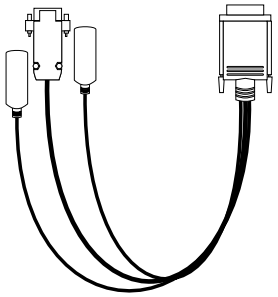
Connect a C2T breakout cable to the C2T (Out) connector of the last server in the chain; then, connect your monitor, keyboard, and pointing device to the device breakout cable.

Note: The C2T breakout cable is available in the C2T cable option kit.



C2T breakout cable

A keyboard, monitor, and mouse or pointing device are connected to your server through the C2T 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 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 illustration and table show the pin-number assignments for the keyboard connector on the end of the cable.

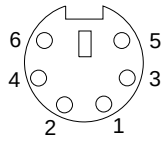


Table 7. Keyboard-connector (6-pin female) pin-number assignments .

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.

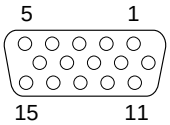


Table 8. Video-connector (15-pin female) pin-number assignments.

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

There is one auxiliary-device connector that supports a mouse or other pointing device on the end of the C2T breakout cable. 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.

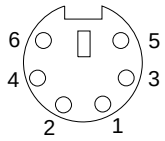


Table 9. Auxiliary or pointing-device-connector (6 pin female) pin-number assignments .

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 (10 Mbps or 100 Mbps) 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. The device drivers are provided on the ServerGuide CDs.

Failover for redundant Ethernet

When you connect your server to the network, the Ethernet controllers automatically detect the data transfer rate (10 Mbps) or or 100 Mbps) on the network and then set the controllers to operate at the appropriate rate. The IBM 10/100 Ethernet Adapter or the IBM 10/100 EtherJet™ PCI family of adapters are optional redundant network adapters that you can install in your server. You can configure either one of the integrated Ethernet controllers or the Network 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 throughput. 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 modes, see 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 Web site at http://www.ibm.com/networking/support on the World Wide Web.

Priority Packet prioritizes traffic based on priority filters. These are parameters 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 priority 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, you must launch IBMSet and select **802.1p/802.1Q Tagging** on the Advanced page.

Note: IEEE 802.1p tagging increases the size of the packets 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 VLANs and packet tagging on the same adapter, 802.1p/802.1Q Tagging must be enabled on the IBMSet Advanced page.

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 virtual LAN (VLAN) is a logical grouping of network devices 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 across the 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. You also need to use Windows NT 4.0 or later, or Novell NetWare 4.1x or later.

Notes:

1. Microsoft Windows NT versions prior to 4.0 do not support VLANs.
2. VLANs require NT 4.0 with Service Pack 3.0 and the NDIS driver hotfix from Microsoft.
3. In Windows NT, VLANs cannot be implemented on controllers that have been configured for teaming options. NetWare can support teaming options and VLANs on the same adapters.

To join a VLAN from Microsoft Windows NT 4.0:

1. Create a VLAN on the switch. Use the parameters you assign there to join the VLAN from the server. See 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 you want to be on the VLAN and click **Properties**.
4. In IBMSet, select **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 you want the server to join. The VLANs you add are listed on the Adapters page.
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.

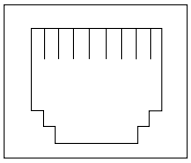


Table 10. Ethernet RJ-45 connector pin-number assignments..

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

Advanced System Management ports

There are two kinds of Advanced System Management (ASM) ports: the Management port (Serial port A) and RS-485 ports.

Management port (Serial port A)

This port uses a standard D-shell serial-port connector, labeled A on the rear of the server. You can attach a dedicated modem to the D-shell connector on the rear of your server to communicate with the integrated ASM processor. For more information about the serial port, see “Serial port and connector” on page 50.

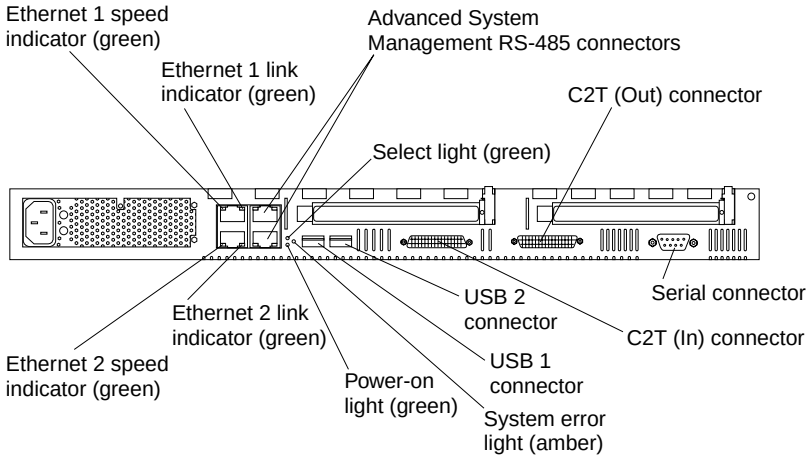
RS-485 ports

The RS-485 ports on the rear of your server enable you to connect the ASM processors of several rack-mounted servers so that they can communicate with each other in half-duplex mode.

Working with cables

Your server has two different cabling options: the ASM bus and the Cable Chain Technology (C2T). The following sections discuss each of these options. While reading about these options, keep in mind that they are independent of each other.

Note: Refer to the following illustration to locate the connectors on the back of your server.



The ASM connectors on the back of the server are referred to in this book as RS-485 (A) and RS-485 (B).

Cabling the RS-485 connectors

You can use the RS-485 connectors to create an ASM bus between several xSeries 330 servers or other servers.

Before you begin, review the following:

- The ASM bus is designed to connect up to 12 units or servers. When using the IBM Remote Supervisor adapter, you can connect a maximum of 11 units or servers together.
- You can hot-swap the cables in the ASM bus.
- Use standard unshielded twisted pair (UTP) cables with RJ-45 connectors.

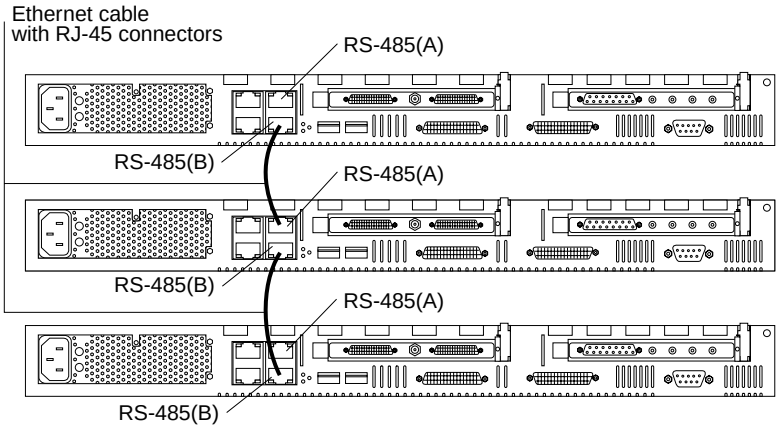
Note: For more information about the ASM PCI adapter, see the documentation that came with the adapter.

The servers in the ASM bus are referred to by their assigned addresses and not their positions in the rack.

Complete the following steps to connect the ASM bus:

1. Turn off the servers.
2. Locate the RS-485 connectors on the rear of the servers and several UTP cables with RJ-45 connectors.
3. Starting at the top server in the ASM bus, connect one end of the cable into the RS-485 (B) connector and the other end of the cable into the RS-485 (A) connector of the next server.
4. Continue connecting the servers together in this manner until you reach the second-to-last server in the ASM bus.

5. Connect a cable from the RS-485 (B) connector of the second-to-last server to the RS-485 (B) connector of the last server. Refer to the following illustration to see how to connect the ASM bus.



6. Turn on the servers.

Connecting servers with a C2T chain

To share the same monitor, keyboard, and pointing device with several servers, you must connect the servers together with Cable Chain Technology (C2T) interconnect cables through the C2T (In) and C2T (Out) connectors.

The C2T chaining cable uses physically different shells and different-colored connector covers (a black cover for out and a white cover for in) to prevent the accidental connection of two C2T (Out) connectors.

Before you begin, review the following:

- You can connect a maximum of 42 servers with the C2T chaining cables.
- When connecting servers across a space larger than 3 U or on two separate racks, you must use a C2T interconnect cable that is 2 m (6.5 ft) long, which is available in the C2T option cable kit.

  Note: Only one 2-m (6.5 ft) cable can be used in the C2T chain.
- The C2T chaining cables are hot-swappable.

  Attention: Do not let the pins of the C2T cable connectors touch the server chassis when adding or removing systems to or from the C2T chain.
- Servers are numbered by their position in the chain (1 through *n*). If one server is removed from the chain, all successive servers are renumbered. For example, if the twelfth server is removed from a chain of 15 servers, servers 13 through 15 will then be renumbered to 12 through 14.
- The C2T numbering is independent of any other server reference. Changing the position of the server in the C2T chain does not affect its IP addresses.

Complete the following steps to connect the servers:

1. Gather several of the C2T cables.

   Note: Your server comes with a short C2T chaining cable that can span approximately 3 U if needed. A longer C2T cable is available in the C2T cable option kit.

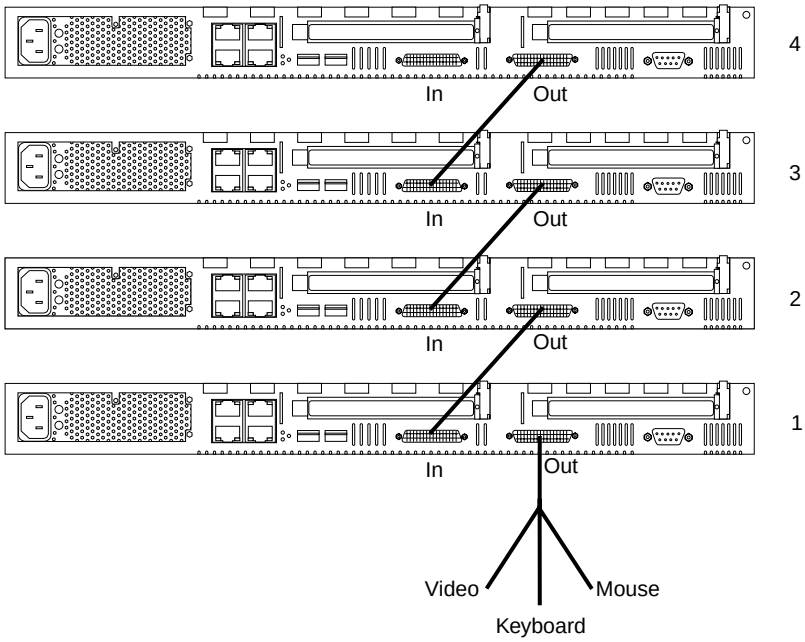
2. Connect the servers together:

   a. Connect one end of the C2T chaining cable to the C2T (Out) port of the top server.

   b. Connect the opposite end of the C2T chaining cable to the C2T (In) port of the server below it.

   c. Repeat these steps until all of the servers are connected together.

   d. Connect the C2T breakout cable to the C2T (Out) port of server 1.



   Note: Server 1 (usually the server at the bottom of the rack) is the server to which you connect the device breakout cable.

3. Turn on the servers; then, check the operation of the monitor, pointing device, and keyboard with each server. (See “Testing the C2T chain” for testing instructions.)

Note: Write-on adhesive labels have been provided so that you can label the positions of the servers in the rack.

Testing the C2T chain

After connecting the C2T chain, you will need to test the monitor, keyboard, and pointing device to be sure that they work with each of the servers.

Follow these steps to test the C2T cabling:

1. Turn on all the servers and the monitor and verify that the light in the Select button on server 1 in the C2T chain is lit, indicating that it is selected. If it is not, press the Select button.

2. Verify that the monitor is working.

3. Start up an operating system that has a mouse or pointing device driver and verify that the mouse or pointing device buttons function.
4. Test your keyboard by typing a few words within an application.
5. Press NumLock on the keyboard twice, and then press the number of the server to test next, and then press Enter. Repeat steps 1 through 4 for each of the servers in the chain.

Note: If you cannot use the devices, check your cable connections and retry the test. If the problem persists, turn off the servers and connect the C2T breakout cable directly to the C2T (Out) port of the server. Power-on the server and retry the devices. If the devices work, you probably have a bad C2T interconnect cable. Replace the cable and retry the devices in the C2T chain configuration.

Using C2T

Placing several servers in a C2T chain enables you to share the same monitor, keyboard, and mouse on all servers in the chain. To select a server, you can either use the Console Select button on the front of the server that you want to select, or you can use the keyboard. If you turn off a selected server, you must select another server that is powered up. For the location of the Select button, see page 6.

To use the keyboard, do the following:

1. Press NumLock on the keyboard twice. The screen goes blank.
2. Type the number that corresponds to the server ID in the C2T chain. The screen returns for the server that you selected, and the Console Select LED for that server illuminates.

Server 1 (usually the server at the bottom of the rack) is the server to which you connect the C2T breakout cable. Server 1 must not be turned off (powered down) for the chain to work properly. If server 1 is turned off (powered down), it must be removed from the chain and replaced by the next server in the chain.

Servers are numbered by their position in the chain (1 through *n*). If one server is removed from the chain, all successive servers are renumbered. For example, if the twelfth server is removed from a chain of 15 servers, servers 13 through 15 will then be renumbered to 12 through 14.

When removing or replacing servers, or changing cables in the chain, it is possible for more than one Select LED to be illuminated on the servers in the chain. To clear all but the selected server LED, press the Select button on any one of the servers in the chain.

If you are using a flat-panel monitor, you might need to adjust the image lock on your monitor when multiple servers are connected using C2T interconnect cables. To adjust this image, select one of the middle servers in the chain by pressing the Select button on the front of the server; then, adjust the image lock accordingly. For more information on how to adjust the image lock, see the documentation that comes with your flat-panel monitor.

Note: For the chain to operate properly, no more than two adjacent servers can be unplugged from the electrical outlet at the same time.

Cable management

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

Note: 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, see “Getting information, help, and service” on page 102 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 77 for more information.

- **Light Path Diagnostics feature**

  Use the Light Path Diagnostics feature to identify system errors quickly.

- **Troubleshooting charts**

  These charts list problem symptoms, along with suggested steps to correct the problems. See the “Troubleshooting charts” on page 90 for more information.

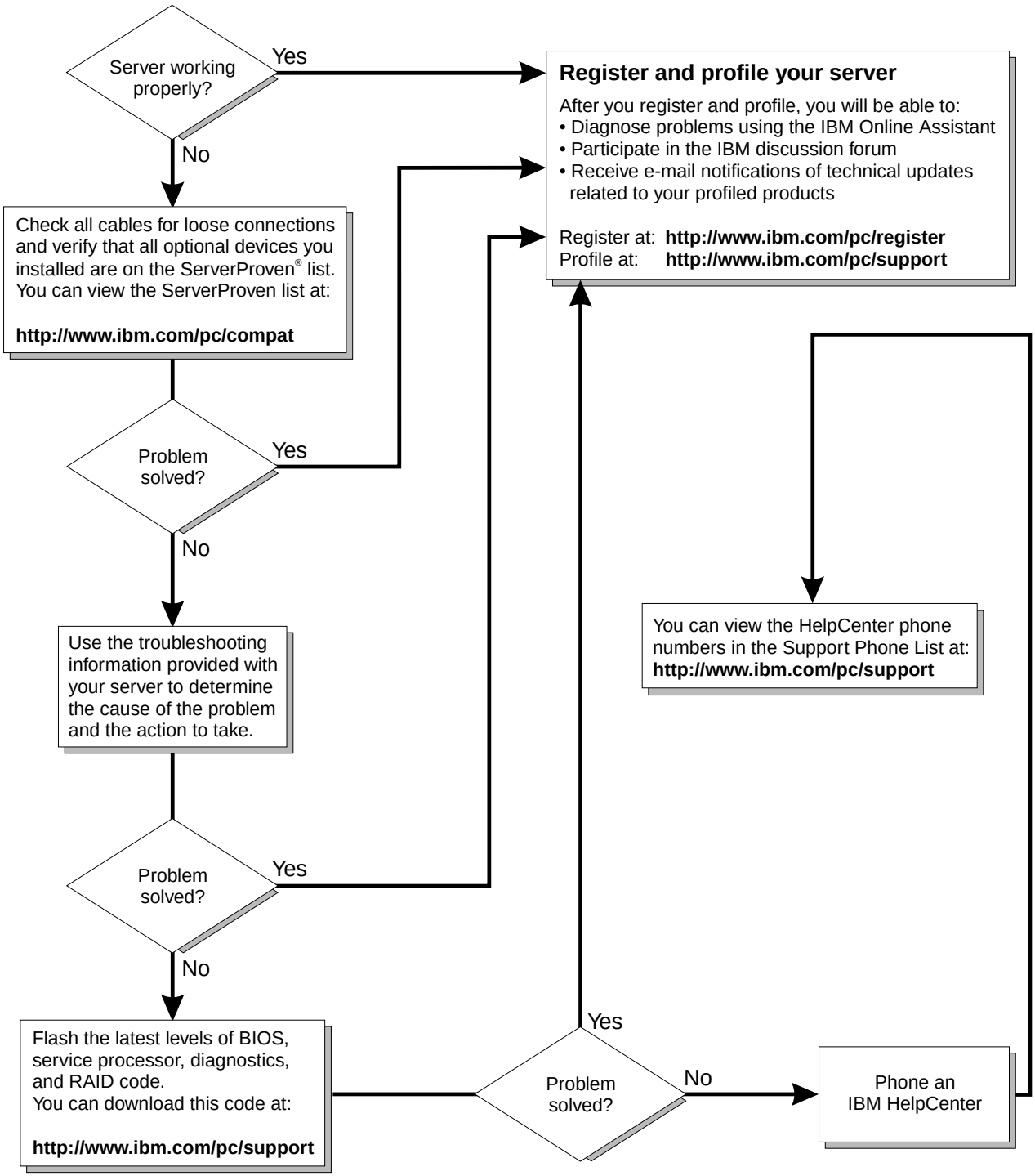
- **Customized support page**

  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 profile 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 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 type an incorrect power-on password.

Two short beeps
POST encountered an error. The Configuration/Setup Utility program will display additional information; follow the instructions that appear on the screen. See “POST error messages” on page 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 “POST beep code descriptions” on page 67, your server might emit beep codes that are described in the following table. For example, a 1-2-4 beep code sounds like one beep, a pause, two consecutive beeps, another pause, and four 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.	
1-2-4	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.	

Table 11. POST beep codes.

Beep code	Description	Action
1-4-3	Interrupt vector loading test has failed.	Call for service.
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.	
2-3-1	Screen initialization has failed.	Turn off the computer and then restart the computer. If the problem persists, call for service.
2-3-2	Screen memory test has failed.	Call for service.
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.	
3-3-1	A memory size mismatch has occurred.	Reseat the memory modules or install a memory module. If the problem persists, call for service.
3-3-2	I2C bus has failed.	Call for service.
3-3-3	**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 computer three times to force the system BIOS to reset the memory connector or bank of connectors from **Disabled** to **Enabled**.	Reseat the memory modules or install a memory module. If the problem persists, call for service.

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. Use the **Cache Control** selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the caches. If the problem persists, call for service. When the problem is corrected, be sure to enable the caches.
101 102 106	An error occurred during the system board and microprocessor test. **Action:** Call for service.
114	An adapter read-only memory (ROM) error occurred. **Action:** Remove the options. If you can start the server without the options installed, reinstall each option one at a time and retest after each is reinstalled. When an option fails, replace it. If you cannot isolate and correct the problem, call for service.
129	An error was detected in the L1 cache of one of the microprocessors. **Action:** 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, call for service.
151	A real-time clock (RTC) error occurred. **Action:** Call for service.
161	The real-time clock battery has failed. **Action:** Replace the battery yourself or call for service. You can use the server until you replace the battery. However, you must run the Configuration/Setup Utility program and set the time and date and other custom settings each time you turn on the server.
162	A change in device configuration occurred. This error occurs under one or more of the following conditions: • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the server as being installed. • An external device is not turned on. • An invalid checksum is detected in the battery-backed memory. **Action:** Verify that all external devices are turned on. You must turn on external devices before turning on the server. If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic program might isolate the failing device. If you cannot isolate and correct the problem, call for service.

Table 12. POST error messages.

POST message	Description
163	The time of day has not been set. **Action:** Set the correct date and time. If the date and time are set correctly and saved, but the 163 error message reappears, call for service. You can use the server until the system is serviced, but any application programs that use the date and time will be affected.
164	A change in the memory configuration occurred. This message might appear after you add or remove memory. **Note:** The server can be used with decreased memory capacity. **Action:** 1. If POST error message 289 also occurred, follow the instructions for that error message first. 2. If you just installed or removed memory, run the Configuration/Setup Utility program; then, exit, saving the new configuration settings. If the message appears again, shut down the server, 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.
184	The power-on password information stored in your server has been removed. **Action:** From the Configuration/Setup Utility program main menu, select **System Security.** Then, follow the instructions on the screen. If this information cannot be restored, call for service.
185	A power failure damaged the stored information about the drive-startup sequence. **Action:** From the Configuration/Setup Utility program main menu, select **Start Options**; then, follow the instructions on the screen. If this information cannot be restored, call for service.
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**, and then select **Product Data.** If the problem persists, call for service.
188	A vital product data (VPD) error occurred. **Action:** Call for service.
189	An attempt has been made to access the server with invalid passwords. After three incorrect attempts, the server locks up; that is, the logon data fields are no longer available to the user.

Table 12. POST error messages.

POST message	Description
201	An error occurred during the memory controller test. This error can be caused by: • Incorrectly installed memory • A failing memory module • A system board problem **Action:** 1. If you just installed memory, verify that the new memory is correct for your server. Also verify that the memory is installed and seated correctly. 2. If the problem persists, call for service.
229	An error was detected in the L2 cache of one of the microprocessors. **Action:** 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, call for service.
289	An error occurred during POST memory tests and a failing DIMM was disabled. **Note:** You can use the server with decreased memory. **Action:** 1. If you just installed memory, verify that the new memory is correct for your server. Also verify that the memory is installed and seated correctly. Start the Configuration/Setup Utility program and select **Memory Settings** from the Advanced Setup menu to enable the DIMM. 2. If the problem remains, replace the failing DIMM. If the problem persists, call for service.
301 303	An error occurred during the keyboard and keyboard controller test. These error messages also might be accompanied by continuous beeping. **Action:** Ensure that: • Nothing is resting on the keyboard and pressing a key. • No key is stuck. • The keyboard cable is connected correctly to the keyboard and to the correct connector on the server. Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, call for service. **Note:** If you just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds; then, turn on the server. If the error message goes away, replace the device.
602	Invalid diskette boot record **Action:** 1. Replace the diskette. 2. If the problem persists, make sure that the diskette drive cables are correctly and securely connected. 3. If the problem remains, replace the diskette drive. If the problem persists, call for service.
604	An error occurred during a diskette drive test. **Action:** 1. Verify that the Configuration/Setup Utility program correctly reflects the type of diskette drive that you have installed. 2. Run the diagnostic tests. If the diagnostic tests fail, call for service.
662	A diskette drive configuration error occurred. **Action:** If you removed a diskette drive, make sure that the diskette drive setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it. If the problem persists, call for service.

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.
1600	The Advanced System Management processor is not functioning. **Action:** 1. Verify that the jumpers for the ASM processor are set correctly. 2. Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server. If the problem persists, call for service.
1601	An Advanced System Management flash update is needed. **Action:** Download and install the latest xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility program.
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 you want to start from is in the startup sequence. 1. Select **Start Options** from the Configuration/Setup Utility program main menu. If you are unable to set the startup sequence, call for service. 2. Check the list of startup devices in the **Startup device** data fields. Is the drive you want to start from in the startup sequence? **Yes** Exit from this screen; then, select **Exit Setup** to exit 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 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.
00019502	Processor 2 is not functioning. **Action:** Replace microprocessor 2. If the problem persists, call for service.
00019701	Processor 1 failed the built-in self test. **Action:** Replace microprocessor 1. If the problem persists, call for service.
00019702	Processor 2 failed the built-in self-test. **Action:** Replace microprocessor 2. If the problem persists, call for service.

Table 12. POST error messages.

POST message	Description
00180100	A PCI adapter has requested memory resources that are not available **Action:** 1. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If all memory resources are being used, you might need to remove an adapter to make memory available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. See the documentation provided with the adapter.
00180200	A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective. **Action:** 1. Make sure that the I/O address for the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. 2. If the I/O port resource settings are correct, the PCI adapter might be defective. Call for service.
00180300	A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective. **Action:** 1. Make sure that the memory address for all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If the memory resource settings are correct, the PCI adapter might be defective. Call for service.
00180400	A PCI adapter has requested a memory address that is not available. **Action:** If all memory addresses are being used, you might need to remove an adapter to make memory address space available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation 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* Planar 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. 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 microprocessors installed in the server.
01298002	No update data is available for processor 2. **Action:** Update the system BIOS to a level that supports the microprocessors installed in the server.
01298101	The update data for processor 1 is incorrect. **Action:** Update the system BIOS to a level that supports the microprocessors installed in the server.
01298102	The update data for processor 2 is incorrect. **Action:** Update the system BIOS to a level that supports the microprocessors installed in the server.
01298200	Microprocessor speed mismatch **Action:** The microprocessors installed do not run at the same speed; install microprocessors with identical speeds.
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 issued during POST and all system status messages from the ASM processor.

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

Small computer system interface (SCSI) messages

If you receive a SCSI error message when running the SCSISelect Utility program, 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

To solve the problem, 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.

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

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 and return to where you left off, 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 Cat 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 normal server operations, a software error might be the cause. If you suspect a software problem, see 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, and 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, ServeRAID, and diagnostics microcode installed.

Table 13. 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	

Table 13. Diagnostic error messages.

Code	Function	Result	Text message	Action
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.

Table 13. Diagnostic error messages.

Code	Function	Result	Text message	Action
035	ServeRAID	Aborted	Test setup error: No ServeRAID adapter found on system board or PCI bus	Make sure that the ServeRAID adapter is properly installed. If the problem remains, replace the ServeRAID adapter. If the problem persists, call for service.
		Failed	Adapter in slot *n*; adapter/drive configuration error (where *n* is the slot number of the failing adapter)	Run the ServeRAID Configuration Utility. If the problem remains, replace the ServeRAID adapter in slot *n*. If the problem persists, call for service.
			Adapter in slot *n*; internal error (where *n* is the slot number of the failing adapter)	
			Logical drive *m* on adapter in slot *n* (where *m* is the number of the failing logical drive and *n* is the slot number of the adapter)	
			On system board; internal error	Run the ServeRAID Configuration Utility. If the problem persists, call for service.
			On system board; adapter/drive configuration error	
			Logical drive on system board adapter	
			Adapter in slot *n*; memory allocation error (where *n* is the slot number of the failing adapter)	Call for service.
			On system board; memory allocation error	
			On system board; PCI configuration error	
			On system board; POST error	
			Adapter in slot *n*; POST error (where *n* is the slot number of the failing adapter)	Replace the ServeRAID adapter in slot *n*. If the problem persists, call for service.
			Adapter in slot *n*; PCI configuration error (where *n* is the slot number of the failing adapter)	
			SCSI drive on adapter in slot n, SCSI ID m (where *n* is the slot number of the adapter and m is the SCSI ID of the drive)	Check the cable and power connections on the drive. If the problem persists, call for service.
075	Power supply	Failed	Voltage sensed by the system is out of range	Call for service.

Table 13. 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 13. 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.
165	Service processor	Failed	Service processor BIST indicate failed tests.	Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and ty again. If problem persists, call for service.
			Unable to restart service processor.	
			I2C Bus Error(s). See System Error Log for details from both SERVPROC and DIAGS messages.	
			I2C Busses *xyz* bad or devices on these busses are functioning incorrectly (where *xyz* identifies the busses that are causing the error message)	
			Failed I2C Bus *xyz* bad or devices on this bus are functioning incorrectly (where *xyz* identifies the busses that are causing the error message)	
			Service processor is temporarily unreachable or not installed.	
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 13. 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 code installed, update the BIOS code 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 code installed, update the BIOS code 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 13. 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. See 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. See 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	See the information that came with the monitor.

Table 13. 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 code

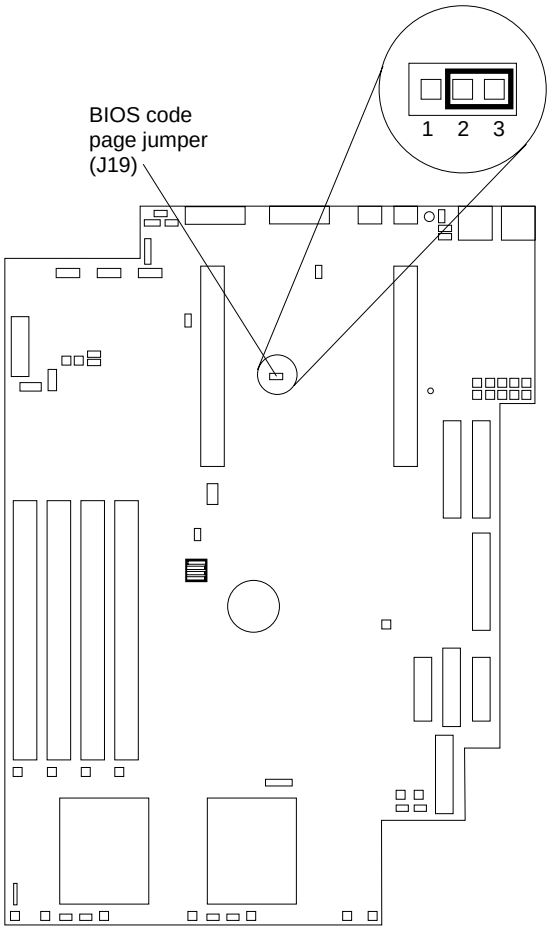
If the BIOS code has become damaged, such as from a power failure during a flash update, you can recover the BIOS code using the BIOS code page jumper and a BIOS flash diskette.

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

- Use the ServerGuide 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 code:

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. Move the jumper from pins 2 and 3 to pins 1 and 2 to enable BIOS back page.
4. Reconnect all external cables and power cords and turn on the peripheral devices.
5. Insert the BIOS flash diskette into 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 as to whether you want to save the current code to a diskette, press N.
9. When prompted to choose a language, select a language (from 0 to 7) and press Enter to accept your choice.
10. Do not restart your system at this time.
11. Remove the BIOS flash diskette from the diskette drive.
12. Turn off the server.
13. Move the jumper on J19 to pins 2 and 3 to return to normal startup mode.
14. Restart the server. The system should start up normally.
15. Replace the cover.

Identifying problems using the Light Path Diagnostics feature

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 may be on. Use the Light Path Diagnostics panel to identify the type of error that occurred.

For LED locations see “System board LEDs” on page 33.

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

Your server is designed so that any LEDs that are illuminated can be illuminated again without ac power after you remove the cover. This feature helps you isolate the problem if an error causes the server to shut down. See “Light Path Diagnostics table” on page 89.

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

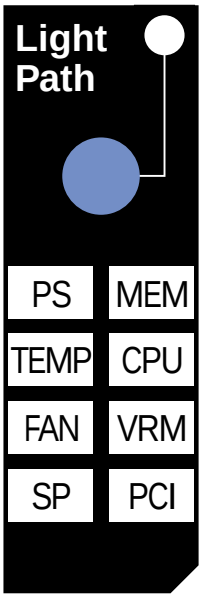
To view the LEDs on the system board:

1. Turn off the server and peripheral devices.
2. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information see “Removing the cover” on page 36 for instructions.
3. Press and hold the Light Path Diagnostics (blue) button on the diagnostics panel. The LEDs will be illuminated while the switch is pressed.

   Note: You can illuminate the LEDs for a maximum of two minutes. After that time, the circuit that powers the LEDs is exhausted.
4. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information see “Installing the cover” on page 49 for instructions.

Light Path Diagnostics panel

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



Light Path Diagnostics table

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

Table 14. Light Path Diagnostics.

Lit LED on diagnostics panel	Cause	Action
None	An error has occurred and can not be isolated, or the ASM processor has failed.	An error has occurred that is not represented by a Light Path Diagnostics LED. Check the system error log for more information about the error.
PS	Power supply has failed.	Have the system serviced.
TEMP	The system temperature has exceeded a threshold level.	1. Check to see if a fan has failed. If it has, replace the fan. 2. Make sure the room temperature is not too hot. (See “Features and specifications” on page 2.) If the problem persists, have the system serviced.
FAN	A fan has failed or is operating too slowly. **Note:** A failing fan can also cause the TEMP LED to be on.	Check the LEDs on the fans and replace the indicated fan.
SP	The service processor has failed.	Remove ac power from the server and then restart the server. If the problem persists, have the system serviced.

Table 14. Light Path Diagnostics.

Lit LED on diagnostics panel	Cause	Action
MEM	A memory error occurred.	1. Check the DIMM failure LEDs on the system board. 2. Replace the DIMM indicated by the lit DIMM failure LED.
CPU	One of the microprocessors has failed.	1. Check the microprocessor failure LEDs on the system board. 2. If a microprocessor failure LED is on, make sure the microprocessor is installed correctly (see “Installing a microprocessor” on page 44). 3. If the problem persists, replace the microprocessor. If the problem persists, have the system serviced.
VRM	One of the VRMs on the system board has failed.	Remove ac power from the server and then restart the server. If the problem persists have the system serviced.
PCI	An error occurred on a PCI bus. The system board caused the error.	1. Check the error log for additional information. 2. If you cannot isolate the failing adapter from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus B (PCI slots 1 and 2) and restarting the server after each adapter is removed. If the problem persists, have the system serviced.

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, ServeRAID, and diagnostics microcode installed.

See “Starting the diagnostic programs” on page 78 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.

Table 15. Troubleshooting charts.

Device	Suggested action
CD-ROM drive CD-ROM drive is not recognized.	Verify that: 1. The IDE channels are enabled in the Configuration/Setup Utility program. 2. All cables and jumpers are installed correctly. 3. The correct device driver is installed for the CD-ROM drive.
Diskette drive Diskette drive in-use light stays on, or the system bypasses the diskette drive.	If there is a diskette in the drive, verify that: 1. The diskette drive is enabled in the Configuration/Setup Utility program. 2. The diskette is good and not damaged. (Try another diskette if you have one.) 3. The diskette contains the necessary files to start the server. 4. 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: 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. 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: 1. All cables and cords are connected securely to the rear of the server and attached options. 2. When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no air flow, the fan is not working. This causes the server to overheat and shut down. 3. 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 items above are correct, call for service.

Table 15. Troubleshooting charts.

Device	Suggested action
Keyboard, mouse, or pointing-device problems. All or some keys on the keyboard do not work.	1. Make sure that the keyboard cable is properly connected to the C2T breakout cable. 2. Make sure that the C2T breakout cable is properly connected to the server. 3. Make sure that the server and the monitor are turned on. 4. Try using another keyboard. **Note:** If you are using the C2T chain, see “Testing the C2T chain” on page 61. If the items above are correct, call for service.
The mouse or pointing device does not work.	1. Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. 2. Try using another mouse or pointing device. **Note:** If you are using the C2T chain, see “Testing the C2T chain” on page 61. If the problem remains, call for service.
Memory problems The amount of memory displayed is less than the amount of memory installed.	Verify that: 1. The memory modules are seated properly. 2. You have installed the correct type of memory. 3. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. 4. 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 system-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 Testing the monitor.	Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the information that comes with the monitor for adjusting and testing instructions. If you still cannot find the problem, call for service.

Table 15. Troubleshooting charts.

Device	Suggested action
The screen is blank.	Verify that: 1. The server power cord is plugged into the server and a working electrical outlet. 2. The monitor cables are connected properly. 3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. If the servers are C2T chained together, verify that: 1. The C2T chain cables are securely connected to the servers. 2. The C2T breakout cable is connected properly. 3. A powered-up server is selected. **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 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 items above are correct and 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: 1. The primary monitor cable is connected to the C2T device breakout cable. 2. You installed the necessary device drivers for the applications. If the items above are correct and 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 properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. **Notes:** 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, 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 code with the correct language. If the problem remains, call for service.

Table 15. Troubleshooting charts.

Device	Suggested action
Option problems An IBM option that was just installed does not work.	Verify that: 1. The option is designed for the server. See the "Server Support" flowchart for information about obtaining ServerProven™ compatibility information from the World Wide Web. 2. You followed the installation instructions that came with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. 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 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: 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. 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 The server does not power on.	Verify that: 1. The power cables are properly connected to the server. 2. The electrical outlet functions properly. 3. The type of memory installed is correct. 4. If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. If the problem remains, call for service.
Serial port problems The number of serial ports identified by the operating system is less than the number of serial ports installed.	Verify that: 1. Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports are disabled. **Note:** The Management connector is the same as a serial port connector, but it is used only by the integrated ASM processor, and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus. It can be configured using IBM Director. 2. The serial-port adapter, if you installed one, is seated properly. If the problem still exists, call for service.

Table 15. Troubleshooting charts.

Device	Suggested action
A serial device does not work. For more information about the serial port see “Serial port and connector” on page 50.	Verify that: 1. The device is compatible with the server. 2. The serial port is enabled and is assigned a unique address. 3. Make sure that the device is not connected to the management port C. **Note:** The management C connector is the same as a serial port connector, but it is used only by the integrated ASM processor and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus. It can be configured using IBM Director. If the problem still exists, call for service.
Software problem Suspected software problem.	To determine if problems are caused by the software, verify that: 1. Your server has the minimum memory requirements needed to use the software. For memory requirements, refer to the information that comes with the software. **Note:** If you have just installed an adapter or memory, you might have a memory address conflict. 2. The software is designed to operate on your server. 3. Other software works on your server. 4. The software that you are using works on another system. If you received any error messages when using the software program, refer to the information that comes with the software for a description of the messages and solutions to the problem. If the items above are correct and the problem remains, contact your place of purchase.
Universal Serial Bus (USB) port problems A USB device does not work.	Verify that: 1. 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, then the USB is disabled and no USB device will work during POST. 2. The correct USB device driver is installed. 3. Your operating system supports USB devices. If the problem still exists, call for service.

Troubleshooting an Ethernet controller

This section provides troubleshooting information for problems that might occur with an 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 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 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 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 assigned to the Ethernet adapter is also assigned to another device in the Configuration/Setup Utility program. Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device. If the problem remains, call for service.

Table 16. Ethernet troubleshooting chart.

Ethernet controller problem	Suggested action
The Ethernet controller stopped working without apparent cause.	Check the following: • Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. Refer to your operating-system documentation and to the ServerGuide information. If the problem remains, call for service.

Ethernet controller error messages

The integrated Ethernet controllers might display messages from the following device drivers:

- Novell NetWare or IntraNetWare Server ODI
- NDIS Adapter for level 4.0 (Windows NT)

Novell NetWare or IntraNetWare server ODI driver teaming messages

This section provides explanations of the error messages for the Novell NetWare or IntraNetWare server ODI driver, and suggested actions to resolve each problem.

Table 17. 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 prior to loading the device driver. The device driver must be loaded after loading AFT.NLM but before any bind command can be issued. **Action:** Load the 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 not supported by AFT.NLM. **Action:** Make sure that you attempt to bind only adapters supported by AFT.NLM.

Table 17. 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 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(TM).	**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 above).
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 driver. **Action:** Unload the adapter driver before unloading the AFT module.

NDIS 4.0 (Windows NT) driver messages

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

Table 18. NDIS (Windows NT or Windows 2000) driver messages for the Ethernet controller.

Error code (hex)	Description
0x00	**Explanation:** The 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 adapter, and that Ethernet is enabled.

Table 18. NDIS (Windows NT or Windows 2000) driver messages for the Ethernet controller.

Error code (hex)	Description
0x02	**Explanation:** Bad node address (multicast address). **Action:** Make sure the locally administered address is valid, if one is specified. The address can not be a multicast address.
0x03	**Explanation:** Failed self-test. **Action:** Make sure a cable is attached to the Ethernet connector. If the problem persists, call for service.
0x0D	**Explanation:** Could not allocate enough memory for transmit queues. **Action:** 1. From the Windows NT desktop, click **Start** → **Control Panel** → **Networks** → **Adapters**. 2. Select your IBM Ethernet adapter from the list. 3. Click **Properties** → **Advanced**. 4. Lower the resource values that apply to the transmit queue.
0x0E	**Explanation:** Could not allocate enough memory for receive queue. **Action:** 1. From the Windows NT desktop, click **Start** → **Control Panel** → **Networks** → **Adapters**. 2. Select your IBM Ethernet adapter from the list. 3. Click **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, click **Start** → **Control Panel** → **Networks** → **Adapters**. 2. Select your IBM Ethernet adapter from the list. 3. Click **Properties** → **Advanced**. 4. Lower the value for the resource named in the message.
0x10	**Explanation:** Did not find any Ethernet controllers. **Action:** Using the Configuration/Setup utility, make sure that Ethernet is enabled.
0x11	**Explanation:** Multiple Ethernet controllers found, but none matched the required ID. **Action:** Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.
0x13	**Explanation:** Did not find any Ethernet controllers that matched the required subven/subdev. **Action:** Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.
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 10/100 Ethernet Adapter or the IBM 10/100 EtherJet PCI adapter is enabled.
0x17	**Explanation:** Slot parameter not specified in the registry. **Action:** Remove the adapter driver and reinstall it. If the problem persists, call for service.
All other 4-character hexadecimal codes	**Action:** Call for service.

Ethernet teaming messages:

Table 19. NDIS (Windows NT or Windows 2000) driver teaming messages for the Ethernet controller.

Event ID	Type	Description
01	Error	**Explanation:** Team Name and physical adapter name are the same. This is an invalid configuration. **Action:** Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
02	Error	**Explanation:** Unable to allocate required resources. **Action:** Free some memory resources and restart.
03	Error	**Explanation:** Unable to read required registry parameters. **Action:** Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
04	Error	**Explanation:** Unable to bind to physical adapter. **Action:** Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
05	Error	**Explanation:** Unable to initialize an adapter team. **Action:** Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
06	Informational	**Explanation:** Team *nn*. Primary adapter is initialized. **Action:** None.
07	Informational	**Explanation:** Team *nn*. Secondary adapter is initialized. **Action:** None.
08	Informational	**Explanation:** Team *nn*. Virtual adapter or Team is initialized. **Action:** None.
09	Informational	**Explanation:** Team *nn*. Primary adapter is switching over. **Action:** None.
10	Warning	**Explanation:** Team *nn*. Adapter link down. **Action:** Make sure the adapter is functioning properly.
11	Informational	**Explanation:** Team *nn*. Secondary adapter took over. **Action:** None.
12	Warning	**Explanation:** Team *nn*. Secondary adapter is deactivated from the Team. **Action:** Make sure the secondary adapter is functioning properly and that the adapter cable is securely connected to the LAN.
13	Informational	**Explanation:** Team *nn*. Secondary adapter has rejoined the Team. **Action:** None.
14	Informational	**Explanation:** Team *nn*. Secondary adapter link is up. **Action:** None.
15	Error	**Explanation:** Team *nn*. The last adapter has lost its link. Network connection has been lost. **Action:** Shut down the server and replace the adapters; then, restart the server to reestablish the connection.
16	Informational	**Explanation:** Team *nn*. An adapter has re-established the link. Network connection has been restored. **Action:** None.
17	Informational	**Explanation:** Team *nn*. Preferred primary adapter has been detected. **Action:** None.
18	Informational	**Explanation:** Team *nn*. Preferred secondary adapter has been detected. **Action:** None.
19	Informational	**Explanation:** Team *nn*. Preferred primary adapter took over. **Action:** None.

Table 19. NDIS (Windows NT or Windows 2000) driver teaming messages for the Ethernet controller.

Event ID	Type	Description
20	Informational	**Explanation:** Team *nn*. Preferred secondary adapter took over. **Action:** None.
21	Warning	**Explanation:** Team *nn*. Primary adapter does not sense any Probes. Possible reason: partitioned Team. **Action:** Make sure the cables of the adapter team are connected to the same LAN segment. Reconfigure the team if necessary.

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:

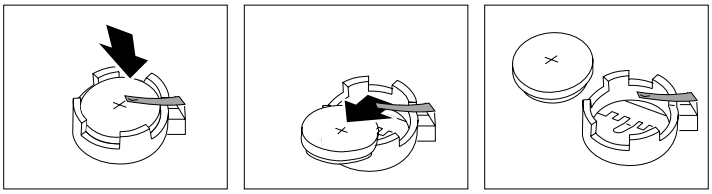
- **Throw or immerse into water.**
- **Heat to more than 100 C (212 F)**
- **Repair or disassemble**

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

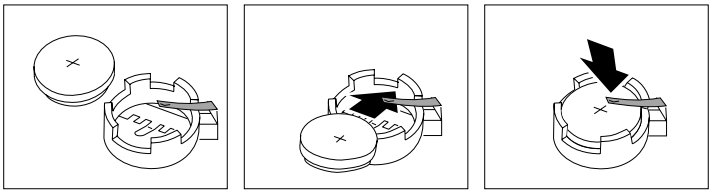
Complete the following steps to replace the battery:

1. Read “Safety” on page vii, 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 information, help, and service

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

Getting information

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

Using the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM 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 at http://www.ibm.com/pc/support/.

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

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

Getting information by fax

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

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

Getting help and service

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

Using the documentation and diagnostic programs

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

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

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

Calling for service

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

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

- **IBM hardware repair** - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.
- **Engineering Change management** - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make selected Engineering Changes (ECs) available that apply to your hardware.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts. All warranted parts contain a 7-character identification in the format IBM FRU XXXXXXX.
- Identification of software problem sources.
- Configuration of BIOS as part of an installation or upgrade.
- Changes, modifications, or upgrades to device drivers.
- Installation and maintenance of network operating systems (NOS).
- Installation and maintenance of application programs.

Refer to your IBM hardware warranty for a full explanation of IBM warranty terms. Be sure to retain your proof of purchase to obtain warranty service.

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

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

In addition, 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 adapters
- Installing and configuring network adapters

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

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

Country		Telephone number
Austria	Österreich	01-24 592 5901
Belgium - Dutch	Belgie	02-210 9820
Belgium - French	Belgique	02-210 9800
Canada	Toronto only	416-383-3344
Canada	Canada - all other	1-800-565-3344
Denmark	Danmark	45 20 82 00
Finland	Suomi	09-22 931 840
France	France	02 38 55 74 50
Germany	Deutschland	07032-1549 201

Country		Telephone number
Ireland	Ireland	01-815 9202
Italy	Italia	02-482 9202
Luxembourg	Luxembourg	298-977 5063
Netherlands	Nederland	020-514 5770
Norway	Norge	23 05 32 40
Portugal	Portugal	21-791 51 47
Spain	España	91-662 49 16
Sweden	Sverige	08-477 4420
Switzerland	Schweiz/Suisse/Svizzera	058-333 0900
United Kingdom	United Kingdom	01475-555 055
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227

In all other countries, 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 service name might vary by country.

For more information about these services, contact your IBM marketing representative.

Appendix A. Product warranty and notices

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

Warranty information

This section contains the warranty period for your product and the IBM Statement of Limited Warranty.

Warranty period

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

Machine - IBM @server xSeries 330 Type 8674
Warranty Period* - Three years

IBM Statement of Limited Warranty

Z125-4753-06 8/2000

Part 1 - General Terms

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

The IBM Warranty for Machines

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

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

Extent of Warranty

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

responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

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

Items Not Covered by Warranty

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

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

Warranty Service

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

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

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

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

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

You also agree to

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

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

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

Limitation of Liability

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

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

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

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

Governing Law

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

Part 2 - Country-unique Terms

AMERICAS

BRAZIL

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

NORTH AMERICA

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

CANADA

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

UNITED STATES

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

ASIA PACIFIC

AUSTRALIA

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

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

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

CAMBODIA, LAOS, AND VIETNAM

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

The following is added to this Section:
Disputes and differences arising out of or in connection with this Agreement shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own

competence and on the validity of the Agreement to submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law.

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

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

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

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

HONG KONG AND MACAU

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

INDIA

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

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

JAPAN

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

NEW ZEALAND

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

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

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

PEOPLE'S REPUBLIC OF CHINA (PRC)

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

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

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

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

EUROPE, MIDDLE EAST, AFRICA (EMEA)

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

Warranty Service:

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

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

Governing Law:

The applicable laws that govern, interpret and enforce rights, duties, and obligations of each of us arising from, or relating in any manner to, the subject matter of this Statement, without regard to conflict of laws principles, as well as Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided, except that in 1) Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Romania,

Slovakia, Slovenia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan, the laws of Austria apply; 2) Estonia, Latvia, and Lithuania, the laws of Finland apply; 3) Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Djibouti, Democratic Republic of Congo, Equatorial Guinea, France, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia, this Agreement will be construed and the legal relations between the parties will be determined in accordance with the French laws and all disputes arising out of this Agreement or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 4) Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe, this Agreement will be governed by English Law and disputes relating to it will be submitted to the exclusive jurisdiction of the English courts; and 5) in Greece, Israel, Italy, Portugal, and Spain any legal claim arising out of this Statement will be brought before, and finally settled by, the competent court of Athens, Tel Aviv, Milan, Lisbon, and Madrid, respectively.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

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

The following paragraphs are added to this Section:

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

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

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

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

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

EGYPT

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

Applicability of suppliers and resellers (unchanged).

FRANCE

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

IRELAND

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

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

Applicability of suppliers and resellers (unchanged).

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

ITALY

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

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

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

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

UNITED KINGDOM

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

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

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

Applicability of suppliers and resellers (unchanged).

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

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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

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, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dubai, Fiji, Ghana, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
6952301	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

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